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Analysis of the annual reports 2019 under the Energy Efficiency Directive

Summary Report

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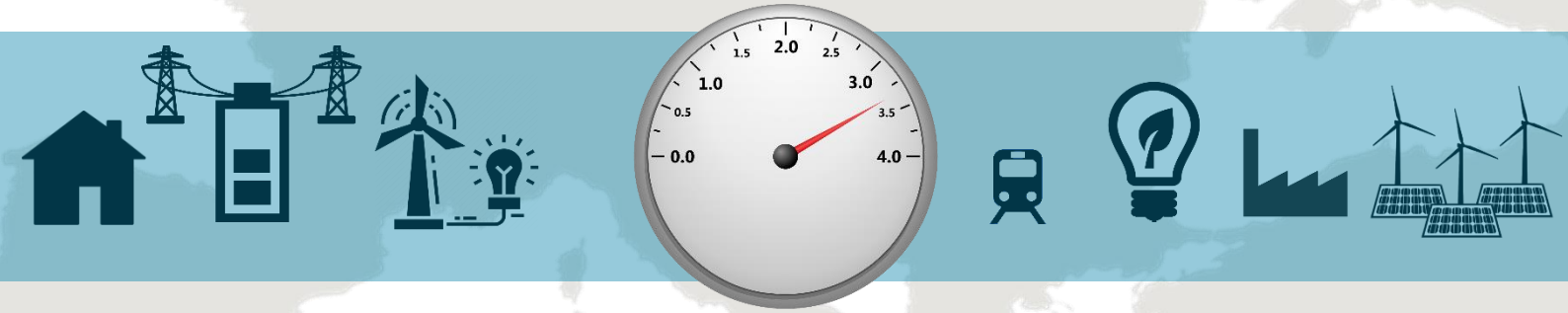
2020



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Contents

Abstract

This report discusses the progress towards the 2020 Energy Efficiency targets and the implementation of the provisions of the Energy Efficiency Directive 2012/27/EU (EED), providing an overview of the main energy trends in the European Union with special focus on the period 2005-2017. It is based on the latest available EUROSTAT data and on the information provided by Member States in their Annual Reports 2019 submitted under the EED. Our analysis has shown that 2015 was a turning point for the progress towards the energy efficiency targets due to a reversal in the preceding 5-year declining consumption trend of 2010-2014. Energy consumption increased mildly in 2015 and continued to rise in 2016 and 2017; the latest increase in 2017 point to a gap of 3.4% and 5.3% with respect to the EU final and primary energy consumption targets of 2020, respectively. At end-use level, rising energy consumption in transport and industry were the main causes of this progress slowdown. The assessment of the 2019 Annual Reports generally confirmed good progress with regards to implementation of various provisions the Energy Efficiency Directive including those stipulated in Article 7 on energy efficiency obligations. While a few Member States reported new measures which can be viewed positively in light of the need to narrow the gap towards the targets, more intensified policy efforts are needed. Beyond the various information gaps identified by this report, our analysis suggests that achieving central government requirements on energy efficiency may be challenging and accelerated efforts across all sectors are crucial in ensuring that sufficient progress is made in the coming years.

1 Introduction

The Energy Efficiency Directive 2012/27/EU (the EED or the Directive), adopted in 2012, forms a key part of the EU's overall climate and energy legislative package, laying down the foundation for actions to be taken in order to help realise the energy efficiency potential of the European economy. All EU Member States are required to implement policy measures that improve energy efficiency at all stages of the energy chain from production to final consumption. This effort is aimed at achieving the EU energy efficiency target in 2020. In particular, the EU target corresponds to a 20% reduction in the EU primary energy consumption by 2020 compared to 2007 primary energy consumption projections in 2020 (based on the model PRIMES 2007). In terms of primary energy, this target results in a reduction of 370 Mtoe and consumption levels of 1483 Mtoe in 2020 (to be compared with 2007 projections of 1853 Mtoe in 2020).

In accordance with Article 3, Member States have set indicative energy efficiency targets – based on either primary or final energy savings, primary or final energy consumption or energy intensity – in view of the overall target of 20% reduction in EU primary energy consumption by 2020. To comply with Article 24, Member States are also requested to report on the progress achieved towards their national energy efficiency targets by 30 April each year as of 2013 in the form of the so-called Annual Reports (ARs). In particular, Member States are required to specifically report on their recent consumption trends as well as policy updates and progress towards implementing Articles 5 and 7 of the Directive.

As per the Directive's requirements, the European Commission's responsibilities include the assessment of the annual progress made by Member States towards achieving the national indicative energy efficiency targets and implementing the various provisions of the Directive. The Joint Research Centre has undertaken the task of evaluating the submitted annual reports and the results of the analysis of the Annual Reports of 2019 (AR2019) are presented in this Report. This report represents the third of the summary report series published by the JRC to monitor the progress at the EU and MS levels in relation to the key elements of the EED. The assessment of the latest Annual Reports of 2019 cover the progress towards the targets (covering the year 2017 for which the latest available data exist) and progress in relation to various energy efficiency policies.

The structure of the report is as follows. Section 2 sets the background, with information of the main elements covered by and submission details of the national Annual Reports of 2019. Section 3 discusses the progress towards the 2020 targets, focusing at the whole economy and each end-use sector individually (industry, residential, services and transport). Section 4 zooms into the evolution of short-term trends of key energy efficiency-related indicators in the latest two-year period (2016-2017) and discusses the underlying reasons behind the trends in part through the application of decomposition analysis. The progress towards the implementation of EED provisions is discussed in Section 5, with a detailed summary of a country-by-country progress achieved towards EED Articles 5 and 7. New AR2019 measures identified under Articles 7 and 5 are also highlighted in Section 5, with a view to discuss how Member States have recently accelerated their efforts to reach the 2020 targets. Conclusions are drawn in Section 6 and complementary information is presented in Annexes 1-3.

2 Background

The annual reports referred to in Article 24(1) of the EED provide a basis for the monitoring of the progress towards national 2020 targets.

For the Annual Reports 2019, the following minimum information had to be provided by each Member State:

(a) an estimate of various energy-related indicators (listed in **Table 1**) for the year 2017, including a discussion of the reasons if stable and growing energy consumptions were observed;

(b) updates on major legislative and non-legislative measures implemented in 2018 which contribute towards the overall national energy efficiency targets for 2020;

(c) the total building floor area of the buildings with a total useful floor area over 500 m^2 and as of 9 July 2015 over 250 m^2 owned and occupied by the Member States' central government that, on 1 January 2019, did not meet the energy performance requirements referred to in Article 5(1);

(d) the total building floor area of heated and/or cooled buildings owned and occupied by the Member States' central government that was renovated in 2018 referred to in Article 5(1) or the amount of energy savings in eligible buildings owned and occupied by their central government as referred to in Article 5(6);

(e) energy savings achieved in 2017 through the national energy efficiency obligation schemes referred to in Article 7(1) or the alternative measures adopted in application of Article 7(9).

Table 1. Indicators to be included in the Annual Reports, as required by Annex XIV of EED.

(i) primary energy consumption (PEC)
(ii) total final energy consumption (FEC)
(iii) final energy consumption (FEC) of industry sector
(iii) final energy consumption (FEC) of transport sector
(iii) final energy consumption (FEC) of households sector
(iii) final energy consumption (FEC) of services sector
(iv) gross value added (GVA) of industry sector
(iv) gross value added (GVA) of services sector
(v) disposable income for households (DIH)
(vi) gross domestic product (GDP)
(vii) electricity generation from thermal power generation (thPG)
(viii) electricity generation from combined heat and power plants (CHPP)
(ix) heat generation from thermal power generation (thPG)
(x) heat generation from combined heat and power plants (CHPP), including industrial waste heat
(xi) fuel input for thermal power generation (thPG)
(xii) passenger kilometres (pkm)
(xiii) tonnes kilometres (tkm)
(xiv) combined transport kilometres (pkm + tkm), in case (xii) and (xiii) are not available
(xv) population

In the framework of the Administrative Agreement TSSEED[1] between DG Energy and JRC, in 2015 the European Commission has developed a reporting template in order to ensure a harmonised reporting approach and thereby enhance data analysis capabilities. In 2019 12 Member States (Austria, Belgium, Cyprus, Denmark, Estonia, Greece, Spain, Hungary, Ireland, Italy, the Netherlands, Portugal and Slovenia) filled out the template (see **Table 2**). This number is reduced by 1 compared to 2017. The ability of this tool to avoid misunderstandings was confirmed by the analysis of the Annual Reports 2018 and 2019.

Table 2. Reporting overview of Annual Reports 2019 (T: Template, R: Report).

	AT	BE	BG	CY	CZ	DE	DK	EE	EL	ES	FI	FR	HR	HU	IE	IT	LT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK	UK
T	✓	✓		✓			✓	✓	✓	✓				✓	✓	✓					✓		✓			✓		
R	✓		✓		✓	✓					✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓

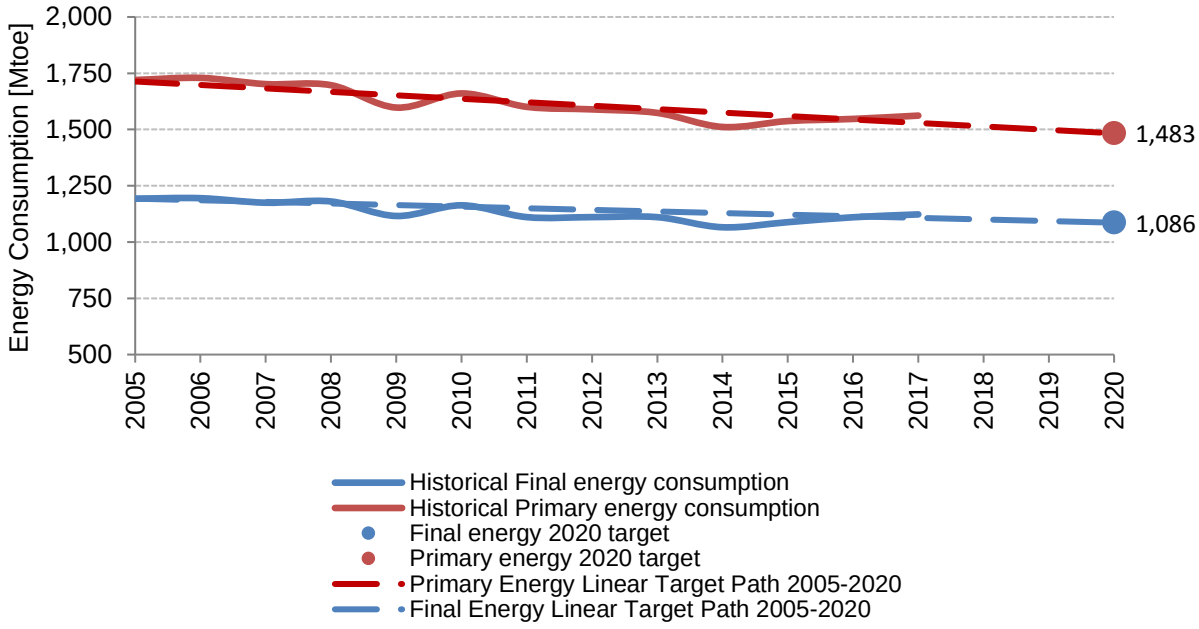
[1] Technical and Scientific Support to the implementation of the EED and the EPBD, as well as contribution to the development of concepts for the strengthening of the overall EU legislative framework for energy saving.

3 Progress towards the 2020 Energy Efficiency targets

Unless otherwise stated, the source of the data presented in this chapter is EUROSTAT. The indicators used are listed in **Annex 1**.

In the period from 2005 to 2017, the EU energy consumption has followed a general downward trend, as depicted in **Figure 1**. The decrease in energy consumption was accompanied with an overall drop in energy intensity and energy consumption per capita, reflecting a possible increase in competitiveness in the same period. In 2014, the EU had already met the target values set in the EED for 2020 in terms of final energy consumption (1066 Mtoe in 2014 vs 1086 Mtoe of the target) and it was on track to reach the target value for primary energy consumption (1511 Mtoe in 2014 vs 1483 Mtoe of the target; corresponding to a gap of 1.9%). However, in 2015 final energy consumption increased (1088 Mtoe) and in 2016 it increased even more (1110 Mtoe), thereby slightly exceeding the 2020 target with a gap of 2.2%. The upward trend continued in 2017, when final energy consumption registered the value of 1122.8 Mtoe, corresponding to a gap of 3.4% above the target. Primary energy consumption followed a similar trend, with a gradual increase as of 2014. In particular, the decreasing trend was reversed in 2015: the EU primary energy consumption in 2015 amounted to 1537.5 Mtoe, leading to a gap of 3.7% with the EU target. Consumption also increased in 2016 (1546.9 Mtoe) and in 2017 (1561.6 Mtoe), registering a primary energy gap of 5.3% in 2017 with respect to the 2020 target.

Figure 1. Final and Primary Energy Consumption trends of the EU28 (the dotted line represent a linear trajectory between the 2005 actual consumption and the 2020 target consumption).



Source: Eurostat, JRC, 2019.

In terms of individual end-use sectors, only transport and services have increased their final energy consumption over the 2005-2017 period (by 2.5% and 3.8% respectively); whilst in the others (i.e. residential and industry sectors) the final energy consumption has declined. The increasing trend in the tertiary sector is expected to continue as per the on-going tertiarisation process in the EU. On the other hand, the decreasing trend in the industry sector has been influenced, in part by the financial and economic crisis and by the delocalisation of industry in emerging countries. In the residential sector, the energy demand is decreasing. At the national level observed variations strongly depend on weather and climate conditions, although there are multiple factors affecting the energy consumption, such as building characteristics (i.e. building envelope, insulation level, location, etc.) or social and cultural reasons (lifestyle, habits, etc.).

Table 3. Indicative national energy efficiency targets for 2020.

MS	PEC Target [Mtoe]		FEC Target [Mtoe]	
	Up to 2016	Latest value (from NEEAP 2017 or latest value)	Up to 2016	Latest value (from NEEAP 2017 or latest value)
BE	43.70	43.70	32.50	32.50
BG	16.87	16.87	8.64	8.64
CZ	39.60	44.31	25.32	25.32
DK	17.40	16.89	14.43	14.70
DE	276.60	276.60	194.30	194.30
EE	6.50	6.50	2.80	2.80
IE	13.90	13.90	11.70	11.70
EL	24.70	24.70	18.40	18.40
ES	119.80	122.58	80.10	87.24
FR	219.90	219.90	131.40	131.40
HR	11.15	10.71	7.00	6.96
IT	158.00	158.00	124.00	124.00
CY	2.20	2.23	1.85	1.91
LV	5.37	5.37	4.47	4.47
LT	6.49	6.49	4.28	4.28
LU	4.48	4.48	4.20	4.20
HU	24.10	24.10	14.40	14.40
MT	0.70	0.82	0.50	0.63
NL	60.70	60.70	52.20	52.20
AT	31.50	31.50	25.07	25.07
PL	96.40	96.40	71.60	71.60
PT	22.50	22.50	17.40	17.40
RO	43.00	43.00	30.30	30.30
SI	7.30	7.13	5.10	5.10
SK	16.38	16.38	9.24	9.24
FI	35.86	35.86	26.66	26.66
SE	43.40	43.40	30.30	30.30
UK	177.60	177.60	129.20	129.20
Sum of indicative targets EU28	**1526.09**	**1532.61**	**1077.36**	**1084.92**
EU28 target 2020	**1483**		**1086**	

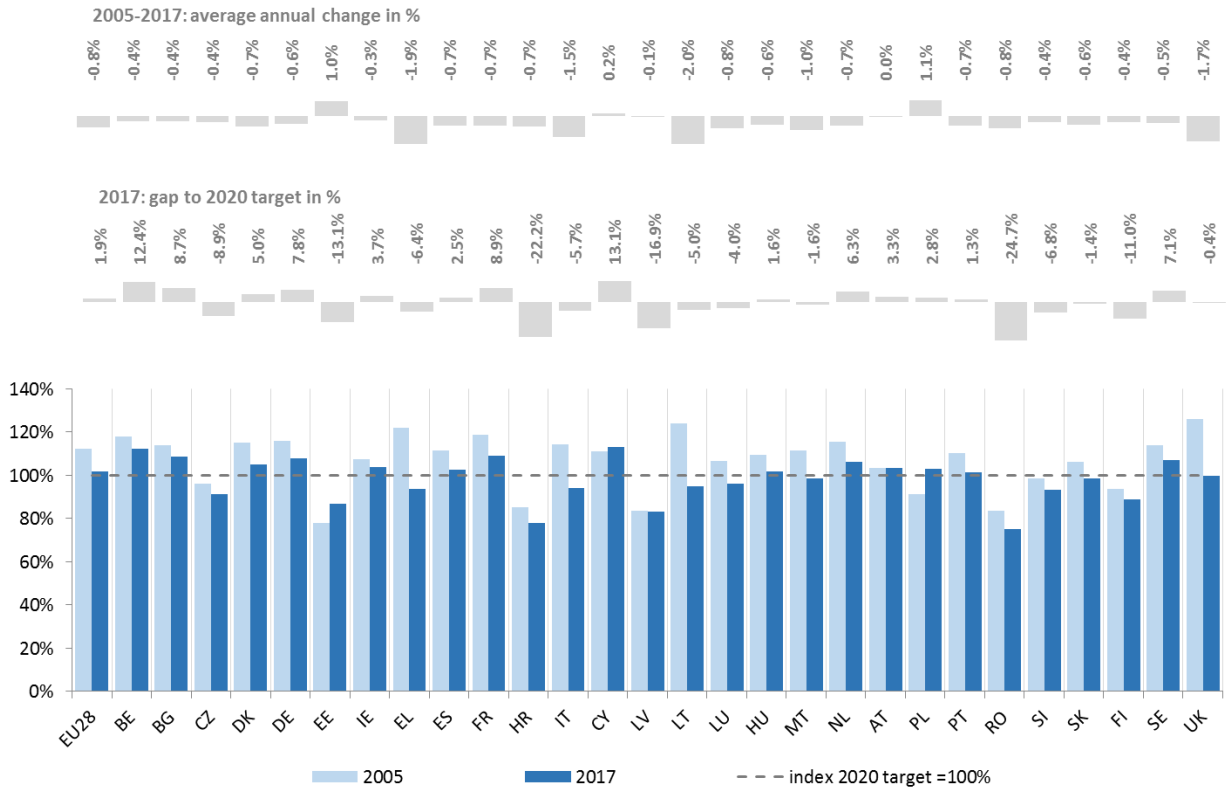
Source: DG ENERGY, 2018.

It has to be noted that, after the last updates by some Member States, the sum of national 2020 absolute consumption targets is 1532.6 Mtoe in terms of primary energy and 1084.9 Mtoe in terms of final energy (**Table 3**). While the latter value is below the EU target (1086 Mtoe), there is a negative mismatch regarding the primary energy objective: the sum of the indicative national targets is 3.3% above the EU target (1483 Mtoe) and therefore corresponds to 17.3% savings (instead of 20%) compared to the PRIMES baseline projections.

At national level, the absolute primary energy consumption of all Member States, except Estonia, Cyprus and Poland, has declined since 2005 (**Figure 2**). Poland experienced the largest primary energy consumption increase, which was equivalent to an average annual 1.4% rise in the period 2005-2017. The average annual reduction during 2005-2017 was more pronounced compared to EU28 in 7 Member States (Greece, Italy, Lithuania, Luxemburg, Malta, Romania and the United Kingdom). Fourteen countries (Belgium, Bulgaria, Denmark, Germany, France, Cyprus, Ireland, Spain, Hungary, Austria, the Netherlands, Poland, Portugal and Sweden) still have a positive gap towards their national indicative targets for 2020. This means that efforts to further reduce the energy consumption in these countries are necessary in the remaining period up to 2020.

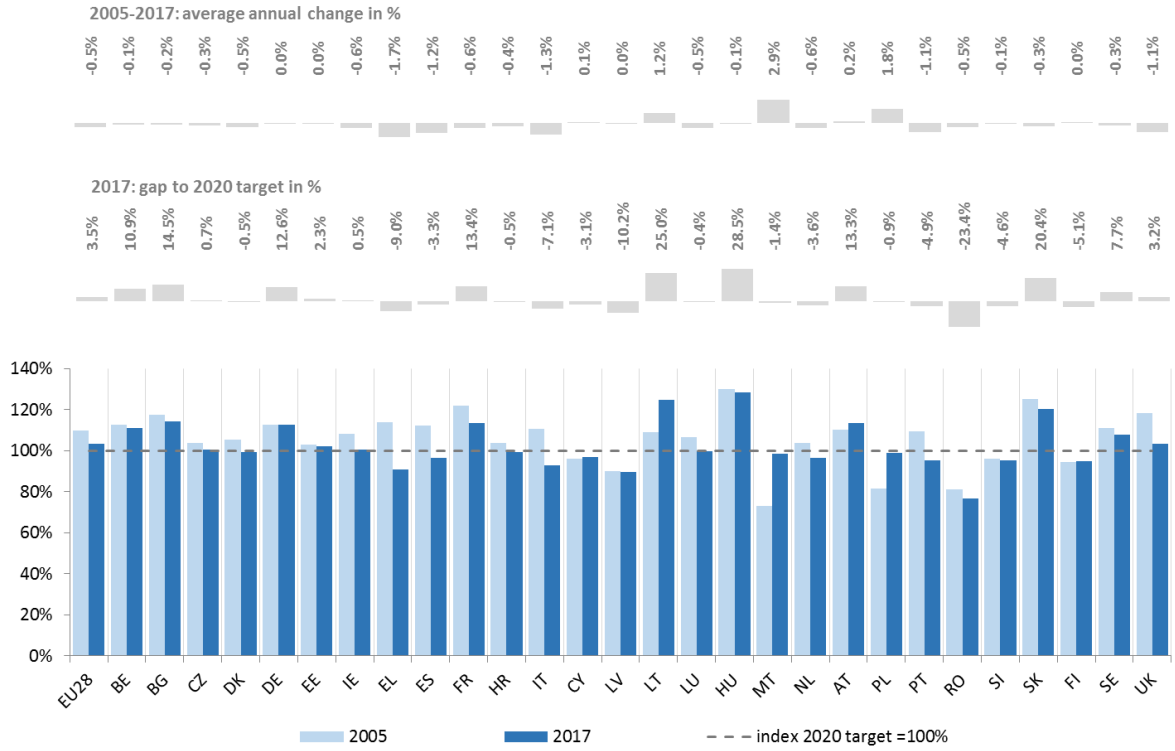
The absolute final energy consumption of all Member States has declined since 2005 except in Cyprus, Lithuania, Malta, Austria, Finland and Poland (**Figure 3**). 15 Member States achieved already in 2017 a final energy consumption which is below their indicative final energy target for 2020 (Denmark, Greece, Spain, Croatia, Italy, Cyprus, Latvia, Lithuania, Luxembourg, Malta, Romania, Slovenia, Slovakia, Finland and the United Kingdom).

Figure 2. Primary energy consumption trends (2005-2017), average annual change in 2005-2017 and comparison of current efforts with EU 2020 target.



Source: Eurostat, JRC, 2019.

Figure 3. Final energy consumption trends (2005-2017), average annual change in 2005-2017 and comparison of current efforts with EU 2020 target.



Source: Eurostat, JRC, 2019.

A quick overview of main energy trends is shown in **Table 4** and **Table 5**, where the green colour is used to indicate a decrease in energy consumption.

Table 4. Overview of variations of main energy indicators (part 1).

MS	Trend to reach the 2020 target		Short-term trend		Energy Intensity whole economy	Industry	Residential	
	PEC 2005-2017 trend compared to PEC 2005-2020 trend to reach the 2020 target	FEC 2005-2016 trend compared to FEC 2005-2020 trend to reach the 2020 target	Change of PEC 2017 compared to PEC 2016 [%]	Change of FEC 2017 compared to FEC 2016 [%]	2005-2017 average annual change of PEC energy intensity [%]	2005-2017 average change of FEC energy intensity in industry [%]	2005-2017 average annual change of FEC in residential per capita with climatic corrections [%]	2005-2017 average annual change of FEC in residential per household with climatic corrections [%]
EU28	+	-	0.9%	1.1%	-2.0%	-2.0%	-0.5%	n.a.
BE	-	-	-0.3%	-1.2%	-1.7%	-0.7%	-2.0%	-2.0%
BG	-	-	3.7%	2.5%	-2.8%	-5.2%	2.1%	1.6%
CZ	+	+	0.8%	2.7%	-2.9%	-4.6%	0.9%	0.1%
DK	-	+	2.1%	1.2%	-1.9%	-1.8%	0.0%	0.3%
DE	-	-	0.2%	0.9%	-2.0%	-1.6%	-0.4%	-0.9%
EE	+	-	-4.2%	1.3%	-1.9%	-6.0%	1.2%	0.8%
IE	-	+	-1.4%	1.4%	-4.5%	-5.0%	-2.5%	n.a.
EL	+	+	1.2%	0.3%	-0.4%	1.8%	-1.3%	-1.6%
ES	-	+	5.4%	2.3%	-1.5%	-2.4%	1.9%	1.1%
FR	-	-	-0.3%	0.2%	-1.6%	-1.4%	-0.6%	-1.2%
HR	+	+	3.5%	4.3%	-1.4%	-1.6%	0.2%	0.4%
IT	+	+	0.7%	-0.6%	-1.3%	-2.7%	0.6%	0.0%
CY	-	+	4.4%	5.3%	-1.1%	0.8%	1.5%	0.7%
LV	+	+	4.0%	5.1%	-2.1%	1.4%	-0.1%	-1.8%
LT	+	-	2.0%	4.9%	-4.9%	-2.0%	1.7%	-0.8%
LU	+	+	3.5%	3.5%	-3.2%	-1.0%	-1.4%	-1.8%
HU	+	-	3.1%	3.8%	-1.5%	2.0%	0.3%	-0.6%
MT	+	-	14.1%	7.0%	-4.6%	n.a.	9.7%	8.1%
NL	-	+	-0.4%	0.9%	-2.0%	-1.3%	-0.8%	-1.3%
AT	-	-	2.7%	2.1%	-1.1%	-0.3%	0.4%	0.0%
PL	-	-	4.5%	6.5%	-2.7%	-3.6%	1.0%	-0.2%
PT	+	+	4.7%	2.3%	-0.7%	-1.1%	1.1%	0.2%
RO	+	+	5.7%	4.4%	-4.3%	-5.9%	1.4%	0.5%
SI	+	+	1.5%	-0.3%	-1.9%	-3.1%	0.4%	-0.7%
SK	+	-	5.1%	7.0%	-4.0%	-4.9%	-0.9%	-1.7%
FI	+	+	-1.3%	0.5%	-1.8%	-0.5%	-0.3%	-0.7%
SE	-	-	-0.9%	0.8%	-2.4%	-1.1%	-0.7%	n.a.
UK	+	+	-1.7%	-0.8%	-3.2%	-2.5%	-2.0%	-2.1%
Source and extraction data	Eurostat 06/2019	Eurostat 06/2019	Eurostat 06/2019	Eurostat 06/2019	Eurostat 06/2019	Eurostat 06/2019	Eurostat 06/2019	Eurostat 06/2019

Source: Eurostat, Odyssee, JRC, 2019.

Table 5. Overview of variations of main energy indicators[2] [3] (part 2).

MS	Services	Transport			Generation	
	2005-2017 average change of FEC energy intensity in the service sector [%]	2005-2017 average change of total FEC energy intensity in the transport sector [%]	2017 vs. 2005 change of share of trains, motor coaches, buses and trolley buses for passenger transport [%]	2017 vs. 2005 change of share of railway and inland waterways for freight transport [%]	2005-2017 average annual change of heat generation from CHP [%]	2005-2017average annual change of ratio Transformation output/Fuel input of thermal power generation [%]
EU28	-1.0%	-1.0%	-0.4%	-0.4%	-0.8%	0.9%
BE	-0.1%	-0.8%	-2.2%	-0.3%	2.9%	1.3%
BG	-0.5%	-0.9%	-14.2%	7.4%	-1.1%	0.6%
CZ	-1.8%	-1.1%	1.6%	-4.3%	-0.7%	0.7%
DK	-1.2%	-1.2%	-2.5%	n.a	-0.8%	1.4%
DE	-0.8%	-1.0%	0.1%	-3.3%	-0.5%	1.3%
EE	0.0%	-1.1%	-3.5%	n.a.	2.1%	-0.1%
IE	-5.0%	-4.0%	-0.5%	n.a.	8.3%	1.8%
EL	1.6%	0.3%	-4.2%	n.a.	1.2%	1.7%
ES	0.0%	-1.7%	-3.3%	n.a.	8.3%	0.1%
FR	-0.2%	-0.7%	1.6%	-1.2%	-3.6%	0.4%
HR	0.1%	1.0%	-0.5%	3.8%	1.0%	1.1%
IT	0.3%	-1.2%	-0.9%	3.2%	1.3%	1.0%
CY	1.1%	-1.0%	n.a.	n.a.	50.6%	1.5%
LV	-1.5%	-0.5%	-7.9%	n.a.	0.8%	-0.1%
LT	-1.6%	0.6%	-1.4%	6.9%	-4.9%	7.5%
LU	-0.6%	-3.1%	2.6%	-15.2%	-0.9%	5.7%
HU	-5.0%	-0.3%	-5.8%	4.3%	-5.4%	0.3%
MT	n.a.	-1.3%	n.a.	n.a.	8.3%	3.7%
NL	-1.8%	-1.5%	2.4%	1.5%	-2.2%	0.4%
AT	-3.3%	-1.0%	1.7%	-3.1%	2.7%	0.9%
PL	-1.8%	1.1%	-8.9%	-9.1%	-0.8%	0.4%
PT	-1.9%	-0.4%	0.7%	n.a.	3.6%	1.4%
RO	-1.9%	1.1%	-4.2%	14.4%	-4.4%	0.0%
SI	-1.0%	0.6%	-0.8%	n.a.	0.7%	1.2%
SK	-3.6%	-1.8%	-3.6%	-8.4%	1.1%	0.1%
FI	0.3%	-0.4%	0.7%	2.2%	-0.4%	0.8%
SE	-2.8%	-1.3%	2.2%	-2.3%	2.5%	0.5%
UK	-1.8%	-1.6%	2.1%	-1.6%	8.3%	1.9%
Source and extraction data	Eurostat 06/2019	Eurostat 06/2019	DG MOVE Pocketbook 2019	DG MOVE Pocketbook 2019	Eurostat 06/2019	Eurostat 06/2019

Source: Eurostat, DG MOVE, JRC, 2019.

[2] 2005-2017 average annual change of heat generation from CHP [%]: Due to changes in Eurostat methodology in energy balances, the nrg_ind_peh database table has been used instead of the Supply, transformation, consumption - heat - annual data [nrg_106a]. In the new database table, there are the following indicators to be selected: operator/trader (autoproducer or main activity), type of plant (electricity, chp, heat), energy balance (gross electricity production otr gross heat production), SIEC. In the columns E and F are included all the indicators used. The difference compared to the previous database table used is estimated around 1.1% in this case (on average for all MSs and over the period 2005-2016). To note that in the new database table there are not available data for gross heat production from electric boilers and heat pumps

[3] Due to changes in Eurostat methodology in energy balances, the Complete energy balances [nrg_bal_c] database table has been used instead of the Complete energy balances - annual data [nrg_110a]. Instead of: Transformation output - Conventional Thermal Power Stations (B_101101), Transformation output - Nuclear Power Stations (B_101102) the following indicators have been used: Transformation output - electricity and heat generation (TO_EHG). The difference compared to the previous database table used is estimated around 1% in this case (on average for all MSs and over the period 2005-2016)

[4] Symbol "+" is used if Member States decreased their primary and final energy consumption between 2005 to 2016 at a rate which is higher than the rate of decrease which would be needed in the period 2005 to 2020 to meet the 2020 primary and final energy consumption targets. Symbol "-" was used for the other cases.

More details are provided and discussed in the following sub-chapters, and further elaborations will be published with the annual JRC Report "Energy Consumption and Energy Efficiency Trends in the EU-28" that will be available in early 2020.

3.1 Primary energy consumption

Primary energy consumption (PEC) in the EU-28 in 2017 was 1562 Mtoe, i.e. almost 1% higher than in 2016. During the period 1990-2005 it increased by 9.7% and it decreased by 9.2% over the period 2005-2017. There was however consumption increase during 2010, when primary energy consumption increased by nearly 4% in one year. That was followed by another relevant and constant decrease in the period 2011-2014. After several years of decline, PEC started to increase again in 2015 and continued increasing in 2016 and 2017.

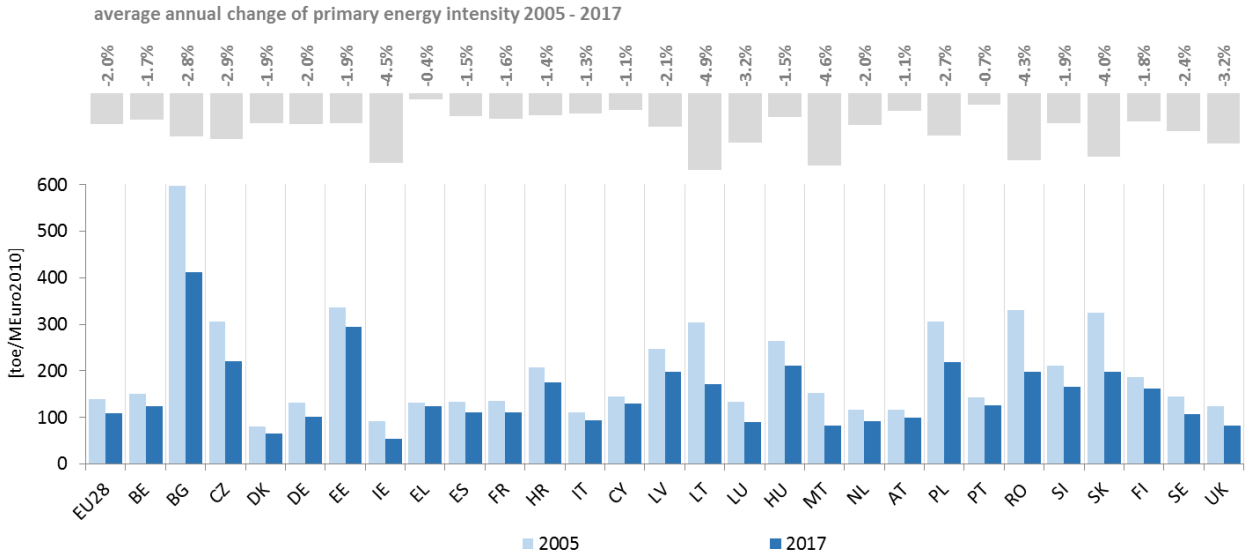
In 2017, only 4 Member States (Belgium, Estonia, Finland and Sweden) were associated with primary energy consumption of over 4 toe per capita. In Croatia, Malta and Romania consumptions was under 2 toe per capita, while the EU average stood at 3.1 toe per capita.

The biggest increase in primary energy consumption per capita between 2005 and 2017 was observed in Estonia and Latvia (around +15% each), followed by Poland (+13%), while the biggest decrease (under -20%) was observed in Luxemburg, the United Kingdom, Malta, Greece and Italy.

In many countries, primary energy consumption per capita increased between 1990 and 2005 and then decreased between 2005 and 2017. The biggest difference was seen in Ireland, Greece, Italy, Cyprus and Spain, where the consumption per capita increased over 25% between 1990 and 2005, then decreased by more than 10% in the period up until 2017. In other countries (Estonia, Latvia, Bulgaria and Poland), the picture was reversed: there was indeed a decrease in consumption per capita from 1990 to 2005, however this was followed by a further increase in the period up to 2017. The biggest difference in absolute terms was seen in Estonia, where the consumption per capita decreased by 38% between 1990 and 2005 and then rose by 15.5% in the period up to 2017.

As shown in Figure 4, the EU primary energy intensity (PEC divided by GDP) has dropped by an average rate of 2% per year in the period 2005-2017. On average, all Member States significantly reduced their primary energy intensity in this period. Bulgaria, Czech Republic, Ireland, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Romania, Slovakia, Sweden and the United Kingdom reduced their intensity on average by more than 2% per year. The largest annual average decrease of primary energy intensity over this period has been recorded in Lithuania, Malta and Ireland (between -4.5 and -4.9%/ year). In 2017 the largest drops compared to the previous year were observed in Estonia (-8.6%) and Ireland (-8.1%).

Figure 4. Primary energy intensity trends and average annual change in 2005-2017.



Source: Eurostat, JRC, 2019.

3.2 Final Energy consumption

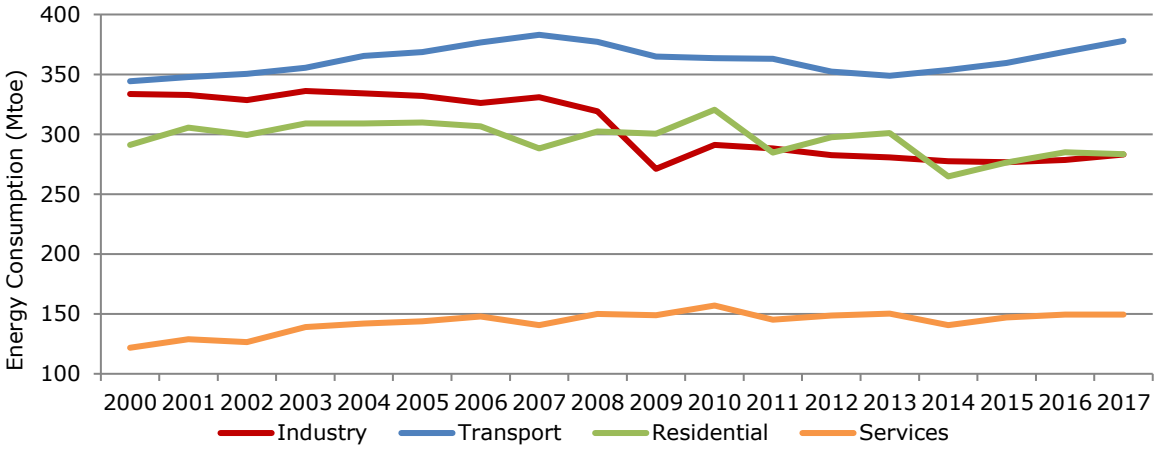
Final energy consumption (FEC) in EU-28 was 1123 Mtoe in 2017, slightly higher than in 2016 (+1.1%). Final energy consumption has increased slowly since 1994, reaching its highest value, 1195 Mtoe, in 2006. After that, the level remained relatively steady, until the first strong decrease, by 5.5% (with respect to the previous year), in 2009. The sharpest drop among the main energy sources used in final energy in 2009 was in the use of solid fuels, by 10.5%, followed by natural gas (6%), oil and petroleum products and electricity (5% for both of them) [5]. Overall, there was an increase in 2010, when the final energy consumption increased by 4%, though in 2011, there was a decrease of 4.5%, whilst final energy consumption remained almost at the same level in the period 2012-2013. In 2014, final energy consumption decreased by 4% compared to the previous year. In the period 2015-2017, final energy consumption registered positive annual growth rates under 2.5%. The final energy consumption in 2017 resulted slightly above the 2011 level.

Figure 5 shows final energy consumption values per sector from 2005 to 2017. It can be observed how final energy consumption values in industry and residential sector have oscillated more markedly throughout the different years, while energy consumption of the transport and services sector has changed more gradually.

The breakdown of final energy consumption in 2017 by sector shows that transport accounted for the largest share (33.7%), followed by residential and industry (25.3% and 25.2% respectively). The service sector accounted for 13.3% whilst the other sectors were responsible for the remaining 2.5%.

[5] Analysis of final energy consumption trends per fuel type has been done based on Eurostat's new methodology for energy balances data

Figure 5. Final energy consumption dynamics through main sectors in the EU-28, 2000-2017.



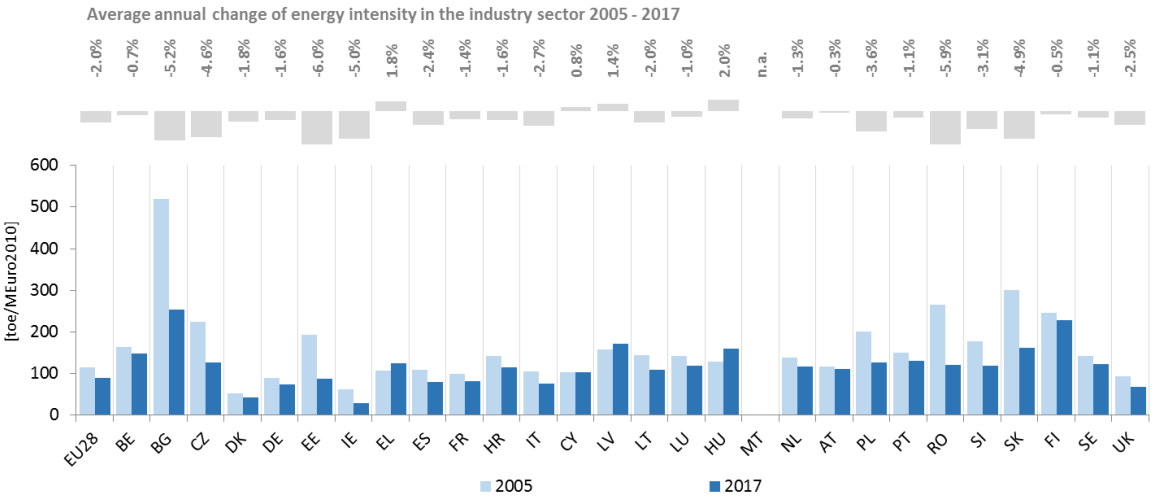
Source: Eurostat, JRC, 2019.

3.2.1 Industry

The previously mentioned final energy consumption decrease of 2009 was sharpest in industry (-15%), which was partially compensated in 2010 (+7%). After the decrease in the period 2011-2015 (-1% on average), the final energy consumption slightly increased in 2016 and in 2017 (+0.67% and +0.67% respectively compared to the previous years).

In terms of industry final energy intensity of industry sector (FEC divided by GVA[6]) (**Figure 6**), in 2017 there is still a significant difference between the most energy intensive Member State, Bulgaria (253 toe/M€), and the least energy intensive one: Ireland (29.5 toe/M€). Most Member States however decreased energy intensity in industry in 2017 compared to 2005, the exceptions being Greece, Hungary, and Latvia.

Figure 6. Final energy intensity trends in industry and average annual change in 2005-2017.



Source: Eurostat, JRC, 2019.

3.2.2 Residential

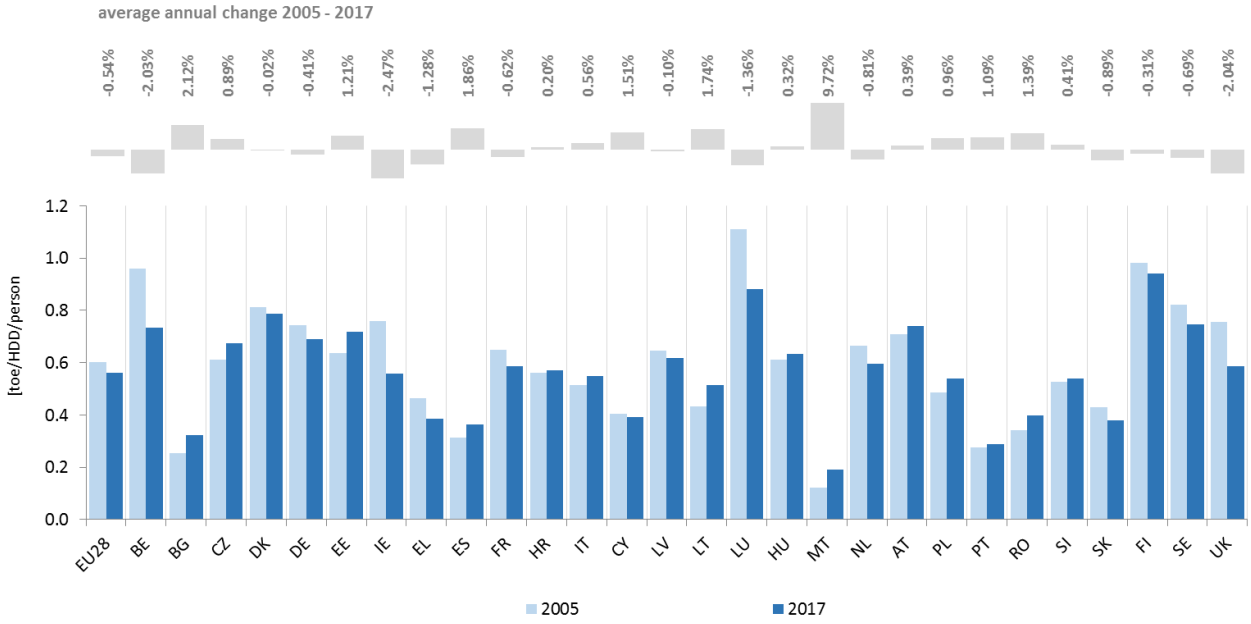
The final energy consumption of the EU28 residential sector decreased slightly in 2009, increased by nearly 7% in 2010, and decreased substantially in 2011 (-11%). In the period 2011-2013 a small recovery was registered (almost +6%), while in 2014 another significant decrease was recorded (-12%). 2015 data show an increase of 4%, the data for 2016 show an increase of 3% compared to the previous year, while the last data for 2017 show a slight reduction by 0.5%. Residential final energy consumption remains abundantly below the figure of 2005 (283.5 Mtoe vs 310 Mtoe, representing a decrease of -8.5%). This might reflect the efficiency improvements occurred in the last decade, but also the influence of the annual climatic variations on this indicator. The reduction in the HDD normalised final energy consumption[7] over the period 2005-2017 is -3.6%.

Taking also population into account, it can be seen that EU28 decreased its final energy consumption per capita on annual average by 0.5% (see **Figure 7**). The biggest improvements (under -2%) are in Ireland, United Kingdom and Belgium.

[6] Gross Value Added

[7] For this calculation the average heating degree days of the reference period 2005-2017 are taken into account.

Figure 7. Climate-normalised residential final energy consumption per capita and average annual change in 2005-2017.



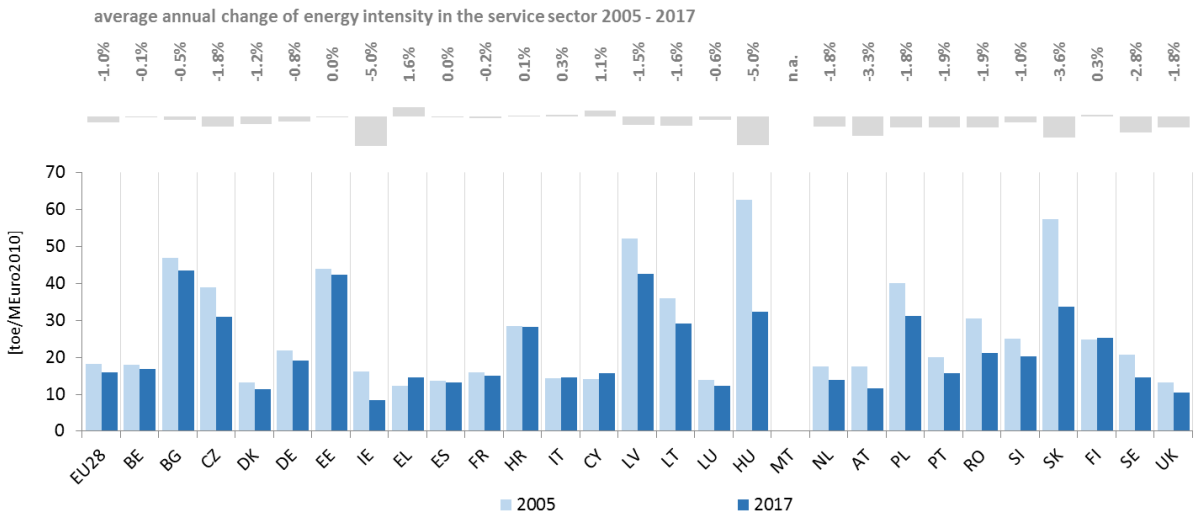
Source: Eurostat, JRC, 2018.

3.2.3 Services

Similarly to residential, the FEC of the EU28 service sector decreased in 2009, increased by 5.4% in 2010, and then decreased again by 7.5%. In the period 2011-2013 a small increase was registered (almost +3.5%), while in 2014 another decrease was recorded (-6%). Data of 2015 and 2016 show increases of 4.5% and 1.5% respectively, while last data for 2017 show a very slight decrease by –0.02%.

As shown in **Figure 8**, EU28 has improved the energy intensity of its service sector (FEC divided by GVA[8]) annually on average by 1.0 % over the period 2005-2017. The highest improvements (between -5% and – 3.3%) happened in Ireland, Hungary, Austria and Slovakia, in this period.

Figure 8. Final energy intensity in the services sector and average annual change in 2005-2017.



Source: Eurostat, JRC, 2019.

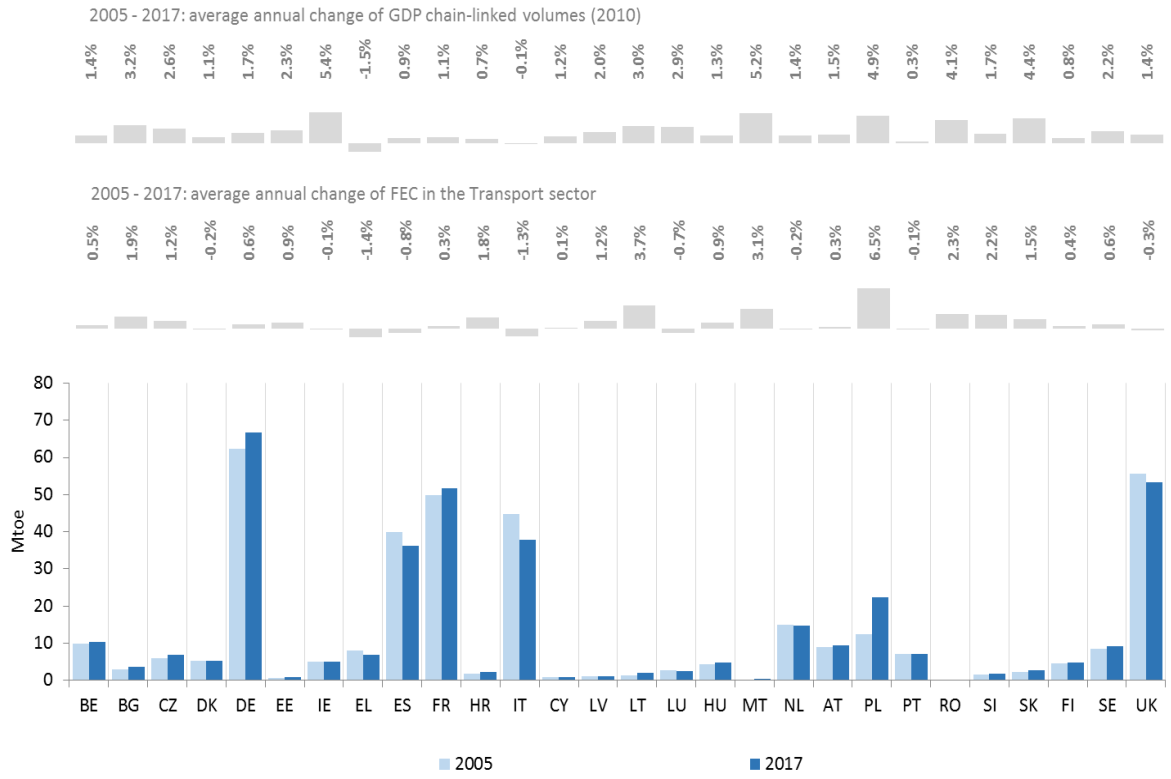
[8] Gross Value Added

3.2.4 Transport

In the last year a slight increase in the FEC of the transport sector has been registered (+2.5%). Transport FEC increased from 369 Mtoe in 2005 to 378 Mtoe in 2017 (on average the annual decrease was 0.5% in the period 2005-2017).

Comparison between Member States should be undertaken with caution because final energy consumption is based on the fuels sold rather than on the fuel used on the territory of a country. Therefore, factors other than energy efficiency come into play (e.g. the degree to which a given Member State is a 'transit country' for road transport or a hub for aviation). As shown in **Figure 9**, 19 Member States increased their consumption in this sector on average in 2005-2017. The rest of the countries managed to slightly decrease their consumption. With a parallel increase in GDP or passenger/freight transport activity, a decrease in energy consumption could be a sign of increased energy efficiency. This is the case of 7 countries (Denmark, Ireland, Spain, Italy, Luxembourg, Portugal and the UK).

Figure 9. Final energy consumption in the transport sector and average annual change in 2005-2017.



Source: Eurostat, JRC, 2019.

4 Evolution in the short-term

Despite the positive trend over the period 2005-2017, in 2017 a general increase of energy consumption compared to the previous year was observed. **Table 6** shows the short-term trend of the energy consumption in 2017 with respect to 2016. A colour-code system was used to define these trends: red for an increase of at least 1% with respect to 2016, green for a decrease of at least 1% and light pink for stable trend (a change within the range of ±1%). For comparability reasons, the data used to assess these trends are derived from EUROSTAT. It can be noted that this year only Belgium has experienced a reduction in total final energy consumption and all countries except Belgium and the United Kingdom have observed at least one increasing trend in one of the economic sectors reported in Table 6. 18 Member States have experienced increases in total final energy consumption while 9 Member States maintain their final energy consumption stable. The largest increase was observed in Malta and Slovakia (+7% both) and Poland (+6%).

Only 4 Member States recorded instead a reduction in primary energy consumption (Estonia, Ireland, Finland, and United Kingdom). The largest increases are in Malta (+14%), Romania (+6%) and Spain (+5%).

Table 6. Trends in consumption in key sectors at national level in the period 2016-2017.

MS	Primary Energy	Final Energy				
		Total	Industry	Transport	Households	Services
BE	→	↘	↘	→	↘	↘
BG	↗	↗	↗	↗	↗	↗
CZ	→	↗	↗	↗	↗	↗
DK	↗	↗	↗	↗	↘	↗
DE	→	→	→	↗	→	↗
EE	↘	↗	→	↗	↗	↘
IE	↘	↗	↗	↗	↘	↗
EL	↗	→	→	→	↗	↘
ES	↗	↗	↗	↗	↗	↘
FR	→	→	→	→	↘	↗
HR	↗	↗	↗	↗	→	↗
IT	→	→	↘	↘	↗	↗
CY	↗	↗	↗	↗	↗	↗
LV	↗	↗	↗	↗	↗	↗
LT	↗	↗	↗	↗	↗	↗
LU	↗	↗	↘	↗	→	↗
HU	↗	↗	↗	↗	↗	↘
MT	↗	↗	↗	↗	↗	↘
NL	→	→	↗	↗	↘	↗
AT	↗	↗	↗	↗	↗	↗
PL	↗	↗	↗	↗	→	↘
PT	↗	↗	↗	↗	↘	→
RO	↗	↗	↗	↗	↗	↗
SI	↗	→	↗	↘	↘	↘
SK	↗	↗	↗	↗	↗	↗
FI	↘	→	↗	↗	↘	↗
SE	→	→	→	↗	→	↘
UK	↘	→	→	→	↘	↘
EU	→	↗	↗	↗	→	→

Source: Eurostat, JRC, 2019.

The sector with the most significant final energy consumption growing trend is noted as the transport sector with a 2.5% increase at the EU level. Only Italy and Slovenia reported a drop in the final energy consumption of the transport sector. A 16% increase was noted in Poland, followed by 13% in Slovakia, 8% in Malta and Croatia.

Energy consumption in the industry sector experienced the second largest growth after the transport sector, with the EU average increase of 1.7% in 2017 compared to 2016. All countries experienced a growth or maintain stable levels of industry energy consumption except Belgium, Italy and Luxemburg that registered a drop. The most significant growth rates are observed in Malta (+29%), Hungary (+9%), followed by Croatia, Poland and Lithuania (+8%).

Services and residential sectors have maintain stable energy consumption levels (reduced slightly by -0.02% and -0.5% respectively at EU level) with 9 countries reporting a decrease of the final consumption of residential sector while 10 countries reporting a decrease of final consumption of services sector. The highest growths were observed in Malta (+9%), Latvia (+5%) and Romania and Slovakia (+4%) for households and Luxemburg (around +14%), a Slovakia (+9%) and Lithuania and Croatia (around 5%) for services.

When residential energy consumption is corrected for climate variations, a worsening is observed for 10 Member States while when service energy consumption is corrected for climate variations, a worsening is observed for 12 Member States. In Belgium, Denmark, France, Ireland, the Netherlands , Portugal and the United Kingdom, the variation over the 2016-2017 period goes from negative (without climatic correction) to positive or stable (with climatic correction) for residential sector, while in Estonia, Spain and the United Kingdom the variation goes from negative to positive or stable for service sector.

As requested by Annex XIV of EED, Member States must analyse sectors where energy consumption remains stable or is growing year by year, and provide possible explanations for that. This has been done by almost all countries, but often without the support of in-depth analyses. The reasons manly indicated for growing or stable consumptions are summarised in **Table 7** and **Annex 2** shows all the explanations provided in the Annual Reports 2019.

Table 7. Main reasons provided by Member States (sorted from high to low recurrences) to justify growing or stable final energy consumptions over the period 2016-2017.

Sector	Reasons
Industry	Increase of value added. Economic growth. Increase of production.
Transport	Increase of transport of passengers. Increase of transport of goods. Economic growth. Increase of passenger cars
Residential	Increase of the population or the number of households. Increase of the disposable income of households. Worsening of winter climatic conditions. Economic growth.
Services	Economic growth. Increase of value added. Increase of employment. Worsening of winter climatic conditions.

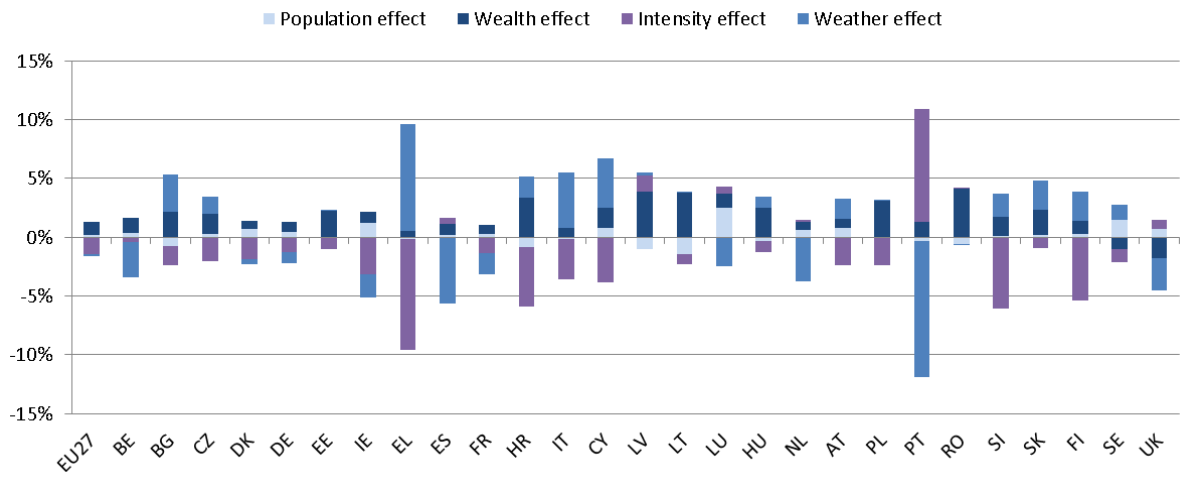
Source: AR2019, JRC, 2020.

To contextualise the explanations provided by Member States, the JRC carried out index decomposition analysis, with the aim to identify and quantify possible driving factors of and their contributions to the latest energy consumption trends in the EU (Economidou, 2017, Economidou and Roman-Collado, 2019).

Figure 10 provides a breakdown of the additive decomposition results in the residential sector in all Member States in the period 2016-2017, expressed as share of 2016 consumption levels. At the EU level, the drop of energy consumption in 2017 was mainly caused by intensity gains and warmer winter conditions with respect to 2016. The combined impact of these effects offset both the overall positive population and wealth effects at EU level. While trends vary from country to country, the MS results also suggest that intensity and weather effects were two important factors restricting energy consumption growth in many countries. Intensity gains drove down consumption in all Member States except Spain, Latvia, Luxembourg, the Netherlands and Portugal. Warmer winter conditions in 2017 with respect to 2016 exerted a limiting force on consumption in 10 Member States (Belgium, Denmark, Germany, Ireland, Spain, France, Luxembourg, the Netherlands, Portugal and Romania).

While the population effect had a milder impact compared to the weather effect, it also had a limiting role in 10 countries (Bulgaria, Estonia, Greece, Croatia, Italy, Latvia, Lithuania, Hungary, Portugal, and Romania). The wealth effects linked to growth of floor area and of disposable income of households exerted an opposite force in most countries; that is, it drove up consumption. The only exception is Sweden where the wealth effect is negative due to a small drop in the total residential floor area in 2017 with respect to 2016.

Figure 10. Contribution of different effects on the variation of the residential FEC, in the countries where increased or stable consumption was observed over the period 2016-2017.



Source: JRC, 2020.

5 Progress towards implementation of EED provisions

5.1 Overview of policy updates in year 2018

In compliance with the general framework for annual reports Annex XIV Part 1, Member States were required to report updates on major legislative and non-legislative measures implemented in the previous year which contribute towards the overall national energy efficiency targets for 2020.

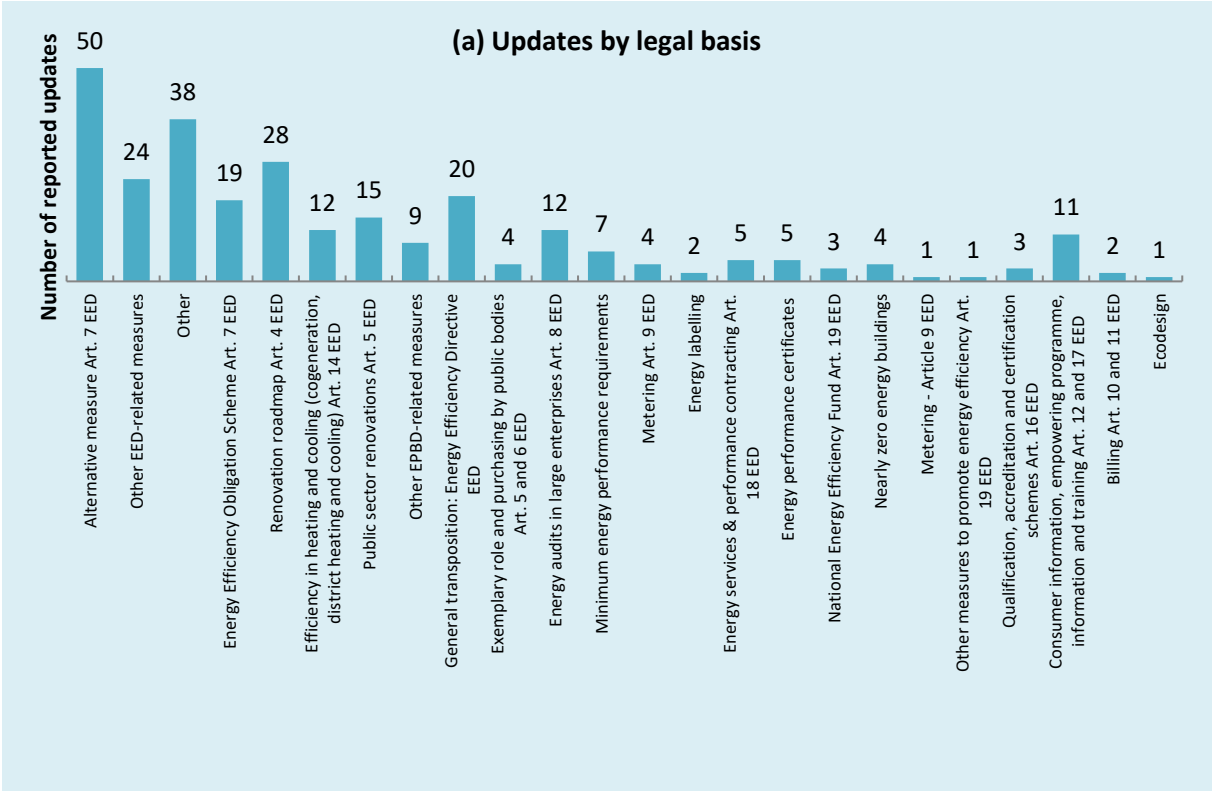
In 2019, all the Member States except Sweden and Denmark[9] communicated their updates in the Annual Reports.

In total 280 updates were reported, i.e. 94 less than 2018 (374 updates in 2018 Annual Reports[10]). As shown in **Figure 11**, the majority of the AR2019 updates concerned measures claimed under Alternative measures (Article 7), under other not-specified legal basis and under the Renovation Roadmap (Article 4).

In terms of policy types, the vast majority of policies were "Regulations, supporting legal & other legislative measures" (40.0%) and "Funds, financial & fiscal measures" (34.3%). These were followed by updates in "Information, knowledge & advice" (7.9%), "Market-based instruments (e.g. EEOS)" and "Plans & Strategies" (6.1% both of them), "Competition, pilot & demonstration projects" (3.2%) and "Other" and "Voluntary Agreements" (1.4% and 1.1% respectively). **Figure 12** provides more details.

As shown in **Figure 13**, the major part of the measure updates (around 38.6%) concerned adoption of new measures, conclusion of agreements, publication of legislations, and commencement or enforcement of measures and programmes. Amendments, implementation or design changes and extension of on-going measures represented around one quarter of all updates (around 27.1%).

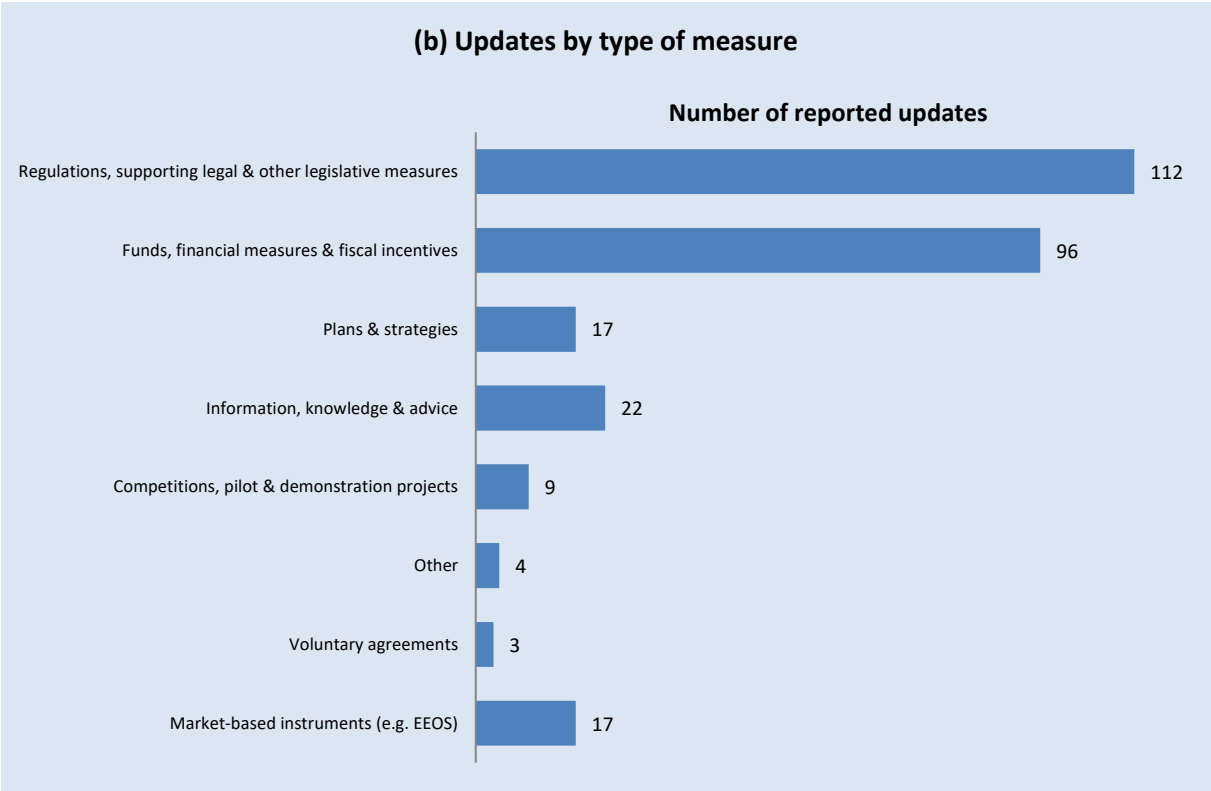
Figure 11. Summary of policy updates reported in Annual Reports 2019 by type of legal basis.



Source: AR2019, JRC, 2020.

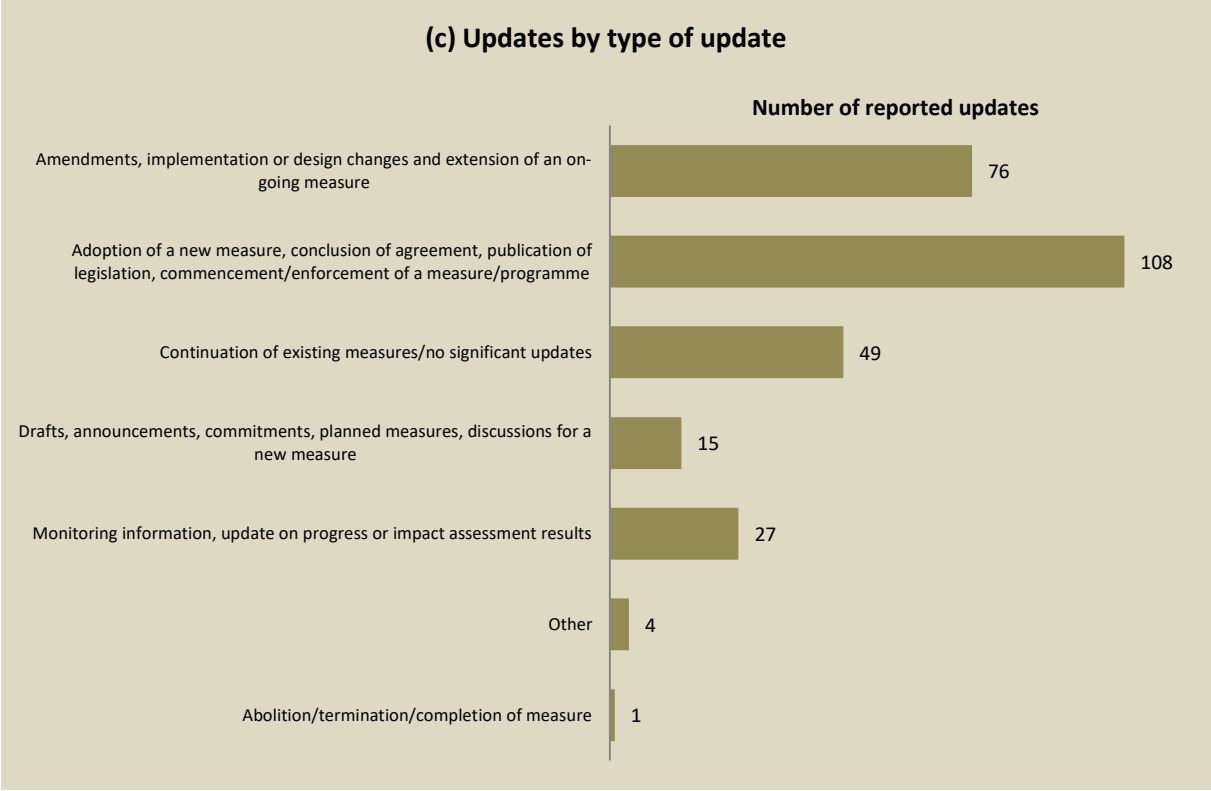
[9] No data are available in the Annual Report of Sweden and Denmark in relation to updates on legislative and non-legislative measures.
[10] In 2018 the updates of only 1 Member State were missing

Figure 12. Summary of policy updates reported in Annual Reports 2019 by type of measure.



Source: AR2019, JRC, 2020.

Figure 13. Summary of policy updates reported in Annual Reports 2019 by type of update.



Source: AR2019, JRC, 2020.

5.2 Progress towards Article 5 in 2018

In accordance with Article 5(1) of Directive 2012/27/EU, Member States were required to ensure that, as from 1 January 2014, 3% of the total floor area of heated and/or cooled buildings owned and occupied by their central government which does not meet minimum energy requirements is renovated each year, to meet at least the minimum energy performance requirements (MEPS) that has been set in application of Article 4 of Directive 2010/31/EU. Alternatively, Member States may opt for an alternative approach (Article 5(6)), and achieve by 2020, energy savings which are equivalent or greater than those which would be achieved through the application of the provisions of Article 5(1) in the same building stock.

A summary of the latest progress made by Member States in connection with Article 5 are presented in **Table 8** (default approach) and **Table 9** (alternative approach). This is based on the latest data[11] reported by Member States on the central government building stock and the obligations calculated by Member States to comply with the Article 5 provisions in terms of annual floor area to be renovated or annual energy savings to be reached. The actual progress made in 2018 (in terms of renovated floor area or energy savings) is currently under review. Moreover, the fifth column displays the actual obligation achievement for the year 2018 (if available), which is expressed as the:

- ratio of renovated floor area in 2018 to the respective annual renovation obligation for countries opting for the default approach (Article 5(1));
- ratio of achieved annual energy savings in 2018 compared to the annual energy saving obligation for countries opting for the alternative approach (Article 5(6)).

The last column reports (when provided data allow to calculate this values):

- ratio of the total renovated floor area over the period 2014-2018 and the total renovation requirements over the same period for Member States opting for the default approach (Article 5(1));
- ratio of total savings generated in 2014-2018 and the total savings requirement over the same period for Member States opting for the alternative approach (Article 5(6)).

The following colour-code system was used to depict the level of obligation achievement: green circles indicate countries which fully reached or exceeded their obligation in 2018, while the yellow and red circles show countries which fell short of their 2018 obligation by up to 0-50% and 50-99%, respectively. The ratios were calculated based only on information declared by Member States in their Annual Reports 2019. Table cells coloured in yellow refer to data that Member States have provided to the European Commission in documents other than the Annual Reports. Table cells coloured in green include instead values that have been calculated by the JRC based on these additional data.

[11] Where an updated target figure was not made available by Member States, we considered the value provided in previous annual reports.

Table 8. Implementation status of Article 5 of Member States which chosen the default approach (Art. 5(1)), based on the reports of the Member States [12] [13] (data currently under review)

MS	Central government buildings with floor area > 250 m2 in		Article 5. annual requirement	Article 5 progress in 2018				
	All [m2]	Non-compliant with MEPS [m2]	Floor area renovation obligation [m2]	Renovated floor area [m2]	Annual obligation achieved in 2019 in terms of floor area [%]	Sum of savings in 2014-2018	Total renovated floor area over the period 2014-2018	Total obligation achieved in 2014-2018 in terms of floor area [%]
BG	2,542,699	1,849,081	64,394	139,066	216.0%	n.a.	n.a.	n.a.
EE	1,396,696	920,134	23,474.75	32,237.000	137.3%	n.a.	n.a.	n.a.
EL	212,725 (2018)	200,725 (2018)	6,021.75	0	0.0%	0.15	n.a.	n.a.
ES	11,190,055	9,330,073	278.509	212.571	76.3%	n.a.	1.45	99.7%
HU	n.a.	413,071.6 (2018)	12,392	4,056	32.7%	n.a.	33440	50.6%
IT	16121449 (2018)	14388614 (2018)	431,658	582,195	135%	n.a.	2679431	116.4%
LT	n.a.	2,307,411	69,897	22,502	32%	n.a.	326984	98.0%
LU	126253 (2018)	66,205	2,187	6,705	307%	0.08	18885	159.8%
LV	n.a.	1,865,090	57,313	29,917	52%	n.a.	398707	118.6%
RO	n.a.	n.a.	n.a.	n.a.	n.a.	3.52	n.a.	n.a.
SI	758,016	712,908	22,615	11,035	49%	0.21	n.a.	n.a.

Source: AR2016, AR2017, NEEAP2017, AR2018, AR2019 JRC, 2020.

[12] LT: 20246 m2 updated, 2256 withdrawn, LV: As reported in AR2019: In order to ensure that the amount of the eligible area is not carried over more than three years from the actual adoption of the building, Latvia will not count on 9 July 2018 the renovated area of 10 032.90 m 2 which was renovated and put into service in 2015. In order to ensure that the amount of the eligible area is not carried over more than three years from the actual adoption of the building, Latvia will not count on the renovation rate balance of 32 733.58 m 2 in the renovation rate of previous years, BG: The data for renovated floor area were provided in March 2019 by the owners of the buildings in response to an official inquiry by the SEDA of January 2018 . It's reported that "the cumulative energy savings expected to be achieved by 2020 amount to 119.35 GWh" LU: Inventory of 1.2.2018 is provided. ES: From the report: "Taking into account the 1.452.606 m2 of building floor area renovated in the period
2014-2018 the fulfillment is practically the 100% over the target of 1.457.075 m2. The small difference of 4.469 m2 can be balanced with an excess over the goal next years."

[13] Unless otherwise stated annual renovation obligation is calculated by multiplying the reported non-compliant with MEPS floor area of last year per 3%.

Table 9. Implementation status of Article 5 of Member States which chosen the alternative approach (Art. 5(6)), based on the reports of the Member States[14] [15] [16] [17] [18] (data currently under review)

MS	Central government buildings with floor area > 250 m2 in		Article 5. annual requirement	Article 5 progress in 2018				
	All [m2]	Non-compliant with MEPS [m2]	Annual energy savings obligation [ktoe]	Savings achieved [ktoe]	Annual obligation achieved in 2018 in terms of energy savings [%]	Sum of savings in 2014-2018	Total renovated floor area over the period 2014-2018	Annual obligation achieved in 2014-2018 in terms of energy savings [%]
AT	n.a.	n.a.	0.15	0.77	526.8%	3.13	n.a.	428.3%
BE	2473313 (2017)	636490 (2018)	0.11	-0.16 (2017)	n.a.	10.85 (2014-2017)	n.a.	2525%
CY	585,502 (2018)	582,282 (2018)	0.29	0.24	85.2%	1.35	n.a.	94.8%
CZ	2,400,537	1,492,709	0.49	0.23	47.3%	1.34	n.a.	54.3%
DE	n.a.	2,900,000	0.63	0.15	24%	3.28	n.a.	98.7%
DK	n.a	n.a	n.a	0.00	0%	n.a.	n.a.	n.a.
FI	884,000.00	n.a.	0.10	0.08	79.3%	1.22	n.a.	233.7%
FR	n.a.	22200000	35.55	115.2 (2017)	n.a.	488.392089 (2014-2017)	4818132 (2014-2017)	343%
HR	n.a	n.a	0.12	0.74	630.8%	3.96	n.a.	677.5%
IE	n.a.	335,175 (2018)	0.11	0.20	178.9%	1.09	n.a.	194.4%
MT	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
NL	618,5910 (31.12.2017)	n.a.	4.18	11.8 (2017)	n.a.	30.9 (2014-2017)	n.a.	185%
PL	n.a.	1,087,964	0.37	0.43	114%	2.23	n.a.	119.4%
PT	732,915 (2018)	82,284 (2018)	n.a.	0.17	n.a.	0.22	n.a.	n.a.
SE	3311358 (2014)	n.a.	0.25	10.94	n.a.	n.a.	n.a.	n.a.
SK	n.a.	n.a.	4.49	7.10	158%	26.31	n.a.	117.3%
UK	n.a.	n.a.	3.52	5.07	144%	38.01	n.a.	216.2%

Source: AR2016, AR2017, NEEAP2017, AR2018, AR2019 JRC, 2020.

Compared to the last year, a higher level of compliance with reporting obligations can be observed. In fact, only 5 Member States didn't provide the requested update regarding Article 5 progress in 2018, whilst 8 Member States did not comply with their reporting obligation in the previous year. Among these Belgium, the Netherlands, Romania and Malta didn't notify their achievements for the last two years[19].

As shown in **Table 8**, from the Member States with available reports that have chosen the default approach, there are 4 Member States that achieved their annual targets in terms of renovated floor area. These are Bulgaria, Estonia, Italy and Luxemburg. In addition, based on the provided data, other 4 countries have fulfilled their total targets for the period 2014-2018. These are Spain, Italy, Luxemburg and Latvia.

As displayed in **Table 9**, from the Member States that have implemented the alternative approach 6 Member States achieved their annual energy saving targets. These are the Austria, Ireland, Croatia, Poland, Slovakia, and the United Kingdom. At the same time, 7 countries have provided data allowing establishing that they have fulfilled their total targets for the period

[14] Unless otherwise stated in the annual reports and in other documents possibly provided by Member States, it has been assumed that the annual saving target is identical for all the years

[15] SE: Not clear if savings reported in AR2019 are new or total, FR: not clear if non-compliant with MEPS value refers to 2019

[16] DE: Energy savings and annual target for each year have been provided by the Member State. Required savings are calculated by JRC based on data related to energy savings and annual targets expressed in primary energy as provided by Germany.

[17] FI: Reported current savings in force probably correspond to the total annual savings. Difference of the current savings in force in 2018 minus the current savings in force in 2017 possibly correspond to the new savings achieved in 2018.

[18] BE, DK, DE, CY, HU, PL: primary energy savings
PT, SK, SI, SE, UK: not clear if savings are primary or final
CZ, FR, HR, LU, MT, NL, AT, FI, IE: final energy savings

[19] Belgium, Malta and the Netherlands have provided information for 2017 and not for 2018 on the 2019AR.
Romania and Greece provided information on energy savings under Article 5 and not on renovated floor area even if it has chosen the default approach.

2014-2018. These are Austria, Finland, Ireland, Croatia, Slovakia, Poland and UK while France, Belgium and Netherlands have fulfilled their total targets for the period 2014-2017.

In addition, it should be noted that 11 Member States updated within the AR2019 their figures for the floor area which is non-compliant with the minimal energy performance standards. These are France, Spain, Estonia, Germany, Germany, Ireland, Poland, Latvia, Luxembourg, Slovenia and Lithuania. Seven countries provided figures for the floor area which is non-compliant with the minimal energy performance standards for 2017(Greece, Hungary, Belgium, Cyprus, Italy, Ireland and Portugal). Three Countries notified a slightly larger non-compliant total floor area with respect to the previous year: Estonia[20] (+17.6%), Spain (+0.5%) and Lithuania (+0.02%).

5.3 Progress towards Article 7 in 2017

With regards to EED Article 7, a number of Member States notified updates on their Energy Efficiency Obligations Schemes (EEOSs)(Article 7(1)) and alternative policy measures (Article 7(9)) in their Annual Reports. It is important to note that the following analysis is based on unverified information reported by Member States. The Commission services are in the process of verifying the information submitted by the Member States and the presented figures may be subject to corrections if it is found that they are not in line with the methodology set by the EED.

Table 10 provides a summary of the latest Article 7 implementation status. It provides an overview on the approach used by each Member State (i.e. obligation scheme and/or alternative measures) and the total amount of cumulative savings required by the end of 2020 per each Member State. The actual progress made is presented in terms of:

A. savings achieved from new actions implemented in 2017;

B. savings achieved in 2017, from new actions implemented in 2017 and from actions implemented in 2014, 2015 and 2016 that continue delivering savings in 2017;

C. cumulative savings achieved over the period 2014-2017.

Where applicable the progress is also expressed as a ratio of savings achieved from new actions implemented in 2017 (A) and of the cumulative savings achieved over the period 2014-2017 (C) against the expected annual savings on the basis of a linear delivery. In addition the last column provides the share of cumulative savings (C) against the national cumulative savings requirement due by the end of 2020. As represented in **Figure 14**, the linear delivery (taken as reference) assumes that the new actions implemented every year (from 2014) achieve 1/28 of the total savings requirements to be achieved by the end of 2020.

The same colour-code system as above was used to highlight the level of the achievement in 2017: green indicates countries which fully reached or exceeded their expected savings for 2017, yellow denotes countries which fell short of their 2017 expected savings by up to 50% and red indicate countries which fell short by more than half.

[20] In EE Annual Report is reported that non-compliant with MEPS have been increased last year due to revision of the energy performance requirements. With old calculation principles this number would have been 731 381 m2 (-6.5% lower than this of the previous year).

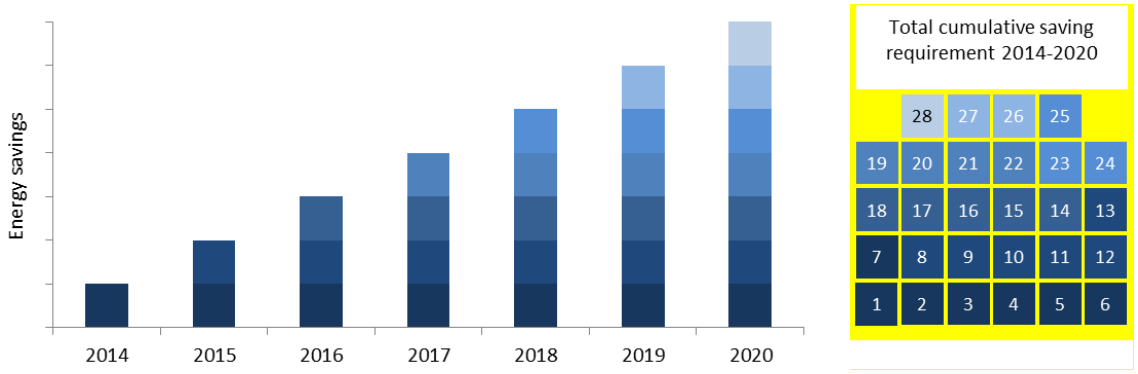
Table 10. Article 7 implementation status based on latest information available (reported values are in final energy). [21] [22] [23] [24] [25] [26] [27]

MS	Implementation		Total cumulative savings requirement in 2014-2020 under Article 7 [ktoe]	Progress made in 2017					
	Obligation schemes	Alternative measures		Savings achieved from new actions implemented in 2017 [ktoe]	Savings achieved from new actions implemented in 2017 against expected annual average savings on the basis of linear delivery [%]	Savings achieved in 2017, from new actions implemented in 2017 and from actions implemented in 2014, 2015 and 2016 that continue delivering savings in 2017 [ktoe]	Cumulative savings achieved over the period 2014-2017 [ktoe]	Cumulative savings achieved over the period 2014-2017 against expected average savings on the basis of linear delivery [%]	Share of savings achieved until 2017 against total cumulative savings requirement in 2014-2020 [%]
EU28			230486	10274	125%	32587	86034	105%	37%
BE		✓	6911	286	116%	1024	2691	109%	39%
BG	✓	P	1942	42	61%	144	323	47%	17%
CZ		✓	4882	167	96%	470	1004	58%	21%
DK	✓		3841	212	154%	872	2143	156%	56%
DE		✓	41989	2754	184%	5157	15214	101%	36%
EE		✓	610	92	421%	102	284	131%	47%
IE	✓	✓	2164	90	117%	379	942	122%	44%
EL	✓	✓	3333	321	269%	489	881	74%	26%
ES	✓	✓	15979	436	76%	1849	4428	78%	28%
FR	✓		31384	1281	114%	4120	11038	98%	35%
HR		✓	1296	9	20%	72	177	38%	14%
IT	✓	✓	25502	879	97%	3183	8172	90%	32%
CY	✓	✓	242	64	744%	69	78	91%	32%
LV	✓	✓	851	79	261%	114	305	100%	36%
LT		✓	1004	91	253%	180	470	131%	47%
LU	✓		515	10	56%	34	69	38%	13%
HU		✓	3680	122	93%	415	1156	88%	31%
MT	✓	✓	67	5	210%	11	31	129%	46%
NL		✓	11512	667	162%	2088	5502	134%	48%
AT	✓	✓	5200	332	179%	1071	2726	147%	52%
PL	✓		14818	1039	196%	2646	5914	112%	40%
PT	✓	✓	2532	29	32%	124	336	37%	13%
RO		✓	5817	n.a.	n.a.	177	768	37%	13%
SI	✓	✓	945	34	101%	134	314	93%	33%
SK		✓	2284	78	128%	369	969	119%	42%
FI		✓	4213	561	373%	1119	3276	218%	78%
SE		✓	9114	n.a.	n.a.	1702	n.a.	n.a.	n.a.
UK	✓	✓	27859	593	60%	4471	13500	136%	48%

Source: AR2016, AR2017, AR2018, AR2019, JRC, 2020.

[21] It is important to note that the table is subject to correction following the verification by the Commission services.
[22] UK: Total savings for 2014, 2015, 2016, 2017 and 2018 include savings generated by early actions. SE, RO: Not clear if savings included in the ARs are total or from new actions.
[23] LU, SK: Calculations are based in the assumption that savings don't decay.
[24] BG: In AR2019 it's reported that "In 2014-2017, Bulgaria achieved 48.4% of the total cumulative energy savings target for the period (1,008.4 ktoe).".
[25] BE, IE, EL, IT, CY, HU, MT, FI : Information provided by Member States in documents other than Annual Reports is included.
[26] EE, ES, AT: The energy savings reported in ARs of taxation measures have been adjusted to have a lifetime of 1 year.
[27] HR: Data from NEEAP 2017 are included

Figure 14. Example of linear delivery of the total cumulative savings requirement under Article 7.



At EU level half of the Member states have achieved their cumulated target over the period 2014-2017 (C)[28]. Good partial results achieved by Finland, Denmark and Austria are to be emphasised. On the other side, 5 Member States (Croatia, Luxembourg, Bulgaria, Portugal, Romania) seem to be far away from their savings requirements.

A variety of policy measures were used by Member States to generate the energy savings claimed under Article 7 in 2017. The breakdown of the savings achieved from new actions in 2014, 2015, 2016 and 2017 per type of policy measure is shown in **Figure 15**. Here the measures have been grouped into the following 6 categories:

- energy efficiency obligation schemes (EEOS);
- regulations;
- taxation;
- funds, fiscal and financial incentives;
- information, training and education;
- other measures.

The figure about the savings achieved from new actions implemented in 2017 (A) is not available for 2 Member States (Romania and Sweden) [29] and it is not possible to identify the policies' contributions to Slovakia and Bulgaria targets in the related AR2019. Of the remaining 22 ones[30] with available annual reports, 13 Member States either partially or fully generated their 2017 savings through the implementation of EEOS (EED Article 7(1)): Denmark, Ireland, Greece, Spain, France, Italy, Latvia, Luxemburg, Malta, Austria, Poland, Slovenia and UK. In absolute terms, the savings generated by the EEOSs represent almost the 34.9% of the Article 7 savings at the EU level.

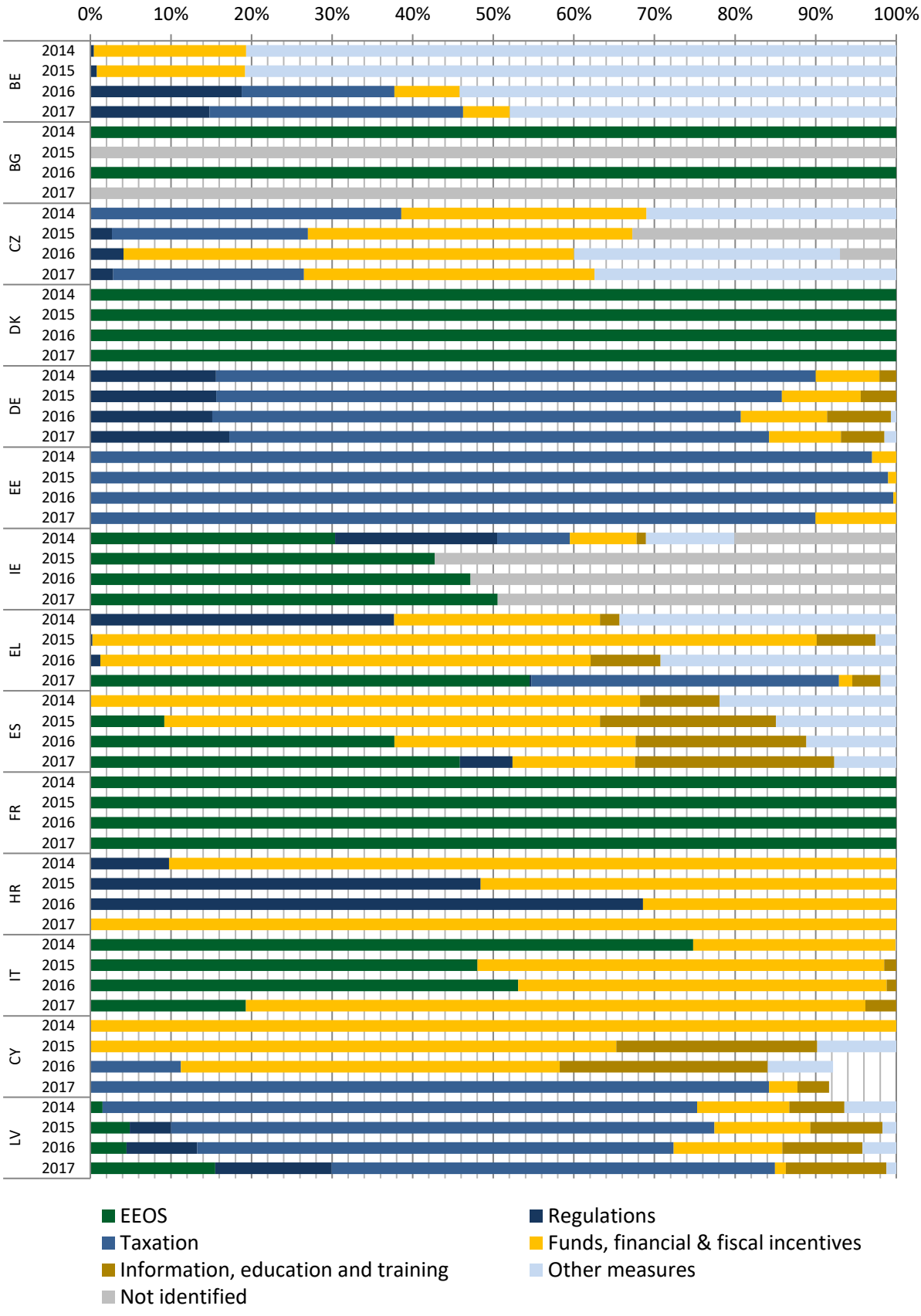
Looking at the current (not exhaustive) picture, savings through alternative measures (EED Article 7(9)) play a relevant role for generating the new energy savings under Article 7 in 2017. The measures falling under the category "Taxation" covered a substantial share (27.7%) of the total achieved savings in 2017 while "Funds, fiscal and financial incentives" measures provided the 14.7% of the savings. New regulatory measures were adopted by 11 Member States (Belgium, Czech Republic, Germany, Greece, Spain, Malta, Latvia, Hungary, Portugal, Finland and UK) generating 10.7% of the total savings reported for 2017. "Information, education and training" measures used by Germany, Greece, Spain, Italy, Latvia, Lithuania, Austria and Hungary generated 3.4% of the total saving achieved by new actions that were implemented in 2017. Instead, 6.9% was achieved through other measures, as voluntary agreements, public transport development programmes, etc. The remaining 1.7% could not be associated with any specific measure type.

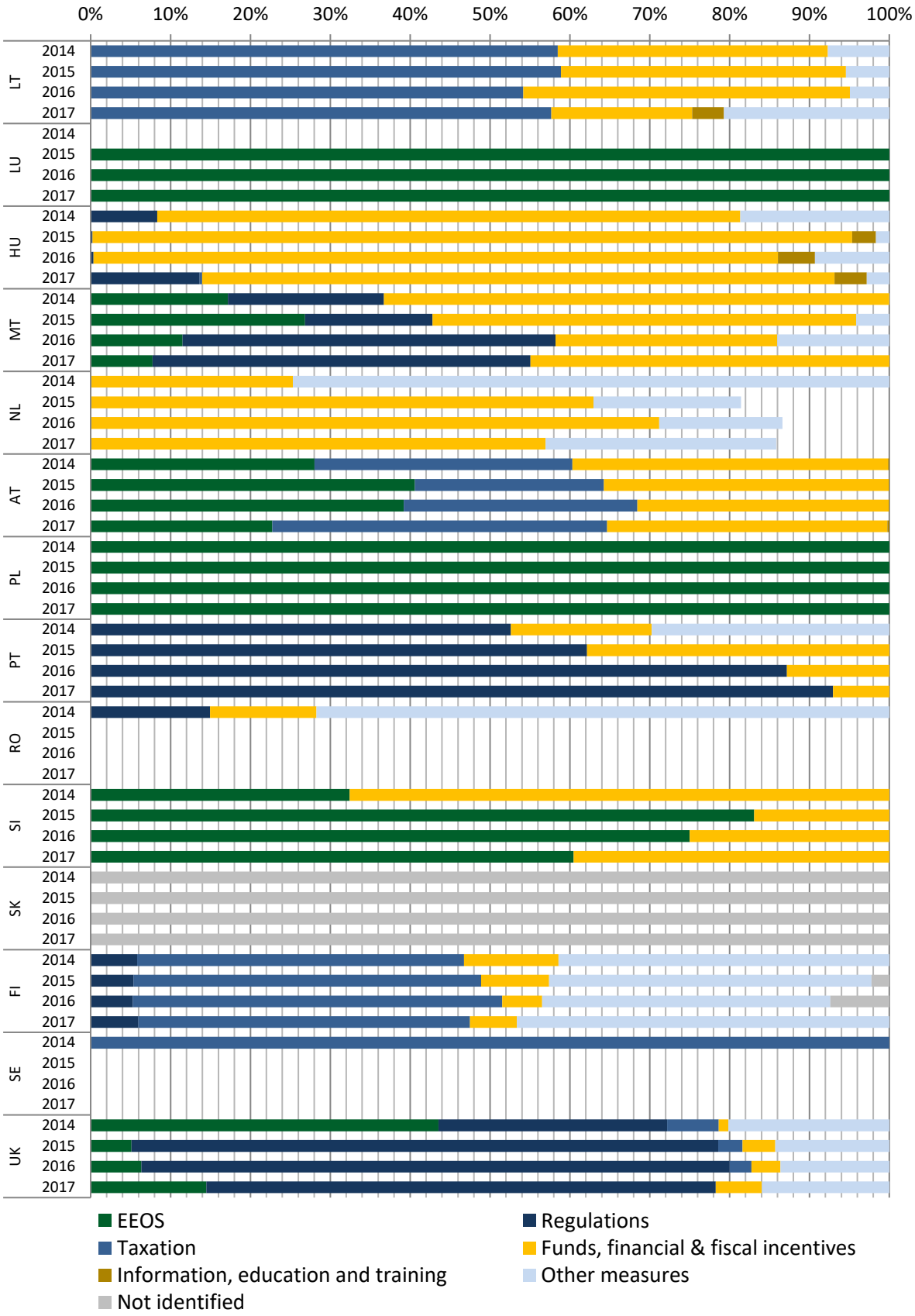
[28] Considering as reference an average annual saving rate equal to the total cumulative saving requirement divided by 28.

[29] Not clear if reported savings are new or total.

[30] Netherlands and Cyprus were excluded from the calculations detailed in this paragraph as the distribution of the totally generated energy savings over the different measures considered under Article 7 is provided in the related 2019AR without excluding energy savings double counting among different measures.

Figure 15. Share of energy savings achieved in 2014, 2015, 2016 and 2017 from new actions that were implemented in these years, by type of policy measure.





Source: AR2016, AR2017, AR2018, AR2019, DG ENERGY, JRC, 2020.

5.4 New measures under Articles 7 and 5

In an attempt to step up efforts towards the achievement of the 2020 targets, some EU Member States have included new policies and measures under Articles 5 and 7 in their AR2019. "New" measures in this context refer to measures which have not been reported in the previous year's Annual Report (i.e. AR2018). These new measures may include newly-implemented measures, but can also be on-going measures which have not contributed to the Article 5 or 7 targets before. In the Annual Reports of 2019, these correspond to new Article 7 measures implemented in 2017 and new Article 5 measures implemented in 2018.

As shown in Table 11, more Member States implemented new measures under Article 7 compared to Article 5: only Czech Republic listed new Measures under Article 5, while 12 Member States listed new measures under Article 7. The latter include Czech Republic, Germany, Greece, Spain, Italy, Cyprus, Latvia, Lithuania, Hungary, the Netherlands, Romania and the United Kingdom.

There are in total 68 new measures under Article 7 in 2019 Annual Reports. Of these, 12 (or 17.7%) were implemented by Hungary, 9 (13.2%) by Latvia, followed by Romania[31] (8 measures or 11.8%).

The savings generated by these measures varied from country to country. In case of Cyprus, 87.1% of total 2017 savings and 86.12% of the total cumulative savings expected by 2020 have been generated by new policies and measures listed in Annual Reports of 2019[32]. The measure that has generated the largest share of these savings is the "Taxation on fuels". In case of Latvia, 84.2% of the total savings generated in 2017 and 86.8% of the total cumulative savings expected by 2020 are associated with new measures. Among the new Latvian measures, "Energy Taxes" generated the largest share of these savings. For the remaining countries, the share of savings of new measures against the total savings of 2017 are significant in Lithuania (42.1% by consumer education, savings agreements, economic operators deployment, public transport infrastructure, buildings modernisation and replacement of heat production facilities), Greece (25% by fuel taxes), Hungary (15.9% by energy efficiency corporate tax benefit, public transport programmes, intelligent transport systems, municipalities measures, energy offices network, support programmes, e-mobility, energy efficiency innovation project support, energetic specialist engineer obligation, fossil energy use reduction by public institutions), and Romania[33] (energy efficiency in industry, energy audit and management, transport measures). In contrast, the corresponding shares are under 10% in Germany, Spain and Italy.

In summary, almost a third of the new measures under Article 7, fell under the category "Other measures" (transport sector measures, voluntary agreements etc.) (29.4%), followed by "Funds, financial & fiscal incentives" (32.4%), "Regulations" (20.6%), "Taxation" (8.8%), "Information, education and training" (5.9%) and EEOS (2.9%).

For Article 5, the new measure reported by Czech Republic regards the replacement of lighting systems in buildings. Together with other construction measures, it generated savings equal to 0.23 ktoe in 2018.

More information regarding the new policies and measures under Articles 5 and 7 can be found in Annex 3.

[31] Some new measures listed by Romania have been included in previous version of Annual Reports (i.e. Annual Report of 2017 but not in Annual Report of 2018).

[32] Double counting reduction of the total savings has not been counted in these calculations.

[33] No measures under Article 7 have been reported in AR2018.

Table 11. Overview of *new* measures in 2018 and 2017 under Articles 5 and 7, respectively ("new" measures are defined as measures which have not been reported in the previous year) [34]

	Article 5		Article 7		Information on new measures under Article 7
	No new measures in 2018	New measures in 2018	No new measures in 2017	New measures in 2017	
BE	X		X		
BG	X		X		
CZ		X		X	Operational programmes, fuel taxes, marketing bans for boilers: 11.6% of total savings in 2017
DK	X		X		
DE	X			X	Energy audits, heating system labelling: 3.8% of total savings in 2017
EE	X		X		
IE	X		X		
EL	X			X	Fuel taxes: 25.0% of total savings in 2017
ES	X			X	Building renovation plans, public transport, measures, voluntary agreements, central government buildings, traffic's environmental label: 5.3% of total savings in 2017
FR	X		X		
HR	X		X		Some measures are not mentioned in AR2018 but they are mentioned in NEEAP2017.
IT	X			X	Cohesion policy, information programmes: 8.0% of total savings in 2017
CY	X			X	Installation of photovoltaic systems, electricity taxes, fuel taxes, grant schemes, EEOS, incentives for NZEB: 87.1% [35]of total savings in 2017
LV	X			X	EEOS, energy audits, energy taxes, financial competitions, building regulations, education measures, municipalities measures, green bonds issue, vehicle inspections: 84.2% of total savings in 2017
LT	X			X	Consumer education, savings agreements, economic operators deployment, public transport infrastructure, buildings modernisation, replacement of heat production facilities: 42.1% of total savings in 2017
LU	X		X		
HU	X			X	Energy efficiency corporate tax benefit, public transport programmes, intelligent transport systems, municipalities measures, energy offices network, support programmes, e-mobility, energy efficiency innovation project support, energetic specialist engineer obligation, fossil energy use reduction by public institutions, improving the quality of engineering and engineering work in the field of energy efficiency: 15.9% of total savings in 2017
MT	X		X		
NL	X			X	Logistic sector measures, energy efficiency and renewable energy funds, experimentation under the Electricity Act, information requirement, energy savings agreements: these measures will produce additional savings until 2020
AT	X		X		
PL	X		X		
PT	X		X		
RO	X			X	Energy efficiency in industry, energy audit and management, transport measures: 100%of total savings in 2017 as no measures under Article 7 have been reported in AR2018. However some of these measures were included in AR2017.
SI	X		X		
SK	X		X		
FI	X		X		
SE	X		X		
UK	X			X	Re:Fit Cymru, Green Growth Wales, Warm Homes Programme, Boiler Plus, Streamlined Energy and Carbon Reporting Framework (SECR), Small Scale Renewables (FiT): 2.9% of total savings in 2017

Source: AR2019, JRC, 2020.

[34] For some Member States there are new measures not included in previous Annual Reports, however it seems that they have delivered savings also in the past years.

[35] Double counting reduction of the total savings has not been counted in these calculations.

6 Conclusions

In light of the latest 2017 energy consumption data, the EU energy consumption trends can now be viewed alongside the overall targets. In 2017, both primary and final energy consumption levels exceeded the theoretical linear target path 2005-2020, as a result of the reversal of the downward consumption trend in 2015 and the further increase in consumption registered in 2016 and 2017. As explained by the Member States in their latest Annual Reports, several contextual factors justify this 2017 increasing trend: the economic growth and the increase of value added, the increase of the population and number of households, the increase of passengers and goods transport, the climatic conditions (colder winter & warmer summer), are some of the reported reasons for observed energy consumption increases. Increase of adjusted disposable income and increase of population and households primarily affected the residential sector, while economic growth and increase of value added had an impact on industry and services. The increase in transport of passengers and goods influenced instead the transport sector consumption negatively.

While the aforementioned factors are generally expected to drive up energy demand, continued commitment can ensure that the EU could reach the 2020 targets. To this end, some Member States should evaluate the latest trends and take actions with a view to introducing new policy measures or strengthening existing ones in the coming years.

In this context, the EED energy savings obligation related to Article 5 ("Exemplary role of public bodies' buildings") and Article 7 ("Energy efficiency obligation schemes") of the Energy Efficiency Directive are crucial. The first one has an important symbolic value, since it demonstrates public commitment on government properties and therefore lead-by-example approach. The second one is associated with a significant energy saving potential and represents one of the most important articles of the Directive in terms of measurable/verifiable energy savings.

The assessment of the Annual Reports submitted by Member States in 2019 has confirmed good progress with regards to the implementation of Article 7 and of Article 5. However, a lack of information provided in the Annual Reports is observed which does not enable to have a complete picture at EU level. Beyond the various information gaps, our analysis suggests that achieving the Article 5 requirements may be challenging and accelerated efforts are crucial in ensuring that sufficient progress is made in the coming years. At this point, it's important to highlight that some Member States have included new measures in their 2019 Annual Reports (not included in 2019 Annual Reports) in an attempt to accelerate the efforts to achieve the 2020 targets.

On the update process, it is important to emphasize the importance of using a common reporting format. The template introduced in 2015 and fine-tuned in 2016/2017 allowed Member States to harmonise the collection of main information and well-defined indicators, avoiding serious misinterpretations and subsequent need of requests for clarification. This aspect should be taken into account in the future reporting framework related to the requirements of the new Energy Union Governance.

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List of abbreviations and definitions

AR	Annual Report
CHPP	Combined Heat and Power Plants
EE	Energy Efficiency
EED	Energy Efficiency Directive
EPBD	Energy Performance of Buildings Directive
FEC	Final Energy Consumption
GDP	Gross Domestic Product
GVA	Gross Value Added
HDD	Heating Degree Days
MS	Member State
NEEAP	National Energy Efficiency Action Plan
PEC	Primary Energy Consumption
thPG	Thermal Power Generation
TSSEED	Technical and Scientific Support to the implementation of the EED and the EPBD, as well as contribution to the development of concepts for the strengthening of the overall EU legislative framework for energy saving

List of figures

List of tables

Annex 1: EUROSTAT indicators

The table below lists the EUROSTAT indicators (and related information) associated to the indicators required by Annex XIV of the EED.

Annual Report Indicator	EUROSTAT Indicator(s)	EUROSTAT database table	EUROSTAT Code	Field/ product(s)	Unit(s)	Period (EU28)
(i) primary energy consumption	Primary Energy Consumption	Simplified energy balances - annual data [nrg_bal_s]	PEC2020-2030	-	Mtoe	2005-2017
(ii) total final energy consumption	Final Energy Consumption	Energy-Balances-April-2019-edition	B_101700	All products	ktoe	2005-2017
(iii) final energy consumption - industry	Final Energy Consumption - Industry	Energy-Balances-April-2019-edition	B_101800	All products	ktoe	2005-2017
(iii) final energy consumption - transport	Final Energy Consumption - Transport	Energy-Balances-April-2019-edition	B_101900	All products	ktoe	2005-2017
final energy consumption in pipeline transport	Consumption in Pipeline transport	Energy-Balances-April-2019-edition	B_101945	All products	ktoe	2005-2017
(iii) final energy consumption - households	Residential	Energy-Balances-April-2019-edition	B_102010	All products	ktoe	2005-2017
(iii) final energy consumption - services	Services	Energy-Balances-April-2019-edition	B_102035	All products	ktoe	2005-2017
final energy consumption - agriculture	Agriculture/Forestry	Energy-Balances-April-2019-edition	B_102030	All products	ktoe	2005-2017
final energy consumption – other sectors	Other sectors	Energy-Balances-April-2019-edition	B_102000	All products	ktoe	2005-2017
(iv) gross value added - industry	- Industry (except construction) - Construction	Gross value added and income by A*10 industry breakdowns [nama_10_a10]	- B-E - F	Value added, gross	Million euro, chain-linked volumes, reference year 2010 (at 2010 exchange rates)	2005-2017
(iv) gross value added - services	- Wholesale and retail trade, transport, accomodation and food service activities - Information and communication - Financial and insurance activities - Real estate activities - Professional, scientific and technical activities; administrative and support service activities - Public administration, defence, education, human health and social work activities - Arts, entertainment and recreation; other service activities; activities of household and extra-territorial organizations and bodies	Gross value added and income by A*10 industry breakdowns [nama_10_a10]	- G-I - J - K - L - M_N - O-Q - R-U	Value added, gross	Million euro, chain-linked volumes, reference year 2010 (at 2010 exchange rates)	2005-2017
(v) disposable income for households	Gross disposable income	Non-financial transactions [nasa_nf_tr]	- S14 (if available) or S14_S15	Households (if available) or Households; non-profit institutions serving households	Million euro (current prices)	2005 - 2017
(vi) gross domestic product (GDP)	Gross domestic product at market prices	GDP and main components - volumes [nama_10_gdp]	B1GQ - Gross domestic product at market prices	-	Million euro, chain-linked volumes, reference year 2010(at 2010 exchange rates)	2005 - 2018

Annual Report Indicator	EUROSTAT Indicator(s)	EUROSTAT database table	EUROSTAT Code	Field/ product(s)	Unit(s)	Period (EU28)
(vii) electricity generation from thPG[36]	- Gross electricity generation Main activity electricity only - Nuclear - Gross electricity generation Main activity CHP plants - Nuclear - Gross electricity generation Autoproducer electricity only - Nuclear - Gross electricity generation Autoproducer CHP plants - Nuclear - Gross electricity generation Main activity electricity only - Geothermal - Gross electricity generation Main activity electricity only - Combustible Fuels - Gross electricity generation Main activity electricity only - Other Sources - Gross electricity generation Main activity CHP plants - Geothermal - Gross electricity generation Main activity CHP plants - Combustible Fuels - Gross electricity generation Main activity CHP plants - Other Sources - Gross electricity generation Main activity electricity only - Solar Thermal - Gross electricity generation Autoproducer electricity only - Geothermal - Gross electricity generation Autoproducer electricity only - Combustible Fuels - Gross electricity generation Autoproducer electricity only - Heat from Chemical Sources - Gross electricity generation Autoproducer electricity only - Other Sources - Gross electricity generation Autoproducer CHP plants - Geothermal - Gross electricity generation Autoproducer CHP plants - Combustible Fuels - Gross electricity generation Autoproducer CHP plants - Heat from Chemical Sources - Gross electricity generation Autoproducer CHP plants - Other Sources - Gross electricity generation Autoproducer electricity only - Solar Thermal	Gross and net production of electricity and derived heat by type of plant and operator [nrg_ind_peh]	-GEP	- PRR_MAIN - ELC - N9000 - PRR_MAIN - CHP - N9000 - PRR_AUTO - ELC - N9000 - PRR_AUTO - CHP - N9000 - PRR_MAIN - ELC - RA200 - PRR_MAIN - ELC - CF - PRR_MAIN - ELC - X9900 - PRR_MAIN - CHP - RA200 - PRR_MAIN - CHP - CF - PRR_MAIN - CHP - X9900 - PRR_MAIN - ELC - RA400 - PRR_AUTO - ELC - RA200 - PRR_AUTO - ELC - CF - PRR_AUTO - ELC - X9900H - PRR_AUTO - ELC - X9900 - PRR_AUTO - CHP - RA200 - PRR_AUTO - CHP - CF - PRR_AUTO - CHP - X9900H - PRR_AUTO - CHP - X9900 - PRR_AUTO - ELC - RA400	ktoe	2005 - 2017
(viii) electricity generation from CHPP[37]	- Gross electricity generation Main activity CHP plants - Nuclear - Gross electricity generation Autoproducer CHP plants - Nuclear - Gross electricity generation Main activity CHP plants - Geothermal - Gross electricity generation Main activity CHP plants - Combustible Fuels - Gross electricity generation Main activity CHP plants - Other Sources - Gross electricity generation Autoproducer CHP plants - Geothermal - Gross electricity generation Autoproducer CHP plants - Combustible Fuels - Gross electricity generation Autoproducer CHP plants - Heat from Chemical Sources - Gross electricity generation Autoproducer CHP plants - Other Sources	Gross and net production of electricity and derived heat by type of plant and operator [nrg_ind_peh]	-GEP	- PRR_MAIN - CHP - N9000 - PRR_AUTO - CHP - N9000 - PRR_MAIN - CHP - RA200 - PRR_MAIN - CHP - CF - PRR_MAIN - CHP - X9900 - PRR_AUTO - CHP - RA200 - PRR_AUTO - CHP - CF - PRR_AUTO - CHP - X9900H - PRR_AUTO - CHP - X9900	ktoe	2005 - 2017

[36] Due to changes in Eurostat methodology in energy balances, the nrg_ind_peh database table has been used instead of the Supply, transformation, consumption - electricity - annual data [nrg_105a]. In the new database table, there are the following indicatros to be selected: operator/trader (autoproducer or main activity), type of plant (electricity, chp, heat), energy balance (gross electricity production otr gross heat production), SIEC. In the columns E and F are included all the indicators used. The difference compared to the previous database table used is estimated around 1.2% in this case (on average for all MSs and over the period 2005-2016).

[37] Due to changes in Eurostat methodology in energy balances, the nrg_ind_peh database table has been used instead of the Supply, transformation, consumption - electricity - annual data [nrg_105a]. In the new database table, there are the following indicatros to be selected: operator/trader (autoproducer or main activity), type of plant (electricity, chp, heat), energy balance (gross electricity production otr gross heat production), SIEC. In the columns E and F are included all the indicators used. The difference compared to the previous database table used is estimated around 0.2% in this case (on average for all MSs and over the period 2005-2016).

Annual Report Indicator	EUROSTAT Indicator(s)	EUROSTAT database table	EUROSTAT Code	Field/ product(s)	Unit(s)	Period (EU28)
(ix) heat generation from thPG[38]	- Gross heat production Main activity CHP plants - Nuclear - Gross heat production Main activity heat only plants - Nuclear - Gross heat production Autoproducer CHP plants - Nuclear - Gross heat production Autoproducer heat only plants - Nuclear - Gross heat production Main activity CHP plants - Geothermal - Gross heat production Main activity CHP plants - Combustible Fuels - Gross heat production Main activity CHP plants - Heat Pumps* - Gross heat production Main activity CHP plants - Electric Boilers* - Gross heat production Main activity CHP plants - Other Sources - Gross heat production Main activity CHP plants - Solar - Gross heat production Autoproducer CHP plants - Geothermal - Gross heat production Autoproducer CHP plants - Combustible Fuels - Gross heat production Autoproducer CHP plants - Heat Pumps* - Gross heat production Autoproducer CHP plants - Electric Boilers* - Gross heat production Autoproducer CHP plants - Heat from Chemical Sources - Gross heat production Autoproducer CHP plants - Other Sources - Gross heat production Autoproducer CHP plants - Solar - Gross heat production Main activity heat only plants - Geothermal - Gross heat production Main activity heat only plants - Solar - Gross heat production Main activity heat only plants - Combustible Fuels - Gross heat production Main activity heat only plants - Heat Pumps* - Gross heat production Main activity heat only plants - Electric Boilers* - Gross heat production Main activity heat only plants - Other Sources - Gross heat production Autoproducer heat only plants - Geothermal - Gross heat production Autoproducer heat only plants - Solar - Gross heat production Autoproducer heat only plants - Combustible Fuels - Gross heat production Autoproducer heat only plants - Heat Pumps* - Gross heat production Autoproducer heat only plants - Electric Boilers* - Gross heat production Autoproducer heat only plants - Heat from Chemical Sources - Gross heat production Autoproducer heat only plants - Other Sources - Gross heat production Autoproducer heat only plants - Heat from Chemical Sources - Gross heat production Autoproducer heat only plants - Other Sources	Gross and net production of electricity and derived heat by type of plant and operator [nrg_ind_peh]	- GHP	'- PRR_MAIN - CHP - N9000 - PRR_MAIN - HEAT - N9000 - PRR_AUTO - CHP - N9000 - PRR_AUTO - HEAT - N9000 - PRR_MAIN - CHP - RA200 - PRR_MAIN - CHP - CF - PRR_MAIN - CHP - X9900 - PRR_MAIN - CHP - RA400 - PRR_AUTO - CHP - RA200 - PRR_AUTO - CHP - CF - PRR_AUTO - CHP - X990H - PRR_AUTO - CHP - X990 - PRR_AUTO - CHP - RA400 - PRR_MAIN - HEAT - RA200 - PRR_MAIN - HEAT - RA400 - PRR_MAIN - HEAT - CF - PRR_MAIN - HEAT - X990 - PRR_AUTO - HEAT - RA200 - PRR_AUTO - HEAT - RA400 - PRR_AUTO - HEAT - CF - PRR_AUTO - HEAT - X990H - PRR_AUTO - HEAT - X990	ktoe	2005 - 2017
(x) heat generation from CHPP[39]	- Gross heat production Main activity CHP plants - Nuclear - Gross heat production Autoproducer CHP plants - Nuclear - Gross heat production Main activity CHP plants - Geothermal - Gross heat production Main activity CHP plants - Combustible Fuels - Gross heat production Main activity CHP plants - Heat Pumps* - Gross heat production Main activity CHP plants - Electric Boilers* - Gross heat production Main activity CHP plants - Other Sources - Gross heat production Main activity CHP plants - Solar - Gross heat production Autoproducer CHP plants - Geothermal - Gross heat production Autoproducer CHP plants - Combustible Fuels - Gross heat production Autoproducer CHP plants - Heat Pumps* - Gross heat production Autoproducer CHP plants - Electric Boilers* - Gross heat production Autoproducer CHP plants - Heat from Chemical Sources - Gross heat production Autoproducer CHP plants - Other Sources - Gross heat production Autoproducer CHP plants - Solar	Gross and net production of electricity and derived heat by type of plant and operator [nrg_ind_peh]	- GHP	'- PRR_MAIN - CHP - N9000 - PRR_AUTO - CHP - N9000 - PRR_MAIN - CHP - RA200 - PRR_MAIN - CHP - CF - PRR_MAIN - CHP - X9900 - PRR_MAIN - CHP - RA400 - PRR_AUTO - CHP - RA200 - PRR_AUTO - CHP - CF - PRR_AUTO - CHP - X990H - PRR_AUTO - CHP - X990 - PRR_AUTO - CHP - RA400	ktoe	2005 - 2017
(xi) fuel input for thPG[40]	- Transformation input - electricity and heat generation - main activity producer electricity only - energy use - Transformation input - electricity and heat generation - main activity producer combined heat and power - energy use - Transformation input - electricity and heat generation - main activity producer heat only - energy use - Transformation input - electricity and heat generation - autoproducer electricity only - energy use - Transformation input - electricity and heat generation - autoproducer combined heat and power - energy use - Transformation input - electricity and heat generation - autoproducer heat only - energy use	Complete energy balances [nrg_bal_c]	-TI_EHG_MAPE_E -TI_EHG_MAPCHP_E - TI_EHG_MAPH_E - TI_EHG_APE_E - TI_EHG_APCHP_E - TI_EHG_APH_E	- All products - All products except Renewables an biofuels (RA000) - All products - All products - All products except Renewables an biofuels (RA000) - All products	ktoe	2005 - 2017

[38] Due to changes in Eurostat methodology in energy balances, the nrg_ind_peh database table has been used instead of the Supply, transformation, consumption - heat - annual data [nrg_106a]. In the new database table, there are the following indicatros to be selected: operator/trader (autoproducer or main activity), type of plant (electricity, chp, heat), energy balance (gross electricity production otr gross heat production), SIEC. In the columns E and F are included all the indicators used. The difference compared to the previous database table used is estimated around 1.9% in this case (on average for all MSs and over the period 2005-2016). To note that in the new database table there are not available data for gross heat production from electric boilers and heat pumps.

[39] Due to changes in Eurostat methodology in energy balances, the nrg_ind_peh database table has been used instead of the Supply, transformation, consumption - heat - annual data [nrg_106a]. In the new database table, there are the following indicatros to be selected: operator/trader (autoproducer or main activity), type of plant (electricity, chp, heat), energy balance (gross electricity production otr gross heat production), SIEC. In the columns E and F are included all the indicators used. The difference compared to the previous database table used is estimated around 1.1% in this case (on average for all MSs and over the period 2005-2016). To note that in the new database table there are not available data for gross heat production from electric boilers and heat pumps.

[40] Due to changes in Eurostat methodology in energy balances, the Complete energy balances [nrg_bal_c] database table has been used instead of the Simplified energy balances - annual data [nrg_100a].

Instead of:

Transformation input - electricity and heat generation - main activity producer electricity only - energy use (B_1010002), transformation input - Conventional Thermal Power Stations (B101_001), transformation input - District Heating Plants (B101009)

the following indicators have been used:

Transformation input - electricity and heat generation - main activity producer electricity only - energy use (TI_EHG_MAPE_E), Transformation input - electricity and heat generation - main activity producer combined heat and power - energy use (TI_EHG_MAPCHP_E), Transformation input - electricity and heat generation - main activity producer heat only - energy use (TI_EHG_MAPH_E), Transformation input - electricity and heat generation - autoproducer electricity only - energy use (TI_EHG_APE_E), Transformation input - electricity and heat generation - autoproducer combined heat and power - energy use (TI_EHG_APCHP_E), Transformation input - electricity and heat generation - autoproducer heat only - energy use (TI_EHG_APH_E).

The difference compared to the previous database table used is estimated around 4.3% in this case (on average for all MSs and over the period 2005-2016).

Annual Report Indicator	EUROSTAT Indicator(s)	EUROSTAT database table	EUROSTAT Code	Field/ product(s)	Unit(s)	Period (EU28)
(xii) passenger kilometres (pkm)	Railway TRA_COV: Total transport	Railway transport - Total annual passenger transport (1 000 pass., million pkm) [rail_pa_total]	- TOTAL	-	Millions of passenger-kilometres	2005 - 2017
	Road VEHICLE: Total	Passenger road transport on national territory, by type of vehicles registered in the reporting country [road_pa_mov]	- TOTAL	-	Millions of passenger-kilometres	2005 – 2017
(xiii) tonnes kilometres (tkm)	Railway TRA_COV: Total transport	Railway transport - Goods transported, by type of transport (1 000 t, million tkm) [rail_go_total]	- TOTAL	-	Millions of Tonne-kilometre	2005 - 2017
	Road TRA_OPER: Total - Total transport	Summary of annual road freight transport by type of operation and type of transport (1 000 t, Mio Tkm, Mio Veh-km) [road_go_ta_tot]	- TOTAL	Total	Millions of Tonne-kilometre	2005-2017
	Waterway TRA_COV: Total transport	Transport by type of good (from 2007 onwards with NST2007) [iww_go_atygo]	- TOTAL	Total	Millions of Tonne-kilometre	2007-2017
(xv) population	Population on 1 January - total	Demographic balance and crude rates [demo_gind]	JAN	-	Persons	2005-2018
Energy transmission and distribution losses (all fuels)	Distribution Losses	Supply, transformation, consumption - all products - annual data [nrg_100a]	B_101400	All products	ktoe	2005-2016
Heat generation from district heating plants	Transformation output - District Heating Plants	Supply, transformation, consumption - heat - annual data [nrg_106a]	B_101109	Derived heat	ktoe	2005-2016
Fuel input in district heating plants	Transformation input - District Heating Plants	Supply, transformation, consumption - all products - annual data [nrg_100a]	B_101009	All products	ktoe	2005-2016

Annex 2: Explanations provided by Member States

The table below collects all of the reasons provided by Member States in their Annual Reports 2019 to explain growth or stable final energy consumption in 2017. The indicator shown in the "Trend" column refers to EUROSTAT data. Eventual disagreements between this indication and the reason provided are due to the fact that some Member States refer to national statistics which can be different respect the EUROSTAT ones.

MS	Sector	Trend	Reasons
AT	Industry	↗	**Economic growth**
	Transport	↗	**Increase of transport of goods - Increase of transport of passengers**
	Households	↗	**Increase of population and/or households** - **Worsening of winter climatic conditions**
	Services	↗	**Economic growth - Increase of employment.**
	Agriculture	→	n.a.
BE	Industry	↘	
	Transport	→	**Economic growth - Increase of transport of passengers - Increase of transport of goods**
	Households	↘	
	Services	↘	
	Agriculture	↗	n.a.
BG	Industry	↗	**Increase of value added - Other** (structural changes in sector)
	Transport	↗	**Economic growth - Other** (increasing inefficiencies in road transport: increasing trips by passenger cars/ large share of old cars/ congestions) - **Other** (Growth in consumption of the least efficient air transport)
	Households	↗	**Other** (increased living area per capita) **- Other** (increased use of electrical appliances for different purposes) **- Other** (increased level of thermal comfort in dwellings both in winter and in summer)
	Services	↗	**Increase of value added - Increase of employment - Other** (increased level of thermal comfort in public buildings)
	Agriculture	↘	
HR	Industry	↗	No clear explanation
	Transport	↗	No clear explanation
	Households	→	Energy consumption decreases in this sector.
	Services	↗	No clear explanation
	Agriculture	→	Energy consumption decreases in this sector.
CY	Industry	↗	**Increase of value added - Economic growth**
	Transport	↗	**Economic growth - Increase of transport of passengers**
	Households	↗	**Increase of population and/or households - Economic growth - Increase of disposable income of households**
	Services	↗	**Increase of value added - Economic growth - Increase of employment**
	Agriculture	↗	n.a.
CZ	Industry	↗	**Change in the methodology of measurement or calculation of energy consumptions**
	Transport	↗	**Increase of transport of passengers**
	Households	↗	**Increase of population and/or households - Increase of disposable income of households - Other** (increased number of new housing units) **- Other** (increased average floor area in housing units and fall in the number of people living in a single housing unit)
	Services	↗	**Economic growth - Increase of employment**
	Agriculture	→	n.a.
DK	Industry	↗	**Increase of value added**
	Transport	↗	**Increase of transport of goods - Increase of transport of passengers**
	Households	↘	**Increase of population and/or households**
	Services	↗	**Economic growth**
	Agriculture	↘	**Increase of value added**
EE	Industry	→	**Economic growth**
	Transport	↗	**Economic growth - Increase of disposable income of households**
	Households	↗	**Economic growth - Increase of disposable income of households**
	Services	↘	
	Agriculture	↗	**Economic growth**
FI	Industry	↗	**Increase of value added - Other** (Increase of industrial production volume indices) **- Decline of fuel prices**
	Transport	↗	**Increase of transport of goods - Increase of transport of passengers**
	Households	↘	
	Services	↗	**Increase of value added - Economic growth - Worsening of winter climatic condition**.
	Agriculture	↘	
FR	Industry	→	n.a.
	Transport	→	**Increase of transport of goods - Increase of transport of passengers**
	Households	↘	
	Services	↗	**Economic growth**
	Agriculture	→	n.a.
DE[41]	Industry	→	**Economic growth - Increase of population and/or households - Worsening of winter climatic conditions - Decline of fuel prices - Increase of disposable income of households**
	Transport	↗	**Economic growth - Increase of population and/or households - Worsening of winter climatic conditions - Decline of fuel prices - Increase of disposable income of households**
	Households	→	**Economic growth - Increase of population and/or households - Worsening of winter climatic conditions - Decline of fuel prices - Increase of disposable income of households**
	Services	↗	**Economic growth - Increase of population and/or households - Worsening of winter climatic conditions - Decline of fuel prices - Increase of disposable income of households**
	Agriculture	→	n.a.

[41] Only general explanations provided in AR2019 - no specific explanations per sector

MS	Sector	Trend	Reasons
EL	Industry	→	**Increase of value added - Increase of employment**
	Transport	→	n.a.
	Households	↗	**Worsening of winter climatic conditions - Increase of disposable income of households - Worsening of summer climatic conditions**
	Services	↘	**Increase of value added - Increase of employment - Worsening of winter climatic conditions - Worsening of summer climatic conditions**
	Agriculture	↗	n.a.
HU	Industry	↗	**Economic growth - Increase of transport goods - worsening of climatic conditions**
	Transport	↗	**Economic growth - Increase of transport goods**
	Households	↗	**Increase of disposable income of households - worsening of winter and summer climatic conditions**
	Services	↘	
	Agriculture	↘	
IE	Industry	↗	**Economic growth**
	Transport	↗	**Economic growth - Increase of transport of goods - Increase of transport of passengers**
	Households	↘	**Increase of population and/or households**
	Services	↗	**Economic growth**
	Agriculture	↗	n.a.
IT	Industry	↘	**Economic growth**
	Transport	↘	
	Households	↗	**Driving of summer climatic conditions - Ageing of climate conditions**
	Services	↗	**Economic growth**
	Agriculture	↗	n.a.
LV	Industry	↗	**Other** (increase of production) - **Increase of value added**
	Transport	↗	**Increase of transport of passengers - Increase of passenger cars - Increase of transport of goods**
	Households	↗	**Change in the methodology of measurement or calculation of energy consumptions - Other** (the rebound effect)
	Services	↗	**Increase of value added**
	Agriculture	↗	n.a.
LT	Industry	↗	**Other** (increase of production) **- Other** (increase of technology deployment) **- Other** (increase of labour productivity)
	Transport	↗	**Increase of transport of goods - Increase of transport of passengers - Increase of value added - Other** (efficient public authorities combat smuggled fuel (diesel) access from third countries into the territory of the country)
	Households	↗	**Decline of fuel prices - Increase of disposable income of households - Other** (growth of new energy users) **- Other** (increase of electrical and electronic equipment volumes in households)
	Services	↗	**Increase of value added - Other** (Development of the sector)
	Agriculture	↗	n.a.
LU	Industry	↘	
	Transport	↗	n.a.
	Households	→	Energy consumption is declining.
	Services	↗	n.a.
	Agriculture	↘	
MT	Industry	↗	**Increase of value added**
	Transport	↗	**Economic growth - Increase of transport of passengers - Increase of transport of goods - Other** (Increase of tourism) **- Other** (Increase of motorcycles) **- Increase of passenger cars**
	Households	↗	**Other** (Increase in total household expenditure) **- Increase of population and/or households - Worsening of winter climatic conditions - Worsening of summer climatic conditions**
	Services	↘	**Increase of value added - Other** (Increase in the number of tourist arrivals)
	Agriculture	↘	
NL	Industry	↗	**Change in the methodology of measurement or calculation of energy consumptions - Economic growth**
	Transport	↗	**Economic growth - Other** (increased consumption by road traffic) - **Other** (increased vehicle kilometers)
	Households	↘	
	Services	↗	**Economic growth**
	Agriculture	→	n.a.
PL	Industry	↗	no clear explanation
	Transport	↗	**Increase of transport of goods - Increase of transport of passengers - Increase of passenger cars - Other** (increase of foreign trade) **- Economic growth**
	Households	→	**Economic growth**
	Services	↘	
	Agriculture	↗	n.a.
PT	Industry	↗	n.a.
	Transport	↗	**Economic growth**
	Households	↘	
	Services	→	n.a.
	Agriculture	↗	n.a.
RO	Industry	↗	**Increase of value added**
	Transport	↗	**Increase of transport of goods**
	Households	↗	**Other** (measures taken in order to increase the living standards)
	Services	↗	**Increase of value added**
	Agriculture	↗	n.a.
SK	Industry	↗	**Economic growth - Other** (increase in production)
	Transport	↗	**Increase of transport of passengers - Increase of transport of goods - Other** (Increase of registered motor-vehicles) **- Other** (Comparable financial costs for road haulage)

MS	Sector	Trend	Reasons
	Households	↗	**Worsening of winter climatic conditions**
	Services	↗	**Change in the methodology of measurement or calculation of energy consumptions**
	Agriculture	↘	
SI	Industry	↗	**Increase of value added**
	Transport	↘	
	Households	↘	
	Services	↘	
	Agriculture	→	n.a.
ES	Industry	→	**Economic growth - Increase of value added**
	Transport	↗	**Economic growth - Increase of transport of goods - Increase of transport of passengers**
	Households	↗	**Economic growth - Increase of population and/or households - Increase of disposable income of households**
	Services	↘	Energy consumption decreases in this sector.
	Agriculture	→	n.a.
SE	Industry	→	n.a.
	Transport	↗	n.a.
	Households	→	n.a.
	Services	↘	
	Agriculture	↘	
UK	Industry	→	**Increase of value added**
	Transport	→	**Increase of transport of passengers - Increase of transport of goods - Economic growth - Decline of fuel prices**
	Households	↘	
	Services	↘	
	Agriculture	↗	n.a.

Annex 3: New measures under Articles 7 and 5

The tables below provide all the policies and measures under Article 5 and 7 reported by Member States in the AR 2019 which were not included in the AR2018.

New measures under Article 7

	Name of measure	Category	Total savings achieved in 2017 (ktoe)	Share with respect to total savings in 2017(%)	Savings achieved in 2017 from new actions (ktoe)	Share with respect to new savings in 2017(%)	Total cumulative expected savings [ktoe] by 2020 expressed in final energy (voluntary)	Share with respect to total cumulative savings expected by 2020(%)
CZ	Integrated Regional Operational Programme (MMR) — Public transport (IROP SC 1.2)	Funds, financial & fiscal incentives	1.30	0.28%	n.a.		n.a.	
CZ	Environmental tax on fuels	Taxation	39.48	8.39%	39.48	23.65%	n.a.	
CZ	Marketing ban for boilers using solid fuels 1st and 2 rd emission class	Regulations	13.92	2.96%	4.75	2.85%	n.a.	
DE	Energy audit obligation for non-SMEs	Regulations	143.31	2.78%	71.65	2.60%	n.a.	
DE	National efficiency label for heating systems	Regulations	50.40	0.98%	50.16	1.82%	n.a.	
EL	Oil products specific consumption tax	Taxation	122.47	25.04%	122.47	38.18%	n.a.	
ES	2013-2017 State plan to promote building renovation (3R)	Other measures	42.12	1.90%	0.54	0.12%	11.93	0.11%
ES	Introduction of environmental criteria and criteria for efficient distribution to central government for urban public transport	Regulations	44.44	2.00%	14.95	3.43%	222.40	2.04%
ES	Savings resulting from the implementation of the Directorate-General for Traffic's environmental label	Regulations	21.41	0.96%	13.56	3.11%	93.51	0.86%
ES	MULTIREGIONAL SECTION (IDAE): central government buildings	Funds, financial & fiscal incentives	4.15	0.19%	4.15	0.95%	16.60	0.15%
ES	CNAE voluntary agreement	Other measures	0.64	0.03%	0.64	0.15%	1.28	0.01%
ES	AEFGA voluntary agreement	Other measures	3.96	0.18%	0.32	0.07%	23.78	0.22%
IT	Cohesion policy	Funds, financial & fiscal incentives	198.51	6.24%	0.57	0.06%	n.a.	
IT	Information programmes	Information, education and trainir	55.00	1.73%	33.70	3.83%	n.a.	
IT	Sustainable mobility	Funds, financial & fiscal incentives	0.00	0.00%	0.00	0.00%	n.a.	
CY	Installation of Photovoltaic Systems for commercial and industrial consumers (own use).	Funds, financial & fiscal incentives	0.43	0.01%	0.43	0.07%	2.49	0.01%
CY	Installation of Photovoltaic Systems - Net metering. Household Sector (own use)	Funds, financial & fiscal incentives	1.66	2.19%	0.27	0.38%	11.59	3.16%
CY	Taxes in electricity	Taxation	2.70	3.57%	2.70	3.82%	15.09	4.12%
CY	Taxes in fuels	Taxation	61.56	81.21%	61.56	87.04%	272.93	74.51%
CY	[illegible] domestic hot hoter	Funds, financial & fiscal incentives	0.11	0.14%	0.11	0.15%	0.67	0.18%
CY	Urban incentive for increasing nearly zero energy buildings	Other measures	0.00	0.00%	0.00	0.00%	0.16	0.04%
CY	EEOS	EEOS	n.a.		n.a.		15.00	4.09%
LV	Other measures	EEOS	2.30	2.02%	2.30	2.90%	9.12	2.03%
LV	Implementation of measures identified as part of energy audits by large companies and major electricity consumers	Regulations	13.00	11.45%	8.34	10.53%	57.45	12.78%
LV	Issue of green bonds to improve the energy efficiency of businesses	Funds, financial & fiscal incentives	0.79	0.70%	0.79	1.00%	3.17	0.71%
LV	Measures implemented by municipalities and reports on savings submitted	Other measures	0.06	0.06%	0.04	0.05%	0.28	0.06%
LV	Regular public information education measures run by public bodies	Information, education and training	9.90	8.71%	9.90	12.50%	24.46	5.44%
LV	Measurement of exhaust fumes as part of the State technical vehicle inspections	Other measures	0.93	0.82%	0.93	1.17%	3.52	0.78%
LV	Tightening up of building regulations and building energy efficiency regulations	Regulations	5.10	4.49%	3.11	3.93%	22.36	4.97%
LV	Energy taxes	Taxation	43.55	38.34%	43.55	54.99%	153.05	34.05%
LV	Climate change financial instrument project competitions	Funds, financial & fiscal incentives	20.03	17.63%	0.00	0.00%	116.48	25.92%
LT	Energy consumer education and consultation agreements	Information, education and trainir	3.60	1.99%	3.60	3.96%	3.60	0.56%
LT	Implementation of energy savings agreements	Other measures	31.48	17.44%	18.80	20.71%	100.58	15.58%
LT	Economic operators deployment	Funds, financial & fiscal incentives	6.34	3.51%	0.00	0.00%	12.19	1.89%
LT	Replacement of heat production facilities	Funds, financial & fiscal incentives	30.75	17.04%	1.13	1.24%	70.02	10.85%
LT	Buildings update (modernisation)	Funds, financial & fiscal incentives	3.82	2.12%	0.40	0.44%	9.01	1.40%
LT	Public transport infrastructure update	Funds, financial & fiscal incentives	n.a.		0.42	0.47%	2.76	0.43%
HU	Fossil energy use reduction by public institutions according to the	Regulations	0.35	0.07%	0.12	0.11%	1.55	0.06%
HU	Obligation to apply for energetic specialist engineer (energetikusi szakreferensi kötelezettség)	Regulations	15.29	2.89%	15.29	14.67%	61.03	2.48%
HU	Energy Offices Network by the National Government Office (Nemzeti Energetikusi Hálózat)	Information, education and training	0.12	0.02%	0.12	0.11%	0.12	0.00%
HU	Energy efficiency corporate tax benefit (energiahatékonysági TAO kedvezmény)	Taxation	0.36	0.07%	0.36	0.34%	1.43	0.06%
HU	Family Home Creation Support Program (CSOK otthonteremtési támogatás)	Funds, financial & fiscal incentives	0.12	0.02%	0.12	0.11%	0.48	0.02%
HU	Annual cost supports for operating public transport from state budget (Közösségi közlekedés működtetésének állami fenntartói támogatása) / (Measure not mentioned in NEEAP)	Funds, financial & fiscal incentives	23.88	4.52%	23.88	22.92%	95.54	3.88%
HU	Implementation of Jedlik Ányos Plan for e-mobility support (Jedlik Ányos Terv megvalósítása) 0	Funds, financial & fiscal incentives	0.00	0.00%	0.48	0.46%	7.17	0.29%
HU	Realization of M4 subway and reorganization of surface public transport after completion (M4 metro megvalósítása és a felszíni közösségi közlekedés átszervezése) / (Measure not mentioned in NEEAP)	Other measures	28.75	5.44%	0.00	0.00%	203.02	8.25%
HU	Operation of intelligent transport systems and operation of the National Access Point (Intelligens közlekedési rendszerek üzemeltetése és a Nemzeti Hozzáférési Pont működtetése) / / (Measure not mentioned in NEEAP)	Other measures	0.48	0.09%	0.48	0.46%	1.91	0.08%
HU	Improving the quality of engineering and engineering work in the field of energy efficiency: 1. Establishment of the Technical Committee for Construction and Development of Energy Efficiency Technical Guidelines 2. Support for the translation of energy efficiency standards into Hungarian. 3. National BIM Standard and BIM Manual (Műszaki, mérnöki tevékenység színvonalának fejlesztése energiahatékonysági területen) / (Measure not mentioned in NEEAP)	Regulations	4.78	0.90%	1.19	1.15%	17.91	0.73%
HU	Self-implemented energy efficiency measures by municipalities (Önkormányzatok önálló energiahatékonysági intézkedései) / / (Measure not mentioned in NEEAP)	Other measures	9.13	1.73%	2.39	2.29%	52.55	2.14%
HU	Energy efficiency innovation project support with expected revenue growth (energiahatékonysági innovációs támogatások árbevételnövekedési előírások mellett) / / (Measure not mentioned in NEEAP)	Other measures	0.48	0.09%	0.48	0.46%	10.51	0.43%
NL	Information requirement	Regulations	n.a.		n.a.		n.a.	
NL	MJA3/MEE covenants	Other measures	n.a.		n.a.		232.16	
NL	Experimentation under the Electricity Act	Regulations	n.a.		n.a.		n.a.	
NL	Logistics sector measures	Other measures	n.a.		n.a.		31.05	
NL	Additional funding for the Energy efficiency and renewable energy for greenhouse horticulture scheme	Funds, financial & fiscal incentives	n.a.		n.a.		n.a.	
RO	Energy efficiency in the industry receiving a State aid under Government Decision No 495/2014	Funds, financial & fiscal incentives	26.96	15.25%	n.a.		n.a.	
RO	Energy audit and management	Regulations	145.09	82.05%	n.a.		n.a.	
RO	Extension of the underground transport in Bucharest	Other measures	3.82	2.16%	n.a.		n.a.	
RO	Retrofitting of rail transport	Other measures	0.95	0.54%	n.a.		n.a.	
RO	Implementation of the National Programme for Improvement of Energy Performance in Residential Blocks	Funds, financial & fiscal incentives	n.a.		n.a.		n.a.	
RO	Implementation of the Programme for the thermal rehabilitation of residential blocks funded from the EU Structural and Cohesion Funds - the 2014-2020 ROP	Funds, financial & fiscal incentives	n.a.		n.a.		n.a.	
RO	Retrofitting of air transport	Other measures	n.a.		n.a.		n.a.	
RO	Energy efficiency in government buildings	Funds, financial & fiscal incentives						
UK	Re:Fit Cymru	Other measures	n.a.		n.a.		n.a.	
UK	Green Growth Wales	Funds, financial & fiscal incentives	8.60	0.19%	8.60	1.45%	34.39	0.13%
UK	Warm Homes Programme	Other measures	8.60	0.19%	8.60	1.45%	34.39	0.13%
UK	Boiler Plus	Regulations	n.a.		n.a.		n.a.	
UK	Streamlined Energy and Carbon Reporting Framework (SECR)	Other measures	n.a.		n.a.		n.a.	
UK	Small Scale Renewables (FiT)	Other measures	111.78	2.50%	8.60	1.45%	713.67	2.64%

New measures under Article 5

	Name of measure	Savings	Notes
CZ	REPLACING THE LIGHT SYSTEMS	n.a.	A total of construction measures including the replacement of lighting systems resulted in savings equal to 9.78 TJ (0.23 ktoe) in 2018

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