Shedding light on energy in the EU

2022 INTERACTIVE EDITION

Lighting, heating, moving, producing...

...energy is vital for our day-to-day life. Without energy, people and businesses cannot function. Turning on our computers or starting our cars are actions that we take for granted, yet they represent the final stage of a complex process.

The interactive publication **Shedding light on energy in the EU** developed by **Eurostat** helps to make the complex process of energy more understandable. It replies to the needs of those who are not familiar with the energy sector as well as more experienced users.

The publication is divided into four chapters:

European policies: This chapter presents the challenges of the European Green Deal and the Energy Union.

Energy in the EU: This chapter answers questions such as where does our energy come from, which type of energy do we produce and how dependent are we on energy imports.

Energy consumption: This chapter focuses on the different types of energy we consume and its cost.

Energy and environment: This chapter presents data on greenhouse gas emissions, energy efficiency and renewable energy.

Data in this edition show yearly figures up until 2020 (and figures for the second semester 2021 for prices). Where applicable, the impact of the COVID-19 crisis is commented on.

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1. WHAT ARE THE EUROPEAN GREEN DEAL AND THE ENERGY UNION ABOUT?

The **European Green Deal** is the ambitious EU climate policy that aims for Europe to become the first climate neutral continent by 2050.

In particular, reaching this target will require action by all sectors of our economy, including investing in environmentally-friendly technologies, decarbonising the energy sector, ensuring buildings are more energy efficient or rolling out cleaner forms of private and public transport.

The **Energy Union** is the main energy policy instrument to deliver the transformations required to decarbonise our energy system. The goal of the Energy Union is to give EU consumers — households and businesses — secure, sustainable, competitive and affordable energy.

In order to ensure that policies and measures at various levels are coherent, complementary and sufficiently ambitious, the Energy Union adopted a strong governance mechanism, based on integrated national energy and climate plans.

Using reliable high quality data to monitor the policy targets under the European Green Deal and the Energy Union packages will enhance the credibility of EU energy policy.

The State of the Energy Union monitors progress made to bring about the transition to a low-carbon, secure and competitive economy. It also highlights each year the issues where further attention is needed.

European Green Deal
https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en

Energy Union
https://energy.ec.europa.eu/topics/energy-strategy/energy-union_en

Renewable energy
https://energy.ec.europa.eu/topics/renewable-energy_en

Energy efficiency
https://energy.ec.europa.eu/topics/energy-efficiency_en

2. ENERGY IN THE EU

2.1 Where does our energy come from?

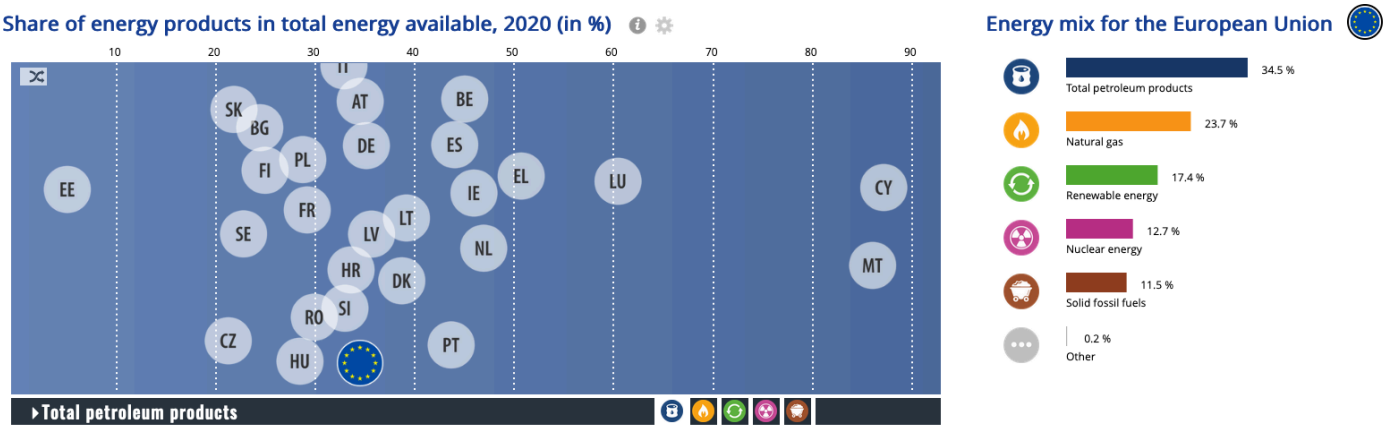
The energy available in the European Union comes from energy produced in the EU and from energy imported from third countries. Therefore, in order to get a good overview of the total energy available in the EU, energy production should always be put in context with imports.

In 2020, the EU produced around 42 % of its own energy (up compared with 40 % in 2019) while 58 % (down compared with 60 % in 2019) was imported. This decrease in imports is partly linked to the COVID-19 economic crisis.

Petroleum products have the largest share in the EU energy mix

In 2020, the energy mix in the EU, meaning the range of energy sources available, was mainly made up by five different sources: petroleum products (including crude oil) (35 %), natural gas (24 %), renewable energy (17 %), nuclear energy (13 %) and solid fossil fuels (12 %).

The shares of the different energy sources in the total energy available vary considerably between Member States. Petroleum products (including crude oil) account for a significant share of total energy available in Cyprus (87 %), Malta (86 %) and Luxembourg (60 %), while natural gas accounts for 40 % in Italy and 38 % in the Netherlands. Renewables have the highest share in Sweden (49 %) and Latvia (40 %), while nuclear energy makes up 41 % of energy available in France and 25 % in Sweden and Slovakia respectively. More than half of energy available in Estonia (53 %) and 41 % in Poland comes from solid fossil fuels.



The negative values for the category 'Other' for certain Member States are due to net exports of electricity.
Source: Eurostat - access to dataset

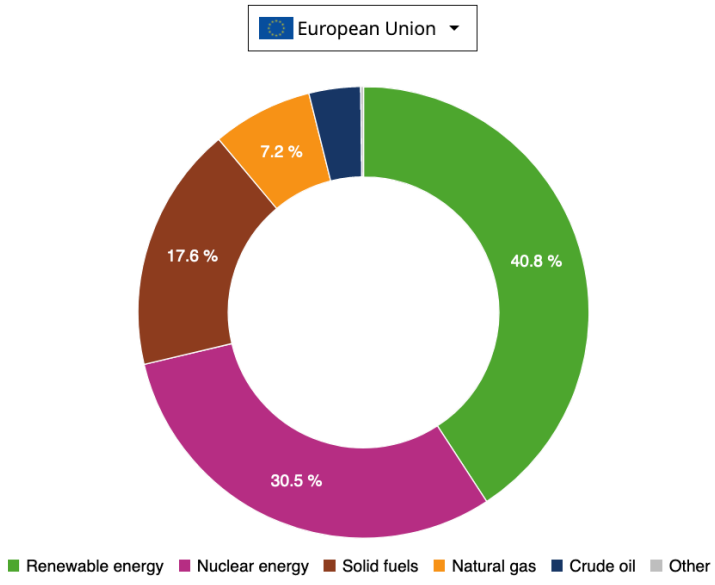
2.2 What do we produce in the EU?

The production of energy in the EU is spread across a range of different energy sources: solid fuels, natural gas, crude oil, nuclear energy and renewable energy (such as hydro, wind and solar energy).

Renewable energy (41 % of total EU energy production) was the largest contributing source to primary energy production in the EU in 2020. Nuclear energy (31 %) was the second largest source, followed by solid fuels (18 %), natural gas (7 %) and crude oil (4 %).

However, the production of energy is very different from one Member State to another. Renewable energy is the exclusive source of primary production in Malta and represents the main source in a number of Member States, with shares of over 95 % in Latvia, Portugal and Cyprus. The significance of nuclear energy is particularly high in France (75 % of total national energy production), Belgium (63 %) and Slovakia (60 %). Solid fuels are the main source of energy produced in Poland (71 %), Estonia (58 %) and Czechia (45 %). Natural gas has the largest share in the Netherlands (63 %) and Ireland (47 %), while the share of crude oil is largest in Denmark (38 %).

Primary energy production by source, 2020
(in %)



Source: Eurostat - access to dataset

2.3 From where do we import energy ?

What do we import?

For its own consumption, the EU also needs energy that is imported from third countries. In 2020, the main imported energy product was petroleum products (including crude oil, which is the main component), accounting for almost two thirds of energy imports into the EU, followed by natural gas (27 %) and solid fossil fuels (5 %).

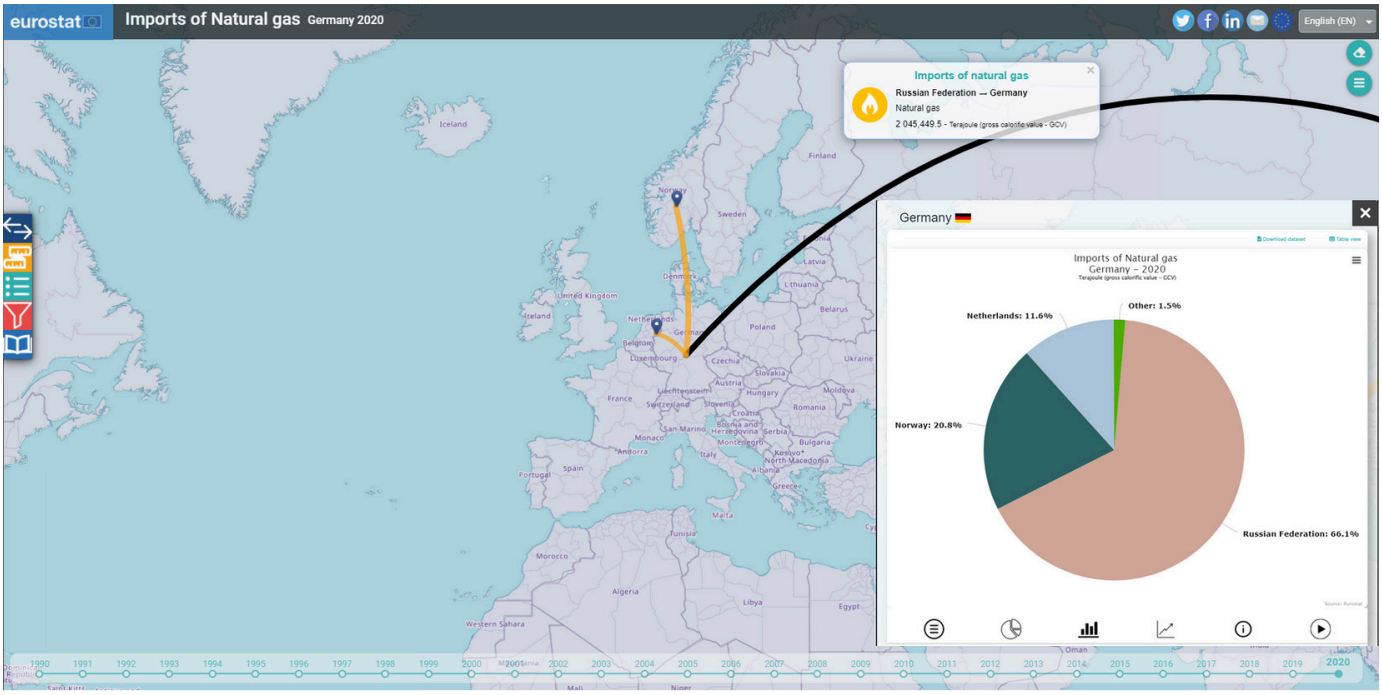
Russia is the main EU supplier of crude oil, natural gas and solid fossil fuels

In 2020, almost three quarters of the extra-EU crude oil imports came from Russia (29 %), the United States (9 %), Norway (8 %), Saudi Arabia and the United Kingdom (both 7 %) as well as Kazakhstan and Nigeria (both 6 %). A similar analysis shows that over three quarters of the EU's imports of natural gas came from Russia (43 %), Norway (21 %), Algeria (8 %) and Qatar (5 %), while more than half of solid fossil fuel (mostly coal) imports originated from Russia (54 %), followed by the United States (16 %) and Australia (14 %).

Different patterns among the EU Member States

In 2020, more than 80 % of energy imports were petroleum products in Cyprus, Malta, Greece and Sweden and more than a third was natural gas in Hungary, Austria and Italy. Nearly 15 % of energy imports were solid fuels in Slovakia, Poland and Czechia.

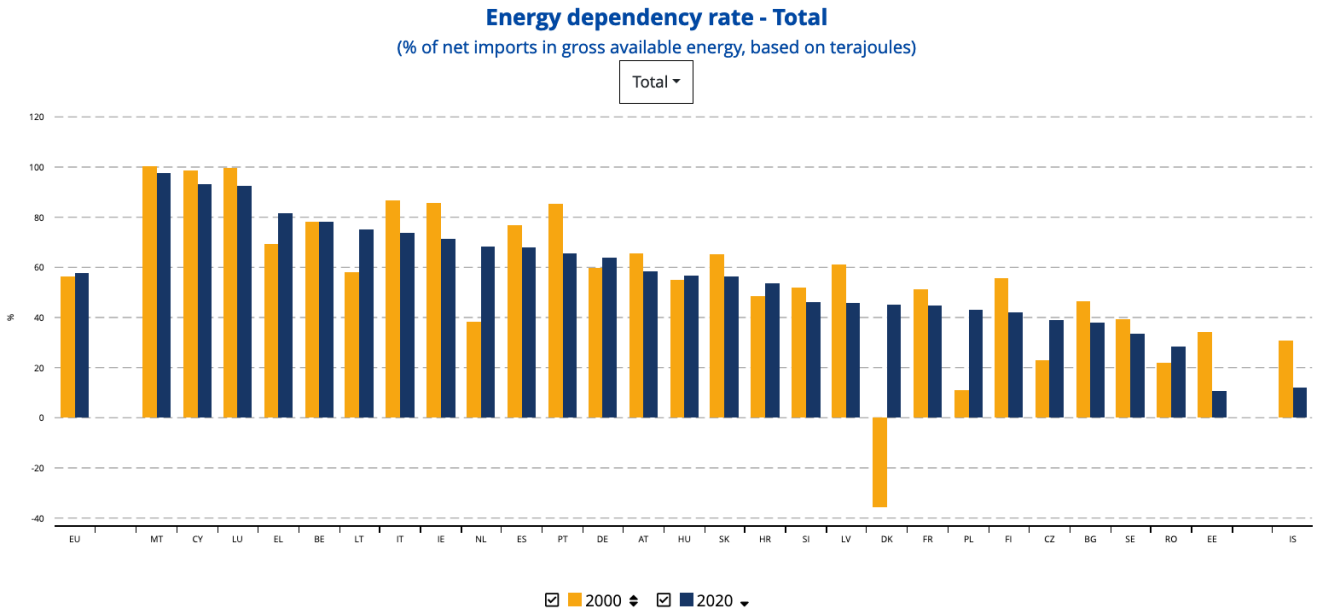
To discover the main trading partners of your country and see the different trade flows, please open the full-screen data visualisation tool 'Energy trade'. The screenshot below gives you an idea of the information you can find when playing around with the tool.



How dependent are we on energy produced outside the EU?

The dependency rate shows the extent to which an economy relies upon imports in order to meet its energy needs. It is measured by the share of net imports (imports - exports) in gross inland energy consumption (meaning the sum of energy produced and net imports). In the EU in 2020, the dependency rate was equal to 58 %, which means that more than half of the EU's energy needs were met by net imports. This rate is lower compared with 2019 (60 %), which is partly linked to the COVID-19 economic crisis, however it is still slightly higher compared with 2000 (56 %). Across the Member States, the import dependency rate ranges from over 90 % in Malta, Cyprus and Luxembourg to 10 % in Estonia.

In 2020, the EU mainly depended on Russia for imports of crude oil, natural gas and solid fossil fuels, followed by Norway for crude oil and natural gas.



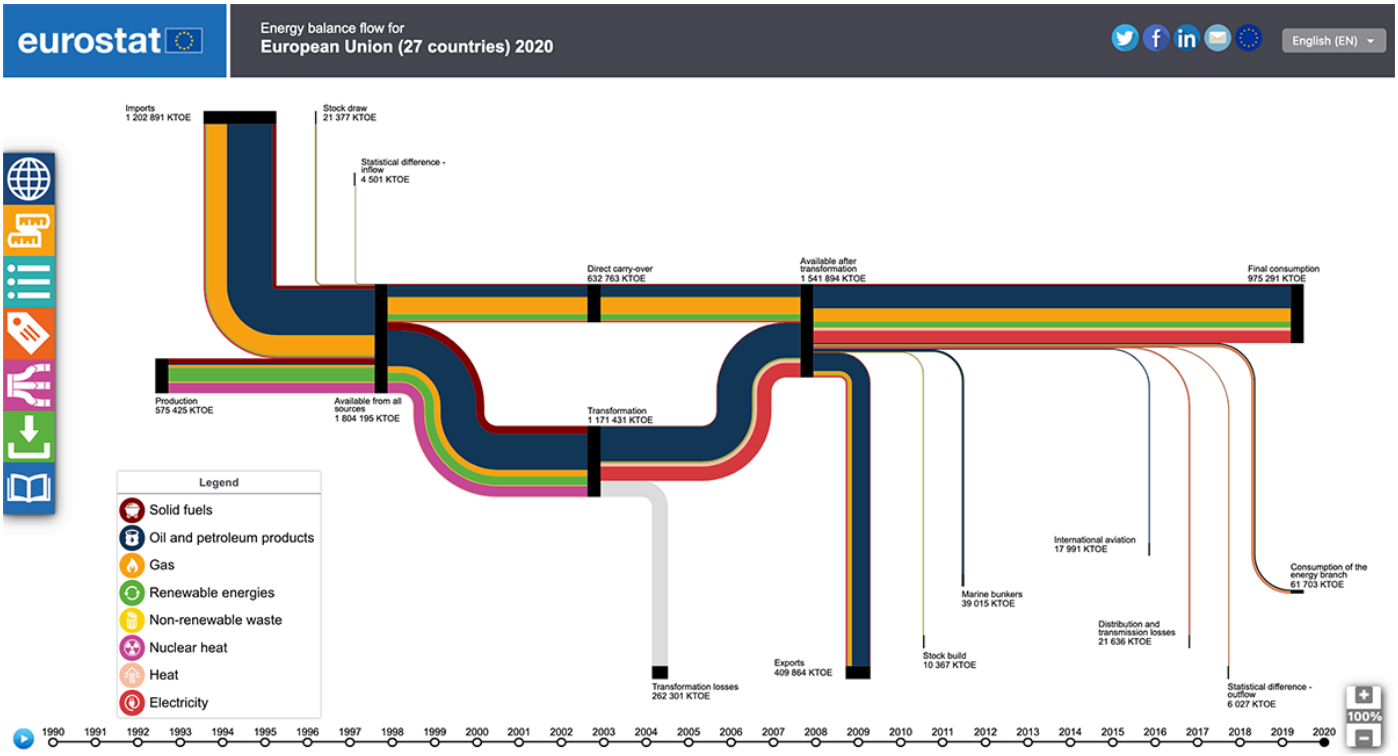
The dependency rates for Norway (2000: –723.0 %; 2020: –623.1 %) are significantly negative, so they are not shown to avoid distorting the graph.
Source: Eurostat - access to dataset

2.4 How does energy flow in the EU?

An energy balance presents energy products (solid fuels, oil and petroleum products, gas, renewable energies, nuclear heat, electricity, etc.) of a country and their production, transformation and consumption by different types of economic actors (industry, transport, etc.). It allows you to see the total amount of energy extracted from the environment, traded, transformed and used by end-users.

Energy balances can be graphically represented through flow diagrams (also called Sankey diagrams), which allow users to visualise the interrelation of energy commodities in a more illustrative and intuitive way. These flows can be combined, split and traced through a series of events or processing stages.

The Sankey energy tool is based on a series of black nodes connected by flows. The nodes represent events or processes (imports, final energy consumption etc.) while the flows in different colours represent energy products. The width of each stream in the flow represents the amount of energy (fuel) in the flow.



3. ENERGY CONSUMPTION

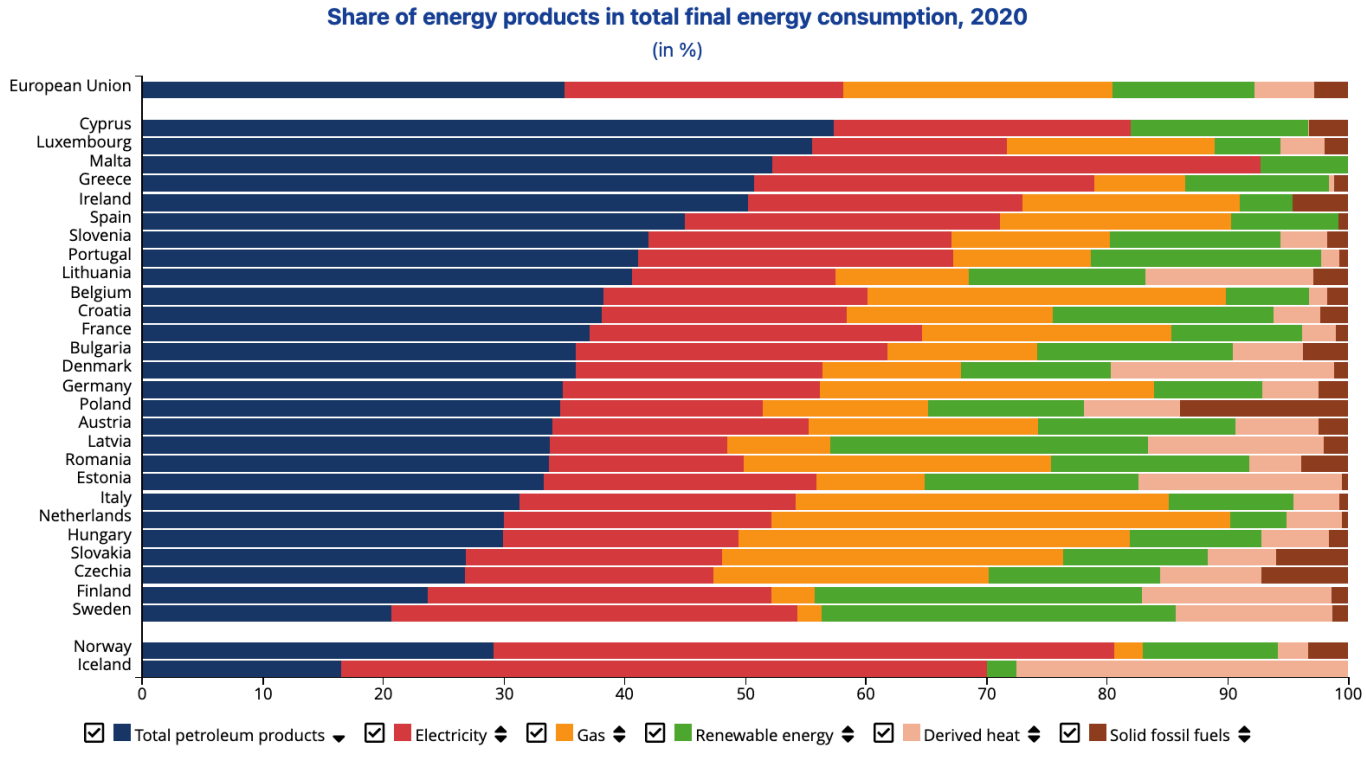
3.1 What kind of energy do we consume in the EU?

Out of the total energy available in the EU, around two thirds is consumed by end users (final energy consumption), for example EU citizens, industry, transport etc. The difference — around one third — is mainly lost during electricity generation and distribution, used to support energy production processes or in non-energy uses (like asphalt or bitumen).

Petroleum products are the most consumed

In the EU in 2020, petroleum products (such as heating oil, petrol, diesel fuel), which represent 35 % of final energy consumption, were the most consumed. Electricity (23 %) ranked second in final energy consumption, just ahead of natural gas and manufactured gases (22 %) and followed by direct use of renewables (not transformed into electricity, e.g. wood, solar thermal, geothermal or biogas for space heating or hot water production) (12 %), derived heat (such as district heating) (5 %) and solid fossil fuels (mostly coal) (3 %). The real consumption of renewable energy is higher than 12 %, because other renewable sources are included in electricity (e.g. hydropower, wind power or solar photovoltaic).

Within the EU Member States, the final energy consumption pattern varies considerably. Petroleum products make up more than 55 % of final energy consumption in Cyprus and Luxembourg. Electricity accounts for over 30 % in Malta and Sweden, while gas makes up more than 30 % in the Netherlands, Hungary and Italy. Renewable energies account for over 25 % of final energy consumption in Sweden, Finland and Latvia.



Source: Eurostat – access to dataset

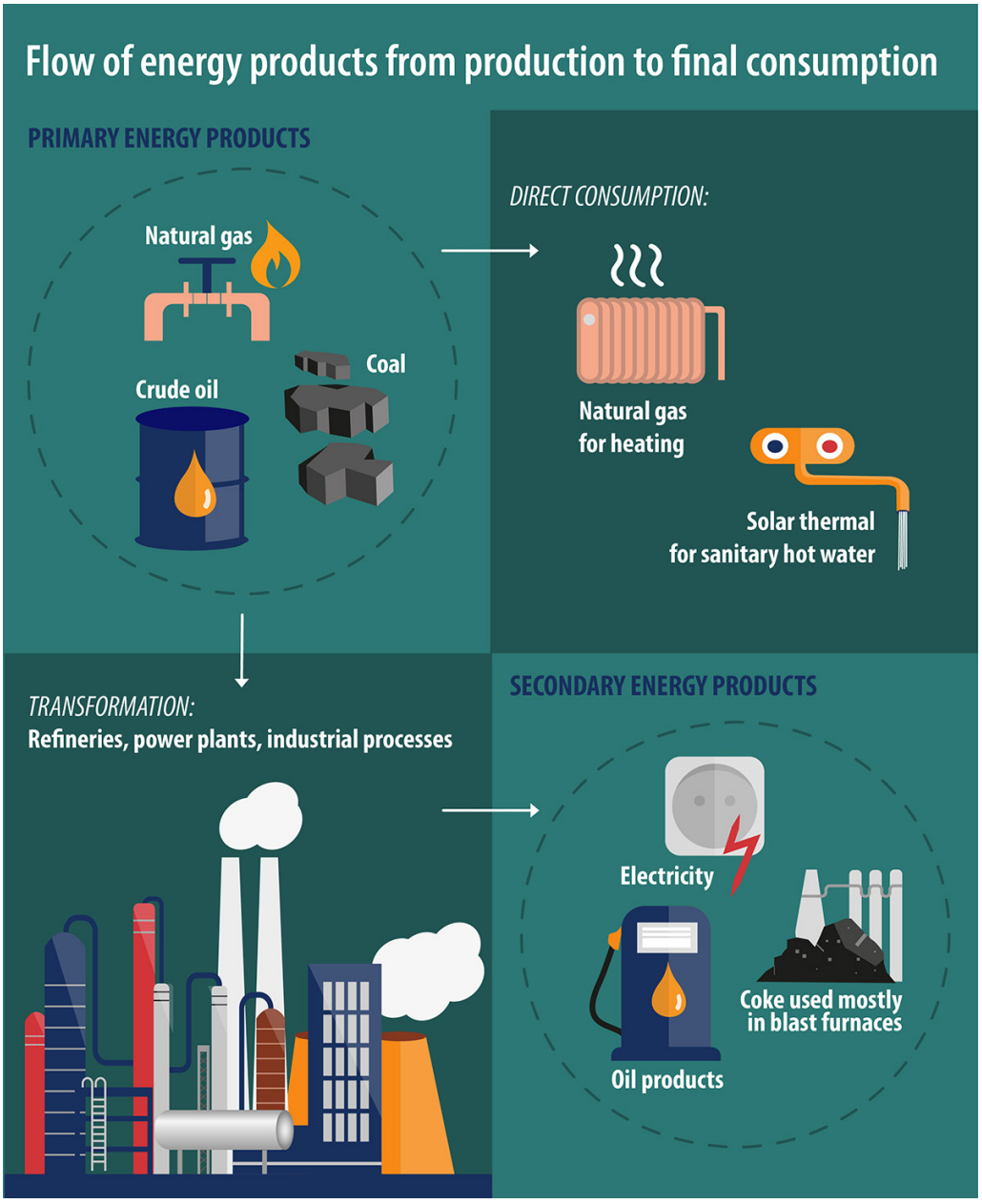
The industry sector consumes around a third of the final energy consumption in the EU

Energy is consumed by different sectors of the economy: households (i.e. energy consumed in citizen's dwellings), transport (e.g. rail, road, domestic aviation or inland shipping), industry, services (including commercial and public services) and agriculture & forestry.

Looking at which sectors in the EU consume the most energy, the industry sector (32 % of final energy consumption) consumed the most energy in 2020, followed by the transport sector (26 %), households (25 %), services (12 %) and agriculture & forestry (3 %).

Methodology

To properly interpret energy statistics, it is necessary to distinguish between primary and secondary energy products. A primary energy product is extracted or captured directly from natural resources, such as crude oil, firewood, natural gas or coal. Secondary energy products (such as electricity or motor gasoline) are produced as a result of a transformation process, either from a primary or from a different secondary energy product.



3.2 What is the source of the electricity we consume?

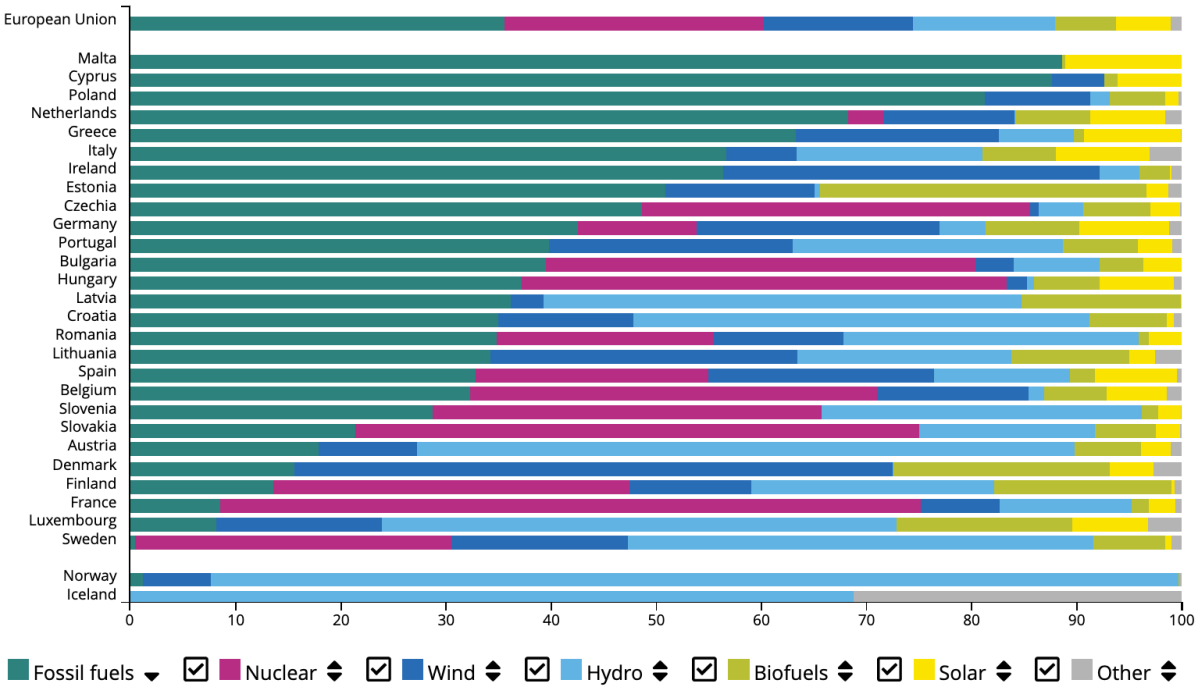
More electricity in the EU comes from renewables than from fossil fuels

Around 23 % of the final energy we consume is electricity and it comes from different sources. In 2020 at EU level, renewable energy sources accounted for 39 % of the electricity and overtook for the first time fossil fuels (36 %) as the main power source. In addition, 25 % of the electricity came from nuclear power plants. Among renewable sources, the highest share of electricity came from wind turbines (14 %), hydropower plants (13 %), biofuels (6 %) and solar power (5 %).

The sources of electricity production vary among the Member States. In 2020, in Denmark over half of electricity production (57 %) came from wind energy, while more than 60 % of electricity production in Austria came from hydro power plants. Around 90 % of electricity production came from fossil fuels in Malta and Cyprus, while over two thirds (67 %) of electricity production came from nuclear power plants in France, followed by 53 % in Slovakia.

Production of electricity by source, 2020

(in %)



Hydro includes pumped hydro, which for certain Member States, in particular Lithuania and Luxembourg, leads to a higher share for this category.

Other includes electricity from geothermal, non-renewable waste, heat from chemical sources and other sources.

Source: Eurostat - access to dataset

3.3 How much does the energy we consume cost?

Electricity prices for households highest in Denmark and Germany

In order to compare prices of electricity and gas among the Member States, national prices have been converted into euro. Exchange rate fluctuations can have an effect on prices expressed in euro for non-euro area Member States.

In the second half of 2021, household electricity prices, including taxes and levies, were highest in Denmark (EUR 34 per 100 kWh), Germany (EUR 32 per 100 kWh), Belgium and Ireland (both EUR 30 per 100 kWh), while the lowest prices were recorded in Hungary (EUR 10 per 100 kWh) and Bulgaria (EUR 11 per 100 kWh). Taxes and levies accounted for over half of the electricity price in Denmark and Germany, while their share was smallest in the Netherlands, where the value was negative (-3 %), followed by almost 6 % in Malta, 17 % in Bulgaria and 19 % in Ireland.

Natural gas prices for household consumers, including taxes and levies, were highest in Sweden (EUR 19 per 100 kWh), Denmark (EUR 12 per 100 kWh), the Netherlands and Spain (both EUR 11 per 100 kWh), and lowest in Hungary (EUR 3 per 100 kWh), Croatia, Lithuania, Slovakia and Latvia (EUR 4 per 100 kWh each). The share of taxes and levies in gas price was highest in the Netherlands (58 %) and lowest in Greece (6 %).

Gas prices for non-household consumers highest in Finland, Sweden and Denmark

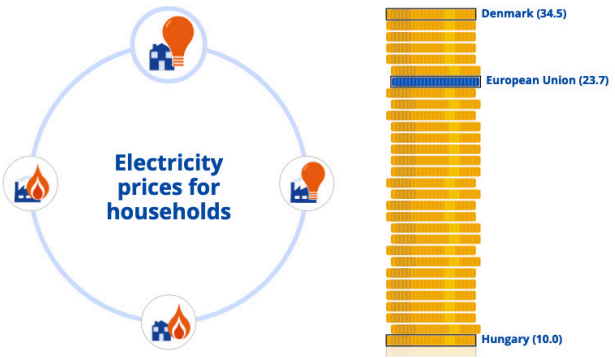
For non-household consumers, electricity prices (excluding VAT and other recoverable taxes and levies) in the second semester of 2021 ranged from EUR 22 per 100 kWh in Greece to EUR 8 per 100 kWh in Finland.

Natural gas prices for non-household consumers (excluding VAT and other recoverable taxes and levies) in the second semester of 2021 were highest in Finland (EUR 10 per 100 kWh), Sweden and Demark (both EUR 8 per 100 kWh), and lowest in Czechia, Slovakia, Belgium, Portugal and Spain (EUR 3 per 100 kWh each).

For petrol, diesel and heating oil prices, see the Oil bulletin of the Directorate-General for Energy of the European Commission.

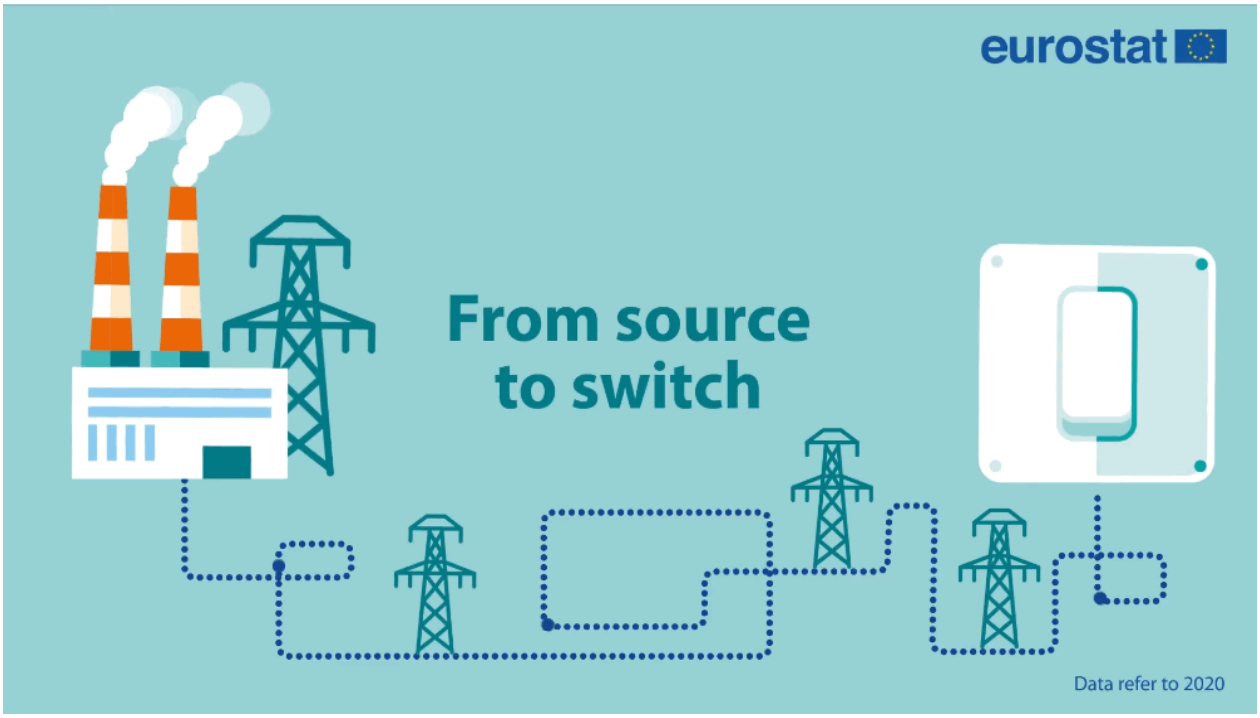
Electricity and gas prices in the European Union, 2nd semester 2021

(in euro per 100kWH)



Source: Eurostat - access to dataset

3.4 From source to switch



4. ENERGY AND ENVIRONMENT

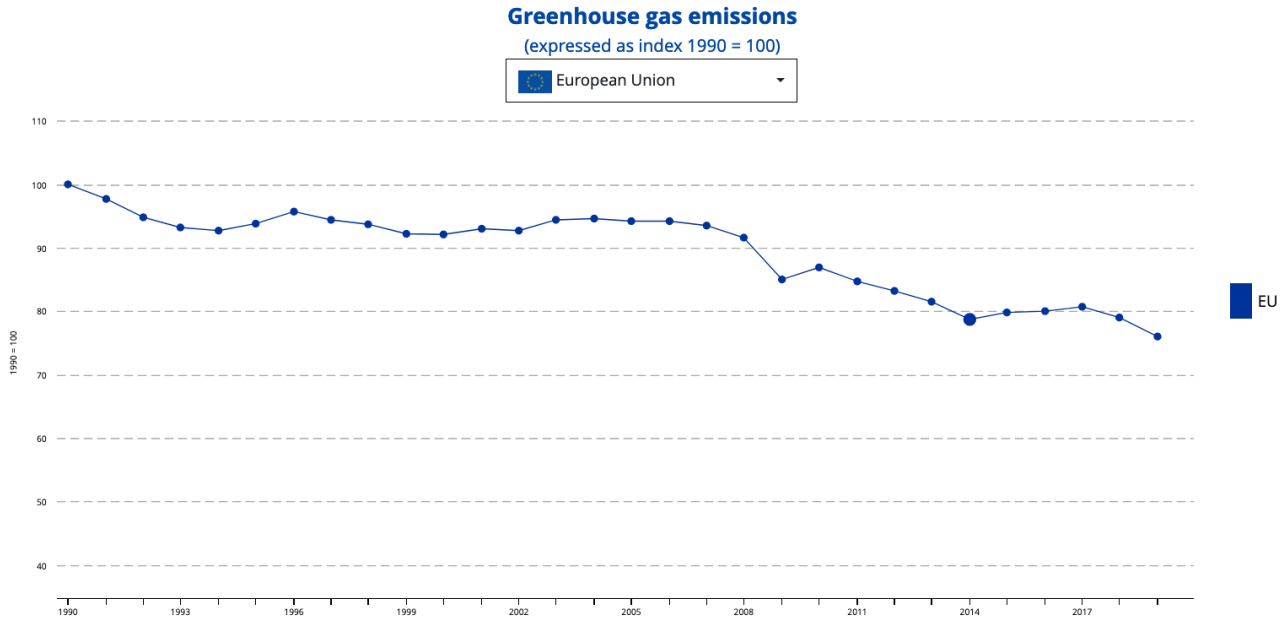
4.1 How are emissions of greenhouse gases in the EU evolving?

Climate change is a threat to sustainable development. After years of extensive research, the scientific community agrees that man-made greenhouse gas (GHG) emissions are the dominant cause of the Earth's average temperature increases over the past 250 years (IPCC, 2014). Man-made GHG emissions are primarily a by-product of burning of fuels in power plants, cars or homes. Farming and waste decaying in landfills are also sources of GHG emissions.

EU greenhouse gas emissions declined steadily from 2010 until 2014, rose slightly in the period 2015-2017 and dropped again in 2018. In 2019 emissions fell by nearly 4 % compared to 2018, the sharpest drop since 2009.

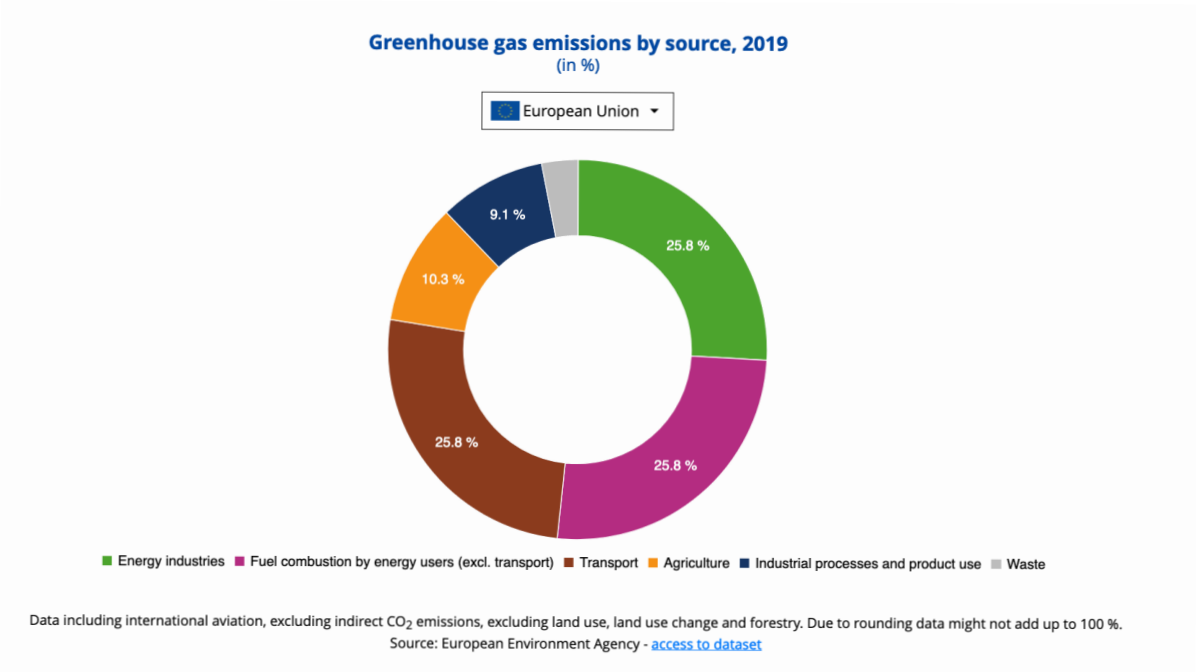
In 2019, EU GHG emissions were over 1 billion tonnes of CO2 equivalent lower than in 1990. This corresponds to a 24 % reduction compared with 1990 levels, which is more than the EU reduction target of 20 % by 2020. The new target for 2030 is a 55 % reduction of GHG emissions compared to 1990.

GHG emissions were below 1990 levels in 22 Member States. The largest reductions, over 50 %, were recorded in Estonia, Romania, Lithuania and Latvia.



Data including international aviation, excluding indirect CO_2 emissions, excluding land use, land use change and forestry.
Source: European Environment Agency - access to dataset

In 2019, the energy producing industries, fuel combustion by users and the transport sector all had the same share in total greenhouse gas emissions (25.8 % each). Compared with 1990, the share decreased for all sectors except transport, where it rose from 14.8 % in 1990 to 25.8 % in 2019, and agriculture, whose share slightly increased from 9.9 % to 10.3 %.



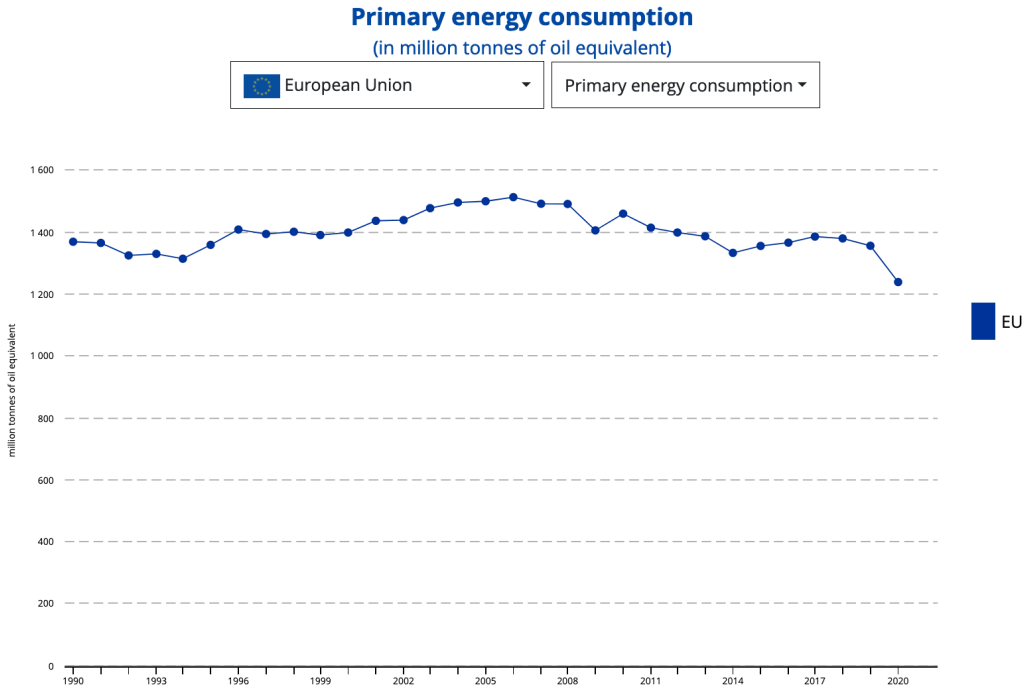
Data including international aviation, excluding indirect CO_2 emissions, excluding land use, land use change and forestry. Due to rounding data might not add up to 100 %.
Source: European Environment Agency - access to dataset

4.2 How efficient are we in our consumption of energy?

One of the priorities of the Energy Union strategy is to increase energy efficiency, mainly by cutting the EU's overall energy use and managing energy in a more cost-effective way. Improving energy efficiency contributes to achieving energy savings, protecting the environment, mitigating climate change and reducing the EU's reliance on external suppliers of oil and gas.

In concrete terms, using less energy means reducing primary energy consumption, which is the total domestic energy demand, and final energy consumption, which is the energy actually consumed by end users, not including what the energy sector needs itself as well as transformation and distribution losses.

In 2020, primary energy consumption dropped to its lowest level since full records have been available (1 236 million tonnes of oil equivalent (Mtoe)). This is 5.8 % below the EU 2020 efficiency target (no more than 1 312 Mtoe primary energy consumption) and 9.6 % above the EU 2030 target (no more than 1 128 Mtoe). Final energy consumption also saw a significant decrease (to 907 Mtoe), 5.4 % below the 2020 target (no more than 959 Mtoe final energy consumption) and 7.2 % above the 2030 target (no more than 846 Mtoe).

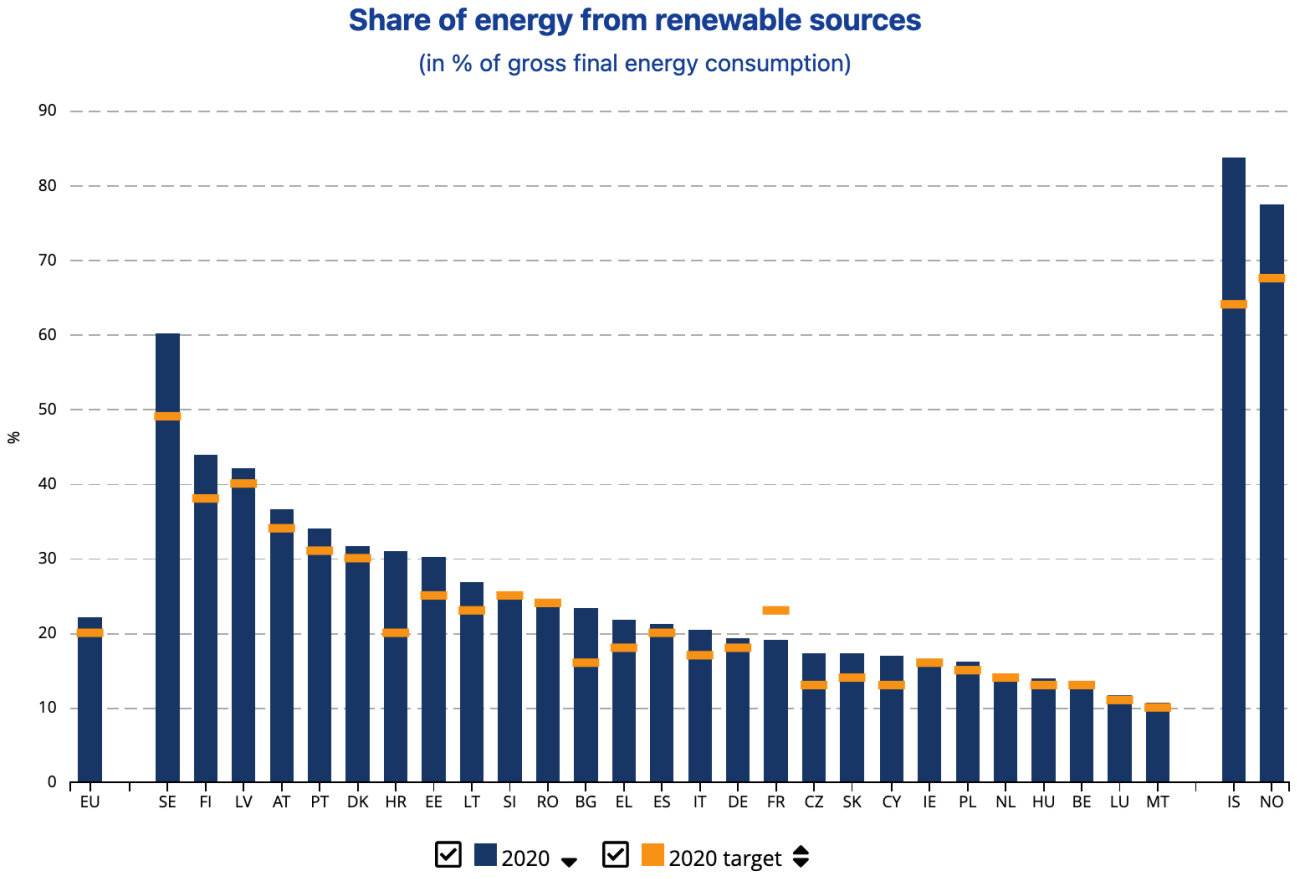


Source: Eurostat - access to dataset

4.3 What is the share of renewable energy in the EU?

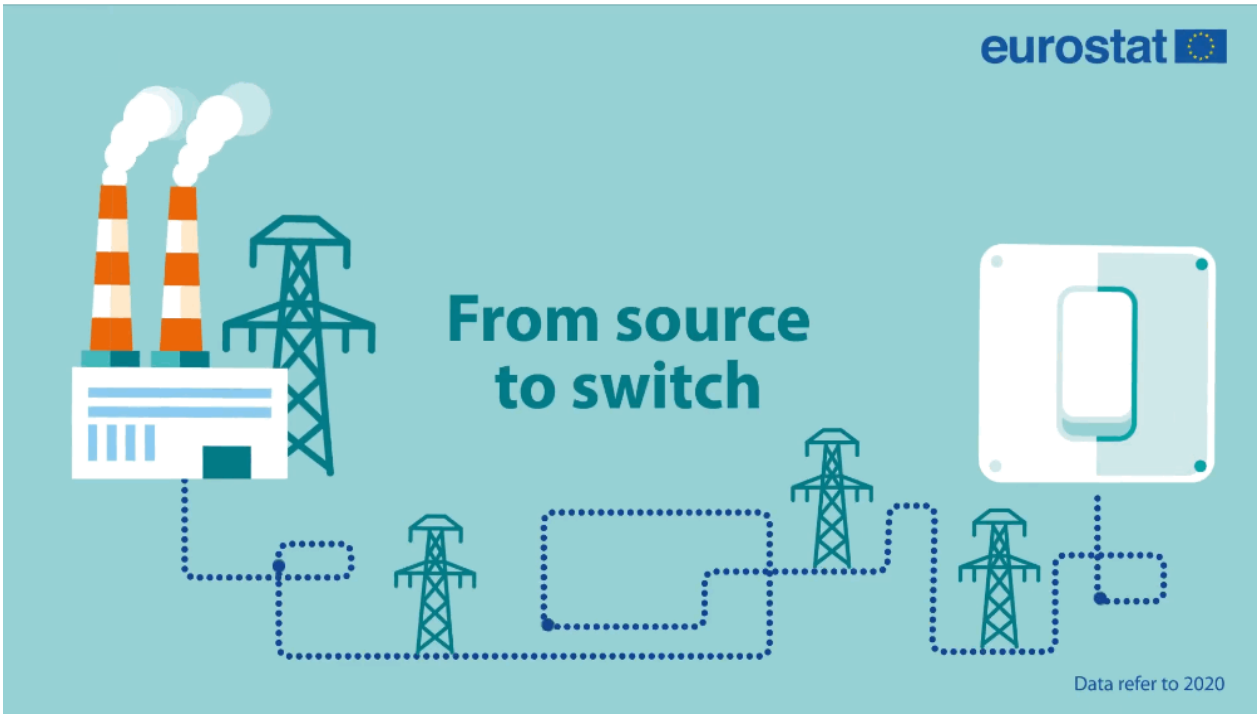
At EU level, the share of renewable energy in energy consumption increased steadily from 9.6 % in 2004 to 22.1 % in 2020, thus exceeding the EU target of 20 % renewables by 2020. The increased share of renewables in 2020 was partly prompted by the decrease in the consumption of fossil fuel brought about by the COVID-19 pandemic. The new EU target for 2030 is 32 % (the target is under revision).

Sweden had by far the highest share of renewables (60.1 % of energy consumption) in 2020, followed by Finland (43.8 %) and Latvia (42.1 %). In contrast, Malta (10.7 %), Luxembourg (11.7 %) and Belgium (13.0 %) registered the lowest shares of renewables in energy consumption. Differences stem from variations in the endowment with natural resources, mostly in the potential for building hydropower plants and in the availability of biomass. All Member States increased their renewable energy share between 2004 and 2020, seventeen have at least doubled their share.



Source: Eurostat - access to dataset

4.4 From wind to watts



Glossary

Bunkers

Bunkers include all dutiable petroleum products loaded aboard a vessel for consumption by that vessel. International maritime bunkers describe the quantities of fuel oil delivered to ships of all flags that are engaged in international navigation. It is the fuel used to power these ships. International navigation may take place at sea, on inland lakes and waterways, and in coastal waters. International maritime bunkers do not include fuel oil consumption by: ships engaged in domestic navigation; whether a vessel is engaged in domestic or international navigation is determined only by the ship's port of departure and port of arrival - not by the flag or nationality of the ship; fishing vessels; military forces.

Combined heat and power

Combined heat and power describes the simultaneous production of both useful heat (that can be used, for example, in industrial processes or city heating schemes) and electricity in a single process or unit.

Derived heat

Derived heat is used for warming spaces and for industrial processes and is obtained by burning combustible fuels like coal, natural gas, oil, renewables (biofuels) and wastes, or also by transforming electricity to heat in electric boilers or heat pumps.

Energy dependency rate

The energy dependency rate shows the proportion of energy that an economy must import. It is defined as net energy imports (imports minus exports) divided by gross inland energy consumption plus fuel supplied to international maritime bunkers, expressed as a percentage. A negative dependency rate indicates a net exporter of energy while a dependency rate in excess of 100 % indicates that energy products have been stocked.

Energy intensity

Energy intensity measures the energy consumption of an economy and its energy efficiency. It is the ratio between gross inland consumption of energy and gross domestic product (GDP). Gross inland consumption of energy is calculated as the sum of gross inland consumption of five energy types: coal, electricity, oil, natural gas and renewable energy sources. The GDP figures are taken at constant prices to avoid the impact of inflation. Since gross inland consumption is measured in kilograms of oil equivalent and GDP in EUR 1 000, this ratio is measured in kgoe per EUR 1 000.

Final energy consumption

Final energy consumption is the total energy consumed by end users, such as households, industry and agriculture. It is the energy which reaches the final consumer's door and excludes that which is used by the energy sector itself. Final energy consumption excludes energy used by the energy sector, including for deliveries, and transformation. It also excludes fuel transformed in the electrical power stations of industrial auto-producers and coke transformed into blast-furnace gas where this is not part of overall industrial consumption but of the transformation sector. Final energy consumption in "households, services, etc." covers quantities consumed by private households, commerce, public administration, services, agriculture and fisheries.

Energy end user categories

Energy end user categories include private households, agriculture, industry, road transport, air transport (aviation), other transport (rail, inland navigation) and services.

Electricity

Electricity denotes the set of physical phenomena related to electrical charges. It allows to store and transfer energy, or to consume it through electrical appliances. It has a very wide range of applications in almost all kinds of human activities ranging from industrial production, household use, agriculture or commerce and it is normally used for running machines, lighting and heating.

Fossil fuel

Fossil fuel is a generic term for non-renewable natural energy sources such as coal, natural gas and oil that were formed from plants and animals (biomass) that existed in the geological past (for example, hundreds of millions of years ago). Fossil fuels are carbon-based and currently supply most human energy requirements.

Gas

Gas includes mostly natural gas and derived gases.

Gigajoule

A gigajoule, abbreviated as GJ, is a unit of measurement of energy consumption: a gigajoule is equal to one thousand million joules.

Gigawatt hours

Gigawatt hours, abbreviated as GWh, is a unit of energy representing one billion (1 000 000 000) watt hours and is equivalent to one million kilowatt hours. Gigawatt hours are often used as a measure of the output of large electricity power stations.

Greenhouse gas (GHG)

Greenhouse gases constitute a group of gases contributing to global warming and climate change. The Kyoto Protocol, an environmental agreement adopted by many of the parties to the United Nations Framework Convention on Climate Change (UNFCCC) in 1997 to curb global warming, covers six greenhouse gases: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and the so-called F-gases (hydrofluorocarbons and perfluorocarbons) and sulphur hexafluoride (SF6). Converting them to carbon dioxide (or CO_2) equivalents makes it possible to compare them and to determine their individual and total contributions to global warming.

Gross inland energy consumption

Gross inland energy consumption, sometimes abbreviated as gross inland consumption, is the total energy available of a country or region. It represents the quantity of energy necessary to satisfy inland consumption of the geographical entity under consideration. Gross inland energy consumption covers consumption by the energy sector itself; distribution and transformation losses; final energy consumption by end users; 'statistical differences' (not already captured in the figures on primary energy consumption and final energy consumption). Gross inland consumption does not include energy (fuel oil) provided to international maritime bunkers. It is calculated as follows: primary production + recovered products + net imports + variations of stocks – bunkers.

Gross electricity generation

Gross electricity generation or gross electricity production refers to the process of producing electrical energy. It is the total amount of electrical energy produced by transforming other forms of energy, for example nuclear or wind power. It is commonly expressed in

gigawatt hours (GWh). Total gross electricity generation covers gross electricity generation in all types of power plants. The gross electricity generation at plant level is defined as the electricity measured at the outlet of the main transformers, i.e. including the amount of electricity used in the plant auxiliaries and in the transformers.

District heating

City heating, also known as district heating, is the distribution of heat through a network to one or several buildings using hot water or steam produced centrally, often from co-generation plants, from waste heat from industry, or from dedicated heating systems.

Kilogram of oil equivalent

Kilogram(s) of oil equivalent, usually abbreviated as kgoe, is a normalized unit of energy. By convention it is equivalent to the approximate amount of energy that can be extracted from one kilogram of crude oil. It is a standardized unit, assigned a net calorific value of 41 868 kilojoules/kg and may be used to compare the energy from different sources.

Kilowatt hours

Kilowatt hours, abbreviated as KWh, is a unit of energy representing one thousand watt hours. Kilowatt hours are often used as a measure of domestic energy consumption.

Net electricity generation

Net electricity generation or net electricity production is equal to gross electricity generation minus the consumption of power stations' auxiliary services.

Nuclear heat

Nuclear heat is the thermal energy produced in a nuclear power plant (nuclear energy). It is obtained from the nuclear fission of atoms, usually of uranium and plutonium.

Primary production of energy

Primary production of energy is any extraction of energy products in a useable form from natural sources. This occurs either when natural sources are exploited (for example, in coal mines, crude oil fields, hydro power plants) or in the fabrication of biofuels. Transforming energy from one form into another, such as electricity or heat generation in thermal power plants (where primary energy sources are burned), or coke production in coke ovens, is not primary production.

Renewable energy sources

Renewable energy sources, also called renewables, are energy sources that replenish (or renew) themselves naturally. Renewable energy sources include the following: Biomass (solid biofuels): organic, non-fossil material of biological origin, which may be used for heat production or electricity generation. It includes: charcoal; wood and wood waste; black liquor, bagasse, animal waste and other vegetal materials and residuals.

Biogases: gases composed principally of methane and carbon dioxide produced by anaerobic fermentation of biomass, or by thermal processes. It includes: landfill gas; sewage sludge gas; other biogases from anaerobic digestion; bio gases from thermal processes.

Liquid biofuels are liquid fuels from a non-fossil biological origin and a renewable energy source, to be distinguished from fossil fuels. Biofuels can be split up into four categories: bio gasoline, biodiesel, bio jet kerosene (aviation fuel) and other liquid biofuels.

Renewable waste: portion of waste produced by households, industry, hospitals and the tertiary sector which is biological material collected by local authorities and incinerated at specific installations.

Hydropower: the electricity generated from

the potential and kinetic energy of water in hydroelectric plants (the electricity generated in pumped storage plants is not included).

Geothermal energy: the energy available as heat from within the earth's crust, usually in the form of hot water or steam.

Wind energy: the kinetic energy of wind converted into electricity in wind turbines.

Solar energy: solar radiation exploited for solar heat (hot water) and electricity production.
Tide, wave, ocean: mechanical energy derived from tidal movement, wave motion or ocean current and exploited for electricity generation.

Share of renewable energy in energy consumption

Renewable energy sources cover solar thermal and photovoltaic energy, hydro (including tide, wave and ocean energy), wind, geothermal energy and all forms of biomass (including biological waste and liquid biofuels). The contribution of renewable energy from heat pumps is also covered for the Member States for which this information was reported. The renewable energy delivered to final consumers (industry, transport, households, services including public services, agriculture, forestry and fisheries) is the numerator of this indicator. The denominator, the gross final energy consumption of all energy sources, covers total energy delivered for energy purposes to final consumers as well as the transmission and distribution losses for electricity and heat. It should be noted that exports/imports of electricity are not considered as renewable energy unless a specific intergovernmental agreement has been signed. For more information: The national shares of energy from renewable sources in gross final consumption of energy are calculated according to specific calculation provisions of Directive 2009/28/EC (*http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32009L0028&from=EN*).

Solid fuels

Solid fuels are fossil fuels covering various types of coals and solid products derived from coals. They consist of carbonised vegetable matter and usually have the physical appearance of a black or brown rock.

Tonnes of oil equivalent

Tonne(s) of oil equivalent, abbreviated as toe, is a normalized unit of energy. By convention it is equivalent to the approximate amount of energy that can be extracted from one tonne of crude oil.

Total fuels

Total fuels is the sum of all energy products and is composed of the following fuel families: Solid fuels (coal), total petroleum products (crude oil and derived petroleum products), gas, nuclear heat, derived heat, renewable energies, electricity and waste (non-renewable).

Total petroleum products

Total petroleum products are fossil fuels (usually in liquid state) and include crude oil and all products derived from it (e.g. when processed in oil refineries), including motor gasoline, diesel oil, fuel oil, etc.

Waste (non-renewable)

Waste (non-renewable) consists of materials coming from combustible industrial, institutional, hospital and household wastes such as rubber, plastics, waste fossil oils and other similar types of wastes, which can be either solid or liquid.

FURTHER INFORMATION

Shedding light on energy in the EU is an interactive publication released by Eurostat, the statistical office of the European Union.

For further information

The dedicated section on energy on the Eurostat website.
Interactive visualisations on energy.
Articles on energy in Statistics Explained.

Information on data

The European Union (EU) includes 27 EU Member States.
Date of data extraction: April 2022 for text. Data in the visualisations are generally linked directly to the online database to the reference year mentioned in the text. The Sankey diagram and other energy interactive tools are continuously updated.

Contact

If you have questions on the data, please contact the Eurostat User Support.

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