

National Energy and Climate Plan

**NECP
2021-2030**

Section A - National Plan

**Context, objectives,
policies and measures**



Belgian Integrated National Energy and Climate Plan

2021-2030

Approved by the Consultation Committee on 18 December 2019

SECTION A: NATIONAL PLAN

1.	Overview and process for establishing the plan.....	3
1.1.	Executive summary	3
1.2.	Overview of current policy situation	23
1.3.	Consultations and involvement of national and Union entities and their outcome	30
1.4.	Regional cooperation in preparing the plan.....	35
2.	National objectives and targets.....	42
2.1.	Dimension decarbonisation.....	42
2.1.1.	GHG emissions and removals.....	42
2.1.2.	Renewable energy.....	55
2.2.	Dimension energy efficiency	74
2.3.	Dimension energy security	88
2.4.	Dimension internal energy market.....	92
2.4.1.	Electricity interconnectivity	92
2.4.2.	Energy transmission infrastructure.....	92
2.4.3.	Market integration	93
2.4.4.	Energy poverty	95
2.5.	Dimension research, innovation and competitiveness	99
3.	Policies and measures	104
3.1.	Dimension decarbonisation.....	104
3.1.1.	GHG emissions and removals.....	104
3.1.2.	Renewable energy.....	177
3.1.3.	Other elements of the decarbonisation dimension	194
3.2.	Dimension energy efficiency	207
3.3.	Dimension energy security	296
3.4.	Dimension internal energy market.....	299
3.4.1.	Electricity infrastructure	299
3.4.2.	Energy transmission infrastructure.....	301
3.4.3.	Market integration	301
3.4.4.	Energy poverty	309
3.5.	Dimension research, innovation and competitiveness	318

1. Overview and process for establishing the plan

1.1. Executive summary

i. Political, economic, environmental and social context of the plan

Political context (¹)

Belgium is a federal state in which decision-making power is shared between a Federal Government and three Regions (Wallonia, Flanders and the Brussels Capital Region), as well as three Communities (the Flemish Community, the French Community and the German-speaking Community).

The Regions are responsible for areas such as rational use of energy, promotion of renewable energy sources, public transport, transport infrastructure, urban and rural planning, agriculture and waste management.

The Federal State is responsible for many aspects of fiscal policy, as well as for policies on goods (standards, fuel quality, labelling and performance standards for household and industrial appliances, etc.). It has overall responsibility for nuclear energy and the security of the country's energy supply. It also oversees Belgium's territorial waters, which means that it is also responsible for the development of offshore wind farms. Through its complementary policies in areas ranging from taxation to biofuels, bicycles, product standards, energy efficient public buildings and railways, the Federal Government supports the Regions in their climate and air quality policies. These complementary policies, in addition to the forecasts for offshore wind energy, represent the federal contribution to achieving Belgium's targets under the EU's 2020-2030 climate and energy package (²).

Responsibility for energy is shared under the Law of 8 August 1980.

Given Belgium's federal structure and the division of powers, several bodies have been set up to foster cooperation and consultation between the various levels of authority and to ensure consistency between the actions of the Federal State and its component entities.

The three Regions and the Federal Government collaborate closely and continually on energy and climate policy.

The work is coordinated within various forums, including:

- the energy policy coordination platform known as CONCERE/ENOVER;
- the Coordination Committee for International Environmental Policy (Comité de coordination des politiques internationales de l'environnement/Coördinatiecomité Internationaal Milieubeleid);
- the National Climate Commission (Commission nationale du climat/Nationale Klimaatcommissie – CNC/NKC).

The National Climate Commission is the central coordinating body for national climate policy. Established by the cooperation agreement of 14 November 2002, the CNC is responsible for developing and monitoring the national climate plan and for complying with EU and international reporting obligations. The CNC is made up of representatives from the four entities concerned.

Under the terms of the cooperation agreement between the Federal State and the Regions on energy coordination signed on 18 December 1991, the Federal Government and the three regional governments set up an official body for the discussion and coordination of all energy-related issues, known as CONCERE/ENOVER (Groupe de Concertation État-Régions pour l'Energie/Energie-Overleggroep Staat-Gewesten). This CONCERE body meets once a month and has several permanent and ad hoc thematic working groups on national, European and international priorities.

In connection with the preparation of the National Energy and Climate Plan (NECP), a steering group (CONCERE-CNC PNEC 2030) was set up to provide guidance and coordination. The steering group is composed of representatives from the climate and energy agencies of the Federal Government and each Region. With this aim in mind, CONCERE and the CNC adopted a working methodology that included a mandate for the steering group.

¹ Government agreement of October 2014.

² Government agreement of October 2014.

Economic context (3)

Belgium has a very open economy, situated at the heart of a region of intense economic activity. The Belgian economy is dominated by industry and the tertiary sector.

Gross domestic product (GDP) stood at EUR 459.6 billion in 2018 (average GDP growth from 2005 to 2018: 1.4%). Greenhouse gas (GHG) emissions stabilised between 1990 and 2005 and are now on a downward trend (-19.7% in 2016 compared with 1990 levels). The main drivers of this decoupling are greater use of gaseous fuels (reduction in the use of liquid and solid fuels), increased energy efficiency, and changes in the structure of the economy (fewer energy-intensive industries such as steel, and more added value in less energy-intensive sectors such as the tertiary and retail sectors).

GHG emissions per unit of GDP were 277 tonnes per billion euro in 2016 (excluding land use, land-use change and forestry – LULUCF).

Energy

Energy intensity has been on a downward trend since 1990, reflecting the decoupling of economic growth and primary energy consumption.

In terms of the market share of total final consumption, petroleum products remain the principal source of energy (43%), followed by natural gas (27%) and electricity (20%).

The residential and tertiary sectors are the main consumers of final energy (40% in 2017), followed by industry (30%) and transport (30%).

Natural gas is the dominant fuel in the industrial and residential sectors (38% and 40% respectively in 2015). In the transport sector, energy consumption is dominated by petroleum products (93%). Belgium has limited energy resources; its total primary energy production accounts for about 30% of its total primary energy consumption. It is therefore dependent on other countries for its fossil fuel supply. Nuclear energy (nuclear heat) accounts for 74% of Belgium's primary energy production. The proportion for renewable fuels and waste is 26%.

In recent years, Belgium has made progress in developing renewable energy. In 2016, renewable energy accounted for 8.65% of total final energy consumption.

Transport

Belgium is covered by an extensive network of inland waterways and an extremely dense communication network (road and rail). As Belgium is a transit country, transport is a fast-growing sector. Road transport is the most energy-intensive form of transport in Belgium. The number of private vehicles is growing steadily (Belgium has an extremely high level of car ownership, with one car for every two inhabitants). Road transport still accounts for the bulk of land goods transport. Demand for fossil fuels in this sector is expected to continue to rise.

Industry

Although the importance of the industrial sector (particularly heavy industry) in the economy has declined since the 1960s, it remains a relatively large component of Belgium's economic activity (accounting for almost 15% of GDP).

The principal contributing factors to industrial GHG emissions covered by the EU Emissions Trading System (EU ETS) are energy transformation (mainly attributable to electricity and heat production, but also oil refining), industrial processes (notably the chemical, mineral products and metal industries), and energy combustion in manufacturing industries (steel, chemicals, food and beverage production, cement).

³ Joint General Policy Declaration of the Government of the Brussels Capital Region and the Joint Board of the Common Community Commission, 2019-2024 parliamentary term.

In 2015, non-ETS industrial GHG emissions accounted for 24% of all industrial emissions from energy combustion and industrial processes. These included nitrous oxide (N_2O), fluorinated gases (F-gases) and carbon dioxide (CO_2).

Waste

Waste production rose by 24% between 2004 and 2014. Significant improvements in waste treatment have considerably reduced the amount of waste sent to landfill.

Housing stock

Since 1995, the number of buildings has increased by 12%; over the same period, the number of households has risen by 20%. Belgium's housing stock includes a high proportion of old buildings. Natural gas is the main source of heating. The number of homes with energy-consuming appliances is continuing to rise.

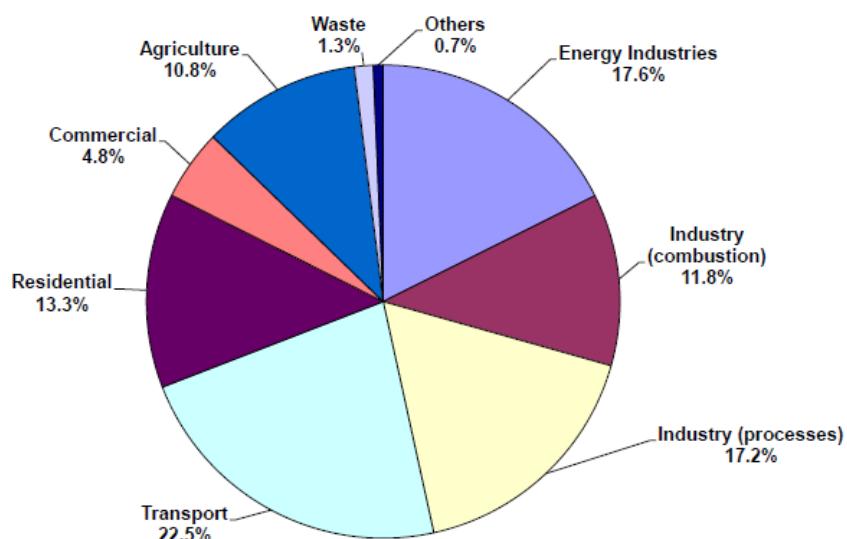
Agriculture

Belgium's agricultural sector specialises in vegetables and horticultural crops, cereals, potatoes, sugar beet, livestock farming and dairy production. Although more of the country's land (44%) is used for agriculture than for any other purpose, the number of farms has continued to decline in recent years. Agriculture's share of the Belgian economy is steadily falling and now represents less than 1% of GDP. Despite high population density, the proportion of forests and other natural habitats remains relatively stable (23% of the land area).

Environmental context

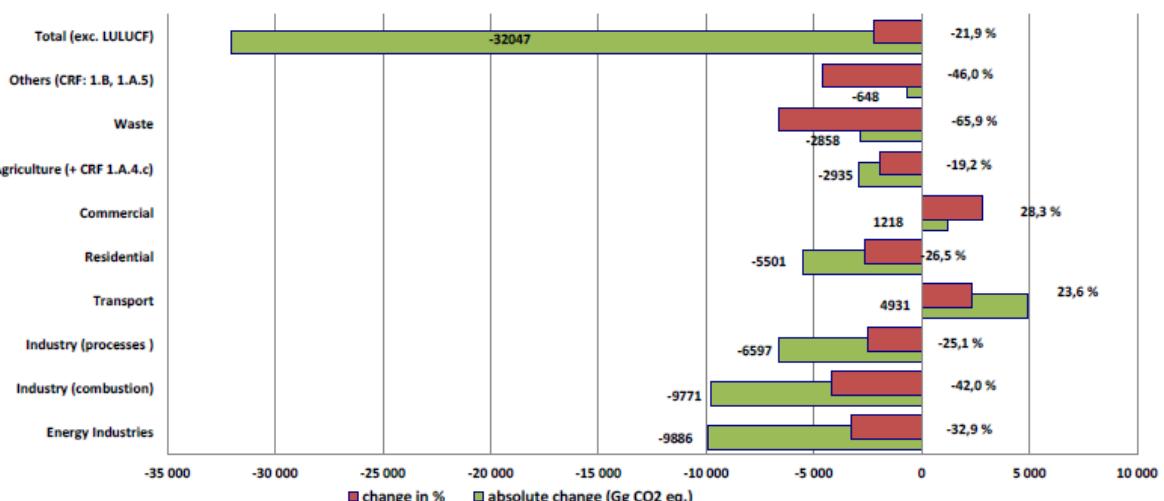
The diagram below shows the contribution of the main sectors of the economy to Belgium's GHG emissions.

Contribution of the main sectors to total GHG emissions in 2017



The following diagram summarises the impact of the main sectors on the national trend. It clearly shows the sharp increase in road transport and the rise in emissions from commercial buildings.

Trends in GHG emissions from the main sectors between 1990 and 2017



In Belgium as a whole, total GHG emissions (ETS and non-ETS combined) fell by 20.2% in 2017 compared with 1990 levels, and by 21.9% if we take 1995 as the baseline for fluorinated gases (excluding LULUCF). The largest contribution to total emissions is that of CO₂, which accounted for 85.2% of emissions in 2017. Methane (CH₄) emissions make up the second-largest share at 7%, while N₂O emissions represent an additional 5.2% (the remaining 2.6% is fluorinated gases). In 2017, ETS and non-ETS emissions fell by 28% and 16% respectively compared with 2005 levels.

Emissions from energy consumption (i.e. Sector 1 of the Common Reporting Framework – CRF: energy, industry, transport, residential and tertiary in the main) contributed 73% to total emissions in 2017 (excluding LULUCF). Since 1990, these emissions have declined by around 20%. Emissions from the energy and manufacturing sectors have fallen by 33% and 42% respectively, while emissions from transport rose by 24% between 1990 and 2017.

There has been a shift from solid fuels to gaseous fuels in the electricity generation sector and in industry. Combined with the development of biofuels in some sectors, this situation has resulted in a decrease in the level of CO₂ emissions produced for a given level of energy consumption.

Emissions from the residential and tertiary sectors fell in 2017 relative to previous years as a result of the change in the type of fuel used and better insulation. This is despite the upward trend observed in several indicators (such as the rise in the number of households and the number of workers in the tertiary and institutional sectors). Moreover, the trend for the tertiary sector since 1990 shows a net increase in emissions due to the growth in activity in this sector.

Emissions from road transport have been rising steadily since 1990 due to growth in the number of cars and increasing traffic density. Nevertheless, growth in traffic has slowed considerably in recent years.

Industrial processes and product use are the second biggest source of greenhouse gases in Belgium, accounting for 17% (ETS and non-ETS) of the national total in 2017. Since 1990, emissions have fallen by 25% due to investments in alternative fuels and in energy efficiency, and as a result of carbon leakage. This applies across all sectors, although the metal industry saw the sharpest decline on account of plant closures.

Agriculture accounts for 9% of total emissions (mainly CH₄ and N₂O). Some CO₂ emissions are caused by liming. Since 1990, emissions from this sector have fallen by 17% due to a decrease in emissions from enteric fermentation (linked to the reduction in the number of livestock and the shift from dairy cattle to breeding cattle) and farmland (decline in the use of synthetic fertilisers and reduction in the number of livestock, which in turn reduces the amount of nitrogen excreted on grazing land).

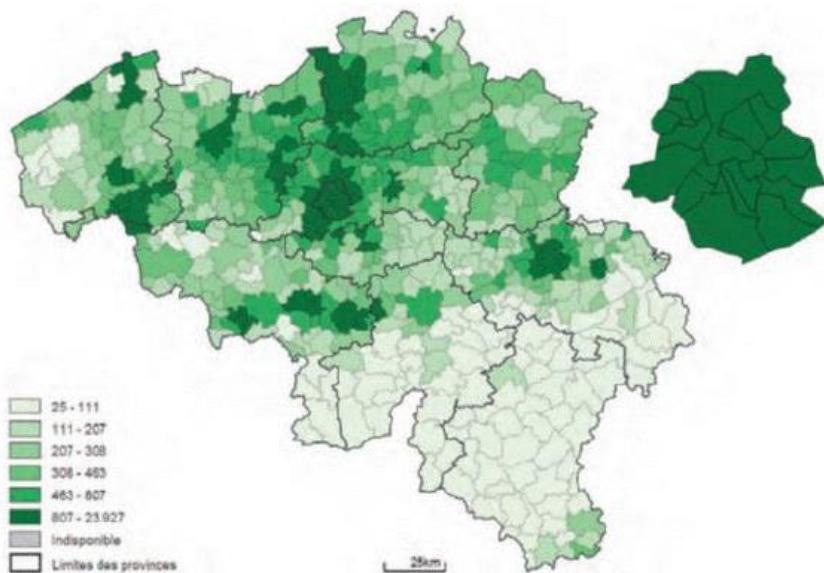
LULUCF is both a carbon sink and a source of CO₂ emissions. However, the LULUCF sector was a net sink in 2017, as it always has been in the past.

In 2017, the waste sector accounted for around 1.3% of the national total. Emissions come from waste incineration, (solid) landfill waste and wastewater treatment. Emissions from this sector have fallen steadily; in 2017, they were 66% below 1990 levels, mainly due to the recovery of biogas and its use in solid waste disposal.

Social context

Belgium had 11,398,589 inhabitants as of 1 January 2018, representing 2.2% of the total population of the European Union (Belgium is the ninth most populous Member State in the EU). Belgium is very densely populated: with an average density of 371 inhabitants per km² (2018), it is the third most densely populated country in Europe. However, this density varies from one part of the country to another, with the north of the country being much more densely populated than the south. As of 1 January 2018, Flanders is home to 57.5% of the population, Wallonia 31.9% and the Brussels Capital Region 10.6%.

Population density by municipality as of 1 January 2018



Source: FPS Economy – FPS Economy - Directorate-General Statistics and Economic Information

Indisponible	Not available
Limites des provinces	Provincial boundaries

Belgium's GHG intensity in 2017, at 10.5 tonnes of CO₂ equivalent per capita, is significantly lower than in 1990 when it was 14 tonnes. Due to the significant contribution of energy-intensive industry to Belgian GDP, this figure is above the CO₂ intensity for the EU, which fell from 12 tonnes to 8.8 tonnes per capita between 1990 and 2017.

Statbel, the Belgian national statistics office, uses inability to pay energy bills as a measure of material poverty (defined as an inability to maintain an average standard of living and to cover the costs of rent, water, electricity, etc.). The percentage of the population in poverty was 5.1% in 2017.

Constituent parts of the National Energy and Climate Plan

In preparing this initial Integrated National Energy and Climate Plan, cooperation and consultation with various other strategic areas was vital at both federal and regional level. As well as climate and energy, these areas included mobility, science policy, finance, defence and agriculture. Given the integrated nature of the plan, contributions from the various entities and agencies involved in these strategic areas proved essential. This was because many of the strategic objectives and measures overlap and/or have a direct or indirect impact on one or more strategic areas other than climate and energy. This approach also sought to confer a certain degree of

ownership on all the strategic areas involved. This ensured the necessary level of engagement when preparing entity-specific plans, ensuring that efforts required to achieve or deliver the agreed objectives and measures could be made.

Interfederal Energy Pact

In the Interfederal Energy Pact of December 2017, Belgium reaffirmed its commitment to the Paris Agreement by putting particular emphasis on the transition to a low-carbon society.

The Interfederal Energy Pact sets out a common ambition for the energy transition in Belgium. It is recognised by the three regional governments and the Federal Government as a significant statement of intent regarding their determination to complete the required energy transition. As such, it has informed the development of the various entity-specific plans that form the basis of this integrated NECP.

The Energy Pact outlines objectives for Belgium's energy system by 2050, setting various energy transition targets. It serves as the basis for a coherent medium- and long-term strategy for changing Belgium's energy system, setting out key measures to accelerate the energy transition. The Pact also gives an insight into the 2030 energy mix.

Lastly, it reaffirms energy's central role in government policy. Energy efficiency and the transition to sustainable energy consumption must be seen as horizontal measures. These should be integrated into the various relevant areas of public policy, including tax, health, mobility, employment, training, land use and the circular economy.

Entity-specific plans

The decision to start with entity-specific plans as the basis for the final integrated plan was part of the steering group's working methodology. Each entity adopted its own approach to developing its plan, both in terms of content and implementation through consultation, etc.

This integrated NECP contains the plans of the various Belgian entities.

Federal State

Working methodology

A federal task force, chaired by the Directorate-General for Energy of the Federal Public Service for the Economy and by the Directorate-General for the Environment of the Federal Public Service for Health, was created to coordinate the activities. The commitment of the other relevant Federal Public Services and entities (including the Federal Public Service for Mobility and Transport, the Régie des Bâtiments/Regie der Gebouwen [Government Buildings Agency], the Federal Public Service for Finance, the Federal Public Service for Defence, the Federal Public Service for Justice, the Federal Public Service for Foreign Affairs, etc.) to provide content contributions was critical in this respect.

The overall objective of the task force was (and is) to identify federal measures on the basis of the Interfederal Energy Pact and to incorporate them, including relevant opinions and alternative proposals, which eventually resulted in the federal contribution to this plan.

Additional policy measures requested by the regions

The draft NECP approved on 18 December 2018 by the Consultation Committee stated as follows:

'The Federal Government is committed to reviewing and implementing regional proposals made under the NECP by the end of March 2019. Where appropriate, it will propose alternative federal policies and measures with a similar effect to compensate for any demands it cannot meet.'

On 10 May 2019 the Council of Ministers of the Federal Government approved the indicative list of additional federal measures in support of regional measures under the draft Integrated National Energy and Climate Plan

2021-2030. These measures will be discussed with the Regions with the aim of scaling up Belgium's energy transition objectives towards a low-carbon economy.

Content

The Federal Energy and Climate Plan, which was adopted by the Federal Government on 29 November 2019, is broadly based on the Federal Energy Strategy approved by the Federal Government on 30 March 2018.

By approving the Belgian Interfederal Energy Pact as a constituent part of the Federal Energy Strategy, the Federal Government has once again confirmed its commitment to implementing the Paris Agreement by initiating the transition to a low-carbon society. In this way, the Federal Government is laying the groundwork for an energy system capable of ensuring a continuous, sustainable and affordable energy supply, and confirming its intention to do so as efficiently as possible. With the Energy Pact, the government has a solid basis for drawing up the Integrated National Energy and Climate Plan and the associated federal contribution.

However, the climate and energy transition of Belgium's economic fabric requires not only common ambitions to be identified, but also every policymaker to be enabled to develop specific measures. The scale and time horizon of this challenge require daring to move away from the usual frameworks for reflection and to look beyond the normal parliamentary terms. This is essential if the objectives defined in the Federal Energy Strategy, the Energy Pact, the Climate and Energy Package, and the Paris Agreement are to be achieved.

In addition to the Energy Pact and the contribution of all the federal agencies and entities concerned, as well as the analyses of the Federal Planning Bureau (Bureau fédéral du plan/Federaal Planbureau), the interparliamentary dialogue on climate, the input of the advisory councils, the European Commission recommendations, the results of the public and stakeholder consultations, the results of the regional consultation, and the points for attention raised by the Regions are also important sources of inspiration.

Flemish Region

On 20 July 2018 the Flemish Government approved both the draft Flemish Climate Policy Plan 2021-2030 and the draft Flemish Energy Plan 2021-2030.

These plans were integrated into the draft Belgian Energy and Climate Plan 2021-2030, which was approved by the Consultation Committee on 18 December 2018 and notified to the European Commission at the end of December 2018.

Since the draft Flemish and Belgian plans were approved, various opinions/recommendations have been received, carefully studied and, where possible, integrated into the Flemish Energy and Climate Plan 2021-2030 (VEKP) approved on 8 December 2019.

Walloon Region

Energy and climate policy in Wallonia

Parliamentary activities

On 19 February 2014 the Walloon Parliament adopted the Climate Decree. Its purpose is to set short-, medium- and long-term greenhouse gas emission reduction goals and to put in place monitoring instruments. In particular, it provides for the setting of five-year emission 'budgets'. The goals set by the Decree are as follows:

- a 30% reduction in greenhouse gas emissions by 2020 compared with 1990;
- an 80% to 95% reduction in greenhouse gas emissions by 2050 compared with 1990.

In order to achieve these goals, provision is made for the Walloon Government to produce an Air, Climate and Energy Plan (Plan Air-Climat-Energie – PACE) every five years, setting out all the measures to be taken in order to comply with the emission budgets.

On 23 November 2016 the Walloon Parliament adopted a decree approving the Paris Agreement (adopted on 12 December 2015). It then embarked on further legislative work. As a result, on 28 September 2017, the Walloon Parliament adopted a resolution on the implementation of a Walloon climate policy, thus demonstrating Wallonia's commitment to a long-term climate policy that is coherent with the policies adopted by other Belgian entities. In this resolution, the Walloon Parliament asks the Walloon Government to adopt an ambitious policy and a strategy for the growth of renewable and sustainable energies allowing the goal of a 95% reduction in greenhouse gas emissions by 2050 (compared with 1990) to be achieved. The resolution makes direct reference to the process of drafting the NECP 2030. It is available on the Walloon Parliament's website (http://nautilus.parlement-wallon.be/Archives/2017_2018/RES/886_9.pdf).

Air, Climate and Energy Plans

Wallonia is currently updating its climate policy on the basis of the Air, Climate and Energy Plan (PACE). (http://www.awac.be/images/Pierre/PACE/Plan%20Air%20climat%20énergie%202016_2022.pdf).

In line with the procedure described in the Climate Decree, the Air, Climate and Energy Plan forms part of a dynamic process that involves annual reporting to the government and parliament, making it possible to amend the Plan either in response to feedback or in preparation for future legislative amendments.

PACE 2016-2022

In accordance with the Climate Decree, the first draft Air, Climate and Energy Plan will apply until 2022 (i.e. over the first two periods). It was approved at first reading by the Walloon Government on 23 January 2014. It then underwent a public consultation process, during which a large number of comments were submitted. The amended version of the PACE 2016-2022, incorporating the outcomes of the public consultation, was adopted at second reading by the Walloon Government on 21 April 2016.

PACE 2021-2030

The processes associated with implementing the Clean Energy Package's Governance Regulation and the Air Quality Directive interact in various ways.

The Walloon Government has therefore decided to combine and formalise measures relating to energy, climate and air quality in a new Air, Climate and Energy Plan for the period to 2030 (PACE 2030). This will include new policies and measures making it possible to achieve, by 2030, the energy and climate goals set under the Energy Union, and the air quality goals provided for in the revised National Emission Ceilings Directive. This integrated vision of air, climate and energy policies avoids conflicting or counterproductive measures, as the Energy and Climate Plan must take account of the impact of air quality measures.

The draft PACE 2021-2030 was adopted by the Walloon Government on 4 April 2019.

The resolution is available on the Walloon Parliament's website (http://nautilus.parlement-wallon.be/Archives/2017_2018/RES/886_9.pdf). (http://www.awac.be/images/Pierre/PACE/Plan%20Air%20climat%20énergie%202016_2022.pdf).

Brussels Capital Region

Our way of living in the world in an increasingly urban context adds its share of constraints when it comes to dealing with the challenge of climate change. Cities are major centres of energy consumption and yet provide fascinating opportunities for reflection. What is more, half of the planet's inhabitants now live in this environment; by 2050, nearly three-quarters will live in cities.

The urban area of Brussels serves as a good model for these issues. The Brussels Capital Region is a medium-sized city in global terms (between one and five million inhabitants). There are currently more than 400 (417) cities in this category, compared with only around 30 megacities. The solutions developed in Brussels are therefore likely to be of interest to a substantial and growing number of the global population.

The specific context of this Brussels plan is the Paris Agreement on climate change signed in December 2015, which, as the first universal climate agreement, aims to keep the global temperature rise below 2°C above pre-industrial levels by 2100 and, if possible, to pursue efforts to limit the temperature increase to 1.5°C.

With regard to the Belgian situation, on 14 December 2017 the Government of the Brussels Capital Region and the Walloon Government both adopted the Energy Pact, which outlines a clear energy vision for our country to 2050. On 30 March 2018 the Federal Government and the Flemish Government also signalled their approval of this pact. This vision, as it relates to the Brussels Capital Region for the coming decades, is set out in this document.

Fully in line with the framework provided by the Sustainable Development Goals (SDGs), the Brussels Capital Region aims to adopt a systemic approach by implementing these goals in a coordinated manner. In this respect, environmental policies, although necessary, are not in themselves sufficient. The government wants an ambitious response to the European goals and to the commitments made under the Paris Agreement, by developing a fair and proactive climate policy. To that end, it will develop a systemic, structural and structured approach. All regional levers will be mobilised to establish a new climate governance and to ensure that these climate and biodiversity challenges lead to regional decisions.

Lastly, through its Regional Policy Statement (⁴), the new Brussels Government has committed to the following climate goals:

- The region will develop a long-term strategy based on binding targets and an evaluation framework governed by a ‘Brussels Climate Order’.
- The government has set a target of reducing greenhouse gas emissions by at least 40% by 2030 compared with 2005 levels.
- The government will do its utmost to increase the European Union targets for the same deadline.
- The government undertakes to get close to the European carbon neutrality target by 2050.

This plan is based on other strategic plans. These are, in particular, the strategy for reducing the environmental impact of existing buildings, which is annexed to this document, and the Good Move regional mobility plan. On occasion, we will very briefly mention certain objectives or measures from these plans without, however, necessarily going into detail on them. We will refer the reader to these documents where appropriate. The WAM scenario projections will include these policies as far as possible.

From PACE to NECP 2030

Against this background, the Brussels Capital Region has decided to use this document to set new objectives and measures for 2030 and, where appropriate, to give an overview of the following decade to 2040, as suggested by the Governance Regulation.

These objectives and measures will complement those already included in the Regional Air, Climate and Energy Plan adopted in 2016 (⁵). In order to combine these various planning exercises with the need to incorporate air, climate and energy measures and the ambitions of the Regional Policy Statement 2019-2024 (participation, air and climate objectives), a new Air, Climate and Energy Plan will be produced by mid-2023. The government will assess possible interactions between the PACE and the NECP 2030 as well as other planning tools.

ii. Strategy relating to the five dimensions of the Energy Union

Belgium’s energy and climate policy sets the following strategic objectives, in line with the overall philosophy and four pillars of the Interfederal Energy Pact:

⁴ Joint General Policy Statement of the Government of the Brussels Capital Region and the Joint Board of the Common Community Commission, 2019-2024 parliamentary term.

⁵ Also called the Integrated Plan.

- **Ensure sustainable, secure and affordable energy.** The aim is to achieve an optimal balance between environmental efficiency, economic efficiency and social efficiency.
- **Put citizens at the heart of the energy system.** Empower and encourage citizens and businesses to make the most effective and energy-efficient decisions in order to collectively achieve the overarching objectives through participation and information.
- **Maintain an affordable system for both large and small consumers.** The global energy transition comes at a price, but the cost of failing to act would be even higher. The transition will also yield economic opportunities for Belgium. The focus will be on affordability and business competitiveness, as well as on vulnerable consumers.
- **Ensure participation and that initiatives at all levels of government are consistent.** The focus will be on dialogue, inclusiveness, communication and consistency between the different levels of government to achieve a positive outcome.

This is reflected in this NECP for each dimension of the Energy Union as follows.

1. Dimension decarbonisation

Reduction in GHG emissions

As part of the dimension decarbonisation, Belgium will reduce its GHG emissions by 35% by 2030 compared with 2005 levels for non-ETS sectors. Energy-intensive industry and the electricity sector come under the EU ETS. With this in mind, the EU ETS is designed as a harmonised instrument that reduces GHG emissions while largely preserving the competitiveness of businesses. In the past, Belgium has taken considerable steps to reduce greenhouse gases in the economy, to the point where several sectors have already adopted the most cost-effective measures possible. However, non-ETS sectors will have to move up a gear before 2030 and their GHG emissions will have to decline at a faster rate than they have done so far. This will require a renewed effort from those sectors that contribute the most to GHG emissions, i.e. the buildings and transport sectors. In the buildings sector, emphasis is placed on significantly improving energy efficiency and on ‘greening’ energy sources. The transport sector is aiming for an ambitious modal revolution in passenger transport, at the same time as greening the vehicle fleet and other types of transport (freight, public, etc.).

This NECP proposes a range of measures with a view to effecting this transition.

The Regions are concentrating on the large-scale renovation of their buildings. The transport sector is relying on legislation and behavioural change. All entities have pledged to introduce measures to support these initiatives and raise awareness.

Renewable energy

As part of the dimension decarbonisation, Belgium has set a contribution in terms of the proportion of renewable energy it uses. The EU target is 32% by 2030. Based on the measures outlined in the entity-specific plans, Belgium will generate 17.4% of its gross final energy consumption from renewable energy sources (RES) by that date.

Renewable energy production in 2030 (Mtoe)

By entity	RES production		Final energy consumption		Proportion of RES	
	(Mtoe)	(GWh)	(GWh)	(Mtoe)	own consumption (%)	BE consumption (%)
Belgium	6.20	72,128	411,407	35.4	17.5%	
Brussels Capital Region	0.11	1,250	17,372	1.5	7.2%	0.3%
Walloon Region	2.37	27,506	117,053	10.1	23.5%	6.7%
Flemish Region	2.45	28,517	276,982	23.8	10.3%	6.9%
Federal State	1.28	14,855				3.6%

2. Dimension energy efficiency

With regard to energy efficiency, Belgium has set its contribution to the EU target of 32.5% by 2030. Its estimated contribution is 15% in primary energy savings and 12% in final energy savings by 2030 compared with the PRIMES (Price-Induced Market Equilibrium System) 2007 baseline. A significant contribution (estimated at a cumulative figure of 185 TWh) to Belgium's target should come from the implementation of Article 7.

3. Dimension energy security

Energy security is one of the major challenges facing Belgium in the short and medium term. The strategic objectives or priorities associated with energy security can be summarised as follows:

- In view of the plans announced to phase out low-calorific gas (L-gas) supplies from the Netherlands from 2022 onwards, Belgium intends to convert and switch 1.6 million connections to high-calorific gas between 2017 and 2029.
- The energy mix will radically change due to the planned gradual phase-out of nuclear power by 2025, with 5,918 MW of decommissioned nuclear capacity having to be replaced. Belgium is opting for an energy mix based on flexible capacity, load shifting, storage and renewable energy. A monitoring and correction mechanism will therefore be developed to ensure security of supply, safety, sustainability and long-term affordability.
- As nuclear power is phased out, plans will be drawn up for the decommissioning of nuclear power plants and the management of radioactive waste. This will require various decisions to be made, particularly regarding technical specifications and the siting of waste storage facilities.
- A capacity compensation mechanism will be developed by 2021 and implemented during the period 2022-2025 to ensure security of electricity supply and attract investment to develop new capacity or maintain existing capacity. The security of supply situation will be monitored at a structural level, taking the situation in neighbouring countries into account.
- Belgium will also carry out the various risk assessments regarding the security of electricity, natural gas and oil supply enshrined in EU and international legislation. These assessments will mainly be carried out at regional level through, inter alia, the Pentalateral Energy Forum (PLEF) and the Gas Platform.
- Several longer-term forecasts are being prepared, including triennial energy outlooks by the Federal Planning Bureau. Regulators and system operators, individually or within their European organisations (e.g. ACER, CESR, ENTSO-E, ENTSO-G), are also conducting numerous studies in support of energy security policy.
- Lastly, Belgium is continuing to invest in improving and updating its crisis management policy for all relevant energy carriers.

4. Dimension internal energy market

The strategic priorities for improving the internal energy market are focused on the following areas:

- With regard to energy transportation infrastructure, efforts will be made in the next few years to reinforce the existing interconnections with France and the Netherlands (Brabo) and the existing 380 kV internal corridors. In the next network development plan, the added value of a network will also be studied through projects of common interest (PCIs) aimed at reinforcing the interconnections with Germany (ALEGrO HVDC link) and the UK (Nemo HVDC link).
- To encourage market integration, the results of the existing market coupling will be evaluated at regular intervals during the period 2020-2030 on the basis of clear key performance indicators (KPIs).
- Solutions will be found in response to the increasing need for flexibility by aligning supply and demand, integrating the storage sector, extending interconnections between countries and making energy networks smarter, creating energy communities and developing opportunities for energy saving.
- With regard to energy poverty, all existing federal and regional measures, which are already highly developed, will continue to focus in coming years on tackling the issue at source in accordance with EU directives, with targeted measures to reduce energy consumption.
- Smart meter roll-out will continue, allowing citizens to make their own contribution to flexibility and security of supply.
- Tariffs calculated on the basis of both a capacity tariff and consumption will be introduced in a bid to ensure that network costs are shared fairly.
- Market mechanisms will be adapted in order to create the conditions for ensuring security of supply while facilitating an energy transition at the lowest possible cost.

5. Dimension research, innovation and competitiveness

Belgium's research and innovation (R&I) policy in connection with the Energy Union is aimed at supporting the general objectives of EU energy policy in terms of energy security, sustainability and competitiveness. In addition, the R&I policy encourages innovation in and by Belgian companies in order to boost their competitiveness. Belgium is convinced that a common European approach is necessary to achieve the EU strategy for a resilient Energy Union and a forward-looking climate policy.

Belgium is committed to spending at least 3% of GDP on research and development (R&D).

The various Belgian entities are developing different programmes to achieve these goals. For the federal authorities, the main emphasis is on the Belgian Federal Science Policy Office (BELSPO) programme and research in the nuclear sector. In the various Regions, the focus on climate and energy is reflected in research programmes and cooperation as part of the Strategic Energy Technology Plan (SET Plan).

Hydrogen is recognised as being a vital technology in the energy transition as it enables the decarbonisation of certain market segments that have few other alternatives and it offers the electricity system a flexible solution tailored to the significant rise in the penetration rate of variable renewable energies. Although it is currently too early to set targets for 2030, the four entities must, however, agree on a dynamic roadmap for the gradual roll-out of power-to-gas. Maintaining and enhancing the competitiveness of its firms is a key issue for Belgium. To ensure that Belgian industry remains competitive and to protect jobs, an energy standard is being developed for energy-intensive businesses in particular. Household energy bills will also be monitored and special consideration given to a proactive policy to address poverty.

Flemish Region

Flanders needs to take great strides forward in the coming years to decarbonise the energy system and make it more sustainable. This is necessary in order to achieve the Flemish energy and climate targets for 2020 and beyond. The conclusion of the Paris Climate Agreement and the Directives from the Clean energy for all Europeans package provide clear guidelines for a future energy transition. Significant improvements must be made in energy efficiency, the proportion of renewable energy sources in the energy supply must increase sharply, and our energy infrastructure must become better and more flexible so that the energy supply remains secure at all times. Energy bills must remain affordable for households. To achieve all this, we need a smart energy system that can respond flexibly to the fluctuating supply of renewable energy. The competitiveness of our businesses cannot be compromised by the costs associated with the investments needed in the energy transition, which can in fact offer opportunities to our businesses. The first and foremost strategic objective is a substantial increase in energy efficiency in all sectors. The three main energy-consuming sectors are industry, the residential sector and the transport sector. In addition to improving energy efficiency, we must also focus on the solid expansion of renewable energy. Energy services and technologies will be digitally controlled with smart interconnections.

The energy model of today is not ready to tackle the challenges of tomorrow. We are therefore at a turning point in the way in which we organise our energy supply. The importance of renewable energy is growing, especially green electricity produced locally and on a decentralised basis. In the future, citizens and certain businesses will increasingly be able to take responsibility for their own energy supply. In certain segments, such as households, electricity will increasingly have to be consumed when renewable sources are available. For times when renewable energy sources supply too little or too much electricity, flexible applications and storage must be developed and made accessible to ensure that the energy system is efficient and can operate at the pace of a 21st century economy.

Our energy system will have to become more flexible to allow integration of renewable energy. Optimum matching of energy demand and energy supply, demand-side management and energy storage play a key role in the development of a sustainable energy system that guarantees security of supply at all times at an affordable price. The latter is essential to maintain public support.

There are major challenges in the energy transition and appropriate solutions are essential. To prepare for the energy transition and pave the way for a new energy model, the Flemish Government has already developed a long-term vision in consultation with citizens, businesses and civil society. In addition to the energy vision, a strategic plan is now also being produced, which takes into account the action points from the energy vision and the recent Energy Pact.

Flanders is aiming to reduce its GHG emissions from non-ETS sectors by 35% ⁽⁶⁾ by 2030 compared with 2005 levels, which is a considerable challenge. The target set for Belgium is also well beyond the figure calculated on the basis of cost efficiency (25%). During the 13-year period between 2005 and 2018, non-ETS emissions fell by only 5% in Flanders.

The Flemish Energy and Climate Plan is a step forward in tackling this challenge, but, based on the forecasts, its measures will not currently achieve the 35% reduction set for 2030. The latest forecasts indicate that, after implementing the measures in the plan, there will be a shortfall in emission allocations of 3.8 million tonnes of CO₂ equivalent for the entire period 2021-2030.

The Flemish Government intends to keep gradually reducing this shortfall in the coming years through the following measures:

- continuing to innovate, e.g. by using drones for deliveries and by digitising the buildings sector;
- speeding up the development of the circular economy through further initiatives taken by and with businesses, e.g. recycling of complex plastics, circular construction, urban mining and design-to-recycle;

⁶ See paragraph 2.1.1.1 for further details on how this 35% target determines the emission allowance for 2030.

- federal support policy, e.g. greening company cars;
- transposing other European (regulatory and financing) instruments, e.g. the EcoDesign regulations and the new Multiannual Financial Framework 2021-2027.

To help ensure that the target is achieved, Flanders will use the flexibility offered by Article 6 of the Effort Sharing Regulation. This is a specific form of flexibility reserved for Member States facing a significant difference between their non-ETS target for 2030 and their cost-effective reduction potential. During the period 2021-2030, this flexibility mechanism allows a quantity of additional emission allocations every year to be provided for non-ETS sectors through the limited cancellation of EU ETS emission allocations that would otherwise have been auctioned. However, in order to limit use of this flexibility as much as possible, Flanders will continue to prioritise, in the next 10 years, the adoption of measures that further reduce non-ETS emissions.

Under the European regulations, use of this flexibility can be notified to the European Commission only at the end of 2019 and will cover a 10-year period. The European regulations also specify that the planned use of this flexibility during the period 2021-2030 can be revised downwards in 2024 (impact from 2026) and 2027 (impact from 2029).

Energy and climate policy is a cross-cutting theme for which the Flemish Government as a whole is responsible. The Environment and Energy Minister will set a good example with his policy and, as the coordinating minister for energy and climate policy, will invite the other ministries to adopt and implement additional targeted and supported measures in their policy area, which will contribute to the Flemish energy and climate targets.

There are a huge number of options at federal level for supporting regional energy and climate policy. In this respect, the changes needed to company car tax can be made at federal level in order to green the company car fleet as quickly as possible and make it emission-free. A reduced VAT rate of 6% throughout Belgium could encourage post-demolition rebuilding. Likewise, European initiatives, such as EcoDesign or stricter CO₂ emission standards for vehicles, will effectively reduce emissions in Flanders. As coordinating minister, the Environment and Energy Minister will also encourage the other political levels to assume their share of the responsibility.

However, we in the Flemish Government accept our responsibility and want Flanders to make its contribution to the global climate challenge, while remaining fully aware that achieving these targets will require everyone to make an effort. Future innovations and the technologies that we are also developing in Flanders will help in this respect in the coming years.

Given the size of this challenge, we need everyone to take part. We want to see the creativity, commitment and energy in our society being used to achieve our ambition of reaching these targets.

We are therefore also calling on all citizens, businesses, civil society, local authorities and scientific institutions to join us in thinking about the additional measures that we can each take or about measures that will help us to achieve the targets more effectively. We are thinking in this respect about the commitments that each stakeholder can make, regardless of sector or network. Where this is advisable, such measures can be anchored in instruments such as covenants, Green Deals, etc.

With regard to the climate, this plan focuses on sectors that are not yet included in the EU ETS, as it is only for such non-ETS sectors – buildings, transport, agriculture, waste and a small part of industry – that Member States must meet the targets. The emphasis is therefore on the direct emissions of each sector. When adopting measures, we must ensure that the reduction measures in these sectors cause as few indirect emissions as possible in the ETS sector or abroad. The electrification of building heating and transport is probably the main example of emissions being transferred from non-ETS to ETS.

For energy-intensive industry and electricity generators, the EU ETS creates fair conditions of competition within Europe, with specific reduction targets. Bearing in mind that the EU ETS will lead to the drastic emission reductions that are needed, we also want to support this transition in Flanders, which particularly explains the emphasis placed on innovation in the plan.

In terms of research, innovation and competitiveness, we are transforming the energy and climate challenge into an economic opportunity. We intend to play a leading role in research and innovation, which are the key to

the long-term solution of society's key challenges. This policy will help to maintain and reinforce a local manufacturing industry and to achieve the Flemish energy and climate targets.

iii. Overview table with key objectives, policies and measures of the plan

Key objectives

Dimension	2030 target	Comments
Decarbonisation		
GHG-ESR	-35%	Compared with 2005 levels
RES	17.5%	of gross final energy consumption
Energy efficiency		
Primary energy consumption	42.7 Mtoe	i.e. -15% compared with the BAU (business-as-usual) scenario, using PRIMES as the baseline
Final energy consumption	35.2 Mtoe	i.e. -12% compared with the BAU scenario, using PRIMES as the baseline

Federal State

The federal contribution to the NECP commits to achieving the following targets:

Reduction of greenhouse gases in non-ETS sectors	The Federal State is committed to pursuing current internal policies and measures, implementing the measures recommended in the NECP and adopting new measures that will help to achieve the GHG reduction targets.
Energy savings	The Federal State will assist with the Belgian contribution through support measures.
Renewable energy	4 GW of offshore wind capacity installed by 2030. In 2030, the biofuel incorporation rate will reach 10.45% (in real terms) or 13.9% (including double counting). During the period 2021-2030, the first-generation biofuel incorporation rate will be 7%. The proportion of the biofuels listed in Parts A and B of Annex IX will be 3.45% (in real terms) or 6.9% (including double counting) by 2030, based on the scenario indicated in this plan and in the context of RED II.
Energy security	Guarantee that the national energy security targets (including LOLE) will be met. Interconnection level of ±30% by 2030.
Competitiveness	No quantifiable targets. Guarantee of affordable prices and that new energy technologies will be supported and promoted to ensure/strengthen the competitiveness of Belgian industry.

Flemish Region

Under the Flemish Energy and Climate Plan 2021-2030, Flanders is committed to the targets in the table.

Reduction of greenhouse gases in non-ETS sectors	-35% in GHG emissions by 2030 compared with 2005 levels (⁷)
LULUCF sector	Comply with the neutral or positive balance rule (no-debit rule) for the period 2021-2030
Energy savings (Article 7 of the Energy Efficiency Directive)	84,062 TWh
Renewable energy	28,512 GWh by 2030

Key policies and measures

Federal State

Use stimuli to green transport and mobility
Conclusion of an interfederal cooperation agreement on sustainable mobility (1 January 2021): <ul style="list-style-type: none"> ▪ investment to consolidate and optimise rail passenger and freight transport (EUR 35 billion); ▪ adaptation/optimisation of the legal framework and greening of the company car fleet; ▪ tax reform to encourage sustainable mobility and intermodality.
Encourage the renovation of buildings and improve their energy efficiency
<ul style="list-style-type: none"> ▪ By ensuring that the energy efficiency of federal public buildings meets the 2040 neutrality target, which 40% of federal buildings must meet by 2030 (taking into account technical, legal and HR restrictions, accessibility of public buildings and service continuity). ▪ Review of building taxation: <ul style="list-style-type: none"> ○ introduce a reduced rate of VAT for demolition and rebuilding subject to approval by the European Commission; ○ draft a plan for an environmental energy tax by 2021; ○ develop and apply the third-party financing formulas by 2021
Contribute to renewable energy
Offshore and biofuel mix percentage: <ul style="list-style-type: none"> ▪ increase offshore capacity to 4 GW; ▪ strengthen regional cooperation on projects (North Seas Energy Cooperation); ▪ legislate on the biofuel mix obligation: see targets.
Guarantee energy security
<ul style="list-style-type: none"> ▪ Constant monitoring of the national security of supply situation, taking into account developments in neighbouring countries. ▪ Implementation of a capacity compensation mechanism tailored to the market size. ▪ Guarantee of robust networks, with the transition to L-gas being successfully achieved by 2030 and the electricity interconnection rate being increased to 30%. In addition, both aspects will be examined to see how their administrative procedures can be simplified in order to help implement planned projects in due course.

⁷ See paragraph 2.1.1.1 for further details on how this 35% target determines the emission allowance for 2030.

- Promotion of storage and flexibility projects (including DSM, integration of sectors through Power-to-X, etc., H₂ transport).
- Reinforcement of regional collaboration (Pentalateral Energy Forum, Gas Platform) in order to guarantee security of supply and improve market coupling.
- Development of an operational crisis management policy for all energy carriers.

Finance the transition

Green OLOs (Belgian linear bonds):

In 2018 and 2019 the Federal Government launched the first green linear bonds (Green OLOs), totalling EUR 6.89 billion, with the income being used solely for public expenditure on the transition to a sustainable economy. The new eligible expenditure for the period 2021-2030 will be made in the transport, energy and buildings sectors, essentially based on this plan, the Energy Pact and the National Pact for Strategic Investments.

National Pact for Strategic Investments (Pacte National pour les Investissements Stratégiques – PNIS)

The PNIS aims to offer an assessment of strategic investment needs in Belgium up to 2030. These needs cover six areas, including energy and mobility.

Around EUR 150 million from the ‘Infrastructure 4 Belgium’ fund will be used as leverage to mobilise around EUR 2 billion of infrastructure investment.

Some of the work to coordinate and structure the PNIS, which involves experts from the federated/federal entities, involves budget and financial tools, funding techniques, EU, federal and federated funding sources, including debt agencies and National Promotional Banks (NPBs), and financial market instruments.

Energy Transition Fund

An Energy Transition Fund was set up in 2016 to finance innovative energy projects falling under the responsibility of the Federal State and also measures designed to maintain and/or develop and/or research a system capable of guaranteeing security of supply and network balance, particularly as regards energy production and storage, and also demand-side management.

Flemish Region

Energy branch agreements for industry and agriculture
Encouragement to renovate residential buildings following a notarial transfer, and obligation to renovate non-residential buildings following a notarial transfer
Reduction in N ₂ O emissions when producing caprolactam, and measures to reduce fluorinated GHG emissions
Faster elimination of the asbestos risk in the roofs of dwellings, and promotion of post-demolition rebuilding
Promotion of low-emission and zero-emission vehicles for individuals and company and bus fleets, installation of charging infrastructure, and encouragement of innovation in order to green goods transport

Walloon Region

Name of the measure	Description	Key objectives	Sectors affected
Implementation of measures from the energy renovation strategy for buildings	<p>The Walloon contribution involves gradually decarbonising the buildings sector through energy efficiency measures that largely stem from the strategy to reduce the environmental impact of existing buildings.</p> <p>This strategy aims to ensure the energy efficiency and high environmental performance of the Walloon building stock by 2050.</p>	<ul style="list-style-type: none"> ▪ In the residential sector: aim for the EPB A label (specification $\leq 85 \text{ kWh/m}^2/\text{year}$) on average for the entire housing stock by 2050. ▪ For the tertiary sector: aim for an energy-neutral (zero-energy) tertiary building stock by 2050. ▪ These measures are intended to reduce average energy consumption in the residential and tertiary sectors by 29.1% by 2030. 	Buildings
Implementation of measures from the Vision FAST mobility plan	<p>The aim of the Vision FAST mobility plan is to reduce the distances travelled by both individuals and goods.</p> <p>The plan involves six priority measures: greening of the vehicle fleet; roll-out of electric vehicles; reduction in combustion engines and diversification into CNG vehicles; diversification of the bus fleet; penetration of LNG in goods transport by road; and improvement of transport infrastructure</p>	<ul style="list-style-type: none"> ▪ These ambitions are intended to reduce GHG emissions from transport by at least 24% compared with 2005 levels. 	Transport
Increase in the capacity to generate electricity, heating and cooling from renewable sources	<p>Support for the generation of renewable electricity by revising the green certificate mechanism.</p> <p>Implementation of a renewable heat transition plan and introduction of a coordinated mechanism of structural support tailored to the size of installations.</p>	<ul style="list-style-type: none"> ▪ The generation of renewable electricity by 2030 is estimated at 10 TWh. ▪ The generation of renewable heat by 2030 is estimated at 14.2 TWh. 	RES
Specific measures in the non-ETS industrial sector	Continued improvement of energy efficiency in this sector through various types of technical measure, including decarbonisation of energy carriers and improved flexibility of energy demand. In the longer term,		Industry

	widespread fuel switching to decarbonised electricity and renewable heat (thermal solar, heat pumps and geothermal energy, or biomass combustion) must be pursued.		
Implementation of a framework to reduce indirect emissions in the Walloon Region.	Implementation of measures to reduce direct and indirect GHG emissions. This involves cross-cutting measures, such as the development of the circular economy and the promotion of urban agriculture.	<ul style="list-style-type: none"> ▪ Achieve the European neutrality target by 2050, including for indirect emissions 	Cross-sectoral

Brussels Capital Region

Name of the measure	Description	Key objectives	Sectors affected
Implementation of measures from the strategy to reduce the environmental impact of Brussels buildings by 2030 and 2050, and measures aimed at decarbonising the buildings sector	The Brussels contribution involves gradually decarbonising the buildings sector by phasing out coal and heating oil. In addition, energy efficiency measures in the buildings sector largely stem from the strategy to reduce the environmental impact of existing buildings. This strategy aims to ensure the energy efficiency and high environmental performance of Brussels buildings by 2050.	<ul style="list-style-type: none"> ▪ Ban on coal-fired appliances from 2021. ▪ Ban on heating oil appliances from 2025. ▪ Average consumption of 100 KWh/m²/year in the residential sector. ▪ Energy neutrality for buildings in the tertiary sector. 	Buildings
Implementation of measures from the Good Move plan	The regional mobility plan (Good Move) aims to reduce individual mobility needs. Good Move sets out the region's mobility objectives and measures for the period 2020-2030. It is based around six priorities (cross-cutting strategic action programmes) and provides for the implementation of around 50 measures.	<ul style="list-style-type: none"> ▪ A 21% reduction in vehicle-kilometres in the Brussels Capital Region by 2030 compared with 2018 levels. 	Transport
Increase in the capacity to generate electricity, heating and cooling from renewable sources	<p>The combined target set for the electricity, heating and cooling sectors intra muros is 470 GWh by 2030.</p> <p>The region also wants to develop a policy of extra muros investment in new renewable energy generating facilities that can generate around 700 GWh by 2030.</p>	<ul style="list-style-type: none"> ▪ 1,170 GWh of renewable energy by 2030 by combining intra muros efforts in the electricity and heating sectors with extra muros efforts. 	RES
Gradual adaptation of the LEZ and gradual elimination of combustion engines	From 2020, set new milestones for the LEZ for any type of vehicle for the period 2025-2035. Make the access criteria stricter and introduce a ban on diesel vehicles in 2030 and a ban on petrol and LPG vehicles in 2035 within the LEZ.	<ul style="list-style-type: none"> ▪ Elimination of diesel by 2030 at the latest and elimination of petrol and LPG by 2035 at the latest. 	Transport
Implementation of a framework aimed at reducing indirect emissions in the Brussels Capital Region	Implementation of measures to reduce direct and indirect GHG emissions. These are cross-cutting measures, such as developing the circular economy or promoting urban agriculture.	<ul style="list-style-type: none"> ▪ Get close to the European neutrality target by 2050, including for indirect emissions. 	Cross-sectoral

1.2. Overview of current policy situation

i. National and Union energy system and policy context of the national plan

Federal State

Economic and energy policy responsibilities are divided between the Federal State and the regional governments (Wallonia, Flanders and the Brussels Capital Region) in accordance with the Law of 8 August 1980 on the division of energy responsibilities.

Renewable energy sources remain, for the most part, under the exclusive competence of the regions, although the Federal Government is also responsible for regulating the development of offshore wind farms due to the fact that it manages the territorial waters. Several coordination bodies have been established to facilitate communication between the federal and regional governments.

The energy policy priorities set by the current Federal Government can be summarised as follows:

- ensuring energy security and taking the necessary measures to improve generation adequacy;
- contributing to the achievement of the European internal energy market and to the development of strategic and interconnected European energy networks, while unlocking greater potential for flexibility within the electricity system;
- providing a stable and favourable investment climate that promotes innovation and offers some predictability through long-term guarantees;
- monitoring energy prices to ensure the affordability of energy bills for industry and households, while also safeguarding competitiveness;
- establishing a long-term interfederal energy vision and an ‘energy pact’ between the Federal State and the Regions.

Climate policy responsibilities are divided between the Federal State and the Regions (Wallonia, Flanders and the Brussels Capital Region).

By conducting a policy of support in the areas of taxation, biofuels, bicycles, product standards, energy-efficient federal public buildings and railways, the Federal Government will support the Regions in their climate policy and in their air pollution policy. Together with the planned off-shore wind energy, this policy of support will be the federal contribution to the achievement of Belgium’s targets in the EU climate and energy package 2020 and 2021-2030.

Given Belgium’s federal structure and its division of powers, several structures have been created to promote consultation and cooperation between the different levels of power and to ensure the consistency of the actions of the Federal State and its entities. The central coordinating body for national climate policy is the National Climate Commission, established by the cooperation agreement of 14 November 2002, which in particular is responsible for establishing and monitoring the National Climate Plan, as well as for complying with European and international reporting obligations. The cooperation agreement on burden sharing 2013-2020 was also adopted on 15 June 2018 between the Federal Government and the Regions.

ii. Current energy and climate policies and measures relating to the five dimensions of the Energy Union

1. Dimension decarbonisation

Reduction in GHG emissions

Belgium succeeded in reducing its non-ETS and ETS GHG emissions (excluding LULUCF) by 20.2% in 2017 compared with 1990 levels. The most significant contributions came from the transition from solid/liquid fuels to gaseous fuels, industry efforts to cut emissions (CO₂/N₂O/Fluorine) and a widespread commitment to rational energy use.

Although the main focus is on the key non-ETS sectors, significant reductions appear to have been made in the residential sector, largely as a result of better insulation. Emissions from road transport have been rising steadily since 1990, owing to the increase in the number of cars and longer journeys.

In policy terms, Belgium has set itself a binding target of a 15% reduction by 2020 (compared with 2005 levels) in non-ETS sectors. This target is spread among the different Regions, which have introduced their own measures to achieve the necessary reductions. The Federal State is contributing to this effort through additional measures and a policy of enablement.

Renewable energy

In principle, responsibility for renewable energy in Belgium lies with the Regions. However, this principle is undermined by the fact that the Regions exercise their substantive powers only within the limits of their territorial jurisdictions, and not therefore in maritime areas. Consequently, since the 1980 State Reform, the Federal Government has been responsible for renewable energy sources in maritime areas under Belgian jurisdiction according to international maritime law. Biofuels are also subject to federal jurisdiction. All other aspects relating to renewable energy are under regional jurisdiction.

Potential for renewable energy generation is comparatively low in Belgium. The country is very flat and densely populated, with a relatively low number of sunshine hours. The large-scale use of hydropower, onshore wind turbines and solar panels is difficult owing to the considerable challenges around land use and public support.

In 2017, the share of renewable energy in gross final energy consumption was 9.06%. For the first time, Belgium is therefore on track according to the National Renewable Energy Action Plan and Directive 2009/28/EC. However, growth in the share of renewables in final energy consumption has slowed in recent years and is being closely monitored to ensure that the targets will be met.

Total electricity production stood at 7,854 ktoe in 2017. The share of electricity generated from renewable sources was 17.24%, a large part of which came from wind energy (41%). Biomass and solar energy each accounted for around 20%. In the transport sector, 6.58% of fuel came from renewable sources, out of a total of 8,829 ktoe. 8.03% of energy used in heating and cooling was renewable, out of a total of 18,577 ktoe.

2. Dimension energy efficiency

In order to transpose and implement Article 3 of Directive 2012/27/EU on energy efficiency, in June 2013 Belgium notified the European Commission of its indicative energy efficiency target for 2020, specifically an 18% reduction in primary energy relative to projected gross inland energy consumption (excluding non-energy uses), according to the PRIMES 2007 baseline model.

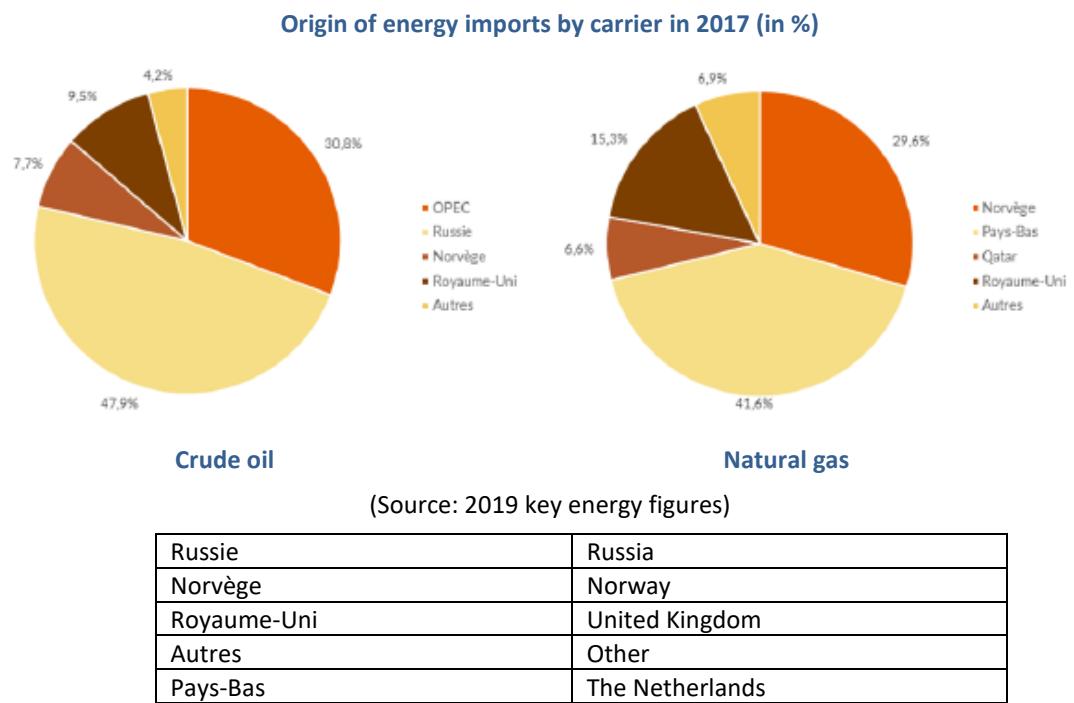
Belgium's indicative energy efficiency target is the sum of individual estimates of primary energy savings based on existing and planned policy measures taken at federal and regional level. The energy reduction in 2020 relative to the PRIMES 2007 baseline scenario (53.3 Mtoe) was calculated using the methodology developed for the 2011 and 2012 National Reform Programmes. This equates to an energy saving of 9.6 Mtoe and gross inland energy consumption of 43.7 Mtoe in 2020. As required by the Energy Efficiency Directive (EED), this primary target is converted into a final consumption target of 32.5 Mtoe in 2020.

In 2017, primary energy consumption was 49 Mtoe and final energy consumption was 36 Mtoe.

3. Dimension energy security

Like Europe as a whole, Belgium is largely dependent on imports of primary energy sources (oil, natural gas, coal, nuclear fuel) to meet domestic demand. Nuclear fuel is not naturally present below ground in Belgium. Since the markets for the various energy carriers are almost completely liberalised and are therefore subject to market movements at international, European, regional and national level, Belgium does not have a clear policy on the diversification of its energy supply when it comes to oil, natural gas or coal. However, the origin of these different

primary energy sources is continually monitored and no potentially problematic supplier monopolies have been identified to date.



4. Dimension internal energy market

Belgium serves as a role model for the proposed EU interconnection target. According to the current timetable, Belgium will already have an electricity interconnection rate of approximately 21% by 2020. The EU target for 2030 (i.e. 15%) will therefore be achieved by 2020. The interconnection rate will increase again in late 2020 or early 2021 due to the Aachen Liège Electricity Grid Overlay (ALEGrO) and investments in additional static voltage regulators. Aside from existing projects, further expansion could potentially be envisaged following the consultation currently under way on the Draft Federal Development Plan 2020-2030 submitted by Elia (Belgium's national transmission system operator), additional impact assessments and changes to the electricity system in the coming years. If all the projects described in the Development Plan are completed, the interconnection rate will be approximately 30% by 2030. With regard to natural gas, Belgium already has an efficient and well-developed natural gas network, with well-established internal infrastructure complemented by interconnections with all its neighbouring countries, an LNG terminal at Zeebrugge and a storage facility at Loenhout. In addition, Belgium's gas transmission system operator, Fluxys, has a major stake in key projects in central and western Europe. This provides added flexibility and enhances both security of supply and the attractiveness of Belgium's natural gas market. The interconnection rate makes an enormous contribution to energy security, provided that this security can be guaranteed for Belgian consumers. This aspect will need to be developed in future and will be included in measures relating to market function.

The roll-out of smart meters will ensure that citizens make their own contributions to flexibility and security of supply. Market function will be adapted in order to provide the framework for ensuring security of supply during the energy transition, and to ensure this is done at the lowest possible cost.

Fuel poverty is another major strand of Belgium's energy policy, including in the context of efforts to secure accessible and affordable energy for all citizens. Various measures are already in place nationwide.

5. Dimension research, innovation and competitiveness

Belgium is committed to research and innovation as a means of supporting the EU's general energy and climate policy objectives in terms of sustainability, energy security and competitiveness. In addition, research and

innovation policy encourages innovation in and by Belgian companies with a view to boosting their competitiveness. Given the need for a common European approach, Belgium's research and innovation policy is closely linked to the priorities set out in the SET Plan. At international level, Belgium is a member of the International Renewable Energy Agency (IRENA) and the International Energy Agency (IEA).

Overall, Belgium is committed to achieving the European R&D target of 3% by 2020.

Belgium's general objectives are translated into specific policies by the Federal Government and the different Regions, taking into account the distribution of research and innovation powers between them.

Given the significant presence of energy-intensive industries in Belgium, maintaining competitiveness is crucial for a successful energy transition.

Flemish Region

The current climate policy options are mainly set out in the Flemish Climate Policy Plan 2013-2020 (⁸) and in the additional policy described in the corresponding progress reports (⁹). The trends resulting from the greenhouse gas inventory are explained in more detail in point 4.1.

The current energy policy options are mainly set out in the Flemish Energy Efficiency Action Plan 2017 and in the additional policy described in the corresponding progress reports. The resulting trends are explained in more detail in point 4.3.

As regards renewable energy, the current policy options are set out in a Renewable Energy Plan 2020. The sub-targets set in that plan are developed in a Solar Plan, a Heat Plan and a Wind Plan in point 2.1.2.

Walloon Region

The main measures currently being implemented in the fields of decarbonisation, energy efficiency and promotion of renewable energies are set out in the Air, Climate and Energy Plan 2016-2022 (PACE 2022) (¹⁰).

The PACE 2022 contains 142 measures, broken down by sector, aimed at reducing emissions of greenhouse gases and other atmospheric pollutants, improving air quality and adjusting to the impacts of climate change.

iii. Key issues of cross-border relevance

Within the framework of the Regional Energy and Climate Dialogue 2030 (see point 1.4 below), the countries in the Pentalateral Energy Forum have identified a number of issues with a cross-border impact and on which cooperation would seem desirable in terms of preparing their respective NECPs. A governance structure has also been established to ensure structural monitoring of this cooperation.

iv. Administrative structure of implementing national energy and climate policies

In September 2016, the CONCERE-CNC steering group for the NECP 2030 was given its mandate by the CNC and CONCERE. The Federal Government and each of the Regions are represented by two steering group members, responsible for the energy and climate sectors respectively. The steering group (see point 1.1(i)) coordinates, plans and oversees the following aspects.

- (a) The development of Belgium's NECP in accordance with the European Commission's guidelines and timetable.
- (b) National dialogue and consultations with other relevant official sectors (such as transport and agriculture) and stakeholders are instigated by the steering group. In addition, dialogue and

⁸ https://www.lne.be/sites/default/files/atoms/files/2013-06-28_VMP2013-2020.pdf

⁹ https://www.lne.be/sites/default/files/atoms/files/VORA2016-2017_Mitigatie.pdf

¹⁰ The text of the PACE 2016-2022 is available on the following website:

<http://www.awac.be/index.php/thematiques/politiques-actions/les-politiques-changement-clim/politique-wallonne>

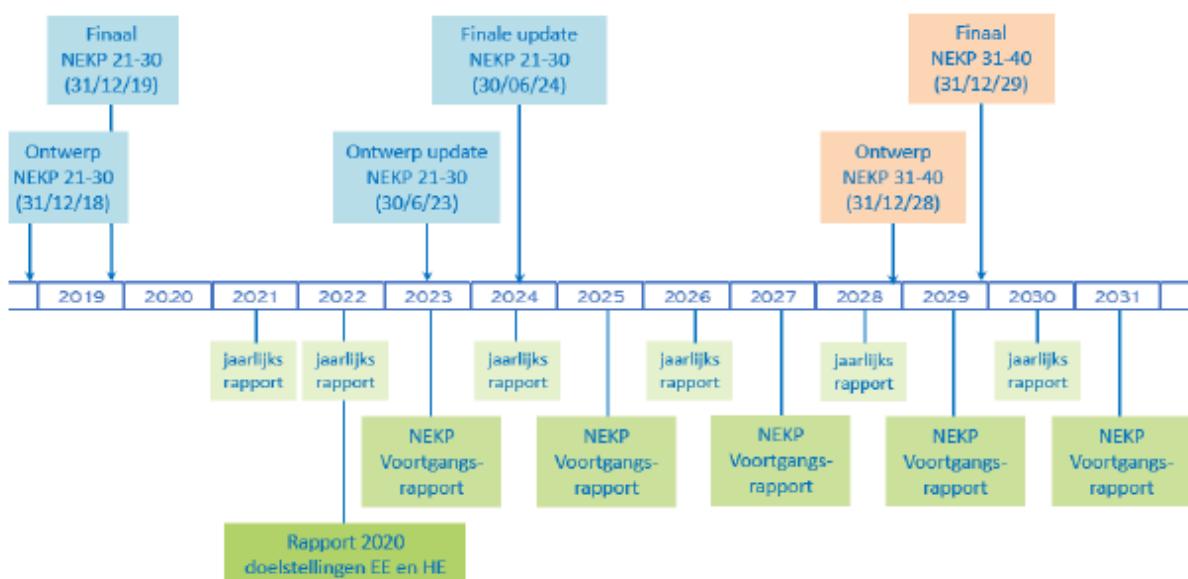
consultation on topics that fall within the exclusive remit of each entity may be organised separately by each entity as it deems appropriate, with the aim of fostering synergies and preventing duplication of effort. The content of this dialogue and consultation is shared with the steering group.

- (c) Dialogue with neighbouring countries and the European Commission on Belgium's NECP.
- (d) Options for outsourcing and supervising joint missions with third parties as part of the NECP development process.

Flemish Region

European framework

The European Regulation on the Governance of the Energy Union and Climate Action ('Governance Regulation') contains provisions on monitoring, reporting and updating the national energy and climate plans. The Effort Sharing Regulation also provides for a supervisory mechanism to ensure that Member States make sufficient progress in terms of reductions in non-ETS sectors. In summary, these regulations set out the steps following submission of the final NECP to the European Commission (see Figure 1-1).



Chronology of the planning and drafting of energy and climate reports

(Source: Governance Regulation)

Ontwerp NEKP	Draft NECP
Finaal NEKP	Final NECP
Ontwerp update NEKP	Draft update of NECP
Finale update NEKP	Final update of NECP
jaarlijks rapport	annual report
Rapport 2020 doelstellingen EE en HE	Report on 2020 energy efficiency and renewable energy targets
NEKP Voortgangs-rapport	NECP progress report

- From 2021, there must be annual reporting (Articles 26 and 19 of the Governance Regulation) on greenhouse gas inventories, use of auctioning revenues and international climate finance. Greenhouse gas policies and measures, emission projections and national adaptation actions must be reported on every two years (Article 18 of the Governance Regulation). In the years in which a national progress report is drawn up (see below), all of these aspects must be included therein.

- From 2021, the European Commission will assess on an annual basis whether Member States are making sufficient progress as regards the reduction of greenhouse gases in non-ETS sectors. In the event of insufficient progress, specific recommendations will be made. Member States will then have three months to submit a corrective action plan. If specific recommendations are not followed, Member States must explain why (Article 8 of the Effort Sharing Regulation).
- From 2023, a national progress report must be drawn up every two years on the state of implementation of the integrated NECP relating to all five dimensions of the Energy Union. In addition to the climate aspects, the other dimensions of the Energy Union must therefore also be reported on, in particular renewable energy, energy efficiency, energy security, internal energy market, and research, innovation and competitiveness (Article 18 of the Governance Regulation). Based on these reports from Member States, the Commission will assess progress at the EU level and for each Member State and take the necessary action (Article 29 of the Governance Regulation).
- In 2022, a one-off report must be made on achievement of the 2020 national energy efficiency and renewable energy targets (Article 27 of the Governance Regulation).
- Unless reasons are provided why the NECP does not require updating, the plan will be updated by 30 June 2023 (draft) and by 30 June 2024 (final) and then every 10 years thereafter (Article 14 of the Governance Regulation).

Flemish framework

The Flemish policy cycle of implementation, monitoring, reporting, assessment and correction is in line with the biennial European reporting cycle. The Flemish Energy and Climate Plan will be updated during the period 2023-2024, unless reasons are provided why the plan does not require updating.

From the plan to specific policy measures

The current Flemish Energy and Climate Plan outlines policy for the period 2021-2030. It contains the action plans and policy programmes announced for each sector, including for this purpose the policy's estimated impact on projections. Those projections not taking account of the measures included in the plan equate to the WEM (with existing measures) scenario, while those projections that do take account of those measures equate to the WAM (with additional measures) scenario.

A framework of agreements will be established by the end of 2020 at the latest to ensure that the policy is fully integrated and based on energy and climate data. The framework will include a clear timetable and procedures for the successive stages of the energy and climate policy cycle, and will also clarify the role of each ministry, department and entity involved. It will also indicate how stakeholders, experts, local authorities, innovators and pioneers will participate. In this way, all the relevant parties will have a clear view of their role in the process, which will avoid parallel consultations or overlapping projects. Stakeholders will be involved in both preparing and implementing the policy, for which purpose a framework will be created to enable mutual undertakings. Lastly, the role of independent experts in this respect will also be determined.

For each measure resulting from the plan, an entity will be designated in the short term to assume responsibility for implementing the measure. For most of the measures, several public entities as well as other stakeholders will also be involved, even if they do not have ultimate responsibility. In particular, the new Flemish Energy and Climate Agency (Vlaams Energie en Klimaat Agentschap – VEKA), which is yet to be set up, and the Environment Department (for climate-related environmental issues) will use their knowledge and skills to support the other policy areas and levels of government with the policy measures in the plan.

The specific measures will be determined over the next few years and will influence the sectoral strategic plans of every policy area and level of government involved. This will occur based on the following principles:

- Within their specific area, all ministers will take the necessary measures to ensure that the climate transition picks up speed. All sectors must assume their respective responsibility so that the common

aim can be achieved. Each functionally relevant minister must develop targeted and supported measures that contribute to the Flemish energy and climate objectives.

- **Every policy area and level of government** will have to make significant and continuous efforts to achieve the ambitions of the Flemish Energy and Climate Plan. Where relevant, work will also be needed in all policy areas and at all levels of government to develop an integrated and effective approach that respects everyone's responsibilities. The VEKA will ensure overall coordination, effective oversight of the plan's implementation and progress monitoring.
- All ministers will be responsible for ensuring that their own policy is compatible with the climate (Climate Proofing or mainstreaming of climate change).
- Stakeholder participation: in addition to the various policy areas and authorities, the active participation of various stakeholders and society as a whole will also be necessary to achieve the Flemish climate targets. Co-creation, dialogue, engagement, openness and cooperation are the keys to this approach. All agencies must ensure, in conjunction with VEKA, that all interested parties remain engaged in the development of policy and that the implementation of this plan is worked on together.

Progress reports every year or every two years

The Flemish Government will annually report to the European Commission on:

- the emissions inventory;
- the use of auctioning revenues;
- international climate finance

Flemish biennial progress reports will cover all aspects (relevant to Flanders) of the five dimensions of the Energy Union.

Given the considerably heightened ambition of the binding GHG reduction target (in comparison with previous planning periods), correct monitoring of sectoral emissions and underlying indicators is crucial in order to adjust policies where necessary. Monitoring and reporting will therefore need to be not only objective and accurate but also very targeted and specific.

The first annual report in this planning period will be produced by 15 March 2021 at the latest, with the first biennial integrated progress report being produced in 2023.

Follow-up of recommendations and potential adjustments

Based on the annual report, biennial integrated progress report and any recommendations made by the European Commission, the Flemish Government will consider whether and how the Flemish Energy and Climate Plan should be adjusted.

If, based on the aforementioned assessments, it appears that insufficient progress has been made in reducing emissions in non-ETS sectors, the Flemish Government will contribute to the national action plan by explaining the adjustments and/or additional measures to be adopted.

Walloon Region

The Walloon Government instructed the Department of Energy and Sustainable Building (part of the Wallonia Public Service for Planning, Housing, Heritage and Energy: <https://energie.wallonie.be>) and the Walloon Air and Climate Agency (Agence wallonne de l'Air et du Climat – AwAC: <http://www.awac.be>) to work together on a new PACE 2030.

These two agencies set up a Steering Committee (Comité de Pilotage – COPIL) with the task of coordinating the drafting of the PACE 2030.

The COPIL used the following for this purpose:

- work carried out within the Department of Energy and within AwAC (with the latter in particular having access to sectoral experts);

- a thematic working group including other agencies (transport, industry, etc.);
- work of the Committee of Experts set up under the Climate Decree (<http://awac.be/index.php/thematiques/politiques-actions/les-politiques-changement-clim/politique-wallonne>)

1.3. Consultations and involvement of national and Union entities and their outcome

iv. Involvement of the national parliament

Federal State

Two debates were held on the federal contribution to the draft NECP after this was submitted to Belgium's Chamber of Representatives. The new Energy, Climate and Sustainable Development Committee has already expressed its interest in cooperating with Parliament on the federal contribution to the NECP, having indicated this in particular during the sitting on 2 October 2019.

Walloon Region

The Climate Resolution, adopted on 28 September 2017 by the Walloon Parliament, calls on the Walloon Government to pursue an ambitious climate policy by recommending a series of measures concerning renewable energy, energy efficiency, housing, mobility, agriculture, etc. Following on from that resolution, although not called for in it, the Energy Minister has undertaken to present quarterly feedback on the various measures contained in the resolution.

An initial feedback meeting took place on 12 January 2018 in the presence of four MPs, at which the progress made in terms of climate policy was presented.

v. Involvement of local and regional authorities

Federal State

The NECP has been developed and coordinated within a steering group jointly established by the National Climate Commission (CNC) and CONCERE, as explained in more detail in point 1.1(i).

Local authorities have not been consulted on the federal part of the plan. However, inspiration has been taken from the draft regional plans and parliamentary resolutions, as well as from the items raised in those documents for the attention of the federal authorities.

Flemish Region

Local authorities have not been separately consulted on the development of the Flemish Energy and Climate Plan. However, their opinions have been heard through the advisory councils and Electricity groups.

The way in which the Flemish Government wants to work with the local level is set out in the 'cross-cutting measures' part of the plan.

Walloon Region

In Wallonia, the public inquiry held on the PACE enabled broad consultation with authorities at all levels. Local authorities will also be involved in implementing the measures.

vi. Consultations of stakeholders, including the social partners, and engagement of civil society and the general public

The various stages of the NECP have been presented to the general public and civil society in a number of ways:

Draft NECP:

A nationwide consultation was organised on the Interfederal Energy Pact. Between early May and late June 2017, the 129 key stakeholders were canvassed in writing on their vision, expectations and requirements regarding the development of Belgium's energy market by 2050. Nearly 50 written responses to this consultation were received.

In addition, a vast online citizens' consultation was organised in the autumn of 2017 (17 October to 5 November). More than 45,000 people took part in the online survey.

The responses to the two public consultations were analysed by the energy agencies concerned (under the aegis of the CONCERE Energy Pact working group) and were fully taken in account by policymakers as a contribution to the pact.

An analysis of this survey can be found at: <https://www.energypact2050.be/129-17-brochure-A4-N.pdf>.

Final NECP:

After the first draft plan was produced, a 'communication' working group was set up under the aegis of the Steering Committee and was given responsibility for consultations with the public and stakeholders, among other tasks. This resulted in the launch of a large-scale national public consultation in which the public could participate in three ways: an online questionnaire; an open-ended question allowing general comments to be added on the draft NECP; and the possibility of responding by email.

Nearly 61,000 people took part, of which around 52,000 completed the questionnaire in full. At the end of the questionnaire, respondents could also answer an open-ended question allowing them to make general comments on the draft NECP; this option was used by almost 20,000 respondents.

In addition to providing feedback through the online questionnaire, the public and stakeholders were also able to respond by email, either on the NECP in general or on the various entity-specific plans. A different email address was provided for each of the plans. Through the email addresses for the NECP and the federal contribution, around 230 responses were also received from individuals or stakeholders, with or without attachments and written positions. More detailed information on the results of this public consultation can be found at: <http://www.plannationalenergieclimat.be/fr/enquete-publique>, which is the official NECP website launched in mid-September.

This website is the result of a joint national initiative to bring together all the local initiatives and present them to the public. It is currently available in NL and FR, with EN being added soon, and also contains information on regional cooperation initiatives, for example.

Federal State

No targeted public consultation was organised ahead of the federal contribution to the draft NECP. This can be explained in part by the fact that a large-scale national consultation was organised on the Interfederal Energy Pact⁽¹¹⁾, which partly served as a contribution to the drafting of the NECP⁽¹²⁾.

Draft NECP:

At the federal level, the advisory bodies FRDO CFDD (Federale Raad Voor Duurzame Ontwikkeling/Conseil Fédéral du Développement Durable – Federal Council for Sustainable Development) and CCE/CRB (Conseil Central de l'Économie/Centrale Raad Voor Het Bedrijfsleven – Central Economic Council) delivered their contributions and proposed specific measures, which were, to a certain extent, incorporated in the federal contribution to the NECP. The Gas and Electricity Advisory Board (Conseil Consultatif du Gaz et de l'Électricité/Adviesraad Gas en Elektriciteit) was also invited to submit an opinion, but declined the invitation

¹¹ As approved by the Federal Government on 30 March 2018.

¹² Federal Council for Sustainable Development: Opinion on the National Pact on strategic investment and financing of the transition to a decarbonised economy, 30/05/2018:

<https://www.frdo-cfdd.be/sites/default/files/content/download/files/2018a07f.pdf>

due to lack of time to prepare a specific opinion as a contribution to the federal part of Belgium's NECP. Nevertheless, it forwarded two earlier opinions that had some relevance for the NECP (¹³).

Final NECP:

As regards the social partners and civil society, the Federal Council for Sustainable Development was asked for an opinion in early 2019 and took on the task of coordinating a joint opinion (¹⁴) from all the federal and regional councils in response to the draft NECP. On 13 September, a dialogue was organised with stakeholders at administrative level to find out the views of those concerned, such as consumers, NGOs, employer organisations and trade unions, with particular attention being paid to the European Commission's recommendations (¹⁵).

The results of the public consultation and the opinions (¹⁶) and comments of the advisory boards and stakeholders were taken into account when the final NECP was prepared.

Flemish Region

Stakeholders, experts and the public were extensively involved and consulted during the preparation of the draft Flemish Climate Policy Plan 2021-2030 and the draft Energy Plan 2030. This particularly occurred through the Flemish Climate Summit approach (with round tables on the climate conducted by each minister in the Flemish Government), the 'Fast-Track' approach (with consultation of the public and the 'Électricité' (Electricity) groups on five themes: energy efficiency, renewable energy, flexibility, funding and governance), the Renovation Pact approach, and several other approaches associated with the climate and energy (on mobility, planning, clean energy for transport, etc.).

Following approval of the draft Flemish Climate Policy Plan 2021-2030 and the draft Energy Plan 2030 on 20 July 2018, the Flemish Government received opinions and recommendations from a wide range of stakeholders and experts through various channels:

- Opinion of the Socioeconomic Council for Flanders (Conseil socio-économique de la Flandre/Sociaal-Economische Raad voor Vlaanderen – SERV), the Flemish Council for the Environment and Nature (Conseil flamand de l'Environnement et de la Nature/Milieu- en natuurraad van Vlaanderen – Minaraad) and the Strategic Advisory Board for Agriculture and Fisheries (Conseil consultatif stratégique de l'Agriculture et de la Pêche/Strategische Adviesraad voor Landbouw en Visserij – SALV) on the draft Flemish Energy Plan and Climate Plan, Sporen naar een krachtiger klimaat- en energie plan 2030 (08/10/2018)
<https://www.vlaanderen.be/publicaties/advies-sporen-naar-een-krachtiger-klimaat-en-energieplan-2030-gezamelijk-advies-serv-minaraad-en-salv-1>
- Opinion of the Flemish Youth Council (Conseil flamand de la jeunesse/Vlaamse Jeugdraad) on the Flemish Climate Policy Plan 2021-2030 (05/09/2018)

¹³ Gas and Electricity Advisory Board, 25/06/2018: response to a request for an opinion: reference to Opinion cc161221-068, 21/12/2016, and Opinion cc161019-067, 19/10/2016.

¹⁴ Joint opinion on the draft National Energy and Climate Plan 2030 (NECP) – CFDD, CCE, CESE Wallonie – Pôle environnement – Pôle énergie, SERV, Minaraad, CESRBC, CERBC:

<https://www.frdo-cfdd.be/sites/default/files/content/download/files/2019a03f.pdf>

¹⁵ https://www.climat.be/files/9715/7320/2169/SH_dialogue_PFEC_13092019_Chairs_summary_FR.pdf

¹⁶ Federal Council for Sustainable Development: Opinion on the federal contribution to the NECP 2030, 30/05/2018:

<https://www.frdo-cfdd.be/sites/default/files/content/download/files/2018a06f.pdf>

Federal Council for Sustainable Development: Opinion of the CFDD on the draft National Energy and Climate Plan 2030 (NECP):

https://www.frdo-cfdd.be/sites/default/files/content/download/files/2019a02f_0.pdf

Central Economic Council: Specific measures for the federal part of the National Energy and Climate Plan. Opinion of 17/07/2018:

https://www.ccecrb.fgov.be/dpics/fichiers/2018-12-21-09-12-41_doc181750fr.pdf

Central Economic Council: New contribution of the CCE to the Integrated National Energy and Climate Plan. Opinion of 24/10/2019:

<https://www.frdo-cfdd.be/sites/default/files/content/download/files/2018a06n.pdf>

https://vlaamsejeugdraad.be/sites/default/files/advies/1807_advies_klimaatbeleidsplan_2021-2030.pdf

- ‘Youth for climate’ report of the Working Group for Climate and Sustainability, at the request of Youth for Climate and in collaboration with the organisers Leo Van Broeck, architect in the Flemish Government, and Jean-Pascal van Ypersele, climatologist
https://www.klimaatpanel.be/laravel-filemanager/files/shares/Binnenwerk%20klimaat_OK_NL_HgR_2.pdf
- ‘Sign for My Future’ campaign report: A net-zero Greenhouse Gas Emissions, Belgium 2050, Initiating the debate on transition policies. Report produced by a group of scientists: <https://t.co/shFt3HgOqM>
- Public consultation on the NECP during the summer of 2019: it was possible to respond separately to the Flemish part of the NECP.
- Monitoring group consisting of experts appointed by the Flemish Government – first opinion (11/7/2019) and second opinion (12/10/2019).
- The five ‘Électricité’ groups (energy efficiency, renewable energy, flexibility, funding and governance) were re-formed in the spring of 2019 for the purpose of contributing to the NECP.

See https://www.energiesparen.be/Vlaams_energieplan

These opinions and recommendations were carefully examined by the various authorities, and incorporated in the NECP where appropriate. They will continue to be included in subsequent versions of the NECP.

Walloon Region

First consultation

In the process of preparing the PACE 2030, an initial written consultation was held from 13 March to 21 April 2017. Based on a list of existing policies, its aim was to obtain responses from the various stakeholders and allow them to inform the competent authorities of their views on the current Walloon energy and climate policy and on how the energy system should be developed to 2030. Those contributions (which consisted of around 40 responses) were examined and highlighted a number of areas for improvement in the existing measures, and also new measures to be adopted.

The documents provided briefly described the various tools and levers in place as part of the energy and climate policy in Wallonia. They formed a basis for reflecting on current actions and future routes to achieving the target of reducing GHG emissions by 35% by 2030 in Belgium and Wallonia. Stakeholders were asked to answer a themed questionnaire.

Second consultation

A second consultation was held from 19 February to 19 March 2018. This written consultation allowed stakeholders to express their views on the authorities’ proposals. At a linked event (22 and 23 February), the authorities presented those measures and constructively discussed them with the socioeconomic partners, before the government adopted the new Air, Climate and Energy Plan 2030.

Particular emphasis was placed on proposals for new measures to be implemented between 2020 and 2030.

The main themes of those consultations were connected with the non-ETS target and mainly involved renewable energy, energy efficiency, industry (non-ETS, including HFC), transport and mobility, and agriculture.

Public inquiry on PACE

Following the consultations, the Walloon Government presented a draft PACE 2030. In accordance with Article D.29-1 of Book I of the Environment Code, Wallonia held a public inquiry on the draft PACE 2030, including its associated documents. This draft PACE is a summary of the measures included in the draft Walloon Energy and Climate Plan 2030 and in the Air Plan, which are themselves designed to meet our European obligations.

Following the public inquiry, the government will examine a second version of the PACE incorporating the inquiry's results. Those aspects that have been corrected will also be included in the Walloon Energy and Climate Plan 2030 (Plan Wallon Energie Climat 2030 – PWEC 2030).

The public inquiry closed in August 2019, with contributions having been received from:

- 23 organisations,
- 62 individuals,
- 21 municipalities (¹⁷).

Brussels Capital Region

A national consultation on the draft integrated plan was held between 4 June and 15 July 2019. The public and stakeholders were invited to respond to both the national document and also the entity-specific plans (¹⁸). The Brussels Plan 2030 received 63 responses from the public and stakeholders; those responses have been taken into account in this version.

The Brussels contribution was also adapted in light of the European Commission's recommendations on the draft NECP (¹⁹), which were made in June 2019.

The plan was also adapted following the consultation of neighbouring countries in September 2019.

Lastly, the Regional Policy Statement of the Brussels Government has been incorporated into the plan in order to bring it into line with the ambitions of the new regional executive following the regional elections on 26 May 2019.

In addition, other consultations have fed into the discussions leading to the development of the plan. As indicated above, this plan aims to implement the vision contained in the Interfederal Energy Pact, with that vision also stemming from consultations with Belgian stakeholders (April-June 2017) and the general public (November 2017) (²⁰).

Lastly, as stipulated in the Governance Regulation, the perspective of this document is to 2050. It therefore takes account of sectoral consultations conducted as part of the low-carbon study 2050 (²¹) in February and March 2016. Those consultations and that study will also feed into the future long-term strategy of Brussels in accordance with Article 15 of the Governance Regulation.

In addition, the plan is based on other plans, such as the strategy to reduce the environmental impact of existing Brussels buildings (²²) (see point 2.2.1.1) and the Good Move regional mobility plan (see point 2.2.2.1), on which consultations have also been conducted.

¹⁷ The public inquiry procedure allows the municipal authorities to play a central role. First of all, they are consulted prior to the procedure on the table of contents of the Environmental Report. The municipalities then have another important role to play in the inquiry process itself by relaying the contributions of the public. In total 152 municipalities responded, but 131 simply stated that they had not received any response from their residents.

¹⁸ The results of the consultation are available on the dedicated website.

¹⁹ Commission Recommendation of 18 June 2019 on the draft integrated National Energy and Climate Plan of Belgium covering the period 2021-2030.

²⁰ 45,016 responses were received during the public consultation. The results are available on the dedicated website: <https://pacte-energetique2050.be>

²¹ Low-carbon scenarios to 2050 for the Brussels Capital Region: study carried out by the Climact firm for Bruxelles Environnement in 2016-2017.

²² Also known as the renovation strategy. This was the subject of a sectoral consultation on renovation work on 27 April 2018 and also multiple bilateral consultations with Brussels operators in the sector in late 2018 and early 2019.

vii. Consultations of other Member States

At bilateral level, there is no specific initiative for the exchange of information on NECP-related projects. Belgium's dialogue with neighbouring countries and other Member States tends to take place in the context of regional cooperation (see point 1.4 below).

Walloon Region

The Member States face many common challenges in all the dimensions described in this plan.

As regards the Walloon Region (taking into account its regional powers), there is great interest in working with cross-border regions and countries such as North Rhine-Westphalia, Rhineland-Palatinate, Sarre, Lorraine and Luxembourg.

In structural terms, we can point to the region's participation in the 'Great Region' bodies, or the signature of a Declaration of Intent between the Walloon Government and the Regional Government of North Rhine-Westphalia, which has the energy transition as one of its themes in order to ensure a future energy supply that is secure, affordable and environmentally friendly.

It also covers the following themes:

- Bioenergy

Together with the Walloon Region, the cross-border regions and countries form a unique biomass supply area (wood in particular). As a result, different levels of support could create distortions in neighbouring markets or the Walloon market, bearing in mind that there are already significant tensions between the various potential users of biomass residues and co-products.

- Electric mobility

The roll-out of electric mobility requires an infrastructure that is continuous and interoperable. This roll-out is supported by the EU through Directive 2014/94/EU in particular, but cross-border cooperation could benefit all the areas concerned.

viii. Iterative process with the Commission

The European Commission was invited to participate in the Regional Energy and Climate Dialogue 2030 (see point 1.4), to which it responded enthusiastically. It will continue to participate in this process in future at the request or initiative of the Member States.

At national level, several informal consultations with the Commission have taken place with various representatives of all relevant entities within the Commission's Technical Working Group (Directorate-General for Energy and Directorate-General for Climate Action) on the NECPs.

In order to respond to the Commission's recommendations ⁽²³⁾, a table summarising the 10 most important recommendations on Belgium's draft NECP is contained in an annex.

1.4. Regional cooperation in preparing the plan

i. Elements subject to joint or coordinated planning with other Member States

Belgium has well-established structures for regional cooperation and coordination on energy and climate issues. Possibilities for regional collaboration are currently examined within the Benelux framework, expanded to countries in the Pentalateral Energy Forum (i.e. BE, NL, LUX, FR, DE, AT, and CH as an observer).

²³ Commission Recommendation of 18 June 2019 on the draft integrated National Energy and Climate Plan of Belgium covering the period 2021-2030, C(2019) 4401 final and SWD(2019) 211 final:

https://ec.europa.eu/energy/sites/ener/files/documents/be_rec_fr.pdf &
https://ec.europa.eu/energy/sites/ener/files/documents/be_swd_en.pdf

Within the North Sea cooperation framework, i.e. the North Seas Energy Cooperation (NSEC), work is also underway on a Danish-led initiative to include a common paragraph in the respective cooperation plans with the Member States of NSEC, namely BE, NL, LUX, DE, FR, UK, IE, DK, NO and SE (point (ii)).

ii. Explanation of how regional cooperation is considered in the plan

1. Benelux

The Benelux Declaration on Regional Cooperation for the Development of Integrated National Energy and Climate Plans was signed during the Energy Council on 11 June 2018. This policy commitment laid the foundations for enhanced regional cooperation on the integrated national energy and climate plans, and also looked to include the member countries of the Pentalateral Energy Forum (PLEF).

2. Pentalateral Energy Forum (PLEF/Penta)

Cooperation within the PLEF on the Integrated National Energy and Climate Plans (INECPs) was confirmed at the launch event ‘Regional Energy and Climate Dialogue 2030’ held on 27 June 2018 and aimed at the directors-general for energy and climate and at experts from all the PLEF member countries. During this event, the participants presented their respective INECP, set out the cross-border issues and exchanged their first impressions. The intention was to subsequently approve a working method for continuing to develop this regional cooperation and consultation dialogue on the respective INECPs. With the PLEF member countries having already demonstrated their commitment to continuing this initiative, the way forward was to be developed over the next few months so that the provisional and final plans could be submitted by 31 December 2018 and 2019.

A policy statement was signed on 4 March 2019 formalising the PLEF’s regional cooperation on the INECPs.

On the margins of the Energy Council on 25 June 2019, the energy ministers of the PLEF countries agreed to adopt the following as common text in the INECPs. This text specifically sets out the commitment to cooperate in this respect:

Since 2005, the Pentalateral Energy Forum has been a structure for voluntary regional cooperation between Belgium, France, Germany, Luxembourg, the Netherlands and, since 2011, Austria. It therefore covers over one third of the EU population and more than 40% of electricity generation in the EU. In 2011, Switzerland joined the forum as a permanent observer and actively contributes to the technical work and decision-making process. In close cooperation with the European Commission (by invitation), the Pentalateral Energy Forum is improving cooperation between all the participants with a view to creating a regional electricity market as an intermediate step towards achieving a common European electricity market.

The cooperation is led by the ministers responsible for energy policy who meet regularly. Activities are monitored by the Penta coordinators and by the Penta NECP Committee under the guidance of the respective directors-general of the participating countries. The work programme is implemented by electricity Transmission System Operators (TSOs), ministries, National Regulatory Authorities (NRAs), the European Commission and market operators who meet regularly within three Support Groups.

The main success recorded in the last 15 years has been the change seen in Penta countries, which have moved from a purely national policy perspective on the energy markets to the adoption of a regional approach. Specific regional steps have been taken in a number of dimensions that remain relevant today:

Internal electricity market/market integration:

Support Group 1 (Groupe de Soutien 1 – SG1) focuses on the coupling of electricity markets in the region. As one of its goals, SG1 has encouraged the flow-based market coupling (FBMC) of overnight markets and, in May 2015, FBMC was officially launched in the Penta region: the first of its kind within the European Union.

Since then, FBMC has been constantly improved and become increasingly successful; it now serves as a basis for a fully established FBMC at EU level for overnight markets.

In addition, to increase transmission capacity available for cross-border trade on the intra-day market, SG1 has encouraged a process of coordinated calculation of the intra-day capacity following the FBMC of overnight markets for all borders in the region. This was implemented in March 2016 as a first step towards the coupling of European intra-day markets.

SG1 has been a privileged witness to the radically changing landscape of electricity and governance of electricity markets. Whereas in 2005 grid operators worked separately, over the years SG1 has actively encouraged cooperation between participants. This has, for example, helped to bring TSOs together within regional associations, merge power exchanges with TSOs and encourage new regional players (TSCNET, Coreso, former CASC-CWE, SSC).

Given the new implementation plans that need to be prepared in accordance with the Clean Energy Package, the Penta countries will closely coordinate their activities and explore possibilities for joint action.

Internal electricity market/flexibility:

Support Group 3 (SG3) focuses on flexibility issues in the region. Its work so far has been concentrated on balancing, the intra-day market and the role of demand-side management, which are the three main areas of regional cooperation allowing the flexibility of electricity markets to be improved. Various technical reference documents have been developed that summarise the main obstacles to increased use of flexibility in the Penta region. Participation in SG3 has been opened up to the traditional participants (NRAs/TSOs), as well as to other stakeholders such as Distribution System Operators (DSOs), the main consumer protection organisations and renewable energy generators.

As regards balancing, current approaches have been assessed and best practices exchanged within the PLEF. In addition, Penta plays a vital role in the process of implementing EU guidelines on electricity system balancing. In terms of demand-side management, a separate group of experts has worked on a report describing the real situation in the Penta region, with emphasis on the rules and responsibilities of new market players in each country of the region. As regards the future cooperation of the Penta countries on hydrogen, a workshop has been organised to identify possible topics for cooperation in this respect.

Security of supply:

Support Group 2 (SG2) deals with security of supply issues in the region. A memorandum of agreement on security of supply cooperation was signed between the Penta countries in June 2017. On that basis, and in the light of the new EU Regulation on risk-preparedness, a crisis management exercise ('PENTEX 2018') was organised in 2018 to improve mutual understanding of national concerns, identify the main potential crisis (cross-border) situations for the region and to assess various measures aimed at mitigating the effects of a crisis.

The first regional Generation Adequacy Assessment (GAA) carried out by the Penta TSOs and published in March 2015 marked an important step. The assessment method was based on a probabilistic and chronological approach with an hourly resolution for the years 2015/2016 and 2020/2021; this was a significant improvement on the existing deterministic approaches. The Penta TSOs also used a common regional dataset based on the same scenarios and assumptions, a regional temperature-sensitive load pattern and harmonised probabilistic hydrological data.

The governments of the Penta countries are convinced that these dimensions are relevant. In addition to continuing their work in these areas, the Penta countries will use the PLEF over the next few years to work on the following priorities:

DECARBONISATION OF THE ELECTRICITY SECTOR

Common vision of a decarbonised electricity system in the Penta countries by 2050:

The Penta countries will exchange their visions of a decarbonised electricity system by 2050 (with intermediate stages in 2030 and 2040) in terms of a highly efficient energy system mainly based on renewable energy, gradual elimination of electricity generated from fossil fuels, and effective final use of electricity. To start with, the national scenarios indicating what the electricity system could be like in 2050 will be compared, the common and divergent aspects of those scenarios will be identified, and the way in which security of supply would be guaranteed in those scenarios will be determined. This will ensure a common understanding of the expectations and challenges in creating a future electricity system.

Launch of cross-border cooperation on renewable electricity:

The Penta countries will work on a voluntary basis to develop a menu of common ideas covering various levels of cooperation, including exploring the possibilities of opening up national/cross-border calls for tender and organising joint calls for tender for interested Penta countries, with increasing reference being made to the European framework for renewable energy and existing cooperation mechanisms, such as joint projects and statistical transfers ('menu cluster') for interested Penta countries.

The Penta countries are also supporting the work being carried out by the European Commission and Member States to develop an EU financing mechanism for renewable energy.

Integration of electromobility options and services without any regional restrictions:

The Penta countries will help to increase the proportion of renewable energy in transport by encouraging electromobility (including fuel cell options). They will facilitate the integration/implementation of electromobility options and services without any restrictions within the Penta region by identifying and, where necessary, removing obstacles to the cross-border roll-out of electromobility and charging services and by ensuring interoperability.

Study of carbon pricing options and their cross-border impact on electricity prices:

The Penta countries that are planning to introduce carbon pricing, or considering introducing this system, will exchange their views, on a voluntary basis, on the political approaches to introducing carbon pricing and on its advantages and disadvantages in terms of reducing CO₂ emissions, security of supply, price trends and ensuring a fair situation for their industries.

INTERNAL ELECTRICITY MARKET

Market integration:

The Penta countries will further improve their supervision of FBMC in order to increase cross-border trade and social well-being and also optimise the advantages for consumers. They will make this supervision more innovative so that it provides common key indicators for assessing the transition towards a fully decarbonised pentagonal electricity market by 2050.

The Penta countries will work together to rapidly implement the Clean Energy Package and to tackle any cross-border impacts for the energy market (e.g. by continuing to develop redispatching in the Penta region and by improving cooperation in this respect).

Flexibility:

The Penta countries will study the impact of implementing flexibility options such as demand-side management, PtX (Power-to-X) and hydrogen, storage and electromobility, and will analyse the specific electricity-related obstacles to sectoral coupling.

As regards the potential future role of increasingly renewable hydrogen as an energy carrier in their energy systems, the Penta countries will examine possible joint approaches to guarantees of origin, cross-border infrastructure, the respective role of TSOs and DSOs, and hydrogen mixing standards. They will also exchange information and best practices on hydrogen support schemes and innovation projects, as well as on the future role of hydrogen in general.

SECURITY OF SUPPLY

The Penta countries will constantly improve the pentagonal generation adequacy assessment by using more reliable meteorological data and the latest NECP figures and targets of the Penta countries when determining future energy mixes and carrying out other sensitivity analyses. The third assessment is currently being conducted by the Penta TSOs for the 2021 and 2025 horizons, taking into account regional scenarios (based on national scenarios), improved flow-based calculations, and demand flexibility sensitivities.

As part of the Clean Energy Package (CEP), and particularly in the context of regional cooperation and the Regulation on risk-preparedness, discussions have begun with ENTSO-E, the Commission and other stakeholders. The aim is to define the rules for cooperation between Member States in order to identify potential regional crisis scenarios and prevent, prepare for and manage crises in the electricity sector, in a spirit of solidarity and transparency, while taking full account of the requirements of a competitive internal electricity market. The Penta countries will work in partnership to develop specific regional measures for crisis situations.

TOOLS FOR FUNDING THE ENERGY TRANSITION

The PLEF will start to exchange information on possible regional approaches aimed at improving energy efficiency and the roll-out of renewable energy, for example by identifying, with financial institutions such as the EIB, common approaches designed to reduce risks in both sectors and therefore facilitate achievement of the Penta countries' objectives.

3. North Seas Energy Cooperation (NSEC)

At the Ministerial meeting on 20 June 2019, the ministers decided to include the following common paragraph in this chapter on NSEC:

Belgium is part of the wider North Seas region, which has a large renewable energy potential. The European Commission has estimated that offshore wind from the North Seas can cover up to 12% of the electric power consumption in the EU by 2030. Offshore wind generation and grid infrastructure projects may have cross-border effects on energy prices, security of supply and the environment, including availability of marine space as well as the pace of innovation. The North Seas countries therefore have great benefits to gain from cooperation.

The North Seas Energy Cooperation (NSEC) is a voluntary, bottom-up, market-oriented, regional cooperation initiative established in 2016, which seeks to create synergies, avoid incompatibilities between national policies and foster joint strategies where possible and beneficial.

The aim is to coordinate and facilitate further cost-effective deployment of offshore renewable energy, in particular wind, ensuring a sustainable, secure and affordable energy supply in the North Seas countries through increased and better coordinated offshore wind deployment as well as potential joint projects or cluster projects. The NSEC focuses on a step-by-step approach with the perspective of further integration and increased efficiency of wholesale electricity markets in the longer term, while contributing to a reduction of greenhouse gas emissions and enhancing security supply in the region.

The North Seas Energy Cooperation consists of 10 countries with participation from the European Commission: Belgium, the Netherlands, Luxembourg, France, Germany, UK, Ireland, Norway, Sweden and Denmark.

As regards to preparing this plan, Belgium made use of the NSEC, in which experts in the support groups shared information and experiences on specific aspects, for example on barriers and best practices of national offshore wind development and in particular on aggregation of national renewable energy trajectories for offshore wind until 2030 and market integration.

Belgium furthermore consulted on its National Energy and Climate Plan in the area of planned offshore wind deployment until 2030 and related grid planning aspects with the other North Seas countries.

The support groups under the cooperation focus on the following subjects:

- *Support group 1: Maritime Spatial Planning*
- *Support group 2: Development and regulation of offshore grids and other offshore infrastructure*
- *Support group 3: Support framework and finance for offshore wind projects*
- *Support group 4: Standards and technical rules in the offshore wind sector*

Maritime spatial planning

Within the North Seas Energy Cooperation, Belgium contributes to the work on establishing a common environmental impact assessment methodology. In order to reach our energy and climate targets within the EU, there is a need to better understand the possible ecological limits of large-scale wind development in the North Seas. Further work is needed on maritime spatial planning and environmental assessment to be able to utilise the potential of the North Seas. To increase knowledge and support the deployment of offshore wind in the North Seas, the North Seas countries will continue to cooperate closely on environmental research, cumulative impact assessment of wind farms between responsible authorities for energy, maritime spatial planning and environment.

Offshore grids and other offshore infrastructure

The NSEC serves as a platform to jointly work on concepts for potential joint wind offshore projects and for coordinated electricity infrastructure including transmission infrastructure.

Belgium works together with the other North Seas Energy Cooperation countries on the possibilities for concrete cooperation projects. Besides joint offshore wind projects that would be connected to and supported by several Member States, this includes the work on possible ‘hybrid’ solutions that would use cross-border solutions for connecting offshore wind farms to the grid and seek synergies with interconnection capacity between countries, and on the corresponding market arrangements.

Belgium is therefore contributing to the development of possibilities for cooperation on hybrid projects and identifying and addressing possible legal, regulatory and commercial barriers.

By coordinating on increased interconnection among the countries in the NSEC, an increasing amount of excess production of energy could flow across borders to meet demand in a well-functioning internal energy market.

The NSEC has identified a list of potential areas and projects in the region, where joint projects could be particularly beneficial. These include: (1) IJmuiden Ver offshore wind farm to UK, (2) CGS IJmuiden Ver – Norfolk, (3) COBRA Cable, (4) DE offshore wind farm connected to NL and (5) North Seas Wind Power Hub.

The NSEC is working on developing concrete concepts for the implementation of selected projects from the above list.

The NSEC will continue to work on the action plans for the specific hybrid projects which can also be taken further at a national and regional level. Furthermore, the cooperation will continue to work as a forum to reflect on how to deal with the uncertainties about the regulatory treatment of hybrid projects at EU and national level and as a forum to discuss options for addressing these issues.

Support framework and finance of offshore wind projects

As regards to measures, Belgium benefits from the NSEC in several ways. The work in the NSEC provides a platform for exchange of best practice regarding the design of support schemes and to develop and work on new concepts tackling new challenges concerning support for offshore wind as well as to develop possible options for future joint offshore wind projects.

Belgium works in the NSEC to coordinate the timing of calls for tender, to exchange best practices on the design for offshore wind support schemes and to identify, where possible, common principles as well as possible options for alignment of support.

As regards the coordination of calls for tender, Belgium regularly shares information regarding its national tender schedule with the other NSEC countries. The NSEC member countries regularly meet and share information on their respective national tender schedules with the aim of identifying possible overlaps in time and enabling the most continuous tender pipeline across the North Seas region to ensure that tender processes maximise competition and deliver most value for money to consumers. Belgium is ready to take into account, amongst other criteria and where possible, this overview of tender schedules in its future tender planning to avoid unnecessary bottlenecks and to provide a steady capacity pipeline to involved stakeholders without stop and go cycles.

Belgium shares and discusses in the NSEC the estimated national offshore renewable trajectory, information on its national offshore deployment plans and best practices in the design of offshore wind tenders.

At the Ministerial meeting in Esbjerg on the 20th of June 2019, North Seas countries agreed to work together to achieve an indicative aggregated installed offshore wind capacity of Member States of the NSEC of at least 70 GW by 2030 based on national planning. The indicative contribution of Belgium to this aggregate capacity in 2030 is 4 GW (see also point 2.1.2).

In order to reflect the dynamics of offshore wind deployment in the region, this aggregate planned capacity of at least 60 GW for 2030 can be translated into an overall trajectory with indicative milestones for the region of approximately 23 GW in 2020 and 48 GW in 2025.

In the NSEC, Belgium also contributes to the work of analysing and developing options for further mobilisation of investment capital for joint projects, for instance through EU funds such as European Fund for Strategic Investments (EFSI) and Connecting Europe Facility (CEF) as well as institutional investors. Such future joint projects could be cross-border projects for renewable energy in accordance with the CEF proposal.

Harmonisation of standards and technical rules

The North Seas Energy Cooperation is working on aligning standards and technical rules that could contribute to further reducing costs of offshore wind deployment. The focus is on aligning rules and technical standards within five identified areas. These include: (1) Aviation, marking and lights, (2) Health and safety, (3) Certification of regulatory requirements, (4) Park layout and site investigation and (5) Approaches to research. The NSEC works to develop proposals and recommendations for implementation in close cooperation with industry. The aim of those recommendations is to achieve cost reductions whilst at the same time being achievable. The cooperation will continue to work on aligning rules and technical standards as well as exchange of best practices to reduce unnecessary regulation and costs for the industry.

2. National objectives and targets

2.1. Dimension decarbonisation

2.1.1. GHG emissions and removals

i. The elements set out in point (a)(1) of Article 4

1. ESR target

As regards the reduction of GHG emissions under the dimension of 'Decarbonisation', Belgium has a binding emission reduction target of 35% by 2030 (compared with 2005 levels) for non-ETS sectors. This is 5% higher than the European average under Regulation (EU) 2018/842 of 30 May 2018 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No 525/2013.

To that end, the various entities will implement the following measures:

Federal State

In view of its federal powers and its policy of supporting the Regions in achieving their joint climate targets, the Federal State will pursue existing internal policies and measures, implement the measures recommended in the NECP and adopt new measures contributing to the achievement of GHG reduction targets.

If those measures prove impossible or insufficient, the Federal State will propose alternative federal policies and measures with a similar effect to those that could not be implemented.

The federal measures will continue to be updated, as far as possible, as part of the NECP assessments. The Federal State will, if possible, quantify its measures in terms of resources and results as part of the biennial assessment of the policies and measures.

Flemish Region

Non-ETS target 2021-2030

The Effort Sharing Regulation (ESR) requires Member States to reduce their annual GHG emissions in non-ETS sectors over the period 2021-2030 by way of a linear trajectory.

This linear trajectory for Belgium is as follows:

- The start point is in May 2019 and is based on average non-ETS emissions in the years 2016, 2017 and 2018.
- The end point is in 2030 and is based on a reduction in non-ETS emissions, compared with the year 2005, in line with the target set for Belgium in the ESR, namely 35%.
- This linear trajectory then determines the annual emission allocations for the intermediate years of 2021 to 2029.

The final annual emission allocations for the years 2021-2030 will not be set by the European Commission until 2020, based on the non-ETS emissions in the base years (2005, 2016, 2017 and 2018) as indicated in the emissions inventory submitted by the Member States in that year. The approach taken in this Flemish Energy and Climate Plan assumes that the trajectory for each region is structured in the same way as the trajectories for the Member States. Pending an intra-Belgium distribution of the Belgian non-ETS target of -35%, the precise target for Flanders is not yet known. In this plan, the Flemish annual emission allocations are based on an (indicative) non-ETS reduction target of -35% and the inventory data that is currently available for 2005, 2016 and 2017, supplemented by the provisional inventory data for 2018.

European calculation methods, which are not yet formally set out in the European regulations, will be used to determine the end point of the trajectory. The non-ETS emissions for 2005 will therefore be recalculated based on the non-ETS target for 2020.

If we look at the most recent emissions inventory, this 2005 recalculated non-ETS emission allocation is 47.8 million tonnes of CO₂ equivalent (Mt CO₂eq), which is higher than the actual emission allocation in 2005 for non-ETS sectors, based on the years 2013-2020. The actual emission allocation is 46.1 Mt CO₂eq. The difference between these two allocations can be explained by the way in which the changes made to the scope of the EU ETS (during the transition from the period 2008-2012 to the period 2013-2020) were calculated by the European Commission when defining the non-ETS trajectory for the period 2013-2020.

The 35% reduction target based on the 2005 recalculated non-ETS emissions (which are higher than the actual 2005 non-ETS emissions) equates to an indicative reduction target of 32.6% by 2030 compared with the actual 2005 non-ETS emissions. In this plan, the reductions made will always relate to a given sector compared with the 2005 actual emissions, given that the 2005 recalculated allocation cannot be distributed between different sectors.

The precise emission allocation cannot therefore be finally set until a later date. We would point out that there are still currently some uncertainties about the indicative emission allocation used in this plan:

- The calculation method for defining the 2030 end point has yet to be formally confirmed by the Commission.
- The emissions inventory for 2018 is only provisional. The annual emission allocations for the period 2021-2030 will be finally set using the baseline annual emissions in the Flemish greenhouse gas inventory 1990-2018, which will be submitted in early 2020 to the European Commission.
- A technical issue relating to the fluorinated gas monitoring methodology will be explained further on. This issue may have a significant impact on the Flemish non-ETS emissions for the baseline years. If this technical issue ultimately results in an amendment, its impact will be indicated in the aforementioned inventory.

Unlike the current period 2013-2020, from the 2021 compliance year an annual emissions breakdown will no longer be required. The compliance cycle is described in the Governance Regulation.

The Effort Sharing Regulation (ESR) stipulates that the Member States will continue to report every year on their emissions, even for the period after 2021-2030. The Commission will also continue to verify every year, through an initial check, the accuracy of reported emissions. The emissions inventories of the Member States will be examined in depth only twice during this period: once in 2027 (for the years 2021-2025) and once in 2032 (for the years 2026-2030). Following this in-depth examination, the Commission will officially set the non-ETS emissions for each Member State for each year of the five-year period and may reintroduce the breakdown requirement. This would mean Member States having to indicate, on an annual basis, compliance units to cover their non-ETS emissions. They could use for this purpose, for a short period of time, the various flexibility options available to them through the ESR and the LULUCF Regulation. The compliance of each Member State would then be formally established. Any shortfalls noted in a given year would be multiplied by a compliance factor of 1.08 and added to the emissions for the following year.

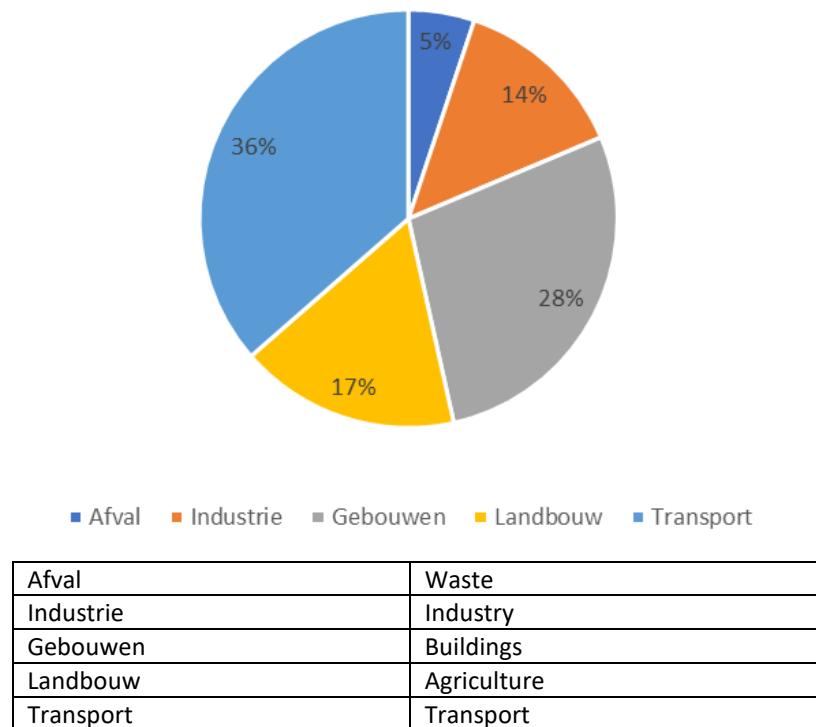
Overview of emissions and projections for 2005-2030

Overview of projection results

In terms of sectoral distribution, this plan uses the inventory categories used in European and international reporting formats, namely the CRF categories. In Chapters 4 and 5 of this plan, the main categories of the non-ETS sectors (transport, buildings, agriculture, industry and waste) are also subdivided into sub-categories.

In 2018, the transport sector (36%) and the buildings sector (28%) contributed the most to total non-ETS GHG emissions in Flanders (Figure 2.1). The agriculture and non-ETS industry sectors accounted for a smaller share of non-ETS emissions at 17% and 14% respectively. The waste sector contributed the smallest amount at 5%.

Sectoral shares of Flemish non-ETS GHG emissions in 2018



The figure gives an overview of the non-ETS GHG emissions by sector during the period 2005-2030 based on the 2005-2017 inventories, the provisional 2018 inventory and the projections to 2030. There are two scenarios with regard to the projections:

- WEM ('with existing measures') scenario, which is based on existing policy measures.
- WAM ('with additional measures') scenario, which is based on additional policy measures that are explained further on in this plan.

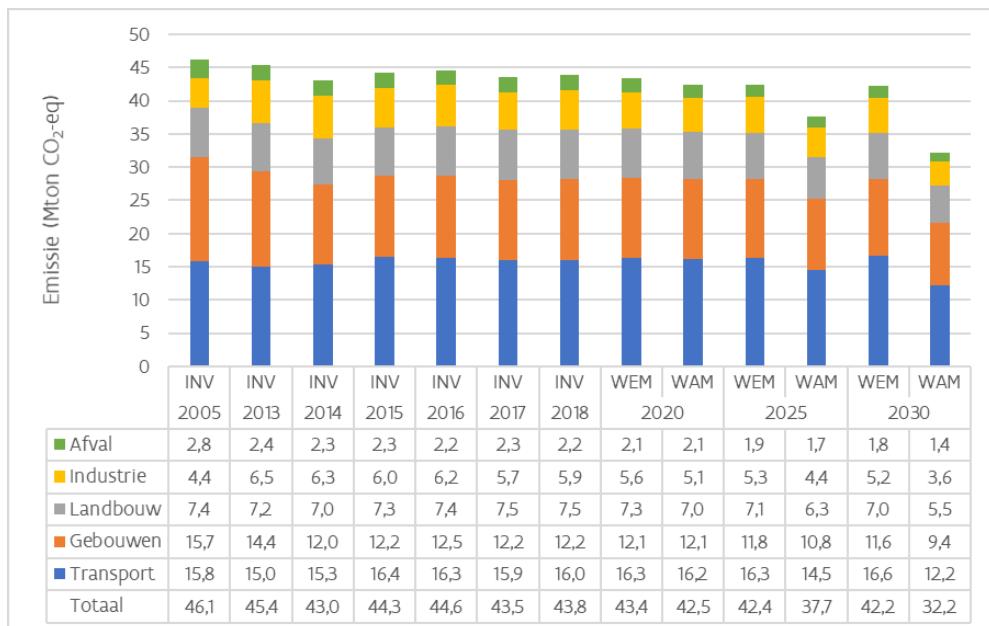
Non-ETS GHG emissions in Flanders fell by 5% from 46.1 Mt CO₂eq in 2005 (actual non-ETS emissions in 2005) to 43.8 Mt CO₂eq in 2018.

According to the projections, the WEM scenario results in an 11.8% reduction by 2030 compared with the 2005 recalculated non-ETS emissions (which equates to an 8.6% reduction compared with the actual 2005 figures).

Taking account of the measures included in this plan, the projections indicate that non-ETS emissions will fall by 32.6% by 2030 compared with the 2005 recalculated non-ETS emissions in the WAM scenario (which equates to a 30.1% reduction compared with the actual 2005 figures). In the draft plan approved in July 2018, projections were made for the BU scenario (equivalent to the WAM scenario in this plan), which indicated a 35% reduction in non-ETS emissions in Flanders compared with 2005 levels.

The main reason for this difference between the projections of the policy scenario in the 2018 draft plan and those of the WAM scenario in this plan is a sophisticated methodology for determining the projection for the buildings sector. In the draft plan (climate part), a top-down approach was used for the buildings sector, which was based on a target of an average EPB index of 100 kWh/m² for residential buildings in 2050, by combining an extensive renovation process to achieve the renovation objectives and a drastic reduction in the use of fossil fuels. The projections were then determined for the period 2021-2030 by interpolation between 2017 and 2050. However, in this plan (climate part under energy efficiency), the projections for the buildings sector are based on a bottom-up calculation of the impact of planned policy measures. Furthermore, adaptations have also been made in other sectors when calculating the projections by using the most recent inventory database and small technical corrections.

Non-ETS GHG emissions in Flanders 2005-2030 (Mt CO₂eq)



Emissie (Mton CO ₂ -eq)	Emissions (Mt CO ₂ eq)
Afval	Waste
Industrie	Industry
Landbouw	Agriculture
Gebouwen	Buildings
Transport	Transport
Totaal	Total

Over the period 2005-2018, reductions were mainly recorded in the buildings sector (-22%) and the waste sector (-21%). In the next few years, in the WAM scenario, an additional reduction of 40% by 2030 compared with 2005 levels is estimated in the buildings sector. The agricultural sector stabilised between 2005 and 2018 (+1%). In the WAM scenario, a 25% reduction is estimated in the agricultural sector by 2030 compared with 2005 levels. An increase of 1% was recorded in the transport sector over the period 2005-2018. Given the policy intentions, the trend observed in the transport sector is expected to reverse by falling 23% by 2030 compared with 2005 levels. In the industry sector, emissions rose by 36% between 2005 and 2018, but, once again, this trend is expected to reverse with a 16% reduction by 2030 compared with 2005 levels.

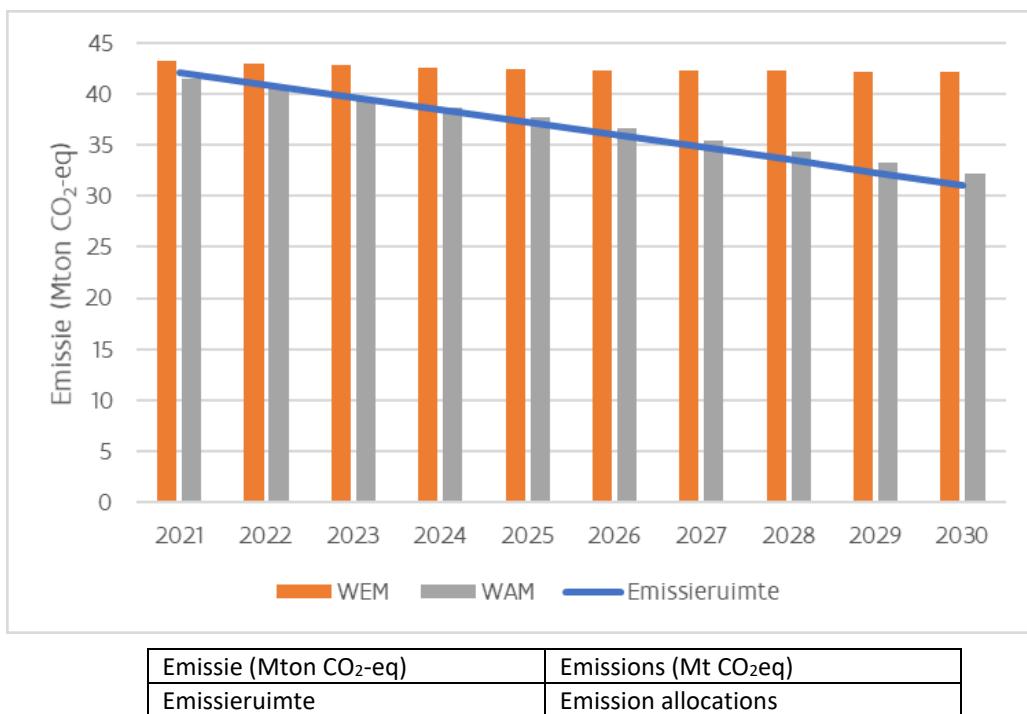
Assessment of the non-ETS target 2021-2030

In Figure 2.3, the projection scenarios are compared with the non-ETS allocations for the period 2021-2030 (see also point 2.1.1.1). The WEM scenario results in a shortfall from 2021 onwards, which amounts to 11 Mt CO₂eq by 2030 (on an annual basis) or 59 Mt CO₂eq by 2030 (total for the period 2021-2030). In the WAM scenario, minor shortfalls are expected from 2023 onwards, which amount to 1.1 Mt CO₂eq by 2030 (on an annual basis) or 3.8 Mt CO₂eq by 2030 (total for the period 2021-2030). In the plan approved in 2018, no shortfall was estimated for the BU scenario (equivalent to the WAM scenario in this plan) for the period 2021-2030. The main reason for the shortfall estimated in the WAM scenario in this plan is the sophisticated methodology used to determine the projection for the buildings sector, as indicated in point 2.1.1.2.1.

Based on the WEM scenario for 2021-2030, the cost of inaction is roughly estimated at between EUR 1.8 billion and EUR 3.0 billion, using an estimated unit price of emission allocations between EUR 30 and EUR 50. The costs are likely to increase year on year. Using the same unit price assumptions, the costs for the WAM scenario could be between EUR 0.1 billion and EUR 0.2 billion.

When interpreting the results of the WEM and WAM scenarios, various uncertainties inherent in projections must, however, be taken into account. We can mention in this respect exogenous assumptions in various sectors (including economic growth, fuel prices, demographic change and degree-days) and a series of policy assumptions. A biennial progress assessment must monitor the reduction path and ensure that this stays on course.

Assessment of the non-ETS target 2021-2030



Application of flexibility mechanisms

The ESR provides for several flexibilities that Member States can use to achieve their targets in the period 2021-2030 if they have insufficient emission allocations. In addition to keeping some flexibilities (banking, borrowing and transferring emission allocations) from the period 2013-2020, certain mechanisms have been abolished (purchase of allocations from CDM and JI projects) and new mechanisms have been established (ETS flexibility and LULUCF flexibility). The ESR imposes a quantitative limit on the use of a number of flexible instruments. The distribution between the Regions of access to these flexibilities forms part of the intra-Belgian burden-sharing exercise in relation to the climate targets for 2030.

For the period 2021-2030, some Member States can also, to a limited extent, auction fewer ETS emission allowances and benefit from an additional quantity of emission allocations for the non-ETS sectors. This flexibility is limited for Belgium to 2% of non-ETS emissions in 2005 on an annual basis. If Member States want to use this flexibility, they must inform the European Commission before 31 December 2019.

As it is not clearly known whether a flexibility offer will be made to the market by other Member States, Flanders will propose that Belgium informs the European Commission that it intends to use this flexibility.

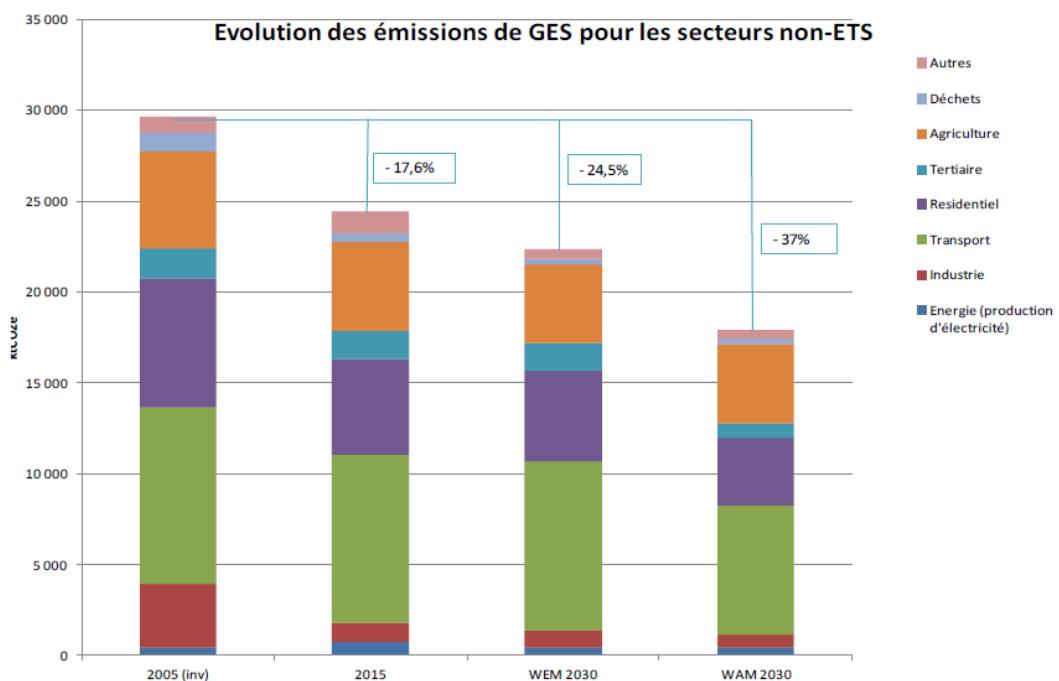
Walloon Region

	2008-2012	2020	2030	2050
GHG	-7.5%/1990	-30%/1990 (Climate Decree) -14.7%/2005 for non-ETS (burden sharing)	-37% non-ETS/2005	-80% to -95%/1990
RE		13% of gross final energy consumption (burden sharing: 14,850 GWh)	23.5% of gross final energy consumption	
EE			-23% of final energy/2005	

GHG target and link with the ESR

The following graph shows a comparison for Wallonia between the GHG emission inventories for 2005 and 2015, and the two projected scenarios with existing measures (WEM) and with the additional measures (WAM) set out in Chapter 3.

Trends in GHG emissions in Wallonia in non-ETS sectors



Évolution des émissions de GES pour les secteurs non-ETS	Trends in GHG emissions in non-ETS sectors
Autres	Other
Déchets	Waste
Agriculture	Agriculture
Tertiaire	Tertiary
Résidentiel	Residential
Transport	Transport
Industrie	Industry
Energie (production d'électricité)	Energy (electricity generation)

It should be noted that the overall projected effects of the new policies and measures will be a **37% reduction in emissions from non-ETS sectors compared with 2005** (-24.5% if policies remain unchanged).

This 37% reduction includes a biofuel incorporation rate of 14% by 2030 according to the trajectory set out in the NECP. This percentage may change in response to national debates.

It should be noted that the ESR 2030 trajectory is calculated by applying a correction due to changes in the scope of the ETS since 2005: some businesses were included in the ETS between the periods of 2008-2012 and 2013-2020 and their emissions must therefore be excluded from the ESR trajectory. As the change in scope only became effective in 2013, the 2005 emissions reported in the inventory include businesses that since then have been included in the ETS. A correction is therefore necessary, which has been made in accordance with European rules. A correction of the same type has been made for the period 2013-2020: a 14.7% reduction applied to the 2005 data in order to remove from the trajectory the emissions transferred to the ETS. For that reason, the 2020 trajectory corresponds to an apparent reduction of 18.46% compared with non-ETS emissions as reported for 2005. The overall trajectory to 2030 indicated as a percentage in this plan takes account of this correction.

Brussels Capital Region

Faced with the climate emergency, the Brussels Government is taking responsibility in this plan and intends to make an ambitious contribution to the Belgian GHG emission reduction target for 2030.

At the same time, because short-term efforts are not sufficient and must be developed into a long-term perspective (2050), the government has decided to equip the region with a long-term strategy based on binding targets and an assessment framework regulated by a ‘Brussels Order for the Climate’, so that Brussels will become a ‘low-carbon’ region. This strategy will be rapidly introduced as part of the implementation of the Governance Regulation, but will then be examined in depth and submitted to wide-ranging public debate. *This challenge can only be solved if the people of Brussels share a vision. The government will therefore initiate a public debate, bringing together Brussels residents, economic, social and institutional operators, transition initiatives and local authorities around a ‘low-carbon’ vision for Brussels to 2050.*

The Brussels Capital Region, like other large cities in Europe and worldwide, wants to commit to tackling climate change. To do so, **the government wants to prioritise the reduction of fossil fuel emissions in the policies developed during all future parliamentary terms**.

The government is therefore setting a double cap in this plan in order to define a long-term vision.

- By 2030, the quantifiable measures in this plan must together result in a 40% reduction in direct emissions from the non-ETS sector. In order for Brussels to become a ‘low-carbon’ region, the government will, however, reinforce the interim commitments and the measures currently included in this Brussels contribution to the NECP so that there is a 40% reduction in GHG emissions (compared with 2005 levels) by 2030.
- By 2050, the region undertakes to be close to the European carbon neutrality target.

In order to reduce the region’s real carbon footprint, the government has therefore decided to include a framework for reducing indirect emissions in the regional climate policy. This will ensure consistency in the fight against climate change and show solidarity with the other regions and areas on which we depend.

2. LULUCF targets

Belgium undertakes to comply with at least Article 4 of Regulation (EU) 2018/841 and therefore with the non-debit rule.

The various entities will therefore make the following efforts:

Flemish Region

Land use, land use change and forestry, shortened to LULUCF, is a sector in the GHG inventory that covers the emission and storage (immission, capture, sequestration) of greenhouse gases stemming from use of the land, changes in land use and forestry activities.

The target that applies to all Member States for the period 2021-2030 is the **no-debit rule**. This means that existing carbon stocks at the beginning of the period must, according to the rules defined in the LULUCF Regulation (Regulation (EU) 2018/841), at least remain the same at the end of the period, subject to the permitted flexibility. This does not mean that none of the land use categories can cause an emission, but rather that carbon stocks as a whole cannot fall. In particular, credits (carbon storage) from a given land use category can be used to offset a shortfall (carbon emission) in another land use category.

The LULUCF Regulation sets annual net emissions or net storage for two sub-periods, namely 2021-2025 and 2026-2030. Member States that record a surplus receive credits in this case and can sell them to Member States that record a shortfall. Another possibility is to use these credits, to a limited extent, to comply with the Effort Sharing Regulation (ESR) target. On the other hand, any shortfall must be offset by purchasing LULUCF credits from Member States (or regions) that have a surplus or by using, without limitation, their own emission allocations from ESR sectors.

Flanders has set itself the target of complying with the no-debit rule without having to purchase additional LULUCF emission allocations within Belgium or from other Member States and without using its own scarce ESR emission allocations.

Walloon Region

LULUCF commitments

In accordance with the LULUCF Regulation, the forest reference level (FRL) is based on the forest management observed during the period 2000-2009 and does not take account of current trends in species changes. According to the data that is currently available, an alternative scenario taking account of such species changes, particularly the gradual replacement of spruce with Douglas fir, would result in a slightly higher sink during the period 2021-2030, given that the Douglas fir is more productive. If this trend continues, forest management accounting based on the FRL could result in a net sink in the order of 105 kt CO₂ per year. However, this projection is very uncertain, particularly given that around half of the Walloon forest belongs to private owners, with its management being guided by various factors.

Furthermore, the afforestation/deforestation balance currently represents a net emission source (308 kt CO₂ in 2017) and cropland/grassland management, according to the accounting rules, also seems to be an emission source in the order of 89 kt CO₂/year for 2013-2016. These estimates need to be confirmed as the land use change matrix is currently being updated and could alter these figures. Furthermore, no projection of land use in 2030 is currently available.

Given these changes in methodology and the significant uncertainty about developments to 2030, in terms of both forest management and land use, it is not currently possible to determine whether the sector will be a carbon sink or a net source in 2021-2030 according to the rules of the LULUCF Regulation, even though several measures aim to help maintain or increase carbon stocks (see point 3.1.1(i)).

Given these points, Wallonia is therefore assuming that it will simply comply with the non-debit rule and neutrality in the LULUCF sector, without using the flexibilities between LULUCF and ESR.

ii. Where applicable, other national objectives and targets consistent with the Paris Agreement and the existing long-term strategies. Where applicable for the contribution to the overall Union commitment of reducing the GHG emissions, other objectives and targets, including sector targets and adaptation goals, if available

In 2010, Belgium adopted the National Climate Change Adaptation Strategy (²⁴). This describes the main consequences of climate change, the measures taken to adapt, the roadmap to a future national adaptation plan for 2020-2030 and the different strategic guidelines for the development of adaptation policy. The strategy has three objectives:

- improve consistency between adaptation activities in Belgium (assessment of the impact of climate change, vulnerability to climate change and the adaptation measures already implemented);
- improve communication at national, European and international level;
- start developing a national action plan.

The National Adaptation Plan was adopted on 19 April 2017 by the National Climate Commission. It sets out 11 national measures to reinforce cooperation and develop synergies between the various governments (federal, regions) on the subject of adaptation.

Belgium will continue implementing this plan and its updates, particularly the measure designed to assess the impact of climate change on security of supply and energy transmission and distribution infrastructure in order to increase the energy sector's resilience to climate change risks.

Federal State

Long-term strategy

The long-term vision for sustainable development, established by the Royal Decree of 18 July 2013, sets long-term objectives for federal sustainable development policy, including a reduction of Belgium's greenhouse gas emissions by at least 80% by 2050 compared with 1990 levels.

Objective 32 states that 'Belgium will be adapted to the direct and indirect impact of the consequences of climate change'. The federal contribution to the National Adaptation Plan (adopted on 28 October 2016 by the Council of Ministers) (²⁵) aims to respond to the need to:

- 'strengthen the capacity to assess, anticipate and respond to the risks associated with climate change impacts (improvement of knowledge)';
- 'anticipate and mitigate risks and maximise any benefits of climate change'.

Buildings

- Scenario of the progressive banning of the placing on the market/installation of boilers using fossil fuels (from 2035, heating oil boilers will no longer be sold).
- Make the federal authorities carbon-neutral, make buildings energy-neutral and make mobility climate-neutral by 2040, taking into account the existing building stock, technical, legal and HR constraints, accessibility of public buildings and continuity of public services.

Mobility & Transport

- Decarbonisation and reduction of externalities in relation to the environmental aspects (pollution, noise, etc.) and the societal aspects (accidents, congestion, public health, etc.) of mobility in Belgium with a switch to zero-emission vehicles as the ultimate objective.

²⁴ National Climate Commission, 2010. National Climate Change Adaptation Strategy.

http://www.climat.be/index.php/download_file/view/286/1205/409/

²⁵ Federal Public Service Health, Food Chain Safety and Environment, 2016. Federal contribution to the National Adaptation Plan. http://www.climat.be/index.php/download_file/view/1628/1205/

- Promote and regulate alternative fuels such as biofuels (taking account of an overall bio-based policy) and, in this context, enhance the sustainability criteria of biofuels at European level and limit the use of problematic alternatives and gradually exclude them.
- The objective is to reach a modal share in terms of the use of environmentally friendly modes of travel (walking/bicycles/electric motorised vehicles limited to 25 km/hour and speed pedelecs) for commuting by 2030. In addition, mobility plans for pedestrians will also be promoted.
- Promotion of the electrification of transport: electric cars and electric bicycles, scooters, mopeds and motorcycles, etc.
- Green the vehicle fleet of public authorities (exemplary role) with zero-emission vehicles as the ultimate objective.
- In the maritime sector, and in consultation with other Member States, Belgium will explore the introduction of a mechanism to ensure a transition to carbon-neutral energy sources at national and international level, as well as the introduction or strengthening of emission standards. To that end, a step-by-step plan is to be developed for shipping in Belgium. In parallel, active cooperation at international level should continue and proposals for measures should be submitted to and supported by the International Maritime Organization (IMO).
- Within the framework of the interfederal cooperation agreement on sustainable mobility, taxes and regulations on monowheels, bicycles, scooters, mopeds, electric motorcycles and light electric vehicles will be assessed and, if necessary, reviewed in terms of tackling environmental and mobility issues, so that there is a clear framework for these modes of transport to confidently take their place in the mobility offer.
- An interfederal cooperation agreement on mobility will be concluded by 1 January 2021 on the basis of consultations between the Federal State and the Regions on specific subjects (e.g. public transport, transport taxes, etc.) for which an interfederal agreement is necessary in order to implement certain measures included in this plan.

Circular economy

- Action plan for a strong circular economy in which raw materials last, are reused and retain their usefulness for as long as possible.
- By means of sustainable public procurement, public authorities will give the necessary impetus to the market to commit to a decarbonised transition of the economy (by greening their vehicle fleets, purchasing green electricity, purchasing according to the principles of the circular economy, choosing appropriate tender selection criteria, etc.).

Tax instruments, public finances and financial regulation

- Shifting of charges from raw materials with less fossil material content to raw materials with more fossil material content.
- Gradual phasing out of the support given to fossil fuels.
- Bring financial flows into line with the transition to a low-carbon economy.

Organisation of the labour market

- Ensure a fair transition.

Education and awareness-raising

- Focus on changing mindsets through initiatives in the areas of teaching, education and cultural awareness-raising, with particular attention being paid to the importance of raising awareness of the environmental impact of consumption and with the aim of motivating, stimulating and informing the public to change their behaviour and continue to engage.

- Provide information on the climate issue and climate policy, and encourage the public to initiate and strengthen climate actions (behavioural and investment changes).
- Commitment to education, public awareness, public participation, public access to information and public debate under Article 12 of the Paris Agreement in order to strengthen support for the transition to carbon neutrality among stakeholders and the general public.

Governance

- Establishment of a robust system of governance, throughout the cycle of planning, implementing, assessing and refining the various components of energy and climate policy.
- Strengthening and optimisation of existing governance structures.
- Alignment of internal governance structures with the arrangements put in place at European level (Governance of the Energy Union and Climate Action) and international level (Paris Rulebook).
- Optimisation of the complementarity and synergies between the measures implemented at federal and regional level, in particular through the systematic application of the principle of mutuality (each entity verifies the potential impact of a measure on the climate policy of another entity and endeavours to act to strengthen the effectiveness of the measures of all the other levels of power).

International cooperation

- Remain at the forefront at international level and build on strong and ambitious climate collaboration and diplomacy.
- Ensure that Belgium makes a fair contribution to international climate financing.

Adaptation

- Objectives of the federal contribution to the National Adaptation Plan (²⁶):
 - strengthen the capacity to assess, anticipate and respond to the risks associated with climate change impacts (improvement of knowledge);
 - anticipate and mitigate risks and maximise any benefits of climate change.

Walloon Region

Transport

Development and distribution of demand

The Walloon Government has set ambitious targets for mobility. These are outlined in the FAST Vision, particularly in terms of passenger-kilometres and tonne-kilometres, and are indicated in the following tables.

Passenger mobility (passenger-kilometres):

Distribution of passenger-kilometres

	2017	2030
Walking	3%	5%
Cycling	1%	5%
Bus	4%	10%
Train	9%	15%
Car	83%	60%
Average occupancy rate per car	1.3 persons	1.8 persons

This table takes account of a 5% reduction in demand for passenger transport.

²⁶ Federal Public Service Health, Food Chain Safety and Environment, 2016. Federal contribution to the National Adaptation Plan. http://www.climat.be/index.php/download_file/view/1628/1205/

Other modes of transport that are currently being developed may also be added to this vision, such as motorised two-wheelers travelling at more than 25 km/h (mopeds, speed pedelecs) or electric scooters.

Freight mobility (tonne-kilometres):

Distribution of tonne-kilometres

	2017	2030
Rail	4%	7%
Water	14%	18%
Road	82%	75%

Compliance with these targets will ensure that GHG emissions from transport are reduced by at least 24% compared with 2005 levels, which is the target set in the NECP.

In order to promote progress towards the extremely ambitious targets set in the FAST 2030 Vision, certain measures have been supported through the Walloon Investment Plan, mainly with a view to improving mobility in Wallonia. The Regional Mobility Strategy is an action plan for achieving the FAST 2030 Vision, and provides general guidelines for meeting those targets.

Change in and greening of the vehicle fleet

- **Greening of the private vehicle fleet**

The 2030 fleet composition target set out below may need to be adapted to medium-term developments that cannot currently be foreseen, such as developments in technology, changes in the price of equipment or the various energy sources, market launches of new products, etc.

At present, the transport sector consumes petroleum products on an almost exclusive basis, and diesel accounts for a significant share of this figure (56% of the car fleet in 2018, i.e. 1.8 million vehicles in the Walloon Region). Diesel engines are also used in almost all other vehicles (lorries, buses, vans, tractors, etc.).

Eventually, the aim is to increase the share of alternative fuels in the energy mix of transport, with, in the meantime, a (presumed) temporary transition to fossil fuels with significantly reduced climate and environmental effects.

These changes will be coordinated with the targets set under the National Action Plan adopted pursuant to Directive 2014/94/EU on the deployment of alternative fuels infrastructure. They will also be dovetailed with the targets set under the Energy Pact, mainly in terms of electric vehicles, which should see their share substantially increase from 2030 with an annual renewal rate of the fleet set at 25% (i.e. between 40,000 and 45,000 electric vehicles/year from 2030).

Trends in the private vehicle fleet

	2019	2030
Diesel (including micro-hybrids)	52.52% (0.06%)	17% (3%)
Petrol (including micro-hybrids)	46.36% (0.9%)	40% (13%)
CNG	0.07%	18%
BEV (Battery Electric Vehicle)	0.13%	19%
PHEV (Plug-in Hybrid Electric Vehicle)	0.23%	5%
Hydrogen	0%	1%

In addition to the regional measures aimed at achieving these targets, account should be taken, in discussions, of market developments as a result of the expected reduction in production costs of electric vehicles and European obligations on average emissions of vehicles sold by motor vehicle manufacturers, and more specifically the application of Regulation (EC) No 443/2009. The targets indicated in Table 5 will be refined based on technological and market developments and the potential of each type of engine in terms of its environmental, economic and social impacts.

- ***Diversification of the bus fleet***

The TEC Group has already started greening its in-house fleet, which numbers around 1,850 buses. This process commenced with the purchase of 11 plug-in hybrid electric buses in 2016 and 71 in 2017. By 2020, 298 hybrid buses will be in use in Wallonia (i.e. 15% of the in-house bus fleet).

From 2021, the obligations under Directive 2009/33/EC, as amended by Directive (EU) 2019/1161, will have to be strictly fulfilled. They will require the bus and tram operator Opérateur de transport wallon (OTW) to engage in a structured reflection on the development of its fleet, which should ideally be incorporated in the Regional Mobility Strategy for the long term.

It is already evident that Article 34 of the Service Contract signed between Wallonia and OTW for the period 2019-2024 provides for an ambitious approach to improving the environmental indicators of public transport, with an overall target of reducing GHG emissions by 30%, in particular by diversifying energy sources for vehicles already in use. If this target is met, the obligations under Directive 2009/33/EC, as amended by Directive (EU) 2019/1161, for the period from 2 August 2021 to 31 December 2005 will be fulfilled (share of category M3 vehicles meeting the requirements of the Directive in the indicative period for Belgium).

Trends in the bus fleet

	2018	2030
Diesel (including micro-hybrids)	96%	50% (15%)
CNG		10%
BEV (Battery Electric Vehicle)		20%
PHEV (Plug-in Hybrid Electric Vehicle)	4%	15%
Hydrogen		5%

- ***Greening of goods transport by lorry and van***

The issue of logistics and freight must be considered hand in hand with specific structural support for those technologies most suited to fuel transfer.

In this context, the breakthrough of liquefied natural gas (LNG) in heavy freight will enable savings in terms of both energy consumption and emissions (CO₂ and local air pollutants). In the case of shorter heavy logistics (less than 150 km per day), it will also be important to improve the potential of hybrid or pure electric lorries as the technology develops (the first fully electric lorries are still currently being tested). Eventually, hydrogen could become an important fuel in this respect.

At the moment, it is difficult to foresee the developments in technology that could allow this segment to be electrified. However, it seems reasonable to consider that one quarter of the lorry fleet could be converted to natural gas based on 2012 levels.

Trends in the lorry fleet

	2019	2030
Diesel	10%	75%
CNG (all technologies)	0%	25%

The case of vans also merits special attention. The Walloon van fleet currently stands at 240,000 vehicles (category N1), but has increased considerably since 1990 (it has tripled). This growth is mainly explained by the introduction (on 1 April 2016) of the tax per kilometre for vehicles with a maximum permissible mass of more than 3.5 tonnes and by the growth in online sales. Further growth in online sales of 60% by 2030 could lead to a considerable expansion in this road segment.

- ***Roll-out of transport infrastructure***

The following infrastructure will need to be rolled out:

1. LNG stations: 25 LNG stations will have to be operational by 2030, mainly along arterial roads.

2. CNG stations: 220 CNG stations will have to be operational in Wallonia by 2030. Some of these will be decentralised so that gas can be distributed directly from local biomethanisation plants.
3. Support will be provided to the biogas sector so that it can supply a growing share of gas on the basis of short supply chains (5% biogas in 2025 and 15% in 2030). Although the natural gas network is well-established in Wallonia, biogas can be used to cover areas that are not connected to this network.
4. Charging points for electric vehicles: 6,900 public charging points will be installed. A total of 185,000 charging points will be needed for B2B solutions. This roll-out must be consistent with the Corporate Mobility Plan, which encourages the use of low-emission or zero-emission vehicles in company fleets.
5. Hydrogen stations: it is estimated that 10 stations (mainly for HGVs) will be required by 2025 and 20 stations by 2030 in connection with the transition to hydrogen.

Walloon Region – Specific fluorinated gas target

Fluorinated greenhouse gases account for 3% of Wallonia's total GHG emissions. Unit emissions from certain pieces of technical equipment can be very high. This is particularly true for cooling equipment in the retail sector, which can contain significant quantities of refrigerant gas with a global warming potential of almost 4,000 and high leakage rates. For example, the global warming potential of the gas emitted by a piece of cooling equipment containing 1 tonne of refrigerant gas with an annual leakage rate of 5% is equivalent to burning 75,000 litres of heating oil. Steps must therefore be taken to prevent these emissions, in particular because alternative technologies using refrigerants with low or zero global warming potential are now available. The cost-benefit ratio of GHG emission reduction measures in the fluorinated gas sector has been assessed as good.

The overall target is to reduce fluorinated GHG emissions by 50% by 2030 compared with 2005 levels (in line with the Kigali Agreement (²⁷)).

2.1.2. Renewable energy

i. The elements set out in point (a)(2) of Article 4

An agreement has been reached at European level to set an overall EU target of at least 32% renewable energy by 2030.

Belgium's contribution to this target will consist of the total contributions of the various entities and will be 17.5% by 2030 according to the following table.

Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
RES numerator (Mtoe)	4.2	4.4	4.5	4.6	4.7	5.0	5.3	5.4	5.9	6.0	6.2
RES denominator (Mtoe)	36.3	36.3	36.3	36.3	36.4	36.4	36.2	36.0	35.8	35.6	35.4
RES (%)	11.68	11.98	12.28	12.59	12.89	13.66	14.69	15.10	16.47	16.89	17.53

Federal State

The federal share of this contribution consists of its offshore wind energy share and its biofuel share, in accordance with the legal division of powers between the Federal State and the Regions.

Offshore:

In 2030, the contribution of offshore wind energy to Belgium's renewable energy mix will be 4 GW.

²⁷ https://fr.wikipedia.org/wiki/Accord_de_Kigali

Biofuels:

In 2030, the biofuel incorporation rate will reach 10.45% (in real terms) or 13.9% (including double counting).

During the period 2021-2030, the first-generation biofuel incorporation rate will be 7%. The proportion of the biofuels listed in Parts A and B of Annex IX will develop in line with the following scenario, in the context of RED II:

Biofuels	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Actual value	8.95	8.95	9.25	9.55	9.8	10	10.2	10.45	10.45	10.45	10.45
1G	7	7	7	7	7	7	7	7	7	7	7
Part A	0.1	0.1	0.1	0.1	0.1	0.5	0.5	1	1.5	1.75	1.75
Part B	1.85	1.85	2.15	2.45	2.7	2.5	2.7	2.45	1.95	1.7	1.7
Double counting	0.6	0.6	0.95	0.95	0.95	2.2	2.2	2.7	3.2	3.45	3.45
Nominal value	9.55	9.55	10.2	10.5	10.75	12.2	12.4	13.15	13.65	13.9	13.9

The Federal Government will adopt additional GHG reduction and renewable energy measures by 1 January 2025 at the latest in order to meet its incorporation rate commitments made in the draft NECP approved by the Consultation Committee on 19 December 2018, and to ensure that the adjusted incorporation obligation does not negatively impact on the Regions' renewable energy and CO₂ emission figures.

Every two years, a study will examine the following aspects: technical feasibility of the incorporation rate; availability of raw materials; environmental integrity and potential usage conflicts; availability of advanced fuels, including recycled carbon fuels, and technological developments on the European market; availability of other renewable energy sources; consumer costs.

The first of these interfederal studies will be carried out in the second half of 2020, after consulting the relevant stakeholders, and will allow the incorporation rate to be adjusted, if necessary. If the target is not met, alternative federal measures will be implemented to achieve the same level of emissions reduction and to contribute to the renewable energy target. The Regions may themselves adopt additional alternative measures, if they so wish.

Flemish Region

Based on an update of the sub-targets in the Energy Plan 2020, additional growth is anticipated in the generation of renewable energy in Flanders. This presumed growth will particularly stem from the future development of green heat and also solar and wind energy.

The projections for Flanders, taking into account additional policy measures, therefore indicate a total renewable energy generation in Flanders of 28,512 GWh in 2030, which is an increase of 812 GWH over the draft Flemish Energy Plan of July 2018, which projected a figure of 27,700 GWh.

Walloon Region

In its resolution of 28 September 2017, the Walloon parliament called on the government to set a target of 100% renewable energy in the final energy consumption of Wallonia by 2050.

The Energy Pact drafted by the four Belgian Energy Ministers in December 2017 set a target of 40% renewable electricity by 2030.

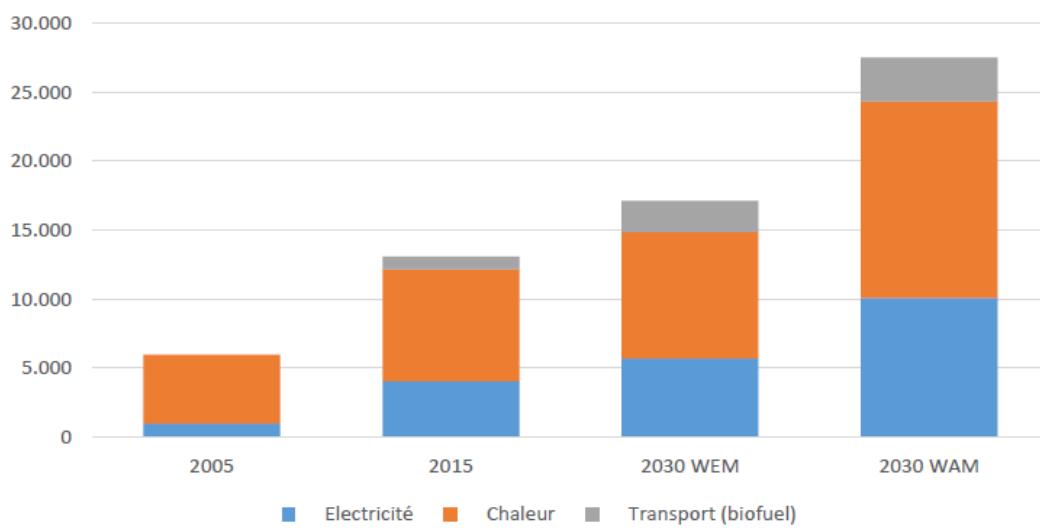
Renewable energy targets

GWh	Achieved in 2015	Achieved in 2016	2020 target	2030 target	
				WEM (28)	WAM (29)
Electricity	4,060	4,463	5,555	5,691	10,081
Heating	8,108	8,706	8,900	9,170	14,233
Transport*	906	1,596	2,382	2,263	3,187
Final consumption of renewables	13,073	14,765	16,837	17,124	27,501
Gross final consumption	121,700	124,194	120,770	131,955	117,032
Share of RES in final consumption	10.74%	11.89%	13.94%	12.98%	23.50%

* Biofuels (incorporation rate of 14% set by the Federal Government) and biogas only (renewable electricity for transport included in 'electricity').

The envisaged policies and measures will lead to a **total share of renewable energy sources of 23.5% in 2030**, i.e. 10.5 percentage points more than the scenario with existing measures. The highest share in the WAM scenario compared with the WEM scenario results not only from an increase in renewable generation, but also from a reduction in gross final energy consumption.

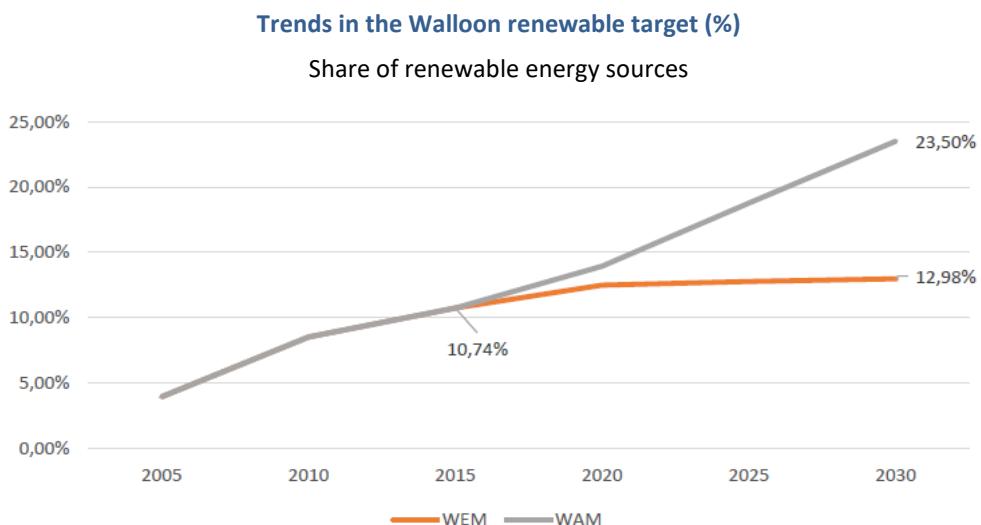
Trends in final renewable consumption in Wallonia (GWh)



Electricité	Electricity
Chaleur	Heating
Transport (biofuel)	Transport (biofuels)

²⁸ WEM: With Existing Measures.

²⁹ WAM: With Additional Measures.



Indicative trajectory: share of renewables in 2022, 2025 and 2027

Indicative trajectory	2020	2022	2025	2027	2030
Share of renewables (%)	13.94%	15.85%	18.76%	20.64%	23.50%
Minimum trajectory imposed by the EU (%)	13%	15.66%	18.05%	20.15%	23.50%

Brussels Capital Region

The Brussels Capital Region will contribute to the national effort, bearing in mind its specific context, which is characterised by heavy urbanisation and limited space. The strategy and policy for the development of renewable energy in Brussels will ensure that they:

- are adapted to the availability and scarcity of the natural resources needed for this purpose;
- remain consistent with the water policy (in particular the installation of green roofs to delay flooding, etc.).

Targets

Intra muros

The context for setting the renewable energy target for Brussels for 2030 is complex. The dense urban configuration, proximity of the national airport (which prevents wind projects) and large number of tenants (which are specific regional characteristics that make uniform and rapid deployment of renewable energy complex) will all have an impact during the period 2021-2030 on the generation of renewable energy in the Brussels Capital Region.

1. Firstly, bio-waste flows that are currently recovered at the Neder-Over-Heembeek incinerator will be reduced (see above).
2. Secondly, the use of bioliquids in cogeneration plants is set to gradually reduce. The volatility of rapeseed will undoubtedly prevent new investments in this segment.
3. Thirdly, public health imperatives will gradually reduce the use of solid biomass (wood and coal segment) in the coming years due to its emissions of fine particulate matter.
4. Finally, Eurostat recently provided us with clarification on how to deal with the incinerator-turbine coupling at Neder-Over-Heembeek in our figures. The result is a decrease in the contribution from this installation of approximately 80 GWh due to the ban on including energy consumed internally during the process, which was previously included in the regional accounting.

Despite this intrinsic context, the region fully intends to continue the intra muros roll-out of renewable energy sources suited to the urban context.

The combined target set for the electricity and heating and cooling sectors is therefore **470 GWh by 2030**. By way of comparison, the revised figures for 2020 incorporating the Eurostat information indicate a combined level of renewable energy for electricity and heating of around 330 GWh.

The table below shows the expected trend in the use of renewable energy sources in the regional territory between 2021 and 2030. In view of the division of powers, the efforts made by Brussels, as indicated in this table, concern only the generation of electricity, heating and cooling using renewable sources⁽³⁰⁾.

Unit: GWh	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
RES-E	234.66	239.32	244.36	249.77	255.58	270.51	271.17	281.33	292.06	303.48
PV Solar	99.76	105.38	111.31	117.58	124.20	139.90	150.30	161.17	172.59	184.68
Municipal waste	112.79	111.84	110.94	110.09	109.27	108.50	107.75	107.04	106.35	105.68
Biogas	13.12	13.12	13.12	13.12	13.12	13.12	13.12	13.12	13.12	13.12
Liquid fuels	8.99	8.99	8.99	8.99	8.99	8.99	-	-	-	-
RES H&C	136.11	138.00	139.92	144.19	148.56	153.00	152.19	157.03	162.08	167.44
Heat pumps	27.32	27.97	28.64	30.62	32.61	34.61	36.68	38.80	40.98	43.27
Solar thermal	16.72	17.84	19.04	21.29	23.63	26.04	28.60	31.28	34.11	37.12
Municipal waste	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08
Biogas	28.32	28.32	28.32	28.32	28.32	28.32	28.32	28.32	28.32	28.32
Solid fuels	57.21	57.32	57.38	57.42	57.46	57.48	57.51	57.55	57.59	57.65
Liquid fuels	5.47	5.47	5.47	5.47	5.47	5.47	-	-	-	-
Total	370.77	377.32	384.28	393.97	404.15	423.50	423.37	438.36	454.14	470.92

Extra muros

The European targets and those assigned to Belgium are ambitious. The Energy Pact also focuses on a future based on the increased and very significant use of renewable energy sources.

Despite its significant current and future efforts, the Brussels Capital Region has limited capacity in its territory. Renewable energy resources are, however, available (sometimes at a better price) in neighbouring territories or ones that are relatively close to the region. In this context, the region therefore also wants to develop a policy of extra muros investment in new renewable energy generation plants by, for example, setting up joint projects with other Member States or other cooperation mechanisms provided for Directive (EU) 2018/2001.

Such investments should enable the region to have an additional **700 GWh** in order to reach the threshold of **1,170 GWh** of renewable energy in 2030, by combining the intra muros efforts in the electricity and heating sectors with extra muros efforts. This should enable the region to play a full role in the European and Energy Pact processes.

This investment strategy is yet to be refined, but a choice based on the generation of electricity from renewable sources would be consistent with the prospects of increased electrification of a number of uses. These included heat with heat pumps and transport with electromobility.

The region currently imports over 90% of the energy that it consumes and this extra muros investment policy would therefore significantly develop the region's renewable supply and contribute to the reduction of regional indirect emissions.

ii. Estimated trajectories for the sectoral share of renewable energy in final energy consumption from 2021 to 2030 in the electricity, heating and cooling, and transport sectors

In 2017, 18.2% of the electricity generated in Belgium came from renewable sources.

³⁰ Renewable energy in the transport sector (included in the template for the NECP) is the responsibility of the Federal State.

Federal State

- Offshore:

In 2020, the final three wind farms will be constructed and the total capacity will reach 2,261 MW. A call for tender system will be set up to handle the next wave of offshore wind energy. Given that much of this area is within the Natura 2000 area, studies will be carried out in advance of the calls for tender in order to resolve any issues connected with this area. The first study, which is already being carried out by the Royal Belgian Institute of Natural Sciences (Institut royal des Sciences naturelles de Belgique – IRSNB), will specifically look at the impact of wind farms on this Natura 2000 area. Its first results will be published in 2020.

Along the lines of the Dutch model, a coordinator will also be appointed to carry out several preliminary offshore studies which will allow a wind farm to be constructed and operated with less risk, and therefore less cost.

These studies will take time. In addition, the harmonisation of the offshore transmission system and the onshore transmission system must be guaranteed.

Given all these stages, the first call for tender is expected in the first quarter of 2023, meaning that the first farm with a maximum output of 700 MW may be operational by 2025. The second call for tender should be launched in 2025, providing an additional capacity of 1,050 MW by 2027.

With 2,261 MW of installed capacity in 2020, and 1,750 MW of additional capacity over the period 2020-2030, by the end of this period there will be 4,011 MW of installed capacity in the Belgian North Sea.

Since October 2018, Belgium has had an installed offshore wind capacity of 1,553 GW. In 2030, the contribution of offshore wind to Belgium's renewable energy mix will be 4 GW.

In the context of the regional cooperation with other countries bordering the North Sea, Belgium will further exploit the MOG/North Seas Energy Cooperation (NSEC)/international waters potential. Belgium will engage with its neighbours in regional and bilateral cooperative relationships with a view to developing joint projects for the generation of offshore energy, particularly within the framework of NSEC.

The development of renewable energy must also take account of a social objective and must benefit all consumers.

- Biofuels:

Suppliers of diesel and/or petrol are required to demonstrate on an annual basis that the volumes released for consumption contain a nominal volume of sustainable biofuels.

Since 1 January 2017, the minimum content of sustainable biofuels has been 8.5% by volume for petrol and 6% by volume for diesel (5.5-5.6% expressed in energy terms for both petrol and diesel). Under the Law of 13 July 2013, in 2020 this minimum content will increase to 8.5% expressed in energy terms for both petrol and diesel. The Royal Decree increasing the minimum content of sustainable biofuels to 8.5% in energy terms will enter into force on 1 January 2020.

Another Royal Decree is being prepared that will increase the minimum content to 9.55% expressed in nominal terms from 2020.

To overcome the coexistence of two Royal Decrees for 2020, a transitional period has been specified:

- 8.5% expressed in energy terms for the first quarter of 2020;
- 9.9% expressed in energy terms for the second, third and fourth quarters of 2020.

This transitional period will enable the figure of 9.55% expressed in nominal terms to be achieved for the whole of 2020.

For 2021, the minimum content will be 8.95% in real terms or 9.55% expressed in nominal terms.

For the trajectory beyond 2020, see point 2.1.2(i).

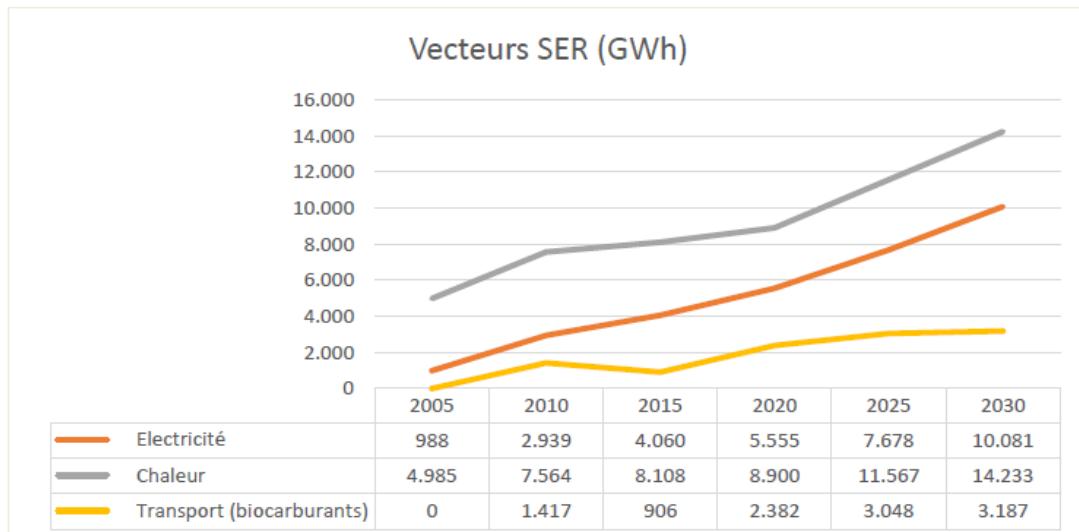
Flemish Region

Generation (GWh)	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Green heat	8,589	8,657	8,732	8,815	8,905	9,004	9,122	9,249	9,386	9,532	9,688
Green electricity	9,695	9,987	10,280	10,572	10,864	11,156	11,481	11,806	12,131	12,456	12,780
Biofuels in transport	5,167	5,059	4,950	4,842	4,734	6,608	6,323	6,037	5,751	5,466	6,044
Total	23,451	23,703	23,962	24,229	24,503	26,768	26,925	27,092	27,267	27,454	28,512

Generation (ktoe)	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Green heat	738.7	744.5	751.0	758.1	765.8	774.3	784.4	795.4	807.2	819.7	833.1
Green electricity	833.8	858.9	884.0	909.2	934.3	959.4	987.4	1,015.3	1,043.2	1,071.2	1,099.1
Biofuels in transport	444.4	435.1	425.7	416.4	407.1	568.3	543.8	519.2	494.6	470.1	519.8
Total	2,016.8	2,038.5	2,060.7	2,083.7	2,107.2	2,302.0	2,315.6	2,329.9	2,345.0	2,361.0	2,452.0

Walloon Region

Trends in renewable energy in Wallonia by carrier (electricity, heating, transport) in the WM (with measures) scenario (GWh)



Vecteurs SER (GWh)	Renewable energy carriers (GWh)
Electricité	Electricity
Chaleur	Heating
Transport (biocarburants)	Transport (biofuels)

Renewable electricity targets

The estimated generation of renewable electricity in 2030 is 10 TWh, i.e. an increase of 4.5 TWh over the 2020 estimate.

According to these estimates, 10,081 GWh of renewable electricity will be generated, i.e. around **37% of the final electricity consumption in 2030**.

Renewable heat targets

The estimated production of renewable heat in 2030 is 14.2 TWh, i.e. an increase of 5.3 TWh over the 2020 estimate.

An increase of 55% in renewable heat production is envisaged with regard to the baseline scenario.

These efforts will result in **renewable heat contributing 24.7% of the gross final heat consumption** (compared with 13.1% in 2015 and 14.7% in 2020).

Renewable transport target

The renewable transport target is significantly higher than the WEM figure due to a higher biofuel incorporation rate (14%), the breakthrough of biogas and the increased take-up of electric vehicles.

- iii. Estimated trajectories by renewable energy technology that the Member State projects to use to achieve the overall and sectoral trajectories for renewable energy from 2021 to 2030, including expected total gross final energy consumption per technology and sector in Mtoe and total planned installed capacity (divided by new capacity and repowering) per technology and sector in MW*

Flemish Region

Estimated trajectories by technology – production of green heat

Production (GWh)	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Solar	193	200	208	216	224	233	243	253	264	276	287
Heat pumps	610	655	707	765	831	905	997	1,098	1,208	1,327	1,455
Geothermal energy	95	145	195	245	295	345	394	444	494	544	594
Biomass households	3,850	3,660	3,470	3,280	3,090	2,900	2,710	2,520	2,330	2,140	1,950
Biomass other	3,841	3,997	4,153	4,309	4,465	4,621	4,777	4,933	5,089	5,245	5,401
Total	8,589	8,657	8,732	8,815	8,905	9,004	9,122	9,249	9,386	9,532	9,688

Production (ktOE)	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Solar	16.6	17.2	17.8	18.5	19.3	20.0	20.9	21.8	22.7	23.7	24.7
Heat pumps	52.5	56.3	60.8	65.8	71.5	77.8	85.7	94.4	103.9	114.1	125.1
Geothermal energy	8.2	12.5	16.8	21.0	25.3	29.6	33.9	38.2	42.5	46.8	51.1
Biomass households	331.1	314.8	298.4	282.1	265.7	249.4	233.1	216.7	200.4	184.0	167.7
Biomass other	330.3	343.7	357.2	370.6	384.0	397.4	410.8	424.2	437.7	451.1	464.5
Total	738.7	744.5	751.0	758.1	765.8	774.3	784.4	795.4	807.2	819.7	833.1

Estimated trajectories by technology – generation of green electricity

Generation (GWh)	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Solar	3,230	3,515	3,800	4,085	4,370	4,655	4,973	5,291	5,608	5,926	6,244
Wind (onshore)	2,736	2,962	3,188	3,414	3,639	3,865	4,091	4,316	4,542	4,768	4,994
Hydroelectricity	9	9	9	9	9	9	9	9	9	9	9
Biomass	2,923	2,680	2,436	2,193	1,950	1,707	1,463	1,220	977	733	490
Biogas	797	822	846	871	896	921	945	970	995	1,019	1,044
Total	9,695	9,987	10,280	10,572	10,864	11,156	11,481	11,806	12,131	12,456	12,780

Generation (ktoe)	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Solar	277.8	302.3	326.8	351.3	375.8	400.3	427.7	455.0	482.3	509.6	537.0
Wind (onshore)	235.3	254.7	274.2	293.6	313.0	332.4	351.8	371.2	390.6	410.0	429.4
Hydroelectricity	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Biomass	251.4	230.5	209.5	188.6	167.7	146.8	125.8	104.9	84.0	63.1	42.1
Biogas	68.5	70.7	72.8	74.9	77.0	79.2	81.3	83.4	85.5	87.7	89.8
Total	833.8	858.9	884.0	909.2	934.3	959.4	987.4	1,015.3	1,043.2	1,071.2	1,099.1

Total capacity (MWe)	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Solar	3,600	3,900	4,200	4,500	4,800	5,100	5,418	5,736	6,053	6,371	6,689
Wind (onshore)	1,414	1,522	1,630	1,738	1,846	1,954	2,062	2,170	2,278	2,386	2,494
Hydroelectricity	4	4	4	4	4	4	4	4	4	4	4
Biomass	546	500	455	410	365	320	275	229	184	139	94
Biogas	144	146	148	150	152	155	157	159	161	163	165
Total	5,708	6,072	6,437	6,802	7,167	7,532	7,915	8,298	8,680	9,063	9,446

Changes from the Flemish Energy and Energy Climate Plan 2018

Based on the Commission's recommendations and comments from stakeholders, the onshore wind energy potential to 2030 has been further assessed. The draft plan took into account only the estimated potential for new sites. In addition, the repowering potential has also been determined, based on projects reaching the end of their life during the period 2020-2030. For these projects, the increase in power and generation has been calculated if the previous generation turbines are to be replaced with new, more efficient turbines offering increased power and more full-load hours. As a result, the potential growth in onshore wind energy has risen from 50 MW/year to 100 MW/year.

As for biofuels, the recently amended incorporation rates of 8.4% have been applied to the appropriate fuel consumption figures.

Since the draft plan, a year of additional figures for generation and for renewable energy projects carried out in the meantime has become available. For 2020, the starting point has therefore changed given the more up-to-date and realistic data and projections, meaning that we can now estimate generation for 2020 with much more accuracy.

This has particularly resulted in the following changes:

Green electricity (GWh)	Projection 2020	Sub-target 2020
Solar	3,230	3,544
Onshore wind	2,736	3,030
Hydroelectricity	9	9
Biomass	2,923	3,024
Biogas	797	912
Total	9,695	10,519

Green heat (GWh)	Projection 2020	Sub-target 2020
Solar water heaters	193	246
Heat pumps	610	610
Deep geothermal energy	95	164
Biomass households	3,850	4,327
Biomass other	3,841	4,327
Total	8,589	9,197

Green heat

Increased use of green heat potential has been chosen for the various heat technologies. It is nearly always more cost-effective to achieve the same contribution from green heat as through green electricity or transport.

For heat pumps, the system cost (impact on network load, higher investment and support costs than for other green heat sources) is higher than for other (renewable) options. Not everyone will choose a heat pump for a renovation or replacement investment. To encourage greater use of heat pumps, the cost effectiveness of heat pumps in dwellings with a falling demand for heat and the integration of heat pumps in the electricity market and system must improve. This can be achieved, for example, by adopting a more flexible approach to heat pumps, allowing owners to take advantage of cheaper energy prices through a smart meter.

District heating systems contribute to more efficient heat production and offer the infrastructure needed to facilitate the transition to renewable energy sources.

The main focus will continue to be on district heating systems that facilitate the use of renewable heat or waste heat. This has been the focus in recent years, through regular calls for green heat (including district heating systems), waste heat (networks), biomethane injection and geothermal energy.

A Heat Plan 2025 (Plan Chaleur 2025) with projections to 2030 will be prepared in order to increase green heat production.

Solar water heaters

The potential of solar water heaters has been determined from the data in the EPB database and from the number of incentives granted by system operators, taking into account the expected number of households by 2030. An average annual increase of 5,000 solar water heaters is expected. This figure is lower than the assumptions made in the Energy Plan 2020, but will be offset by the noted shift from solar water heaters to heat pump water heaters and by stronger growth in the production of heat pumps. Between 2014 and 2017, on average 7,250 solar water heaters were added each year. The number of additional solar water heaters fell in 2018 to 3,602. The production is estimated by multiplying the number of solar water heaters by indicators for the required (roof) area and for related production. These indicators are based on information gathered for the Flanders Inventory of renewable energy sources 2005-2016 (Jespers et al., October 2017). It is assumed that a domestic solar water heaters needs an average roof area of 5 m² and achieves an average heat production of 0.37 MWh per m² per year. These are representative figures for solar water heaters used for domestic hot water (i.e. excluding space heating).

Heat pumps

To ensure a realistic growth scenario, a projected production of 1,455 GWh by 2030 is proposed. To achieve this, the number of additional heat pumps will have to increase every year from 4,550 in 2021 to 12,000 in 2030. Installation of heat pumps in new buildings will increase sharply due to several measures planned in the government agreement. Heating oil boilers can no longer be installed in new buildings and during major energy renovations from 2021, and a gas connection will no longer be possible in new large-scale developments and large apartment buildings, except for district heating by cogeneration or in combination with a renewable energy system as the main heating system. Overall (new-builds and renovations), 3,832 and 4,196 heat pumps were installed in 2017 and 2018 respectively.

Furthermore, this potential anticipates 1,000 gas condensing boilers being replaced every year by hybrid systems in existing dwellings that are not being renovated. This figure has been revised downwards from the draft Energy Plan because it was found that only a few tens of these hybrid systems are being installed every year.

In addition, it is estimated that 4,500 electric boilers are being placed every year by heat pump boilers. In 2017 and 2018 respectively, 3,029 and 3,194 heat pump boilers were installed in this context.

The government agreement stipulates an increase in the minimum share of renewable energy in new-builds. In this context, it has also been considered whether the minimum share of renewable energy in new-builds should be split into a minimum share of green electricity and a minimum share of green heat. Use of local energy communities could also result in additional heat pumps.

Deep geothermal energy

The Vito paper 'Nota potentieel diepe geothermie, december 2016' (Paper on the potential of deep geothermal energy, December 2016) was used to assess the potential of deep geothermal energy. This type of energy is still limited to a few projects in Flanders. Any estimate of the future supply of deep geothermal energy is consequently rather theoretical. Under the present circumstances, it is difficult to find worthwhile business cases. Pilot projects provide greater insight into the geothermal potential and the technical, economic, social and legal conditions.

The production of green heat by 12 installations with boreholes at between 500 and 3,500 metres and associated district heating systems has been used to determine the potential to 2030. This projection will not change until two ongoing geothermal projects included in the government agreement have been assessed.

Biomass and biogas

The potential of green electricity from biomass and biogas was examined in the Vito study 'Het potentieel van bio-energie in Vlaanderen in 2030, April 2017' (The potential of bio-energy in Flanders in 2030, April 2017). In consultation with experts, a realistic growth target to 2030 was determined. Seven biomass value chains were chosen in the study, which examined the flows used in existing bio-energy installations in Flanders and recent developments in the commercial market. Incineration and anaerobic digestion are the basic conversion technologies chosen for Flanders up to 2030.

When determining the potential, it was important to realistically estimate changes in the existing bio-energy capacity. This is due to the fact that each existing installation will reach 10 years of age during the period to 2030. Support for those installations with a start date prior to 2013 will end after the initial period of aid and the legally guaranteed possibility of extension, as provided for in Article 7.1.1(1) of the Energy Decree (i.e. two five-year extensions are possible based on full-load hours). As each installation individually assesses whether or not to continue, work on the existing value chains assumed a range from complete closure to status quo of the existing bio-energy capacity. In addition to changes in the existing capacity, consideration was given to the possibilities of extending the various value chains.

This study, which estimates the potential, shows that, for those bio-energy value chains in Flanders that are currently fully developed and that will reach 10 years of age during the period to 2030, it remains important to provide a forward-looking policy framework. New biomass value chains are gradually finding their way into the existing Flemish renewable energy policy. For these value chains, the potential as an energy source is often linked to challenges in other policy areas, such as agriculture and materials.

For residential wood-burning, we have committed to a partial shift towards medium-sized combustion plants that use local biomass to efficiently heat local public and private buildings, with fewer toxic emissions, via a (small-scale) district heating system. As a result, the focus is on replacement of plants to improve overall efficiency and emissions. The same quantity of heat is supplied, but less wood is used. According to the Eurostat methodology, the wood consumption is taken into account for the target, but not for the heat production. This results in a reduction in the contribution to the European renewable energy targets due to the consumption of wood by households. The falling wood consumption in the residential sector is 60% offset by the quantity of wood that this releases to be partly used in medium-sized installations (1 MWth) in industry, agriculture or the tertiary sector. The shift from residential consumption of wood to medium-sized combustion installations is included in the objectives and actions of the Flemish Green Deal for domestic wood heating. Through a systematic approach, a structured action plan and broad cooperation among the public bodies involved, social organisations, businesses and other stakeholders, this Green Deal aims to encourage solutions that will reduce emissions from domestic wood heating by at least 50% by 2030. The focus will therefore mainly be on decommissioning old heating appliances that are the most polluting. The target is to decommission 100% of these old appliances by 2030 (with a minimum of 50%). This will be achieved, on the one hand, by replacing these old appliances with new, more efficient wood heating appliances or alternative heating systems and, on the other hand, by simply decommissioning them without any replacement. This could release a quantity of

wood in line with the projections for the generation of renewable energy by 2030, as indicated. The Green Deal action plan for domestic wood heating is included in the Flemish Air Policy Plan 2030.

As regards waste incineration, a significant shift from green electricity to green heat is anticipated in the form of district heating systems. A 25% reduction in waste by 2030 due to waste policy measures has also been calculated. The incineration capacity to be maintained in the meantime must achieve the highest possible energy efficiency and the lowest possible emissions.

In collaboration with major partners, the firm focus will be on compulsory selective collection of organic waste from large and medium-sized producers of this waste. The potential for anaerobic digestion will increase as a result. The pre-fermentation of vegetable, fruit and garden waste, before the waste is composted, releases biogas that can then be used to generate renewable energy. To this end, it is expected that some composting plants for vegetable, fruit and garden waste will be (partly) converted to pre-fermentation followed by composting.

District heating systems

An important role is assigned to the further expansion of district heating systems in Flanders. Approximately 560 GWh of heat is supplied every year via the current systems. Based on the projects submitted in various calls and in relation to strategic environmental aid, further growth of 1,000 GWh is estimated by 2020 (250 GWh/year in the period 2017-2020). This growth will continue to 2030. Based on the district heating systems planned to 2020, around 50% of these heat supplies are expected to come from renewable energy sources, which represents an increase in the use of green heat of approximately 125 GWh per year. As the supply of green heat via district heating systems will mostly come from heat pumps, geothermal energy, solar water heaters and biomass (waste incineration), for which significant additional growth is already projected, no extra renewable energy potential through district heating systems has been taken into account. District heating systems are an instrument allowing renewable energy sources to be used, with this use having already been taken into account for each heat source.

In accordance with the government agreement, the regulatory framework, EPB regulations and call for green and waste heat are being assessed with a view to further promoting the development of district heating systems supplied with green and waste heat. Flanders is helping local authorities to produce a Heat Plan.

Heat zoning plans are being prepared for the 2019-2024 parliamentary term. The public and businesses can only make the right investment choices if they have sufficient information on the long-term strategy. This strategy is set out in a heat zoning plan and is based on data on energy consumption and generation, new or existing waste heat sources, the possibility of establishing a district heating system, the possibility of a new decentralised (and preferably renewable) heat production plant, and so on.

Green electricity

Photovoltaic solar power

As solar panels can be installed with limited subsidy costs (with no more direct subsidies for installations up to 40 kW, large projects have fewer unprofitable parts than other technologies in the same aid period), the vision of the Solar Plan continues to be pursued, with maximum use being made of this potential. Other secondary conditions are being taken into account in this respect, such as integration in the system and the generating potential within a stable supply side (stable market for suppliers and installers).

Detailed potential has been identified on the basis of the solar map. This map depicts the available roof areas, with only those roof areas with optimum orientation, without shade and with a sufficient surface area being included.

Using the solar map, a potential of 57 GWe has been identified in the 'ideal' suitability class with incident solar radiation of more than 1,000 kWh/m²/year. The potential of the 'usable' suitability class with incident solar radiation of between 800 kWh/m²/year and 1,000 kWh/m²/year is 15 GWe. At the end of 2019, the installed PV

capacity was approximately 3.2 GWe. The solar map shows that there is sufficient potential available on roofs to achieve significant growth.

Further annual growth of 300 MWe is estimated over the period 2021-2025, with 318 MWe per year from 2025 onwards, with the aim being for solar PV capacity to reach 6.7 GWe in Flanders by 2030. This target is easily within the potential identified using the solar map, and also within the system integration and balancing capacity.

A Solar Plan 2025 with projections to 2030 will be produced in order to increase solar power.

Under the Flemish government agreement, the existing investment aid system is to be expanded through budgets set annually for small and medium-sized wind farms and medium-sized PV projects from 2021 so that the most cost-effective projects are carried out. The aid system is to be funded by the Energy Fund.

Wind energy

As regards wind energy, the targets of the wind plan ‘Windkracht 2020’ (Wind Power 2020) have been taken into account with the installation of 280 additional wind turbines between 2016 and 2020. This corresponds to average annual growth of 50 to 60 turbines or 150 MWe of additional wind capacity, largely on the basis of projects that have already been authorised. ‘Windkracht 2020’ therefore corresponds to an installed capacity of 1.5 GWe by 2020, including around 80 MW that is likely to be completed after 2020, or a further 8 MW/year on average over the period 2021-2030. According to the latest projections, the average growth rate of approximately 59 MW/year due to new sites will continue over the period 2021-2030, with 49 MW/year due to the repowering of existing sites. With this total additional annual capacity of 108 MW/year, the total installed capacity will amount to 2.5 GWe by 2030.

A Wind Plan 2025 with projections to 2030 will be produced in order to increase wind power.

Biogas

Biogas plants need significant energy subsidies (compared with sun and wind), but must be viewed in a broader context than just energy policy. This is an energy source that not only is available in the country, but that also contributes to other objectives such as security of supply and system stability, conversion of fertilisers and nutrients, the circular economy and land carbon stocks.

In this respect, the use of available domestic flows, thereby ensuring the desired transfer to green heat, should be supported. This potential is already being exploited to a significant extent, with no real increase being expected unlike the other potentials that have already been mentioned. In order to maximise the energy potential of biogas, a biogas usage framework is being developed, particularly involving injection into the natural gas system.

As already mentioned, the potential of green electricity from biomass and biogas was examined in the Vito study ‘Het potentieel van bio-energie in Vlaanderen in 2030, April 2017’ (The potential of bio-energy in Flanders in 2030, April 2017).

With regard to biogas, a slight rise in production has been included because 10 additional plants for the anaerobic digestion of vegetable, fruit and garden waste and additional small-scale anaerobic digesters are planned in the agricultural sector.

Biomass

With regard to large-scale biomass plants run on waste wood, it is assumed that the capacity projected in the Energy Plan 2020 will be maintained to 2030. The Max Green power station run on wood pellets will be decommissioned in the period between 2020 and 2030, and conversion to green heat via district heating systems is assumed for most plants running on biomass waste. This explains the fall in the generation of green electricity from biomass.

This renewable energy source also needs significant energy subsidies of various types. In addition, reservations have been expressed about the impact of using biomass on sustainability targets, more cost-effective use of biomass to produce green heat, the limited availability of biomass and the affordability of the targets.

Due to the potential impact on raw material markets (for industry and food), the impact on ecosystems and the effects of the indirect change in land use, new projects will be approved on the basis of (existing) secondary conditions and maximum energy efficiency (expressed as maximum primary energy savings), which will allow negative effects to be avoided. For that reason, the Energy Decree stipulates that aid for green electricity can be granted only for biomass or biogas that is used in qualitative cogeneration.

Biofuels

The incorporation rate has been applied to fuel consumption that takes account of a WAM scenario and a recent increased incorporation rate of 8.4% (excluding double counting of advanced biofuels) from 2020 to 2024.

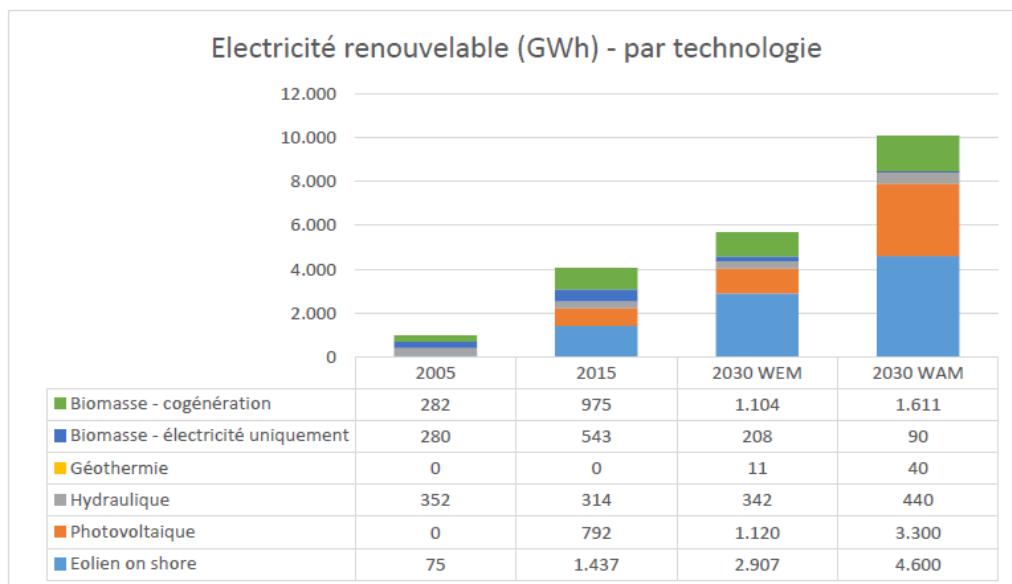
As regards biofuels in transport, reference has been mainly made to federal policy plans as most of the powers in relation to policy are held by the federal level. Furthermore, expectations are for a stabilisation of the relatively limited use of renewable energy sources (compared with the production of green heat and electricity), although there will be a shift from first generation biofuels to advanced biofuels. In accordance with RED II, the share of biofuels will gradually be increased to 14% by 2030.

Incorporation rate	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
(%)	8.4	8.4	8.4	8.4	8.4	12.0	12.0	12.0	12.0	12.0	14.0

Walloon Region

Renewable electricity targets

Trends in renewable electricity by technology in the WEM and WAM scenarios (GWh)



Electricité renouvelable (GWh) - par technologie	Renewable electricity (GWh) – by technology
Biomasse - cogénération	Biomass – cogeneration
Biomasse - électricité uniquement	Biomass – electricity only
Géothermie	Geothermal energy

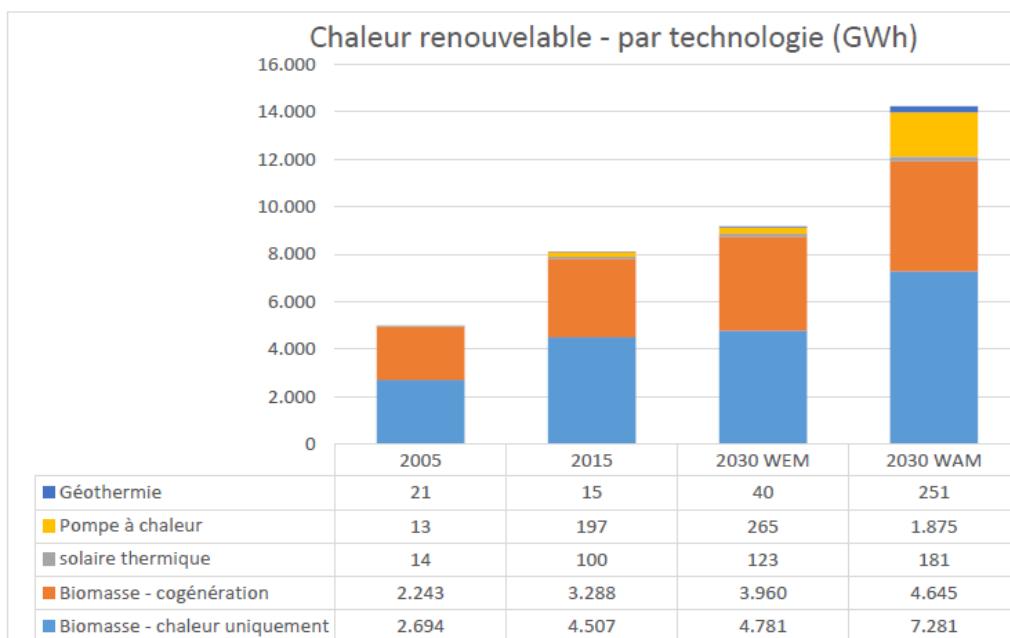
Hydraulique	Hydropower
Photovoltaïque	Photovoltaic
Eolien on shore	Onshore wind

A larger increase, compared with the baseline scenario, is projected in the wind and photovoltaic sectors (+58% and +195% respectively).

According to these estimates, 10,081 GWh of renewable electricity will be generated; in other words, **the share of renewable electricity in final electricity consumption in 2030 will be around 37%**. It should be noted that the development of offshore wind will by itself achieve 40% of the Belgian target.

Renewable heat targets

Trends in renewable heat by technology in the WEM and WAM scenarios (GWh)



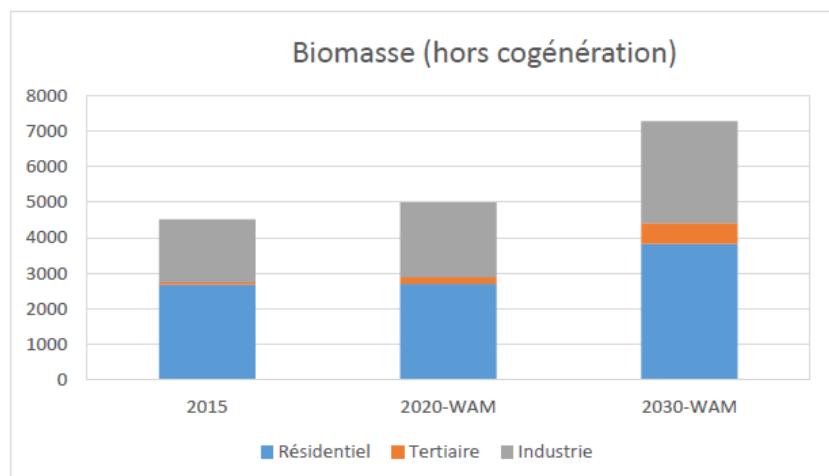
Chaleur renouvelable - par technologie (GWh)	Renewable heat – by technology (GWh)
Géothermie	Geothermal energy
Pompe à chaleur	Heat pump
solaire thermique	Solar thermal
Biomasse - cogénération	Biomass – cogeneration
Biomasse - chaleur uniquement	Biomass – heat only

Compared with the baseline scenario, the production of renewable heat is projected to rise by 55%.

All the technologies and sectors are involved in meeting this target, as shown by the following graphs for solar thermal, heat pumps and biomass (31) (excluding cogeneration).

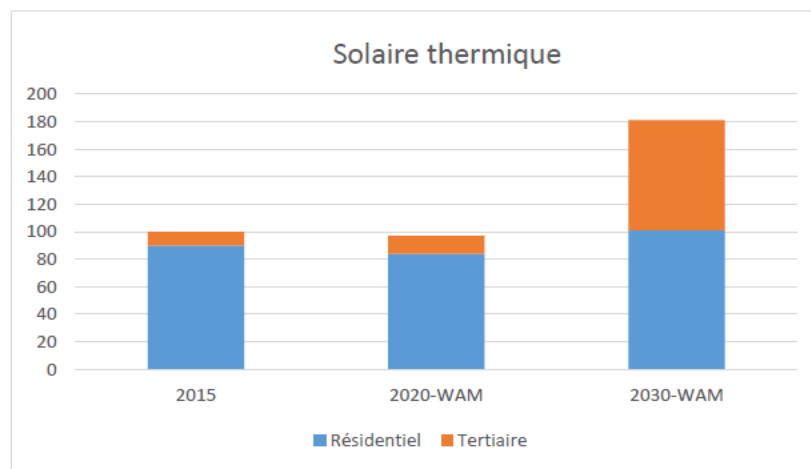
³¹ Solid biomass and biogas.

Trends in consumption from biomass (excluding cogeneration) in the various sectors



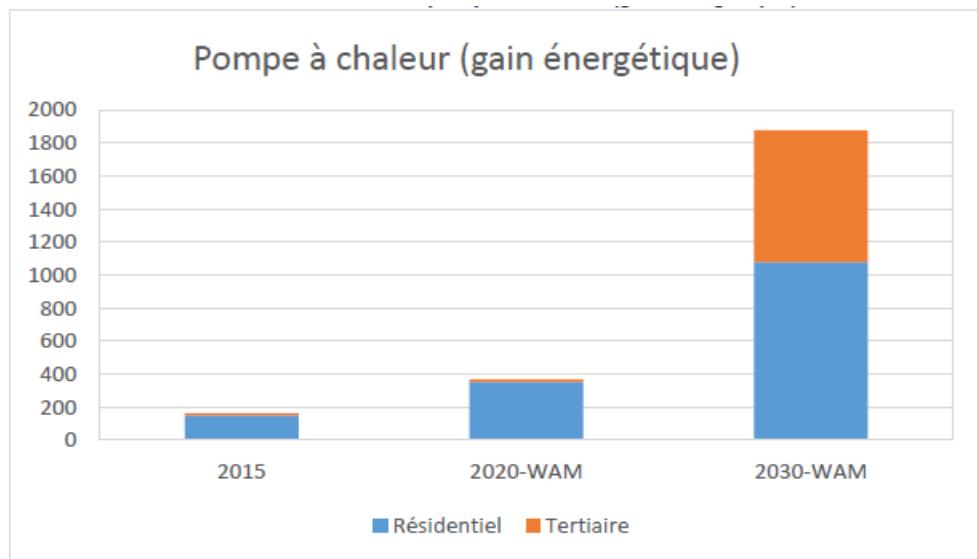
Biomasse (hors cogénération)	Biomass (excluding cogeneration)
Résidentiel	Residential
Tertiaire	Tertiary
Industrie	Industry

Trends in consumption from solar thermal in the various sectors



Solaire thermique	Solar thermal
Résidentiel	Residential
Tertiaire	Tertiary

Trends in consumption from heat pumps (energy gain) in the various sectors



Pompe à chaleur (gain énergétique)	Heat pump (energy gain)
Résidentiel	Residential
Tertiaire	Tertiary

These efforts will result in the **share of renewable heat in gross final heat consumption being 24.7%** (compared with 13.1% in 2015 and 14.7% in 2020).

The share of renewable energy sources in the heating and cooling sector will therefore rise by an average of 1 percentage point every year between 2020 and 2030. It is anticipated that each technology will develop in terms of its technical and economic potential. Furthermore, with regard to biomass, the impacts on air quality, the availability of materials and sustainability have also been taken into account. The potential has been calculated based on the hierarchy of plant resources.

- iv. *Estimated trajectories on bioenergy demand, disaggregated between heat, electricity and transport, and on biomass supply by feedstocks and origin (distinguishing between domestic production and imports). For forest biomass, an assessment of its source and impact on the LULUCF sink*

Federal State

The quantified and detailed measures and policies requested by the Commission are set out below in point 3.1.

Flemish Region

As regards the priority applications for biomass in the Flemish Region, we would refer you to the Action Plan ‘Duurzaam Beheer van Biomassa(rest)stromen’ (Sustainable management of (residual) biomass flows) prepared by the Public Waste Agency of Flanders (Société publique des Déchets de la Région flamande/Openbare Vlaamse Afvalstoffenmaatschappij – OVAM). In the period 2021-2030, we are expecting biomass to be much less used for generating electricity. With regard to heat production, we are also expecting less use of biomass in households due to the reduced consumption of wood by more efficient heating appliances. We predict that 60% of the biomass released from households in this way will be used in large-scale plants with better energy performance and lower emissions. The Action Plan also contains a framework and measures for the sustainable use of forest biomass.

Walloon Region

As indicated in point '*ii. Targets by sector and technology*', heat and electricity are produced from both solid biomass and biogas.

▪ **Forest resources**

With regard to the local supply of fuelwood, the proposal is to maintain the current status quo in the forest-wood sector (logging, softwood lumber industry, industry, etc.) so as not to disrupt the organisation of the wood sector. In a business-as-usual scenario, the latest simulations predicting changes in the use of Walloon forest resources therefore project an increase in the standing volume ⁽³²⁾ and, as a result, the continued function of our forests as a carbon sink.

According to the estimates proposed by ValBiom ⁽³³⁾, all the local supply sources combined total 7,806 GWh of fuelwood, distributed as follows:

Local forest resources (2030)

GWh	Primary energy available in 2030
'Firewood'	1,943
Pellets	2,342
Black liquor	2,447
Roadside wood	75
Grade B wood waste	925
Woodchips	74
TOTAL	7,806

With regard to imports, we note that the planned closure of the Awirs plant (100% fuelled by imported pellets) will reduce imports by around 800 GWh. On the other hand, a relatively small increase in fuelwood imports is expected, mainly for the production of heat.

▪ **Agrofuel resources** ⁽³⁴⁾

As a result of favourable and attractive conditions, it is considered that surface areas will increase faster than the recent trend, with 1,500 ha being estimated as available for production in 2030.

▪ **Biomethane production resources**

The exercise was carried out based on data from:

- 'Panorama de la biométhanisation en Wallonie' (Overview of biomethane production in Wallonia), 2018 edition (2017 figures);
- 'Potentiel de biométhane injectable en Belgique' (Potential of injectable biomethane in Belgium), 2019, in which the section on sources in Wallonia is based on the 'Cadastre de la biomasse wallonne valorisable énergétiquement - 2015, réactualisé en 2019' (Register of Walloon biomass recoverable for energy - 2015, reupdated in 2019).

The types of material have been grouped into seven main categories, as shown in the table below.

³² J. Perin et al., 2019. 'La forêt wallonne en 2040'. Prédiction de l'évolution des ressources forestières au moyen du modèle SIMREG appliqué aux données de l'inventaire permanent des ressources forestières wallonnes ('The Walloon Forest in 2040'. Prediction of changes in forest resources using the SIMREG model applied to data from the permanent inventory of Walloon forest resources).

³³ Note méthodologique sur la contribution des bioénergies aux objectifs du PACE/PNEC (Methodology note on the contribution of bioenergies to the PACE/NECP objectives (August 2019).

³⁴ Miscanthus, short-rotation willow coppice, etc.

According to ValBiom, local sources realistically total around **7,625 GWh** (theoretical potential to which a mobilisation factor is applied to take account of the technical, agronomic and environmental reality).

Biogas – Realistic sources by type of material

GWh	Overview for 2018 (already used)	Realistic sources
Biogas from landfills	150	0
Fermentable portion of household waste	24	113
Biogas from wastewater treatment plants	2	37
Biogas from agri-food residues	148	737
Biogas from crop residues	50	1,079
Biogas from livestock manure	48	1,635
Biogas from dedicated crops	59	4,024
TOTAL	482	7,625

To reach the assumptions made in this plan for cogeneration, heat only (mainly via injection) and transport (incorporation of 5% biogas) applications, less than one quarter of the total realistic sources need to be mobilised. We note that the percentage of use of the realistic sources varies according to the type of material in question: for example, these percentages will be higher in the case of waste and lower in the case of dedicated crops.

This additional potential can be used only if different mechanisms are introduced in the sector.

The ‘biowaste’ actions in the Walloon Waste and Resources Plan 2025 (Plan Wallon des déchets-ressources – PWD-R horizon 2025), which are confirmed in the Regional Policy Statement, will impact on the data/projections for recoverable biomass (through composting and/or biomethane production). These projections are currently being reviewed and updated.

In particular, widespread selective collection of biowaste from households and businesses, which is also required under the new Waste Framework Directive (EU) 2018/851 by 2023, risks impacting on the carbon balance of biowaste collection and treatment (incineration, biomethane production and composting). These new factors will be included in the Walloon Air, Climate and Energy Plan when it is revised in 2021.

- v. *Where applicable, other national trajectories and objectives, including those that are long term or sectoral (e.g. share of renewable energy in district heating, renewable energy use in buildings, renewable energy produced by cities, renewable energy communities and renewables self-consumers, energy recovered from the sludge acquired through the treatment of wastewater)*

Flemish Region

In the past, there has not been widespread use of urban heating in Flanders. However, since the introduction in 2013 of financial support through regular calls for tender for green heat, waste heat, district heating systems and geothermal energy, a large number of new projects have been carried out and are still planned.

At the end of 2017, around 600 GWh of heat were supplied by urban heating systems. Based on planned and approved projects, this figure is expected to continue rising to reach 1,500 GWh by 2020. According to the Energy Plan 2021-2030, there will be average growth of 250 GWh/year (4,000 GWh by 2030).

In 2017, 39% of the heat in these district heating systems was provided by renewable energy sources, with this figure being estimated to rise to 52% by 2020.

2.2. Dimension energy efficiency

i. The elements set out in point (b) of Article 4

Article 4(b)(1): the indicative national energy efficiency contribution to achieving the Union's energy efficiency targets of at least 32.5% in 2030, as referred to in Article 1(1) and Article 3(4) of Directive 2012/27/EU [as amended by proposal COM(2016)761], based on either primary or final energy consumption, primary or final energy savings, or energy intensity.

Belgium's contribution to the indicative European target will be obtained by combining the contributions of the various entities and will be expressed as primary energy consumption.

In 2030, primary energy consumption will be 42.7 Mtoe and final energy consumption will be 35.2 Mtoe. Compared with the PRIMES 2007 baseline, which estimates primary energy consumption at 50.1 Mtoe in 2030 and final energy consumption at 39.9 Mtoe in 2030, this implies an energy saving of 7.4 Mtoe, i.e. 15% for primary energy consumption compared with PRIMES 2007 in 2030 and, converted into final energy consumption, an energy saving of 4.7 Mtoe, i.e. 12% for final energy consumption compared with PRIMES 2007 in 2030.

In this respect, the entities will make the following efforts:

The federated entities will contribute to Belgium's contribution through policies and measures, and the Federal State, within the framework of its own powers, will contribute to Belgium's contribution through support measures.

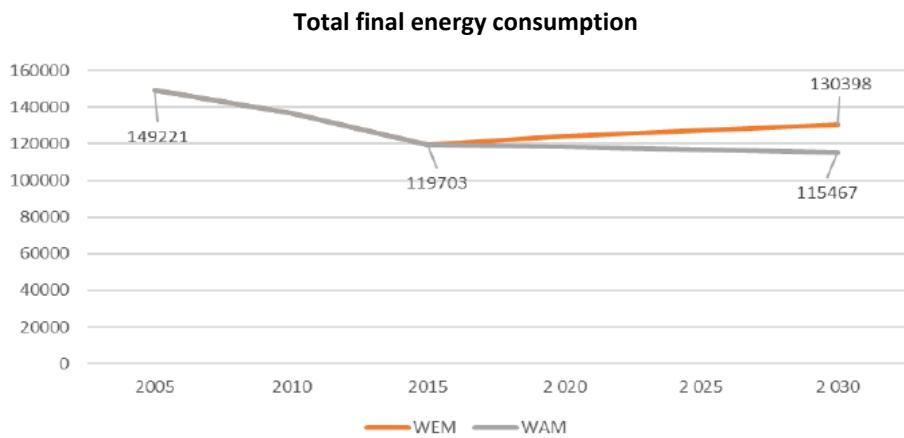
Flemish Region

Final (energy) consumption (GWh)	2007	2013	2014	2015	2016	2017	2030	2030
	Source: Energiebalans (Energy balance) 1990-2017						WEM	WAM
Residential	62,695	63,639	53,851	54,269	56,028	53,861	50,416	42,791
Tertiary	28,012	29,693	26,985	28,770	29,223	29,228	30,423	25,821
Industry	108,654	109,923	106,451	107,022	109,639	110,188	132,956	131,820
Transport	76,388	70,383	72,047	76,226	76,410	76,520	81,250	68,556
of which aviation	13,225	11,303	11,812	12,680	12,307	13,306	13,861	13,861
Agriculture	7,841	7,713	7,001	7,853	8,137	8,158	7,667	6,251
TOTAL	283,589	281,351	266,334	274,140	279,436	277,957	302,712	275,240

Walloon Region

Walloon Region: Final consumption

Based on the overall impact of the measures that Wallonia is planning between 2020 and 2030, the region's final consumption will fall by 11% compared with the baseline scenario, and by 23% compared with 2005, with a total of 115 TWh for all sectors.



Final consumption of Wallonia (GWh)

In the WAM scenario, the contribution of each sector to the final energy consumption savings is as follows:

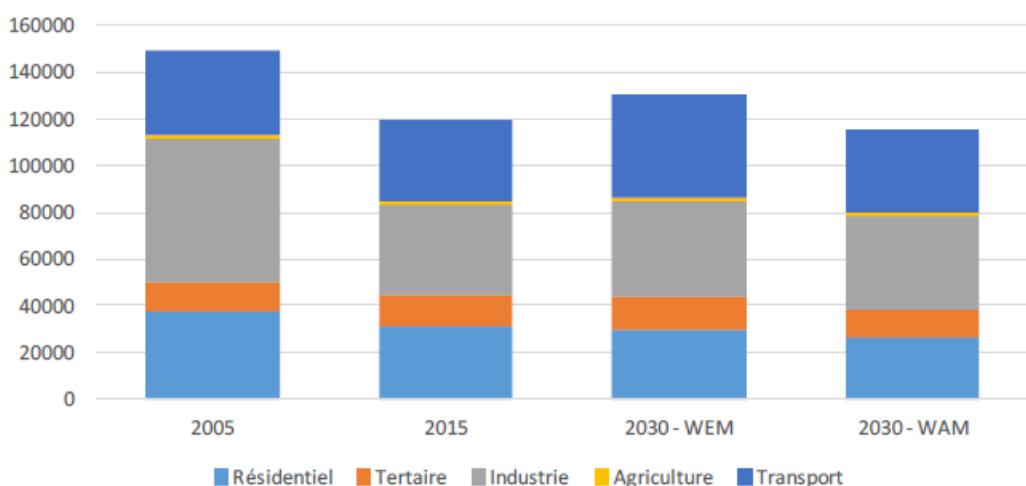
Final consumption in WAM scenario

Final consumption (GWh)	2005	2030 WEM	2020 WAM	2030 WAM	Difference (%)		
					2030 WAM-WEM	2030-2005 WAM	2030-2020 WAM
Residential	37,585	30,018	2,524	26,141	-12.92%	-30.45%	-11.46%
Tertiary	12,249	13,800	12,813	12,146	-11.99%	-0.84%	-5.21%
Industry	61,793	41,375	39,408	40,272	-2.67%	-34.83%	2.19%
Agriculture	1,289	1,289	1,289	1,289	0.00%	0.00%	0.00%
Transport	36,305	43,916	35,265	35,619	-18.89%	-1.89%	1%
TOTAL final energy consumption	149,221	130,398	118,300	115,467	-11.45%	-22.62%	-2.39%

Between 2020 and 2030, the measures involving building renovation, behavioural changes, energy performance of new buildings and increased use of renewable heat in buildings will have a significant impact in the residential and tertiary sectors.

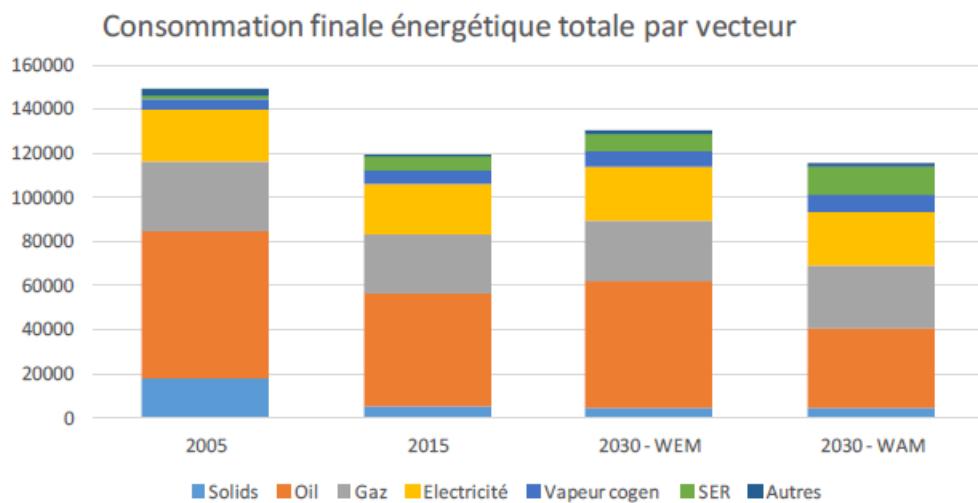
In the transport sector, Wallonia is aiming to make ambitious efforts by implementing its FAST programme. The new vehicle fleet structure (roll-out of electric and CNG vehicles, phasing out of traditional combustion engines) will also impact on the distribution of final consumption.

Final consumption by sector (GWh)
Consommation finale énergétique totale par secteur



Consommation finale énergétique totale par secteur	Total final energy consumption by sector
Résidentiel	Residential
Tertiaire	Tertiary
Industrie	Industry
Agriculture	Agriculture
Transport	Transport

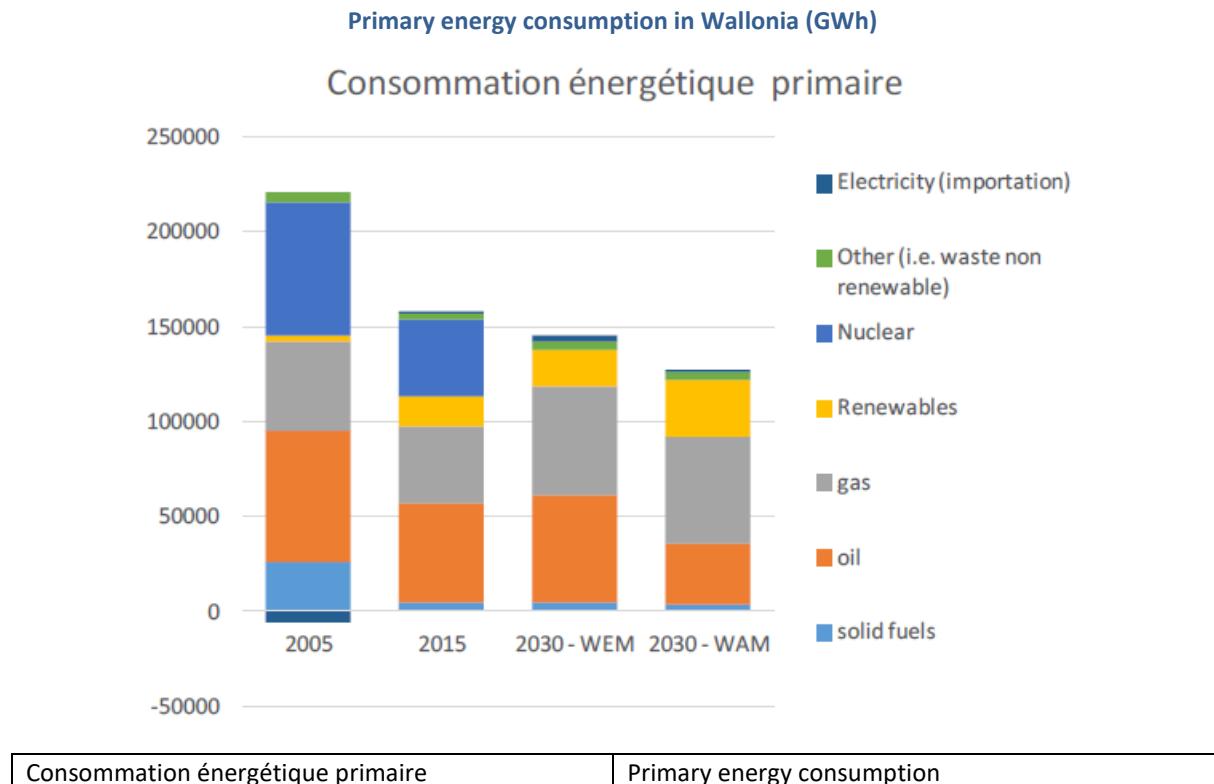
Final consumption by carrier (GWh)



Consommation finale énergétique totale par vecteur	Total final energy consumption by carrier
Solids	Solid fuels
Oil	Oil
Gaz	Gas
Électricité	Electricity
Vapeur cogen	Steam cogeneration
SER	RES
Autres	Other

Walloon Region: Primary consumption

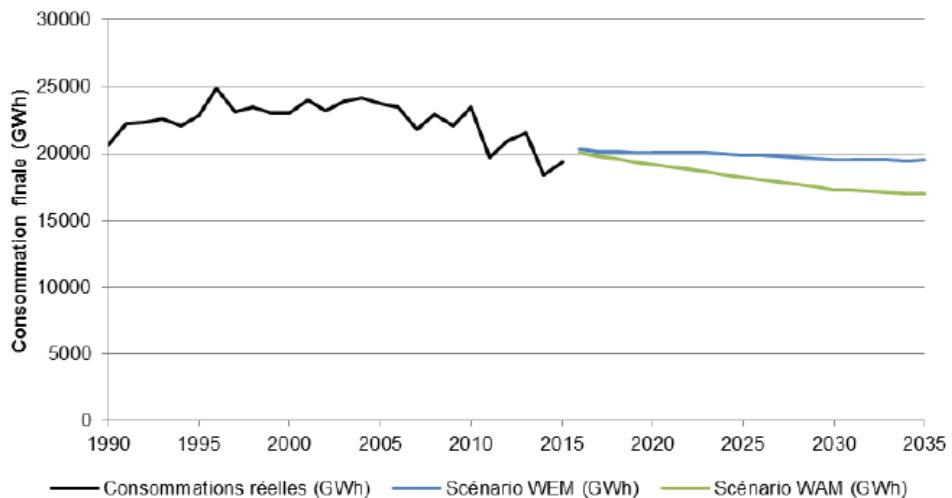
Primary consumption depends on the estimated electricity generating capacity. The effort shown here assumes the phasing out of nuclear power according to the current timetable and limited imports into Wallonia.



Primary energy consumption will fall by 36% compared with 2005 and by 15% compared with 2015. Primary consumption of oil products will fall sharply. This reduction will be offset by an increase in primary consumption of gas and renewables. The import of electricity in the WAM scenario is assumed to be relatively limited (1,600 GWh).

Brussels Capital Region

The following graph shows that the measures applied will reduce final energy consumption (as final energy) by 28.51% compared with 2005.



Consommation finale (GWh)	Final consumption (GWh)
Consommations réelles (GWh)	Actual consumption (GWh)
Scénario WEM (GWh)	WEM scenario (GWh)
Scénario WAM (GWh)	WAM scenario (GWh)

Article 4(b)(2): the cumulative amount of energy savings to be achieved over the period 2021-2030 under Article 7(1)(b) on energy savings obligations of Directive 2012/27/EU [as amended by proposal COM(2016)761].

Based on an initial assessment to be subsequently confirmed, Article 7(1)(b) on energy savings obligations of Directive 2012/27/EU imposes the obligation to make additional annual end-use energy savings of around 3.3 TWh, i.e. cumulative savings of approximately 185 TWh over the period 2021-2030.

As the final energy consumption for 2018 has not yet been finalised, the calculation is based on an estimate. The target will therefore need to be adjusted once the 2018 data are available.

All the federated entities will contribute to Belgium's target through policies and measures, and the Federal State, within the framework of its own powers, will contribute to Belgium's target through support measures.

Federal State

Within the framework of its own powers, the Federal State will contribute to Belgium's target through support measures.

Flemish Region

With regard to achieving the target in Article 7 for 2021-2030, the Flemish Region has for now decided not to implement an obligation scheme for distribution system operators or suppliers, but to initially continue along the path of alternative measures. As a result, the measures already notified to the European Commission during the period 2014-2020 will be continued in the WEM scenario (scenario with existing measures), with all existing and new measures taken into account in accordance with the European Commission's guidelines.

The following table indicates the measures under Article 7 and an initial estimate of the cumulative energy savings for the period 2021-2030:

Description	Cumulative savings (21-30) [TWh]
Rational energy use/public service obligations incentive for:	
roof insulation	7.925
glazing	1.891
wall	1.921
insulation of floors and basements	0.5810
solar water heater	0.029
heat pump	1.350
boiler with heat pump	0.422
Energy performance contract (including EPC extension with increase + reduction in the threshold in accordance with the energy plan declared at 0.1 PJ)	50.941
Environmental incentive + mini-EPC	3.685
Connection of SMEs to district heating systems	2.910
Optimisation of the settings of existing natural gas and heating oil boilers	3.641
E-Level < E30 (reduction on property tax)	0.358
Nudging via info on bills	0.532
Tax per kilometre for lorries (³⁵)	7.876
Total	84.062

On that basis, the Flemish Region's contribution to Belgium's target is 84.062 TWh.

Industry's contribution to the total energy savings made through all the alternative measures under Article 7 of the EED for the period 2021-2030 is 60%.

Walloon Region

Walloon Region: European obligation

Between 1 January 2021 and 31 December 2030, Wallonia must achieve a cumulative end-use energy savings target that is at least equivalent each year to 0.8% of its annual final consumption (calculated using the average for the years 2016, 2017 and 2018). In principle, this obligation will then be renewed every 10 years.

Although the Member States still have some flexibility in implementing this obligation scheme (choice between a white certificate scheme, alternative measures applied by the government or a mix of both), the rules for setting the target and for calculating the savings in order to achieve the target have been reinforced.

As a result, 0.8% of the total final energy consumption requires an annual effort of more than 1.5% of sales, excluding transport, over the previous period (2014-2020).

³⁵ The effect of the tax per kilometre for lorries has been calculated on an indicative basis. Further research is needed in collaboration with the two other regions and the Federal Government.

Basic target calculation (minimum absolute value)

Year	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Cumulative target
Energy savings	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	8.0%
	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	7.2%
	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	6.4%
	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	5.6%
			0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	4.8%
				0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	4.0%
					0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	3.2%
						0.8%	0.8%	0.8%	0.8%	0.8%	2.4%
							0.8%	0.8%	0.8%	0.8%	1.6%
								0.8%	0.8%	0.8%	0.8%
Total active energy savings	0.8%	1.6%	2.4%	3.2%	4.0%	4.8%	5.6%	6.4%	7.2%	8.0%	44.0%

Walloon Region: Specifically in Wallonia

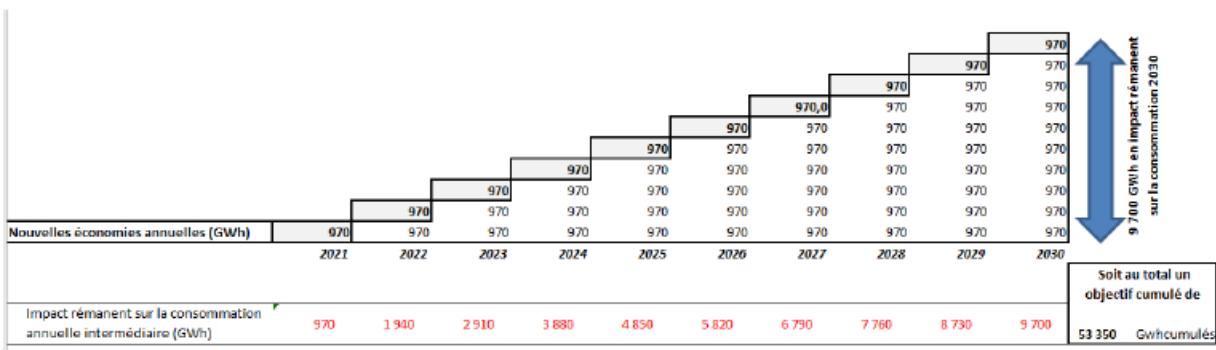
With a final energy consumption in Wallonia of 121.7 TWh in 2016 and 120.9 TWh in 2017, and assuming an energy consumption of 121 TWh in 2018 (³⁶) (data not yet available), **this figure of 0.8% entails an annual linear reduction target of 970 GWh.**

Detailed final energy consumption for 2016 to 2018

Final consumption (TWh)	2016	2017	2018	Baseline average for the obligation 2021-2030	Annual savings of 0.8%
Final consumption excluding energy uses (TWh)	121.7	120.9	121 (estimated)	121.2	0.970
<i>of which industry</i>	39.9	39.7			
<i>of which transport</i>	36.4	36.3			
<i>of which residential</i>	31.1	30.7			
<i>of which tertiary</i>	13.1	13			
<i>of which agriculture</i>	1.2	1.2			
<i>For climate impact: 15/15 degree-days</i>	1,948	1,870	1,739		

The reduction scale applied to this compulsory basis of 122.5 TWh gives the final figures for the savings to be made:

³⁶ The annual final consumption is affected by various activity factors (economic growth, demographic changes, climate, etc.). Between 2017 and 2018, it has been assumed that macroeconomic conditions did not fundamentally change, that the climate effect was limited and that, in theory, consumption reduced. A cautious estimate therefore results in a 2018 consumption similar to that in 2017.



Nouvelles économies annuelles (GWh)	New annual savings (GWh)
9 700 GWh en impact rémanent sur la consommation 2030	Resulting impact of 9,700 GWh on 2030 consumption
Impact rémanent sur la consommation annuelle intermédiaire (GWh)	Resulting impact on interim annual consumption (GWh)
Soit au total un objectif cumulé de 53 350 GWh cumulés	i.e. a cumulative target of 53,350 GWh

This means that the following effort is required in order for Wallonia to meet its Article 7 obligation:

- **additional energy savings of 970 GWh** per year between 2021 and 2030;
- an estimated impact in 2030 amounting to a reduction of 9,700 GWh compared with a scenario without this obligation;
- a cumulative target for Wallonia of 53,350 GWh over the period 2021-2030.

Brussels Capital Region

Cumulative volume of end-use energy savings (Article 7)

From 2021 to 2030, under Article 7(1) of Directive 2012/27/EU, the Brussels Capital Region must make annual energy savings of 0.8% of its final energy consumption compared with the 2016-2018 average.

An initial estimate of the volume of energy to be saved over the period 2021-2030 has been made using the average final energy consumption for 2016-2018, based on the 2018 energy balance.

The effort required in the Brussels Capital Region in order to meet the Article 7 obligation has been estimated as:

- additional annual energy savings of 159 GWh;
- cumulative energy savings from 2021 to 2030 of 8,747 GWh.

Article 4(b)(4): the total floor area to be renovated or equivalent annual energy savings to be achieved from 2021 to 2030 under Article 5 of Directive 2012/27/EU on the exemplary role of public bodies' buildings.

Exemplary role of public authorities under Article 5 of the Energy Efficiency Directive

European obligation: floor area to be renovated or equivalent energy savings for 2020-2030

The Energy Efficiency Directive 2012/27/EU aims to reduce energy needs by acting on various levers. Consumption in the buildings sector has been clearly identified as a major source of potential energy savings. The exemplary role of public authorities in this respect, by applying in practice their commitment under the Paris Agreement, is a powerful tool due to its knock-on effects.

Article 5 of Directive 2012/27/EU therefore imposes, as from 2014, **an obligation to renovate each year 3% of all central government buildings in order to set an example**. This obligation has been extended to the period 2021-2030. Furthermore, Article 5 encourages local authorities to follow this exemplary role, on a voluntary basis, by renovating their buildings.

Public building managers subject to this obligation are therefore required to:

- establish an inventory of their buildings;
- monitor the annual consumption of those buildings;
- benchmark performance to the cost-optimal level;
- establish a targeted action plan ensuring that, each year, at least an additional 3% of their buildings achieve the baseline performance.

Flemish Region

The Flemish Government has opted for an alternative approach in order to comply with Article 5 of the Energy Efficiency Directive.

Buildings that meet all the following criteria fall within the scope of the Directive:

- buildings owned by the Flemish Government;
- buildings used by the Flemish Government;
- heated/cooled buildings;
- buildings with a floor area over 250 m²
- buildings that do not meet the current minimum energy performance requirements;
- buildings that are not covered by one of the exceptions set out in Article 5(2) of the Energy Efficiency Directive.

In order to monitor this renovation target, all entities within the Flemish Government are expected to annually send the following information to the Flemish Energy Agency (Agence flamande de l'Énergie/Vlaams Energieagentschap – VEA) via the Property Database (Banque de Données des biens immobiliers/Vastgoeddatabase):

- an inventory of their property indicating the floor area;
- the annual energy consumption of these buildings;
- the energy saving measures implemented and their compliance with the energy performance requirements;
- the energy saving measures planned and their compliance with the energy performance requirements.

Progress is being made in simplifying monitoring of the renovation target via the Terra database of the Flemish Agency for Energy Saving in the Public Sector (Agence flamande pour l'économisation énergétique dans le secteur public/Vlaams EnergieBedrijf – VEB).

Equivalent annual energy savings in GWh from 2020 to 2030 in accordance with Article 5

2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
182	176	171	166	161	156	151	147	142	138

Walloon Region

Brussels Capital Region

- Volume of energy savings in central government buildings (Article 5)

Under Article 5 of Directive 2012/27/EU, the Brussels Capital Region must each year renovate 3% of the total floor area of buildings owned and/or occupied by regional authorities to meet at least the minimum energy performance requirements, or make equivalent energy savings in such buildings.

In 2019, the total useful floor area of all such buildings was approximately 157,660 m². The savings made are estimated at 595 MWh of end-use energy.

These savings should be made by a combination of the PLAGÉ (local action plan for energy management) and NRCLick (renovation work) programmes, as well as a potential reduction in owned or occupied floor area that does not meet the requirements.

- ii. *The indicative milestones for 2030, 2040 and 2050, the domestically established measurable progress indicators, an evidence-based estimate of expected energy savings and wider benefits, and their contributions to the Union's energy efficiency targets as included in the roadmaps set out in the long-term renovation strategies for the national stock of residential and non-residential buildings, both public and private, in accordance with Article 2a of Directive 2010/31/EU*

Flemish Region

The long-term building renovation strategy 2050 is currently being developed and will be submitted to the European Commission by the set deadline of March 2020.

Walloon Region

The objectives set out here stem from the Walloon renovation strategy 2017 (<https://energie.wallonie.be/servlet/Repository/strategie-wallonne-a-long-terme-pour-la-renovation-energetique-des-batiment.pdf?ID=47301>). The update resulting in the next renovation strategy (expected in March 2020) is currently being discussed, particularly with regard to the key moments in the life of a building. The phasing and depth of renovation are factors that will influence the results. The 2030 milestone may be revised following this work.

Walloon Region: Long-term objectives of the renovation strategy

The objectives of the energy renovation strategy for the Walloon building stock are as follows:

- **In the residential sector:** aim for the EPB A label (specification ≤ 85 kWh/m²/year) on average for the entire housing stock by 2050.
- **In the tertiary sector:** aim for an energy-neutral (zero-energy) tertiary building stock by 2050 in terms of heating, domestic hot water, cooling and lighting.

By analysing the results of the COZEB-Extension study, the action priorities for achieving these aims have been identified. The study assessed all cost-effective measures for the various types of building. The proposed priorities correspond to the most cost-effective measures, namely deep renovation of the least energy efficient housing (insulation of the building envelope, with the priority being the roof, but without neglecting systems reaching the end of their life). In this respect, however, it should be ensured that all renovation projects are generally carried out in a manner consistent with the region's objectives.

Achieving these aims will result in a 70% reduction in energy consumption in 2050 compared with 2005.

Walloon Region: Medium-term objectives of the renovation strategy

The strategy proposes that the rate of renovation to achieve the 2050 objective needs to be phased in five-year periods. This will indicate whether Wallonia is on the right track to achieve its objectives.

Not all buildings covered by the strategy will be able to achieve the objective set on average for the entire building stock. Demolition and rebuilding must therefore be considered as an option.

Furthermore, increasing the number of new energy efficient buildings is one of the keys to improving the building stock and achieving the overall objective. In this respect, mention must be made of the development of New Districts, which are particularly aimed at combating global warming and ‘optimising local production/resources and energy consumption’. New buildings meeting high performance requirements should also contribute to the overall objectives. Around 15,000 new homes are expected to be built every year, on top of the current stock of approximately 1.5 million dwellings.

The relative change in energy consumption that will result from this phased implementation by the 2020, 2030 and 2050 milestones is illustrated in the following table:

	Residential	Tertiary	Strategy	BE Target
Reduction by 2020 vs 2005	-10.4%	-12.9%	-11.1%	-11.5%
Reduction by 2030 vs 2005	-27.9%	-32.0%	-29.1%	-24.0%
Reduction by 2050 vs 2005	-70.3%	-70.3%	-70.3%	

Table: Reduction in energy consumption by the 2020, 2030 and 2050 milestones compared with 2005

This change means that the **2030 target for reducing average energy consumption in the tertiary and residential sectors is 29.1%**.

Walloon Region: Phasing of the objectives

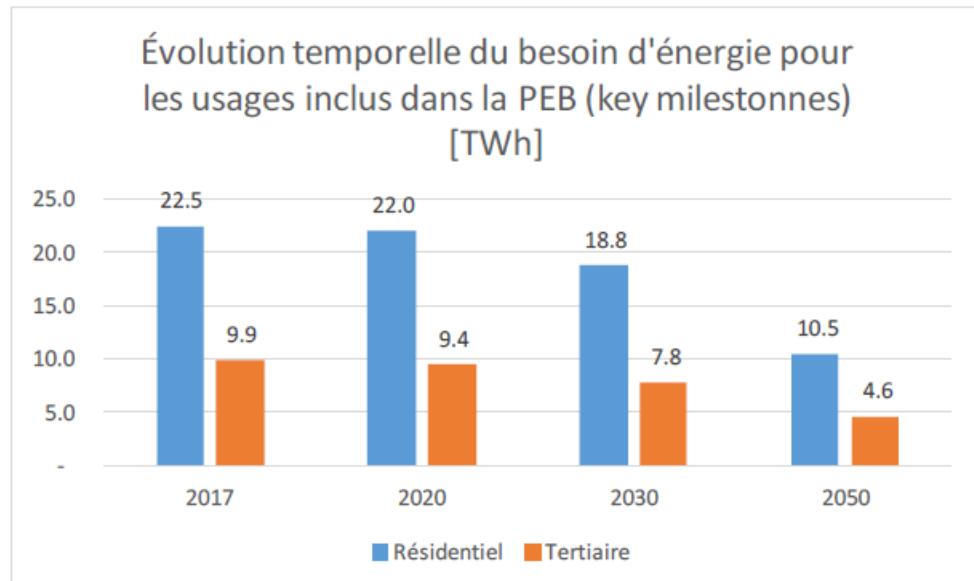
Phasing of the renovation takes account of the need to spread the investments and prioritise those investments with the greatest potential impact (³⁷).

Although the phasing of renovation measures will be determined on a case-by-case basis (in a specific renovation roadmap for each building), it is expected that, for the entire stock, the phased deep energy renovation will generally prioritise the renovation of roofs, then the rest of the building envelope, and finally the renovation of systems and installation of renewable energy generation sources.

³⁷ The working assumptions can be found in Annex 8 to the Walloon renovation strategy (Annex B).

Walloon Region: Expected energy savings

Figure 1: Annual energy need of buildings in terms of heating, domestic hot water and cooling (and lighting in the tertiary sector) in the short, medium and long term as a result of meeting the renovation strategy objectives



Évolution temporelle du besoin d'énergie pour les usages inclus dans la PEB (key milestones) [TWh]	Change over time of the energy need for uses included in the EPB (key milestones) [TWh]
Résidentiel	Residential
Tertiaire	Tertiary

The above graph summarises the expected energy savings. As a result, between 2017 and 2020, energy needs will reduce by 1%/year on average, then by 1.6%/year between 2020 and 2030, and finally by 2.2%/year between 2030 and 2050.

If the 2020 energy needs are compared with those in 2017 (heating, domestic hot water and cooling in the residential and tertiary sectors, and also lighting in the tertiary sector), a saving of 1 TWh is expected for 2020. This will rise to 5.8 TWh by 2030, and should reach 17 TWh in 2050.

Walloon Region: Energy savings in new buildings

New buildings are covered in accordance with the regulations, given that the requirement level will very shortly be Q-ZEN, i.e. in 2021 (and in 2019 for public buildings).

This requirement will be reviewed as the cost-optimal study is updated and as climate and energy objectives change, with the latest review (June 2018) indicating that the cost-optimal level is beyond Q-ZEN. The 2023 update will determine if the ZEN level can become the new norm from 2025. In any event, Wallonia is aiming for carbon neutrality in new buildings from 2027.

Brussels Capital Region

Objectives of the strategy to reduce the environmental impact of buildings

The objective of the strategy to reduce the environmental impact of existing buildings in Brussels is to ensure that the building stock achieves a high level of energy performance by 2050.

Residential sector

In the residential sector, the objective of the renovation strategy is to achieve an average primary energy consumption of 100 kWh/m²/year.

In order to improve the housing stock, the idea is to make all homes more energy efficient by phasing their renovation. The work will be carried out in five stages up to 2050 (³⁸). The improvement of their performance will be recorded in the EPB certificate, which will become mandatory for all homes. The certificate will also change as it will list the priority measures suited to the certified property. By each deadline set by the legislation, owners must prove that the work has been correctly carried out.

Objective	Work
2030	Deadline for one of the five mandatory measures, at the individual's choice.
2035	Deadline for the second of the five mandatory measures, at the individual's choice.
2040	Deadline for the third of the five mandatory measures, at the individual's choice.
2045	Deadline for the fourth of the five mandatory measures, at the individual's choice.
2050	Deadline for the fifth of the five mandatory measures.

The minimum level of performance to be achieved by 2050 will be set by type of building.

With regard to multi-family buildings, the obligations will apply at apartment and building level. The roof, façades and other common parts will be tackled through a mandatory report specifically produced for this purpose, which will be based on all the recommendations made in the EPB certificates for the common parts. The joint owners will be responsible for implementing the recommendations applicable to the common parts.

Tertiary sector

In the tertiary sector, the strategy to reduce the environmental impact of existing buildings in Brussels provides for the introduction of a mandatory system of work to be carried out by certain deadlines, similar to the system established for the residential sector. The aim is to ensure that the tertiary sector has energy-neutral buildings by 2050.

- iii. Where applicable, other national objectives, including long-term targets or strategies and sectoral targets, and national objectives in areas such as energy efficiency in the transport sector and with regard to heating and cooling*

Flemish Region

(a) Transport sector targets

We would refer in this respect to the Transport section of the dimension decarbonisation.

(b) Heating sector targets

A decision has been taken to make maximum use of green and waste heat capacity for the different heating technologies. It is nearly always more cost-effective to obtain a given contribution to generation from green and waste heat than from green electricity or green transport.

For heat pumps, the system cost (impact on network load, higher investment and support costs than for other sources of green heat) is higher than for other options (renewables). However, not everyone will opt for a heat pump when investing in a replacement system or as part of a renovation. To encourage a wider uptake of heat

³⁸ Owners will of course be able to carry out all the work in one go in order to achieve the set energy performance level.

pumps, their cost-effectiveness in dwellings must be improved by reducing heating demand and integrating heat pumps into the electricity market and power grid. One way of achieving this could be by adopting a more flexible approach to heat pumps, which would enable owners to react to cheaper electricity prices through a smart meter.

District heating systems contribute to more efficient heat production and provide the infrastructure required to facilitate conversion to renewable energy sources and waste heat.

The focus will continue to be on district heating systems that facilitate the use of renewable or waste heat. This concept has come under the spotlight in recent years through regular calls for green heat (including district heating systems), waste heat (networks), biomethane injection and geothermal energy.

A Heat Plan 2025 with projections to 2030 will be developed in order to increase the production of green heat.

Walloon Region

Walloon Region: Other sectoral targets – non-ETS industry

A reduction in GHG emissions from non-ETS industry by 2030 (compared with 2005) could be achieved by working towards the following two targets.

- The first type of possible measure is to continue improving energy efficiency in the sector. A target of increasing energy efficiency by 10% (by means of various technical measures) has been set.
- More radical decarbonisation measures in non-ETS industries would appear to be needed in order to move beyond this value. Wallonia has decided to pursue a fuel switching policy in the sector alongside more traditional energy efficiency measures. Users can be encouraged to switch to other energy carriers by promoting, firstly, the use of renewable heat (solar thermal and heat pumps, whether or not combined with geothermal energy or biomass combustion) and, secondly, the use of decarbonised electricity generation. A total of 213 GWh of renewable heat could be produced and consumed in this way, accounting for 8% of the overall figure.
- CO₂ capture and sequestration or reuse solutions could also be included in pilot projects with a temporarily limited impact.

As a result of these measures, emissions from the non-ETS industry sector should fall by 32% compared with 2015. This represents a total reduction of 79% compared with 2005 levels, given that significant reductions were made between 2005 and 2015, particularly as some businesses in the non-ETS sector in 2005 were included in the ETS from 2013.

2.3. Dimension energy security

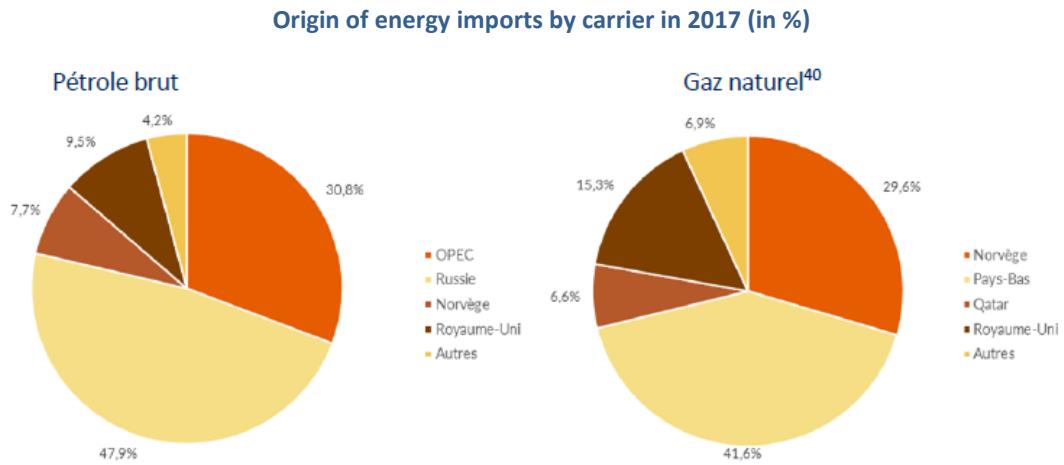
The Federal State alone is responsible for the country's energy security and the following text therefore reflects this.

- i. *The elements set out in point (c) of Article 4 (39)*
- ii. *National objectives with regard to increasing: the diversification of energy sources and supply from third countries for the purpose of increasing the resilience of regional and national energy systems*
- iii. *Where applicable, national objectives with regard to reducing energy import dependency from third countries, for the purpose of increasing the resilience of regional and national energy systems*
- iv. *National objectives with regard to increasing the flexibility of the national energy system, in particular by means of deploying domestic energy sources, demand response and energy storage*

Belgium depends to a large extent on imports of primary energy resources in order to meet domestic demand. Belgian energy policy therefore aims to ensure an uninterrupted supply of these primary sources, not only for their applications in the energy sector itself, but also as a raw material in various industrial processes. The aim is to ensure a diversified supply in terms of energy sources, origin and route, without, however, setting quantified targets.

Belgium has an open and liquid market for both oil and natural gas, involving many national and international players. Although trade in these two products is highly globalised and governmental operators therefore have limited impact on this trade, Belgium's aim is to create the preconditions for the market to operate in a stable and competitive manner. Correct price signals for supply and demand are therefore the first element in guaranteeing security of supply at all times.

In addition, the origin of the various sources of primary energy is constantly monitored (see figure below), with no particular producer having yet been identified as dominant. However, if this were to become the case in the future, it would have to be considered whether public intervention was desirable and necessary.



(Source: Chiffres clés Énergie 2019 [Key figures for Energy 2019])

³⁹ (1) National objectives with regard to: – increasing the diversification of energy sources and supply from third countries, the purpose of which may be to reduce energy import dependency, – increasing the flexibility of the national energy system, and –addressing constrained or interrupted supply of an energy source, for the purpose of improving the resilience of regional and national energy systems, including a timeframe for when the objectives should be met.

Pétrole brut	Crude oil
Gaz naturel (⁴⁰)	Natural gas (⁴⁰)
OPEC	OPEC
Russie	Russia
Norvège	Norway
Royaume-Uni	United Kingdom
Autres	Other
Pays-Bas	The Netherlands
Qatar	Qatar

The announced reduction in the supply of lean gas from the Netherlands from 2022 requires particular attention on account of the scale of the conversion that will need to be undertaken. Belgium plans to switch 1.6 million residential and business connections from lean gas to rich gas between 2017 and 2029. Furthermore, market participants will have to conclude contracts with new parties over the next few years to meet their end-customer obligations. The government may act as facilitator in this respect.

On one hand, as a refining hub, Belgium depends to a large extent on imports of crude oil. On the other hand, the refining sector allows Belgium to produce a large number of oil products within the country (domestic production). To guarantee growth in the refining sector, and therefore in the domestic production of oil products, the refining industry must continue to be supported. Furthermore, during the period 2020-2030, Belgium will take the necessary steps to promote investment in refineries to ensure as much independence as possible, both nationally and internationally. In addition, Belgium will further diversify its oil products by continuing to promote the incorporation of biofuels. This policy should reduce the dependence on a limited number of specific products that are frequently used.

Furthermore, in accordance with the ‘energy efficiency first’ principle, Belgium is aiming to reduce energy intensity and therefore dependence on foreign supplies of primary energy sources. The measures to be taken in this respect are listed in point 3.1 (Energy Efficiency).

With regard to electricity, Belgium has clear rules, in the form of ‘Loss of Load Expectation’, for measuring the security of supply situation. This is an important concept that determines the number of hours during which electricity demand cannot be met by any of the generating capacity within the national electricity system, taking account of interconnections. This number of hours is a legal obligation in Belgium: the LOLE cannot legally exceed 3 hours in a normal winter and 20 hours in a severe winter (⁴¹). In addition, in accordance with the Regulation on the internal market for electricity (⁴²), a value of lost load must be determined by 5 July 2020 at the latest in order to correctly assess the security of supply situation, bearing in mind developments in the energy landscape.

At the moment, the total electricity need in Belgium is one fifth of the total energy need. However, the expected electrification in the transport, heat and industry sectors will increase the share of electricity in the energy mix.

In this context, Belgium foresees a radical conversion of the electricity mix in the period 2020-2030. Nuclear power plants will be gradually decommissioned (see Figure 2). The Federal Government confirmed this commitment – which was enshrined in legislation back in 2003 – on 30 March 2018 as part of the Interfederal Energy Pact.

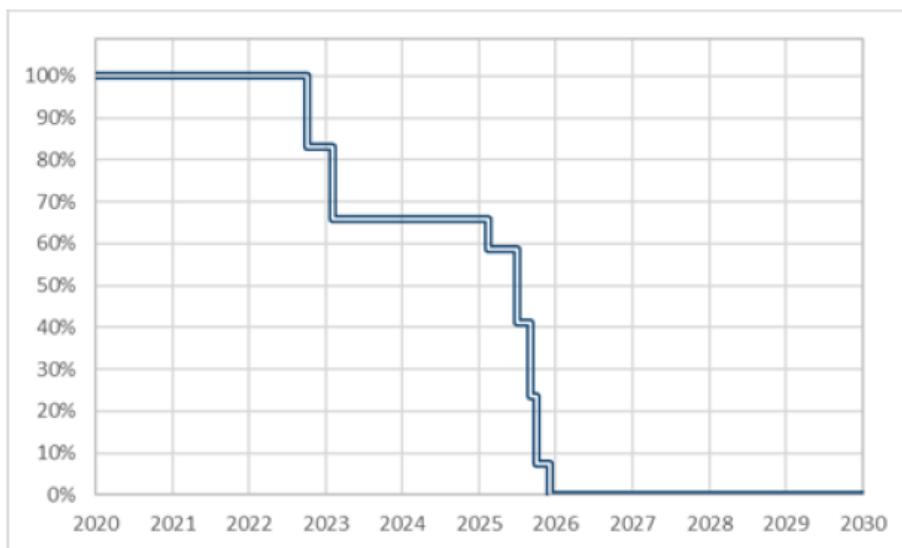
A structure has been developed not only to monitor progress in implementing the measures listed in the Energy Pact, but also to closely monitor security of supply, the development of energy prices, and the impact on climate objectives and nuclear safety, and also to take additional measures if necessary.

⁴⁰ 40% of the natural gas imported from the Netherlands comes from a third country and is therefore simply transported via the Dutch natural gas system.

⁴¹ In accordance with Article 7bis(2) of the Law of 29 April 1999 on the organisation of the electricity market, the energy security level to be achieved is set at an LOLE below 3 hours and an LOLE95 below 20 hours, in the absence of common European rules.

⁴² Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity.

Timetable for phasing out nuclear power



In order to attract investment in electricity generation, a centralised capacity compensation mechanism covering the entire market will be developed. This system, which will be technology-neutral, will fully comply with the provisions of European directives and legislation on State aid. Furthermore, in addition to encouraging the construction of new gas-fired power plants or the continued operation of existing gas-fired power plants, the system will allow the large-scale implementation of demand-side management or storage solutions. The chosen mechanism will minimise costs, preserve the competitiveness of businesses and SMEs as much as possible and in no way affect the purchasing power of citizens. The framework law on this capacity compensation mechanism was adopted on 4 April 2019 and the various implementing decrees are being drafted.

In order to compensate for the decommissioning of an estimated nuclear capacity of 6,000 MW, the following measures will be developed and implemented.

1. Adequacy and flexibility study (Elia): this biennial study must broadly and clearly quantify the country's security of supply situation, bearing in mind the LOLE rules.
2. Capacity compensation mechanism: the legal framework for this mechanism will be developed in the next few months so that Belgium can organise a call for tender in good time to attract by 2025 the investment needed to ensure the required level of security of supply.
3. Renewable energy: Belgium aims to have 40% renewable energy by 2030, as an interim step towards achieving fully renewable energy generation by 2050. The Federal State will contribute to this goal through offshore wind energy. The aim here is to have a total installed capacity of 4 GW by 2030. The measures that Belgium will take to achieve these aims of developing renewable energy sources are set out in Chapter 3.
4. Interconnections: Belgium is already extensively interconnected with its neighbouring countries. In the next few years, additional investments will be made not only to increase this capacity, but also to further increase the commercial availability of the existing capacity, in accordance with the Regulation on the internal market for electricity. The objectives are discussed in point 2.4 below.
5. Flexibility: the smooth functioning of the flexibility market will be regularly reviewed so that it is in a position to meet the changing needs of the system. If necessary and desirable, the existing legislation on flexibility will be revised.

Cooperation between the competent authorities will be improved in order to simplify the granting of authorisations needed to develop new generating capacity and to adapt the necessary systems to the development of renewable energy. In this context, a one-stop-shop approach, rooted in the Cooperation

Agreement of 27 February 2014 on the creation of a coordination and facilitation committee, will be systematically applied to energy infrastructure projects of national interest. Particular efforts will be made to minimise the administrative burden for project owners.

The various levels of authority will ensure that new centralised and decentralised storage systems and options for peak-load shifting in both industry and private households continue to be developed. Based on its responsibility for guaranteeing security of supply, the Federal Government will organise active cooperation with the regions in order to fully explore the flexibility potential and guarantee system stability.

Belgium will make all necessary plans in relation to the decommissioning of its nuclear power plants and to ensure that radioactive waste and spent nuclear fuels are stored/managed in the most appropriate manner. It will take all necessary decisions, particularly regarding technical specifications and the location of waste storage facilities.

Alongside monitoring of the Energy Pact (see point 1.2), the Federal State will continue to structurally monitor the country's security of supply, in collaboration with the regions and stakeholders, as part of the federal strategy and implementation of the capacity compensation mechanism, taking into account the situation in neighbouring countries. In addition, in accordance with the Regulation on the internal market for electricity (⁴³), a value of lost load (VoLL) will be determined by 5 July 2020 at the latest, alongside the current national LOLE (⁴⁴) rules, in order to correctly assess the security of supply situation, bearing in mind developments in the energy landscape. The impact on the climate, energy prices and safety of nuclear facilities will also be closely monitored. A federal monitoring committee, made up of representatives of the federal and regional entities, employers and industry, must check whether additional measures are needed based on this monitoring.

In addition to the monitoring at federal level, Belgium will also conduct various risk assessments relating to the security of its electricity, gas and oil supplies in accordance with EU and international legislation. In this context, active regional cooperation (including through the Pentalateral Energy Forum and the Gas Platform) will be established. Several longer-term forecasts will also be prepared, such as the prospective studies on electricity and natural gas (by the Federal Public Service for the Economy – Directorate-General for Energy) and the Federal Planning Bureau's energy outlooks. The objective and methodology of these studies will be regularly evaluated to make them as useful as possible for policymakers, minimise any overlaps with other analyses and maintain consistency. In addition, regulators and system operators, individually or within their European confederations (e.g. ACER, CEER, ENTSO-E, ENTSO-G), will also conduct numerous studies in support of energy security policy.

Lastly, Belgium will continue its efforts to refine and update its crisis management policy for all significant energy carriers. In this respect, it will develop contingency plans for each energy carrier, taking into account national, regional, EU and international obligations, and will give due consideration to developments in cybersecurity. Based on its various contingency plans, Belgium intends to produce an overarching contingency plan which maps the spillover effects between the various energy carriers and sets out specific procedures to address these effects. Finally, participation in national, regional, European and international crisis simulations/exercises is also part of the plan. All of this will be carried out in close cooperation with stakeholders, particularly centres and agencies specifically set up for this purpose (e.g. APETRA (⁴⁵)).

⁴³ Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity.

⁴⁴ In accordance with Article 7bis(2) of the Law of 29 April 1999 on the organisation of the electricity market, the energy security level to be achieved is set at an LOLE below 3 hours and an LOLE95 below 20 hours, in the absence of common European rules.

⁴⁵ The national storage company (Agence PETRolière/PETRoleumAgentschap).

2.4. Dimension internal energy market

2.4.1. Electricity interconnectivity

- i. *The level of electricity interconnectivity that the Member State aims for in 2030 in consideration of the electricity interconnection target for 2030 of at least 15%, with a strategy with the level from 2021 onwards defined in close cooperation with affected Member States, taking into account the 2020 interconnection target of 10% and the following indicators of the urgency of action: (1) price differential in the wholesale market exceeding an indicative threshold of EUR 2/MWh between Member States, regions or bidding zones; (2) nominal transmission capacity of interconnectors below 30% of peak load; (3) nominal transmission capacity of interconnectors below 30% of installed renewable generation. Each new interconnector shall be subject to a socioeconomic and environmental cost-benefit analysis and implemented only if the potential benefits outweigh the costs*

Federal State

In recent years Belgium has invested heavily in reinforcing its level of electricity interconnectivity with neighbouring countries. As a result, the maximum import capacity of the Belgian bidding zone will rise from 5,500 MW to 7,500 MW between 2018 and 2023. This is in line with the Federal Development Plan 2020-2030 (⁴⁶), which was approved in April 2019 by the Federal Ministry of Economic Affairs and Energy.

Given these confirmed infrastructure projects and the expected growth in installed generation capacity ('with additional measures' scenario), Belgium will achieve a rate of electricity interconnection of 24% in 2020. Once the interconnector with Germany (ALEGrO) is commissioned in early 2021, this could rise to around 33%. In addition, two further interconnector projects, which may add value in relation to achieving Belgium's core energy targets after 2025, have already been included on an indicative basis in the Federal Development Plan 2020-2030, namely Nautilus (Belgium-United Kingdom) and ALEGrO II (Belgium-Germany). Given that the final investment decision on these interconnector projects will only be made in the context of the next Federal Development Plan (2022), they have not yet been taken into account when determining the interconnection rate. In view of the expected increase in renewable energy sources, this percentage is currently set to fall towards the end of the reference period. However, it already well exceeds the European target for 2020 (10%), and even the target for 2030 (15%).

2.4.2. Energy transmission infrastructure

- i. *Key electricity and gas transmission infrastructure projects, and, where relevant, modernisation projects, that are necessary for the achievement of objectives and targets under the five dimensions of the Energy Union Strategy*

Federal State

Belgium will assess where it may be desirable to construct additional cross-border system infrastructure or modernise existing interconnectors in order to support its energy targets.

The domestic system will also be reinforced so that it can cope with the challenges facing electricity systems in the future: electrification, large-scale integration of renewable energy sources (including offshore), self-generators and flexibility needs. In the natural gas sector, the transition to lean gas will require investment, mainly by the DSOs, but under the responsibility of the regions. In this respect, the agreed timetable must be strictly observed. In addition, the system operator Fluxys plans further investments to ensure the integrity of the existing infrastructure and to make the adaptations needed to respond to new developments (e.g.

⁴⁶ See Section 4.1.9 for more details on the projects leading to this growth: <https://www.elia.be/nl/infrastructuur-en-projecten/investeringsplannen/federaal-ontwikkelingsplan-2020-2030>

renewable gas, hydrogen, etc.). In the face of growing public opposition to infrastructure work, system operators will assess, in liaison with the relevant authorities, which additional measures could ensure more support for projects and their completion within the set timescales.

ii. *Where applicable, main infrastructure projects envisaged other than Projects of Common Interest (PCIs)*

2.4.3. Market integration

- i. *National objectives related to other aspects of the internal energy market such as increasing system flexibility, in particular related to the promotion of competitively determined electricity prices in line with relevant sectoral law, market integration and coupling, aimed at increasing the tradeable capacity of existing interconnectors, smart grids, aggregation, demand response, storage, distributed generation, mechanisms for dispatching, re-dispatching and curtailment, and real-time price signals, including a timeframe for when the objectives shall be met*

Federal State

Market integration:

Integration of the electricity market: in the electricity sector, Belgium has been active in the Pentalateral Energy Forum (PLEF) since 2007 in order to ensure, through greater market coupling, increased security of supply, optimisation of the electricity market and optimal use of the existing infrastructure. In 2015, this led to the launch of flow-based day-ahead market coupling between the countries in Central Western Europe (CWE) region (⁴⁷).

The results of the existing market coupling will be assessed at regular intervals during the period 2020-2030 on the basis of clear KPIs (**Key Performance Indicators**). If the results do not meet expectations, opportunities for improving existing mechanisms will be discussed in consultation with authorities, regulators, transmission system operators and market operators in the PLEF countries.

In this context, Belgium will closely monitor the commercial capacity available from interconnections with neighbouring countries. Where appropriate, the correct and timely implementation of action plans to be drawn up under the Regulation on the internal market for electricity will also be closely monitored to ensure that Belgium's energy security policy is not compromised.

Flexibility:

Flexibility: due to the growing contribution of intermittent energy sources in the electricity system and also demand variability, the need for flexibility measures to ensure system stability will only increase in the coming years. In recent years, the system operator Elia has therefore assessed not only security of supply in the strict sense of the term, but also flexibility needs.

In the most recent version of the 'Adequacy and Flexibility Study for Belgium 2020-2030' (⁴⁸), Elia forecasts an upward flexibility need of 5,080 MW and a downward flexibility need of 4,340 MW in 2030. This is a 40% increase on 2020. The following are possible sources of flexibility:

- flexible use of generating units
- demand-side management
- electricity storage

⁴⁷ The member countries of the PLEF are Belgium, the Netherlands, Luxembourg, France, Germany and Austria. Switzerland participates in meetings as an observer. The secretariat is provided by the Benelux Secretariat-General.

⁴⁸ http://www.elia.be/~media/files/Elia/publications-2/studies/20190628_Elia_Adequacy_and_flexibility_study_EN.pdf

- interconnectors.

It also forecasts that sufficient flexibility sources will be available during the period 2020-2030 to cope with growing fluctuations between electricity fed into the system and consumption.

Offshore: in 2017, it was decided within the North Seas Energy Cooperation (NSEC) to explore some clusters intensively and to develop them in practice. In addition to long-term projects such as Dogger Bank, the German Bight and developments in the Irish Sea, the Belgium-Netherlands-United Kingdom cluster is especially important because this area already has substantial offshore wind generation and collaboration will therefore be possible in the short term.

Belgium is very active in the development of collaboration around this cluster, together with the Belgian Offshore Platform (BOP), the CREG (Belgian Federal Commission for Electricity and Gas Regulation) and Elia, and is exploring possibilities for connections, collaborations and further development of this cluster with the countries concerned.

Walloon Region

A range of measures have been or will be implemented in Wallonia to enable and facilitate this flexibility (e.g. smart meters, Electricity Decree and Flexibility Order, renewable energy communities).

This flexibility will have two aims.

- Security of supply and system balance. With the phasing out of nuclear power, the energy mix will radically change and renewable energy sources, which are often intermittent, will multiply. The region's flexibility sources will help to ensure the system's stability. The capacity needed will depend on the Federal State's objectives and the distribution between the regions.
- Congestion management. In terms of the distribution systems, multiple renewable energy sources risk creating congestion. Developing flexibility in those distribution systems can be combined with their reinforcement.

The development of smart grids has the following aims:

- maximise the capacity of infrastructure to accommodate generating units and flexible tools, and maximise synchronicity in order to optimise the overall stability of the electricity system;
- maximise energy efficiency efforts;
- remunerate systems based on performance indicators, starting with the removal of tariffs not connected with the electricity system.

Furthermore, modernising distribution systems by rolling out smart meters in line with the framework set out by the Decree of 19 July 2018 will encourage the integration of decentralised generating units, develop new forms of flexibility and develop different methods of energy sharing, while empowering consumers who will have more accurate and virtually real-time information on their energy consumption or generation.

- ii. Where applicable, national objectives related to the non-discriminatory participation of renewable energy, demand response and storage, including via aggregation, in all energy markets, including a timeframe for when the objectives are to be met*

Not applicable.

- iii. Where applicable, national objectives with regard to ensuring that consumers participate in the energy system and benefit from self-generation and new technologies, including smart meters*

Not applicable.

iv. *National objectives with regard to ensuring electricity system adequacy, as well as for the flexibility of the energy system with regard to renewable energy production, including a timeframe for when the objectives are to be met*

The increasing integration of intermittent, decentralised renewable energy also requires greater flexibility, which can be achieved in various ways:

- by balancing supply and demand;
- by developing connections between countries and making energy networks smarter;
- by creating energy storage potential.

The four entities will ensure that new centralised and decentralised storage systems and potential for peak-load shifting in both industry and private households continue to be developed. Residential storage, SME storage, local storage potential, electric vehicles in storage mode and local tools will increase further by 2030, as will the volume of daily demand shifts. An increasing proportion of these various capabilities will contribute directly to security of supply, in that they will be readily available and can be activated via the market. Market operation will be adapted to develop the framework for ensuring security of supply during the energy transition at the lowest possible cost.

v. *Where applicable, national objectives to protect energy consumers and improve the competitiveness of the retail energy sector*

Walloon Region

The aim is to ensure a competitive energy price compared with those countries with which Belgium is in competition.

2.4.4. Energy poverty

ix. *Where applicable, national objectives with regard to energy poverty, including a timeframe for when the objectives are to be met*

Federal State

There is a federal policy for the protection of low-income or vulnerable residential energy consumers. Certain initiatives taken at federal level are helping to make energy bills more affordable.

- Social tariff for electricity and natural gas

Since 2004, there has been a social tariff for electricity and natural gas. This is cheaper than the average market price for certain target groups of people who are in a vulnerable situation. Since 2010, the social tariff for electricity and natural gas has in most cases been automatically applied so that beneficiaries do not need to do anything to benefit from a lower price. The social tariff is calculated every six months by the Belgian energy regulator based on the lowest market prices, meaning that it moves with the market.

Since 1 January 2020, beneficiaries connected to a district heating system have been able to benefit from the social tariff following the inclusion of such systems in the Gas Law via an amendment. This same amendment also expanded the types of social housing eligible for the social tariff, by including social rental housing provided by public social welfare centres (Centres Publics d'Action Sociale – CPAS).

- Fonds Gaz et Electricité (Gas and Electricity Fund)

Through the Fonds Gaz et Electricité, the CPAs can offer preventive and remedial support to the most vulnerable who cannot pay their gas and/or electricity bills.

- Fonds social chauffage (Social Heating Fund)

The Fonds social chauffage was set up to help people who heat their homes using heating oil, but who find themselves struggling financially. This fund pays part of the heating bill for people in certain target groups.

- Payment by instalment

The payment by instalment system enables customers to pay their heating oil bill in instalments. The advantage of this system is that customers can receive a large delivery without having to pay a large sum of money in one go.

- Gas and electricity campaign: osez comparer (dare to compare)

In Belgium, every region has an energy prices regulator. Suppliers in each region must inform their respective regulator every month about their various tariffs. All these tariffs are recorded in a database and can be compared using an online simulator available on the website of each regulator. The campaign encourages people to use the simulators and annually compare prices in order to choose the best contract.

The current measures at federal level primarily involve financial support that directly or indirectly helps people to pay their energy bills or financial support that can be used by the CPASSs. These measures will continue in the future because it is vital that energy bills remain affordable for everyone and that those who are vulnerable do not find themselves in a situation of energy poverty due to being unable to pay their bills. Social tariff beneficiaries also benefit from protection measures if their power supply is disconnected.

Both the government agreement and the federal plan to combat poverty 2016-2019 focus on assessing and improving existing federal measures to combat energy poverty. Based on this vision, the federal measures have been assessed by the various bodies concerned and by the government so that improvements can be made.

These measures will continue because they are keeping energy bills affordable for vulnerable consumers so that they do not find themselves in a situation of energy poverty. Social tariff beneficiaries also benefit from further protection measures if their power supply is disconnected, meaning that they are supplied by the distribution system operator in the event of payment problems.

The Federal Public Service for the Economy has also published a study on the impact of energy prices on growing inequality in the Belgian social model.

Statbel, the Belgian statistical office, considers the inability to pay energy bills to be an element in material deprivation (the usual standard of living in terms of rent, water, electricity, etc.). In 2017, this figure was 5%.

The Fondation Roi Baudouin (King Baudouin Foundation), which manages the Platform against energy poverty (Plateforme de lutte contre la précarité énergétique), published its second energy poverty barometer in 2018. This barometer distinguished between three different forms of energy poverty: measured energy poverty (14.5% of Belgian households have energy bills that are too high for their income), hidden energy poverty (4.3% consume as little energy as possible to make ends meet), and subjective energy poverty (4.9% say that they cannot heat their homes properly). The barometer linked these figures to size of family, housing and health, and concluded that single people, single-parent families, poor quality housing and poor health are risk factors for energy poverty. These areas are the responsibility of the Regions, which are taking the necessary measures in this respect.

The various studies and statistics indicate that energy poverty has economic, structural and technical causes and that an overarching approach is needed. To meet the EU's targets, a study will be carried out into how the current measures at each level of government can contribute to that approach or be revised in order to support the fight against energy poverty and minimise consumption. It should not be forgotten that energy is a basic need and must be available to everyone, and that it must also therefore be affordable for those who are vulnerable.

Flemish Region

Contextual analysis

Between 2000 and 2019, the population of the Flemish Region increased by 11% to around 6.9 million inhabitants. From 2007 to 2019, the number of private households in the Flemish Region increased from 2.55 million to 2.8 million, a rise of more than 10%. Statistiek Vlaanderen, the Flemish statistical office, forecasts that this figure will rise by more than 150,000 households to 2.95 million (+5%) by 2030. According to the forecasts, between 2017 and 2030, single-person households will grow by 11% to 954,000 (+94,000 or 32% of all households) and two-person households will rise by 10% to 1,060,000 (+100,000 or 36% of all households). The number of elderly people in both categories will rise sharply. The need for adapted, affordable and quality housing will therefore increase based on this demographic change.

Although the Flemish Region is one of the most prosperous regions in the world, energy poverty has long been a harsh reality. The Platform against energy poverty publishes an annual energy poverty barometer that measures energy poverty using three indicators:

- households in 'measured energy poverty' spend too much of their disposable income on energy costs (11.4% of Flemish households);
- households in 'hidden energy poverty' are very economical in their energy consumption, meaning that their energy costs are abnormally low compared with households living in a similar situation (3.1%);
- households in 'subjective energy poverty' say that they struggle financially to heat their homes properly (2.5%).

Bearing in mind the overlap between these categories, 15.9% of households in the Flemish Region are faced by a form of energy poverty (445,000). Most of them are single-parent and single-person (elderly) households. Having electricity and heating is generally regarded as an integral part of the right to decent housing and therefore as a basic need for a dignified existence.

The gap between owners and tenants on the housing market has increased, with tenants facing more than twice the risk of energy poverty that owners face.

Social welfare to prevent the disconnection of energy supplies and structural work to reduce energy consumption in housing are two of the ways in which Flemish energy policy is tackling energy poverty.

The protection afforded to Flemish energy consumers against disconnection is one of the most successful approaches in Europe. The arrival of smart meters since mid-2019 is offering numerous options, particularly in terms of real-time consumption information, targeted communication and budget meters that can be set to even more proactively prevent the accumulation of debt.

Given that the long-term renovation strategy 2050 covers all Flemish housing, measures have also been put in place to raise the awareness of vulnerable target groups and provide them with targeted support so that their homes eventually meet the long-term objective. In this respect, on 4 March 2016 the Flemish Government approved a programme against energy poverty consisting of 34 actions. For private rental housing, the mechanism of existing social roof insulation programmes (high level of financial support combined with practical support) was extended at the beginning of 2017 to cavity wall insulation and the installation of high-performance glazing. Vulnerable groups receive at least 50% extra on existing energy incentives and also vouchers to reduce the cost of energy-efficient domestic appliances. Vulnerable groups also qualify for a free energy scan of their homes, with over 20,000 such scans being carried out every year.

In 2019, this programme was assessed following a new consultation with stakeholders, and further recommendations were made to the Flemish Government.

Objectives and timeframe

1. By 2021 at the latest, all traditional budget meters will be replaced with smart budget meters that offer more proactive assistance and support, therefore preventing the accumulation of debt. The public

service obligations that protect consumers from disconnection will be optimised as a result so that even more proactive work can be carried out to prevent the accumulation of energy debt.

2. A rolling fund for the energy renovation of housing purchased out of necessity will be launched in early 2020 to provide vulnerable owners with loans of up to EUR 25,000 with deferred repayment. In 2020 the effectiveness of this fund will be assessed with a view to possibly continuing the loans.
3. The measures aimed at existing target groups will be assessed and revised where necessary with a view to establishing an effective structural support framework in order to substantially increase the number of renovations among the vulnerable target group.

Walloon Region

Walloon plan to tackle poverty

Energy poverty is not clearly defined in law. It is generally accepted that energy poverty means a situation in which a person or a household faces particular difficulties in meeting their basic energy needs at home.

Tackling poverty has been an integral part of Wallonia's policies for many years. In September 2015, the first Walloon plan to tackle poverty was adopted in order to strengthen the region's action in this area. Involving all ministers and developed in partnership with operators in the sector, this plan aims to identify specific actions with a positive impact on the day-to-day lives of people living in poverty or at risk of this situation. It is therefore based around thematic priorities corresponding to the main categories of expenditure in the budgets of Walloon households: housing, food, energy, water, health, family policies, mobility, leisure, technology, etc. For each of these priorities, the plan sets out decisions, resolutions and concrete actions that the Walloon Government will take.

Bearing in mind that 10% of the poorest households spend 19% of their annual income on energy, the energy part of the plan aims to improve the **healthiness** and **energy performance** of housing.

Energy policy and poverty

Access to energy for all and combating energy poverty are at the heart of Walloon energy policy. The objective in terms of consumer protection is to reinforce the current level of protection of the vulnerable. Measures to support struggling households (such as subsidies for low-income households, winter fuel allowance, social tariffs, preventive action plans for energy, etc.) will be improved.

The concept of protected customers should be expanded to take account of the income level of households. This would enable vulnerable households not included in the existing categories of protected customers to benefit from the protection measures forming part of the public service obligations, in particular application of the specific social tariff. Ideally, this expansion should occur at federal level.

With regard to aid mechanisms, the effectiveness of existing measures should be generally reviewed. Household support measures should also be improved, both in terms of energy savings and ability to access the market.

2.5. Dimension research, innovation and competitiveness

- i. *National objectives and funding targets for public and, where available, private research and innovation relating to the Energy Union, including, where appropriate, a timeframe for when the objectives are to be met*

Belgium has committed to the objectives set out in Lisbon and the Europe 2020 strategy with a view to achieving the target of investing at least 3% of GDP in R&D. Public authorities will account for 1%, whilst the private sector will cover 2% of R&D funding. Gross domestic expenditure will be expressed as gross domestic expenditure on research and development (GERD). Belgium's R&D efforts will be recorded, and reported to the Organisation for Economic Co-operation and Development (OECD) in particular. Belgium's figures aggregate the data from the country's Regions and Communities. These data are available at http://www.innovationdata.be/i/KNO_RDGT_1/Total-RD-expenditure.

Responsibility for research and innovation policy in Belgium is shared between the Federal Government, the three Regions and the Communities (see also Chapter 3. Policies and measures). More detailed information on the Federal Government and the Regions is given below.

Federal State

From 2020, between 5% and 10% of the R&D budget will be spent on climate- and energy-related projects. At federal level, the Energy Transition Fund will be used to promote innovative projects.

One of Belgium's priorities is to maintain its nuclear expertise and know-how, particularly in relation to the responsible management of radioactive waste and spent nuclear fuel. This will ensure a high level of safety and avoid unnecessary burdens for future generations. In an international context, Belgium will continue its research into innovative solutions for highly radioactive waste and for classifying materials from nuclear fusion reactors. Maintaining these skills should also enable the continued production of radioisotopes in Belgium.

Belgium also wants to remain a world-class player in R&D and innovation in key areas such as: (1) nuclear medicine and the production of medical radioisotopes; (2) research into new materials; (3) particle accelerator technology, and (4) transmutation of radioactive waste. It has therefore decided to build a new large-scale research facility known as MYRRHA (Multi-purpose hYbrid Research Reactor for High-tech Applications). This is described in the Strategy Report on Research Infrastructures Roadmap drawn up by the ESFRI (European Strategy Forum on Research Infrastructures).

Flemish Region

Reinforcing Research and Development in the area of energy and climate

The aim is to have a balanced policy of research and innovation that focuses as much on untargeted long-term scientific research as on targeted basic research in order to triple the development and subsequent deployment of innovations.

- Lay a firm foundation for excellent scientific research that can serve as the basis for long-term solutions to society's major challenges.
- In addition, engage in research and innovation to support new and existing business activities stemming from energy and climate challenges with a view to maintaining and reinforcing a local manufacturing industry capable of participating in sustainable European and international value chains.
- As a result of the above objectives, support the energy transition together with the social and economic transitions in order to achieve the Flemish energy and climate objectives.

Walloon Region

(a) Clean energy and technologies, R&I national strategies and the overall vision for R&I

The thematic priorities will be determined based on the strategic priorities of the Walloon smart specialisation strategy for research and innovation (RIS3), which is currently being revised. Emphasis will be placed on those subjects in which the Walloon Region has recognised expertise, in line with the European roadmap (SET Plan) and the themes of the ‘climate, energy and mobility’ cluster of the future Horizon Europe framework programme.

The following energy, climate and mobility priorities have been identified:

- smart/integrated communities, including positive energy districts, smart power grids, and connected, automated and autonomous mobility;
- integration of storage systems;
- energy efficiency of buildings;
- new fuels (including electricity) and sustainable vehicles;
- management and recovery of CO₂ in production processes;
- climate projections, predictions and modelling and new associated services;
- traffic and network management;
- rail technologies.

The Energy Union priority ‘Facilitating consumer participation and the acceleration of progress towards the future smart energy system’ is incorporated in the Walloon priority ‘Smart/integrated communities, including positive energy districts’.

The Energy Union priority ‘Developing and reinforcing energy efficient systems’ is incorporated in the Walloon priorities ‘Energy efficiency of buildings’ and ‘Management and recovery of CO₂ in production processes’ with regard to reducing the production of CO₂. The latter priority also covers the capture and recovery of anthropic CO₂, particularly in value-added products such as synthetic fuels. The Energy Union priority ‘Diversifying and strengthening options for sustainable transport’ is therefore incorporated, together with the additional priority ‘Driving ambition in carbon capture and storage deployment’, in Wallonia’s promotion of the capture and use of carbon, but not its geological storage.

The Energy Union priority ‘Diversifying and strengthening options for sustainable transport’ is also incorporated in the Walloon priorities ‘New fuels (including electricity) and sustainable vehicles’ and ‘Integration of storage systems’. The latter priority not only covers batteries, but also hydrogen storage and electrolysis. It therefore involves the ‘Fuel Cells and Hydrogen Joint Undertaking’ and stationary applications.

Although traffic and network management and rail technologies are not covered by any of the Energy Union priorities, they will contribute to sustainable mobility.

R&I in the development of the next generation of renewable energy technologies is not a priority in Wallonia. Having said that, the roll-out of renewable energies, green heat, geothermal energy and district heating systems is included in the objectives of the Walloon Energy and Climate Plan. R&I in renewable energy technologies may be funded at the request of businesses.

(b) SMART national objectives and concrete funding targets

Part of the public annual budget allocated to research and development is earmarked for energy projects.

Within relevant projects, energy can be the sole theme or one of the themes (for example, a project aiming to develop a new machine that will consume less energy in use, but that will also have a lower maintenance cost). The budget allocated therefore applies only to the project’s ‘energy efficiency’ objective.

The budget amount earmarked for energy projects is EUR 43,000,000 on average (2012-2017 average). Nearly 90% of this amount is used for ‘energy-specific’ projects, with the remaining 10% being for mixed-theme projects.

The average annual amount granted by Europe to co-financed projects (Structural Funds) is EUR 1,900,000 (2011-2017 average).

The average annual amount granted by Europe through the Horizon 2020 research framework programme, under the ‘Secure, clean and efficient energy’ societal challenge, is around EUR 2,000,000 (2014-2019 average).

The average annual amount granted by Europe through the Horizon 2020 research framework programme, under the ‘Climate action, environment, resource efficiency and raw materials’ societal challenge, is around EUR 1,400,000 (2014-2018 average).

The aim is that, by 2030, EUR 110,000,000 of public money will be spent every year on research and innovation with regard to the energy and climate objectives.

This amount will come from the following sources:

- Walloon budget: EUR 75,000,000
- European programmes: EUR 20,000,000
- Innovation Fund: EUR 10,000,000
- Structural Funds: EUR 5,000,000

The additional amounts needed in order for EUR 75,000,000 to be allocated every year from the Wallon budget to the energy and climate theme will come from other resources earmarked for this theme, given that research and innovation with regard to other themes must not suffer a funding cut.

(c) Setting benchmarks against which the national/regional progress will be measured

The amount allocated from the Walloon public budget to research, development and innovation projects is EUR 321,000,000 on average (2012-2018 average). Other parts of the research budgets, such as funding of universities and research centres, can also be added to this figure (see <http://www.innovationdata.be>).

The Walloon **private** budget allocated to research is around EUR 2,000,000,000 every year.

Walloon GDP stands at EUR 96,600,000,000 (2012-2018 average, current euro).

The proportion of the total Walloon budget (public and private) allocated to research in relation to Walloon GDP is therefore EUR 2,321,000,000/EUR 96,600,000,000 or 2.40%.

The proportion of the Walloon annual public budget allocated to R&D projects that is earmarked for energy projects is around 13% (2012-2017 average).

Private funding of ‘energy’ research, development, innovation and competitiveness is difficult to calculate, but may be around EUR 200,000,000 every year.

The proportion of Walloon GDP allocated to energy research (private and public) is therefore put at 0.26% on average (EUR 246,900,000/EUR 96,600,000,000).

If private research pursues the same objectives as public research, the amount allocated to this research should rise to EUR 460,000,000 every year by 2030, which would equate to 0.59% of GDP in 2030 for public (Walloon and European funding) and private energy and climate research.

In summary

Current and 2030 budgets allocated to energy and climate research and innovation

Wallonia	Current budgets (€)	Forecast for 2030 (€)
GDP 2012-2018	96,600,000,000	
Walloon public budget for research (2012-2018 average)	321,000,000	
Walloon private budget for research	2,000,000,000	
Walloon public/private budget for research	2,321,000,000	
Walloon public budget for energy research (2012-2017 average)	43,000,000	75,000,000
Walloon public budget for climate and environment research (2012-2017 average)	not available	
Budget received from Europe (Structural Funds) for energy research (2012-2017 average)	1,900,000	
Budget received from Europe (Structural Funds) for climate and environment research (2012-2017 average)	not available	
Budget received from Europe (Horizon 2020) for energy research (2014-2019 average)	2,000,000	20,000,000
Budget received from Europe (Horizon 2020) for climate and environment research (2014-2019 average)	1,400,000	
Budget received from the Innovation Fund – NER300	0	10,000,000
Walloon private budget for energy research	200,000,000	460,000,000
Walloon private budget for energy climate and environment research	not available	
Walloon-Europe public/private budget for energy research	246,900,000	570,000,000
Walloon-Europe public/private budget for climate research	not available	

- ii. *Where available, national 2050 objectives related to the promotion of clean energy technologies and, where appropriate, national objectives, including long-term targets (2050) for deployment of low-carbon technologies, including for decarbonising energy and carbon-intensive industrial sectors and, where applicable, for related carbon transport and storage infrastructure*

Flemish Region

Research and innovation for a Flemish low-CO₂ and low-carbon circular industry in 2050

Identification of, and support for, innovative research in order to develop cutting-edge technologies (for processes and products) by 2040 through the Flemish Moonshot programme ‘Vlaanderen CO₂-neutraal/Flandre neutre en CO₂’ (CO₂-neutral Flanders).

Further encourage the demonstration of low-CO₂ technologies

Targeted support for demonstration projects and pilot projects in relation to low-CO₂ technologies.

Speed up the deployment of innovative low-CO₂ technologies in Flanders

Use economic support instruments in a more targeted manner and in conjunction with other Flemish support instruments.

Walloon Region

Please refer to the 'Long-Term Climate and Energy Strategy' document.

iii. Where applicable, national objectives with regard to competitiveness

Federal State

The Energy Standard, which depends on the pattern of use and energy intensity, must ensure that the various components of the energy cost in Belgium are no higher than those in neighbouring countries, so that the competitiveness of Belgian businesses and the purchasing power of families are maintained.

Flemish Region

Encourage and monitor the competitiveness of the Flemish economy in the energy and climate transition

This objective firstly involves monitoring the impact of energy and climate regulations, in terms of their definition and implementation, on the competitiveness of the Flemish economy, particularly its high-energy-intensity industry.

Increasing the competitiveness and technological leadership of Flemish businesses in global low-CO₂ value chains will also be targeted.

3. Policies and measures

3.1. Dimension decarbonisation

Federal State

The criterion of **cost-effectiveness**, which underpins the principle of technological neutrality, will be applied in the selection of Policies and Measures (PaMs).

In view of its federal powers and its policy of supporting the Regions in achieving their joint climate targets, the Federal State will pursue existing internal policies and measures, implement the measures recommended in the NECP and adopt new measures contributing to the achievement of GHG reduction targets.

If those measures prove impossible or insufficient, the Federal State will propose alternative federal policies and measures with a similar effect to those that could not be implemented.

The federal measures will continue to be updated, as far as possible, as part of the NECP assessments. The Federal State will, if possible, quantify its measures in terms of resources and results as part of the biennial assessment of the policies and measures.

3.1.1. GHG emissions and removals

- x. Policies and measures to achieve the target set under Regulation (EU) 2018/842 as referred in point 2.1.1 and policies and measures to comply with Regulation (EU) 2018/841, covering all key emitting sectors and sectors for the enhancement of removals, with an outlook to the long-term vision and goal to become a low emission economy and achieving a balance between emissions and removals in accordance with the Paris Agreement

A. Cross-cutting policies and measures

By definition, cross-cutting PaMs cover a wide range of sectors.

At national level, all governments are committed to developing new PaMs on the principles set out below.

Environmentally friendly taxation

Environmentally friendly taxation involves developing a new tax system or new tax instruments to identify price signals that are not compatible with decarbonisation targets and the ‘polluter pays’ principle. An analysis of environmentally friendly energy taxation will be carried out jointly between the federal and regional governments by 2021. This new system or these new instruments must be consistent with any other tax reforms in order to maintain the international competitiveness of businesses and provide for a policy that supports citizens.

International shipping and aviation

International shipping and aviation are not covered by the Member States’ non-ETS climate objective. Therefore, policy will be organised for the most part at international level. However, Belgium is keen to introduce strategic measures such as promoting energy efficient vessels and shoreside power.

In the maritime sector, and in consultation with other Member States, Belgium will explore the introduction of a mechanism to ensure a transition to GHG-free energy at national and international level, as well as the introduction or strengthening of emission standards. To that end, a step-by-step plan is to be developed for shipping in Belgium. In parallel, active cooperation at international level should continue and proposals for measures should be submitted to and supported by the International Maritime Organization (IMO).

Similarly, Belgium will urge the aviation industry to make concrete commitments and develop a roadmap to achieve a significant reduction in its GHG emissions.

The aim is to internalise the external environmental costs of aviation through tax measures. For example, Belgium could support Europe-wide initiatives to introduce standardised carbon pricing in the aviation sector.

Inclusion of the ‘climate change’ dimension in financial, budgetary and investment decision-making

The necessary public measures can be co-financed by shifting priorities within existing budgets. Belgium is looking at ways of greening the financial system to encourage private funding for the climate transition. It may also be possible, for example, to use stimulus funding to finance the energy and climate transition. Belgium wants to focus more on attracting EU funding in all policy areas relevant to energy and climate policy.

Strengthening support for local climate policy

Belgium will also focus on practical support and guidance, smart cities, mobilising local energy investments, project co-financing and better communication, as well as on multi-level governance. This will also require the voluntary commitment of local councils to the Covenant of Mayors, a European initiative enabling local and regional authorities to pledge to reduce GHG emissions by more than 20% by 2020 and by more than 40% by 2030.

Improving climate governance and optimising the National Climate Commission

The various governments will provide and guarantee sufficient resources for all authorities involved in the introduction of the NECP.

Strengthening the exemplary role of public authorities in the energy transition

By means of sustainable public procurement, public authorities will give the necessary impetus to the market to commit to a decarbonised transition of the economy (by greening their vehicle fleets, purchasing according to the principles of the circular economy, choosing appropriate tender selection criteria, etc.).

Federal State

Tax instruments, public finances and financial regulation.

- *Carbon Pricing:* The Belgian National Debate on Carbon Pricing study, published at the end of June 2018 at federal level, consists of exploratory research into carbon pricing options (including a carbon tax). This may be a tax instrument that could give significant impetus to the various non-ETS sectors (including transport, buildings, industry and agriculture). However, additional studies on its practical implementation and feasibility are still required given the division of responsibilities in Belgium and the sharing of the proceeds of such carbon pricing between the Regions and the Federal Government. It goes without saying that, if any shift is to take place, the principle of budget neutrality must be respected. Awareness-raising measures will be planned in the meantime.
- *VAT:* As part of the proposal to reform VAT rates, Belgium will ask the European Commission for a change to the VAT on environmentally friendly investments (cycle tracks, heat pumps, insulation, full renovations, product repair, etc.).

Exemplary role of authorities (see also points 3.2(iii) and 3.1.3(iii)).

- Purchase and manage vehicle fleets and building stock in line with climate and energy neutrality objectives by 2040.
- Maximise renewable energy generation and use (green electricity, installation of photovoltaic solar panels).
- Integrate sustainable development in management contracts.
- Set a good example in their purchases (e.g. equipment and materials).
- Optimise tender selection criteria (carbon clauses).
- Operate authorities digitally, continue the digitalisation of government, rationalise procedures, and introduce one-stop shops and paperless offices.

Organisation of the labour market

- Organise a ‘National dialogue on the fair transition to a climate-neutral society’ with all policymakers, authorities and stakeholders. This dialogue will be supported by an analysis of the positive and negative effects of the transition to a climate-neutral society and will be particularly aimed at identifying policy options.

Flemish Region

Environmentally friendly taxation

In addition to the sectoral tax measures adopted by Flanders and set out elsewhere in this plan, the Flemish Government will urge the Federal Government to implement a number of measures aimed at developing climate-friendly taxation:

- extending to the whole country the currently reduced rate of VAT on post-demolition rebuilding of town centres could make a major contribution to the climate neutrality of the building stock;
- making the necessary adjustments to company car taxation is vital in order to make the company car fleet emission-free and more environmentally friendly as quickly as possible;
- tax incentives for soft mobility and use of modes of transport other than private cars (walking, cycling, public transport);
- increasing the tax relief for investments in energy saving measures from 13.5% to a level comparable with the Netherlands.

The **reform of international aviation and shipping taxation** (fuel and/or flight tickets), preferably harmonised at EU level and, if possible, even at global level, could generate new income for the Member States, Belgium and the Regions, which could be used to co-finance the climate transition.

Mitigation of climate change and spatial planning

Principles and objectives of the strategic vision for a ‘Spatial Policy Plan for Flanders’

On 20 July 2018 the Flemish Government approved the strategic vision for a ‘Spatial Policy Plan for Flanders’. Based on the approved strategic vision, a Spatial Policy Plan for Flanders (Beleidsplan Ruimte Vlaanderen – BRV) will be produced in order to shape future spatial policy. The principles and objectives of the programme support the achievement of the Flemish energy and climate objectives.

The strategic vision for the BRV provides a comprehensive and ambitious response to demographic, economic, mobility, environmental, natural, biodiversity, climate, energy, raw material and food challenges. The BRV must provide a framework for changing construction so that options for increasing density are created in each municipality and pressure is reduced on open spaces by ensuring a growth rate of 0 ha/day by 2040. It is vital to involve the civil society stakeholders who support and want to help achieve these BRV objectives. This is a task for all Flemings given that the Flemish Government cannot do this alone. It is not only citizens and businesses that need to be convinced, as local authorities are also essential in this transition.

In 2020 a series of draft policy frameworks setting out specific actions will be submitted for approval by the Flemish Government so that the initial Spatial Policy Plan for Flanders is approved in 2021 and the policy planning system can effectively begin.

Smart use of space

A sustainable spatial policy ensures the necessary space for all social functions. ‘Smart growth’ is encouraged by focusing on increasing the density of well-located sites through a quality-based approach. New high-quality spatial developments guarantee healthy and attractive living and working conditions. These factors will therefore be taken into account in spatial planning, together with the proximity of transport hubs and facilities, the location of developments in relation to any pollution, and also open spaces and blue-green corridors.

Increasing density and focusing on urban development does not mean that only opportunities within the Flemish Diamond or towns and cities can be exploited: rural centres must also be boosted in order to prevent increased fragmentation.

Multifunctional and adaptive use (not only in terms of space, but also time) and intertwining of space, functions and buildings, if possible and desirable, will be encouraged without compromising the main use or the needs of the main user. The high-quality transformation of sites with significant development potential will be prioritised (well-located sites that are underused due to their ageing, for example).

By increasing density through innovative quality-based approaches, using space in a multifunctional and time-based manner, reusing buildings and taking advantage of underused land, the efficient use of space can be increased and spatial sprawl can be slowed.

Improving the quality of the environment in an integrated and innovative manner

Good-quality living conditions are important. The 10 fundamental qualities of the BRV are important for all spatial developments. Any development or growth must ensure healthy and attractive living conditions that are designed to facilitate travel, with sufficient access to greenery, water and oases of tranquillity, good air quality, availability of nature and space for food production, and attention to thermal stress.

In line with the fundamental quality of ‘living together in inclusiveness’, space and environment will be designed to give all groups in society access to green spaces, public spaces and basic services.

Robust public space

Open spaces will be maximised as they are particularly useful for encouraging natural systems, mitigating and adapting to climate change, storing water, and enabling agriculture, leisure and recreation. This multifunctionality will be interwoven as much as possible, but without compromising the main use (for example, large-scale professional agriculture being separated from large areas of vulnerable nature if necessary). In addition to strategic areas for agriculture, nature and water, open spaces will include landscaped areas that are designed and used with multifunctionality in mind. This interweaving of functions within open spaces will play a specific role. The physical system and ecosystem services will structure the functional choices made in open spaces.

Robust areas of nature, forest and valley that form the backbone of a wider functional blue-green network extending from the centre of towns and villages will be reinforced. The aim will be to green the built fabric with green roofs, green façades, district gardens and play areas to ensure healthy living conditions that can be adapted to climate change.

The growing trend for certain parts of open spaces to be paved will be reversed by reducing the paved area every year.

These principles are important for carbon storage (see the chapter on LULUCF), protecting against the effects of climate change (water management), reducing energy demand in buildings (increased energy efficiency) and curbing transport demand.

Using renewable energy (wind energy) and protecting the landscape from the effects of climate change (space reserved for blue-green corridors) are also important. In addition, they play a role in the modal shift (to public transport and cycling/walking for the movement of people and to inland waterways for freight transport) and managing demand for mobility (proximity of infrastructure).

Coherent and dynamic (open) spaces: space for agriculture, forestry, nature and water that is coherently and functionally managed, a dense network of blue-green corridors, and dynamic spatial planning that guarantees food production, biodiversity, soil infiltration and rainwater storage are particularly important for protecting against climate change and for carbon storage.

Measures: monitoring and regulation

In addition to spatial policy at all levels of government, climate policy and spatial planning measures are envisaged:

1. The Flemish Government has the specific task of implementing a **monitoring mechanism** for the strategic vision, operational policy, implementation and effects. Through this monitoring, it will be possible to assess **whether the contribution of the space to climate change mitigation or adaptation is moving in the right direction and whether this is happening fast enough** to make a sufficient contribution to the climate and energy targets in the period 2021-2030. The Spatial Policy Plan of Flanders provides for such a monitoring system.

2. Regulatory barriers, obsolete regulations and administrative obstacles preventing smart and flexible use of the space and innovative ways of living and working will be removed. Projects involving new spatial concepts that increase spatial efficiency and focus on the interweaving of functions, reuse, timed use of space, climate change mitigation and adaptation, and improved mobility and landscape quality will be encouraged.

Green and circular economy

The climate targets will be met only if we can transition to a green and circular economy.

In a green and circular economy, we can build on our current level of wellbeing and prosperity in the long term, while also preserving our natural capital and a healthy climate. A green and circular economy involves intelligently using the synergies between economy and ecology. In this way we can pursue our economic and environmental goals and also preserve the competitiveness of our economy in the future.

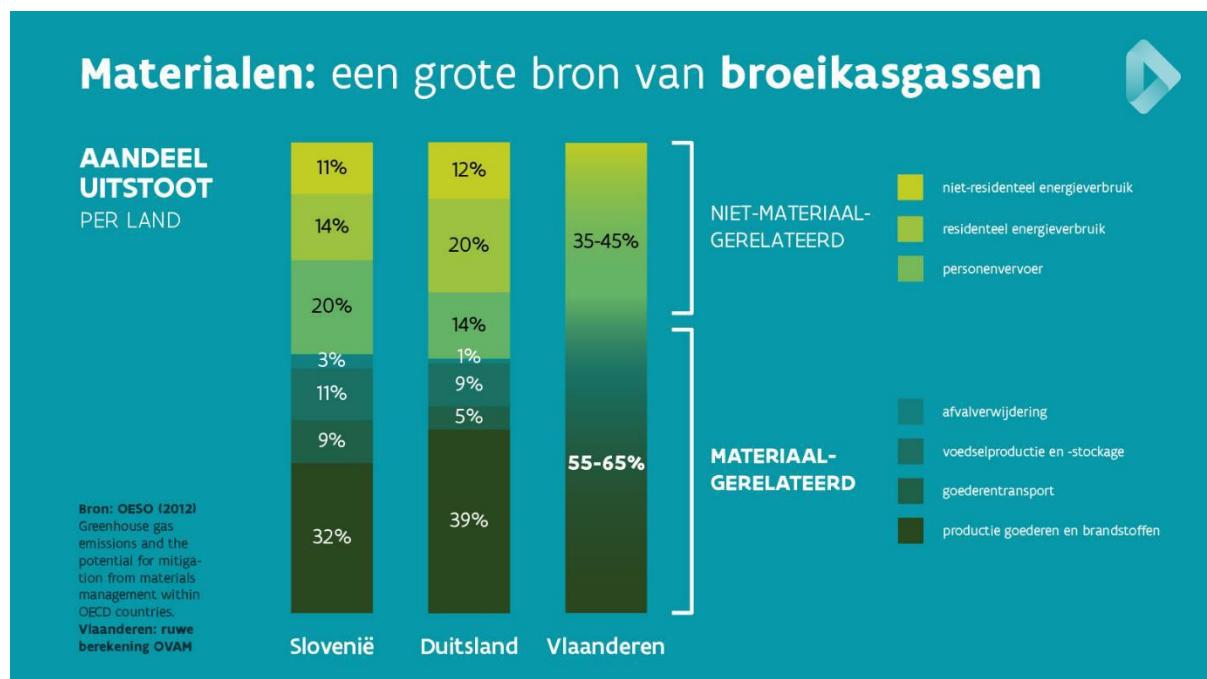
The contribution of the circular economy to climate policy

Circular economy is a term that derives from waste and materials policy. Traditional waste policy aimed to process waste in an as environmentally friendly way as possible. Materials policy aims to develop and organise material cycles that can in principle continue to meet our needs indefinitely. Waste becomes new raw materials and products are designed to be recyclable and/or made of recycled materials. However, the circular economy is about more than just recycling: it is also about meeting our needs with fewer resources. To achieve this, products and the systems in which they are applied must be completely re-thought: reuse, demountability for repair and replacement, introduction of product-service combinations, support for other consumption models based on shared use, etc.

The climate challenge is not just an energy issue, as we must also focus on the underlying drivers of high energy demand, namely the high consumption of materials that results in a linear economy. Framing the climate challenge as a materials issue, and more broadly as a challenge posed by the linear economy, opens up prospects for finding new solutions to make the economy greener.

Figure 7-1 below shows that over half of the GHG emissions of various countries are materials-related, and that is a conservative estimate. For example, residential energy consumption is partly determined by the way in which our homes are built (e.g. insulation) and is therefore also materials-related, or at least partly so. Passenger transport is also for the most part materials-related: in the average trip by car, approximately 100 kg of people are transported by 1.5 tonnes of materials. Lighter vehicles or shared use will therefore have a major impact on the share of passenger transport.

Share of materials-related GHG emissions



Materialen: een grote bron van broeikasgassen	Materials: a major source of greenhouse gases
AANDEEL UITSTOOT PER LAND	SHARE OF EMISSIONS BY COUNTRY
NIET-MATERIAAL-GERELATEERD	NON-MATERIALS-RELATED
niet-residentiel energieverbruik	non-residential energy consumption
residentiel energieverbruk	residential energy consumption
personenvervoer	passenger transport
MATERIAAL-GERELATEERD	MATERIALS-RELATED
afvalverwijdering	waste disposal
voedselproductie en -stockage	food production and storage
goederentransport	goods transport
productie goederen en brandstoffen	fuel and goods production
Bron: OESO (2012) Greenhouse gas emissions and the potential for mitigation from materials management within OECD countries.	Source: OECD (2012) Greenhouse gas emissions and the potential for mitigation from materials management within OECD countries.
Vlaanderen: ruwe berekening OVAM	Flanders: rough calculation by the OVAM
Slovenië	Slovenia
Duitsland	Germany
Vlaanderen	Flanders

Applying circular strategies reduces overall CO₂ emissions. This can occur directly (e.g. by preventing transport) or because the strategy requires fewer materials and/or fewer products to meet the same need, thus reducing indirect emissions. A strategy that increases a product's service life can therefore lead to fewer products being required to meet a particular need. This results in CO₂ savings in terms of the extraction, production, transport and waste treatment of those products avoided. A combination of various circular strategies to meet a particular need (e.g. mobility) can have a far greater effect than the sum of those strategies. This can result in a real system change.

In this context, it is also useful to look beyond the CO₂ emissions generated in Flanders, because Flemish consumption results in GHG emissions around the world. These can be mapped using footprint indicators, which calculate the global impact of Flemish consumption in terms of GHG emissions (carbon footprint) and materials consumption (material footprint). These footprint indicators provide an insight into where the greatest impacts

occur throughout the supply chain. By mapping the emissions in this way, we can avoid proposing solutions that simply shift the problem abroad, because such solutions will not change global emissions. It is therefore useful, in addition to calculating greenhouse gases based on local emissions and setting associated targets, to adopt an approach based on the carbon footprint of Flemish consumption. This footprint largely lies abroad (88%) and is double the local emissions in Flanders. The vast majority stems from housing, passenger transport, food and a wide range of consumer goods, such as textiles, domestic appliances and furniture.

The carbon footprint of Flemish consumption stands at 20 tonnes of CO₂eq per inhabitant, which is significantly higher than the total GHG emissions within Flanders (around 9 tonnes of CO₂eq per inhabitant). Studies estimate that global GHG emissions need to reduce to an average of 2 tonnes per inhabitant by 2050 in order to meet the targets of the Paris Agreement and therefore limit the average global temperature rise to a maximum of 2°C, and subsequently 1.5°C. This means that other more sustainable production and consumption methods need to be found in order to reduce the carbon footprint.

Climate targets must not be solely translated into energy targets, but also into guidance on materials indicating the amount of materials that an economy can consume to achieve a sustainable level of raw materials use. An example of this is the UNEP International Resource Panel report according to which the material footprint should be approximately 7 tonnes per capita in 2050. The material footprint of Flemish consumption was estimated to be 17 tonnes per capita in 2010. Using guidance on materials as a policy guideline is an important step towards achieving a circular economy that no longer destabilises the climate. The aim will be to reduce the material footprint of Flemish consumption by 30% by 2030. The amount of residual household waste will therefore fall from 146 kg per inhabitant to 100 kg per inhabitant by 2030. The aim will also be to reduce the amount of industrial waste by an equivalent percentage by the same date.

The contribution of the circular economy to climate policy goes beyond simply reducing GHG emissions. Circularity, in all its aspects, can also help to make society more climate-proof. A circular economy that makes smart use of materials, energy, space, water and food is also a resilient and adaptive economy that is better placed to adapt to external trends in the environment. By focusing on maximising the value of materials and closing (local) cycles, the circular economy offers a robustness that is useful for adapting to climate change.

Objectives for developing a green and circular economy

In order to combat climate change, it is therefore important to focus on the following specific objectives.

- (1) Ensure that products placed on the market last longer, are easier to repair, can be reused, are demountable and recyclable, and/or contain more recycled materials.
- (2) Encourage businesses to play their role in the transition through production, distribution, activity and consumption models that are adapted in such a way as to ensure that production processes are more environmentally friendly and products remain in a closed cycle for longer, are used more intensively and are more environmentally friendly.
- (3) Continue to prioritise the best possible selective collection with a view to reuse and recycling.
- (4) Introduce new indicators and associated guidance, such as the material footprint of consumption, so that potential CO₂ savings can be detected and made throughout the supply chain, including outside Flanders.

This will require a combination of incentives to create the space for experimentation and sales outlets for green and circular models, together with the right financial, tax and regulatory incentives to steer the market towards the right decisions. A more innovative way of conducting policy based on establishing links and cooperation between target groups and themes will also need to be found.

Priority measures for a green and circular economy

Encouraging businesses to participate in the transition

New business models

A participatory study has shown that businesses recognise the need to transition to appropriate business models, such as product-service combinations, but that there are sticking points and obstacles making them cautious: attachment to existing organisational and governance structures; lack of clarity about potential savings; lock-in effect due to concentration on the main activity; fear of the risk involved in being the first mover, and day-to-day determination of strategy. The policy aims to remove these bottlenecks using new or adapted policy instruments. The transition will have to occur at several levels, such as governance, funding, innovation and behaviour.

We want to encourage businesses to think more broadly when they create added value, and not just to take account of factors such as growth, short-term risk and income in their business model. In this way, businesses, consumers, researchers and authorities will be able to transform the economy together in a more systemic way. We are looking into the possibility of giving some kind of benefit to businesses that score well in the area of corporate social responsibility (CSR) and climate change. This could be achieved through public contracts or improved visibility, for example. We are also looking into steering consumers' purchasing behaviour towards the more sustainable products and services of businesses that take these steps, for example by encouraging such purchases. After all, consumers have a major impact on the demand side of the economy.

Encouraging circular solutions through public and private contracts

We are leading by example as we are introducing circular priority rules in public contracts in order to maximise opportunities for the circular economy.

However, private businesses also have significant purchasing power; we are therefore encouraging them to focus on circular purchases and making them accountable, for example by including the circular concept and circular purchases in instruments such as the duty of acceptance and Green Deals.

Using Green Deals to transition to a circular economy

The chapter on innovation explains that Green Deals are a generic instrument. Due to their participatory nature, they can play a role in the transition to a green and circular economy and environmentally friendly consumption. Green Deals help to identify sticking points and find solutions (which become new policy) through cooperation between the participating organisations. Experience with the Green Deal for Circular Procurement and the Green Deal for Circular Construction shows that, by working proactively together and forming a learning network, we can play a leading role within the European Union. The Green Deals will benefit from the resources needed to play their role. In particular, a Green Deal is currently being prepared with the distribution and food sector to encourage the prevention of packaging waste.

Development of a symbiosis platform

We are developing and supporting a Flemish symbiosis platform for the exchange of information on residual streams and options for reuse as raw materials. This will avoid CO₂ emissions and reduce the amount of primary raw materials consumed. We are helping businesses to find the right partner. Initially the platform will focus on the exchange of material streams. In the longer term, it may also be used to exchange residual energy and waste streams and underused space.

Study into the creation of a CO₂ backbone network

A CO₂ backbone network will be used to temporarily store, transport and use CO₂ in order to promote the circular economy of carbon. On the one hand, captured CO₂ can be reused in industrial processes, so that the carbon is kept in circulation throughout the value chain. On the other hand, CO₂ can be temporarily stored with a view to its permanent underground storage abroad, which is known as carbon capture and storage (CCS).

Better policy

A policy for a green and circular economy should work to link the various environmental perspectives and themes, such as the climate, waste policy, (renewable) energy, mobility and food. In order to achieve a green economy, as authorities, we must therefore take on a new role and seek to cooperate with the relevant partners. This can be achieved in particular through instruments based on cooperation between authorities and stakeholders, with Green Deals being a typical example.

Implementation of a plan to transition to the circular economy

We need to establish a plan for transitioning to the circular economy that will be widely supported and involve a partnership between the main stakeholders (industrial federations, civil society, knowledge institutions, local and federal authorities) and the Flemish Government. As a result, this plan must not only take account of technological innovations, but also the development of appropriate skills, production, management and consumption models, and social inclusion.

This partnership must be established so that the OVAM/Vlaanderen Circulair (Circular Flanders hub) can continue to act as a catalyst, connector and innovator. Given the priority that we attach to a circular approach in numerous respects, we will combine the resources of the relevant policy areas and ensure that a sufficiently active role can be given to each policy area in the management of the Vlaanderen Circulair. We will adapt the current governance of the Vlaanderen Circulair so that this broader objective can be achieved. An appropriate legal framework will also be needed.

The legislation on waste, products, accountability, intellectual property, purchase and rental of property, licences, producer responsibility and so on is frequently based on the linear economy as the default value. Consequently, the existing legislation is not always helpful to the circular economy, and sometimes even hinders it. We are trying to gradually adapt the legislation so that it better meets the needs of a circular economy, particularly by imposing more requirements in terms of service life, reuse, recyclability and recycled content. We are also working proactively to get the Federal Government and the European Commission to update federal and European legislation. We are in particular using an intra-Belgian circular economy platform, which brings together representatives from the Federal Government and the three Regions to better coordinate legislation and strategy.

Development and roll-out of a circular economy roadmap

A circular economy roadmap will be developed with specific objectives for raw material use. It will define how our production and consumption systems in terms of food, housing, mobility and comfort can be circularly organised. It will focus on GHG reduction measures by improving the closure of cycles and better meeting needs with fewer raw materials. It must take account of the limited space available, the symbiosis between industrial players and partners in production and consumption chains, employment policy and investment. This roadmap must clearly focus on prevention, by giving priority to measures higher up in the chain. Both material efficiency and energy efficiency must increase in order to reduce CO₂ emissions in production and consumption processes. The circular economy can also be one of the strategic priorities of external economic policy in the areas of trade, investment, research and international partnerships.

Minimising the impact of construction on the climate through circular construction

We are encouraging the construction sector to move towards circular and modular buildings. Through the current 'Preventieprogramma duurzaam materialenbeheer in de bouwsector'/'Programme de prevention de la gestion durable des matériaux dans le secteur de la construction' (2014-2010) (Prevention programme for the sustainable management of materials in the construction sector), we are working with relevant partners on a large-scale testbed (including demonstration projects and living laboratories) to promote innovation in construction and demolition technologies. In this context, new funding mechanisms must be developed in order to fairly distribute the costs and benefits of the entire construction process (construction, use and demolition, logistics) so that the reuse of materials and the adaptability of buildings are maximised in the transition to a

circular construction economy. The costs and benefits of having smaller demolition sites will also be examined. Together with operators in the construction sector, we are supporting the Green Deal for Circular Construction. To reduce the environmental footprint of buildings, we are taking account of their entire life cycle. We are also focusing on the design of buildings and infrastructure. Using the TOTEM, we are continuing efforts in all three Regions to precisely and jointly determine the physical impact of buildings. The construction sector is seeing a very rapid rise in digital technologies, such as 3D scanning, artificial intelligence and BIM (Building Information Modelling), which we want to use as much as possible. In collaboration with the relevant partners, we are ensuring that data on materials can be easily used in these new technologies to ensure more targeted prevention and repair, and that urban mining supporting a circular construction economy becomes much more efficient in the future.

Encouraging change-oriented construction

Based on research into urban mining, in 2020 researchers from the 'Circular Construction' testbed will make recommendations on change-oriented construction. These recommendations will enable a building to be adapted to new needs more easily, more quickly and more cheaply, with less waste being generated during the process than currently, or to be dismantled and reused in order to minimise its impact on the climate.

Encouraging temporary use of buildings

It is important to use buildings, even when they are only temporarily vacant, as this avoids the need for additional buildings to be constructed. This is why we are working on a framework to facilitate the temporary use of buildings.

Environmentally responsible consumption

We want to make every possible effort to further improve our quality of life, while considerably reducing our environmental footprint. More and more people want to live in comfort, eat well, travel quickly, relax and so on. In order to develop, those regions with a lower quality of life than ours also need raw materials, etc. The use and processing of raw materials, materials and natural resources that go hand in hand with this lead to increased pressure on the climate, depletion of raw material reserves, harm to nature, pollution and waste generation. In addition to a more sustainable and circular production system, a more sustainable consumption system is also vital in order to turn the tide in this respect. The aim is to improve everyone's quality of life, but with less environmental impact. The consumption categories that have the most impact on the environment are mobility, housing and food.

The impact of consumption on the climate and the environment is calculated using the environmental footprint. If we want to reduce our environmental impact, we also need to reduce and modify our consumption, in addition to implementing technological solutions and ensuring efficiency gains in production. This is also true for indirect emissions, i.e. emissions concealed within the products that we consume, which stem from our consumption patterns. These indirect emissions can form as much as 88% of our total environmental impact. Communicating easy-to-understand and action-oriented measures to encourage environmentally responsible consumption is a priority, including within the framework of European initiatives such as the PEF (Product Environmental Footprint), which will enable Flemish people to take this into account in their purchases.

Meat consumption in Belgium fell by 22% between 2005 and 2016, i.e. an average reduction of 1.3 kg per inhabitant per year. In general, surveys show that people are ready to consume more environmentally friendly products, but this does not always lead in practice to responsible purchasing behaviour.

Habits, inadequate supply and other factors also influence consumption behaviour. We want to work on this discrepancy between readiness and actual behaviour by gaining as much insight as possible into consumption behaviour. By focusing on alternative consumption patterns, reduced consumption and reconsumption, we will be able to move towards more environmentally responsible consumption patterns.

We must achieve environmentally responsible consumption patterns that remain within the limits of the planet's ecological capacity and that take account of the social and economic impact of purchasing, using and

scrapping products and services. This means consumers no longer buying, or buying less of, certain products/services. It also means replacing (in a timely fashion) certain products/services with (more) environmentally responsible alternatives that can also be reused or repaired more. Other forms of consumption, such as sharing and replacing products with services, must also become commonplace. This trend will form part of the broader product cycle, in which closing cycles is the norm.

General consumption measures

Among those consumption categories with the most impact, significant efforts are already being made in the areas of mobility, buildings and energy. However, more remains to be done in the area of food.

In order to move towards more environmentally responsible consumption patterns, we are taking the following initiatives:

Green Deals

We are setting up Green Deals for environmentally responsible consumption.

Education and training

We are ensuring that an understanding of environmentally responsible consumption and healthy eating is at the heart of relevant training, particularly for general practitioners and dietitians, and we are including these aspects in educational curricula.

Food policy measures

Food policy

We are developing a coherent food policy that takes account of ecological, economic, social and health aspects and that is focused on making our diet more sustainable. Awareness-raising initiatives emphasising sustainable diets, based on the food pyramid, are also being implemented. The aim is to ensure that local products are appropriately consumed.

Protein transition

In the summer of 2019, the protein transition steering committee was set up within the Department of Agriculture and Fisheries, with representatives from ILVO (Flanders Research Institute for agriculture, fisheries and food), with the aim of promoting a protein transition in the broad sense in both feed and food. This group is focusing on policies, research and cooperation with stakeholders, and has the following tasks, among others:

- ensure the sustainability of protein sources in feed, in accordance with the action plan for alternative proteins and in cooperation with the Belgian Feed Association (BFA);
- continue to ensure the sustainability of conventional animal production;
- continue to focus on plant proteins from protein crops;
- support the development of alternative sources of plant and animal proteins, particularly through the strategic platform for insects, algae, etc.;
- support new markets for the entire chain, from production to waste.

In this context, we are researching and developing a Flemish protein transition, specifically for human consumption, from animal sources to plant sources in line with the food pyramid recommendations of the Flemish Institute for Healthy Living (Vlaams Instituut Gezond Leven/Institut flamand de la vie saine).

Reduction of food waste from producer to consumer

In Flanders, total waste food streams are estimated at 3.5 million tonnes per year (2015). These involve both edible food waste and inedible by-product streams. Three quarters (74%) of waste food streams are unavoidable by-product streams. In 2015, only one quarter (26%) of waste food streams were food waste. The Flemish agro-food industry (agriculture + food industry) accounts for 80% of waste food streams and 61% of food waste.

Depending on the circumstances, by-product streams can be recovered for feed, industry, composting and renewable energy. 92% of streams are currently recovered for feed, compost and energy. Agriculture and the food industry score highly in terms of recovery (7.9 and 8.8 out of 10 respectively in the cascade index). Recovering waste food streams as feed for animals or soil improvers is therefore intrinsically linked with their commercial management.

Flemish consumers throw away on average between 18 kg and 26 kg of food per year, which equates to 4% to 6% of total food purchases and approximately 4% of the carbon footprint of purchased food. The government and the entire supply chain are working together on this issue and have implemented a supply chain roadmap, which covers the period from 2015 to 2020 and aims to reduce food waste in Flanders by 15%. A good mix of awareness-raising and behaviour change, technological and social innovation (reorganisation) and new economic models is needed for this purpose. An interim report (2019) indicated the efficiency with which the agro-food chain processed food raw materials in 2017.

Preparations are currently being made within the Ketenplatform Voedselverlies/Plateforme gaspillage alimentaire (Food Waste Platform) to produce a document that will replace the food chain roadmap. The OVAM, Environment Department, ASF Department and AP Department are working together on this document. This new 'food waste prevention plan' will form part of an action programme with the provisional title of 'Voedsel en biomassa circulair 2021-2025'/'Alimentation et biomasse circulaires 2021-2025' (Circular food and biomass 2021-2025). In addition to the prevention plan, the action programme will also include a successor to the OVAM's 2015-2020 Biomassareststromenplan/Plan de flux résiduels de biomasse (Biomass waste streams plan).

Developing distribution platforms for surplus food and food platforms to combat food waste

We are encouraging the development of a network of distribution platforms and food platforms. The distribution platforms will manage surplus food supply and demand in a given region and organise the logistics of these streams. The food platforms will transform surplus food into new food products and then distribute these.

Working towards an environmentally responsible Flemish Government

Analysis

The climate transition will require everyone in all sectors of society to make a major effort. A credible policy and stable support are therefore vital. In this context, the Flemish Government must play an exemplary role and achieve just as much in its internal management as the target groups that form the focus of its policy.

In terms of its own energy and fuel consumption and associated CO₂ emissions, the Flemish Government approved the Climate Plan of the Flemish Government in 2016. This plan sets out its targets for improving the energy efficiency of its buildings and technical installations, with a 27% reduction in primary energy and a 40% reduction in CO₂ emissions due to energy consumption in its buildings and technical infrastructure and due to the fuel consumption of its official vehicles. These targets apply to both the Flemish Government as a whole and to each specific entity. Four action plans are in place to the end of 2020 to help achieve these targets.

Due to increased ambitions at the European, Belgian and Flemish levels, this Climate Plan of the Flemish Government needs to be revised. Furthermore, recent changes in consumption and new projections indicate that it is realistic to significantly increase the level of ambition in terms of CO₂ emissions.

At the same time, the Flemish Government can also influence the indirect emissions that stem from its activities. Through a sound purchasing policy, it can use its purchasing power to encourage other players in the value chain to reduce their material footprint and energy and fuel consumption.

Targets

By revising the Climate Plan of the Flemish Government, the level of ambition will be raised and the scope extended. The following overarching targets will be set for the Flemish Government for the period up to 31 December 2030 (compared with the baseline year 2015):

- CO₂ emissions from buildings and technical installations: 40% reduction compared with 2015;
- CO₂ emissions from the fuel consumption of official vehicles: 40% reduction by 2030 compared with 2005;
- primary energy consumption as a result of energy consumption in buildings and technical infrastructure: 2.5% reduction on average from 2020.

In 2019, the scope will include 75 entities forming part of the Flemish Government.

Measures

Development of long-term property strategies in order to achieve CO₂ neutrality

A long-term vision extending beyond the 2030 target is vital for renovating the building stock and rationalising technical installations. All entities in the Flemish Government will be helped to analyse their buildings and produce a master plan aimed at achieving carbon neutrality before 2050. This long-term vision will also take into account the Flemish Government's aim of encouraging entities to examine their property strategy and management in a broader context (grouping with other entities, cooperation with private operators, etc.).

Action plan for renovating the building stock

Each entity must meet the set targets, for which purpose it can use a range of support measures (potential scans, framework for concluding energy performance contracts, visualisation of energy data and their linking with property data, benchmarking, project subsidies, etc.). The change in consumption of each individual entity will be monitored and reported on an annual basis.

Reduction in the work of entities by centralising the management of office buildings and vehicle fleets

The property of the various entities will be taken over by the Agence de Gestion des Infrastructures (Infrastructure Management Agency), which will be responsible for managing the buildings. The work of the various entities will therefore be reduced so that they can focus on their core purpose. By developing and centralising the necessary expertise, the Agence de Gestion des Infrastructures can tackle the climate targets more effectively.

Management of the vehicle fleets of all entities covered by the Climate Plan of the Flemish Government will also be centralised and entrusted to a common service provider, which will ensure more reliable and constant monitoring of data and stricter application of the directives issued.

Both for the vehicle fleets and for the buildings and technical installations, the consumption figures will be kept up to date in central databases, enabling constant monitoring, visualisation of changes and benchmarking.

Action plan for mobility

At the end of 2018, the Flemish Government decided to purchase no more new official cars with traditional petrol or diesel engines from 2021. As a result, from 2021, it will purchase or lease only fully electric vehicles (BEV and FCEV) or plug-in hybrid electric vehicles (PHEV) with CO₂ emissions not exceeding 50 g/km, and CNG passenger cars. Measures will also be taken to minimise the use of petrol/diesel in plug-in hybrid electric vehicles and CNG cars. Charging of PHEVs will therefore be encouraged, with the electricity consumption being monitored and incentive measures being introduced, if necessary, to increase this charging. With regard to CNG, fuel card use will be monitored.

From 2025, the Flemish Government will purchase or lease only zero-emission passenger cars (BEV or FCEV). Green solutions will also be maximised when purchasing or leasing other categories of vehicle. For example, similar ambitions will be set for vans two years after passenger cars (i.e. from 2023, only BEV, FCEV, PHEV and CNG vans and, from 2027, only BEV and FCEV vans). As regards lorries, this will depend on market developments.

In addition to purchase and leasing agreements for environmentally friendly vehicles, the Flemish Government will work on the following aspects: roll-out of the charging infrastructure needed; actions aimed at changing user behaviour; limited financial incentives; reduction in the work of entities; cycling infrastructure; mobility studies; option to propose framework contracts for environmentally friendly vehicles, etc. The most polluting vehicles will also be removed as far as possible.

Other measures will constantly be taken outside this scope (e.g. making commuter traffic more sustainable), but without the reduction in CO₂ emissions being monitored.

Environmentally responsible public contracts

The Flemish Government is committed to environmentally responsible and circular public contracts and will therefore include specific requirements and criteria imposing or encouraging environmentally responsible and circular solutions in tender documents. By also proposing environmentally responsible and circular framework agreements, the entities of the Flemish Government can reduce the environmental impact of their purchases with very little administrative work. The Flemish Government will test the CO₂ performance scale in a number of pilot projects and, if this proves successful, will apply it in projects where this is useful and feasible. This measure should reduce CO₂ emissions from large projects.

Many players are involved in public contracts (local authorities, health sector, education sector, etc.). However, their expertise in environmentally responsible and circular public contracts is still very limited. As the central authority, the Flemish Government also wants to play a leading role in this respect and continue to disseminate knowledge, information and good examples to support these other public players. Measures will be formulated and monitored in line with the agreements under the Flemish Plan on Public Contracts.

Climate and local authorities

Towns, cities and municipalities have a wealth of powers to support the energy transition at its root. Nearly 90% of Flemish towns, cities and municipalities have already made commitments under the Covenant of Mayors 2020-2030 and taken numerous initiatives. There are many interfaces between these local initiatives and the regional targets, measures and actions (e.g. with regard to the long-term renovation strategy, development of green electricity, district heating systems, transition to sustainable heating of buildings, energy poverty, etc.). These local arenas are clearly keen to improve cooperation with the regional level.

The Flemish Government will therefore continue to encourage local authorities in Flanders to work together to achieve the 2030 target of the Covenant of Mayors. In particular, it will support local authorities in their work to reduce energy consumption and GHG emissions within their area, and to increase renewable energy generation. It will provide practical support with the development and, in particular, the implementation of their climate and energy plans. These initiatives not only concern the mitigation policy, but will also support the climate adaptation policy at local level.

Supporting local environment and energy plans

There is a lot of demand within local authorities for an integrated framework for developing and implementing climate measures. In cooperation with local authorities, some joint actions will be researched in order to best meet this demand.

Furthermore, as part of the Covenant of Mayors, tools for developing climate mitigation and adaptation measures will also be proposed. In cooperation with local authorities, these tools will be evaluated in due course and adapted to new requirements.

Good tools need correct data to be inputted. For transport emissions, the traffic data used are still very uncertain. Better local traffic data is therefore needed. The Flemish Government wants to encourage local authorities to count traffic on their roads themselves by installing inductive-loop traffic detectors and sending the results to the Flemish Government (Vlaams Verkeerscentrum/Flemish traffic management centre). It is important that traffic data are collected in an accurate and uniform manner and that measurements are recorded over a long enough period of time. To that end, the Flemish Government will produce a framework contract for municipalities to sign. We are currently studying the possibility of financially supporting the municipalities.

Big data, sensor technology and the Internet of Things are increasingly available in towns and cities, and represent new instruments in the transition to a climate-neutral society. The Flemish Government is taking the lead in this transition through pilot projects and cooperation with universities and centres of expertise. We are

very interested in the interface between transport, energy and digital technology, with a specific focus on innovative infrastructure solutions (such as smart grids, energy storage, e-mobility, charging infrastructure and alternative fuels).

As regards data delivery, efforts are being made to provide as much data as possible to local authorities so that they can pursue a policy based on facts.

A renewed partnership with local authorities

Our towns, cities and municipalities have a key role to play in Flemish energy and climate policy. As the most visible level of authority, they play an important exemplary role with regard to their inhabitants and businesses. They translate the targets, actions and measures of regional policy into the day-to-day lives of citizens and are the best placed to develop local support and ensure the energy and climate transition at its root.

For that reason, the Flemish Government wants to continue supporting local authorities and involve them more closely in the development of energy and climate policy. We will therefore work together to conclude an Energy and Climate Pact between the Flemish Government, towns, cities and municipalities, and the Vereniging van Vlaamse Steden en Gemeenten/Association des villes et communes flamandes (Association of Flemish Towns, Cities and Municipalities). This pact will lay the foundations for structural cooperation and, through mutual undertakings, will ensure a vigorous local energy and climate policy.

The Flemish Interior Minister will discuss the following topics with local authorities: local climate tables, local demolition policy plans and local demolition funds.

Increasing support for a climate-neutral society

Analysis and objectives

At the moment, the debate surrounding climate policy is often highly polarised. For some people, this policy is not sufficiently proactive. Others feel threatened and are afraid that climate policy will cost them dear or affect how they live. In such a context, achieving the climate transition and meeting the ambitious policy objectives set will therefore require the close involvement of all stakeholders. Cooperation between citizens and civil society, politics and administration, entrepreneurs and knowledge centres is vital. Many say that they are ready to get involved, but we will only have the necessary support if everyone is involved.

- In order to consolidate and broaden support among the population, the Flemish Government wants to utilise the knowledge resulting from behavioural science. The obstacles that prevent people making environmentally responsible choices will be identified, studied and eliminated, and levers will be further developed. This will allow a coherent policy to be developed that effectively involves and engages citizens in this issue. The key elements of this policy include producing and communicating a clear and enthusiastic vision of the future that encompasses reducing GHG emissions and improving of living standards.
- The population must be informed how the current and future (policy) initiatives of the public authorities, businesses and organisations will gradually achieve this.
- It must be clearly explained to the population how they can specifically contribute to the energy and climate transition.
- Nudging.

Measures

In order to involve and engage the population, close cooperation will be established with the relevant players in society, such as businesses, civil society, the education sector, local authorities, grassroots movements and the academic world. In this way, the various roles can be assumed by the appropriate political level. The Flemish Government will play its role through the following initiatives.

- Monitor the knowledge and skills, motivation and contextual factors that determine someone's position/attitude on the climate transition and their actual behaviour (based on existing research). Also, if necessary, improve our understanding of this subject through new methods.

- Acquire the necessary know-how in terms of communicating the climate issue to target groups and pass on that know-how to the various segments of society. We will use that know-how to develop an attractive vision of the future in Flanders that works for the largest number of people possible because it addresses various segments of the population (age, socioeconomic environment, etc.) and illustrates (their contribution to) the transition over various timescales.
- Help social and administrative players to inform the population about the climate challenge, increase vital support for the climate transition and encourage the necessary changes in behaviour.

In order for people to better understand and tackle the challenges of climate change, its causes and possible consequences, change strategies and their complexity, it is vital that the education and training sector commits just as positively to this work.

With three educational programmes, the Environment Department is structurally focusing on 'education in nature, the environment and sustainability' (MOS programme, Ecocampus programme and NME programme). Climate education is already being encouraged, in close dialogue with the Working group on climate and education.

We want to actively engage in climate education through a targeted approach tailored to the various target groups (primary, secondary and higher education, and nature and environment learning centres in Flanders). In this context, we will use the current knowledge of the requirements that have been identified, particularly within the Working group on climate and education.

We therefore propose the following three-pronged approach.

- In the short term, significantly increase the focus on and expertise in climate education by developing a tailored offer for primary, secondary and higher education, and for nature and environment learning centres. Through temporary secondments (every year for a period of five years), some teachers from primary, secondary and higher education, and from nature and environment learning centres will develop a tailored support offer in close cooperation with the target group.
- We want to respect educational goals as much as possible and, in conjunction with the policy area, determine how to most effectively tackle climate education at various levels and in various directions. We want to fund action research to ensure that climate education continues to be successfully delivered in compulsory education and in nature and environment learning centres in higher education, and is also broadened and integrated, for example, in the training of teachers.
- In higher education, we will focus on support for educational innovation and integration of the climate in curricula through targeted calls for projects. In this context, we will make use of recent positive experiments conducted in climate-focused living labs.

Increasing and spreading capacity and knowledge

An effective energy and climate administration ensures that implementation and reporting are coordinated by establishing a framework of clear agreements setting out the role of the various departments and entities. Climate policy transcends policy areas, which is why all policy areas must help to achieve the climate targets by using their own expertise.

As regards knowledge building, we will continue to aim for a high level of expertise on climate policy among all the entities involved. This knowledge building is not only based on studies and research but also, to a large extent, on lessons learnt from the initiatives and experiments of pioneers and innovators in all sectors of society.

Given the new challenges, the focus will be on the following topics.

- Innovation: knowledge of how existing instruments are used at the Flemish and European levels, knowledge of developments at the international level and applicability at the Flemish level.
- Cross-cutting: knowledge of how spatial planning instruments are used to achieve energy and climate targets, knowledge of new ways of involving and engaging the population, knowledge of how to mobilise private

funding for the climate transition and to make the financial sector more sustainable, knowledge of the transition to an environmentally responsible tax system, knowledge of indirect emissions and ways in which the Flemish carbon footprint can be reduced and monitored.

- Transition and systemic change: knowledge will be developed for each of the sectors.
- Simulation models and long-term models: overall, there is a need to continue using and improving existing simulation models and to develop additional and complementary long-term models (techno-economic models, electricity models, etc.). New methods must be used to (better) model aspects such as uncertainty, actual behaviour in imperfect markets and interaction between different elements of the energy system. For this purpose, we want to develop and use a series of complementary models.

To better support Flemish energy and climate policy (e.g. in terms of data management, support for measures, potential cost studies, social and other impact analyses, and *ex ante* and *ex post* policy assessments), an inventory of the information available to support policies, shortcomings in terms of coordination and any missing information will be produced. Proposals will be made to ensure the best possible justification of energy and climate policy and the necessary scientific support in Flanders.

Walloon Region

Spatial planning

The Regional Development Plan (Schéma de Développement du Territoire – SDT)⁽⁴⁹⁾ identifies the climate and energy as two of the ten challenges to be tackled in terms of spatial planning.

The SDT's vision includes using the energy and climate transitions as key regional levers. Through the SDT, the Walloon Government plans to organise the urban areas into a network and develop new ways of organising the economy, such as the local economy and the circular economy. The aim is to transform how the region and links between functions, activities and resources are understood.

The SDT identifies 20 ambitious objectives for 2030 and 2050, all of which will help across the board to combat global warming, increase energy efficiency and improve air quality.

The SDT, which forms a guideline for Walloon regional planning policy, will steer the key spatial planning decisions while ensuring respect for the four priorities of the Regional Development Code, which are:

- prevention of urban sprawl and rational use of land and resources;
- socioeconomic development and attractiveness of the region;
- qualitative management of living conditions;
- management of mobility.

The options identified by the SDT may be further developed within spatial planning tools produced at local and supra-local level. However, these tools cannot disregard the objectives set by the plan.

The draft SDT proposes a series of strong measures, including the following, aimed at preserving Wallonia's regional wealth and better protecting its environment.

- Reduce the consumption of undeveloped land to 6 km²/year by 2030, i.e. half of the area currently consumed, with a goal of 0 km²/year by 2050.
- By 2030, construct 50% of new housing in the centre of towns and villages, with a goal of 75% by 2050.
- By 2030, develop 30% of new areas of economic activity on previously developed land, in particular by restoring wasteland, or in areas already earmarked by planning tools, with a goal of 100% by 2050. Aim for a higher occupation density of areas intended for economic activity with a land occupation factor of between 50% and 70%, excluding areas that cannot be used such as boundaries, fencing and environmental compensation areas. In accordance with the regional business development plan,

⁴⁹ <http://lampspw.wallonie.be/dgo4/tinymce/apps/amenagement/views/documents/amenagement/regional/sdt/projet-sdt-FR.pdf>

authorise business complexes with a net commercial area of more than 2,500 m² only in urban centres rather than on the periphery, unless it can be proven that a complex on the periphery will not harm nearby urban centres.

- Create private green spaces (to be transferred to the public authorities where applicable) at a rate of at least 10% of the area of all urban development projects of more than 2 ha.
- Create around 100 modal interchange facilities or hubs by 2030 and cover the entire region by 2050.
- Repurpose 100 ha of redevelopment sites every year by 2030.
- Increase the modal share of public and shared transport (in vehicle-kilometres), This was 13% in 2017 and should be around 25% by 2030 and 50% by 2050.
- Increase the modal share of cycling (in vehicle-kilometres), This was 1% in 2017 and should be around 5% by 2030 and 10% by 2050.
- Reduce the modal share of private cars (in vehicle-kilometres), This was 83% in 2017 and should be around 60% by 2030 and 40% by 2050.
- Create 1,000 km of safe cycle paths by 2030 and 2,000 km by 2050.
- Increase the average number of people per vehicle from 1.3 in 2017 to 1.8 in 2030 and 3 in 2050.

These last five points are detailed in the chapter on mobility.

Encouragement of behaviour to reduce GHG emissions

The success of climate change campaigns depends on several factors, including the receptiveness of the population. For example, the public will not necessarily utilise available aid or adapt their behaviour in the short term only. The blind use of education and awareness-raising campaigns, or short-term financial incentives, will not result in long-term behaviour change. Integrated socio-community marketing approaches (community initiatives able to promote behaviour change) offer great potential in terms of encouraging responsible behaviour (⁵⁰) and must therefore be envisaged.

Such behaviour campaigns can target certain flagship topics, such as environmentally conscious consumption, energy saving behaviour in the home, mobility or even digital pollution, which is a form of hidden energy consumption that is often neglected (⁵¹), even though the electricity consumption of data centres is expected to increase in the coming years.

Several awareness-raising or behaviour change platforms, actions and campaigns have been established at institutional level (⁵²), supplemented by a wealth of other structures (⁵³). To ensure rapid access to information on virtuous behaviour, the Walloon Region will ensure that existing platforms, actions and campaigns are integrated so that everyone can quickly and easily find the information they need and the answers to their questions.

These approaches must be made possible by rationalising and optimising existing tools in cooperation with, and with the support of, operators in the sector who must be able to deliver the required information through their actions.

⁵⁰ <https://www.seai.ie/publications/Changing-Energy-Behaviour.-What-Works..pdf>

⁵¹ In 2016, data centres in Wallonia accounted for 7.7% of the total electricity consumption of the service sector.

⁵² Guichets Energie (energy information points), 'Les wallons ne manquent pas d'air' platform, 'Les mini-influenceurs' videos, etc.

⁵³ For example: IEW, GoodPlanet, écoconso, Réseau Transition, Passeurs d'énergie, consocollaborative.com portal, Greencap challenges.

Brussels Capital Region

Cross-cutting approach: integration of climate objectives in other regional policies

Integration of climate priorities in regional decisions

The government wants an ambitious response to the European goals and to the commitments made under the Paris Agreement, by developing a fair and proactive climate policy. To that end, it will develop a systemic, structural and structured approach. All regional levers will be mobilised to establish a new climate governance and to ensure that these challenges (and those linked to biodiversity) lead to regional decisions.

As an example, from the start of the parliamentary term, the government will include a contribution to climate priorities in the guidance notes and letters of each minister and each public body, and also in the goals assigned to senior officials.

Development of a low-carbon vision for Brussels to 2050

Given the challenges and opportunities involved in these efforts in such a dense and urbanised area, the government undertakes to move towards the European carbon neutrality target by 2050.

To achieve this target, the government intends to equip the region with a long-term strategy based on binding targets and an assessment framework regulated by a ‘Brussels Order for the Climate’.

This challenge can only be solved if the people of Brussels share a vision. The government will therefore initiate a public debate, bringing together Brussels residents, economic, social and institutional operators, transition initiatives and local authorities around a ‘low-carbon’ vision for Brussels to 2050.

The terms of this debate will be decided in 2020.

Adaptation to climate change

Although the climate change mitigation measures in this plan will limit the regional contribution to climate change, they will not be sufficient to avoid its current and future consequences. As a result, adaptation measures will be needed to mitigate the damage caused by the inevitable impact.

In addition to the measures included in the adaptation priority of the Regional Air, Climate and Energy Plan, the government will therefore produce a regional adaptation strategy anticipating the consequences of climate change and its resulting environmental, economic and social risks.

Scientific support for the climate strategy

The government will base its action, particularly in terms of the climate, on scientific expertise. An independent interdisciplinary evaluation committee, consisting of scientific experts, will therefore be set up within the Environmental Council and will be responsible for annually submitting a report to Parliament on the state of public policies with regard to the climate strategy and regional biodiversity.

An integrated regional development and environment policy to tackle the climate challenge

Spatial planning and urban development are vital components and tools in the construction of Brussels society. They define how Brussels residents live, work, travel, learn or play in the city. Given the population growth in the Brussels Capital Region, the government has opted for a smart spatial development strategy making targeted choices to allow an increase in both urban density and green areas, sustainable social interactions and the creation of high-quality public spaces.

The Brussels Capital Region will therefore roll out a sustainable regional development strategy in line with the ambitions of the Regional Sustainable Development Plan (Plan régional de développement durable – PRDD), i.e. a polycentric city with local communities at district level. In particular, the regional development policy will aim

to improve the living conditions and attractiveness of the densest central districts by creating green spaces and oases of coolness, reducing the built area and increasing district facilities.

The cross-cutting planning tools that guide regional policy will therefore be adapted, if necessary.

The **Regional Land Use Plan (Plan Régional d'Affectation du Sol – PRAS)** is a key document in the region's development. Given that it is binding and creates rights, its amendment is a substantial, costly and complex process. An inadequately assessed amendment could have major uncontrolled consequences on both regional development and the achievement of regional objectives (creation of housing and the associated living environment, preservation of heritage, attractiveness and economic performance, balanced mobility, and public engagement in the region's future).

The PRAS will therefore be updated in response to the changes in the Brussels Capital Region and the new PRDD. Such an amendment will enable the PRAS to be adapted to the challenges in Brussels and will necessarily include the climate ambitions. It should also clarify the balance between functions in mixed areas, incorporate the objectives of the Good Move regional mobility plan, protect sites of high biological value that make a specific contribution to the green network, and offer a framework for urban agriculture. The legal feasibility of including areas where the density is to be increased or reduced will also be assessed.

Furthermore, **10 priority development hubs** have been identified by the government and are in the process of being set up. Further to Action 105 of the Regional Air, Climate and Energy Plan, which has a zero-carbon target for any new urban development, and based on sufficient diagnoses and knowledge (initial phase), these hubs will be planned (planning phase) and set up (operational and subsequent phases) in line with the regional ambitions and climate targets.

To ensure that this approach adds real value and proves to be effective, the climate impact focus in the regional planning of the priority development hubs must be forward looking and aim to research and validate proposals so that the relevant expertise is gradually developed within perspective.brussels and the best possible compromise is achieved between the climate ambitions, resources used and other regional objectives.

To help achieve the climate targets and regional ambitions, and to guarantee their legal stability, the government will take the following steps.

- Update the PRAS in order to include the multi-criteria climate targets in the general objectives and in the provisions on green areas, business zones in urban areas (zones d'entreprises en milieu urbain – ZEMU), areas with (significant) mixed functions, areas of regional interest (zones d'intérêt régional – ZIR), areas of regional interest for deferred development (zones d'intérêt régional à aménagement différé – ZIRAD), housing areas, and requirements 21 to 28. For this purpose, a working group will be set up in early 2020 to bring together the various authorities involved (Perspectives, Bruxelles Environnement, Urban.Brussels, Bruxelles Mobilité). Prior analyses and studies will be begun during 2020 and the amended PRAS will be adopted in 2024.
- Plan climate-compatible priority development hubs. Sustainability objectives (including circular economy aspects) will be included from 2020 in all regional diagnoses (criteria and a framework will be defined for this purpose), and from 2025 in all hub planning documents. A comprehensive review will be conducted in 2025.

These two actions will be carried out together with the various competent bodies (Perspectives, Bruxelles Environnement, Urban.Brussels, Bruxelles Mobilité, Société d'Aménagement Urbain, Citydev, etc.).

The Regional Planning Regulation (Règlement régional d'urbanisme – RRU) is also an important tool in the region's development. The RRU sets out rules on the following aspects in particular: (i) characteristics of structures and their surroundings; (ii) housing standards; (iii) construction sites; (iv) accessibility of buildings for people with reduced mobility; (v) advertising and signage; (vi) the road network, its accesses and surroundings, and (vii) parking rules away from public roads.

The current RRU has been in force since 2006. However, a draft revised RRU was adopted by the previous government. The public inquiry into this draft was held from 14 March to 13 April 2019.

The government will complete the revision of the RRU, with the following objectives being maintained and/or reinforced:

- the principle of contextualising authorised dimensions;
- increase in the size of public spaces in response to changing ways of living;
- improvement in pedestrian and cyclist comfort;
- a new definition of A, B and C accessibility areas taking into account changes in the public transport offer;
- variation in the number of authorised parking spaces depending on the location of a project;
- new proactive provisions on bicycle parking spaces and delivery areas;

Economic innovation to aid the transition

A dynamic and innovative region in economic, environmental and social terms is vital for holding onto its driving forces and attracting the talent of the future.

To achieve the objective of a regulated and decarbonised market economy, the region will treat economic operators as preferred partners. Each sector will therefore be encouraged to contribute to the collective objectives resulting from the NECP.

In agreement with the social partners and building on the existing impetus, economic support tools (regulations, funding, assistance, human resources allocated within organisations, promotion abroad, economic research, etc.) will therefore be gradually steered towards support for the transition of all businesses and sectors to decarbonised production models, the circular and regenerative economy, social and democratic entrepreneurship, and digitisation of the economy. The government's goal is that, by 2030, only the best economic models in social and environmental terms will continue to benefit from regional public support.

As an extension of the Strategy 2025, the government will therefore develop a transition strategy for the Brussels economy to 2030, which will promote the decarbonisation of all sectors and reinforce support for the sectors of the circular economy (see point 1.1.2.2.2 on this subject), social economy and digital economy. Particular attention and support will be given to training in the resulting new trades and skills.

Sustainable renovation strategy and economy

To achieve the medium- and long-term climate targets (2030 and 2050), and also to reduce the overall cost of housing in Brussels and improve its quality, the sustainable renovation of buildings is a key issue in the environmental transition. It is also an opportunity to create businesses and jobs that cannot be easily relocated, which the government must seize by supporting training, guaranteeing high-quality jobs and preventing social dumping.

This will be the aim of the 'Employment-Environment-Finance' Alliance (Alliance 'Emploi-Environnement-Finances'), within which all sectoral stakeholders will work to implement the Strategy for the sustainable renovation of Brussels buildings (Stratégie de rénovation durable du bâti bruxellois). The government will also involve public and private sponsors in the Alliance so that all possible options are available for funding the transition of buildings. The Alliance will work to stimulate demand for the renovation of buildings (by adopting support and information measures, tightening standards, public authorities setting an example, etc.), build the capacity of operators in the energy renovation sector (by supporting businesses, supporting innovation, etc.) and develop the necessary skills (by improving the vocational training offer, providing specific support to jobseekers, etc.).

Sustainable construction is an economic sector with the goal of achieving the region's environmental objectives while locating as many jobs and as much economic activity as possible in Brussels. The region already has recognised experience, pioneers and public policies in eco-construction. The government intends to pursue this

policy by developing circular construction and locating as many jobs and as much economic activity as possible in this sector in Brussels.

Regional digital sobriety strategy (⁵⁴)

Digital technology is nowadays inescapable as connected objects are steadily becoming part of all aspects of our lives (housing, cars, communication, etc.). The digital transition and smart cities can in particular be regarded as ways of reducing energy consumption in many sectors (*IT for Green*). However, the direct and indirect environmental impacts of increasing use of digital technology are often underestimated, partly due to the 'invisibility' of the infrastructure used.

The energy efficiency of digital technologies has significantly improved. However, the broad global trends in all sectors are painting an alarming picture. New technologies account for 4% of annual global CO₂ emissions, i.e. just as much as aviation (⁵⁵).

This source of emissions therefore needs to be urgently included in the overall emissions reduction goal in order to limit its impact on climate change. Digitisation also needs to be refocused on one of its key objectives: reducing the environmental impact of activities (reducing travel, printing, etc.). The explosion in the environmental impact of digital technology can and must be prevented by implementing 'digital sobriety'.

A sober digital transition does not just involve reducing the direct energy consumption of digital activities, purchasing more energy-efficient and more sustainable equipment (*Green for IT*), changing equipment less often or reducing superfluous energy-intensive uses. Reducing the energy and environmental footprint of digital technology also involves using our individual and collective capacity to question the rationality of our purchasing and consumption behaviour in terms of digital objects and services, and adapting it accordingly. It equally involves efficiently managing digital tools at the end of their life (smartphones, computers, data centres, etc.).

It is also vital to raise awareness of the existence and nature of the behind-the-scenes aspects of digital services:

- upstream: consumption of rare earths and water, and environmental and social damage in extracting countries; significant use of grey energy;
- during use: energy consumption, surface area occupied (⁵⁶);
- downstream: electronic waste, environmental and social damage in the countries affected by landfill activity and recycling.

The region has a role to play among digital consumers, whether individuals, businesses/organisations or public authorities. It must also reduce the impact of its own digital needs or activities. For this purpose, a digital sobriety strategy tackling the various aspects mentioned above will be studied.

⁵⁴ Sources:

- Technologies numériques, information et communication (TNIC). Guide sectoriel 2012. Réalisation d'un Bilan des émissions de gaz à effet de serre:
<https://www.ademe.fr/technologies-numeriques-information-communication-tnic-guide-sectoriel-2012>
- Cécile Duguet and Fanny Lopez (eds), *L'impact spatial et énergétique des data centers sur les territoires*, Rapport Ademe, 2019: <https://www.ademe.fr/impact-spatial-energetique-data-centers-territoires-1>
- The Shift Project, Lean ICT – pour une sobriété numérique 2018:
<https://theshiftproject.org/article/pour-une-sobriete-numerique-rapport-shift/>
- IDDRI, FING, WWF France, GreenIT.fr (2018), White Paper on the Digital Economy and the Environment:
<https://www.iddri.org/en/publications-and-events/report/white-paper-digital-economy-and-environment>
- Policy paper, Greening government ICT strategy: <https://www.gov.uk/government/publications/greening-government-ict-strategy>
- Action Plan for Green IT in Denmark:
https://www.apc.org/sites/default/files/Action_Plan_for_Green_IT_in_Denmark.pdf

⁵⁵ Source: Green IT Belgium.

⁵⁶ In France, old buildings have been renovated into data centres.

The Walloon Government will therefore:

- reduce the environmental and climate impact of regional digital tools and services in their design and use and at the end of their life (in the context of a circular economy);
- inform, alert and educate the Brussels population (individuals, businesses, etc.) about the impact of digital technology and the development of tools;
- reduce the consumption of regional data centres (existing or to be built), including taking advantage of opportunities for heat recovery.

The public authorities will set an example by:

- implementing a regional digital equipment strategy, including digital purchases and services (*Green for IT*);
- developing digital innovation pilot projects;
- implementing a circular economy approach for end-of-life regional digital tools;
- studying the feasibility of extending the guarantee period of digital equipment.

This strategy will also take account of climate change impacts that have already occurred in order to develop adaptations.

In terms of cooperation with the other entities, the government will:

- ask the Federal Government to:
 - continue reviewing planned obsolescence and finish drafting a regulation in this respect;
 - ensure more widespread use of 'sustainability' labelling for digital equipment (environmental footprint, service life, repairability, availability of spare parts).

Measures in relation to indirect emissions

Aware of the need to reduce its total carbon footprint, and not just its direct emissions, the Brussels Capital Region has set itself the goal of also working on its indirect emissions. In addition to energy, the manufacture of goods and production of food consumed in the region must therefore also be considered.

Data

Indirect GHG emissions are real, but most measurement and reporting efforts are currently focused on direct emissions given the international rules and undertakings in this respect. However, knowing the region's total carbon footprint will in the long term enable the government to make its decisions on a more global basis in solidarity with the rest of Belgium, Europe and the world.

In order to better identify these indirect emissions and determine the progress made through measures in this respect, the government undertakes to:

- equip itself, by 2021, with the means to better calculate and regularly monitor these indirect GHG emissions. This work on data could prove a useful addition to the Regional Energy Balance.

Development of the circular economy

Zero-waste lifestyles, prevention, reuse, repair, recycling, and service or collaborative economy models are vital ingredients for drastically reducing our indirect emissions.

An ambitious circular economy policy has the side effect of increasing the capacity of society and the region to adapt because it reduces the dependence on imported raw materials and increases local economic autonomy by reducing the length of logistics flows and mobilising the region's resources.

It also enables a better response to global warming and shocks that may affect international logistics chains and natural resources around the world.

Moving from a linear economic model to a circular economic model involves adopting a vision and a strategy consistent with building the circular economy and integrating it within all regional policies (economy, jobs and training, research and innovation, environment, spatial planning, waste management, etc.) by encouraging synergies and coordinating the various stakeholders and initiatives in this area.

Against this background, the region will put the economic transition at the heart of its strategy and will gradually, and as a priority, target its resources at businesses operating in an environmentally and socially responsible manner. The declared ambition is to place Brussels at the forefront of the ecological and inclusive transition by rooting its economic activity within the region, developing high-quality jobs that cannot be relocated, and offering local and high-quality goods and services.

In agreement with the social partners and building on the existing impetus, economic support tools will be gradually steered towards support for the transition of all businesses and sectors to decarbonised production models, the circular and regenerative economy, and the social economy.

The government's goal is that, by 2030, only the best economic models in social and environmental terms will continue to benefit from regional public support.

The Regional Circular Economy Programme (Programme Régional d'Economie Circulaire – PREC) has three general objectives:

- transform the environmental objectives into economic opportunities;
- root the economy in Brussels in order to produce locally where possible, reduce travel, optimise use of the region and created added value for residents of Brussels;
- help to create jobs.

This programme consists of 111 measures divided into four strategic parts: cross-cutting measures; sectoral measures; regional measures, and governance measures. For each measure, the PREC details the project leader, timescale, milestones and objectives, as well as the partners involved.

At sectoral level, the PREC focuses on the five sectors that consume the most resources: construction, resources and waste, logistics, retail and food.

The government will:

- develop a strategy consistent with building the circular economy, in particular by implementing the measures in the PREC;
- adapt the regulatory and economic framework, and also taxation, in order to support the development of circular economic activities;
- encourage a circular regional policy with regard to sustainable public contracts and purchasing;
- study the possibility of creating a 'Designed/Made/Grown/Repaired in and around Brussels' label;
- pursue its policy of eco-construction by developing circular construction and locating as many jobs and as much economic activity as possible in this sector in Brussels.

Food

Food is a key issue when considering the region's carbon footprint. According to the low-carbon study, 15% of the region's indirect emissions in 2013 were linked to the production, transport and processing of food products. Possible measures in this respect include promoting organic farming as this reduces the use of carbon-intensive synthetic chemicals and is better for the soil, biodiversity and human health. Meat consumption also causes significant emissions and is increasing deforestation across the world (to feed cattle) (⁵⁷).

⁵⁷ According to the latest FAO report, cattle intended for meat production are therefore responsible for 14.5% of GHG emissions and for four fifths of emissions from the agricultural sector. The IPPC Fifth Assessment Report also recommends significantly reducing meat consumption. Another key area with an impact on indirect emissions is reducing food waste.

The region is already working to develop a more sustainable food system through the Good Food Strategy⁽⁵⁸⁾.

Under this energy and climate plan, the government will take the following steps.

- Continue and reinforce the Good Food Strategy and, with a view to reducing the region's total carbon footprint, include it in a common vision developed with all the stakeholders in this sector, including public players. The aim will be to move towards a genuine urban agricultural strategy by launching an 'Employment-Environment-Sustainable Food' Alliance bringing together stakeholders in urban farming, hospitality, processing and distribution, training and employment in Brussels and its surroundings in order to maximise the production, processing and consumption of local, sustainable and affordable food.
- In order to promote urban and peri-urban farming, the government intends to set ambitious targets in this respect, namely the minimum production of 30% of the annual consumption in Brussels of fruit and vegetables by 2035.
- Develop sustainable urban ecological farming by implementing a support policy (particularly for the purchase of land) for new urban farmers and market gardeners.
- Develop strong cooperation between the Flemish and Walloon public authorities and operators in order to create a food belt to feed Brussels.
- Set up an integrated logistics offer (cleaning and packaging, transport and distribution) to allow small-scale producers to easily sell their products.
- Set up a scientific reference centre to demonstrate the best possible ecological farming techniques suited to the urban environment, with a seed bank in particular.
- Support the non-professional food production projects of citizens, schools, community groups, associations and public authorities.
- Support the roll-out of a sustainable food supply (based on the criteria of the Good Food Strategy) in school canteens (as a priority), other canteens and restaurants managed directly or indirectly by public authorities.

Facilities

Consumer goods and services account for another large chunk of indirect emissions in the Brussels Capital Region (65%). Work on this aspect will require significant long-term efforts.

Initiatives have already been implemented through the PREC and the new Resources and Waste Management Plan (Plan de Gestion des Ressources et des Déchets – PGRD).

Over the period 2021-2030, the government will also:

- include in the Good Move regional mobility plan and implement the objective of encouraging people away from private vehicles by developing non-individual transport solutions as a priority, increasing the resources allocated to public transport and facilitating the penetration of shared vehicles;
- create a register of transport facilities available from municipalities and regional bodies with a view to sharing tools and limiting these facilities to what is strictly necessary;
- set up by 2021 a central fleet management and transport facility purchasing unit at regional level, which will prioritise the purchase of zero-emission, energy-efficient, repairable and recyclable vehicles with the smallest possible total carbon footprint;

⁵⁸ The Good Food Strategy was adopted by the Government of the Brussels Capital Region on 17 December 2015.

- revise by 2030 the tool for assessing environmental performance, used under the regulation on the exemplary role of the public authorities in terms of transport, in order to include the indirect emissions of vehicles (⁵⁹).

Cooperation with the Federal Government

- Introduction of a carbon pricing system (in order to internalise the damage caused by GHG emissions and steer economic operators towards the most decarbonised solutions possible). Failing that, the government will argue for the gradual increase of fuel duty.
- Reduction in VAT on repair services.
- Adaptation and gradual tightening of product standards with an eventual ban on the marketing of:
 - energy-intensive domestic appliances;
 - drinks in plastic bottles, with the simultaneous introduction of a framework encouraging the use of deposits and the adoption of two or three standard formats for all drinks sold in Belgium.

B. Transport and mobility

Policies and measures to reduce GHG emissions from transport are organised according to the following three priorities:

1. reduce demand for mobility, mainly through spatial planning (reduction of distances between residential areas, amenities and recreational facilities) and a cultural shift in behaviour;
2. guide the development of mobility through investments in multimodal mobility systems and promote a modal shift by strengthening and improving public transport and encouraging the use of soft mobility (e.g. walking and cycling);
3. aim for the gradual decarbonisation of the remaining road transport through the use of low- or zero-carbon technologies.

An interfederal cooperation agreement on mobility will be signed by 1 July 2021 following consultations between the Federal Government and the Regions on specific subjects (e.g. public transport, taxation of transport, etc.) requiring such agreement in order to implement some of the measures set out in this plan.

A cooperation agreement may be signed with leasing companies on vehicle registration tax/annual road tax in the form of a partnership, independent state-owned enterprise or non-profit organisation.

Federal State

See point 3.1.3(iii).

Flemish Region

To reduce the impact of transport on the climate, we are pursuing a vigorous three-part approach. Sustainable regional development supports sustainable accessibility. We want the growth in motorised goods transport to level off and motorised passenger transport to reduce, which requires an ambitious modal shift in terms of both passenger transport and logistics. Lastly, we want to further green the existing vehicle fleet. From 2030, all new passenger cars sold will be low-emission vehicles, and at least half will be zero-emission.

⁵⁹ Decree of the Government of the Brussels Capital Region of 15 May 2014 on the exemplary role of the public authorities in terms of transport.

Investing in accessibility by focusing on demand

One of the key points in developing basic accessibility is the capacity to access important social and economic locations. The starting point in this respect is the effective demand for transport, rather than the supply. A more efficient transport system will be achieved by using resources in an optimal and targeted manner, providing a system that improves accessibility in a better and more efficient way and that persuades people to use more sustainable and cleaner forms of transport.

Daily journeys that involve several forms of transport require a solid mobility network that people use based on their transport demand. Resources are therefore focused on measures offering the highest social and economic return.

Attractive pedestrian and cycle networks (i.e. coherent, safe, comfortable, direct and with amenity value), equipped with the necessary facilities for cyclists, contribute to safe and active mobility. Direct cycle routes and cohesive networks, together with the increased use of (electric) cycles, help to make cycling more attractive as a form of transport. We are supporting the positive trend towards more journeys by cycle.

We are developing urban routes that ensure the smooth and safe flow of motorised transport, which must significantly reduce in volume.

Fluidity is the key on the main roads of the core network.

- A modal shift to more journeys by cycle makes a significant contribution to reducing CO₂ emissions. Flanders is focusing on creating a network of supralocal functional cycle routes, together with cycle highways. This investment needs to be accelerated and also more targeted, initially around town centres because they deliver the best results. Flanders is already making additional efforts, but more can always be done. As a result, between 2019 and 2023 the Flemish Government will continue the trend of increasing investment in cycling. In 2019 we have invested at least EUR 150 million and we plan to sharply increase this figure to EUR 300 million for the cycling infrastructure.
- The capacity of public transport systems will be adapted to the growing user demand stemming from population growth and increased density. Compared with 2013, demand has risen by 63% for bus, tram and metro services and by 45% for train services.
- Pedestrian and cycle networks will be made more attractive. Cycle highways will offer quick, safe and direct routes between urban centres, employment clusters and major public transport hubs.

We will create the spatial conditions for environmentally friendly mobility and sustainable accessibility

The spatial organisation needs to be focused on proximity to ensure sustainable accessibility in the transport regions.

To achieve a smooth-running multimodal transport system that supports the combined use of sustainable forms of transport, new spatial developments will be based around the transport system. By ensuring that the links between homes and workplaces (within existing networks) and road transport hubs are sustainably organised now and in the future, spatial policy will ensure that transport systems are cost-effective.

Together with developing basic accessibility rooted in demand, this spatial proximity will ensure the optimum conditions for successful combined mobility. The targeted development of networks and the efficient organisation of logistics will also help to increase the accessibility of social functions situated in easily accessible locations.

In the strategic vision of the Spatial Policy Plan for Flanders, the Flemish Government has outlined how the region will develop in the next few decades. The aim is that, by 2050, more people will be able to travel to work or school on foot, by bike or possibly, in the future, using other sustainable forms of transport. They will also have basic services within their immediate environment. To that end, new homes and workplaces will be located as far as possible within existing networks and close to road transport hubs and service hubs. Logistical activities

will ideally be carried out within regional road transport hubs that are linked to the mainland connections of the trans-European transport network. Improved multimodal access is very important in this respect.

Functions such as housing, work and structures will ideally be closely linked to limit the number of journeys. However, not all functions can be combined within a single location. Their separation remains the best solution for those disturbing activities that require numerous direct environmental mitigation measures or for those activities that attract large volumes of traffic. In this specific context, we will adopt various measures that are detailed in the Air Quality Plan.

Controlling the development of mobility

To achieve the climate targets, we must take draconian steps in terms of mobility and transport. First of all, we must endeavour to control demand for mobility. This can be achieved through spatial and social action, where each kilometre avoided contributes to the goal. At the same time, we must make mobility more sustainable. Developing an integrated, smart and robust multimodal mobility system that offers sufficient capacity should enable improved traffic flow and greater use of alternatives. This is the second part of the approach to reducing emissions. Lastly, we will undertake an ambitious and extensive greening of the vehicle fleet. It is only by tackling these three aspects simultaneously that we will achieve the climate targets.

Preparing transport networks for the future

To improve accessibility, investments will be made to futureproof the various transport networks. Stable investment in network maintenance and targeted investments in capacity and service development are also required. The aim is to ensure that these networks can respond to future challenges, such as the development of autonomous and connected modes of transport, conversion to clean vehicles and vessels, etc. The investments will focus on achieving the highest possible economic and social returns.

Given our ambition of guaranteeing basic accessibility in Flanders, networks must have the necessary capacity to cope with the expected growth. They must also be reliable enough to offer the service quality levels that are needed to ensure basic accessibility.

To ensure robust and safe transport networks, we must structure and categorise them hierarchically. Developing a solid and comprehensive core multimodal network is vital in this respect. This core network will then be optimised where necessary through targeted and mutually-reinforcing investments. Local and regional demand in transport regions consisting of several municipalities must be harmonised based on real and potential transport flows.

Developing an integrated multimodal and synchromodal mobility system

Well-integrated modal networks are needed to ensure effective combined mobility and synchromodality as well as efficient logistical organisation. This gives travellers, commuters and businesses more options for travel or transporting goods sustainably and makes better use of available transport capacity.

To ensure an integrated multimodal transport system, a hierarchical network of road transport hubs is being developed to provide a multimodal service within which users can transfer between different modes.

The smooth exchange of data is also vital in this respect. Linking several networks more closely requires data to be fully exchanged between the various modes and personalised mobility solutions to be offered.

In terms of logistics, developments in technology are simplifying information flows and facilitating cooperation between players in the value chain. This is resulting in genuine synchromodality, which is particularly important in goods transport on inland waterways and railways.

The removal of obstacles between the various modes of transport, and also between public, private and shared transport, will radically alter mobility as we know it today. The cooperation between public and private parties on the one hand and with numerous other social players and citizens on the other hand also needs to be

increased as a result. We must also prepare for these new forms of cooperation not only within the Flemish region as a whole, but also within the transport regions.

As the government, we want to be even more active in developing sustainable transport to and from the ports. This is already occurring through existing operational subsidies that are aimed at improving connectivity and increasing container transport by rail and inland waterway. We will endeavour to better link new initiatives with results already achieved, and we will work on a regulatory and incentive framework.

This will all be carried out under the cooperation agreement signed in 2019 with the Flemish port undertakings. This agreement will be further developed through individual agreements between the Flemish Region and one or more individual port undertakings. New initiatives to improve inland connectivity form a key part of these individual agreements and the individual air and climate agreements that will also be signed.

As the mobility policy aims to achieve a significant modal shift from road transport to the railways and inland waterways, the latter's greening is vital. The emissions of both maritime shipping and inland shipping can in particular be improved by using cleaner fuels and engines and shoreside electricity.

We will change behaviour

Travellers, commuters and businesses must change their behaviour by using sustainable forms of transport more often. To achieve behaviour change, a spatial organisation is needed that supports green mobility and logistics (see above), as well as attractive and exciting measures to incentivise changes in behaviour (such as a wide range of clean forms of transport).

As set out in the Air Policy Plan, we will encourage sectoral organisations, businesses and associations to adopt targeted measures so that individuals and businesses can more often choose sustainable alternatives to the car and easily transfer from one mode of transport to another. This will reduce the number of vehicle-kilometres to a maximum of 44.5 billion by 2025 and a maximum of 38.4 billion by 2030 (compared with 42 billion in 2005 and 45.3 billion in 2015). We are thinking in this respect of bottom-up initiatives that aim to avoid and replace vehicle-kilometres for both commuting and leisure travel. Measures to green company fleets are also an option. Together with the Federal Government and the other Regions, we are looking at how we can green company cars as quickly as possible. To that end, we are searching for partners who want to, and can, take specific measures, such as businesses taking specific steps to encourage workers to travel to work by a form of transport other than the car. With the VOKA (Flemish Economic Association), FEB (Belgian Business Federation), UNIZO (Union of Self-Employed Entrepreneurs) and other relevant organisations, we are looking at possible coordination measures. We are focusing on sport and culture to make leisure travel more sustainable, and are therefore trying to harmonise and realise existing initiatives as far as possible.

With regard to goods transport, we are also encouraging sectoral organisations and businesses to further optimise the loading of goods.

The Federal Government is responsible for tackling some travel behaviour, such as the important issue of company cars. Having a company car and a fuel card results in more vehicle-kilometres. Adapting this system is therefore recommended in terms of both mobility and the environment. We are monitoring the changes to the mobility budget and will suggest adjustments if necessary. We are also calling for a tax incentive for soft mobility and using forms of transport other than private cars (walking, cycling, public transport). We are urging the Federal Government to increase investment in the rail transport offer and infrastructure. We are also waiting for the Federal Government to improve short-distance container transport and groupage transport over short and medium distances, commit to increased flexibility and reliability on the part of the infrastructure manager, adapt the infrastructure for longer trains by loosening the regulations, and create a web-based tracking and tracing platform for goods.

We are focusing just as much on the non-rational choices that we make every day as 'mobility users'. We know from behavioural psychology that, without question, our behaviour is not always guided by rational considerations (such as price). We often allow ourselves to be guided by our emotions, reflexes and

social/cultural background. We must therefore also work on instruments that act on emotions or social norms and that break habits. In this respect, we are focusing just as much on the target group of construction vehicles, which are often left to idle for no good reason.

We will aim for a sustainable modal shift in cooperation with the transport regions

We are focusing on levelling off the growth in motorised transport. We are also aiming for an ambitious modal shift, in terms of both passenger transport and logistics, by continuing to develop a profitable and demand-driven public transport network. We are also continuing the upward trend in cycling investment. The share of sustainable forms of transport (walking, (e-)scooters, (e-)bikes or speed pedelecs, clean systems or sub-systems, public transport and taxis) must increase to at least 40% throughout Flanders. This ambitious modal shift target also applies to the transport regions. In fact, for those transport regions covering the Flemish periphery, Antwerp and Ghent, the target is at least a 50% share. The network of facilities for cyclists, public transport and Points Mob (mobility hubs) should contribute to the modal shift ambition. By the end of 2021, we will therefore produce concrete tailored action plans for each transport region.

We are investing in alternatives to cars and lorries and creating a multimodal mobility system that will convince travellers and commuters to use the most sustainable form of transport (mobility as a service). We are continuing to encourage and facilitate transport by rail, inland waterway and estuary navigation. We are optimising the journeys for which the tax per kilometre for heavy goods vehicles applies. We are examining how the deliveries of online shops and other courier services can be made sustainable.

We will review climate and air quality targets when assessing traffic-generating functions and major infrastructure projects

Major infrastructure projects can significantly increase traffic flows and emissions. As a result, during the authorisation process, we are evaluating their impact with a view to achieving the climate and air quality targets and making considered choices. Where the construction of traffic-generating functions is authorised, the necessary measures must be taken to guarantee sustainable and environmentally friendly mobility.

We will green the fleet

In addition to investing in alternatives to cars and lorries and reducing vehicle-kilometres, it is vital to make mobility significantly greener in order to achieve the climate targets. Reducing CO₂ emissions from mobility is the ultimate goal in this respect, rather than encouraging any particular technology. This means that all technologies and fuel types making a contribution to low-carbon mobility have a place in Flanders. CO₂ emissions are therefore calculated on the basis of a life cycle assessment (LCA).

One of the key policy frameworks is the European Clean Power for Transport Directive (CPT Directive). Flanders is committed to the objectives of this Directive, which is aiming for an increasing number of vehicles to have alternative propulsion systems. The Flemish ambitions in this respect are outlined up to 2020 in the Flemish CPT Action Plan; the ambitions up to 2030 will be set out in a new CPT vision, together with an action plan. Flanders is concentrating its efforts in this respect on low-carbon and zero-emission vehicles. With regard to electric vehicles, the purchase price, supply (models and volumes) and range will continue to be brakes on their penetration. These brakes will gradually be removed as prices fall across the board and batteries improve. The Total Cost of Ownership of battery electric cars is predicted to be the same as that of traditional cars by 2025. To speed up the penetration of zero-emission passenger cars/vans and low-carbon lorries, the public authorities are encouraging the market, in particular through the Flemish road tax and a sustainable vision, and also through European standardisation.

Despite the crucial role that the electrification of vehicles plays in achieving the climate targets, the environmental impact of the manufacture and use of such methods of transport cannot be ignored. Their impact also stems from the energy mix used to generate the electricity and from the nature of batteries: the way in

which they are manufactured, used and recycled. Even as such methods of transport become more prevalent, it will still be important to ensure that mobility is used rationally, that alternatives to cars and lorries are used as much as possible, and that motorised transport is therefore avoided.

In agreement with local authorities, we will gradually halt the use of two-stroke machinery to maintain public green spaces. New machinery purchased to maintain such spaces under local authority management will be emission-free (except for large machinery for which there are no alternatives or where the alternatives are too small). We will impose similar conditions when awarding contracts for maintenance services.

We will encourage the vehicle market

To allow the planned switch to low-carbon and zero-emission cars, the supply of zero-emission vehicles (number of models, number of cars on offer, range, etc.) must improve over the next few years, including in the lower-priced segments, and their purchase price must fall. There are reasons to believe that, after 2020, supply and demand will even out and that the step can be taken towards mass production/use. For this purpose, a properly functioning market, which no longer needs subsidies, is ultimately necessary. By allowing all technologies to compete, the best solution will be found at the lowest possible cost for society. However, we are not yet at this critical point and the market itself has a role to play in this context, both in ensuring the necessary supply and in increasing demand (particularly through promotions). As a result, by 2025 there should be a supply of low-carbon and zero-emission models of passenger cars, vans, city buses and mopeds/motorcycles that is comparable (price, range, choice, size, type, comfort, etc.) to that of conventional models.

The public authorities will also encourage the low-carbon and zero-emission vehicle market, in particular through a sustainable vision and ambitious European CO₂ standards, which should ensure a level playing field. Individuals, fleet owners (businesses, public authorities, etc.) and leasing companies will also be constantly encouraged to green their vehicles through other measures in the CPT action plans.

We will encourage the use of light vehicles that are primarily electric

Within a multimodal mobility system, for individual journeys, light electric vehicles such as electric bicycles, speed pedelecs and motorcycles are more environmentally friendly and energy efficient than heavier alternatives. This of course also applies to standard bicycles. We will work to adapt public land in order to create the space and infrastructure needed for safe and comfortable use of such methods of transport. We will also develop coherent, comfortable and safe networks for soft or softer mobility.

Light electric vehicles (LEV) offer great environmental potential for both commuting and logistics. A recently completed study entitled ‘Potentieel van lichte elektrische voertuigen’ (Potential of light electric vehicles) mapped out the sector and made recommendations for further releasing this potential. Based on this study in particular, we will shortly produce a specific policy for light electric transport. The priorities in this respect are incentives for light vehicles, simple legislation based on actual speed and not on vehicle type, adapted road, parking and charging infrastructure, attention to quality (and quality labels), tax incentives and positive campaigns.

We will support the purchase and use of zero-emission vehicles

Tax reliefs are key instruments for ensuring that the Total Cost of Ownership (TCO) of zero-emission vehicles in particular falls at a quicker pace. We are boosting the capacity of tax instruments to green the vehicle fleet. In this respect, we will reform road taxation by 2021 to take account of the new emissions tests (WLTP) and the progress made towards eliminating diesel and to continue promoting the use of energy-efficient (low-carbon) and zero-emission vehicles.

We will also look at further ways of increasing the price of more polluting vehicles, making vehicles cleaner and making zero-emission vehicles in particular more attractive. There may also be other incentives that we can offer to overcome the higher price of zero-emission vehicles, initiate/maintain the transition and achieve the fleet

targets. In order to meet the 2025 and 2030 targets, the benefits granted to zero-emission vehicles must become more attractive over the next five years.

We will guide the associated charging/refuelling infrastructure towards the future

We are also committed to rolling out as quickly as possible the basic charging infrastructure of 7,400 publicly accessible charging points, spread throughout Flanders. Additionally, fast charging infrastructure will be installed along the major traffic routes, with charging points every 25 km. As the fleet expands, the capacity of the charging infrastructure must also increase. Based on current figures, investment needs to be made in further public, semi-public and private charging points. The fast charging infrastructure will also be developed. We are assessing the roll-out of public and semi-public charging and refuelling infrastructure and extending this infrastructure in a targeted manner. As regards the charging points, semi-public fast chargers are being prioritised. The approach for the period to 2025 will be outlined in 2020. To ensure uniformity and economies of scale, we have already started developing this approach at regional level, but will also consult the transport regions and local authorities. Proper monitoring of the fleet's development and of the use of charging infrastructure will ensure that this roll-out can be quickly speeded up where necessary. The manner of the roll-out will not only depend on available space, parking policies, and location and nature of the electricity network, but also on ease of use for EV drivers, with proximity and accessibility being prioritised. As regards the public charging infrastructure, strategic positioning will be combined with effective positioning on demand. The approach will be adapted to local circumstances. Districts with a large number of housing units without their own parking facilities will therefore require more effort to be made. One key point is the gradual conversion of the 230V networks to 400V networks, which are better suited to charging infrastructure, although this will require additional investment. The distribution system operator Fluvius must map out the necessary investments as quickly as possible, and then plan and implement those investments as necessary.

With fast chargers currently charging at 50 kW, there are concrete plans to increase this power to 150 kW, and even 350 kW, by 2020. Combined with vehicles having a longer range, this means that the obstacles in terms of charging time and range will be eliminated. However, this does not come without a cost, namely the investments and challenges associated with connecting to the grid and potential local increases in peak loads. These can be prevented by combining fast chargers with associated batteries on site or through additional investments in the grid.

To ease the minds of EV drivers, public and semi-public charging infrastructure must not be just accessible but also easily accessible, irrespective of who owns or operates the charging station. Interoperability and standardisation will become a reality in Flanders, and where possible at European level, by 2020. By then, there must also be a structural solution for managing and accessing information on charging stations. This does not only involve static information (such as location and power), but also dynamic information (price information and whether or not the charging point is occupied) and information on smart charging at such points.

Private and semi-private charging also needs to be considered, not just because of its relative importance, but also because of its inherent additional advantages. This network must be efficiently organised, cheaper to use and better managed and monitored. Monitoring can also ensure that PHEVs are used more in electric mode. The advantages lie in particular in developing charging systems at workplaces. A proactive approach would be for the entire connection and cabling needed to be installed, as a priority for private and semi-private charging, when the opportunity arises. The possibility of offering support in this respect will be examined. A recent European directive sets out the obligations in this regard, particularly in terms of charging infrastructure in the parking lots of buildings. These obligations need to be transposed into Flemish law by the start of 2020.

The link between electric vehicles and the electricity system is becoming increasingly significant as more and more electric vehicles are driven and connected to the grid. The first milestone will be reached when the charging process is determined by the time and intensity. The existing grid only has sufficient capacity if simultaneous charging can be avoided. By controlling the charging process, peaks can be avoided and the available power can be intelligently distributed. The growing proportion of intermittent (renewable) energy

sources means that demand-side management or additional investments in the grid are essential. The introduction of smart meters is enabling large-scale application, primarily in the private context. This will quickly catch on if it can also be factored into the price that the EV driver or business pays.

Further options will emerge when bidirectional charging can eventually be used. In this case, electric vehicles will act as a buffer in both directions and will become an integral part of the energy system. When all sorts of energy services can be delivered through aggregators or other means (reserve capacity, switching, frequency regulation, etc.), it will become possible for self-generated electricity to be stored or for consumers to supply their own homes with electricity through the battery in their car.

As the number of electric vehicles increases, the capacity or local capacity of the grid will become an additional challenge. While the numbers are limited (e.g. up to 150,000 electric cars), there will be few issues overall. Through smart management, the current distribution system should even be able to support up to 500,000 electric cars. Between 2025 and 2030, more drastic changes to the distribution system may be needed, unless the options offered by the medium-voltage system can be better utilised. This system could currently support around 1,000,000 electric cars. Once again, Fluvius must map out the necessary investments as quickly as possible, and then plan and implement those investments as necessary.

The electricity generation capacity is seen as less of a problem, particularly while the electric fleet remains under 20% (CREG study). Smart demand-side management also ensures that charging is spread over time, to avoid peaks, and that it occurs when there is plenty of renewable electricity available. The public authorities will facilitate these new developments and remove any legal or technical barriers.

The charging infrastructure will be powered, as far as possible, by electricity from renewable sources. As with other technologies, the source is important and ‘green production’ will be the aim so that we have green hydrogen and green gas.

The challenge over the coming period is to develop a network of hydrogen refuelling stations similar to the network of conventional or CNG stations, albeit on a different scale. We will make progress in this respect in 2020 through a number of European projects, including our own BENEFIC project. The way in which this network will be rolled out up to 2030 will largely depend on the technology choices made by the heavier freight market.

We will introduce low-carbon and zero-emission (shared) vehicles through niche and company fleets

As a number of barriers are less of an issue for niche fleets (taxis, shared systems, buses, etc.) and company fleets, particularly because their journeys are fixed or can be planned and/or their home locations are fixed, they are the first in line in the transition to zero-emission vehicles and low-carbon fuels. Taxis and shared systems are mostly used for shorter distances in urban environments. We are focusing on greening these systems with a view to large-scale electrification over time. When granting permits to operate an individual paid passenger transport service, municipalities will take account of the minimum environmental criteria in the national and local decrees on taxis, and may also impose additional requirements for zero-emission taxis. From 2030, it will only be possible to register zero-emission taxis with the Vehicle Registration Directorate (Direction pour l’Immatriculation des Véhicules – DIV). We will also further build on the results of the E-Taxi project and develop the necessary initiatives based on the CPT projects and the work within the Green Deal for Shared Mobility.

Flanders operates public buses together with De Lijn and has opted for the principle of switching to alternative fuels based on electricity and hydrogen. From 2019, only zero-emission buses will be permitted in any new procurement by De Lijn. By 2025, there will only be emission-free buses in city centres. Even De Lijn’s (private) subcontractors will be brought on board in this respect as much as possible. A total of 925 battery electric buses will be purchased between 2020 and 2024, as announced in the September 2018 statement. This will mark the first step towards an entirely zero-emission bus fleet for public transport by 2035 at the latest. The possibility of deconsolidating De Lijn will be expressly examined. Operating outside the consolidation perimeter will enable (more) creative investment plans. However, the Flemish Government has indicated its intention to remain as the majority shareholder. European obligations, such as the revised European Directive on the promotion of

clean and energy-efficient road transport vehicles (2009/33/EC), will be taken into account in this respect, along with the study on the greening of Flemish public transport carried out by the European Investment Advisory Hub (EIAH) and the results of ongoing projects, including the European ZeEUS project and the Zero-Emission Bus (Zero-Emissie Bus – ZEB) project in Flanders.

In addition to specific niche fleets, owners of large fleets will have to commit to the transition to low-carbon and zero-emission vehicles through specific measures/agreements. We will examine, together with the Federal Government and the other Regions, how we can speed up the greening of company cars. In this respect, the policy recommendations made in the Electric Company Cars Platform (Platform Elektrische Bedrijfswagens – PEB) project will also be taken into account. The leasing sector and other business sectors will be closely involved in this work. The main levers of federal company car taxation have also been identified in Flanders as they hold enormous potential in terms of future greening. The Flemish Government will include its own fleet in the various initiatives and aims to lead by example, particularly in terms of the targets set. The ‘Sustainable Mobility’ action plan is one step towards achieving the Flemish Government’s target to reduce CO₂ emissions by 40% by 2030 compared with 2015. Within this framework, the Flemish Government has decided that, from 2021, it will not purchase or lease any more cars that only have a conventional combustion engine. Furthermore, Flanders is required to meet the targets set in the revised European Directive on the promotion of clean and energy-efficient road transport vehicles (2009/33/EC) when purchasing or leasing vehicles for its own fleet.

We will encourage innovation in order to develop solutions for freight transport

A roadmap for reducing climate and air emissions from freight transport (roadmap voor de vermindering van klimaat- en luchtemissies van vrachtvervoer) was recently produced. Introducing zero-emission urban zones for freight transport, electric lorries (with an electric battery or fuel cell) and heavy goods vehicles powered by biofuels are key elements in the preferred scenario indicated for 2030. Due to the many remaining challenges, using electric road systems and hydrogen-powered lorries is included only as an option. Lorries running on (bio)methane are suggested as a separate alternative. The climate potential of LNG/CNG is still limited, if not non-existent, but these gases could form a temporary solution during the transition to applications based on renewable biomethane, although their feasibility and availability are still uncertain.

With regard to vans and small lorries, we are aiming for their conversion to battery electric vehicles, along with passenger cars. Mass production is expected from 2025, although this requires a systematic approach, sufficient charging infrastructure, zero-emission loading and unloading sites, and eventually local storage sites. This therefore goes hand in hand with the development of zero-emission zones.

With regard to heavier lorries, which are responsible for around 80% of CO₂ emissions, switching to zero-emission vehicles, or even low-carbon vehicles, is less easy. As a result, in the short term there will be few models available, except for short distances, and the supply of low-carbon fuel will be very limited. By 2030 we will carry out research into lorries powered by advanced renewable fuels (bio and synthetic) and fuel cells. We also expect breakthroughs in terms of batteries and charging infrastructure and/or electric road systems, which will reduce the total cost of ownership. Obligatory rest periods offer opportunities to charge vehicles along electric transport corridors. The issue of connecting to the electricity grid will also be examined in this respect. In the transitional period to low-carbon and zero-emission freight transport, CNG and LNG represent alternative fuels for lorries.

Over the coming period, we will also focus on encouraging the necessary innovation, in particular by setting up demonstration projects along the lines of the Dutch example (see Demonstratieregeling Klimaattechnologieën en -innovaties in transport). The speed of introduction will also depend on the available funding. Through the environmental incentive, the Flemish Government is already providing funds to green lorries by switching them to hydrogen and natural gas. There is still potential in this respect given that this support measure is not yet being fully used and there are funds still available. Providing further innovation funds to make lorries greener will continue to be useful over the next few years. The scope will be extended to battery electric vehicles and infrastructure. To ensure a successful transition, support will also be given through projects as a priority, and

this will be coupled with developing a greening plan for fleet owners to fully convert their fleets in the short term (e.g. five years) to significantly more environmentally and climate friendly models.

We want to encourage the transition to a greener and more energy-efficient combined modal offer on a small scale. We are closely monitoring technological innovations in terms of making freight transport more sustainable (e.g. delivery by drone, hyperloops, etc.). We will examine the possibility of making online shop deliveries and other courier services more sustainable. We will encourage emission-free distribution so that, by 2025, only zero-emission vehicles are delivering in town centres.

We will assess the impact of new European vehicle standards

Ambitious European vehicle standards are the core policy instrument for reducing CO₂ emissions from vehicles. There is no limit value for CO₂ with which all cars must comply. However, obligations have been imposed on manufacturers, meaning that the average CO₂ emissions of the cars sold by each manufacturer must not exceed 130 g/km by 2015, with a further reduction of 10 g/km for non-motorised means of transport, and 95 g/km by 2021. A new proposal with CO₂ values for 2025 and 2030 was submitted at the end of 2017. The European Parliament and the Council have reached agreement on this issue. The average CO₂ emissions of the new vehicles sold by each manufacturer are set to fall by 37.5% for cars and by 31% for vans by 2030 compared with 2021. An interim target has also been set: a 15% reduction in CO₂ emissions for both types of vehicles by 2025 compared with 2021. The agreement also includes a mechanism to encourage zero- and low-emission vehicles (ZLEVs: vehicles with emissions between 0 mg/km and 50 mg/km) in the form of a reference value. ZLEV reference values will be 15% for cars and vans from 2025, 30% for vans from 2030 and 35% for cars from 2030. These are not therefore binding sales targets, but rather target values. If manufacturers sell more than 15% ZLEVs in 2025 and more than 30% or 35% in 2030, they will be rewarded with a bonus in the form of a reduction in their CO₂ emissions reduction target (maximum of 5%). We will closely monitor the impact of the European Directive on the vehicle market and, at the same time, continue to work actively at European level to develop and design this framework.

Since 2019, lorry manufacturers have been required to measure the fuel consumption of their vehicles using the VECTO test procedure and report CO₂ and other vehicle data to the European Commission. The Commission proposal aimed at reducing CO₂ emissions from heavy goods vehicles was approved by the European Parliament and the Council on 22 February 2019. The agreement aims to reduce CO₂ emissions from new lorries by 15% from 2025 and by 30% from 2030 compared with the baseline level in 2019/2020. The 2030 reduction target is binding, unless otherwise decided during the review planned for 2022. The agreement reached is very close to Belgium's ambitions during the negotiations. It also includes a mechanism designed to encourage zero- and low-emission lorries (ZLEVs), which will involve a system of super-credits up to 2024. From 2025, the system of super-credits will be replaced with a reference value system (with a guideline value of 2% ZLEVs from 2025). The effectiveness of this mechanism to encourage ZLEVs will be assessed by the Commission during the review planned for 2022. We will closely monitor the 2022 assessment and determine its impact on emissions.

We will ensure that actual vehicle emissions fall

We will call for test procedures that better calculate actual fuel consumption and CO₂ emissions

It is currently common knowledge that the emissions declared for vehicles based on laboratory tests are not representative of the emissions produced under real driving conditions. The actual CO₂ emissions and the emissions measured during dynamometer testing (type-approval values) are increasingly different. We therefore call on the European Commission to take the necessary initiatives to ensure that actual emissions are aligned with type-approval values in the near future. The agreement reached on CO₂ emission standards for new cars and light-duty vehicles contains a number of guarantees that the difference between emissions measured in the laboratory (WLTP values) and actual emissions will not increase any further up to 2030. The agreement provides for the collection, publication and monitoring of emission data under real driving conditions ('real

emission data'), based on standardised consumption calculators (OBFCM), and the introduction of an 'in-service' conformity test combined with a mechanism allowing declared emissions to be adjusted in the event of significant differences from the values indicated in the type-approval.

We will ensure a smooth traffic flow and steady speed

Vehicle CO₂ emissions are closely linked to fuel consumption. These aspects largely depend on driving behaviour, which is also influenced by road infrastructure, environmental management and traffic rules. Certain aspects that can improve driving dynamics are detailed below.

Average speed monitoring

Average speed monitoring ensures a more constant average speed and smoother traffic flow. Every year for at least three years, we will install 20 average speed monitoring systems in new locations on regional roads. We also want to significantly increase the number of average speed monitoring systems on motorways. The ambition is to achieve a 'coverage' of ±50% by making use of the federal ANPR network on motorways.

Smart traffic lights and green wave

Junctions need to be equipped with 'smarter' traffic lights that respond more dynamically and flexibly to the actual traffic situation at junctions where the signal control system has been optimised. By making traffic lights more dynamic and flexible, cars can be prevented from needlessly stopping at a red light and emitting even more CO₂. In this study, we will also look at how the central traffic management computer, which has proven its value, can be extended throughout Flanders (road safety has priority over traffic flow).

Self-driving and automated vehicles

We want to be a world leader in innovation with regard to connected and autonomous mobility. That is why we are joining forces with manufacturers, operators and data providers, research institutes, transport operators and other authorities to find smart and innovative mobility solutions.

The development of connected and autonomous means of transport offers excellent opportunities not only to make traffic safer and smoother (reduction in the number of accidents, reduction in the distance between vehicles), but also to make mobility more sustainable and inclusive. It facilitates the combined use of different forms of transport, but also presents new challenges (potential increase in demand for mobility, cybersecurity, privacy, etc.).

Through the Mobilidata programme, innovative mobility solutions are being developed in co-creation with private partners. Work is also ongoing to develop a digital data infrastructure, together with qualitative and reliable data sources.

We will reduce the maximum speed more quickly if fine particulate matter limits are exceeded

Various mitigation measures can be taken if fine particulate matter limits are exceeded. For example, the speed on motorways and ring roads can be limited to 90 km/h.

Generally limiting the maximum speed to 90 km/h also has a positive effect on CO₂ emissions. We will reduce the maximum speed when there is a risk of fine particulate matter limits being exceeded. This measure has a positive impact on air quality for local residents and also a positive impact on CO₂ emissions.

The Flemish Minister of Mobility and Public Works, in consultation with the Flemish Environment Minister, will produce a model for this purpose.

A recent study on the impact of speed limits on mobility and air quality shows that the scenario of limiting the speed to 100 km/h on the R0 has a limited positive impact on CO₂ emissions, given that the current rate is more

or less maintained. Over the next few years, a series of large-scale and small-scale projects will be carried out along the R0. As a result, the speed limit will have to be adjusted to a maximum of 100 km/h. This will not apply across the entire motorway network. We are consulting with the Brussels Capital Region on these projects.

We will achieve more by working together

The challenges involved in making the mobility system more sustainable are extensive, diverse and not ones that the Flemish Government can tackle alone. Many stakeholders, such as municipal and regional authorities, the Federal Government, infrastructure operators, transport service providers, users of the mobility system and the various segments of society must play an active role in this respect.

Regional transport cooperation

There are several levels and parties responsible for mobility within the government. A regional and integrated approach to basic accessibility is needed. Basic accessibility requires cooperation. An integrated approach to transport, infrastructure and spatial development is needed in the areas of planning, investment, operation and services.

Working with market players, businesses and knowledge institutions

The transition to the mobility of the future is a tale of cooperation involving various stakeholders and closely monitoring the development of new technologies. These stakeholders are the private sector, the academic/research world, social players and the relevant authorities. We will work with businesses and knowledge institutions within clusters of excellence to formulate and implement the research agenda and on various projects to prepare and implement policies.

In collaboration with the private sector and the academic world, we will define and implement intelligent transport services (ITS) to facilitate changing mobility. ITS initiatives will grow from strategic clusters that will shape, guide and manage the development of the ITS plan for Flanders. In collaboration with transport and logistics businesses, we will transform Flanders into a ‘digital supply highway’. As a result, logistics service providers will be able to better manage the various ‘flows’ (goods, money and information), optimise their logistics chains and make them more sustainable (maximum use of the inland waterways and rail transport, improved lorry load factors, etc.). It will be possible to use new technologies more safely, quickly and, above all, economically. A more comprehensive Internet of Things will encourage optimum data sharing. These developments will allow logistics processes to be managed and controlled efficiently, flexibly and reliably. They will help to produce a multimodal transport system and intelligent logistics services. These developments will be the driver of sustainable economic growth and will reinforce the competitiveness of our businesses.

A Green Deal instrument can play a significant complementary role in speeding up the transition. The Green Deal for Shared Mobility began on 27 March 2017 and involves carpooling and bike sharing. The Green Deal for Sustainable Urban Logistics began on 2 April 2019 and focuses on the conscious behaviour of consumers and drivers, new logistics concepts, and technological regulations and innovations that make sense. Further Green Deals may follow. Various (private) partners and the government are working together on a green project based on a voluntary agreement.

The independent mode-neutral platform ‘Multimodaal.Vlaanderen’ (Multimodal Flanders), set up within the Flanders Innovation Cluster for Logistics (VIL), informs, alerts and guides businesses to encourage a change in attitude. This change in attitude should lead to (more) efficient use of the right modes of transport for the right business and the right flows.

We are also planning research to gain an insight into the critical factors allowing a multimodal shift. We will study the business models for regional transshipment points for rail transport and the possibilities of eliminating physical and organisational hurdles to the groupage of goods for rail transport. A roadmap showing the most cost-efficient, logical and feasible way of achieving the ambitions to reduce both greenhouse gases and air

emissions within the set timescales will serve as the basis for further political and public debate on freight transport measures with regard to climate change and air pollution.

Working with citizens, associations and civil society organisations

To ensure smooth, safe and environmentally friendly mobility and logistics, the active participation of citizens, associations and civil society organisations is crucial. Over the last few years, digital platforms, online applications and new social visions have given rise to a range of sub-platforms (carpooling, central booking platforms, etc.), through which inhabitants and associations themselves take the initiative or make the necessary contacts to enable new forms of transport. As a government, we will support these processes. We will also promote them so that they are accepted more quickly by others.

Walloon Region

The transport sector in general and mobility in particular will be studied based on three priorities that must better define the passenger and freight transport landscape to 2030 and serve as the basis for longer term objectives.

The general aim is to prevent further growth in the vehicle fleet by offering effective alternatives for passenger and freight transport based on an overarching ‘Avoid-Shift-Improve’ principle.

Priority 1: Rationalise mobility needs (Avoid)

The goal of ‘reducing our individual and freight transport needs’ is a fundamental guideline in making the transport system more sustainable. The Walloon Government has therefore developed a mobility vision to 2030, referred to as FAST. This vision aims to reduce the mobility of people by 5% by 2030 compared with 2017. Practical measures to achieve this aim need to be developed through the regional mobility strategy, in particular by reinforcing measures such as remote working, carpooling, etc.

At the same time, measures under the spatial planning policy could enable businesses to locate in places that minimise travel needs (goods and people), encourage use of the most sustainable forms of transport (see priority 2 below) and even address the increasing length of car journeys or the increasing volume of goods transported.

Policies promoting short supply circuits and local production and developing the circular economy and the service economy may also help to reduce freight transport demand (tkm)

Priority 2: Encourage modal shifts (Shift)

The Walloon Government’s FAST mobility vision (see below), which lies at the heart of the draft Walloon Energy and Climate Plan, is based on shifting freight transport by road to rail and waterway by 2030. The same applies to the mobility of people, with cars largely giving way to public transport and active forms of transport (walking, cycling, etc.).

This vision is a complete reversal of the trend observed in recent decades. New measures to reduce demand for both passenger and freight transport will be needed to achieve the targets set.

A plan to develop active forms of transport across the entire Walloon Region is therefore needed. This will involve funding and constructing safe pedestrian and cycle paths and infrastructure, and rebalancing public space in favour of these active forms of transport. The Walloon Government has committed to a budget for cycling of EUR 20 per inhabitant per year.

These measures are set out in the regional mobility strategy and will have to be developed into a new Wallonia Cycle Plan, among other approaches. According to the Walloon Government’s Regional Policy Statement, the aim is to adopt this plan by mid-2021.

The public transport offer, predominantly on the key routes and main transport systems (train, tram, metro), will be expanded and linked with the ‘mobipôle’ (mobility hub) approach, with the aim of implementing the ‘MaaS – Mobility as a Service’ concept to form a transport network.

Special attention must be paid to multimodal options in freight transport, by reinforcing groupage options (piggyback transport for example) and by reducing demand over the last miles, either by using adapted micrologistics or by shortening logistics circuits.

Priority 3: Improve vehicle performance (Improve)

The aim is to further increase the electrification of cars to 2030. At the same time, new vehicle purchases will be steered towards less energy-intensive models (less powerful, lighter) in an approach that should also reduce road accidents.

There must be a particular focus on ensuring improved accessibility for the entire population to these new technologies, mainly by reducing the extra cost that vehicles with alternative engines currently entail. This focus must therefore take account of the changing costs of these technologies.

Further down the line, a dialogue with other levels of government will be needed to:

- define a maximum GHG emission limit for new vehicles, with a gradual reduction in this maximum limit (this type of approach is less costly for public authorities and offers more reliable results);
- examine the taxation of alternative fuels (gas and electricity);
- consider tax policies connected with mobility and transport of people (mainly with regard to company vehicles).

In addition, the overall efficiency of vehicles and their use must be considered more generally, in similar fashion to the ‘Lean and Green’ approach in freight transport. Improvements may be achieved through driver support measures or preventive vehicle maintenance measures (such as descaling engines). The efficiency of the logistics chain must also be considered.

Particular attention must also be paid to the carbon footprint of vehicles and their refuelling in the case of alternative fuels. Use of renewable electricity and biogas will be increased. Low-carbon fuels will be generally assessed, mainly for modes of transport where electrification is difficult to envisage.

Mobility - FAST

As a reminder, the FAST vision aims to promote the objectives of fluidity, accessibility, safety and health through the modal shift.

To give practical effect to this vision, the multimodality model will have to be developed. In the light of current issues and challenges, only a model that combines the various modes effectively will offer maximum accessibility by simultaneously addressing both direct symptoms (i.e. accidents and congestion) and indirect symptoms (i.e. pollution and paralysis of the economy).

This choice translates into a willingness to make large-scale structural changes to the relative shares of the various modes of transport (for both passengers and freight) and therefore to initiate the modal shift.

The modal shift strategy will entail the near-simultaneous implementation of eight inextricably linked projects. As outlined in the FAST vision, the priorities for these eight projects are threefold; namely mobility governance, mobility supply and mobility demand. None of these projects is superfluous as each one is a prerequisite for success, which must be measured from an economic, social and environmental perspective in the short, medium and long term.

The eight projects are:

1. to establish a harmonised and coherent model for the governance and management of mobility at regional level;

2. to predict and manage the social impacts of new technologies and patterns of use;
3. to increase the shared transport offer and focus each mode of transport on its relevant area;
4. to make co-modality more attractive for people and goods;
5. to harness technological developments to improve the efficiency and safety of transport systems;
6. to use regional planning to reduce the volume of travel;
7. to focus practical action on sustainable mobility using intelligent and targeted taxation (with the long-term aim being to encourage less powerful and lighter, and therefore less polluting, cars);
8. to inform, train and educate the public and civil society on sustainable mobility.

FAST 2030 is the subject of an action plan: the Regional Mobility Strategy (Stratégie Régionale de Mobilité – SRM). In the long term, this SRM must provide general guidelines for achieving the objectives. The first part of this SRM on passenger transport was approved by the Walloon Government on 9 May 2019 (⁶⁰). The part on freight transport is yet to be completed. These texts will evolve to ensure the best possible response to the FAST objectives.

Some of the SRM measures on passenger transport have already begun.

A. Development of the MaaS concept – ‘mobipôles’

‘Mobipôles’ or mobility hubs will offer various services and enable people to change their mode of transport. Depending on their individual design, they may have car parks (in particular for carpooling), secure bike storage, bus stops, tram stops or access to railway stations, as well as other services such as new bus rapid transit (BRT) services, fully connected co-working spaces, bike hire, charging stations in line with the ‘post-diesel’ strategy (electricity, gas, etc.), shared vehicles, etc.

These multimodal platforms must be positioned carefully in relation to existing infrastructure and must also be connected to the following:

- the telecommunications network operated by Sofico;
- residential areas and business hubs, by creating links that are accessible to active forms of transport and by creating or upgrading bus routes with new BRT services.

The primary aim of the mobility hubs is to promote smart mobility, i.e. a system centred around sustainable, efficient and innovative mobility solutions and behaviours.

A mobility hub can be defined as follows.

1. It is a physical location with a **well-structured mobility offer** that appeals to users. In this context, ‘well-structured offer’ means that the frequency, speed and level of convenience of the available services make them more attractive than traditional (sub-capacity) car use. This offer will involve developing types of service with characteristics that particularly meet the expectations of future users.
2. It is also a place that provides as many **accessibility** solutions as possible to as many people as possible. The aim in this regard is to avoid scattering infrastructure funding around the region. The careful choice of mobility hub locations will make it possible to minimise infrastructure funding.
3. Finally, it is a place designed to become a **transit location**. Ways must therefore be found of making it attractive to users, so that a detour to get there is worthwhile. The provision of services such as co-working spaces may be appropriate in this context. The aim is not for individuals to spend long periods of time there, however, but to pass through it as a transit hub using the fastest possible mobility solution. Any services offered should therefore help to make it worthwhile for users to visit the transit hub (e.g. co-working spaces, car wash, parcel pick-up/drop-off point). They should also allow users to avoid another journey.

⁶⁰ http://mobilite.wallonie.be/files/eDocsMobilite/politiques%20de%20mobilit%c3%a9/SRM_PERSONNES_2019.pdf

4. The mobility hub concept will only make sense and have any chance of success if its use becomes almost unavoidable. Measures aimed at ensuring that this is the case must be carried out on both the supply and the demand sides. In order to guarantee success, smart mobility must be **incentivised** (e.g. tax deductibility of shared cars, etc.) alongside supply-side measures.
5. If the trial proves successful, it will also be useful to integrate **energy** considerations (relating to both production and consumption) in tandem with the mobility aspects. Interactions between these two areas are also likely to deliver economic and environmental benefits.

The mobility hub concept forms part of the overall smart mobility concept, which includes the development and/or improvement of digital communication solutions for the purpose of providing real-time information, reserving spaces on different modes of transport, making car-sharing arrangements, etc. This will require and promote new ways of working (NWOW), including not only remote working at the mobility hub itself, but also during journeys.

B. Charleroi metro

The work needed to extend the Charleroi light metro branch route to the site of the future Grand Hôpital de Charleroi (GHdC) has been examined by the bus and tram operator Opérateur de transport de Wallonie (OTW). This work will need to be integrated with the current OTW project to renovate the metro trainsets.

C. TEC, BRT, bicycles, vehicle sharing, fleet greening

Within the FAST vision, there are five particularly important projects:

1. **Carpooling:** create carpools car parks at motorway interchanges and also at other potential sites, and create vehicle lanes reserved for carpools.

A list of criteria for the creation of carpools car parks has been drawn up by the Wallonia Public Service for Mobility and Infrastructure (SPW MI). It will be used to identify the necessary conditions for constructing carpools car parks and ensuring their effective use.

This list will be discussed between the SPW MI and Sofico in order to determine the feasibility of developing the proposed sites.

A list of potential carpools car parks next to motorway interchanges has been drafted by the SPW MI and will be discussed with Sofico.

Two pilot projects for vehicle lanes reserved for carpools on the A4/E411 between Wavre and Brussels and between Arlon and Sterpenich were implemented in May 2019. This ‘pilot’ approach could be extended to other sites.

2. **Bus routes:** upgrade existing routes and create new routes (mainly BRT routes) designed to provide fast links between popular destinations or intermodal hubs. Funding will be earmarked for the operating costs of these new routes and the purchase of new buses with a view to greening of the fleet. This principle is also enshrined in the OTW’s new public service contract.

3. **Bus lanes and corridors and new park and ride schemes to increase the speed of bus travel and make it more attractive.**

The OTW’s technical services are responsible for reconciling the needs of operators with the latest proposals under the Infrastructure Plan 2019-2024.

One solution in this respect is the introduction of multimodal platforms.

The measures under this pillar of the fiche will supplement those provided for in the other two plans (Fiche 2a and Infrastructure Plan 2019-2024).

4. **ITS (Intelligent Transport System):** complete the PEREX 4.0 project that is currently under way with a view to improving and modernising the management of road and river infrastructure. Provide

innovative services for the various modes of transport and for the management of road and inland waterway traffic in order to ensure safer, more coordinated and smarter use of the transport networks. This ITS pillar particularly concerns the future accommodation of self-driving vehicles and data management (big data, open data, etc.).

Detailed proposals by the OTW's services will be presented during the next meeting of the working group.

The measures under this pillar of the fiche will therefore supplement Sofico's existing plans, namely publication of a call for tenders in relation to carpooling monitoring/penalties in late June, call for tenders in relation to a traffic management system, and a call for tenders in the area of inland waterways (automated locks), for which the specifications are to be published this summer.

5. **Cycling and walking:** equip Wallonia with new infrastructure where necessary and adapt existing infrastructure. Cycling infrastructure must be based on further development of the RAVeL cycle path and footpath network as a means of making quick journeys using soft modes of transport. Accessibility will be increased with a view to enabling more daily journeys to school, work and multimodal platforms. A dedicated working group will investigate ways of coordinating multimodal platforms ('mobipôles') and soft mobility.

Calls for projects aimed at municipalities will be extended with a view to connecting residential areas with schools and workplaces and increasing the accessibility of the RAVeL network. Maintenance work on the network will also be stepped up, with special equipment being purchased where necessary.

A project to improve lighting along the RAVeL routes is also planned.

The construction of new cycle lanes and the maintenance of existing cycle lanes along the region's main roads will also be promoted. As regards walking, work will be carried out to build new footpaths and to redevelop and maintain existing footpaths.

Demand for soft modes of transport is currently being examined in relation to road-related needs under the Infrastructure Plan 2019-2024, in order to optimise regional investment.

This pillar will also be coordinated with the Walloon Cycling Plan (WaCy 3.0).

D. Dredging of inland waterways to increase their depth and width

The dredging of inland waterways to increase their depth and width must be stepped up so that the modal shift of goods from road to waterway can continue to be encouraged and optimised. A funding mechanism is planned in this respect, based on a public-private partnership.

This partnership should initially enable dredging down to the former bed and out to the former banks along 450 km of inland waterway in Wallonia in 2024; it will also organise and carry out the removal of sediment. Sediment removal includes the dredging itself, transport, desiccation, treatment, use and disposal in landfill where necessary. A system promoting the use of sediment, in particular through research and development, will also be established under the partnership. A percentage target will be set for the use of sediment.

A financial feasibility study for the dredging and sediment management work is currently being carried out in order to set the specific targets and decide on the method to be used to seal this partnership.

E. Improved mobility to support long-term business growth around airports

The two airport hubs in Wallonia (Charleroi and Liège) play a vitally important role in the region's socioeconomic development. It is therefore important for their accessibility to be improved.

Using the allocated budgets, the relevant services will therefore:

- identify the infrastructure needs (improvements to existing infrastructure or construction of new infrastructure) in relation to the business zones around the airports;

- research alternative means of transport to the car (bus, bicycle and train), which may also involve, in the long term, constructing a driverless shuttle to serve the airports;
- in the specific case of Charleroi, take into account, firstly, the economic restructuring priority in the interests of ‘catching up’ and, secondly, the construction of a bus shuttle or link between the airport and airport business park and the Fleurus and Luttre railway stations (which will also be redeveloped);
- in the specific case of Liège, take into account the possible introduction of high-speed trains to transport freight (Carex);
- prioritise, plan and complete the projects;
- also pay special attention to soft and shared mobility and fuel switches.

Greening of the vehicle fleet

The main measures can be summarised as follows.

- The roll-out of LNG/CNG and hydrogen infrastructure will be supported, provided that the current technological cost differential can be maintained using appropriate mechanisms.
- Industry-level support will be provided, in accordance with the Walloon Regional Policy Statement, to encourage the use of biogas to produce CNG and LNG. Discussions must be started with the Federal Government on setting a biogas incorporation rate in the transport sector.
- Electric vehicle charging points: the Walloon Government plans to continue publishing calls for projects in order to encourage public and private players to roll out electric charging points throughout the region. The preferred mechanism is a system of repayable advances. Specific attention must be paid to ensuring sufficient coverage.
- Hydrogen: a support mechanism may be established to encourage infrastructure building.

Brussels Capital Region

For the region to achieve its climate targets, it must reduce emissions from the key emitting sectors. Road transport is the sector with the second highest emissions and is alone responsible for over 26% of regional GHG emissions. The regional climate ambition involves gradually decarbonising this sector through the following two types of measure.

- **Reducing (individual) mobility needs** to reduce energy consumption. This objective will primarily be achieved by adopting and implementing the Good Move regional mobility plan as detailed in the second part of this document ('Towards a more energy-efficient city').
- **Improving the performance of the remaining vehicles** and transitioning the vehicle stock in Brussels to zero-emission vehicles. It is mainly this type of measure that we detail below.

The combustion engine, which is polluting, usually powered by fossil fuels and inefficient, has no place in the city of 2050. The government has therefore confirmed its intention to phase out diesel no later than 2030, and petrol and LPG no later than 2035 (⁶¹). During the period 2021-2030, preparations must therefore be made to implement this decision.

Vehicle taxation must also be redesigned so that cars are better used and have no negative social impact. This is a tool that will be used to achieve the region's targets under the NECP.

⁶¹ This decision also features in the Good Move regional mobility plan, in measure D.5 - Phasing out combustion engines, which states that the aim in implementing this action is to reduce the vehicle fleet and use of cars in general.

Initiating the phase-out of combustion engines

Like other large cities, the Brussels Capital Region faces specific challenges in terms of transport, particularly due to the large number of commuters. In addition, mobility needs are still largely met by individual solutions that are very carbon-intensive and emit significant amounts of air pollutants.

Nitrogen dioxide (NO_2), which currently exceeds the annual limit value in Brussels, is harmful to human health. When its density in the air we breathe is high, it causes respiratory problems, bronchial hyperreactivity and, especially in children, increased sensitivity of the bronchi to infection. Road transport is also the largest emitter of fine particulate matter (PM2.5) with 32% of emissions in 2015 in the Brussels Capital Region. This fine particulate matter penetrates deep into the respiratory tracts and is also a health hazard.

Given these facts, the government has decided to act to improve air quality in the capital. It has therefore confirmed the ban on diesel vehicles from 2030 at the latest, and the ban on petrol and LPG vehicles from 2035. Having said that, reducing the presence of diesel engines must be made a priority in the very near future in order to immediately reduce nitrogen oxide (NO_x) and fine particulate matter emissions.

The transition has already been started with the implementation of the low-emission zone in 2018, which will remain in place until 2025. The aim of the low-emission zone is to reduce regional emissions of air pollutants; it may also help to reduce greenhouse gases and improve energy efficiency.

The government's decisions on the phasing out of diesel and petrol may lead, from a technical and legal perspective, to the extension and tightening of the low-emission zone. In consultation with stakeholders and the relevant professional sectors, and taking account of the socioeconomic and budgetary impacts and the alternative technologies available⁽⁶²⁾, the government will therefore take the following action.

- In 2020, set new milestones for any type of vehicle in the low-emission zone (LEZ) for the period 2025-2035. Tighten the access criteria, incorporate the ban on diesel vehicles from 2030 and the ban on petrol and LPG vehicles from 2035⁽⁶³⁾, and extend the scope (inclusion of the most polluting powered two-wheel vehicles from 2022, which are currently outside the scope for operational reasons).
- Consider creating 'Zero-Emission Zones' (ZEZs) in the Pentagon or certain areas such as shopping hubs. These ZEZs would be combined with tighter access criteria than for the LEZ, bringing forward the ban on diesel and petrol vehicles as well as on powered two-wheel vehicles, and a possible complete ban on heavy goods vehicles (taking into account any exemptions).
- Introduce an 'LEZ Pass' for light vehicles to discourage the use of private cars. The LEZ Pass would be regarded as an extension of the current day pass concept⁽⁶⁴⁾ to certain motor vehicles accessing the LEZ (permitted cars, vans and powered two-wheel vehicles). Its price could be fixed or variable depending on several parameters including fuel, weight and/or Euro standard. An operational study on incorporating this LEZ Pass should be completed in 2020.
- Tighten the LEZ inspection conditions: checking of foreign vehicles by introducing mobile teams; detection of cases of particulate filter fraud, and measurement of actual emissions through the use of remote sensing technology.
- Maintain or even strengthen support measures taking account of the social situation of households, such as the development of bicycle parking areas in apartment blocks and charging infrastructure, the provision of information on alternatives (mobility boutiques) or communication on the LEZ. These

⁶² A wide-ranging consultation process was carried out in 2019 in order to determine how to phase out combustion engines. At the same time, studies were launched to assess the socioeconomic and budgetary impacts of this approach and to identify the alternative technologies available. The results of these consultations and studies will be taken into account in decision-making, in particular when determining any exemptions (whether temporary or not).

⁶³ Non-rechargeable hybrid petrol engines and CNG engines are not affected by this tightening of the access criteria due to their environmental characteristics. Banning them, which would equate to a total ban on fossil fuel engines, may be subsequently considered, depending, in particular, on the alternative technologies available on the market and their accessibility.

⁶⁴ The current day pass limited to eight uses per year for vehicles not permitted in the LEZ remains in place.

support measures could be further strengthened as revenue from the day pass increases. In order to support the transition of households, the government will completely overhaul the ‘Bruxell’Air’ incentive.

- Set up a permanent LEZ Strategic Committee, made up of independent experts, to produce recommendations on the development and adaptation of the planned restrictions.

Supporting the emergence of zero-emission vehicles

In line with the government’s decision to phase out combustion engines from 2030, the emergence of zero-emission vehicles as an alternative for the remaining stock of vehicles needs to be supported. As a reminder, the main idea in this respect is actually to reduce, in the medium and long term, the number of private vehicles on our roads in favour of soft mobility, public transport, carpooling and car-sharing (see the Good Move plan measures in the ‘Towards a more energy-efficient city’ part).

In its majority agreement 2019-2024, the government therefore decided to prioritise the development of shared low-carbon light vehicles and to promote, following an environmental and economic efficiency analysis, alternative propulsion systems to diesel and petrol, based on its mobility and environmental objectives.

Vehicle taxation is a tool that will be used to achieve the targets set by the region under the NECP. The government has therefore reaffirmed its intention to conclude a cooperation agreement between the regions aimed at implementing a smart tax per kilometre for light vehicles within the metropolitan area or the entire country. Such a tax would be introduced as a replacement for road tax. Within its own area of responsibility, the government will propose a comprehensive reform of vehicle taxation aimed at improving everyone’s quality of life as part of a fair and inclusive transition. Appropriate vehicle taxation should help to improve the overall energy performance of the vehicle fleet, and also achieve the aim of easing congestion in Brussels.

Furthermore, the Energy Pact sets targets for the growing proportion of zero-emission vehicles among new registrations. We are including a summary of these commitments below as they will support an overall reduction in the number and use of private vehicles:

Horizon	Proportion of zero-emission light vehicles among new registrations
2025	2% Targets for the public authorities (including public transport): 100%
2030	50%
2050	100%

Among these alternatives, the electric vehicles that are already available obviously come to mind. However, in the long term, other possibilities could perhaps be significant, such as hydrogen or CNG vehicles.

In this context, the government will:

- adapt (for the period 2021-2030 and taking into account any exemptions) the relevant regional regulations (⁶⁵) in order to include:
 - the Energy Pact target according to which 100% of new vehicle registrations by public authorities and public transport are to be emission-free from 2025, taking into account any procurement timeframes;
 - the phasing out of diesel and petrol vehicles, with progressive quotas for electric vehicles being introduced or strengthened.
- carry out market analyses and studies of the alternatives available for specific vehicle types (refuse collection vehicles, coaches, light-duty vehicles, recovery vehicles, etc.);

⁶⁵ In particular the COBRACE (Brussels Air, Climate and Energy Management Code) (Articles 2.4.5 and 2.4.6), the Decree of the Government of the Brussels Capital Region of 15 May 2014 on the exemplary role of the public authorities in terms of transport, and the Decree of 1 June 2017 on workplace travel plans.

- adapt regulations or introduce new ones (for the period 2021-2030) for vehicles in ‘captive’ fleets, such as taxis (⁶⁶) and car-sharing vehicles (⁶⁷), for which the transition will be easier and more important due to their role as ambassadors in the region and the distance that they travel. In this context, the Energy Pact target according to which 100% of new registrations must be emission-free from 2025 will be applied, with progressive quotas for electric vehicles once again being introduced or strengthened.

With regard to vehicle taxation, the government has decided to take the following action.

- Revise the vehicle registration tax (taxe de mise en circulation – TMC) system by making it more progressive based on the environmental performance of vehicles (weight, actual power and type of fuel used) in order to discourage the purchase of vehicles not suited to use in an urban environment. The government has also reaffirmed its intention to conclude a cooperation agreement between the regions aimed at implementing a smart tax per kilometre for light vehicles within the metropolitan area or the entire country.
- Revise the road tax (taxe de circulation – TC) system in line with the LEZ’s objectives and using its technology. This new system will apply to all vehicles in Brussels and will be based on use in order to limit road congestion, particularly at peak times. The government will therefore develop its network of ANPR cameras (used for the LEZ).

Finally, in the specific case of electric vehicles, the government plans to:

- boost the development of charging stations (public or private), particularly through concessions for public charging infrastructure (⁶⁸) under the BENEFIC (⁶⁹) project;
- develop the charging infrastructure for electric vehicles to achieve the Energy Pact target of one publicly accessible charging point for every 10 electric vehicles (⁷⁰);
- encourage the installation of charging points at existing and new service stations;
- reinforce or introduce obligations regarding the installation of charging facilities (intended for residents, workers or visitors) in private or public car parks and in new buildings or those undergoing major renovation (by at least ensuring the transposition of the new EPB Directive), with a view to achieving the target of one charging station for every 10 parking spaces.

Cooperation with the Federal Government:

- develop the company car system in line with the ‘Mobility as a Service’ concept;
- introduce a tax on kerosene in the aviation sector.

C. Industry

This sector is extremely diverse, given the large number of industries that differ greatly in terms of size and function. The trend in GHG emissions and energy consumption in this sector is closely linked to economic growth and the implementation of cross-cutting policies and measures on tax and investment.

⁶⁶ Taxis are an interesting niche for an accelerated transition to electric vehicles. After all, they have a high consumption (average of 65,000 km/year with one shift per day to 120,000 km/year with multiple shifts), they often drive short journeys in an urban environment and their engine is often idling (Source: Clean Power for Taxis, BBL study: https://www.bondbeterleefmilieu.be/sites/default/files/files/bbl_2017_e-taxis_rendabiliteitsstudie_tml.pdf).

⁶⁷ Vehicles covered by the Decree of the Government of the Brussels Capital Region of 21 March 2013 establishing the arrangements for the use of parking spaces by operators of shared motor vehicles.

⁶⁸ An initial concession is planned for 2018-2021 (minimum of 100 charging stations, i.e. 200 charging points, per year), with a second for 2022-2025 (probably with higher targets).

⁶⁹ The aim of the BENEFIC project is to co-finance private charging infrastructure.

⁷⁰ Target adopted in the Interfederal Energy Pact.

Most of the measures combine energy efficiency improvements with the introduction of specific regulatory measures, both voluntary and binding.

Federal State

- Continuation and refinement of federal support for businesses under energy contracts or sectoral agreements to encourage industry to make the necessary additional effort by 2030. This assumes a level playing field within the EU in terms of constant improvement, adequate reporting, avoidance of any lock-in and rapid elimination of fossil fuel subsidies.

Flemish Region

Non-ETS industry

Reinforcing and expanding the existing energy policy agreement

See point 3.2 Dimension energy efficiency

Rolling out a tailored energy efficiency policy for SMEs

See point 3.2 Dimension energy efficiency

Making energy carriers greener in non-ETS industry

To make energy carriers greener in non-ETS industry by 2030, several approaches will be taken.

Efforts will mainly be directed at sustainable direct heat production, including through heat pumps and solar heating, although biomass may also play a role. However, biomass will be used as much as possible as a raw material before being burned for energy generation, in accordance with current sustainability criteria.

Secondly, when producers make natural gas greener, this can indirectly lead to a reduction in the intensity of emissions from industry.

Thirdly, further electrification of industry can result in reduced emissions (both direct and indirect). Renewable electricity that is sustainably generated, such as wind and solar energy, can be used, in whole or in part, to heat production processes, for example through initial conversion into hydrogen or synthetic methane.

Heat from geothermal energy may also have a role to play in some regions in the industrial heat supply of the future.

An economic potential study should indicate the extent to which these technologies can be used in a competitive environment for industry, which should then be followed by specific studies of the cost-benefit and the needs in terms of innovation, funding and infrastructure.

Optimising economic support instruments

See point 3.2 Dimension energy efficiency

Providing transparent and aggregated information

See point 3.2 Dimension energy efficiency

We will encourage cooperation between businesses

Existing learning networks can gather information on all current generation methods and opportunities for sustainable improvement in order to reduce CO₂ emissions, and also on the prerequisites for achieving this

reduction. Through these networks, industrial businesses can pool their practical knowledge on the opportunities for reducing CO₂.

We will also encourage a collective approach within business parks. Group purchases can be a source of relief and generate cost benefits. A tailored approach is used to take account of the diversity within different business parks. In addition, business parks can form local or Smart Energy communities. In this approach, energy is generated locally as much as possible, for example through solar panels, wind energy, cogeneration and green heat, and is also consumed or recovered locally (waste heat). Using flexibility services such as storage or demand-side response can ensure that supply and demand are balanced as far as possible. Furthermore, information can be shared within the community on energy efficiency measures and other best practices.

Reducing N₂O emissions from caprolactam production

With this measure, the two-stage approach will involve imposing special conditions in the environmental permit. The first stage consists of the installation of end-of-pipe technology and the second stage involves a feasibility study to research further measures. It will be examined whether the ‘prime écologique+’ environmental incentive can be used for new or very specific technologies (based on the standard principles of the ‘prime écologique+’). This may help to reduce greenhouse gases (N₂O etc.) linked to a specific production process.

Through the above measures, absolute nitrous oxide emissions will be reduced by more than 30% from 2020, compared with the level of emissions in recent years, and will therefore fall below the level of emissions from the reference year 2005.

If the implementation of an additional end-of-pipe measure is technically and economically viable, it is forecast that annual emissions could be reduced by 60%, compared with the level of emissions in recent years, at the mid-way point of the period 2021-2030.

If other measures prove to be technically and economically viable, further reductions (approaching 75%) will be possible by 2030 compared with the level of emissions in recent years.

Continuing efforts to reduce fluorinated greenhouse gas emissions

In response to the gauntlet laid down by Regulation (EU) No 517/2014 on fluorinated greenhouse gases (F-gases), the Flemish Action Plan for reducing F-gas emissions 2015-2020 was launched during the Flemish climate conference of 19 April 2016. The measures in this plan aim to limit F-gas emissions in the Flemish Region to 1.8 Mt CO₂eq by 2020. It is also estimated in the plan that, by adopting these measures, F-gas emissions will be limited to 1.0 Mt CO₂eq by 2030.

Given that the technical potential is already largely available, in addition to the actions set out in the existing plan, other measures will be taken to further reduce these F-gas emissions. The measures detailed below aim to help reduce F-gas emissions in the Flemish Region to a maximum of 0.6 Mt CO₂eq by 2030. In 2020, it will be assessed whether a new specific Flemish action plan for the period 2021-2030 may offer added value in terms of consolidating the new initiatives/measures below, among others.

The further measures/actions needed for this purpose are primarily as follows.

- (1) Reinforcing economic support instruments as part of a comprehensive strategy to support the conversion to natural refrigerants

The switch to natural refrigerants requires major investment. We will therefore assess the environmental measures that are currently being supported by the ‘prime écologique+’ and that could be continued beyond 2020. We will also examine whether any other environmental measures that may make a positive contribution to reducing F-gas emissions (e.g. air-conditioning systems in large buildings and heat pumps with a low GWP value) could be supported as well.

At the same time, we will ensure that available European funding is used as much as possible.

In addition, to aid the switch to natural refrigerants, the creation of new training centres (and/or the conversion of existing centres) with the necessary facilities for teaching about natural refrigerants will be specifically supported.

(2) Imposing additional responsibilities on specific target groups

In this respect, a Green Deal will be discussed with the distribution sector in 2020, so that by 2030 the use of conventional refrigerants in this sector has been reduced to the minimum and F-gas emissions are virtually zero.

In the chemical sector as well, following consultation, specific agreements will be reached at company level (through the environmental permit or otherwise) with producers of fluorinated compounds, during the production of which F-gases are emitted, so that F-gas emissions by these producers are reduced as quickly as possible to a maximum of 0.15 Mt CO₂eq.

Finally, based on the results of the study into the waste issues of cooling applications that involve F-gases and the identification of potential sticking points (Afvalproblematiek van F-gasbevattende koeltoepassingen en identificeren van mogelijke knelpunten), measures will be taken together with the sectors directly concerned (refrigeration sector, RECUPEL, construction sector, etc.), which should lead to a considerable increase in the current degree of recovery of refrigerants in the waste stage.

We will limit methane slip in natural gas cogeneration engines

When natural gas is burnt in cogeneration engines, some unburnt pure natural gas (CH₄) ends up in the flue gas and therefore in the atmosphere. In the last few years, in the Flemish GHG emissions inventory, 3-4 kt of CH₄, i.e. 75-100 kt CO₂eq, have been attributed to this methane slip, and the trend is upwards. Technical measures are available to limit this methane slip, either through design improvements or through the installation of methane oxidation catalysts.

Limiting this methane slip (and therefore emissions) has become a focal point in several Member States over the last few years, and this could also become part of a European methane strategy. In the Environment Department's research programme, resources have been included for undertaking a limited study to further investigate: (1) the technical measures that could be taken, and (2) the policies that can be developed.

This measure will also cover natural gas cogeneration engines in the agricultural sector.

We will minimise methane emissions due to natural gas transport and distribution

In natural gas transport and distribution activities, a small amount of the natural gas escapes in the form of pure methane. For a number of years, Fluxys and Fluvius have been taking steps to minimise these emissions. Over the period 2021-2030, these measures will be continued and reinforced where necessary.

In mid-2019, Fluxys produced an action plan for reducing methane emissions from its activities. Through this plan, Fluxys will reduce its methane emissions to a maximum of 46 kt CO₂eq by 2025, which will be a significant reduction (± 0.1 Mt CO₂eq) from the period 2013-2017.

Other measures will also be discussed with Fluvius.

Brussels Capital Region

In principle, large industrial emitters are already covered by a specific system for reducing GHG emissions: the Emissions Trading System (⁷¹) (ETS). However, few plants in the Brussels Capital Region are included in this programme, with some large GHG-emitting plants actually being excluded, such as the Neder-Over-Heembeek waste incinerator and turbine plant, wastewater treatment plants (WWTP) and the turbojet electricity generation unit in Ixelles.

⁷¹ The European Union Emissions Trading System (EU-ETS) is a CO₂ emission allowances mechanism implemented within the European Union in the context of its ratification of the Kyoto Protocol.

As a result, the necessary reduction in direct GHG emissions also applies to these large-scale plants. Given the level of investment in this type of plant and the period of validity of their environmental permits (15 years), it will also be necessary to plan, inform and discuss in advance with operators how to avoid inappropriate or unnecessary investments given the regional targets.

Waste incineration is an activity that is responsible for significant GHG emissions. Furthermore, the Resources and Waste Management Plan (PGRD), which was approved by the government on 22 November 2018, aims to reduce the production of household and business waste by 20% by 2030.

The PGRD therefore focuses on the issue of economical and responsible consumption upstream, as well as on the traditional management of waste downstream. This requires new collaborative economy and sharing practices at intermediate levels.

The PGRD has three general objectives:

- ingrain the switch to more sustainable and circular consumption practices;
- maximise the conservation and recovery of materials, if possible locally;
- steer the supply sector towards circular practices.

The PGRD 2018-2023 and beyond is therefore organised into seven strategic objectives that are also priorities, with each one being broken down into several operational objectives that in turn comprise measures to be implemented.

Finally, following recent developments, European legislation now requires the separate collection of bio-waste by 2023 at the latest (⁷²). With regard to the European targets (50% by 2020, 55% by 2025 and 65% by 2030), particularly those for bio-waste, the government has committed to reducing the regional flows destined for incineration over the next decade. The Regional Policy Statement also plans to start phasing out the incinerator.

At wastewater treatment plants, a significant quantity of biomethane is produced during the treatment process. Methane is a warming gas and a source of energy. Optimised management of this biogas is essential to regional climate policy efforts.

Turbojet units are electricity generating plants. They are designed to respond to consumption peaks and therefore to support the local grid in the event of an unexpected rise in demand or the failure of core generating plants. The electricity is generated using an aircraft jet engine capable of being started and reaching its full operating power very quickly (⁷³). In the past, there were three turbojet units operating in the region (⁷⁴). The Schaerbeek and Buda-Machelen units stopped generating in 2007 and 2017 respectively. Only the unit in Ixelles remains, which runs for a few hours every year on kerosene, which is high in carbon dioxide.

Finally, the long-term planning exercises (energy, climate (⁷⁵), air, waste, etc.) need to be repeated at an accelerated rate in the coming years. The Governance Regulation actually provides for these exercises to be repeated at least every 10 years. For its part, the Paris Agreement provides for global stocktakes (⁷⁶), i.e. regular assessments that may, where appropriate, lead to the current plan being adapted and new measures being adopted with a view to increasing the level of ambition. In this context, the fact that the environmental permit for such key plants is granted for a period of 15 years can create lock-in effects, which means that discussions need to take place on adapting the legal framework of these environmental permits. With regard to such plants, the government needs to take specific action as follows.

- Establish a long-term phased timetable for the adaptation of the Neder-Over-Heembeek regional facility taking into account the gradual reduction in flows destined for incineration, while maintaining self-

⁷² Circular Economy Package – Waste Directive - Article 22.

⁷³ Source: Fédération Belge des Entreprises Électriques et Gazières – FEBEG (Federation of Belgian Electricity and Gas Companies).

⁷⁴ Schaerbeek, Volta-Ixelles and Buda-Machelen.

⁷⁵

⁷⁶ The global stocktake provided for in Article 14 of the Paris Agreement is a core element of the agreement. It aims to increase the ambition of the Parties over time. It also links the commitments to the agreement's objectives.

sufficiency in terms of the Brussels Capital Region managing its own waste and also public control over this strategic facility. The study that will provide a framework for this adaptation will be conducted in 2020 and will focus on reducing emissions, recovering the residual waste flows for energy generation, waste imported into the Brussels Capital Region, and the socioeconomic and environmental effects of this conversion (energy generation, indirect impacts resulting from changes to waste collection, etc.). The government will study the phasing out of this facility, which is desirable in order to meet the region's GHG emission obligations. As a result of this phasing out, the benefits deriving from the green certificates granted to the incinerator will be used to achieve the objectives of the PGRD and the Regional Circular Economy Programme (PREC) ⁽⁷⁷⁾. Green certificates will no longer be granted to the incinerator.

- Plan to ban the generation of electricity using petroleum products with the exception of emergency generators, while ensuring security of supply.
- Drastically reduce the use of flaring (which burns surplus biogas) in all (future) plants, in consultation with their operators. An increase in storage capacity without reducing the safety of these sites will be considered where necessary.
- Develop the legal framework for granting environmental permits to avoid lock-in effects that would make it impossible to meet the region's decarbonisation and energy transition commitments and targets.
- Achieve its climate objectives by respecting the hierarchy of waste treatment methods, namely: recycling, material recovery, energy recovery, and finally landfill.

D. (Residential) buildings

Federal State

See point 3.2(ii).

Flemish Region

See point 3.2 Dimension energy efficiency.

Walloon Region

See point 3.2 Dimension energy efficiency.

Brussels Capital Region

The buildings sector, which is the main sector responsible for direct GHG emissions in Brussels (44% of emissions come from residential buildings), is marked by very high use of fossil energy sources (coal, heating oil and natural gas) to meet most heat requirements (heating, domestic hot water and cooking). These fossil energy sources are very carbon-rich. They therefore have a significant impact on climate change. In view of the challenges and targets set, strong measures must be adopted to reduce the emissions of these installations, together with measures encouraging energy sobriety (covered in point 2.2.1). After analysing whether the timetable currently indicated in this document can be brought forward, the government will develop a strategy aimed at gradually phasing out heating powered by fossil fuels in new buildings or major renovations. It will introduce social support measures for people on low incomes.

In addition, communication is a key element in explaining the coherence and impacts of these short- and medium-term measures. Prohibitive measures and financial support (including incentives) will therefore be accompanied by significant communication with the public and professionals.

⁷⁷ The PREC was adopted by the Government on 10 March 2016. It is being managed by Bruxelles Environnement, together with Impulse, Innoviris and the Agence Bruxelles Propreté (Clean Brussels Agency). For more information: <https://environnement.brussels/thematiques/transition-de-leconomie/programme-regional-en-economie-circulaire>

In the specific case of the Brussels Capital Region, where there are many tenants and co-owners, special attention will be paid to the impact of ‘buildings’ measures to avoid adverse side effects for these particular groups.

This ‘buildings’ chapter sets out measures for all buildings in Brussels. However, these measures will not necessarily apply to listed buildings given their specific circumstances. The government nevertheless wants this specific stock of buildings to contribute to the regional emissions reduction effort. In 2021, Patrimoine.brussels (authority responsible for monuments and sites) will propose a specific action plan in close collaboration with Bruxelles Environnement (the Brussels Environment Authority), which will eventually be incorporated into the strategy to reduce the environmental impact of existing buildings in the Brussels Capital Region.

NB: Some of the measures set out below are also contained in the draft strategy to reduce the environmental impact of existing buildings in the Brussels Capital Region. They are also included here given the relevance of their direct impact on the decarbonisation of the buildings sector, whether they concern existing or new buildings.

Starting to phase out coal from 2021

Coal, which is extremely harmful to air quality and therefore to health, and which significantly drives the greenhouse effect (69% more emissions than natural gas), still remains a method of heating the homes of certain groups in Brussels (mainly vulnerable ones). It is estimated that 0.05% of homes are heated primarily using coal, and that less than 2% use coal as a supplementary heating source. In terms of energy, coal accounted for 0.11% of total consumption in 2017 (⁷⁸) (in 97% of cases, it is used to fuel supplementary heating and in 3% of cases for primary heating). These figures may seem insignificant but, in terms of fine particulate matter, they account for 31% of residential emissions of PM2.5 (⁷⁹).

In view of the climate and public health issues, this situation cannot be allowed to continue beyond 2030. The government will therefore:

- enshrine in legislation a ban on installing appliances running on coal from 2021;
- first put in place support measures such as an energy incentive enabling the Brussels inhabitants concerned to acquire a system that is less harmful to the environment, provided that their coal-fired system is destroyed.

Starting to phase out heating oil from 2025

Heating oil is still extensively used for heating and domestic hot water in the region. It is used in 16% of boilers and emits 32% more carbon dioxide than natural gas. Yet lower-carbon or renewable alternatives are available. Studies and feedback from the field show that heating systems and boilers in particular have a much longer lifespan than other equipment in buildings. At the very least, owners tend to keep them for as long as possible while they work, regardless of their energy performance. It can therefore be assumed that a heating oil boiler installed today and receiving a minimum amount of maintenance will still be operating in 28-30 years’ time (and possibly even 35 years). In view of the issues, the coming period should therefore be used to progressively phase out heating oil for heating, with particular attention being paid to large-scale heating oil plants in schools and public buildings.

In this context, the government undertakes to:

- enshrine in legislation a ban on the installation of heating and/or domestic hot water production appliances running on heating oil from 2025;

⁷⁸ Source: Regional energy balance.

⁷⁹ Source: Inventory of pollutants, 2017. Bruxelles Environnement. PM2.5 is fine particulate matter that is a major cause of poisoning in the airways and therefore poses a real danger to human health.

- from 2021, offer a specific incentive for replacing a heating and/or domestic hot water production system running on heating oil with a better alternative in terms of air quality and GHG emissions, which may be modifiable depending on the replacement option chosen (energy-efficient heat pump, natural gas condensing boiler, etc.), and for removing the heating oil tank (in accordance with Brussels legislation on soil pollution), provided that the heating oil system is destroyed.

Starting to phase out natural gas from 2030

Achieving carbon neutrality means, as indicated in the Energy Pact, that by the middle of the century we will no longer use fossil energy sources for our heat requirements. Given the observed lifespan of equipment (20-25 years for equipment running on gas), we therefore also need to plan for the progressive phasing out of natural gas from 2030.

To this end, the government undertakes to:

- examine the possibility of a ban on installing cooking, heating and domestic hot water production appliances running on natural gas or butane/propane from 2030 in consultation with the sector and paying particular attention to the issue of energy dependence and the economic and social impacts caused;
- discontinue support for the generation of green electricity from natural gas-fired cogeneration (currently guaranteed by green certificates) from 2030;
- consider the possibility of decarbonising gas and developing renewable heat in Brussels;
- work with stakeholders in the sector, the Federal Government and the other regions to develop by 2030 a strategy and an action plan aimed at evolving the natural gas distribution network by 2050 on a case-by-case basis according to the renewable potential.

Promoting decarbonised energy carriers

Currently, the EPB method assesses a building's performance by converting the energy consumed into primary energy. As a result, gas consumed to produce heat is favoured over electricity. Indeed, the calculation based on the primary energy coefficient penalises electricity given its conversion in a power plant. A de facto advantage is therefore granted to natural gas, which has a lower primary energy coefficient. Given the energy transition challenges, the situation needs to be rebalanced, otherwise there is a risk of maintaining the status quo in favour of gas for many years to come through the EPB regulations.

The government undertakes to:

- adapt the primary energy coefficient for electricity in the EPB method.

Cooperation with the Federal Government:

- (In the very near future), standardise the VAT rate for coal (up from 12% to 21%) as part of the reduction in (indirect) subsidies to fossil fuels indicated in the Energy Pact.
- Reduce VAT for demolition/rebuilding operations, on the basis that regional policies will prioritise quantifying the environmental cost of operations in order to assess their relevance.
- Adapt and gradually tighten product standards, with an eventual ban on the sale of coal-fired heating systems and heating and domestic hot water production systems running on heating oil.

E. Agriculture

Flemish Region

Agriculture means all activities where land is used to produce plants and animals, mainly for human consumption (basic food needs). It also includes primary forms of production that do not directly use land. The emissions

inventory and this climate plan also include offshore fishing in the ‘agriculture’ sector. The agricultural sector forms part of an agri-food chain with multiple links, both upstream and downstream of the farming operation.

This chapter focuses on the ‘agricultural production’ link in this agri-food chain. Neither the demand side of the market nor the other agri-food links on the supply side (ETS or non-ETS) are included in this chapter. This approach does not change the fact that a comprehensive approach to the chain is the best way of maximising use of the emissions reduction potential in food consumption and supply.

The policy options and associated measures for non-energy emissions in the agricultural sector are as follows:

- Animal production:
 - reduction in enteric emissions (methane);
 - reduction in emissions from manure storage and management (methane, nitrous oxide).
- Plant production:
 - reduction in soil emissions as a result of higher nitrogen efficiency (nitrous oxide);
 - closure of cycles/recovery of by-products.
- Continuation of efforts to make the fisheries sector more sustainable.
- Cross-cutting measures in the agricultural sector:
 - post-2020 common agricultural policy;
 - cooperation in the supply chain;
 - integrated approach to research, innovation and dissemination of knowledge.

Animal production

Livestock farming is the main source of GHG emissions in the agricultural sector. Changing the size and composition of the herd and also the GHG emissions per animal or per unit produced will help to achieve the sector’s climate targets. The general trend of moderating consumption of animal products (including beef and pork), which began in the last decade, will continue. A reduction in demand will lead to falling supply given that this trend on the demand side is occurring not only in Belgium, but also throughout the single market/customs union. On the supply side, the European Commission predicts that pig and cattle stocks will fall by 2030.

The nutrient emission rights system will be assessed and overhauled so that it makes more of a contribution to the climate, water quality and air quality targets.

Reduction in enteric emissions

Optimising feed rations and feed efficiency as well as improving farm management can reduce methane emissions from cattle. More progress is needed in areas such as feed efficiency, feed additives and longevity of cattle.

The continuation of research and the implementation of such measures form part of the ‘Enterische emissies rundvee’ (Enteric emissions from cattle) agreement signed on 29 March 2019 by the Flemish Minister for the Environment, Nature and Agriculture, the Department of Agriculture and Fisheries, the ILVO and various partners from the cattle industry as a whole. By signing this agreement, the partners have committed to achieving the enteric emissions target by 2030.

The agreement aims to roll out measures in the sector and is based around five main themes: (1) developing the beef market; (2) improving the management of herds and animals at farm level; (3) adapting the management of animal feed; (4) options in terms of genetics and selection, and (5) monitoring and assurance of measures. There will also be an emphasis on research. From 2021, the policy framework implemented will be reviewed every year and the reduction in greenhouse gases will be reviewed every two years in order to determine

whether the top-down measures are on target to 2030. Further measures will be adopted if the targets are not on track in 2025.

Reduction in emissions from manure storage and management

By fermenting manure on pig and dairy farms, methane emissions from manure storage can be substantially reduced and at the same time produce biogas for green heat and electricity. This technique is already being applied on around 80 dairy farms (2017) and is being tested on pig farms (VLAIO [Flemish Agency for Innovation and Entrepreneurship] LA project Pocket Power). If viable in economic, functional and technical terms, this technique could be implemented on more pig and dairy farms. External storage of liquid livestock effluents could also be encouraged. This not only reduces emissions from the storage of the manure, but also improves homogenisation of the manure so that it can be better applied, which in turn reduces soil emissions. This can be combined with small-scale anaerobic digesters.

There are several methods other than small-scale anaerobic digestion for reducing methane emissions from manure storage and management, namely covering or crust formation, composting (e.g. composting solid manure and solid fractions after separation of the liquid manure), aerobic treatment, manure separation and composting, acidification of liquid manure and other forms of fertilisation. We will therefore obtain analyses and advice on high-quality fertilisers through certified advisers.

Emissions from manure storage and spreading can also be prevented through Smart Farming and precision spreading.

By applying an input/output balance at farm level, the cycle of nutrients on a farm can be better identified and losses can be tackled where they occur. This is one of the aspects that will be considered in the climate analysis of the VLAIO's Klimrek project.

Plant production

Reduction in soil emissions as a result of higher nitrogen efficiency

Current nitrogen losses in the agricultural sector have a direct and indirect impact on the quality of the environment (greenhouse gases, acidification, eutrophication).

Nitrogen emissions to the air and water from animal and plant production and biomass processing can be reduced through targeted measures. The sixth action programme implementing the Nitrates Directive (MAP 6 [Manure Action Plan], 2019-2022) includes the following measures:

- low-protein rations, own protein production and protein from waste flows for animal feed;
- precision farming: the right dose at the right time in the right place;
- more efficient nitrogen absorption by adapting crops (selection, new techniques, etc.) and using crop rotation (e.g. with legume crops);
- reduction in the use of chemical fertilisers by adapting crop rotation and encouraging the use of alternatives to chemical fertilisers;
- transition in fertiliser processing from nutrient removal to nutrient recovery and restriction of nitrogen losses.

Other practical research will incorporate new knowledge and support the choice of the most efficient measures. Future action programmes under the Nitrates Directive will also focus on improving nitrogen efficiency and, if possible, reducing the processes that release nitrous oxide.

Closure of cycles/recovery of secondary flows

Agriculture already plays an important role in the recovery and use of secondary flows. This role will be further reinforced and extended to 2030.

Anaerobic digestion is a key way of recovering manure by transforming it into green energy (biogas, biomethane) and digestate. Researchers are also examining to what extent digestate can be used as an alternative to mineral fertilisers. Plant and animal waste streams (e.g. meat-and-bone meal) will also be used as much as possible in the agricultural and horticultural sectors as animal feed, to improve soil structure and soil fertility, as an energy source or in other applications. This also applies to marine secondary flows (e.g. recovery of crab, prawn and mussel shells).

Good cooperation between producers and users of secondary flows and appropriate legislation allowing products deriving from these secondary flows to be used are of paramount importance in this respect.

Continuation of efforts to make the fisheries sector more sustainable

The environment and the climate are key priorities for the European Maritime and Fisheries Fund (EMFF). The range of measures to protect the environment and transition to a low-carbon economy in offshore fishing include:

- investment in fishing vessels that will also contribute to energy efficiency (LED lighting, on-board insulation);
- improvement of fishing gear in order to increase selectivity, reduce towing power and reduce damage to the seabed;
- optimisation of engines/generators and other propulsion mechanisms of fishing vessels;
- development of sustainable and integrated farming systems in aquaculture (sea- and land-based) and innovative aquaculture research (e.g. cultivation of algae) that could have a beneficial impact on the climate. Even if such measures do not directly improve the non-ETS climate score of Flanders, they may further reduce our overall climate impact.

In cooperation with the ILVO, the Belgian fishing fleet has developed a sustainability label (Valduvis) for fishing levels. In addition, research efforts are being directed at improving general knowledge and protecting the aquatic environment.

All of this is in line with the goals of Europe's common fisheries policy.

A new 'Sustainable fisheries' agreement will follow on from the current agreement, which runs until 2020 and provides for active research into fishing techniques and alternative energy sources.

Cross-cutting measures

In the agricultural sector, tackling the climate challenge requires the resources (in terms of funding, human resources, knowledge and research, cooperation relations, etc.) of the various governments and other social players (businesses, banks, general public, etc.) to be targeted at the specific climate objectives. It is vital that governance is aimed by design at implementing, monitoring and adjusting the necessary instruments. It is for that reason that the measures concern use of the post-2020 common agricultural policy, cooperation based on new economic models, and research, innovation and dissemination of knowledge. Other climate measures may be incorporated, particularly in the Flemish environment, manure and energy policy.

Post-2020 common agricultural policy

On 1 June 2018, the European Commission published its proposal for a regulation on the future common agricultural policy (CAP). The timetable of the implementing regulations and delegated regulations is not yet known. As the new CAP (2021-2027) is implemented in the region, we will adopt the measures and instruments needed to reduce GHG emissions in the agricultural sector.

Income support will be linked to the provision of public services and environmental benefits through preconditions (climate, environment, public health, animal and plant health, and animal well-being) and eco-schemes, as far as possible and depending on the results. Within the limits of the new CAP, these could include,

for example, increased storage of carbon in agricultural land, soil and grassland kept carbon rich, efficient management of nutrients to prevent nitrogen and phosphorous losses and to improve air and water quality, sustainable water management, drought control, and production, storage and distribution of renewable energy. When implementing the post-2020 CAP in the region, agri-environmental and climate measures will be reinforced to achieve the environmental, climate, biodiversity and landscape objectives of farmers.

In addition, under the new CAP, the Flemish Agricultural Investment Fund (Fonds flamand d'investissement Agricole – VLIF) will be completely overhauled so that it becomes a forward-looking entrepreneurial fund. Investment policy will focus on innovative production that is environmentally and climate friendly. The selection method used for all support applications will be adapted so that investments that make the greatest contribution to reducing pressure on the environment and mitigating climate change (highest reduction in GHG emissions per euro of investment aid) and to adapting to this change will be ranked the highest. The efficiency of measures, the progress made and the financial implementation of the new VLIF will be closely monitored.

Coupled income support under the CAP will be gradually abolished by 2027 at the latest and replaced with a sustainable alternative in order to offset the loss of income support and achieve the climate objectives on which the livestock farmers concerned are focusing their efforts.

Cooperation in the supply chain

To achieve a transition in the agri-food chain, close cooperation between all partners is necessary. The 2016 Climate Change Conference showed that the major players in the supply chain are certainly prepared to make this happen.

Flemish agriculture and horticulture form the basic link in a much larger agri-food chain that has numerous links extending from the supply of raw materials, other materials and machinery to farmers through to processing and retail sales. Knowledge institutions, lenders, education, interest groups, social organisations, government and other stakeholders also play a vital role in this extended chain. One crucial factor for a successful transition is that efforts, innovation and investment aimed at reducing the carbon footprint of foodstuffs are correctly rewarded by the market.

Horizontal and vertical cooperation within the supply chain is crucial for ensuring that supply is properly aligned with demand (or expected demand). This leads to improved use of market opportunities, less food waste, risk spreading, etc. Some types of cooperation and agreement can result in new revenue models and other climate funding mechanisms.

Integrated approach to research, innovation and dissemination of knowledge

Research resources will mainly be used to support continued transformation and innovation in the agricultural sector, particularly in the areas of cost-effectiveness, environmental pressures, climate, agro-ecology, short supply chains, biodiversity and scalability.

The VLAIO's Klimrek project began in 2019, through which, based on knowledge gained and the development and use of a climate analysis for holdings, achievable climate measures can be introduced on holdings, with farmers then being guided and monitored individually or in groups.

The ILVO's Center of Expertise for Agriculture and Climate (ELK), in cooperation with other knowledge institutions, can play a major coordinating role in this respect.

It is vital that farmers have the knowledge and know-how needed to adapt their operational management so that it is more environmentally friendly. That is why the focus is on supporting farmers, raising their awareness and informing them about the interaction between agriculture and climate change, the role that agriculture can play in the fight against climate change, agro-ecological principles, existing climate-related (support) measures, the impact on other environmental aspects, and a cost-benefit analysis of climate friendly agricultural practices.

Walloon Region

Development strategies

- **GHG and NH₃ energy balances at farm level (DECIDE tool)**

The Walloon Air and Climate Agency (AwAC) and the Walloon Agricultural Research Centre (Centre wallon de Recherches agronomiques – CRA-W) have worked together to develop a calculator that accurately indicates the balance of energy consumption and GHG and NH₃ emissions at farm level. The DECIDE tool is still being developed, but is already available for use in Wallonia. Once a balance has been calculated, specific recommendations can be made and discussed, particularly with agricultural advisers, about optimising the use of inputs (energy and other), limiting losses (economic impact) and reducing the environmental impact of farm activities.

- **Afforestation, planting of woody elements and agroforestry**

The afforestation potential in Wallonia is relatively limited. Over a third of the region is already covered with forest. However, there is still potential in agricultural areas by replanting hedges along the edges of plots, planting trees on grassland and developing meadow orchards. These steps can help to tackle a number of different challenges: production of biomass; increase in carbon sinks; reinforcement of the ecological network, and improvement of biodiversity and the countryside's resilience to the impacts of climate change (see the section on adapting to climate change).

- **Development of the biomethanisation process in the agricultural sector**

Biomethanisation is a technology that converts organic matter into methane gas and fertiliser. On farms, organic matter of both animal and plant origin is available at all stages of farming. This process is particularly interesting because of the quality of the fertiliser produced: the nitrogen that fertilises soil is partly mineralised by the process. In its Regional Policy Statement, the government proposes to encourage biomethanisation in order to improve waste management, by supporting farmers who produce enough energy to power a local network (village, hamlet, business).

Point 3.1.2 on renewable energy proposes measures in this respect.

F. LULUCF

Flemish Region

In order to develop and implement an effective and coherent LULUCF policy, a number of policy initiatives are needed, which are explained step-by-step below.

Development of a comprehensive LULUCF emissions inventory and the associated carbon monitoring system

The current Flemish GHG emissions inventory for LULUCF is based on a fixed monitoring network of around 6,800 reference points where the land use is monitored. To determine the carbon content of the soil in each land use category (field, forest, grassland, wetland, etc.) and to monitor how this changes, the best available information in Flemish studies and literature is currently used for each soil type. For the 'forest' category, the above-ground biomass and volumes of harvested timber are also taken into account.

This approach is in line with the definitions and requirements of the IPCC and is currently the best possible approach given the information that is available. As the current methodology uses fixed coefficients for the change in carbon stocks in the various land use categories, the GHG emissions inventory cannot monitor the effects of current or future efforts to increase carbon storage. An effective carbon monitoring system is therefore needed for the emissions inventory for the period 2021-2030, with this system giving a detailed view of the change in soil carbon and production and harvesting of timber, among other elements.

Soil carbon monitoring network

A detailed knowledge of Flemish soils and wetlands is vitally important for ensuring optimum monitoring of the policy effects and the actual change in carbon fluxes and carbon stocks at Flemish level. To overcome the current reporting limits, we are working on a soil carbon monitoring network.

The specific issues that must be taken into account in developing this network are:

- quantifying the effects of a (sudden) change in land use category, in particular deforestation or conversion of grassland into arable land, on the underlying soil carbon content;
- identifying the impact of the type of management on the carbon content and mapping the change in carbon stored in the soil of grassland;
- identifying the carbon concentrations in the soil for the various types of land cover (excluding paving).

Improvement of data collection and monitoring of timber production

In order to properly understand the storage of carbon in wood products and the harvesting and use of those wood products (sawn timber, wood panels, paper, energy, etc.), a system of monitoring timber production at Flemish level (volumes, types of timber, etc.) needs to be developed.

Preparation of a LULUCF action plan with projections, based on an evaluation of the current situation and a calculation of the effect of potential policy strategies on carbon stocks

The LULUCF policy can use three approaches to protect or increase carbon stocks:

(1) Focus management on the carbon of a land use category

Where the land use, vegetation or land cover remains unchanged, the management and use of the soil can have a significant impact on carbon storage. Carefully managing the unpaved part of land cover, adding small landscape elements and buffer strips, adapting soil cultivation and crop rotation, incorporating crop residues, extensifying management, rewetting grassland and other steps can all ensure the preservation or development of carbon stocks. Conversely, ploughing and renewing grassland, soil erosion, drought, drainage of wetlands, overly intensive arable crops and other aspects can lead to carbon losses.

(2) Encourage a change in land use to increase carbon storage

Switching from one land use category to another will change the carbon content of the soil and any aerial biomass. Changes in land use such as afforestation (where spontaneous), rewetting, conversion of arable land to grassland (where extensive), management of nature and reduction of land cover (with paving) generally lead to increased carbon storage.

(3) Slow the change in land use resulting in a loss of carbon

Cultivation of land, deforestation, conversion of grassland to arable land and new land cover are all examples of changes in land use that are often accompanied by a fall in carbon stocks.

When land use categories are changed, carbon losses usually occur much more quickly than building new carbon stocks. The priority is therefore to avoid such changes in order to protect existing stocks (in forests, grassland, wetland, etc.). When it comes to offsetting legal offers, owners must be fairly compensated.

We are in the process of developing an action plan to shape LULUCF policy for the period 2021-2030. As a result, various long-term strategies are being prepared, within which the consequences of policy options (existing and additional) on carbon stocks in Flemish soil and biomass are being systematically defined in terms of quantity wherever possible. Based on these projections, the action plan will examine the policy efforts needed to safeguard and actively manage Flemish carbon stocks in order to comply with the no-debit rule for the period 2021-2030.

Below is a qualitative explanation of how the above principles can be reflected in spatial policy, agricultural policy, forest and nature policy, and materials policy, and how they will impact on the Flemish LULUCF carbon balance.

Reduction in additional land cover, depaving and management of unpaved land cover

Land cover, particularly the paving of different types of soil, leads to relatively high carbon losses. The extent of these losses can be limited in three ways:

- reducing the use of additional land;
- reducing or limiting paving in current and future land cover;
- designing and managing unpaved land cover in order to increase carbon storage.

The strategic vision for the Spatial Policy Plan for Flanders (Plan de politique spatiale pour la Flandre/Beleidsplan Ruimte Vlaanderen – BRV) includes the objective of reducing the average daily increase in land cover to 0 hectares by 2040. Given that the ‘land cover’ category has the lowest carbon stocks, net emissions are expected in this category.

Achieving the objectives of the BRV’s strategic vision should enable carbon losses to be gradually reduced compared with current trends. Not achieving those objectives will result in even higher emissions due to the increased land cover.

Carbon losses can be further reduced by achieving the ambition of the strategic vision to ensure that the remaining increase in land cover does not increase the total cover rate, with an effective carbon monitoring system being introduced for the purpose of detection.

Depaving open spaces and land cover, as well as blue and green corridors in our towns and villages, should help to increase carbon storage in land cover. Encouraging the management of unpaved land cover (gardens, parks, public and private spaces, etc.) also offers carbon storage opportunities. Environmental policy supports the development and sharing of knowledge so that Flanders can build up a practice of cutting-edge projects in this area in cooperation with local authorities and developers.

The focus will also be on depaving public space. The BRV’s strategic vision assumes that the cover rate in agricultural, nature and forest uses will fall by at least 20% by 2050 compared with 2015.

When the BRV is drawn up, the impact on Flemish carbon stocks will be taken into account, and the necessary measures will be adopted to limit the impact of spatial development on the Flemish LULUCF balance.

Increased carbon storage in agriculture and horticulture

In addition to measures to reduce agricultural emissions, which are covered by the ESR Regulation (Regulation 2018/842) (see point 3.1.1.3), the agricultural and horticultural sector also has an important responsibility with regard to the carbon stored in the soil. Indeed, carbon stocks in arable land and cultivated grassland are steadily declining in Flanders. However, this means that there is considerable potential to reduce carbon losses and increase carbon storage in agricultural land. A higher carbon content is also an excellent adaptation measure because it improves soil quality and increases resistance to drought and erosion.

The agricultural sector can reduce carbon losses through the following policies and associated measures.

1. Protecting carbon stocks

A constant plot of grassland that is not often renewed (ploughing and immediate re-sowing) stores carbon until its saturation point is reached after a few decades. When grassland is ploughed and converted into arable land, carbon stocks are quickly lost (approximately twice as fast as they were accrued). As a result, to protect existing carbon stocks, it is important to limit the ploughing of grassland and ensure that grassland plots remain constant.

Compensating for ploughed grassland with new plots (see the permanent grassland scheme) will lead to net emissions in the short term, because the carbon takes time to build up in the new land.

2. Promoting carbon storage

Every year, part of the organic matter in soil is converted into CO₂ and nutrients through natural decomposition and mineralisation processes, which therefore have to be compensated for by adding fresh organic matter. It is only once this loss has been compensated for and more stable organic matter has been gradually built up that net storage occurs. Farmers can take a combination of measures on arable land to maintain or increase carbon stocks, such as crop rotation using crops with more green cover, cereals or permanent crops, adding stable organic matter in the form of organic fertilisers (e.g. manure, compost), or agroforestry.

This requires an integrated policy framework to remove the obstacles in the current legislative framework (e.g. on local use of organic waste streams through farm composting) and to focus on the adaptability of the appropriate measures. Efforts should be made in particular to ensure that fertilisation practices are compatible with increasing the carbon content. This work should be supported by targeted (practical) research into the potential and practical feasibility of measures aimed at increasing carbon storage in agricultural land.

There is increasing competition for biomass, i.e. its application to soil to increase the carbon content or its removal for bioenergy, biofuels and bioeconomy. When managing biomass streams, a climate assessment must always be made that also takes account of carbon storage in the soil. The quality of organic matter added to soil is a key point as this should obviously not have any impact on other environmental aspects or lead to net emissions of greenhouse gases.

3. Using carbon storage

As the Flemish Region implements the new common agricultural policy (2021-2027), the necessary instruments and measures will be used to achieve the climate objectives in the agricultural sector. The Flemish LULUCF balance is a key point in this respect. Income support will be linked to the provision of public services and environmental benefits through preconditions (climate, environment, public health, animal and plant health, and animal well-being) and eco-schemes, as far as possible and depending on the results. These could include, for example, increased storage of carbon in agricultural land and soil and grassland kept carbon rich. Agri-environmental and climate measures as well as VLIF resources (non-remunerative investments in water and soil management) may also be used to encourage carbon storage in agricultural land.

In addition to the CAP instruments, new market-based funding mechanisms may be developed and used to increase carbon storage in the soil and aerial biomass (see point 3.1.1.6.3).

Increased carbon storage in forests and nature

Deforestation is a major source of emissions in the LULUCF sector. However, new forestation increases carbon storage, although the process is slow. Ancient grassland also has very carbon-rich soil, which sometimes contains even more carbon than forest soil. In general, however, the LULUCF policy is that avoiding deforestation is more efficient than compensating for deforestation through new forestation. Natural and semi-natural grassland and wetland also contain high quantities of carbon. It is therefore better to protect those carbon stocks to achieve the LULUCF objective.

○ Prevention of deforestation and loss of ancient grassland

The most obvious measure for complying with the no-debit rule is to protect existing carbon stocks by minimising emissions. The management of natural and semi-natural grassland, forest and wetland could become more focused. Existing valuable forests will be safeguarded as far as possible, and rapid and effective forest compensation will be granted. Protecting ancient grassland is also a key challenge in this context.

- Increased carbon storage by creating additional forests and natural spaces

By 2030, 10,000 additional hectares of forest will have been created in Flanders, with 4,000 hectares by 2024.

Investments will also be made to ensure a net increase in high-quality natural spaces. The focus will be on achieving the conservation objectives under the Natura 2000 policy, and also on creating natural spaces with significant carbon storage potential. Coordination with integrated water management and adaptation to climate change is also a core principle. By 2024, 20,000 additional hectares of nature will be under efficient management.

At the same time, preventing natural fires (in forests and more generally, for example, on moorland) through appropriate monitoring and surveillance must also be a point of focus. Fires disrupt the accumulation of carbon in the soil and vegetation, and release large quantities of CO₂.

- Forest management

For existing forests, a comparison of the observed carbon stock/emissions with an *ex ante* reference level will determine whether Member States have an emission credit or debit. The management/exploitation of existing forests (without deforestation or afforestation) during the period 2000-2009 will be decisive. If the management does not change, no significant credits or debits will be generated for this category. More intensive exploitation, such as quicker rotation, could lead to a debit in this land use category, whilst a more extensive approach could generate credits.

- Increased carbon storage through integrated water management, development and rewetting

A large proportion of the ancient wetlands and marshes in Flanders was dried out during the 20th century. As with ancient forests and grassland, it is better, in terms of carbon storage, to maintain existing wetlands than to replace them with wetlands elsewhere.

In cooperation with water authorities, we are restoring the natural dynamic in valley areas. We are maximising use of the storage capacity in stream and river landscapes, and we are creating further natural wetlands where necessary. We are in the process of drawing up a specific programme to restore and develop wetlands (where degraded) for the purposes of water management, development of nature, carbon storage and a climate buffer.

Several policy instruments, which were not exclusively designed for this purpose, are encouraging carbon storage through rewetting. For example, the regional conservation objectives include the goal of restoring wet vegetation such as wet moorland, peatlands and swamp forests.

The Sigma plan will improve the resistance of Flanders to flooding of the Scheldt and its tributaries. The space given over to natural floodplains will also allow rewetting and therefore carbon storage in the wet soil. The Leie River Restoration Project aims to restore wet landscapes along the Leie. In addition, a standard assessment framework will be developed that can be used by all water authorities and the Agency for Nature and Forests (Agentschap voor Natuur en Bos – ANB) to develop and advise on stream and floodplain restoration projects.

The Flanders Environment Agency (Vlaamse Milieumaatschappij) is trying, wherever possible, to restore the natural state of watercourses and river valleys through ecological restoration. In addition to increasing resilience and biodiversity, work such as the remodelling of watercourses will also increase carbon storage. Preventing certain watercourses that are under threat from drying out may also help. Green and blue corridors are being created as part of integrated projects in specific areas.

In addition to the examples given, rewetting projects should also be considered in the broader context of integrated water management, as this will create more space for groundwater and surface water. The development of key areas of interest and also the expansion of all stream and river valleys will be based on an integrated approach in which water management, climate protection, carbon storage and biodiversity will be the focus.

Carbon fluxes are limited in the wetland land use category. This does not mean that this category is insignificant, but rather that it only comprises a small amount of land. Given the potentially large carbon stock present per hectare of wetland, conserving these areas is a key concern.

Opportunities to capture more greenhouse gases in the most important Flemish ecosystems will be studied in more detail. As a result, the impact of land use and management on carbon storage must be quantified so that innovative methods of management can be developed.

In the future forest and nature policy, the impact on Flemish carbon stocks will be systematically analysed and every effort will be made to limit the impact on the Flemish LULUCF balance.

New market-based funding mechanisms will be developed and rolled out (see point 3.1.1.1.6.3) in order to increase carbon storage in the soil and aerial biomass.

Increased carbon storage in wood products and the circular economy

The use made of timber harvested from (existing) forests determines how quickly the carbon is converted to CO₂ after harvesting. The LULUCF Regulation lays down rules on calculating and reporting the carbon storage in harvested wood products (HWP). In climate terms and in line with the cascade principle, it is advisable to use wood products for products with a long life cycle and only afterwards (e.g. at the end of the life cycle) for energy generation.

The above principles are applied in the work of the OVAM and the Environment Department on the circular economy. In the future, the impact of policy choices on carbon stocks in wood products and therefore on the greenhouse gas inventory will be quantified and every effort will be made to limit the impact on the Flemish LULUCF balance.

Establishment of a Flemish carbon market as part of the LULUCF policy

Complying with the no-debit rule requires investment in carbon storage through a variety of land uses. In addition to public investment, creating a Flemish carbon market may be an appropriate and useful funding instrument. Such a market would serve as a platform for bringing together operators developing projects to achieve negative emissions (carbon storage) (the supplier) and businesses, organisations and individuals wanting to reduce their climate impact (the purchaser). In practical terms, this could involve a business undertaking to offset the climate impact of aircraft movements, for example, by investing in the planting of a forest. At the moment, this is often achieved by supporting foreign projects with unknown results, due to a lack of national alternatives.

- The CO₂ market is a local market. Projects are carried out in Flanders and not abroad. They contribute not only to the Flemish LULUCF balance, but also to innovation in land use, and they encourage the local economy (see rural policy). There are other international offsetting mechanisms. Potential negative emission projects include protecting and expanding wetlands, creating forests, and promoting silicate-based soil alteration and carbon enrichment in the various types of land use in agriculture, horticulture and forestry (carbon farming, agroforestry, etc.). Keeping projects local ensures closer links between suppliers and purchasers and also increased engagement in the projects, which in turns leads to greater climate awareness. Market studies also show that purchasers are prepared to pay a higher price for certificates generated by local projects.

It is important to the Flemish Government that there are more suppliers and projects in Flanders, that initiatives and measures are effective at capturing greenhouse gases, and that they avoid unwanted side effects (too much focus on CO₂ fixing to the detriment of other services provided by ecosystems). To ensure this, we could have certification by type of sequestration, based on the quantity of carbon fixed by the technique, among other aspects, and meeting the criteria of additionality, permanence and prevention of side effects.

- The CO₂ market is an independent and voluntary market. Projects generate exchangeable CO₂ certificates, and suppliers and purchasers come together on a voluntary basis. The government does not provide

any subsidies, but acts as a facilitator by ensuring that the market operates smoothly and by controlling quality. It is very important that sound rules and reliable methods are established for determining negative CO₂ emissions as this allows attractive and high-quality CO₂ certificates to be offered (reliable and additional storage of CO₂).

- The CO₂ market operates alongside policy. Businesses, organisations and individuals purchase CO₂ certificates to offset the climate transition in Flanders or their own (persistent) residual emissions. This approach always acts as a supplement to existing agreements and obligations (such as the EU ETS or other national and international obligations) to avoid double counting in the emissions inventory.
- The CO₂ market is not just about CO₂, but also offers other benefits. Negative emission projects do not just increase CO₂ storage, but can also offer other benefits in terms of water infiltration, combating erosion, biodiversity, etc. As CO₂ certificates are a source of income, it will also be possible to initiate sustainable projects that are environmentally and nature friendly and that could be hard to pursue without this support.

European regulations and conventions on local CO₂ markets are still in the process of being drafted. In order to achieve their LULUCF objectives, some countries (such as the Netherlands and France) are taking exploratory steps in relation to local CO₂ markets. This approach also offers huge potential in Flanders. Further research and development are needed in terms of the design and implementation of these systems, with the following aspects being important.

- Potential: identify the negative emissions potential in Flanders, including opportunities for businesses and services connected with the Flemish Government and local authorities.
- Practical aspects: how would a carbon market be rolled out in Flanders? Would the expected result be achieved in practice? What is the link between the carbon market and the international framework (including the LULUCF Regulation)?
- Instruments: establish comprehensive rules and reliable methods for high-quality CO₂ certificates.

Research: to support this policy, we need to have scientific expertise on CO₂ storage options and techniques (for example, carbon stored in the soil, biochar, accelerated alteration), both in land-based systems (agriculture, forests and nature reserves) and coastal-based systems (for example, construction of wind farms and coastal protection).

Walloon Region

The actions planned in the agricultural and forestry sectors firstly involve continuing and strengthening current policies and measures.

Additional measures will subsequently be considered, based on an assessment of current actions.

Existing policies and measures

The policies and measures that are already in place are starting to have an impact. Most of the actions in the agricultural and forestry sectors involve strengthening these measures:

▪ *Maintain and increase existing carbon stocks in agriculture and forestry*

Agricultural and forestry soils contain large stocks of carbon, significantly more than in aerial biomass. Several practices, such as simplified cultivation techniques or no-till under certain conditions, can help to increase carbon stocks in these soils.

Permanent grasslands also contain carbon stocks that must be preserved. Additionally, their destruction can release huge quantities of nitrogen (up to 700 kg in the year after destruction). As a result of the greening of the common agricultural policy, Europe requires permanent grasslands to be maintained and preserved.

Ploughing a permanent grassland has been totally banned since 1 January 2015 in 91 of the 240 Natura 2000 sites in Wallonia. At the other sites, ploughing a permanent grassland is subject to authorisation. It is vital that these requirements are maintained or even reinforced by extending them to all Natura 2000 sites.

In terms of forest management, and more particularly planting, local subsidies are granted to private owners to ensure the renewal of softwood and hardwood stands⁽⁸⁰⁾.

Lastly, over half of Walloon forests are PEFC certified (Programme for the Endorsement of Forest Certification Schemes), which is a global certification system that guarantees the **sustainable management of forests**. Currently, 300,000 hectares are certified in Wallonia⁽⁸¹⁾ (271,340 hectares of Walloon public forest and 30,437 hectares of private forest), which represents 54% of all the forests in Wallonia. Almost all public forests are already certified.

- **Manage Walloon forests with a view to helping them adapt to climate change**

The themes of the Fourth Framework Agreement on Forest Research and Extension⁽⁸²⁾ include forest management and risk assessment in the context of global changes, prospective analysis tools for the Walloon forest based on data from the Permanent Inventory of Walloon Forest Resources, and the design of innovative silvicultural systems. Continued funding of this research is provided for by the Forestry Code.

Various research projects and results are directly linked with maintaining and improving forest resources in the long term, in a context of climate change.

The themes of this research reflect the principles and guidelines set out below.

Species must be appropriate for forestry stations in order to improve not only productivity, but also the resilience of forests. In 2017, a new version of the Ecological Species List⁽⁸³⁾ was published; this tool helps managers of forest and natural spaces to make planting decisions.

The biomass removal intensity must be compatible with maintaining soil fertility in the long term. This will be determined in particular by quantifying the mineral exports as a result of logging.

The reaction of trees to repeated stresses (insect attacks, frost, drought, soil quality, etc.) is currently being studied in order to better manage forests, for example by reducing the density of trees to improve access to resources (water and nutrients), by planting them in adapted forestry stations or by mixing them with other species (diversity).

Research is ongoing into species that should be better able to support a drier and hotter climate, particularly by examining the reactions of species planted in arborets to various climate stresses (drought, frost, etc.). The aim is to identify species that are more resistant to drought and produce high-quality wood so that species diversity and good wood production can be maintained in the future.

Modelling the growth of forests is also continuing, with the aim of identifying the most appropriate management methods to ensure that forests are more resilient to future environmental uncertainties. One type of forest management involves mixed stands, which are particularly intended to increase the resilience of beech and oak forests as a result of more diverse forests that are better adapted to climate change.

Beetle epidemics (*Ips typographus* and *Ips chalcographus*) have been particularly extensive in recent years, as a result of the windthrow linked with Storms Eleanor and David in 2017 and the weather conditions in 2018 and 2019, which really helped the insects to thrive. In this context, the Walloon Forest Health Observatory⁽⁸⁴⁾ was set up in 2011 to centralise data and knowledge on forest health within the Walloon and Brussels Capital Regions. Its main tasks are to produce a periodic review of forest health, detect and identify pathogenic insects

⁸⁰ <http://www.province.luxembourg.be/fr/prime-provinciale-aux-plantations-forestiere-sprivees.html?IDC=4844&IDD=93372#.XVvwZvkzIU>

⁸¹ <https://www.pefc.be/fr/presse-et-actualites/actualites/1995-300-000-ha-de-forets-certifiees-pefc-en-wallonie>

⁸² <https://www.foretwallonne.be/images/stories/pdf/ForetNatureHS1-web.pdf>

⁸³ <https://www.fichierecologique.be>

⁸⁴ <http://environnement.wallonie.be/sante-foret/>

and fungi, participate in the production of a map of biotic and abiotic risks based on the vulnerability of forest species and forestry stations to forest health risks, and lastly centralise sufficient knowledge to coordinate the fight in the event of a health crisis.

G. Waste management, fluorinated gases and circular economy

Federal State

- Updating and practical implementation of the federal roadmap for a circular economy⁽⁸⁵⁾.
- F-gases:
 - continued coordination and development of measures with the regions on F-gases;
 - implementation of the Kigali Amendment;
 - work on product standards and their use.
- The Federal Government will propose that the life cycle analysis, which maps total CO₂ production throughout the life cycle, forms part of a standard sustainability test. In any event, such analyses should definitely be used for products promoting energy efficiency and for products or parts needed to generate renewable energy. This action should be a sub-action of the implementation of methods for calculating the environmental footprint of products, so as to avoid transfers of impacts.
- *The roadmap would also facilitate further integration of the circular economy policy, by highlighting its benefits in terms of GHG emissions.*

Flemish Region

Implementation of a long-term vision for waste treatment facilities

In 2016, the Implementation Plan for household waste and similar industrial waste (HAGBA) was approved. This plan is based on achieving a balance between the supply of combustible waste and treatment capacity. A second goal is for 200 kt to 250 kt of waste to disappear from residual waste through recycling and prevention. The HAGBA aims to improve the energy efficiency of waste incineration by primarily focusing on heat and steam applications and less on green certificates (electricity generation). In terms of energy, it is after all better to recover heat than to convert steam into electricity, which results in greater energy losses. Energy is best used in a high-quality cogeneration system, followed by steam and heat applications, and finally electricity generation.

For a number of years (2014-2016), the supply of combustible waste has remained more or less the same. In a business-as-usual (BAU) scenario, this trend will continue in the future. However, additional actions aimed at selectively collecting and recycling more waste should reduce the amount of combustible waste available. We will shortly develop a long-term vision for waste treatment, based on which the Flemish Government will negotiate with the sector on reducing capacity. If a balance is achieved between treatment capacity and supply of combustible waste and if the HAGBA ambitions are met, incineration capacity will have to be reduced. By 2030, this could involve a reduction of around 25%.

If supply is effectively reduced, capacity will also have to be systematically reduced, starting with the least efficient or most polluting capacity (in a similar way to the landfill capacity having been reduced as the corresponding supply has decreased).

In collaboration with the sector, the OVAM will study which instruments can be used to ensure that the least efficient capacity is effectively reduced. The incineration capacity maintained in the meantime must have the highest possible energy performance and the lowest possible emissions.

Around 2030, there will be a pivotal moment in the current authorisation periods. During the period 2030-2033, the authorisations for 1,500,000 tonnes, i.e. around 65% of the existing incineration capacity, will expire. A

⁸⁵ <http://www.marghem.be/wp-content/uploads/CIRC-ECON-NL-LIGHT-2.pdf>

decision will therefore have to be made at that point as to whether to authorise or re-authorise a large number of facilities. The starting point for granting new authorisations at that time must be that only facilities needed to meet the capacity requirement and compatible with a CO₂-neutral society in 2050 will be authorised. This will require an effective set of criteria for assessing whether or not a facility can continue to be operated.

In addition, it will be examined how waste incineration facilities can capture the CO₂ emitted in 2050 and use it as a raw material in a circular economy (CCS).

Undertaking to pre-ferment vegetable, fruit and garden waste

On 10 July 2015, the Flemish Government approved the ‘Action Plan for the sustainable management of (residual) biomass streams 2015-2020’. This action plan aims to further encourage prevention, selective collection and recycling of (residual) biomass streams with a view to saving on costs, raw materials, equipment and energy. The plan provides a framework for the government and relevant sectors to jointly implement the sustainable management of (residual) biomass streams in Flanders over the period 2015-2020.

The action plan states that (residual) biomass streams can be used for energy applications. The preferred option is to combine this approach with the production of one or more high-quality products, as in the case of anaerobic digestion, which therefore meets the applicable sustainability criteria. The measure involving the pre-fermentation of vegetable, fruit and garden (VFG) waste was therefore included in the action plan.

Pre-fermenting VFG waste before it is composted releases biogas that can be recovered to generate renewable energy. Some VFG waste composting facilities will therefore be (partly) converted for pre-fermentation with post-composting, where this is technically and economically viable.

Extension of the selective collection of plastics with the corresponding sorting and recycling capacity

The selective collection and recycling of household and commercial plastics will be increased in order to reduce CO₂ emissions from their primary production and incineration. This will be accompanied by increased cooperation with the Federal Government to make recyclable or reusable packaging more attractive through a policy based on products or financial incentives.

The plan to allow all plastic packaging to be placed in recycling bags should significantly reduce the number of plastic items left in residual waste. For businesses also, we will work to strengthen instruments.

By 2030, the plastics sorting and recycling capacity in Flanders should quadruple compared with 2015. Flanders has a vast knowledge base, is recognised as a leading player in sorting, and enjoys a major advantage due to the excellent location of its ports and the synergy between the Flemish chemical sector and the recycling sector. Flanders must focus on speeding up the development of more extensive and innovative plastics sorting and recycling capacity. The Flemish holding company for the environment lies at the root of this strategic infrastructure and is responsible, on behalf of the Flemish Region, for supporting and implementing environmental policy. When it is wound up, its activities will be taken over by Participatiemaatschappij Vlaanderen (PMV).

Initial measures to develop additional sorting capacity have already been adopted under the P+MC plan.

Other strategic measures

- Intensive research is being carried out in order to develop an appropriate combination of instruments that will allow the selective collection and recycling of similar industrial waste to be considerably increased.
- Working with relevant partners, we are firmly committed to the mandatory selective collection of organic and biological waste from medium and large producers of this type of waste.
- Using the Extended Producer Responsibility (ERP) instrument, we want to discourage the supply of products that are difficult to collect, sort and recycle, particularly through eco-modulation.

- Where there is potential to redevelop landfill sites, we are encouraging the reuse of raw materials from those sites. We are also encouraging landfill sites where non-recyclable waste is deposited to be designed and operated, as far as possible, on the basis of the waste streams potentially being used in the future, and therefore becoming recyclable.
- Actions to remove asbestos from building envelopes (as included in the asbestos action plan) may encourage solar PV panels and insulation to be installed more quickly.

Walloon Region

FLUORINATED GASES

Voluntary sectoral agreements

The measure involves concluding a voluntary agreement with the food distribution sector on reducing its GHG emissions. Both the use of fluorinated gases and energy consumption will be covered. It will be designed from the outset to reflect the increasing restrictions on the use of HFC gases enshrined in Regulation (EU) No 517/2014.

An approach based on voluntary agreements means that businesses (or federations) can be subject to obligations that relate to results rather than the means used to achieve those results. The Walloon Government believes that it is more effective to set businesses (or federations) targets for reducing GHG emissions (albeit with a specific focus on HFCs), while leaving them free to decide on the most appropriate means of achieving those targets. This option appears to be preferable to making certain working methods or technologies mandatory.

Voluntary HFC agreements can be used to outline trajectories for reducing HFC emissions (to be achieved by reducing leakage rates, among other aspects). The overall target of this voluntary agreement will be to reduce F-gas emissions by 90% by 2030, initially compared with 2005. The reference year for this calculation will be negotiable in order to avoid penalising businesses that have already recently invested in measures to reduce HFC emissions.

At this stage, the target set in the voluntary agreement can be broken down into three secondary goals:

- take action in relation to refrigerant gases in installations;
- improve the energy efficiency of commercial food distribution premises;
- develop renewable energy sources in order to achieve zero GHG emissions from any new commercial food distribution building from 2025.

Support for businesses wanting to replace equipment

Businesses wanting to install refrigeration equipment that uses alternative refrigerants are already currently eligible for investment aid. However:

- the distribution sector, which is the main emitter of HFCs, is excluded;
- the method used to calculate aid is complex because the aim is to cover part of the additional investment cost compared with the reference technology (which must therefore be defined).

The objective of the new measure will therefore be to:

- encourage operators to switch to a non-HFC solution;
- simplify the current aid mechanism and introduce specific aid for the distribution sector;
- grant higher subsidies for replacing installations that contain large quantities of fluorinated greenhouse gases, expressed in t CO₂eq;
- ensure that the F-gas is properly recovered during the replacement operation.

Additional training on the use of alternative refrigerants/alternative technologies

The purpose of this measure is to prepare courses on new refrigerants/technologies (with a particular focus on safety-related aspects). ‘Train-the-trainer’ sessions will also be provided for training centres in Wallonia. As a first step, priority will be given to training courses relating to the use of CO₂; subsequent training courses will cover the following topics:

- propane and fluorinated greenhouse gases that have a low global warming potential but that are inflammable;
- ammonia.

Training centres will also need to be provided with access to appropriate technical infrastructure so that technicians can be trained in these new technologies.

CIRCULAR ECONOMY

The Walloon Waste and Resources Plan (Plan Wallon des déchets-ressources – PWD-R), adopted in March 2018, contains more than 700 actions designed to reduce, reuse, sort, recycle and recover waste. Key actions will primarily aim to speed up the transition to a circular economy, with some having already been implemented (⁸⁶). It is vital that tailored solutions are easy for everyone to access, that circular economy initiatives are encouraged and that different types of incentive are available for project owners. The aim is also to avoid lock-ins and develop public infrastructure, where necessary.

Development of circular and local supply

The PWD-R sets out a series of measures designed to stimulate sustainable supply.

At framework level, the plan aims to ‘define or adapt the legal framework needed to increase circular economy and functionality economy projects’.

The following measures aim to support businesses by informing them:

- ‘identify new sources of circular economy growth’, ‘implement a system for identifying emerging and economically viable models, and make economic operators aware of opportunities, particularly by offering new management training and using education for this purpose’;
- ‘raise awareness among industrial businesses about the eco-design of products to facilitate their dismantling and recycling’;
- ‘spur on economic operators in the area by encouraging meetings and exchanges of information between producers and the recycling industry (identification of the materials in products, identification of products where advances must be made in terms of eco-design, etc.)’.

The PWD-R also aims to develop synergies within the region (industrial and regional ecology):

- ‘encourage industrial symbiosis, i.e. converting the by-products of one sector into raw materials for another sector’;
- ‘develop quality standards for secondary raw materials to increase operator confidence within the single market’;
- ‘carry out business promotion actions in the field to encourage businesses to form recovery and exchange partnerships in relation to by-products and various flows (hot water, gas, etc.) in appropriate areas’;
- ‘with regard to organic products, encourage multi-stakeholder biomethanisation projects (farmers, local authorities, businesses, etc.)’.

⁸⁶ <http://economiecirculaire.wallonie.be>

In addition to practical support, the Walloon Region will approve financial instruments to support and encourage the various stakeholders towards more circularity: calls for ‘waste’ projects; ‘circular economy’ cheques; Easy’Green mechanism; NEXT programme; waste prevention and management or reuse subsidies.

The PWD-R also aims to encourage the functionality economy (e.g. facilitating and encouraging the rental of equipment, rather than its purchase) and increase the period of use of equipment (e.g. reinforcing and supporting the network of Repair Cafés, creating new waste sorting and recovery centres).

Wallonia will also endeavour to develop short supply chains in the agri-food sector, by supporting the set-up of agri-food cooperatives so that they can reach a critical mass ensuring their commercial viability.

A ‘community of circular economy stakeholders’ will be developed and promoted, involving private operators, local authorities, associations, universities, businesses, technical centres, research centres and the GreenWin innovation cluster, in order to create a platform for synergies between all stakeholders so that innovative collaborative projects can be developed. This multisectoral platform will identify and facilitate opportunities for collaboration in terms of available resources between businesses involved in the production, processing and distribution of products and businesses involved in the supply of services, mainly in the high added value sectors such as (de-)construction and electrical and electronic equipment.

Brussels Capital Region

Fluorinated gases, used in refrigeration and air-conditioning systems, aerosols, fire-fighting and insulating foams, are a group of powerful greenhouse gases⁽⁸⁷⁾.

For the Brussels Capital Region, the inventory of greenhouse gases shows that the proportion of fluorinated gases is 8% of regional GHG emissions (compared with 3% for the whole of Europe). This 8% breaks down as follows: 74% for refrigeration, air-conditioning and heating, 3% for foams, 6% for aerosols, 2% for fire-fighting and 15% in semiconductors and other uses. In 2017, gas losses from refrigeration and air-conditioning equipment (fugitive emissions) were equivalent to over 350,000 tonnes of CO₂. Ambitious measures are therefore needed to combat these losses, with closer monitoring of equipment and bodies.

Against this background, the Brussels Government undertakes to:

- significantly increase checks of HFC refrigerant gases by refrigeration engineers from 2020;
- in 2020, introduce a financial incentive for new refrigeration equipment (including precision air-conditioning units and air-conditioning systems) using alternative refrigerants (refrigerants not listed in Annex I to Regulation (EU) No 517/2014 on fluorinated greenhouse gases).

H. Other policies

Federal State

Governance

- Energy and climate burden sharing agreement 2021-2030.
 - The competent federal authorities will have sufficient human and financial resources to plan, coordinate, implement and monitor the policy effectively and efficiently within tight deadlines.
- Reform of the existing administrative framework to ensure the closest possible alignment with the Governance of the Energy Union and the international framework, and more particularly the Paris Rulebook, in order to improve energy and climate policy and monitoring, among other aspects, throughout the planning, implementation, evaluation and correction cycle.

This will be achieved by:

⁸⁷ Fluorinated gases have a global warming potential (GWP) that is several hundred or even several thousand times higher than CO₂. In working to protect the ozone layer, the Montreal Protocol has therefore had the perverse effect of leading to the development of new substances that exacerbate the greenhouse effect and global warming.

- developing a common medium- and long-term vision and trajectory resulting in a robust policy framework for all policy levels (national, regional, local, etc.) and offering clear prospects to all stakeholders, particularly young people;
- introducing a federal policy cycle, coordinated with the national policy cycle, in which each revision of the integrated energy and climate plan will involve a multi-stakeholder dialogue and be subject in advance to the federal parliament.

International cooperation

- The annual Belgian contribution to international climate financing reflects international climate ambitions that have steadily grown over the years. These various ambitions should be achievable by continuing and increasing the budgetary commitments for carrying out specific international projects aimed at increasing the adaptability of developing countries, whether through technological innovation, which will help to raise standards of living while reducing GHG emissions, or through energy efficiency, sustainable land, agriculture and forest management, water resources management, etc.

xii. Where relevant, regional cooperation in this area

Not applicable.

xiii. Without prejudice to the applicability of State aid rules, financing measures, including Union support and the use of Union funds, in this area at national level, where applicable

Federal State

- Green OLOs (Belgian linear bonds): in 2018 and 2019 the Federal Government launched the first green linear bonds (Green OLOs), totalling EUR 6.89 billion, with the income being used solely for public expenditure on the transition to a sustainable economy. The new eligible expenditure for the period 2021-2030 will be made in the transport, energy and buildings sectors, essentially based on this plan, the Energy Pact and the National Pact for Strategic Investments.
- The National Bank of Belgium (BNB) will be asked to continue its efforts in the area of climate analysis, in particular by including this in its annual Financial Stability Report on the Belgian economy.
- The federal authorities will ensure that the European Union's new multiannual budget for the period 2021-2027 is compatible with and contributes to the achievement of the Paris Agreement objectives. The federal authorities will support the Commission's proposal to implement climate mainstreaming, i.e. to spend this part of the budget on climate actions, and will ensure that this climate mainstreaming is reflected in all areas of expenditure. In addition, the implementation, monitoring and reporting of the climate mainstreaming principle must be improved to ensure that the positive climate impact of expenditure is maximised.
- A Belgian regulatory framework appointing the supervisory authorities and a legal framework defining sustainable finance for the purpose of meeting the requirements of the Taxonomy Regulation will be developed based on the existing European regulations.
- A methodological framework for collaborative working and funding arrangements at Belgian level will be developed so that maximum use can be made of EU funding opportunities in the low-carbon transition/energy sector: CEF, Horizon Europe, InvestEU, BICC, ESIF, new EIB funding policy, etc.

In response to the Commission recommendation on the quantification of investment needs, supplemented by a comprehensive assessment of all investments needed to achieve the objectives, reference can be made to the National Pact for Strategic Investments (see point 5.3).

On 11 September 2018, under the **National Pact for Strategic Investments**, a report was submitted by a Strategic Committee (group of independent experts) to the country's various governments. This report specifically offers

an assessment of the strategic investment needs in Belgium through to 2030, which cover six areas⁽⁸⁸⁾, including energy and mobility.

Against this background, the working group on energy has produced a detailed technical report on the investments needed to ensure the country's energy transition. The results of the group's analysis are summarised in the following table.

Area	Recommendation	Funding (billion EUR)	
		Public	Private
Major renovation of public buildings	<ul style="list-style-type: none"> ▪ Invest heavily in the renovation of public buildings to make them intelligent and more energy efficient 	8.5	8.5
Electricity mix	<ul style="list-style-type: none"> ▪ Continue to guarantee security of supply at competitive prices ▪ Continue developing renewable energy, including for households ▪ Find a solution to further reduce the cost of renewable energy 	0	19
Strengthening of systems	<ul style="list-style-type: none"> ▪ Invest in transmission and distribution systems to ensure a fair and more flexible transition ▪ Support the development of smart grids 	0	17
Development of storage	<ul style="list-style-type: none"> ▪ Use the storage capacity (of vehicles, housing and businesses) ▪ Attract a battery producer to Belgium ▪ Develop pumped storage 	0	5
Roll-out of alternative fuels	<ul style="list-style-type: none"> ▪ Ensure that there are sufficient CNG refuelling stations and electricity charging stations ▪ Support R&D in hydrogen and green gas 	0	0.3
Nuclear decommissioning and waste management research	<ul style="list-style-type: none"> ▪ Support projects aimed at building the decommissioning knowledge of Belgian businesses via the Advanced Belgian Cluster on Decommissioning (ABCD) ▪ Research how to effectively treat nuclear waste 	0.7	1
TOTAL~		~9	~51
			~60
Impact	<ul style="list-style-type: none"> • Renovating the building stock will quickly lead to a considerable reduction in energy consumption by authorities, which will result in major savings and help Belgium to achieve its energy targets by 2030. It will also have a significant impact on SMEs and other stakeholders in the private sector. • The investments made in systems and generating capacity will help to guarantee security of supply. • Encouraging the use of CNG (and other greener fuels) will result in a healthier environment for the Belgian population. 		

The report produced by the working group on mobility offers the following assessment.

Area	Recommendation	Funding (billion EUR)	
		Public	Private

⁸⁸ The six areas of the PNIS are: 'Digital', 'Cybersecurity', 'Education', 'Healthcare', 'Energy' and 'Mobility'.

Maintain and develop integrated transport networks and services	<ul style="list-style-type: none"> ▪ Service and maintain existing infrastructure (e.g. bridges, tunnels) ▪ Improve access to towns and cities, particularly through suburban rail systems, hubs and integrated cycle paths ▪ Improve rail access to ports and industrial parks and modernise locks 	17.2-20.5	2.8-3.5
Facilitate intelligent mobility solutions	<ul style="list-style-type: none"> ▪ Set up a national real-time data lake ▪ Create a single group mobility application to facilitate 'door-to-door' mobility ▪ Roll out intelligent transport systems (ITS) to reduce congestion 	1.5-2	0.1
Manage transport demand	<ul style="list-style-type: none"> ▪ Promote spatial planning and redevelopment of industrial sites ▪ Create satellite offices and coworking spaces ▪ Smart charging for mobility services ▪ Promotional events on the theme of mobility 	0	2
Establish a support framework	<ul style="list-style-type: none"> ▪ Create a National Mobility Observatory ▪ Produce a multiannual multimodal investment agenda (providing a clear vision of investments and specific governance structures at the appropriate level (metropolitan, regional or national)) 	0	<0.1
TOTAL~		~19	~6
			~22.27
Impact	<ul style="list-style-type: none"> • More intelligent mobility and reduced demand for mobility will reduce the economic losses caused by congestion. • Major infrastructure projects also create jobs, which has a significant multiplier effect on the economy. • Helping hand to high-technology digital operators in the smart mobility sector 		

ii. Sector or market risk factors or barriers in the national or regional context

iii. Analysis of additional public finance support or resources to fill identified gaps identified under point (ii)

Sources of funding for strategic investments have also been discussed in detail under the National Pact for Strategic Investments (PNIS). The issue of mobilising capital is one of the four cross-cutting factors identified in the Strategic Committee's report (⁸⁹), on which action must be taken to encourage investment. In relation to the 'mobilisation of capital' factor, the working group's report identifies a number of financial instruments that can be used to make the investments identified in the Strategic Committee's report.

However, the work to identify national, regional and EU funding sources is still ongoing. In particular, technical work on the subject is being carried out within two projects (⁹⁰) established by a decision of the Consultation Committee of 27 March 2019.

⁸⁹ The four cross-cutting issues in the PNIS are 'Better regulation for strategic investment projects', 'Mobilisation of capital', 'Public-private partnerships', and 'A budget strategy and European rules encouraging public investment'.

⁹⁰ These 'projects' are actually technical working groups created under the PNIS (by a decision of the Consultation Committee of 7 November 2018) and tasked with preparing for the Interministerial Conference on Strategic Investments. They are as follows: 'Project I: Interfederal governance and synergy with European institutions' and 'Project III: Mobilisation of capital (PPP and EPC)'.

3.1.2. Renewable energy

The common thread running through Belgium's renewable energy policy is the search for cost-effectiveness, taking into account the wealth of geographical, socioeconomic and technological potential. Although powers are shared between federal and regional authorities, interaction between these authorities is maintained.

xiii. Policies and measures to achieve the national contribution to the binding 2030 Union target for renewable energy and trajectories as referred to in point (a)(2) Article 4, and, where applicable or available, the elements referred to in point 2.1.2 of this Annex, including sector- and technology-specific measures

Federal State

- Develop offshore wind capacity in the North Sea.

Policy note in the draft law of 20 July 2018 on the procedure for awarding new wind farms (law scheduled to be adopted by the end of the parliamentary term).

Achieve 4 GW by 2030 as indicated in the draft federal contribution.

Further exploit the MOG/North Seas Energy Cooperation (NSEC)/international waters potential in the context of the regional cooperation with other countries bordering the North Sea.

Engage with neighbouring countries in regional and bilateral cooperative relationships with a view to developing joint projects for the generation of offshore energy, particularly within the framework of NSEC.

Open discussions are ongoing with the Ministry of Defence on the installation of onshore wind turbines around military zones with prohibited access and in areas around airports.

- Continue the supply of green electricity and extend it to all managed buildings within the federal public building stock.
- Maximise the generation and use of renewable energy (green power, installation of photovoltaic solar panels).
- In the draft Marine Spatial Plan for the period 2020-2026, several areas have been designated for industrial and commercial activities. These areas may (directly or indirectly) contribute to the achievement of the national energy and climate targets.
- Biofuels:

In 2030, the biofuel incorporation rate will reach 10.45% (in real terms) or 13.9% (including double counting).

During the period 2021-2030, the first-generation biofuel incorporation rate will be 7%. The proportion of the biofuels listed in Parts A and B of Annex IX will develop in line with the following scenario, in the context of RED II:

Biofuels	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Actual value	8.95	8.95	9.25	9.55	9.8	10	10.2	10.45	10.45	10.45	10.45
1G	7	7	7	7	7	7	7	7	7	7	7
Part A	0.1	0.1	0.1	0.1	0.1	0.5	0.5	1	1.5	1.75	1.75
Part B	1.85	1.85	2.15	2.45	2.7	2.5	2.7	2.45	1.95	1.7	1.7
Double counting	0.6	0.6	0.95	0.95	0.95	2.2	2.2	2.7	3.2	3.45	3.45
Nominal value	9.55	9.55	10.2	10.5	10.75	12.2	12.4	13.15	13.65	13.9	13.9

The Federal Government will adopt additional GHG reduction and renewable energy measures by 1 January 2025 at the latest in order to meet its incorporation rate commitments made in the draft NECP approved by the Consultation Committee on 19 December 2018, and to ensure that the adjusted incorporation obligation does not negatively impact on the Regions' renewable energy and CO₂ emission figures.

Every two years, a study will examine the following aspects: technical feasibility of the incorporation rate; availability of raw materials; environmental integrity and potential usage conflicts; availability of advanced fuels, including recycled carbon fuels, and technological developments on the European market; availability of other renewable energy sources; consumer costs.

The first of these interfederal studies will be carried out in the second half of 2020, after consulting the relevant stakeholders, and will allow the incorporation rate to be adjusted, if necessary. If the target is not met, alternative federal measures will be implemented to achieve the same level of emissions reduction and to contribute to the renewable energy target. The Regions may themselves adopt additional alternative measures, if they so wish.

Flemish Region

Policies and measures

Measures have been developed in the various policy areas in order to achieve the renewable energy target.

Energy area:

The Flemish Government's **Solar Plan** of 24 June 2016 includes the following practical actions (which are now being implemented) aimed at developing the use of solar energy in Flanders.

- Develop a solar map showing appropriate roof surfaces for potential investors (photovoltaic panels and solar water heaters).
- Calculate the solar potential across Flanders and in towns based on a solar map.
- Broadcast weather forecasts on regional television channels and a website which predict how much solar energy will be generated.
- Remove the restriction preventing extensions to photovoltaic systems from being authorised within 36 months.
- Increase the minimum contribution of renewable energy in new-builds from 10 kWh/m² to 15 kWh/m² from 2017. For non-residential buildings, this contribution will be 20 kWh/m².
- Introduce a minimum contribution of renewable energy in buildings undergoing a major energy renovation of 10 kWh/m² from 2017 and 15 kWh/m² from 2018. For non-residential buildings, this contribution will be 20 kWh/m².
- Adjust the representative categories for photovoltaic systems in the calculation of the uneconomic portion.
- Involve various sectors in developing a sectoral declaration of commitment on the installation of photovoltaic systems.
- Develop a policy framework for the crowdfunding of investments in renewable energy generation: production of a solar guide.
- Simplify the opportunity for involvement in order to achieve the minimum contribution of renewable energy.
- Expand low-cost energy loans.
- Develop standard specifications to encourage public authorities to allow third parties to install photovoltaic systems on the roofs of their public buildings.

The Flemish Government's **Wind Energy 2020 concept note** of 16 December 2016 includes the following practical actions to help realise the wind potential.

- Establish an interagency consultation on the provincial wind targets.
- Support the provinces in researching and analysing wind potential.
- Maximise the wind potential in Flemish port areas.

- Maximise the wind potential in large industrial areas.
- Create a Defence thematic working group.
- Create a Civil Aviation thematic working group.
- Explore options for speeding up the time taken to process planning applications.
- Reinforce and increase the uptake in wind energy: develop a wind energy guide. Voluntary declaration of commitment with measures to increase support.
- Maximise wind energy in areas favourable to projects.
- Calculate the long-term wind energy potential.
- Facilitate the installation of wind turbines at radar/airport sites (EUR 3 million).

The **Heat Plan** approved by the Flemish Government on 2 June 2017 includes the following practical actions to encourage investment in the environmentally friendly production of heat and the construction of district heating systems (already implemented or in the process of being implemented).

- Organise an annual call for green heat, waste heat and biomethane with an annual budget of EUR 10.5 million.
- Set a target for the extension of district heating systems to 2030.
- Identify areas of interest in district heating systems using a refined thermal map and other available energy data.
- Produce a manual for connecting existing multi-family residential buildings to district heating systems.
- Develop a heat assessment concept for infrastructure work.
- Set up information and exchange channels between local authorities on the installation of district heating systems.
- Introduce support for public engagement in district heating systems.
- Research guarantees of origin for green gas and green heat.
- Optimise the way in which district heating systems are taken into account in the energy performance regulations.
- Allocate aid more effectively to micro-cogeneration: investment aid instead of operating aid.
- Introduce sustainability criteria for biomass.
- Transfer support from green electricity to the use of heat (cogeneration).
- Increase the minimum contribution of renewable energy in the energy performance regulations.
- Calculate the potential of large-scale solar water heaters.
- Improve the potential of heat pumps.
- Identify and remove obstacles to heat pumps.
- Develop a system of guarantee for the geological risks of deep geothermal energy.
- Ensure cooperation and support through the European Geothermal ERA-NET project.
- Include deep geothermal energy in the EPB under the energy performance regulations.
- Support organisations promoting sustainable energy: Biogas-E, ODE, Warmtenetwerk Vlaanderen, Cogen Vlaanderen.
- Prepare an atlas of renewable energies in order to calculate and show the renewable energy potential of each municipality in Flanders on an interactive map of Flanders.

Tax area:

- Increase the flexibility of the property tax exemption criteria for national properties where renewable energy technologies are installed.
- Introduce property tax relief in the case of major energy renovations, where renewable energy impacts on the E-level achieved.
- Extend the property tax exemption to equipment and appliances, which encourages businesses to invest in replacements (new machinery that is more energy-efficient and environmentally friendly than the old machinery).
- Introduce a specific reduced rate of gift tax on property where the recipient carries out energy saving work, including the use of renewable energy technologies.
- Clarify how the win-win loan applies to energy cooperatives.

Mobility and Public Work area:

- Install hydroelectric plants at locks.
- Install solar panels and/or wind turbines on decentralised facilities.
- Transition public vehicle fleets and vessels to environmentally friendly energy sources.
- Purchase electricity generated using renewable energy sources.
- Install solar panels on public buildings and bus depots.
- Gradually replace buses with electric models.

Work and Sport areas:

- Install solar panels and solar water heaters on public buildings.

Walloon Region

[WR: Promotion of renewable electricity](#)

[WR: Support mechanism: 'green certificates' mechanism](#)

The main tool for supporting the growth of renewable electricity in Wallonia is the 'green certificates' mechanism, under which funding is granted for the manufacture of systems.

Following an internal evaluation, the Walloon Government believes that adapting the current mechanism is the most appropriate, pragmatic and cost-effective solution for continuing the growth in renewables in order to achieve the targets set. However, a number of key improvements must be made.

- ***Gradual reduction in the support mechanism***

The support mechanism will remain in place until the technologies targeted by Wallonia are able to compete on an equal footing on the electricity market with conventional systems (powered by fossil and nuclear fuels).

The revised version of the mechanism will reduce the support for new projects, by gradually limiting the envelopes for additional green certificates.

- ***Limited impact on consumer bills***

Funding benchmarks have been set for each consumer category. The impact of the support mechanism is being monitored from a consumer protection perspective, and arrangements are in place to adjust it if necessary (changes in the funding split between consumer categories or the distribution of funding over time).

When setting these benchmarks, consideration was given to the need for businesses to remain competitive and for individuals to share in the investment burden connected with the energy transition.

- ***Shift to calls for projects***

Over time, the 'green certificates' mechanism will be merged with the competitive tendering procedure for projects and sectors, making it possible to meet efficiency and market integration objectives while complying with the EU's move towards greater market integration. The use of calls for projects will allow tighter control over the pace of development, as well as facilitating competition between projects and targeting certain development areas. The following key principles will be applied:

- minimum power thresholds for certain technologies;
- predefined ceiling (in the absence of competition);
- multi-criteria approach (environmental and social).

Calls for projects will initially involve high-power systems only. Technologies will be required to compete with each other only at a later stage, when they have essentially proven their competitiveness.

The calls for projects mechanism may eventually be extended to the production and distribution of renewable heat.

- ***Extension of the mechanism and incorporation of the 'true cost' approach***

Targeted support will be provided for the generation of electricity through the recovery of waste heat (following the model of high-efficiency cogeneration systems using fossil fuels).

Over time, support will only be available under the mechanism for the generation of renewable electricity with a view to implementing the 'true cost' principle (similar to the 'polluter pays' principle), thereby reducing the burden on the electricity consumer:

- support for the production of cogenerated heat will be provided through a different mechanism specifically targeted at renewable heat;
- the mechanism for supporting the generation of electricity using biomethanisation methods will be assessed in order to identify potential improvements (with a view to ensuring that funding is only granted for the generation of renewable energy).

- ***Changes in the level of support***

Changes will be made to the level of support according to market-based parameters (in particular the price of electricity, green certificates and guarantee of origin labels), with a view to allowing a high level of responsiveness, especially if the price of electricity rises.

WR: Other support measures for the generation of renewable electricity

- ***Improvement and safeguarding of the general framework***

See point 3.1.2(v).

- ***Adoption of a policy on photovoltaics***

Photovoltaics is a technology of the future that requires a high level of integration (of materials and infrastructures) together with a significant drop in production costs to make it a suitable solution for both the residential sector and the industrial sector.

By organising pilot projects involving buildings (for example in the public sector), Wallonia will aim to roll out BIPV (Building Integrated Photovoltaics) within the region.

- ***Other support measures***

Other measures, coordinated with the 'green certificates' mechanism, will also promote the roll-out of renewable electricity in Wallonia:

- ***investment aid, including investment aid granted to businesses in the interests of protecting the environment and promoting the sustainable use of energy;***

- support aimed at helping industries to carry out feasibility studies before building renewable generation facilities (industry agreements);
- support for research and pilot projects;
- advisory service involving renewable and cogeneration experts (operational since January 2019);
- energy information points.

WR: Development of a framework supporting renewable energy communities

The Walloon Region led the way by starting discussions in September 2018 on the framework for new forms of energy sharing. The reform work resulted in the adoption on 30 April 2019 of a legislative framework designed to support the emergence of renewable energy communities (REC). Article 22 of Directive (EU) 2018/2001 of 11 December 2018 on the promotion of the use of energy from renewable sources was also transposed early.

This wide-ranging reform was based on the objectives of developing and integrating renewable energies, changing and adapting methods of energy production and consumption, and ensuring the energy transition and the energy competitiveness of businesses.

Collective consumption of locally produced green energy will in particular help to limit the injection of electricity into the local transmission and distribution system by encouraging short supply chains. It will also help to overcome the difficulties involved in integrating 'intermittent' energies into the grid, given that careful and local collective self-consumption can be accompanied by storage methods suited to individual and collective needs.

The general principles set out in the Decree are as follows:

- several participants can form a group in order to share and synchronise their production and consumption of renewable energy within a local area via the public grid;
- the aim of the REC must be to generate, consume, store and sell renewable electricity in order to secure environmental, social and economic benefits for both its members and the local community;
- the REC must be authorised by the Walloon Energy Commission (Commission Wallonne pour l'Energie – CWaPE) on the advice of the DSO, and must comply with certain conditions and obligations, particularly in terms of the collective self-consumption threshold.

Where the REC meets its specific conditions, a special tariff for using the grid will be applied, as determined by the CWaPE. This tariff must strike a balance between solidarity in covering both the network costs and the contribution to taxes, surcharges and other regulated costs, and the interest in participating in such an operation. The WR therefore underlines the importance of the principles of solidarity and sharing of network costs.

There are various possible combinations and scenarios. Several Walloon universities are also actively working on a number of experimental pilot projects.

WR: Individual and collective self-consumption of renewable electricity

There is no obstacle in the Walloon regulations to the individual self-consumption of renewable energy, given that this is already authorised.

A new regulatory framework will allow collective renewable energy self-consumption projects to be implemented and developed within a single building in accordance with Article 21 of Directive (EU) 2018/2001.

WR: Regulatory measures

- Removal of the legal uncertainty associated with granting permits in the wind sector

See point 3.1.2(v).

WR: Promotion of renewable heat

Several measures are needed to provide a framework for the roll-out of renewable heat and cooling.

- Implementation of a renewable heat transition plan, including a list of technological alternatives for multiple applications, in particular with a view to replacing the use of oil products for heating with less-polluting alternatives (heat pumps, solar thermal, district heating systems, geothermal energy, pellets/chips, biogas, biofuel, mini gas networks, etc.). This plan will be developed together with the updated report referred to in Article 14 of the Energy Efficiency Directive.
- Wallonia will support the development of various forms of renewable heat, based on their respective advantages, through one or more appropriate mechanisms. In the residential sector, see the building-related measures.
- Removal of all funding for boilers powered by fossil fuels where there are alternatives.

- **Measures for small-scale installations**

As far as individuals are concerned, it is a good idea to maintain a system of incentives specifically targeted at residential consumers in order to encourage them to fit heat pumps, boilers that use less-polluting resources than fossil fuels, or solar thermal panels, possibly combined with heat storage systems. The incentive will be calculated based on the increased cost of production compared with the baseline situation.

As regards the worst performing buildings, priority will be given to energy efficiency work, which is also the target of the current incentive mechanism.

In order to achieve Wallonia's renewable targets while protecting air quality, measures will be introduced to encourage the replacement of poor-performing individual biomass heating systems or wood-burning stoves with wood pellet stoves or stoves that drastically reduce the emission of particulate matter. One measure could be, for example, to have a system of incentives for the replacement of stoves and pipework by qualified professionals. Particular emphasis must be placed on incentives for vulnerable individuals. An extra incentive will be granted for the most efficient appliances.

In the public tertiary sector, the installation of renewable systems in public buildings will be promoted with a view to their exemplary role.

WR: Regulatory measures

The creation of a 'Heating Decree' must:

- remove the obstacles to the development of district heating systems;
- increase the profitability of injecting biogas into the networks.

The 'Heating Decree' could even include long-term objectives so that real impetus is given to the growth in thermal energy in Wallonia.

WR: Cross-cutting measures

- ***Implementation of a renewable obligation in new buildings***

An obligation to have a minimum percentage of renewable energy ⁽⁹¹⁾ in new buildings and major renovations will also be established.

As a reminder, the European regulations (Article 15(4) of Directive (EU) 2018/2001) stipulate that 'Member States shall, in their building regulations and codes or by other means with equivalent effect, require

⁹¹ This obligation also complies with Article 15(4) of Directive (EU) 2018/2001: 'Member States shall, in their building regulations and codes or by other means with equivalent effect, require the use of minimum levels of energy from renewable sources in new buildings and in existing buildings that are subject to major renovation in so far as technically, functionally and economically feasible'.

the use of minimum levels of energy from renewable sources in new buildings and in existing buildings that are subject to major renovation in so far as technically, functionally and economically feasible, and reflecting the results of the cost-optimal calculation carried out pursuant to Article 5(2) of Directive 2010/31/EU, and in so far as this does not negatively affect indoor air quality. Member States shall permit those minimum levels to be fulfilled, *inter alia*, through efficient district heating and cooling using a significant share of renewable energy and waste heat and cold'.

In the work to develop the EPB regulations (EPB Decree), these obligations will take particular account of the most vulnerable in society.

- ***Implementation of an integrated quality approach***

In transposing Directive 2009/28/EC, the Walloon Region implemented a certification system for installers of renewable energy systems. In order to be certified, installers must complete a training course that includes both theoretical and practical components.

Given the importance of this system, the Walloon Region decided to take the quality process further by developing a quality label for businesses.

This process has several objectives:

- build momentum in terms of the quality approach;
- raise awareness among the general public of the importance of investing in high-quality products;
- propose a mechanism for offering quality guarantees to citizens investing in renewable energies;
- support businesses that apply quality assurance procedures by giving them a platform.

This approach must be continued, with a link being established between the granting of incentives and certification/labelling.

- ***Framework for biomass use***

See point 3.1.2(vii).

- ***Biomethanisation***

See point 3.1.2(vii).

- ***Use of biogas***

See point 3.1.2(vii).

- ***Cogeneration***

See point 3.1.2(vii).

- ***Heating***

In terms of heating, the sector's contribution is based on the following considerations:

- increase in performance so that better use can be made of wood for space heating (increase in performance from 10% to 20 %);
- changes in technology where installations are placed by qualified professionals;
- development of the sustainable use of biomass energy for municipal buildings and collective heating systems.

Pellet production facilities are currently operating under capacity, as the sector could supply additional primary energy amounting to several GWh if operated at maximum capacity. However, an increase in production of this magnitude could result in supply problems for the local pulping industry.

In terms of air quality, various options need to be analysed: use of filters, high-quality fuels and modern equipment, and regular maintenance.

- ***Use of biomass***

See point 3.1.2(vii).

- ***Communication, information, awareness-raising***

Communication on specific topics, in particular the proper use of biomass appliances, will also be required. This measure ties in with the behavioural measure described in the previous chapter.

The Walloon Region may also support initiatives aimed at setting up collective purchasing groups in order to make these installations more affordable and ensure quality monitoring, where is appropriate to the technology.

It may also encourage individuals to participate in local energy production projects (e.g. green gas).

xiv. ***Where relevant, specific measures for regional cooperation, as well as, as an option, the estimated excess production of energy from renewable sources which could be transferred to other Member States in order to achieve the national contribution and trajectories referred to in point 2.1.2***

xv. ***Specific measures on financial support, where applicable, including Union support and the use of Union funds, for the promotion of the production and use of energy from renewable sources in electricity, heating and cooling, and transport***

Flemish Region

Financial instruments

Energy area:

- Support mechanism for the production of renewable energy: operating support through green certificates (around EUR 1.1 billion on an annual basis).
- Low-interest or interest-free loans for a specific target group needing financial support (EUR 55 million per year) and encouragement for banks to grant energy loans.
- Annual call for green heat, district heating systems, waste heat and biomethane (EUR 10.5 million per year).
- System operator incentives for solar water heaters (around EUR 4 million per year).
- System operator incentives for heat pumps and water heaters with heat pumps (around EUR 3 million and EUR 1.8 million per year respectively).
- Encouragement of small- and medium-sized wind turbines through investment aid (EUR 4.2 million per year).
- Easier installation of wind turbines at radar/airport sites (EUR 3 million).

General government policy area:

- Co-financing of provincial support centres for sustainable construction, which raise awareness among builders and encourage them to build and renovate homes and districts sustainably. Using renewable energy sources forms part of this approach. Since 2010, the sustainable development policy has supported five provincial support centres through five-year agreements (one per province). In 2016, following an evaluation, the agreements were renewed for a further five years.

Education area:

- Loans for installing solar panels on school buildings (EUR 5 million per year).

Social economy area:

- Loans for investing in renewable energy for social economy initiatives (EUR 5 million per year).

- Launch of a call for sheltered and social workshops in investment projects encouraging an efficient working environment and sustainable mobility (EUR 8.1 million per year).

Social housing area:

- Within the maximum subsidy amount, fixed sum for solar water heaters for new-builds and renovations in the current design guidelines for social housing.
- Within the maximum subsidy amount, fixed sum for renewable energy applications for new-builds and renovations in the future design guidelines for social housing from 1 January 2018.
- Incentives under the Flemish Climate Fund: renewable energy applications: solar water heaters and heat pumps (EUR 20 million per year).

Administrative issues area:

- Application of renewable energy technologies in Flemish government buildings (EUR 8.3 million in 2018).

Economy, science and innovation area:

- Investment aid (known as ecology aid) granted to businesses (around EUR 3.4 million per year).
- Flux50 cutting-edge research centre investigating energy technologies (EUR 500,000 per year).

Culture, media and youth area:

- Budget to make cultural buildings more energy efficient and use renewable energy sources (EUR 5 million per year).
- Loans for installing solar panels (EUR 5 million per year).

Agriculture and fisheries area:

- VLIF (Flemish Agricultural Investment Fund) aid scheme for investments in energy efficiency and renewable energy sources in agriculture.
- Support for farmers with their investments in energy efficiency and renewable energy sources.

xvi. *Where applicable, the assessment of the support for electricity from renewable sources that Member States are to carry out pursuant to Article 6(4) of Directive (EU) 2018/2001*

xvii. *Specific measures to introduce one or more contact points, streamline administrative procedures, provide information and training, and facilitate the uptake of power purchase agreements | Summary of the policies and measures under the enabling framework Member States have to put in place pursuant to Article 21(6) and Article 22(5) of Directive (EU) 2018/2001 to promote and facilitate the development of self-consumption and renewable energy communities*

Flemish Region

Streamlining of administrative procedures

Environment area:

- Introduction of a single environmental permit rather than separate environmental permit and planning permission.

- Launch of project studies to facilitate the roll-out of renewable energy installations, for example the Energielandschappen project, SIG studies into wind modelling and scenario analyses for the installation of wind turbines, the Atelier Diepe Geothermie, and the role of spatial planning in the energy and climate transition.
- Development of a regulatory framework for exploring and exploiting deep geothermal energy.
- Drafting of a circular on the installation of wind turbines, solar panels and other renewable energy installations.

Walloon Region

- ***Improvement and safeguarding of the general framework***

In order to make renewable technologies more competitive, the risks associated with their roll-out must be mitigated and their costs reduced (administrative procedures, harmonised permit procedures, guarantee scheme, etc.).

In particular, and in accordance with the requirements in Article 16 of Directive (EU) 2018/2001, the Walloon Region will take steps to facilitate the administrative permit granting procedure.

- ***Removal of the legal uncertainty associated with granting permits in the wind sector***

In order to remove the obstacles to the development of wind power in Wallonia, the Walloon Government has identified 15 measures to help the wind sector grow.

For the purpose of implementing these measures, several stakeholder undertakings will also be included in the Ecological Transition Convention, which is provided for under the Programme Decree that came into force on 18 October 2018. The Ecological Transition Convention resembles a Green Deal and should enable various stakeholders (private sector, public sector, associations, general public, etc.) to engage in a dynamic and collaborative process aimed at encouraging the energy transition through wind development projects.

The Pax Eolienica:

- aims to streamline administrative procedures for wind farm developers and improve existing tools in order to overcome the 'mortality rate' of current projects;
- expresses the Walloon Government's desire to fully involve all stakeholders in tackling the challenges associated with the growth of renewables through the construction of wind farms in the Walloon Region;
- seals the undertakings made by the parties involved.

The measures under the Pax Eolienica involve industry conditions, acoustic monitoring, the necessary legislative amendments to the Spatial Planning Code, in particular as regards permits, adjustments to the Electricity Decree allowing the roll-out of micro-networks, administrative streamlining, aviation-related criteria, access to land registry data, social acceptance and taxation.

In return, the Walloon Government has set up a Biodiversity Fund, which will be topped up by wind farm developers required to pay environmental compensation, with grants under this fund being allocated to biodiversity restoration projects.

xviii. Assessment of the necessity to build new infrastructure for district heating and cooling produced from renewable sources

Flemish Region

In the past, district heating has not been commonly used in Flanders. However, since financial support was introduced in 2013, involving regular calls for tenders for green heat, waste heat, district heating systems and geothermal energy, a large number of new projects have been implemented and are still planned.

By the end of 2017, around 600 GWh of heat had been supplied through district heating systems. Based on the projects planned and approved, this figure is expected to increase to 1,500 GWh by 2020. The Energy Plan 2021-2030 is aiming for average growth of 250 GWh/year (4,000 GWh in 2030).

Renewable energy accounted for 39% of the heat supplied to these systems in 2017, with this figure expected to rise to 52% by 2020.

- xix. *Where applicable, specific measures on the promotion of the use of energy from biomass, especially for new biomass mobilisation taking into account: biomass availability, including sustainable biomass: both domestic potential and imports from third countries; other biomass uses by other sectors (agriculture and forest-based sectors); as well as measures for the sustainability of biomass production and use*

Flemish Region

As regards measures for biomass management in the Flemish Region, we would refer you to the Action Plan for the sustainable management of (residual) biomass flows prepared by the OVAM. This also contains a framework and measures for the sustainable use of forest biomass.

Walloon Region

- Framework for biomass use

In April 2016, a working group (Cross-Disciplinary Committee on Biomass) made up of representatives of different authorities submitted a report to the Walloon Government with recommendations on a Walloon Biomass Energy Strategy (produced after consulting various stakeholders).

The Biomass Energy Strategy forms part of a wider ‘bioeconomy’ encompassing all the uses of biomass. It will be necessary for each sub-sector to play a role in order to achieve the targets, taking into account the main methods for recovering energy from biomass and their various categories. The energy recovery procedures that offer the best environmental and energy performance will be prioritised and encouraged. Use of biomass for energy recovery purposes must be consistent with the Walloon Government’s efforts to tackle the following main challenges: sustainability, conflict of uses, integration in the bioeconomy roadmap, and balance between energy carriers.

The Walloon Government therefore wants to approve a framework regulating the use of biomass (all sources combined) for energy purposes.

Efforts to network stakeholders as closely as possible will also continue.

Before applications are made to reserve green certificates, the Cross-Disciplinary Committee on Biomass must give an opinion on renewable electricity generation projects involving biomass or biogas. The committee’s role is to advise on the sustainability and hierarchy of uses of biomass inputs in such projects. Whenever the supply plan is changed, the committee’s opinion must be sought by the project leader.

- Biomethanisation

In order to ensure sustainability, preference will be given to biomethanisation using by-products from crops grown for non-energy purposes or resulting from the treatment of waste (agricultural, household or industrial). The sources study indicates that adequate quantities of this ‘biowaste’ will be available in Wallonia to achieve the targets that have been set.

In cases where biomethanisation plants require intercrops or even energy crops to stabilise production, best practices must be applied in the cultivation of these crops.

A framework for agricultural biomethanisation will be adopted, particularly concerning waste management, management of digestates, energy crops (both main crops and intercrops), regulatory obstacles, etc.

The gas from renewable energy sources ('RES gas') sector was reformed in 2018 with the aim of supporting and speeding up the development of the biomethanisation sector. Under this reform, producers of RES gas that is injected into the natural gas transmission or distribution system in the Walloon Region receive guarantee of origin labels at the rate of one label per MWh injected, expressed as gross calorific value. These labels guarantee the renewable origin of the gas produced. They can then be sold to green electricity producers who use natural gas to fuel their fossil fuel-powered cogeneration plant, so that they can obtain additional green certificates, which must be reserved. The electricity generating plant must therefore be entitled to apply for green certificates, and the label supply contract between the RES gas producer and the green electricity producer must have a minimum term of two years.

These measures also contribute to the efforts being made in the agricultural sector (see point 3.1.1(i) Agricultural and forestry sector).

- ***Use of biogas***

Discussions will be started with the other levels of power with a view to promoting biogas as a biofuel. In the long term, the amount of biogas used in transport must be increased by adopting standards similar to those for liquid biofuels.

In order to use biogas for heat production purposes:

- the injection of biomethane into the natural gas network will be supported through the heat support mechanism and a framework ensuring that injection is technically feasible;
- the on-site recovery of unrefined biogas will be supported through the heat support mechanism;
- the use of biogas by green electricity producers will be encouraged through guarantee of original labels that can be traded for additional green certificates.

- ***Cogeneration***

The expected progress in the area of cogeneration depends on the following factors:

- improvements in energy performance;
- recovery of energy from by-products;
- increase in the internal use of generated energy;
- development of cogeneration plants and improvements in existing plants as a local resource.

At the moment, numerous cogeneration plant projects involving the gasification of wood come under the following heading of the environmental permit: '40.20.01.02. Production or processing of gas, excluding refinery gas, where the production capacity exceeds 100 Nm³/h (Class 1)'. This type of plant is therefore almost always placed in Class 1 (production of gas), which is a major obstacle to the development of this type of cogeneration for those plants in which the gas is consumed on site to produce electricity and heat. This classification is inappropriate given the true impact of wood gasification technology on the environment. Cogeneration actually reduces the quantity of CO₂ emitted, compared with separate heat and electricity production systems.

The environmental permit headings must therefore be reviewed so that it is easier to develop this type of plant.

- ***Use of biomass***

The use of raw materials that have been produced locally or by the consumer is a key stabilising factor in Wallonia's biomass energy sector given that:

- it automatically improves security of supply;
- it avoids competition for resources;
- it ensures a certain degree of price control;
- it improves traceability;
- it limits transport and therefore reduces the overall impact.

There is no need to make the priorities for using biomass mandatory and binding within Wallonia as the production of food (for humans and animals), the production of fibres (textiles), green chemistry and biomaterials, to name but a few, are all essential. These uses (and their respective proportions) will also change over time. It is necessary, however, to recognise and identify undesirable uses to ensure that they are not supported and to promote efficient use of the resource.

Within this framework, the tools proposed by the Wood-Energy working group should guarantee the sustainable use of all biomass:

- non-binding application of the cascade principle to the use of wood;
- a ‘negative list’ of products excluded from the support scheme: ‘round timber’;
- a financial benchmark for support mechanisms;
- the adoption of supply plans and careful monitoring of their relevance and potential impacts at the level of the supply area;
- improvements to sustainability monitoring procedures, including the certification of sustainable biomass by third parties in order to facilitate administrative monitoring and commercial trade. For industrial enterprises, international certification would have the benefit of being recognised in several different countries, which is not currently the case.

Brussels Capital Region

Measures

The proposed measures cover the electricity and heat/cooling sectors (⁹²). In the latter case, in addition to the energy incentives that currently support certain renewable energies, a range of regulatory, stimulus or cooperation (with the Federal Government) measures should enable the Brussels Capital Region to annually increase the proportion of renewable energies in heat and cooling by more than 1.3 percentage points from the level to be achieved in 2020. Extra muros investment initiatives have also been launched.

The region has already started the transition to more renewables, and the general public as well as businesses have invested in this area. The region will continue its efforts by setting an example in its public buildings, by requiring the same effort from other public authorities located in the territory, and by developing the most appropriate solutions for its urban environment. The solar sectors (thermal and photovoltaic) and heat pumps offer interesting prospects for decarbonising the regional energy system.

NB: Some of the measures referred to below have also been included in the strategy to reduce the environmental impact of existing buildings in Brussels. They also feature here given the relevance of their direct impact on the decarbonisation of the buildings sector, whether they concern existing or new buildings.

Exemplary role of public authorities

In order to continue the deployment of renewable energies in the regional territory, public institutions have to set an example and play a driving role in the energy and climate transition.

In the Brussels Capital Region, public authorities have launched several ambitious initiatives in recent years. These include, for example, the SolarClick programme to install photovoltaic solar panels on the roofs of municipal and regional buildings, which alone will enable nearly 200 projects to be implemented by 2020 with an installed capacity of 12.5 MWc (⁹³).

⁹² Renewable energy in the transport sector (included in the NECP template) is the responsibility of the Federal State.

⁹³ This programme is funded by the Region and will equip buildings that have well-insulated, favourable and suitably oriented roofs with photovoltaic solar panels. In total, 85,000 m² of panels will be installed in three years, resulting in an estimated renewable electricity surplus of 11 GWh/year and a CO₂ saving of 4,500 tonnes/year from 2020.

The development of synergies between certain existing programmes will also be made possible from 2020, such as the interactions between SolarClick and NRClick. NRClick is a programme that helps municipalities to make energy savings in their buildings (⁹⁴). For example, improved insulation makes the installation of heat pumps possible. With a better insulated roof, the building in question can be selected for the installation of photovoltaic solar panels (SolarClick). The panels can also help to power the heat pump.

Certain buildings of the regional public authorities may also qualify: the buildings included in the economic expansion of Citydev will, for example, be particularly targeted for the installation of photovoltaic solar panels and for energy-sharing; the tertiary buildings in the economic expansion will be gradually equipped (25% of the buildings in 2020, 50% in 2025 and 100% in 2030); an incentive mechanism will be set up in 2020 for private buildings, and an obligation to include photovoltaic installations will be imposed at the same time for new buildings within the economic expansion sites.

Finally, the separate collection of biowaste by 2024 has been approved by the Brussels Government (see above). To achieve its climate targets, the public policy of waste collection and treatment organised by Bruxelles-Propreté will be aligned with the region's environmental policies (NECP, PGDR or PREC) and will form part of the ecological transition pursued by the government.

All or some of the biowaste and green waste collected will be appropriately treated within the region, in particular by constructing a biomethanisation unit with renewable energy recovery within the territory. This treatment will, as appropriate, partly offset the gradual reduction in the production of renewable energy from the recovery of this biowaste in the Neder-Over-Heembeek incinerator (which is planned to be decommissioned by 2050 at the latest – see above).

Against this background, the government undertakes to:

- assess and redirect the NRClick and SolarClick programmes from 2021 towards specific support for the renovation of municipal and regional public buildings;
- gradually develop photovoltaic installations on buildings within the economic expansion sites of Citydev.bussels;
- continue and strengthen the collaboration with social housing associations, with the aim of investing in renewables in their buildings through the installation of photovoltaic solar panels funded by the Climate Fund and the revision of the management contract of the associations concerned (in line with the measures included in the strategy to reduce the environmental impact of existing buildings in Brussels that concern social housing);
- recover all or some of the locally collected biowaste and green waste in a biomethanisation unit, which will only treat waste from Brussels and which will produce between 15 GWh/year, if the biogas is used in a cogeneration plant, and 19 GWh/year, if the biomethane is injected into the gas distribution system;
- in order for 43% of the efforts planned by 2030 to have already been made by 2025, rapidly develop a strategy for investing in low-cost renewable electricity outside the regional territory with a view to contributing to the efforts planned in the Energy Pact and ensuring consistency with the electrification of uses in the region; by 2030, this strategy should enable the region to achieve an increase in electricity of 700 GWh (see 'Cooperation' below);
- study the possibility of extending district heating systems powered by renewable energy;
- by the end of the parliamentary term, ensure that the electricity supplied to all public buildings and facilities and to those facilities within public spaces (operators of billboards, scooters or electric bikes, etc.) is 100% renewable.
- assess the green certificates system and adjust the rate at which certificates are granted, particularly taking into account the reduced cost of renewable energy systems.

⁹⁴ NRClick has the following objectives: a 15% reduction in the gas consumption of public buildings and a 5% reduction in the electricity consumption of public buildings.

Regulatory measures

Working in partnership with regional public authorities, municipalities or operators of large plants is possible as shown in the previous section. However, where there are many different economic operators, the most effective actions are usually regulatory in nature.

Just as it is nowadays unconceivable to design a building without insulation, it would seem absurd for new buildings not to be designed from the outset to incorporate renewable energies in those cases where energy is relevant. This approach has already been adopted in the Brussels regulations on the energy performance of buildings (EPB 2015 Strategy), as the relatively ambitious rules require ⁽⁹⁵⁾ equipment that can generate renewable energy. Furthermore, in order to contribute to the electrification of transport with the aim of reducing energy consumption, improving air quality and reducing noise, solar panels must be installed in large car parks to take advantage of all the opportunities that exist locally.

Against this background, the government undertakes to:

- study the possibility of an obligation to install photovoltaic solar panels in large covered or open-air car parks managed by private owners, following an assessment of the best possible use of such spaces;
- for any new district project or large building projects, consider carrying out a technical and economic feasibility study into the installation of a district heating system.

In addition, in regulatory terms, the risks associated with rolling out renewable energy sources that are ill-suited to the urban context must be taken into account. This is the case with wood, which emits, when burnt, among other substances, fine particulate matter and more specifically very fine PM2.5 that penetrates deep into the respiratory tract. In 2015, wood did not even account for 1% of the regional energy supply; however, 30% of the fine particulate matter emitted in the region comes from the residential sector and 38% of those particulate matter emissions are caused by the burning of wood in domestic heating systems ⁽⁹⁶⁾. This is substantial given the energy input actually provided. It should also be noted that, even when equipped with a particulate filter, the best systems burning wood or one of its derivatives still emit five times more fine particulate matter than natural gas systems. For information purposes, it is useful to note that the Bouwmeester (Chief Architect) of the Flemish Region recommends an outright ban on the burning of wood ⁽⁹⁷⁾. Finally, the European Commission in its 'Clean Air Outlook' report ⁽⁹⁸⁾ points out in particular Belgium's insufficient efforts to tackle fine particulate matter in the residential sector ⁽⁹⁹⁾.

Given the public health issues associated with preserving regional air quality and the European obligations, the government undertakes to:

- communicate in a meaningful and regular manner on this public health issue and further raise the population's awareness of the pollution associated with the burning of wood in all its forms, even outside peak pollution periods;
- study the possibility of enshrining in regional legislation a ban on the installation of central heating systems running on wood or its derivatives, bearing in mind the renewable heat potential in the region.

⁹⁵ Data from EPB certificates indicate that, since 2015, a renewable energy generating unit has been installed in 90.9% of new residential dwellings (68.8% photovoltaic solar panels, 16.7% cogeneration, 3.8% solar thermal and 1.6% heat pump).

⁹⁶ Based on the new emission factors for wood, which were recalculated in 2018 and are lower than the values used previously.

⁹⁷ <https://www.vrt.be/vrtnws/nl/2018/02/21/vlaamse-bouwmeester--met-kerstmis-mag-je-houtkachels-nog-eens-a/>

⁹⁸ http://ec.europa.eu/environment/air/pdf/clean_air_outlook_overview_report.pdf

⁹⁹ https://www.rtbf.be/info/belgique/detail_la-belgique-la-moins-ambitieuse-d-europe-dans-la-lutte-contre-les-particules-fines?id=9943863

Stimuli

While also adapting the existing support tools (energy incentives, green certificates), the government plans to promote and develop collective energy production using renewable sources. However, pilot projects will initially be needed to assess whether, and how, current electricity market rules need to be adapted for such projects.

In this respect, the government will take the following steps.

- Study the possible amendment of regional rules on the operation of the electricity market to encourage the emergence of collective projects and better use of renewable electricity generated locally within districts, while using and fairly remunerating the distribution system. To that end, the government will, as a priority, allow the implementation of pilot projects from no later than 2020 with the aim of identifying the most favourable conditions and the simplest methods for developing collective self-consumption. Based on the lessons learnt from the pilot projects, the government will support energy community development projects (voluntary grouping of inhabitants situated downstream from a district terminal for the purpose of collectively managing energy consumption and production). Cooperatives (existing and new) will also be helped to roll out energy production systems, with one category of shares being accessible by anyone wanting to take part in a collective project.
- Extend the energy incentives to the most efficient air-to-air heat pumps.
- Refine support for BIPV (Building Integrated Photovoltaics⁽¹⁰⁰⁾) through the green certificates mechanism.
- Adapt the green certificates mechanism to support the installation of photovoltaic solar panels in public spaces (such as on bus shelters or fixed urban furniture).
- Commission an assessment of the green certificates mechanism from the Brussels energy regulator, BRUGEL, which will also contain recommendations on options for simplifying the operation of the system that comply with European requirements, while maintaining an appropriate level of support in the Brussels context. The results of this study are to be presented to the government in 2020 so that it can adopt long-term reforms of the support system (ideally up to 2040) by no later than 2023.

Support

The region already provides substantial support to the initiators of building or renovation projects, whether professionals or households. However, there is a lack of knowledge or even distrust with regard to heat pump systems, despite their undeniable benefits in terms of energy efficiency and use of renewable energy.

In this context, the government undertakes to:

- increase the support for professionals and individuals in relation to heat pumps in order to facilitate the selection of this technology and its correct sizing and to provide information on the regulations and energy incentives available, among other matters.

Cooperation

The efforts made by local and regional public authorities, citizens and businesses located in the regional territory will be supplemented by cooperation between the regional government and other stakeholders.

The government undertakes to:

- encourage the public building services of the federal, Flemish, Community, European and international authorities that have buildings in the regional territory to invest in energy production from renewable energy sources at their Brussels sites;
- as a priority, conclude cooperation agreements with neighbouring regions with a view to directly investing in installations for the generation of renewable electricity (in particular using solar or wind energy) outside the region);

¹⁰⁰ These are photovoltaic modules integrated into elements of the buildings such as windows, cladding, tiles, etc.

- urge the Federal Government to reduce VAT on the most efficient heat pumps (installation and equipment), on thermal and photovoltaic solar equipment and its installation, as well as on the supply of renewable electricity.

3.1.3. Other elements of the decarbonisation dimension

xx. Where applicable, national policies and measures affecting the EU ETS sector and assessment of the complementarity and impacts on the EU ETS

Flemish Region

The climate objective for Member States is to reduce GHG emissions from sectors not covered by the emissions trading system (EU ETS). The transport, building, agriculture, non-ETS industry and waste sectors are therefore the subject of debate.

In Flanders, approximately 200 installations in the electricity sector and energy-intensive industry fall under the EU ETS. For every tonne of CO₂ emitted, they must surrender one emission allowance, which incentivises them to use CO₂-efficient production techniques. Given that, at European level, the number of emission allowances is limited, total European CO₂ emissions always remain within the pre-established ‘cap’. In 2030, this cap will be 43% less than in 2005, meaning that the EU ETS sector is making considerable efforts to reduce GHG emissions. In Flanders we have always argued for a sufficiently ambitious EU ETS, with the CO₂ price providing a real incentive for low-carbon investments. At the same time, the competitiveness of energy-intensive industry needs to be preserved through a sufficiently protective carbon leakage framework. The recent reform of the EU ETS, which established the basic rules for the period 2021-2030, is in line with these fundamental principles.

xxi. Policies and measures to achieve other national targets, where applicable

Federal State

- Implementation of the National Adaptation Plan and its updates.
A national adaptation action plan was adopted in 2017 (¹⁰¹). This plan identifies specific adaptation measures that must be taken at national level over the 2017-2020 period in order to strengthen cooperation and develop adaptation synergies between the various entities (federal level, regions).
- Implementation of the federal contribution to the National Adaptation Plan, adopted on 28 October 2016, and its updates.

This federal contribution aims to mobilise the federal levers and instruments for conducting a coordinated adaptation policy. It identifies 12 federal adaptation actions. These actions form part of a process of integrating the ‘adaptation to climate change’ component in two sectors: transport and crisis management. Cross-cutting measures aimed at coherently integrating adaptation in various fields/policies and raising awareness and understanding of the issues are also identified.

NB: The measures identified in the adaptation plan will not have a direct impact on GHGs. In the context of the identification of measures, the risk of maladaptation has been taken into consideration to avoid adaptation measures leading to an increase in vulnerability (e.g. by increasing GHG emissions).

- Integration of sustainable development in administration contracts.
- Setting of a good example through purchases (e.g. hardware and equipment).
- Optimisation of the criteria for public tenders (carbon clauses).
- Digital operation of authorities, continuation of the digitisation of government, streamlining of procedures, one-stop shops, paperless offices.

¹⁰¹ National Climate Commission, 2017. National Adaptation Plan for Belgium.
https://www.climat.be/index.php/download_file/view/1958/1205/

Flemish Region

A Flemish Adaptation Plan 2021-2030 will be drawn up as part of the Flemish Climate Plan 2021-2030. The adaptation plan will be based on the measures and results of the current Flemish Adaptation Plan 2013-2020, with the aim of further strengthening Flanders' resilience to the consequences of climate change and better adapting to its expected effects. Work will also continue on identifying Flanders' vulnerability to climate change based on the results already achieved and further insights. Adapting to the effects of climate change requires a comprehensive and integrated approach in all sectors, with a view to maximising the synergies between adaptation and mitigation and with other policy objectives.

Walloon Region

Like other regions around the world, Wallonia is being affected by climate change: general rise in temperatures, changes to rainfall patterns, extreme events, etc. This is in turn generating a series of impacts: increase in flooding and soil erosion risks, increase in heatwaves and droughts, emergence and spread of diseases, etc. All these impacts were identified, assessed and quantified in 2011 and 2014 through studies assessing the impacts of climate change on Wallonia and its vulnerability (ECORES & TEC, 2011), ICEDD, 2014) (¹⁰²).

Based on those assessments, initial adaptation measures for various sectors were identified and set out in the Air, Climate and Energy Plan (PACE) 2016-2022. Some were incorporated within existing tools (Flood Risk Management Plans, Walloon Forest Health Observatory, etc.), while others formed the basis for new tools ('adapte ta commune' [adapt your municipality] approach, planning tool intended for local authorities).

Those measures clearly have to continue after 2022, which must be guaranteed by this plan to 2030. Some existing measures will therefore continue as they are, while others will be updated; however, new measures must also be identified.

This is particularly the case with the Flood Risk Management Plans (second cycle) 2022-2027, which will take account of climate change.

As regards the forestry sector, the Walloon Forestry Code sets out a series of measures to promote the sustainable development of woods and forests. Particular measures include maintaining a balance between softwood and hardwood trees, and promoting mixed forests with trees of different ages, which are adapted to climate change and capable of mitigating some of its effects. Recommendations for forest managers were published in 2017 in order to propose specific actions taking account of climate change; those recommendations partly stemmed from forest research. The Walloon Forest Health Observatory monitors and ensures the health of forests in collaboration with neighbouring countries. It has been particularly active in recent years due to beetle infestations in the Ardennes (500,000 m³ of trees were infected in Wallonia in 2018, with this figure likely to double and reach 1,000,000 m³ in 2019). Lastly, various research studies are currently being carried out to help forests adapt to climate change (see point 3.1.1(i)).

Agriculture has been particularly affected by climate change in recent years. The 2017 drought was acknowledged as an agricultural disaster in all Walloon municipalities, with the total cost of the damage estimated at nearly EUR 130 million. There was also a drought in 2018, which continued in 2019. Agronomic research must be supported and aimed at farming practices, varietal selections and even new crops that can adapt to these drier conditions and water stress, and also to the diseases and pests fuelled by climate change. Conversely, heavy rainfall leads to mud flows, erosion and therefore soil loss. The GISER unit (which advises on the integrated management of soil, erosion and runoff) of the SPW ARNE (Walloon Public Service for Agriculture, Natural Resources and Environment) works with municipalities and farmers to combat erosion, runoff and mud flows. Between 2011 and 2015, it was called out over a hundred times to around 400 different sites. Over this

¹⁰² ECORES & TEC. (2011). *Région wallonne - Agence wallonne de l'Air et du Climat – L'adaptation au changement climatique en Région wallonne*.

ICEDD. (2014). *L'identification et l'évaluation des coûts de l'inaction face au changement climatique en Wallonie*.

period, around 100 projects were carried out to reduce erosion and mud flows, including over 8 km of linear features (grass strips, weirs, banks, ditches, etc.).

Heatwaves affect the population, particularly the most vulnerable. The Walloon Plan for ‘heatwaves and ozone peaks’ is regularly triggered during the summer; its aim is to communicate and remind people of the steps to take, provide specific assistance to the elderly, who are often isolated, and generally raise awareness. The Walloon Environment and Health Plan 2009-2023 also takes direct account of climate change through measures such as monitoring and combating non-indigenous mosquitos, tick-borne diseases, and spores and pollens, which are all influenced by climate change.

In terms of energy, climate change is affecting levels of production and forms of consumption in parallel with the efforts made in this plan. Wallonia is therefore working with the other regions to identify the impacts of climate change on security of supply (see national measure).

Biodiversity and ecosystem services – which have already been weakened by habitat fragmentation, species disappearance, arrival of invasive species, etc. – are being heavily impacted by climate change. Efforts to develop ecological networks must therefore be continued and stepped up. These are natural and semi-natural ecosystems, and also replacement habitats, that can meet the vital requirements of species and their populations. These areas of green infrastructure are also needed to develop a wide variety of ecosystem services that can regulate the effects of human activities. Developing blue and green corridors enables habitats to be connected and reinforces ecosystems so that they become more resilient to the effects of climate change in particular.

Replanting hedges in the countryside, planting trees and agroforestry have a key role to play in adaptation due to their many positive effects. In the rural environment, they can prevent mud flows, provide safe areas and homes for various species, produce biomass for energy purposes (recovery of hedge trimmings), produce timber or horticultural crops, contribute to carbon storage, increase biodiversity, provide areas of shade for livestock, structure the landscape, etc. There is also a place for green infrastructure in the urban environment, as this can help to better manage rainwater and combat urban heat islands: green roofs, tree planting and/or permeable ground (in particular surfaces of car parks) are all good examples.

Spatial planning must take account of the impacts of climate change on the territory at both the regional and municipal levels. Under the Covenant of Mayors, there is increasing collaboration between these two levels as, in addition to the energy and GHG reduction aspects, this agreement also covers the aspect of adapting to climate change. A tool has been developed in Wallonia – the ‘adapte ta commune’ (adapt your municipality) approach – to help municipalities understand and assess the impacts of climate change on their territory. This tool has been publicised via the POLLEC (local energy and climate policy) campaigns and is therefore being used by a number of municipalities. It contains a series of action fiches and example projects to inspire municipalities and exchange knowledge so that actions can be developed on the ground. The plan is obviously to continue promoting and constantly improve this tool.

As regards disaster risk management, Wallonia is working with the other Belgian entities under the Sendai Framework for Disaster Risk Reduction 2015-2030. Joint work is being carried out within the Sendai national platform by various experts from different disciplines (crisis centres, defence, etc.). Experts on adapting to climate change are also involved so that the impacts of climate change can be taken into account.

Cross-border cooperation is also ongoing, particularly within Benelux. Specific workshops on the impacts of climate change on health, transport and energy have enabled information to be exchanged and lessons learnt to be shared. This cooperation is planned to continue for the next few years.

Lastly, communication, awareness-raising and education actions on climate change are regularly carried out to make stakeholders and the general public aware of the impacts of climate change and the steps that need to be taken in order to adapt. For example, educational kits on the climate have been produced for primary students in years 5 and 6. These kits have already been sent to schools and are available to order and on the internet.

The following table sets out the 15 adaptation actions to be implemented.

Summary table of the 15 adaptation actions

Actions	Sectors	Associated impacts
1 Flood Risk Management Plans (second cycle) 2022-2027	Spatial planning, Agriculture, Water management	Flooding
2 Walloon Forestry Code, sustainable management of forests adapted to climate change	Forests	Weakening of forest stands
3 Recommendations to forest managers	Forests	Weakening of forest stands
4 Walloon Forest Health Observatory	Forests	Diseases and parasites
5 Agronomic and forest research	Research, Agriculture, Forests	Rise in temperature, drought, etc.
6 Advice and opinions of the GISER unit	Agriculture	Erosion and mud flows; flooding
7 Heatwaves and Ozone Peaks Plan	Health	Heatwave
8 Environment and Health Plan 2019-2023	Health	Increase in vector-borne and respiratory diseases
9 Security of energy supply	Energy	Rise in temperature, flooding, etc.
10 Develop ecological networks and green and blue corridors	Biodiversity, Spatial planning	Flooding, heatwave, drought, etc.
11 Planting, afforestation and agroforestry	Agriculture, Spatial planning	Erosion, flooding, drought, heatwave
12 Support for the Covenant of Mayors	Towns and municipalities	Flooding, heatwave
13 Crisis management and link with disaster risk reduction	Cross-cutting	
14 Communicate, raise awareness and educate on the impacts of climate change and the need to adapt	Cross-cutting	
15 Cross-border cooperation	Cross-cutting	

Brussels Capital Region

Adaptation to climate change

Although the climate change mitigation measures set out in this plan will limit the regional contribution to climate change, they will not be sufficient to prevent its current and future consequences. As a result, adaptation measures will be needed to mitigate the damage caused by this inevitable impact.

In addition to the measures set out in the adaptation part of the Regional Air, Climate and Energy Plan, the government will therefore adopt a regional adaptation strategy anticipating the consequences of climate change and the associated environmental, economic and social risks.

xxii. Policies and measures to achieve low-emission mobility (including electrification of transport)

Federal State

Mobility framework

- An interfederal cooperation agreement on mobility will be concluded by 1 January 2021, following consultations between the Federal State and the Regions on specific subjects (e.g. public transport, taxation of transport, etc.) for which an interfederal agreement is needed in order to implement certain measures included in this plan.
- As part of the analysis to be made by 2021 of environmentally friendly energy taxation and in agreement between the federal and regional governments, the current or proposed regulatory framework on company cars will be reviewed and adjusted for new contracts in order to:
 - propose alternatives to company cars (see, *inter alia*, the Mobility Budget, the 'cash for car' measure, and the cafeteria plan), with a view to continuous improvement in order to meet the energy and climate targets;
 - reduce the externalities associated with company cars (to combat air pollution and congestion, and improve road safety) by considering other reductions in labour costs, and also simplify the system;
 - green company car fleets (taking into account the CO₂ targets for cars).

Options to be assessed for greening the fleet (following analysis):

- The mass and power of the vehicle could be used in company car taxation, with a correction factor being applied for electric cars to take account of the additional weight of the battery. It would make sense for the same parameters to be used as in the Walloon and Brussels Capital Regions. The intention in the Walloon Region is to include the mass/power/CO₂ in their revision of company car taxation.
- The WLTP values could be used instead of the NEDC 2.0 values from 1 January 2021 without needing a correction factor.
- The requirements around PHEVs could be reinforced: increase in the energy capacity of the batteries to ensure a minimum range, and limitation of the combustion engine power to combat 'fake hybrids'.

Rail initiatives

For passengers

- Optimise rail transport (competitiveness, meeting passenger expectations). In order to encourage a modal shift to rail transport and improve the rail offer, major investment will have to be made in the coming years to improve passenger transport by rail, namely:
 - complete the Regional Express Network (RER) by 2031 (primarily the four-track development of lines 161 and 124);

- equip the rail network with the European Train Control System (ETCS) (continuous train speed control and automatic braking system): from 2025 only ETCS-equipped trains will be able to travel on the Belgian rail network;
- purchase new rolling stock (M7 double-deck carriages, etc.): investment of EUR 2 billion over the period 2018-2022 in order to modernise the fleet of carriages and locomotives, which will create an additional 20,000 seats by 2022 (including 10,000 by 2020);
- modernise the Brussels-Luxembourg route by 2027;
- increase the capacity of the Ghent-Bruges route by 2024;
- improve access to Brussels South Charleroi Airport: Fleurus station by 2022;
- electrify line 19 between Mol and Hamont by 2020 and line L15 between Balen and Zonhoven by 2022.
- For the other lines that have not yet been electrified, a cost-benefit study (financial, energy, environment) of a more sustainable alternative solution, such as complete electrification of both the infrastructure and operation of the rail network, will be carried out.
- The possibility of running hydrogen trains or equipping electrical multiple units with batteries to cover short distances on non-electrified lines will be studied in 2020 (¹⁰³).

Operational measures will also be adopted to improve the quality of the rail offer so that it is more user-friendly and attractive and so that the customer experience is enhanced (operating schedule and timetables, products and services, pricing policy and distribution).

Multimodality will be encouraged as much as possible: improved access to stations for cyclists and pedestrians; harmonisation of timetables with those of other public transport services (intermodal platforms), etc.

Together with the SNCB and Infrabel, the Federal Government will study the rail offer in the medium term with the aims of reaching consensus on how to operate the network in the future and determining, based on the future offer, the infrastructure investments to be prioritised.

The budgets needed for these measures are estimated at EUR 35 billion for the period 2021-2030 (including revenue from the issue of green bonds) and will be confirmed in the next few years.

This approach is expected to reduce annual CO₂ emissions by around 1.5 million tonnes by 2030 compared with the WEM scenario.

If annual CO₂ emissions in 2015 are compared with the estimates for 2030 after the approach has been implemented, a reduction of around 3.7 million tonnes can be expected.

For freight

- Encourage rail transport for freight transport. In order to increase the modal share of rail freight transport (from 12% currently to 20% in 2030), targeted investments must be made to improve the ability of rail freight transport to compete with other modes of transport:
 - carry out work so that 740-metre-long trains can run on the Belgian rail network and these trains can be handled at terminals by 2030;
 - improve the rail links of logistics platforms by 2030;
 - construct or repair missing links in the rail freight network by 2030;
 - increase the capacity of the Zeebrugge-Bruges route by 2031 and the Ghent-Bruges route by 2024;
 - improve the condition of support infrastructure by 2030.

¹⁰³ The specifications for this study (due to be carried out in 2020 by the SNCB) are currently being prepared. The study results will be provided to the Federal Public Service for Public Health and the Federal Public Service for the Economy.

In addition, measures relating to the operation or regulation of the rail network will also be implemented by 2030 to improve the attractiveness of rail freight transport:

- revise the priority rules for the allocation of train paths;
- create a neutral body to promote rail freight transport in the industrial and logistics sectors (following the example of the Netherlands);
- update the rail freight subsidy mechanism beyond 2020 to encourage the modal shift of freight transport to rail transport: support for transshipment rather than the transport itself;
- include specific provisions in the management contract with Infrabel to encourage the rail network operator to achieve these goals.

Budget and impact

The budgets currently planned for these measures (excluding the rail freight subsidy mechanism) total EUR 0.985 billion (including revenue from the issue of green bonds). An additional budget of EUR 135 million is planned for the rail freight subsidy mechanism. These budgets will be confirmed in the next few years.

This approach is expected to reduce annual CO₂ emissions by around 0.7 million tonnes by 2030 compared with the WEM scenario. If annual CO₂ emissions in 2015 are compared with the estimates for 2030 after the approach has been implemented, a reduction of around 1.6 million tonnes can be expected.

For both passengers and freight

- The current inclusion of the rising costs of the energy transition in the electricity cost for rail transport will be reviewed so that the modal shift to more sustainable electric rail transport is not deterred.
- Consideration will be given to how to reduce the electricity cost for rail transport (ETS, federal surcharges, etc.) so that the rail network can continue to be electrified and rail transport can become more competitive. The electricity cost is currently high and poses an obstacle to the modal shift needed to more electric-powered transport in general and to rail transport in particular. Following this study, measures will be taken to reduce the electricity cost for rail transport.

In terms of taxation

- Assess the current tax framework for utility vehicles, e.g. pickups.
- Reform the (para)fiscal framework to promote sustainable mobility and intermodality.
- Enable the combination of an annual train pass with other active or collective modes of transport (multimodality) for a number of days per year. In other words, the tax benefits associated with an annual train pass could be combined, for the same journey, with (non-exhaustive list) the tax exemption for the bicycle allowance, the organised collective transport allowance or the allowances associated with other public transport for a limited number of days to be determined.
- Establish a regulatory and tax framework at EU and national level aimed at reducing the weight of vehicles.
- Urge the air transport sector to also make concrete commitments and develop a roadmap for substantially reducing the GHG emissions for which it is responsible. Achieving zero-emission air transport by 2050 should be the ambition of all countries.

Promotion of soft modes of transport

- Call for a cross-cutting approach to bicycle transport at EU level (e.g.: VAT regulation reform, CEF funding for bicycle infrastructure projects and development of an EU bicycle policy).
- Improve action to tackle bicycle theft (e.g. monitoring and/or support for the Traxio 'Velo-Pass' system).
- Produce national statistics on bicycle use and trends.
- In the context of the investment pact, construct 600 km of bicycle highways in the three regions.
- Etc.

Promotion of new technologies

- Develop vessels, heavy goods vehicles and public transport powered by CNG and LNG as a transitional technology.^A

Car-related measures

- Standardise tyres and fuels.
- Promote car-sharing, carpooling and remote working. Support for carpooling and car-sharing entails harmonising/simplifying the (para)fiscal framework, organising promotional and awareness-raising campaigns, supporting private initiatives and including initiatives in Mobility as a Service (MaaS).
- Facilitate the development of shared autonomous vehicles in Belgium.
- In order to contribute to e-mobility targets, the Régie des Bâtiments (Government Buildings Agency) will include provisions in its contracts that aim to equip buildings for electromobility. By 2025, where technically feasible, a charging point for electric vehicles will be installed in at least one in five parking spaces at federal government buildings. The installation of charging points in SNCB station car parks will also be specified when drafting the next SNCB management contracts, with relevant targets being set in these contracts. Furthermore, easily accessible and secure parking for environmentally friendly one- and two-wheel vehicles ((electric) bicycles, (electric) scooters, mopeds and electric motorcycles, etc.) will be provided at as many federal buildings as possible so that visitors and employees can more easily travel in an environmentally friendly manner. By 2023, charging points for electric one- and two-wheel vehicles will be installed at all buildings managed by the Régie des Bâtiments.

FEDERAL VEHICLE FLEET

Objective: greening of the public authorities' vehicle fleet (exemplary role) with the ultimate goal being zero-emission vehicles.

The first measure will involve minimising the size of the vehicle fleet, in particular by not replacing certain vehicles or by offering softer mobility alternatives where practical (electric bicycles or scooters for example). Improved sharing of vehicles between adjacent authorities ('shared vehicles') may also be envisaged to limit the number of vehicles.

When replacing vehicles, federal services will favour low-carbon or zero-carbon models (electric, CNG, hybrid, hydrogen and other vehicles) that are more energy efficient and lighter, where this is possible depending on the intended use of the vehicle.

The [most recent report of the CIDD \(Interdepartmental Commission for Sustainable Development\)](#) reviewing the federal (federal public services and public planning services) vehicle fleet (cars / vans / lorries / minibuses / motorcycles / other vehicles) dates from 2016 (2015 data). At that time, only just over 1% of vehicles were not in the petrol or diesel 'combustion engine' categories. This review of the fleet will be updated.

A plan to replace all the vehicles in the existing fleet will be produced by all federal public services, which will enable group purchases (purchase or leasing; economies of scale for vehicles regarded as more expensive).

Timetable

By 2030.

Budget

Each public service establishes its own budget in this respect, which makes it difficult to obtain an overview of this item. The data in the CIDD report do not allow the costs to be easily extrapolated.

Decisions

Set a target and implementation scenarios for 2030.

A Federal Mobility Action Plan must be produced by the ministers responsible for sustainable development, mobility and public service.

Action points:

- 1- The Minister for Sustainable Development will ask the IFDD (Federal Institute for Sustainable Development) to update the study on the state of the federal vehicle fleet by 2020/2021.
- 2- The existing '307 sexies' circular of 13 July 2009 must be adapted and brought into line with the Clean Vehicles Directive so that outdated standards can be eliminated as quickly as possible.
- 3- The BOSA (Federal Public Service for Policy and Support) framework contract with the supplier (currently CMS) will be reassessed and checked to see if it sets strict enough conditions.
- 4- Other contracts with suppliers will also be reassessed.

The Ministry of Defence has set itself the target of at least 25% of its passenger vehicle fleet consisting of environmentally friendly vehicles (176 CNG, hybrid or electric vehicles out of 702 vehicles) by 2030, with a budget of **EUR 422,400 per year**.

Drivers will also be trained in eco-driving and their vehicles will be fitted with driving behaviour monitoring systems by 2030 (**EUR 500,000 per year**).

Rail-related measures

- Reduce the SNCB's traction energy consumption by 4% per passenger-kilometre in 2022 compared with 2017, which will primarily be achieved through:
 - eco-driving;
 - eco-stabling (i.e. the reduction of energy consumption when the train is 'parked');
 - introducing more energy-efficient equipment;
 - increasing or at least stabilising train occupancy rates;
 - carrying out a study entitled 'Efficience du coût du remplacement des trains diesel par l'électrification des autres lignes' [Cost-effectiveness of replacing diesel trains by electrifying other lines] (the current level of electrification is 89.9%);
 - carrying out a cost-benefit study on the electrification of the entire Belgian rail network and the replacement of diesel traction equipment. Infrabel's network is made up of 6,515 km of main tracks of which 5,857 km are electrified. The merits of electrifying the remaining lines therefore need to be studied.
- The federal authorities will ensure that the SNCB remains an attractive alternative compared with other modes of transport by taking account of the electricity cost for rail transport (ETS, federal and regional surcharges, etc.). The relevant federal authorities will consider this issue, preferably in cooperation with

neighbouring countries, taking into account the fact that the cost of the different modes of transport reflects all the associated costs.

- Consider reducing the electricity cost for rail transport (ETS, federal and regional surcharges, etc.).

Air and maritime transport-related measures

- Study of emissions in the transport sectors in Belgium that are under federal responsibility and analysis of potential measures for reducing GHG-emitting fuel. Continue to call for zero-emission maritime transport by 2050, in the context of the COP and the IMO. Urge the air transport sector to also make concrete commitments and develop a roadmap for substantially reducing the GHG emissions for which it is responsible. Achieving zero-emission air transport by 2050 should be the ambition of all countries.

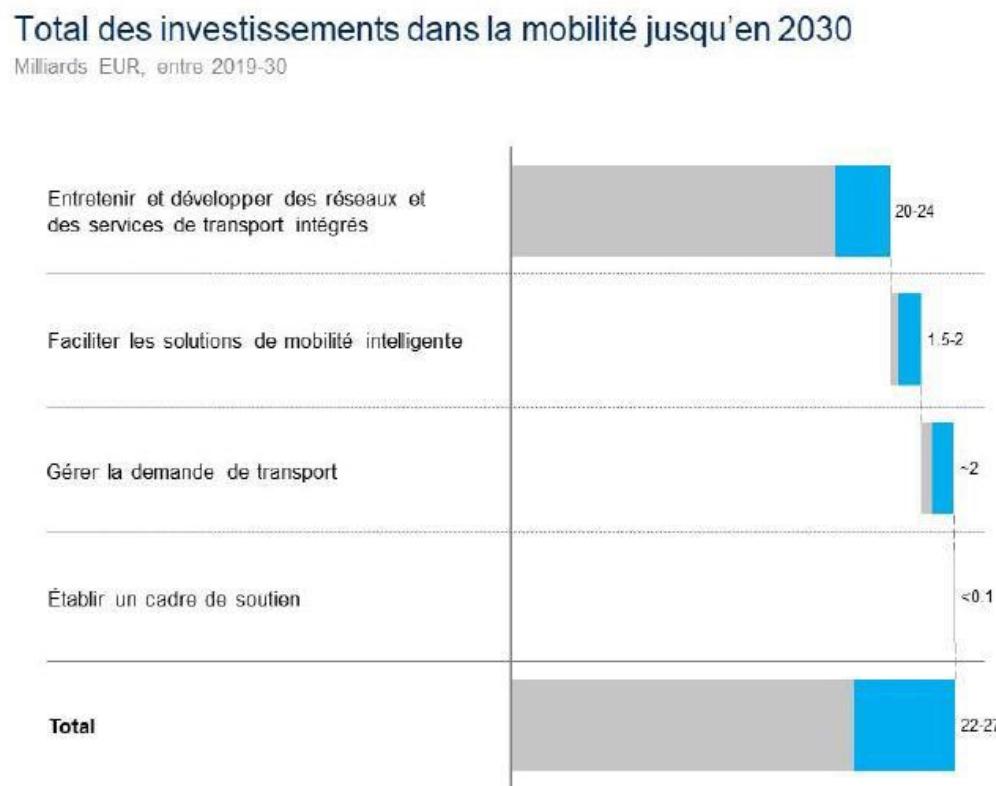
In terms of investment aid

- The National Pact for Strategic Investments states that most of the public investment will be made in maintaining and developing integrated transport services and networks.

The total investment in these proposals is estimated at around EUR 20-24 billion. The cost of maintenance is estimated at approximately EUR 9 billion and the cost of network development at approximately EUR 13 billion. Of this amount, around EUR 7 billion relates to investment in rail infrastructure for freight and passengers, EUR 2 billion in inland waterways and EUR 3 billion in other transport projects. Private sources, including public-private partnership (PPP) structures and/or tolls, will fund 14%.

Figure 5: Total investment in mobility to 2030

(source: National Pact for Strategic Investments)



SOURCE : Pacte National pour les Investissements Stratégiques

Total des investissements dans la mobilité jusqu'en 2030 Milliards EUR, entre 2019-30	Total investment in mobility to 2030 EUR billions, 2019-2030
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Publics	Public
Privés	Private
Entretenir et développer des réseaux et des services de transport intégrés	Maintaining and developing integrated transport services and networks
Faciliter les solutions de mobilité intelligente	Facilitating intelligent mobility solutions
Gérer la demande de transport	Managing transport demand
Etablir un cadre de soutien	Establishing a support framework
Total	Total
SOURCE: Pacte National pour les Investissements Stratégiques	SOURCE: National Pact for Strategic Investments

Flemish Region

For road transport, see the section on GHG emissions and removals – transport sector.

International aviation and shipping

Overview of the situation

GHG emissions that stem from international bunkering (i.e. fuel deliveries to international air and maritime transport) are not included in the non-ETS climate target for Member States for the period 2021-2030.

Demand in these two sectors is driven by international factors rather than local factors (including tourism and extensive globalisation of trade) and competition in these sectors is also very international in nature. For those reasons, reducing greenhouse gases in these sectors should preferably be organised at a global level. Flanders relies heavily on the International Maritime Organization (IMO) and the International Civil Aviation Organization (ICAO) for its policy.

It is crucial that action is also taken in these two sectors. In 2016, international aviation and shipping were each responsible for around 12% of total GHG emissions from transport in the EU, and this share is expected to grow in the current policy scenario due to increasing demand for international passenger and freight transport.

In the last few years, the IMO and the ICAO have taken important decisions and measures to reduce GHG emissions from the bunkering sectors:

- within the IMO:
 - o EEDI (Energy Efficiency Design Index) for new vessels;
 - o MRV (Monitoring, Reporting and Verification): fuel consumption obligations for all vessels > 500 GT;
 - o adoption of an initial GHG reduction strategy with an absolute reduction target of at least -50% by 2050 compared with 2008 emissions, and relative reduction targets of at least -40% by 2030 and at least -70% by 2050 (CO₂ per tonne-mile), both compared with 2008;
- within the ICAO:
 - o resolution on carbon-neutral growth from 2020 (CNG 2020);
 - o CORSIA (Carbon Offsetting and Reduction Scheme for International Aviation) implementing the CNG 2020 resolution, which will start in 2021 and cover approximately 90% of all international aviation emissions;
 - o CO₂ standard for new aircraft.

As for the EU, it has adopted additional measures to remedy the sometimes limited level of ambition and tardiness of the IMO and the ICAO in the past.

Since 2012, intra-EEA (European Economic Area) flights have come under the EU emissions trading system, with CO₂ emissions being limited in the 2013-2020 period to 90% of the 2004-2006 level. Since 2018, there has been

a European system for mandatory monitoring, reporting and verification of CO₂ emissions from maritime transport.

Measures have also been adopted in the Flemish Region, such as the promotion of energy-efficient vessels and alternative fuels (e.g. supply of LNG to vessels). The Port of Antwerp has also applied measures in the form of reduced tonnage dues for vessels with a positive Environmental Ship Index (ESI), which takes into account CO₂ emissions among other aspects. Considerable efforts are also being made to supply shoreside power to vessels while moored in port (e.g. at the Port of Antwerp).

Measures in 2021-2030

Despite the efforts already made, further actions are needed in the 2021-2030 period to make international aviation and shipping compatible with achieving the general long-term goals of the Paris Agreement.

These measures will focus on the following aspects, among others:

- 1) Aim for climate transition within the IMO and the ICAO

In conjunction with the other Belgian entities within the IMO and the ICAO, Flanders will continue working towards short-term measures to enable the bunkering sectors to transition to a climate-friendly society, through both operational and technical measures and also market-based measures.

- 2) Support an ambitious European policy for the aviation sector

International aviation (= outgoing flights from the EU) is included in Europe's NDC (National Determined Contribution) under the Paris Agreement and is therefore part of the European target to reduce GHG emissions by 40% by 2030 compared with 1990.

An additional European policy – with a higher level of ambition than CORSIA currently proposes – will therefore also be needed after 2020 for international aviation.

- 3) Research the possibility of carbon pricing for aviation

Fiscal policy can play a crucial role in rationalising the demand for, and the cost of, international air and maritime transport.

The Flemish Region would support initiatives taken at the European level to introduce harmonised carbon pricing for aviation.

- 4) Research how Flanders can contribute to the supply of climate-friendly fuels

The potential of pure electric power and batteries is relatively limited in these sectors, given the large amounts of energy consumed by seagoing vessels during their journeys and the fact that aircraft need to remain relatively light. Even in the long term (up to 2050), aviation and shipping will remain at least partly dependent on liquid fuels. The development, availability in large quantities and sale of climate-friendly fuels, which can prove their sustainability throughout their life cycle, are becoming vitally important and also offer opportunities at an economic level. Flanders will therefore study how to take maximum advantage of these opportunities and how it can contribute to an increased supply of advanced biofuels and synthetic fuels based on renewable energy storage for aviation and shipping.

- 5) Agreements to reduce the impact of aviation and shipping on the climate by 2050

In consultation with the sectors (ports, airports, shipowners, airlines) and stakeholders, agreements may be concluded to improve the sustainability of aviation and shipping more quickly in Flanders. The aim will be to work with the sectors to identify and implement viable best practices in the best way possible. The resulting commitments could be included in the voluntary action plans requested by the IMO and the ICAO.

xxiii. Where applicable, national policies, timelines and measures planned to phase out energy subsidies, in particular for fossil fuels

Federal State

In collaboration with other EU Member States, Belgium will gradually discontinue financial investment in, and support for, fossil fuels. It will produce an inventory of all fossil fuel subsidies, to be submitted to the European Commission by the end of 2020.

By 2021, Belgium will produce an action plan for gradually removing fossil fuel subsidies; this will take particular account of the country's guarantee of security of supply. The plan must set out specific stages and social adjustment measures to accompany the transition to a carbon-neutral society.

- Shifting of charges for fossil fuels such as gas and heating oil (see 'Taxation' section below).
- Continuation and refinement of federal support for businesses under energy contracts or branch agreements in order to sufficiently incentivise industry to agree to additional efforts by 2030, taking into account a level playing field within the EU in terms of continuous improvement, sufficient reporting, avoidance of a lock-in and accelerated phasing-out of fossil fuel subsidies.

3.2. Dimension energy efficiency

- i. *Energy efficiency obligation schemes and alternative policy measures under Articles 7a and 7b of Directive 2012/27/EU, to be prepared in accordance with Annex III to this Regulation*

The federated entities will contribute to Belgium's target through policies and measures, and the Federal State, within the framework of its own powers, will contribute to Belgium's target through support measures.

Flemish Region

Planned policies, measures and programmes to achieve the indicative national energy efficiency contributions for 2030 as well as other objectives referred to in point 2.2, including planned measures and instruments (also of a financial nature) to promote the energy performance of buildings, in particular with regard to the following:

- Energy efficiency obligation schemes and alternative policy measures under Articles 7a and 7b and Article 20(6) of Directive 2012/27/EU and to be prepared in accordance with Annex III to this Regulation*

With regard to achieving the target in Article 7 for 2021-2030, the Flemish Region has for now decided not to implement an obligation scheme for distribution system operators or suppliers, but to initially continue along the path of alternative measures. As a result, the measures already notified to the European Commission during the period 2014-2020 will be continued in the WEM scenario (scenario with existing measures), with all existing and new measures taken into account in accordance with the European Commission's guidelines.

The following table indicates the measures under Article 7 and an initial estimate of the cumulative energy savings for the period 2021-2030:

Description	Cumulative savings (21-30) [TWh]
Rational energy use/public service obligations incentive for:	
roof insulation	7.925
glazing	1.891
wall	1.921
insulation of floors and basements	0.5810
solar water heater	0.029
heat pump	1.350
boiler with heat pump	0.422
Energy performance contract (including EPC extension with increase + reduction in the threshold in accordance with the energy plan declared at 0.1 PJ)	50.941
Environmental incentive + mini-EPC	3.685
Connection of SMEs to district heating systems	2.910
Optimisation of the settings of existing natural gas and heating oil boilers	3.641
E-Level < E30 (reduction on property tax)	0.358
Nudging via info on bills	0.532
Tax per kilometre for lorries (¹⁰⁴)	7.876
Total	84.062

¹⁰⁴ The effect of the tax per kilometre for lorries has been calculated on an indicative basis. Further research is needed in collaboration with the two other regions and the Federal Government.

On that basis, the Flemish Region's contribution to Belgium's target is 84.062 TWh.

Industry's contribution to the total energy savings made through all the alternative measures under Article 7 of the EED for the period 2021-2030 is 60%.

Brussels Capital Region

SELECTION OF MEASURES

Bruxelles Environnement is responsible for monitoring and controlling the various measures implemented and energy savings delivered. The government has to adopt any corrective measures needed to achieve the energy savings target under Article 7 of the EED.

The savings generated by the measures taken by the relevant parties are allowing the savings under Article 7 to be made. This would not have been possible without the final consumer measures having been taken. The required volume of energy savings is expressed in terms of final energy consumption, in gigawatt hours (GWh). The energy savings have been calculated using the methods and principles set out in Annex V to the EED. Additionality and materiality have been verified.

Given the area covered by the Brussels Capital Region, there is no need to apply a climatic variation, as suggested by point 5(i) of Annex V to the EED.

MEASURES

Regular inspection of heating systems

This regulatory measure consists of an obligation to regularly inspect boilers in accordance with the Brussels Air, Climate and Energy Management Code ([COBRACE](#)) (Articles 2.2.15 to 2.2.17 and 2.5.1 to 2.5.5) and the [Decree of the Government of the Brussels Capital Region of 21 June 2018 on the inspection and servicing of heating and air-conditioning systems and on the approval of persons carrying out this work](#). It applies to the residential and tertiary sectors.

More specifically, the regular inspection of boilers involves cleaning all components of the boiler and smoke exhaust system, adjusting the burner and checking compliance with the EPB requirements. Heating oil boilers must be inspected annually and natural gas boilers every two years.

The parties responsible for implementing this measure are as follows:

- the **Government of the Brussels Capital Region** adopts regulations on the EPB requirements applicable to heating systems of buildings at the time of their installation and during their operation;
- **Bruxelles Environnement** approves inspection engineers (COBRACE – Articles 2.5.1 to 2.5.5) and appoints quality control bodies;
- the **EPB boiler engineer** carries out the regular inspection;
- the **quality control body** checks the undertakings and obligations of EPB boiler engineers, issues reports on quality checks carried out and send these reports to Bruxelles Environnement.

Approval of heating systems

This regulatory measure applies to the residential and tertiary sectors.

Whenever a new boiler is approved, the heating system must be fully inspected to optimise its operation. The aim is to check that the heating system is properly installed in terms of its settings, insulation of pipework, ventilation of the boiler room, quality of the combustion and gases emitted, and draw of the chimney.

According to Article 2.1.1 of the Decree of the Government of the Brussels Capital Region of 21 June 2018 on the inspection and servicing of heating and air-conditioning systems and on the approval of persons carrying out this work, the heating system must be approved after a boiler is installed or replaced.

The parties responsible for implementing this measure are as follows:

- the **Government of the Brussels Capital Region** adopts regulations on the EPB requirements applicable to heating systems of buildings at the time of their installation and during their operation;
- **Bruxelles Environnement** approves engineers (COBRACE – Articles 2.5.1 to 2.5.5) and appoints quality control bodies;
- the **EPB heating adviser** carries out the approval;
- the **quality control body** checks the undertakings and obligations of EPB heating advisers, issues reports on quality checks carried out and send these reports to Bruxelles Environnement.

Local Action Plan for Energy Management (Plan Local d'Action pour la Gestion Energétique – PLAGE)

This regulatory measure was imposed by Articles 2.2.21 to 2.2.24 and 2.4.3⁽¹⁰⁵⁾ of the Brussels Air, Climate and Energy Management Code ([COBRACE](#) – adopted on 2 May 2013).

Its aim is to ensure that managers of extensive property holdings, whether public or private, optimise the energy management of their property by:

- carrying out an energy survey of the buildings owned or occupied by the body;
- implementing energy accounting for those buildings;
- developing and implementing an action programme in order to achieve an energy consumption reduction target: This plan will include actions connected with the management and maintenance of building installations and investments.

The methods for implementing the PLAGE are defined in several decrees⁽¹⁰⁶⁾. This measure came into force on 1 July 2019. The first energy surveys are expected in 2021.

The parties responsible for implementing this measure are as follows.

- The **Government of the Brussels Capital Region** determines the methods for preparing and implementing the PLAGE (Article 2.2.23(7) of the COBRACE).
- **Bruxelles Environnement** sets the energy savings target to be achieved and checks the end-of-PLAGE report to see whether the target has been met. If the target has not been met, Bruxelles Environnement penalises the body as provided for by the COBRACE.
- The **body subject to the PLAGE requirement** appoints a PLAGE coordinator, undertakes to achieve a PLAGE target and, at the end of the second phase, produces a report assessing whether the target has been met.
- The **PLAGE coordinator** appointed by the body carries out the energy survey, identifies the priority buildings for the body concerned, and produces an action programme that the coordinator implements in order to achieve the energy savings target (Article 2.2.23 of the COBRACE).
- The **PLAGE auditor** is independent of the body. The auditor assesses the credibility and relevance of the action programme and, where necessary, makes recommendations (Article 2.2.23(3) of the COBRACE). The auditor subsequently checks the data and information in the report assessing whether

¹⁰⁵ http://www.ejustice.just.fgov.be/mopdf/2013/05/21_1.pdf – pp. 28357-28420.

¹⁰⁶ [7 November 2018.- Ministerial Decree laying down the scales of effort for determining the target of the PLAGE, p. 90663](#), [7 November 2018.- Ministerial Decree laying down the methods and procedural conditions for implementing a system equivalent to the PLAGE, p. 90668](#).

[14 June 2018.- Decree of the Government of the Brussels Capital Region on the Local Action Plan for Energy Management, p. 53307](#).

the target has been met. If the target has not been met, the auditor assesses the relevance and veracity of the specific circumstances that the body may have cited to justify this failure (Article 2.2.23(4) of the COBRACE).

The PLAGE is mandatory for all the following (Articles 2.2.22 and 2.4.3 of the COBRACE):

- any company that owns and/or occupies buildings located within the region that have a combined total surface area in excess of 100,000 m²;
- any association covered by the Law of 27 June 1921 on non-profit associations, international non-profit associations and foundations that owns and/or occupies buildings located within the region that have a combined total surface area in excess of 100,000 m²;
- public authorities that own and/or occupy buildings located within the region that have a combined total surface area in excess of 50,000 m²;
- federal, regional and community authorities that own and/or occupy buildings located within the region.

Energy audits

This regulatory measure, laid down in [Article 6 of the Decree of the Government of the Brussels Capital Region of 8 December 2016 on the energy audit of large businesses and on the energy audit of the environmental permit](#), requires applications to renew environmental permits to be accompanied by an energy audit, where they relate to an establishment consisting of one or more buildings with a total surface area not allocated to housing in excess of 3,500 m². Holders of environmental permits are also required to implement any measures identified that have a return time of less than five years.

The parties responsible for implementing this measure are as follows:

- the **Government of the Brussels Capital Region** adopts regulations on the energy audit for energy-intensive establishments;
- the **independent auditor** is approved (Chapter III of the Decree of 8 December 2016);
- **Bruxelles Environnement** approves the auditor and carries out or delegates the quality control of energy audits (Article 18(9) of the Decree of 8 December 2016).

Energy incentives

Energy incentives are regional subsidies for work to reduce energy consumption that are available to any natural or legal person who owns, leases or manages property located in the Brussels Capital Region.

These incentives are means-tested and are particularly aimed at insulation work, investments in energy efficient thermal regulation systems, etc.

The parties responsible for implementing this measure are as follows:

- the **Government of the Brussels Capital Region** decides on the annual budget allocated to energy incentives within the energy fund (Article 24(2), third paragraph, of the Order of 19 July 2001 on the organisation of the electricity market in the Brussels Capital Region, and Article 18bis(2), second paragraph, of the Order of 1 April 2004 on the organisation of the gas market in the Brussels Capital Region, on highway occupation fees for gas and electricity, and amending the Order of 19 July 2001 on the organisation of the electricity market in the Brussels Capital Region) and on the annual implementation programme;
- **Bruxelles Environnement** is responsible for the public service obligations of promoting the rational use of energy through information, demonstrations and provision of equipment, services and financial aid to all categories of final customer (Article 24(2), first paragraph, of the Order of 19 July 2001 on the organisation of the electricity market in the Brussels Capital Region, and Article 18bis(2), first paragraph, of the Order of 1 April 2004 on the organisation of the gas market in the Brussels Capital Region, on highway occupation

fees for gas and electricity, and amending the Order of 19 July 2001 on the organisation of the electricity market in the Brussels Capital Region).

NRClick

NRClick is a regional support programme providing technical and financial support to reduce energy consumption within the buildings of local and regional public authorities in the Brussels Capital Region.

This project is a reflection of the government's desire to offer Brussels public authorities a framework for implementing energy saving measures.

The NRClick project was included in the public service tasks of the distribution system operator by Article 24bis(1) of the [Order on the electricity market](#):

Article 24bis. 1. The distribution system operator shall also be responsible for the following public service tasks:

10. in accordance with the arrangements in paragraph 2, supporting local and regional public authorities within the framework of the regional project to promote energy efficiency in the buildings of those public authorities, through advice, help with identifying opportunities, and administrative and technical support.

The project is based on three pillars: **energy accounting using the NRClick Scan tool; central purchasing body; energy efficiency.**

The energy saving measures will continue to have an effect after the project ends.

Improvement of the energy performance of public lighting

Under Article 24bis(1)(2) of the Order of 19 July 2001 on the organisation of the electricity market in the Brussels Capital Region, the distribution system operator (Sibelga) has a public service task with regard to the construction, maintenance and renewal of public lighting installations on the highway and in communal public spaces. This task encompasses:

- the construction and renewal of lights (and the low-voltage network specifically intended for the public lighting);
- the preventive and curative maintenance of the installations;
- the consumption of the public lighting.

This task also involves targets to improve energy efficiency.

The parties responsible for implementing this measure are as follows:

- the **Government of the Brussels Capital Region** adopts the [Order on the electricity market](#) and decides on the allocation of resources from the climate fund;
- **Bruxelles Environnement** is responsible for monitoring the implementation of the NRClick programme;
- **Sibelga** is responsible for implementing the NRClick programme;
- the **local and regional authorities** decide whether to participate in the NRClick programme.

Good Move regional mobility plan 2020-2030

As an innovative and coherent response to the issue of mobility, the Brussels Capital Region decided to aim the preparations for its mobility plan at users so that they could be offered easy, integrated and tailored mobility solutions allowing them to opt for the most efficient mode of transport for their travel.

The Order of 26 July 2013 (¹⁰⁷) made the Regional Mobility Plan (Plan Régional de Mobilité – PRM) a regulatory measure. The Good Move plan (Regional Mobility Plan 2020-2030) is a strategic and operational instrument for guiding and applying mobility policy.

The implementation of the PRM is to be assessed every 30 months. Based on this report, the government determines the corrective actions to be applied (Article 10).

The ambitions of the mobility policy have been categorised according to various urban issues, three of which impact on energy efficiency:

- reducing the impact of mobility on the environment (GREEN);
- developing mobility that is favourable to the socioeconomic development and supply of the region (EFFECTIVE);
- developing mobility that optimises resources (EFFICIENT).

The parties responsible for implementing this measure are as follows:

- the **Government of the Brussels Capital Region** adopts the Good Move plan (adopted at first reading in April 2019 and then submitted for public consultation) and defines the broad outlines and objectives of the PRM;
- **Bruxelles Mobilité** is responsible for implementing the Good Move plan;
- other Brussels public organisations and administrations are involved in implementing the measures according to their responsibilities (Bruxelles Environnement, the STIB, municipalities, etc.).

Energy savings in public transport (Société de transports intercommunaux bruxellois – STIB)

The STIB has faced the dual challenge of increasing its transport offer while reducing its CO₂ emissions and energy consumption. After four years of collaborative work, the STIB has developed a carbon and energy strategy to 2030.

This strategy is based on a framework established in accordance with current international standards and covering both direct emissions and some indirect emissions. Using an initial diagnosis made for 2010 and having identified certain influencing parameters and a series of actions, the STIB has studied various scenarios for reducing its emissions from a baseline scenario.

The STIB has identified numerous actions for improving its energy efficiency, which mainly concern its vehicle fleet and buildings:

1. renewal of the fleet;
2. recovery of braking energy;
3. Secure/Eco Drive;
4. optimisation of the heating and ventilation of vehicles;
5. renovation of heating installations;
6. lighting of metro stations;
7. awareness-raising;
8. improvement of heating, ventilation and air-conditioning systems in infrastructure;
9. improved integration of rational energy use clauses for maintenance.

¹⁰⁷ Order of 26 July 2013 establishing a mobility planning framework and amending various provisions impacting on mobility.

Energy Pack

The Energy Pack is a four-year programme (2018-2021) resulting from a call for projects among four business federations (Bruxeo, Comeos, Santhea and UCM). The successful federations have received a subsidy to offer free energy coaching to their members, and also to non-members who apply.

By assisting the energy advisers of these four bodies, the Energy Pack aims to support the implementation of specific energy measures as part of the adaptation or renovation of buildings.

The services available include awareness-raising among energy managers, general management and staff of establishments, group training and individual coaching (energy diagnosis of buildings, heating check-ups, work assistance, etc.).

A ‘coordination’ provider has also been contracted to draw up a communication plan, provide individual support to the partner federations (technical, communications, methods), lead group sessions and help with reporting.

Together with the coaching service provided with its partners, Bruxelles Environnement has created a support mechanism for further investment in addition to the existing incentive and tax relief offers. A proportional amount can be granted under a number of conditions.

The parties responsible for implementing this measure are as follows:

- the **four business federations**: Bruxeo, Comeos, Santhea and UCM;
- the **coordination provider** is 21 Solutions, which has the task of drawing up a communication plan, providing individual support to the partner federations (technical, communications, methods), leading group sessions and helping with reporting;
- **Bruxelles Environnement** is responsible for operating the Energy Pack, establishing appropriate processes and managing subsidies (four federations and investment support) and the coordination contract.

Walloon Region

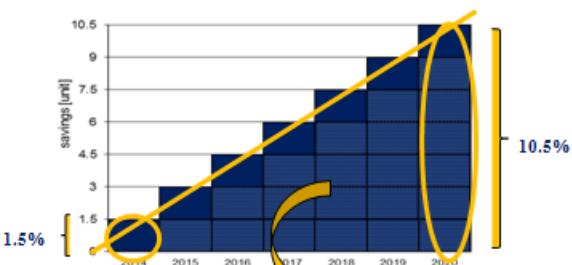
Existing scheme

Article 7 of the Energy Efficiency Directive (Directive 2012/27/EU) obliged the Walloon Region to introduce a scheme for annually reducing energy sales (i.e. final consumption) by 1.5% over the period 2014-2020.

Calculation method (Annex V)

Target = By 31 December 2020, achieve a **cumulative new energy savings target** (the trajectory can be broken down as desired):

2014 : 1.5 %
2015 : 3 %
2016 : 4.5 %
2017 : 6.0 %
2018 : 7.5 %
2019 : 9.0 %
2020 : 10.5 %
Total : 42.0 %



Durée de vie
Additionalité (au-delà des normes EU + pas double comptage)
EE matérielles et démontrables
Système indépendant de mesure, vérification et contrôle
2 périodes + rapportage annuel

Durée de vie	Lifetime
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Additionalité (au-delà des normes EU + pas double comptage)	Additionality (over and above EU standards + no double counting)
EE matérielles et démontrables	Tangible and demonstrable energy savings
Système indépendant de mesure, vérification et contrôle	Independent measurement, verification and control system
2 périodes + rapportage annuel	2 periods + annual reporting

This is an obligation of both means and outcome, which translates into a cumulative energy savings target for Wallonia in the first period (2014-2020) of 25,675 GWh, i.e. an additional 917 GWh of new savings per year.

Member States can choose one of two options in this respect (or a combination of both):

- an obligation scheme;
- a set of alternative measures.

In 2013, the Walloon Government decided to use alternative measures only, rather than to introduce an obligation such as an energy efficiency certificate scheme.

In view of the difficulty of achieving the target for the first period (2014-2020) through alternative measures, Wallonia must take steps to implement an additional scheme alongside the alternative measures for 2021-2030.

To 2030

The revision of the Energy Efficiency Directive extended and reinforced the obligation for the period 2021-2030. Wallonia must introduce a scheme guaranteeing a further 970 GWh of new end-use energy savings per year.

The energy savings made to meet this obligation must be counted in accordance with very strict criteria:

- robust, consistent and documented measurement or assessment methodology;
- account taken of the lifetime of the impact of each measure individually;
- eligibility of the measure taken into account (based on the reduction in final consumption, and not on the cancelling out of consumption by renewable generation);
- additionality of the measure in relation to European rules and standards and also spontaneous development;
- materiality (representative contribution of the measure to the transition to action) of each selected measure;
- minimum quality requirements for implementation;
- no double counting of impacts where several measures lead to the same action.

Monitoring, verification and reporting of annual energy savings therefore play a vital role in the Article 7 obligation. It is planned to set up an Article 7 multidisciplinary committee to ensure the consistency of measures and compliance with eligibility criteria, identify and verify the impacts of the scheme, monitor and report on the results, and propose new measures where applicable.

Furthermore, the measures selected to achieve the Walloon target are as follows:

- implementation of the long-term renovation strategy for Walloon buildings, with all measures being eligible for the Article 7 scheme, both in the residential sector and in the public and private tertiary sector, including the exemplary role of public buildings in achieving energy neutrality well before 2050;
- easier recourse to energy performance contracts, with the guaranteed result meeting the impact demonstrability requirements of the Article 7 scheme;
- implementation of the FAST plan, with all modal shift measures (soft modes, public transport, shared vehicles, etc.) being eligible for the Article 7 scheme;
- new generation of sectoral agreements with industry and business;
- continued financial support for businesses transitioning to sustainable energy, with particular focus on SMEs.

ii. Long-term renovation strategy to support the renovation of the national stock of residential and non-residential buildings, both public and private, including policies, measures and actions to stimulate cost-effective deep renovation and policies and actions to target the worst performing segments of the national building stock, in accordance with Article 2a of Directive 2010/31/EU

The energy performance and energy efficiency of buildings are the responsibility of the federated entities. Consequently, each entity has developed its own long-term renovation strategy for the buildings in its region: ‘Renovatiepact’ (Renovation Pact) and ‘Actieplan voor tertiaire gebouwen’ (Action plan for tertiary buildings) in Flanders; ‘Stratégie Rénovation à long terme du bâtiment wallon’ (Long-term renovation strategy for Wallonia’s buildings) in Wallonia, and ‘Stratégie de réduction de l’impact environnemental du bâti existant’ (Strategy to reduce the environmental impact of existing buildings) in the Brussels Capital Region. These strategies are detailed below.

While these strategies inevitably differ on some points, they present a common vision and share numerous measures.

Each entity has the following objectives: dramatically increase the rate of energy renovation of its building stock; work towards a defined average performance level by 2050; focus on decarbonising the supply of heat, and involve civil society and stakeholders in the development of these policies.

To achieve these objectives, legislative measures (e.g. introducing a housing passport and a building passport), tax measures and financial incentives (e.g. subsidies and access to low-interest loans for renovation works, as well as support measures) have been introduced. Emphasis has also been placed on developing data to gain a better understanding of the building stock. Demonstration projects within the European LIFE BE REEL project may serve as good examples and also help to provide data. General awareness is being raised through targeted communication campaigns.

Without question, governments always have a very important exemplary role to play, and the respective strategies are increasing the speed at which the entities are having to renovate their own buildings. Lastly, to successfully implement these strategies, there needs to be sufficient capacity in the construction sector, among others, and quality training needs to be guaranteed. Each region is therefore also working on these aspects.

Federal State

- The scope of the reduced VAT rate of 6% on the demolition and rebuilding of private dwellings, which currently applies in 32 towns, *could be extended if the European Commission were to regard this measure as making a significant contribution to the Belgian energy efficiency target.*
- Entry into force on 1 January 2019 of an optional scheme for charging VAT on new buildings leased for commercial purposes where the lessee is a Belgian taxpayer. This measure will spur on the renovation of Belgium’s commercial building stock by allowing the deduction of the VAT payable on the costs associated with these new buildings.
- A plan for an environmental energy tax will be drawn up in consultation with the federal and regional governments by 2021.

Flemish Region

RESIDENTIAL BUILDINGS

Flanders has a population density of 487 inhabitants per km², which makes it one of the most densely populated regions in Europe. At the start of 2019, the Flemish Region had 6,589,069 inhabitants. Between 2007 and 2019, the number of private households in the region increased from 2.55 million to 2.8 million, which was an increase of over 10%.

The average family size was 2.32 in 2017, but will be 2.29 in 2027. Since 1995, the size of households has shrunk considerably. Between 1995 and 2017, the number of single-person households increased by half. By 2030, it will have almost doubled compared with 1995.

Statistiek Vlaanderen predicts that, by 2030, the number of households will have risen by over 150,000 to 2.95 million (+5%).

Single-person households are expected to rise by 11% between 2017 and 2030 to 954,000 (+94,000, or 32% of all households), and two-person households by 10% to 1,060,000 (+100,000, or 36% of all households). In both categories, the proportion of elderly people will increase significantly. The number of ‘larger’ households (three people or more) has been falling for years, and this trend will continue in the future. This demographic change is accompanied by a growing need for small homes that are appropriate, affordable, high-quality and easily accessible. In the longer term, the population of the Flemish Region is expected to rise to 7.1 million inhabitants by 2040 and 7.4 million by 2060 (20.4% additional households) (source: Statbel).

Number of households by size	1995 (observation)	2017 (forecast)	2030 (forecast)	% increase 1995-2017	% increase 2017-2030
single-person household	588,542 (26%)	860,252 (31%)	954,362 (32%)	46	11
two-person household	731,905 (32%)	963,203 (35%)	1,061,533 (36%)	32	10
three-person household	431,981 (19%)	406,854 (15%)	397,920 (13%)	-6	-2
four-person household	370,843 (16%)	361,032 (13%)	357,781 (12%)	-3	-1
household with 5 or more members	178,126 (8%)	175,955 (6%)	179,108 (6%)	-1	2
Total	2,301,397	2,767,295	2,950,704	20	7

Figure: Change in number of households by size and growth forecasts to 2030

(Statistiek Vlaanderen, 2017)

Current policy

Achieving a much more energy-efficient housing stock poses considerable challenges. The government can support and facilitate this transformation, but other stakeholders, such as the construction sector, must also get involved. At the end of 2014, through a Renovation Pact, the Flemish Government started a process of mobilising investment to systematically improve the energy performance of the region’s housing stock. This not only required a support policy, but in particular a positive message mainly based on the social importance of this transformation for the region’s housing stock as a necessary part of the transition to a climate-neutral society.

Thirty-four organisations undertook to help actively and constructively to develop a Renovation Pact. With regard to the energy performance of existing housing, a long-term target was set for 2050, consisting of two equivalent parts: a series of measures and an energy performance indicator, which was set at an energy score of 100 kWh/m². This long-term target will be adjusted according to the type of dwelling.

Owners face many obstacles to the deep renovation of their homes. Together with a lack of funds or access to funds, one of the most commonly cited issues is a lack of knowledge: what to do, where to start and what measures to take first to renovate housing so that it is high quality and energy-efficient.

1. Woningpas

With the Woningpas (housing passport), the Flemish Government has developed a centrally managed instrument that, based on a specific vision and advice, helps owners to plan renovation works and their interactions with authorities in this respect (e.g. to obtain incentives and certificates). By removing barriers and offering streamlined and customised information, the Woningpas will encourage high-quality renovations and help to boost the renovation market.

The Woningpas is a free digital passport that was launched at the end of 2018 and that will eventually be available to all homes in Flanders. Owners can access relevant information on buildings, land and the environment, and also the certificates and incentives that the government already offers.

- Insulation scores (roof, walls, floors, etc.) from the energy performance certificate (EPC) are displayed in the form of coloured bars (red, yellow, green) in the Woningpas so that owners can quickly and easily see how their home currently performs and the long-term target for 2050.
- By the end of 2019/start of 2020, renovation advice from the EPC will be presented in graphic form in the Woningpas and will be supplemented by interactive encouragement aimed at owners. Owners will be able to use the Woningpas to monitor renovation work as it is carried out.
- If an EPC for the dwelling is available, the owner can already obtain detailed information from the Woningpas on the age or performance of a boiler, which may encourage investment in a replacement and which could eventually be used to provide targeted information on the servicing obligation. This function will eventually be extended to all homes.

The Woningpas allows owners to become more involved in the general condition of their homes in terms of comfort, energy performance, regulatory compliance, etc. This greater involvement may help to increase their desire to invest in improving the energy performance and quality of their homes.

This is a new and innovative policy instrument in Flanders, which lies at the heart of the efforts to implement the long-term renovation strategy for buildings. As a partner in the European Horizon 2020 iBRoad project, the Flemish Government is sharing its experience and expertise to help other EU Member States to develop similar instruments.

2. Energy performance certificate (EPC)

The EPC is also used as an important policy instrument for informing the public and raising their awareness about the energy performance of the house or apartment that they want to buy or rent. A new version of the EPC was launched in early 2019. The standard recommendations have been replaced by a package of measures, including an estimate of energy savings and costs (only for single-family houses), in accordance with the 2050 long-term target. A label has been added to this new EPC, ranging from F to A+. An A label currently corresponds to the long-term target. This will differ depending on the type of building. Outside the selling or renting context, the new EPC is also useful for anyone not necessarily wanting to sell or rent, but wanting to know their property's label and what energy renovation work may be needed to achieve an A label. Even for those who have already completed a renovation, the EPC may be useful for knowing what label the renovated house has achieved.

From 2022, every apartment block must have an EPC for the common parts. This will involve a different approach to selling and renting as this EPC will include information on the communal facilities, building envelope, and internal dividing floors and walls. The EPC for the common parts will aim to guide owners and the building manager on the building's energy performance and inform them about the steps needed for an energy efficient renovation. This EPC will also assist with producing effective EPCs for the individual apartments. The information on the building's common parts, such as the insulation properties of the roof, walls or floor or the characteristics of the communal facilities, will only need to be identified and checked once. This will represent a time saving for both the building manager and the energy expert, meaning that the apartment EPC can be produced at a lower cost. This method will also ensure that the apartment EPCs are uniform from the outset.

3. Financial support

System operators support energy saving by granting incentives for certain measures: insulation of walls, insulation of roofs and lofts, insulation of floors and cellars, high-performance glazing, heat pumps, solar water heaters.

When the incentives were reformed by the Flemish Government on 15 June 2016, some [new energy saving incentives](#) (e.g. for the insulation of internal walls and the comprehensive renovation incentive) were introduced and collective renovation projects ('prime de voisinage' or neighbourhood incentive) became entitled to financial support for their management. To achieve the long-term target, the content requirements of various individual incentives were tightened.

The new [comprehensive renovation incentive](#) came into effect on 1 February 2019. The improvement incentive disappeared and was fully absorbed into the renovation incentive. However, the adaptation incentive for work on housing for the over-65s will continue to exist separately. The renovation incentive is exclusively intended for individuals (natural person). It is particularly aimed at people who have carried out work on their own main residence ('occupant' target group) or people who have renovated a property for rental to a social rental agency or people in receipt of social housing allowance ('owner' target group). The renovation incentive is calculated for each category of work and amounts to 20% or 30% of the accepted cost price of the work (excluding VAT, with a maximum per category).

4. Tax measures

The [reduced rate of VAT of 6%](#) (instead of 21%) for the renovation of houses that are more than 10 years old has been an important tax incentive for many years. In addition, a reduced rate of VAT of 6% has been applied since 2007 for rebuilding after demolition in 13 central towns in Flanders. In 2009 and 2010 the measure was temporarily extended to the entire country in order to give the construction sector a helping hand following the financial crisis.

When [gift taxes](#) were reformed on 1 July 2015, the first initiative adopted used these tax instruments to provide targeted support to investments aimed at improving the energy performance of our housing stock. When the gift is made, the normal rate of gift tax must be paid. When the gift recipient proves that additional conditions have been met, the difference between the normal rate and the [special rate for energy renovation](#) is refunded. The gift recipient must carry out the renovation work within five years of the date of the deed of gift. The total cost of the work must be at least EUR 10,000 (excluding VAT) and the conditions applicable to energy incentives must be met.

Brackets Rates from 1/7/2015	Direct line (Grand)parents - (grand)children Between partners	Direct line Energy renovation	Indirect line	Direct line Energy renovation
0 - €150,000	3%	3%	10%	9%
€150,000 - €250,000	9%	6%	20%	17%
€250,000 - €450,000	18%	12%	30%	24%
> €450,000	27%	18%	40%	31%

On 9 May 2018 the Flemish Parliament approved changes to the [registration tax](#) on property purchases for sale contracts concluded from 1 June 2018. Since then, when purchasing a family home (not including second homes), the rate has been 7%. If a [major energy renovation is carried out, the rate is reduced to 6%](#), which gives the purchaser an additional budget for renovation.

For major energy renovations of residential buildings where the planning permission application dates from 1 October 2016, [property tax is reduced](#) for five years:

- if the E-level is not higher than E90, the reduction is 50%;
- if the E-level is not higher than E60, the reduction is 100%.

A major energy renovation involves completely replacing the technical installations (heating, cooling, ventilation, etc.) and (post-)insulating at least 75% of the existing and new external envelope.

For the renovation of inhabitable buildings, there will be an exemption from property tax from the 2019 tax year. Owners of properties listed in the regional inventory as being inhabitable or unavailable can benefit from a property tax exemption for five years if the building or housing concerned is demolished in order to build one or more new/replacement buildings. For housing, the tax benefit is limited to maximum of EUR 1,000 per year. This benefit can be combined with the property tax relief for a new ultra-energy-efficient building.

5. Standards

There are already some standards, such as the roof insulation standard and the glass standard under the Flemish Housing Code. By 2020 all roofs of individual homes (single-family houses, studios and apartments, therefore not rooms) must be insulated (¹⁰⁸). By 2023 all homes must have double glazing. The environment policy includes the obligation to inspect and service the central heating. The electrical installation must also be inspected when the property is sold and also every 25 years. An EPC must be produced on sale or rental of the property. EPC requirements apply to both new buildings and major energy renovations, and also to renovation work requiring permission. From 2021 construction in accordance with NZEB principles will be the standard for new homes in Flanders, which must therefore achieve an E-level of E30 or below.

6. Energy loans

On 19 May 2017 the Flemish Government decided to reform and optimise the policy instrument. From 2019 energy loans for individuals will be reserved solely for the priority target group. Through an energy loan, vulnerable families can borrow and repay interest free up to EUR 15,000 over a period of 10 years for work intended to save energy. Beneficiaries can also obtain free advice and support (quotations, selection of contractors, follow-up of work, applications for incentives). In addition to individuals in the vulnerable target groups, some non-market legal persons and some cooperatives (schools, hospitals, non-profit associations, etc.) can also borrow up to EUR 15,000 at 1% (over 10 years) until at least 2020.

7. Extension of the tasks of energy centres

In addition to granting energy loans, the 19 energy centres have been given additional tasks and will therefore, from 1 January 2019, act as one-stop shops with the emphasis being on help and guidance. Assessments aimed at helping vulnerable families to carry out energy saving work (roof insulation, double glazing, boiler) have been included in the tasks of energy centres since 2019. The centres will also act as local coordinators, for example by harmonising the services of local partners and housing information points.

8. Housing policy initiatives

The Flemish Decree on the rental of housing stipulates that, from 2019, landlords and tenants can agree that the rent will be adjusted following energy renovation work and that, in the event of disagreement, the courts can decide on the adjustment if the normal rental value resulting from the investment is more than 10% higher than the rent applicable at the time.

Several initiatives have recently been adopted to make existing social housing more energy efficient.

- Social housing framework decree:
 - o An energy correction can be applied when calculating the rent if the projected use is less than the reference use.
 - o Regulation on the method of calculating how social housing tenants can offset the investment costs associated with installing solar panels.

¹⁰⁸ From 2020, a maximum EPC value will be set in the regulation on the quality of housing. EPC values higher than this figure may offset the lack of roof insulation or double glazing.

- In 2018 social housing associations produced an inventory of their assets using a limited measurement of their condition. On that basis, they drew up a renovation plan for the next five years. At the end of 2011, a budget of EUR 28.5 million was made available for individual energy measures in rented social housing in the context of rational use of green heat and energy. This amount will almost entirely have been paid out by the end of 2019.
- When the Flemish Climate Policy Plan 2013-2020 was approved, a budget of EUR 7.8 million was earmarked for co-financing a comprehensive renovation incentive for social housing associations. This has since been increased and ...
- Over the 2016-2019 period, the Flemish Climate Fund provided EUR 20 million per year for additional investments in the energy renovation of rented social housing. In its September 2018 statement, the Flemish Climate Fund indicated that a further EUR 16 million would be made available, with an advance of EUR 3 million being paid in 2018. This left a budget of EUR 13 million for 2019. The funds have been used to subsidise extensive energy measures in the renovation and replacement of existing housing, in particular the installation of high-performance glazing, an insulating external envelope and technical installations such as heat pumps, high-performance boilers or solar water heaters.

Additional measures

The WAM scenario (or policy scenario) includes the following (energy saving) measures:

1. Develop the EPC

Through an EPC containing energy renovation recommendations, we will help owners to renovate their homes in a sustainable and high-quality manner.

An EPC will be essential in order to obtain a large renovation incentive (minimum of EUR 5,000) or an energy loan (minimum of EUR 7,500). Through communication and awareness-raising, we also aim to increase the number of voluntary EPCs. In this way, we will be able to inform 'historic' owners about the energy performance of their house or apartment. Depending on how the measures are developed and assessed, this will also provide a clearer and more complete view of the (energy) performance of the housing stock.

In collaboration with the financial sector, we will determine how EPC data can be shared so that lenders can decide, on the basis of simulations, scenarios, construction plans, etc., on additional borrowing capacity or which benefits may be associated with the loan for owners who significantly improve energy savings during the renovation.

In order to systematically improve the EPC score of rental housing, the Housing Minister will gradually tighten the maximum EPC score in terms of the minimum quality requirements of housing. This will be done by taking account of the 2050 long-term target and introducing reference criteria in accordance with the Flemish Energy and Climate Plan.

This measure will result in energy savings of 341 GWh by 2030.

2. Develop assistance initiatives

Through innovative assistance and financing initiatives, we will encourage a higher rate of renovation.

We will promote integration of the services currently provided by energy centres, housing information points (IGS [inter-municipal partnership] projects) and provincial support points for sustainable construction. Greater coordination should result in the creation of a local one-stop shop for energy and housing, which will offer a permanent high-quality service and form the first point of contact for local target groups (public, businesses, associations, etc.).

We will form a pool of trained renovation coaches, with the following tasks for example:

- provide initial renovation advice from the energy and housing one-stop shop; for tailor-made advice, it would be better to have a pool of architects who are experienced in energy efficient renovation;
- assist specific target groups (plan of approach, request and assessment of quotations, monitoring work, help with the acceptance of work, applications for incentives, etc.);
- develop a financing proposal suited to the needs of the owner/housing.

Many owners are not yet sufficiently engaged with the long-term renovation goal. They feel that their homes are 'in order'. For many in this target group, the long-term goal needs to be personalised so that they are motivated to act. The results of a number of projects that have already been implemented suggest that thermography is a prime motivation tool. The combination of thermographic photographs with a series of explanations and subsequent advice during the energy saving renovation work seems to be an attractive, cost-effective and far-reaching approach. The use of roof and façade scans makes the thermal losses clear and understandable and is a simple measure that could encourage many owners to take the decision to renovate. Given their significant awareness-raising effect, we will gradually produce a finely meshed series of thermographic photographs of roofs and façades, which will be used in the services provided by the energy and housing one-stop shop. We will start with pilot projects in regions where there is already a good supply of local energy renovation services. Correct interpretation of the thermographic images by these service-providers will be guaranteed (training, manuals, etc.). If the pilot projects are assessed as having a positive effect, they will be rolled out more widely.

This measure will result in energy savings of 78 GWh by 2030.

3. Local round tables on the climate

Being in the frontline in terms of the consequences of climate change on the ground, it is unsurprising that most local authorities want to positively tackle this issue. It is not by chance that the vast majority have signed the Covenant of Mayors on the climate and energy and are committed to actively implementing that agreement.

Objections or practical issues sometimes prevent good intentions from being converted into action on the ground. Like the Netherlands, we will organise round tables on the climate for this purpose. Through this initiative, we will bring all local stakeholders and key players around the table. This will particularly involve authorities, individuals, associations, businesses, etc., as well as all those who want to or can get involved in local policy or who can help to overcome practical objections.

Without doubt, one particular aspect of this approach that will ensure an impact on the ground is 'renovation at district level'. This will enable us to significantly improve the renovation rate. Some of the key players who must have a seat at the renovation table are the local authorities for the mapping of needs, citizens and businesses living and located in the district to be renovated, the local energy and housing one-stop shop, the financial sector, and local suppliers and installers of sustainable products.

The information gathered through these local round tables on the climate will also be crucial for participating in the implementation and monitoring of the long-term renovation strategy 2050. The Flemish Government will also ensure that the best practices resulting from these round tables will be communicated to other round tables so that they can be disseminated as widely as possible in the short term.

In relation to the local Energy and Climate Pact, the Flemish Minister for Internal Administration will continue the discussions on these round tables with the local authorities.

We estimate an effect in terms of additional energy savings of around 284 GWh by 2030.

4. Align housing and energy incentives

To ensure user-friendliness and transparency, the greatest possible number of incentives targeted at energy savings, improvement of quality and adaptation of housing will be brought within a one-stop shop with a view to developing a comprehensive housing renovation incentive.

There is currently a wide range of incentives in the area of housing and energy policy. Housing incentives are strictly limited to certain income categories, whereas energy incentives (roof, walls, floor insulation, glazing, etc.) are open to everyone, but their basic amount is limited.

Our aim is to eventually offer a single incentive for the renovation of housing. To start with, a one-stop shop will be set up in the form of a common front office for the public. This requires a high level of coordination in terms of content, with the focus being on existing target groups as far as possible in order to encourage improvements in quality and energy savings. Subsidised work will be clearly defined so that any overlaps or contradictions are avoided. Cooperation between the VEA, the Flanders Housing Agency and its legal successor, and distribution system operators will also be needed in order to organise the data flows between the front office and the back office.

5. Reduce registration taxes

In terms of housing taxation, we will shift the tax benefit from possession of a property to its purchase. At the same time as gradually abolishing the housing bonus, we will reduce the rate of sales tax on the purchase of a sole private single-family home from 7% to 6%. In the case of a major energy renovation and following a demolition, we will further reduce the rate to 5%.

6. Encourage the replacement of electric water heaters with heat pump water heaters

A heat pump water heater is a heat pump equipped with a tank. As heat is extracted more uniformly for domestic hot water than for space heating, heat pumps are perfectly suited to this function and ensure good energy efficiency. The heat source can be smaller, but there is always domestic hot water on tap. The fan draws in ambient heat that is used by the air-to-water heat pump to heat the water. This results in a 70% saving on electricity compared with an electric water heater.

In 2018, 2,726 heat pump water heaters were installed in existing residential buildings. In 2019 and 2020, it is predicted that 2,200 heat pump water heaters will be installed in existing residential buildings. Over the period 2021-2030, it is assumed that an average of 4,500 heat pump water heaters will be installed every year, of which 4,050 (90% of 4,500) will be installed in existing residential buildings.

In 2019, a declining incentive was introduced for heat pump water heaters: EUR 400 in 2019, EUR 300 in 2020 and EUR 200 in 2021, 2022 and 2023. From 2024, no incentive will be paid for installing heat pump water heaters. We will revise the incentive scheme in 2020 with a view to adding a condition on active direction.

If it is assumed that the average domestic hot water consumption per family is 3,000 kWh and that the average seasonal performance factor (SPF) is 3 for heat pump water heaters, this gives a saving of 2,000 kWh per heat pump water heater.

This measure will result in energy savings of 90 GWh by 2030.

7. Speed up the rate of renewal and setting optimisation of existing natural gas and heating oil boilers

In 2017, nearly 1.5 million homes in Flanders still had an old heating system (more than 15 years old). Every year, 90,000 to 95,000 appliances will be replaced with new fossil fuel boilers (which must comply with the Ecodesign Directive from September 2015) and 1,000 to 1,500 appliances will be replaced with a heat pump.

In order to make the heating of buildings more sustainable, we must firstly speed up the rate of renewal of heating systems.

At European level, the transposition of Directive 2018/844/EU, also known as the Energy Performance of Buildings Directive or EPBD, will encourage the tightening of existing measures and possibly the development of new measures to increase the energy efficiency of the European building stock. This is particularly the case with the energy-related operation of technical building systems in such buildings.

The Flemish Government Decree of 8 December 2006 on the servicing and inspection of central heating appliances for the heating of buildings or for the production of utility hot water is the most appropriate tool for this purpose. The Decree imposes a servicing obligation: natural gas (natural gas, butane or propane) central heating appliances must be serviced every two years by a qualified engineer who is familiar with heating oil and solid fuel appliances.

The Decree also contains performance requirements. Where the inspection of an appliance reveals that it does not meet the energy efficiency requirements, it must be replaced, at the very least by a condensing boiler, but preferably by a heat pump or other form of environmentally friendly energy production. Where there is an available district heating system, preference must be given to connection to that system.

In order to check that the servicing obligation is being met and to make the heating of buildings more sustainable, we will firstly digitise the inspection and servicing documents and, in 2020, we will start to develop a database containing this information on the main heating system used in each building. The database will be populated over the period 2021-2022. It will also be accessible via the Woningpas so that owners are informed when a service of their central heating system must be scheduled. A well-maintained central heating system allows significant energy savings to be made, is good for the climate and reduces energy bills.

At the same time as developing the database, we will amend the regulations. The items in the heating audit that relate to the calculation of energy performance will be included in the inspection and servicing documents, together with information on the correct sizing of such heating systems. The required power calculations will be relatively simple. Whenever a scheduled service is carried out, the energy efficiency of the boiler will be optimised by correctly setting the installation (setting optimisation). After all, many existing appliances (and also newly installed appliances) are over-sized, with the water temperature often being set (by the installer) higher than it needs to be. The combination of maximum efficiency of the heating system (reduced water temperature and longer operating hours) and careful use of a programmable thermostat (which can control several heating zones) will ensure a potential for savings in 1.5 million homes without compromising on comfort.

From 2021 onwards, we will start to raise the awareness of owners through various methods.

To help owners in their choice of sustainable heating, we will prepare a decision tree in 2020. We will conduct communication and awareness-raising campaigns on the energy efficiency of heating and air-conditioning installations through, for example, Veilig verwarmen or 'Safe Heating' (www.veiligverwarmen.be), which targets individuals and engineers as well as local authorities and intermediary organisations (e.g. housing associations), and Koel je goed or 'Cool yourself well' (www.koeljegoed.be).

From 2021, we will no longer grant incentives for the replacement of a heating oil boiler by a protected customer if natural gas is present in the street. To encourage more sustainable heating, we will grant higher incentives to protected customers only for natural gas condensing boilers and heat pumps.

Digital electricity and natural gas meters will be installed in Flanders in the next few years for all low-voltage connections up to 56 kVA. When the digital natural gas meter is installed, the boiler must be switched off. To ensure quick installation, users will be asked, in the letter sent prior to installation, to ensure that their boiler has been serviced and inspected in accordance with the applicable regulations (¹⁰⁹). If the boiler has been correctly inspected and complications arise following installation, the boiler restart or reprogramming costs will be covered by the distribution system operators. If the boiler has not been inspected, users will be responsible for the costs. This measure will ensure widespread communication with the corresponding financial incentive to promote the inspection of boilers.

A solid framework for applying the servicing obligation is also important for this measure, which has a significant impact on energy consumption and CO₂ emissions. Effective application of the law will improve compliance with the servicing obligation and with the performance requirement, resulting in a higher rate of replacement. Local authorities are responsible for monitoring compliance with the Decree, which is hardly being applied at the

¹⁰⁹ Article 8 of the Flemish Government Decree of 8 December 2006 on the servicing and inspection of central heating appliances for the heating of buildings or for the production of utility hot water.

moment. Decentralised heating appliances are not covered by these regulations. In collaboration with local authorities, we will look at how to improve the application of this measure and how to accompany it with appropriate awareness-raising, communication and information flows so that an effective application framework can be in place from 2025.

This measure will result in energy savings of 2,163 GWh by 2030.

8. Connection to natural gas of homes in new large housing developments and apartment buildings

From 2021, homes in new large housing developments and apartment buildings can be connected to natural gas only for district heating by cogeneration or in combination with a renewable energy system as the main heating system. From that date, the E30 level will apply to new-builds and the limited residual energy demand can therefore be easily met by sources other than fossil fuels.

EPB certificates reveal that 80% of new homes are connected to natural gas, which represents around 8,000 natural gas boilers every year. It can be assumed that 2,750 homes will opt for a heat pump and 1,000 for connection to a district heating system.

Assuming that the average heating and domestic hot water consumption in a new home is 3,785 kWh for fossil fuels and 1,708 kWh for a heat pump, the saving is 2,077 kWh per additional heat pump installed.

With regard to district heating systems, it can be assumed that the residual heat comes from industry in half of the cases (500 homes), therefore producing a 100% saving. The other 500 homes will be connected to a green district heating system.

This measure will result in energy savings of 76 GWh by 2030.

9. No heating oil boilers in new homes and in the case of major energy renovations from 2021 or in the case of replacement of an existing heating oil boiler

From 2021, we will impose a ban on heating oil boilers in new-builds and in the case of major energy renovations. It will not be possible to replace existing heating oil boilers with other heating oil boilers if there is a possibility of connecting to the natural gas system in the street, except where it is proven that the heating oil boilers have an equivalent performance to the latest natural gas condensing boilers.

Heating oil boilers are rarely used in new-builds. Since 2012, only 0.15% of EPB certificates have indicated heating oil as the energy carrier. The potential for savings in new-builds is therefore limited. The potential from 2021 will therefore lie almost entirely with major energy renovations, which should involve 500 homes per year based on predicted growth.

Installing a gas boiler instead of a heating oil boiler has a positive effect only on CO₂ emissions, as it does not result in much energy saving. Only installing a heat pump allows energy savings to be made (around 4,847 kWh in savings per heat pump). It is assumed that a heat pump will be installed in half of the cases.

This measure will result in energy savings of 10 GWh by 2030.

10. Measures to encourage demolition and rebuilding

Post-demolition new-builds replace old houses with mediocre energy performance and insufficient comfort and help to increase the density of our town centres and villages and make them more attractive

As part of preparations for the final NECP, we will ask the Federal Government to extend the reduced rate of VAT of 6% for renovations to all towns and municipalities in Belgium as soon as possible, as this is an effective instrument for speeding up the implementation of regional renovation strategies. In the meantime, the Flemish demolition and rebuilding incentive, introduced in October 2018, will be extended to the end of 2020. It is predicted that 2,300 applications will be made and 620 demolition incentives will be paid in 2019 and that, in 2020 when the system is in full swing, 3,000 applications will be made and 2,000 incentives will be paid.

In 2018, post-demolition rebuilding resulted in 4,079 new residential units (EPB database). In the Flemish Region, given that 350,000 homes are structurally inadequate (mainly dating from pre-1960), the potential is huge.

We assume that the reduced rate of VAT will apply from 2021.

In consultation with local authorities, the Flemish Minister for Internal Administration will also discuss local demolition plans and local demolition funds. Lastly, post-demolition registration taxes will be reduced from 6% to 5%, as with the registration taxes for major renovations.

This measure will result in energy savings of 557 GWh by 2030.

11. Rolling fund for the energy renovation of housing purchased out of necessity

The rolling fund for the energy renovation of housing purchased out of necessity is active. It aims to reduce energy poverty by granting interest-free loans to ‘emergency purchasers’, i.e. households that have purchased a low-quality home partly out of necessity, without having the financial resources to improve the quality of the home, resulting in high energy bills among other issues. The number of homes purchased out of necessity in Flanders is estimated at 4% (i.e. around 119,000 homes) of the Flemish housing stock.

The interest-free loans will be used to fund measures designed to ensure that the housing meets the basic safety, health and quality requirements set out in Article 5 of the Decree of 15 July 1997 on the Flemish Housing Code, and to make it more energy efficient. It is planned that the loan (and part of any capital gain) will be repaid when the property is sold or gifted, or after 20 years at the latest.

The interest-free loan must not exceed EUR 25,000. The resources available in the rolling fund (EUR 15.5 million) will therefore allow around 620 homes to be renovated. A call for projects will therefore be launched in early 2020, aimed at the CPAs. The effectiveness of the fund will be assessed through the selected projects.

This measure will result in energy savings of 96 GWh by 2030.

12. Change behaviour through information in energy bills

Including behavioural information in energy bills is a powerful tool. People are heavily influenced by what others are doing, particularly in their immediate surroundings. Where there is a benchmark (even if only implied), people are intrinsically motivated to conform. In other countries, such information has already had significant positive effects in terms of energy savings for the public.

The energy bill compares the family with ‘comparable families’. The result is an average reduction in energy consumption of between 1.5% and 3.5%. This cheap non-financial measure – sending a bill containing this information – can therefore significantly change consumer behaviour.

Assuming that this technique leads to a 2.5% saving on electricity consumption and a 1% saving on natural gas consumption, a total theoretical saving of 523 GWh can be achieved by Flemish households (basis: Vito energy balance). To avoid any overlap with other measures, such as the setting of heating installations, a saving of **52 GWh** will be taken into account.

13. E-level requirement for major energy renovations of E70 in 2020 and E60 in 2025

Since 2015, there have been specific requirements for major energy renovations (MERs). These are renovations (with planning permission) where at least the heating and/or cooling generator is completely replaced and at least 75% of the external envelope is (re)insulated. To ensure additional and faster savings from MERs, the required E-level will change from E90 to E70 in 2020, and to E60 in 2025.

The 50% reduction in property tax due to an E-level of E90 will disappear in 2020, with the 100% exemption due to an E-level of E60 being maintained from the same year.

The methods of calculating the energy performance of new-builds and major energy renovations have frequently changed and become more complex in recent years. Numerous construction partners have therefore

lost touch with the EPB regulations. In consultation with stakeholders, we will transform the current methods into one transparent and simplified method in which innovative construction techniques receive sufficient attention. The aim of the method will be to ensure that buildings can be objectively compared with each other and can be steered towards energy efficiency measures. In collaboration with stakeholders, we will also work to further improve the user-friendliness of the software tools. Simplifying the software and making it more user-friendly will remove a number of obstacles to MERs, which will therefore increase in number.

Based on current applications for planning permission for MERs, it is assumed that there will be 1,000 applications per year. An E90 home uses an average of 10,108 kWh for heating and domestic hot water.

Tightening the requirement from E90 to E70 will save 2,246 kWh (an E70 home consumes an average of 7,861 kWh).

Introducing the E60 requirement from 2027 (in actual fact from 2025 as the average period of time between the application for planning permission and the EPB certificate is 2 years) will result in the following saving compared with the baseline scenario: 3,369 kWh (an E60 home consumes an average of 6,738 kWh).

This measure will result in energy savings of 25 GWh by 2030.

14. Encourage the renovation of housing within five years of the notarial transfer

By 2050 at the latest, the entire Flemish housing stock must have been fully improved in energy terms in line with the long-term target, meaning that every year an average of 3% of housing must undergo a full energy renovation. An appropriate support policy is needed to achieve the interim targets in accordance with the Flemish Energy and Climate Plan 2021-2030 and the 2050 long-term target.

On average, over 75,000 homes have been sold every year in Flanders in recent years, which represents 2.5% of the housing market. Over 1% of homes change hands every year as a result of gifts and inheritances. Given that the Flemish Building Confederation (Vlaamse Confederatie Bouw – VCB) has found that 50% of new owners renovate (to a certain extent) in the first year following purchase and 75% within three years, a change of owner is the ideal moment in the life of a home to start renovating with the aim of meeting the long-term target. On average, this opportunity will arise only once for each home during the 2019-2050 period. Taking systematic advantage of the potential offered by a change of owner is an excellent way of encouraging owners to give greater consideration to energy renovation work in their overall renovation project. Given that, at the current rate of 3.5% per year, most non-compliant homes will change hands (sold, gifted, contributed to a company or inherited) by 2050, financial incentives should be developed so that major energy renovations can be carried out at these natural moments for extensive renovation work, such as a sale, although market price distortions and affordability must be monitored.

In order to control the energy consumption and energy bills of new owners, while achieving our climate objective, we will ensure, in particular by relaxing the terms of an energy loan, that non-energy efficient homes are fully renovated in terms of energy consumption within a maximum of five years of the notarial transfer of full ownership in order to achieve a maximum EPC score by type of building from 2021.

We will also examine the following options by September 2020 at the latest:

- reduction in property tax on non-energy efficient homes following a major energy renovation;
- increase in energy incentives for new owners to improve the EPC label;
- assistance with preparing an energy efficient renovation master plan, which will help the association of co-owners and the building manager with the renovation of large apartment buildings;
- public-private rolling fund for the renovation of apartments so that the term of VME loans can be extended from 10 years to 30 years. Granting a public guarantee can help to mobilise private capital.

Pending further research, it is assumed that homes will be renovated to achieve at least the C label within five years of their transfer.

This measure will result in energy savings of 3,406 GWh by 2030.

15. Social housing

The simulation table for the construction of social housing 2017 anticipates that subsidised funding will be granted for renewable energy sources, the NZEB level will be achieved and special district heating installations will be used in social housing. Before the end of 2019, the guidance document on the design of social housing will be amended so that it sets an E-Level of E60 as standard for major renovations.

We will also ensure that social housing associations are correctly informed in good time of the fact that new social housing must be built in accordance with the NZEB E-30 standard from 2021. This will also apply to the construction of replacement housing, which is generally the best possible option in energy terms. By 2050 all rental social housing must have a maximum EPC rating of 100 kWh/m². In cooperation with social housing associations and using the Woningkenmerken (property features) tool and the GeefEpc (Give EPC) tool, the Flemish Social Housing Association (Vlaamse Maatschappij voor Sociaal Wonen – VMSW) will draw up an action plan for achieving this target by 2050 and will indicate the effort needed in this respect.

In the short term, the VMSW will launch the Design and Insulate procedure to facilitate the energy renovation of social housing association properties. In the first instance, the sector has asked for this procedure to be applied to roof insulation, following which procedures will be launched for other energy work.

16. Speed up elimination of the asbestos risk in residential roofs

In order to speed up renovation of residential roofs containing asbestos, an incentive is granted as an additional measure for renovating such roofs. This incentive represents a contribution by the Flemish Government to the additional costs incurred by owners in renovating a roof containing asbestos and is intended to ensure rapid and safe/responsible demolition of such roofs.

According to figures from the OVAM and the VEA, the number of residential roofs containing asbestos is estimated at 270,000.

The asbestos plan aims to eliminate the asbestos risk in Flanders by 2034. Renovating 270,000 roofs over a 15-year period corresponds to 18,000 roofs per year and requires an annual incentive budget of EUR 18 million.

Through this incentive, a larger number of roofs will be renovated each year compared with the current situation of the existing rational energy use incentive and the additional incentive policy in the event of a notarial transfer.

The current rational energy use incentive allows the annual renovation of 46,384 roofs. Assuming that all roofs date from pre-2000, 15% contain asbestos, which corresponds to 6,958 roofs.

Through the incentive policy in the event of a notarial transfer, the roofs of 4,758 homes will be renovated each year. Once again, it is assumed that the roofs date from pre-2000 and therefore that 15% of them contain asbestos.

Out of the 18,000 roofs containing asbestos that need to be renovated each year, 11,716 will already be covered by the rational energy use incentive and the incentive policy in the event of a notarial transfer.

The renovation of 6,381 roofs will therefore be speeded up. If the calculation is based on an energy saving of 7 MWh per roof, this gives an additional annual energy saving of 44.67 GWh.

We will focus on communication and assistance to encourage individuals to renovate their roofs containing asbestos.

This measure will result in energy savings of 447 GWh by 2030.

17. Increase the inflow of labour into the construction sector

The capacity of the construction sector represents a major challenge for achieving the renovation strategy by 2050. In cooperation with the construction sector, the ministers responsible for education, energy and employment will draw up an action plan through the Flemish Advisory Committee on Construction (Vlaams

Bouwoverlegcomité – VBOC) in order to devise systematic solutions for structurally increasing the inflow of labour into the construction sector and to develop more efficient and less labour-intensive techniques of energy renovation.

- **NON-RESIDENTIAL BUILDINGS**

Among non-residential buildings, there are six main subsectors: offices, retail, hotel and catering, health, education, and other community and social services (water and waste, goods handling, laundries, sport and culture, etc.). The office sectors (excluding public authorities, retail, hotel and catering, and some of the other community and social services) can be grouped within the business sectors. Health and education are community sectors.

Offices (28%) and retail (21%) together accounted for around half of the total final energy consumption in the tertiary sector in 2018. The ‘other community and social services’ subsector accounted for 26% of tertiary energy consumption, with hotel and catering, health and education respectively accounting for around 12%, 10% and 4% of final energy consumption in the tertiary sector.

Given the large number of subsectors, there is also a wide variation within the stock of non-residential buildings in terms of energy consumption and market characteristics. In addition, the ownership structure is more complex than for residential buildings. Properties are more often leased, or managed by a third party.

There are also buildings that belong to, and are used by, the public. In terms of the Flemish Government, this accounts for 2,861 buildings with a primary energy consumption of 1,340 GWh in 2018. In this case, the final energy consumption is 330 GWh for electricity, 504 GWh for gas and 10 GWh for heating oil. The total useful floor area of these buildings is 3.1 million m².

If we look at the Flemish Government in the broad sense (including local authorities and all healthcare and educational establishments), primary energy consumption is around 15,000 GWh.

The main reasons why offices, public authorities, etc. are not achieving the potential energy savings are as follows:

- energy costs represent only a small part of operating costs (less than 5% on average for office buildings);
- knowledge of energy saving measures is limited in office/business buildings;
- funding, as available investment resources are primarily used for the basic activities;
- many businesses also lease their buildings, which makes them less inclined to invest in them.

Current policy

The current range of policy instruments can be divided into two categories: regulations and financial support. A number of assistance initiatives have also been developed for the target group.

1. EPC

An energy performance certificate (EPC) must be issued for public buildings, which are buildings occupied by public bodies that provide public services to a large number of people. A public building EPC must be issued for public buildings with a useful floor area of 250 m² or more. This requirement therefore covers not only the buildings of the Flemish authorities (both federal and local), but also those of healthcare and educational establishments.

From 2020, the EPC will become compulsory on the sale or lease of small non-residential buildings.

In order to be regarded as a small non-residential unit, the building must meet the following conditions:

- be functionally independent (the unit operates independently);
- be accessible through a lockable private access from the public highway, a courtyard or a shared circulation area;

- be a small unit: useful floor area $\leq 500 \text{ m}^2$;
- not form part of a large non-residential unit: useful floor area of the uninterrupted set of non-residential units $\leq 1,000 \text{ m}^2$.

2. Compulsory energy audit for large businesses

Under Article 8 of the Energy Efficiency Directive, large businesses are required to undergo an audit. Large businesses are defined as those employing over 250 persons or which have an annual turnover exceeding EUR 50 million and which have an annual balance sheet total exceeding EUR 43 million. Establishments that have a public building EPC including an energy plan complying with VLAREM II (Flemish Government Decree of 1 June 1995 laying down general and sectoral requirements in terms of environmental health), that have signed an energy policy agreement or that meet standards EN 16001 or ISO 50001 are not subject to this obligation.

This compulsory energy audit covers both the energy consumption of the building and the energy consumption of the process and transport. The audit is carried out by an in-house or external energy expert and the VEA checks the quality of audits. The audit must be updated every four years.

Among the specific examples of non-residential buildings covered by the scope of the Directive are bank buildings such as those of BNP Paribas Fortis and KBC, the Jessa hospital in Hasselt, residential care centres, stores such as IKEA, etc. In the non-residential sectors, it is mainly office buildings, healthcare establishments and, to a lesser extent, retail establishments that are subject to the compulsory energy audit for large businesses.

3. Energy performance level (EPL) regulations

The EPL regulations imposes energy performance requirements on non-residential buildings. For example, there are standards for insulation, ventilation and energy performance. The requirements differ depending on whether the building is new or is undergoing a major energy renovation or a normal renovation.

4. Compulsory inspection of heating and air-conditioning systems

Articles 14 and 15 of the EPBD lay down obligations for the inspection of heating and air-conditioning systems.

With regard to heating installations, the requirements are met through the heating audit (Article 9 of the Decree on heating appliances). The heating audit consists of a comprehensive assessment of the size and efficiency of the heating appliance and also an assessment of the energy performance of the entire *heating installation*, taking into account the building's heating requirements. The owner receives a heating audit report containing recommendations on the possible replacement of the installation and other energy saving measures. A copy of the report must also be provided by the owner to the user (lessee). The frequency of the heating audit depends on the rated output and type of fuel and ranges from every two years to every five years.

With regard to air-conditioning installations, an energy inspection must be carried out. In accordance with Article 15 of the EPBD, air-conditioning systems with a rated output of more than 12 kW must be regularly inspected. This obligation is set out in Article 5.16.3.3 of VLAREM II. The inspection consists of an assessment of the efficiency and sizing of the air-conditioning system, taking into account the building's cooling requirements, an examination of the available documentation, a visual inspection of the air-conditioning system, an assessment of the correct use of the air-conditioning system, and an examination of some of the operating parameters of this system. The frequency of inspection of air-conditioning systems depends on the rated output and ranges from every two years to every five years. In addition, a new air-conditioning system must be inspected for the first time within 12 months of being commissioned. All air-conditioning units must also undergo an energy inspection within 12 months of being installed or replaced.

5. Energy incentives

Electricity distribution system operators (DSOs) must promote the rational use of energy (RUE) by their customers under their public service obligations (PSOs). The main measure implemented by DSOs under their PSOs is the payment of energy incentives for both residential and non-residential buildings.

More specifically, for non-residential buildings, incentives can be obtained for the insulation of roofs, lofts, external walls, cellars and floors, for the installation of high-performance glazing, a solar water heater, a heat pump or a heat pump water heater, and for relighting. The above incentives can be combined.

6. Energy incentive following an energy audit

If an energy audit reveals that making an energy investment in a building would result in significant energy savings and where this investment has actually been made, Fluvius also grants an energy incentive under its PSOs. The incentive amount is EUR 0.035 per kWh of primary energy saved, with a maximum of EUR 25,000 per project and per year.

The depreciation period of the measure must exceed two years and the buildings concerned must be at least five years old on the date of the application for the incentive. This incentive applies only to measures for which there is no specific energy incentive as defined in point 3.1.5.

Elia also grants an energy incentive in the form of investment aid following an energy audit. Energy saving measures that result in significant energy savings and that have a depreciation period of more than two years are eligible for this investment aid. A maximum of EUR 200,000 of investment aid can be granted per year, per final customer and per site.

7. Increased investment deduction

Businesses can reduce their taxable profits through an increased investment deduction for investments in energy savings. Investments allowing energy savings to be made that are eligible for an increased investment deduction are, for example, insulation of roofs, external walls and floors, double-glazing, relighting and heat pumps.

The applicable provision is set out in Article 69 of the Income Tax Code and can be combined with energy incentives granted by DSOs. For the tax year 2019, an investment deduction of 13.5% applies, regardless of the size of the business. Sole trader businesses and SMEs are eligible for a 20% deduction for investments made in 2018 and 2019.

The increased investment deduction is ultimately granted by the Federal Government (Federal Public Service for Finance), but a certificate must be obtained to confirm eligibility. This certificate must be requested from the Flemish Energy Agency for investments in the Flemish Region.

8. ‘Prime écologique+’ environmental incentive

The environmental incentive is a measure intended to support the sustainability of businesses and is managed by the Flemish Agency for Innovation and Entrepreneurship (VLAIO). The aid covers between 15% and 55% of the additional cost of the investment, and only measures included in a defined list are eligible. This list is issued every year by ministerial decree. The following are examples of energy saving measures in the current list: connection to existing district heating systems, heat pump powered by residual heat, active and intelligent natural lighting system, etc.

9. Tax benefits

In order to encourage major energy renovations and new energy efficient installations in non-residential buildings, a number of tax benefits are available. These tax benefits involve a reduction in property tax for a period of five years. The amount of the reduction depends on the building's E-level.

For major energy renovations involving an application for planning permission between 1 October 2016 and 31 December 2019, the reduction is 50% for a maximum E-level of E90 and 100% for a maximum E-level of E60. For new buildings for which the planning permission application was submitted after 1 January 2016, the reduction is 50% for a maximum E-level of E30 and 100% for a maximum E-level of E20.

10. Mini-energy agreements (Mini-EPCs)

To encourage SMEs to adopt energy saving measures, sectoral assistance programmes have been developed for the SME target group: mini-EPCs.

As the SME target group is very diverse in terms of size, processes and energy saving measures, it was decided to implement energy saving programmes at sectoral level. As part of the mini-EPC procedure, the sectoral federation appoints an energy coach, funded by the Flemish Government, to help SMEs adopt energy saving measures. The energy coach is there to help SMEs to:

- carry out an energy scan;
- compare offers;
- monitor the installation process;
- request existing incentives and subsidies.

The sectoral federation is responsible for promoting and disseminating the mini-EPC procedure. As far as possible, framework contracts for certain investments are also concluded with suppliers in relation to measures that are very common in the sector.

With regard to the SME target group, pilot projects have been set up with the sectoral federations Fevia, Agoria, Horeca Vlaanderen, Boerenbond and Comeos. At the end of these pilot projects, the results will be assessed.

11. Terra

As part of its task of promoting energy efficiency in public buildings (in the broad sense), the Flemish Agency for Energy Saving in the Public Sector (Vlaams EnergieBedrijf – VEB) is developing a data platform known as 'Terra'. This database will allow entities to easily monitor their energy consumption without having to set up their own system.

The fundamental aim of this database is to encourage institutions using the data platform to adopt energy saving measures. This will be achieved by producing reports for institutions that contain specific proposals for measures and by making the platform public so that other energy service-providers can also develop a range of services based on an analysis of the published data.

Due to the importance of collecting data for the energy transition, the Flemish Government decided on 5 April 2019 to allocate a further EUR 1.575 million to the development of Terra. The aim of this investment is to continue the software development of Terra so that there can be fluid reporting on the energy and climate targets within the Flemish Government.

12. Climate commitments in the health sector

On 12 January 2017 a declaration containing 13 climate commitments was made by the health sector. This declaration was written and signed by the umbrella organisations, the competent minister, the VEB and the VIPA (Flemish Infrastructure Fund for Personal Matters). To help meet these commitments, EUR 23 million were made available by the Climate Fund. A number of the commitments concern energy efficiency.

1. The aim is for annual energy savings of 2.09% (per healthcare establishment), with a total saving of 27% by 2030.
2. Resources have been made available to fund personalised energy performance diagnoses. These should result in an action plan setting out various possible investments and a feasibility study on ESCO contracts.
3. In return for these free services, institutions undertake to adopt measures with a depreciation period of less than five years. Otherwise, payment must be made for the energy performance diagnosis.
4. For measures with a longer depreciation period, a subsidy instrument has been developed using funds from the Climate Fund in order to financially encourage these investments. However, adopting such measures remains optional.
5. From 2018, all new buildings in the sector will be NZEB (defined as cost-optimal in the EPL methodology) and sustainable.
6. Monitoring and comparative analysis tools are being developed in cooperation with Vlaams EnergieBedrijf.

The Flemish Government Decree of 30 March 2018 organises the implementation of the first four commitments. The Decree stipulates that energy performance diagnoses will be free if measures with a depreciation period of less than five years are adopted within three years.

In order to meet the fourth commitment, two subsidy measures have been introduced: the subsidy for energy performance contracts and the subsidy for climate investments in long-term projects. The first subsidy is granted where a series of energy saving measures is adopted as part of an energy performance contract. The subsidy is 10% of the cost price of facilitating an EPC, with a maximum of EUR 8,000. Energy saving measures can therefore be adopted more quickly. The second subsidy aims to reduce the depreciation period of investments to five years. The subsidy is granted for energy saving measures that have a significant impact in terms of reducing CO₂ emissions and is 60% of the estimated investment cost.

Energy savings made through the declaration will be monitored via Terra. However, under the Energy Decree, usage data of system operators can be forwarded only to the Flemish Energy Agency (¹¹⁰). That is why there is an agreement with the VEB, under which the VEA can transfer usage data to the VEB. The latter will use these data to populate Terra. In addition, measures proposed following energy performance diagnoses will also be inputted into Terra. This database can also indicate the potential savings and depreciation periods for each measure, which will allow users to plan the appropriate time for implementing each measure.

All the necessary data will also be collated within Terra in order to provide a reference measurement for the installations concerned, which will be used for further comparative analyses and for monitoring the energy saving targets. Every effort will be made to assist establishments, with emphasis on the following aspects:

- management of the invitation to tender for energy scans and quality control;
- prior examination of the energy performance contract after each energy scan and support in the process of drawing up a facilitation contract and in the subsequent development of the energy performance contract;
- establishment of framework contracts and performance contracts with funding solutions (citizens' cooperatives);
- cooperation with external partners (e.g. Fluvius) so that existing energy incentives and energy audits are seamlessly integrated;
- centralised collection of data in Terra on: potential measures, measures adopted, consumption and savings;
- administrative simplification;

¹¹⁰ Article 12.2.2 of the Energy Decree.

- transparency of the offer through targeted communication with best practices.

Under the standard VIPA subsidy, extensive renovations in the context of a ‘major energy renovation’ are treated like a new-build and are also now subsidised at 100% of the base amount of the investment subsidy, rather than 75% of that amount as in the case of renovations.

13. Climate commitments in education

The Education Minister has announced 11 climate commitments in this policy area, with EUR 54 million having been provided by the Climate Fund for the period 2016-2019. In 2019, a further tranche of EUR 20.7 million was added. A number of the commitments concern energy efficiency.

Out of the 11 commitments, 5 were approved and implemented by the Flemish Government in the first phase (31 March 2017).

1. A call for investments in energy savings (the list of possible measures was established in advance) was launched in 2016 for higher education. Institutions could therefore obtain a subsidy of 50% of the amount invested (limited to EUR 500,000 per project). The subsidies were awarded by a panel according to a ranking based on the CO₂ saving per euro invested. In 2016 subsidies totalling around EUR 5.1 million were granted to projects. A further call for proposals was launched in 2017, this time without the EUR 500,000 ceiling per project. EUR 12 million were therefore invested in higher education in 2017. For the period 2016-2019, a total amount of EUR 20 million has been allocated to universities. Following the 2016 and 2017 calls, there is just under EUR 3 million remaining.
2. Subsidy for improving the settings of boilers (heating installations). Schools (all levels) and universities were invited to have their heating systems adjusted during the winter of 2017-2018, regardless of the legal requirements for the regular inspection and servicing of heating systems. A one-off subsidy was therefore paid to support the implementation of this project by a private company based on a predetermined checklist (which went beyond the legal requirements). The application had to be made before 31 October 2017 and the subsidy amount depended on the installation’s output. Through this subsidy, nearly 1,000 boilers in around 500 schools and universities were adjusted to their optimum settings.
3. Using additional resources from the Climate Fund, efforts were made to implement energy saving measures in compulsory education.
4. Climate projects at school level. A call for projects was launched in 2017 to identify opportunities for investment in energy efficiency and to develop a school renovation plan. To support the measure, a budget of up to EUR 100,000 per province was granted, with a maximum of two projects to be approved in each province. The total budget of this call for projects is EUR 500,000. All the projects are currently being implemented.
5. STEM-Climate call for projects for primary, secondary and adult education. In 2017 educational establishments were given the opportunity to develop an innovative project in which the topics of STEM (science, technology, engineering and mathematics) and climate were linked. They were free to decide on the approach, but projects resulting in demonstrable direct or indirect CO₂ savings were regarded as having added value. The maximum subsidy was EUR 5,000 per project and there was a total budget of EUR 375,000. In the end, 92 projects benefited from this subsidy.
6. Since September 2017, AGION (Agency for School Infrastructure) has been offering low-cost loans for the installation of solar panels. By 16 September 2019, the Agency had already approved 83 solar loan applications. The scope has also been extended, as these loans can now be granted for various investments in renewable energy and energy savings.

In 2018 the Flemish Government focused its attention on a second series of measures connected with ‘education and awareness-raising’ (Flemish Government Decision of 22 December 2017).

1. To ensure good energy management in schools, a partnership has been established between AGION and the VEB. Due to its expertise, the latter can offer advice and assistance to schools; it already has access to school

consumption data, which it can transfer free of charge to schools. AGION also receives this information from the VEB, which it uses to carry out awareness-raising actions among school authorities. The main aim of the partnership between the VEB and AGION is to raise the awareness of school authorities about the measures that they can take to achieve greater energy efficiency. This measure has resulted in five energy performance contracts being concluded under the control of the VEB. These projects are ongoing (see also point 6.3.7).

2. Building of climate-related knowledge and skills through the following measures.
 - ✓ Creation of a 'climate and education' working group in order to ensure that correct information on the climate is available to all stakeholders and is used in teaching practice. The measure involves a text on the climate, produced in the environmental policy area, which clearly sets out the main aspects of the climate issue. The taskforce will also identify best practices and obstacles in the area of climate education. It brings together representatives of the main stakeholders in education.
 - ✓ The taskforce will also be responsible for the following specific tasks.
 - Providing tools to schools.
 - Designing a lifelong training course on the climate for teachers.
 - Developing a 'climate' educational activities module for specific subjects in secondary education. Certain subjects will be studied in this respect and the climate-related levers will be examined.
3. Promote the climate issue within Flemish higher education establishments.
 - ✓ Transform higher education establishments into 'Living Labs'. This means that establishments examine how their function and start a process of improvement in consultation with researchers, teachers, students and managers. The knowledge needed for this purpose exists within the institutions themselves.
 - ✓ Conduct of practical research into climate-related educational issues. There seems to be a lack of clarity about how higher education can best respond to a number of specific climate-related issues. The aim is to show how teachers in various disciplines can make room for meaningful teaching on the climate.

14. Klimaatscholen 2050

Klimaatscholen 2050 (Climate Schools 2050) is a Catholic educational initiative in Flanders. Framework agreements have been concluded in collaboration with six citizens' cooperatives (BeauVent, Ecopower, EnerGent, PajoPower, Stroomvloed and ZuidtrAnt) and five consulting firms (BAS Bouwen, Efika, Bureau 9000, Zero Emission Solutions and Energield).

Klimaatscholen 2050 focuses on assisting schools with sustainability investments. The project revolves around energy savings and energy measurement, as well as renewable energy. In terms of energy savings, BAS Bouwen, Efika, Bureau 9000 and Zero Emission Solutions have developed a common approach to make the energy consumption of schools more sustainable. The focus is primarily on the correct measurement of consumption, efficient use of existing installations and development of an action plan for saving energy in the school.

Energy is measured in collaboration with Energield. Klimaatscholen 2050 allows schools to monitor their energy consumption free of charge through the Energield service, with consumption data being monitored through an online platform.

Within this project, the citizens' cooperatives are responsible for investments and exploiting renewable energy (PV installations).

15. Cultural sector

In the cultural sector, the Flemish Government has approved a decree under which investments in cultural facilities are used as a priority for energy saving measures. For example, cultural associations can apply for subsidies for a whole range of energy saving measures: conduct of an energy audit, set-up of smart energy metering, general relighting, roof insulation, external wall insulation, floor insulation, replacement of a heating oil system with a gas-fired system, installation of a heat pump, installation of a solar water heater, etc. When subsidies are approved, the applicant undertakes to annually monitor its energy consumption for a period of 10 years.

In 2018 the Flemish Government launched the energy loan for culture- and youth-related facilities. Cultural and youth associations working in the culture and youth policy areas at local, provincial or regional level are eligible for this low-cost energy loan.

16. Youth activities sector

Raising awareness of the climate is a key issue for our young people and we want the places where they meet to set an example. The subsidies available in the cultural sector for energy saving measures are also available for youth-related facilities. We will improve the approach and study other options so that those responsible can get to work and take advantage of any available subsidies and loans. We are particularly determined to lower the threshold for assistance and to provide more intensive support for work undertaken spontaneously.

We are progressing with the masterplan for bivouac sites, and we are continuing our efforts to give every child the chance to go on camp and to provide sufficient funds for homes, centres and accommodation for young people. The focus will be on sustainability in the broad sense, i.e. on heating and electricity requirements in buildings and on local renewable energy sources.

17. Sports facilities

With regard to sports facilities, the focus will be on sustainability in accordance with the Decree of 5 May 2017 supporting supralocal sports facilities and high-level sports facilities. In its 14 centres, Sport Vlaanderen (Flemish Sports Agency) will continue cooperating with the VEB on energy efficiency and will endeavour to ensure that sports centres lead the way in their capacity as centres of excellence in numerous areas including the environment (energy efficiency, water recovery, waste policy, etc.).

18. Energy efficiency action plan for Flemish public buildings

In order to comply with Article 5 of the Energy Efficiency Directive, at least 3% of the floor area of existing public buildings must be extensively renovated every year, or equivalent energy savings must be made using another approach.

The Flemish Government has chosen to take an alternative approach. In 2016, in addition to this alternative approach, the Energy efficiency action plan was produced for the Flemish Government. The aim of the action plan is to reduce the CO₂ emissions of government entities by 40% by 2030. A 27% reduction in primary energy consumption is also expected. This represents an annual energy saving of 2.09% for each entity.

To achieve this goal, two key players have been identified. Firstly, there is Het Facilitair Bedrijf (HFB), which centrally manages all the property of the Flemish Government, with priority being given to the office buildings. HFB has proposed a long-term strategy in which the bar is set high for new buildings in terms of energy consumption in particular, major energy renovations are carried out and the most energy-intensive buildings are abandoned. Secondly, government entities can regularly participate in calls for energy efficiency projects launched by the VEB. These entities can also call on the usual assistance services provided by the VEB, such as potential scans, insulation, relighting and boiler renovation advice, etc.

For the largest energy users, an annual reduction in the energy budget of 2.09% is intended to further encourage them to consume less energy and to focus on energy efficiency measures. The largest energy users can also have recourse to the VEB's energy performance contracts (using the ESCO model). Agreements have been reached between HFB and the VEB regarding the division of tasks.

SURE2050 is an initiative of the Flemish provinces, Factor4, Fluvius, HFB and the VEB, with the latter as project coordinator. This initiative is designed to help the Flemish central and local authorities formulate a strategic property plan, based on climate neutrality by 2050 at the latest. The participating authorities receive support with cost-effective investment projects. The initiative is also a knowledge development programme in the area of sustainable property management and policy. The expertise of its initiators is combined with that of participating municipalities and entities.

Additional policy

The WAM scenario involves measures similar to those for housing, including planning permission, non-residential EPCs, incentives and tax measures, Flemish strategy and action plans for making the heating of our buildings more sustainable, etc., and semi-specific measures such as integrating the investment incentive for energy saving measures adopted by system operators in the 'prime écologique+', expanding the Terra information platform, etc.

We are currently developing an energy performance certificate for large non-residential buildings (**EPC-NR**). The EPC for public buildings will be included in the EPC policy framework for non-residential buildings.

In order to better understand the current energy performance of non-residential buildings, **all large non-residential buildings** (that have the option of heating or air-conditioning) must have an EPC-NR **by 2050** at the latest. From 2030, these buildings will need to have a **minimum energy performance label**. **Public buildings** in the Flemish Region must set a good example by obtaining **this label before 2028**. We are therefore in the process of setting up specific collaboration with the VEB and HFB.

From 2021, non-energy-efficient tertiary buildings must undergo a **complete energy renovation** within **five years of a notarial transfer** of full ownership.

Further to the Woningpas launched at the end of 2018, we will develop a **Gebouwenpas** (Building passport), which will enable owners or users to save, access and exchange digital information on buildings, land and the environment, and also recommendations to improve energy performance. In developing the Gebouwenpas, we will ensure that the business information point and the Terra database for public authorities, schools and healthcare establishments are complementary.

In addition, a **data platform for non-residential buildings** will be developed in order to provide an overview of energy data and technical and construction properties of buildings. It will therefore be possible to obtain a precise picture of the number of buildings in each sector, their floor area and their energy performance. This data platform will be made available to the public for comparative analysis purposes, while respecting confidentiality, so that building owners and managers can also compare the energy performance of their building with other (similar) buildings.

The **1% energy loan** for the current target groups, i.e. non-market legal persons and cooperatives, will be extended to 31 December 2020. Given that the government agreement stipulates that the conditions of energy loans will be relaxed, the extension (and possible adjustment) of the 1% loan beyond 2020 will form part of this exercise.

From 2021, we will also **impose a ban on heating oil boilers** in non-residential buildings in the case of new-builds and major energy renovations. It will not be possible to replace existing heating oil boilers with other heating oil boilers if there is a possibility of connecting to the natural gas system in the street, except where it is proven that the heating oil boilers have an equivalent performance to the latest natural gas condensing boilers. Buildings situated in new large housing developments and apartment buildings can be connected to natural gas

only for district heating by cogeneration or in combination with a renewable energy system as the main heating system.

To help owners in their choice of sustainable heating, we will prepare a decision tree.

It is important that the various public authorities set an example, which will ensure greater support among the other social players. Article 5 of the Energy Efficiency Directive requires public authorities to annually renovate 3% of the floor area of their air-conditioned or heated buildings, or to make similar energy savings through a combination of measures.

We will ask the **municipalities, cities, towns, local authority associations, public social welfare centres, provinces and autonomous municipal agencies** to make additional efforts to achieve an average annual **primary energy saving of 2.09%** in their buildings (including technical infrastructure, but excluding housing stock) by 2020. We will initially discuss this approach with the Association of Flemish Cities, Towns and Municipalities (Vereniging van Vlaamse Steden en Gemeenten – VVSG). It is estimated that local authorities manage a total of 15,000 buildings. The technical infrastructure includes public lighting, bridges, etc. These efforts will particularly involve converting to LED around 1.2 million public lights managed by the local authorities. By 2030 at the latest, **all public lighting on municipal roads will be LED**. We will therefore conclude the necessary agreements between all those involved, with particular emphasis on reducing timescales and costs. Public lighting maintenance costs will no longer be passed on through the distribution system tariffs.

In collaboration with HFB and the VEB, we will raise the Flemish Government's own renovation ambitions so that we truly set an example and make a primary energy saving of 2.5% every year.

All public authorities can call on the services and expertise of the VEB as a central purchasing body for the supply of energy and energy services. The VEB must also develop energy performance contracts with funding solutions in accordance with the charter produced with the Flemish Building Confederation. In this way, it will be possible to connect public supply and demand with private supply.

It is vital that public authorities make targeted investments in energy efficiency through masterplans. With regard to the Flemish Government, the HFB Building action plan and the Energy Efficiency action plan will be progressed and optimised. The Terra platform (the Flemish database on property and energy) will also be used for reporting and for the comparative analysis of energy consumption data in the public sector.

The methods of calculating the energy performance of new-builds have frequently changed and become more complex in recent years. Numerous construction partners have therefore lost touch with the EPB regulations. In consultation with stakeholders, we will transform the current methods into one transparent and simplified method in which innovative construction techniques receive sufficient attention. The aim of the method will be to ensure that buildings can be objectively compared with each other and can be steered towards energy efficiency measures. In collaboration with stakeholders, we will also work to further improve the user-friendliness of the software tools. Simplifying the software and making it more user-friendly will remove a number of obstacles to major energy renovations, which will therefore increase in number.

Walloon Region

Exemplary role of public buildings

In order to achieve its 2030 and 2050 targets, Wallonia will reinforce and extend the exemplary role of its public buildings. An energy neutrality target will be set for all public buildings, with a timescale depending on the level of government concerned. The aim of this timescale will be to guarantee carbon neutrality by 2050 at the latest.

This approach will apply to the following buildings:

- the administrative buildings of the central governments (Walloon Region, French Community and German-Speaking Community);
- the administrative buildings of the local governments (municipalities and provinces), and also schools.

Energy neutrality is defined as reducing requirements (heating, DHW, cooling and lighting) to the level of an equivalent new building (¹¹¹), keeping other electricity consumption at the current level, and meeting those requirements through renewable energy, whether purchased or self-generated.

The following tools are proposed for achieving this target.

- Updating sound management manuals and procedures for public building infrastructure (lighting, heating control, electrical equipment, telephone and IT infrastructure, etc.).
- Requiring an accurate register of public buildings (linked with the certification of public buildings) by using a methodology that ensures reliability and consistency of the data collected.
- Producing a roadmap aimed at improving the energy performance of buildings.
- Establishing a targeted renovation strategy based on the roadmap in order to reduce total energy consumption and therefore achieve energy neutrality, with a prioritised action plan.
- When any work is carried out on a building, studying all the associated measures that could increase the building's energy performance. This will involve at least those measures in the roadmap that are compatible with the planned work being implemented.
- Requiring monitoring and reporting of the impact of the measures adopted.
- Making it easier to use energy performance contracts.

Walloon long-term strategy for the energy renovation of buildings

In order to significantly increase the rate of renovation (>3%/year), the Walloon long-term strategy for the energy renovation of buildings proposes a range of actions and measures, for both the residential and tertiary sectors, which are based on three priorities:

- priority 1 aims to create a transparent framework favourable to energy efficient investments;
- priority 2 aims to structure and reinforce the market supplying goods and services associated with renovation;
- priority 3 aims to boost demand for energy efficient buildings.

These three priorities are broken down into objectives, which are themselves broken down into actions and measures, over half of which are planned for the short term. Several of the actions and measures approved in other texts, particularly through the 'Employment-Environment' Alliance, are included in these short-term actions and measures.

Specific implementing measures are described in the Walloon renovation strategy (<https://energie.wallonie.be/servlet/Repository/strategie-wallonne-a-long-terme-pour-la-renovation-energetique-des-batiment.pdf?ID=47301>), which is currently being updated. These measures will therefore also be updated and even reinforced. The Walloon Government will focus on setting a precise implementation timetable for the actions and will ensure that the measures are implemented. A mechanism for assessing the achievement of the targets will also be established.

Existing measures

The following table lists some of the existing measures included in the long-term renovation strategy (excluding financial incentives) (¹¹²). These measures must be continued between 2020 and 2030.

¹¹¹ According to the Cost-Optimal 2 study.

¹¹² In particular, the table does not include the scheme involving renovation incentives for private individuals or the incentives for the tertiary sector, such as the UREBA (energy renovation of buildings) programme.

Type of measure	Existing measures	Description
Regulatory	EPB requirements	<p>The EPB regulations adopted by the Walloon Government came into force on 1 May 2010. In terms of building renovation, the EPB requirements cover the performance level of renovated walls and state that the level achieved must be the same as that for the walls of new structures (¹¹³).</p> <p>From 1 January 2017, the minimum overall performance level for buildings ($Espec \leq 115 \text{ kWh/m}^2/\text{year}$) must be achieved by new housing and major renovations (defined as involving over 75% of the surface area of the building envelope and the replacement of systems). This level will be reduced to $85 \text{ kWh/m}^2/\text{year}$ (¹¹⁴) from 1 January 2021.</p> <p>In terms of renovations, the requirements have been tightened for certain modified walls (windows, floors).</p> <p>The calculation method also changed on 1 January 2017. The changes include, firstly, a new NEP (non-residential energy performance) method for calculating the performance of NEP units (non-residential units and multi-family buildings), and, secondly, amendments to the REP (residential energy performance) method for individual housing, structural nodes and transmission losses.</p>
	System-related requirements	Since 1 May 2016, requirements (efficiency, lagging, energy metering, etc.) have also applied to systems (heating and domestic hot water, air-conditioning, ventilation) that are installed, replaced or modernised. Although these requirements mainly apply to existing buildings, some of them (energy metering) also apply to new buildings.
	Coherence of the various regulations	The Walloon Sustainable Housing Code has been revised with a view to improving the quality of Wallonia's building stock and its energy performance. The Code now sets out criteria for hygiene and minimum energy performance based on airtightness that apply across all Wallonia's housing stock. The Walloon Territorial Development Code, which entered into force on 1 June 2017, contains a number of provisions aimed at administrative streamlining. By allowing the general use of indicative values for urban planning permissions and schemes and by abolishing certain standards, urban planning requirements are now more flexible and energy concerns are more effectively integrated in the management of administrative authorisations.
Information, awareness-raising	Information for citizens	Wallonia has developed a series of information and awareness-raising tools that are available on the energie.wallonie.be portal, including practical guides, advertising campaigns to promote energy audits, and energy information points (16 across Wallonia), which citizens can visit for free advice on issues relating to domestic energy use.

¹¹³ For new buildings, the requirements cover the overall performance of the building.

¹¹⁴ Value of the NZEB (nearly zero energy building) standard in the Walloon Region.

Type of measure	Existing measures	Description
	Information for professionals	Exemplary practices in terms of sustainable construction and renovation are also showcased in training centres set up specifically for this sector, in particular the two Construform skills centres (Hainaut and Liège) and the Greenwal centre of excellence in the province of Namur. Since 2014, the Sustainable Construction portal has provided professionals, contractors, architects, consulting firms, manufacturers and traders with internet-based access to validated information on innovative and sustainable techniques, materials and products; it also links to the Energy portal.
Voluntary agreements	Exemplary buildings	In order to disseminate best practices allowing the sector to gradually meet the energy performance requirements for buildings, between 2004 and 2011 the Walloon Region conducted a campaign entitled ' Construire avec l'énergie ' (Build with Energy), intended to promote the construction of new low-energy housing meeting higher standards than those imposed by the applicable regulations. This was followed by a campaign entitled ' Bâtiments Exemplaires Wallonie ' (Exemplary Buildings in Wallonia), designed to promote the construction and renovation of exemplary sustainable buildings in both the residential and tertiary sectors. This measure has served as a real-life laboratory for sustainable construction and energy performance of buildings.
Tools	Energy audits	The energy audit has been in place since 2006, but was significantly expanded and adapted in 2014 (PAE 2 [Energy Audit Procedure]) and in 2019 became the 'housing audit'. It represents an opportunity not only to comprehensively assess the performance of existing housing, but also to determine the weaknesses of housing and identify the work to be prioritised in order to improve the comfort and health of occupants and reduce energy consumption. Previously, the 'PAE 2' audit was limited to the energy criteria of housing. Now, the housing audit also includes health, safety and hygiene criteria in the auditor's analysis of the housing. It is currently an essential step in order to access housing incentives. The energy audit, as required under the current incentive and loan granting scheme, will be improved in order to simplify and speed up the renovation of buildings. It will remain compulsory, except for roof insulation and work costing less than EUR 3,000.

Additional measures

Among the additional measures, three specific tools will be used as part of the renovation strategy. These tools reflect the wish, repeatedly expressed by the sector during consultations, for renovation projects to be comprehensively assessed in line with the long-term objectives of Wallonia in order to ensure that the renovation work is properly framed.

These tools are indicated below.

- The roadmap: forming part of the housing audit, the roadmap suggests the renovation route to be followed in order to achieve the region's objective, namely an A label (primary consumption of 85 kWh/m²/year), while offering an estimate of the associated renovation costs.
- The building passport: an interactive and evolving tool designed to accompany the building throughout its life. It will gather in one place all the information on the building that is held by various administrative entities (location, type of housing, permission) and technical entities (plans, stability studies, HVAC, soil testing, water, energy, etc.).
- The one-stop shop: this will provide all the necessary support services for households in terms of energy/housing. It can steer households towards the type of energy renovation needed, help them to understand the benefits of renovation, ensure that those benefits are tied in with the building's energy passport, assist households in identifying contractors who can carry out the work, and guide them in funding the work. The one-stop shop will use existing tools and network existing operators.

Although it is currently planned for these tools to be used for residential buildings only, they may be extended in the future to the renovation of tertiary buildings.

As regards financing, the incentive scheme will be maintained and improved, although it will be necessary to conduct an audit (except for roof insulation work and renovation work costing less than EUR 3,000) in order to benefit from the incentives. The following improvements in particular will be made:

- reinforcement of the incentive scheme so that the least energy efficient housing is prioritised;
- means-tested increase in the incentive amount for people in poverty;
- prioritisation of work, particularly improvement of the building envelope.

Other additional measures are currently being discussed and will form part of the new renovation strategy planned for March 2020, including:

- identifying and implementing the most effective incentive measures in order to reduce the split incentive (¹¹⁵);
- identifying and implementing measures designed to reduce energy poverty;
- introducing a renovation incentive at key moments in the life of a building, for example:
 - From 2025, all rental housing with an energy performance level of F or G will be renovated (according to the roadmap) within a set period of time, although it can still be rented in the meantime in accordance with the terms to be determined at a later date. Those terms must be developed in accordance with the conditions of access to housing and in the interests of owners.
 - No earlier than 2025, incentive to renovate housing at the time of its purchase, according to the roadmap (payback time of less than 10 years).

¹¹⁵ Certain obstacles arise where the interests of the various participants are not aligned (split incentive). This is often the case between owners and tenants: for the tenant, the payback period is often far longer than the period of occupation. This divergence of interests and of the information held by owners and tenants, together with the difference in time between the payback period and the period of occupation of the housing, form an important barrier to widespread renovation. This lack of alignment can also occur between different types of owner (e.g. bare owner and beneficiary; owner-occupier and owner-landlord in a jointly owned property, or, lastly, joint owners and building manager in a jointly owned property).

- implementing measures to facilitate the division of housing;
- enhancing the status of trades through the labelling/certification of professionals, without this increasing the cost of the work carried out;
- clarifying the renovation strategy for public buildings (including housing);
- further developing the funding strategy.

The following table sets out all the existing and additional measures envisaged to 2050 as a result of the renovation strategy. They apply to both supply and demand.

Priorities	Objectives	Measures
Strengthen the framework to ensure the necessary transparency, stability and credibility for energy efficiency investments	Further develop the incentive system	<ol style="list-style-type: none"> 1. Tighten up energy standards 2. Improve the coherence of the various regulations with regard to energy efficiency criteria
	Update knowledge and adapt the strategy	<ol style="list-style-type: none"> 3. Improve the knowledge of the building stock 4. Monitor the results of the renovation strategy 5. Assess and regularly update the renovation strategy for buildings
	Mobilise the public authorities	<ol style="list-style-type: none"> 6. Set an example when renovating public housing [AEER 22 (AEER - Refocused Employment-Environment Alliance)] 7. Reinforce the exemplary role of public buildings 8. Incorporate social, ethical and environmental clauses in public works contracts [AEER 7 - AEER 8 - PAEE002 (PAEE - Energy Efficiency Action Plan) PACE B10 (PACE - Air, Climate and Energy Plan)]
	Ensure that the communication and awareness-raising tools have a horizon of 2050	<ol style="list-style-type: none"> 9. Encourage municipalities to adopt an energy and climate policy in their territory [PACE B32] 10. Adapt the communication to ensure that all players (civil society, stakeholders, etc.) are engaged
Structure and reinforce the market supplying goods and services associated with renovation	Support the development of energy efficient and sustainable solutions	<ol style="list-style-type: none"> 11. Develop the sectors offering innovative and sustainable building materials and systems in Wallonia [AEER 15] 12. Promote innovative Wallonia-sourced materials for sustainable design [AEER 16] 13. Promote exemplary practices in terms of reuse/recycling/recovery of building or demolition materials [AEER 14] 14. Support and promote sustainable, high-quality and energy efficient solutions
	Develop tools and support for professionals	<ol style="list-style-type: none"> 15. Develop and reinforce tools enabling an integrated and long-term approach to projects 16. Promote tools that allow all the sustainability-related aspects of renovation projects to be assessed 17. Raise awareness among professionals and encourage the sharing of experiences in the field of sustainable energy renovation

Priorities	Objectives	Measures
	Step up efforts in terms of awareness-raising, training, certification and monitoring	18. Provide high-quality training 19. Ensure that works or services are properly executed 20. Expand the role played by professionals in renovation work 21. Monitor the proper execution of works or services
Strengthen demand for energy efficient buildings	Raise awareness among citizens and provide them with support	22. Raise awareness among citizens of the energy performance of housing and encourage them to carry out sustainable energy renovations 23. Encourage citizens to comprehensively assess their renovation projects by producing a renovation roadmap 24. Encourage organisations to comprehensively assess their renovation projects by producing a renovation roadmap 25. Develop and promote tools to support households, with preference being given to integrated support solutions
	Strengthen demand across all categories	26. Help the most disadvantaged in society to implement the most effective housing renovation solutions 27. Support landlords in making overall improvements to the energy performance of their buildings 28. Encourage and facilitate grouped renovation projects
	Ensure that energy consumption continues to fall	29. Encourage the maintenance of buildings and installations 30. Implement a strategy aimed at mitigating the rebound effect

The action plan for these measures is available in the renovation strategy approved in 2017 (¹¹⁶).

Description of the phasing at regional level

The phasing of the renovation stages at regional level results in a change to the annual rate of renovation, broken down by measure and by segment of the housing stock.

The following aspects determine the phasing:

- the desire for energy renovation to go hand-in-hand with a significant reduction in energy poverty and an improvement in the quality of Walloon housing;
- the need to stagger the public funding required to stimulate investment in renovation projects;
- the Region's intention to use its renovation strategy as a key driver for achieving the European energy consumption reduction targets.

The figure below maps out these changes, which are quantitatively presented in the tables below.

The main aspects of the proposed phasing are as follows:

2020: Rise in the annual rate of renovation (dark orange) of roof insulation for all housing in order to achieve a cruising speed (blue). This rise should be facilitated by removing the obligation for a compulsory audit for this type of work.

2025: Prioritisation of efforts to renovate the rest of the building envelope: rise in the rate of renovation for buildings with G and F labels.

2030: Prioritisation of efforts to renovate the rest of the building envelope for other buildings.

2030: Efforts will be made to renovate systems and use renewable energy sources in buildings with a G label.

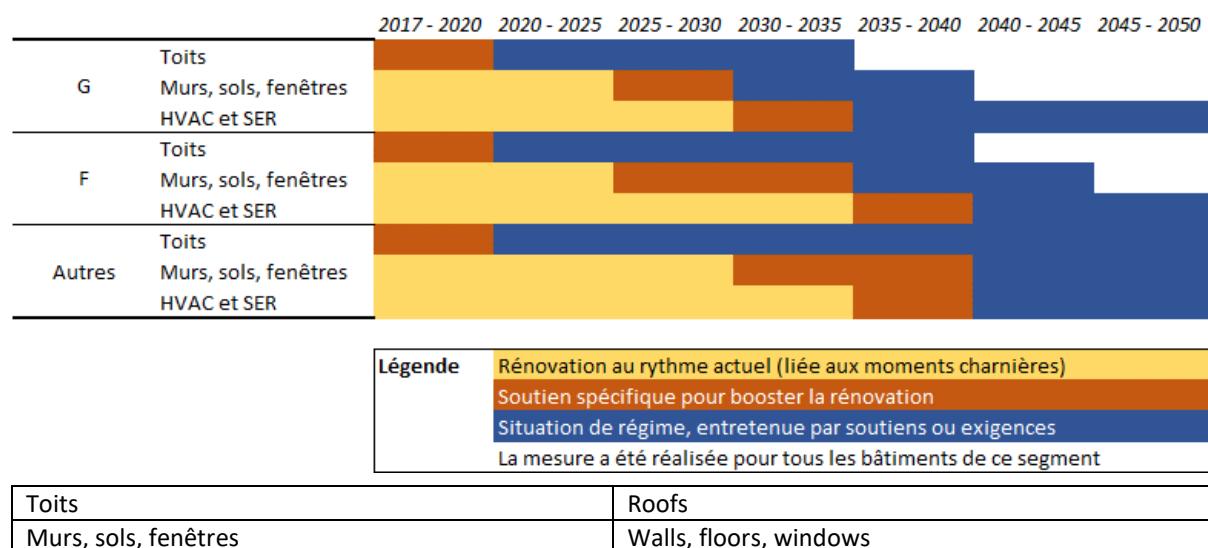
2035: Efforts will be made to renovate systems and use renewable energy sources in buildings with an F label and other buildings.

2040: The entire building envelope will be renovated for all buildings with a G label.

2045: The entire building envelope will be renovated for all buildings with an F label in 2045.

Renovations will continue at the current rate (beige) where efforts are not made to increase the rate. This is the case for renovations at key moments in the life of a building (sale, rental, etc.).

However, the current rate will rise due to renovations undertaken as part of one-off major renovations (¹¹⁷).



¹¹⁶ <https://energie.wallonie.be/servlet/Repository/strategie-wallonne-a-long-terme-pour-la-renovation-energetique-des-batiment.pdf?ID=47301>

¹¹⁷ See Annex 8 to the Walloon renovation strategy.

HVAC et SER	HVAC and RES
Autres	Other
Légende	Key
Rénovation au rythme actuel (liée aux moments charnières)	Renovation at the current rate (linked to key moments)
Soutien spécifique pour booster la rénovation	Specific support to boost renovation
Situation de régime, entretenue par soutiens ou exigences	Cruising speed maintained by support or requirements
La mesure a été réalisée pour tous les bâtiments de ce segment	The measure has been completed for all buildings in this segment

Specific funding measures

The funding strategy will follow the guidelines indicated below:

1. **Cost of the strategy to the public authorities:** this cost depends on a series of variable that the public authority can influence. It is not therefore a question of a fixed figure to be accepted or rejected. The funding effort is more a question of aligning available budgets than meeting net requirements.
2. **Priority measure for buildings belonging to public authorities:** consolidating demand so that energy performance contracts can be used (action under preparation).
3. **Priority measure for private housing:** the decision to renovate depends on many other criteria than just the availability of funds. The one-stop shop (see point 3.3.2) will take charge of all the necessary formalities and will provide solutions to all the technical, financial and administrative constraints facing the renovation applicant.
4. **Priority measure for private tertiary buildings:** the assumption is that the private sector will undertake the necessary work once it becomes more expensive to do nothing than to start renovating. The various options allowing action to be taken in this sector without creating a significant burden for the sector will be assessed.
5. **Mobilisation of private savings:** given that 75% of the building stock consists of private housing, with most owners likely to take out a mortgage or instalment loan to fund their work, it would seem that working to develop suitable financial products in collaboration with the retail banks is a priority. These funds could also be mobilised through specific ESCOs or energy performance contracts.
6. **Mobilisation of European funds:** there are many European programmes and projects. In terms of energy, we would underline the growing importance of the LIFE programme.
7. **Mobilisation of regional funds:** considerable budgets have been mobilised in recent years with energy efficiency as the theme. Measures will be adopted to achieve the most effective results through relatively limited public funds.

The table below sets out the instruments listed in the renovation strategy approved in 2017. Those instruments will be re-examined as part of the update planned for March 2020, particularly taking account of the obstacles to renovation for certain target groups (landlords, joint owners, etc.) and in accordance with the European guidelines.

Type of instrument	Measures	Target group	Actions	Horizon
Contractual	Grant incentives and subsidies	Residential	Energy incentives; renovation incentives; MEBAR incentive (for low-income households); PIVERT (energy investment plan for the renovation of public housing)	Existing
			Link the system of incentives to the renovation roadmap; incentive mechanisms and pilot schemes will be introduced, particularly for the simultaneous renovation of entire districts or for the demolition/rebuilding of old housing that is difficult to efficiently insulate or for the renovation of key public buildings; analyse the possibility of granting demolition/building incentives.	2030
		Tertiary	UREBA (energy renovation work in public buildings); school building funds; Infrasport (sports facilities); swimming pool plan; AMURE energy audits, SEU (sustainable energy use) grants; energy audits in the industrial sector (through branch agreements)	Existing
			Continue the 'UREBA+' and 'UREBA exceptionnel' schemes (¹¹⁸); optimise the investment aid system; subsidies for audits through incentives	2020
	Encourage low-interest loans and offer loan guarantees	Residential	Use 'UREBA exceptionnel' as a lever to consolidate demand and therefore obtain third-party investment and energy performance contracts	Under preparation
			Ecopack/Rénopack/Accesspack loans	Existing, undergoing changes
			Pilot scheme involving a framework agreement between the Walloon Public Service and a bank for low-interest loans, combined with renovation subsidies	Under study
			Extend the low-interest loan pilot scheme; offer loan guarantees for low-income households	2030

¹¹⁸ Since 1 January 2019, a call for 'UREBA exceptionnel' projects, aimed at schools in the compulsory education system, has supported work intended to improve the building envelope or the installation or improvement of the ventilation system through a 75% subsidy (80% under certain conditions) of the eligible amounts.

Type of instrument	Measures	Target group	Actions	Horizon
			Introduce a zero-interest loan instrument, to complement the UREBA programme, for buildings in the public and non-market sectors	2020
		Tertiary	VAT rate of 6% on buildings occupied for at least 10 years	Existing
Tax	Reduce VAT on energy renovations	Residential	Together with other national authorities, study the possibility of introducing a reduced VAT rate of 6% on renovations involving demolition/rebuilding where this seems more cost-effective than major renovation.	In place
			Together with other national authorities, study the possibility of introducing a VAT rate of 6% on work aimed at improving energy performance and on materials allowing such work to be carried out (including for individuals).	
			Tax relief for roof insulation costs; housing cheque (tax relief for the mortgage)	Existing
	Develop a 'green' taxation system	Residential	Analyse all the tax and other levers available to the Region in terms of major renovations	2030
			Reduction in gift tax since 1 September 2018	Existing
	Adapt registration, inheritance and gift taxes	Residential	Tax relief for investments in energy-saving measures	Existing
			Reduce inheritance tax where major energy renovations are carried out	Existing
Mobilisation of funds	Mobilise funds for energy renovations	Residential	Reduce registration and gift taxes for first-home purchases where major energy renovations are carried out	Existing
			Create, manage and promote a specific mechanism for energy renovations	2030
	Mobilise European funds	Residential	ERDF/Low-carbon/buildings – make urban areas more attractive for citizens, visitors and businesses (EUR 32.8 million)	Existing
			EIB (Smart Cities and Sustainable Development projects with Belfius) for cities and municipalities, ERDF/Increase regional competitiveness through the creation and adaptation of infrastructures likely to attract businesses	Existing

Type of instrument	Measures	Target group	Actions	Horizon
Innovative	Encourage the mobilisation of community savings		contributing to the transition to a low-carbon economy (EUR 19.7 million + EUR 18.7 million for the Province of Brabant), ELENA, PIVERT (EIB)	
		Tertiary	Mobilise savings on behalf of SMEs (Sowalfin)	Existing
		Residential	Mobilise community savings for energy renovations of buildings	2030
		Residential /tertiary	PPP under the aegis of the Walloon Housing Association	Existing
			Encourage landlords to charge an all-inclusive rent and join management cooperatives with a view to property renovations	To be defined
	Encourage landlords to invest in energy renovations	Public residential	Belesco, local authority associations, Rénowatt	Existing
	Establish a framework for energy performance contracts	Tertiary	Encourage the use of energy performance contracts; assess the possibility of introducing a regulatory framework	2020

Brussels Capital Region

Strategy to reduce the environmental impact of existing Brussels buildings

For nearly 15 years, the Brussels Capital Region has been implementing calls for projects, measures and rules in the building sector in order to reduce the latter's impact: the energy challenge, PLAGÉ (Local action plan for energy management) calls for projects, 'exemplary buildings' calls for projects, energy incentives, the Brussels Air, Climate and Energy Management Code and, two years ago, the Air, Climate and Energy Plan, with its longest chapter focusing on this sector.

So far the main ambitions have involved new construction and energy management within buildings, although renovation has not been ignored.

However, reducing the environmental impact of the Brussels building stock has not been the subject of a stand-alone strategy. In view of the objectives to be achieved, we must now apply the principle that, in the long term, there can no longer be any poor performing buildings in Brussels. It is irrelevant whether properties are owned or rented: put quite simply, occupying a real energy drain will no longer be tolerated. However, not all hope can be placed on the building envelope or systems: the behaviour within the building is decisive and energy sobriety is a must.

In order to drastically reduce the environmental impact of buildings, three main angles of attack must therefore be fully pursued:

- increasing the rate of renovation: the target of achieving a rate of 3% has been set;
- improving the quality of renovations; and
- making rational use of energy within buildings.

The entire arsenal of public policies must be deployed: documentation, communication, regulation, support, incentives, financial assistance, innovation, etc.

However, achieving these objectives will only be truly feasible if the following two elements exist: clear and firm requirements that can raise the performance of the entire building stock to a high level, and an unprecedented mobilisation of public and private finances.

Establish clear requirements with set deadlines

Increase and realise ambitions

The residential and tertiary sectors are currently subject to a number of obligations designed to improve their performance: issuing an EPB certificate at the time of a property transaction; requirements to be met in the event of work, and requirements concerning technical installations. Certain segments of the tertiary sector are also subject to other constraints: producing a local plan for energy management; carrying out an energy audit, and obligation to display the EPB certificate. An overview of these obligations and their scope can be found in the following table.

Main energy obligations imposed on the residential and tertiary sectors

Current obligations	Residential sector	Tertiary sector
EPB Certificate	Provide the EPB certificate if a housing unit or office space in excess of 500 m ² is sold or rented	Public authorities: display the 'public building' certificate (actual consumption) every year
	Major renovations treated as new-builds: limit the energy requirement for heating and the primary energy consumption, insulate walls, limit thermal bridges and the risk of overheating, install meters for technical installations	
EPB work - renovations		

	Renovation of part of the building envelope: insulate the walls in question and ventilate	
	Regular inspection and acceptance of new heating installations by approved professionals	
Technical installations		Requirements concerning sizing, lagging, metering, partitioning, etc. and obligations to service and inspect air-conditioning installations
Environmental permit audit		Energy-intensive consumers within the meaning of the environmental permit regulations: conduct an energy audit and implement the recommendations with a payback time of less than five years
PLAGE		Owners or occupiers of large property complexes (100,000 m ²): produce an action plan to reduce consumption by 10%

By 2050 all Brussels buildings must be energy efficient.

Fiche No 1 on energy performance requirements and obligations for buildings sets out the regulatory framework for ensuring that the building stock meets this objective.

Binding targets for the residential sector

The general objective for the residential sector is ambitious, realistic and rational in terms of both cost and sustainability: an average of 100 kWh/m²/year by 2050, as recommended by the Interfederal Energy Pact (Pacte énergétique interfédéral) for the residential sector, seems to be a fair and achievable target. The ‘cost-optimal’ study of residential buildings, which assesses the economic impact of various energy objectives, also confirms the relevance of this objective (¹¹⁹).

There are sound arguments for not having a tougher objective: (1) the current state of buildings and the impossibility, for a significant part of the stock, of achieving the performance of a passive building; (2) the amount of investment needed to achieve this type of performance, balanced against the often underestimated impact of the behaviour within the building; (3) the material reality and environmental impact of this investment and any sophisticated technological solutions, which must also be balanced against the importance of changes in behaviour in terms of how buildings are occupied.

The introduction made it clear that the general objective can be achieved only if a minimum level of performance is required for all buildings. The residential sector will be driven towards the appropriate level of performance by imposing obligations at regular intervals to carry out energy-saving work in order to achieve the level required for the type of building concerned by 2050.

Five deadlines have been set, although, quite clearly, buildings that achieve their objective before the final deadline will be exempt from carrying out work by the interim deadlines. This system requires an EPB certificate to be issued for every building, whether or not it is the subject of a transaction. This system also requires certificates of impeccable quality; the work currently being carried out on the approval of certifiers aims to achieve this objective.

The EPB certificate will be tailored to show all the recommendations needed so that all potential energy savings within the building can be made. Furthermore, if, despite all the recommendations made in the EPB certificate,

¹¹⁹ The key messages of the study are set out in the annex to the renovation strategy.

the objective set for the type of building cannot be achieved, the objective of implementing all the recommendations will be set for the building (see Fiche No 14 on the roadmap).

While initially focusing on energy, the EPB certificate will include sustainability criteria in the medium term, and its recommendations will also be adapted in line with the gradual phasing out of fossil fuels to heat buildings; this is an objective fully covered by Fiche No 10 on renewable heat.

Jointly owned buildings will be subject to a two-part obligation: one covering the building, for which the joint owners will be responsible, and the other covering the private parts, for which their individual owners will be responsible.

Rules to be met by category in the tertiary sector

The Interfederal Energy Pact has set the bar very high: by 2050 the tertiary sector must aim to achieve an energy-neutral building stock in terms of heating, production of domestic hot water, cooling and lighting.

However, from small shops situated on the ground floor of houses to office blocks, and from sports facilities to hospitals, the tertiary sector covers some very different situations and must therefore be approached using an appropriate sectoral breakdown.

Given the chosen segmentation, the following are therefore envisaged: imposing a system of obligations similar to the residential sector; extending the scope or reinforcing the objective of the local action plan for energy management imposed on large property complexes if they are considered relevant following evaluation of the measure; extending the payback time on investments required as a result of the energy audit recommendations imposed on energy-intensive consumers as part of their environmental permit.

Reducing the overall environmental impact of the building stock

In accordance with the strategy's general environmental approach, renovations cannot be limited to improving the energy performance of buildings: they must form part of a framework allowing all the environmental impacts of the building sector to be reduced. The energy performance requirements must therefore be mirrored by sustainability requirements, with methods and deadlines to be determined as resources are developed. This is the subject of Fiche No 2.

Key role of public authorities in speeding up renovation work

As shown in Fiche No 3, public authorities can play an important role by setting an example: the Brussels Air, Climate and Energy Management Code requires them to drive the property market towards excellent environmental and energy performance, by meeting a minimum performance level in the property purchases and rentals of regional authorities or by taking account of the occupation cost in the choices made by local authorities during property transactions.

The case for all public authorities to be subject to energy performance and sustainability requirements by 2040 will be examined. Sustainability clauses may be proposed in this respect, which authorities can insert in their specifications for design or work contracts. Certain specific measures are already planned to support regional and local public authorities in this effort: the NRClick and SolarClick programmes, which are covered in more detail in the 'support' chapter, are intended to ensure that a significant proportion of the public building stock has lower energy consumption and uses local energy production where possible.

Public housing, which will be covered by the system of obligations referred to above, will also be required to achieve excellent energy performance during major renovation work; the management contract of the SLRB (Brussels Capital Region Housing Association) will be revised along these lines.

Whether in the residential sector or in the tertiary sector, the acceptability of such rules and requirements depends on the establishment of specific and reliable funding and support measures at all the decision-making stages of a renovation project, and on simplifying the applicable regulatory and administrative framework. This is the subject of the following chapters.

A transition accessible to vulnerable households

Fuel poverty affects all three regions of the country. In Brussels, measured fuel poverty was 13.4% in 2015.

Improving the energy and environmental performance of the building stock may arouse fears of significant rent increases. One of the key measures for guaranteeing access to decent housing for all is to control these potential increases. As explained in Fiche No 4, this risk and the ways of overcoming it will therefore be carefully examined.

A recent report by the Fondation Roi Baudouin analysed the social housing situation and concluded as follows with regard to the Brussels Region: 44% of social housing units must be regarded as high energy consumers⁽¹²⁰⁾. Under its management contract, the SLRB must therefore apply the ‘treated as new-build’ renovation performance level to every major renovation of social housing.

The housing stock managed by social housing agencies will in any event be driven towards a high performance level in line with the system of obligations introduced for the residential sector.

The acceptability of the performance requirements imposed by this strategy naturally depends on the establishment of funding and support measures that have, at their very core, the specific financial assistance that must be provided to vulnerable households.

Fund the transition of existing buildings to sustainability

Huge investment will be required to achieve this transition. The state of the building stock, as mentioned above, and the cost of extensive work mean that tens of billions of euro will be needed to achieve a stock of sustainable buildings.

Many households quite simply do not have the funds needed to carry out such work and, more generally, a renovation strategy cannot have the effect of impoverishing the Brussels population. The financial assistance must therefore be in line with the ambitions pursued by this strategy.

Clearly, there are already financial assistance mechanisms designed to encourage energy-saving work to be carried out: the Prêt Vert Bruxellois (Brussels Green Loan) and energy incentives are prime examples of these. However, these mechanisms must be adapted to the new ambitions. As the Prêt Vert Bruxellois currently has a relatively low take-up rate, its attractiveness and accessibility will be reinforced: in the short term, this will involve opening up the mechanism to everyone and allowing the loan to be extended to investments ancillary to energy-saving work; in the medium term, other more significant adaptations are envisaged, such as extending the term of the loan and including incentives in the calculation of the amount to be repaid (Fiche No 8).

The energy incentive system will be revised in the light of the system of obligations that is being introduced. It will also be extended to support the production of heat and electricity through renewable sources. In the longer term, all the incentives for (local and regional) buildings will be examined to ensure that they are complementary and consistent, and that they correspond with the requirements imposed in terms of other aspects of sustainability (Fiche No 7 ‘Revise the energy incentive mechanism’).

In the short term, work will continue to be funded in the main through an incentive mechanism, which should give way, at least in part, to other mechanisms in the longer term.

It would be unrealistic to imagine that the public budget alone could support this financial effort. All funding levers must therefore be used: mobilisation of community savings, attractive banking products, tax incentives, third-party investments, participatory funding, activation of European funds, etc. These levers are mentioned in Fiche No 5 on innovative funding mechanisms, Fiche No 6 on taxation and Fiche No 9 on European funding.

¹²⁰ Agnès Mathieu; Isis Consult (2017) *Coûts et avantages sociaux de la lutte contre la précarité énergétique au sein du parc de logements sociaux (étude réalisée à la demande de la Plateforme de lutte contre la précarité énergétique)*.

Mobilisation of community savings: a vital resource in funding renovation

This idea has already been highlighted by the Regional Air, Climate and Energy Plan, as a considerable amount of money is sitting in bank accounts earning little interest. According to the latest available data, this resource stands at EUR 260 billion in Belgium.

These savings can be used in a variety of ways for renovation projects: issue of green bonds, coupled with public intervention to limit the risks; establishment of community cooperatives with regional participation and participatory funding, where necessary. All these options will be explored in the near future.

Taxation: a very powerful lever

As a highly effective incentive for encouraging virtuous decisions, the option of tax deductions must be analysed without delay. This can take a number of very different forms.

As highlighted by the Air, Climate and Energy Plan, adjusting property taxation is an interesting idea. The Finance Ministry Circular of 22 February 2010 quite rightly suspended the increase in cadastral income following energy-saving work. Taking into account the region's financial capacity, a further step could be to release part of the sum used to pay property tax for carrying out renovation work. Likewise, reducing registration taxes in the event of energy renovations would no doubt form a valuable incentive.

In addition to property taxation, other options could be fruitfully explored, such as reducing inheritance tax provided that energy renovations are begun.

Establishment of funding mechanisms based on energy performance

In association with a community cooperative and in order to support public authorities or, more generally, help any entity starting a renovation project, third-party investments or energy performance contracts may prove interesting. Such mechanisms have not so far revealed their full potential. The conditions assisting their roll-out must be examined without delay, such as the clustering of projects or the establishment of contacts able to provide appropriate legal, accounting and tax advice. The objective pursued through such facilitation measures is to drive the market towards taking responsibility for work with a longer return on investment.

Involvement of the banking sector in urban renovation

The banking sector must become a fully-fledged partner in urban renovation. It is in a position to offer vital solutions to the funding needs of households, in particular through low-interest loans, which would usefully complement the Prêt Vert Bruxellois.

Use of regional or European funds

Currently underutilised in the Brussels sustainable renovation sector, European programmes offer numerous funding opportunities to support projects to decarbonise the building stock. It is time to use the necessary resources in terms of skills and time to fully exploit these significant honey pots.

Support before, during and after the renovation process

Support is the key to a successful transition to sustainable buildings.

Individuals and developers, designers and contractors, joint owners and municipalities, everyone has a part to play, and everyone must be able to receive personalised assistance, at all stages of a renovation process, for each of its aspects: technical, administrative and financial.

Developed by the Region over a number of years – as shown by the following table – this multidimensional support will be considerably reinforced at all levels.

	What support?	For whom?
HOMEGRADE	<p>This is a support structure for individuals, which provides information on acoustics, energy, housing and renovation. One of its key objectives is to encourage Brussels households to reduce their energy consumption, in terms of both their homes and their behaviour, through the following actions:</p> <ul style="list-style-type: none"> • a permanent offer of information and advice to individuals on rational use of energy, bio-construction (environmentally friendly materials, green roofs, etc.), renewable energy, regulations and work to improve energy and environmental performance; • technical, administrative and financial support for households, which particularly covers the following aspects: <ul style="list-style-type: none"> - behaviour and management of installations (heating, domestic hot water, standby consumption, ventilation, etc.); - through a simplified diagnosis (quick scan), identification of renovation work that is easy to carry out (roof, windows, heating, ventilation); - small jobs (installation of thermostatic valves, insulation of pipes, etc.) that can be carried out and checked, where necessary, with information on their impact on consumption; - production of a technical and economic report assessing the cost-effectiveness of the work envisaged, as well as help with accessing funding through the various credit and financial advice mechanisms, in particular the Prêt Vert Bruxellois for which the non-profit association is the front office; - help with defining specifications and finding a contractor; - information on gas and electricity bills. 	Individuals
RÉSEAU HABITAT (HOUSING NETWORK)	<p>This is a network of nine Brussels associations subsidised by the Region, which are active in urban renovation and support aimed at engaging inhabitants in the work to revitalise their districts. The aim of this network is to encourage renovation through actions such as the following:</p> <ul style="list-style-type: none"> • distribution of information on the various rules applicable to housing in the Brussels Capital Region (Brussels Housing Code (Code Bruxellois du Logement), RRU (Regional Planning Regulations), EPB, etc.) and on municipal and regional aid (incentives, green loan, taxation) and the estimation of their amounts; • technical and administrative advice, and raising awareness of the rational use of energy; • diagnosis of priority work; • analysis of quotations and technical documents; • training of target audiences in renovation techniques. <p>These services are provided through hotlines, home visits, community events and other awareness-raising events.</p>	Individuals
ANIMATIONS ÉNERGIE (ENERGY INFORMATION EVENTS)	<p>These are information events that raise awareness about energy-saving actions not requiring any major investment or loss of comfort, with particular focus on those who are vulnerable.</p>	Individuals
NRCLICK/ SOLARCLICK	<p>These two regional support programmes (technical and financial support) involve reducing energy consumption within buildings (NRClick) and producing energy from photovoltaic panels (SolarClick).</p>	Regional and local public authorities

LOCAL EPB AGENTS	These are agents appointed to ensure compliance with the EPB procedure in simple renovation work carried out under a subsidy granted by the Region.	Municipalities
FACILITATORS	These are free advice services provided by experts in energy and bio-construction, recognised for their expertise gained in numerous projects both in Brussels and abroad. These Facilitators have the task of helping developers and building managers with the management of energy consumption, rational use of energy and promotion of renewable energy, at any stage of a project. To ensure full coverage of the issues of energy and bio-construction, in both renovation and new construction, the unique service of the Facilitateur Bâtiment Durable (¹²¹) (Sustainable Building Facilitator) has been set up.	Developers, designers, building managers
EPB HELPDESKS	These offer technical support to those involved in EPB (certifiers, heating professionals and EPB advisers).	EPB professionals
PACK ÉNERGIE (ENERGY PACK)	This is coaching designed to support the use of specific energy measures when developing or renovating buildings in the business and non-market sectors. It is currently being provided by the BRUXEO, UCM, Santhea and Comeos organisations to their target audiences.	SMEs, businesses, non-market organisations
LABEL ENTREPRISE ÉCODYNAMIQUE (ECODYNAMIC ENTERPRISE LABEL)	This is free official recognition granted by the Region to public and private organisations that implement environmental management.	Private, public and voluntary sectors
FORMATIONS « BÂTIMENT » et « ÉNERGIE » ('BUILDING' AND 'ENERGY' TRAINING)	This firstly involves statutory training that teaches professionals in the construction sector who are active on the Brussels market about the statutory requirements. This training is a mandatory prerequisite for the granting of approval to carry out certain trades (tertiary sector certifier, approved boiler engineers, energy auditors involved with the environmental permit, etc.) (¹²²). Secondly, this involves voluntary training in the concepts and techniques of high performing buildings, for which the energy and environmental requirements go beyond what is required by the regulations. For most professionals, this voluntary training can be accessed without any specialist knowledge in the subject concerned, so that as wide a range of professionals as possible can be reached. In addition to the training, seminars are organised to provide information on the subjects of sustainable building and to allow the networking of professionals.	Developers and designers
GUIDE BÂTIMENT DURABLE (SUSTAINABLE BUILDING GUIDE)	This is a dynamic technical reference framework (¹²³) on sustainable building, which is intended to support the design and construction of buildings with high energy efficiency and environmental performance, while also taking account of the quality of life of occupants and economic feasibility.	Developers and designers
PARTNERSHIPS WITH THE CONSTRUCTION SECTOR	These are partnerships developed with certain stakeholders in the construction sector in order to encourage the move towards circular economy and sustainable building practices (CCBC, Cluster Écobuild, CDR-Construction, EFP, CSTC, etc.) in various areas such as innovation, training, business support, etc.	Designers, contractors, jobseekers

¹²¹ www.bruxellesenvironnement.be/Facilitateur

¹²² www.bruxellesenvironnement.be/formations

¹²³ www.bruxellesenvironnement.be/guide_batiment_durable

Segmentations and tools to be re-examined

Individuals, professionals: these generic terms cover a variety of situations.

From an apartment in a large jointly owned building to a detached house, and from the family wanting to grow to older people, there is a very wide range of situations. From the developer to the designer, and from the building manager to the contractor, needs vary considerably.

The needs of individuals and professionals are currently segmented. However, these target audiences and their needs should be analysed in more detail so that the decision-making processes involved in a major renovation project can be more accurately identified. Fiche No 12 covers this measure as it concerns studying the approaches and behaviour of Brussels individuals and professionals in order to further encourage renovation.

Individuals, guided at every stage

A single contact

Which work for which performance? In which order should this work be tackled? Which financial aid for which work? Which administrative procedures are necessary for a major renovation? How can the quality of work be ensured?

There are so many questions when deciding to embark on a renovation project. Everyone must be able to find answers in the support offer, which is covered by Fiche No 13.

The renovation process needs to be as simple as possible, with a single contact to meet the many needs. As with other models that have already been developed around Europe, providing constantly evolving support will involve setting up a one-stop shop covering all aspects of the process. This one-stop shop must be easily accessible: one per municipality seems to be the best solution.

It will be divided into two main sections: a completely free information service offering information on financial aid, current regulations and technical aspects, and a paid support service offering assistance at any stage, from diagnosis to acceptance of the work. Emphasis will be placed on a deliberately dynamic approach: a 'marketing' service will be specifically created to raise awareness of the one-stop shop and its services.

The technical aspects of a renovation are particularly difficult to grasp. If personalised support is not provided, an individual may soon feel overwhelmed by the multitude of choices to be made. The 'roadmap' tool referred to below will provide the necessary information and clarification.

A roadmap to achieve the performance target

This tool does not lack ambition as it aims to provide information on the extent of the work needed to achieve the target and increased property value at the end of the work, ensure the energy consistency of the renovation process while meeting the needs expressed by the owner, and avoid unhelpful blockages in the event of a phased renovation. Fiche No 14 describes this tool in detail.

The roadmap will consist of a personalised renovation plan supplementing the EPB certificate. It will be required for any renovation needing planning permission, and will be recommended by the one-stop shop in other cases. Depending on the scenario, the renovation plan will therefore be produced by the client's architect or by the architect provided by the one-stop shop. Whether a total renovation or a sequential approach is involved, the plan will be based on a full diagnosis of the building in energy, urban and, more broadly, environmental terms (such as acoustics) and will take account of the owner's needs and wishes.

Information provided at the right time

The measures established to incentivise and support renovation are not yet sufficiently well-known among the general public, and the energy performance of a property remains a characteristic that is often overlooked: notaries, architects and estate agents have a role to play in distributing useful information on the various incentives and support available and in raising public awareness of this subject. This strategy will also use these stakeholders, as explained in Fiche No 15.

Community initiatives: a collective approach to sustainability issues

With examples such as local currencies, collective composting, car sharing and grouped housing, community initiatives for a more sustainable society are on the increase. They have huge potential to reduce the environmental footprint of the Brussels building stock, and are the subject of a specific fiche (Fiche No 16): community events designed to raise awareness of the rational use of a building, grouped purchasing of sustainable materials and renovation work carried out at district level must be promoted and supported through financial aid and specific support from the one-stop shop referred to above. Particular attention will be paid to self-supply in multi-family buildings.

Rational use of buildings: a subject in itself

As an absolutely vital aspect that is complementary to renovation, the behaviour within a building must be treated as an entirely separate issue. To a large extent, it determines whether regional objectives in terms of reducing greenhouse gas emissions will be achieved.

The result displayed by the energy performance certificate is theoretical and based on standardised behaviour. A significant disparity therefore sometimes exists between this theoretical performance and the actual consumption within the building: a rebound effect and poor adoption of technologies need to be combated, which is the subject of Fiche No 17.

In broad terms, the general public needs to be made more aware of their energy consumption within a building. As has happened with water, when they receive their energy bill, households will be shown a comparison between their consumption and the average consumption in the residential sector. Eventually, energy bills will be issued more frequently; they will be sent monthly, allowing Brussels residents to graphically monitor the development of their consumption.

Improving the performance of the Brussels building stock also raises the question of the adoption of technologies within buildings. Poor use of these technologies sometimes results in higher consumption than necessary within an energy efficient building. It can also have a harmful impact on health (as in the case of a ventilation system not being maintained). Support for users of high performing buildings will therefore be reinforced through two measures: the financial assistance of associations that provide this support in public housing, and the establishment of a platform for exchanges between the various stakeholders, coordinated by Bruxelles Environnement.

Self-renovation: a reality that must not be neglected

In order to cut costs and retain full control of the work, some households take on the renovation of their housing themselves. What is the extent of this phenomenon? What training should be given to the professional supporting such households in this approach? How can quality work be guaranteed in such a situation? Fiche No 18 proposes to study these issues in more depth.

Indoor air quality: a health issue that must be highlighted more clearly

The general public is still not fully aware that indoor air is much more polluted than outdoor air. Construction products and materials (such as insulation) and inadequate ventilation are principally to blame. We spend the vast majority of our time in enclosed spaces, so this is a major problem. Increased awareness, availability of information and diagnosis tools, and regulation of product use in enclosed public spaces are some of the solutions set out in Fiche No 19.

Extensive and simplified support for various professional audiences

The support must cover all the various profiles and needs of professional audiences.

Some sectors already have specific support measures in place: construction professionals receive assistance from the CSTC (Scientific and Technical Construction Centre) and the CCBC (Brussels Capital Construction Confederation); professionals approved under the regulations on the energy performance of buildings have access to a dedicated technical support service. Property managers and small and medium-sized enterprises also have access to specific support.

Other professionals can use the services of the Facilitateur Bâtiment Durable, which offers specific support and a range of useful information on the sustainable renovation of buildings.

A one-stop shop for professionals

The aim of the measure, which is described in Fiche No 20, is simple: to make the Facilitateur Bâtiment Durable service into a one-stop shop meeting the various needs of professionals. The services offered by the Facilitateur will therefore be extended to also include quick scans, assistance with drafting applications, assistance with setting up a renovation project, and so on.

Another new and important element is the ‘marketing’ task entrusted to this service: using instruments such as solar mapping and EPB certificates, this service will be permitted to contact professionals in order to encourage them to undertake the renovation of their property.

Small and medium-sized enterprises and the non-market sector must not be neglected

Energy bills are a source of concern for many self-employed workers, associations, and small and medium-sized enterprises. As a result, the Region is already assisting this sector through a specific support measure: free and personalised coaching known as the Pack Énergie (Energy Pack). Access is also available to the general support schemes for developers: the general sustainability advice service (Facilitateur Bâtiment Durable) and the environmental management label (Label Entreprise Écodynamique).

Assessing, integrating and extending measures: this is the objective of Fiche No 21 on support for businesses, SMEs and shops.

The Pack Énergie will be assessed and adapted so that it becomes a genuine lever for renovation, through ‘renovation’ advisers rather than energy advisers, and so that it is consistent with the Facilitateur Bâtiment Durable service. The advisers appointed following Pack Énergie calls for projects will be integrated within the Facilitateur service so that each adviser uses the same tools and services.

The Label Entreprise Écodynamique will be extended to the energy renovation of buildings.

Jointly owned buildings: a challenge to be tackled without delay

With multiple occupiers in one building and a majority of accommodation occupied by tenants, jointly owned buildings epitomise the main obstacles to a renovation scheme. The complexity of the decision-making process and the short-term mandate of property managers also discourage the undertaking of major renovations. Jointly owned buildings merit special attention, which is why they have their own fiche (Fiche No 22).

Jointly owned buildings will benefit from a dedicated support service: the Facilitateur Copropriété (Jointly Owned Building Facilitator) will guide joint owners through the various administrative, financial and technical procedures. Specific tools will be developed, based around a unique web interface.

Municipalities will need support in their transition measures

In terms of reducing the environmental footprint, much is expected of local authorities. Due to their closeness to the population, they represent a very important level for action. Many of them are already part of the Agenda 21 approach. However, municipalities have few tools to meet these expectations: introducing energy accounting in their area and an action plan aimed at reducing energy consumption, particularly in the building sector, requires specific resources and skills.

Without doubt, SolarClick and NRClick, which are covered by Fiche No 3 on the exemplary role of public authorities, are already excellent regional initiatives allowing municipalities to benefit from the energy produced by photovoltaic panels and energy-saving work. In this respect, special attention must be paid to school buildings, which in some cases are in a worrying condition: the assessment of the NRClick programme will form an opportunity to review the support for local schools in terms of improving their buildings, in collaboration with the proposed Facilitateur École (School Facilitator) service.

Work must also be carried out on empowering municipalities in this area: establishing a network of local officials working in the area of energy and the environment, managed by Bruxelles Environnement, will allow them to

exchange advice and best practice, and jointly develop solutions to common problems. Fiche No 23 on support for municipalities details this measure.

Learning about sustainability for every stakeholder in a renovation process

Technologies and requirements are constantly developing towards more sustainability; the very concept of buildings is in flux. As they move from fixed to modular in the near future, they must include the sustainability constraint in each of their components. Designers and contractors will no longer have the same work as before. Continuing training must include technological developments in sustainable construction, which should also be an integral part of curricula for all construction trades. Collaboration with the French Community and the Flemish Community will be established in this respect (Fiche No 23).

Specific communication on the various measures taken by the Region

Meeting the requirements imposed by the Region in terms of the performance of Brussels buildings and using the various tools and support offered by the Region to its citizens to meet those requirements will not be possible without a communication campaign setting out the context, recalling the objectives and establishing the link between the various measures of the strategy: this is the subject of Fiche No 25.

Simplify the lives of clients

A single record for residential buildings

Within Bruxelles Environnement alone, a large amount of data and information on residential buildings is collected: EPB certificates, certificates of inspection or acceptance of heating installations and energy incentives, and, beyond the issue of energy, soil certificates and environmental permits. There is also the data and information collected by other authorities, such as cadastral data and planning permissions. In the long term, these will be supplemented by the roadmap, data on materials and, potentially, data on the building's modularity.

This is vital information, albeit limited at the moment. Centralising such data via a single platform will significantly facilitate the renovation process, and, beyond that, contacts and procedures with the authorities concerned. This single platform is the housing passport ('passeport logement') (Fiche No 26). It will initially contain the data collected by Bruxelles Environnement, but, as this initial prototype is developed, the desirability and feasibility of its extension to data held by other authorities will be examined.

Urban legislation in line with the regional ambition for renovation

The Region has already put sustainability at the heart of its urban legislation: the Brussels Planning Code (Code bruxellois pour l'aménagement du territoire) refers to the sustainable development of the Region, the economical use of its resources and the improvement of the energy performance of its buildings.

Authorising or prohibiting certain work is not, however, in line with the regional desire to promote sustainable renovation. Ensuring that the rules applicable to the outside insulation of the front façade are flexible is, for example, one of the essential changes to be made to achieve the Region's overall performance objective. Removing certain work from the list of work subject to planning permission is an issue that must also be raised and assessed. As already recommended by the Air, Climate and Energy Plan, an interinstitutional working group will soon be set up to propose revisions to the urban regulations (Fiche No 27).

Long-awaited simplification of procedures

The multiple procedures and financial incentives and the administrative complexity of each mechanism are undoubtedly a major obstacle to renovation.

As already mentioned in the chapter entitled 'Fund the transition of existing buildings to sustainability', the complementary nature of the various financial incentives for renovation and the development of simplified interfaces will be examined (see in particular Fiche No 7 'Revise the energy incentive mechanism').

Incentives for the renovation of buildings in the Brussels Capital Region

Incentives	Objective	Type of work		Authority concerned
Renovation	Improve the health, safety and basic comfort of housing	Stability Roof Humidity Dry rot Ventilation Electricity Gas	Insulation Cladding Heating Stairs Rainwater etc.	Bruxelles Urbanisme et Patrimoine
Energy	Improve the performance of the building and its equipment	Study/Audit Insulation/Ventilation Heat		Bruxelles Environnement
Façades	Improve the street façade	Rendering, cleaning, etc.		Bruxelles Urbanisme et Patrimoine
Heritage property	Restore unprotected heritage property	Various		Bruxelles Urbanisme et Patrimoine
Municipal	Encourage work within the municipal area	Various (e.g. rainwater tank)		Municipality

As mentioned in relation to the housing passport, centralising information is one of the keys to administrative simplification. A platform will be set up, which will have all the documents required for a planning permission procedure. A single interface will inform citizens about all the procedures and formalities to be carried out in a renovation process and about the financial aid that they can access for this purpose.

Document, assess and innovate

Place regional action on a solid footing that is constantly assessed

Whenever a large-scale transformation process begins, there are many uncertainties and grey areas. The proposed strategy is based on our current knowledge, and we therefore need to examine and further study many issues and parameters: the actual state of Brussels buildings and the precise consumption of certain sub-segments; the development of technologies and their adoption by the various stakeholders; collective awareness of the need for society to consume fewer resources, and the needs of professionals and individuals in this transition.

Whether it is a question of implementing alternative funding mechanisms, promoting collective action through cooperatives or including other aspects of sustainability in the regulatory framework, it is these studies that will enable us to gauge the usefulness of certain solutions. The fiches therefore highlight the need to closely examine the various parameters that may influence the proposed models in the medium or long term.

By assessing the measures implemented through this strategy, we will be able to refine or alter the approaches as necessary. Indicators must therefore be carefully defined in relation to the resources, work, results, efficiency, effectiveness or impact of the measures. One of the fiches therefore concerns the need to document the Brussels building stock and the impact of the regional action on this stock (Fiche No 28).

Innovation to give an overview of sustainability

The process will be necessarily iterative, and innovative initiatives will ensure better performance with fewer impacts and increased comfort at a lower cost.

As indicated in Fiche No 29, an innovation laboratory (RenoLab) will be set up as a link between all stakeholders in the construction sector in order to share and encourage innovative practices. Over and above energy performance, innovation involves taking an overview of all the sustainability aspects of a building in order to consider its environmental impact. In this respect, the regional action is completely novel as it has, for some time already, been studying the reduction of this impact from all angles through the Guide Bâtiment Durable (Sustainable Building Guide): energy, site and building management, mobility, materials, human and physical environment, water, comfort (acoustic in particular), well-being and health are all themes covered by the Guide. This must be continually updated with new practices and techniques (Fiche No 32).

Two specific issues have also seen particularly innovative developments: reducing the impact of construction materials, and the modular design of buildings.

Analysing the environmental impact of materials throughout their life cycle is the aim of TOTEM (Tool to Optimise the Total Environmental impact of Materials), which is covered by Fiche No 30.

With regard to the circular economy objectives in the area of construction, BAMB is a project that is aiming to radically change our view of buildings, by including the dimensions of 'reversibility' and reuse of materials. Fiche No 31 explains the next steps in this project.

Following a period of experimentation and encouragement, it will be considered whether making TOTEM and the sustainable building reference framework compulsory in major renovation work will be useful.

From demolition to dismantling and reuse

According to the CSTC, statistics for Belgium reveal that around 5% of the building stock is in such a state that an acceptable level of performance cannot be achieved following renovation (¹²⁴).

Given its impact, demolition must, however, remain an absolute exception. In the light of the regional circular economy objectives, demolition should be permitted only if it is intended as a source of materials, and not waste. The question of demolition, which is assessed by Fiche No 33 and which is closely linked to the circular economy, must therefore be dealt with in a way that maximises reuse of equipment and materials: any dismantling will therefore be subject to an inventory of reusable items and prior evidence of its need.

However, demolition also and in particular raises the question of the certification of materials for reuse: the feasibility of a compulsory certificate for each item that is potentially reusable must therefore be quickly studied. Reusing construction materials could drastically reduce construction waste (Fiche No 34).

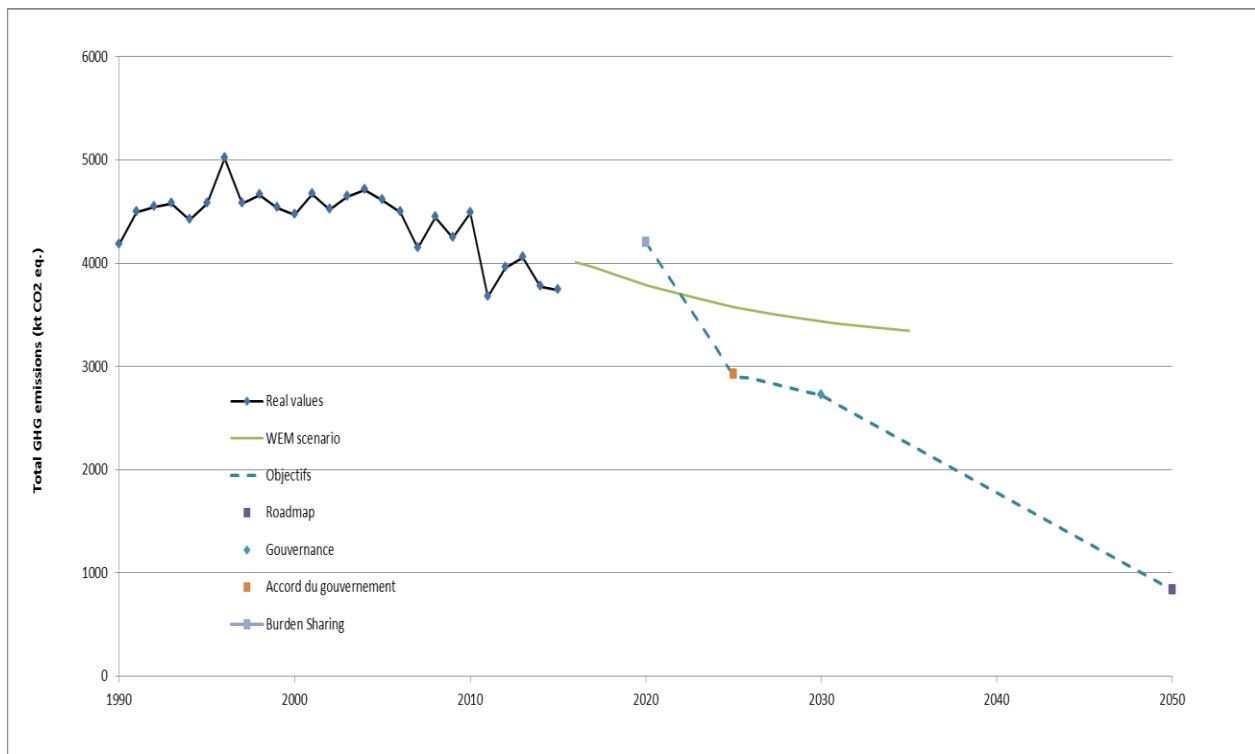
Commit everyone to a more sustainable city

The objective of reducing greenhouse gas emissions by 80%, or the factor 4 as it is sometimes known, requires an unprecedented mobilisation of all stakeholders. The measures in this strategy therefore involve everyone: public authorities and organisations, citizens, businesses, associations, federations, research centres, schools, etc.

The following graph clearly shows the need for such a mobilisation.

¹²⁴ <https://www.cstc.be/homepage/index.cfm?cat=publications&sub=bbri-contact&pag=Contact49&art=731>

Path to achieving the 80% reduction objective by 2050



(WEM scenario: 'With Existing Measures' in a standard situation)

Objectifs	Objectives
Gouvernance	Governance
Accord du gouvernement	Government agreement

The objective has been set and the priority sectors are known: the building sector is the largest emitter of greenhouse gases in Brussels. In addition to this effort, and without exporting our pollution elsewhere, the Region's environmental footprint needs to be considerably reduced. A building stock that consumes much less energy and produces more energy locally is one of the key steps to a resilient, more sustainable and also more desirable urban structure: improving the energy and environmental performance of buildings guarantees a genuine improvement in comfort within those buildings.

The Region must now determine the approaches that it intends to favour in order to encourage and support this transition so that it is fair and accepted, and achieves its objectives. That is why this strategy has been produced: use all possible sources of funding and set sufficient mandatory targets to ensure the credibility of its ambition; support, train and assist all stakeholders, simplify procedures for them and allow them to exchange best practices; provide information on all measures; constantly assess and innovate.

It is through all these measures that the transition to a sustainable building stock will be achieved and will genuinely ensure a better quality of life for everyone.

Action fiches

The renovation strategy guidelines set out in the above sections are supplemented by 34 action fiches that are not included in this document for the sake of balance.

Other 'building' measures

There is other scope for action in terms of buildings aside from this ambitious strategy to reduce the environmental impact of existing Brussels buildings.

Accordingly, for new buildings in the tertiary sector (excluding administrative and teaching areas within those buildings), an increase in the EPB requirement will be envisaged. The current PLAGUE tool will also be assessed in relation to the commitments made in this document.

The Brussels Government will also specifically commit to the public authorities setting an example in terms of building renovation.

Furthermore, there are significant differences in surface area by use in the tertiary sector (see table below). Depending on the activity, a larger or smaller surface area may sometimes be justified. However, our view is that, in some subsectors, convergence could be envisaged so that optimum use is made of the limited Brussels space.

Subsector (tertiary)	Surface area by use in m ² /use
Retail	46.5
Transport and Communication	8.5
Banking	37.8
Education	152.5
Health	77.3
Administration	39.1
Other Sectors	92.5
Energy, waste, water	6.3

In the residential sector, the Citydev strategy for the development of new housing will incorporate the regional environmental and climate objectives by developing passive and zero-energy housing. The programme will provide for the development of 1,000 passive housing units every five years, of which 30% will be zero-energy.

Lastly, one particular type of energy-intensive building could be specifically targeted: data centres. It would be useful for the CIRB (Brussels Regional IT Centre) to analyse regional data centres, firstly with a view to making them more sustainable and energy efficient, based on a prior audit, and secondly, where a new site is needed, in terms of incorporating the elements guaranteeing sustainability and reduced energy consumption from the design phase of the project.

In this context, the Brussels Government undertakes as follows.

- Taking account of the long-term objectives of the Energy Pact for public buildings, each purchase and large-scale renovation of regional or regionally funded public buildings must incorporate these objectives from 2019. The collaboration between the various authorities responsible for managing public buildings will be formalised and reinforced in order to achieve the set objectives.
- The EPB requirement level for new non-residential buildings (sports centres, cultural centres, hospitals, residential homes, crèches, etc., excluding administrative and teaching areas within those buildings) will be assessed and raised from 2021.
- In 2021 a proposal will be made to adapt the rules on the maximum surface area by use in the tertiary sector, following a dialogue with trade union and employer organisations. Within this dialogue, the Brussels Government will aim for at least a 10% reduction in administrative areas by 2030.
- The PLAGUE programme will be assessed and, if necessary, adjusted in agreement with the tertiary sector in order to steer its building stock towards the long-term objectives of energy neutrality.
- Within five years, the Brussels Government will complete the construction of the 6,400 housing units indicated by the Regional Housing Plan and the Housing Alliance, which, depending on their current state of progress, could benefit from fast-track planning procedures in order to shorten their timescales for completion.
- The Brussels Government will ensure that all existing social housing is returned to rental condition, in particular by removing obstacles and shortening timescales.

- The Brussels Government will produce an additional four-year plan aimed at reducing the energy consumption and costs charged to social housing tenants.
- New working practices will be promoted in order to reduce the surface area by use in the tertiary sector (e.g. remote working, new office facilities close to stations, or actions targeted at sectors with the highest surface area by use, such as banking/insurance).
- Through Citydev, 1,000 passive housing units will be developed every five years, of which 30% will be zero-energy.
- The energy consumption of sites housing regional data centres will be reduced by introducing, in 2020, an energy audit for all relevant sites. The rules applicable to future data centres established in the Region will be examined, particularly in relation to the environmental permit.
- An energy incentive will be created for the installation of sunshades.
- Cooperation will be established with the federal level.
- Taking into account the division of responsibilities and in addition to its own efforts, the Brussels Capital Region also wants to develop cooperation with the federal level within the framework of the Energy Pact. In this context, the Brussels Government will call on the federal level to:
 - reduce VAT on energy renovation work and environmentally friendly insulation;
 - invest more in the renovation of federal public buildings situated in the Brussels Capital Region (under Article 5 of the Energy Efficiency Directive);
 - instigate a comprehensive discussion of tax measures to speed up and improve the energy quality of renovations in the context of a socially just vision.

iii. Description of policy and measures to promote energy services in the public sector and measures to remove regulatory and non-regulatory barriers that impede the uptake of energy performance contracting and other energy efficiency service models

The market for energy service companies (ESCOs) and energy performance contracting (EPC) is still relatively undeveloped in Belgium, despite a few positive individual experiences. Nevertheless, this energy efficiency financing model offers some potential for development. The Belgian public authorities are mindful of this and are in the process of establishing the structure needed to support this development in consultation with stakeholders (both suppliers and potential customers), which involves the following:

- analysis of barriers to the development of the concept and searching for solutions;
- communication campaigns to promote ESCOs and the benefits of energy performance contracting;
- renewed contact with financial institutions to de-risk the financing of the sector;
- preparation of specifications and model contracts, measurement and monitoring tools, and training/qualifications to ensure quality of service.

Federal State

- The options for supporting the energy renovation of buildings through third-party financing formulas will be reviewed in depth by 2021.
- Discussions will be launched within the Special Advisory Committee on Energy Consumption in order to define a legal framework enabling third-party investment firms to lend to individuals and businesses and provide them with the financial guarantees needed to carry out energy efficiency improvement work.

Flemish Region

Energy services for local authorities

As many local authorities are looking for support to implement energy saving or energy generation measures across their estates, Fluvius has been providing a service to facilitate this process since 2010. The service is an extension of the mandatory support required under Article 6.4.1.1/7 of the Energy Decree of 19 November 2010, which states that distribution system operators must assist a local authority with the planning and implementation of its energy policy if the authority requests them to do so. This supplementary service is not a regulated activity and thus has no impact on distribution system tariffs. Energy services in buildings may include, but are not limited to, the building envelope, heating, ventilation and air-conditioning, lighting, heating and lighting maintenance, renewable energy and work associated with such measures (such as demolition and maintenance). Similar services are also available for public lighting and the application of the sustainable fleet principle. The VEB also offers energy services to local authorities.

Energy services for public buildings

On 7 July 2006, the decree on the retrofitting of school infrastructure was enacted. The decree defines the key elements of the investment programme for (new) school infrastructure through alternative sources of funding. In 2009, the private investment company Scholen van Morgen nv, which specialises in DBFM (Design, Build, Finance and Maintain), was chosen to accelerate the investment of funds totalling around EUR 1 billion. The programme consists of the design, construction, funding and maintenance (over a period of 30 years) of 182 school construction projects (new-builds and renovations).

In February 2012, the Flemish Government set up the independent private agency Vlaams Energiebedrijf (VEB). The agency's mandate is to manage energy on behalf of the public sector, making it more sustainable and efficient. It firstly does this by purchasing energy centrally and more cost-effectively, and, secondly, by pooling and utilising energy data. Lastly, it also advises public services on how to use energy more efficiently.

With regard to this final aspect of its activities, the VEB has developed a comprehensive service that encourages public bodies to introduce energy-related measures in a structured and accessible way. Ideally, the approach should be based on an in-depth analysis of the portfolio (data analysis and on-site surveys are used to identify which buildings consume the most energy and which can potentially be renovated, following which a comparative analysis is carried out). A dynamic energy investment plan is then drawn up on the basis of energy audits of the selected buildings. To ensure that the plan's measures are implemented effectively, the VEB works with stakeholders via a two-pronged approach: (i) by guiding them through the process of energy performance contracting, where a third party commits to a guaranteed energy saving for the public entity on the basis of energy-related measures, and (ii) by providing a 'library' of quality framework agreements that public entities can refer to quickly and confidently when deciding on their energy-related measures.

Energy services for businesses

In 2017 Participatiemaatschappij Vlaanderen (PMV) set up a EUR 20 million fund for a period of five years. Known as the 'Energy Efficiency Fund', it invests in improving the energy efficiency of SMEs through public-private partnerships ('ESCO' model). The overarching aim is the energy efficiency of SMEs, although broad-based projects combining energy efficiency with local renewable energy generation (wind, solar, green heat) and energy management (flexibility, demand-side response) are also considered under the scheme. In practical terms, the Energy Efficiency Fund invests in projects, ESCOs or ESCO funds where, for every euro that the Energy Efficiency Fund invests in a project, private funds invest at least one euro in the same category or in a lower category. The projects, ESCOs or ESCO funds are managed by private managers. PMV thus unlocks the venture capital available for this type of investment.

If the Energy Efficiency Fund discovers that some markets or niches are not being targeted, it has the option of setting up a new project company (ESCO or ESCO fund) to cover this target group. In the end, the ultimate goal is to make maximum use of energy efficiency opportunities in order to achieve the energy and climate targets.

Walloon Region

The regulation of energy service companies (ESCOs) (which currently work with public services) will be reinforced and their area of action will be expanded. ESCOs provide skills, human resources and certain guarantees (energy performance contracts and even third-party investors) allowing the investments needed to reduce energy consumption to be made.

The target audience is:

- public buildings (current situation), including public housing;
- businesses in terms of their buildings and industrial activities;
- jointly owned properties.

Individuals in the residential sector may be assisted at a later date.

An ESCO agency develops the necessary tools (model contracts, performance monitoring, technical management, pooling of buildings) and institutionalises practices to improve efficiency.

The aim is to manage and reduce the energy consumption of consumers.

In the case of a tertiary or multi-family building, the relationship between the owner (the person likely to make the investment and therefore to bear the cost) and the tenant (the person likely to benefit from a more energy efficient building) is key. Steps should be taken to ensure a fair distribution of the costs and benefits. The manager of a portfolio of buildings will make every effort to:

- apply the principle of the Total Cost of Ownership (TCO): the manager bears the costs associated with energy consumption (and therefore has an interest in reducing that consumption) and provides a full service;
- mobilise resources and ensure that the benefits are fully controlled by the manager.

The ESCO system reduces the risk for service-providers (portfolio of buildings) and releases customers from the energy-related administration so that they can focus on their core business. This measure also reinforces the exemplary role of public buildings.

Particular attention must, however, be paid to the feasibility of including the thermal insulation of building envelopes in the ESCO system. This system is more difficult to apply to work where the return on the investment is longer, as in the case of thermal insulation.

The analysis carried out has identified over 30 actions, grouped into 8 key tasks, for developing ESCOs in the Walloon Region. It has also highlighted a priority shared with the renovation strategy, namely the development of the legal and regulatory framework for ESCOs and EPCs (energy performance contracts).

Several measures have been prioritised for this purpose:

ID	Description	Main stakeholders to be involved
1. Regional agency	<ul style="list-style-type: none"> - Set up a regional facilitation agency as a single point of contact for all operators. - Its task: pool skills and information and support stakeholders so that the private and non-market sectors can adopt professional processes and implement them effectively. - In line with the renovation strategy, digitalisation and performance monitoring of organisations benefiting from energy services must be stepped up. 	<p>Walloon Public Service Existing facilitation agencies (e.g. Rénowatt) ESCO federations Technical experts</p>
2. Technical tool box	<ul style="list-style-type: none"> - Develop simplified EPC forms and frameworks tailored to SMEs in the tertiary sector. - Establish a technical framework and a performance measurement and verification standard that is both simple and tailored to SMEs in the tertiary sector (e.g. based on the International Performance Measurement and Verification Protocol (IPMVP)). - Set up a technical certification centre providing access to specialists (qualified staff) and standard 'test beds' for key processes to be improved in the tertiary sector, schools and hospitals. The techniques covered can be gradually added to the register so that the focus is always on proven results. - After 2020, develop an ESCO accreditation framework (once the market has been established). - Set up a technical certification centre (potentially involving extremely simplified monitoring, reporting and verification (MRV)), for example based on registers of techniques with proven performance and results validated by the technical centre (see above). The catalogues of Standard Qualifying Actions discussed in the 'Article 7' note in this NECP 2030 must serve as the basis. 	<p>Legal experts Existing ESCO facilitators, ESCO federations</p>
3. Dissemination	<ul style="list-style-type: none"> - Launch an information campaign on energy services and the regional energy strategy. - Promote and publicise incentives for energy efficiency investments tailored to the tertiary sector and the available ESCO solutions. Publish model EPCs and a list of ESCOs that are recognised (or accredited in the medium term) via the facilitation agencies. - Publicise success stories/Develop an educational portal on EPCs for energy managers and legal professionals. 	<p>Communication team of the Walloon Public Service</p>

ID	Description	Main stakeholders to be involved
	<ul style="list-style-type: none"> - Include energy efficiency funding and ESCO models in energy audit findings and renovation roadmaps. - Promote facilitation agencies among equipment suppliers, energy service-providers and energy/building managers. 	
4. Training	<ul style="list-style-type: none"> - Establish a training programme for the banking sector, including the promotion of the European Commission's De-Risking Energy Efficiency Platform (DEEP). - Set up a training course on performance monitoring and verification techniques/Develop interdisciplinary higher education training focused on ESCOs and EPCs. 	Universities, higher education institutions
5. Reduce the risks associated with funding mechanisms	<p>Study various mechanisms providing access to funding and reducing funding risks through banks, such as the following.</p> <ul style="list-style-type: none"> - For the tertiary sector, use the Energy Transition Fund for revolving-type financing to allow access to capital for small ESCOs (or final beneficiaries in the bank guarantee model). The fund must be fed by various sources (public, municipal, community, green bonds, revenue from CO₂ allowances, suppliers' obligations under Article 7, etc.) and will be topped up through energy savings or loan interest rates. The fund will in particular offer subordinated debt at attractive rates. The total fund will be between EUR 250 million and EUR 300 million. - Establish other mechanisms to reduce the financial risk (and interest rate) for SMEs, e.g. additional public guarantee, subsidised interest rates (or tax relief), co-investment by sources other than the fund, etc. - Secure energy efficiency revenue streams: if the price of energy for the tertiary sector or public buildings is not increased through fiscal measures, financial support may be needed to supplement energy savings and guarantee a return for ESCOs, as well as to make the scheme sufficiently attractive for final beneficiaries. This should be consistent with measures taken under 'Article 7'. - At regulatory level, develop green bonds at regional or municipal level, in line with the European framework, to raise new dedicated sources of funding. 	Banking world Public funds Community cooperatives Walloon Public Service, Energy fund

ID	Description	Main stakeholders to be involved
6. Pilot projects	<ul style="list-style-type: none"> - Support EPC pilot projects for (1) selected tertiary sector businesses; (2) a panel of five or six local authorities and (3) a pool of Wallonia Public Service buildings. - Monitor and publicise the results. 	<p>Walloon Public Service Current public facilitators (e.g. Rénowatt)</p>
7. Public energy governance	<p>Review management procedures and regulations restricting the adoption of EPCs by public organisations (especially hospitals and schools), including the adaptation of management agreements and the inclusion of energy performance concepts (EPC, MRV, future energy savings, etc.) in multi-annual investment plans. Review existing maintenance agreements to allow the future adaptation or integration of EPCs (or energy efficiency improvements in general).</p>	Public authorities
8. Monitoring of the measure	<ul style="list-style-type: none"> - Monitor the effects of the actions implemented. - Reassess their relevance every year and make any modifications needed. - Conduct the necessary studies to refine them (e.g. for financial de-risking measures and legal support actions, development of MRV standards, etc.). 	<p>Walloon Public Service-DGO4 Technical experts</p>

- iv. *Other planned policies, measures and programmes to achieve the indicative national energy efficiency contributions for 2030 as well as other objectives referred to in point 2.2 (for example measures to promote the exemplary role of public buildings and energy-efficient public procurement, measures to promote energy audits and energy management systems, consumer information and training measures, and other measures to promote energy efficiency)*

Federal State

FEDERAL BUILDING STOCK

In terms of the renovation and construction of federal buildings:

Objective: Bring the energy performance of federal public buildings into line with the neutrality objective by 2040, with 50% of federal buildings having to achieve this objective by 2030, taking into account the existing building stock and the technical, legal, HR, accessibility and public service continuity constraints faced by public buildings.

- Régie des Bâtiments (Government Buildings Agency);
- SNCB and Infrabel;
- Defence authorities (La Défense).

Régie des Bâtiments

Given the wide range of buildings concerned, action plans will be drawn up for each type of building with a view to achieving the energy neutrality objective (different standards will be envisaged for protected/listed buildings). The current obstacles (market supply, current standards, leasing or partnership constraints, budget, service continuity, etc.) that may prevent the objective being achieved in the set timescale will be studied and addressed, together with the opportunities (co-benefits, in terms of adaptation to climate change, that will result from improving the thermal management of buildings during heatwaves, for example). The concept of neutrality in terms of energy and climate will be precisely defined.

Improving the building stock also involves rationalising its use by reducing the portfolio (closure of premises) and replacing buildings with high energy performance buildings, excluding renovation (e.g. new prisons). Once again, there will be co-benefits in terms of adaptation to climate change.

SNCB/Infrabel

Reduction of the non-traction energy consumption. Between 2005 and 2017, the SNCB reduced its non-traction energy consumption by 17.5%. This effort will continue in the coming years. Between 2016 and 2022, the SNCB aims to achieve an additional reduction of 7% through the following actions:

- renewal and modernisation of lighting systems for platforms, stations, offices and other service buildings;
- continuation of the renewal of heating systems in buildings;
- entry into service of new workshops to replace old and less energy efficient workshops;
- renovation of existing buildings (insulation, frame, etc.); etc.

Estimated impact of the measure on absolute non-traction energy consumption and on CO₂ emissions for the SNCB

Reduction of non-traction energy – period 2016-2022 (SNCB)							
Evaluation of new PaMs	Energy consumption				CO ₂ emissions		
	2016 GWh	2022 GWh	reduction GWh	%	2016 kton	2022 kton	reduction kton
Reduction of non-traction energy	264.0	245.5	-18.5	-7%	52.4	48.2	-4.2
▪ heating oil	27.0	17.6	-9.4	-35%	8.2	5.3	-2.8
▪ natural gas	125.0	123.8	-1.2	-1%	28.7	28.4	-0.3
▪ electricity	112.0	104.2	-7.8	-7%	15.6	14.5	-1.1

For the period beyond 2023, a vision will be established to continue these efforts to 2040 or 2050. An action plan to 2030 is already envisaged, which will form the first step towards neutrality.

The building renovation rate must be speeded up in order to achieve neutrality by 2040. The number of square metres concerned must be precisely determined (see the register action below).

Wherever feasible, the potential for adding appropriate renewable energy sources (PV, district heating systems, etc.) will also be taken into account.

Defence authorities

In the management of their infrastructure, the defence authorities comply with the EPB and EE legislation. In particular, and within their budget constraints, their aim is to apply the NZEB (Nearly Zero-Energy Building) standard to any new or treated-as-new buildings and to major renovations from 1 January 2019, and to improve the energy efficiency of their existing buildings through 'quick-win' small-scale work/investment to reduce its heating oil and gas consumption.

Vision of the defence authorities with regard to the energy consumption of buildings:

1. First, the defence authorities want to reduce their energy consumption by:
 - replacing old technical systems with more efficient and innovative techniques;
 - switching from heating oil to gas where feasible;
 - correctly setting their technical systems and adapting them to efficient consumption;
 - installing LED lighting;
 - insulating pipework, walls and roofs;
 - raising the awareness of staff.
2. Second, carrying out a number of large infrastructure projects will significantly reduce the energy consumption of the districts concerned, by replacing old buildings with modern and energy efficient buildings, which will also have positive effects in terms of adaptation to climate change (improved thermal management).
3. Last, the defence authorities want to invest in renewable energy where possible.

Once again, a vision and an overall plan for the entire building stock will allow all the necessary work to be scheduled for different stages (2030, 2040), with the required resources being calculated.

The objective of exceeding the NZEB standard through positive-energy buildings may be set for the long term.

For all public services, public interest bodies and social security institutions

- The respective public procurement will aim to utilise the circular economy, particularly in terms of construction materials, and to optimise the co-benefits in terms of adaptation to climate change (thermal management).
- An energy register of federal public buildings (Régie des Bâtiments, SNCB, defence authorities) will be produced by 2021. This will help to achieve the neutrality objective by 2040, as indicated in the national energy pact.
- A tool that must not be forgotten will be the establishment of energy passports for buildings (see BECI), as indicated in the interfederal energy pact.

Budget

A strategy for funding the large-scale energy renovation of public buildings will be established by 2021, taking into account the various existing options (CFDD recommendation on the National Pact for Strategic Investments and on the NECP/CION No 7).

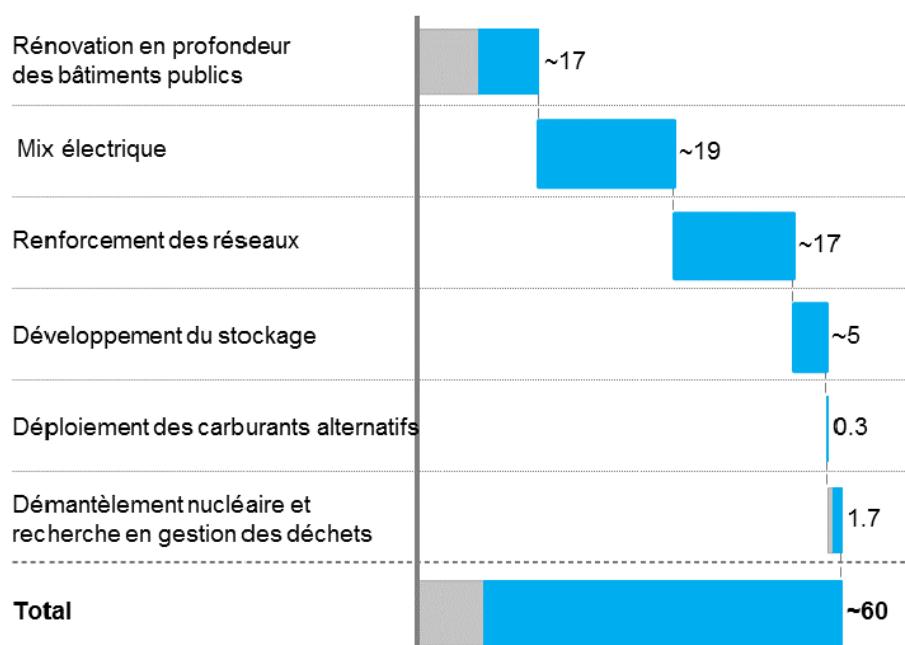
The use of innovative financial instruments such as public-private partnerships, energy performance contracts and green bonds will be envisaged for the work of these three main bodies. The **National Pact for Strategic Investments** indicates that most of the public investment will be focused on the major renovation of public buildings. According to the Pact, this will involve investment of EUR 17 billion by 2030 (linear projection), of which EUR 1.65 billion will be for federal public buildings (i.e. EUR 150 million per year).

Total energy investments to 2030 (source: National Pact for Strategic Investments)

Total des investissements pour l'énergie jusqu'en 2030

Milliards EUR, entre 2019-30

■ Publics
■ Privés



Total des investissements pour l'énergie jusqu'en 2030 Milliards EUR, entre 2019-30	Total energy investments to 2030 billion EUR, 2019-2030
Publics	Public
Privés	Private

Renovation en profondeur des bâtiments publics	Major renovation of public buildings
Mix électrique	Electricity mix
Renforcement des réseaux	Strengthening of networks
Développement du stockage	Development of storage
Déploiement des carburants alternatifs	Deployment of alternative fuels
Démantèlement nucléaire et recherche en gestion des déchets	Nuclear decommissioning and waste management research
Total	Total

Régie des Bâtiments

Budget commitment guarantees will be given via multi-annual plans with differentiated appropriations (over 5-6-7 years) and 20-year budgets depending on the level of ambition chosen.

The current calculations point to the following budget.

TABLE A – EXISTING BUDGET

Project Fiche No	Object	Period concerned	CO ₂ savings envisaged/year*	Energy savings envisaged/year*	Gross m ² savings	Sundry costs	Internal FTE costs**	External FTE costs	Total costs
			(in t CO ₂ eq.)	(in kWh)	(in m ²)	(in €)	(in €)	(in €)	(in €)
00.01	Reduction in surface area	2022 > 2025 (4 years)	29,831	111,020,000	850,076	-	8,164,524	-	8,164,524
14.01	Renovation of surface area	-	-	-	-	-	-	-	-
15.01	Relighting of buildings	-	-	-	-	-	-	-	-
22.01	Replacement of old prisons	2022 > 2050 (29 years)	1,501	5,418,000	86,500	1,819,000,000	6,569,494	5,000,000	1,830,569,494
OVERALL TOTAL			31,332	116,438,000	936,576	1,819,000,000	14,734,018	5,000,000	1,838,734,018

TABLE B – FUTURE BUDGET

Project Fiche No	Object	Period concerned	CO ₂ savings envisaged/year*	Energy savings envisaged/year*	Gross m ² savings	Sundry costs	Internal FTE costs**	External FTE costs	Total costs
			(in t CO ₂ eq.)	(in kWh)	(in m ²)	(in €)	(in €)	(in €)	(in €)
00.01	Reduction in surface area	-	-	-	-	251,150,384	-	-	251,150,384
14.01	Renovation of surface area	2020 > 2040 (21 years)	59,860	228,550,761	-	1,220,581,384	31,433,418	143,060,631	1,395,075,433
15.01	Relighting of buildings	2020 > 2022 (3 years)	1,151	4,427,500	-	30,000,000	938,920	-	30,938,920
22.01	Replacement of old prisons	-	-	-	-	26,000,000	25,000,000	-	51,000,000
OVERALL TOTAL			61,011	232,978,261	-	1,527,731,768	57,372,338	143,060,631	1,728,164,737

For more details, see the annex (budget: version of 18/10/2019)

* At the end of the envisaged period.

** The most unfavourable statutory internal FTE (full-time equivalent) option is used in this case.

SNCB/Infrabel

The measures planned for the period 2016-2022 will be funded through the investment grant and the operating grant.

Defence authorities

The objective must be achieved through energy performance contracts (EPCs). It is currently estimated that, in total, the buildings eligible for an EPC account for 75% of the energy consumption of buildings. The objectives that could be achieved by 2030 (compared with 2018) are as follows:

1. Gas and heating oil: -15% = -28 GWh ~ savings of EUR 1.2 million/year
2. Electricity: -30% = -24.7 GWh ~ savings of EUR 3 million/year

The estimated cost of the investments needed for the EPC approach, based on an extrapolated feasibility study, is EUR 60.5 million, of which EUR 55 million is the investment and EUR 5.5 million is the EPC return on investment = 14.4 years.

The reductions in energy consumption targeted through a number of large infrastructure projects, such as the construction of new headquarters for the Ministry of Defence, a new medical centre to replace the current military hospital and new infrastructures for the Melsbroek, Kleine-Brogel and Florennes airbases, could reduce electricity consumption by 40% and gas and heating oil consumption by 60% (baseline year of 2018) at the Evère, Neder-Over-Heembeek, Melsbroek, Kleine-Brogel and Florennes sites. As regards water, a 50% reduction is expected by incorporating rainwater recovery, among other approaches. The objectives that could be achieved are as follows:

1. Gas and heating oil: -60% = -46.5 GWh ~ savings of EUR 1.8 million/year
2. Electricity: -40% = -16.6 GWh ~ savings of EUR 2 million/year

Investments must also be made in renewable energy. At the moment, an initial project has been launched in Saffraanberg: 500 kWp at a cost of EUR 500,000. Generation is estimated at 475 MWh per year, with self-consumption of 85%-90%. The estimated CO₂ reduction over 21 years (to 2040) is 2,654,415 kg.

Below is an overview of the energy consumption of the defence authorities for the year 2017/2018:

	2017	2018	2040
Electricity kWh	110,215,093	109,573,437 (-0.58%)	68.3 GWh
Gas kWh	128,128,456	127,610,447 (-0.40%)	66.8 GWh
Water m³	689,064	691,839 (+0.40%)	415 million litres
Heating oil litre	11,722,083	12,249,145 (+4.5%)	0

Overall, the measures planned to reduce energy consumption should reduce electricity consumption to 68.3 GWh and heating consumption to 66.8 GWh by 2040. To make buildings energy neutral, EUR 142 million will need to be invested in renewable energy, which corresponds to installing 142,000 kWc or 752,432 m² of solar panels (at the current output of 310 Wp/1.64 m²).

Flemish Region

INDUSTRY

Current policy

The table below shows the breakdown of energy consumption in industry by the various target groups.

Total energy consumption (in final GWh)		EII businesses		Non-EII businesses	
		With EPC	Without EPC	With EPC	Without EPC
<i>EPC participation</i>		97.9%	2.1%	39.0%	61.0%
Refineries	EC > 5 PJ	27,361			
EPC target group	EC > 5 PJ	63,333			
	0.5 PJ < EC < 5 PJ				
Voluntary signature of EPC	0.1 PJ < EC < 0.5 PJ	18.918	2,322	10,000	6,246
Non-energy intensive	EC < 0.1 PJ				9,370
Total		111,934		25,616	

(EC = energy consumption; EII = energy-intensive industry)

The current energy policy for industry mainly focuses on intensive energy consumers ('energy-intensive industries') with an annual primary energy consumption > 0.1 PJ (= 27.78 GWh). The Energy Decree and the Regulation on environmental permits require such businesses to meet obligations in terms of producing energy studies and plans. Since 2015, the Energy Efficiency Directive has required large businesses to carry out an energy audit.

However, the main thrust of Flemish policy on energy-intensive industries consists of voluntary agreements. Sites within the target industrial group of energy-intensive industries can voluntarily sign such agreements with the Flemish Government, under which they commit to going further than the current legislation and receiving certain compensation in return. Flanders has a long tradition with this instrument: Benchmarking Covenant (2002-2014); Audit Covenant (2004-2014), and the current energy policy agreements (EPAs) (2015-2022). This method has proved successful and resulted in a sustainable improvement in energy efficiency in such businesses over the years.

For non-energy-intensive industries, the Flemish Government has also developed a range of instruments, with the emphasis being on information, awareness-raising and encouragement of investments in energy efficiency. For example, mini-EPCs have been developed and businesses can resort to a wide range of economic support instruments (e.g. environmental incentive, portfolio of SMEs, increase in the tax relief (¹²⁵) for investments in energy savings, etc.).

Additional policy

As a sector, industry will be supported in the transition to a climate-neutral society. Through additional policies, a coherent framework for industry will be developed, which, in addition to energy efficiency, will cover the broader industrial transition to low-carbon processes, the integration of renewable energy and the efficient use of materials. Industrial processes must be completely overhauled (e.g. by moving towards electrification, use of green gas, green hydrogen and synthetic fuels, residual heat, circular processes, etc.).

The existing range of energy efficiency support instruments will be extended to ensure a broader industrial transition within a larger group of businesses. The current instruments cannot yet reach all businesses through the same measure. There are still many opportunities for extending their scope and lowering the barriers to entry.

¹²⁵ Applications are processed by the VEA, which issues a certificate for this purpose.

Regulatory framework for industry

Within the group of energy-intensive businesses (annual energy consumption > 0.1 PJ), voluntary agreements remain at the forefront of Flemish policy (see also the paragraph 'Reinforcing and optimising energy policy agreements').

For non-energy-intensive businesses (annual energy consumption < 0.1 PJ), the emphasis is on disseminating new solutions within the Flemish industrial fabric. These may involve incentives to obtain energy advice or support for specific consulting projects. An action plan for more energy efficient SMEs and tighter legislation will meet the European obligation to develop specific actions aimed at the energy use of SMEs. The starting point is to gather knowledge on energy consumption and identify useful measures. Sectoral characteristics will be taken into account.

To overcome the current obstacles and barriers facing this target group, the policy instruments needed to better reach and support the various target groups will be developed. The optimum division between small businesses and very small businesses will be determined based on an analysis that will ensure the best possible approach for businesses and government. In addition, a pilot project will be developed with the industrial sectors to detect the obstacles and the opportunities if the voluntary agreement were extended to small businesses.

Small businesses (in terms of energy consumption) will carry out an energy audit in order to precisely target the measures suited to the needs of the business. Establishing a link between this audit and the energy consumption will clarify the policy framework for businesses. It will also be possible to monitor the audit obligation through the existing web application for the energy audits of large businesses. Establishments falling within this category must update their energy audit if their business is extended or modified.

The current legislation on energy audits does not impose any obligation to apply cost-effective measures. To encourage such businesses to also invest in energy efficiency, it is proposed that cost-effective measures are applied.

The public authorities and these businesses must develop an attractive framework similar to the energy policy agreements, under which such businesses can voluntarily commit to go beyond the applicable regulations.

Very small businesses (in terms of energy consumption) will produce at least an overall energy balance. A list of 'no-regret' measures can be implemented as part of a voluntary agreement, while maintaining the current benefits for businesses signing an EPC. In developing this policy framework, the conditions to be met by the overall energy balance must be determined in consultation with the relevant stakeholders. It is important that the administrative burden remains limited.

To prevent a disproportionate administrative burden being caused by the above policy instruments, the VEKA may introduce, in collaboration with Fluvius, automatic reporting of energy data for small and very small businesses. This database will be accessible through the electronic information point for entrepreneurs, among other routes. It will allow businesses to monitor their own electricity and natural gas consumption and to compare their energy consumption with the reference values using the NACE code.

Schematic representation of the regulatory framework

Category	SME	Large businesses
Large businesses (energy consumption > 0.1 PJ)	Establishments must have an approved energy plan, which must be updated every four years. Voluntary energy policy agreements.	
Small businesses (in terms of energy consumption)	Energy audit Voluntary agreement	Energy audit (existing energy audit obligation for large businesses) Voluntary agreement
Very small businesses (in terms of energy consumption)	Overall energy balance Implementation of sectoral 'no-regret' measures (as part of an agreement with the Flemish Government)	Energy audit (existing energy audit obligation for large businesses) Implementation of sectoral 'no-regret' measures (as part of an agreement with the Flemish Government)

Reinforcing and optimising energy policy agreements (EPAs)

Energy policy agreements (EPAs) concluded with energy-intensive industry in order to anchor and maintain energy efficiency within Flemish energy-intensive industry (EII and non-EII businesses), which are applicable from 1 January 2015 to the end of 2022, will continue to be an important instrument not only for achieving the Flemish energy efficiency objectives (EII and non-EII), but also for reducing GHG emissions (non-EII) beyond 2022. Energy policy agreements will be used as a key policy instrument for supporting the industrial transition.

The way in which energy policy agreements will be continued beyond 2023 will be examined. This will involve assessing the current target groups, the cost-effectiveness of measures and the attractiveness to businesses of participating in this scheme. Consultations will be organised with the sectors concerned on reinforcing and expanding the EPA instrument. Currently there are some parts of industry that cannot participate in this scheme.

In this context, the European regulations and the wider industrial transition in Flanders should be taken into account. In addition to energy efficiency, the latter may also involve the climate impact and the efficient use of materials and water, without compromising the competitiveness of businesses. The WAM scenario takes account of the expansion of energy themes ⁽¹²⁶⁾ ensuring a sustainable improvement in energy efficiency for EII businesses (0.865% per year) and non-EII businesses (1.22% per year).

In order to rationalise the regulations between the different sizes of businesses, the threshold for an approved energy plan will be reduced to 0.1 PJ, in accordance with the government agreement. This will also allow additional energy savings to be made, over and above the energy savings made under the EPAs. To calculate this energy saving, the calculation model will take account of an annual improvement in energy efficiency of 0.50% per year. See also the paragraph ‘Overview of the savings made through the described measures in 2030 and their contribution to Article 7 of the EED’ under ‘non-EPA’.

Extension of mini-EPAs to other sectors

It is assumed that the public authorities and the businesses concerned will be able to develop an attractive framework so that businesses can voluntarily commit to go beyond the applicable regulations. It is also assumed that, given the growing experience in various sectors, the number of businesses newly involved could rise rapidly each year to reach a total of around 1,000 businesses by 2030.

This scheme can be combined with maintaining the SME portfolio for subsidised energy advice, with subsidies of 20% to 30%. It could also be examined whether the city of Ghent’s energy coaching project can be used to provide support.

Continued support for industry through economic support instruments: ‘prime écologique+’, strategic environmental aid and SME portfolio

The ‘prime écologique+’ and strategic environmental aid remain key instruments for supporting a wide-ranging industrial transition in Flanders, i.e. to improve energy efficiency and make the most efficient environmental investments. The current instruments are in the process of being assessed with a view to their continuation. Energy advice could also be subsidised through the SME portfolio.

Development of the ESCO market for businesses, with particular emphasis on SMEs

The knowledge acquired through the ‘ESCO for SMEs’ programme, under which four pilot projects were implemented between 2014 and 2017 to identify bottlenecks, could be used for this purpose.

¹²⁶ The energy savings resulting from using residual heat can therefore, for example, be included in the energy efficiency savings of the business supplying this residual heat.

Through the ESCO (2018) initiative, PMV could invest EUR 20 million over the next five years in ESCOs that will take on the energy efficiency investments of other businesses (that cannot make these investments). Particular emphasis will be placed on investments in SMEs. The initiative will be assessed in due course to decide whether it will continue.

Development of a service provision accessible to everyone (sensitisation, awareness-raising, information, advice, networking) by the VLAIO and its partners in order to reach the widest possible audience and ensure their active participation with the aim of achieving the energy and climate policy objectives

For many businesses, it is important to share their knowledge of existing technologies and know-how. It is also important for them to obtain information, improve their awareness and, if necessary, receive advice and guidance on how they can tackle energy and climate issues. The VLAIO possesses valuable tools for involving these businesses. For example, a wide-ranging initiative has already been implemented in universities, which enables businesses to familiarise themselves with existing technologies. Service contracts provide resources to a number of structural partners so that they can provide easily accessible information, advice and guidance, in addition to the traditional guidance on starting up and growing businesses.

The VLAIO will also make maximum use of its available channels to reach civil society.

The agency will use its existing channels and partnerships to reach the greatest possible number of businesses in relation to energy and climate. The aim in this respect is not only to transfer know-how and provide information on technological options, but also to provide information, advice and guidance on how to incorporate that know-how and those options in the business model.

Communication of a range of transparent information

Through the electronic information point for entrepreneurs, we will work to provide centralised information that is tailored to entrepreneurs by connecting them to existing information channels. In particular, information on best practices in the sector, local contact points, learning networks and support options will be combined in this process.

We will also encourage sectoral federations to exchange information on best practices with a view to the energy transition of business.

Request for the Federal Government to increase the investment tax relief for energy saving measures from 13.5% to a level similar to that in the Netherlands, i.e. 45%

In the Netherlands, 14,234 applications for tax relief on energy investments were made in 2015, which was clearly higher than the 1,139 in Flanders. The applications in the Netherlands equated to a total investment of EUR 1,368 million, compared with EUR 332 million in Flanders. In terms of use, there is therefore a significant difference between Flanders and the Netherlands. This measure will considerably reduce the payback times on investments.

Overview of the savings made through the described measures in 2030

The table below gives an overview of the measures that can be quantified in the WEM and WAM scenarios. The energy savings for each of the aforementioned measures are those achieved in 2030.

GWh, f	WEM	WAM
EPA, DEN	10,143	10,506
EPA, no DEN	1,085	1,114
Non-EPA, DEN	0	101
Non-EPA, no DEN	0	224
Mini-EPA	0	775
Environmental incentive	205	99

To determine the contribution of the measures to Article 7 of the EED, the energy savings made through the measures over the period 2021-2030 must be cumulated.

In the WEM scenario, the EPA and environmental incentive measures, cumulated over the period 2021-2030, respectively account for $47,819 + 868 = 48,687$ GWh of final energy savings.

In the WAM scenario, the EPA, non-EPA (regulatory framework), mini-EPA and ‘prime écologique+’ measures, cumulated over the period 2021-2030, respectively account for $49,110 + 1,750 + 3,308 + 377 = 54,544$ GWh of final energy savings.

TRANSPORT

See point 3.1.1.1.

AGRICULTURE

Current policy

The Flemish energy policy measures and the technological developments based on the principles of the Trias Energetica strategy also have an impact on the agricultural sector.

Renewable energy use will increase by 2030 as a result of utilising solid and liquid biomass, fermentation, PV, solar water heaters, heat pumps, biofuels in agricultural machinery and other methods.

Despite efforts to rationalise energy consumption and use low-carbon fuels in glasshouse horticulture, the consumption of oil products (particularly heating oil) has not reduced, and has even slightly increased over the last five years. However, the relative importance of heating oil is expected to decrease due to energy savings and the switch to natural gas, biomass, heat pumps and recovery of residual heat, among other options.

Natural gas consumption has risen significantly in recent years due to the combined production of heat and electricity on agricultural holdings. This trend will not continue because the glasshouse horticulture sector has largely transitioned from gas and heating oil boilers to cogeneration.

Investments in energy saving techniques (insulation, heat recovery, frequency regulation of pumps and fans, LED lighting, pre-cooling, etc.), green heat and renewable energy (solar water heaters, heat pumps, local and sustainable use of biomass, tractors, etc.) are currently being supported by the VLIF (Flemish Agricultural Investment Fund). Over the period 2013-2017, aid for energy investments rose to an average of EUR 7 million per year (i.e. approximately 560 investment projects per year).

Additional policy

Further efforts will be made to facilitate the dissemination of knowledge and technologies so that energy measures are introduced in the sector. For example, this may involve: business energy analyses that specifically cover the Trias Energetica principles; the Enerpedia guidance project and the Kratos business advice system, which offers simple energy analyses; and measures involving new energy technologies and more in-depth energy advice for agricultural and horticultural businesses. The ILVO’s ELK (Centre of Expertise for Agriculture and Climate of the Flanders Research Institute for agriculture, fisheries and food) plans to expand its activities in the next few years, with particular emphasis on research into resources that can continue to reduce energy

consumption in horticulture. In the glasshouse horticulture sector, which accounts for a significant proportion of primary energy consumption, further efforts must be made to reduce greenhouse gases by 2030. Investments in new technologies will be needed to further decouple energy consumption from production volume. This involves district heating systems, glasshouse insulation, use of screens, transparent PV panels, heat recovery, residual heat, residual CO₂, steam heat pumps, energy storage systems and possible geothermal energy solutions.

In the agricultural sector as well, cogeneration is an efficient technology for transitioning to a climate-neutral society. The current support provided through certificates for the cogeneration savings of new units will be assessed and gradually withdrawn over the next 10 years (with 30% being withdrawn by 2025) as developments occur in the gas/electricity price ratio, new support mechanisms for capacity and flexibility, fair efficiency and the ultimate goal of gradually eliminating fossil fuels. When the post-2020 common agricultural policy (CAP) is implemented, it may be decided to offer broader support to energy investments through the VLIF. The selection method applied to all aid applications will be adapted so that investments that make the greatest contribution to reducing the pressure on the environment and mitigating and adapting to climate change will be ranked the highest.

Energy emissions in the agricultural and horticultural sectors will be 28% lower in 2030 in the WAM scenario than in the WEM scenario. To achieve this reduction, as in the industrial sector, EPAs will be concluded from 2023 with the energy-intensive (glasshouse) horticultural sector. Under the 2019-2024 government agreement, the (glasshouse) horticultural sector is one of the notified enlargements of the EPA target group. Furthermore, non-energy-intensive agricultural businesses will also be able to conclude mini-EPAs, like the mini-EPAs for industrial SMEs, through the relevant (sub)sectoral federations.

Walloon Region

Brussels Capital Region

Good Move plan

The Good Move plan is the new regional mobility plan, which includes a regulatory part (¹²⁷). It was adopted at first reading on 4 April 2019.

The plan forms one of the methods being used by the region to achieve the climate and environmental objectives and commitments of the Brussels Capital Region, particularly those commitments set out in this NECP. It takes a short-, medium- and long-term view of the development of mobility in Brussels. The government will start to implement this plan once it adopts the final version of its strategic and regulatory part and once it provides the human and budgetary resources needed to rapidly, flexibly and fully implement the plan.

Developed through a dynamic and participatory process, the Good Move plan sets out the region's mobility objectives and measures for the period 2020-2030. It is based around six priorities (cross-cutting strategic action programmes) and provides for the implementation of around 50 measures. According to its environmental impact report, the Good Move plan could reduce vehicle-kilometres in the Brussels Capital Region by 21% by 2030 compared with 2018. The key energy and climate objectives of the Good Move plan are to reduce the use and ownership of vehicles and to green the rolling stock.

In this respect, the key measures are grouped below according to their priority (¹²⁸). The measures set out in the following sections are broken down into specific actions in the Good Move plan. Reference should be made to the plan for more details on those actions.

¹²⁷ The plan was adopted through the Order of 26 July 2013 establishing a framework for mobility planning and amending various provisions with an impact on mobility.

¹²⁸ The Good Move plan is based around six priorities, but only four of those are relevant for supporting the regional climate objectives. The last two priorities, i.e. 'E. Good partner' and 'F. Good knowledge', respectively cover the actions associated with governance and knowledge and also the transparency of mobility policy data. They are not included in this plan, but

As the Good Move plan has not yet been finally adopted (a public inquiry was held from mid-June to mid-October 2019), the amendments made to the draft version (resulting in the final plan) will become part of the NECP. However, it will be ensured that the general ambition of the transport measures either remains constant or is revised upwards. Any downward revision of the environmental ambition of the measures must be offset.

Priority A - Good Neighbourhood

This priority covers all the actions associated with organising mobility in the districts of Brussels in order to improve the quality of life of inhabitants. The ambition is to create the conditions so that districts are truly peaceful, so that quality of life and quality of public space are significantly improved, and so that the aspects of living in the district, universal accessibility, road safety, air quality and health are prioritised. This involves developing large calmed areas with a diameter of 1 km to 2.5 km. Road traffic will be permitted for local access, but through traffic will be heavily discouraged and speeds will be systematically reduced by establishing 30 km/h zones that are clear and understandable to users and that are reinforced by specific features (road narrowing through build-outs or pinch points, signage, etc.).

The main measures proposed are as follows:

- Set 30 km/h as the prescribed speed on roads from 2025 (A.1) to maintain the local nature of the vast majority of roads, reduce actual speeds in order to limit environmental nuisance, and ensure calm, safe and mixed traffic.
- Create peaceful districts (A.2) consisting of large calmed areas without through traffic, where quality of public space and accessibility to active modes of transport are prioritised in collaboration with local authorities. From 2020, at least five projects will be launched every year. In 2025, 10 transport networks will be in operation, with 20 in 2030.
- Enhance and pool off-road parking (A.4) to reduce the public space occupied by parked vehicles and encourage vehicles into off-road car parks, in line with ensuring quality of life within the district, the overall parking strategy and the other actions included in the plan. The number of unreserved on-road parking spaces will gradually reduce from 265,000 to 235,000 in 2025 and 205,000 in 2030.
- Optimise deliveries by developing local logistics space and smarter urban distribution (A.5) to ensure the supply of the various local urban functions, generally optimise deliveries across the district, including e-commerce, reduce the impact on active modes of transport and public transport, and reduce the nuisance caused. Five pilot projects will benefit from support every year from 2020.

Priority B - Good Network

This priority covers all the actions associated with transport networks in order to ensure efficient and high-quality services and travel. The fundamental challenge is to re-establish the best possible balance between the car and other modes of transport on the various roads in order to improve travel via active modes of transport and also the performance of surface public transport. This will involve making a qualitative leap in terms of the facilities for active modes of transport and public transport. The Brussels Capital Region has developed a strategy for establishing clear priorities in the sharing of road space. This strategy involves ensuring that roads are multimodal by creating a key network for each mode of transport (walking, cycling, public transport, motorised traffic and heavy goods vehicles).

this does not mean that their implementation and the respective investment by Bruxelles Environnement are not important.

The main measures proposed are as follows:

- Adapt the main urban routes by making them multimodal (B.2) to improve their integration into the urban context, reduce the public space occupied by road traffic and its associated nuisance, and encourage alternative modes of transport. One urban route will be adapted in 2020, 18 by 2025 and 35 by 2030.
- Create pedestrian routes (B.3) that allow people to walk long distances and offer rest areas. This will involve creating a network of uninterrupted pedestrian routes that connect regional hubs, particularly train and metro stations, and expanding the city centre beyond the Pentagon. It is planned that the network of pedestrian routes will be 30% complete in 2025 and 60% complete in 2030.
- Create a network of priority cycle routes (B.4) to support the role of cycling in urban mobility. These routes must meet five quality criteria: they must be cohesive, quick (direct), safe, pleasant and comfortable. All the regional cycle routes (which will be referred to as the 'high-comfort cycle network') will be in use by 2025. The Vélo PLUS network (Petite Ceinture [inner ring], Moyenne Ceinture Est [eastern middle ring], Avenue Louise, canal crossing, etc.) will be 50% complete by 2025 and 100% complete by 2030.
- Through all available action levers, improve the performance of surface public transport (B.5) by improving the service speed and particularly the regularity of surface routes to make the network more attractive and more efficient. The planned speed of the bus and tram networks will be gradually increased from 16 km/h in 2020 to 17 km/h in 2025 and 18 km/h in 2030.
- Continue developing the key public transport network (B.6) to meet the expected increase in its use, anticipate population changes and the creation of new districts, and reinforce the role of the public transport network as the backbone of urban development. Network extensions to Neder-Over-Heembeek, Tour & Taxi, the Heysel and the Nord-Albert part of the north-south route will be completed in 2025. The north-south route ('diagonale tram') and the Marcel Thiry-Bordet extension will be completed in 2030.
- Convert key bus routes into tram routes, including route 95 (to ensure a priority connection between the Gare Centrale and the new Usquare site) and route 49 (to extend the rail network from Albert to the Gare de l'Ouest). The government will initially set up these new routes as rapid transit routes in order to quickly improve the offer. Lastly, a route to ensure that the Mediapark site is accessible will be created as the site is developed. The extension of key routes 7 (to Forest) and 8 (to Evère and the Forêt de Soignes) will be studied and planned, as will the separation of certain parts of routes 92 and 55.

The metro extension to Bordet is confirmed for 2030. The surface work needed in all the areas impacted by the metro work will be carried out in accordance with the S-T-O-P principle.

- Facilitate access for heavy goods vehicles to the region's logistics areas (B.7) by creating dedicated and appropriately adapted routes. A test will be conducted in 2020 with regard to access to the main logistics and industrial hubs of Brussels situated to the south of the canal area (Anderlecht Industrie) and in 2025 for those situated to the north (Schaerbeek-Formation).

Priority C - Good Service

This priority covers all the actions associated with mobility services so that users are offered a range of integrated services which, for a significant proportion of the population, replace the need to have a personal car.

This service approach must be implemented:

- without increasing the overall demand for mobility;
- by developing the offer and steering demand towards shared mobility by optimising resources;
- by ensuring that services are accessible to everyone;
- by preventing new services (car sharing, chauffeur-driven cars, self-driving shuttles) from replacing more efficient modes of transport such as walking, cycling or public transport.

The constraint imposed (for some) by the LEZ will be used as an opportunity to steer the population towards the MaaS (Mobility as a Service) concept and a reduction in car ownership.

The main measures proposed are as follows:

- Support the development of MaaS (C.1): the MaaS concept is the new trend in the area of mobility and is intended to change how people move about, through a transport offer that integrates all modes of transport and all stages of the journey to ensure 'door-to-door' mobility. The regulatory framework will be established in 2020 and the MaaS platform will become operational in 2021.
- Set up integrated mobility service and information points (C.2) so that users can access information and advice on all mobility services and also purchase or subscribe to those services. Information on the issues associated with goods transport by and for individuals will also be offered, ranging from the use of cars to go shopping to the impact of home deliveries on mobility. Mobility shops must offer a genuine coaching service to meet the specific needs of users and allow them to try new ways of moving about and obtaining supplies. Particular attention will be paid to support for new arrivals and households that are separated from their vehicle due to the LEZ. The first mobility shop will be set up in 2020, with another five in 2025 and twenty in 2030.
- Develop services for cycling and new forms of mobility (C.3), including for goods transport. By 2025, 25,000 secure parking spaces for bicycles will be made available at train and metro/pre-metro stations, with 50,000 by 2030.
- Improve the accessibility of public spaces and the public transport network at a faster pace (C.5). This involves having a proactive policy to create high-quality pedestrian facilities so that the use of both walking and public transport are optimised. In 2020, 120 public transport stops (including their surroundings) will be made accessible, with 420 by 2025 and 700 by 2030.
- C8: Develop stations and transfer points in order to improve the opportunities for intermodal transport. Transfer points will be requalified, while ensuring service quality, universal accessibility, comfort and clear pathways. Such sites must be better integrated in the urban fabric, particularly S-network stations.
- Implement the regional part of the metropolitan Park & Ride (P+R) strategy (C.9). This strategy aims to offer feeder parking (for cars and bicycles) on key routes of the public transport network, at the earliest possible point in the transport chain, in order to reduce vehicle flows entering the Region. This offer will complement the offer that already exists or that is to be created at metropolitan level, and will be integrated into the management of public parking at regional level. By 2030, 10,000 parking spaces will be created, with an occupancy rate of around 80% (65% of spaces will be available in 2025).
- Reinforce shared mobility services (C.11), in the form of mobility points, by ensuring that these complement public transport, so that reducing vehicle ownership is credible. In 2020, five mobility points will be brought into use, with 50 in 2025 and 200 in 2030.

Priority D - Good Choice

This priority covers all the local measures and incentives designed to influence and guide personal and collective mobility choices.

The actions are intended to ensure the best possible conditions:

- for managing overall transport demand, by reducing the number of journeys, specifically those over long distances;
- for encouraging use of the most appropriate mode of transport for each journey (depending on the conditions (season, weather, distance) and reason (need to transport children or goods, for example));
- so that owning your own vehicle is no longer essential.

The main measures proposed are as follows:

- Reinforce parking management tools as a lever for achieving the mobility objectives (D.2), by supplementing and reinforcing the technical and regulatory tools, particularly the Regional Parking Policy Plan (Plan Régional de Politique du Stationnement – PRPS) and the COBRACE. The PRPS will be revised in 2020.
- Create tools aimed at discouraging vehicle ownership (D.3), whether personal or company vehicles. This involves creating and using various economic and tax tools. By 2025, a tool will have been developed for assessing mobility costs.
- Base transport charges on use (D.4). The aim is to make users aware of their transport habits (choice of mode of transport, time of travel, etc.) in order to encourage them to rationalise and manage their mobility choices and use the most appropriate mode(s) of transport at the right time and in the right place.
- Proactively support transport generators (businesses, schools, commercial, cultural and sporting activities) (D.7) by developing structural measures, trials or services (one-off or constant). Among the existing tools, the government has decided that business travel plans will be used as levers to reduce commuting pressure on the roads.
- Change the logistics practices of the construction sector (D.9) so that logistics management becomes part of the circular economy and the best logistics practices are encouraged, such as consolidating flows and pooling vehicle deliveries, in order to reduce disruption on the roads.

NB: The Good Move plan also includes phasing out internal combustion engines and developing alternative vehicles (measure D.5 – see the part ‘Towards a carbon-free city’).

Cooperation

The Brussels Capital Region is fully engaged with the issues of mobility and is aware of the energy savings to be made in this area. It is also investing considerable resources in this respect and will continue to do so. However, work to coordinate with other bodies is vital, as around 340,000 commuters enter the Region every morning.

In this context, the government is committed to strengthening its collaboration with the Federal Government and the other two Regions, whether through the regional policy statement or the Good Move plan. Measure E.3 ‘Collaborate with the federal and regional authorities’ provides for the implementation of projects and actions that need to be managed by several federated entities and the Federal Government to ensure supra-regional mobility, including in terms of goods transport. It is also noted that improved collaboration will allow certain resources to be pooled, expertise to be reinforced and coherent action by the public authorities to be demonstrated to the public and socioeconomic circles in order to inspire confidence.

Vehicle taxation is one tool that will be used to achieve the Region’s objectives under the NECP. The government confirmed in its 2019-2024 majority agreement that it wants to conclude a cooperation agreement between the Regions in order to implement smart kilometre charging for light vehicles in the metropolitan area or the entire country. If such charging is introduced, it must replace the current form of taxation.

The government also undertakes to:

- Strengthen its collaboration with the federal and regional authorities in terms of ensuring coherence in the metropolitan area. To this end, the government intends to start the groundwork on institutionalised cooperation between the various levels of power for the specific case of the Brussels Capital Region and to define a series of priority actions and a partnership framework for implementing those actions. The majority agreement identifies the following actions, among others:
 - In order to enhance the synergies between public transport operators, the government will propose a transport plan for the metropolitan area that is common to the four operators (SNCB, TEC, STIB, De Lijn). The government will request an increase in the SNCB rail offer to and from Brussels, as well as an increase in the rail offer throughout the Brussels network so that the maximum waiting time is

10 minutes during peak periods and 15 minutes during the rest of the day, including at weekends and in the evening. In order to support the development of the RER network and the S-network offer of the SNCB, the government will produce a regional plan to improve railway halts, in agreement with the SNCB, Infrabel and the affected municipalities. The government will consult the other two Regions to ensure cooperation in terms of the public transport offer.

- More broadly, the government will study the operational and financial feasibility and the operating conditions of the intra-Brussels rail network for the benefit of Brussels residents.
- Implement the Energy Pact, which in particular provides for the conclusion of a cooperation agreement on decarbonisation and the reduction of environmental and societal externalities in mobility.

Taking into account the division of responsibilities, the Regional Government also undertakes to call on the Federal Government to:

- reform business taxation, in particular by:
 - adapting the tax system for company vehicles in order to:
 - remove, reduce or redirect the tax benefits;
 - encourage the faster introduction of alternative solutions with a view to developing the MaaS concept;
 - improve its energy and environmental performance by reducing the proportion of internal combustion engines, with diesels being a priority (as part of the phase-out of internal combustion engines), and taking more account of size, weight and power.
 - introducing a tax framework that encourages employers to contribute to the public transport costs of all commuters, including public officials;
 - reducing VAT on work and facilities allowing the development of cycle paths;
 - reducing VAT on bicycle delivery services;
 - increasing investment in the railways for the transport of passengers: networks, stations (and surrounding district), rolling stock and service frequency;
- encourage significantly increased use of the inland waterways for goods transport, where this is feasible;
- systematically use embankments alongside railways for the development of safe cycle paths and, where possible, cycle highways; in particular, the work currently ongoing or planned on the RER network offers such opportunities;
- adapt and gradually tighten product standards with, in particular, a gradual ban on the marketing of polluting vehicles based on various criteria (size, fuel, power, etc.); in particular, a call will soon be made for a ban from 2025 on light vehicles with internal combustion or hybrid engines that are over 1,500 kg, which will be gradually reduced to 1,000 kg by 2030;
- ensure the adoption by all social partners of the bicycle kilometric allowance for workers using their own bicycle for commuting to their place of work (to be included in all collective agreements so that this becomes a worker right).

As part of the new mobility cooperation agreement, the Brussels Capital Region will ask for the Regions to agree on the common objectives in relation to the development of the Brussels Ring, preceded by joint studies in this respect. The government confirms that it is opposed to the Brussels Ring being enlarged as such. Development of the Brussels Ring must be linked with a broader mobility project, incorporating public transport and cycling, as well as transit car parks, to encourage a modal shift from personal cars to alternative modes of transport. Development of the Brussels Ring must have the effect of reducing traffic in the Brussels Capital Region, by acting as a bypass for road journeys that do not need to enter the city centre, and, in terms of the environment and public health, must comply with the regional commitments and help to improve air quality.

Lastly, the government will also ask the other two Regions to tighten up the mandatory technical inspection of vehicles, in particular to reduce fraud (AdBlue and particulate filters), in line with the GOCA study (GOCA is the group of businesses approved to inspect vehicles and driving licences).

Regulating products and systems

The Federal Government is responsible for setting product standards. It plans to introduce a broader, tougher policy on products and market access for products and equipment that consume energy (stricter emission standards, ban on the use of certain types of heating, and fuel standards, etc.), ensuring that sufficient attention is paid to harmonisation between the Regions. Products will be required to achieve a minimum energy efficiency rating by a certain date. An impact assessment using a model based on stock statistics is needed to estimate the precise impact of these measures.

In this context, a study is currently under way to determine the structure of energy consumption in Belgian households. It is focusing in particular on household appliances and their specifications, such as the energy rating defined by the European energy label.

Federal State

- Product standards, Ecodesign and labelling:
 - Broader, tougher policy on products at national level and via the European Union.
 - Access to market regulation (stricter emission standards, ban on the use of certain types of heating, and fuel standards), ensuring that sufficient attention is paid to harmonisation between the Regions.
 - Products will be required to achieve a minimum energy efficiency rating by a certain date.
 - An impact assessment using a model based on stock statistics is needed to estimate the precise impact of these measures.
- The Federal Public Service for the Economy (Directorate-General for Energy) has launched a study in order to determine the stock of installed appliances and their specifications, such as the energy rating defined by the European energy label.

One aim of the study, in the context of the NECP, is to look at possible policy developments based on a European energy label in Belgium and to assess the potential in terms of energy savings. On that basis, proposals may be made for a future Belgian policy that will go further than the EU policy.

Promoting energy efficient public procurement

The public authorities take their exemplary role very seriously. As well as implementing energy efficiency measures in their buildings, they must also set a good example in their procurement procedures (for equipment, for example).

Federal State

For public buildings:

- Monitoring of the usable areas and **energy consumption** of property managed by the Régie des Bâtiments will continue.
- All federal public buildings will be required to use the central purchasing body (grouped purchases) via the Federal Public Service for Strategy and Support (BOSA).
- The obligation for the supplier to provide consumption data will be tightened up and appropriate tools will be developed for this purpose. This will be valid for gas and electricity (for which data are currently

available for around 95% of the consumption of the property managed by the Régie des Bâtiments) and also for heating oil or any other fuel.

- A feasibility study (in terms of both quality and quantity) will be conducted on establishing an energy register or inventory for Belgian property (public and private sector).
 - More specifically for public buildings:
 - Monitoring of the usable areas and **energy consumption** of property managed by the Régie des Bâtiments will continue.
 - All federal public buildings will be required to use the central purchasing body (grouped purchases) via the Federal Public Service for Strategy and Support (BOSA).

The obligation for the supplier to provide consumption data will be tightened up and appropriate tools will be developed for this purpose. This will be valid for gas and electricity (for which data are currently available for around 95% of the consumption of the property managed by the Régie des Bâtiments) and also for heating oil or any other fuel.

Other measures for the tertiary sector

Walloon Region

Public service obligation for municipal lighting

Under the Electricity Decree and the Walloon Government Decree of 6 November 2008, electricity DSOs are required to maintain and improve the energy efficiency of public lighting installations. Under those provisions and at the request of municipalities, the DSO must maintain the municipal public lighting installations in the geographical area for which it is responsible, which includes improving their energy efficiency.

The DSOs must prioritise replacing lights that are more than 10 years old and must also take into account, in their plans, the need to prioritise the replacement of public lighting technologies that will no longer be marketed in the short and medium term due in particular to the European Ecodesign technical regulation being implemented. The programme of replacement must ensure that all lights are modernised within 10 years, with this replacement work being scheduled for completion by 1 January 2030 at the latest. Eventually, all public lighting installations will be equipped with the most appropriate LED technologies.

Support and assistance for private businesses in the tertiary sector, particularly in order to improve the energy performance of processes

Alongside the UREBA programme mentioned in point 3.2.2 above and with specific reference to the public and non-market sectors, Wallonia will continue to support and assist private businesses in the tertiary sector:

- Network of facilitators responsible for informing and assisting project owners in the tertiary sector and SMEs.
- AMURE programme and Chèques Entreprises for energy audit subsidies for SMEs-VSEs.
- UDE subsidies for process energy improvements, cogeneration and renewable energy use.
- New AMURE incentives to improve insulation, ventilation, lighting and cold storage rooms in shops and restaurants.
- Novallia funding for SMEs and VSEs that actively invest in the energy transition.

Large private businesses in the tertiary sector must also carry out an energy audit under Article 8, like their counterparts in industry.

Reducing consumption and emissions through behaviour change

Walloon Region

According to an analysis conducted in Wallonia, individual behaviour change is regarded as a crucial lever for moderating energy consumption in housing, transport, leisure and other consumption sectors.

The potential for reducing GHG emissions through behaviour change is high: studies carried out in other countries estimate that this can vary between 10%⁽¹²⁹⁾ and 27%⁽¹³⁰⁾. However, the level of acceptance of behaviour change is currently low, and estimated at just 5%⁽¹³¹⁾. Long-term coherent programmes therefore need to be established in order to increase this level of acceptance and maximise the available reduction potential. Such programmes must have a clear message that is easy to take on board.

Wallonia has been promoting rational energy use for many years. Various legislative tools (EPB) and incentives and subsidies have therefore been introduced, accompanied by communication campaigns in various forms and using various channels.

The theoretical potential in Wallonia is around 2-3 TWh. However, it is virtually impossible to determine how much of this potential can actually be achieved without a precise action plan and retro-verification of the result obtained. Moreover, this result will never be achievable simply through a communication action, but will require the convergence of a whole series of coherent actions (communication, training, incentives, legislative or technical frameworks, etc.).

In this context, Wallonia can take action through:

➤ ***Coherent communication based on the objectives pursued:***

The basic long-term message must be accompanied by thematic campaigns based around certain annual priorities (subjects and targets) and taking account of the heterogeneity of the public. The basic rules of effective communications apply to such messages.

➤ ***A long-term integrated approach that includes legislative measures:***

A recent study⁽¹³²⁾ indicates that awareness-raising campaigns can be a first important step, but that the literature suggests that they cannot by themselves bring about behaviour change, in particular once they have ended. The study highlights the effectiveness of using top-down approaches, including regulatory measures, to promote long-term behaviour change. The study also notes that temporary tax measures struggle to achieve long-term behaviour change.

In connection with regulatory measures, a second study from 2018⁽¹³³⁾ highlights the impact of changing default options in bringing about behaviour change. In the same respect, offering free audit programmes should also encourage investment in both the industrial and the residential sectors.

➤ ***Removing barriers***

Another role of the public authorities is to remove barriers to this behaviour change.

The actions identified in this respect are as follows:

- Assist and encourage the emergence on the market of services/products/technologies that support responsible energy behaviour, by avoiding lock-ins.
- Enable quick and easy access to information, via a centralised platform, ideally linked to the proposed platform for promoting responsible choices (see point 3.1.1(v)). A one-stop shop, based on existing

¹²⁹ (Stern, 2009) (USA).

¹³⁰ (S. Nonhebel, 2001) (Netherlands).

¹³¹ (5% according to (S. Nonhebel, 2001)).

¹³² Axon S. et al. (2018) 'The human factor: Classification of European community-based behaviour change initiatives', Journal of Cleaner Production, 182, 567-586.

¹³³ Byerly H. et al. (2018) Nudging pro-environmental behavior: evidence and opportunities. Frontiers in Ecology and the Environment 16:159–168; https://www.repository.cam.ac.uk/bitstream/handle/1810/276879/Byerly_et_al-2018-Frontiers_in_Ecology_and_the_Environment.pdf?sequence=3&isAllowed=y

expertise (energy information point, housing advisers, etc.), will provide all the energy/housing support services for households. This can guide households towards the type of energy renovation to be carried out, help them to understand the benefits of renovation, ensure that those benefits are linked with the building's energy passport, help households to identify contractors who can carry out the work, and guide them on how to finance the work.

- Organise the local support network that will be accessible to the public and that will be responsible for some of the communication, practice advice and incentives.
- Develop public infrastructure, where this is necessary.
- Showcase best practices and establish a qualitative framework for products and services.
- Establish the financial and legal framework of incentives and deterrents.
- Ensure the positive development of 'social norms' that have so much influence on behaviour, by limiting the impact of counter-productive external communications.

➤ ***Assurance of governance***

A final important role of the public authorities is to regularly ensure that the actions taken towards the objective pursued are relevant. The impact of communication campaigns must be regularly assessed so that they can be constantly optimised by correcting them aim, if necessary. New ideas that emerge must also be rapidly incorporated.

Likewise, the impact of the tools made available must be systematically monitored, and the extent of the financial support or brakes must be adapted as the situation changes.

A group of experts should be formed to carry out this monitoring, communicate its conclusions and ensure the implementation of its recommendations.

- v. *Where applicable, a description of policies and measures to promote the role of local renewable energy communities in contributing to the implementation of policies and measures in points i, ii, iii and iv*

Flemish Region

See point 2.4.3.4 'Involving the public, local authorities and businesses in the energy transition (objectives)' and point 3.4.3.4 'Involving the public, local authorities and businesses in the energy transition (measures)'

- vi. *Description of measures to develop measures to utilise energy efficiency potentials of gas and electricity infrastructure*

Federal State

Optimise the energy efficiency of the gas and electricity infrastructure used by gas and electricity transmission system operators.

Flemish Region

Article 3.1.4/1(4) of the Energy Decree states that energy efficiency is one of the objectives that the Flemish energy market regulator (VREG) must pursue in developing the systems.

In practice, this is done by approving the investment plans of system operators.

Under Article 4.1.19 of the Energy Decree, distribution system operators must submit an annual investment plan to the VREG for their systems, highlighting key investments and the associated timescales.

On 26 February 2014 the Flemish Parliament approved a decree containing an article that provides a formal basis for the technical rules to include a requirement for the system operator to send the VREG its assessment of the energy efficiency potential of its gas and electricity infrastructure.

The study carried out by Synergrid under Article 15(2) of Directive 2012/27/EU on energy efficiency did not suggest any additional projects and/or ideas for proactively limiting the energy losses of the distribution systems or adjusting investments in the existing infrastructure. The current investment policy already takes optimal account of energy losses in the power grids and the cost-effectiveness of investments, given the failure rate of existing assets and the expected safety and reliability performance of those grids. However, some improvements could be made to system operation.

Article II.1.1.1(3) of the Technical Regulation for the operation of electricity distribution systems requires system operators to annually send the VREG their assessment of the energy efficiency potential of their electricity infrastructure, in particular regarding distribution, load management, interoperability and connection to energy generating installations, including access possibilities for micro energy generators.

The Flemish DSOs have therefore looked at various measures to improve energy efficiency in the operation of their distribution systems. They report to the VREG on the implementation of those measures.

Investment measures:

- In terms of low-voltage, three-conductor systems (3X230V) are already being converted into four-conductor systems (3X230/400V) whenever they are replaced. Three-conductor systems (3X230V) that are in operation are also being converted into four-conductor systems (3X230/400V).
- In terms of medium voltage, the optimal cable cross-section is being rolled out.
- When new distribution transformers are purchased for new electrical cabinets or to replace existing transformers, DSOs must choose a high energy performance transformer that complies with Commission Regulation (EU) No 548/2014 on the ecodesign of transformers. The optimal choice of transformer must be determined by investment, load, loss and growth factors.
- To optimise use of the distribution system, DSOs must install switch-disconnectors and remote-controlled circuit-breakers in their medium-voltage cabinets.

Operating measures:

- switch to automatic transformer setting;
- dynamic line rating;
- reduction in consumption of substations and cabinets, with power for own use generated on site;
- reduction in travel by using remote control/remote readings;
- careful choice of the open point in distribution loops;
- deactivation of spare transformers.

Walloon Region

Under Article 15(2) of Directive 2012/27/EU, the various DSOs have assessed the energy efficiency potential of their gas and electricity infrastructure. All the measures assessed by each DSO are set out in the report sent to the Commission.

Furthermore, the decrees organising the gas and electricity markets in the Walloon Region require DSOs to take account of energy efficiency when planning their investments.

DSOs are required to consider energy efficiency measures in accordance with Article 11(2) of the 'Electricity' Decree:

'The DSO shall guarantee that its assigned system is operated, maintained and developed under socially, technically and economically reasonable conditions, including interconnections with other power grids, in order to ensure security and continuity of supply while respecting the environment and energy efficiency. The government shall define the concept of socially, technically and economically reasonable conditions.'

To that end, the DSO shall have the following tasks in particular: ...

10° to examine, when planning the system's development, energy efficiency, demand-side management and generating installation accommodation measures in order to avoid any increase in, or replacement of, system capacity.'

A similar requirement is laid down in Article 12(2) of the decree organising the regional gas market: 'The DSO shall guarantee that its assigned system is operated, maintained and developed under socially, technically and economically reasonable conditions, including interconnections with other gas systems, in order to ensure security and continuity of supply while respecting the environment and energy efficiency.'

Such measures must be submitted to the regulator through adaptation plans, as defined in Article 15(1) of the 'Electricity' Decree:

'In consultation with the CWaPE, each DSO shall produce an adaptation plan for the system that it manages in order to ensure continuity of supply, security and development of that system under socially, technically and economically reasonable conditions. The government shall define the concept of socially, technically and economically reasonable conditions.

When producing their adaptation plan, DSOs shall in particular consider measures involving intelligent system management, active demand-side management, energy efficiency, integration of decentralised generating installations and flexible access to avoid any increase in system capacity.'

Technical regulations determine the timetable and methods for producing and updating the adaptation plan. The adaptation plan for distribution systems covers a period corresponding to the charging period. It is adapted as and when necessary and at least every year for the next two years, according to the procedure set out in the technical regulation. The adaptation plan for the local transmission system is produced at the same time as the development plan referred to in Article 13(1), second subparagraph, of the 'Electricity' Law.

A similar requirement is laid down for gas.

vii. *Regional cooperation in this area, where applicable*

Not applicable

viii. *Financing measures, including Union support and the use of Union funds at national level*

Walloon Region

Funding of the renovation strategy

The measures in relation to funding the renovation strategy are described in point 3.2.2 'Renovation strategy of residential and tertiary buildings'.

Funding of local initiatives

The POLLEC project aims to provide financial and methodological support to municipalities that voluntarily adopt a Local Energy and Climate Policy under the Covenant of Mayors. The Covenant of Mayors is a European initiative enabling local and regional authorities to commit to reducing their GHG emissions by more than 20% by 2020 and by more than 40% by 2030.

Three calls for projects have been launched by Wallonia since 2012.

The pilot project enabled 16 municipalities to receive a subsidy for external support through an invitation to tender in order to develop a Sustainable Energy and Climate Action Plan (Plan d'Actions Énergie Durable et Climat – PAEDC).

In the second campaign, 11 municipalities prepared a PAEDC, whilst six supra-municipal structures (province, local authority associations, local action groups) received subsidies in order to help a total of 62 municipalities in their area with the preparation of their PAEDC. The municipalities subsidised under the pilot project also took

part in this second campaign as they studied the possibility of setting up renewable energy generating installations through innovative funding mechanisms. Feedback on those mechanisms was provided to all the municipalities in Wallonia in the autumn of 2018.

A third campaign was launched in November 2016. It involved 79 municipalities and was intended to enable new areas to initiate their energy transition.

As a result of these three campaigns, a total of around 160 municipalities have become involved in the Covenant of Mayors and have prepared a PAEDC, i.e. over 60% of the municipalities in Wallonia.

Measures will be taken by the Walloon Region to support the local authorities in the implementation of their PAEDCs.

Taxation

The tax lever must be thoroughly reviewed.

Taxation needs to be revised in order to ensure that the price signal is consistent with the goals and that negative externalities are internalised (polluter-pays principle).

As a reminder, the aim in reforming taxation or any form of public support or levy is to ensure that price signals are consistent with the energy and climate objectives. Reforms will be effective only if they are accompanied by a broader package of measures that make low-carbon alternatives available and accessible. All those measures must be linked so that there is a gradual move towards an appropriate and predictable price signal that necessarily takes account of the financial capacity (and particularly the lack of capacity) of those involved to adapt to the price signal. For example, and as a reminder, the renovation strategy must prioritise vulnerable households so that they can anticipate any change in taxation.

The various measures in question cannot be adopted just by the region. Most of the measures require close cooperation with the federal level and the other regions, either because responsibility lies at federal level or is shared, or because the schemes must be harmonised across the regions (in order to avoid distortions). All the measures must therefore be carried out in close cooperation with the other entities.

The impact of tax measures will be studied in economic terms (competitiveness, etc.) and social terms (poverty, etc.) to ensure that taxation is fair and equitable in social and environmental terms.

Furthermore, close attention will be paid to the budget neutrality of those measures at the various levels of power.

The following measures will be taken:

1/ All taxation and tax expenditure will be fully analysed in order to identify price signals that are counter-productive in terms of the climate and environmental objectives. A comprehensive climate and environmental taxation framework will be established in order to rectify signals (ensure a fair price signal) in the sectors concerned.

2/ Separately from this comprehensive framework:

- Buildings (¹³⁴):
 - The modulation of registration, inheritance and gift taxes based on the property's climate and environmental performance will be studied, taking into account the financial capacity of households.
 - The use of property tax to indebt buildings (¹³⁵) when work improving their energy performance is carried out will be assessed with regard to its legal and financial implications.
- Transport:

¹³⁴ Reminder of certain items included in the strategy for funding the renovation strategy.

¹³⁵ The debt is transferred from owner to owner.

- The modulation of vehicle registration tax and road tax based on the vehicle's climate and environmental efficiency and its weight-to-power ratio will be introduced.
- The introduction of an incentive for cycling (including for cargo bikes) and electric micro-mobility will be studied.
- The introduction of a ceiling on amounts that can be deducted for business travel will be studied together with the Federal Government, in order to take account of the climate and environmental efficiency of vehicles.
- The taxation of nozzles for dispensing alternative fuels (regional tax on vending machines) will be suspended in order to support the installation of LNG/CNG pumps.
- The taxation of CNG, hydrogen and electric vehicles will be reviewed together with the other levels of power in order to fine-tune the Walloon objectives in terms of development of alternative fuels.
- All sectors:
 - Tax relief on rational energy investments will be studied together with the Federal Government for businesses that install alternative fuel infrastructure (charging points, CNG, LNG or H₂ pumps).

Walloon investments

From 2020, Wallonia intends to make long-term investments in the energy and climate transition through a range of actions that will be detailed in the coming months. The following is a non-exhaustive list of those actions.

- KYOTO fund used in particular for the energy transition of businesses, international climate funding and roll-out of charging points: EUR 111 million.
- Improvement of the environmental fabric by planting hedges and trees and creating protected areas: EUR 7.3 million (budget doubled).
- Measures to encourage alternatives to car use (walking, cycling, bus and shared transport): EUR 80 million.
- Increase in the bus offer in both urban and rural areas: EUR 3.7 million.
- Greening of the bus fleet (purchase of hydrogen, electric and hybrid buses): EUR 4.5 million.
- Gradual implementation of free bus travel, with the first stage being a reduction in prices for 18-24 year-olds and the vulnerable: EUR 5.4 million.
- Renovation of public housing: EUR 100 million.

Brussels Capital Region

See Part B, point 5.3 'Overview of financing needs'

3.3. Dimension energy security

i. Policies and measures related to the elements set out in point 2.3

As described above in point 2.3, Belgium will adopt various measures to guarantee energy security during the phase-out of nuclear power.

First, structural monitoring of the energy security situation will continue and, if possible, be fine-tuned, with account also being taken of the situation in neighbouring countries. In addition, in accordance with the Regulation on the internal market for electricity (¹³⁶), a value of lost load (VoLL) will be determined no later than 5 July 2020.

In order to attract additional investment in electricity generation, it has been decided to develop by 2020 a centralised capacity compensation mechanism, which will fully comply with European State aid legislation and directives. The system will be technologically neutral. Furthermore, in addition to constructing new gas-fired power stations or extending the operation of existing gas-fired power stations, this mechanism will allow the large-scale implementation of storage and demand-side management solutions. It will also minimise costs and guarantee the competitiveness of businesses and SMEs, as well as the purchasing power of individuals. The framework law for this capacity compensation mechanism was adopted on 4 April 2019 and the various implementing decrees are currently being drafted. The first award is planned for the autumn of 2021, with the delivery year being 2025.

Cooperation between the competent authorities will increase so that it becomes easier to grant the authorisations needed to develop new generating facilities and also to adapt the systems needed for renewable energy. In this context, the ‘one-stop shop’ approach, set out in the cooperation agreement of 27 February 2014 on the creation of a coordination and facilitation committee for granting authorisations for trans-European energy infrastructure projects, will be systematically applied to energy infrastructure projects in the national interest. Particular attention will be paid to minimising the administrative burden for project owners.

The various levels of responsibility will ensure that new centralised and decentralised storage systems are continually developed, and also that peaks can be shifted for both industry and individuals. The Federal Government, in the context of its energy security responsibilities, will consult with the regions to ensure that the system’s flexibility potential is fully exploited and its stability is guaranteed.

Belgium will also make the necessary preparations for decommissioning its nuclear power plants and correctly storing and managing the radioactive decommissioning waste and spent fuel. The necessary decisions will therefore be taken, particularly as regards the technical specifications and location of the waste disposal site.

Belgium will also carry out the various risk assessments with regard to security of supply of electricity, natural gas and oil, as required by European and international legislation. In this context, active cooperation will be established at regional level (including through the Pentalateral Energy Forum and the Gas Platform). In addition, several longer term projections will be prepared, in particular prospective studies (Federal Public Service for the Economy – DG Energy) and energy outlooks (Federal Planning Bureau). The design and methodology of these studies will be regularly re-examined so that their usefulness in terms of policy is optimised, any overlaps with other analyses are minimised, and their consistency is guaranteed. Lastly, regulators and system operators will also carry out a number of studies on an individual basis or within their European coordination organisations (in particular ACER, CEER, ENTSO-E, ENTSO-G) to support policy and guarantee energy security.

- Market forces will be adapted to provide the framework that will ensure energy security during the energy transition, at the lowest possible cost.
- Coupling of electricity markets will improve their liquidity, which should reduce electricity prices and make them more stable. These interconnections will allow us to benefit from the complementary production mixes of the European countries.

¹³⁶ Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity.

- Pilot projects will be promoted in the context of Power-to-X projects, provided that these are economically and environmentally justifiable.
- Feasibility studies will be carried out on the transmission of hydrogen through the natural gas transmission system.
- Large-scale and small-scale storage projects will be facilitated where their economic and environmental importance has been demonstrated in advance.
- Various tools will be developed to improve market flexibility and better harmonise consumption and production.

Key actions

- Creation of a Federal Energy Committee (with representatives from the federal authorities, regions, employers and industry), which will monitor the implementation of the federal energy strategy based on four specific analyses:
 - impact on the climate of the NECP (National Climate Commission);
 - changes in energy tariffs and prices made by the Belgian Energy Regulators Forum (Forum des régulateurs belges de l'énergie – FORBEG);
 - guarantee of supply by Elia, the CREG and the authorities (DG Energy);
 - security of nuclear facilities, which is guaranteed by the Federal Nuclear Control Agency (Agence Fédérale de Contrôle nucléaire – AFCN).
- Development of a capacity compensation mechanism (CCM) to ensure security of electricity supply and attract investment in new capacity.
- Implementation of the L-gas conversion plan.

Other measures

- Market forces will be adapted to develop the framework that will ensure energy security during the energy transition, at the lowest possible cost.
- The interconnection of electricity markets will improve their liquidity, which should result in lower and more stable electricity prices. These interconnections will allow us to benefit from the complementary production mixes of the European countries.
- Pilot projects will be promoted in the context of Power-to-X projects, provided that this is justified in economic and environmental terms.
- Initiatives will be taken so that gas systems can also carry hydrogen.
- Large-scale and small-scale storage projects will be facilitated where their economic and environmental importance has been demonstrated in advance.
- Various tools will be developed to improve market flexibility and better harmonise consumption and production.

ii. Regional cooperation in this area

The Pentalateral Energy Forum particularly focuses on cooperation in the area of power crisis management and prevention, as indicated by the Memorandum of Understanding on emergency planning and crisis management, signed in the Grand Duchy of Luxembourg on 26 June 2017, which requires the signatories to:

- be entirely transparent with regard to the distribution of tasks and responsibilities between the countries;
- make arrangements for an ‘early warning’ system;
- agree on the type of instruments to be used to respond to a crisis, with priority being given to market-based solutions; and
- identify possible common risks for the region.

Based on the above, a joint crisis exercise (Pentex 2018) was organised, which took place on 20 June 2018.

Emergency plans for the seven countries involved were discussed in depth in 2019. Those plans will be analysed and studied by early 2020 in order to develop a regional emergency plan (under the Risk Preparedness Regulation).

iii. Where applicable, financing measures in this area at national level, including Union support and the use of Union funds

Not applicable

3.4. Dimension internal energy market

3.4.1. Electricity infrastructure

- i. Policies and measures to achieve the targeted level of interconnectivity as set out in point d) of Article 4

Federal State

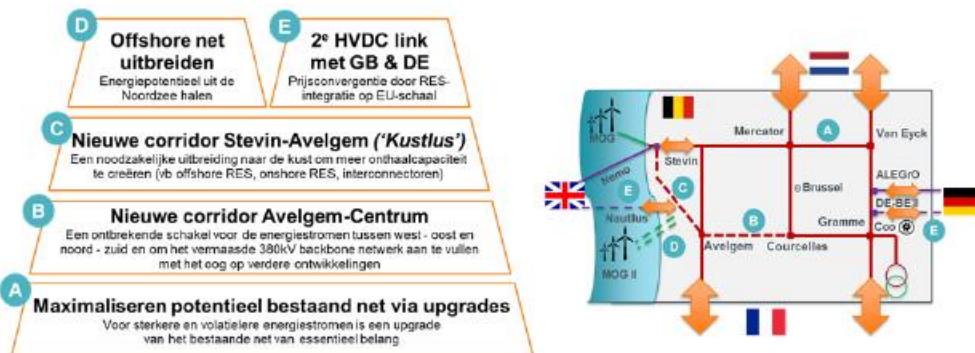
Given these indicators, Elia, the transmission system operator, has taken the initiative of launching studies with the relevant transmission system operators in neighbouring countries in order to research the possibility of developing additional interconnectivity across all the borders. These initiatives have been included in the 10-year network development plan 2018 (TYNDP18), as well as in the new Federal Development Plan 2020-2030 (which will be submitted for public consultation in October 2018 and on which a decision by the minister with responsibility for energy will be taken in January 2019).

The development plan indicates that the 380 kV grid will be developed in three ways:

1. **Reinforcing and expanding the 380 kV domestic grid:** in order to integrate domestic renewable energy generation, connect new generating units and carry additional international electricity flows.
2. **Expanding the offshore grid:** in order to further integrate renewable energy generation at sea.
3. **Reinforcing and expanding interconnection capacity:** in order to integrate renewable energy at European level and have access to the most competitive prices on the international market, which ensures price convergence.

The figure below provides an overview of the key investments in the 380 kV grid for the period 2020-2030, grouped into five investment packages based on a modular approach. Package A comprises both the reinforcement of existing interconnections with France and the Netherlands, and the reinforcement of existing 380 kV domestic corridors. To date, the following projects have been recognised as projects of common interest (PCIs):

- Brabo project: reinforcing the interconnection with the Netherlands;
- second high-voltage direct current (HVDC) link with the United Kingdom;
- second HVDC link with Germany.



Offshore net uitbreiden Energiepotentieel uit de Noordzee halen	Expansion of offshore grid To bring in energy potential from the North Sea
2e HVDC link met GB & DE Prijconvergentie door RES-integratie op EU-schaal	2nd HVDC link with GB and DE Price convergence through RES integration at EU level
Nieuwe corridor Stevin-Avelgem ('Kustlus') Een noodzakelijke uitbreiding naar de kust om meer onthaalcapaciteit te creëren (vb offshore RES, onshore RES, interconnectoren)	New Stevin-Avelgem corridor ('Coastal loop') A necessary extension to the coast to create more reception capacity (e.g. offshore RES, onshore RES, interconnectors)

Nieuwe corridor Avelgem-Centrum Een ontbrekende schakel voor de energiestromen tussen west-oost en Noord-zuid en om het vermaasde 380 kV backbone network aan te vullen met het oog op verdere ontwikkelingen	New Avelgem-Centrum corridor A missing link in energy flows between west-east and north-south, designed to supplement the meshed 380 kV backbone network with a view to further development
Maximaliseren potentieel bestaand net via upgrades Voor sterkere en volatielere energiestromen is een upgrade van het bestaande net van essentieel belang	Maximisation of existing grid potential through upgrades The existing grid must be upgraded in order to boost energy flows and make them more flexible

Figure 6: Overview of the modular development of the 380 kV grid in 2020-2030 (Source: Elia, draft Federal Development Plan)

Natural gas – Belgium already has an efficient and well-established natural gas network, in which a robust domestic infrastructure is complemented by interconnections with all neighbouring countries, an LNG terminal at Zeebrugge and a storage facility at Loenhout. In addition, Fluxys, the Belgian transmission system operator, holds significant stakes in key projects across Central Western Europe. This provides additional flexibility, which contributes to the attractiveness of the Belgian natural gas market and is beneficial for security of supply. All the same, a review of whether additional investments are needed in the natural gas network for the period 2020-2030 will be carried out. Fluxys is planning investment projects for the period 2018-2027 totalling EUR 549 million.

The programme is based on three key pillars:

1. investments to preserve the integrity of the natural gas transmission infrastructure and to adapt and modernise the infrastructure (67%);
2. investments in LNG initiatives and cross-border projects (26%);
3. investments to cover the increase in capacity made available to end-users (7%).

As a result, our position as a natural gas hub in Central Western Europe can be reinforced, additional demand and/or the relocation of demand can be satisfied and new developments in the market can be anticipated (e.g. alternative fuels, power-to-gas).

ii. Regional cooperation in this area

Federal State

Regional cooperation at authority level mainly occurs through the Pentalateral Energy Forum. This was established in 2005 by the energy ministers of the Benelux countries, Germany and France to foster cooperation in the area of cross-border electricity exchange. Its main objectives are market integration and continued security of supply. A new action plan was agreed by the ministers through the signature of the Second Political Declaration of the Pentalateral Energy Forum on 8 June 2015. One of the key aims of this action plan is to reinforce the internal market by strengthening regional cooperation and combining a flexible market with a high level of security of supply. To achieve this goal, the Pentalateral Energy Forum will continue to play a pioneering role in the interconnection of electricity markets and will improve the quality of its joint regional assessment of the adequacy of production (see point 3.3.2). Other key objectives are to make electricity markets more flexible and explore different approaches to cross-border participation in capacity compensation mechanisms (CCM). Lastly, the integration of the renewable energy market will also feature high on the Forum's agenda. The Pentalateral Energy Forum will therefore continue to support EU energy policy and proactively share its findings with other countries and the European Commission.

The Member States of the North Seas Energy Cooperation (NSEC) have decided that a number of 'clusters' should be studied in depth and then set up. In parallel with long-term projects such as Dogger Bank, Germany Bight and developments in the Irish Sea, the Belgium-Netherlands-United Kingdom cluster is particularly

important, since a large proportion of the existing offshore wind generation already takes place in this area, meaning that cooperation is possible in the short term.

The Federal Government is playing a very active role in developing cooperation around this cluster, in conjunction with Elia, the CREG and the Belgian Offshore Platform (BOP). Together with the other countries involved, it is exploring opportunities for connection, cooperation and further development of this cluster.

iii. Where applicable, financing measures in this area at national level, including Union support and the use of Union funds

Not applicable

3.4.2. Energy transmission infrastructure

i. Policies and measures related to the elements set out in point 2.4.2, including, where applicable, specific measures to enable the delivery of Projects of Common Interest (PCIs) and other key infrastructure projects

Federal State

Belgium encourages the businesses concerned to submit plans for cross-border projects. These projects are actively supported and overseen by Belgium's federal and regional governments as they contribute to the development of Belgian infrastructure and increase interconnections with neighbouring countries.

Coordination between the relevant authorities will be scaled up with a view to making the authorisations needed to develop new generating capacity easier to obtain and adapting the networks required for renewables development. In this context, the 'one-stop shop' approach will be routinely applied to energy infrastructure projects of national interest. Particular attention will be paid to maintaining the lowest possible administrative burden for project owners.

ii. Regional cooperation in this area

Federal State

All projects are reviewed by the TEN-E regional committees and, where possible, are submitted jointly (e.g. the FR/B project for the conversion of B-gas to H-gas).

In addition, the regional partnerships mentioned in connection with electricity infrastructure also address issues surrounding energy transmission infrastructure.

iii. Where applicable, financing measures in this area at national level, including Union support and the use of Union funds

If necessary, PCIs can apply for European funding – for example from the CEF – at the same time as being supported and overseen by the Federal Government.

3.4.3. Market integration

i. Policies and measures related to the elements set out in point 2.4.3

Federal State

Belgium will closely monitor the commercial capacity available from interconnections with neighbouring countries. Where appropriate, the correct and timely implementation of the action plans drawn up in accordance with the Regulation on the internal market for electricity will also be closely monitored to ensure that policy on security of supply is not compromised.

- ii. Measures to increase the flexibility of the energy system with regard to renewable energy production such as smart grids, aggregation, demand response, storage, distributed generation, mechanisms for dispatching, re-dispatching and curtailment, real-time price signals, including the roll-out of intraday market coupling and cross-border balancing markets*

Federal State

At both federal and regional level, the aim will be to better balance demand and consumption. For example, measures will be taken to attract the right investments in order to obtain a complementary energy mix. At the same time, technical regulations and regulatory regimes will be regularly reviewed to make producers more accountable, and barriers will be removed to improve demand response.

The gradual integration of the intraday and balancing markets will be pursued at regional and European level so as to increase the liquidity, security of supply and flexibility of the system. Flexibility solutions must be jointly reviewed at federal and regional level.

At federal level, particular attention will be paid to the potential of hydrogen technologies to convert surplus renewable energy into energy and economic processes (e.g. power-to-gas, power-to-industry, power-to-mobility), with an emphasis on developing a roadmap and launching pilot pilots.

Lastly, to bolster (energy) infrastructure, the legal certainty and investment security of projects must be ensured through a simplified permit application procedure.

In the light of this situation, legal frameworks have been revised according to the different regional contexts in order to provide for the gradual and targeted roll-out of smart meters. This should give network users more insight into their energy consumption so that they can identify ways of using less energy. Smart meters will also help households and businesses to shift their energy consumption from times of peak demand to periods of surplus production without inconvenience or loss of productivity.

Prosumers can choose whether or not to be aggregated and whether or not to feed the electricity that they generate into the grid at peak times, using a (domestic) battery storage system, in order to contribute to network stability.

Lastly, the gradual integration of the intraday and balancing markets will be pursued at regional and European level so as to increase the liquidity, security of supply and flexibility of the system.

As mentioned in Chapter 1, Belgium already has extensive interconnections. Further consideration will be given in the future to whether additional investments represent added value from a social point of view and whether Belgian consumers can be sure of benefiting from them. In addition, transmission and distribution system operators will endeavour to make efficient use of the existing grid by introducing intelligent network features and solutions (e.g. dynamic line rating, high-performance conductors). In addition to the meters supplied to final users, which are designed to allow the grid to be used and managed as efficiently as possible, the energy infrastructure will also evolve to facilitate the energy transition. Within this framework, the existing discrete energy networks will interact and become increasingly interdependent. District heating or a gas network (hydrogen/biogas) could thus serve as a back-up for the electricity grid, for example. Due to the increasing interaction and dependencies between existing discrete energy networks, operational cooperation will also be enhanced, both between transmission and distribution system operators and among distribution system operators.

Distribution-level storage could be used to support the distribution network as an alternative to traditional network dimensioning based on peak power. In order to install individual home or neighbourhood batteries and to achieve demand-side management across a distribution network, a clear regulatory framework is needed. In addition, the focus is on large-scale, long-term storage to bridge seasonal differences and provide a solution for long periods during which the supply of solar and wind energy is not sufficient. Particular attention will also be paid to the potential of hydrogen technologies to convert surplus renewable energy into energy and economic

processes (e.g. electricity-gas, electricity-industry, electricity-mobility), with an emphasis on developing a roadmap and launching pilot projects.

To bolster (energy) infrastructure, the legal certainty and investment security of projects must be supported by a simplified permit application procedure and by optimising existing legislation on urban planning and the environment.

Flemish Region

Achieving our climate objectives and using much more renewable energy will not be possible without examining the energy system and infrastructure in the wider sense.

The integration of variable, renewable and decentralised energy sources will increase demand for digitisation, flexibility and more intelligent management of the system, and will also require more investment in the system. Flexibility can be ensured in a number of ways: by matching supply and demand, by increasing connections between countries, by making energy systems more intelligent, and by enabling the storage of renewable energy for longer periods. Long-term energy storage will be vital, particularly to cope with seasonal variations in supply and demand.

Such measures are also required in order to transpose the revised European Directive on common rules for the internal market for electricity (Fourth Electricity Directive, which forms part of the Clean Energy for all Europeans package).

Digitisation of the energy system

Over the next few decades, digital meters and other digital technologies will make our energy system more connected, intelligent, efficient, reliable and sustainable. Digitised energy systems provide much more data and will be able to determine who needs energy so that it can be supplied at the right time, in the right place and at the lowest possible cost. The energy service offer, with all its various options and convenience, will also increase, which will improve market integration. The greatest potential of digitisation lies in its capacity to remove the barriers between the traditional sectors (electricity, gas and heat), increase flexibility and ensure system integration.

- Roll-out of digital meters

So that all households and businesses can anticipate when prices will be high or low and take advantage of the benefits of digitisation, we aim to maximise the roll-out and use of digital meters by 2024. Suppliers will therefore be able to develop new contractual arrangements and market operators can become more flexible. Various technologies are ready for large-scale roll-out and will therefore be available for use once a digital meter has been installed. In addition, there is an urgent need for a powerful, cost-effective and future-oriented software platform so that the market can use the data from the digital meters.

- Smart use of energy data

We will focus on the smart use of digital meters, by using aggregated/anonymised data to adopt better policies, and in this context we will look at the digital data technology options. We will also make the data available in a non-discriminatory manner for the purpose of future market developments, research and innovation. At the same time, digitisation will also pose new risks in terms of security and privacy, which we duly tackle.

- Informing households and businesses

User participation in the energy system will be facilitated by digital tools, such as geographical systems, web portals, the Internet of Things (IoT), megadata, blockchains, digital twin technologies, etc. So that the benefits of a flexible digital energy system are also clear to its users, we will support the development and use of applications allowing smart use of digital meters. We will provide sufficient information on the (technical) properties and options, and also on how the roll-out itself is progressing. We will inform the

public and operators concerned about the storage of energy, and we will develop a website containing objective information.

Modernisation and reinforcement of the low-voltage systems

The low-voltage systems still seem to have the capacity to cope with current demand for PV, heat pumps and electric vehicles. However, we will soon have to choose between rapidly reinforcing the existing systems or voluntarily and temporarily restricting access through increased flexibility.

The emergence of electric vehicles is a key issue for the existing systems. While numbers are limited, there are few problems globally. However, at local level, the situation can already be quite different. We will need intelligent management to avoid consumption peaks or system investments.

The existing 230V systems need particular attention. They account for around 23% of all the low-voltage systems in Flanders, particularly in urban areas, and complicate the trend for increasing electrification (PV installations, heat pumps and electric vehicles). Fluvius will have to identify the necessary investments as soon as possible and, where applicable, plan and implement those investments. The energy data will be useful for comparing the costs of electrical systems or alternative such as hydrogen.

Increase in storage capacity

The storage of electricity in batteries (or indirectly via heat pumps in boilers, for example) has already been technically developed and can be used to absorb short-term fluctuations. Energy storage in the form of hydrogen or other synthetic fuels offers an alternative for long-term storage.

- **Encouraging energy storage through an incentive**

We are currently encouraging the Flemish market for energy storage and management systems by supporting investments in electricity storage through a purchase incentive. Such energy storage systems will help to ensure system stability during peaks in demand and generation. They form a temporary alternative to additional investments in the system. The existing incentive will be assessed in 2020.

- **Establishing a regulatory framework for energy storage**

A regulatory framework for energy storage will be developed in order to increase storage capacity. The new style of electricity market requires energy services such as storage to be market-based and competitive. For that reason, we will not allow system operators to own, develop, manage or operate energy storage installations.

In addition, we will study the role of energy storage within districts, and any obstacles to this, and we will adopt support measures or initiatives if need be. This framework will be closely linked with the regulatory frameworks for flexibility, which are yet to be developed, and with the local energy communities that are currently being developed as a result of the transposition of the European Directive on electricity and renewable energy, within which energy storage (at district level) may play an important role.

- **Demonstration projects for energy storage and power-to-x**

Electricity can be stored in the short term in batteries; however, for longer-term energy storage, hydrogen or other synthetic fuels offer an alternative. Developing such storage on a larger scale takes time and the infrastructure and investments needed are significant, meaning that lead times of three to seven years are not unusual. In order to have reliable storage technology available from 2023, we need to quickly gain experience in this respect.

We are therefore going to launch new pilot and demonstration projects for energy storage and power-to-x. We will therefore develop synergies between the various systems (gas and electricity), energy sectors and other sectors (sectoral coupling or integration). The aim will be to learn everything needed in order to develop a power-to-x policy and integrate it within the Flemish context. Energy storage capacity in Flanders will also be increased.

Design of a flexible energy system

In addition to storage, demand or production management, where customers adjust their net energy purchases or production based on price signals, can also increase the flexibility of the energy system. The greatest potential for demand or production management currently lies with large consumers and/or producers. Small customers (households), SMEs and local authorities in the energy sector can also participate in this market as digital meters are rolled out and as smart devices or controls are installed. Due to a number of regulatory, technical and economic obstacles, a large part of this potential flexibility has not yet been exploited.

The digital meters that we are currently rolling out and the new European regulations on the electricity market offer the opportunity to develop a Flemish framework for flexibility and to facilitate the development of new energy services across the distribution system.

- **Developing a Flemish regulatory framework for flexibility in the low-voltage and medium-voltage distribution systems**

We will develop a general regulatory framework for flexibility, in accordance with the recently adopted European legislation (such as the EMD), as a source of clarity, transparency and certainty for market players. This framework should ensure that the market is clear for the relevant operators and functions correctly and efficiently. Low-voltage and medium-voltage users must have more opportunity to base their flexibility on the market, which should allow them to react to external (price) signals, for example by using dynamic contracts and pricing. In addition to a regulatory framework, we will also emphasise communication and awareness-raising. End customers must be correctly informed of the options and value of flexibility.

Market roles will be clearly defined in this respect.

- **Developing a framework for support services and flexibility for the distribution system operator**

We will develop a regulatory framework for the use of support services and flexibility for the distribution system operator (DSO). In this way, we will integrate smart solutions into the distribution system and thus offer an alternative to investment in more robust systems. The DSO will therefore have additional options for managing the distribution system. This framework will be comparable to the one for the support services of the transmission system operator, Elia, where energy services are purchased from various market players. This system is open to a range of users (households, local authorities, businesses, etc.), sources (demand, production, storage, electric vehicles, etc.) and technologies. It is designed to involve all the relevant market players.

Involvement of the public, local authorities and businesses in the energy transition

It is vital that the public, local authorities and businesses become more involved in the energy issue in order to increase public support for the energy transition and the continued development of renewable energy projects. The concept of local energy communities offers an interesting framework for developing and testing new forms of (public) participation that are focused more on the collective or individual level.

We will therefore ensure that the public, local authorities and businesses can be more active and come together within local energy communities in order to participate in the energy market as full stakeholders by engaging in activities such as financing, production, flexibility services, energy documents, energy storage, energy efficiency services, etc. In this way, they will help to achieve the community's economic, environmental and social objectives.

- **Developing a regulatory framework for active customers and local energy communities**

Numerous pilot projects involving local energy communities are currently being carried out both in Belgium and abroad. In Flanders too, initiatives have already been implemented by various stakeholders, based around local energy communities. These projects will provide valuable information for the future design of local energy communities. Based on the analysis of existing (pilot) projects and in close cooperation with all

stakeholders, we will develop a regulatory framework for active customers and local energy communities. Through a consultation platform, we will have in-depth discussions with the relevant stakeholders about how to fashion local energy communities: options, objectives, value added, governance, priorities, best practices, professionalisation, scope, conditions, rights and obligations, etc.

In this way, we will support and facilitate the active role that the public, local authorities and businesses can play in the energy transition and enable them to take advantage of that transition.

- **Setting the thresholds and developing a framework to assist local energy communities**

By the end of 2020, under the Directive on electricity and renewable energy, we plan to adopt a policy framework facilitating the development of local energy communities and removing administrative burdens and legal obstacles. We will focus on information, awareness-raising and alleviating the concerns of participants and project initiators. Other support instruments may also be developed. At the same time, we will ensure continued solidarity between all system users by contributing fairly to the funding of climate and energy policy and the energy infrastructures supplying each consumer.

Walloon Region

Measures in relation to the flexibility market

The potential savings to be made from DSOs using flexibility vary according to the system and the assumptions made in each study. In general terms, there are two types of saving to be made from DSOs using flexibility: reduction in system losses and reduction in the need for investment in infrastructure.

It is considered that the market itself can encourage the development of solutions in terms of flexibility, storage and appropriate use of electric vehicles. All measures associated with flexibility need to comply with the relevant directives (RES and System). The measures in question must be accompanied by a framework facilitating the development of those solutions.

- Following the transposition of Directives (EU) 2019/944 and 2018/2001, it will be assessed whether the compensation mechanism for electricity generating facilities <10 kW can be maintained.
- The flexibility framework, as provided for by the Decree of 19 July 2018, will be implemented (technical regulations, communication in order to encourage, development of the role of DSOs, issue by the CWaPE of flexibility service supply licences based on the Walloon Government Decree of 28 March 2019, etc.).
- A framework encouraging centralised and decentralised storage will be adopted: granting of permits; alteration of tariffs (inappropriate feed-in and feed-out tariffs); removal of economic and administrative obstacles.
- The DSOs will plan the development of flexibility needs and will determine how they will call on that flexibility.
- Recharging infrastructure for electric vehicles and the management of charging and discharging operations will be planned. One of the main challenges for the distribution systems is the increased number of electric vehicles, as their recharging could significantly increase peaks in demand.

These solutions must be implemented according to their technical feasibility, taking account of the situation of households and on a voluntary basis.

Measures in relation to system development and intelligent systems

- Smart meters will be rolled out in accordance with the framework, rate and principles determined in the Decree of 19 July 2018. This roll-out will be accompanied by an appropriate communication campaign and customer support when the meter is installed (see measure on smart meters).
- A regulatory framework will be developed for innovative pilot projects.

The Programme Decree of 17 July 2008 added to the Electricity Decree of 12 April 2001 the option for the CWaPE to authorise innovative pilot projects involving alternative systems to the public system, while using and fairly remunerating the distribution system.

This particularly means that certain barriers (tariffs, taxes, obligations, etc.) are temporarily suspended, within a well-defined, time-limited and controlled framework, in order to test and document the relevance and performance of projects aimed at implementing the best possible technological solutions for the Walloon electricity market, with a view to their widespread use across Wallonia.

The pilot projects that can be authorised are in line with European energy policy as they must in particular involve the following areas: energy efficiency, demand flexibility, optimisation of the development and management of decentralised production, and promotion of local self-consumption and short supply circuits. This new option responds to various demands made by the sector and will allow these various issues to be better managed, where applicable, in order to optimise their development.

- The measures in relation to collective self-consumption and renewable energy communities explained above are also intended to make the system smarter.

DSO-TSO coordination measure

A lack of coordination between TSOs and DSOs can impact the security and efficiency of the system or prevent the use of flexibility resources. It is therefore vital to ensure good coordination between these operators. This can be established via a common market within which TSOs, DSOs and BRPs can obtain flexibility services, through a system ensuring prioritisation between local and global balancing, or by requiring TSOs to consult DSOs on the system's management.

Pricing

At the moment, dual-rate tariffs are intended to guide consumer behaviour by influencing the periods of consumption or non-consumption. More refined tariffs, with more time-slots, will further develop this approach. These tariffs must be constructed in such a way that they are understandable and predictable for households.

To achieve the objective of developing flexibility, pricing must be adapted based on the following goals:

- The pricing system, among other factors, must support the shift in consumption.
- The DSO remuneration system must encourage them to invest in the most cost-effective solutions, including flexibility solutions.
- The pricing methodology must help to develop renewable energy communities, while ensuring a balance between solidarity in covering the total system costs and the contribution to taxes, surcharges and other regulated costs, and the interest in participating in such an operation.
- The pricing methodology must not reinforce market segmentation and must not negatively impact those households that have chosen not to use flexibility, dynamic tariffs, etc. or that are unable to use flexibility.
- The pricing methodology must ensure a balance between solidarity in covering the total system costs and the contribution to taxes, surcharges and other regulated costs, and the development of special schemes.

A working group has been set up to define the new guidelines for pricing methodology, which must comply with the State aid guidelines.

Measures in relation to the roll-out of power-to-x (¹³⁷)

The production of hydrogen will develop in line with the market and the increased penetration of variable energy sources (by 2030 the Belgian variable renewable capacity could be nearly three times higher than the base load). The following should be the initial measures:

- creation of a roadmap for rolling out power-to-x;
- conduct of pilot projects;
- development of a framework favourable to power-to-x.

iii. Where applicable, measures to ensure the non-discriminatory participation of renewable energy, demand response and storage, including via aggregation, in all energy markets

As a member of the Pentalateral Energy Forum (PLEF), Belgium and the other members can learn from the efforts and experiences of the other PLEF members with regard to demand-side response (DSR). The DSR volumes at certain times and on certain markets that can already be seen in a number of PLEF countries (for example, in France and Belgium) show that, if enough barriers and obstacles are removed and if participation in DSR is actively encouraged, flexibility with regard to DSR will be offered and will contribute to system stability. The aim is now to learn lessons from these experiences and to extend participation in market-based DSR to all timescales and all markets in all the PLEF countries, in accordance with the Clean Energy for all Europeans package and in the interests of all consumers.

Federal State

- Guarantee the roll-out of power-to-x.

iv. Policies and measures to protect consumers, especially vulnerable and, where applicable, energy poor consumers, and to improve the competitiveness and contestability of the retail energy market

Walloon Region

Several measures have been adopted or reinforced in order to improve business competitiveness.

- The carbon leakage measure has been authorised by the European Union since 2012. It allows the financial compensation of businesses that have become less competitive than international businesses not subject to the EU ETS (mainly in the metallurgical, steel, chemical, pharmaceutical and paper sectors). This measure currently applies until 2020 and should be extended.
- Various measures have been adopted to help businesses, including VSEs and SMEs (through Novallia and the SOGEPA in particular), to reduce their energy consumption: low-interest loans; support and expertise; investment aid, etc.

¹³⁷ Power-to-x (or P2X) means the conversion of electricity into another energy carrier. This 'X' carrier can be heat (in the case of Power-to-Heat (2)), which, for example, can meet industrial needs or supply district heating systems. It can also be a synthetic gas (Power-to-Gas (3)): hydrogen for mobility purposes or methane (following methanation), which can itself be injected into the gas system to meet industrial, heating or mobility needs.

v. *Description of measures to enable and develop demand response, including those addressing tariffs to support dynamic pricing (138)*

Flemish Region

See point 3.4.3.2.

Walloon Region

A Decree governing flexibility in the distribution system and the associated operators was adopted by the Walloon Parliament on 19 July 2018.

Under this legislation, a Decree on the licence to supply flexibility services was adopted by the Walloon Government on 28 March 2019.

It can only be fully implemented once the technical regulation on electricity distribution systems has been adapted.

Furthermore, as a result of the roll-out of smart meters and in accordance with the new Electricity Market Directive, dynamic pricing will be studied.

3.4.4. Energy poverty

i. *Where applicable, policies and measures to achieve the objectives set out in point 2.4.4*

Federal State

Energy poverty is not an isolated phenomenon; it is an integral part of overall poverty. Energy poverty must be tackled at source. Developing tools to make homes more energy efficient will ease pressure on energy bills, while an action plan to tackle energy poverty will be drawn up by each entity. This plan will outline measures to reduce consumption, as the size of energy bills is directly linked to consumption. The main priority for the energy poverty action plan should be to reduce consumption and promote energy efficiency. Existing aspects of social energy policy should also be assessed. The Regions are responsible for housing and its quality and will therefore take the necessary energy efficiency measure within an energy poverty action plan.

Flemish Region

Current policy

The statistics published annually by the VREG in its ‘Social report’ reveal, among others, the trends in a number of indicators relating to the regulatory stages of the procedure to protect against the disconnection of electricity and natural gas supplies.

The most important indicators of energy poverty, such as the number of operational budget meters and the average monthly amount of repayment plans, have remained stable in recent years.

Other indicators, such as the number of formal notice letters sent by suppliers, the number of terminated contracts and, in particular, the number of ongoing and additional repayment plans arranged by commercial suppliers, have risen significantly, mainly due to a more proactive and assertive approach on the part of suppliers when there is the least sign of default or late payment.

¹³⁸ In accordance with Article 15(8) of Directive 2012/27/EU.

Statistics from the ‘Social report’ (electricity and natural gas)

	2015	2016	2017	2018
Number of households having received at least one formal notice letter	242,613	253,100	258,090	272,336
Number of ongoing repayment plans arranged by commercial suppliers	83,757	100,197	118,176	125,423
Number of repayment plans started by commercial suppliers	64,791	81,198	97,015	98,331
Average amount of monthly repayment	€123.67	€136.99	€130.67	€128.39
Average outstanding debt	€678.40	€672.05	€691.48	€713.97
Number of supply contracts terminated by the supplier (due to non-payment)	78,539	80,376	83,326	87,198
Number of operational electricity budget meters	40,619	40,768	41,501	41,042
Number of operational natural gas budget meters	27,760	27,830	28,094	27,396

Number of customers of the distribution system operator

When the commercial energy supplier terminates the supply contract with a customer due to non-payment, it is the system operator who, in accordance with the law, continues to supply those customers in its capacity as the social supplier. In 2018, the number of customers of the distribution system operator remained stable. In total, 2.90% (2.89% in 2017) of households were customers of the distribution system operator for electricity (81,080) and 3.10% (3.12% in 2017) of households were customers for natural gas (58,916). These figures cannot be simply added together because households can be customers of the distribution operator for both forms of energy.

The number of customers returning to the commercial market after paying off their debt in full increased in 2018 to 13,380 for electricity (+11.5% compared with 2017) and to 9,385 for natural gas (+6.9% compared with 2017). In 2016, however, these figures actually fell sharply.

Budget meters

Households that are also in debt to the distribution system operator receive a budget meter. The installation of a budget meter therefore indicates a structural payment problem. The number of operational electricity budget meters went from 41,501 in 2017 to 41,042 in 2018, which represents a fall of 1.1%. The number of operational natural gas budget meters fell by 1.4%, from 28,094 in 2017 to 27,396 in 2018 (¹³⁹).

The number of households with a prepayment electricity meter (where the electricity restriction function has been disabled and which only work with credit on the meter card) rose by 1%, from 9,177 to 9,265. This means that nearly 23% of budget meters have no electricity restriction function (+1% compared with 2017).

Given that the natural gas budget meter is de facto a prepayment meter, there is the risk that customers will themselves cut off their supply if they cannot add credit. Consequently, a minimum supply of natural gas has been introduced. Customers can use this service, via the CPAS, from 1 November to 31 March so that they can continue to heat their homes throughout the winter. The figures show that this measure meets a real need. 5,408 households (around 19%) with an operational budget meter have benefited from this service (5.5% more than in the previous period), with 70% being supplied by the system operator.

Disconnections

Before shutting off an access point due to non-payment, the distribution system operator must refer the case to the local advisory committee for the municipality. This committee consists of CPAS members and representatives of the distribution system operator. The customer in question is also invited to the meeting. In

¹³⁹ This is an absolute increase. Demographic differences have not been taken into account.

2018, 1,642 electricity disconnections were recorded, i.e. an increase of 26.5% over 2017 (1,298 disconnections), and 1,504 natural gas disconnections were recorded (compared with 1,508 in 2017).

Additional policy

Over the next few years, the Flemish Government wants to make additional efforts to reduce energy poverty. For that reason, we will optimise the energy poverty action programme, in consultation with all stakeholders in this respect. Priority will be given to structurally improving the energy performance of housing. Targeted financial support for energy saving measures, intensive advice and tighter rules will remain essential. In order to best reach the target group, we will work in cooperation with local partners. Digital meters will allow budget shortfalls to be detected and tackled in good time.

A monthly consultation process has been set up with stakeholders in order to make the most of the opportunities offered by digital meters. This process should result in a consensus general policy framework that will be applied once analogue meters have been completely replaced. The aim is to maximise the benefits offered by digital meters.

A number of support measures have been developed in order to provide as much help as possible to the vulnerable target group in the renovation of their housing. To help those concerned prepare for and carry out such renovations, they have access to the services of an ‘Energy House’ (‘Maison de l’énergie’), which guides the vulnerable target group through the various support measures, such as incentives, loans, tax relief, etc., for energy saving work and investments. The ‘Energy House’ also grants energy loans to the priority target group and provides further information on investments in renewable energy.

We will continue the existing financial instruments for the vulnerable target groups and link them to a fixed income ceiling (interest-free energy loan, energy scans and social insulation projects for private rental housing). We will also provide efficient services in connection with all financial instruments that can increase the renovation rate.

Support measures:

1. Targeted financial support

- **Social housing and insulation incentive:** in addition to a EUR 200 flat-rate incentive received by the project owner for each item of work carried out, aimed at supporting the overall process, the owner receives (if a number of conditions are met):
 - o EUR 20 per m² of roof or floor insulation in the loft;
 - o EUR 12 per m² of insulation inserted in cavity walls;
 - o EUR 85 per m² for the installation of high-performance glazing.

In April 2019, a communication campaign targeted at owners was launched (www.huur-en-isolatiepremie.be/).

- **Interest-free energy loan for the priority target group:**

- o Loan amount: EUR 15,000 over a term of 10 years.
 - o The borrower can use the subsidy or incentive received for work covered by the loan either to repay the loan early or to have the loan adjusted to reduce the monthly payment.

- **Rolling fund for the energy renovation of housing purchased out of necessity:**

The emergency purchase fund aims to reduce energy poverty by granting interest-free loans to ‘emergency purchasers’, i.e. households that have purchased a low-quality home partly out of necessity, without having the financial resources to improve the quality of the home, resulting in high

energy bills among other issues. The number of homes purchased out of necessity in Flanders is estimated at 4% (i.e. around 119,000 homes) of the Flemish housing stock.

The interest-free loans will be used to fund measures designed to improve the energy performance of the housing and ensure that this meets the basic safety, energy, health and quality requirements for housing. It is planned that the loan, including part of any capital gain, will be repaid when the property is sold or gifted, or after 20 years at the latest. We will assess the effectiveness of the emergency purchase fund with a view to possibly extending the loan arrangement.

- **Digital meters:** digital meters allow the accumulation of energy debts to be detected more quickly and a more proactive approach to be adopted. Given the priority roll-out of digital meters by the end of 2021 for all customers with a budget meter, we will optimise the current social public service obligations that protect electricity and natural gas customers from accumulating energy debts and losing their energy supply
- **Increased energy incentives for protected customers** (beneficiaries of the maximum social price for energy):
 - o 50% increase in energy incentives (20% for solar water heaters, heat pumps and heat pump water heaters) + even higher incentives for:
 - roof insulation (EUR 10.5 per m² instead of EUR 4);
 - high-performance glazing (EUR 56 per m² instead of EUR 10);
 - incentive for installing a condensing boiler: EUR 1,800 (only for protected customers).
 - o In addition, the amount of the incentives granted as part of the total renovation bonus where three or more measures are carried out is to be increased by 50%.

2. General support

- **Neighbourhood incentive:** support instrument for collective renovation. The neighbourhood incentive is a maximum of EUR 400 per house or housing unit and is paid to the project guide.
- **Free energy scan:** an adviser identifies ways of saving energy in housing. Occupants benefit from energy saving advice that can be immediately implemented. If necessary, the energy adviser provides energy-saving materials free of charge (energy efficient light bulbs or showerheads, radiator reflectors, pipe insulation). The occupant receives a report containing energy advice and other ways of making savings. Following this basic scan, a follow-up scan can be requested, which builds on the basic analysis and suggests further adjustments, where possible. These may be minor energy saving measures, but advice can also be given on more significant energy saving measures, such as installing high-performance glazing, roof insulation or a more energy efficient heating system. Since 2019, this type of follow-up scan has also formed part of the services provided by the 'Energy Houses'.
- **Energy advice projects** to tackle energy poverty 2019-2021 are helping to achieve the objectives of the energy poverty action programme (<https://www.energiesparen.be/energieconsulenten>). They provide information on energy scans, energy incentives (at the higher rate) and interest-free energy loans. Energy advisers inform the target group about the 2050 long-term objective of the Renovation Pact and about the measures and initiatives taken in this respect to ensure that, by 2050, all housing – including that of vulnerable families – is as economical as a new-build in 2015. Energy advisers also take direct action to encourage and help the target group to invest in energy savings. Five projects are currently ongoing: [Samenlevingsopbouw](#), [Komasie](#), [REGENT](#), [SOM Meetjesland](#) and [vzw Effect](#).
- **Provide frontline renovation advice from the integrated energy and housing information point.**

3. Standardisation

- Compulsory roof insulation standard: by 2020 all the roofs of every individual home (single-family houses, studios and apartments, i.e. excluding rooms) must be insulated.
- Compulsory glazing standard: by 2023 all housing must have double-glazing.
- Increase in the maximum energy score: in order to systematically improve the EPC score of rental housing, the Housing Minister will gradually increase the maximum EPC score as part of the minimum housing quality requirements. In this respect, we will take into account the 2050 long-term objective and introduce reference criteria complying with the Flemish Energy and Climate Plan.

Walloon Region

The Walloon Government considers that keeping energy affordable is extremely important. The energy transition is vital, but it cannot come at the expense of the general public or reinforce inequalities. It must be accessible to all and must not adversely affect those households that cannot or do not want to use complex instruments such as dynamic tariffs. It must also not make consumption less flexible.

Liberalising the energy market has already proven to be too complex for many households and has not necessarily enabled them to benefit from better technical solutions and tariffs. According to the CREG, every year 360,000 households pay EUR 600 too much for their energy because they have not made the right choice of supplier or tariff. The government will study the possibility of introducing a basic gas and electricity supply for residential consumers so that they can access energy at an affordable price without having to complete complicated processes.

The government will call for a European-wide assessment of energy liberalisation in order to identify whether corrective measures are needed to better meet the environmental, economic and social objectives.

All the energy policies will be closely reviewed from the perspective of households, and the most vulnerable in particular. The government will also adopt a new strategic plan to tackle poverty and reduce inequalities, which will focus on access to energy. Energy is a vital commodity and a fundamental right, to which access must be guaranteed for all.

Tariff measures for protected customers

As part of the organisation of the gas and electricity markets resulting from the European directives, the Federal State and the Regions have introduced specific mechanisms designed to help vulnerable households, known as 'protected customers'. These mechanisms are set to be improved.

There are two categories of protected customer:

- first, federal protected customers⁽¹⁴⁰⁾ who benefit from the social tariff offered by all residential customer suppliers;
- second, regional protected customers⁽¹⁴¹⁾ who benefit from the social tariff offered by their DSO, where they are supplied by the latter in its capacity as the social supplier.

Protected customers benefit from the social tariff set every six months by the CREG based on the best commercial offer (from among the suppliers).

The Walloon Region has extended the concept of protected customers, as defined by the Federal State, to take account of other problematic situations faced by vulnerable households.

Regional protected customers include beneficiaries (either the person holding the supply contract or a person with the same address as the contract holder) of the following:

- a financial educational guidance decision made by a CPAS;

¹⁴⁰ <https://www.energieinfowallonie.be/upload/documents/tableau-de-synthese-clients-proteges.pdf>

¹⁴¹ <https://www.energieinfowallonie.be/fr/mesures-sociales/le-client-protege#quels-avantages-pour-le-client-protege>

- debt mediation by a CPAS or an approved debt mediation centre;
- a collective debt settlement.

In order to benefit from the social tariff, the regional protected customer must contact his or her supplier, who must transfer the customer to the relevant DSO. The DSO then acts as the social supplier of the protected customer.

Wallonia has seen a rise in the number of vulnerable households, as shown by the following figures for the **number of protected customers and social tariff use** (¹⁴²).

Trend in the number of protected customers and electricity social tariff use

ELECTRICITY	02.2013				02.2019			
	BE	FLA	BCR	WAL	BE	FLA	BCR	WAL
Number of social customers (protected customers)	394,877	196,076	55,509	143,292	451,335	214,739	92,768	143,828
Number of federal social customers	384,376	196,076	52,681	135,619	434,737	214,739	91,356	128,642
Number of regional social customers (supplied by the DSOs)	10,501	0	2,828	7,673	16,598	0	1,412	15,186
Ratio of social customers to total number of residential customers (as %)	8.25	7.11	10.75	9.47	9.35	7.86	18.37	9.05
Social tariff (all-inclusive in euro cents/kWh)	16.76	16.74	16.72	16.83	17.96	17.83	17.99	18.06

Trend in the number of protected customers and gas social tariff use

GAS	02.2013				02.2019			
	BE	FLA	BCR	WAL	BE	FLA	BCR	WAL
Number of social customers (protected customers)	225,883	115,948	44,785	65,150	271,707	138,543	44,288	88,876
Number of federal social customers	218,510	115,948	39,859	62,713	261,846	138,543	43,112	80,191
Number of regional social customers (supplied by the DSOs)	7,383	0	4,926	2,247	9,861	0	1,176	8,685
Ratio of social customers to total number of residential customers (as %)	8.46	6.76	12.14	11.07	9.70	7.99	12.20	12.62
Social tariff (all-inclusive in euro cents/kWh)	4.46	4.46	4.46	4.47	3.25	3.25	3.25	3.25

¹⁴² Data taken from the CREG monthly reports (February 2013 and 2017).

Number of beneficiaries of the heating social fund (for heating oil) and amounts allocated

	Number of beneficiaries	Amount	Number of beneficiaries	Amount	Number of beneficiaries	Amount
	2016	2016	2017	2017	2018	2018
Flemish Region (308)	39,600	€7,386,213.36	38,853	€7,396,208.01	37,584	€7,120,843.61
Walloon Region (262)	49,727	€8,639,595.95	50,921	€8,871,337.32	50,635	€8,811,944.50
Brussels Capital Region (19)	571	€73,069.30	646	€83,513.58	592	€73,750.54
Total (589)	89,898	€16,098,878.61	90,420	€16,351,058.91	88,811	€16,006,538.65

Measures connected with meters and consumption monitoring

Budget meters

Budget meters are regarded as a tool for managing household debt, but cannot in any way help households to structurally reduce their consumption by improving their housing or equipment. Furthermore, the technical information available to the DSO does not paint a reliable picture of the situation on the ground in terms of electricity or gas disconnections experienced by households.

An analysis supplementing the studies that are already available will be carried out, and the budget meter framework will be reviewed in order to limit use of such meters to those cases where they are proven to be useful.

Legal framework for rolling out smart meters

The Decree governing the use, functions and roll-out of smart electricity meters was adopted by the Walloon Parliament on 19 July 2018. It will be implemented through a series of implementing decrees and technical regulations.

It provides for the phased roll-out of smart meters in the Walloon Region:

The legal framework requires smart meters to be systematically installed and activated (communication function) in the following cases by 1 January 2023 at the latest, unless this is technically impossible or not cost-effective:

- 1. depending on the results of the study carried out, the possibility of smart meters being used for residential customers declared in default will be assessed;
- 2. when a meter is replaced;
- 3. when a new connection is made;
- 4. when a distribution system user so requests.

No later than 31 December 2029, the DSO must reach the target of 80% smart meters installed within its system for users meeting one of the following requirements:

1. standardised annual consumption of 6,000 kWh or more;
2. net developable electrical capacity (in terms of electricity generation) of 5 kWe or more;
3. recharging points accessible to the public.

Support measures to reduce consumption or bills

In the Walloon Region, various mechanisms have been established to improve access to energy and help households at risk of energy poverty: awareness-raising, incentives, MEBAR programme. These measures will be improved in the future.

Awareness-raising

Various awareness-raising and support tools aimed at vulnerable individuals have been created: preventive action plans for energy (plan d'action préventive pour l'énergie – PAPE), energy guardians and training for social workers.

In terms of the PAPEs, the task of the CPASs is to inform the public about the rational use of energy and management of consumption (reduction of consumption and therefore bills), and also about the subsidies and incentives available in this respect. Actions under the PAPEs also involve personalised monitoring in three stages: energy balance of the household, identification of possible solutions, and support for the household in implementing those solutions. This personalised monitoring is provided by social workers trained in this area, energy guardians or specialised associations.

The work of the CPASs in this context involves personalised monitoring of vulnerable households, whether or not they are beneficiaries of social welfare. Information and awareness-raising sessions aimed at this target public are also organised.

In 2017-2018, 121 PAPEs received subsidies totalling EUR 2,752,456. In 2019-2020, 134 PAPEs received subsidies totalling EUR 2,700,000. Through these PAPEs, over 15,000 households benefit from individual support every year. In addition, nearly 6,000 households benefit from monitoring in their homes, which allows them to be supported in reducing their consumption and bills.

Energy guardians focus on nine priority actions, namely:

- making and explaining diagnoses, making recommendations, relaying information and motivating beneficiaries;
- supporting vulnerable people in their efforts to carry out small or large energy saving projects, which involves going to users' homes;
- raising awareness of Rational Use of Energy (RUE);
- informing social welfare beneficiaries, which involves providing information consistent with the actions of the social service;
- explaining the results of the energy audit, where applicable;
- negotiating with owners;
- informing people about available schemes and administrative processes;
- making personal situations (all the ins and outs) clear and understandable, and analysing the situation, together with all those involved, from a technical, administrative and behavioural perspective;
- participating in the sustainable management of the institution, i.e. raising the awareness of everyone within the institution/promoting discussion and bringing about changes in attitude.

Incentives

The Walloon Region also grants a subsidy to low-income households so that they can carry out work on their homes allowing them to use energy more rationally (MEBAR incentive). This emergency assistance can cover replacing external doors or frames, carrying out insulation work, installing a stove, lining a chimney, installing a boiler or water heater, etc.

The subsidy can also be granted to a household or applicant living in a caravan or lodge on a campsite or a weekend residential park.

If the applicant is a tenant, the owner's consent must be obtained in advance.

In order to obtain the subsidy, the applicant must contact the local CPAS, which will start the procedure.

The incentive is a maximum of €1,365 including VAT for households with an income less than or equal to the living wage plus 20%.

An amount of EUR 1.5 million is reserved each year for this incentive in the general expenditure budget of the Walloon Region. This annual amount included in the initial budget is generally increased when the budget is amended and can reach EUR 1.75 million. On average, around 1,200 households benefit each year from the MEBAR incentive. In addition to this incentive, the Walloon Region also grants energy incentives, which are higher for those on low incomes, to help people improve their homes so that they can reduce their energy consumption. For example, for a household with an income of EUR 23,000 or less, the incentive is multiplied by six. The incentives are granted for the following investments: thermal roof insulation, thermal wall insulation, thermal floor insulation, installation of efficient heating and/or hot water systems, conduct of an energy audit.

Brussels Capital Region

The issues of poverty and social inequality will be tackled by the Brussels Government across the board, based on an analysis of the impact of planned reforms on poverty and health factors.

This is the case with the renovation policy, which will also reflect the government's social policy by focusing financial support on low- and average-income households and by tackling energy poverty.

In the context of a liberalised energy market, consumers are in a vulnerable position with regard to energy suppliers and the competition in which they engage: protection of privacy, changes in tariffs, complexity of offers, multiplicity of intermediaries, etc. For that reason, the government intends first of all to further develop and reinforce consumer protection policy.

The government will also provide access to an independent and effective service offering information and support on energy contracts, understanding of bills, legal issues, etc. for all Brussels residents. It also intends to ensure that the independent regulator Brugel operates effectively.

3.5. Dimension research, innovation and competitiveness

General information

Belgium's research and innovation (R&I) policy in relation to the Energy Union is aimed at supporting the general objectives of EU energy policy in terms of energy security, sustainability and competitiveness. In addition, the R&I policy encourages innovation in and by Belgian businesses in order to boost their competitiveness. Belgium is convinced that a common European approach is necessary to achieve the EU strategy for a resilient Energy Union with a forward-looking climate policy.

Belgium's R&I policy is therefore closely linked to the priorities of the European Strategic Energy Technology Plan (SET Plan). Within the framework of the SET Plan, Belgium (both the Federal State and the Regions) is working with other SET Plan countries to define the strategic objectives of the plan's 10 key actions. This definition will be followed by R&I activities (as defined in the implementation plans) to achieve those strategic objectives. This will involve national and regional R&I programmes and/or co-financing of EU programmes, such as participation in ERA-NET co-financing activities.

At international level, Belgium is a member of the International Renewable Energy Agency (IRENA) and the International Energy Agency (IEA). Belgium (both the Federal State and the Regions) participates in various IEA programmes for technological collaboration.

Responsibility for R&I policy in relation to the Energy Union in Belgium is shared between the Federal Government, the three Regions and the Communities. The Federal State is responsible for R&I in the field of nuclear energy (nuclear fission and fusion) and in other areas under federal jurisdiction – such as renewable energy in the Belgian Exclusive Economic Zone of the North Sea, biofuels, security of supply and network balancing – and is also responsible for funding research in federal scientific institutions in support of climate policy. The Regions are primarily responsible for R&I in relation to non-nuclear energy. The Communities are responsible for research policy in universities.

On 11 December 2017, the Federal Minister for Energy and the energy ministers of the three Regions reached an agreement on a Belgian Interfederal Energy Pact, which is a common vision for the energy transition to 2030 and 2050. To ensure that Belgian industry remains competitive and to protect jobs, an Energy Standard will be introduced for energy-intensive businesses.

At administrative level, the BELSET platform has been set up between the federal and regional authorities. This is an informal consultation platform for all issues relating to the European Strategic Energy Technology Plan (SET Plan), which is the overarching European strategy for R&I in energy technologies. BELSET was created in order to allow productive consultations between policy advisers for energy technology R&I (CIS-Energy) and energy policy advisers (CONCERE/ENOVER) involved in the follow-up to the European SET Plan.

i. Policies and measures related to the elements set out in point 2.5

Federal State

R&D is extremely important because the 2030-2050 objectives will not be achievable unless significant technological progress is made. In order for new technologies to emerge, due emphasis must also be placed on the qualification of human capital.

An **interfederal platform** will be created to ensure that the projects and activities funded by the various entities are coherent and to develop synergies between research centres. The aim of this platform will be to disseminate information on research programmes and studies. Progress reports and findings will be made available to higher education establishments and universities, businesses and organisations active in the field of energy.

In cooperation with the Regions, the Federal Government will develop a clear, coordinated and collaborative **research programme**. This will include **wide-ranging impact studies** on crucial aspects of energy and climate policy (including the impact on sustainable development indicators, the impact on costs and benefits of investments, and the socioeconomic impact of climate change) and also studies on financial governance with an

impact on consumer and producer behaviour (taxation, spatial planning, mobility and transport, standards, etc.). Within this framework, it is vital that cooperation between the political levels in Belgium is as integrated as possible ... Furthermore, the specific socioeconomic aspects of each region must always be taken into account. This programme will be accompanied by national objectives and funding objectives for research, innovation and competitiveness, particularly as regards the Energy Union. Those objectives must be easily measurable and appropriate in terms of helping to achieve the objectives of the other dimensions of the Integrated National Energy and Climate Plan.

Research fields

Innovation in the field of storage will mainly involve flexibility, renewable energy sources and energy efficiency. It will generally consist of minor improvements in, or further development of, existing technologies, processes and commercial models. In a number of cases, more radical ('disruptive') innovations will be needed. The key challenge will be to intelligently combine and integrate a range of innovations.

In addition to technological innovation, social innovation should also be encouraged. Changes in habits and culture can have a major impact, such as more grouped housing instead of separate housing, urbanisation, fewer car purchases and a transition to more sustainable consumer goods.

Social partners have identified the following research priorities:

- **Greening and storage of gas**

Power-to-gas technology results in synergies between the electricity and gas systems, and offers an effective solution for seasonal electricity storage.

However, a cost-benefit analysis of such technology is needed in the light of other renewable energy sources and energy efficiency.

The production and deployment of these forms of renewable energy should be encouraged, in particular through a guarantee of origin, such as 'green gas', which can then be converted into guarantees of origin for electricity or green heat, depending on how the green gas is used.

- **Training to support the energy transition**

A register of 'at-risk jobs' in all sectors will be created as part of the transition to a low-carbon economy and will be analysed in the context of training and retraining needs:

- in sectors involving energy generation and, in particular, the decommissioning of nuclear power plants;
- in the transport sector and, more specifically, in the area of vehicle electrification;
- in the construction sector, in particular as regards the promotion of cross-cutting professional qualifications in the field of the energy renovation of buildings;
- in sectors involving the use of intelligent networks and the intelligent management of networks;
- in the processing sectors.

- **Impact of the transition on state finances**

The impact of the transition to a low-carbon economy on policy funding and any measures to be adopted will be analysed, and more specifically:

- the impact of vehicle consumption and local energy businesses on the funding of system costs and social and environmental measures (due to the reduction in the quantity of kWh consumed in the conventional system);
- the impact of the reduction in petrol and diesel consumption on public revenue due to the development of clean vehicles.

It is important to ensure diversification of the funding base and consistency between financial instruments, because the energy transition will go beyond electricity and the reduction of energy consumption will erode funding based on kWh.

Technological innovations

See the Energy Pact. However, such innovations are mainly the responsibility of the Regions.

Potential federal responsibilities are as follows (which may or may not be shared with the Regions):

- circular economy;
- new, more efficient and large-scale methods of renewable energy generation, such as wind energy, wave energy, tidal energy, etc.;
- efficient storage technologies;
- use of renewable energy in transport: more sustainable biofuels (algae- or waste-based), sustainable biogas- or biofuel-based maritime and air transport, third-generation biofuels;
- power-to-X.

Flemish Region

Introduction

The energy transition coupled with a future-oriented climate change policy offers opportunities and requires technological and social innovations in every sector. In this respect, Flanders aims to be a pioneer in the area of research and innovation.

By supporting basic and strategic scientific research, Flanders wants to ensure a high level of knowledge in and for our society, forming a solid basis for developing long-term solutions to the major challenges facing society. The research and innovation policy will also focus on supporting new and existing economic activities developed in response to the energy and climate challenges, and on helping to maintain and reinforce a local manufacturing industry that can position itself within sustainable value chains at European and international level. Lastly, the research and innovation policy will be targeted at helping to achieve the Flemish energy and climate objectives, by supporting the necessary social and economic transitions.

Flanders has many assets, including a high level of education and broad scientific and technological expertise within universities, knowledge institutions and businesses, both multinationals and SMEs. The Flemish innovation policy will be targeted in terms of offering businesses and knowledge institutions the opportunity to develop their innovations and bring them to market. Cross-sectoral cooperation is fundamentally important in this respect. Small-scale demonstration projects in low-traffic areas will be facilitated with a view to developing them further. In addition to technological innovation, sufficient attention will be paid to social innovation, for example through new forms of investment (energy cooperatives, ESCOs, crowdfunding, etc.). The climate and energy transition is therefore a major opportunity for Flanders to position itself as a top region for research and innovation in all sectors of our society.

The current research and innovation policy supports the Vision 2050 priorities in a number of ways. This vision document from 2016 arranges the strategic vision of the Flemish Government into seven transitions, including the energy transition, which is closely linked to a future-oriented climate change policy. Other transitions that are also closely linked involve the built environment ('Slim Wonen en Leven' (Smart Living and Life) transition), transport (mobility transition) and industry (circular economy transition and industry 4.0 transition). For all these societal challenges, the research and innovation instruments of the Flemish financing agencies FWO and VLAIO can be broadly deployed. There is also structural financing available for the Strategic Research Centres (VITO, IMEC and Flanders Make), which can all help in their own way to develop technologies for the energy transition and climate policy through their strategic research programmes.

The current cluster policy provides thematic support for networking in Flanders by funding 6 pilot clusters and 20 innovative business networks, some of which are focusing on the innovative solutions and technological breakthroughs needed to achieve the energy transition and climate policy. Since the summer of 2017, there has

also been an open call for cluster projects that fit with the goals of the energy transition, circular economy and industry 4.0 priorities of Vision 2050.

Moonshot was also launched in 2019, as the spearhead for innovation in Flemish energy and climate policy. Its aim is to identify and support research and innovation for a low-CO₂ industry by 2050. In terms of innovation, the Catalisti and Flux50 spearhead clusters will give real substance to the Flemish Moonshot, together with other spearheads.

European and international cooperation is a constant priority in Flemish research and innovation policy. The energy and climate challenges that we are facing are global challenges that require an overarching European and international approach, especially as regards research and innovation. Only by strengthening European and international cooperation in the area of research and innovation will we be able to speed up the development of cutting-edge technologies. Strategic coordination of Flemish research and innovation policy with European and international developments is therefore essential. In this context, Flanders fully supports the strategy and objectives of the European Strategic Energy Technology Plan (SET Plan), which is acknowledged throughout Europe as the research and innovation pillar for achieving the goals of the Energy Union. Flanders is currently using its scientific and technological strengths to participate in a number of joint European projects co-financed by Europe (European ERA-NET Cofund scheme) in order to achieve the common objectives of the SET Plan.

Policies

Boosting research and development in the area of energy and climate

We are aiming for a balanced research and innovation policy that covers both long-term non-specific scientific research and more targeted basic and strategic research in order to develop and roll out innovations. Through strategic and innovative scientific research, Flanders wants to ensure a high level of knowledge in and for our society, forming a solid basis for developing long-term solutions to the major challenges facing society. The research and innovation policy will also focus on supporting new and existing economic activities developed in response to the energy and climate challenges, and on helping to maintain and reinforce a local manufacturing industry that can position itself within sustainable value chains at European and international level. Lastly, the research and innovation policy will aim to support the social and economic transitions needed to achieve the Flemish energy and climate objectives.

Encouraging research and development (R&D) in the area of energy and climate through the regular R&D instruments

The regular instruments of the Research Foundation Flanders (FWO) and the Flemish Agency for Innovation and Entrepreneurship (VLAIO) fund research and development in all research areas, including energy and climate.

The FWO funds basic and strategic scientific research carried out in all scientific areas by universities and research centres in the Flemish community. It also encourages cooperation between Flemish universities and other research institutions. The FWO funds both excellent research projects and promising researchers following an inter-university competition and an assessment by foreign and domestic experts.

As the contact point for businesses in Flanders, the VLAIO encourages and supports innovation and entrepreneurship and helps to develop a favourable economic climate. In the area of research and innovation, it grants subsidies for research and development projects. The VLAIO also supports development projects in the later stages of the innovation process (pilot phase). Furthermore, it provides support through advice, training and encouragement of coordination and networking. VLAIO subsidies are granted to projects in all research and innovation areas, including energy and climate, following an assessment based on the innovativeness and added economic value for Flanders.

Further to the request made by the Flemish Parliament in its climate resolution, the budgets for innovation will be increased and a climate- and energy-friendly industry policy will be promoted.

Public funding of research and innovation projects in the area of energy and climate will start to be monitored in 2020 (reference measure).

Priority areas:

- Increasing Flemish R&D involvement in the SET Plan and the International Energy Agency (IEA)

An international dimension is essential for research and innovation policy in Flanders. The themes of energy and climate are global challenges that require a global approach, especially in the area of research and innovation. Only through a joint commitment and stronger European and international cooperation in the area of research and innovation will we be able to speed up the development of innovative technologies.

Flanders will continue its efforts to support the strategic objectives of the European Strategic Energy Technology Plan (SET Plan), which aims to expedite the development and market roll-out of low-carbon technologies. As a result of its scientific and technological strengths, Flanders has helped to define the key R&I actions and strategic objectives of the SET Plan, allowing it to take an active role in their implementation through European, national and/or regional funding instruments. Flanders is currently active within the following working groups for implementing the SET Plan (IWGs): Photovoltaics, Energy systems, Energy efficiency in buildings, Energy efficiency in industry, and Batteries. The overarching strategy of the SET Plan is helping to define the outlines of the European funding programmes for research and development (Horizon 2020 and Horizon Europe, and the 9th EU Framework Programme for Research and development). Flanders is therefore reinforcing its position (in terms of both the Flemish research community and businesses) in these programmes. As a result, Flemish and Belgian research communities have joined forces within the Belgian Energy Research Alliance (BERA) in order to improve cooperation on research and streamline all the research efforts in the area of low-CO₂ technologies in Belgium. BERA is involved in this respect in the EERA (European Energy Research Alliance) and the research pillar of the SET Plan, which has the same objective at European level. Flanders is also participating in the European ERA-NET Cofund actions (joint European R&D calls for proposals and projects with European co-financing). Furthermore, Flanders is currently participating in a range of ERA-Net Cofund projects linked to the SET Plan, such as SOLAR-ERA.NET Cofund, ERA-NET Smart Grids Plus and RegSYS ERA-NET (integrated regional smart energy systems).

As regards clusters, a European and international dimension is an important part of their competitiveness programme. European and international strategic research cooperation is after all crucial for further developing our know-how and expertise and for speeding up the market roll-out of energy solutions. Clusters will therefore play a vital role in highlighting the Flemish energy industry on the global stage. Through the International Energy Agency (IEA), Flanders is participating in various Technology Collaboration Programmes that are strategically important for Flanders.

- Helping to digitise the energy system

Over the next few decades, digital technologies will make our energy system more connected, intelligent, efficient, reliable and sustainable. Digitised energy systems will be able to identify those customers needing energy and supply this at the right time, in the right place and at the lowest possible cost. However, digitisation will also pose new challenges: new risks to security and privacy, a significant annual increase in the energy consumption of computers, servers, data centres, etc. The main advantage of digitisation lies in its capacity to remove barriers between traditional sectors, increase flexibility and facilitate integration between systems. The electricity sector is at the heart of this transformation, because digitisation reinforces the link between generation and consumption and creates interdependent opportunities: smart response to demand, integration of variable renewable energy sources, use of domestic batteries and smart charging of electric vehicles, and emergence of small-scale electricity sources, whether or not coupled within a micro-network.

Digitisation and the energy transition are inevitable and will begin in Flanders with the introduction of smart meters from 2019. Elia has therefore launched one of the first European pilot projects for blockchains in the energy sector. It is vital that everyone in Flanders (citizens, businesses, etc.) reaps the fruit of this digitisation. User participation in the energy system will be facilitated by digital tools, ranging from participatory geographical systems to web portals and social networks, the Internet of Things (IoT), the Industrial Internet of Things (IIoT),

megadata, blockchains, digital twin technologies, etc. Close attention will be paid to these aspects, both in terms of the existing Flemish innovation instruments and Flemish cluster policy (including FLUX50) and in terms of the European instruments (Horizon Europe, SET Plan, etc.).

Structural financing of strategic research through the Strategic Research Centres

The Strategic Research Centres receive an annual subsidy to carry out basic strategic research in their particular area. Through its structural financing of the SOC VITO, the Flemish Government demonstrates the importance that it places on a research centre focusing on sustainable development and innovation in clean technology. IMEC (photovoltaic technology, research into batteries and ICTs with specific applications for the energy transition and smart cities) and Flanders Make (energy efficient process technologies and products) are also helping to develop technologies and innovate in terms of the energy transition and climate policy. Energyville is a collaborative research project between the Catholic University of Leuven, VITO, IMEC and Hasselt University in the area of renewable energy and intelligent energy systems, particularly for towns and cities.

Cluster policy

The Flemish cluster policy is an important lever for reinforcing the position of Flemish businesses on the regional and international markets. It is one of the components of economic policy and innovation policy, and therefore supplements the normal range of R&D support instruments for (individual) businesses.

Recent cluster policy has led to the creation of several innovative business networks (IBNs) and pilot clusters, which, through cross-sectoral cooperation, will focus on developing innovative breakthrough technologies, services and processes connected with socially important themes that have economic added value for Flemish businesses, in particular the social challenge of the energy transition coupled with a climate-proof society. The spearhead clusters and innovative business networks are benefiting from organisational support. In addition, funds reserved for cluster projects have been released for spearhead clusters. Since the summer of 2017, there has also been an open call for cluster projects that fit with the goals of the energy transition, circular economy and industry 4.0 priorities of Vision 2050.

This policy, including the calls for transition priorities, will continue during the planning period, with further reinforcement to support the transition of Flemish industry to a low-CO₂ circular carbon industry.

The current cluster policy supports 6 main clusters and 20 innovative business networks, which are focusing on the innovative solutions and technological breakthroughs needed to achieve the energy transition and which will contribute to a climate-proof society in Flanders. The pilot clusters include Flux50, Catalisti and Blauwe Cluster, while the innovative business networks include Power to Gas, Groen Licht, Offshore Energy and Smart Buildings in Use. The two Smart-Cities-Vlaanderen IoT4Society and IoT Valuechain IBNs are active in the area of smart cities.

Flux50 facilitates cross-sectoral cooperation between the energy, ICT and building sectors with a view to developing innovative, multidisciplinary energy products and services in five innovation areas (energy ports, microgrids, multi-energy systems at district level, energy cloud applications and intelligent renovation). Catalisti, the spearhead cluster for chemicals and plastics, is aiming to boost the competitiveness of the chemical and plastic sectors through innovation, particularly innovation in terms of sustainable products and processes. The Blauwe Cluster is focusing on a strategy for a competitive and sustainable blue economy in Flanders. The Power to Gas IBN is focusing on building and exchanging knowledge, developing business models and conducting demonstration projects in the power-to-gas sector. The Groen Licht IBN is focusing on building and developing knowledge with a view to designing innovative products and services in the lighting sector. The Offshore Energy IBN is focusing on research and development with a view to developing and building a strong and innovative offshore energy value chain (offshore wind, wave and tidal energy) in Flanders. The Smart Buildings in Use IBN is focusing on digitising building management and maintenance. The two Smart-Cities-Vlaanderen IoT4Society

and IoT Valuechain IBNs firstly represent their target group of businesses in the Flemish ecosystem of smart cities and, secondly, aim to inspire Flemish businesses through various smart cities initiatives.

The spearhead clusters have been allocated a specific annual project budget that they can use to subsidise innovation projects that fit with their objectives and roadmaps. The Flux50, Blauwe Cluster and Catalisti spearhead clusters are mainly or wholly using these budgets to achieve the objectives of the energy transition and climate policy. The other spearhead clusters (Flanders' FOOD, VIL, SIM) are generally using a smaller part of their project budget for this purpose. SIM, the Strategic Initiative Materials research centre in Flanders, which is focusing on material innovations to meet the current and future challenges facing society, is a vital promotional tool within the innovation landscape. It is developing knowledge and know-how with regard to material innovations that can be used by other clusters.

Each spearhead cluster is allocated an annual budget of at least EUR 8 million. In 2018 subsidies of EUR 45.5 million were granted. Furthermore, an annual budget of around EUR 20 million is available for inter-cluster projects and transition priorities.

Under their cluster pact and support agreement, the spearhead clusters produce an annual progress report in which they report on their projects and activities approved within and outside their allocated budget. The support agreement of each cluster identifies specific indicators at both cluster level (e.g. the total number of international cooperation and collaboration projects) and at activity level or for each innovation area (specific projects and/or activities in each area of action). As a result, the Flux50 spearhead cluster uses specific indicators for projects in the five innovation areas of energy ports, microgrids, multi-energy systems at district level, energy cloud applications and intelligent renovation.

Research and innovation in order to transition Flemish industry to a low-CO₂ circular carbon industry by 2050

Framework for transitioning to a low-CO₂ industry

Industry has a key role to play in the energy and climate transition. In order to fully switch to a low-CO₂ industry, a major industrial transition is needed over the coming decades, not just in Flanders but throughout the entire world. An important prerequisite in this respect is that the planned change cannot affect the competitiveness of Flemish energy-intensive industry, given that this would result in production capacity moving to other regions around the globe, where the energy and climate transition is less of a priority. Finding a fundamental solution to this unprecedented social, energy and climate challenge therefore requires ambitious, intensive and broadly supported efforts. It is clear that – due to their significant impact – the refining, chemical and steel sectors (in cooperation with the research world and public authorities) will play a key role in this context. New technologies and raw materials, and new products and production processes will be needed for this purpose.

The year 2019 therefore saw the launch of the Flemish Moonshot programme, known as 'Vlaanderen CO₂-neutraal/Flandre neutre en CO₂' (CO₂-neutral Flanders). As the spearhead for innovation in Flemish energy and climate policy, its aim is to transition Flemish industry to a low-CO₂ circular carbon industry by 2050. The innovative research carried out as part of this Moonshot is specifically intended to help develop cutting-edge technologies in Flanders by 2040 so that new and more efficient processes can be used to make new and unique low-CO₂ products. These two aspects (processes and products) could in the future make a substantial contribution to the reduction in CO₂ emissions in Flanders and around the world. This initiative is aiming to build knowledge in the longer term and will involve a budget of EUR 20 million per year.

The Moonshot programme involves four fundamental and closely linked research pathways: (1) biology-based chemistry leading to unique and high-quality products; (2) carbon circularity in materials; (3) electrification and radical transformation of processes, and (4) energy innovation. These four research pathways are supported by, and can rely on, five enablers with regard to which cutting-edge expertise is available in Flanders, namely: (1) conversion technology; (2) separation technology; (3) predictive technology; (4) energy storage, and (5) energy transport.

In 2019 a multidisciplinary consortium (which was active for 10 months) began a contextualised analysis of the transition potential of Flemish industry, by identifying promising and pioneering pathways, opportunities for the Flemish research world in the context of this industrial transition, and other aspects, in order to support and guide the Flemish Moonshot.

More actively encouraging the demonstration of low-CO₂ technologies

Extension of the aid pathway within the usual instruments (demonstration, pilot project, test)

Demonstration projects are a crucial step in the innovation chain and are vital for facilitating the roll-out of low-CO₂ technologies in society. The aid pathway within the usual R&D instruments of the VLAIO has therefore already been extended to support demonstration and pilot projects. A crucial aspect in this regard is that the extension of the aid pathway (i.e. demonstration, pilot project, test) fits in sufficiently with the business reality and involves a sufficiently favourable regulatory framework allowing markets to develop based on these new applications.

In accordance with the new government agreement 2019-2024, Flanders will continue to invest in supporting higher Technology Readiness Levels (TRLs) by assisting pilot and demonstration plants.

ERDF/Interreg programme

During the previous period 2014-2020, Flanders supported R&D in the area of energy and climate through the ERDF/Interreg programme (2014-2020), in particular priority axis 1 ‘Strengthening research, technological development and innovation’, priority axis 3 ‘Supporting the transition to a low-carbon economy’ and priority axis 4 ‘Supporting sustainable urban development’.

The ERDF/Interreg framework also supports demonstration projects in the area of energy and climate, including the required infrastructure. During the 2014-2020 programming period, the Energyville initiative and the Interreg Hydrogen Region 2.0 project were supported in particular.

To improve efficiency and effectiveness, ERDF resources are used in Flanders in eight priority areas of the Flemish intelligent specialisation strategy, including the construction-environment-energy area.

The ERDF Flanders programme for the next programming period 2021-2027 is currently being prepared. The draft regulation on the European Regional Development Fund and on the Cohesion Fund provides for the thematic concentration of support for Member States with a gross national income ratio equal to or above 100% of the EU average, which includes Belgium. Thematic clusters will be used, with the strategic objectives of ‘A smarter Europe’ and ‘A greener Europe’.

The objective of ‘A greener Europe’ is described by the EU as ‘A greener, low-carbon Europe by promoting clean and fair energy transition, green and blue investment, the circular economy, climate adaptation and risk prevention and management’. As in the period 2014-2020, the programme will be based around specific objectives. The ERDF managing authority will imminently start the process of developing and confirming the ERDF 2021-2027 programme with the interdepartmental working groups. The content will be confirmed during 2020.

Resources will be allocated to the ERDF Flanders programme only once agreement has been reached at European level on the multiannual financial framework (MFF), which is the EU’s long-term budget.

Optimal use of the Innovation Fund of the Emissions Trading System

The Innovation Fund of the Emissions Trading System, which will offer European aid for the demonstration of innovative low-CO₂ technologies, will become one of the main sources of funding for innovative investments in the industrial and energy sectors. It is estimated that, over the period 2021-2030, EUR 10 billion from the auctioning of at least EUR 450 million allowances will be made available at EU level.

Flanders has an ambition to channel at least 2% of the fund towards Flemish energy-intensive industry and the innovative energy sector over the period 2021-2030. This represents EUR 200 million of European aid that could mobilise over EUR 300 million of innovative investment in Flanders over this period.

The Department of the Environment and Spatial Planning (DOMG), the Flemish Energy Agency (VEA), the Flemish Agency for Innovation and Entrepreneurship (VLAIO) and the Department of the Economy, Science and Innovation (DEWI) are working together to actively inform Flemish stakeholders and potential project owners about the Innovation Fund of the Emissions Trading System. The opinions of Flemish stakeholders will also be taken into account when the terms of the fund are decided at European level.

From 2020, businesses or business consortia with large-scale investment projects that could apply for aid from the Innovation Fund will be supported by the Flemish Government through cross-cutting project teams who will provide priority support and cooperation in the preparation of project proposals.

Speeding up the roll-out of innovative low-CO₂ technologies in Flanders

Economic investment aid: environmental incentive, strategic environmental aid, subsidy for investment in safe and environmentally friendly goods transport

Ecologiepremie Plus

Through the Ecologiepremie+ environmental incentive, Flanders grants investment aid to businesses wanting to make environmental investments in the Flemish Region through advanced environmental technologies included in a restricted list of technologies. In this way, Flanders aims to encourage businesses to organise their production processes in an environmentally friendly and energy saving manner. The aid consists of funding for the additional investment costs involved in this type of investment.

Under the Ecologiepremie+ measure, 361 aid applications were therefore approved in 2018, with the aid totalling EUR 19,281,572.53 and the investment totalling EUR 90,775,097.92.

Strategic environmental aid

With the strategic environmental aid, the Flemish Government's intention is to encourage SMEs and large businesses to invest in environmental technologies that, due to being unique to the business in question, cannot be standardised and are not therefore included in the restricted list of technologies under the conventional Ecologiepremie+. This involves larger-scale investment projects that are specific to one business.

In 2018, five aid applications were approved, with the aid totalling EUR 10,355,690 and the investment totalling EUR 178,123,075.

Subsidy for investment in safe and environmentally friendly goods transport by road

With this subsidy, the Flemish Government's intention is to encourage businesses and the transport sector in particular to use safe and environmentally friendly lorries.

In 2018, 1,865 aid applications were approved and paid from the 2018 budget, with the subsidy totalling EUR 20,968,351.10. In addition, 31 aid applications approved in 2017 were also paid from the 2018 budget (due to the 2017 budget having been exceeded), with the subsidy totalling EUR 404,939.69.

Investment aid for green heat

Every year the Flemish Government launches a call for green heat, through which a subsidy is granted for investments in green heat, residual heat, district heating systems or biomethane injection. The costs taken into account are the additional investment costs of the installation compared with the investment costs of a reference installation, ignoring operating costs and benefits. During the next planning period 2021-2030, the focus will continue to be on district heating systems that facilitate the use of renewable heat or residual heat.

Assistance for cities, towns and municipalities in order to support the transition to smart and sustainable cities in Flanders

Throughout Europe, cities, towns and municipalities are already working on smart and sustainable projects, often in cooperation with businesses and academic institutions. In order to impact people's quality of life in cities, towns and municipalities, such projects must be effectively implemented on a large scale.

Various initiatives have been launched for this purpose, which will continue during the 2021-2030 planning period.

In 2019 a fact-finding mission began with the aim of assessing the Flemish landscape and creating and promoting a Smart City ecosystem. Lastly, in the context of Smart Cities, three innovative business networks are currently active.

Funding of the Société de participation pour la Flandre

The Société de participation pour la Flandre (PMV) supports Flemish businesses through guarantees, subordinated loans and capital investments. A budget of EUR 20 million has been reserved for capital investments in energy efficiency, with stakes ranging up to 50%. PMV is therefore supporting the Flemish economy to achieve the Flemish, Belgian and European energy and climate objectives.

Conclusion of Green Deals

Green Deals are already being successfully used as an innovative way of establishing voluntary cooperation between businesses, civil society and public authorities. During the planning period, we aim to entrench and expand their use in order to bring about energy and climate innovation. We will therefore make targeted use of support instruments in the policy area of the economy to help complete deals. In this way, we will help Flemish businesses to achieve their ambitions and strategies for the future and become innovative pioneers.

Low-regulation framework to encourage innovation

With the 'Groene innovatie ruimte' (Green Innovation Space) project, we aim to encourage the economy to become greener by using a low-regulation framework to temporarily restrict regulations that hinder innovation, which will therefore promote innovation. This project aims to go beyond the conventional thematic testing ground and offer opportunities to conduct pilot tests in a real-life housing situation. It is targeted at both businesses and knowledge institutions, and all forms of innovation are permitted provided that they help to green the economy, including energy and climate innovations.

On 5 April 2019 the Flemish Government approved the amendment to the Energy Decree that concerns the approval of low-regulation energy zones.

Dissemination of knowledge and provision of accessible services to raise business awareness of the energy and climate transition

The dissemination of existing technology and knowledge is clearly crucial to encourage their use. The VLAIO and its partners therefore provide accessible services (awareness-raising, education, information, advice and networking) to reach the largest possible group of businesses and galvanise them into action with a view to achieving the objectives of the energy and climate policy. Higher education establishments already play an important role in enabling businesses to discover existing technologies; this role will be further developed so that knowledge arising from environmental and other education can be passed on to businesses. Other initiatives to disseminate knowledge from higher education establishments may also be adopted.

Enterprise contracts offer resources to a series of structural partners so that they can provide accessible information, advice and assistance, in addition to the traditional assistance provided with business start-up and growth. As part of the energy transition, climate policy, circular economy and industry 4.0, these partners agree to make businesses aware of the challenges that they face and how they can be incorporated in their business operations. Some of these partners already have useful measures in place in this context, for example the Voka sustainable business charters in cooperation with the economic development agencies of the provinces.

Support for the transition to products with lower net carbon emissions

Products with lower net carbon emissions face various obstacles in their production and marketing:

- cheaper identical products with higher net carbon emissions (e.g. grey hydrogen, ethanol, plastic);
- regulations and standards that do not take account of new technologies, meaning that new products are non-compliant (e.g. use of CO₂ in construction materials);
- European or local regulations that hinder innovation (e.g. CCU and waste in the EU ETS).

Over the planning period and in cooperation with businesses, these barriers will be identified along with possible solutions and the systems that can be used to facilitate the marketing of such products.

Flemish opportunities with regard to CCU/CCS and hydrogen

The presence in Flanders of the largest integrated petrochemical cluster in Europe means that significant CO₂ emissions are concentrated in a relatively small area. Flanders is therefore an ideal region for developing new cooperation and integrating innovative systems allowing tens of millions of tonnes of CO₂ to be offset, collected or sequestered, or transformed into useful products. We will study the possibility of new infrastructure for this purpose, which could be used by both ETS and non-ETS businesses.

Our excellent logistical situation in terms of ports and pipelines offers opportunities to develop hydrogen as a low-carbon energy carrier. This could be widely used, both directly and to recycle CO₂ into useful molecules (e.g. power-to-methanol).

In addition to continued support for the Moonshot programme (CO₂-neutral Flanders), Flanders undertakes to support CCS networks and CCU installations. It also harbours the ambition to become a European leader in Hydrogen technology. In addition to using Flemish research and innovation channels and the ERDF-Interreg framework, Flanders also intends to maximise European opportunities and resources (such as the Innovation Fund of the Emissions Trading System).

In this context, Flanders also intends to adopt a strategic approach to Important Projects of Common European Interest (IPCEIs). The IPCEI framework identifies strategic value chains in Europe and for Europe, in which major investments must be made by Member States and regions. These strategic value chains include 'Hydrogen technologies and systems' and 'Low-carbon industry'.

Furthermore, Flanders intends to support large-scale investment projects of businesses with cross-cutting project teams, which will benefit from priority support and cooperation from the entire Flemish Government.

Establishment of a Flemish carbon market for negative emissions, particularly within the LULUCF framework

This measure is described in the LULUCF chapter, but is mentioned here as well because it needs to be further studied.

Monitoring and encouraging the competitiveness of the Flemish economy in the context of the energy and climate transition

We will monitor the impact of energy and climate regulations on the competitiveness of the Flemish economy, particularly Flemish energy-intensive industry.

Flanders also intends to use the cluster policy to increase the competitiveness of Flemish businesses in the global low-carbon value chains, and the trilateral strategy for the chemical industry to maintain and reinforce a competitive chemical industry in the transition to a sustainable world economy.

Lastly, it will monitor the competitive strengths of the Flemish technology sector in the European and international sustainable and low-carbon value chains through and in cooperation with the spearhead clusters and sectoral federations.

Energy Standard

Through a 2018 decree, Flanders introduced the principle of an ‘Energy Standard’, which is a concept that is also being developed at federal level. This standard will assess the competitive obstacles in terms of energy prices and their components, and must ensure that the various components of energy prices in Belgium, and therefore also in Flanders, are no higher than those in neighbouring countries. The standard is intended to help monitor the competitiveness of businesses, particularly energy-intensive businesses. Effects on other consumers will also be monitored.

Cluster policy

The Flemish cluster policy is an important lever for reinforcing the position of Flemish businesses on the regional and international markets, by releasing unexploited economic potential and by increasing the competitiveness of Flemish businesses through active and sustainable cooperation between operators. Increasing competitiveness is defined as ensuring a stronger position on the regional and international markets for Flemish businesses. Clusters that offer direct economic added value for Flemish businesses can also help to overcome societal challenges, such as the energy and climate transition. There are two types of cluster: a limited number of spearhead clusters in strategic areas for Flanders (which form the centre of gravity of the cluster policy), and a series of innovative business networks (which are more limited cluster initiatives with promising potential, where a model for active cooperation between businesses is vital in order to become more competitive). In the context of the energy and climate transition, the spearhead clusters include Flux50, Catalisti and Blauwe Cluster, while the innovative business networks (IBNs) include Power to Gas, Groen Licht, Offshore Energy, Smart Buildings in Use and the two IBNs active in the area of smart cities.

Depending on the cluster, competitiveness can be increased through a combination of different strategies (creation of access to new markets, accelerated marketing of solutions and/or new knowledge, development of worker skills, creation of new value chains, etc.), which must ultimately result in a sustainable increase in competitiveness and in sustainable economic added value for Flanders (e.g. through investment, job creation, increased exports, higher turnover, cost reduction, etc.).

Under their cluster pact and support agreement, the spearhead clusters produce an annual progress report in which they report on their projects and activities approved within and outside their allocated budget. The competitiveness aspect of spearhead clusters is monitored through ‘additional jobs’, ‘additional turnover for Flemish businesses’ and ‘additional investment in infrastructure’ impact indicators.

Trilateral chemical cooperation between Flanders, the Netherlands and North Rhine-Westphalia

The European chemical industry, particularly the chemical industry in the trilateral region, is facing a number of major challenges in a global market that is rapidly changing and increasingly competitive. The three regions of Flanders, the Netherlands and North Rhine-Westphalia have joined forces to develop a common vision and strategy for 2030. Based on their vision entitled ‘Striving to become the world’s engine for the transition towards a sustainable and competitive chemical industry cluster’, a trilateral strategy has been developed through a partnership between industry, universities and authorities. The strategy identifies 21 measures in three vertical policy fields (Research & Innovation; Energy & Feedstocks; Trilateral Chemical Infrastructure) and one horizontal policy field (Policy Coordination).

https://www.ewi-vlaanderen.be/sites/default/files/bestanden/trilateral_strategy_chemical_industry.pdf

Promoting the export of Flemish greening technology

Following the new government agreement, Flanders will also focus on exporting Flemish greening technology, which will help to build a sustainable economy in Flanders and reduce global CO₂ emissions.

In this context and in collaboration with the relevant sectors, Flanders Investment & Trade (FIT) will develop a strategy for exporting technological solutions that can help to tackle the climate challenge. Cooperation between the VLAIO and the FIT will also be reinforced through a protocol.

Walloon Region

Our development model and the type of society that we want for future generations must dictate our current strategic choices. For that reason, five priority themes have been defined at European level in order to focus our investment in research, namely sustainable development, renewable energy, technology research, ageing and quality of life, and health.

These strategic themes respond to clearly identified societal challenges and correspond to emerging economic areas with significant innovation potential. The competitiveness clusters developed since 2005 in Wallonia have brought together the region's labour forces to work on these themes: BIOWIN (for life sciences), SKYWIN (for aeronautics and space), WAGRALIM (for the agro-industries), LOGISTICS EN WALLONIE (for logistics), MECATECH (for mechanical engineering) and GREENWIN (for environmental technologies). They rely not only on the existing Walloon industrial fabric, but also on expertise and knowledge in terms of technology, research and innovation in order to ensure the economic redeployment of Wallonia by creating new activities responding to the challenges facing society. These competitiveness clusters are based on a partnership between universities, research centres and businesses of all sizes. Concentrating research efforts is also helping to internationalise Walloon stakeholders through their participation in joint research programmes (Horizon 2020, ERA-NET, EUREKA, etc.) or research infrastructures (ESFRI).

In particular, thematic clusters have also been established in the area of renewable energy and energy efficiency, which have brought together researchers so that energy research projects can be developed. These are the 'TWEED' cluster for renewable energy and the 'Cap Construction' and 'Eco-Construction' clusters for sustainable construction and eco-construction of buildings. Furthermore, the GREENWIN competitiveness cluster aims to develop innovation in green chemistry and sustainable materials (including their applications in zero-energy or nearly zero-energy buildings).

Wallonia is supporting the industrial use of innovation results by participating in the Important Projects of Common European Interest (IPCEIs) on batteries and hydrogen. The IPCEIs enable Member States to support this industrial use beyond the limits imposed on State aid.

Furthermore, the Walloon research and innovation budget is mainly managed by the Walloon Public Service for the Economy, Jobs and Research. Every year, a survey of projects is carried out in order to report to the International Energy Agency; a specific methodology and allocation key are used for complex projects or those indirectly linked to energy.

In the most recent report from 2017, the budgets for energy research were allocated as follows:

Wallonia			
GDP 2015	€95,100,000,000		
Walloon public budget for research average 2012-2018	€321,000,000		
Walloon private budget for research	€2,000,000,000		
Walloon public/private budget for research	€2,321,000,000		2.44% of GDP

Walloon public budget for energy research average 2012-2017	€44,451,000	13.85% of the Walloon public budget for research	
budget received from Europe (Structural Funds) for energy research average 2012-2017	€1,900,000		
budget received from Europe (Horizon 2020) for energy research average 2014-2019	€2,000,000		
Walloon private budget for energy research	€200,000,000		
Walloon-Europe public/private budget for energy research	€248,351,000	0.26% of GDP	
Walloon public budget for climate and environment research average 2012-2017	not available		
budget received from Europe (Structural Funds) for climate and environment research average 2012-2017	not available		
budget received from Europe (Horizon 2020) for climate and environment research average 2014-2019	€1,400,000		
Walloon private budget for climate and environment research	not available		

It should also be noted that, within the budget of EUR 110 million:

- in addition to the energy budget, a budget is allocated for climate and environment research (a small part of the budget may therefore also depend on DG03, for example);
- it is planned to further access European funds to 2030 in order to minimise the impact on the Walloon budget.

Furthermore, according to the Regional Policy Statement, the government plans to: ‘increase the public funds invested in support for innovation, achieve the European target of 3% of GDP invested in research and development, and increase this European target to 4% by 2035 and 5% by 2050, with one-third coming from public funds’. A general effort will be made, including in energy research.

ii. Where applicable, cooperation with other Member States in this area, including, where appropriate, information on how the SET-Plan objectives and policies are being translated to a national context

Flemish Region

See point 3.5(i).

Walloon Region

(a) Description of how SET Plan targets were taken into account when setting national objectives and identifying national energy R&I strategy

Energy research is carried out through calls for proposals or through assistance from information points, with the themes coinciding with the SET Plan priorities and the capacity of the Walloon scientific and industrial community (see intelligent specialisation strategy).

The work carried out in the context of the SET Plan to define the key actions, implementation plans and R&I roadmaps is used to guide the Walloon R&I priorities, taking into account the technological skills of our industry and the scientific skills of our research community.

The Walloon intelligent specialisation strategy is currently being revised. A study has been carried out to cross-reference the Walloon strengths with the European research priorities. The competitiveness clusters have been involved in this work, with businesses having been consulted and now being involved in implementing the priorities.

The following energy, climate and mobility priorities have been identified:

- smart/integrated communities, including positive energy districts;
- integration of storage systems;
- energy efficiency of buildings;
- new fuels (including electricity) and sustainable vehicles;
- CO₂ management and reuse in production processes;
- climate projections, predictions and models, and new associated services;
- traffic and system management;
- rail technologies.

These priorities will be implemented to support the NECP, in synergy with the corresponding implementation plans of the SET Plan priorities.

Under the branch agreements (see point 3.2.7 ‘Non-ETS industry’), industries are required to reduce their energy consumption and CO₂ emissions. Implementing the strategic priority ‘CO₂ management and reuse in production processes’ and participating in Action 6 ‘Energy efficiency in industry’ of the SET Plan will encourage industries to invest in research and innovation in this respect.

The strategic priority ‘Energy efficiency of buildings’ will be implemented in synergy with Action 5 ‘Energy efficiency solutions for buildings’ of the SET Plan to support the ‘Long-term building renovation strategy’ (see point 3.2.2).

The strategic priority ‘Smart/integrated communities’ includes positive energy districts, self-sufficient ‘renewable energy’ communities, connected mobility systems and services, and digitisation to improve the flexibility of energy systems, consumption/production management (buildings, mobility, public services and spaces, highways, etc.) and energy storage. This priority will be implemented in synergy with Action 3.2 ‘Positive energy districts’, Action 4 ‘Energy system’ and Action 3.1 ‘Energy consumers’ of the SET Plan. It will support point 3.2.5 ‘Change behaviour to reduce energy consumption in residential buildings’, in particular the ‘Remove barriers’ measure, point 3.2.6 ‘Energy self-sufficiency of new buildings’, point 3.3 ‘Internal energy market’, and point 3.3.1 ‘Adequacy of the electricity system and increase in local flexibility of the energy system to particularly maximise the capacity to accommodate RES’.

The strategic priority ‘Integration of storage systems’, including batteries, will also be implemented to support the internal energy market.

The strategic priorities ‘New fuels (including electricity) and sustainable vehicles’, ‘Traffic and system management’ and ‘Rail technologies’ will support point 3.1.1 ‘Greenhouse gas emissions’, subparagraph ii ‘Mobility and transport sector’. They will be implemented in synergy with Action 8 ‘Bioenergy and renewable fuels for sustainable transport’ and Action 7 ‘Battery’. In this context, the renewable gaseous fuels, hydrogen and synthetic gases mentioned in the Walloon Regional Policy Statement of September 2019 will be a key focus.

The Walloon Region already participates, on a case-by-case basis, in the ERA-NETs resulting from the SET Plan priorities. It will participate in the ‘European Partnership for Clean Energy Transition’ of the future Horizon Europe programme.

The Walloon Region encourages participation, through the NCPs, in the calls of the Horizon 2020 and Horizon Europe programmes. Horizon 2020 calls particularly cover the themes proposed by the European Battery Alliance.

The recommendations of the Clean Energy Industrial Forum on Renewables will be taken on board.

The Walloon Region participates in the Technology Collaboration Programmes of the International Energy Agency.

The most relevant research projects in this respect, subsidised through the above programmes, therefore form part of the IEA programmes, in particular 'Energy in Building and Communities', 'Solar Heating and Cooling', 'Photovoltaic Power Systems' (in particular building-integrated PV), Hydrogen and Bioenergy.

Wallonia participates in the Energy Technology Systems Analysis Programme (ETSAP). The 'Times' tool is used to analyse and compile energy scenarios and as a decision aid. It may in particular be used to develop action plans following on from the NECP.

Belgium participates in other Technology Collaboration Programmes of the IEA; the Walloon Region has access to these, but does not directly participate in them.

Except for bioenergy, research into the generation of energy from renewable sources is the poor relative of the research, innovation and competitiveness policies and measures. It is not among the priorities of the intelligent specialisation strategy that is currently being revised.

However, in a bottom-up approach, at the request of the industrial sector, Wallonia may take part in the 'Number one in renewables' action of the SET Plan.

(b) Description of concrete partnerships that are a result of SET Plan work

The Walloon Region participates in the work of the SET Plan implementation working groups according to its priorities listed in the above point.

It has participated in the ERA-NET 'Smart Grids', 'Solar' and 'Smart Cities' actions and in the 'SOLAR-ERA.NET Cofund 2' and RegSYS programmes (on integrated regional smart energy systems).

It will take part in the ERA-NET Smart Energy Systems programme: Integrated Storage and Digitalisation of Energy Systems.

It has also taken part in the Urban Europe calls, in the ERA-NET New European Wind Atlas and in the Fuel Cells and Hydrogen Joint Technology Initiative.

It will participate in the 'European Partnership for Clean Energy Transition' of the future Horizon Europe programme.

(c) Benchmarks for volumes of cooperation with SET Plan countries

On average, a figure of around EUR 500,000 is committed in the Walloon budgets for each call. The annual amount actually spent is lower and depends on the level of participation and selection of Walloon operators.

(d) Other areas/schemes/instruments for international cooperation

In order to prepare for Wallonia's participation in the Horizon Europe Framework Research and Innovation Programme, working groups have been set up, involving the authorities and research operators. Each group is dedicated to a cluster of Pillar 2 'Global Challenges and Industrial Competitiveness'. The 'Climate, Energy and Mobility' working group is helping to develop the new intelligent specialisation strategy and is working with the authorities on consultations for the Horizon Europe programme. The aim of this group is to improve the participation of Walloon research operators in the European framework research programmes so that they are better integrated within the European dynamic and can improve their expertise and competitiveness, create synergies and gain access to wider markets.

Walloon participation in the NER 300 calls has not been a resounding success. Wallonia will promote the participation of businesses in the Innovation Fund of the Emissions Trading System, starting with the first call in 2020.

iii. Where applicable, financing measures in this area at national level, including Union support and the use of Union funds

Federal State

Adequate levels of funding must be provided. From 2020, 5% to 10% of the R&D budget will be earmarked for climate and energy projects.

Several innovation funds focusing on the energy transition already exist, but more is needed. The energy transition will be included as a priority in support programmes for research, innovation and pilot projects.

The following measures could encourage innovation:

- fiscal support for the recruitment of researchers;
- support for pilot projects;
- promotion and support of innovative technologies;
- circular economy support campaigns;
- social innovation support projects designed to change behaviour;
- conduct of a SWOT analysis and regular update of the SET Plan to focus on those areas in which Belgium offers added value.

Innovation

Objectives

Support and encourage research and development aimed at bringing about the energy transition, particularly in those areas with the greatest impact on the climate, specifically renewable energy, management and adaptation of energy systems, sustainable mobility, agricultural production, the circular economy, and all sectors working directly to reduce greenhouse gas emissions. In addition to developing and disseminating new technologies, jobs connected with the energy transition must be protected and sustainably developed, and the versatility needed in terms of training profiles must be ensured.

From 2020, 5% to 10% of the R&D budget will be earmarked for climate and energy projects, and will also focus on social innovation.

Belgium must ensure that nuclear fission used to generate electricity in the country is phased out in a safe, sustainable and responsible manner so that future generations are not left with a heavy burden.

Key actions

- National Pact for Strategic Investments (PNIS):
 - The National Pact for Strategic Investments aims to provide an assessment of Belgium's strategic investment needs to 2030 in six areas, including energy and mobility.
 - Around EUR 150 million will be made available through the 'Infrastructure 4 Belgium' fund as a lever to mobilise close to EUR 2 billion in infrastructure investment.
 - Through the PNIS, experts from the federated/federal entities will carry out coordination and structural work on budgetary and financial tools, financing techniques, EU, federal and federated sources of funding, including debt agencies and National Promotional Banks (NPBs), and financial market instruments.
- Energy Transition Fund:
 - This fund was set up in 2016 to finance innovative energy transition projects.
 - The fee paid in order to continue operating the Doel 1 and 2 nuclear power plants (a fixed amount of EUR 20 million per year to 2025) will fund the Energy Transition Fund created by the Law of 28 June 2015.

This fee is payable under Article 4(2) of the Law of 31 January 2003 on the gradual phase-out of nuclear power for industrial electricity generation purposes (inserted by the Law of 28 June 2015 amending the Law of 31 January 2003 on the gradual phase-out of nuclear power for industrial electricity generation purposes in order to guarantee security of energy supply).

- This fund aims to finance measures designed to support and encourage research and development in innovative energy projects falling under the responsibility of the Federal State, and in particular:
 - measures to maintain and/or develop and/or research a system capable of guaranteeing security of supply and network balance, particularly as regards energy production and storage, and also demand-side management;
 - renewable energy in the Belgian Exclusive Economic Zone of the North Sea;
 - biofuels;
 - nuclear power.
 - The purpose of the Energy Transition Fund is described as follows in the parliamentary proceedings on the Law of 28 June 2015 laying down various provisions on energy: 'This fund will encourage research and development in innovative energy projects and, in particular, develop energy production and storage'.
[\(http://www.dekamer.be/FLWB/PDF/54/1046/54K1046001.pdf\)](http://www.dekamer.be/FLWB/PDF/54/1046/54K1046001.pdf)
 - Every year the Directorate-General for Energy organises a call for proposals in accordance with Article 3(1) of the Royal Decree of 9 May 2017 laying down the conditions for using the Energy Transition Fund. The first call was launched on 30 June 2017, the second in December 2017, the third on 20 August 2018 and the most recent one in October 2019. The first three calls combined led to subsidies of EUR 57 million being granted to 35 projects.
 - The budget of the Energy Transition Fund for 2019 is EUR 25 million, which may be granted as subsidies in 2019 to projects that meet all the relevant criteria and that involve:
 - research and development;
 - investment in research infrastructure or innovation clusters; or
 - innovation by SMEs.
 - This call is open to:
 - Belgian legal persons;
 - legal persons from other EU Member States.
 - Every year, on a proposal from the Energy Minister, the government decides in advance how the Energy Transition Fund budget may be allocated to specific federal energy responsibilities. Where applicable, this decision is formalised in the next call for proposals.
- Nuclear research:
 - Since the global economic crisis in 2008, public funding of nuclear R&D has increased from under EUR 60 million in 2010 to over EUR 100 million in 2018. Almost one third of this sum has been allocated to SCK•CEN to fund research into nuclear safety and new materials, among other subjects, with one fifth being allocated to the management of nuclear waste (ONDRAF/NIRAS), advanced nuclear technologies (SCK•CEN) and the new MYRRHA research infrastructure, as developed by SCK•CEN. Lastly, nearly EUR 6 million have been allocated to nuclear fusion.
 - Despite the law on the gradual phase-out of industrial electricity generation through nuclear fission, Belgium will continue its nuclear R&D and innovation activities and will maintain or develop a high level of expertise. Nuclear know-how will remain a priority for Belgium in the

coming decades. Through the MYRRHA project, Belgium will continue the international research needed into innovative solutions for highly radioactive waste and the qualification of materials for fusion reactors. Support for skills must also ensure the continued production of radioisotopes in Belgium.

- MYRRHA will be a nuclear research infrastructure of pan-European importance. The Belgian Government has financially supported the project since 2010. Additional funding of EUR 558 million for the period 2019-2038, granted by the Belgian Government on 7 September 2018, will be used to complete the first phase of MYRRHA: construction at the SCK•CEN site of the first part of its particle accelerator and its irradiation stations, which will be commissioned in 2026. The Council of Ministers has also approved the formation of the MYRRHA international non-profit association so that foreign partners can become involved. This type of legal status is ideal for large projects funded by several foreign countries, which will help to finance the next stages of the MYRRHA project. This decision will encourage foreign partners interested in the MYRRHA project and its applications to become involved.
- Belgium will also continue to work on developing nuclear fusion energy in collaboration with Euratom and the other Member States under the European action plan ‘Fusion Electricity: a roadmap to the realisation of fusion energy’.

Other measures

It should be noted that the above list is not exhaustive and only gives an idea of the wide range of innovations that could play an important role in a successful energy transition.

Competitiveness

Objectives

Ensure that the various components of the energy cost in Belgium are no higher than those in neighbouring countries, so that the competitiveness of Belgian (energy-intensive) businesses and the purchasing power of families are maintained. In this respect, the analysis of the position of Belgian businesses on the global market will also be taken into account.

Key actions

- Energy Standard, designed to maintain the competitiveness of businesses and the purchasing power of families.

This standard will depend on the pattern of use and energy intensity.

- In order to protect the competitiveness of Belgian industry in relation to neighbouring countries, and also to preserve jobs, an Energy Standard aimed at businesses, particularly energy-intensive businesses, will be introduced.
- An annual study will be jointly commissioned by the four regulators. A joint study has been requested from the federal and regional regulators (FORBEG). Each entity will assume its responsibilities and will adopt a standard in its area of responsibility. The four entities in the country must work closely together to ensure that their systems are not contradictory or in competition. The study will be used as reference to monitor how electricity prices develop in the various sectors. The first study will be available in 2020. The various entities will use the study results to develop the Energy Standard, which will help to create a level playing field with neighbouring countries.
- A specific and measurable competitiveness objective will be developed, not just for the energy-intensive industries, but also for the low-carbon technology sector. In this respect, their

position on the global market will be specifically analysed, with competitiveness strengths and challenges being identified. Measurable objectives must be defined for the future on that basis, together with the policy and measures needed to achieve those objectives. The necessary links with business and industrial policy must therefore be made.

- Work will continue to remove barriers to the roll-out and marketing of low-carbon products.
- Economic support policy instruments will be calibrated so that they form a springboard for positive business cases with innovative solutions.
- A study will be started in 2020, and completed by mid-2022 at the latest, in close collaboration with the Regions, the Federal Planning Bureau and other relevant authorities. The aim of the study will be to comprehensively review the competitiveness of not just energy-intensive businesses, but also the low-carbon technology sector. It will also specifically analyse their position on the global market, by highlighting competitive advantages and potential challenges and by identifying measurable objectives to be achieved in the future and policy and measures needed to achieve those objectives, in conjunction with industrial policy. This study should be useful for updating the Integrated National Energy and Climate Plan.

Other measures

- Encourage the active involvement of consumers.
- Belgium will call on Europe to assess and monitor environmental, social and economic inequalities between the European Union and its trade partners, in conjunction with industrial policy and energy and climate policy.

Energy and climate research projects supported by federal research policy:

Project	Budget (estimate)	Timetable
ESA-PROBA-V exploitation	EUR 43.4 million	EUR 31 million already spent EUR 12.4 million (2019-...)
ESA-ALTIUS development + exploitation	EUR 152 million	Launch at end of 2023 or 2024 Exploitation from 2024-2027?
JPI Climate - SOLSTICE	EUR 500,000	2020
EUMETSAT	EUR 12 million	2019/yearly based
JPI Climate - ERA-NET AXIS	EUR 348,000 from Research Programme BRAIN-BE2.0 + EUR 63,000 EU top-up	2019
JPI Climate & JPI Oceans - New climate science on oceans	EUR 500,000	2020
BiodivERsA BiodivClim	EUR 500,000	2020
IPCC Trust Fund	EUR 74,000	2019/yearly based
Bilateral cooperation with Vietnam	EUR 250,000	2019
ESFRI-RI ICOS	EUR 84,000 - membership fee	2019/yearly based
	Supporting projects - ICOS IASB: EUR 83,000 - ICOS Belgica: EUR 80,000	2019
	Procedure supporting the valorisation of federal components to ESFRI RIs	2020 onwards EUR 500,000/4 years per selected component
ESFRI-RI ACTRIS	EUR 1.2 million for a project in support of the upgrade of the federal	2018-2022

	infrastructure (IASB-BIRA & IRM-KMI) participating in ACTRIS	
	Procedure supporting the valorisation of federal components to ESFRI RIs	2020 onwards EUR 500,000/4 years per selected component
MYRRHA	EUR 287 million for construction of Phase 1	2019-2026
	EUR 114.9 million for R&D in support of Phases 2 and 3	2019-2026
	EUR 156.7 million for operation of Phase 1 (in case Phases 2 and 3 are delayed or not started)	2027-2038
JPI Climate - ERA4CS ERA-NET Cofund	EUR 417,000 from Research Programme BRAIN-BE + EUR 73,000 EU top-up	2017-2020
BRAIN-BE2.0	TBD with a maximum of EUR 29.4 million	2019-2023
Antarctica campaigns BRAIN-BE2.0	Unknown. Depending on the call themes and selected projects	2018-2023
Belgian Climate Knowledge Center	TBD around EUR 700,000/year	2020/multi-annual (if extra budget available)
Total		

Flemish Region

See point 3.5(i).

Walloon Region

The general support measures for research cover energy research: tax incentives for research and development, including tax credits, and Horizon 2020 incentives helping SMEs to prepare, submit and negotiate collaborative research and innovation projects.

Particular effort will be made to promote, encourage and support the involvement of Walloon researchers in European framework research programmes, through the Horizon Europe working group referred to above. The National Contact Point will clearly be involved in this effort and have an important role to play.

Lastly, use of the Innovation Fund by businesses will be encouraged.

As regards the regional budget, every year a specific budget of EUR 7,000,000 will be earmarked for a research programme on an emerging theme in the future intelligent specialisation strategy.

Brussels Capital Region

The energy and climate transition clearly requires innovation and experimentation. As underlined by the Regional Policy Statement of the Brussels Government, research, development and innovation are not only important factors in economic growth, but also levers for improving public well-being.

The Region must therefore increase its investment in research, development and innovation. In this respect, the Region will actively contribute to the national target of 3% of GDP (including one third public) spent on research and development (¹⁴³).

The Energy Pact also contains research and innovation objectives. From 2020, 5% to 10% of public R&D expenditure should be earmarked for the decarbonisation of the economy, including:

- tax support for the recruitment of researchers;

¹⁴³

- support for pilot projects;
- support for and promotion of innovative technologies;
- campaigns supporting the circular economy.

As buildings are the prime emitters of greenhouse gases in the Brussels Capital Region, the strategy to reduce the environmental impact of existing buildings by 2030-2050 sets out a measure specifically addressing innovation in renovation: RenoLab.

In order to help the construction sector to understand that a sustainable renovation incorporating circular economy principles is feasible, in the first instance specific projects need to be supported and observed. For that purpose, a laboratory for the sustainable renovation of Brussels buildings known as 'RenoLab' will be set up.

This will carry out:

- calls for projects to test and develop existing tools in the renovation strategy and training in these tools (e.g. roadmap, circular design tool, sustainability assessment tool, etc.);
- calls for renovation projects on certain specific themes (materials, acoustics, circularity, etc.) or on the sustainability levels of renovation projects (e.g. small-scale renovations by individuals) in order to observe, analyse and disseminate new, unknown and innovative practices;
- actions aimed at specific target audiences, such as actions to increase the renovation of small jointly owned properties.

This RenoLab will consist of a (continuous) management structure led by Bruxelles Environnement, which will establish the appropriate links between the various operators and actions, while highlighting innovative practices in the renovation sector. The various renovation operators will be brought within a network (like the Kennisplatform Renovatie in the Flemish Region) in order to share their experiences (best practices, innovations) in terms of working methods, models or implementation methods.

Numerous European programmes (ERDF and Interreg, Horizon 2020, LIFE, etc.) also exist and can be used to fund European projects in areas of interest to Brussels, particularly innovation in sustainable renovation.

The Region therefore undertakes to look for further European funds and calls for projects that may be useful, and to provide the means and resources needed in this respect.

Through its intelligent specialisation strategy, the government will support the priority themes for the Region's development, as identified by the Regional Innovation Plan for the period 2016-2020 (¹⁴⁴), adopted in July 2016. This plan aims to regularly assess the return on investments in research and innovation. In this context, three strategic areas of activity have been identified because they offer significant innovation potential:

- environment – green economy;
- information technologies (IT) – digital economy;
- health.

With regard to the environment, the Regional Innovation Plan targets the Smart Cities and circular economy strategies. As a result, energy efficiency, sustainable chemistry, the circular economy and mobility have been identified as key factors in innovation.

The approach proposed in the Regional Innovation Plan is to optimise the impact of R&I in Brussels by reinforcing cooperation in this area between regional public organisations and by creating a collaboration dynamic with the Federal Government, federated entities and the European Union.

New instruments are proposed in the Regional Innovation Plan in order to increase support for businesses and research organisations (including measures to raise awareness of innovation support schemes), reinforce clusters, exploit new forms of innovation (such as social innovation) and utilise know-how in Brussels.

¹⁴⁴ See <http://www.innoviris.be/fr/politique-rdi/plan-regional-dinnovation>

Updating the Regional Innovation Plan will offer an opportunity to anchor the energy and climate transition at the heart of the Region's priorities.

Furthermore, transition also clearly requires experimentation. A series of technologies and also configurations, combinations and practices should be studied. However, some legal and administrative provisions form a brake on this type of experimentation. For that reason, the Region should create a framework for experimentation. Clearly this is not about blurring standards, but about constructing a framework for well-defined experimentation in a given project, over a limited period of time, resulting in an assessment and presentation of the results and lessons learned during the experimentation.

In this context, the government will take the following action:

- Continue with and reinforce the Regional Innovation Plan, while linking it with the energy and climate transition dynamic in the urban area. In preparing this plan, strategic research areas will be clarified and, where applicable, supplemented, and social and behavioural innovations will be combined with technological innovations.
- Develop a regulatory framework for experimentation. This will involve, within a defined and controlled framework (to be developed), temporarily suspending certain barriers (tariffs, taxes, obligations, etc.) in order to test and document the relevance and performance of pilot decarbonisation and energy efficiency projects, while ensuring that this regulatory framework complies with the State aid legislation.
 - The government will reinforce the interactions between the various support tools for research, development and innovation so that all stages of development of an innovative service or product are covered. To that end, it will strengthen collaboration between public players so that businesses are better supported at all stages of their development. More generally, it will strengthen collaboration between the business world and the academic research world. The government will also increase its support for innovation by associations.

Cooperation with the federal level

Bearing in mind the division of responsibilities and in addition to its own efforts, the Brussels Capital Region also wants to develop the cooperation with the federal level within the framework of the Energy Pact.

In this context, the Brussels Government will call on the Federal Government to:

- reform business taxation, in particular by introducing a tax incentive for researchers and research and innovation in relation to the energy and climate transition, including for pilot projects and work that should lead to changes in public behaviour and business practices;
- establish a regulatory framework favourable to experimentation as, for the pilot projects referred to above, the temporary suspension of barriers also potentially applies to federal legislation. Within a specific and controlled framework, it should be possible to better understand the conditions of the energy and climate transition through experimentation. The Brussels Capital Region will therefore encourage the Federal Government to allow this type of experimentation in its regulations.

National Energy and Climate Plan

NECP

2021-2030

Section B - Analytical Basis

Current data and projections

Contents

4. Description of the current situation and projections with existing policies for each of the five dimensions	3
4.1. General parameters and variables	3
4.2. Dimension decarbonisation	3
4.2.1. GHG emissions and removals.....	3
4.2.2. Renewable energy sources	6
4.3. Dimension energy efficiency	7
4.4. Dimension energy security	7
4.5. Dimension internal energy market	8
4.6. Dimension research, innovation and competitiveness	8
4.6.1. Current situation of the low-carbon-technologies sector and, to the extent possible, its position on the global market (that analysis is to be carried out at Union or global level)	8
4.6.2. Current level of public and, where available, private research and innovation spending on low-carbon-technologies, current number of patents, and current number of researchers	9
4.6.3. Breakdown of current price elements that make up the main three price components (energy, network, taxes/levies)	12
4.6.4. Current level of national subsidies for fossil fuels.....	12
5. Impact assessment of planned policies and measures	13
5.1. Assessment of impact on energy system and GHG emissions	13
5.1.1. GHG emissions and removals.....	13
5.1.2. Renewable energy.....	16
5.1.3. Dimension energy efficiency	18
5.2. Dimension energy security	20
IMPACT ASSESSMENT OF PLANNED POLICIES AND MEASURES	22
5.3. Overview of investment needs	22
1. CURRENT SITUATION AND PROJECTIONS WITH EXISTING POLICIES AND MEASURES	23
1.1. Projected evolution of main exogenous factors influencing energy system and GHG emission developments	23
1.2. Dimension decarbonisation	23
1.2.1. GHG emissions and removals.....	23
1.2.2. Renewable energy.....	43
1.3. Dimension Energy efficiency	43
1.3.1. Current primary and final energy consumption in the economy and per sector (including industry, residential, service and transport)	43
1.3.2. Current potential for the application of high-efficiency cogeneration and efficient district heating and cooling	43
1.3.3. Projections considering existing energy efficiency policies, measures and programmes as described in point 1.2.(ii) for primary and final energy consumption for each sector at least until 2040 (including for the year 2030).....	43
1.3.4. Projections considering existing energy efficiency policies, measures and programmes as described in point 1.2.(ii) for primary and final energy consumption for each sector at least until 2040 (including for the year 2030).....	54

1.3.5. Cost-optimal levels of minimum energy performance requirements resulting from national calculations, in accordance with Article 5 of Directive 2010/31/EU	54
2. IMPACT ASSESSMENT OF PLANNED POLICIES AND MEASURES	58
2.1. Impacts of planned policies and measures described in section 3 on energy system and GHG emissions and removals, including comparison to projections with existing policies and measures (as described in section 4).	58
2.1.1. Transport sector	58
2.1.2. Buildings sector	62
2.1.3. Agricultural sector	63
2.1.4. Non-ETS industrial sector	64
2.1.5. Waste sector	65
2.2. Macroeconomic and other impacts of the planned policies and measures	66
2.3. Overview of investment needs	68
2.3.1. Existing investment flows and forward investment assumptions with regard to the planned policies and measures	68
2.3.2. Costs and benefits of Flemish climate policy	69
2.3.3. Financing of the Flemish mitigation policy.....	72
2.3.4. Sector or market risk factors or barriers in the national or regional context	74
1. CURRENT SITUATION AND PROJECTIONS WITH EXISTING POLICIES AND MEASURES	75
1.1. Projected evolution of main exogenous factors influencing energy system and GHG emission developments	75
1.2. Decarbonisation.....	75
1.2.1. GHG emissions and removals.....	75
1.2.2. Renewable energy.....	80
1.3. Dimension Energy efficiency	84
1.4. Dimension internal energy market.....	97
1.5. Dimension research, innovation and competitiveness	100
2. IMPACT ASSESSMENT OF PLANNED POLICIES AND MEASURES	103
2.1. Impacts of planned policies and measures described in section 3 on energy system and GHG emissions, including comparison to projections with existing policies and measures (as described in section 4) ...	103
2.2. Macroeconomic and, to the extent feasible, the health, environmental, employment and education, skills and social impacts, including just transition aspects of the planned policies and measures	115
2.3. Overview of investment needs	122
Impact of the new measures on GHG emissions	129
Financing needs	132
Regional budget funds	133
Financing tools.....	133

Belgium

1. Description of the current situation and projections with existing policies for each of the five dimensions

In the rest of this document, projections taking account of existing policies are referred to as the ‘WEM scenario’ (WEM = with existing measures).

General parameters and variables

The projections are specifically based on changes in the population and number of households and on the number of heating degree days. They are not based on changes in prices or costs (fuels, CO₂, technology, etc.), or on projections for macroeconomic variables (GDP, value added and disposable income).

Table 1 - Parameters and variables specifically used in the projections with existing measures

	2005	2010	2015	2020	2025	2030
Population (in millions)	10.4	10.8	11.2	11.5	11.8	12.0
Number of households	4.4	4.6	4.8	5.0	5.1	5.2
Household size	2.4	2.3	2.3	2.3	2.3	2.3
Heating degree days	1,828	2,309	1,688	1,870	1,870	1,870

Source: Assumptions, compilation of regional projections for 2020-2030.

Household size = average number of people per household.

Dimension decarbonisation

1.1.1. GHG emissions and removals

**Table 2 - Trends in GHG emissions
(WEM scenario, in Mt CO₂eq)**

	2005	2010	2015	2020	2025	2030
Total excluding LULUCF	145.3	132.9	117.1	113.3	119.6	127.5
Total including LULUCF	142.3	131.4	115.9	112.6	118.7	126.3
EU ETS (according to ETS 2013-2020 scope)	66.6	54.8	44.7	42.3	49.8	58.1
ESD ¹ (according to ETS 2013-2020 scope)	78.6	78.1	72.4	71.0	69.8	69.4
LULUCF	-3.0	-1.5	-1.2	-0.7	-0.9	-1.2

Source: Belgian CRF report (15 March 2019) for 2005-2015;

compilation of regional and federal projections for 2020-2030.

Between 2005 and 2015, total GHG emissions (excluding LULUCF) fell from 145 Mt CO₂eq to 117 Mt CO₂eq, a reduction of 19% (**Error! Reference source not found.**). This fall was mainly due to a 33% reduction in EU ETS emissions in 2015 compared with 2005. During the same period, emissions under the Effort Sharing Decision (ESD) fell by 8%. Between 2005 and 2015, Belgium’s total LULUCF emissions balance contracted by 60%, although it remained a significant carbon sink in 2015.

In the WEM scenario, total GHG emissions (excluding LULUCF) are expected to rise between 2015 and 2030 to 128 Mt CO₂eq (-12% compared with 2005). This increase can be explained by a rise in EU ETS emissions of up to 58 Mt CO₂eq (-13% in 2030 compared with 2005), chiefly as a result of higher emissions from electricity generation. In the WEM scenario, due to the phasing out of nuclear power by 2025, nuclear energy generation

¹ ESD for 2013-2020; ESR for 2021-2030.

is partly offset after 2025 by increased generation at gas-fired power stations. In the WEM scenario, ESD emissions record a moderate change, falling by 8% (in 2015) to 12% (in 2030), as compared with 2005. Belgium's LULUCF emissions balance will still be a carbon sink after 2015. Following a slight fall between 2015 and 2020, this carbon sink grows by 3% between 2015 and 2030 in the WEM scenario.

**Table 3 - Trends in total GHG emissions by IPCC sector
(WEM scenario, in Mt CO₂eq)**

	2005	2010	2015	2020	2025	2030
1 Energy	105.5	98.8	85.7	81.9	89.6	98.3
1A Fossil fuel combustion	104.8	98.0	85.1	81.3	89.0	97.7
1A1 Energy industries	29.4	26.5	21.2	16.5	22.0	29.9
1A2 Manufacturing industries and construction	18.5	15.6	13.6	14.4	16.5	17.0
1A3 Transport	26.6	26.4	26.7	26.9	27.5	28.3
1A4 Other sectors	30.0	29.3	23.5	23.4	22.9	22.4
1A5 Other	0.2	0.1	0.1	0.1	0.1	0.1
1B Fugitive emissions from fuels	0.7	0.8	0.7	0.6	0.6	0.6
2 Industrial processes and product use	26.4	21.5	19.7	20.3	19.6	19.2
3 Agriculture	10.3	10.2	10.0	9.8	9.4	9.2
4 LULUCF	-3.0	-1.5	-1.2	-0.7	-0.9	-1.2
5 Waste	3.1	2.5	1.6	1.3	1.0	0.8

Source: Belgian CRF report (15 March 2019) for 2005-2015;
compilation of regional and federal projections for 2020-2030.

At sectoral level, a 19% reduction in energy-related emissions (IPCC sector 1) can be seen between 2005 and 2015. This fall is spread between the subsectors of energy industries (mainly power stations, refineries and coking plants), manufacturing industries and space heating (i.e. 'other sectors'). In the transport sector, emissions stabilised during this period. Emissions from industrial processes were down by 25% in 2015 compared with 2005 levels, largely due to a decline in iron and steel production. During the period 2005-2015, (non-energy) emissions from agriculture saw a modest decrease of 2%. The 48% drop in emissions from the waste sector in 2015 (compared with 2005) is mainly explained by the reduction in methane emissions from landfill.

By 2030, the WEM scenario shows an increase in energy-related emissions that can be mainly attributed to the energy industries subsector. This is explained by the increased use of gas-fired power stations (see above). To a lesser extent, the WEM scenario also projects higher emissions in the transport sector and manufacturing industries, while emissions from buildings continue to fall steadily. Emissions from industrial processes and agriculture see relatively modest falls between 2015 and 2030, with a reduction of 28% and 10% respectively in 2030 compared with 2005 levels. Waste-related emissions continue to decline to 2030.

**Table 4 - Trends in GHG emissions by type of GHG, excluding LULUCF
(WEM scenario, in Mt CO₂eq)**

	2005	2010	2015	2020	2025	2030
CO ₂	125.5	113.8	99.8	97.2	105.0	113.8
CH ₄	9.3	8.8	8.1	7.5	6.9	6.6
N ₂ O	8.4	7.6	6.0	5.7	5.7	5.7
F-gases	2.1	2.8	3.3	2.9	2.0	1.5

Source: Belgian CRF report (15 March 2019) for 2005-2015;
compilation of regional and federal projections for 2020-2030.

In terms of the types of GHG, reductions of 21%, 13% and 29% were recorded for CO₂, CH₄ and N₂O respectively during the period 2005-2015. Over the same period, the only increase observed was in F-gases, which rose by 58%. This can be largely explained by the increased use of F-gases, resulting in higher emissions. The main reason for this is that ozone-depleting substances are no longer used in refrigeration plants, and F-gases have long been the most obvious alternative.

CO₂ emissions are forecast to rise from 100 Mt CO₂eq to 114 Mt CO₂eq between 2015 and 2030, due to the increase in energy-related emissions (see also Table 3). The continued fall in methane emissions can be largely explained by the trend in emissions from landfill (see also **Error! Reference source not found.**). Nitrous oxide emissions also fall during the period 2015-2030, with the same applying to F-gas emissions. Due to stricter EU regulations and Belgium's own policy, F-gases with a very high global warming potential (GWP) are expected to be phased out and replaced with greener alternatives or F-gases with a less negative impact on the climate.

**Table 5 - Trends in ESD GHG emissions by IPCC sector
(WEM scenario, in Mt CO₂eq)**

	2005	2010	2015	2020	2025	2030
1 Energy	63.1	62.3	56.9	56.6	56.8	57.3
1A Fossil fuel combustion	62.4	61.7	56.3	56.0	56.2	56.7
1A1 Energy industries	1.9	2.0	2.4	2.2	2.1	2.1
1A2 Manufacturing industries and construction	4.0	4.1	3.9	3.4	3.7	3.9
1A3 Transport	26.5	26.3	26.6	26.9	27.5	28.3
1A4 Other sectors	29.9	29.2	23.4	23.3	22.8	22.3
1A5 Other	0.2	0.1	0.1	0.1	0.1	0.1
1B Fugitive emissions from fuels	0.6	0.7	0.6	0.6	0.6	0.6
2 Industrial processes and product use	2.7	3.7	4.1	3.6	2.9	2.3
3 Agriculture	10.3	10.2	10.0	9.8	9.4	9.2
4 LULUCF	-	-	-	-	-	-
5 Waste	2.6	1.9	1.3	1.0	0.7	0.6

Source: Belgian CRF report (15 March 2019) for 2005-2015;
compilation of regional and federal projections for 2020-2030.

The 8% reduction in ESD emissions between 2005 and 2015 can be largely attributed to reductions in emissions from buildings (i.e. 'other sectors') and waste-related emissions (in particular methane emissions from landfill – see above). Between 2015 and 2030, energy-related ESD emissions stabilise in the WEM scenario. This stabilisation can be explained by an increase in transport-related emissions, offset by a reduction in other subsectors. Emissions from industrial processes fall in the WEM scenario from 4.1 Mt CO₂eq in 2015 to 2.3 Mt CO₂eq in 2030. This decrease can be primarily attributed to the reduction in F-gas emissions (see also **Error! Reference source not found.**). As explained above, waste-related emissions also continue to decline to 2030.

1.1.2. Renewable energy sources

**Table 6 - Share of renewable energy sources in gross final energy consumption, total and by sector
(WEM scenario, in %)**

	2005	2010	2015	2020	2025	2030
RES	2.3	5.7	7.9	11.2	10.7	10.5
RES-E	2.4	7.1	15.5	24.8	24.4	23.8
RES-T	0.6	4.7	3.8	8.7	8.4	8.4
RES-H&C	3.4	6.1	7.8	7.8	7.3	7.1

Source: Eurostat and SHARES 2016 results (<https://ec.europa.eu/eurostat/web/energy/data/shares>) for 2005-2015; compilation of regional and federal projections for 2020-2030.

The share of renewable energy sources (RES) increased over the period 2005-2015, from 2.3% in 2005 to 7.9% in 2015.

The pace of change varied by sector. The increase was particularly pronounced in the electricity sector, where the RES share (RES-E) rose from 2.4% in 2005 to 15.5% in 2015. The RES shares for heating and cooling (RES-H&C) and transport (RES-T) also increased, but more slowly: from 3.4% in 2005 to 7.8% in 2015 for heating and cooling, and from 0.6% in 2005 to 3.8% in 2015 for transport. The RES share in transport was lower in 2015 than in 2010 due to the reduction in biodiesel supplies following the repeal in June 2015 of the law laying down rules on blending biodiesel with diesel.

The increase in RES-E was mainly due to the growth in wind energy and solar PV (see the energy mix in electricity generation). A small proportion of the increase was also due to a slight fall in gross final electricity demand (-2% between 2005 and 2015).

The increase in RES-T mainly stemmed from biofuels, as the contribution of renewable electricity to rail and road transport remained marginal.

Lastly, despite the rapid growth in heat pumps between 2005 and 2015, their contribution to RES-H&C remained low in 2015. The increase in RES-H&C mainly resulted from biomass, which accounted for more than 94% of RES consumption for heating, and, to a lesser extent, from the fall in heating energy consumption (-8% between 2005 and 2015).

The projections ⁽²⁾ with existing measures show an increase in the share of renewable energy (total share and by sector) in 2020 compared with 2015. Despite the total share rising to 11.2% in 2020, compared with 7.9% in 2015, the existing measures are expected to fall short of the 13% target for 2020. After 2020, the total share of RES stabilises at around 10.5%.

Growth in RES-E is particularly pronounced in 2020. This reflects the significant increase in electricity generation from wind turbines (offshore wind turbines in particular). It is assumed that there will be no new investment in offshore wind after 2020.

For RES-T, the projection is around 8.5% for the period 2020-2030. The jump between 2015 and 2020 is essentially due to the introduction of E10 petrol in January 2017. However, the trend for RES-T shows that existing policies for the development of biofuels and the use of electricity for transport (numerator) are insufficient to meet the 10% target for 2020 and to stimulate the development of renewable energy sources beyond 2020.

Among the RES sectors, the RES-H&C sector remains at the same level between 2015 and 2020.

² Projections of RES indicators are available only up to 2030 due to missing data from the Flemish Region (absence of political agreement for the period 2030-2040).

Dimension energy efficiency

**Table 7 - Primary and final energy consumption in the economy and by sector
(WEM scenario, in ktoe)**

	2005	2010	2015	2020	2025	2030
Primary energy consumption	52,544	53,937	45,741	48,597	46,953	46,076
Final energy consumption	37,803	38,036	35,880	36,675	38,160	38,945
Industry	12,935	12,468	11,918	13,265	14,507	15,100
Residential	9,925	9,411	8,163	7,898	7,720	7,531
Tertiary	4,995	5,812	5,358	5,109	5,159	5,196
Transport	9,948	10,345	10,440	10,404	10,775	11,117

Source: Eurostat (June 2018) for 2005-2015 (updated for solid fuels)⁽³⁾; compilation of regional projections for 2020-2030.

Note: For the period 2020-2030, final energy demand in the transport sector corresponds to fuel sales in Flanders and in the Brussels Capital Region, but to fuel consumption in Wallonia.

Belgium's primary energy consumption fell by 13% between 2005 and 2015. The lower level of primary energy consumption in 2015 compared with 2005 and 2010 is partly explained by the sharp decrease in nuclear energy generation.

Furthermore, final energy consumption fell by 5% over the period 2005-2015. Industry and the residential sector were responsible for this downward trend as their energy consumption fell by 8% and 18% respectively. On the other hand, energy consumption rose in the transport sector (+5%) and tertiary sector (+7%).

The projections with existing measures show a general downward trend for primary energy consumption to 2030 (-12% in 2030 compared with 2005 levels). The downward trend is mainly due to implementation of the law on phasing out nuclear power over the period 2022-2025; the higher level in 2020 than in 2015 is due to the availability of nuclear generation capacity. The projection for primary energy consumption in 2020 (48,597 ktoe) is higher than Belgium's indicative energy efficiency target (47,300 ktoe).

However, the projection for final energy demand with existing measures shows an upward trend to 2030. In 2020, final energy demand (36,675 ktoe) exceeds Belgium's indicative energy efficiency target (32,500 ktoe). In 2030, final energy demand is 3% higher than in 2005. The increase over the period 2020-2040 is mainly due to transport.

Dimension energy security

Table 8 - Energy mix of gross domestic consumption (WEM scenario)

	2005	2010	2015	2020	2025	2030
Solid fuels	10.6	6.8	5.9	5.2	5.5	5.7
Oil	40.9	39.8	44.6	40.8	43.2	45.3
Natural gas	24.5	27.3	25.7	24.0	30.4	36.5
Nuclear heat	20.4	20.2	12.4	19.0	8.4	0.0
Electricity	0.9	0.1	3.3	0.9	2.7	2.8
Renewable energy	1.9	4.6	6.8	8.4	8.1	7.9
Waste	0.8	1.2	1.3	1.7	1.8	1.7

³ Historical figures are taken from Eurostat energy balances for Belgium (European Commission recommendations/requests), while projections are based on regional energy balances. The difference between the two sources is small and reduces over time, for both total primary energy consumption and total final energy consumption: for 2005, it is 4% for both primary and final energy consumption; for 2015, it is zero for primary energy consumption and 1% for final energy consumption. However, the differences at energy and sector level may be much greater. It is worth noting that the consumption of solid fuels is currently under review and will be updated; the update will be sent to Eurostat as soon as possible.

Source: Eurostat (June 2018) for 2005-2015 (updated for solid fuels) (4);
compilation of regional projections for 2020-2030.

Around three quarters of Belgium's gross domestic consumption came from fossil fuels (solid fuels, oil and natural gas) in 2005, 2010 and 2015. In 2005 and 2010, 20% came from nuclear power. However, this share fell to 12% in 2015 following the shutdown of several nuclear reactors. Part of the reduction in nuclear energy generation in 2015 was offset by electricity imports, which increased to 3.3% (compared with less than 1% in 2005 and 2010). The share of renewable energy sources rose steadily, from 2% in 2005 to almost 7% in 2015.

The projections with existing measures point to an increasing share of fossil fuels (almost 90% in 2030). The increase is particularly pronounced for natural gas owing to its more intensive use for electricity generation. In addition, the share of renewable energy sources stabilises at around 8%. An increasing (or decreasing) share is not necessarily synonymous with increasing (or decreasing) consumption. For example, domestic oil consumption is lower in 2020-2030 than in 2005. Gross domestic consumption of natural gas and renewable energy rises steadily over the period covered by the projection.

Table 9 - Import dependency (WEM scenario, in %)

	2005	2010	2015	2020	2025	2030
Import dependency	77.2	73.8	78.9	71.0	81.7	90.4

Source Eurostat (June 2018) for 2005-2015 (updated for solid fuels) (5); compilation of regional projections for 2020-2030.

Note: For the period 2020-2030, the breakdown between domestic renewable energy generation and net imports is not available. For the purposes of calculating import dependency, it is assumed that the renewable energy is generated entirely in Belgium.

Belgium relies on imports for almost all its energy needs as the country has very limited domestic energy sources. These include renewable energy sources (wind, solar and biomass), as well as nuclear heat, although the uranium needed is imported. Domestic production of renewable energy increased by a factor of 3.4 between 2005 and 2015. All fossil fuels are imported. However, fossil fuel imports fell by 8% between 2005 and 2015. Belgium's import dependency varies from 74% to 79%.

The projections with existing measures point to increasing import dependency (90% in 2030). The main reasons for this trend are the phasing out of nuclear power (nuclear heat is considered domestic production according to Eurostat's statistical convention) and the growth in natural gas imports. By contrast, renewable energy sources are projected to increase only moderately.

Dimension internal energy market

Electricity and natural gas prices for 2005, 2010 and 2015 are reported in Annex I, Part 2. No projections are available because they are not used in modelling WEM (and WAM) scenarios.

Dimension research, innovation and competitiveness

1.1.3. Current situation of the low-carbon-technologies sector and, to the extent possible, its position on the global market (that analysis is to be carried out at Union or global level)

Under Regulation (EU) No 691/2011, as amended by Regulation (EU) No 538/2014, the EU Member States must submit six environmental economic accounts from 2017. One of these accounts concerns the environmental goods and services sector (EGSS).

⁴ Ibid.

⁵ Ibid.

The EGSS accounts provide data on the output and gross value added of the environmental goods and services sector as well as on employment in that sector. Environmental goods and services are the products of two types of environmental activities: environmental protection activities (e.g. protection of ambient air, wastewater management) and resource management activities (e.g. management of energy resources, management of minerals). The management of energy resources comprises the production of energy from renewable resources and energy saving measures. These two EGSS ‘subsectors’ are important elements in the low-carbon-technologies sector. As a result, the EGSS accounts offer useful information on the current situation of the low-carbon-technologies sector in Belgium and enable a comparison with the European average.

The most recent EGSS data (2014-2015) were published in December 2017 (<http://www.plan.be>). They were prepared by the Federal Planning Bureau (Bureau fédéral du plan/Federaal Planbureau) (6). The report identifies the share of the environmental goods and services sector in the Belgian economy. Several indicators are reviewed, in particular output, value added and employment:

‘In the period 2014-2015, the market output of environmental goods and services was on average 3.8% of Belgium’s total market output. Environmental goods and services accounted for 2.9% of total Belgian exports, whilst 2.6% of the gross value added linked to market activities was created by enterprises active in the environmental area. The share of the environmental goods and services sector in Belgium’s market sector employment (expressed as full-time equivalents) was 2.4%.’

The EGSS accounts also provide estimates of the share of the production of energy from renewable resources and energy saving measures in the environmental goods and services sector. **Error! Reference source not found.** sets out these estimates for Belgium and the EU (where available).

Table 10 - Share of ‘low-carbon-technologies’ in all environmental protection and resource management activities, 2015

	Output		Value added		Employment	
	BE	EU	BE	EU	BE	EU
Production of energy from renewable resources	7%	25%	8%	21%	7%	n/a
Heat/energy saving and management	7%	20%	6%	19%	6%	n/a

Source: ICN, 2017. Note: n/a = not available.

The two ‘subsectors’ (renewable energy and energy savings) contribute almost equally to output, value added and employment in the environmental goods and services sector, i.e. around 7%.

However, these shares of around 7% are much lower than those in the EU as a whole, which range from 19% to 25%.

1.1.4. Current level of public and, where available, private research and innovation spending on low-carbon-technologies, current number of patents, and current number of researchers

In response to the IEA’s SLT/CERT questionnaire, Belgium provides annual data on public RD&D spending. The annexed 2017/2018 questionnaire contains the most recent data (2016 data for the federal and regional levels; the nuclear energy data include estimates for 2017 and the 2018 budget).

Further information on the RD&D statistics is available at <http://www.iea.org/statistics/RDDonlinedataservice> and in the IEA’s in-depth review of Belgium’s energy policies in 2015 (published in 2016) <https://webstore.iea.org/energy-policies-of-iea-countries-belgium-2016-review>.

⁶ Institut des comptes nationaux (ICN), *Comptes des biens et services environnementaux 2014-2015*, Bureau fédéral du Plan, December 2017.

It is not common or standard practice to collect data on private RD&D spending on low-carbon technologies, as this would be a very lengthy and complex exercise. Data on private RD&D spending is generally collected through the NACE nomenclature, which does not cover the low-carbon-technologies sector. As a result, assumptions have to be made based on several NACE codes (to a certain extent).

Moreover, it is also not common or standard practice to collect data on the current number of patents and the current number of researchers, for the same reasons as those given above.

Information specific to the Federal Government and the Regions is set out below.

Information specific to the Federal Government

The **Energy Transition Fund** aims to finance measures designed to encourage and support research and development in innovative energy projects falling under the responsibility of the Federal State and also measures to maintain and/or develop and/or research a system capable of guaranteeing security of supply and network balance, particularly as regards energy production and storage, and also demand-side management.

<https://economie.fgov.be/fr/themes/energie/transition-energetique/fonds-de-transition>

The purpose of the Energy Transition Fund is described as follows in the parliamentary proceedings on the Law of 28 June 2015 laying down various provisions on energy: 'encourage research and development in innovative energy projects and, in particular, develop energy production and storage⁽⁷⁾'.

The parliamentary proceedings also refer to the government agreement of 10 October 2014, which states that: 'This transition must be technologically neutral'.

In that regard, the responsibilities of the Federal State in the energy transition are set out below according to three thematic priorities:

- (a) renewable energy sources in the Belgian Exclusive Economic Zone in the North Sea and biofuels;
- (b) nuclear energy;
- (c) security of supply and balancing of the transmission system⁽⁸⁾.

The subsidies approved by the Energy Transition Fund total:

- (a) renewable energy: EUR 13 million;
- (b) nuclear energy: EUR 9 million;
- (c) security of supply and balancing of the transmission system: EUR 6 million.

The **National Pact for Strategic Investments** aims to make Belgium future-ready, create jobs and preserve prosperity.

The Strategic Committee that advises the government has identified EUR 144 billion to EUR 155 billion of key investments that are urgently needed in six areas so that Belgium can meet these objectives:

- (d) digital transition: EUR 28-32 billion;
- (e) cybersecurity: EUR 15 billion;
- (f) education: EUR 12 billion;
- (g) healthcare: EUR 7.5-9.5 billion;
- (h) energy: EUR 60 billion;
- (i) mobility: EUR 22-27 billion.

In terms of energy, improving the energy efficiency of buildings, continuing to develop smart power grids and greening traffic are key priorities.

⁷ <http://www.dekamer.be/FLWB/PDF/54/1046/54K1046001.pdf>

⁸ Article 6(1)(VII) of the Special Institutional Reform Law of 8 August 1980 (Loi spéciale de réformes institutionnelles – LSRI).

The plan is to invest EUR 1,700 billion in nuclear decommissioning and research into waste processing over the period to 2030.

According to the report, around 45% of all investment is set to be made by the authorities.

https://www.premier.be/sites/default/files/articles/Report_FULL-FR_WEB_FINAL.pdf

Under the National Pact for Strategic Investments, all the Belgian governments have agreed to call for more favourable treatment of public investment in the context of EU budgetary surveillance. Several options have been studied, with the first being to revise the investment flexibility clause set out in Regulation (EC) No 1466/97. This revision would entail removing the condition associated with the poor economic situation of the requesting country – which currently prevents all Member States (except for Greece) from invoking the clause – and extending eligible investment to investment directly co-financed by the European Investment Bank. However, only Member States having carried out major structural reforms in the last three years could benefit from this revised clause.

This option has already been discussed with the Commission and Member States within the Economic and Financial Committee. The aim in all cases would be to ensure a better balance between fiscal sustainability and support for future growth.

Federal R&D in the nuclear energy area:

Since the global economic crisis in 2008, public funding of nuclear R&D has increased from under EUR 60 million in 2010 to over EUR 100 million in 2018. Almost one third of this sum has been allocated to SCK•CEN to fund research into nuclear safety and new materials, among other subjects, with one fifth being allocated each time to the management of nuclear waste (ONDRAF/NIRAS), advanced nuclear technologies (SCK•CEN) and the new MYRRHA research infrastructure, as developed by SCK•CEN. Lastly, nearly EUR 6 million have been allocated to nuclear fusion.

Despite the law on the gradual phase-out of electricity generation through nuclear fission in Belgium, the country will continue its nuclear R&D and innovation activities and will maintain or develop a high level of expertise. Nuclear know-how will remain a priority for Belgium in the coming decades. Through the MYRRHA project, Belgium will continue the international research needed into innovative solutions for highly radioactive waste and the qualification of materials for fusion reactors. Support for skills must also ensure the continued production of radioisotopes in Belgium.

MYRRHA will be a nuclear research infrastructure of pan-European importance. The Belgian Government has financially supported the project since 2010. Additional funding of EUR 558 million for the period 2019-2038, granted by the Belgian Government on 7 September 2018, will be used to complete the first important part of MYRRHA: construction at the SCK•CEN site in Mol of the first part of its particle accelerator and its irradiation stations, which will be commissioned in 2026. The Council of Ministers has also approved the formation of the MYRRHA international non-profit association so that foreign partners can become involved. This type of legal status is ideal for large projects funded by several foreign countries, which will help to finance the next stages of the MYRRHA project. This decision will encourage foreign partners interested in the MYRRHA project and its applications to become involved.

Belgium will also continue to work on developing nuclear fusion energy in collaboration with Euratom and the other Member States under the European action plan ‘Fusion Electricity: a roadmap to the realisation of fusion energy’.

Information specific to the Walloon Government

Annual public spending on energy research averages between EUR 35 million and EUR 40 million. Most of this sum is devoted to energy efficiency, which since 2012 has accounted for around two thirds of the total amount. All energy efficiency sectors are covered (industry, residential, transport, other). The rest of the sum is allocated to the development of renewable energy, smart power grids and hydrogen, and energy storage.

Universities and research bodies have around 250 full-time equivalent (FTE) researchers.

1.1.5. Breakdown of current price elements that make up the main three price components (energy, network, taxes/levies)

Through its brochure 'Chiffres clés de l'énergie 2016' [Key Energy Data 2016], published in May 2018, the Federal Public Service for the Economy provides objective information on prices, energy, innovation and new technologies. This modern and proactive form of communication makes effective and targeted use of statistical data, market data, databases, and analysis and planning instruments. It can be downloaded from <https://economie.fgov.be/nl/publicaties/energie-kerncijfers-2016> or <https://economie.fgov.be/fr/publications/energie-chiffres-cle-2016>.

Data on the prices and taxes of oil products, natural gas and electricity, and all energy price indices are sent to the IEA every quarter by the Federal Public Service for the Economy, SMEs, Self-Employed and Energy. This information is available from <https://www.iea.org/statistics/topics/pricesandtaxes/>.

Natural gas and electricity prices can be found in the <http://ec.europa.eu/eurostat/data/database> database, which contains all publicly accessible Eurostat data (Database by themes/Environment and energy/Energy/).

A recent study commissioned by the Belgian Federal Commission for Electricity and Gas Regulation (Commission fédérale belge de Régulation de l'Electricité et du Gaz – CREG) <https://www.creg.be/sites/default/files/assets/Publications/Studies/F180628pwc.pdf> compares the energy prices of two residential and two small professional consumer profiles between the three Belgian regions and four other countries (Germany, France, the Netherlands and the United Kingdom) in February 2018. The comparison covers four components for residential consumers and three components for small professional consumers (pure energy component, network component, costs/taxes/VAT).

The breakdown of current electricity and natural gas prices (February 2018) between the main price components is presented in Chapter 6.

1.1.6. Current level of national subsidies for fossil fuels

Ecofys 2014 study commissioned by the European Commission:

https://ec.europa.eu/energy/sites/ener/files/documents/ECOFYS%202014%20Subsidies%20and%20costs%20of%20EU%20energy_11_Nov.pdf

Document provided by Policy Department A of the European Parliament for the Committee on Environment, Public Health and Food Safety (ENVI) at the request of the Committee on Environment, Public Health and Food Safety of the European Parliament:

[http://www.europarl.europa.eu/RegData/etudes/IDAN/2017/595372/IPOL_IDA\(2017\)595372_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/IDAN/2017/595372/IPOL_IDA(2017)595372_EN.pdf)

2. Impact assessment of planned policies and measures

Assessment of impact on energy system and GHG emissions

This chapter sets out the impact of the policies and measures described in Chapter 3 on the energy system and GHG emissions and removals. In the rest of this document, projections taking account of planned policies and measures are referred to as the ‘WAM scenario’ (WAM = with additional measures).

This chapter also includes a comparison with projections based on existing policies and measures (described in Chapter 4).

2.1.1. GHG emissions and removals

**Table 11 - Trends in GHG emissions
(WAM scenario, in Mt CO₂eq)**

	2005	2010	2015	2020	2025	2030
Total excluding LULUCF	145.3	132.9	117.1	113.3	119.6	127.5
Total including LULUCF	142.3	131.4	115.9	112.6	118.7	126.3
EU ETS (according to ETS 2013-2020 scope)	66.6	54.8	44.7	42.3	49.8	58.1
ESD (⁹) (according to ETS 2013-2020 scope)	78.6	78.1	72.4	71.0	69.8	69.4
LULUCF	-3.0	-1.5	-1.2	-0.7	-0.9	-1.2

Source: Belgian CRF report (15 March 2019) for 2005-2015;
compilation of regional projections for 2020-2030.

In the WAM scenario, total GHG emissions (excluding LULUCF) are expected to fall between 2015 and 2030 to 112 Mt CO₂eq (-23% compared with 2005). A reduction in ESD emissions is observed between 2015 and 2030, from 72 Mt CO₂eq to 53 Mt CO₂eq. By contrast, EU ETS emissions rise to 59 Mt CO₂eq (compared with 58 Mt CO₂eq in the WEM scenario), chiefly as a result of higher emissions from electricity generation. In the WAM scenario, the LULUCF emissions balance does not differ from the WEM scenario.

Table 12 below shows the distribution of ESD emissions between the Regions in the WAM scenario. In 2030, the WAM scenario sees a reduction in ESD emissions of 32.6% in Flanders (¹⁰), 36.8% in Wallonia and 39.4% in the Brussels Capital Region, compared with 2005.

Table 12 - Distribution of ESD GHG emissions by region (WAM scenario)

Change from 2005 (%)	2005	2010	2015	2020	2025	2030
Belgium		-2.7%	-9.9%	-14.9%	-24.3%	-34.4%
Flemish Region		-1.3%	-7.4%	-11.2%	-21.3%	-32.6%
Wallonia		-5.7%	-13.1%	-20.3%	-28.6%	-36.8%
Brussels Capital Region		0.5%	-16.1%	-20.7%	-30.1%	-39.4%

⁹ ESD for 2013-2020; ESR for 2021-2030.

¹⁰ The Flemish Region has set itself the target of further reducing the remaining emissions deficit [of 3.8 Mt CO₂eq]. As a way of ensuring that the set target [of -35%] is achieved, it is using the available flexibility in accordance with Article 6 of the European Effort Sharing Regulation (see above, strategic section 1.1.1.ii., Flemish Region).

**Table 13 - Trends in total GHG emissions by IPCC sector
(WAM scenario, in Mt CO₂eq)**

	2005	2010	2015	2020	2025	2030
1 Energy	105.5	98.8	85.7	81.9	89.6	98.3
1A Fossil fuel combustion	104.8	98.0	85.1	81.3	89.0	97.7
1A1 Energy industries	29.4	26.5	21.2	16.5	22.0	29.9
1A2 Manufacturing industries and construction	18.5	15.6	13.6	14.4	16.5	17.0
1A3 Transport	26.6	26.4	26.7	26.9	27.5	28.3
1A4 Other sectors	30.0	29.3	23.5	23.4	22.9	22.4
1A5 Other	0.2	0.1	0.1	0.1	0.1	0.1
1B Fugitive emissions from fuels	0.7	0.8	0.7	0.6	0.6	0.6
2 Industrial processes and product use	26.4	21.5	19.7	20.3	19.6	19.2
3 Agriculture	10.3	10.2	10.0	9.8	9.4	9.2
4 LULUCF	-3.0	-1.5	-1.2	-0.7	-0.9	-1.2
5 Waste	3.1	2.5	1.6	1.3	1.0	0.8

Source: Belgian CRF report (15 March 2019) for 2005-2015;
compilation of regional projections for 2020-2030.

In the WAM scenario, energy-related emissions are expected to fall at sectoral level to 2030. Only emissions from the energy industries subsector continue to rise between 2015 and 2030, from 21 Mt CO₂eq to 31 Mt CO₂eq. This is explained by the increased use of gas-fired power stations (see above). The most significant reductions are in the transport and buildings sectors, with falls of 27% and 41% respectively by 2030 compared with 2005. Emissions from industrial processes see relatively modest falls between 2015 and 2030. In the agricultural sector, the planned additional measures lead to a 20% reduction by 2030 compared with 2005 (as opposed to 10% in the WEM scenario). Waste-related emissions continue their downward trend to 2030, as in the WEM scenario.

**Table 14 - Trends in GHG emissions by type of GHG, excluding LULUCF
(WAM scenario, in Mt CO₂eq)**

	2005	2010	2015	2020	2025	2030
CO ₂	125.5	113.8	99.8	94.4	98.9	99.5
CH ₄	9.3	8.8	8.1	7.3	6.5	5.8
N ₂ O	8.4	7.6	6.0	5.6	5.2	5.0
F-gases	2.1	2.8	3.3	2.6	1.8	1.0

Source: Belgian CRF report (15 March 2019) for 2005-2015;
compilation of regional projections for 2020-2030.

Between 2015 and 2030, the WAM scenario suggests that CO₂ emissions will stabilise (as opposed to increasing to 114 Mt CO₂eq in 2030 in the WEM scenario). The continued decline in methane emissions is largely explained by changes in landfill emissions (see also Table 13), although further reductions in the agricultural sector also play a part. Nitrous oxide emissions fall more sharply during the period 2015-2030 compared with the WEM scenario, particularly due to further reductions in the agricultural sector and in emissions from industrial processes. Likewise, further reductions in F-gases are expected during the period 2015-2030 compared with the WEM scenario.

	2005	2010	2015	2020	2025	2030
Belgium		-2.7%	-9.9%	-14.9%	-24.3%	-34.4%
Flemish Region		-1.3%	-7.4%	-11.2%	-21.3%	-32.6%
Wallonia		-5.7%	-13.1%	-20.3%	-28.6%	-36.8%
Brussels Capital Region		0.5%	-16.1%	-20.7%	-30.1%	-39.4%

**Table 15 - Trends in ESD GHG emissions by IPCC sector
(WAM scenario, in Mt CO₂eq)**

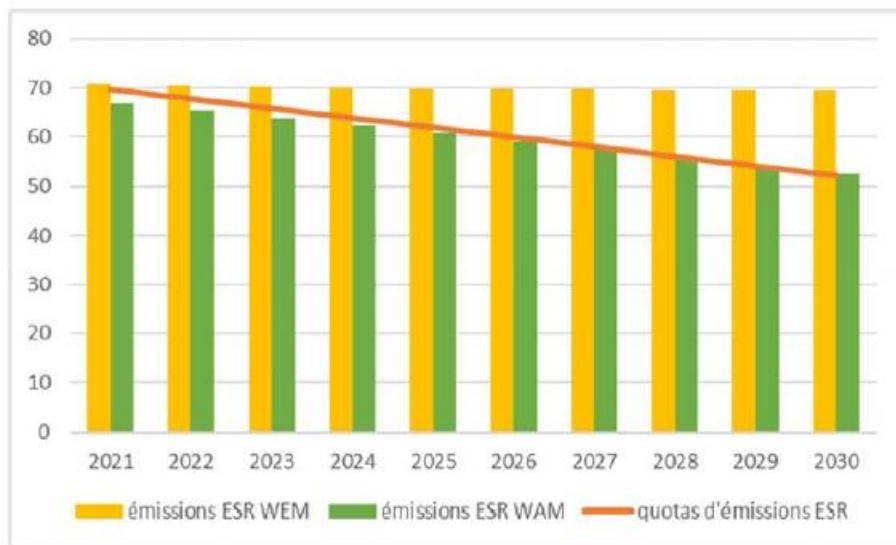
	2005	2010	2015	2020	2025	2030
1 Energy	63.1	62.3	56.9	56.6	56.8	57.3
1A Fossil fuel combustion	62.4	61.7	56.3	56.0	56.2	56.7
1A1 Energy industries	1.9	2.0	2.4	2.2	2.1	2.1
1A2 Manufacturing industries and construction	4.0	4.1	3.9	3.4	3.7	3.9
1A3 Transport	26.5	26.3	26.6	26.9	27.5	28.3
1A4 Other sectors	29.9	29.2	23.4	23.3	22.8	22.3
1A5 Other	0.2	0.1	0.1	0.1	0.1	0.1
1B Fugitive emissions from fuels	0.6	0.7	0.6	0.6	0.6	0.6
2 Industrial processes and product use	2.7	3.7	4.1	3.6	2.9	2.3
3 Agriculture	10.3	10.2	10.0	9.8	9.4	9.2
4 LULUCF	-	-	-	-	-	-
5 Waste	2.6	1.9	1.3	1.0	0.7	0.6

Source: Belgian CRF report (15 March 2019) for 2005-2015;
compilation of regional projections for 2020-2030.

The reduction in ESD emissions of 53 Mt CO₂eq by 2030 (as opposed to 70 Mt CO₂eq in the WEM scenario) is largely attributable to the reductions in energy-related emissions, which fall from 57 Mt CO₂eq to 42 Mt CO₂eq between 2015 and 2030 (as opposed to 57 Mt CO₂eq by 2030 in the WEM scenario). In absolute terms, the main reductions during the period 2015-2030 are in the buildings and transport subsectors. Emissions from industrial processes decrease in the WAM scenario from 4.1 Mt CO₂eq in 2015 to 1.5 Mt CO₂eq in 2030 (as opposed to 2.3 Mt CO₂eq in 2030 in the WEM scenario). This is chiefly due to the fall in F-gas emissions (see also Table 14) and additional policy efforts in the WAM scenario targeting nitrous oxide emissions from caprolactam production. As explained above, waste-related emissions also continue to decline to 2030, as in the WEM scenario.

As a guide, Graph 1 compares the ESR emissions in the WEM and WAM scenarios with the ESR emission allocation, as (provisionally) set by the EEA (European Environment Agency). The emissions during the periods 2021-2024 and 2026-2029 have been determined by interpolation. In the WEM scenario, the emission allocation is exceeded in each year of the ESR period (2021-2030). In the WAM scenario, the emission allocation is exceeded to a limited extent in the years 2029-2030. The cumulative ESR targets are met in the period 2021-2030, with a total surplus of 11 Mt CO₂eq.

Graph 1 - ESR projections 2021-2030, WEM and WAM scenarios (in Mt CO₂eq)



Source: Compilation of regional projections for 2020-2030 (ESR emissions, WEM and WAM scenarios); EEA Report No 16/2018 (¹¹) (ESR emission allocations).

émissions ESR WEM	WEM ESR emissions
émissions ESR WAM	WAM ESR emissions
quota d'émissions ESR	ESR emission allocations

2.1.2. Renewable energy

Table 16 - Share of renewable energy sources in gross final energy consumption, total and by sector (WAM scenario, in %)

	2005	2010	2015	2020	2025	2030
RES	2.3	5.7	7.9	11.7	13.7	17.5
RES-E	2.4	7.1	15.5	25.1	27.6	37.4
RES-T	0.6	4.7	3.8	11.0	17.6	23.7
RES-H&C	3.4	6.1	7.8	8.0	9.4	11.3

Source: Eurostat and SHARES 2016 results (<http://ec.europa.eu/eurostat/web/energy/data/shares>) for 2005-2015; compilation of regional and federal projections for 2020-2030.

The planned policies and measures deliver a total share of renewable energy sources of 17.5% in 2030, i.e. 7 percentage points higher than in the WEM scenario (10.5%).

By comparison with the WEM scenario, the increase during the period is particularly striking in the electricity generation and transport sectors.

The share of renewable energy sources in electricity consumption (RES-E) climbs to 37.4% in 2030 in the WAM scenario, compared with 23.8% in the WEM scenario and 15.5% in 2015. The higher share in the WAM scenario than in the WEM scenario is due to growth in electricity generation from RES (+63% compared with the WEM scenario in 2030) (¹²), although the increase in final electricity consumption should also be noted (+4% compared with the WEM scenario in 2030).

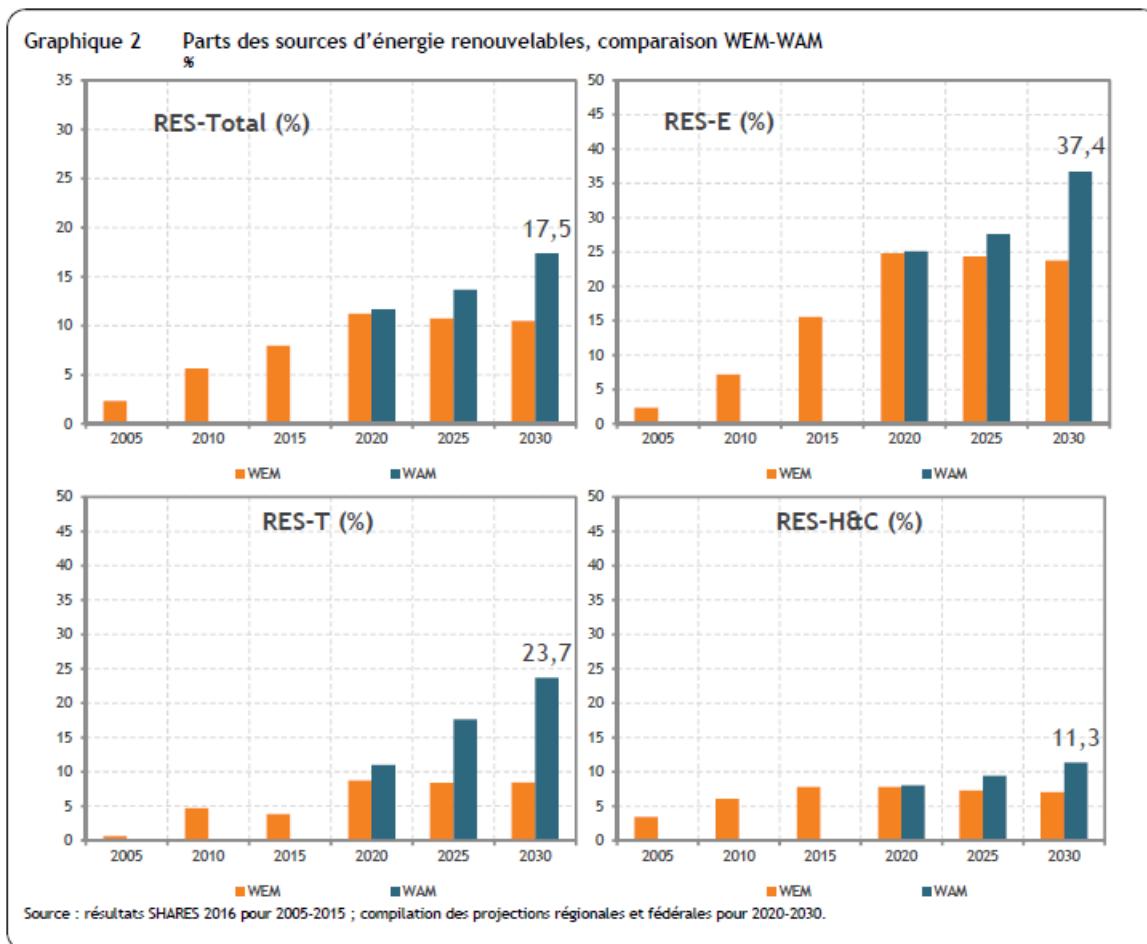
The share of renewable energy sources in transport (RES-T) rises to 23.7% in 2030 in the WAM scenario, compared with 8.4% in the WEM scenario and 3.8% in 2015. The higher share in the WAM scenario than in the

¹¹ <https://www.eea.europa.eu/publications/trends-and-projections-in-europe-2018>

¹² This growth applies to all RES technologies, but is particularly pronounced for wind energy (both onshore and offshore): +77% for wind, +44% for solar PV and +20% for biomass.

WEM scenario is due to increased use of biofuels (+20% compared with the WEM scenario in 2030) and RES-E (4 times the WEM level in 2030) following growth in the use of electric vehicles, as well as the fall in final energy consumption for transport (-21% compared with the WEM scenario in 2030).

Graph 2 - Share of renewable energy sources, WEM-WAM comparison



Source: SHARES 2016 results for 2005-2015;
compilation of regional and federal projections for 2020-2030.

Lastly, the share of renewable energy sources in heating and cooling (RES-H&C) increases moderately in the WAM scenario to 11.3% in 2030, compared with 7.1% in the WEM scenario and 7.8% in 2015. Given that the total energy consumption for heating and cooling is comparable in the WAM and WEM scenarios, the sole reason for this increase is greater use of RES for heating and cooling (e.g. biomass, electric heat pumps).

Graph 2 compares the trends in the share of RES in the WAM scenario over the period 2020-2030 with the indicative trajectory defined in Article 4(a)(2) of the Governance Regulation.

Graph 2 - Trends in the share of RES in the WAM scenario and indicative trajectory (in %)



Lastly, the following table shows the development in RES by technology in the WAM scenario.

(ktoe)	2015	2020	2025	2030
RES-E	1,199.3	2,049.0	2,347.7	3,269.5
Hydro	28.4	31.7	35.2	38.6
Wind	434.8	1,162.9	1,340.5	2,102.3
Solar PV	262.5	387.5	604.4	836.7
Biomass	473.6	466.9	367.6	291.9
RES-T	288.7	717.2	933.9	983.6
RES elec road	0.2	12.3	43.8	118.3
RES elec rail	33.9	34.7	45.5	64.7
Biofuels	254.6	670.2	844.6	800.6
RES-H&C	1,432.5	1,515.7	1,781.8	2,071.6
Biomass	1,343.5	1,393.1	1,529.4	1,665.3
Derived heat	48.6	36.1	75.3	116.1
Heat pumps	40.4	86.5	177.1	290.2

2.1.3. Dimension energy efficiency

Projections with the planned policies and measures show a decline in both primary and final energy consumption during the period 2020-2030. In 2030, primary energy consumption is 42.7 Mtoe, i.e. 19% below the 2005 level (¹³). Final energy consumption is 35.2 Mtoe, i.e. 7% below the 2005 level (¹⁴).

¹³ According to Eurostat energy balances. If the total regional primary energy consumption for 2005 is used, the percentage reduction in 2030 is 22%.

¹⁴ According to Eurostat energy balances. If the total regional final energy consumption for 2005 is used, the percentage reduction in 2030 is 11%.

**Table 17 - Primary and final energy consumption in the economy and by sector
(WEM scenario, in ktoe)**

	2005	2010	2015	2020	2025	2030
Primary energy consumption	52,544	53,937	45,741	47,817	45,602	42,710
Final energy consumption	37,803	38,036	35,880	36,008	36,212	35,202
Industry	12,935	12,468	11,918	13,129	14,436	15,005
Residential	9,925	9,411	8,163	7,802	7,168	6,516
Tertiary	4,995	5,812	5,358	5,017	4,786	4,526
Transport	9,948	10,345	10,440	10,060	9,823	9,156

Source: Eurostat (June 2018) for 2005-2015 (updated for solid fuels) (¹⁵); compilation of regional projections for 2020-2030.

Note: For the period 2020-2030, final energy demand in the transport sector corresponds to fuel sales in Flanders and in the Brussels Capital Region, but to fuel consumption in Wallonia.

The planned policies and measures deliver primary and final energy savings of 3.4 Mtoe and 3.7 Mtoe respectively in comparison with the WEM scenario in 2030. In percentage terms, the savings are -7% and -10% respectively.

The sectors that contribute the most to the downward trend (in both absolute and relative terms) are the residential, tertiary and transport sectors. In 2030, the final energy consumption of each sector is 13% to 18% lower than in the WEM scenario. However, the planned policies and measures in industry reduce the sector's final energy consumption only by 1%.

Table 18 shows the trends in primary and final energy consumption to 2030 according to the PRIMES 2007 baseline. Compared with the levels projected in 2030 in this scenario, primary and final energy consumption in the WAM scenario are respectively 15% and 12% lower.

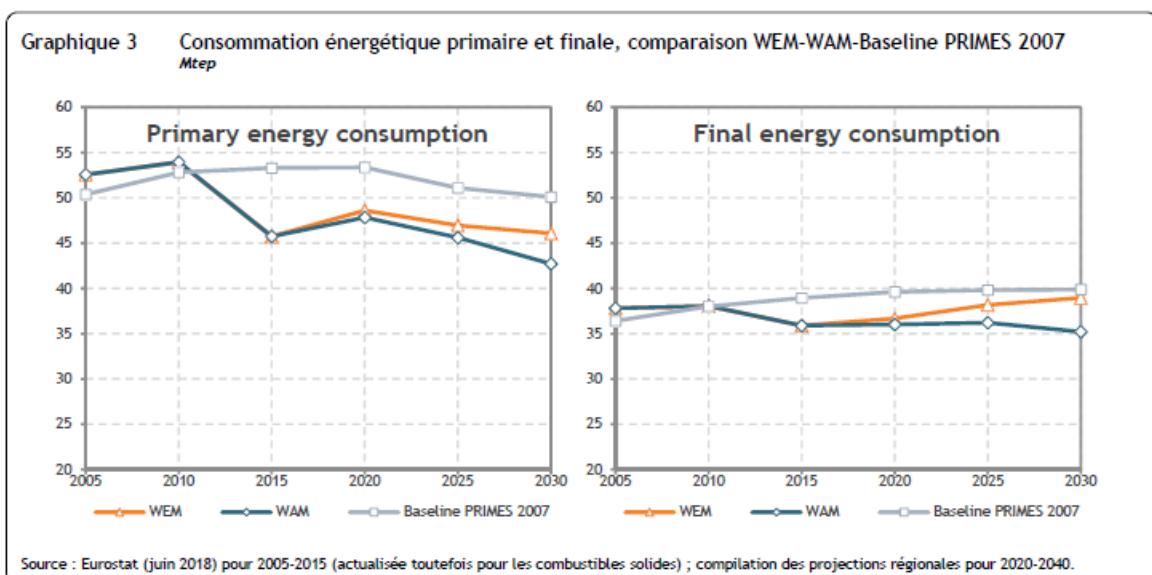
Table 18 - Primary and final energy consumption according to the PRIMES 2007 baseline (in ktoe)

	2005	2010	2015	2020	2025	2030
Primary energy consumption	50,369	52,803	53,289	53,353	51,078	50,094
Final energy consumption	36,403	38,013	38,938	39,613	39,803	39,870

Source: European Energy and Transport - Trends to 2030 – Update 2007 (EC, 2008).

¹⁵ Historical figures are taken from Eurostat energy balances for Belgium (European Commission recommendations/requests), while projections are based on regional energy balances. The difference between the two sources is small and reduces over time, for both total primary energy consumption and total final energy consumption: for 2005, it is 4% for both primary and final energy consumption; for 2015, it is zero for primary energy consumption and 1% for final energy consumption. However, the differences at energy and sector level may be much greater. It is worth noting that the consumption of solid fuels is currently under review and will be updated; the update will be sent to Eurostat as soon as possible.

Graph 3 - Primary and final energy consumption: comparison of WEM, WAM and PRIMES 2007 baseline (Mtoe)



Source: Eurostat (June 2018) for 2005-2015 (updated for solid fuels); compilation of regional projections for 2020-2040.

Dimension energy security

**Table 19 - Energy mix of gross domestic consumption
(WAM scenario, in %)**

	2005	2010	2015	2020	2025	2030
Solid fuels	10.6	6.8	5.9	5.2	5.5	5.9
Oil	40.9	39.8	44.6	40.1	40.2	40.2
Natural gas	24.5	27.3	25.7	24.4	32.4	38.9
Nuclear heat	20.4	20.2	12.4	19.1	8.6	0.0
Electricity	0.9	0.1	3.3	1.0	1.6	1.1
Renewable energy	1.9	4.6	6.8	8.6	9.8	12.2
Waste	0.8	1.2	1.3	1.7	1.7	1.7

Source: Eurostat (June 2018) for 2005-2015 (updated for solid fuels) (16); compilation of regional projections for 2020-2030.

The planned policies and measures reduce the share of fossil fuels in 2030, particularly oil (40.2% in the WAM scenario compared with 45.3% in the WEM scenario), while the share of RES increases by 4.4 percentage points.

Table 19 [sic-20] - Import dependency (WAM scenario, in %)

	2005	2010	2015	2020	2025	2030
Import dependency	77.2	73.8	78.9	70.6	79.8	86.0

Source: Eurostat (June 2018) for 2005-2015 (updated for solid fuels) (17); compilation of regional projections for 2020-2030.

Note: For the period 2020-2030, the breakdown between domestic renewable energy generation and net imports is not available. For the purposes of calculating import dependency, it is assumed that the renewable energy is generated entirely in Belgium.

¹⁶ Ibid.

¹⁷ Ibid.

Despite the additional policies and measures to stimulate the development of renewable energy sources, fossil fuels continue to account for more than 80% of the primary energy mix in 2030. However, Belgium's import dependency reduces by 4 percentage points compared with the WEM scenario.

IMPACT ASSESSMENT OF PLANNED POLICIES AND MEASURES

This assessment is chiefly made in the NECP. Federal measures are partly assessed in Chapter 3. See also the impact assessment note in the Federal Energy and Climate Plan, produced by the Federal Planning Bureau in September 2018, which focuses on the environmental, budgetary and macroeconomic impact of the two main federal measures with regard to renewable energy, namely offshore wind energy and blending of biofuels.

Overview of investment needs

- i. Existing investment flows and forward investment assumptions with regard to the planned policies and measures

On 11 September 2018, under the National Pact for Strategic Investments (Pacte National pour les Investissements Stratégiques – PNIS), a report was submitted by a Strategic Committee (group of independent experts) to the country's various governments. The report's specific aim was to offer an assessment of the strategic investment needs in Belgium to 2030, which cover six areas⁽¹⁸⁾, including energy and mobility.

- ii. Sector or market risk factors or barriers in the national or regional context
- iii. Analysis of additional public finance support or resources to fill identified gaps identified under point ii

Again under the National Pact for Strategic Investments, careful consideration has been given to the funding sources for strategic investments. Mobilising capital is one of the four cross-cutting areas identified in the Strategic Committee's report⁽¹⁹⁾ on which action needs to be taken to encourage investment. The [report of the 'Mobilisation of capital' working group](#) sets out a number of financial instruments that can be used to achieve the investments identified in the Strategic Committee's report.

However, this work of mapping the funding sources at national, regional and EU level is still ongoing. In particular, technical work on the subject has been carried out within two working groups⁽²⁰⁾ formed by a decision of the Consultation Committee of 27 March 2019.

¹⁸ The six areas of the PNIS are: 'Digital', 'Cybersecurity', 'Education', 'Healthcare', 'Energy' and 'Mobility'.

¹⁹ The four cross-cutting areas are: 'Better regulations for strategic investment projects', 'Mobilising capital', 'Public-Private Partnerships', and 'A budgetary strategy and European rules that promote public investment'.

²⁰ The aim of these technical working groups, set up in the context of implementing the PNIS, is to prepare for the work of the Interministerial Conference on Strategic Investments, created by a decision of the Consultation Committee of 7 November 2018. The two groups involved in this case are: 'Group I: Interfederal governance and synergy with European bodies' and 'Group III: Mobilisation of capital (PPP and EPC)'.

1. CURRENT SITUATION AND PROJECTIONS WITH EXISTING POLICIES AND MEASURES

Projected evolution of main exogenous factors influencing energy system and GHG emission developments

Dimension decarbonisation

1.1.1. GHG emissions and removals

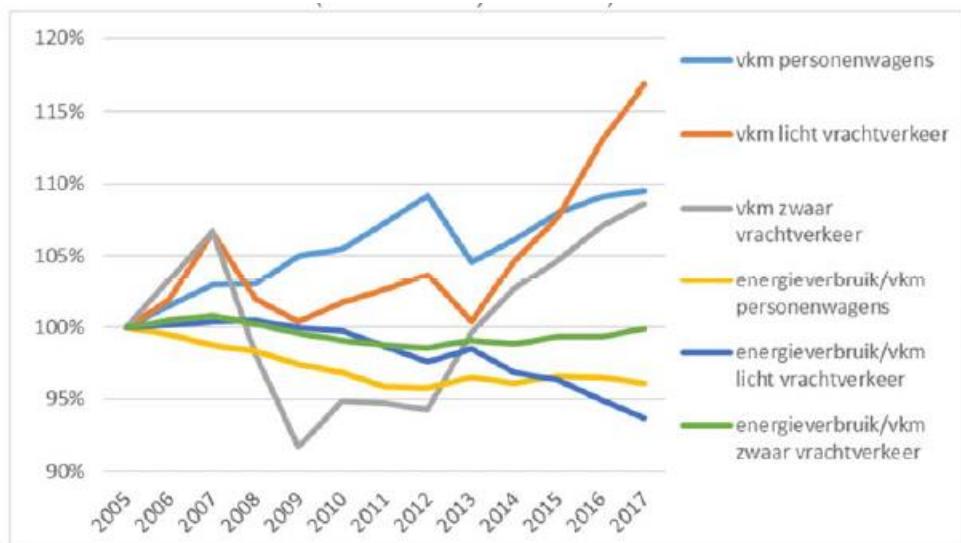
i. Trends in current GHG emissions and removals in the EU ETS, effort sharing and LULUCF sectors and different energy sectors

1.2.1.1. Transport sector

Figure 1-1 gives an overview of the main indicators of transport volumes and vehicle efficiency in road transport for the period 2005-2017. The source and method for calculating the number of vehicle-kilometres in road transport changed in 2013. The Federal Public Service for Mobility and Transport provided the data for the period 2005-2012. Since 2013, this task has been carried out by the Flemish traffic management centre (VMM). The change in method led to a 1% reduction in the total number of vehicle-kilometres (for passenger cars, light commercial vehicles and heavy goods vehicles combined). The estimated activity of passenger cars was revised downwards, especially on country roads. However, the estimate for heavy-duty vehicles was revised upwards, particularly in towns and villages, but less so on motorways. These changes mean that the vehicle-kilometres between 2005 and 2012 are not entirely comparable with those in subsequent years. The trend in the traffic indicators between 2013 and 2017 is based on one and the same method and can therefore be analysed in an entirely consistent manner.

Taking the above into account, the number of vehicle-kilometres for passenger cars in the period 2005-2017 grew by 10%. Over the same period, the growth for vans and lorries was 17% and 9% respectively. It can also be seen that the energy efficiency of vehicles is improving somewhat, but not enough to compensate for the increase in volume.

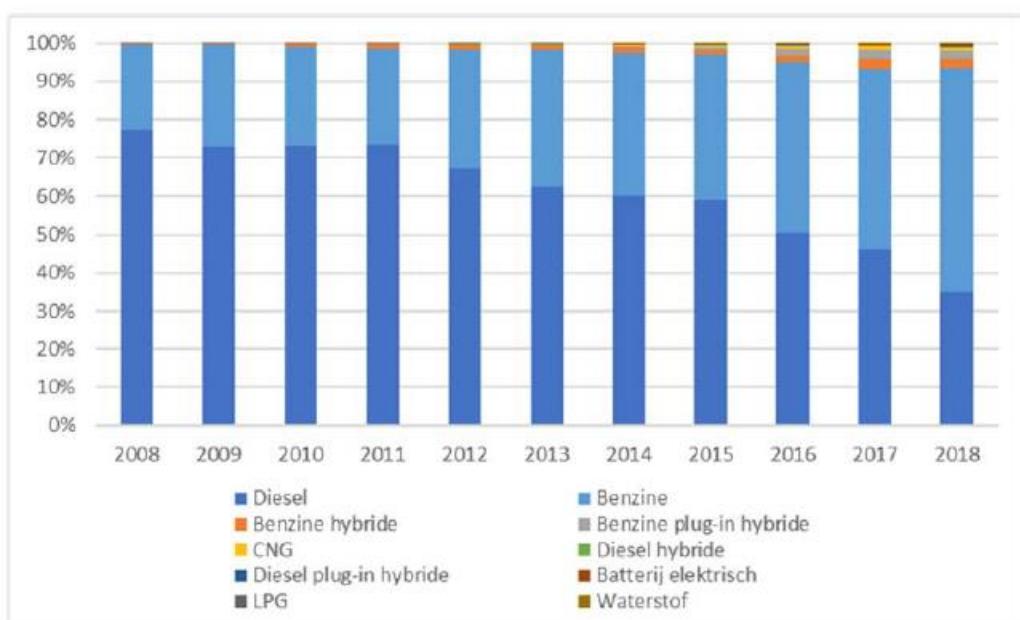
Figure 1-1. Overview of volumes and efficiency in road transport in Flanders (source: VMM, March 2019)



vkm personenwagens	vkm passenger cars
vkm licht vrachtverkeer	vkm light commercial vehicles
vkm zwaar vrachtverkeer	vkm heavy goods vehicles
energieverbruik/vkm personenwagens	energy consumption/vkm passenger cars
energieverbruik/vkm licht vrachtverkeer	energy consumption/vkm light commercial vehicles

The size and composition of the vehicle fleet has a considerable impact on the emissions caused by the transport sector. Figure 1-2 shows that the proportion of diesel vehicles in new vehicle sales has been falling for several years, reaching 35% in 2018. This is due to the fact that even the latest Euro 6 standard is not sufficient to achieve the European air quality objectives, and policies have therefore been put in place to discourage the purchase of diesel vehicles. For example, the Flemish Government has endeavoured to make vehicle taxation greener by adjusting vehicle registration tax and annual road tax. As a result, demand has mainly shifted towards petrol vehicles. Despite the strong relative growth in alternative technologies (battery electric vehicles, plug-in hybrid electric vehicles and natural gas (CNG) vehicles), together these accounted for only just over 4% of new passenger car sales in 2018. The goal for 2020 is to achieve a market share of 7.5% for battery electric vehicles among new car sales. We will assess at the end of 2020 whether this goal has been achieved and make the necessary adjustments. Based on current projections, 3.7% of vehicles will be zero-emission vehicles by the end of 2020. The total size of the Flemish passenger car fleet grew by 20% between 2005 and 2018.

Figure 1-2. Distribution of fuel technology in new passenger cars (source: Ecoscore reports)



Diesel	Diesel
Benzine hybride	Petrol hybrid
CNG	CNG
Diesel plug-in hybride	Diesel plug-in hybrid
LPG	LPG
Benzine	Petrol
Benzine plug-in hybride	Petrol plug-in hybrid
Diesel hybride	Diesel hybrid
Batterij elektrisch	Battery electric
Waterstof	Hydrogen

Passenger transport emissions largely depend on the methods of transport used. A higher proportion of public transport usually leads to lower GHG emissions because the number of vehicle-kilometres travelled in cars is reduced. In the period 2000-2016, the modal share (²¹) of cars/motorbikes fell from 84% to 79%, but that share

²¹Source: MIRA report: <https://www.milieurapport.be/sectoren/transport/sectorkenmerken/personenkilometers->

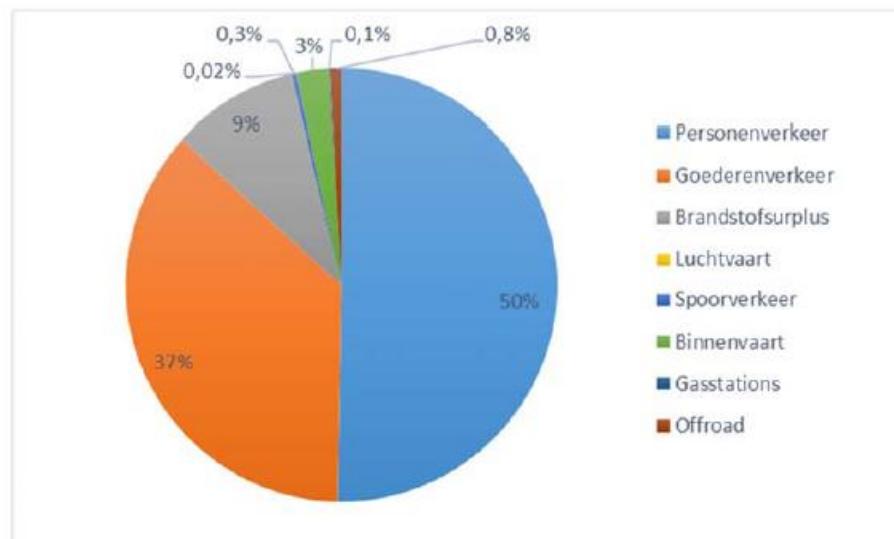
has remained stable over the last few years. A limited modal shift has taken place, but cars remain dominant and, as explained above, have increased in absolute terms.

As regards goods transport, road traffic continues to account for the largest proportion of transport volumes (²²). The share of road traffic in total goods transport has increased from 75% in 2000 to 82% in 2016. The more environmentally friendly modes of rail and inland navigation have therefore not succeeded in reducing the share of road traffic in total goods transport.

The non-ETS transport sector emitted 16.0 Mt CO₂eq in 2017, or 37% of the total non-ETS GHG emissions in Flanders. Emissions in the transport sector are composed of emissions from passenger transport and goods transport by road, plus the relatively low emissions from rail transport, maritime transport ((national share of) marine navigation and inland navigation), petrol stations (caused by the compression or decompression of natural gas) and off-road vehicles at ports and airports (Figure 1-3). Only the consumption of fossil fuels is taken into account within the scope of non-ETS emissions. This means that electricity generation for electric transport (electric trains, trams and road vehicles) falls outside this scope. CO₂ emissions from biofuels are regarded as zero in accordance with European and international inventory directives. Intra-EU aviation CO₂ emissions in the period 2013-2020 are covered by the ETS regulations, while extra-EU aviation and maritime (bunkering) emissions are not covered by international climate agreements. GHG emissions in the transport sector therefore primarily relate to the consumption of fossil fuels for passenger transport and goods transport by road, rail (diesel trains) and inland navigation.

The correction factor for fuel sales (or fuel surplus) accounts for a large proportion of total transport emissions. This correction is necessary due to the difference between emissions calculated using emission models and reported emissions based on federal fuel sales figures for road traffic. Over the past few years, this fuel surplus has fluctuated between 9% and 14% of modelled emissions.

Figure 1-3. Distribution of Flemish non-ETS GHG emissions from transport in 2017



Personenverkeer	Passenger transport
Goederenverkeer	Goods transport
Brandstofsurplus	Fuel surplus
Luchtvaart	Aviation
Spoorverkeer	Rail transport
Binnenvaart	Inland navigation

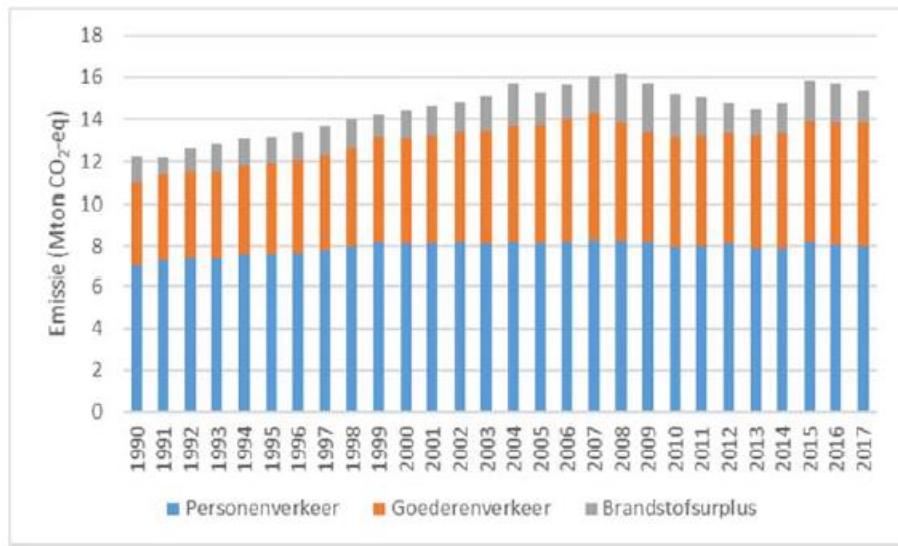
van-personenvervoer

²² Source: MIRA report: <https://www.milieurapport.be/sectoren/transport/sectorkenmerken/tonkilometers-van-goederenvervoer>

Gasstations	Petrol stations
Offroad	Off-road

Figure 1-3 clearly shows that road transport is a decisive factor in transport sector emissions as a whole. The trends in road traffic emissions in Flanders are shown in Figure 1-4.

Figure 1-4. Trends in GHG emissions from road traffic in Flanders for the period 1990-2017 (in Mt CO₂eq)



Emissie (Mton CO ₂ -eq)	Emissions (Mt CO ₂ eq)
Personenverkeer	Passenger transport
Goederenverkeer	Goods transport
Brandstofsurplus	Fuel surplus

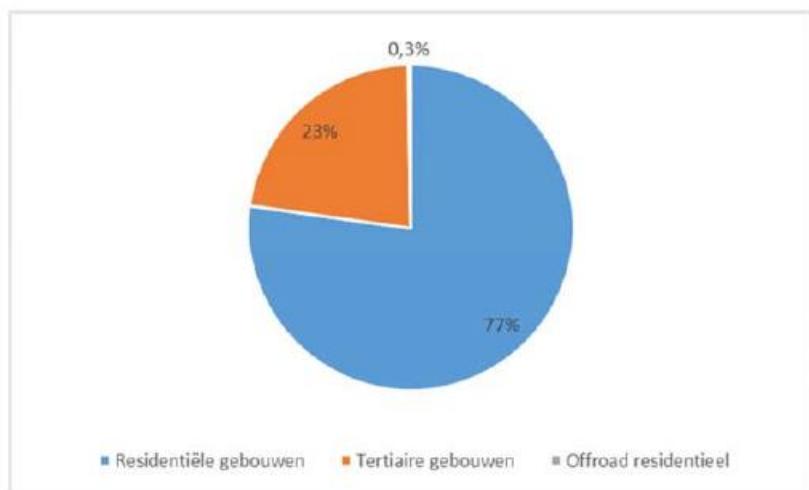
In 2008-2009, due to the financial crisis, there was a considerable dip in the activity and emissions of goods transport by road, but these began to rise again from 2012. Despite increasing fuel efficiency of vehicles and greater use of biofuels, GHG emissions are still not falling because activity has continued to increase. This has resulted in a 1% increase in total emissions from the transport sector in the period 2005-2017.

1.2.1.2. Buildings sector

Overview of the buildings sector

The non-ETS buildings sector emitted 12.2 Mt CO₂eq in 2017, or 28% of the total non-ETS GHG emissions in Flanders. Residential buildings and tertiary buildings respectively accounted for 77% and 23% of this figure in 2017. There are also very limited emissions from off-road activities (e.g. lawnmowers).

Figure 1-5. Buildings sector share of non-ETS emissions in 2017

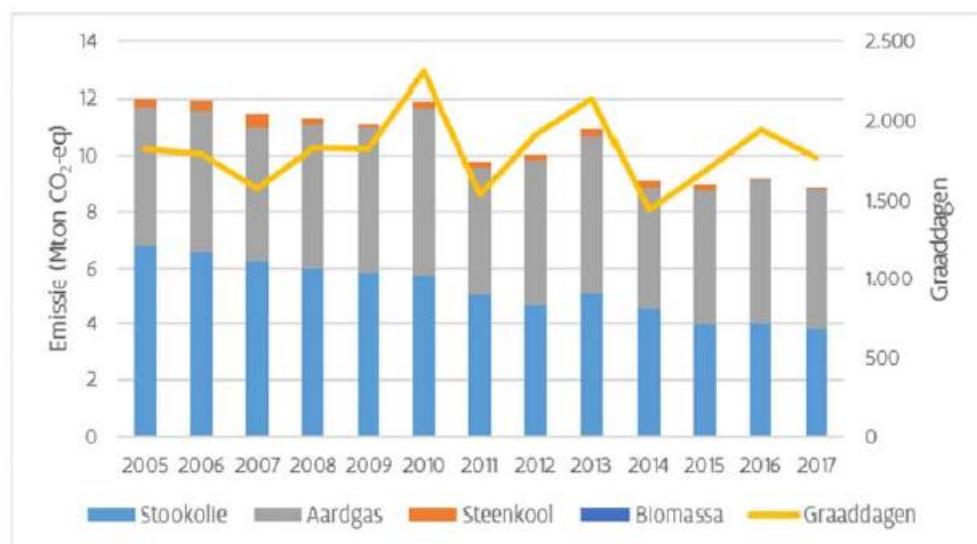


Residentiële gebouwen	Residential buildings
Tertiaire gebouwen	Tertiary buildings
Offroad residentieel	Off-road residential

Residential sector

Figure 1-6 shows the trends in (absolute) GHG emissions from residential buildings and the degree days (²³). GHG emissions are heavily dependent on heating requirements, which are proportional to degree days. Between 2005 and 2017, there was a 25% reduction in GHG emissions. Natural gas and heating oil accounted for the bulk of emissions in 2017, at 55% and 42% respectively.

Figure 1-6. GHG emissions (²⁴) from residential buildings between 2005 and 2017 (in Mt CO₂eq)



²³ Heating needs over a year are expressed in the number of degree days, which are generally based on a threshold value of 15°C for turning on the heating. To calculate the number of degree days in a year, each average daily temperature is compared with a constant daily average of 15°C. This means that each degree below the average daily temperature of 15°C is called a degree day.

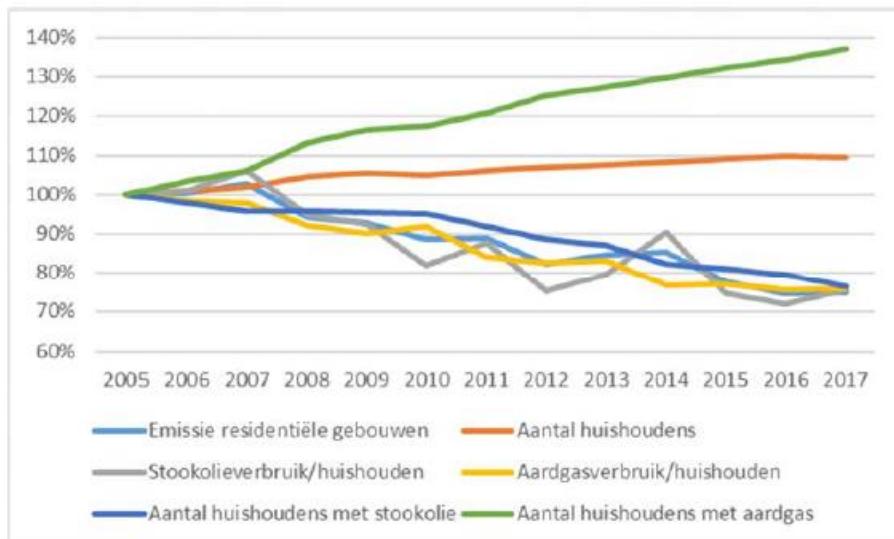
²⁴

Aardgas	Natural gas
Steenkool	Coal
Biomassa	Biomass
Graaddagen	Degree days

Figure 1-7 shows a series of trends in energy and emissions data corrected for the number of degree days. Between 2005 and 2017, emissions were on a downwards trend, despite the increasing number of households in Flanders. This can be partly explained by the fall in energy demand for heating per household. Over the period 2005-2017, this fall was 25% for heating oil and 24% for natural gas. A switch can also be seen from fuels with a high carbon content, such as heating oil and coal, to fuels with a lower carbon content, such as natural gas and, to a lesser extent, renewable energy sources such as wood, heat pumps and solar water heaters. In the same period, the number of households using heating oil fell by 24%, while the number of households using natural gas increased by 37%.

The challenge over the coming period is therefore to continue and intensify this downwards trend through a highly ambitious renovation policy and the continuation of the EPB policy for new-builds.

Figure 1-7. Overview of trends for residential buildings (with correction for degree days)



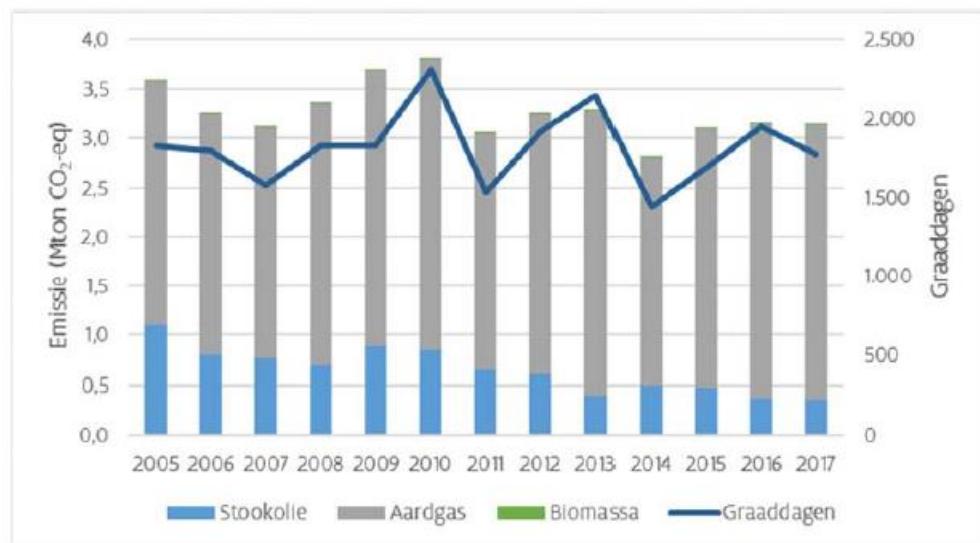
Emissie residentiële gebouwen	Emissions from residential buildings
Stookolieverbruik/huishouden	Heating oil consumption/household
Aantal huishoudens met stookolie	Number of households with heating oil
Aantal huishoudens	Number of households
Aardgasverbruik/huishouden	Natural gas consumption/household
Aantal huishoudens met aardgas	Number of households with natural gas

Tertiary sector (25)

Figure 1-8 shows the trends in GHG emissions in the tertiary sector and the degree days. GHG emissions are heavily dependent on heating requirements, which are proportional to degree days.

²⁵ The tertiary sector is defined as non-residential and non-industrial buildings.

Figure 1-8. Trends in GHG emissions in the tertiary sector between 2005 and 2017



Emissie (Mton CO ₂ -eq)	Emissions (Mt CO ₂ eq)
Stookolie	Heating oil
Aardgas	Natural gas
Biomassa	Biomass
Graaddagen	Degree days

Between 2005 and 2017, there was an 11% reduction in GHG emissions. Up to 2005, GHG emissions had been in line with economic activity. Since then, emissions have more or less stabilised, with fluctuations depending on degree days. The further increase in activity has therefore been offset by improved energy efficiency and by the switch to fuels with a lower carbon content, primarily from heating oil to natural gas.

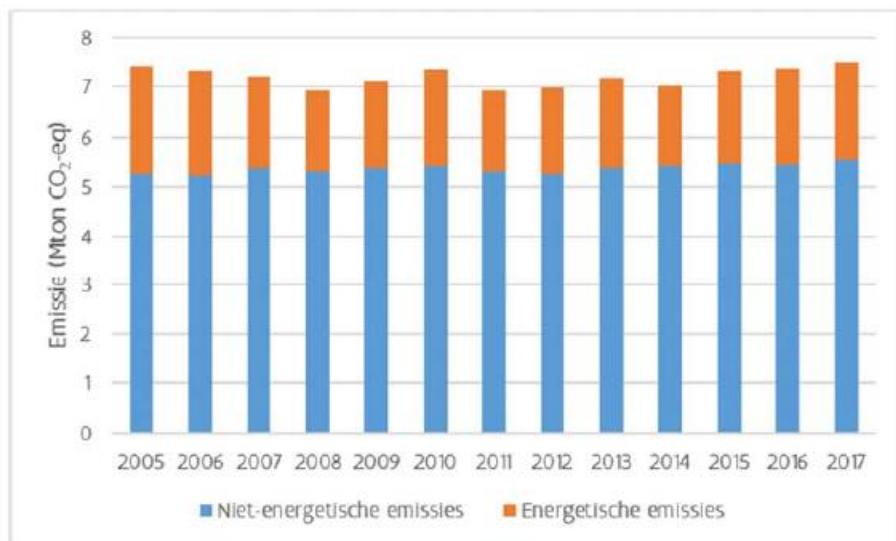
In order to convert this stabilisation of the last few years into a downward trend, a far-reaching renovation policy is required.

1.2.1.3. Agricultural sector

In 2017, the agricultural sector in Flanders emitted 7.5 Mt CO₂eq, or 17% of non-ETS emissions. The main energy sources of greenhouse gases in agriculture are fossil fuels (e.g. for heating greenhouses and barns) and off-road mobile machinery. Non-energy sources are primarily methane production through fermentation in animal digestion and manure storage, and production of nitrous oxide following the use of animal manure and chemical fertilisers. The use of urea and lime is also a very limited source of CO₂.

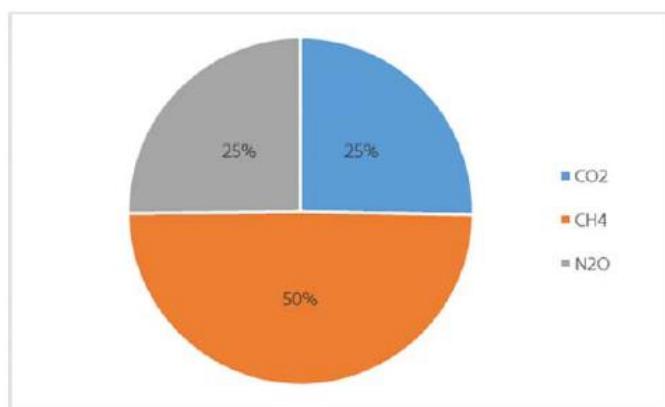
In the period 2005-2017, total emissions in the agricultural sector remained stable (Figure 1-9). In the same period, Flemish agricultural production grew, in terms of both production volumes and final product value for all subsectors combined (+16.7% between 2005 and 2018). These figures indicate that the agricultural sector has been successful in achieving a relative decoupling in this period.

Figure 1-9. Trends in GHG emissions in the agricultural sector 2005-2017



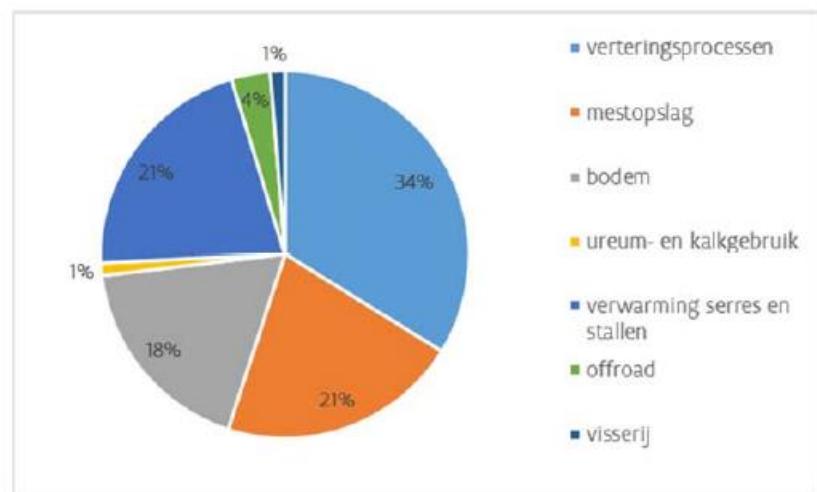
The main greenhouse gases in the agricultural sector in 2017 were, in decreasing order, methane (CH₄), nitrous oxide (N₂O) and carbon dioxide (CO₂) (Figure 1-10). Methane and nitrous oxide together account for 75% of these gases. Methane emissions mainly stem from the digestive processes of ruminants and from the production, storage and use of animal manure. Nitrous oxide is released into the atmosphere during the production and storage of animal manure and through soil processes following the use of nitrogen fertilisers (animal manure/artificial fertiliser). Both CH₄ and N₂O are emitted during the production and storage of manure/fertilisers.

Figure 1-10. Proportions of greenhouse gases in the agricultural sector in 2017



Non-energy emissions account for 74% of Flemish agricultural emissions, with energy emissions representing 26% (Figure 1-11).

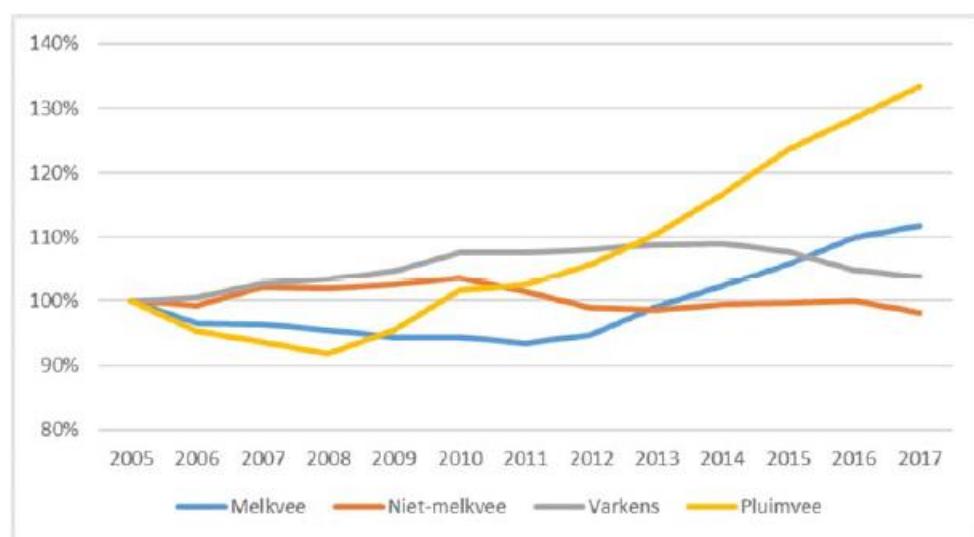
Figure 1-11. Proportions of sources in the agricultural sector in 2017



Verteringsprocessen	Digestive processes
Mestopslag	Manure storage
Bodem	Soil
Ureum- en kalkgebruik	Urea and lime
Verwarming serres en stallen	Heating of greenhouses and barns
Offroad	Off-road
Visserij	Fisheries

Non-energy emissions from digestive processes (CH_4) and manure storage (CH_4 and N_2O) are closely linked to changes in the size and composition of livestock. In this context, cattle (dairy and non-dairy cattle) play an important role. Between 2005 and 2017, the number of non-dairy cattle remained stable, whilst the number of dairy cattle and pigs rose (Figure 4-17). The number of poultry increased significantly in this period. However, as poultry are monogastric, they contribute less to GHG emissions.

Figure 1-12. Trends in livestock according to VLM reports between 2005 and 2017



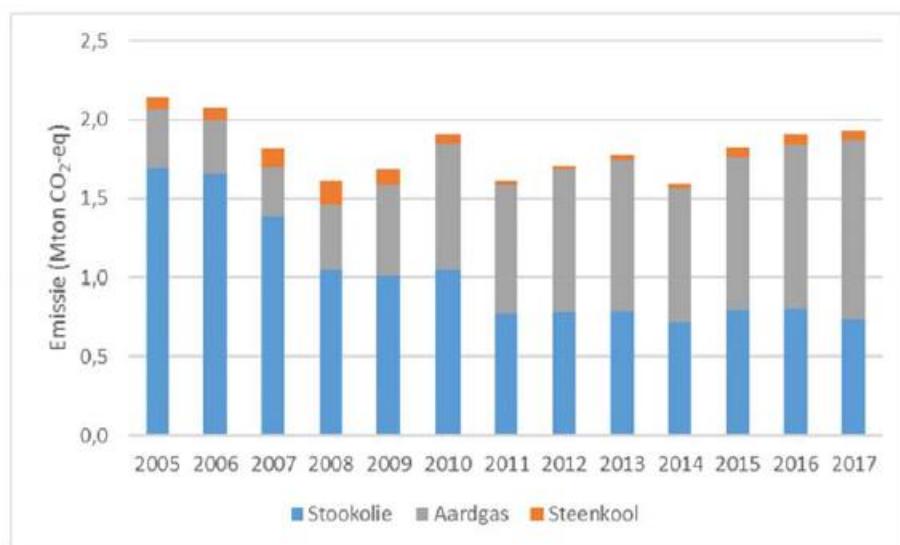
Melkvee	Dairy cattle
Niet-melkvee	Non-dairy cattle
Varkens	Pigs
Pluimvee	Poultry

Emissions from manure consist of nitrous oxide and methane. These two gases are formed by the bacteria that break down the organic material. Barn and manure management therefore has an impact on the formation and emission of these greenhouse gases. Nitrous oxide emissions from manure mainly stem from cattle, whilst methane emissions from manure primarily stem from pigs.

Soil emissions are nitrous oxide emissions that are directly and indirectly released (through nitrogen deposition) from nitrification and denitrification processes in the soil. Nitrous oxide emissions from grasslands and arable land are the result of agricultural activities that add nitrogen to the soil. The main agricultural activities that add nitrogen are the administration of manure, production of manure by grazing animals and crop residues that are left on the land after harvesting.

Energy emissions stem from burning fossil fuels, primarily in greenhouse horticulture and intensive livestock farming in order to heat greenhouses and barns. In 2017, they accounted for 26% of total agriculture emissions. Figure 1-13 shows that energy emissions, taken as a whole, fluctuated to a certain degree in the period 2005-2017 but did not reduce, despite efforts being focused on rational energy consumption and use of less carbon-intensive fuels in greenhouse horticulture. Since 2006, there has been a switch from petroleum-based products (mainly heating oil) to natural gas and biomass (both biogas and solid biomass). However, since 2008, natural gas consumption has risen more quickly due to an increasing number of stand-alone cogeneration units being commissioned. Although most of these have been new installations, some have replaced older equipment that was largely being operated in conjunction with an electricity producer and that has now been replaced by self-managed equipment. In the greenhouse gas inventory, this has resulted in a shift of natural gas consumption from the electricity and heating sector to the agricultural sector.

Figure 1-13. Trends in energy emissions in the agricultural sector 2005-2017



Emissie (Mton CO ₂ -eq)	Emissions (Mt CO ₂ eq)
Stookolie	Heating oil
Aardgas	Natural gas
Steenkool	Coal

Agricultural production in Flanders is mainly market-oriented. Any change in consumption and eating patterns on the demand side leads to changes in production on the supply side, and therefore impacts emissions in the agricultural sector.

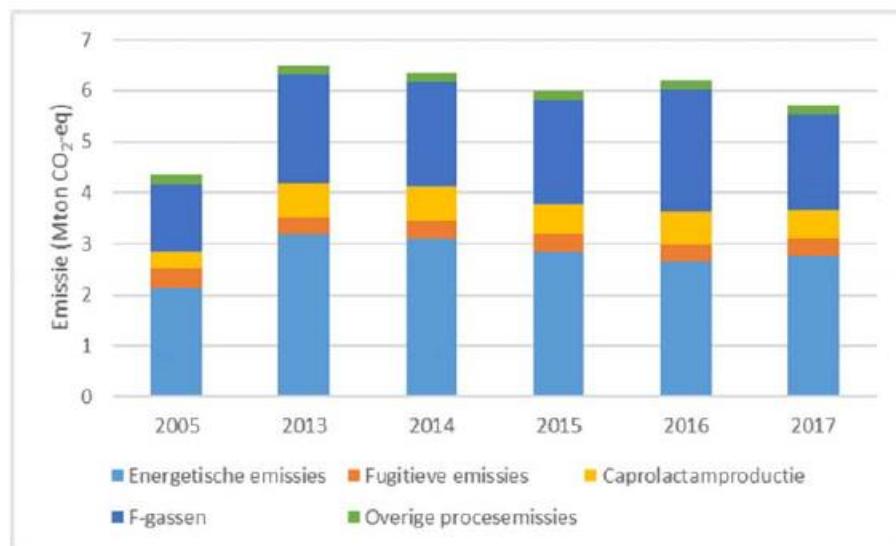
In all logic, technological innovation and management techniques should enable the rise in productivity to continue between 2021 and 2030, in particular through measures such as improved fertility, genetic selection and better biosafety.

1.2.1.4. Non-ETS industry

The total non-ETS GHG emissions from the industrial sector according to the ETS scope 2013-2020 were 5.7 Mt CO₂eq in 2017, or 13% of the total non-ETS GHG emissions in Flanders.

Figure 1-14 shows the trends in GHG emissions in non-ETS industry.

Figure 1-14. Trends in GHG emissions in non-ETS industry 2005-2017



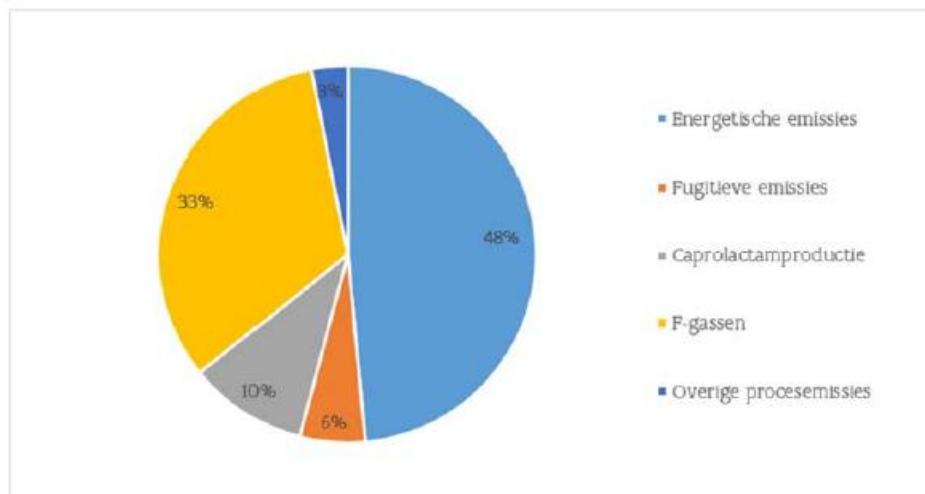
Emissie (Mton CO ₂ -eq)	Emissions (Mt CO ₂ eq)
Energetische emissies	Energy emissions
Fugitive emissies	Fugitive emissions
Caprolactamproductie	Caprolactam production
F-gassen	F-gases
Overige procesemissies	Other process emissions

Several factors particularly underlie the trends shown in Figure 1-14.

- There is a rising trend in the use and emission of F-gases, largely as a result of no longer using ozone-depleting substances in cooling systems, for which F-gases have long been the most obvious alternatives.
- Caprolactam production is a major source of nitrous oxide (N₂O) emissions in Flanders, which come from a single business. Emissions increased considerably between 2005 and 2013 because of rising production. Since then, emissions have fallen again due to process-related measures that have reduced the specific emissions. Over the last few years, emissions have fluctuated around 0.6 Mt CO₂eq.

Energy emissions from non-ETS industry (i.e. businesses that do not fall under the EU ETS) accounted for the bulk of emissions in 2017 (Figure 1-15) at 2.8 Mt CO₂eq., or 48%.

Figure 1-15. Proportions of GHG emissions in the industrial sector in 2017



Energetische emissies	Energy emissions
Fugitive emissies	Fugitive emissions
Caprolactamproductie	Caprolactam production
F-gassen	F-gases
Overige procesemissies	Other process emissions

Most of the energy emissions in industry fall under the ETS. This section only concerns the non-ETS part. Energy emissions in non-ETS industry mainly relate to the consumption of energy by the smallest businesses, which are often less energy-intensive. Their energy consumption (and energy emissions) partly stem from the heating of buildings (offices and other workspaces), as well as from the heating and steam needs of the businesses themselves (e.g. in the food industry). Around 25% of these energy emissions come from businesses that have signed up to the 'non-EDE' strategic measure (namely 0.7 Mt CO₂), of which 95% come from the combustion of natural gas.

Emissions from off-road mobile machinery in the industrial sector (including forklifts in both ETS and non-ETS industry and machinery in the agricultural sector) also form part of these energy emissions and accounted for 0.4 Mt CO₂eq in 2017.

Table 1-1. F-gas emissions (Mt CO₂eq)

	2005	2010	2015	2016	2017
Stationary cooling	0.74	1.07	1.25	1.21	1.21
<i>Air-conditioning and heat pumps</i>	0.04	0.10	0.19	0.20	0.23
<i>Commercial and industrial cooling and air-conditioning of large buildings</i>	0.70	0.97	1.06	1.01	0.98
Chemicals	0.18	0.10	0.29	0.65	0.16
Mobile air-conditioning	0.16	0.26	0.30	0.30	0.29
<i>Car air-conditioning</i>	0.12	0.20	0.23	0.23	0.22
<i>Air-conditioning of other vehicles</i>	0.04	0.06	0.07	0.07	0.07
Plastics industry	0.10	0.11	0.06	0.07	0.06
Sound insulating glass	0.05	0.05	0.05	0.04	0.04
Refrigerated transport	0.02	0.03	0.03	0.02	0.02
Electrical switchgear	0.01	0.01	0.01	0.01	0.01
Other (smaller sources)	0.09	0.07	0.08	0.08	0.08
Total	1.33	1.70	2.05	2.38	1.87

F-gases include PFCs, HFCs and SF₆ and stem from emission sources primarily in the industrial, tertiary and transport sectors (Table 1-1). These F-gas emissions accounted for 40% (or 2.4 Mt CO₂eq) in 2017, which implies a rise in F-gas emissions of approximately 0.5 Mt CO₂eq from 2015.

F-gas emissions resulting from the use of F-gases as a coolant in cooling systems have increased in the last few years. This is mainly due to the rise in F-gas emissions from many cooling applications that are now no longer in use and from which the coolants still present are being insufficiently recovered.

A rise in the number of air-conditioning installations and heat pumps that contain F-gases as a coolant has also led to an increase in the emission of these gases from these systems.

A switch to the use of coolants with a lower GWP value, which has been implemented in the meantime, should slow this rise.

On a positive note, F-gas emissions from stationary cooling systems that are still in operation are falling. Regulation (EU) No 517/2004, which currently applies, aims to reduce Europe-wide emissions by at least 60% by 2030 compared with 2005 levels. To achieve that goal, various measures and conditions have been imposed. Producers of systems that contain coolants and users of F-gases already have to make various efforts and must continue to do so in the future. As these systems are the main sources of these emissions, the fall is therefore explained by a reduction in the use of the most harmful coolants, wider use of more environmentally friendly alternatives and improved leakproofing of the cooling systems.

As regards **process emissions**, since 2013 only nitrous oxide emissions from caprolactam production (and only those from the smallest sources), which accounted for 13% (or 0.8 Mt CO₂eq) of the emissions from non-ETS industry in 2017, have been included under non-ETS emissions. Since 2013, the N₂O resulting from nitric acid production and almost all CO₂ process emissions have been included under the EU ETS.

Only a small proportion of the emissions from non ETS industry (6% or 0.3 Mt CO₂eq) involves **fugitive emissions** from refineries, heating oil transport and gas distribution.

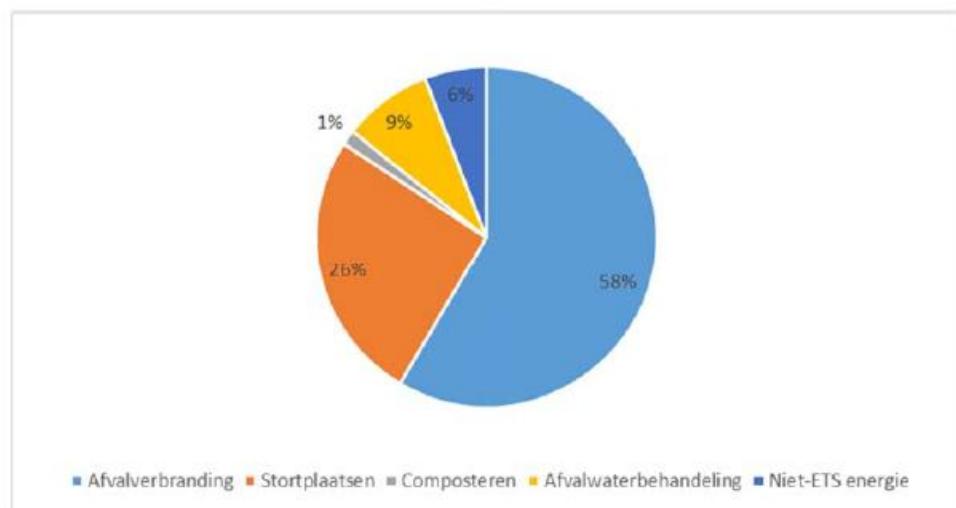
1.2.1.5. Waste sector

In 2017 the waste sector emitted 2.3 Mt CO₂eq, or 5% of non-ETS emissions. GHG emissions taken into account in the waste sector stem from waste incineration, landfills, composting and treatment of wastewater in sewage plants. This category also includes GHG emissions from the non-ETS part of the energy sector. These emissions are limited to methane and nitrous oxide emissions from the production of electricity and heat (as the CO₂ emissions fall under the EU ETS) as well as all GHG emissions from (a very limited number of) non-ETS cogeneration installations operated in collaboration with the electricity sector (²⁶).

Waste incineration accounts for the majority of emissions, at 58% in 2017 (Figure 1-16). Landfills and wastewater treatment account for 26% and 9% respectively.

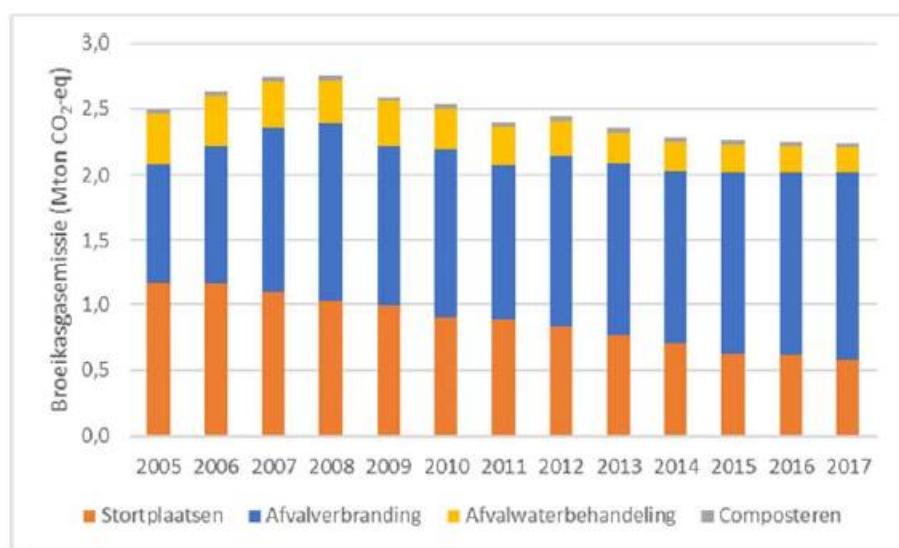
²⁶ Where a cogeneration installation involves collaboration between an electricity generator and a partner in another sector, its consumption, energy balance and GHG inventory are fully attributed to the electricity sector.

Figure 1-16. Proportions of GHG emissions in the waste sector in 2017



Between 2005 and 2017, the waste sector reduced GHG emissions by 20% (Figure 1-17). This is mainly due to the collection and treatment of landfill gas, which have been compulsory since 1995. Dumping in landfill has also been drastically reduced in accordance with the waste treatment hierarchy. A 50% reduction in methane emissions in the period 2005-2017 is the main factor behind the overall reduction in emissions in the waste sector. Restrictions on the dumping of waste continue, with this now being limited to flows for which there is no better treatment currently available. As a result, dumping of flammable waste is limited to fractions that are technically non-combustible. Landfills are designed in accordance with European legislation. Methane production will continue to fall in the future as no (or virtually no) organic waste is now being dumped and methane production at existing landfills is continuing to fall.

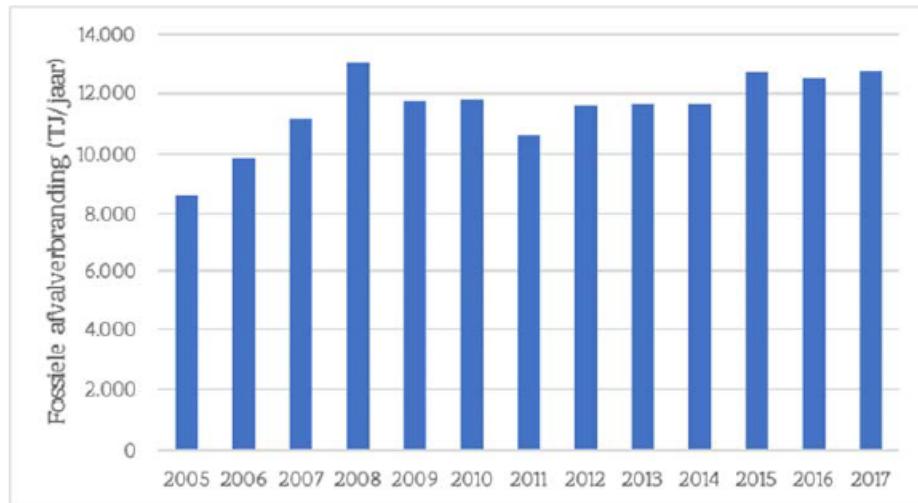
Figure 1-17. Trends in GHG emissions in the waste sector (excluding non-ETS energy)



Stortplaatsen	Landfills
Afvalverbranding	Waste incineration
Afvalwaterbehandeling	Wastewater treatment
Composteren	Composting

Emissions from waste incineration plants increased by 46% in the period 2005-2017. Following a rise in the period 2005-2008, the total quantity of incinerated waste has stabilised (Figure 1-18).

Figure 1-18. Quantity of incinerated waste between 2005 and 2017



Broeikasgasemissie (Mton CO ₂ -eq)	GHG emissions (Mt CO ₂ eq)
Stortplaatsen	Landfills
Afvalverbranding	Waste incineration
Afvalwaterbehandeling	Wastewater treatment
Composteren	Composting

Figure 1-19. Analyses of household waste sorting



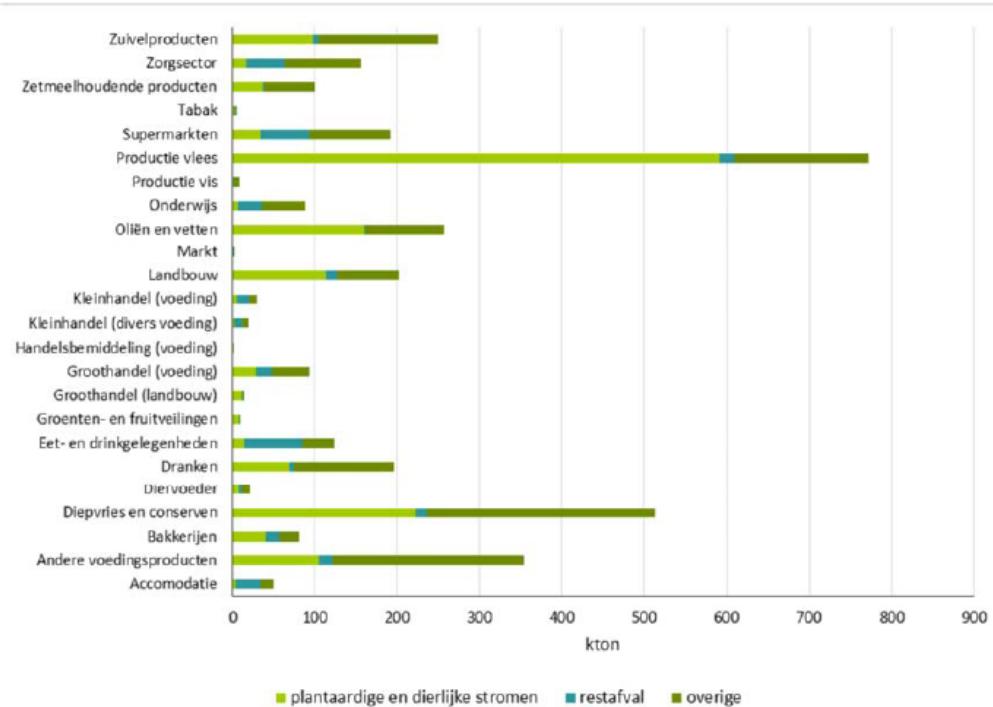
Inhoud van de huisvuilzak	Rubbish bag contents
kga	Small hazardous waste
houtafval	Wood waste
glas	Glass
organisch-biologisch afval	Organic and biological waste
drankkartons	Beverage cartons
textiel	Textiles
papier & karton	Paper and cardboard
kunststoffen	Plastics
metalen	Metals
overige	Other
hygiënisch afval	Hygienic waste
vast en niet-brandbaar afval	Solid and non-flammable waste
TOTAAL	TOTAL

Analyses of household waste sorting conducted by the Public Waste Agency of Flanders (Société publique des Déchets de la Région flamande/Openbare Vlaamse Afvalstoffenmaatschappij – OVAM) show that each inhabitant still generates an average of 110 kg of mixed household waste per year, of which a large proportion is potentially recyclable or can be dumped in landfill free of charge.

Recent waste sorting analyses made of selective roll-on roll-off containers in businesses show that still around 50% of similar residual commercial waste is potentially recyclable.

A recent survey entitled ‘Bedrijfsafvalstoffen productiejaar 2004-2016 (uitgave 2018)’ [Industrial waste production year 2004-2016 (2018 edition)] showed in particular that, in various relevant sectors, most of the organic and biological waste is selectively collected and recovered, but that, in several other sectors, a large part of this waste still ends up in the residual waste. The incineration of this organic and biological fraction is the least appropriate treatment method according to the waste hierarchy.

Figure 1-20. Ratio between plant and animal flows (including secondary raw materials), residual waste and other waste in the food sectors in Flanders in 2016



Zuivelproducten	Dairy products
Zorgsector	Healthcare sector
Zetmeelhoudende producten	Starch products
Tabak	Tobacco
Supermarkten	Supermarkets
Productie vlees	Meat production
Productie vis	Fish production
Onderwijs	Education
Oliën en vetten	Oils and fats
Markt	Market
Landbouw	Agriculture
Kleinhandel (voeding)	Retail (food)
Kleinhandel (diverse voeding)	Retail (miscellaneous food)
Handelsbemiddeling (voeding)	Commission trade (food)
Groothandel (voeding)	Wholesale (food)
Groothandel (landbouw)	Wholesale (agriculture)
Groenten- en fruitveilingen	Fruit and vegetable auctions
Eet- en drinkgelegenheden	Food and beverage outlets
Dranken	Drinks
Diervoeder	Animal feed
Diepvries en conserven	Frozen and canned foods
Bakkerijen	Bakeries
Andere voedingsproducten	Other food products
Accommodatie	Accommodation
plantaardige en dierlijke stromen	plant and animal flows
restafval	residual waste
overige	other

1.2.1.6. LULUCF sector

The way in which land use is organised has a direct impact on CO₂ concentrations in the atmosphere. After all, atmospheric CO₂ stored in soil and biomass (together with a long lifespan) does not contribute to climate change. As a result, better land use and management can slow climate change, while indiscriminate land use can have the opposite effect.

For LULUCF policy, the IPCC advocates five strictly defined categories: forest land, cropland, grassland, wetlands and settlements. In the Flemish greenhouse gas inventory, carbon storage and emissions through the various types of land use and through conversions between these (mandatory) are reported on the basis of these five land use categories. The settlement category in particular includes many different forms of land use, each with a very different carbon storage capacity. Distinctions will be made in this respect to ensure reporting and monitoring that are as accurate as possible. Table 1-2 summarises the breakdown of these categories into types of land use.

Table 1-2. Definition of the land use categories in the current Flemish greenhouse gas inventory

Forest land	- Forest preservation - Other land uses converted to forests
Cropland	- Cropland preservation - Other land uses converted to cropland
Grassland	- Grassland preservation - Other land uses converted to grassland
Wetlands	- Wetland preservation - Other land uses converted to wetlands
Settlements	- Settlement preservation - Other land uses converted to settlements

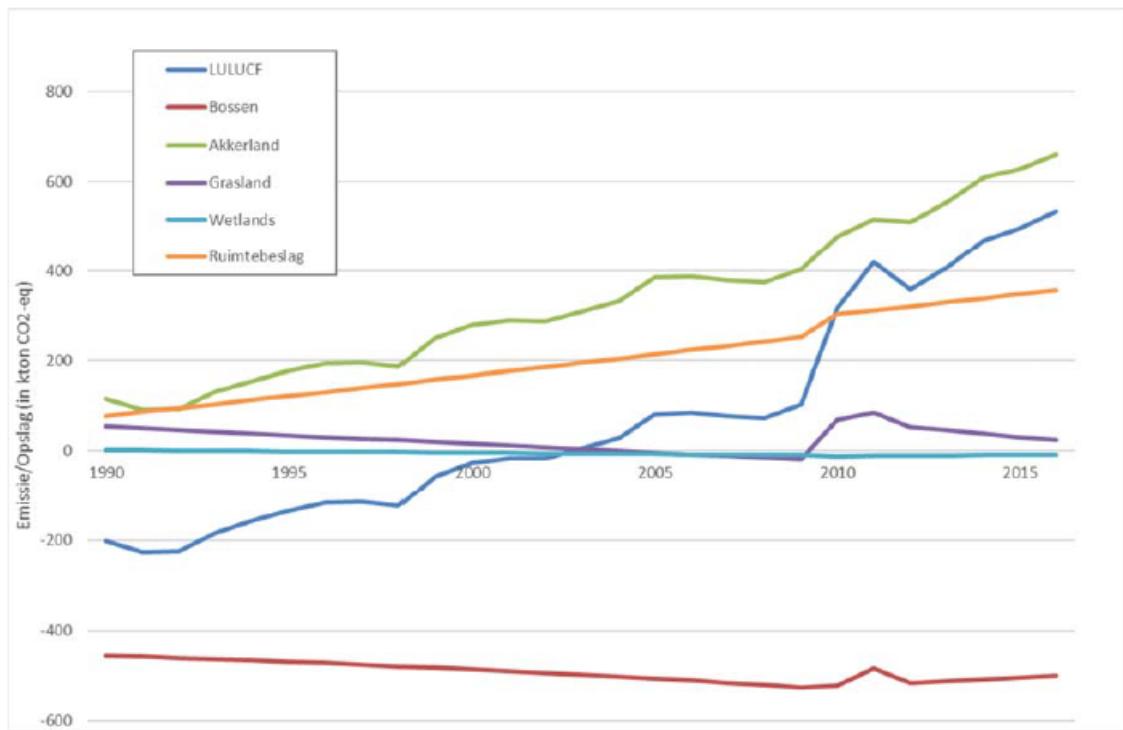
Table 1-3 provides an overview of carbon stocks and soil carbon concentrations for the various land use categories as reported in the Flemish greenhouse gas inventory for 2016. Until a soil carbon monitoring network is established (see Error! Reference source not found.), soil carbon concentrations are determined using the literature available.

Table 1-3. Overview of total carbon stocks in the various land use categories according to the current Flemish greenhouse gas inventory

	Surface area (ha) in 2016	Soil carbon (ton C/ha) in 2016	Total carbon stocks (kt C) in 2016
Forest land	153,938	96.3 (+60.3 in above-ground biomass)	24,159
Cropland	550,317	53.7	29,552
Grassland	188,809	73.5	13,877
Wetlands	33,214	100.0	3,321

Figure 1-21 illustrates the trends in carbon storage and emissions for the various land use categories, as reported in the Flemish greenhouse gas inventory. In accordance with IPCC guidelines, the start year of this inventory is 1990 and the conversion between land use categories is 20 years. In other words, grassland converted to cropland in 1990 leads to emissions in the greenhouse gas inventory up to 2010.

Figure 1-21. Trends in carbon storage and emissions for the various land use categories, as reported in the Flemish greenhouse gas inventory (1990-2016, in kt CO₂eq)



Emissie/Opslag (in kton CO ₂ -eq)	Emissions/storage (in kt CO ₂ eq)
LULUCF	LULUCF
Bossen	Forest land
Akkerland	Cropland
Grasland	Grassland
Wetlands	Wetlands
Ruimtebeslag	Settlements

To date, carbon storage and emissions as a result of these activities have been reported, but have been included in the European climate legislation, and in particular in the European climate targets, only to a very limited extent.

To fill this gap and meet the commitments under the Paris Agreement, Regulation (EU) 2018/841 of the European Parliament and of the Council of 30 May 2018 on the inclusion of greenhouse gas emissions and removals from land use, land use change and forestry in the 2030 climate and energy framework, and amending Regulation (EU) No 525/2013 and Decision No 529/2013/EU (hereinafter referred to as the LULUCF Regulation) has been approved. This regulation sets out the reporting rules and the obligations and objectives of the EU Member States in connection with the LULUCF sector for the period 2021-2030.

The LULUCF Regulation is divided into land use categories in order to cover the carbon storage and emissions through the various types of land use and conversions between them.

Table 1-4 provides an overview of this categorisation.

Table 1-4. Overview and allocation of the various types of land use (including conversions) to the various land use categories (see also Table 1-5)

From	To	Forest land	Cropland	Grassland	Wetlands	Settlements
Forest land	Managed forest land	Uncleared deforested land				
Cropland	Afforested land	Managed cropland	Managed grassland	Managed cropland	Managed cropland	Managed cropland
Grassland	Afforested land	Managed cropland	Managed grassland	Managed grassland	Managed grassland	Managed grassland
Wetlands	Afforested land	Managed cropland	Managed grassland	Wetlands	Wetlands	Wetlands
Settlements	Afforested land	Managed cropland	Managed grassland	Wetlands	Wetlands	Settlements

Carbon storage and emissions through soil and biomass, as shown in Figure 1-21, are partly determined by parameters that stem from natural/biological processes. The LULUCF Regulation is based on the principle that Member States are only responsible for emissions and/or storage of emissions caused by human activity. The accounting legislation agreed at European level therefore aims to count only those emissions and/or storage. That is predominantly why a specific comparison basis is used for counting emissions/storage through the various land use categories in the period 2021-2030.

For some activities such as deforestation and afforestation, all additional storage/emissions are counted, while for other activities (managed cropland, managed grassland, managed wetlands), a comparison is made with a historic reference period. Finally, in a third group, a comparison is made with a storage/emissions projection. To determine the development of storage through existing forests, the specific characteristics of the forest (age, composition, etc.) are decisive. That is why the LULUCF Regulation stipulates that storage/emissions through existing forests must be compared *ex post* with projected storage/emissions where the management of those forests (as in the reference period 2000-2009) is unchanged, i.e. with the Forest Reference Level (FRL) calculated *ex ante*. The ‘settlements’ category encompasses areas with buildings and infrastructure, including gardens, parks (city parks), sports fields, etc. Every category can be converted by human intervention to a ‘settlement’, with this category therefore also being relevant for the LULUCF emissions balance. However, the LULUCF Regulation does not advocate a specific reference or point of comparison for this land use category, which of course does not mean that settlements cannot in practice generate emissions. It is just that those emissions are implicitly included in other land use categories where they are part of settlements.

Table 1-5 shows how the various combinations indicated in Table 1-4 are allocated to the land use categories for reporting under the LULUCF Regulation.

Table 1-5. The various land use categories and the comparison basis advocated by the LULUCF Regulation

Land use categories	Reference
Afforested land	Full accounting
Uncleared deforested land	Full accounting
Managed cropland	Comparison with emissions/storage during the period 2005-2009
Managed grassland	Comparison with emissions/storage during the period 2005-2009
Managed forest land	Comparison with emissions/storage calculated <i>ex ante</i> where the management is unchanged (FRL)
Managed wetlands	Comparison with emissions/storage during the period 2005-2009
Settlements	Indirect accounting through other land use categories

ii. Projections of sectoral developments with existing national and Union policies and measures at least until 2040 (including for the year 2030)

1.1.2. Renewable energy

1.2.2.1 Current share of renewable energy in gross final energy consumption and in different sectors (heating and cooling, electricity and transport) as well as per technology in each of these sectors

This must be included in the energy and climate plan.

1.2.2.2 Indicative projections of development with existing policies for the year 2030 (with an outlook to the year 2040)

This must be included in the energy and climate plan.

Dimension Energy efficiency

1.1.3. Current primary and final energy consumption in the economy and per sector (including industry, residential, service and transport)

See 4.3.3.

1.1.4. Current potential for the application of high-efficiency cogeneration and efficient district heating and cooling

Historically, Flanders has had very few district heating systems. However, since financial aid was introduced in 2013 through regular calls for tender for green heat, residual heat, district heating systems and geothermal energy, many new projects have been implemented and are still planned.

At the end of 2017, urban district heating systems generated around 600 GWh of heat. Based on the projects planned and approved, this figure is expected to rise to 1,460 GWh by 2020. The energy plan 2021-2030 predicts continued average growth of 250 GWh/year (4,000 GWh by 2030), with urban district heating systems in Flanders expected to generate 6,568 GWh by 2030 in the most optimistic scenario. In 2017, 39% of the heat in these district heating systems came from renewable energy sources, with estimates predicting that this figure will rise to 52% by 2020.

Cogeneration is fairly widely used in Flanders, with a total capacity of 2,196 MWe in 2018 (3,369 MWth). According to the results of a comparative analysis with the covenants, the major industries sector offers additional potential of 187 MWe. This potential is more difficult to define in other sectors as it is either already incorporated in bio-cogeneration (auxiliary cogeneration) for the production of green heat and energy, or is less economically feasible based on current investment costs (small-scale cogeneration and micro-cogeneration). The capacity of micro-cogeneration is limited to around 2.5 MWe (2018). Around 9% of the electricity produced through cogeneration comes from renewable energy sources.

1.1.5. Projections considering existing energy efficiency policies, measures and programmes as described in point 1.2.(ii) for primary and final energy consumption for each sector at least until 2040 (including for the year 2030)

RESIDENTIAL BUILDINGS

WOM scenario

The WOM scenario starts in 2007 and is based on the principle that no strategy has been adopted. It is therefore a fictional scenario.

WEM scenario

The current strategy scenario or WEM scenario involves continuing the current policy (see above), with actual energy consumption being used up to 2017.

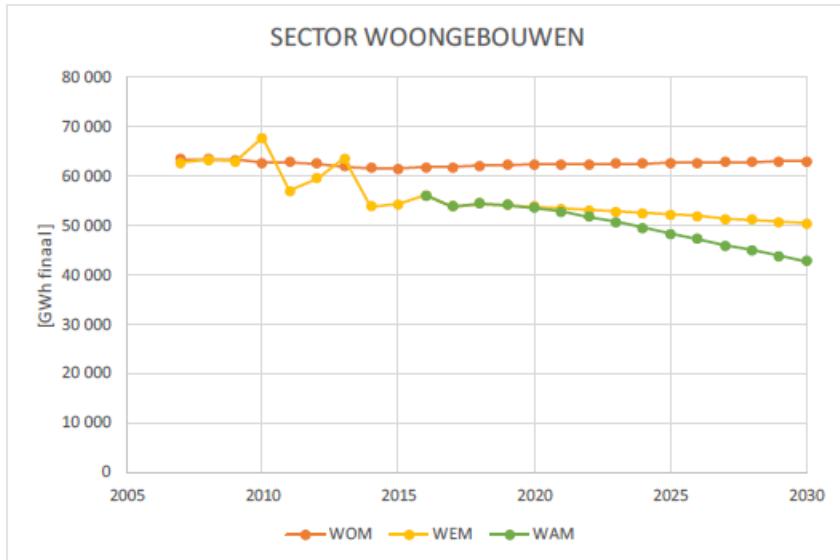
From 2018, a residential model known as the REBUS model is used to determine the fuel consumption of the Flemish housing stock. This is in line with fuel consumption in 2016, as indicated in the energy balance 1990-2017.

The WEM scenario is also based on increasing residential demand for electricity according to the PRIMES 2015. For the years 2019 and 2020, an annual reduction, expressed as a percentage, in electricity consumption of 0.1% is assumed. In the period 2020-2030, an annual increase, expressed as a percentage, of 0.20% is used.

WAM scenario

A WAM scenario has been developed by applying the additional measures to the WEM scenario on a bottom-up basis (by deducting the energy savings made through the additional measures).

[GWh final]	2007	2008	2009	2010	2011	2012
WOM	63,487	63,474	63,213	62,731	62,817	62,570
WEM	62,695	63,332	62,962	67,814	56,946	59,556
WAM						
[GWh final]	2013	2014	2015	2016	2017	2018
WOM	61,929	61,650	61,550	61,752	61,854	62,067
WEM	63,639	53,851	54,269	56,028	53,861	54,514
WAM				56,028	53,861	54,514
[GWh final]	2019	2020	2021	2022	2023	2024
WOM	62,173	62,321	62,357	62,428	62,503	62,554
WEM	54,138	53,805	53,456	53,166	52,876	52,508
WAM	54,121	53,614	52,774	51,780	50,662	49,437
[GWh final]	2025	2026	2027	2028	2029	2030
WOM	62,631	62,731	62,890	62,857	62,930	63,042
WEM	52,149	51,906	51,261	51,091	50,735	50,416
WAM	48,257	47,261	45,866	44,950	43,850	42,791



SECTOR WOONGEBOUWEN [GWh final]	RESIDENTIAL BUILDINGS SECTOR [GWh final]
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The additional measures result in a final energy saving of 7,625 GWh or 15.1% (compared with current policy) by 2030. Compared with the WOM scenario, a final energy saving of 20,250 GWh or 32.1% is made.

The following table summarises the savings expected from the additional measures:

Additional measures	Savings by 2030 (GWh)
Increase the maximum EPB score for rental accommodation	341
Develop tax reduction initiatives (from 2021)	78
Local climate tables	284
Encourage the replacement of electric water heaters with heat pump water heaters (from 2019)	90
Speed up the rate of renewal and optimisation of current gas and heating oil boilers (from 2021)	2,163
No gas connection in new housing developments and large apartment blocks, except in the case of collective heating through cogeneration or in combination with a renewable energy system as the main heating system (from 2021)	76
Ban on using heating oil boilers in new-builds and major energy renovations (from 2021)	10
Measures to encourage demolition (from 2019)	557
Working capital for energy renovations of housing purchased as a matter of urgency (from 2020)	96
Behavioural change through information on bills (from 2021)	52
Major energy renovations – natural gas savings by switching from E90 to E70 (from 2020) and E60 (from 2025)	25
Encourage the renovation of housing following a notary-approved transfer (from 2021)	3406
Speed up the removal of asbestos from the roofs of housing (from 2021)	447
Total of all additional measures	7,625

Changes from the draft energy plan

The WEM scenario has been brought into line with the figures from the 1990-2017 energy balance. In addition, both the WEM and WAM scenarios take account of a change in electricity demand, as the draft energy plan was based on electricity forecasts 'for appliances and lighting'. Given that heating and domestic hot water also consume electricity, it seems more logical to use forecasts covering all electricity consumption.

The REBUS model, used to determine future fuel consumption, has been brought into line with fuel consumption in 2016. In the draft energy plan, the reference year was 2012.

As regards the energy saving calculations, the references have been improved by using data from the energy performance database and system operator incentives.

NON-RESIDENTIAL BUILDINGS

WOM scenario

The starting year is 2007. The WOM scenario is based on the principle that no strategy has been implemented. It is therefore a fictional scenario. The WOM scenario is obtained by adding the savings made through system operator incentives to the WEM scenario.

WEM scenario

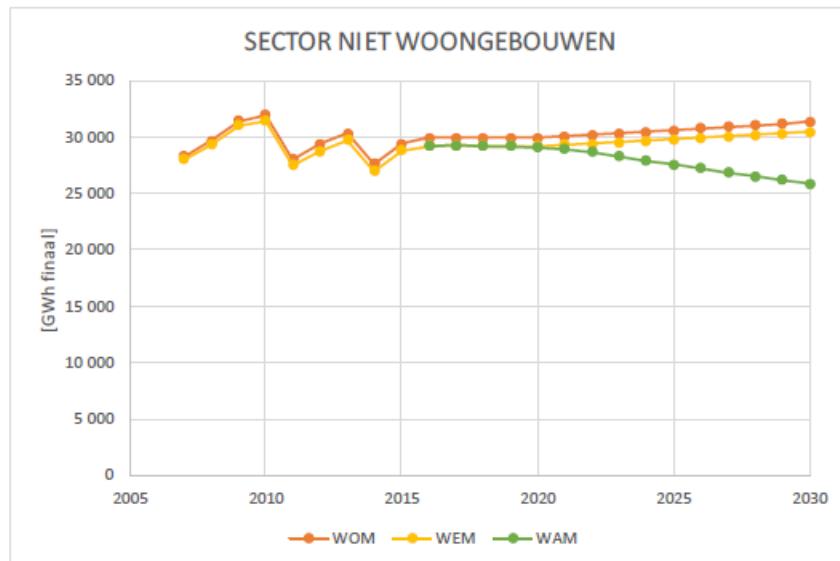
In the WEM scenario, actual consumption figures from the energy balance are used up to 2017. From 2018, the PRIMES assumptions are used to estimate use:

- For fuels: an annual reduction, expressed as a percentage, of 0.064% during the period 2010-2020. For the period 2020-2030, an annual reduction, expressed as a percentage, of 0.307% is used.
- For electricity: during the period 2010-2020, electricity consumption is not expected to change. For the period 2020-2030, an annual increase, expressed as a percentage, of 1.4% is used.

WAM scenario

The WAM scenario is based on additional measures generating savings identical to those in the housing sector.

[GWh final]	2007	2008	2009	2010	2011	2012
WOM	28,250	29,621	31,437	31,920	28,036	29,362
WEM	28,012	29,295	31,006	31,426	27,471	28,762
WAM						
[GWh final]	2013	2014	2015	2016	2017	2018
WOM	30,308	27,608	29,416	29,891	29,915	29,912
WEM	29,693	26,985	28,770	29,223	29,228	29,214
WAM				29,223	29,228	29,214
[GWh final]	2019	2020	2021	2022	2023	2024
WOM	29,916	29,920	30,050	30,182	30,317	30,455
WEM	29,200	29,186	29,299	29,414	29,531	29,651
WAM	29,191	29,083	28,926	28,647	28,295	27,917
[GWh final]	2025	2026	2027	2028	2029	2030
WOM	30,595	30,737	30,882	31,030	31,180	31,333
WEM	29,773	29,898	30,025	30,155	30,288	30,423
WAM	27,551	27,223	26,865	26,530	26,177	25,821



SECTOR NIET WOONGEBOUWEN [GWh final]	NON-RESIDENTIAL BUILDINGS SECTOR [GWh final]
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Given that the additional measures are identical to those in the housing sector and that the savings made are assumed to be the same, a saving of 15.1% is expected. This therefore represents a saving of 4,601 GWh compared with the WEM scenario. Compared with the WOM scenario, a final energy saving of 5,512 GWh or 17.6% is made.

Changes from the draft energy plan

Both the WEM and WAM scenarios take account of a change in electricity demand, as the draft energy plan was based on electricity forecasts 'for appliances and lighting'. Given that heating and domestic hot water also consume electricity, it seems more logical to use forecasts covering all electricity consumption.

INDUSTRY

WOM scenario

The WOM scenario (fictional scenario in which no strategy has been implemented) is obtained by adding the actual energy consumption (in the past) and the future energy consumption (projection of current policy) of industry to the savings made under covenants and energy policy agreements (EPAs) over time.

Final energy consumption in the WOM scenario in 2030 is 156,515 GWh.

WEM scenario

The current strategy is pursued with emphasis on subsequent permanent optimisation of energy efficiency in industry in order to cost-effectively save energy where possible while allowing Flemish industry to grow. As a result of continuing the current EPA, there will be an annual reduction in energy efficiency savings as contractors will find it increasingly difficult to continue improving their energy efficiency processes. That is why the WEM scenario uses a downward trend: from 0.865% (in 2022) to 0.785% (in 2030) in terms of annual energy efficiency improvement for EDE businesses and from 1.22% (in 2022) to 1.14% (in 2030) in terms of annual energy efficiency improvement for non-EDE businesses.

Furthermore, the WEM scenario also assumes that economic growth will increase energy consumption by 1.7% per year (²⁷), where the percentage of both types of EPA business remains the same as currently and where the

²⁷ As regards the impact of economic growth, an increase of 1.30% in the fossil fuel consumption of non-EDE industry is used.

level of electricity consumption also remains constant. In the WEM scenario, the current environmental incentive also continues.

This results in increased efficiency of 8.0% in 2030 compared with 2020.

Final energy consumption in the WEM scenario in 2030 is 132,956 GWh, or 15.1% less than the WOM scenario.

WAM scenario

The WAM scenario takes account of additional measures during the period 2021-2030 as a result of the current instrument being expanded.

The WAM scenario is based on the EPA being extended, resulting in an equivalent level of annual energy efficiency savings over time due to expansions in the measure in energy terms: for EDE businesses, an annual energy efficiency improvement of 0.865% and, for non-EDE businesses, an annual energy efficiency improvement of 1.22%. By extending the legislative framework (reduction in the lower limit of the obligation to produce an appropriate energy plan to 0.1 PJ) to non-energy-intensive businesses, those non-EPA businesses will also achieve an annual energy efficiency improvement of 0.5% in 2030. The environmental incentive remains and results in greening. The mini-EPA also continues to be implemented in non-energy-intensive industry.

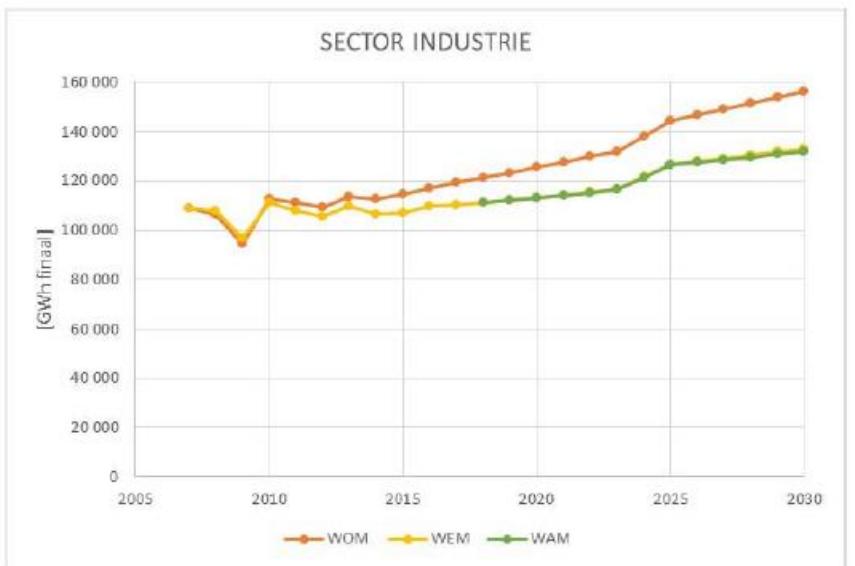
Furthermore, the WAM scenario also assumes that economic growth will increase energy consumption by 1.7% per year ⁽²⁸⁾, where the percentage of both types of EPA business remains the same as currently and where the level of electricity consumption increases in 2030 due to electrification in industry. This results in increased efficiency of 9.2% in 2030 compared with 2020.

The WAM scenario therefore involves final energy consumption of 131,820 GWh in 2030. This represents a reduction in energy consumption of 24,695 GWh (-15.8%) compared with the WOM scenario.

This therefore gives the following figures to 2030:

[GWh final]	2007	2008	2009	2010	2011	2012
WOM	108,554	106,677	94,724	112,629	111,165	109,235
WEM	108,554	108,139	95,761	111,092	107,764	105,516
WAM						
[GWh final]	2013	2014	2015	2016	2017	2018
WOM	113,776	112,895	114,493	117,088	119,288	121,316
WEM	109,923	106,451	107,022	109,639	110,188	111,188
WAM						111,202
[GWh final]	2019	2020	2021	2022	2023	2024
WOM	123,379	125,476	127,649	129,778	131,985	138,228
WEM	112,204	113,238	114,288	115,357	115,453	121,577
WAM	112,232	113,287	114,307	115,334	115,367	121,406
[GWh final]	2025	2026	2027	2028	2029	2030
WOM	144,510	146,831	149,191	151,591	154,032	156,515
WEM	125,730	127,7914	129,127	130,371	131,548	132,956
WAM	126,451	127,504	128,565	129,636	130,720	131,820

²⁸ As regards the impact of economic growth, an increase of 1.30% in the fossil fuel consumption of non-EDE industry is used.



SECTOR INDUSTRIE [GWh final]	INDUSTRY SECTOR [GWh final]
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Changes from the draft energy plan

As indicated in the draft energy plan, the figures for industry have been further refined. In particular, this refined calculation model also takes account, as requested, of impacts and trends in the various economic growth scenarios, electrification in industry and greening of energy carriers.

Forecasts have been made for the scenarios described above: WOM (scenario without any policy), WEM (scenario taking account of current policy) and WAM (scenario taking account of additional policy). The figures are based on the Flemish energy balance. As a result, data provided by the audit office have been used to break down the figures into different categories: energy-intensive or non-energy-intensive, EDE or non-EDE, EPA or non-EPA contractor. Based on this categorisation, forecasts have been made for the various strategic measures.

Compared with the draft energy plan, the WAM scenario now involves an upward trend in energy consumption, whereas it followed a downward trend in the draft. This is due to the fact that the energy savings resulting from measures in non-energy-intensive industry (mini-EPA and environmental incentive) were overestimated. As a result, the WAM scenario in the draft energy plan gave a truncated picture of the trend in energy consumption. This situation has therefore been rectified in the final plan by using the rectified calculation model.

Assumptions

Economic growth

Various trends have been used to estimate how energy consumption and its associated emissions will develop. The first of these is gradual growth in the industrial sector, in terms of both volume and value added. There is no simple correlation between energy consumption and growth in volume. Improvements in the quality of products supplied also have an impact on energy consumption and are reflected in price levels. A growth figure of 1.70% has been used. In terms of growth in fossil fuel consumption in non-EDE industry, a figure of 1.30% has been used.

This assumption is based on figures provided by the HERMREG model for Flanders. Projections of gross value added in volumes and prices were also used to determine an average of 1.70%. In this context, it was also assumed that industry as a whole will experience an improvement in quality (increase in energy consumption).

Several large projects that are currently being prepared at the Port of Anvers and that exceed the average growth figures indicated above have also been taken into account in the figures. All the scenarios involve an absolute

increase in energy consumption in two stages: 4,000 GWh of additional energy consumption from 2024 and a further 4,000 GWh from 2025.

Economic growth mainly affects the reduction in absolute emissions in the non-EDE sector (compared with the reference year 2005) and the proportion of renewable energy (change in the energy consumption denominator). It has little impact on the other forecasts, such as energy consumption or improved efficiency.

Greening of energy carriers and electrification

The forecasts take account of two different types of greening. The first is encouragement to electrify the energy supply of industry. At the same time, there is also increasing use of renewable fuels. These two factors should green energy carriers by 10% in non-EDE industry.

The electrification potential is slowly increasing. EURELECTRIC estimates that, by 2050, between 45% and 60% of all industrial energy consumption will be electric. These figures are based on a current ratio of 33%, which is a European average. In Flanders, the current ratio is 24%, although a more limited forecast of potential should perhaps be used, i.e. between 32% and 44% in 2050. If there is a gradual increase, this will result in electrification of between 27.5% and 32.5% in 2030. The WAM scenario uses a more cautious lower estimate of potential, with maximum electrification being limited to 25.5%.

Without any additional measures, the WOM and WEM scenarios do not include any electrification. In other words, it is assumed that electrification results from industrial policy and innovation.

At the same time, those energy sources that can be used for industrial production need to be gradually greened, which can be achieved by using renewable fuels. This greening may also be accompanied by increased energy consumption and reduced energy efficiency. Furthermore, the availability of renewable fuels in Flanders is limited. The ambition of 10% should be monitored to ensure that it is feasible in the long term.

'Ecologiepremie+' environmental incentive

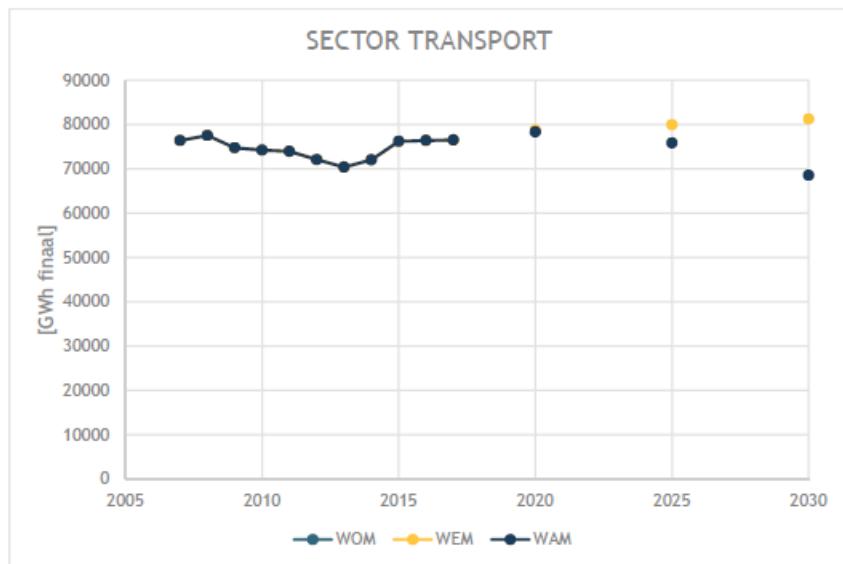
Current environmental incentive projects are not having any impact at the moment in terms of reducing emissions or energy consumption. There is no comprehensive overview of environmental incentive applications that clearly identifies those businesses involved in emissions trading or covered by a covenant or energy policy agreement (EPA). The information currently available is not unequivocal and an estimate of the impact based on that information is also dubious. Improved monitoring will determine whether the estimated orders of magnitude are realistic.

The environmental incentive monitoring system will be adapted in the future. The impact of the environmental incentive in terms of emissions and energy consumption compared with the standard technique will be recorded for each application. Furthermore, an improved database will allow the necessary information and data to be compiled in a structured manner.

Measures covered by the environmental incentive can be classed under energy efficiency improvements, F-gases, renewable heat systems, electrification and environmental measures. This analysis only concerns energy efficiency improvements. Environmental measures are not taken into account as their impact on emissions and energy consumption is not decisive. Renewable heat measures have been suspended since 2015 and are no longer taken into account in the WEM scenario. F-gas measures form part of the F-gas policy.

TRANSPORT

For the assumptions in the WEM and WAM scenarios, please refer to the section on transport in the Climate part.



SECTOR TRANSPORT		TRANSPORT SECTOR	
[GWh final]	[GWh final]	[GWh final]	[GWh final]

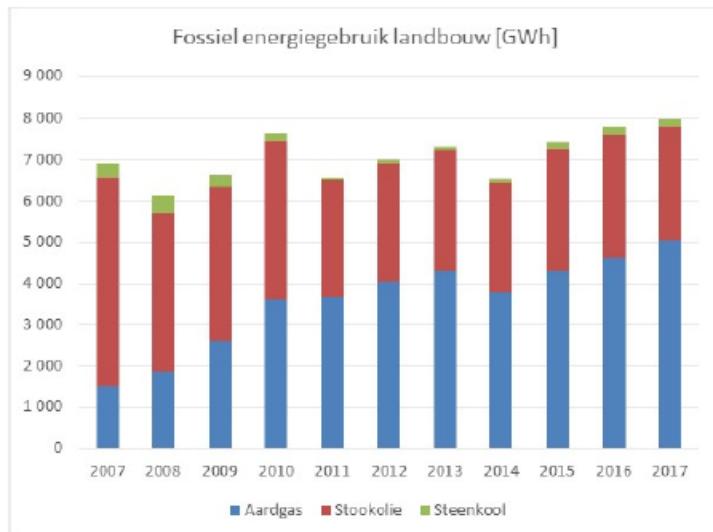
[GWh final]	2007	2008	2009	2010	2011	2012	2013
WEM	76,388	77,545	74,760	74,233	73,949	72,104	70,383
WAM	76,388	77,545	74,760	74,233	73,949	72,104	70,383
[GWh final]	2014	2015	2016	2017	2020	2025	2030
WEM	72,047	76,226	76,410	76,520	78,750	79,944	81,250
WAM	72,047	76,226	76,410	76,520	78,333	75,861	68,556

The WEM scenario forecasts final energy consumption of 81,250 GWh in 2030. The WAM scenario forecasts final energy consumption of 68,556 GWh in 2030, i.e. a reduction of around 16%.

Changes from the draft energy plan

The calculations have been brought into line with the Air Plan. A number of adjustments have also had to be made: in the WEM and WAM scenarios of the draft energy plan, only road transport (without any fuel surplus) was taken into account. Fuel surplus and other modes of transport are now also taken into account. In addition, the WEM scenario was wrongly regarded as a WOM scenario in the draft plan. No WOM scenario is available for transport.

AGRICULTURE



Fossiel energiegebruiklandbouw [GWh]	Fossil fuel consumption in agriculture [GWh]
Aardgas	Natural gas
Stookolie	Heating oil
Steenkool	Coal

The above figure shows that fossil fuel consumption in the agricultural sector did not reduce over the period 2007-2017, despite efforts to rationalise energy consumption and use lower carbon fuels in glasshouse horticulture. Fossil fuels are mainly used, in glasshouse horticulture and intensive farming, to heat greenhouses and barns. The figure also shows a change in fuel, from oil products (particularly heating oil) to natural gas. Since 2008, natural gas consumption has risen at a rapid rate because an ever increasing number of cogeneration units are being brought into service for own use. In addition to installations that are mostly new, some of these cases involve the replacement of older equipment, much of which was operated in collaboration with an electricity producer. This equipment is now being replaced by own-use units, resulting in a shift in natural gas consumption, in the energy balance, from the transformation sector to the agricultural sector.

WOM scenario

The WOM scenario can be calculated as the scenario in which the impact of aid provided by the Flemish Agricultural Investment Fund (Fonds flamand d'investissement Agricole – VLIF) is not taken into account and the change in use of energy carriers is interrupted due to the lack of any support policies. This fictional scenario results in energy consumption of 9,683 GWh in 2030.

WEM scenario

The WEM scenario (existing policy) takes account of existing energy-related VLIF aid (EUR 7 billion/year), which involves around 560 applications/year. If this investment were not made in the absence of VLIF aid, there would be an additional annual energy saving of 224 GWh. Only investment in replacements is included in the WEM forecasts (around 50% of the aid applications), which results in an annual saving of 113 GWh and the respective cumulative total for the entire period. In the WEM scenario, this same rate of investment is used for the period 2021-2030, which results in a final energy consumption of 7,667 GWh in 2030.

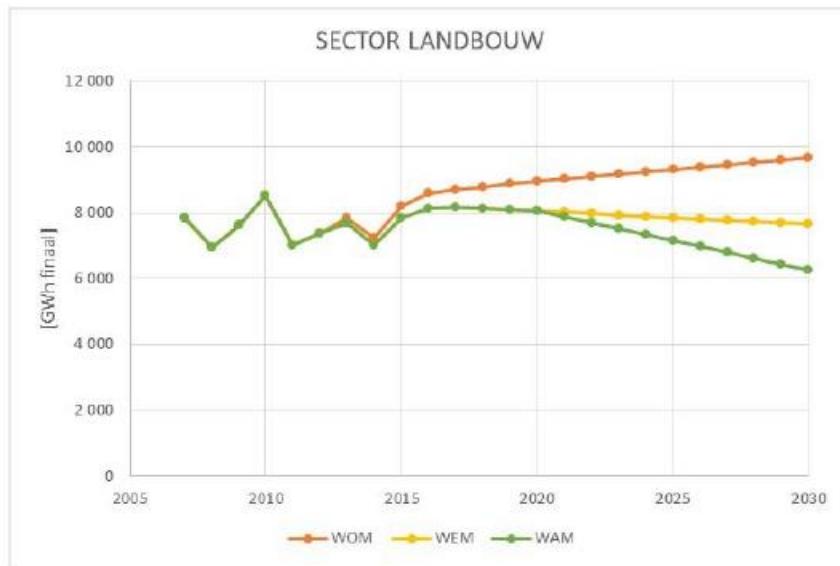
WAM scenario

In the WAM scenario, energy emissions in the agricultural and horticultural sector will be 28% lower than in the WEM scenario in 2030. Achieving this result will require, as in the industrial sector, EPAs for the energy-intensive (glasshouse) horticultural sector, which will take effect in 2023. Under the government agreement for 2019-2024, this is one of the notified expansions, i.e. the expansion of the EPA target group to the (glasshouse)

horticultural sector. Furthermore, mini-EPAs comparable to those for industrial SMEs will also be concluded with less-energy-intensive agricultural undertakings through the relevant (sub-)sectoral federations.

Final energy consumption in the WAM scenario is 6,251 GWh in 2030.

Summary



SECTOR LANDBOUW		AGRICULTURAL SECTOR	
[GWh final]	[GWh final]	[GWh final]	[GWh final]

[GWh final]	2007	2008	2009	2010	2011	2012
WOM	7,841	6,950	7,615	8,534	7,011	7,373
WEM	7,841	6,950	7,615	8,534	7,013	7,373
WAM	7,841	6,950	7,615	8,534	7,013	7,373
[GWh final]	2013	2014	2015	2016	2017	2018
WOM	7,825	7,225	8,189	8,585	8,718	8,792
WEM	7,713	7,001	7,853	8,137	8,158	8,120
WAM	7,713	7,001	7,853	8,137	8,158	8,120
[GWh final]	2019	2020	2021	2022	2023	2024
WOM	8,857	8,941	9,015	9,089	9,163	9,238
WEM	8,083	8,045	8,007	7,969	7,931	7,894
WAM	8,083	8,045	7,865	7,686	7,507	7,327
[GWh final]	2025	2026	2027	2028	2029	2030
WOM	9,312	9,386	9,460	9,534	9,608	9,683
WEM	7,856	7,818	7,780	7,742	7,704	7,667
WAM	7,148	6,969	6,789	6,610	6,431	6,251

Changes from the draft energy plan

The calculations have been brought into line with those in the Climate Plan. The energy savings made as a result of the VLIF aid have been taken into account in the WEM and WAM scenarios by using a bottom-up calculation method. The alignment with the savings figures included in the Climate Plan has led to the assumption that around half of the investment can be categorised as investment in replacements through the VLIF aid.

In addition, the figures for the past in the agricultural sector have been brought into line with the figures in the Flemish energy balance.

A fictional WOM scenario has also been added. In its calculation, it was assumed that, in the absence of relevant support policies, the breakdown of energy carriers would remain the same.

1.1.6. Projections considering existing energy efficiency policies, measures and programmes as described in point 1.2.(ii) for primary and final energy consumption for each sector at least until 2040 (including for the year 2030)

1.1.7. Cost-optimal levels of minimum energy performance requirements resulting from national calculations, in accordance with Article 5 of Directive 2010/31/EU

Residential buildings

In 2017 the Flemish Energy Agency (Agence flamande de l'Énergie/Vlaams Energieagentschap – VEA) re-confirmed the feasibility of the planned reinforcement of energy performance requirements in accordance with cost-optimal measures. In 2012 and 2015, cost-optimal studies were carried out under Directive 2010/31/EU (see <https://www.energiesparen.be/bouwen-en-verbouwen/epb-pedia/epb-beleid/studies>). Those studies involved exhaustive economic optimisation using the method defined in the Commission Delegated Regulation of 16 January 2012. As the input parameters have changed little since the previous study, no exhaustive economic optimisation was required in this study.

The process involved verification calculations for a wider set of buildings (54), with geometries taken from actual files added in the last two years to the energy performance database. Using a limited number of packages of cost-optimal and cost-effective measures deriving from the previous studies, the feasibility of the planned tightening of the requirements to the E30 NZEB level by 2021 was examined for the new geometries.

Although the energy performance levels envisaged were not achieved with the packages of measures examined, further research was conducted to determine the measures needed, the impact on cost optimisation and the cost of the additional investment compared with a package of reference measures (E50). Furthermore, the reasons why certain reference buildings 'more easily' achieved an E-level below that of other buildings with the same packages of measures were examined.

The methodological framework applied in the previous studies was simplified and the following points were adapted:

- new reference buildings, selected from actual files added to the energy performance database;
- limitation of the number of packages of measures to a minimum of 10 (maximum of 15) based on the cost-optimal measures of the previous study;
- limitation of the cost categories to initial investment costs and total energy costs;
- limitation to sensitivity analyses appropriate to this context;
- update of the current methodology and relevant energy performance requirements, with the K level no longer being assessed, but being replaced by the planned S level;
- simplification of the feasibility analysis and results, with no new determination of the cost-optimal levels.

Study results

It generally seems that the additional costs involved in upgrading single-family buildings and apartments to the E30 level are limited to a maximum of 10% of the initial investment cost for most of the packages of measures

defined. These investment costs are largely offset by lower energy bills, and can even lead to cost-optimal solutions, despite additional investments in construction. Some packages of measures may prove more expensive only for large sprawling individual homes with extensive glazing and also apartments (on the top floor) with many windows.

Where there is sufficient space available on the roof for photovoltaic panels, in combination with a gas condensing boiler, the additional investment cost can even be limited to just 2% to 4% of the initial investment cost. The total current cost (TCC) can even be less than the E50 reference package.

However, there are also packages of measures without PV panels that, in combination with building envelope improvements, heat pumps and collective heat production and/or domestic hot water production, can achieve the E30 or E27 levels, with the additional investment still being limited to less than 5% compared with the E50 reference package. Under the current framework conditions, the TCC can therefore be up to 4% higher than the reference package. Collective installations that can also provide renewable energy through heat production can get close to the reference package through the detailed input of performance in accordance with Ecodesign.

It is expected that innovative systems currently available and introduced in the future will increase the number of packages of cost-effective measures.

Further to the above observations, it can also be noted that the calculations were made based on a reference value for the E-level of E50. Since the start of 2018, the E-level requirement has been increased to E40. The actual additional investment needed to achieve E40 will be significantly less than that for E50. In addition, in 2019 the price of photovoltaic panels fell sharply. It can be assumed that this measure is now at the cost-optimal level in all cases.

Furthermore, this study does not use default values at all; rather, it is always based on detailed calculations. This approach clearly requires attention to be paid to all the links in the construction process. Everyone involved will definitely also be on a learning curve.

As regards apartments, certain risks are highlighted: with a high level of glazing, a less favourable density and a possible lack of shaded roof surface, apartments can struggle with the E30 limit. Even the smallest apartments or studio flats with a single external façade can face problems in terms of overheating and cooling needs. The ‘high-rise building with many small units’ combination can therefore struggle to meet the E requirement and the minimum proportion of renewable energy, despite its potential for very low absolute energy consumption.

Non-residential buildings

To ensure that the set requirements are achievable and affordable, a new study of the cost-optimal E-levels has been carried out every two years. If necessary, this procedure can be adapted.

Results for non-residential buildings

In the cost optimisation study (²⁹), various scenarios were calculated for 11 buildings with a total of 38 functions. Different buildings from those included in the 2015 cost optimisation study were specifically chosen so that the widest possible range of buildings could be studied. The highest possible number of different functions was also examined, where possible several times. This time, buildings were available for ‘meeting facilities – low occupancy’ and ‘other’ functions.

The study indicates that the use of photovoltaic panels and the application of free floor cooling are the main options. In other words, these measures are always on the Pareto frontier, which contains all the cost- and energy-optimal solutions. With regard to PV panels, this means that the entire roof of the building is covered with PV panels. The E-level achieved therefore largely depends on the roof area available: the larger the roof,

²⁹ The studies can be consulted through the following list: <https://www.energiesparen.be/bouwen-en-verbouwen/epb-pedia/epb-beleid/studies>

the lower the E-level achieved. Installing PV panels has a major impact on the E-level, but is not always possible (e.g. heavily shaded roof, wrong orientation of the roof, high-rise buildings with a small roof area).

That is why their use was excluded from the base scenario as this removed the high correlation between cost-optimal results and the available roof area, ensuring a wide distribution of results. Without photovoltaic panels as a measure, a uniform range of results was obtained.

The same finding applies to free floor cooling, where the cooling is deemed to be free of charge. With free or passive floor cooling, there is no cold generator, but only a circulation pump to carry the cold stored in the ground during the winter to a heat exchanger in the building. If this form of ‘free’ cooling can be used, the results point towards less heating and more cooling (which is always free of charge, except where auxiliary energy is used). However, this type of cooling cannot be widely used. There needs to be a sufficient cooling capacity available in the immediate vicinity, which depends on the geological properties of the subsoil (for example, depth of the aquifer sand layers, soil permeability, ground area available). That is why this solution was also removed from the base scenario.

Table 9 shows the macroeconomic cost-optimal E-level (without PV panels and without free floor cooling) by function. For those functions with multiple results, the *range* of results is indicated. In addition to the cost optimisation, a ‘tipping point’ was also determined, which is the lowest E-level achieved for a current total cost (CTC) 10% higher than the current total cost of the cost-optimal solution. This point is a good indication of the flatness of the area where the costs are optimal. The larger the difference in E-level between the two points, the flatter the Pareto frontier and the wider the area where the costs are optimal. In other words, for a limited additional cost, even lower E-levels can be easily achieved. The following table gives an example of a Pareto frontier with a tipping point and a cost-optimal point.

Table 10. Results of the study of the cost-optimal E-level and tipping point level for new-builds

	E-Level Requirement 2021 (-)	Cost-optimal E-Level (-)	+10% CTC E-Level (-)
Housing	E70	69	49
Office	E50	62-81	46-65
Education	E55	52-54	40-42
Healthcare – Inpatient	E70	47-58	46-52
Healthcare – Outpatient	E65	69	60
Healthcare – Operating theatres	E50	50	48
Meeting facilities – High occupancy	E65	45-72	40-64
Meeting facilities – Low occupancy	E65	38-48	32-40
Meeting facilities – Cafeteria	E60	48-51	43-44
Kitchen	E55	66 (122)	59 (106)
Retail	E60	42-45	40
Sport – Sports hall/gym	E50	56	46
Sport – Fitness/dance	E40	56	50
Sport – Sauna/swimming pool	E50	37-43	28-39
Plant room	E50	5-8	5-6
Communal areas	E80	47	42
Other	E80	58-60	41-42

The results for the cost-optimal E-level are fairly uniform for the various non-residential functions. Only the Kitchen functional part of residential care centres has a markedly different result. This type of kitchen serves many of the ‘inpatient care’ facilities. Demand for domestic hot water in such kitchens is calculated on the basis of the area of the functional part served ($5,155 \text{ m}^2$), which is very large. This situation results in a high E-level.

As such kitchens form a small functional part of a larger building, the impact on the E-level achieved for the building as a whole is limited. It is therefore very important that designers and draughtsmen pay the necessary attention to the building's division into functions and to the application of any grouping rules. After all, the E-level requirement applies to the building and not to the function. A less efficient functional part can be partly offset by another more efficient functional part within the same NEP (non-residential energy performance) unit.

Based on the results and analyses, the person in charge of the study divided the various functions into three different groups:

- on average meets a lower E-level (green);
- on average meets the set requirement (no marking);
- on average meets a higher E-level (red).

Table 6. Comparison of results for new-builds with set requirement levels by function

	E-Level Requirement 2021 (-)	Cost-optimal E-Level (-)	+10% CTC E-Level (-)
Housing	E70	69	49
Office	E50	62-81	46-65
Education	E55	52-54	40-42
Healthcare – Inpatient	E70	47-58	46-52
Healthcare – Outpatient	E65	69	60
Healthcare – Operating theatres	E50	50	48
Meeting facilities – High occupancy	E65	45-72	40-64
Meeting facilities – Low occupancy	E65	38-48	32-40
Meeting facilities – Cafeteria	E60	48-51	43-44
Kitchen	E55	66 (122)	59 (106)
Retail	E60	42-45	40
Sport – Sports hall/gym	E50	56	46
Sport – Fitness/dance	E40	56	50
Sport – Sauna/swimming pool	E50	37-43	28-39
Plant room	E50	5-8	5-6
Communal areas	E80	47	42
Other	E80	58-60	41-42

Based on the relatively uniform set of results obtained and on the limited impact of the sensitivity analyses, the Flemish Energy Agency (VEA) concludes that the study results are sufficiently reliable to determine the cost-optimal levels. The VEA notes that it was not always possible to determine, from the database of recent non-residential buildings, to what extent the buildings studied form a reference for new-builds. However, the sensitivity analyses associated with the buildings show that the theoretical approach of the NEP method limits the impact of the building's geometry on the cost-optimal level.

Furthermore, the results must be viewed with caution. The buildings in this study are an extension of the 2015 cost optimisation study. However, the results of the two studies cannot be compared on an individual basis. The NEP method has changed in the meantime and can therefore be compared only based on an order of magnitude. As was the case in 2015, a lack of experience has been noted, both within authorities and in the sector, with regard to the subdivision of buildings and its impact, among other factors. There is not yet any 'sense' of the E-level of the various functions, as is the case with residential buildings.

2. IMPACT ASSESSMENT OF PLANNED POLICIES AND MEASURES

Impacts of planned policies and measures described in section 3 on energy system and GHG emissions and removals, including comparison to projections with existing policies and measures (as described in section 4).

Projections of the development of emissions of air pollutants in accordance with Directive (EU) 2016/2284

On 25 October 2019 the Flemish Government finally approved the Air Policy Plan 2030. This plan contains measures to combat air pollution in Flanders and, in so doing, to reduce its impact on our health and the environment. The plan was prepared under Article 23 of Directive 2008/50/EC and under Directive 2016/2284. It contains emission projections and can be consulted at <https://beslissingenvlaamseregering.vlaanderen.be/document-view/5DB31EC95084E700080003D9>.

The aim of both climate policy and air policy is to reduce emissions of certain substances into the air, namely greenhouse gases and pollutant emissions. As most of these emissions come from the same sources, there is a close relationship between the Flemish Energy and Climate Plan and its Air Plan.

As a result, both Flemish climate policy (reduction of GHG emissions) and Flemish energy policy (energy savings and increase in renewable energy) aim to reduce the use of fossil fuels. Less consumption of liquid, solid and gaseous fossil fuels in industry, the transport sector, agriculture and heating of buildings will reduce NO_x, SO₂ and PM emissions (pollutants that are typically released during the combustion of fossil fuels). Solid biomass (a renewable fuel) is an exception as its combustion releases more emissions of certain substances than the combustion of certain fossil fuels. This is particularly the case with the heating of buildings: wood is regarded as biomass but, although the emissions from its combustion can be deducted from greenhouse gases (unlike emissions from gas and heating oil boilers), its combustion significantly increases emissions of fine particulate matter and NO_x.

The effect of climate and energy policy on NO_x, SO₂ and PM emissions is included in the calculation of the emission projections. The models used to produce the air projections are the same as the models used for the GHG projections. The same assumptions in terms of degrees of activity and consumption of fuel are therefore used.

Dimension decarbonisation – GHG emissions and removals

2.1.1. Transport sector

2.1.1.1. Underlying factors and principles

Spatial planning that supports environmentally friendly mobility and sustainable accessibility

By 2030, this means that:

- over half of the population will live in convenient locations;
- more than 60% of workplaces will be in easily accessible locations;
- vital social functions and structures will be easily and safely accessible to everyone via one or more forms of sustainable (public) transport;
- logistics flows will be organised in a sustainable way.

Guiding the development of mobility

- By 2030, the number of road kilometres will be reduced to a maximum of 51.6 billion vehicle-kilometres. This entails a reduction of 15% from 2015 for passenger cars and vans, and the increase for lorries being limited to a maximum of 14%.
- Developing a multimodal transport system:
 - For commuting, the share of sustainable modes of transport will increase to at least 40% (car use limited to a maximum of 60%; the current figure for car use is 71%).

- In the highly urbanised transport regions of Antwerp, Ghent and the Flemish periphery, the share of sustainable modes of transport will be at least 50%.
 - For goods transport, 6.3 billion tonne-kilometres will be shifted from the road to alternative modes of transport (water or rail transport). The share of rail and inland waterway transport in the modal split will increase to 30%.
 - The various maritime ports will make extensive use of sustainable modes of transport. The share of these modes (rail, river and estuary) will increase by around 5-10% (from 2013).
- Encouraging sustainable travel and transport behaviour:
 - In cooperation with the transport regions, we will bring about a modal shift (by developing a cost-effective and demand-oriented public transport network and by continuing the rising trend of investment in cycling policy).
 - Together with sectoral organisations, businesses and associations, we will support actions that encourage the public and business to abandon their cars in favour of alternative modes of transport and that allow them to easily switch from one mode of transport to another, thus reducing the number of road kilometres. We will also work together with the Federal Government and the other Regions on this issue.
 - With regard to goods transport, we will encourage sectoral organisations and businesses to focus on further optimising loading.
 - We will also make considerable efforts to influence 'irrational choice behaviour'.
- A Flemish integrated network of high-quality, wide and safe cycle paths and highways will connect residential centres, schools and major employment hubs and will therefore take full advantage of the high potential of cycle use for commuting to work or school.
- A regional and integral approach to basic accessibility:
 - Basic accessibility requires cooperation. An integrated approach to transport, infrastructure and spatial development is needed, in terms of both planning and investment and also operation and service.

2.1.1.3. Zero-emission, low-emission and low-carbon vehicles

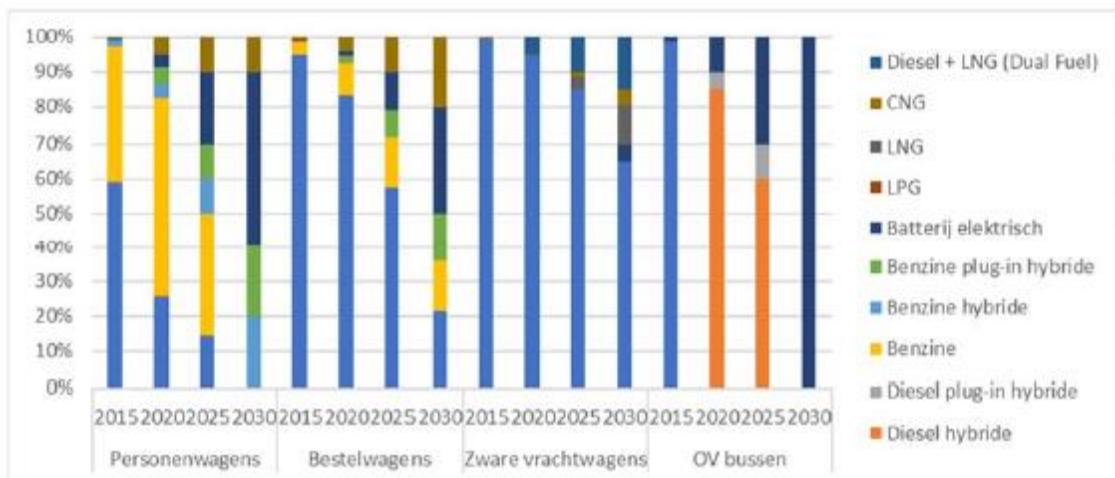
- By 2030, at least half of all new cars sold will be completely emission-free and 20% will be partly emission-free (PHEV). The rest will be low-emission or low-carbon. By 2025, the market share of zero-emission cars will be at least 20%.
- In any new procurement by De Lijn, we will authorise only zero-emission buses. In this context, the possibility of deconsolidating De Lijn will be examined. By 2035 at the latest, all buses used in Flanders will be emission-free.
- From 2025, public transport in urban environments will involve only hybrid, electric or hydrogen buses, with only zero-emission vehicles being permitted in town centres. This measure will also apply to De Lijn's subcontractors.
- By 2030, 50% of all other recently purchased buses (public transport buses, coaches and school buses) will be emission-free, low-emission or low-carbon.
- Among new heavy goods vehicles, the share of zero-emission vehicles will be at least 5% by 2030. The rest will be mainly low-emission or low-carbon.
- By 2030, at least 30% of newly purchased light commercial vehicles and vans will be zero-emission vehicles. The rest will be mainly low-emission or low-carbon.
- We will encourage emission-free distribution so that, from 2025, only zero-emission vehicles will be used in town centres for deliveries.

2.1.1.4. Recycled carbon fuels and biofuels

- If combustion engine technology continues to be used, every effort will be made to use recycled carbon fuels and biofuels.

2.1.1.2. General comments

In the WAM scenario, the strategic measures involve reducing the number of vehicle-kilometres calculated as described in Chapter **Error! Reference source not found.**. For passenger transport and light-duty vehicles, this will reduce the number of vehicle-kilometres by 15% from 2015 (**Error! Reference source not found.**). For heavy goods vehicles, the number of vehicle-kilometres will be 14% higher in 2030 than in 2015. Bus traffic will remain stable to 2030.



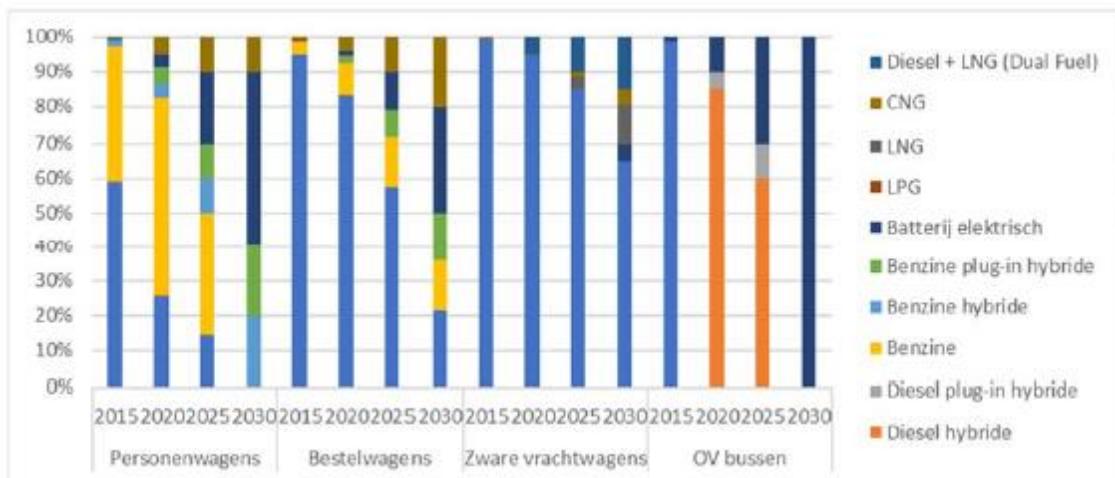
Personenwagens	Passenger cars
Bestelwagens	Vans
Zware vrachtwagens	Heavy goods vehicles
OV bussen	Public transport buses
Diesel + LNG (Dual Fuel)	Diesel + LNG (Dual Fuel)
CNG	CNG
LNG	LNG
LPG	LPG
Batterij elektrisch	Battery electric
Benzine plug-in hybride	Petrol plug-in hybrid
Benzine hybride	Petrol hybrid
Benzine	Petrol
Diesel plug-in hybride	Diesel plug-in hybrid
Diesel hybride	Diesel hybrid

Graph 2-1 summarises the assumptions made with regard to greening of the vehicle fleet in the WAM scenario. The trends in the fuel technology shares are based on the ambitions indicated in the Flemish CPT Action Plan, which sets out the Flemish ambitions to 2020, and in the draft CPT Vision 2030, and also on the assumption that, in 2030, all new cars sold will be low-carbon vehicles, with at least half being zero-emission vehicles.

Efficiency improvements have also been taken into account for both cars (10% reduction in consumption from construction year 2020) and heavy goods vehicles (5% reduction in consumption from construction year 2020). In addition, the incorporation of biofuels has been taken into account in line with the following growth trajectory: 9% on average over the period 2020-2024, 12% on average over the period 2025-2029, and 14% in 2030, as agreed in the draft NECP. Aside from the benefit in climate terms, this will also help to achieve the renewable energy target. As regards the climate and in support of our industrial transition, we will ask the

Federal Government to impose, from 2025, an incorporation rate of at least 1.8% of recycled carbon fuels (RCFs, e.g. those resulting from industrial waste gases). In our exemplary role, we will use fuels with a higher RCF incorporation rate in the captive fleets of the Flemish Government.

Graph 2-1. Breakdown of fuel technologies in new vehicles by vehicle category over the period 2015-2030



Personenwagens	Passenger cars
Bestelwagens	Vans
Zware vrachtwagens	Heavy goods vehicles
OV bussen	Public transport buses
Diesel + LNG (Dual Fuel)	Diesel + LNG (Dual Fuel)
CNG	CNG
LNG	LNG
LPG	LPG
Batterij elektrisch	Battery electric
Benzine plug-in hybride	Petrol plug-in hybrid
Benzine hybride	Petrol hybrid
Benzine	Petrol
Diesel plug-in hybride	Diesel plug-in hybrid
Diesel hybride	Diesel hybrid

* In 2030, 50% of new cars sold will be zero-emission vehicles.

* PT = public transport.

* From 2019, in any new procurement by De Lijn, we will authorise in Flanders only zero-emission buses.

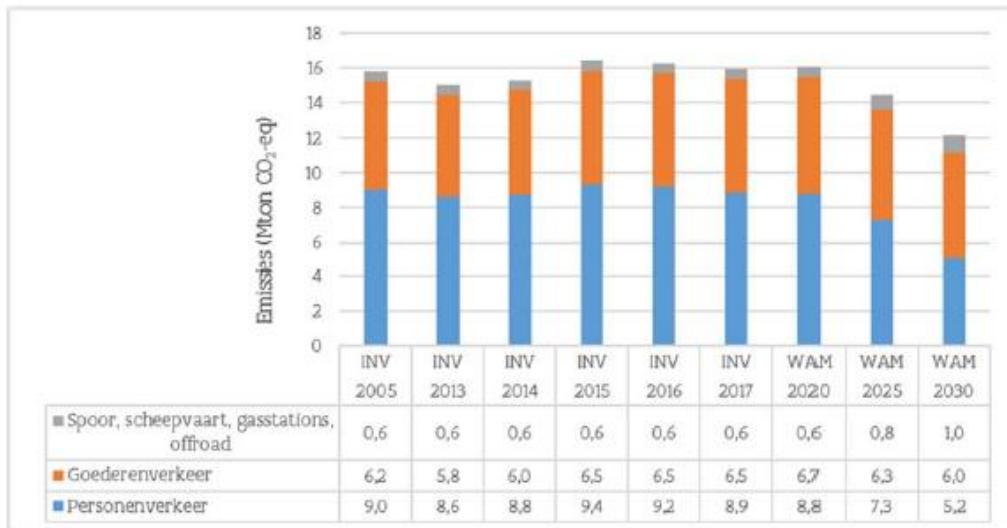
Emissions from other modes of transport are calculated in the WAM scenario by taking account of the fact that, in the future, those modes will absorb part of the growth. The following assumptions have been made, in line with the scenarios developed in the draft Mobility Plan for Flanders:

- The projections for inland navigation in Belgium indicate 100% growth in the number of tonne-kilometres between 2013 and 2030.
- The projections for rail (diesel trains) indicate 140% growth in goods transport and 45% growth in passenger transport between 2013 and 2030 and a constant distribution between diesel and electric rail traffic.

Overall in the transport sector, the WAM scenario points to a 23% reduction in GHG emissions between 2005 and 2030 (Table 2-1). However, significantly different trends are evident for road passenger and goods transport (Graph 2-2). Due to the reduction in traffic volumes and considerable greening of the vehicle fleet, a 43% reduction in emissions is predicted for passenger transport over the period 2005-2030. As for goods transport,

the increase in vehicle-kilometres and relatively limited greening of the fleet will result in a reduction in emissions of only 3% between 2005 and 2030.

Graph 2-2. Overview of actual emissions and WAM projections in the transport sector (including fuel surplus) 2005-2030



Emissies (Mton CO ₂ -eq)	Emissions (Mt CO ₂ eq)
Spoor, scheepvaart, gasstations, offroad	Rail, shipping, petrol stations, off-road
Goederenverkeer	Goods transport
Personenverkeer	Passenger transport
INV	INV
WAM	WAM

Table 2-1. Actual emissions and WAM projections in the transport sector 2005-2030

	2005	2013	2014	2015	2016	2017	2020	2025	2030
GHG emissions in the transport sector (Mt CO ₂ eq)	15.8	15.0	15.3	16.4	16.3	15.9	16.1	14.5	12.2
Trend in GHG emissions compared with 2005 (%)		-5%	-3%	+4%	+3%	+1%	+1%	-8%	-23%

2.1.2. Buildings sector

The WAM scenario for residential buildings has been aligned with the WAM scenario for energy efficiency and renewable energy.

The WAM scenario for tertiary buildings has been aligned with the WAM scenario for energy efficiency and renewable energy.

Overall in the buildings sector, the WAM scenario points to a 40% reduction in GHG emissions between 2005 and 2030. The reductions in the tertiary sector and the residential sector are 32% and 43% respectively by 2030 in the WAM scenario.

Graph 2-3. Overview of actual emissions and WAM projections in the buildings sector 2005-2030



Emissies (Mton CO ₂ -eq)	Emissions (Mt CO ₂ eq)
Offroad residentieel	Residential off-road
Tertiaire gebouwen	Tertiary buildings
Residentiële gebouwen	Residential buildings
INV	INV
WAM	WAM

Table 2-2. Actual emissions and WAM projections in the buildings sector 2005-2030

	2005	2013	2014	2015	2016	2017	2020	2025	2030
GHG emissions (Mt CO ₂ eq)	15.7	14.4	12.0	12.2	12.5	12.2	12.1	10.8	9.4
Trend in GHG emissions compared with 2005 (%)		-8%	-23%	-22%	-20%	-22%	-23%	-31%	-40%

2.1.3. Agricultural sector

The GHG reductions that are feasible in the longer term have been calculated or estimated for a number of measures in the WAM scenario. This has involved theoretical estimates or calculations of the impact of measures. For some of the measures described, the research is already well-advanced, which therefore offers greater certainty as regards the reductions. This is particularly the case with enteric emissions from dairy cattle, environmentally friendly manure management and storage in the case of dairy cattle and pigs, energy savings and renewable energy. As regards other efforts that have the potential to reduce emissions, further research will allow these to be more accurately quantified in the future. This is the case with increased efficiency of nitrogen, closed cycles and recovery of by-products, limitation of food waste, cooperation in the supply chain and smart farming. These climate efforts have been estimated. The WAM scenario for energy emissions has been aligned with the WAM scenario for energy efficiency and renewable energy.

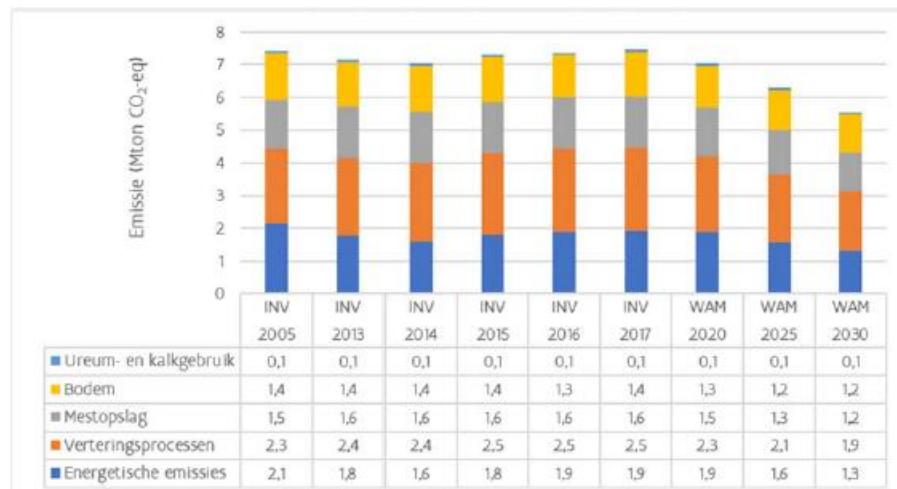
Livestock trends, as referred to in Chapter 4, have also been taken into account in the WAM scenario.

Based on the above approach for the WAM scenario, GHG emissions from the agricultural sector total 5.5 Mt CO₂eq in 2030, i.e. a 25% reduction from 2005 (Table 2-3):

- Enteric emissions reduce by 0.44 Mt CO₂eq (i.e. 19%) between 2005 and 2030.
- Emissions from manure management reduce by 0.31 Mt CO₂eq (i.e. 21%) between 2005 and 2030.
- Increased nitrogen efficiency (less N in fodder and precision fertilisation) and less nitrogen fertilising reduce soil emissions by 0.27 Mt CO₂eq (i.e. 19%) between 2005 and 2030.
- Energy savings and the use of renewable energy reduce energy emissions by 0.86 Mt CO₂eq (i.e. 40%) between 2005 and 2030.

In addition, efforts will be made to recover by-products, reduce food waste, improve the sustainability of the fisheries sector, ensure cooperation in the supply chain and develop open space. These measures may be difficult to allocate to a specific heading of the emissions inventory, but in general should lead to a further reduction of 0.14 Mt CO₂eq by 2030 for the entire agricultural sector. They are not taken into account in the overview.

Graph 2-4. Overview of actual emissions and WAM projections in the agricultural sector 2005-2030



Emissie (Mton CO ₂ -eq)	Emissions (Mt CO ₂ eq)
Ureum- en kalkgebruik	Urea and lime
Bodem	Soil
Mestopslag	Manure storage
Verteringsprocessen	Digestive processes
Energetische emissies	Energy emissions
INV	INV
WAM	WAM

Table 2-3. Actual emissions and WAM projections in the agricultural sector 2005-2030

	2005	2013	2014	2015	2016	2017	2020	2025	2030
Total GHG emissions in the agricultural sector (Mt CO ₂ eq)	7.4	7.2	7.0	7.3	7.4	7.5	7.0	6.3	5.5
Trend in GHG emissions compared with 2005 (%)		-4%	-5%	-2%	-1%	1%	-5%	-15%	-25%

2.1.4. Non-ETS industrial sector

The WAM scenario for non-ETS industry has been aligned with the WAM scenario for energy efficiency and renewable energy. Over and above the WEM scenario, the WAM scenario predicts a further 10% reduction in greenhouse gases in non-ETS industry by 2030 by continuing to green energy carriers. We will therefore encourage further electrification and use of biogas, sustainable biomass, hydrogen and synthetic fuels.

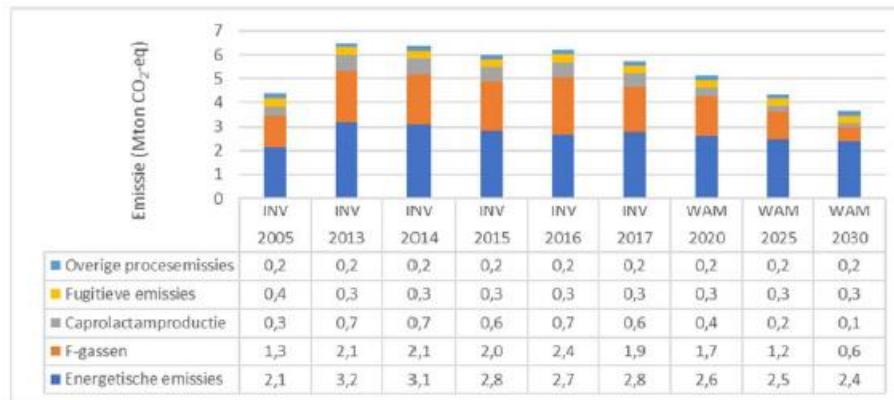
There will be a 12% increase in energy-related GHG emissions in non-ETS industry between 2005 and 2030 (Graph 2-5) in the WAM scenario.

In the policy scenario, the projections for nitrous oxide emissions from caprolactam production take account of the full implementation of all the measures set out in Chapter **Error! Reference source not found..** If an

additional end-of-pipe measure should prove to be technically and economically feasible, nitrous oxide emissions may reduce by 55% between 2005 and 2030.

The WEM scenario takes account of the implementation of the Flemish Action Plan allowing F-gas emissions to be limited to 1.0 Mt CO₂eq in 2030. The WAM scenario also takes account of the implementation of additional measures, as set out in Chapter **Error! Reference source not found.**, which would reduce F-gas emissions to a maximum of 0.6 Mt CO₂eq. Overall for the non-ETS industrial sector, greenhouse gases are projected to reduce by 16% between 2005 and 2030 in the WAM scenario (Table 2-4).

Graph 2-5. Overview of actual emissions and WAM projections in the industrial sector 2005-2030



Emissie (Mton CO ₂ -eq)	Emissions (Mt CO ₂ eq)
Overige procesemissies	Other process emissions
Fugitieve emissies	Fugitive emissions
Caprolactamproductie	Caprolactam production
F-gassen	F-gases
Energetische emissies	Energy emissions
INV	INV
WAM	WAM

Table 2-4. Actual emissions and WAM projections in the non-ETS industrial sector 2005-2030

	2005	2013	2014	2015	2016	2017	2020	2025	2030
Total GHG emissions in the industrial sector (Mt CO ₂ eq)	4.4	6.5	6.3	6.0	6.2	5.7	5.1	4.4	3.6
Trend in GHG emissions compared with 2005 (%)		+49%	+46%	+38%	+43%	+31%	+18%	+0%	-16%

2.1.5. Waste sector

A WAM scenario has been prepared for waste incineration only. As soon as the gradual phase-out approach mentioned above has been developed, the reduction in incineration capacity (and in associated GHG emissions) can be expected to reduce the combustible waste supply and treatment capacity. The WAM scenario therefore predicts a 10% reduction in the capacity of residual waste treatment facilities during the current period of the household waste and similar industrial waste plan (to 2022). By 2030, the reduction will be 25%. The WEM scenario (see point 1.2.1.5) does not predict any reduction in capacity.

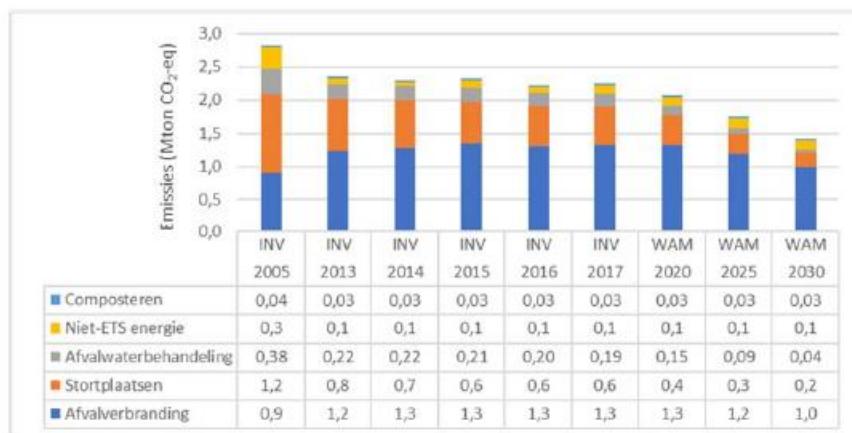
In general, the following assumptions have been used in the WAM scenario:

- By 2022, 220 kt of waste can be avoided through prevention and selective collection in accordance with the Implementation Plan for household waste and similar industrial waste (HAGBA).

- By 2030, we want to be selectively collecting and treating more organic and biological waste in industrial residual waste.
- By 2030, we will further raise the level of ambition. We will make every effort to keep the 50% fraction of recyclable waste in household waste and similar industrial wastes separate from residual waste.
- By 2030, the plastics sorting and recycling capacity in Flanders should be quadrupled compared with 2015.
- In 2030, landfill emissions will be 81% lower than in 2005.

Overall, the WAM scenario predicts a 50% reduction in emissions in the waste sector over the period 2005-2030. In 2030, landfill emissions will be 81% lower than in 2005.

Graph 2-6. Overview of actual emissions and WAM projections in the waste 2005-2030



Emissies (Mton CO ₂ -eq)	Emissions (Mt CO ₂ eq)
Composteren	Composting
Niet-ETS energie	Non-ETS energy
Afvalwaterbehandeling	Wastewater treatment
Stortplaatsen	Landfills
Afvalverbranding	Waste incineration
INV	INV
WAM	WAM

Table 2-5. Actual emissions and WAM projections in the waste sector 2005-2030

	2005	2013	2014	2015	2016	2017	2020	2025	2030
Total GHG emissions in the waste sector (Mt CO ₂ eq)	2.8	2.4	2.3	2.3	2.2	2.3	2.1	1.8	1.4
Trend in GHG emissions compared with 2005 (%)		-17%	-19%	-18%	-21%	-20%	-27%	-38%	-50%

Macroeconomic and other impacts of the planned policies and measures

An impact analysis of the main strands of the draft Flemish Energy Plan 2021-2030 and of the draft Flemish Climate Policy Plan 2021-2030 was carried out in 2019 through a limited study mission (³⁰) on behalf of the Department of the Environment.

³⁰ PWC, Impactanalyse van de uitvoering van het Europees Clean Energy pakket voor Vlaanderen, final report September 2019.

Table: Summary of the impact analysis results (source: PWC, 2019)

Objectives	Indicators									
	Environmental impacts			Macroeconomic impacts			Social impacts			
	Emissions	Land use	Investment cost	Valued added	Energy system cost	Budget impact	Competitiveness	Purchasing power	Fuel poverty	Employment
A. Transport										
Reduction in the number of road kilometres to a maximum of 51.6 billion in 2030 compared with 2015	-	0	+	+	n/a	-	n/a	n/a	n/a	n/a
Low-carbon and zero-emission vehicles	-	0	+	0	n/a	+	n/a	n/a	n/a	n/a
B. Buildings										
<i>Residential</i>										
Faster and deeper renovation	-	0	+	+	n/a	+	0	n/a	0/-	+
Reduction in fossil fuels	-	NA	+	NA	n/a	+	NA	-/0	n/a	+
<i>Tertiary buildings</i>										
Faster and deeper renovation	-	0	+	+	n/a	+	0	n/a	n/a	+
Reduction in fossil fuels	-	NA	+	NA	n/a	+	NA	-/0	n/a	+
C. Non-ETS industry										
Reduction in greenhouse gases in the non-ETS industrial sector of 21% by 2030 compared with 2015	-	NA	n/a	n/a	NA	+	n/a	n/a	NA	n/a
D. Waste										
Reduction in the capacity of waste treatment facilities	-									
E. Agriculture										
Reduction in enteric emissions through an agricultural sector Green Deal	-	-	NA	-	NA	NA	-	-	NA	n/a
Manure management emissions will be reduced	-									
Increased nitrogen efficiency	-	n/a	NA	n/a	NA	NA	n/a	n/a	NA	n/a
Reduction in energy emissions	-	n/a	+	NA	n/a	+	NA	NA	NA	NA
F. Waste										
Reduction in the capacity of residual waste treatment facilities	-									
G. LULUCF										
Effects of the LULUCF targets in the policy on space, nature and materials	n/a	-								
H. Renewable energy										
Increase in renewable energy	-	+		+			n/a	n/a	n/a	n/a

Symbols and abbreviations	Definition
+	Significant increase
-	Significant reduction
n/a (not available)	There is an impact on this indicator, but it cannot be generally determined whether the final impact is + or -

NA (not applicable)	No direct impact
Grey shading	Already discussed or no data available

The study examined the environmental impacts (air pollutant emissions and land use), macroeconomic impacts (investment costs, budget impact, energy system cost, value added, competitiveness) and social impacts (employment, purchasing power and fuel poverty) based on the objectives and sub-objectives of the two draft plans. The above table provides an overview of the main objectives of the draft plans and of the impacts of those objectives on a series of indicators.

This overview generally shows that the envisaged energy and climate policy will make a significant contribution, in all sectors, to air quality by reducing air pollutant emissions. The impact analysis predicts that there will be little or no impact on land use in the traditional sectors. The Green Deal in the agricultural sector and the measures in the LULUCF sector that may reduce land use are an exception to this. On the other hand, greater use of renewable energy may increase the spatial footprint.

It is in the transport and buildings sectors that the greatest impact on the various indicators can be seen. As a result, for transport, significant further reductions in air pollutant emissions are predicted, such as an additional reduction of 31% in NO_x compared with the BAU (business-as-usual) scenario. To achieve the stated GHG emission reduction targets in the transport sector, additional investment costs of EUR 13.2 billion to EUR 16.4 billion will be needed over 10 years (up to 2030). Switching to zero-emission vehicles and sustainable modes of transport may increase value added and employment in the sector. Reducing the number of road vehicle-kilometres may have the opposite effect on these indicators. The net effects on value added, employment, purchasing power and competitiveness have not been calculated.

Likewise, for buildings, total GHG and air pollutant emissions are predicted to fall sharply compared with the BAU scenario. Total additional investment costs for objectives in the residential construction sector are estimated to be in a range of EUR 15.6 billion to EUR 23.4 billion for the period 2021-2030. An increase in the rate of renovation and more sustainable heating systems are included in these costs. The investment costs for increased sustainability are roughly EUR 1.5 billion to EUR 2.4 billion for the period 2021-2030. As regards tertiary buildings, these additional investment costs are estimated to be in a range of EUR 9.3 billion to EUR 13.5 billion over 10 years (up to 2030) (for 100% renovation) or EUR 4.7 billion to EUR 7 billion in the other scenario (for 50% renovation). This brings the total additional investment costs for the entire buildings sector to EUR 20 billion to EUR 37 billion for the period 2021-2030. Due to an increased rate of renovation and greater sustainability, which is vital, activities in the construction sector are predicted to grow. According to the estimates, the value added of the construction sector should rise to EUR 5.6 billion to EUR 8.6 billion by 2030. The study estimates that this could increase employment in the construction sector by 82,799 to 124,198 jobs over the period 2021-2030 (through an increase in the supply of labour in this sector).

In agriculture, the stated GHG emission reduction objectives risk having a negative impact on value added, which can, however, be limited by finding cost-effective solutions such as in the Green Deal Agriculture.

As regards industry, the impact on investment costs will largely depend on the structure of EPAs. No calculation has been made in this respect due to a lack of data. The potential impact is not therefore examined further on.

Overview of investment needs

2.1.6. Existing investment flows and forward investment assumptions with regard to the planned policies and measures

Investment costs of Flemish energy policy

The following estimates primarily concern investment costs for new projects during the period 2021-2030 because this information is required by the Governance Regulation. Replacement costs for existing projects that will end during this period have also been taken into account. The calculations are based on the power needed for generation, as indicated in the tables of the Flemish Energy and Climate Plan and the projects described in

the text. The investment costs per unit of power or per project have been determined using the most relevant and up-to-date sources, namely the investment costs indicated in reports on unprofitable parts (with regard to investment costs for green electricity generation from wind power, solar power, biomass and biogas). The expected reduction in investment costs (which are considerable for solar and wind power) over the period 2021-2030 has been taken from the ASSET study.

As regards green heat, the calculation is based on the number of installations or projects described in the text. The investment costs have been estimated based on various sources (solar map, quotations for different types of heat pump, current geothermal energy projects, SDE+ documents of PBs).

With regard to district heating systems, the estimated growth corresponds to the rate of investment in projects that have been supported in the last three years, which is why the known investment costs of supported projects have also been included.

(million EUR)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
green electricity										
onshore wind	125	124	123	121	120	119	118	116	115	114
PV	319	316	312	309	306	321	317	314	311	307
biomass	26	26	26	26	26	26	26	26	26	26
Biogas	68	68	68	68	68	68	68	68	68	68
Sub-total	539	534	530	525	521	534	530	525	520	516
green heat										
solar water heaters	24	24	24	24	24	24	24	24	24	24
heat pumps	69	76	83	89	96	103	110	116	123	130
geothermal energy	15	15	15	15	15	15	15	15	15	15
household biomass	0	0	0	0	0	0	0	0	0	0
other biomass	15	15	15	15	15	15	15	15	15	15
district heating systems	71	71	71	71	71	71	71	71	71	71
Sub-total	194	201	208	214	221	228	235	241	248	255
Total	733	735	737	740	742	762	764	766	769	771

The total investment cost for the period 2021-2030 is estimated at EUR 7.5 billion.

2.1.7. Costs and benefits of Flemish climate policy

2.1.7.1. Total investment costs of the Flemish mitigation policy

It is clear that major investments will need to be made in all sectors in order to achieve this plan. In the long term, some of these investment costs will be offset by future energy savings delivered by the energy and climate policy.

The impact analysis carried out by PWC (2019) has estimated the investment costs (for both the private sector and the public sector) needed to achieve the objectives of the draft Flemish climate plan and the draft Flemish energy plan (³¹) (over and above the BAU scenario). The estimated investment costs for transport, buildings and renewable energy are indicated in the summary table below (these costs could only be estimated to a very limited extent for the industrial and agricultural sectors and are not therefore indicated).

³¹ This estimate has not been adjusted following the changes made to the Flemish Energy and Climate Plan. It should therefore be interpreted as an approximation with a wide margin of uncertainty.

Table: Estimate of investment costs over the period 2021-2030 in billion EUR/year (source: PWC, 2019)

sector	min.	max.
Transport	1.32	1.64
Residential buildings	1.56	2.34
Tertiary buildings	0.47	1.35
Renewable energy	1.9	1.9
Total	5.25	7.23

These investment needs have also been estimated by the ‘Stroomgroep Financiering’. When converted into additional investment costs over and above the current costs, the investment needed in the Flemish Energy and Climate Plan 2021-2030 has been estimated at a total of EUR 5.6 billion to EUR 11.6 billion per year (³²).

In addition to the costs of implementing this plan, there are also considerable benefits for Flanders. The main benefits are as follows.

- Significant improvement of air quality in Flanders and, as a direct corollary, better health for all Flemish residents. This will translate into a reduced number of premature deaths attribute to poor air quality. The objectives and measures of this climate plan have been aligned with the Air Policy Plan 2019, which identifies the effects on air quality and health.
- A contribution to the reduction of road accidents and traffic jams through the mitigation policy in the transport sector.
- Considerable health benefits due to increased indoor comfort and an adapted food model.
- Net job creation: a study of the macroeconomic impact of the low-carbon transition in Belgium (³³) estimates that this may result in net job creation in Belgium.

2.1.7.2. Budget costs of the mitigation policy for the Flemish Government

As this Flemish Energy and Climate Plan is implemented, the various policy areas will calculate the cost and impact of the measures. The methods of financing the measures will also be defined.

In addition to the budget costs of the mitigation measures, there are also other costs: contributions to international climate finance; compensation of indirect emission costs for industry, and also, potentially, costs to use and purchase flexibility mechanisms in order to achieve the Flemish climate targets.

2.1.7.3. Use and purchase of flexibility

The European Effort Sharing Regulation (ESR) and the LULUCF Regulation provide for various forms of flexibility that Member States can use to achieve their targets in the period 2021-2030. In addition to keeping some forms of flexibility (banking, borrowing and trading emission allocations) from the period 2013-2020, certain mechanisms have been abolished (purchase of rights from CDM and JI projects) and new mechanisms have been established (ETS flexibility, flexibility between the national target for non-ETS sectors and the (new) national target for the LULUCF sector). The ESR and the LULUCF Regulation impose quantitative, and sometimes also qualitative, limits on the use of these various flexibility instruments. The distribution of access to these forms of

³² See the final report of the ‘Stroomgroep Financiering’ of 16 October 2019:

https://www.energiesparen.be/sites/default/files/atoms/files/Stroomgroep_financiering_achtergrondrapport_finaal.pdf

We cite the total investment costs in the minimum and maximum scenarios, from which we have deducted the current costs, and excluding the green and blue infrastructure costs (which relate more to adaptation than mitigation).

³³ Study carried out at the request of the Federal Government by CLIMACT, UCL, Oxford Economics and the Federal Planning Bureau in 2016.

flexibility between the regions forms part of the intra-Belgian burden-sharing exercise with regard to the climate targets for the period 2021-2030.

2.1.7.4. Contributions to international climate finance

Overview

The aim of international climate finance is to support developing countries in their initiatives against climate change caused by humans. Under the United Nations Framework Convention on Climate Change (³⁴), developed countries must take the lead in providing international climate finance and have committed to jointly mobilise USD 100 billion per year by 2020. A new collective international target will be set by 2025, which will be more than USD 100 billion per year. The amount and associated conditions of this new target will be negotiated by 2025.

For the period 2016-2020, Belgium has committed to annual financing of EUR 50 million. Under the cooperation agreement of 12 February 2018 between the Federal Government, the Flemish Region, the Walloon Region and the Brussels Capital Region on burden-sharing with regard to the Belgian energy and climate targets for the period 2013-2020 (³⁵), Flanders must contribute EUR 14.5 million every year to international climate finance.

Strategy and targets

Given the international situation, the Flemish Government will prepare a Flemish international climate finance strategy (Vlaamse Internationale Klimaatfinancieringsstrategie – VIKS) 2021-2030 after an agreement is reached within Belgium on burden-sharing for the period 2021-2030. We will confirm our international climate ambitions by contributing to contribute to international climate finance, and we will prioritise these resources for those projects in which Flemish businesses are involved.

2.1.7.5. Compensation of indirect emission costs for industry

Under the previous Climate Policy Plan for the period 2013-2020 and within the limits of the European State aid rules, the Flemish Government decided to grant compensation to businesses that risk becoming uncompetitive as a result of the indirect CO₂ costs in the price of electricity and that threaten to relocate to countries with less stringent CO₂ emission reduction targets. Since 2014, eligible businesses have been able to submit a claim for compensation to the VLAIO (Flanders Agency for Innovation and Entrepreneurship).

The measure is pre-financed by the Hermesfonds (fund for accompanying economic and innovation policy) from the ‘Indirect emission costs compensation’ budget item. The Hermesfonds pays the compensation in the year after that in which the costs are incurred. Over the period 2016-2018, the total annual amount of aid was around EUR 40 million. Given the increase in the CO₂ price, this figure will have to be revised upwards in the next few years.

Following the recent reform of the emissions trading system, it has been established that Member States can continue to grant aid after 2020 to compensate for indirect emission costs in order to guard against carbon leakage. Any change in the maximum level of this compensation over the period 2021-2030 will depend on the designation of the eligible sectors and the aid parameters that will be laid down in the new State aid rules to be established in 2020.

In accordance with State aid rules, we will extend the current scheme and offer the maximum authorised compensation in line with the Energy Standard and financed by the Climate Fund.

³⁴ www.unfccc.int

³⁵ Burden-Sharing cooperation agreement: https://www.cnc-nkc.be/sites/default/files/content/ac_bs_2013-2020.pdf

2.1.8. Financing of the Flemish mitigation policy

2.1.8.1. Role of public funding versus private funding

The private sector already currently funds most of the energy and climate investments. However, for a number of investments, government intervention will be needed in order to overcome market failures and a lack of initiative on the part of the private sector, for example because initial investments are high and payback periods are long, because the risk is perceived as too high or because the costs and benefits of the initiative are borne by others (think about the renovation of rental property). This is also the case for investments where significant economies of scale are possible (e.g. public transport offer, energy network infrastructure, set-up of data and knowledge sharing platforms). Government intervention is also clearly necessary to support climate investments by groups that have insufficient financial resources.

More private climate finance can be encouraged through a clear, stable and strong policy framework, with the first step in this direction being to establish and implement this plan. We also want to facilitate cooperation between private operators and support financial instruments used for climate purposes (e.g. green bonds, investments funds, etc.). To this end, we will in particular help to draft the EU Action Plan for Financing Sustainable Growth (of 8 March 2018), which aims to improve labelling of sustainable investments, offer advice to investors on the sustainability potential of a project, and ensure transparency within businesses and investment groups with regard to their sustainability strategy.

2.1.8.2. Possibilities within existing Flemish Government budgets

Each government minister is responsible, as far as they are able, for ensuring that standard policies are compatible with the climate (protection against the effects of climate change). They must also take the necessary steps within their area to ensure a faster climate transition. All sectors must accept responsibility for achieving the common goal described in the Flemish Energy and Climate Plan. Each government minister must also formulate targeted and supported measures contributing to the Flemish energy and climate targets. The initiatives announced in the plan will be converted into a specific budgeted policy.

2.1.8.3. Use of European funding channels

There is a vast range of European funding instruments (e.g. specific funds such as the ERDF and Interreg, LIFE, Horizon 2020, CEF, European financial instruments such as those offered by the European Investment Bank for instance) that can be used to meet the European climate targets. In this respect, Flanders aims to ensure that:

1. climate stakeholders in Flanders – both public and private – make maximum use of EU instruments to fund Flemish climate policy, resulting in more (innovative) projects and initiatives being implemented to help achieve the Flemish Climate Policy Plan, the Flemish Energy and Climate Plan 2021-2030 and the Flemish Climate Vision 2050;
2. climate mitigation projects carried out under EU support instruments continue to have maximum impact after the project term;
3. climate issues and climate resilience issues are mainstreamed in the EU budget after 2020 (e.g. for agriculture, transport, etc.).

We will develop a strategy to leverage European funds for both public and private investment in projects helping to achieve the Flemish energy and climate targets. To this end, we will use all available options in the new EU budget 2021-2027 and provide Flemish resources for co-financing European projects. Flanders will therefore make better and wider use of the available European funds.

2.1.8.4. Flemish Climate Fund: estimate of the funds available in the period 2021-2030

The Flemish Climate Fund can play an important role in addition to the aforementioned funding options. This fund was set up in 2012 in the form of an organic budget fund and therefore provides the financial framework needed to pursue an ambitious long-term climate policy.

Over the period 2021-2030, Flemish annual revenue resulting from the region's share of Belgian auction revenues under the European emissions trading system is estimated at around EUR 200 million per year (³⁶).

However, it is difficult to predict how these auction revenues will develop as both the price of auctioned allowances and European auctioned volumes are very hard to estimate at the moment for the trading period 2021-2030.

- Market analysts generally expect the price to steadily increase over the next few years as a result, in particular, of recent measures to reinforce the emissions trading system, which we called for in Flanders.
- Auctioned volumes will depend on other uncertain parameters: how Brexit will pan out, the impact of the market stability reserve, and the extent to which the number of auctioned allowances will reduce to prevent the cross-sectoral correction factor from being applied.
- According to the recent European Commission proposal for the EU budget 2021-2027, 20% of Member State revenues will flow back to the EU budget. This proposal would therefore have a negative impact on Flemish revenue.

2.1.8.5. Flemish Climate Fund: priority use of funds in 2021-2030

The decree creating the Flemish Climate Fund sets out the purposes for which it can be used:

- internal Flemish climate policy with a view to achieving the GHG reduction targets;
- purchase of emission allowances (if the Flemish GHG reduction targets cannot be achieved using internal measures);
- compensation for the loss of competitiveness of Flemish businesses as a result of climate policy (compensation for indirect emission costs);
- international climate finance.

Over the last few years, we have gained experience of using the Flemish Climate Fund for the Flemish mitigation policy, through the first round of funding in the period 2013-2014 and the second round of funding in the period 2016-2019. The Progress Report 2016-2017 assessed this use (and commented on it in detail in an annex). The Flemish Mitigation Plan 2013-2020 detailed the allocation method for the first round of funding. The main findings from these two rounds of funding are as follows.

- All sectors still have more potential for cost-effective reduction, which can be exploited through a targeted policy.
- In the sub-sector of Flemish public buildings (which accounts for only 3% to 5% of Flemish non-ETS emissions), the Flemish Climate Fund is used to a considerable extent.
- Given the limited resources of the Flemish Climate Fund, it would be advisable in the future to focus more on measures with a good cost-efficiency ratio and a significant leverage effect. In this respect, we take account of the fact that measures with a very short payback period should also be implemented without any additional financial support from the Flemish Climate Fund.
- Projects benefiting from Flemish Climate Fund support need to be closely monitored, not only to justify the use of the funds, but also to maximise the learning effects.

³⁶This rough estimate is based on the assumption that the Flemish share of Belgian auction revenues over the period 2013-2020 (52.76%) will remain unchanged over the period 2021-2030.

- By compensating for *indirect carbon leakage*, the Flemish Climate Fund has helped to safeguard our industry's competitiveness.

Over the period 2021-2030, Flemish annual revenue is estimated at around EUR 200 million per year. This is a relatively small amount compared with the expected total costs of climate policy. However, the Flemish Climate Fund can play an important role if it is used for measures with a significant leverage effect.

That is why we will focus on optimising how the Flemish Climate Fund functions. We will use the fund in non-ETS sectors to help achieve our GHG reduction target for 2030. We will ensure that the co-financing principle is always applied, as is the case with many European funds. This means that GHG reduction measures cannot be fully funded by the Flemish Climate Fund, but must also be partly funded by private resources or other public funds. This will ensure that the fund has a leverage effect and greater impact. The resources provided by the fund for a measure may be proportionally higher if the measure funded has a higher cost-efficiency ratio.

The Flemish Climate Fund will also be used for investments in public spatial planning that can help to achieve the 'no net loss' objective in relation to carbon losses due to land use.

We will develop innovative financing tools (working capital, joint funding, etc.) to encourage private investment. The Flemish Climate Fund can be used as co-financing for this purpose.

2.1.9. Sector or market risk factors or barriers in the national or regional context

iii. Analysis of additional public finance support or resources to fill gaps identified under point ii

Walloon Region

1. CURRENT SITUATION AND PROJECTIONS WITH EXISTING POLICIES AND MEASURES

Projected evolution of main exogenous factors influencing energy system and GHG emission developments

i. Socioeconomic forecasts

In Wallonia	2015	2020	2025	2030	2035	2040
Population on 1 January (in thousands) ⁽³⁷⁾	3,590	3,675	3,745	3,818	3,887	3,946
Number of households (in thousands)	1,548	1,610	1,658	1,710	1,759	1,798

The demographic trend, which is based on projections by the Federal Planning Bureau, has been used to determine the growth in the number of households (and therefore the need for housing).

ii. Sectoral changes expected to impact the energy system and GHG emissions

The trend in economic activity is based on activity variables ⁽³⁸⁾ specific to each industrial sub-sector (compound annual growth rate). Closures of facilities and new investments are included.

iii. Global energy trends, international fossil fuel prices, EU ETS carbon price, technology cost developments

In constant euros 2013/toe ⁽³⁹⁾	2020	2025	2030	2035
Oil (Brent)	75	85.1	93.8	97.8
Coal	14.3	17.1	20.5	21.7
Gas	48.3	52.2	56.8	60.6

In constant euros 2013 €/t CO ₂ ⁽⁴⁰⁾	2020	2025	2030	2035
EU ETS Carbon price	15	22.5	33.5	42

Degree days: Consumption in the residential and tertiary sectors is standardised on the basis of 1,870 *degree days* (average 1991-2015).

Decarbonisation

1.1.1. GHG emissions and removals

i. Current trends in GHG emissions and ETS, ESD, LULUCF and various energy sector targets

According to the inventory submitted in March 2019, in 2017 Wallonia emitted 35.3 Mt CO₂eq, or 31% of Belgium's annual emissions (excluding the forestry sector). This inventory is drawn up in accordance with the 2006 IPCC guidelines and the applicable global warming potential (GWP) for the period 2013-2020 ⁽⁴¹⁾.

³⁷ Federal Planning Bureau.

³⁸ Fairly conservative assumptions.

³⁹ Values recommended by the European Commission. Ton Oil Equivalent: 1 toe = 41,868 GJ.

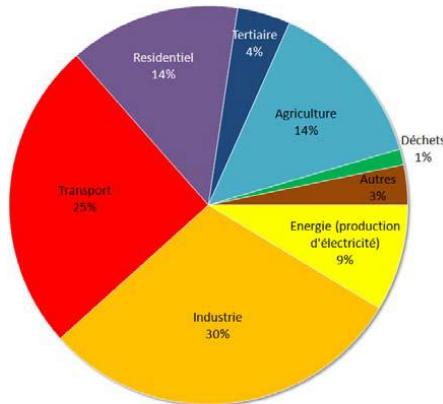
⁴⁰ Idem.

⁴¹ Applicable GWPs: CH₄ = 25 and N₂O = 298. The GWPs for fluorinated gases are also audited.

The Walloon inventory of GHG emissions is combined with the inventories for the Flemish Region and the Brussels Capital Region to make up the Belgian inventory, which is reported by Belgium on an annual basis under the Kyoto Protocol and European commitments (Effort Sharing Decision No 406/2009/EC).

Figure 1 shows the breakdown of total GHG emissions by type of gas and by main sector.

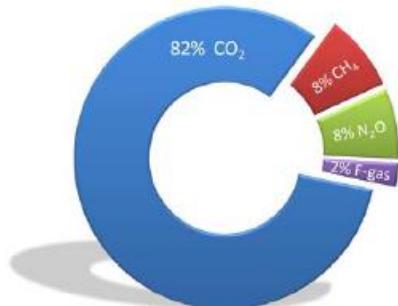
Figure 1: Breakdown of GHG emissions by sector in Wallonia in 2017 (source: AwAC)



Residentiel	Residential
Tertiaire	Tertiary
Agriculture	Agriculture
Déchets	Waste
Autres	Other
Energie (production d'électricité)	Energy (electricity generation)
Industrie	Industry
Transport	Transport

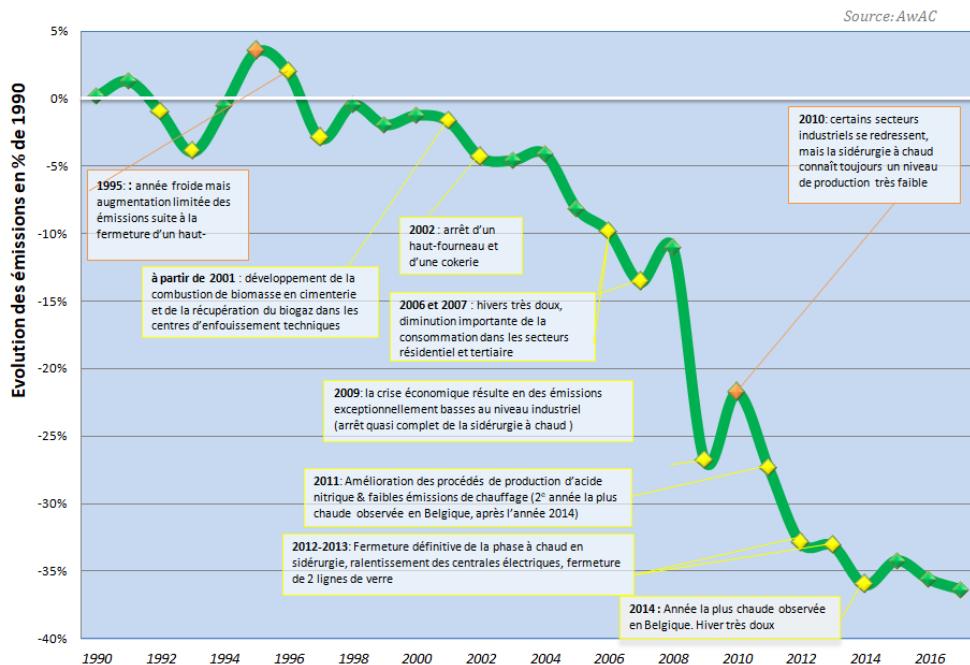
CO₂, which accounts for 82% of total GHG emissions, is emitted in particular during combustion processes in various sectors: industry, transport, tertiary and residential heating, and power plants. CH₄, which accounts for 8% of total emissions, is emitted by agriculture (78%), the waste sector (10%) and natural gas distribution systems (compressors and leaks; 7%), with the remainder being emitted by combustion processes as a whole. N₂O, which accounts for 8% of total emissions, is chiefly emitted by agriculture (81%), the chemical industry (4%) and combustion processes (9%). Finally, fluorinated gases account for 2% of total emissions and are emitted during the manufacture and use of certain products (refrigeration, insulating foams, etc.).

Figure 2: Breakdown of GHG emissions by type of gas in 2017 (source: AwAC)



Based on the latest available estimates, anthropogenic GHG emissions (excluding the forestry sector) in Wallonia in 2017 were 36.9% lower than in 1990.

Figure 3: Trend in total GHG emissions in Wallonia, including the ETS and ESD sectors (source: AwAC)



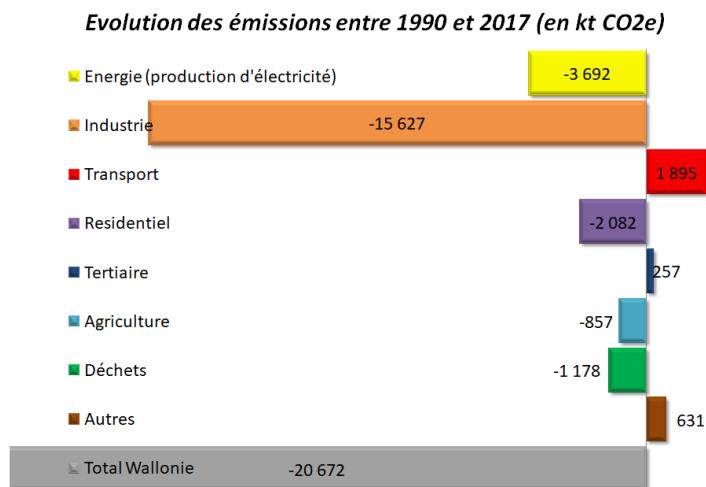
Source: AwAC	Source: AwAC
Evolution des émissions en % de 1990	Trend in emissions (in %) compared with 1990
1995: année froide mais augmentation limitée des émissions suite à la fermeture d'un haut- [text missing]	1995: cold year, but limited increase in emissions due to the closure of a [blast furnace]
à partir de 2001 : développement de la combustion de biomasse en cimenterie et de la récupération du biogaz dans les centres d'enfouissement techniques	from 2001: development of biomass combustion in cement works and of biogas recovery at landfill sites
2002 : arrêt d'un haut-fourneau et d'une cokerie	2002: shutdown of a blast furnace and a coking plant
2006 et 2007 : hivers très doux, diminution importante de la consommation dans les secteurs résidentiel et tertiaire	2006 and 2007: very mild winters; significantly reduced consumption in the residential and tertiary sectors
2009 : la crise économique résulte en des émissions exceptionnellement basses au niveau industriel (arrêt quasi complet de la sidérurgie à chaud)	2009: the economic crisis leads to exceptionally low industrial emissions (the hot working steel industry comes to a virtually complete halt)
2010 : certains secteurs industriels se redressent, mais la sidérurgie à chaud connaît toujours un niveau de production très faible	2010: some industrial sectors recover, but the hot working steel industry still produces very little
2011 : Amélioration des procédés de production d'acide nitrique & faibles émissions de chauffage (2 ^e année la plus chaude observée en Belgique, après l'année 2014).	2011: improvement in nitric acid production processes and low heating emissions (2nd hottest year observed in Belgium, after 2014).
2012-2013 : Fermeture définitive de la phase à chaud en sidérurgie, ralentissement des centrales électriques, fermeture de 2 lignes de verre	2012-2013: permanent shutdown of the hot working phase in the steel industry, slowdown at power plants, closure of 2 float lines
2014 : Année la plus chaude observée en Belgique. Hiver très doux	2014: hottest year observed in Belgium. Very mild winter

The overall trend conceals significant differences in the various sectors. The industrial and electricity generation sectors have seen reductions in total emissions of 28% and 7% respectively, while the increase in transport-related emissions has caused total emissions to rise by 3%.

The main factors behind these sectoral trends are as follows:

- energy: switch from coal to natural gas or wood, closure of coking plants;
- industry: closures in the steel industry, increased use of gas or alternative fuels, sectoral and ETS agreements, increase in value added despite this reduction;
- residential and tertiary: increase in building stock, higher consumption of electricity, limited switch to natural gas, insulation, milder climate;
- transport: increase in the number of cars, engine size and vehicle-kilometres;
- agriculture: reduction in and changes to livestock, reduction in mineral fertilisers;
- waste: recovery and use of biogas at landfill sites.

Figure 4: Trend in GHG emissions by sector in Wallonia (kt CO₂eq, between 1990 and 2017; source: AwAC)



Evolution des émissions entre 1990 et 2017 (en kt CO ₂ e)	Trend in emissions between 1990 and 2017 (in kt CO ₂ eq)
Energie (production d'électricité)	Energy (electricity generation)
Industrie	Industry
Transport	Transport
Residentiel	Residential
Tertiaire	Tertiary
Agriculture	Agriculture
Déchets	Waste
Autres	Other
Total Wallonie	Total for Wallonia

ii. Projections of sectoral developments with existing national and Union policies and measures at least until 2030

The projections set out below are based in particular on work carried out by a consultant (ECONOTEC) using the Emission Projection Model (a technical and economic model) in the second half of 2016. The aim was to update the projections made in early 2015 for the energy generation, industrial, residential and tertiary sectors. The projections for the transport sector were modelled using the COPERT tool and may change depending on the

context or the availability of new tools (⁴²). The model does not cover all the dimensions of the Energy Union (market, network, etc.) or take account of all impacts (jobs, prices, etc.).

Policies and measures taken into account

Only the main measures that generate investments are taken into account (e.g. the effects of soft measures such as communication are not directly included). This choice may mean that consumption and emissions are overestimated, but ensures that the resulting baseline scenario is conservative.

Existing policies and measures are included in the model using an analysis of existing data (databases, regulatory texts, etc.).

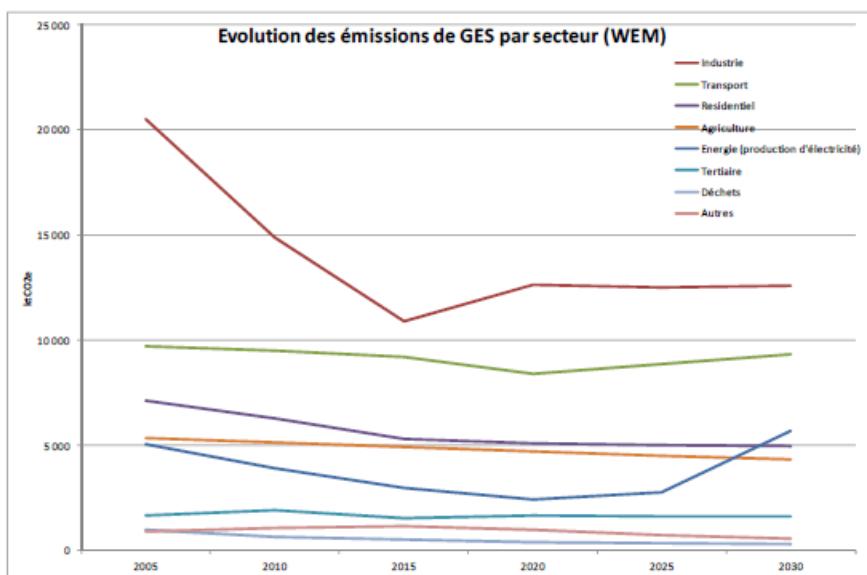
Where the end date of a measure is known, this is taken into account (e.g. green certificates). Otherwise, the measure is continued linearly to 2030 (e.g. incentives).

All the graphs below are based on historical data from the energy balances for the years 2005, 2010 and 2015 (where intermediate years are shown, they have been linearly extrapolated and do not therefore represent official data). The years 2020, 2025 and 2030 are the result of modelling and the intermediate years are extrapolated.

Greenhouse gas emissions

The graph below shows the trend in GHG emissions for all sectors since 2005, with constant-policy-based projections.

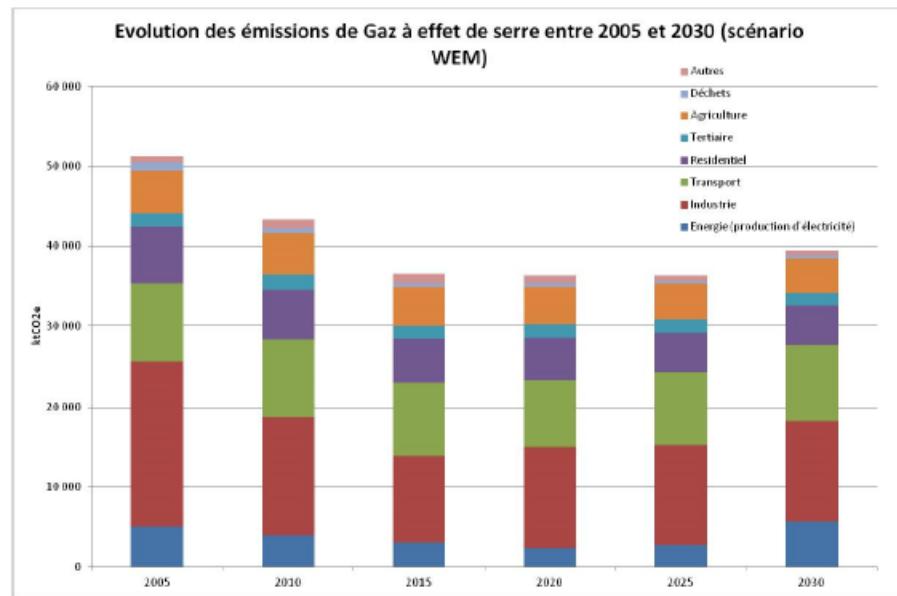
Figure 5: Trend in GHG emissions by sector in the baseline scenario (WEM), in five-year intervals



Evolution des émissions de GES par secteur (WEM)	Trend in GHG emissions by sector (WEM)
ktCO2e	kt CO ₂ eq
Industrie	Industry
Transport	Transport
Residentiel	Residential
Agriculture	Agriculture
Energie (production d'électricité)	Energy (electricity generation)
Tertiaire	Tertiary
Déchets	Waste
Autres	Other

⁴² The TIMES model (optimisation model) is being developed in Wallonia.

Figure 6: Trend in total GHG emissions (ETS + ESR) in the baseline scenario (WEM)



Evolution des émissions de Gaz à effet de serre entre 2005 et 2030 (scénario WEM)	Trend in GHG emissions between 2005 and 2030 (WEM scenario)
ktCO2e	kt CO ₂ eq
Autres	Other
Déchets	Waste
Agriculture	Agriculture
Tertiaire	Tertiary
Residentiel	Residential
Transport	Transport
Industrie	Industry
Energie (production d'électricité)	Energy (electricity generation)

Without any additional measures, the emissions of each sector will generally remain stable over the entire period to 2030. However, there may be some increases in the energy generation, industrial and transport sectors. Emissions in the energy generation sector will increase in 2025 due to the end of nuclear power and its partial replacement by gas-fired plants. There will be an increase in the industrial sector between 2015 and 2020, as it is expected that the sector will return to a level of activity comparable to the pre-crisis level in 2008. The transport sector is also expected to continue its previous growth.

1.1.2. Renewable energy

i. Current share of renewable energy in gross final energy consumption and in different sectors (heating and cooling, electricity and transport) as well as per technology in each of these sectors

'Renewable energy sources' are non-fossil renewable energy sources used for both electricity generation and also heat production and transport (⁴³). The most well-known, given that they form part of our everyday landscape, are wind power, solar power and wood. However, biogas and biofuels are also included in this list.

The renewable energy sources available in Wallonia can be grouped into three categories:

⁴³ Refer to Directive 2009/28/EC for a full definition.

Source électricité (E-SER)	Source chaleur (C-SER)	Transport (T-SER)
<ul style="list-style-type: none"> Hydraulique Eolien Solaire PV Biogaz Biocombustible liquide Biomasse solide Déchets organiques 	<ul style="list-style-type: none"> Solaire thermique Pompes à chaleur Géothermie Biogaz Biocombustible liquide Biomasse solide Bois 	<ul style="list-style-type: none"> Biodiesel Bioethanol Electricité SER

Electricity source (RES-E)	Heat source (RES-H)	Transport (RES-T)
<ul style="list-style-type: none"> Hydroelectric Wind Solar PV Biogas Liquid biofuel Solid biomass Organic waste 	<ul style="list-style-type: none"> Solar thermal Heat pumps Geothermal energy Biogas Liquid biofuel Sold biomass Wood 	<ul style="list-style-type: none"> Biodiesel Bioethanol RES electricity

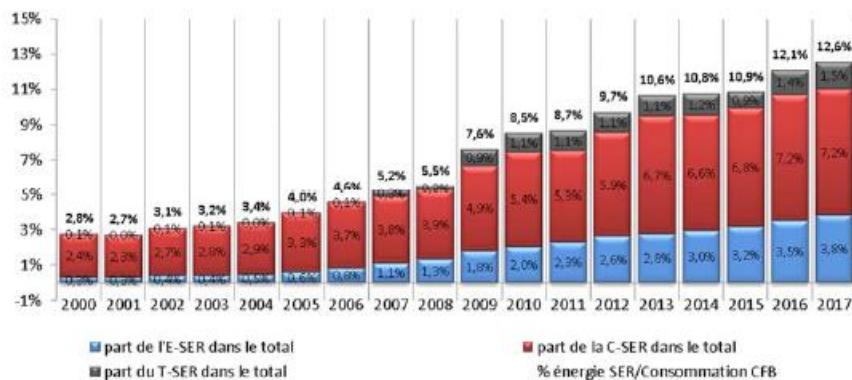
Several European Directives promoting the use of energy produced using renewable sources have been successively adopted in recent years: 2001/77/EC, 2003/30/EC, 2009/28/EC and more recently (EU) 2015/1513. Their aim is to define a minimum renewables target for each country and also the rules for calculating that target.

Belgium's renewable energy commitment at EU level (13% by 2020) was broken down between the regions and the federal level in December 2015, with Wallonia being set a target of producing 14,850 GWh from renewable energy sources by 2020.

Wallonia has, however, adopted a decree enshrining a more ambitious target of 15,600 GWh of production from renewable energy sources by 2020.

This target incorporates generation of renewable electricity, production of renewable heat and consumption of biofuels in the transport sector. The denominator takes account of final energy consumption, including grid losses and own consumption in heat or power plants. The following figures show the trend in the share of renewables in Wallonia and the target set for 2020. It should be noted that the share of renewable electricity is increasing (under 1% of the total before 2007; 3.9% in 2017), that the share of renewables in the transport sector slowed in 2015 but accelerated again in 2016 and 2017, and finally that renewable heat makes the largest contribution to the overall total at 7.2%.

Figure 7: Trend between 2000 and 2016 in the share of gross renewable energy in total gross final energy consumption within the meaning of Directive 2009/28/EC



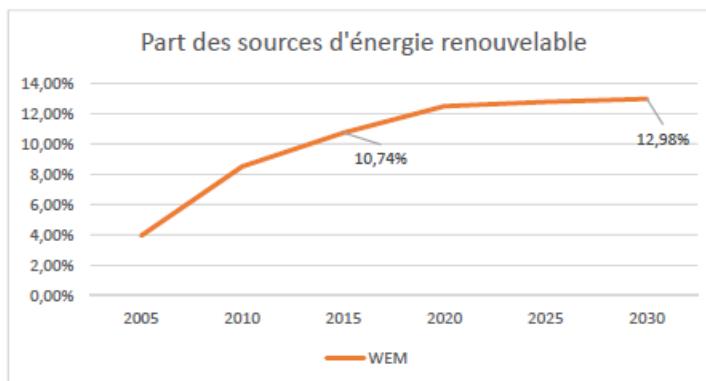
part de l'E-SER dans le total	Share of RES-E in the total
part du T-SER dans le total	Share of RES-T in the total
part de la C-SER dans le total	Share of RES-H in the total
% énergie SER/Consommation CFB	% Renewable energy/Gross final consumption

Having achieved 12.6% in 2017, Wallonia has exceeded the Burden Sharing targets set for Belgium as a whole, i.e. 15,341 GWh with a target of 14,850 GWh.

ii. Indicative projections of development with existing policies and measures for the year 2030

The share of renewable energy sources (RES) increases from 10.74% (⁴⁴) in 2015 to 12.98% in 2030 in a constant-policy scenario. The rate of development varies by sector and subsector.

Figure 8: Trend in the share of renewable energy sources in the WEM scenario



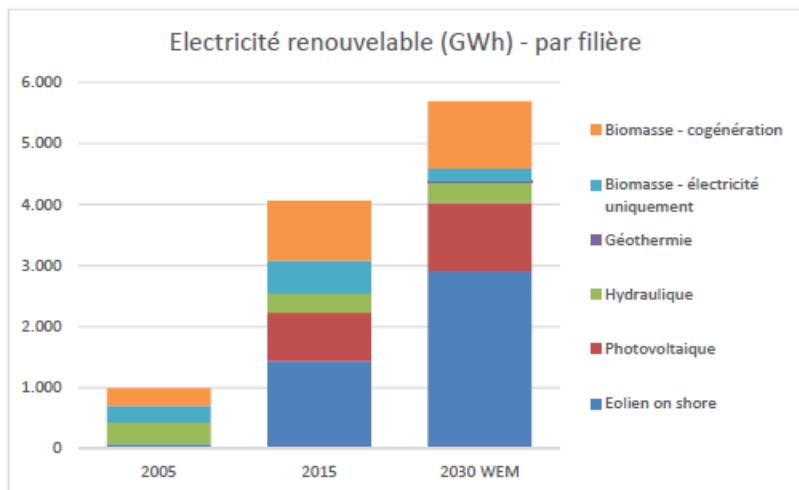
Part des sources d'énergie renouvelable	Share of renewable energy sources
WEM	WEM

With regard to the generation of **renewable electricity**, the green certificates mechanism is taken into account up to 2024 and results in increasing renewable electricity generation up to that year, after which it stabilises (if the green certificates support mechanism is not continued after 2024), except for small-scale photovoltaic systems.

All existing renewable installations in 2014 are assumed to continue operating over the projection period, except for the AWIRS 4 biomass plant, which is expected to shut down after 2020.

⁴⁴ 12.6% in 2017.

Figure 9: Renewable electricity generation by subsector (WEM)

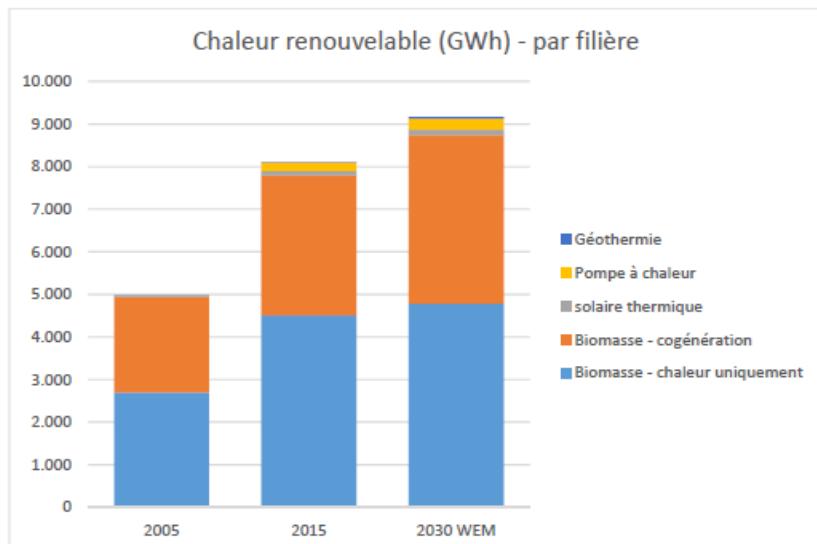


Electricité renouvelable (GWh) – par filière	Renewable electricity (GWh) – by subsector
Biomasse – cogénération	Biomass – cogeneration
Biomasse – électricité uniquement	Biomass – electricity only
Géothermie	Geothermal energy
Hydraulique	Hydroelectric power
Photovoltaïque	Photovoltaics
Eolien on shore	Onshore wind
WEM	WEM

Renewable electricity generation mainly involves wind power, biomass (whether or not through cogeneration) and photovoltaics.

The production of **renewable heat** increases slightly in each subsector. Cogeneration is encouraged through the green certificates mechanism, with the other subsectors also being developed through existing support mechanisms and energy performance obligations.

Figure 10: Production of renewable heat by subsector (WEM scenario)



Chaleur renouvelable (GWh) – par filière	Renewable heat (GWh) – by subsector
Géothermie	Geothermal energy

Pompe à chaleur	Heat pump
Solaire thermique	Solar thermal
Biomasse – cogeneration	Biomass – cogeneration
Biomasse – chaleur uniquement	Biomass – heat only
WEM	WEM

Dimension Energy efficiency

i. Current primary and final energy consumption in the economy and per sector (including industry, residential, service and transport)

The environmental impact of generating and using energy depends not only on the amount of energy consumed, but also on the type of resources used: primary or secondary, fossil or renewable.

Actual energy needs in Wallonia are represented by gross inland (energy) consumption (GIC) (⁴⁵).

Unlike the more commonly used term ‘final energy consumption’, GIC includes losses associated with the transformation and distribution of energy, as well as the fuel consumption of power plants.

The graph below shows that overall Wallonia has consumed less energy each year since 2004, with a total reduction of 15% since 1990. This reduction in consumption is reflected in nuclear production, which fell from 65 TWh in 1990 to 58 TWh in 2017. This reduction in the nuclear share has been offset by the rise in renewables since the early 2000s, which now account for 12% of gross inland consumption.

Wallonia’s level of energy self-sufficiency is therefore increasing each year.

Figure 11: Trend in gross inland consumption by energy carrier between 1990 and 2016



CIB (TWh PCI)	GIC (TWh LCV)
max en 2004	maximum in 2004
min en 2015	minimum in 2015
-16% p.r. à 1990	-16% compared with 1990
-14% p.r. à 2010	-14% compared with 2010
-0.5% p.r. à 2016	-0.5% compared with 2016
Solides	Solid fuels
Produits pétroliers	Oil products
Gaz naturel	Natural gas
Nucléaire	Nuclear
Electricité	Electricity
Autres	Other
CIB total	Total GIC

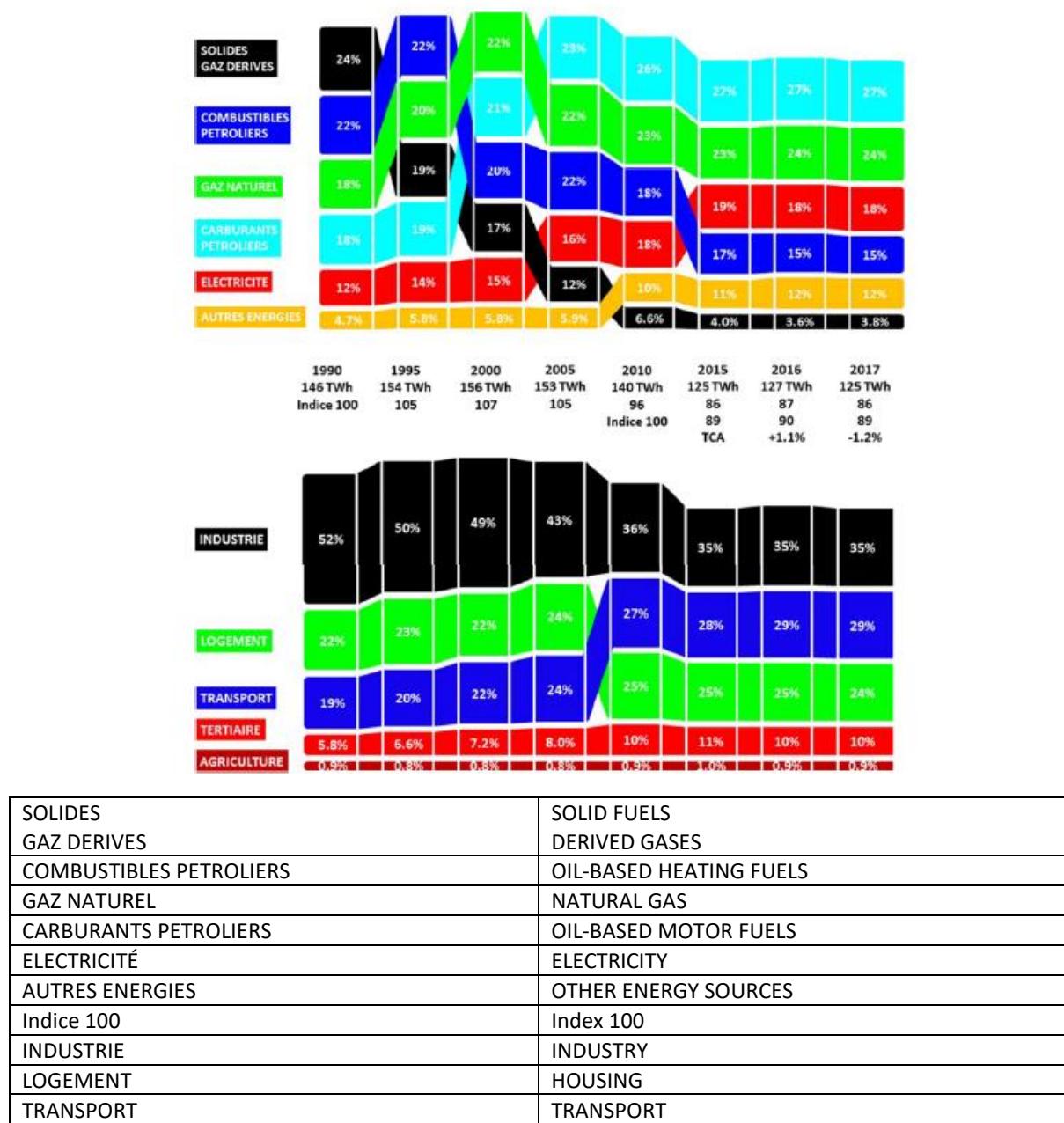
⁴⁵ The term ‘gross domestic consumption of energy’ corresponds to the total energy demand in a geographical area.

However, the graph shows that 2015 was the first year with a net import balance for electricity since 1990. This means that Wallonia did not generate more electricity than it needed in 2015 and that overall it purchased more electricity from its neighbours than it sold to them. In 2017, Wallonia once again recorded a net export balance for electricity of 6 TWh.

In parallel with the changing energy needs in Wallonia, the trend in final consumption reveals the links between the economic sectors responsible for that consumption and the consumption by energy carrier.

For example, different sources of energy are used for transport purposes and for manufacturing industrial products. Changes in the breakdown by economic sector therefore change the breakdown by energy carrier. This is illustrated in the two graphs below.

Figure 12: Trend in total final consumption⁽⁴⁶⁾ by economic sector and energy carrier



⁴⁶ Total final consumption includes non-energy uses, i.e. energy used as a raw material in manufacturing processes.

TERTIAIRE	TERTIARY
AGRICULTURE	AGRICULTURE

It is apparent from the second graph that industry, transport and buildings (tertiary and housing combined) account for the bulk of consumption.

In chronological terms, it is clear that, although industry continues to be the most energy-intensive sector in Wallonia, it now accounts for only 35% of final consumption, whereas this figure was 52% in 1990. This fall has led to a reduction in the consumption of solid fuels (first graph), from 24% in 1990 to just 4% in 2017, which were primarily used in the steel industry. In addition, given the high level of CO₂ emissions associated with this type of fuel, the industries using it have prioritised its elimination and/or replacement.

The transport sector, which accounted for only 19% of energy consumption in 1990, currently consumes 29% of the energy used in Wallonia.

This trend in the sector's share is confirmed by the first graph, which shows that the share of oil-based motor fuels increased from 18% in 1990 to 27% in 2017.

The 2% difference in 2017 relates to biofuels and renewable electricity used in the transport sector.

Oil-based heating fuels have followed the same trend as solid fuels, albeit to a lesser extent. These two families of fuels have been partly replaced by natural gas and electricity.

The use of electricity has increased more than natural gas in the residential sector, even though the latter seems to be a more appropriate substitute fuel for many applications. This is particularly because housing density is low in several areas of Wallonia, which limits development of the natural gas distribution system.

These data also highlight the region's continuing dependence on oil-based products, which form the energy source in 42% of cases.

ii. Current potential for the application of high-efficiency cogeneration and efficient district heating and cooling

A. Estimated potential primary energy savings

Based on defined economic potential, primary energy is calculated using a conversion factor of 2.5 for electricity and 1 for other energy carriers.

With regard to cogeneration, this results in primary energy savings of around 15% of technical potential, i.e. 4,155 GWh.

Primary energy savings for waste energy are 93.12 GWh.

Total primary energy savings are estimated at around 4,288 GWh.

This figure could increase in the event of more favourable economic parameters encouraging investments in cogeneration and recovery of high-temperature waste heat in electricity generation.

Demand for heating and cooling could be met through high-efficiency cogeneration, including domestic micro-cogeneration, and through district heating and cooling systems.

Demand for heating that could be met through high-efficiency cogeneration, including domestic micro-cogeneration, and through district heating and cooling systems is included under substitutable heating. This relates to applications operated at temperatures between 50°C and 250°C.

Substitutable heating requirements are identified in the following table by sector (housing, tertiary and industry) and by use (DHW = domestic hot water).

Sector	Process heat (high t°)	Heating	Space heating	DHW	Cooking	Other uses	TOTAL	Total heating requirements	Substitutable heating	Share of substitutable heating
Tertiary	-	6,923.6	-	785.1	7.4	5,895.3	13,611.3	7,716.0	7,708.6	56.6%
Housing	-	20,180.8	2,245.7	3,608.3	878.2	4,187.5	31,100.5	26,913.1	26,034.9	83.7%
Industry	19,585.2	11,319.0	-	-	-	10,725.7	41,629.9	30,904.2	11,319.0	27.2%
Total	19,585.2	38,423.4	2,245.7	4,393.4	885.5	20,808.5	86,341.7	65,533.2	45,062.5	52.2%

Table 1: Heating requirements

Total heating requirements (65.5 TWh) account for 76% of total energy consumption in the three sectors, which illustrates the importance of these needs in the energy balance. Over half (52.2%) of final energy consumption in the three sectors is substitutable heating requirements, i.e. a total of 45 TWh. Housing accounts for the largest share of this figure (26.0 TWh, 58%), followed by industry (11.3 TWh, 25%) and finally the tertiary sector (7.7 TWh, 17%).

Cooling needs are 20.8 GWh for housing, 935 GWh for the tertiary sector (including 540 GWh of substitutable cooling, i.e. requirements that can be met by district cooling systems) and 830 GWh for industry (including 128 GWh of substitutable cooling).

According to the information available at the time of the study, there are no facilities in Wallonia capable of producing recoverable cooling that can be routed through a distribution system or consumed on site. The only sectors with cooling potential the chemical and food industries.

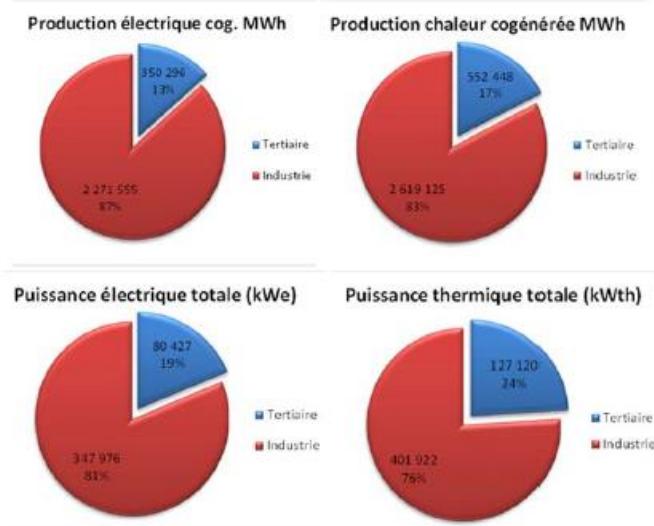
B. Estimated potential

❖ Cogeneration potential

Technical potential of cogeneration

The reporting methodology based on the requirements set out in Directive 2004/8/EC on the promotion of cogeneration was used together with the most recent available data in order to assess the technical potential of cogeneration. This exercise revealed that the potential thermal power is 529 MWth, of which 76% is in the industrial sector, with the corresponding thermal production being estimated at 3,172 GWh. The potential electrical power is 428 MWe, of which 81% is in the industrial sector, with the corresponding electricity generation being 2,621 GWh.

Figure 19: Cogeneration potential



Production électrique cog. MWh

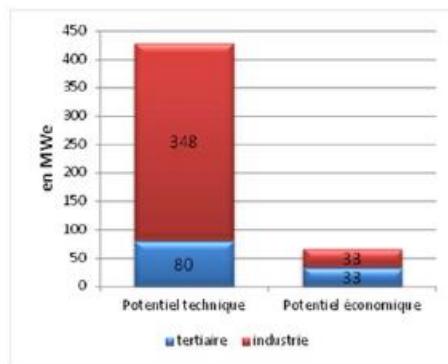
Cogenerated electricity in MWh

Production chaleur cogénérée MWh	Cogenerated heat in MWh
Puissance électrique totale (kWe)	Total electrical power (kWe)
Puissance thermique totale (kWth)	Total thermal power (kWth)
Tertiaire	Tertiary
Industrie	Industry

Economic potential of cogeneration

The following graph clearly illustrates that economic potential is around 15%, i.e. very low compared with technical potential, given the constraints of a two-year payback period for industry and a five-year payback period for the tertiary sector, without any support through green certificates.

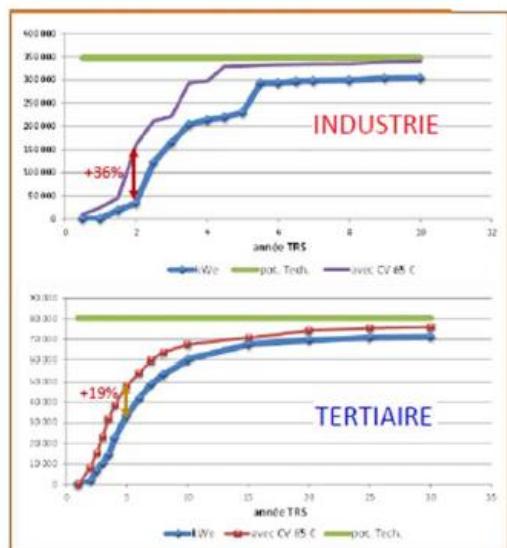
Figure 14: Economic potential of cogeneration



en MWe	in MWe
Potentiel technique	Technical potential
Potentiel économique	Economic potential
tertiaire	tertiary
industrie	industry

It should be noted that cogeneration potential depends on various external or economic factors that can direct investments, such as the price per tonne of CO₂, support mechanism or choice of payback period.

Figure 15: Simple payback period of cogeneration



INDUSTRIE	INDUSTRY
TERTIAIRE	TERTIARY
année TRS	Simple payback period in years
kWe	kWe
pot. Tech.	Technical potential
avec CV 65 €	with €65 green certificate

❖ ***Industrial waste heat potential***

Technical potential of industrial waste heat

The technical potential of recovering waste energy has been assessed for heating temperatures below and above 100°C and amounts to 2,627.6 GWh.

Table 12: Waste heat potential

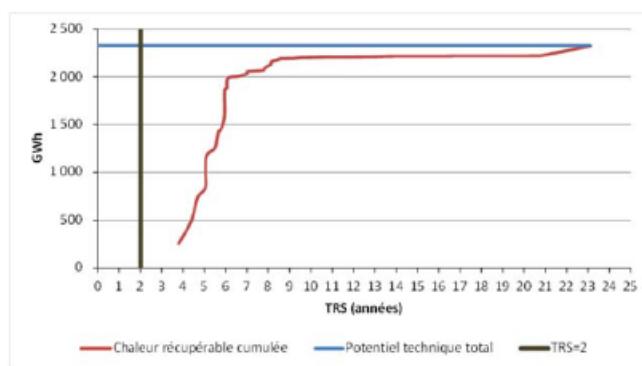
Industrial sector	t°>100°C	t<100°C	Total
STEEL	246.0	0.0	246.0
NON-FERROUS METALS	0.0	0.0	0.0
CHEMICALS	828.5	50.0	878.5
NON-METALLIC MINERALS	1 245.7	0.0	1,245.7
FOOD	7.8	187.7	195.6
TEXTILES	0.0	0.0	0.0
PAPER	0.0	22.1	22.1
METALWORKING	3.1	0.0	3.1
OTHER INDUSTRIES	0.0	36.5	36.5
INDUSTRY TOTAL	2,331.2	296.4	2 627.6

Economic potential of industrial waste heat

- High temperature

Based on the method and assumptions detailed in the study report, the figure below shows the simple payback period according to the cumulative heat potential at high temperature and total technical potential at high temperature.

Table 3: Economic potential of waste heat



GWh	GWh
TRS (années)	Simple payback period (years)
Chaleur récupérable cumulée	Cumulative recoverable heat
Potentiel technique total	Total technical potential
TRS=2	Simple payback period=2 years

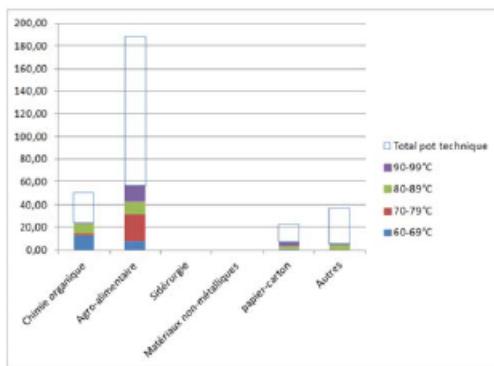
With a simple payback period constraint of two years or less, the economic potential is zero. Payback periods for systems recovering waste heat are currently very long. Given current energy prices, the ORC (Organic Rankine Cycle) subsector is not profitable without aid.

- Low temperature

The total economic potential is estimated at 93.12 GWh/year, which is equivalent to 31% of the total technical potential for the sectors studied.

The figure below shows the results for each sector and the share of technical potential that would be economically viable.

Figure 16: Technical potential of waste heat



Total pot technique	Total technical potential
Chimie organique	Organic chemistry
Agro-alimentaire	Agri-food
Sidérurgie	Steel
Matériaux non-métalliques	Non-metallic materials
Papier-carton	Paper and cardboard
autres	Other

❖ **Energy efficiency potential of district heating and cooling system infrastructures**

Wallonia has 46 district heating systems, but no district cooling systems. Most (67%) of these systems are owned by public and rural bodies, as for the most part they were constructed under the Wood Energy and Rural Development Plan aimed at supporting the development of rural municipalities. Among these systems, 42 are powered by biomass, 2 by natural gas, 1 by deep geothermal energy and 1 by waste energy. These 46 systems annually produce 402 GWh and distribute 190 GWh of energy. They have a total length of 69.55 km, with over 90% of them having a length of less than 500 m.

Technical potential

Qualitative estimates of the technical potential of district heating systems are based on a bottom-up approach which assumes that conditions are favourable to the development of a district heating system. When the study was conducted, data were available at municipality level and could not therefore be used to extrapolate favourable conditions at district or street level, for example.

Detailed data about heating requirements have been built up over time through the EPB legislation, in relation to new housing or housing being renovated under planning permission, or through the housing energy certification system. Likewise, the future energy certification system for non-residential buildings will enable detailed information to be gathered about heating and cooling needs in the tertiary sector.

Economic potential

District heating systems offer development potential in terms of recovering waste heat and using renewable energy. However, new district heating systems must be able to adapt to changing conditions (loss of a source of waste heat, extension of the system, greater density) through a hub-and-spoke arrangement, variable flow rates, possibilities of adding extra power to the system, etc.

There must be a minimum heating requirement before a district heating system can be envisaged. In view of the energy performance of new housing units, joint projects with other infrastructure (housing + offices/crèches/residential homes/hospitals/etc.) are essential.

District heating systems can make financial sense in the long term, but each investment decision must be examined on a case-by-case basis using the results of a feasibility study.

C. Strategies, policies and measures that can be adopted to 2030 in order to harness potential

The following cumulative financial support is available for cogeneration in Wallonia:

- investment aid;
- production aid in the form of green certificates for high-efficiency cogeneration, i.e. where CO₂ is reduced by at least 10% compared with the benchmarks;
- tax deduction by the Federal Government.

The following cumulative support is available from the Walloon Government for the recovery of waste heat and for district heating and cooling systems:

- investment aid;
- tax deduction by the Federal Government.

This financial support will be kept in place for as long as possible, taking into account Wallonia's budget priorities and the need for compliance with EU State aid rules, so that project owners can plan for the long term and make accurate profitability calculations.

In order to help develop cogeneration, district heating and cooling systems and waste heat recovery, Wallonia has already proposed the following measures.

- Sectoral agreements targeted at the most energy-intensive businesses. These agreements are based on a commitment to improve energy efficiency and reduce CO₂ emissions between 2005 and 2020, and require businesses to carry out a comprehensive audit of their facilities with the aim of systematically identifying potential for the on-site recovery of waste heating and cooling. The feasibility of fossil and biomass cogeneration is studied wherever possible.

- A renewable energy and energy efficiency service with the following tasks:

- advise the target audience on cogeneration techniques, methods for recovering waste energy and options for installing district systems;
- offer tailored advice to project owners;
- help managers in the same sector to exchange best practices in relation to waste energy recovery;
- make information tools and calculations available in order to ensure the success of projects;
- train multipliers in these techniques and methods (both basic and advanced training).

- An obligation to study new installations or installations to be renovated with an installed capacity of over 20 MWth (in line with the requirement under Article 14(5) of Directive 2012/27/EU).

- Wallonia is preparing to review its auditor approval systems with a view to improving their quality and further formalising them in relation to the audit methodologies used.

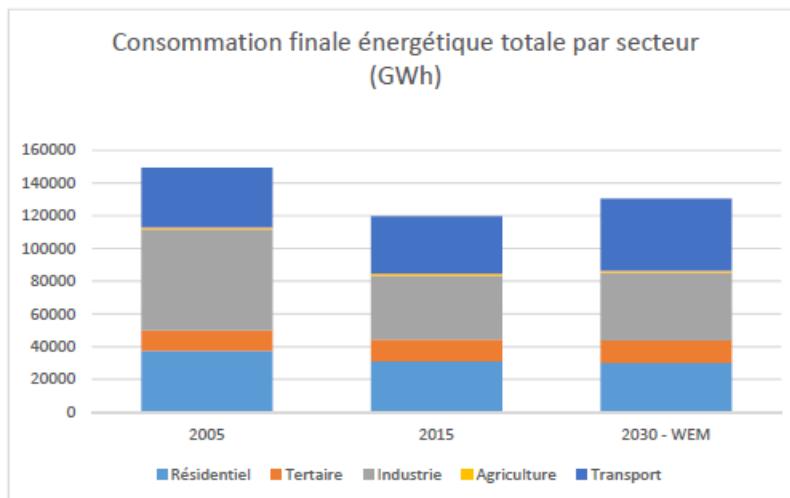
- Following an analysis, Wallonia plans to reduce the energy market barriers for low-voltage cogenerated electricity so that producers can resell any surplus that they have not used themselves.

- It is planned to adapt the categories of environmental permits so that the development of cogeneration projects involving biomass gasification can be encouraged due to these facilities not being regarded as Class 1, which seems an inappropriate categorisation given the actual impact of wood gasification technology on the environment (see point 3.1.2.(i)).

iii. Projections considering existing energy efficiency policies, measures and programmes as described in point 1.2. for primary and final energy consumption for each sector at least until 2030

Final energy consumption shows an upward trend between 2015 and 2030, mainly due to transport.

Figure 17: Trend in final energy consumption by sector



Consommation finale énergétique totale par secteur (GWh)	Total final energy consumption by sector (GWh)
Résidentiel	Residential
Tertiaire	Tertiary
Industrie	Industry
Agriculture	Agriculture
Transport	Transport
WEM	WEM

Despite this increase, **primary energy consumption** falls to 2030 due to the closure of nuclear power plants, which will be partly replaced by CCGT and renewable electricity plants and relatively high imports.

iv. Cost-optimal levels of minimum energy performance requirements resulting from national calculations, in accordance with Article 5 of Directive 2010/31/EU

Articles 4 and 5 of Directive 2010/31/EU on the energy performance of buildings require Member States to set minimum energy performance requirements with a view to achieving the cost-optimal balance between the investments involved and the energy costs saved throughout the lifecycle of the building.

A methodology framework for calculating cost-optimal levels of minimum energy performance requirements has been provided by the Commission so that Member States can compare their results.

The results of this comparison and the data used to reach these results should be regularly reported to the Commission (no longer than five years). These reports should enable the Commission to assess and report on the progress of Member States in reaching cost-optimal levels of minimum energy performance requirements.

The first report (COZEB I) was submitted in 2013, with the second (CO II) in July 2018; these reports must be acknowledged by the Government.

Conclusions of CO II

As stipulated in the guidelines, the gap (expressed in %) between the cost-optimal levels and the current requirements is calculated for each reference building. The gaps are weighted on the basis of their individual representativeness. The total of these weighted gaps divided by the number of buildings in the category in question gives the weighted average gap between the requirements and the cost-optimal level of each building. Checks are then carried out to ensure that this weighted average gap is not less than -15% (gaps greater than -15% are shown in red in the tables below), i.e. that the requirements are not lacking in ambition. However, the Commission allows requirements that are more ambitious than the cost-optimal level to be set.

❖ Existing buildings

Wall insulation

Table 4 - Cost-optimal level of windows - Existing buildings

Windows			
Category of reference buildings	Requirement 2017/2021	CO	Weighted average gap
Existing single-family houses	1.5	1.43	-5%
Existing apartment blocks		1.43	-5%
Existing offices		1.47	-2%
Existing educational buildings		1.43	-5%

The weighted average optimal U of windows is around 5% more efficient than the Umax 2017 requirement (1.5 W/m²K) across all segments (REP, NEP). This requirement is remarkably close to the cost-optimal (CO) improvement level and does not therefore need to be tightened up.

Table 5 – Cost-optimal level of walls - Existing buildings

Walls			
Category of reference buildings	Requirement 2017/2021	CO	Weighted average gap
Existing single-family houses	0.24	0.22	-13%
Existing apartment blocks		0.22	-11%
Existing offices		0.18	-33%
Existing educational buildings		0.24	0%

The weighted average optimal U of walls is close to the Umax 2017 requirement in force (0.24 W/m²K) for existing buildings, with the exception of existing offices for which the weighted average gap is -33%. The optimal values obtained for the reference buildings are, however, systematically lower than the 2017 requirement level. The conclusions on the requirement levels for walls of new buildings could therefore also be applied to existing buildings subject to major renovation.

Table 6 - Cost-optimal level of roofs - Existing buildings

Roofs			
Category of reference buildings	Requirement 2017/2021	CO	Weighted average gap
Existing single-family houses	0.24	0.22	-9%
Existing apartment blocks		0.235	-2%
Existing offices		0.22	-10%
Existing educational buildings		0.2	-19%

The weighted average optimal U of roofs is close to the Umax 2017 requirement in force (0.24 W/m²K) for existing buildings, with the exception of existing educational buildings for which the weighted average gap is -19%. The optimal values obtained for the reference buildings are, however, systematically lower than the 2017 requirement level. The conclusions on the requirement levels for walls of new buildings could therefore also be applied to existing buildings subject to major renovation.

Table 7 - Cost-optimal level of floors - Existing buildings

Floors			
Category of reference buildings	Requirement 2017/2021	CO	Weighted average gap
Existing single-family houses	0.24	0.23	-7%
Existing apartment blocks		0.42	16%
Existing offices		0.26	6%
Existing educational buildings		0.24	0%

The weighted average optimal U of floors is remarkably close (or slightly less demanding, in the case of existing offices and existing apartment blocks) to the Umax 2017 requirement in force (0.24 W/m²K). This requirement is close to the cost-optimal improvement level and does not therefore need to be tightened up.

❖ *New buildings*

Wall insulation

Table 8 - Cost-optimal level of windows - New buildings

Windows			
Category of reference buildings	Requirement 2017/2021	CO	Weighted average gap
New single-family houses	1.5	1.42	-6%
New apartment blocks		1.43	-5%
New offices		1.43	-5%
New educational buildings		1.43	-5%

The weighted average optimal U of windows is around 5% more efficient than the Umax 2017 requirement (1.5 W/m²K) across all segments (REP, NEP). This requirement is remarkably close to the cost-optimal improvement level and does not therefore need to be tightened up.

Table 9 - Cost-optimal level of walls - New buildings

Walls			
Category of reference buildings	Requirement 2017/2021	CO	Weighted average gap
New single-family houses	0.24	0.2	-20%
New apartment block		0.15	-60%
New offices		0.22	-9%
New educational buildings		0.2	-20%

The weighted average optimal U of exterior walls of new buildings is systematically more efficient than the Umax 2017 requirement (0.24 W/m²K). Based on the criteria and the need to review the requirement levels by building element from 2021 onwards, the level could be increased so that it is in line with, or higher than, the cost-optimal level.

Table 10 - Cost-optimal level of roofs - New buildings

Roofs			
Category of reference buildings	Requirement 2017/2021	CO	Weighted average gap
New single-family houses	0.24	0.18	-36%
New apartment blocks		0.2	-20%
New offices		0.2	-20%
New educational buildings		0.2	-20%

The weighted average optimal U of new roofs is systematically more efficient (around 20% for offices, schools and apartment blocks, and up to 36% for single-family houses) than the Umax 2017 requirement in force (0.24 W/m²K). Based on the criteria and the need to review the requirement levels by building element from 2021 onwards, the level could be increased so that it is in line with, or higher than, the cost-optimal level.

Table 11 - Cost-optimal level of floors - New buildings

Floors			
Category of reference buildings	Requirement 2017/2021	CO	Weighted average gap
New single-family houses	0.24	0.24	0%
New apartment blocks		0.24	0%
New offices		0.24	0%
New educational buildings		0.24	0%

The weighted average optimal U of floors is the same as the Umax 2017 requirement in force (0.24 W/m²K). This requirement is in line with the cost-optimal improvement level and does not therefore need to be tightened up.

Overall performance indicators

Table 12 - K-level

K-level			
Category of reference buildings	Requirement 2017/2021	CO	Weighted average gap
New single-family houses	35	27	-31%
New apartment blocks		31	-13%
New offices		41	15%
New educational buildings		32	-13%

Table 13 - E_{spec}

E _{spec}			
Category of reference buildings	Requirement 2017	CO	Weighted average gap
New single-family houses	115	82	-50%
New apartment blocks		63	-83%
Category of reference buildings	Requirement 2021	CO	Weighted average gap
New single-family houses	85	82	-11%
New apartment blocks		63	-35%

Table 14 - E_w level

E _w level			
Category of reference buildings	Requirement 2017	CO	Weighted average gap
New single-family houses	65	46	-52%
New apartment blocks		39	-67%
New offices		64	-2%
New educational buildings		48	-37%
Category of reference buildings	Requirement 2021	CO	Weighted average gap
New single-family houses	45	46	-6%
New apartment blocks		39	-15%
New offices		64	30%
New educational buildings		48	5%

As regards the overall performance indicators (E_{spec} , K and E_w) that apply to new residential buildings (new single-family houses, new apartment blocks), the weighted average cost-optimal levels are significantly more efficient than the requirements in force in 2017. This is an indication that the construction methods and heat production systems currently available on the market allow residential housing to be built that is generally more efficient and less costly (over a period of 30 years) than housing that strictly complies with the overall performance requirements of the EPB regulations.

The weighted average optimal E_w of 46 and E_{spec} of 82 kWh/m²/year of new single-family houses are remarkably close to the requirement levels (E_w 45 and E_{spec} 85 kWh/m²/year) stipulated for 2021.

As regards the overall performance indicators (K and E_w) that apply to new non-residential buildings, the weighted average optimal E_w of offices (E_w 64) and the requirement level in force in 2017 for this segment (E_w 65) are almost exactly the same.

For new schools, the weighted average optimal E_w of 48 is significantly more efficient than the 2017 requirement and very close to the 2021 requirement (E_w 45) stipulated for this segment. This is an indication that buildings in this segment can be constructed with a much higher level of efficiency than required by the current regulations while achieving cost-optimal levels. This trend is confirmed by the recent rise in the number of educational buildings constructed on the basis of passive-energy or very-low-energy standards.

The weighted average optimal K of both offices (K41) and schools (K32) is not more than 15% below the 2017/2021 requirements (K35) as regards insulation of the building envelope.

It can be concluded from these results that the overall requirement levels for new buildings in 2017 are lacking in ambition with regard to the current cost-optimal levels. Tightening the requirements in 2021 to achieve NZE (Nearly Zero Energy) performance will reduce this gap and the requirements will then be cost-optimal in accordance with the current results.

However, these results will be reviewed every five years, as stipulated by the Directive, which will allow changes in construction costs due to technological advances to be taken into account.

Dimension internal energy market

i. Current situation of electricity and gas markets, including energy prices (⁴⁷)

Despite hopes to the contrary, market liberalisation, which profoundly changed the energy landscape, did not directly reduce overall bills. In the specific case of electricity and natural gas, it actually coincided with a marked rise in fossil fuel prices (oil and natural gas) that fed through to consumer prices. During the first few years following liberalisation, the regional and national markets continued to be dominated by the historical operator. Since then, however, the Walloon Energy Commission (Commission Wallonne pour l'Energie – CWaPE) has observed an increase in competition at regional level in terms of both the supply and the generation of electricity, which has been a factor in the recent changes in electricity and natural gas prices.

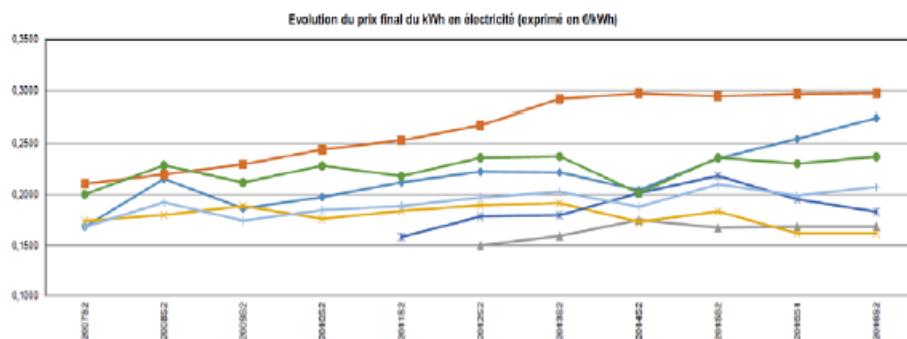
Residential

Competition and any competition-related impacts on price levels can only affect the unregulated component of the price, i.e. the energy component. This amounts to around 50% of the bill for a residential customer in the case of natural gas and 30% in the case of electricity.

In June 2017, the most expensive component of electricity bills was distribution (37.6%), followed by energy (32.5%).

- Electricity

Table 15 - Trends in residential electricity prices



Evolution du prix final du kWh en électricité (exprimé en €/kWh)	Trends in final electricity prices in kWh (expressed in EUR/kWh)
Belgique - données Eurostat - client type DC (2 500 kWh<Consommation<5 000 kWh)	Belgium – Eurostat data – consumption band DC (2,500 kWh<consumption<5,000 kWh)
Allemagne - données Eurostat - client type DC (2 500 kWh<Consommation<5 000 kWh)	Germany – Eurostat data – consumption band DC (2,500 kWh<consumption<5,000 kWh)
France - données Eurostat - client type DC (2 500 kWh<Consommation<5 000 kWh)	France – Eurostat data – consumption band DC (2,500 kWh<consumption<5,000 kWh)
Pays-Bas - données Eurostat - client type DC (2 500 kWh<Consommation<5 000 kWh)	Netherlands – Eurostat data – consumption band DC (2,500 kWh<consumption<5,000 kWh)
Royaume-Uni - données Eurostat - client type DC (2 500 kWh<Consommation<5 000 kWh)	United Kingdom – Eurostat data – consumption band DC (2,500 kWh<consumption<5,000 kWh)
Pour la moyenne pondérée des fournisseurs designés - client type DC (3 500 kWh/an dont 1 600 kWh en heures pleines et 1 900 kWh en heures creuses) à partir de 2011 (avant 2011: client type DC1: 3 500 kWh/an) - données simulateur	For the weighted average of the designated suppliers – consumption band DC (3,500 kWh/year, including 1,600 kWh at peak rate and 1,900 kWh at off-peak rate) from 2011 (before 2011: consumption band DC1: 3,500 kWh/year) – simulated data
Pour la moyenne pondérée des produits meilleurs marchés - client type DC (3 500 kWh/an dont 1 600 kWh en heures pleines et 1 900 kWh en heures	For the weighted average of the cheapest products – consumption band DC (3,500 kWh/year, including 1,600 kWh at peak rate and 1,900 kWh at off-peak

⁴⁷ Report CD-17g17-CWaPE-0030 on the analysis of electricity and natural gas prices in Wallonia (residential customers) over the period from January 2007 to June 2017.

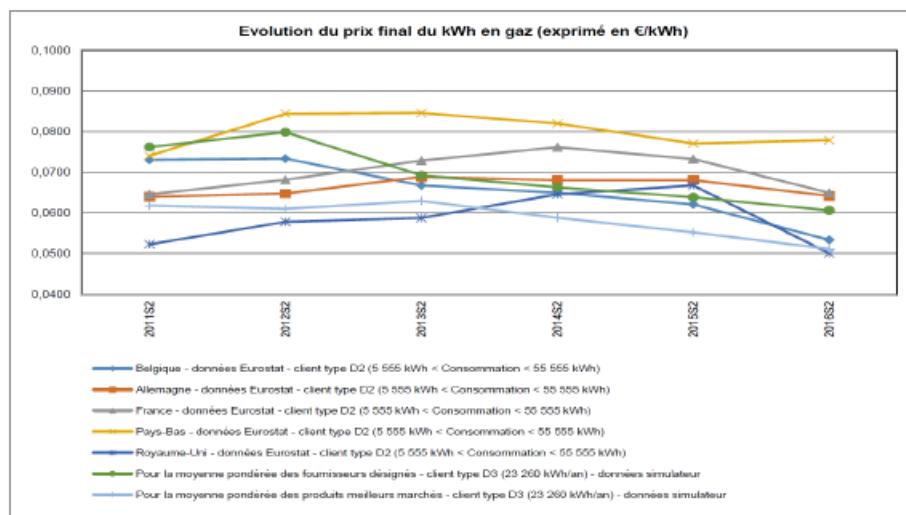
creuses) à partir de 2011 (avant 2011: client type DC1: 3 500 kWh/an) - données simulateur	rate) from 2011 (before 2011: consumption band DC1: 3,500 kWh/year) – simulated data
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In the first half of 2016, prices started to drop from their December 2015 level, but then rose again during the second half of the year (this increase continued in early 2017).

However, prices then dropped to a degree in the second quarter of 2017. These changes in the energy component can be partly explained by changing prices on the wholesale markets, in particular the Belpex indicator.

- Gas

Table 16 - Trends in residential gas prices



Evolution du prix final du kWh en gaz (exprimé en €/kWh)	Trends in final gas prices in kWh (expressed in EUR/kWh)
Belgique - données Eurostat - client type D2 (5,555 kWh<Consommation<55,555 kWh)	Belgium – Eurostat data – consumption band D2 (5,555 kWh<consumption<55,555 kWh)
Allemagne - données Eurostat - client type D2 (5,555 kWh<Consommation<55,555 kWh)	Germany – Eurostat data – consumption band D2 (5,555 kWh<consumption<55,555 kWh)
France - données Eurostat - client type DC (5,555 kWh<Consommation<55,555 kWh)	France – Eurostat data – consumption band DC (5,555 kWh<consumption<55,555 kWh)
Pays-Bas - données Eurostat - client type D2 (5,555 kWh<Consommation<55,555 kWh)	Netherlands – Eurostat data – consumption band D2 (5,555 kWh<consumption<55,555 kWh)
Royaume-Uni - données Eurostat - client type D2 (5,555 kWh<Consommation<55,555 kWh)	United Kingdom – Eurostat data – consumption band D2 (5,555 kWh<consumption<55,555 kWh)
Pour la moyenne pondérée des fournisseurs designés - client type D3 (23 260 kWh/an) - données simulateur	For the weighted average of the designated suppliers – consumption band D3 (23,260 kWh/year) – simulated data
Pour la moyenne pondérée des produits meilleurs marchés - client type D3 (23 260 kWh/an) - données simulateur	For the weighted average of the cheapest products – consumption band D3 (23,260 kWh/year) – simulated data

During 2016 and early 2017, gas bills issued by the designated suppliers were sometimes lower in price and sometimes higher, depending on variations in the energy component.

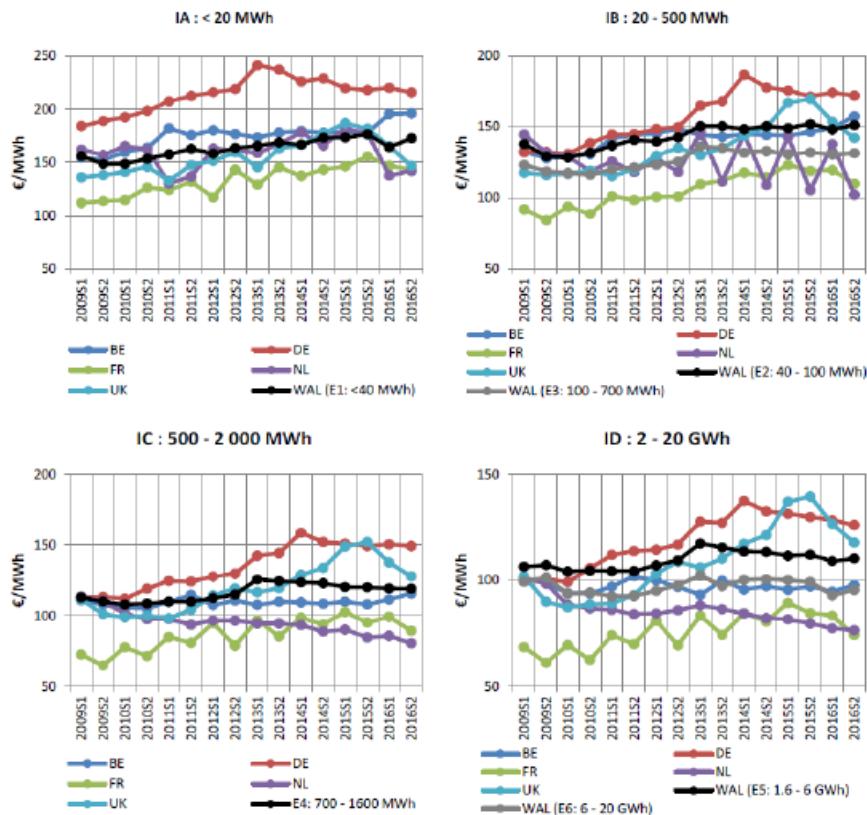
The downward trend in prices during 2016 continued despite a temporary increase in the third quarter. This reduction was partly due to the downward trend in prices on wholesale markets.

Professional

The production, import and supply of electricity and natural gas are subject to competition.

- Electricity

Figure 18: International comparison of electricity prices



The dominant components of the electricity price are the energy component and the distribution component. For consumption band E1 (annual electricity consumption below 40 MWh), the energy component accounts for 31% of the electricity price and the distribution component for around 37%.

Although the energy component of bills has fallen sharply, the other components have increased. The renewable energy support mechanism has not only increased final bills directly through the renewable energy contribution, but also indirectly through the transmission component surcharge introduced in 2012 to allow Elia to meet its obligations to buy back surplus green certificates on the Walloon market.

It should be noted, however, that the Decree of 11 December 2013 partly exempts certain businesses from the Elia green certificate surcharge, mainly those businesses in consumption bands E4 to E6.

In 2009/2010 electricity prices in Wallonia (all-inclusive price excluding VAT) moved closer to the prices charged by our direct neighbours; since then, the trend has reversed and the gap is growing.

The highest prices for consumption bands IA (<20 MWh/year) to ID (from 2 to 20 GWh/year) are charged in the United Kingdom and Germany. Consumers in Germany are paying the price for their country's strong energy policy and energy transition, including the phase-out of nuclear power. A study carried out recently by PWC in relation to larger consumers (i.e. with a different scope to this report) highlighted the fact, however, that some industrial electricity-intensive customers in Germany can benefit from substantial reductions giving them a competitive advantage over their Belgian and European neighbours.

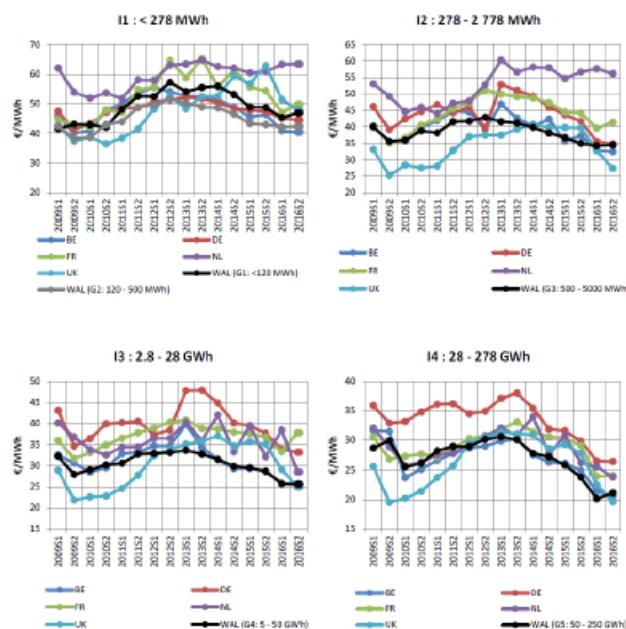
At the other end of the scale to consumers in Germany and the United Kingdom, customers in France and the Netherlands benefit from the lowest tariffs. The prices charged in Wallonia fall somewhere between these two extremes.

- Gas

Over the last 12 months, prices have fallen (by 0.3% for G5 up to 11% for G4), which can be attributed to a price drop on the wholesale market.

The energy component (including transmission) and, to a lesser extent, the distribution component form the bulk of the natural gas price. For consumption band G1 (annual gas consumption below 120 MWh), the energy component accounts for 55% of the gas price and the distribution component for 41%.

Figure 19: International comparison of gas prices



It appears that the prices charged in Wallonia are competitive and often at the lower end of the price scale.

As the study carried out by PWC in relation to larger consumers recently confirmed, gas commodity prices are similar from one country to another. Although the costs associated with transmission, distribution and taxes make up only a small share of final bills, they are key elements in international comparisons. The study also highlighted the fact that the vast majority of prices charged in Wallonia are lower than those in neighbouring countries.

Dimension research, innovation and competitiveness

i. Current situation of the low-carbon-technologies sector and, to the extent possible, its position on the global market

Wallonia has not yet adopted any legislation specifying research objectives in the energy sector. The available budgets and calls for projects are updated on a regular basis in order to guarantee free competition between the different research goals.

However, the following calls for projects form an exception to this rule:

- ERABLE (2011), which related to energy generation methods and energy efficiency;
- RELIABLE (2012), which related to smart grids;
- ENERGINSERE (2013), which related to energy storage;
- calls for projects in 2015 and 2016 aimed at funding research projects in connection with the International Energy Agency (IEA) and supporting regional energy projects.

These calls for projects had a total budget of EUR 26.5 million and were mainly prompted by European initiatives to boost research activity in the field of technology.

More specifically, research in Wallonia is supported through the Decree of 3 July 2008 on support for research, development and innovation in Wallonia and its implementing decrees. This legislation serves as a general framework for supporting research and outlines the arrangements for valuing research projects at regional level, which is vital for obtaining research grants). All support is researched through the mechanisms identified in the decree. A total annual budget of around EUR 340 million (2016) is earmarked within the Walloon Region's budget for the various types of support (subsidy, co-financing or repayable advances).

Coordination with European research programmes is firstly ensured by the Department for Research Programmes within the Walloon Public Service for Research, whose Directorate for Federal and International Programmes manages the programmes that are co-financed by the EU (ERA-NET, ERA-NET+, etc.). Secondly, 'Horizon 2020' calls for projects are promoted by the National Contact Point (NCP) for Wallonia, whose tasks are carried out under contract by the employers' organisation, the Union wallonne des Entreprises (Walloon Union of Companies).

The annual budget earmarked for European co-financing programmes is around EUR 7 million for all research areas combined. In terms of energy, the ERA-NET 'Smart Grids', 'Solar' and 'Smart Cities' programmes and the 'NEWA', 'SOLAR-ERA.NET Cofund 2' and 'REGSys' programmes have been supported by the Walloon Region.

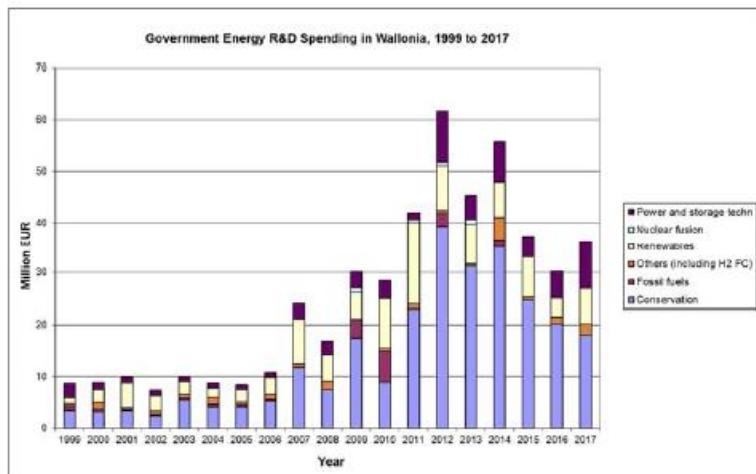
Wallonia has also taken part in the 'Urban Europe' call for projects and the 'Fuel Cells and Hydrogen' Joint Technology Initiative.

Likewise, MecaTech (2006) and GreenWin (2010) Clusters have been established under the Marshall Plan with the aim of assisting technological development stakeholders and supporting research and innovation projects in the fields of mechanical engineering and green chemistry.

TWEED (Technology of Wallonia for Energy, Environment and Sustainable Development), Cap Construction and Eco-Construction clusters promote innovation and economic development among the relevant stakeholders.

ii. Current level of public and private research and innovation spending on low-carbon-technologies, current number of patents, and current number of researchers (⁴⁸)

Figure 20 - Wallonia's public research and development spending in the field of energy by type (1999-2017)



Public spending, which was less than EUR 10 million between 1999 and 2006, rose to almost EUR 60 million in 2012 and has now stabilised at between EUR 35 million and EUR 40 million.

⁴⁸ Trends in public research, innovation and competitiveness spending (source: data collected for the IEA's Energy RD&D Budget/Expenditure Statistics).

The majority is aimed at energy efficiency, which has accounted for around two thirds of the total since 2012. This involves the energy efficiency of all sectors (industry, residential, transport, other).

Around 250 FTE researchers are working in universities, colleges and research institutions. The research budget of private operators is difficult to assess, but could be around EUR 200 million per year.

Existing policies and measures are based on the Decree of 3 July 2008 on support for research, development and innovation in Wallonia, under which themed calls for projects, aid ‘information points’ and bottom-up funding of research presented by businesses are organised. This allows the Walloon research, innovation and competitiveness budget to be maintained at around EUR 43 million per year (2012-2017 average).

iii. Description of energy subsidies, including for fossil fuels

Calculating subsidies for fossil fuels is the subject of much debate and many different methods. There are two types of subsidy in Belgium:

- direct funding of fossil fuels;
- tax rebates.

Fossil fuel subsidies are relatively limited at regional level. Aid for residential gas condensing boilers has recently been abolished.

An exhaustive survey has also been carried out as part of the reporting under the relevant directives (RES, EE and grid).

2. IMPACT ASSESSMENT OF PLANNED POLICIES AND MEASURES

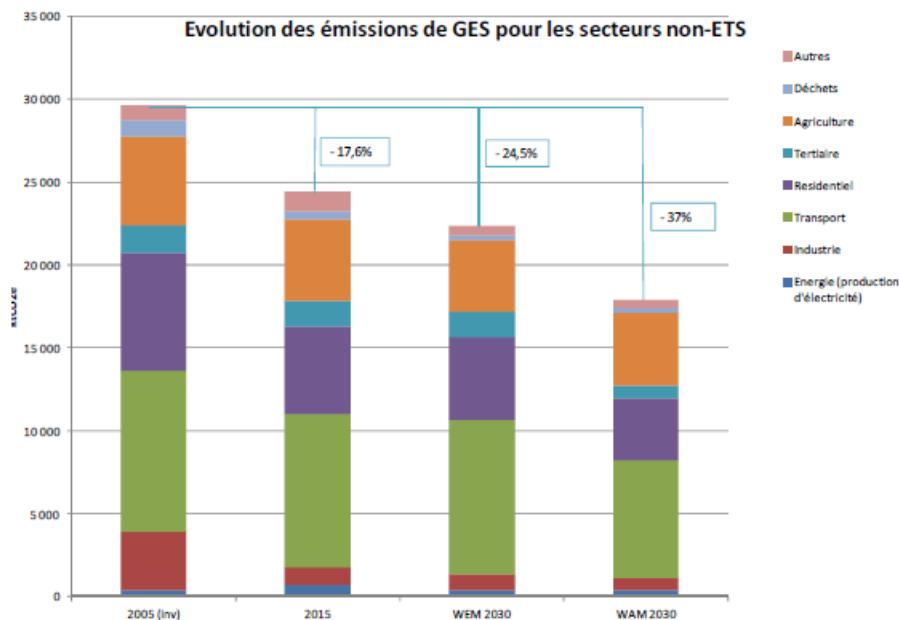
Impacts of planned policies and measures described in section 3 on energy system and GHG emissions, including comparison to projections with existing policies and measures (as described in section 4)

i. Projections of the development of the energy system and GHG and air pollutant emissions under the planned policies and measures

The WAM (49) scenario in Wallonia takes into account the impact of the measures described in Chapter 3 of this document.

A. Greenhouse gas emissions

Figure 21 - Trends in non-ETS GHG emissions



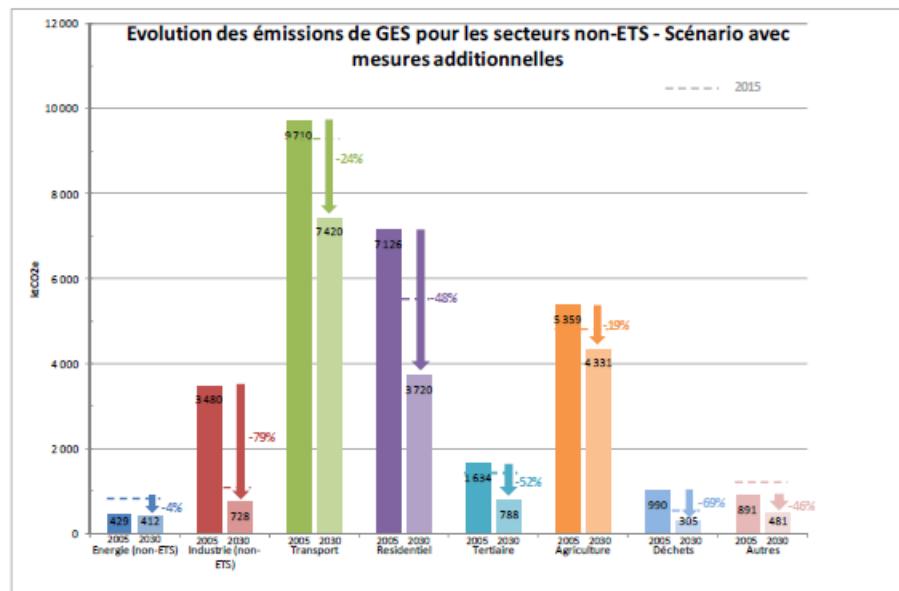
Evolution des émissions de GES pour les secteurs non-ETS	Trends in GHG emissions in non-ETS sectors
Autres	Other
Déchets	Waste
Agriculture	Agriculture
Tertiaire	Tertiary
Residentiel	Residential
Transport	Transport
Industrie	Industry
Energie (production d'électricité)	Energy (electricity generation)
ktCO2e	kt CO ₂ eq
2005 (inv)	2005 (inventory)

According to the projections, the reduction in GHG emissions in non-ETS sectors is estimated at -37% compared with 2005. The baseline scenario predicts a reduction of 24.5% compared with 2005.

Compared with 2005, emissions fall by 79% in the non-ETS industrial sector (2,700 kt CO₂, bearing in mind that most of this reduction occurred between 2005 and 2015), by 48% in the residential sector (3,406 kt CO₂), by 52% in the tertiary sector (846 kt CO₂) and by 24.6% in the transport sector (2,289 kt CO₂). The agriculture sector reduces its emissions by 1,000 kt CO₂, i.e. 19% compared with 2005.

⁴⁹ With Additional Measures.

Figure 22 - Sectoral trends in non-ETS GHG emissions (WAM)

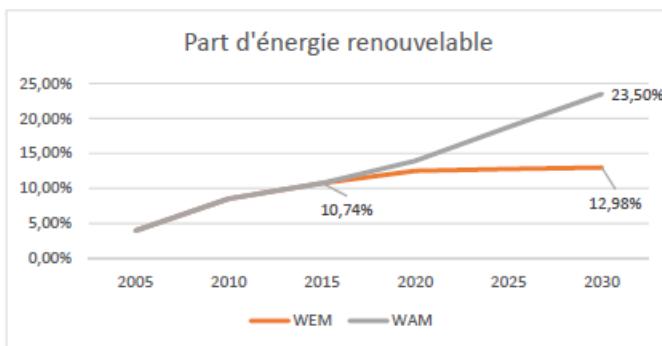


Evolution des émissions de GES pour les secteurs non-ETS - Scénario avec mesures additionnelles	Trends in GHG emissions in non-ETS sectors - Scenario with additional measures
Energie (non-ETS)	Energy (non-ETS)
Industrie (non-ETS)	Industry (non-ETS)
Transport	Transport
Residentiel	Residential
Tertiaire	Tertiary
Agriculture	Agriculture
Déchets	Waste
Autres	Other
ktCO2e	kt CO ₂ eq

B. Renewables

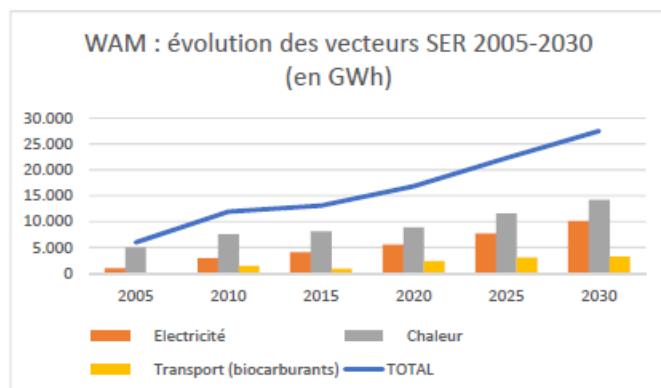
By implementing new measures aimed at developing renewables, Wallonia plans to produce around 27.5 TWh of renewable energy, i.e. 23.5% of estimated gross final consumption in 2030.

Figure 23 - Trends in the share of renewables in Wallonia



Part d'énergie renouvelable	Share of renewables
-----------------------------	---------------------

Figure 24 - Trends in renewable energy sources 2005-2030 - Wallonia



WAM: évolution des vecteurs SER 2005-2030 (en GWh)	WAM: Trends in renewable energy sources 2005-2030 (in GWh)
Electricité	Electricity
Chaleur	Heat
Transport (biocarburants)	Transport (biofuels)
TOTAL	TOTAL

Table 17 – Renewable energy indicators in Wallonia

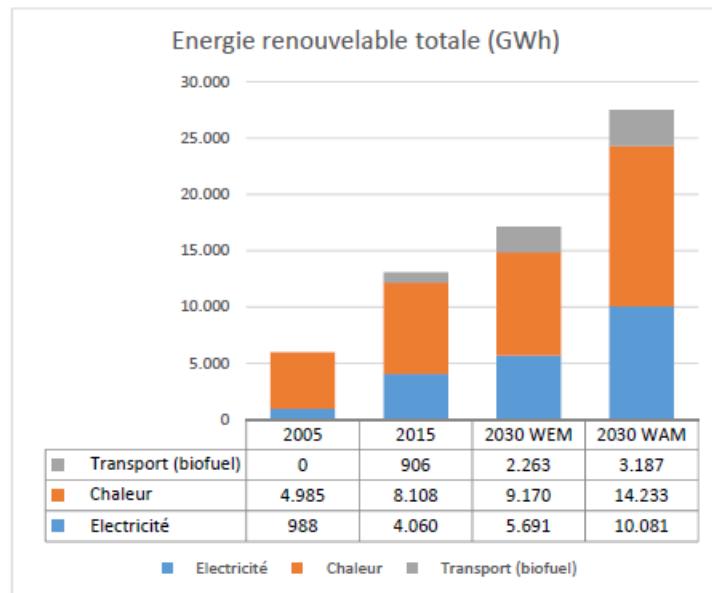
GWh	Achieved 2015	Achieved 2016	Target 2020	Target 2030 WEM (⁵⁰)	Target 2030 WAM (⁵¹)
Electricity	4,060	4,463	5,555	5,691	10,081
Heat	8,108	8,706	8,900	9,170	14,233
Transport*	906	1,596	2,382	2,263	3,187
Final renewable consumption	13,073	14,765	16,837	17,124	27,501
Gross final consumption	121,700	124,194	120,770	131,955	117,032
Share of RES in final consumption	10.74%	11.89%	13.94%	12.98%	23.50%

* biofuels and biogas only (RES electricity in transport included in 'electricity').

⁵⁰ WEM: With Existing Measures.

⁵¹ WAM: With Additional Measures.

Figure 25 - Trends in renewables in Wallonia

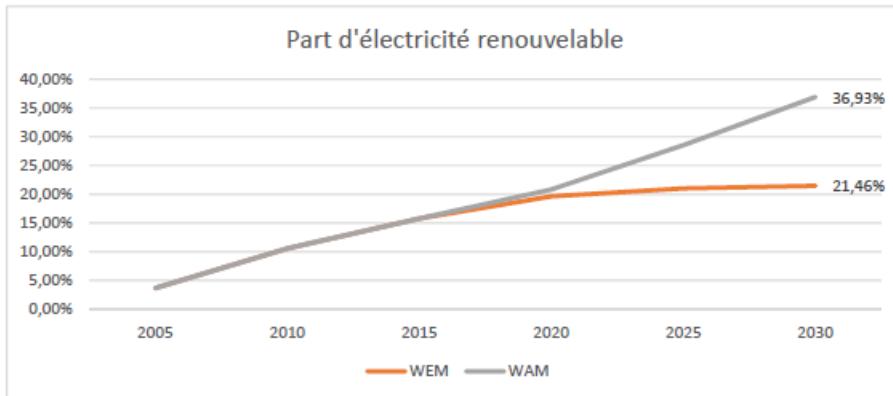


Energie renouvelable totale (GWh)	Total renewables (GWh)
Transport (biofuel)	Transport (biofuels)
Chaleur	Heat
Electricité	Electricity
TOTAL	TOTAL

Renewable electricity

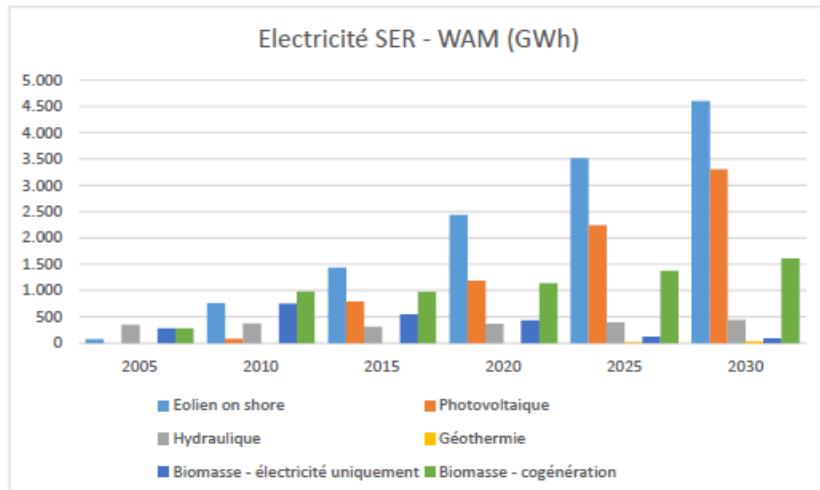
The share of renewable electricity in the gross final consumption of electricity is 37%.

Figure 26 - % of renewable electricity in the final consumption of electricity



Part d'électricité renouvelable	Share of renewable electricity
---------------------------------	--------------------------------

Figure 27 - Trends in the generation of renewable electricity by technology



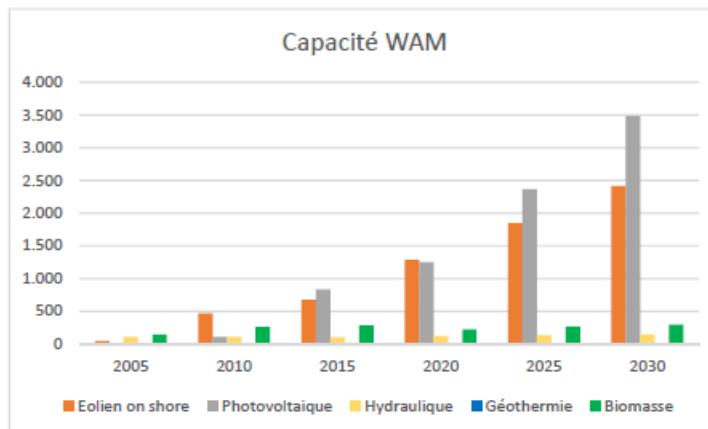
Electricité SER - WAM (GWh)	Renewable electricity – WAM (GWh)
Eolien on shore	Onshore wind
Photovoltaïque	Photovoltaics
Hydraulique	Hydroelectric
Géothermie	Geothermal energy
Biomasse - électricité uniquement	Biomass – electricity only
Biomasse - cogénération	Biomass – cogeneration

The subsectors contributing the most are onshore wind and photovoltaics, at 46% (4,600 GWh) and 33% (3,300 GWh) respectively of the total GWh generated. Hydroelectric remains stable at 4% of the electricity generated, with cogenerated biomass accounting for 16%.

The installed capacity in each subsector will need to be increased in order to achieve the targets set.

In particular, 1,136 MW will need to be installed between 2020 and 2030 in terms of wind energy and 2,228 MW for photovoltaics.

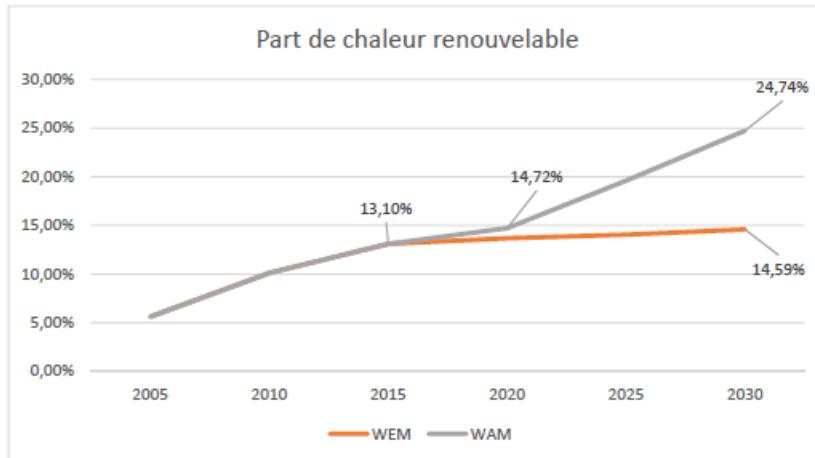
Figure 28 - Estimated renewable electricity generation capacity in the WAM scenario (MW)



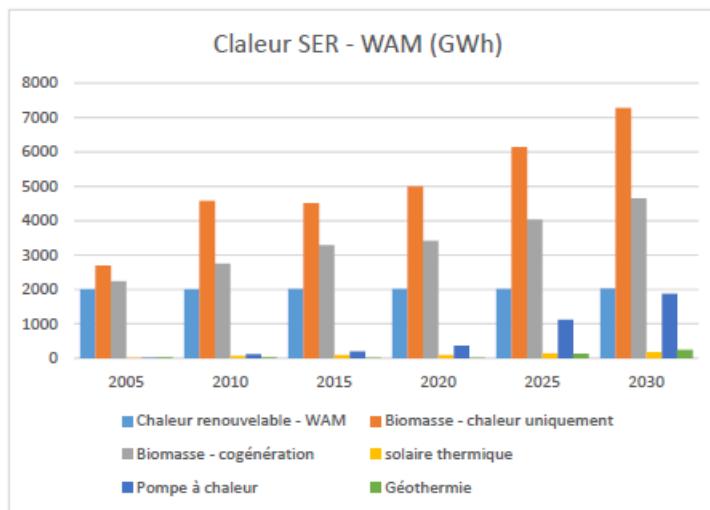
Capacité WAM	WAM capacity
Eolien on shore	Onshore wind
Photovoltaïque	Photovoltaics
Hydraulique	Hydroelectric
Géothermie	Geothermal energy

Renewable heat

The share of renewable heat in final heat consumption is 24.74%.

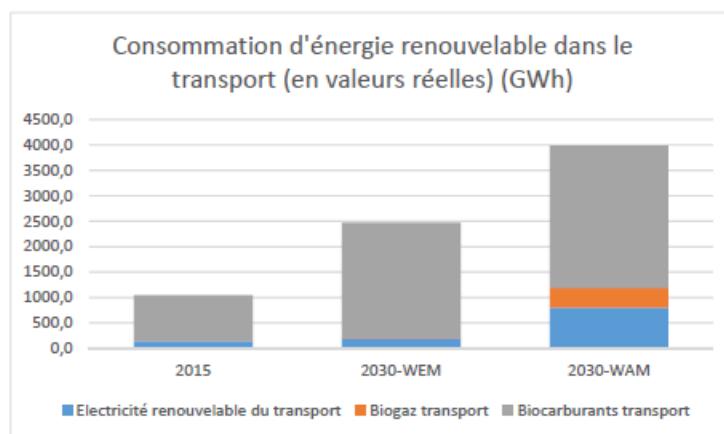
Figure 29 - % of renewable heat in heat consumption

Biomass (all subsectors combined) accounts for 83% of renewable heat production in 2030. An increase in the popularity of heat pumps is also evident, which account for 13% of heat production in 2030 (compared with 4% in 2020).

Figure 30 - Trends in renewable heat production by technology

Renewable transport

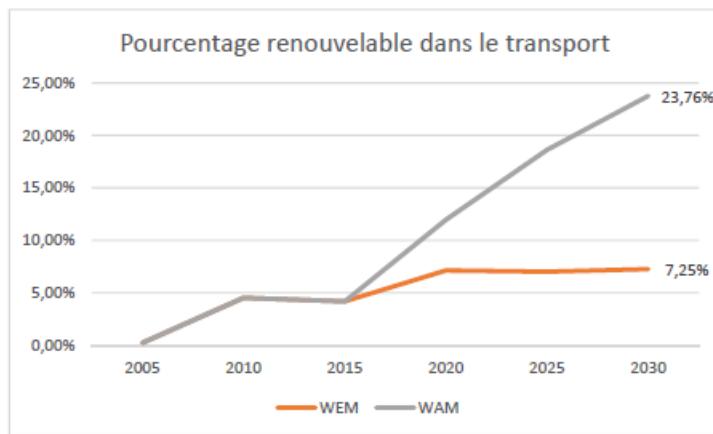
Figure 31 - Consumption of renewable energy in transport (actual values – GWh)



Consommation d'énergie renouvelable dans le transport (en valeurs réelles) (GWh)	Consumption of renewable energy in transport (in actual values) (GWh)
Electricité renouvelable du transport	Renewable electricity in transport
Biogaz transport	Biogas in transport
Biocarburants transport	Biofuels in transport

The share of renewables in transport, within the meaning of the Renewable Energy Directive (⁵²), including the share of renewable electricity, biofuel and biogas, is estimated at 24% in 2030.

Figure 32 - Percentage of renewables in transport (Renewable Energy Directive calculation method)



Pourcentage renouvelable dans le transport

Percentage of renewables in transport

C. Energy efficiency

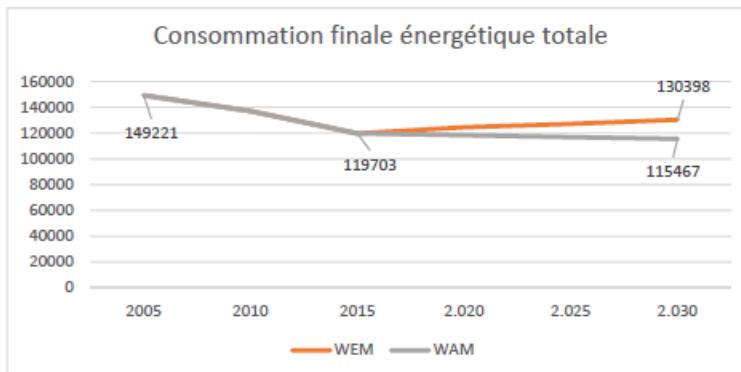
1. Final consumption

Final consumption in 2030 in the WAM scenario is estimated at 115 TWh, compared with 130 TWh in the WEM scenario. The reduction in final consumption compared with 2005 is estimated at 22%. The sectors contributing

⁵² By applying the adjustment factors for electricity and biofuels.

the most are the residential sector (-30% compared with 2005) and the industrial sector (-35% compared with 2005 for the entire industrial sector (ETS and non-ETS)).

Figure 33 - Trends in final consumption - Wallonia

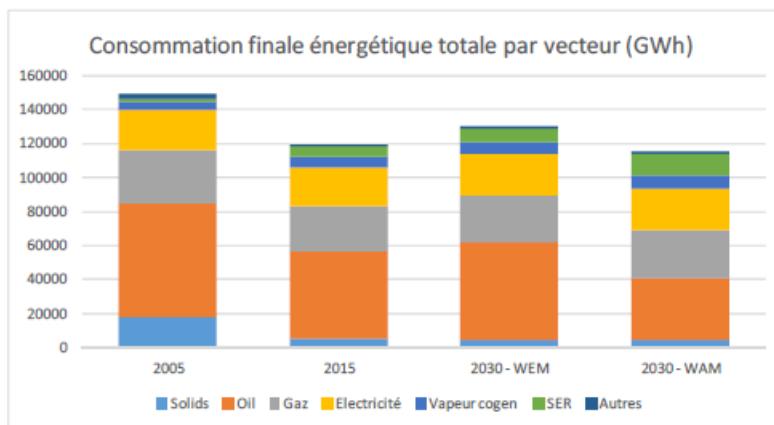


Consommation finale énergétique totale Total final energy consumption

The reduction in final consumption between 2020 and 2030 is estimated at 2%, taking into account demographic changes and economic growth.

The share of oil products reduces by 46% between 2005 and 2030, while the share of renewables increases by a factor of 10.

Figure 34 - Final consumption by energy carrier



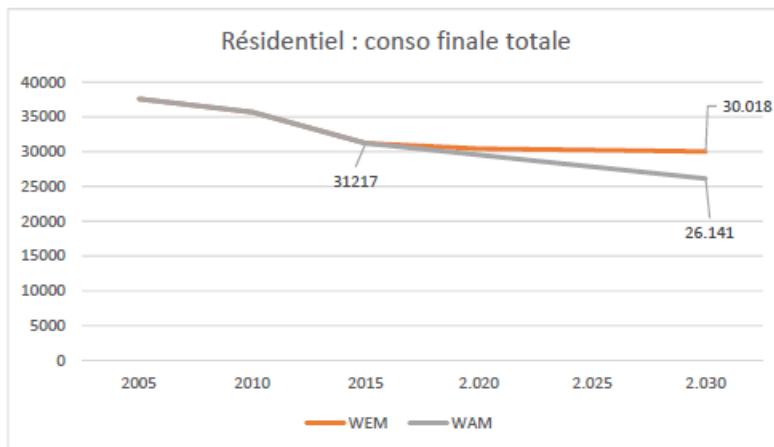
Consommation finale énergétique totale par vecteur (GWh)	Total final energy consumption by energy carrier (GWh)
Solids	Solid fuels
Oil	Oil
Gaz	Gas
Electricité	Electricity
Vapeur cogen	Steam cogeneration
SER	RES
Autres	Other

Residential

Final consumption in the residential sector falls by 11% between 2020 and 2030, mainly due to renovation strategy measures. Compared with 2005, the reduction in consumption is 30%, chiefly due to measures already taken in this sector.

Compared with a scenario without additional measures (WEM), the reduction is 13%.

Figure 35 - Final consumption in the residential sector

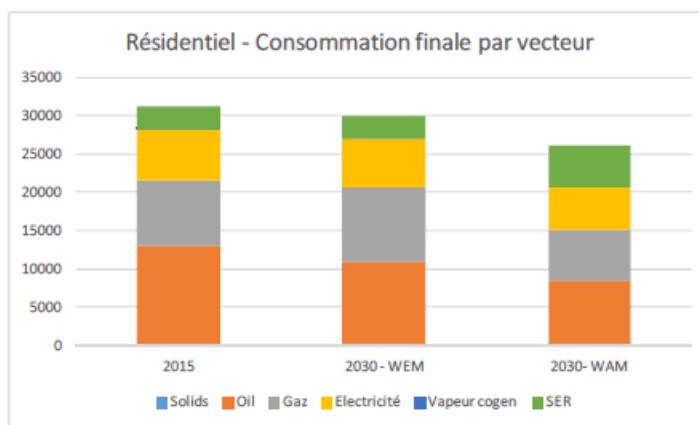


Résidentiel: conso finale totale

Residential sector: total final consumption

An 85% increase in the share of renewables is observed in this sector between 2015 and 2030, while the share of all other energy carriers falls (-35% for oil products and -23% for gas in particular).

Figure 36 - Final consumption in the residential sector by energy carrier



Résidentiel - Consommation finale par vecteur

Residential sector – Final consumption by energy carrier

Solids

Solid fuels

Oil

Oil

Gaz

Gas

Électricité

Electricity

Vapeur cogen

Steam cogeneration

SER

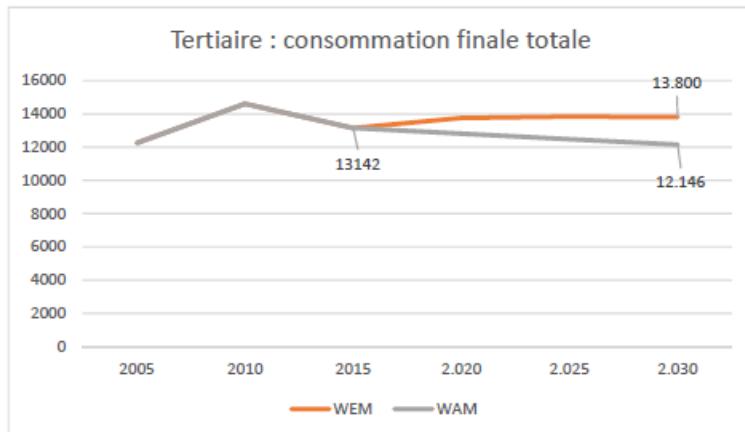
RES

Tertiary

The reduction in consumption in the tertiary sector between 2020 and 2030 is estimated at 5%. The measures implemented in this sector, particularly through the renovation strategy, will have a greater impact in the 2030-2040 period. Between 2020 and 2040, the reduction in consumption in this sector is estimated at 11.6%.

Compared with the baseline scenario, the estimated reduction is 12%.

Figure 37 - Final consumption in the tertiary sector



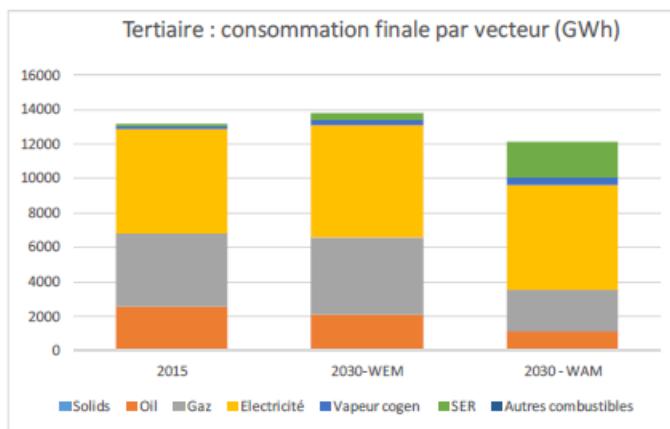
Tertiaire: consommation finale totale

Tertiary sector: total final consumption

In 2030, the share of renewables in the tertiary sector is 18 times higher than in 2015. The share of cogenerated steam increases by 140%.

Other energy carriers are reduced (-56% for oil products and -43% for gas).

Figure 38 - Final consumption in the tertiary sector by energy carrier



Tertiaire: consommation finale par vecteur (GWh)

Tertiary sector: final consumption by energy carrier (GWh)

Solids

Solid fuels

Oil

Oil

Gaz

Gas

Electricité

Electricity

Vapeur cogen

Steam cogeneration

SER

RES

Autres combustibles

Other fuels

Transport

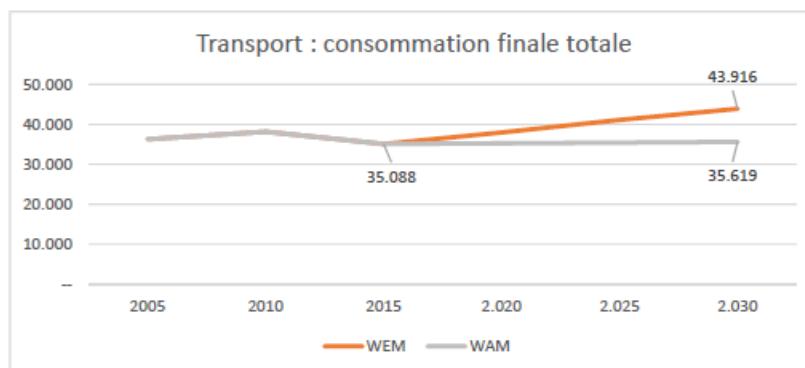
Final consumption in the transport sector increases by 1% between 2020 and 2030.

Compared with the baseline scenario, it reduces by 19%.

Overall, final consumption in the road sector falls by 1% between 2020 and 2030. Final energy consumption in the other sectors increases by 5% for aviation, 10% for rail and 105% for inland navigation.

Between 2005 and 2030, the overall reduction of 2% (or 687 GWh) breaks down into a 12% reduction in consumption in the road sector and a 17% reduction in the rail sector, with a 152% increase in the aviation sector and a 56% increase in the inland navigation sector.

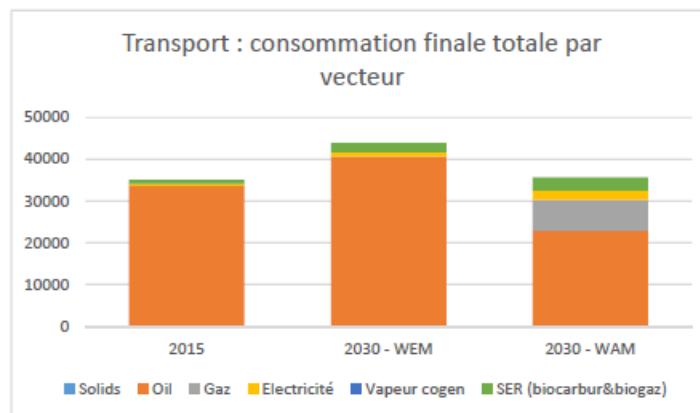
Figure 39 - Final consumption in the transport sector



Transport: consommation finale totale	Transport: total final consumption
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Between 2015 and 2030, the final consumption of oil products falls by 32%, whilst the share of gas and electricity and the share of biofuels both increase.

Figure 40 - Final consumption in the transport sector by energy carrier



Transport: consommation finale totale par vecteur	Transport sector: total final consumption by energy carrier
Solids	Solid fuels
Oil	Oil
Gaz	Gas
Electricité	Electricity
Vapeur cogen	Steam cogeneration
SER (biocarbur&biogaz)	RES (biofuels & biogas)

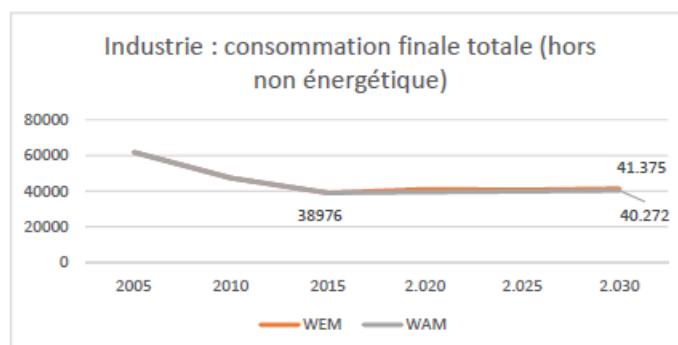
Industry

Between 2005 and 2030, final consumption in the industrial sector is estimated to fall by 35%. There was a marked drop in consumption between 2005 and 2015, due in particular (but not exclusively) to the closure of several energy-intensive industrial operations in Wallonia; the upturn in this sector therefore has the effect of increasing final energy consumption (estimated at +1% between 2015 and 2020).

Taking economic growth into account, final consumption in the industrial sector increases by 2% between 2020 and 2030 across all sectors (ETS and non-ETS).

With additional measures, consumption is estimated to fall by 3% compared with the baseline scenario.

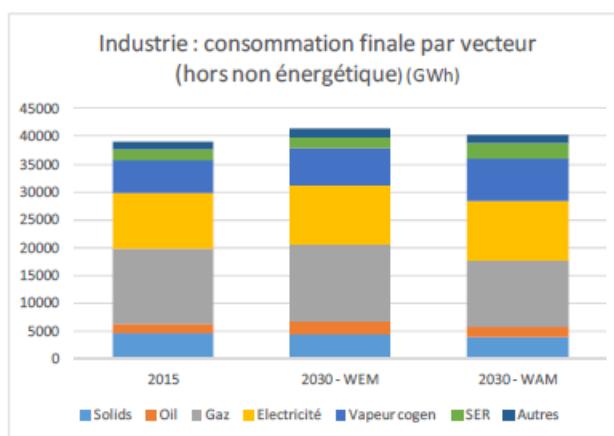
Figure 41 - Final consumption in the industrial sector



Industrie: consommation finale totale (hors non énergétique)	Industrial sector: total final consumption (excluding non-energy consumption)
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Between 2015 and 2030, the final consumption of renewables, cogenerated steam and electricity increases by 57%, 27% and 6% respectively. The share of gas drops by 12%, and the share of solid fuels by 17%. Consumption of oil products, however, increases by 30%.

Figure 42 - Final consumption in the industrial sector by energy carrier



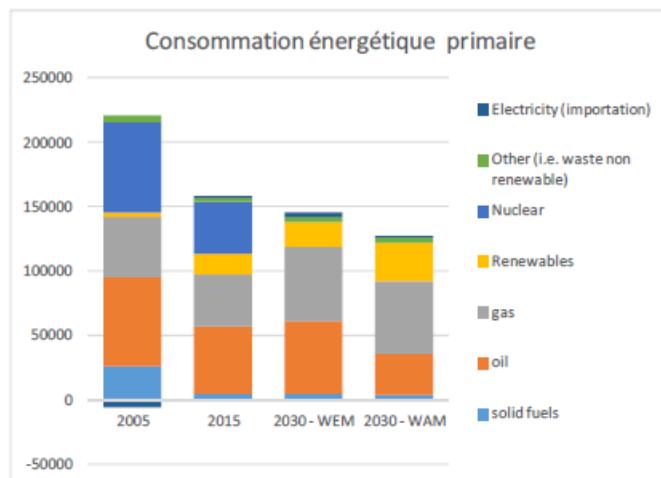
Industrie: consommation finale par vecteur (hors non énergétique) (GWh)	Industrial sector: final consumption by energy carrier (excluding non-energy consumption) (GWh)
Solids	Solid fuels
Oil	Oil
Gaz	Gas
Electricité	Electricity

Vapeur cogen	Steam cogeneration
SER	RES
Autres	Other

2. Primary consumption

Primary consumption depends on estimated electricity generating capacity. The figures here assume that the nuclear phase-out will be completed in line with the current schedule, and that Wallonia's imports will be limited.

Figure 43 - Wallonia's primary energy consumption (GWh)



Consommation énergétique primaire	Primary energy consumption
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Primary energy consumption reduces by 36% compared with 2005 and by 15% compared with 2015. Primary consumption of oil products falls sharply. This reduction is offset by an increase in primary consumption of gas and renewables. Imports of electricity in the WAM scenario are assumed to remain relatively limited (1,600 GWh).

Macroeconomic and, to the extent feasible, the health, environmental, employment and education, skills and social impacts, including just transition aspects of the planned policies and measures

When preparing this plan, Wallonia did not have access to any appropriate tools for assessing in detail the socioeconomic impacts of its various measures.

The following analysis is therefore mainly based on a review of Belgian and European literature. Those studies do not therefore precisely model the assumptions made in the Walloon plan, but are generally aimed at achieving the European objectives.

A. Impacts on economic growth

A Belgium-wide study⁽⁵³⁾ suggests that emission reduction measures do not substantially affect economic growth and may even lead to a slight increase in GDP if appropriate policies are adopted.

⁵³ CLIMACT (2016), 'Macroeconomic impacts of the low carbon transition in Belgium'. This study was carried out by CLIMACT, in collaboration with Professor Th. Bréchet, the Federal Planning Bureau and Oxford Economics, at the request of the Climate Change Service of the Federal Public Service for Public Health, Food Safety and Environment.

It aimed to study the macroeconomic impacts of a low-carbon transition to 2050, with particular emphasis on growth, competitiveness, employment and co-benefits.

According to the Federal Planning Bureau, the macroeconomic impacts particularly depend on how any public revenue from the auctioning of ETS allowances is used and whether a carbon tax is introduced for non-ETS sectors⁽⁵⁴⁾. When combined with recycling of carbon revenues, the measures may lead to a slight increase in GDP. For example, such revenues can be reinvested in developing technology associated with the energy transition or in infrastructure, particularly to encourage use of public transport.

At sectoral level, the impact of climate measures on value added is estimated to be relatively limited and slightly different depending on the sector (Federal Planning Bureau Note). The energy production sector is the worst affected. For all other sectors, where carbon revenues are recycled, the estimated impacts are negligible or positive, with the construction sector seeing the most benefits.

Climate change measures should also enable a series of costs to be avoided, such as those connected with air pollution and its effects on health, traffic congestion and road traffic accidents⁽⁵⁵⁾.

Lastly, productivity (for example in offices and schools) may be positively affected by building-related measures such as improving insulation, ventilation and interior lighting⁽⁵⁶⁾.

B. Impacts on the energy system

The energy system cost is an indicator used to calculate the costs of investing in installations and equipment producing or consuming energy and also the costs of purchasing energy. Climate measures can be expected to slightly increase this cost compared with a business-as-usual scenario, due to the estimated increase in investment costs that will not be offset by the estimated reduction in energy purchase costs.

C. Impacts on business competitiveness

The impact of climate measures on business competitiveness is difficult to estimate because it depends on the international context (particularly energy and technology prices in other countries, etc.) and on the specific characteristics of the regional economic fabric. When drawing up its climate policies, Wallonia pays close attention to the potential impact on competitiveness, particularly as a result of possible increases in the energy cost. An environmental Life Cycle Assessment of products, combined with a social LCA, would allow a label prompting European products to be developed, while avoiding social dumping.

The electricity price in Belgium is expected to increase slightly compared with a business-as-usual scenario (CLIMACT). The estimated price increase is higher for solid and liquid fuels than for natural gas and electricity. However, the energy price increase is estimated to have a moderate effect on production prices due to the improved energy efficiency promoted by the plan.

D. Impacts on employment, education and skills

A Eurofound study⁽⁵⁷⁾ indicates that Belgium is the European country where climate measures have the greatest impact on employment. Based on the study's assumptions, there is a positive net effect overall, with differences between the sectors.

⁵⁴ Federal Planning Bureau (2014), Note on the ‘Macroeconomic impacts of the “2030 climate and energy framework” in Belgium: preliminary analysis’ and

https://www.plan.be/admin/uploaded/201504270958240.WP_1503_10941.pdf

⁵⁵ IPCC (2007), ‘Fourth Assessment Report’, Chap. 5.7; OECD (2015), ‘The Economic Consequences of Climate Change’; OECD (2014), ‘The Cost of Air Pollution, Health Impacts of Road Transport’.

⁵⁶ Seppänen O. (2006), ‘Ventilation and performance in office work’; <https://www.renovermonecole.be/fr/objectifs-bien-être>

⁵⁷ Eurofound (2019), ‘Energy scenario: Employment implications of the Paris Climate Agreement’, Publications Office of the European Union, Luxembourg. This study assesses the sectoral impacts on employment of a low-carbon transition, with particular emphasis on the construction sector.

However, a CLIMACT study suggests that the overall impact in the energy sector is negative, due to a general reduction in energy demand. This takes account of repercussions on the fossil fuel production and refining industries, and on the electricity generation and distribution sector. Investments in renewable energy production and energy infrastructure are often made in labour-intensive sectors. Overall, climate measures should therefore have a positive net effect on employment. An increase in the number of jobs is expected in the manufacturing sector directly connected with or forming part of the renewable energy or energy efficiency supply chain, particularly in the tertiary sector associated with these supply chains.

The largest number of new direct jobs is expected in the construction sector, with the impact on workers in this sector meriting particular attention. Transport is expected ‘to be affected asymmetrically: the reduced demand for the maintenance of private vehicles should be offset by positive effects connected with the roll-out of public transport services, for example’ (CLIMACT).

An inventory of those sectors in which technology will need to evolve must be produced. Several issues will also need to be closely examined to ensure a just transition. There may be several reasons for misalignment⁵⁸ (+Eurofound).

- *Timing reasons*: jobs may not be lost and created at the same time. A faster transition will in all likelihood lead to more friction, with workers being left jobless and certain requirements for new skills not being met.
- *Spatial reasons*: jobs may be lost and created in different areas that are far apart.
- *Sectoral reasons*: jobs may be lost and created in different sectors.
- *Educational reasons*: jobs that are lost and created may be associated with different skills.

Support in terms of adapting existing jobs, providing training in new skills, and anticipating training needs in high-growth sectors such as the ecological transition sector and in sectors with high social value (energy, mobility, communication, circular economy, etc.) will therefore be needed.

E. Impacts on households

Although energy prices are expected to rise, a range of measures in the plan should reduce household gas and electricity bills, in particular building insulation, changes in energy carrier, self-consumption and behavioural change. Close attention will be paid to protecting the most vulnerable in energy poverty terms, by extending or increasing aid, carrying out awareness raising, monitoring consumption and offering support. This attention must be extendable to the lower middle classes. All energy policies will be closely examined in terms of their impact on the public. Energy is an essential resource and a fundamental right, to which access must be guaranteed for all.

As with electricity and gas, fossil fuel prices are also expected to rise (CLIMACT). The impact on households is difficult to estimate as it will depend not only on how much prices rise, but also on how individuals change their behaviour in response to the roll-out and attractiveness of alternatives to private cars, on how the alternative-fuel vehicle market develops and on how the price of such fuels changes. Measures to raise awareness of soft mobility and encourage remote working are already being implemented in Wallonia. The measures in the FAST Vision aim to encourage a modal shift, including in rural environments and suburban areas. They also cover increasing the supply of shared transport and the attractiveness of co-modality, as well as providing information and support to the public on sustainable mobility.

F. Impacts on inequalities

Individuals within society can be impacted differently by the same measure. To ensure a just and fair transition, the Walloon Government will implement the necessary measures after analysing their implications for the

⁵⁸ IRENA (2019), ‘Broadening the Policy Framework to Ensure a Just and Inclusive Transition’, 5th IRENA Policy Day.

energy and climate transition. Those measures will also be based on recommendations made by the Walloon Public Service and on consultations with the public and stakeholders. They will cover all the skills and sectors affected by climate policy.

In particular, there are numerous factors that can have an impact on workers or that can increase inequalities within society, such as:

- developments in the labour market, which can be confronted by a series of misalignments (noted in Section D. Impacts on employment, education and skills) affecting unemployment and hindering retraining;
- poverty, which must not be exacerbated by climate measures that must also not be more beneficial for those on high incomes (e.g. granting of incentives for the purchase of an electric vehicle);
- geographical inequalities between urban and rural environments, for example in terms of access to mobility services, resources and energy infrastructures;
- the gender issue, particularly in connection with:
 - employment, as climate change measures could reduce the number of women in employment;
 - the risk of poverty, which is slightly higher for women than for men and which is significantly higher for single-parent families, which mostly have a woman at their head;
 - representation in energy and climate processes, with women currently being under-represented even though they are generally more concerned about the climate;
 - communication actions, as men and women generally have different perceptions of sustainability, which can affect the chances of such actions being effective (⁵⁹);
 - North/South relations, for example in connection with the origin of biofuels: due to their frequently weaker position in various countries in the South, women are more vulnerable to the seizure of their land, which, when combined with the arrival of large multinationals, is often accompanied by threats and violence against the local population, with sexual violence and abuse of women and girls also increasing in such cases;
- social and environmental inequalities abroad as a result of actions taken on the ground (social dumping, exposure to pollution, etc.).

That is why the Walloon Government is committed to combating any form of discrimination. It will particularly include the gender dimension in mobility and town and country planning policies from the first analysis of projects to their final evaluation.

G. Impacts on health and well-being

Impacts on health

The climate measures should have both positive and negative effects on public health.

Climate change increases the risk of events such as flooding, heatwaves, droughts and fires. It is the people who are socially, economically or otherwise marginalised who are the most vulnerable to the consequences of such events. These may be, for example, pensioners who are left on their own or workers who spend most of their time outside during a heatwave (Eurofound). People on low incomes will also be particularly affected if crop yields fall.

Most of the climate measures are aimed at improving air quality (further detail is provided in the next section), which will impact on health. The Environmental Impact Report for the Walloon Air, Climate and Energy Plan 2030 (*Rapport sur les incidences environnementales du Plan Air Climat Energie à l'horizon 2030 de la Wallonie – ‘RIE’*) indicates that pollutants present in the air, such as O₃, SO₂, NO₂, NH₃ and fine particulate matter, all have negative effects on the respiratory system and can also cause cardiovascular problems. Fine particulate matter

⁵⁹ The Institut pour l'égalité des femmes et des hommes (Institute for the Equality of Women and Men) has produced a manual and a checklist for this purpose, in collaboration with the Réseau des Communicateurs fédéraux (Federal Communicators Network).

is particularly harmful to health as it increases the number of premature deaths and is regarded at European level as being the issue with the greatest impact on public health. Fine and ultrafine particles, which can get into the pulmonary alveoli, are among the most dangerous: there is no evidence of a minimum threshold below which their effects on health can be ignored (⁶⁰). They mainly stem from the production of domestic heat (heating and water) in solid fuel installations (coal, wood).

Although improved building insulation reduces energy consumption, its impact on health depends on the quality of ventilation. Temperature variations are conducive to the development of respiratory and circulatory diseases. Building insulation can therefore reduce the number of hospitalisations for such diseases. However, if there is insufficient air circulation, increased airtightness can lead to the development of mould, particularly in cold and incorrectly ventilated houses, or the accumulation of indoor pollutants (released by materials for instance), with negative impacts on health (⁶¹). The EPB legislation lays down requirements in this respect. Furthermore, the Walloon Renovation Strategy should be accompanied by awareness-raising measures so that the public adopt best practices.

In the transport sector, the RIE notes that promoting soft mobility can have beneficial effects on physical condition (walking, cycling, scooters, etc.), thereby generally improving the health of anyone using this approach.

In terms of road safety, the modal shift and expected reduction in mobility needs should reduce the number of cars on the roads, which should generally limit the number of road traffic accidents. However, the RIE notes that, where cycling is not common, there is an increased risk of accidents involving cyclists. Within Europe, Wallonia has a high cyclist mortality rate per km. Measures will therefore be needed to develop appropriate infrastructure for cyclists and to increase the awareness of motorists.

Lastly, dredging of waterways will also reduce flooding risks by increasing flow capacity.

Impacts on well-being and quality of life

The climate measures should also have effects on the public's well-being and quality of life. The FAST Vision should reduce the number of cars on the roads, thus limiting congestion. The Walloon Renovation Strategy should improve both thermal comfort (improved thermal stability through more efficient control) and acoustic comfort (reduction of noise disturbance through better performing structures). It should also aid access to healthy housing, thereby greatly improving the quality of life and comfort of the most vulnerable households, while allowing them to use the savings made on their costs for basic needs.

Some measures may result in noise pollution, such as renovation work, the development of new road, rail or airport infrastructure and the installation of wind turbines. This aspect must therefore be taken into account in the relevant projects. The installation of solar panels or wind turbines may also adversely affect the public's quality of life and must therefore also be taken into account when choosing the geographical position of such projects. Under the Walloon Renovation Strategy, a district approach may be envisaged, which would have the advantage of limiting the duration of noise pollution.

H. Environmental impacts (⁶²)

This section describes the most significant environmental impacts of the measures in this plan, which have been largely taken from the Environmental Impact Report for the Walloon Air, Climate and Energy Plan 2030 (*Rapport*

⁶⁰ https://www.euro.who.int/_data/assets/pdf_file/0004/193108/REVIHAAP-Final-technical-report-final-version.pdf, page 1.

⁶¹ Frey S.E. et al. (2015), 'The effects of an energy efficiency retrofit on indoor air quality', *Indoor air* 25:210-219.

⁶² Sustainable Development Goal No 15 covers 'the conservation, restoration and sustainable use of terrestrial ecosystems and inland freshwater ecosystems'.

The Convention on Biological Diversity sets out various biodiversity objectives.

A number of strategic goals have been established, including:

- addressing the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society;
- improving the status of biodiversity by safeguarding ecosystems, species and genetic diversity;

sur les incidences environnementales du Plan Air Climat Energie à l'horizon 2030 de la Wallonie – ‘RIE’ (<http://www.awac.be/images/Pierre/PACE/2030/RIE%20PACE2030.pdf>).

Impacts on air quality

The NECP implementing energy and climate policy has been drawn up in parallel and in synergy with the Air Plan, which reinforces air quality policy under Directive (EU) 2016/2284 setting national targets for the reduction of certain atmospheric pollutants by 2020 and 2030 (NEC Directive). These two plans are incorporated within the Walloon Air, Climate and Energy Plan. This synergy is justified by the fact that the energy and transport sectors are two of the main sources of GHG emissions and atmospheric pollutants. These policies for better managing energy production and use, transport and mobility will reduce emissions of the main pollutants covered by the NEC Directive by [80%-85%]. The 2030 targets of the latter can be achieved only by implementing the NECP.

Taking an integrated approach to the energy, climate and air policies also allows any conflicting or counterproductive measures to be avoided or limited.

The following table, taken from the Air, Climate and Energy Plan, sets out the projections of SO₂, NO_x, VOC, PM_{2.5} and NH₃ pollutant emissions based on the measures in this plan. Given certain assumptions, Wallonia's commitments, which are based on the binding 2030 targets compared with 2005 under the NEC Directive, can be met.

Table 18 - Summary of reduction targets and projections for 2030 in absolute terms and as a percentage reduction

Pollutants	Belgian reduction target 2030	Walloon reduction target 2030	Walloon absolute ceilings 2030 (in kt)	2030 projections for Wallonia (in kt)	Estimated reduction for 2030 compared with 2005
SO ₂	66%	65%	15.4	10.76	75.8%
NO _x	59%	60%	49.4	41.72 *	66%
VOC	35%	31%	32.1	29.88 *	37%
PM _{2.5}	39%	43%	8.8	8.3	45.4%
NH ₃	13%	14%	27.0	24.23	23%

* Under the NEC Directive, livestock manure and land management activities are not taken into account when calculating the target and its achievement.

The Environmental Impact Report indicates that the pollutant emissions generated by transport mainly come from exhaust gases (NO_x, fine particulate matter, SO_x, CO, N₂O) and tyre, brake and road surface abrasion (fine particulate matter and heavy metals). The measures aimed at reducing the use of polluting vehicles or emissions from vehicles in use will have a positive impact on air quality.

This plan also aims to significantly increase the share of biomass in future primary consumption, in all sectors combined. Concerns have been raised about the marked increase in the use of biomass as a source of renewable energy because in Wallonia, as in many other countries, the burning of wood (mainly for domestic heating) is the main source (60%) of fine particulate emissions, which are particularly harmful to health, black carbon emissions, which is a short-lived climate forcing agent and therefore contributes to global warming, and carcinogenic PAH emissions (polycyclic aromatic hydrocarbons).

- reducing the direct pressures on biodiversity and promoting sustainable use.

Greater use of biomass with a view to increasing the share of renewables in energy production therefore has a particularly negative impact.

Emissions from installations should be taken into account as a priority, particularly in the residential sector and with regard to PAHs. A general framework should be proposed in order to limit pollutant emissions. Several recommendations can be made: (i) encourage the use of biomass in industry and for collective installations, rather than for small installations; (ii) favour the use of pellets (or, alternatively, wood chip or log installations that perform better in terms of air quality) and biogas, and (iii) offer advice on using boilers in order to limit pollutant emissions. The use of biomass for energy should also be consistent with the work carried out by the Walloon Government ('Biomass-Energy' strategy), taking into account the following key issues: sustainability, conflicts between uses, integration into the bioeconomy roadmap, and consistency between energy carriers.

In terms of indoor air quality, the impact of building insulation will depend on the quality of ventilation.

By contrast, reducing methane (CH_4) emissions is particularly beneficial under both plans, as methane is a significant greenhouse gas and also a precursor to tropospheric ozone, which is an atmospheric pollutant that is harmful to health and ecosystems. The impact of reducing methane is therefore not only entirely positive, but also twofold.

Impacts on biodiversity

According to the IPBES⁽⁶³⁾, we are facing a biodiversity crisis that is unprecedented in human history. Direct exploitation, climate change, pollution and the introduction of invasive exotic species are all factors that have been cited. However, changes in land use are undoubtedly the most impactful factor in terrestrial and freshwater ecosystems.

Any construction work (whether buildings, infrastructure or renewable energy production sites) or any development work (e.g. work on waterways) can cause habitats to be lost or altered, which must therefore be prevented. Work can also disturb fauna during nesting periods or while raising young, which can require schedules to be adapted. There is also the risk of such work spreading invasive exotic species, which are costly to manage⁽⁶⁴⁾.

Public lighting is a source of light pollution that affects fauna, comfort and observation of the night sky. The public service obligation with regard to municipal lighting should be accompanied by recommendations on timing and adjustment of the lighting, or orientation of light flows⁽⁶⁵⁾. A project to improve lighting on the network of greenways (RAVeL) is also envisaged. As these paths are closely linked with green spaces, the project should be studied in terms of the effects of this light pollution on fauna.

Particular attention should also be paid to three sectors at the heart of this National Energy and Climate Plan.

- The negative impacts of onshore wind farms on bats and birds are well-known⁽⁶⁶⁾. Whether for environmental, landscape integration or acoustic discomfort reasons, wind farm development has been significantly hampered by multiple appeals to the Council of State. To ensure that projects are successful, the legal framework needs to be revised and a carefully considered social acceptance campaign must be conducted. At an early stage of projects, investors should also be provided with a map of strategic sites, taking account of various exclusion factors. In some cases, visual markers, audible deterrent systems or even the shutdown of turbines during

⁶³ IPBES (2019), 'Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services', S. Díaz et al., IPBES secretariat, Bonn, Germany, pp. 5-13.

⁶⁴ France and the Grand Duchy of Luxembourg have developed resources for this purpose:

<http://www.biodiversitebati.fr/Files/Other/Biodiversite-et-chantier.pdf>

<https://www.youtube.com/watch?v=2kE0y6GnBT8>

https://environnement.public.lu/fr/publications/conserv_nature/plantes_exotiques_envahissantes/plantes_exotiques_envahissantes.html

⁶⁵ See for example: Les cahiers de BIODIV'2050 : COMPRENDRE n° 6 (2015) 'Eclairage du 21ème siècle et biodiversité'.

⁶⁶ <https://www.natagora.be/position-sur-les-eoliennes>

migratory periods could be used to reduce the risk of fauna colliding with the turbines. However, these actions require certain specific species to be targeted and a good knowledge of their ethological and biological characteristics (⁶⁷).

- Photovoltaic panels have a poorly understood impact in terms of polarised light pollution, which affects aquatic insects that choose the panels as laying sites. This phenomenon can be virtually eliminated by adapting the panel design (⁶⁸).

- Building insulation measures eliminate the cavities that are used by specific fauna for nesting or sheltering. However, simple fauna-friendly changes can be made during construction or renovation (⁶⁹). Green roofs and walls (their impact on biodiversity will depend on the choice of species) or even agriculture projects on roofs (GROOF project) can also be envisaged, and also offer other benefits, particularly in terms of well-being. Some construction materials also have less impact on the environment than others and could therefore be favoured.

Mineral management issue

Lastly, the development of renewable energy will lead to increasing demand for minerals, the exploitation of which has significant environment impacts. It will therefore be necessary, firstly, to encourage recycling and, secondly, to use resources that can be extracted and purified in the least harmful way possible, ensuring just exploitation that respects human rights.

Overview of investment needs

i. Existing investment flows and forward investment assumptions with regard to the planned policies and measures

As Wallonia does not currently (⁷⁰) have an integrated tool for assessing investment needs, certain sectors are targeted below on the basis of available data.

- The **long-term renovation strategy** approved in 2017 indicates that ‘the total investment need over the period 2017-2050 has been estimated at EUR 63 billion in the residential sector’ (⁷¹). In more detail, it is expected that EUR 18.8 billion will be needed up to 2030. Estimates are currently being prepared for the renovation of non-residential buildings (⁷²).
- The following tables indicate the estimated investment needs (⁷³) to 2030 for the **production of renewable electricity and heat**.

⁶⁷ May R.O. et al. (2015), ‘Mitigating wind-turbine induced avian mortality: Sensory, aerodynamic and cognitive constraints and options’, Renewable and Sustainable Energy Reviews 42: 170-81.

⁶⁸ Robertson B.A. et al. (2013), ‘Ecological novelty and the emergence of evolutionary traps’, Trends in ecology & evolution 28: 552-560; Száz D. et al. (2016), ‘Polarized light pollution of matte solar panels: anti-reflective photovoltaics reduce polarized light pollution but benefit only some aquatic insects’, Journal of Insect Conservation 20: 663-675.

⁶⁹ <http://www.biodiversiteetbati.fr/>

⁷⁰ Wallonia is in the process of developing a TIMES economic optimisation model. Once this model becomes operational, it will be possible to assess investment needs for the entire energy system (within the limits of the data entered in the model).

⁷¹ This figure is currently being updated for the next long-term renovation strategy, which is expected in March 2020. Initial estimates, which are yet to be refined, point to EUR 80 billion in the residential sector up to 2050.

⁷² Initial estimates point to EUR 38-45 billion for non-residential buildings up to 2050.

⁷³ Not taking account of discounting.

Table 19 - Estimated investment needs for renewable electricity production to 2030. The cost does not take account of discounting

	2030 target compared with 2014 (GWh)	2030 investment cost compared with 2014 (million EUR)
Photovoltaic	723	3,156
Wind	1,330	2,406
Hydroelectric	290	140

(Source: TIMES model)

Table 20 - Estimated investment needs for renewable heat production to 2030 and estimated additional cost by technology. The investment cost does not take account of discounting. The additional cost takes account of discounting, operating expenses and fuel costs

	2030 target compared with 2020 (GWh)	2030 investment cost compared with 2020 (million EUR)	Additional cost (million EUR)
Solar thermal	84	160	91
Heat pumps	1,507	1,140	282
Deep geothermal energy	233	438	97
Biomass	2,285	1,003	657
Cogeneration (biomass)	1,225	441	95

(Source: 2018 internal calculation file of the administration)

- The following table indicates the estimated investment needs (⁷⁴) to 2030 for transport-related energy infrastructure (⁷⁵).

Table 21 - Estimated investment needs for energy infrastructure to 2030. The cost does not take account of discounting

	2030 target	2030 investment cost compared with 2020 (million EUR)
Hydrogen stations	30	90
Charging points for electric vehicles*:		
- public	6,900	105
- B2B solutions	185,000	830
LNG stations	25	89
CNG stations	220	79

(*) The amounts indicated do not include any additional costs for increasing the power of charging points (~EUR 1,800-EUR 4,000/charging point) or for installing smart points.

(Sources: ASSET 2018 study ‘Technology pathways in decarbonisation scenarios’; internal calculation file of the administration)

⁷⁴ Not taking account of discounting.

⁷⁵ The available data does not allow the transport-related infrastructure cost to be broadly estimated.

ii. Sector or market risk factors or barriers in the national or regional context

The Strategic Committee of the National Pact for Strategic Investments (PNIS) has highlighted a series of investment barriers (⁷⁶).

- ‘Belgium does not currently have a [detailed and complete overview of national financial assets](#)’.
- ‘[European rules](#) currently prevent Belgian public investment. Belgium needs to reduce its public debt, which is too high, and limit its deficit. In this context, it is difficult to allocate significant further resources to investment’.
- The [European funding channel](#) is not being ‘fully utilised, particularly due to the very high number of funding opportunities and a lack of knowledge about the relevant procedures’.

The Strategic Committee has also highlighted a number of barriers in terms of [public-private partnerships \(PPPs\)](#):

- ‘insufficient [technical expertise](#) among project leaders, which often results in projects that are unbalanced in terms of risk-sharing or insufficiently negotiable (bankable)’;
- the [complexity](#) of PPPs, ‘combined with a lack of procedures specific to public investments and also cumbersome administrative and legal procedures for the underlying authorisations and plans’.

iii. Analysis of additional public finance support or resources to fill gaps identified under point ii

The PNIS Strategic Committee would generally like to see the following.

- An [improved understanding of national assets](#), through a complete inventory of public assets. This ‘is valid for both the federal level and also the Communities, Regions and local authorities. It also applies to public enterprises and other associated legal entities’.
- More [coordination](#) at policy level and among experts to ensure a ‘more long-term vision and improved management of public investments’. The Strategic Committee also notes that ‘many countries have adopted mechanisms and procedures designed to [improve the management of public investments](#), [but that] unfortunately such practices are not sufficiently developed in Belgium. And even where such procedures do exist, they are fragmented and specific to certain contracting authorities’.
- ‘Examine how the [European budgetary framework](#) could possibly be [adjusted](#) and flexibly applied to Belgium [to allow for] a temporary relaxing of constraints for a specific entity facing a spike in its investment expenditure, while complying with European budgetary limits’.
- Take advantage of the international [experience of European institutions](#) and agencies in order to improve the management of investment projects.

The Region will ensure that both regional and national and also European and private funds are used efficiently.

❖ Maximise the mobilisation of European funding sources

The PNIS Strategic Committee notes that, ‘in many cases, authorities under-utilise European funds out of ignorance and a lack of support’. There are many funding opportunities, involving specific procedures. To ensure efficient mobilisation of European funds, an administrative unit providing technical support and coordination should therefore be created ‘to help prepare, submit and monitor applications to European bodies and the EIB’.

⁷⁶ https://www.premier.be/sites/default/files/articles/Report_FULL-FR_WEB_FINAL.pdf

Overview of European funding opportunities

The European Union's Multiannual Financial Framework for 2021-2027 particularly emphasises the policies of combating climate change and promoting the energy transition. The Commission has mainstreamed climate action across all the EU's main expenditure programmes, and proposes that a significant proportion of the allocated funds should be used for climate objectives.

Several European-wide financial instruments and programmes are aimed at financing energy transition measures, among others:

- Structural and Investment Funds, including the following:

- The *European Regional Development Fund (ERDF)*, which, in the period 2021-2027, is set to support the achievement of five policy objectives (PO), including a greener, low-carbon Europe by promoting clean and fair energy transition, green and blue investment, the circular economy, climate adaptation and risk prevention (PO 2).
- The European Social Fund Plus (*ESF+*), which aims to improve employment and education and may therefore be used to manage the development of the *labour* and *retraining* market associated with the energy transition. According to the *Proposal for a Regulation of the European Parliament and of the Council on the European Social Fund Plus (ESF+)* (77), this fund could be mobilised to achieve 'a greener, low carbon Europe through the improvement of education and training systems necessary for the adaptation of skills and qualifications, the upskilling of all, including the labour force, the creation of new jobs in sectors related to the environment, climate and energy, and the bioeconomy.'
- The common agricultural policy, which may be used to fund measures in the following areas, for example:
 - *bioenergy*;
 - development of *short agri-food supply chains* in Wallonia;
 - *waste* prevention (e.g. combating food waste and losses), sorting, recycling and recovery;
 - agri-environment and climate.

- European sectoral funds, which cover the following programmes (78):

- *LIFE(+)* *Environment* and *LIFE Climate Action*, which specifically concern developing and implementing innovative responses to environmental and climate challenges and which, since 2014-2015, have been linked with the *Natural Capital Financing Facility* (NCFF) and *Private Finance for Energy Efficiency* (PF4EE) financial instruments. The current integrated project LIFE BE REEL aims to implement regional renovation strategies in Flanders and Wallonia.

Total budget: EUR 5.4 billion over seven years (2021-2027).

Energy budget: EUR 1 billion.

- *Horizon 2020 / Horizon Europe*, which is a research and innovation programme.

Budget: EUR 97.6 billion over seven years (2021-2027).

'Climate, Energy and Mobility' Cluster budget: EUR 15 billion.

- *ERA-NETs*, which are add-on instruments to the Horizon 2020 programme for funding transnational research and innovation (79).

- The *Connecting Europe Facility for Projects of Common Interest* aimed at interconnecting the EU and its regions in terms of *energy*, *transport* and *digital infrastructure*.

Budget of EUR 42.3 billion over seven years (2021-2027):

- energy budget: EUR 8.7 billion;
- transport budget: EUR 30.6 billion;
- digital budget: EUR 3 billion.

- *InvestEU*, which is a new investment instrument replacing the *European Fund for Strategic Investments*. It will provide an EU guarantee that should allow **public and private funds** to be mobilised for strategic investments in support of EU internal policies, in particular to promote the **energy efficiency of buildings and their use of renewable energy**.

Budget: EUR 15.2 billion over seven years (2021-2027).

Objective: to mobilise over EUR 650 billion of additional investment.

- The *Innovation Fund*, which is a funding programme replacing *NER 300*. Its aim is to help energy-intensive **industries** develop **innovative technologies** in the areas of renewable energy **production**, energy **storage**, and capture and use or capture and storage of carbon dioxide.

Proposed budget: EUR 10 billion over seven years (2021-2027) depending on the carbon price (as the fund will be largely resourced through the ETS).

- The *European Energy Efficiency Fund* (*eeef*), which is a public-private partnership aimed at encouraging small-scale renewable energy or energy efficiency projects.

- The *European Investment Fund*, which aims to help SMEs, micro-enterprises and social **enterprises** secure venture capital.

- The *European Investment Bank*, which can also support energy projects (connected with **renewable energy**, **energy efficiency**, and **competitiveness** or **security** of energy supply). The PNIS Strategic Committee notes that, 'in 2017, the EIB and the EIF invested a total of EUR 1.6 billion in Belgium in the areas of the environment, infrastructure, innovation and SMEs. The EIB acts as a catalyst in this respect, with its funding adding to the resources provided by public authorities and private funders. It also has the necessary expertise in the area of project evaluation. It therefore grants a quality label to selected projects'.

- The EU's '**carbon leakage**' measures, which are aimed at increasing business competitiveness in the ETS sector and which will be extended to 2030.

❖ **Mobilise regional and national funding sources**

The investment plans set out in the following table are examples taken in the main from the PNIS (which comes under federal jurisdiction) and the Walloon Investment Plan. They will therefore have to be reassessed in light of the Walloon Regional Policy Statement 2019-2024 and the budgetary framework that are in the process of being adopted.

⁷⁷ http://www.fse.gouv.fr/sites/default/files/widget/document/annexe_3_proposition_de_reglement_du_parlement_europeen_et_du_conseil_relatif_au_fonds_social_europeen_plus_com-2018-382-f1-fr-main-part-1.pdf

⁷⁸ Note: all the budgets mentioned are Commission proposals made in May 2018. They give a rough idea, but will have to be negotiated during the new parliamentary term.

⁷⁹ The corresponding budget is not yet known.

Overview of Investment Plans

- Renewable energy

Nationally, around EUR **19 billion** is set to be mobilised for the electricity mix through [private](#) investment. This sum will be used ‘to continue developing renewable energy, including for households’, ‘to find a solution to further reduce the cost of renewable energy’, and ‘to continue guaranteeing security of supply at competitive prices’.

- Transport

In terms of [mobility](#), it is estimated that EUR **22-27 billion** will be invested [nationally](#), with around 25% coming from [private](#) investors. This sum will be used to maintain and develop integrated transport infrastructure, networks and services, develop intelligent mobility, manage transport demand and establish a support framework. [Private](#) investors are set to provide EUR **0.3 billion** of funding for the roll-out of alternative fuels, specifically for the deployment of CNG and electricity charging points and to support research into hydrogen and green gas.

In the [Walloon](#) Region, an estimated budget of EUR **1.38 billion** will be available to achieve the objectives of the Mobility Plan 2019-2024, develop multimodal platforms ('mobipôles' or mobility hubs), extend the Charleroi metro, increase the depth and width of inland waterways through dredging, and improve mobility around the airports.

- Buildings

Nationally, around EUR **17 billion** will be available for [energy efficiency](#) through the renovation of public [buildings](#). Half of this amount could come from [private](#) investment, through public-private partnerships (PPPs) and/or energy performance contracts (EPCs), which seem particularly well-suited to this type of project.

In the Walloon Region, an estimated total of EUR **755 million** will be available for all aspects of the housing sector (i.e. not limited to the fight against climate change) and could be [particularly](#) used for the energy efficiency of public and private housing. Still in Wallonia, an estimated sum of EUR **675 million** will be available for the energy sector, part of which will be allocated to the energy efficiency of school buildings (with the rest being used to develop smart grids and meters and also for the energy transition of businesses).

- Systems and storage

[Nationally](#), around EUR **17 billion** could be provided through private investment for improving transmission and distribution systems and also for developing smart grids.

In the Walloon Region, an estimated sum of EUR **675 million** will be available for the energy sector, part of which could be allocated to develop smart grids and meters (with the rest being used for the energy efficiency of school buildings and also for the energy transition of businesses).

Nationally, around EUR **5 billion** should be available through private investment for developing energy storage.

- Industry

In the Walloon Region, an estimated sum of EUR **675 million** will be available for the energy sector, part of which could be allocated to the energy transition of businesses (with the rest being used for the energy efficiency of school buildings and also to develop smart grids and meters).

- Agriculture

As regards [agriculture](#), the Walloon Investment Plan has estimated that the local economy will provide EUR **15 million** of funding for the creation of farmers' markets.

- Waste

As regards the [waste](#) sector, an estimated EUR **1.2 million** will be available in Wallonia to fund the current REGAL Plan (2015-2025), which is the Walloon Food Waste and Loss Programme.

The Walloon Waste and Resources Plan (Plan Wallon des déchets-ressources – PWD-R) adopted on 22 March 2018 details the funding needed for its implementation⁽⁸⁰⁾. This plan aims to steer Wallonia along the lines proposed by the European Commission with regard to developing the circular economy.

❖ **Mobilise private funds**

‘Some semi-public bodies, sectoral associations and non-profit associations or private individuals, and also financial institutions (banks, insurance companies, pension funds and other investment funds) have considerable financial reserves’. As a result, public-private partnerships (PPPs) allow authorities to make investments without having to significantly increase public debt. Furthermore, PPPs are particularly advantageous due to the ‘keen interest and technical expertise of many private businesses, for example in the construction and energy sectors’, and also due to the ‘possibility of budget deconsolidation depending on the precise structure of the partnership’.

This approach is key to the renovation strategy, which is why several measures have been prioritised in order to develop the legal and regulatory framework for ESCOs and EPCs in Wallonia (point 3.2.3).

This type of measure could be extended to other sectors where PPPs have a role to play, particularly in the development of transport and digital infrastructure allowing the emergence of intelligent mobility solutions⁽⁸¹⁾.

Moreover, as mentioned in point ‘3.2.10. Financing measures’, Wallonia will aim to ‘develop a tax system that offers price signals consistent with the decarbonisation objectives and the polluter-pays principle’. Taxation will therefore be a useful tool for encouraging operators to change their behaviour and adapt their investment choices in favour of activities compatible with our economy’s decarbonisation objective. This approach will take account of the financial capacity of households.

⁸⁰ http://environnement.wallonie.be/rapports/owd/pwd/PWDR_3.pdf

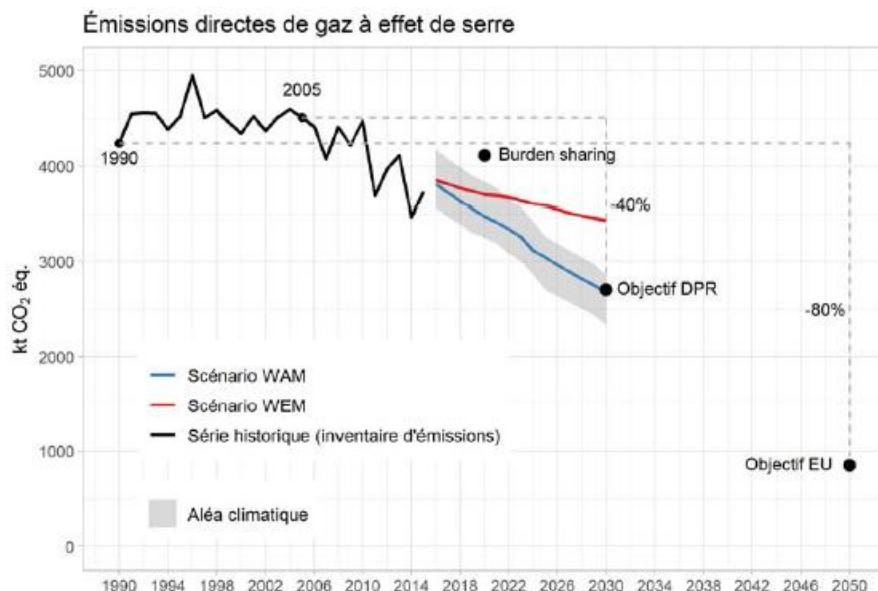
As an example, the estimates made indicate that implementing the actions envisaged in Book 3 of the draft PWD-R (management of household waste) should result in short-term costs estimated at ±EUR 5 million/year for the public authorities, ±EUR 18 million/year for businesses and ±EUR 3 million/year for local authority waste management associations, with a total average annual benefit estimated at around EUR 14 million/year.

⁸¹ See for example: ITS.be.

Brussels Capital Region

Impact of the new measures on GHG emissions

The graph below presents the results with regard to GHG emissions to 2030.



Émissions directes de gaz à effet de serre	Direct GHG emissions
kt CO ₂ éq.	kt CO ₂ eq
Objectif DPR	Regional Policy Statement target
Objectif EU	EU target
Scénario WAM	WAM scenario
Scénario WEM	WEM scenario
Série historique (inventaire d'émissions)	Historical series (emissions inventory)
Aléa climatique	Climatic uncertainty

The proposed measures come close to meeting a target of a 37% reduction in GHG emissions compared with 1990, which corresponds to a 40.1% reduction compared with 2005. The WAM scenario would lead to a transition compatible with the 2050 target (red point) of an 80% reduction in GHG emissions compared with 1990.

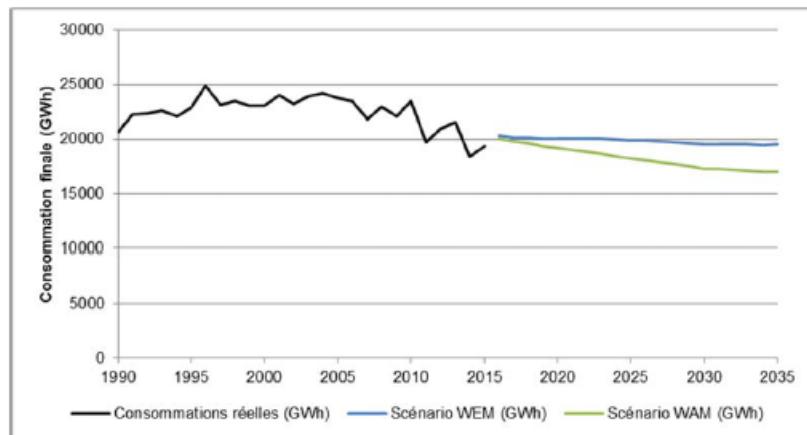
Renewable energy

The table below shows the expected trend in the use of renewable energy in the Brussels Capital Region between 2021 and 2030. Given the distribution of powers, the efforts made in Brussels solely involve the production of electricity, heat and cold from renewable sources.

Unit: GWh	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
RES-E	234.66	239.32	244.36	249.77	255.58	270.51	271.17	281.33	292.06	303.48
Solar PV	99.76	105.38	111.31	117.58	124.20	139.90	150.30	161.17	172.59	184.68
Municipal waste	112.79	111.84	110.94	110.09	109.27	108.50	107.75	107.04	106.35	105.68
Biogas	13.12	13.12	13.12	13.12	13.12	13.12	13.12	13.12	13.12	13.12
Liquid fuels	8.99	8.99	8.99	8.99	8.99	8.99	-	-	-	-
RES-H&C	136.11	138.00	139.92	144.19	148.56	153.00	152.19	157.03	162.08	167.44
Heat pumps	27.32	27.97	28.64	30.62	32.61	34.61	36.68	38.80	40.98	43.27
Solar thermal	16.72	17.84	19.04	21.29	23.63	26.04	28.60	31.28	34.11	37.12
Municipal waste	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08
Biogas	28.32	28.32	28.32	28.32	28.32	28.32	28.32	28.32	28.32	28.32
Solid fuels	57.21	57.32	57.38	57.42	57.46	57.48	57.51	57.55	57.59	57.65
Liquid fuels	5.47	5.47	5.47	5.47	5.47	5.47	-	-	-	-
Total	370.77	377.32	384.28	393.97	404.15	423.50	423.37	438.36	454.14	470.92

Dimension energy efficiency

Lastly, the graph below shows that the proposed measures will reduce final energy consumption by 28.5% compared with 2005.

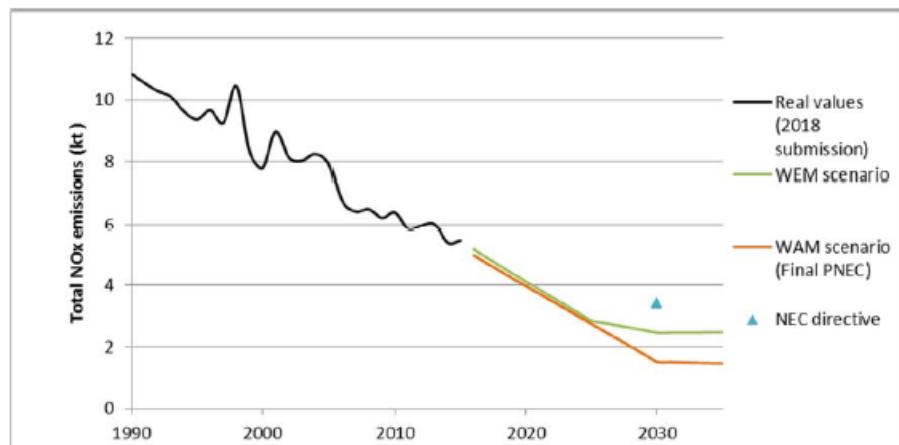


Consommation finale (GWh)	Final consumption (GWh)
Consommations réelles (GWh)	Actual consumption (GWh)
Scénario WEM (GWh)	WEM scenario (GWh)
Scénario WAM (GWh)	WAM scenario (GWh)

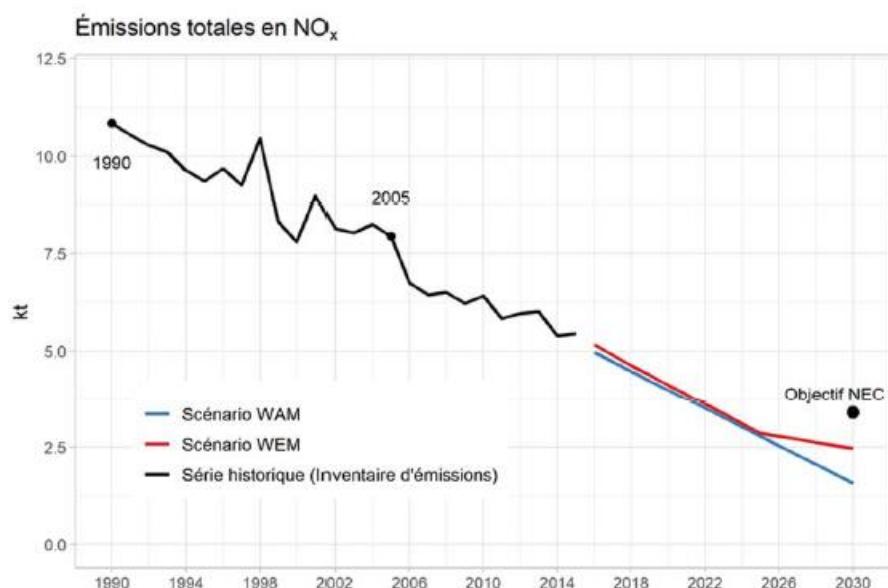
Macroeconomic and, to the extent feasible, the health, environmental, employment and education, skills and social impacts, including just transition aspects (in terms of costs and benefits as well as cost-effectiveness) of the planned policies and measures described in section 3 at least until the last year of the period covered by the plan, including comparison to projections with existing policies and measures

Impact of the new measures on the main atmospheric pollutants

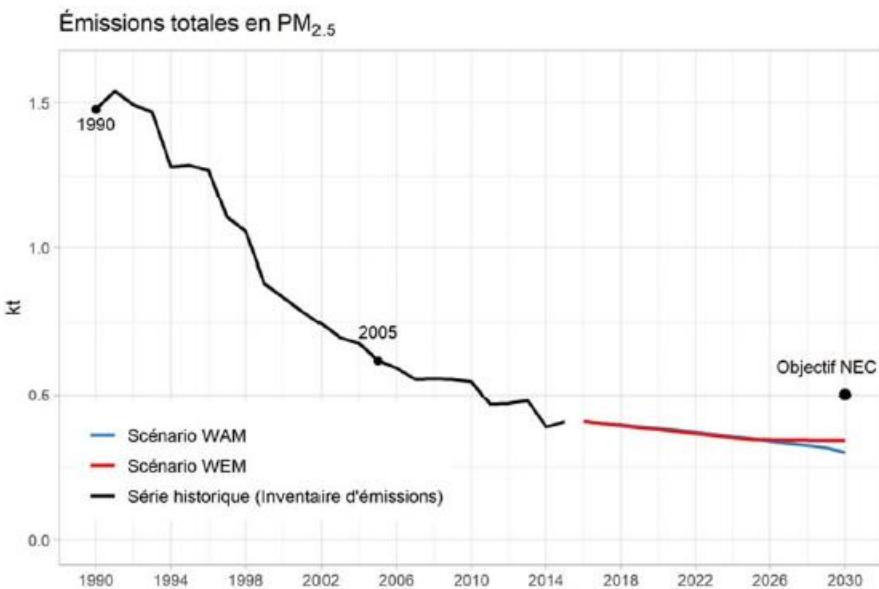
The graphs below show the results for the two most problematic pollutants in the Brussels Capital Region, namely NO_x and fine particulate matter PM_{2.5}.



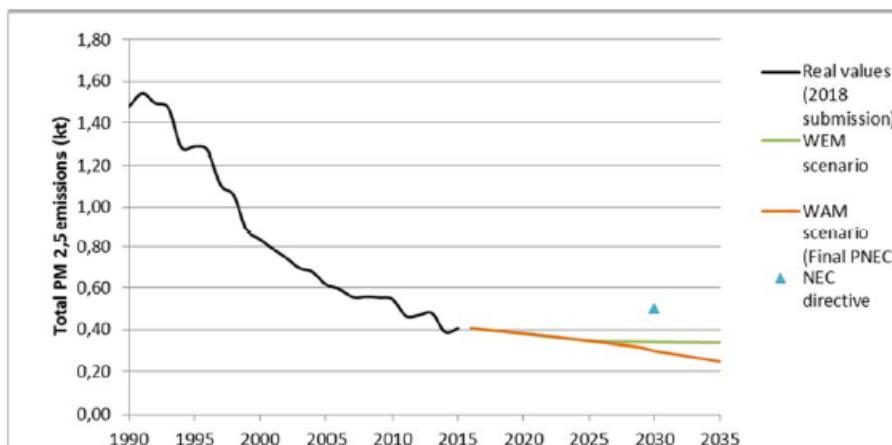
PNEC	NECP
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Émissions totales en NO _x	Total NO _x emissions
Objectif NEC	NEC target
Scénario WAM	WAM scenario
Scénario WEM	WEM scenario
Série historique (inventaire d'émissions)	Historical series (emissions inventory)



Émissions totales en PM _{2,5}	Total PM _{2,5} emissions
Objectif NEC	NEC target
Scénario WAM	WAM scenario
Scénario WEM	WEM scenario
Série historique (inventaire d'émissions)	Historical series (emissions inventory)



PNEC	NECP
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Overview of investment needs

Brussels Capital Region

Implementing the NECP measures in Brussels will require significant funding, which is a key issue. Multiple public and private funding sources will need to be mobilised.

Financing needs

The NECP is a strategy document; it has not yet been decided how various measures will be implemented. As a result, it has not been possible to estimate the total financing needs. However, the needs associated with the renovation strategy have been estimated, as the methods of implementing at least some of the measures have been determined.

By multiplying the surface areas of the types of housing by the total discounted costs (TDC) by type of housing (taken from the Cost-Optimal study), the investment needed to achieve the Region's objectives in terms of the renovation strategy is estimated at EUR 28.7 billion up to 2050, based on units to be renovated and the 2017 Cost-Optimal study.

	Apartments	Houses	Mixed-use properties	Total
Units to be renovated	252,544	196,561	31,914	479,659
New units	47,485	4,539	737	52,761
m ² / unit	76	174	174	
TDC (EUR/m ²)	612	411	542	
Investment needed	EUR 11.7 billion	EUR 14.1 billion	EUR 3 billion	EUR 28.8 billion

Regional budget funds

Substantial resources are available through regional funds allocated at least in part to energy policy.

- The **regional climate fund** created by COBRACE (Brussels Air, Climate and Energy Management Code) is intended to fully meet the requirement of Directive 2003/87/EC for Member States to use the revenue from selling allowances under the European greenhouse gas emission allowance trading scheme for certain specific purposes, such as reducing GHG emissions. The COBRACE therefore stipulates that the revenue of this fund, which mainly consists of the Brussels revenue under this scheme, will be used in particular for:
 - o measures in relation to buildings, installations and products that are aimed at reducing GHG emissions;
 - o measures in relation to transport and mobility that are aimed at reducing GHG emissions.
- The **energy policy fund** is financed by the levy calculated on the basis of available power (electricity) and meter size (gas). The revenue from this levy is allocated to the energy policy fund (95% of the revenue, which is used for the rational energy use policy of Bruxelles Environnement and for the operation of Brugel) and to the energy guidance fund (5% of the revenue, which is used by the public social welfare centres). The terms of this fund are set out in Article 2.16 of the Order creating the budget funds and reiterated in Article 26 of the Order on the organisation of the electricity market in the Brussels Capital Region.

In 2019, this fund received revenue of EUR 14,238,276.37.

- The economic transition fund is a new fund launched by the Brussels Government with a budget of EUR 10 million. This fund has been established in partnership with Finance.Brussels and the Secretary of State for the Economic Transition. Its aim is to encourage a wholesale change in methods of production and consumption in order to achieve a low-carbon economy.

The Brussels Government will also study the possibility of a single fund dedicated to the energy transition of buildings, which will combine the current contributions to the energy improvement of buildings (green certificates, energy and climate fund, renovation incentives, etc.) with other financial support. To ensure that a fair contribution to the fund is made by all the various energy carriers, a federal agreement will include heating oil suppliers among the contributors.

Financing tools

Given the challenge facing us, existing tools (such as the Brussels green loan, energy incentives, etc.) will be fully utilised and extended, with additional tools also having to be created. This approach is particularly important for the renovation strategy (see point 2.2.1.1.2).

In addition to these tools, the Brussels Government has decided to significantly increase the funding allocated to support the energy renovation of buildings. It has therefore decided to create an ‘Employment-Environment-Finance’ Alliance (Alliance ‘Emploi-Environnement-Finances’), within which all sectoral stakeholders will work to implement the Strategy for the sustainable renovation of Brussels buildings (Stratégie de rénovation durable du bâti bruxellois). The government will also involve public and private sponsors in the Alliance so that all possible options are available for funding the transition of buildings. The government will also extend its ambitious policy of encouraging renovation, by steering public and private investment towards this goal, particularly through the next ERDF programming period and use of the third-party investor mechanism.

In order to tackle the wide range of situations (jointly owned properties, landlords, etc.), the government will implement an equally wide range of public and private funding solutions. In collaboration with public and private financial operators, it will develop innovative methods of funding suited to energy renovation, such as mortgages repayable over terms corresponding to the financial return on the planned renovation, or energy renovation loans that are repayable on transfer of ownership.

In order to take full advantage of the opportunity offered by the transfer of ownership for undertaking ambitious renovations, the government will establish a price signal linked to the property’s energy efficiency at the time of transfer, through reduced registration fees or reduced inheritance or gift taxes. The reduction will depend on a comprehensive energy renovation being carried out within a set timescale and following an EPB analysis and development of an improvement strategy. More generally, the government will study how taxation can be used to encourage owners to improve the EPB class of their property.