Shedding light on energy in the EU

A guided tour of energy statistics

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.

First of all, energy resources have to be extracted from our environment. Primary energy sources are transformed into energy products available for consumption. For example crude oil is transformed into motor gasoline, while fossil, nuclear and renewable energy are transformed into electricity.

Statistics can help to make the complex process of energy more understandable.

- Where does our energy come from?
- How dependent are we on energy imports?
- Which kind of energy do we consume in the EU and how much does it cost?
- Are we efficient in the consumption of energy?
- How much greenhouse gas do we emit in the EU?

By providing simple statistical answers to these questions and by presenting the information in different forms (texts, infographics, videos, etc.), this new tool developed by Eurostat replies to the needs of those who are not familiar with the energy sector, but who would like to better understand the challenges the Energy Union initiative is facing. For more experienced users, the whole energy process – from source to final use – is presented in a very detailed way in a user-friendly Sankey-diagram.

Contents

1. WHAT IS THE ENERGY UNION ABOUT?

The European Commission launched in February 2015 a new strategy for a resilient Energy Union with a forward-looking climate change policy.

The goal of the Energy Union is to give EU consumers - households and businesses - secure, sustainable, competitive and affordable energy. Achieving this goal will require a fundamental transformation of Europe's energy system.

The Energy Union Strategy is made up of five closely interrelated and mutually reinforcing dimensions, designed to bring greater energy security, sustainability and competitiveness:

Energy security, solidarity and trust: Diversifying Europe's sources of energy and making better, more efficient use of energy produced within the EU.

A fully-integrated internal energy market: Using interconnectors which enable energy to flow freely across the EU - without any technical or regulatory barriers. Only then can energy providers freely compete and provide the best energy prices.

Energy efficiency contributing to moderation of demand: Consuming less energy in order to reduce pollution and preserve domestic energy sources. This will reduce the EU's need for energy imports.

Decarbonising the economy: Pushing for a global deal for climate change and encouraging private investment in new infrastructure and technologies.

Research, innovation and competitiveness: Supporting breakthroughs in low-carbon technologies by coordinating research and helping to finance projects in partnership with the private sector.

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

Video link : http://europa.eu/!hR86XP

Communication – Energy Union Framework Strategy
http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2015:80:FIN

State of the Energy Union
http://ec.europa.eu/priorities/energy-union-and-climate/state-energy-union_en

The Energy Union on Track to Deliver – Press release on the first State of the Energy Union Report
http://europa.eu/rapid/press-release_IP-15-6105_en-.htm

2. WHAT ENERGY IS AVAILABLE IN THE EU?

1. Where does our energy come from?

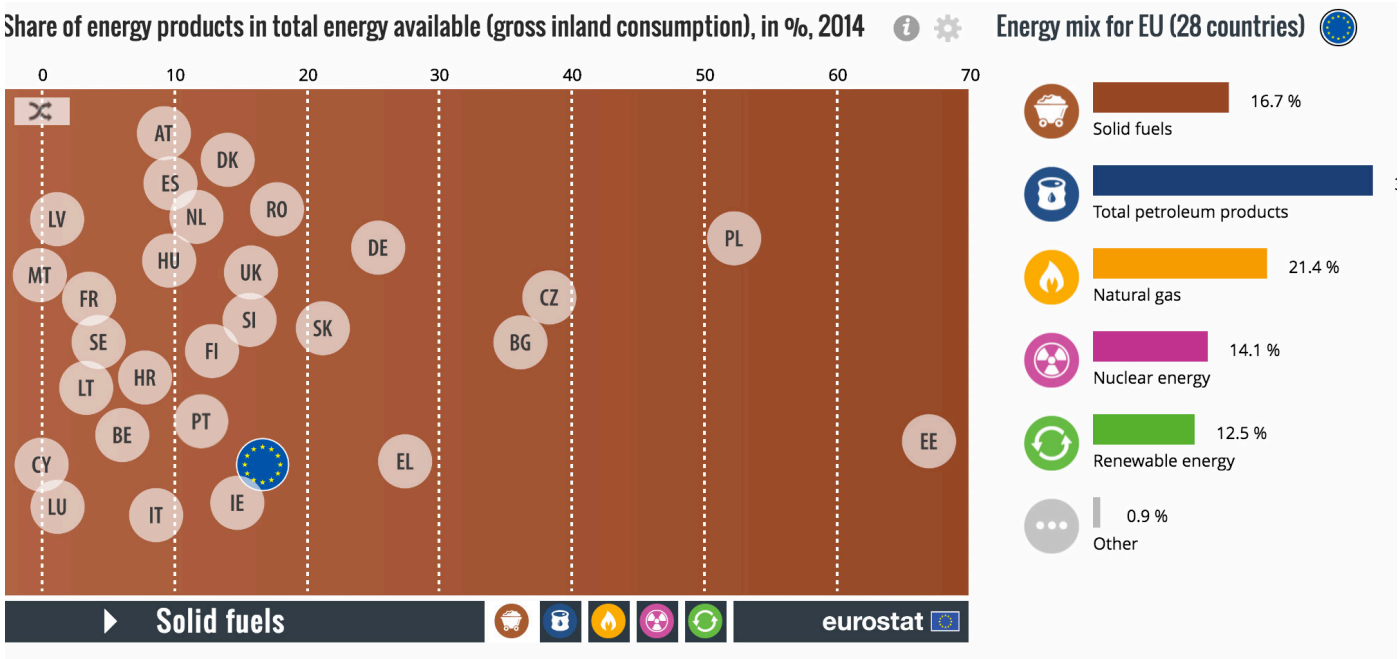
The energy available in the European Union comes from energy produced in the EU and from energy imported from third countries. In 2014, the EU produced around one third (35 %) of its own energy, while around two thirds (65 %) were imported.

Imports and production form together the sources of energy available in the EU

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 2014, 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) (34 %), natural gas (21 %), solid fuels (17 %), nuclear energy (14 %) and renewable energy (13 %).

The shares of the different energy sources in the the total energy available vary considerably between Member States. Petroleum products (including crude oil) account for a significant share of total energy available in Malta (98 %), Cyprus (94 %) and Luxembourg (63 %), while natural gas makes up around a third in the Netherlands, Italy and the United Kingdom. Over half of the energy available in Estonia (67 %) and Poland (52 %) comes from solid fuels (mainly coal), while nuclear energy accounts for 45% in France and 35 % in Sweden. Renewable energy makes up over a third in Latvia and Sweden (both 36 %).


Share of energy products in total energy available (gross inland consumption), in %, 2014
0
10
20
30
40
50
60
70
AT
DK
ES
RO
LV
NL
DE
PL
HU
UK
MT
FR
CZ
SI
SK
SE
FI
BG
HR
LT
PT
BE
EE
CY
EL
IE
LU
IT
Solid fuels
eurostat
Energy mix for EU (28 countries)
16.7 %
Solid fuels
Total petroleum products
21.4 %
Natural gas
14.1 %
Nuclear energy
12.5 %
Renewable energy
0.9 %
Other

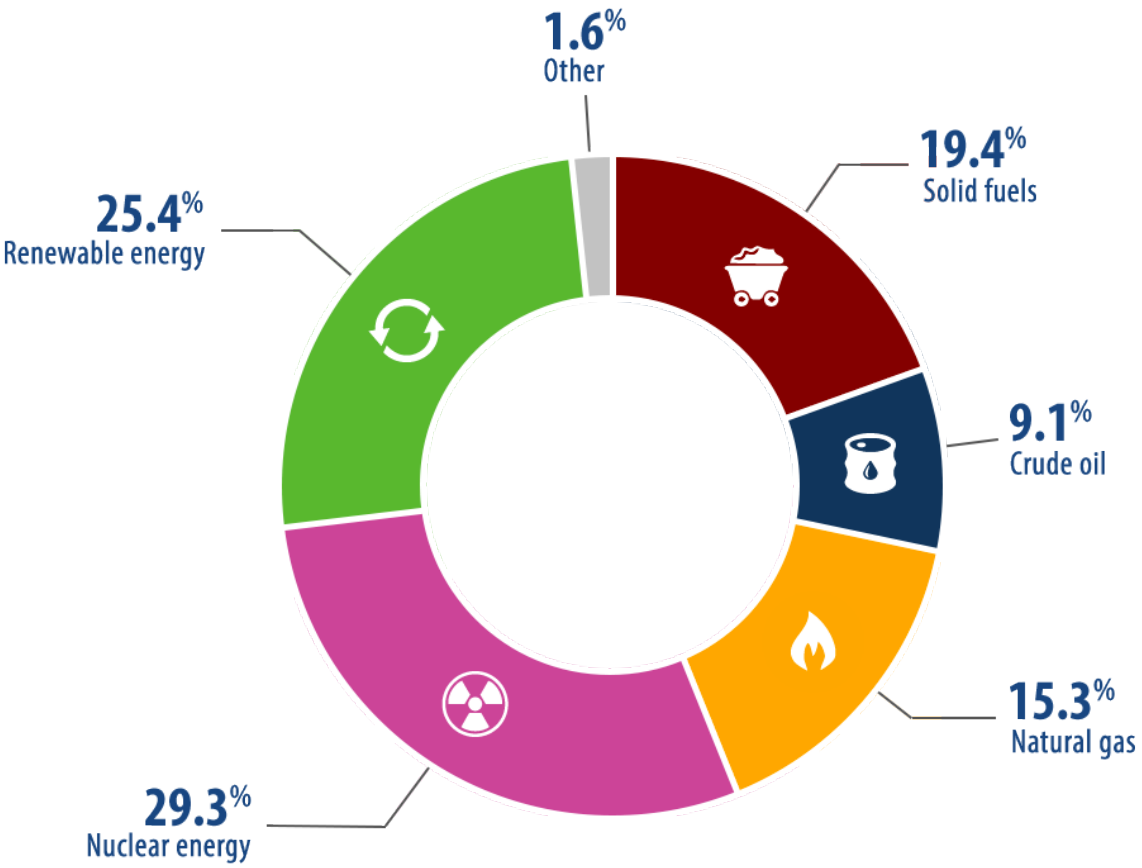
2. What do we produce in the EU?

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

Nuclear energy (29 % of total EU energy production) was the largest contributing source to energy production in the EU in 2014. Renewable energy (25 %) was the second largest source, followed by solid fuels (19 %), natural gas (15 %) and crude oil (9 %).

However, the production of energy is very different from one Member State to another. The significance of nuclear energy is particularly high in France (83 % of total national energy production), Belgium (71 %) and Slovakia (64 %). Renewable energy is the main source of energy produced in a number of Member States, with shares of over 90 % in Malta, Latvia, Portugal, Cyprus and Lithuania. Solid fuels have the highest importance in Poland (80 %), Estonia (78 %) and Greece (73 %), while natural gas is the main source of energy produced in the Netherlands (86 %). Crude oil is the major source of energy produced in Denmark (51 %) and the United Kingdom (38 %).

EU Production 2014



Source EUROSTAT

3. From where do we import energy and how dependent are we?

What do we import?

For its own consumption, the EU also needs energy which is imported from third countries. In 2014, 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 gas (23 %) and solid fuels (11 %).

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

The stability of the EU's energy supplies may be threatened if a high proportion of imports are concentrated among relatively few partners. In 2014, almost two thirds of the EU's crude oil imports came from Russia (30 %), Norway (13 %), Nigeria and Saudi Arabia (both 9 %). Kazakhstan (6 %) and Iraq (5 %) followed. A similar analysis shows that more than three quarters of the EU's imports of natural gas came from Russia (38 %), Norway (32 %) and Algeria (12 %), while almost three quarters of solid fuel (mostly coal) imports originated from Russia (29 %), Colombia (21 %) and the United States (20 %).

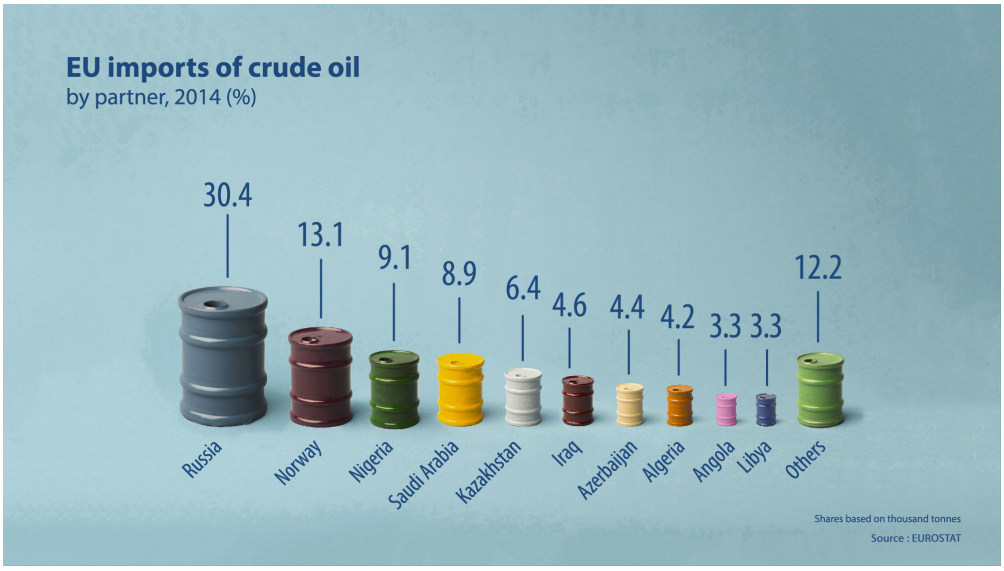
Different patterns among the EU Member States

More than 80 % of energy imports are petroleum products in Malta, Cyprus, Greece, Sweden and Romania and over a third is gas in Hungary and Italy. More than 15 % of energy imports are solid fuels in Slovakia, United Kingdom and Germany.

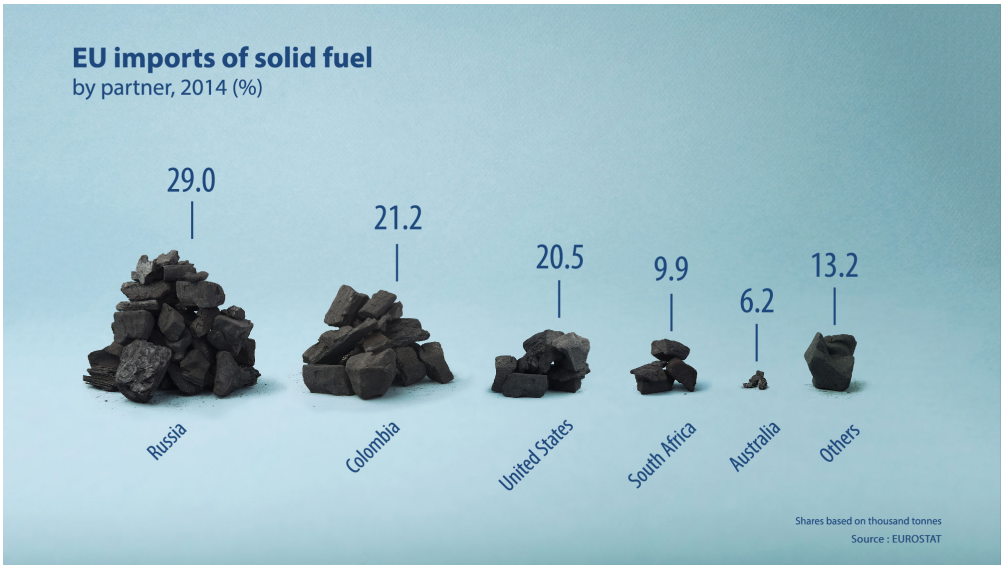
How dependent are we from energy produced outside the EU?

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 2014, the dependency rate was equal to 53 %, which means that more than half of the EU's energy needs were met by net imports. This rate ranges from over 90 % in Malta, Luxembourg and Cyprus to below 20 % in Estonia, Denmark and Romania. The dependency rate on energy imports has increased since 2000, when it was just 47 %.

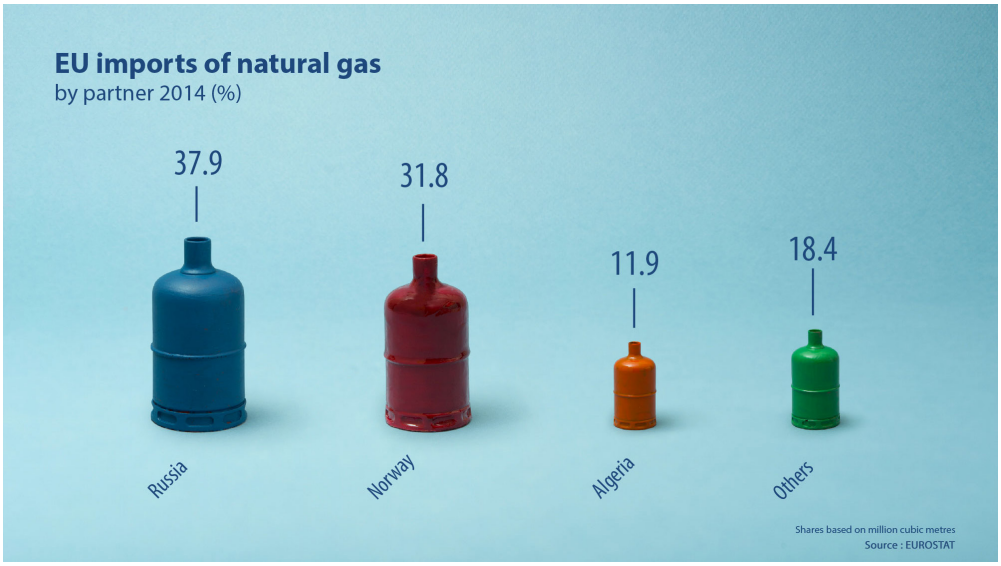
As mentioned in the part dealing with energy imports, the EU mainly depends on Russia for imports of crude oil, natural gas and solid fuels, followed by Norway for crude oil and natural gas.



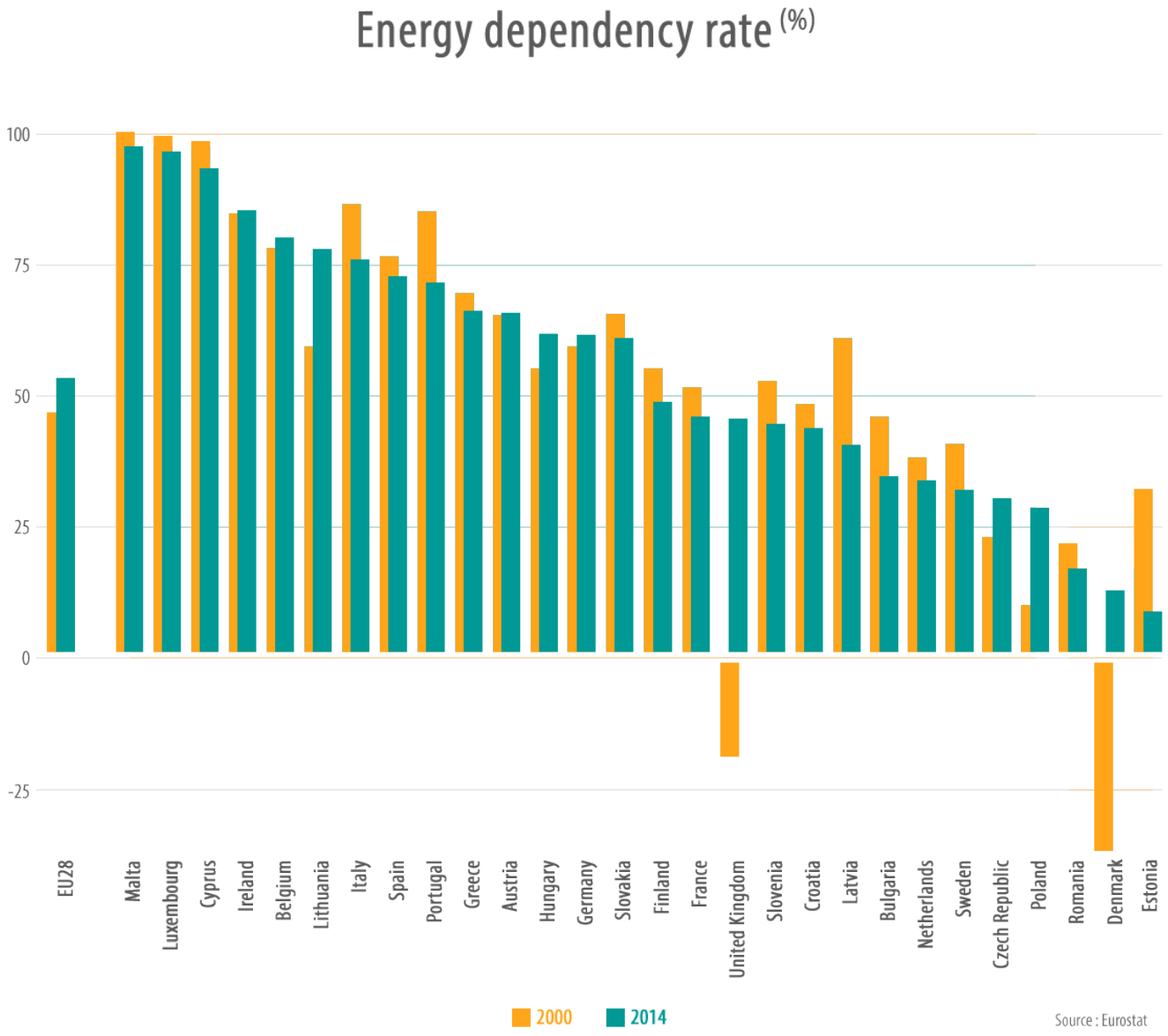
Imports by Member State



Imports by Member State

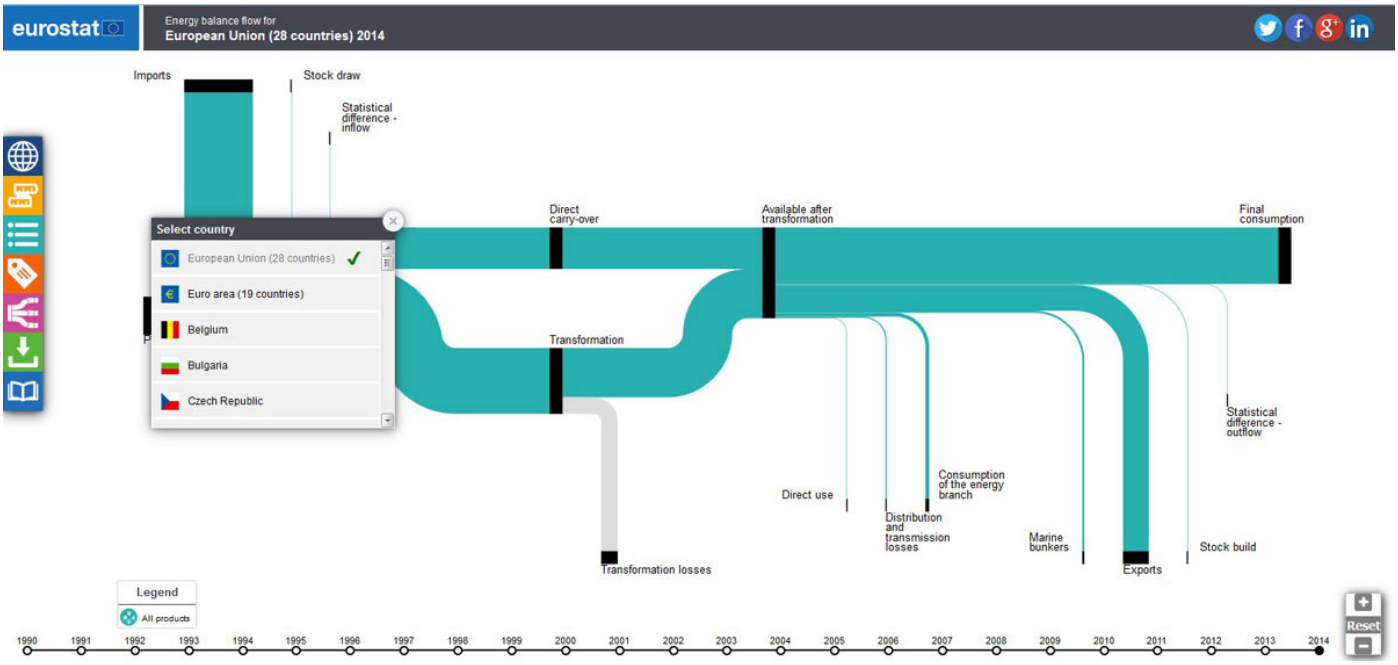


Imports by Member State


Energy dependency rate (%)
100
75
50
25
0
-25
EU28
Malta
Luxembourg
Cyprus
Ireland
Belgium
Lithuania
Italy
Spain
Portugal
Greece
Austria
Hungary
Germany
Slovakia
Finland
France
United Kingdom
Slovenia
Croatia
Latvia
Bulgaria
Netherlands
Sweden
Czech Republic
Poland
Romania
Denmark
Estonia
2000
2014
Source : Eurostat

4. From source to use - what are the energy flows?

The energy flows are shown through a Sankey diagram, which is a graphic illustration displaying the whole energy process.



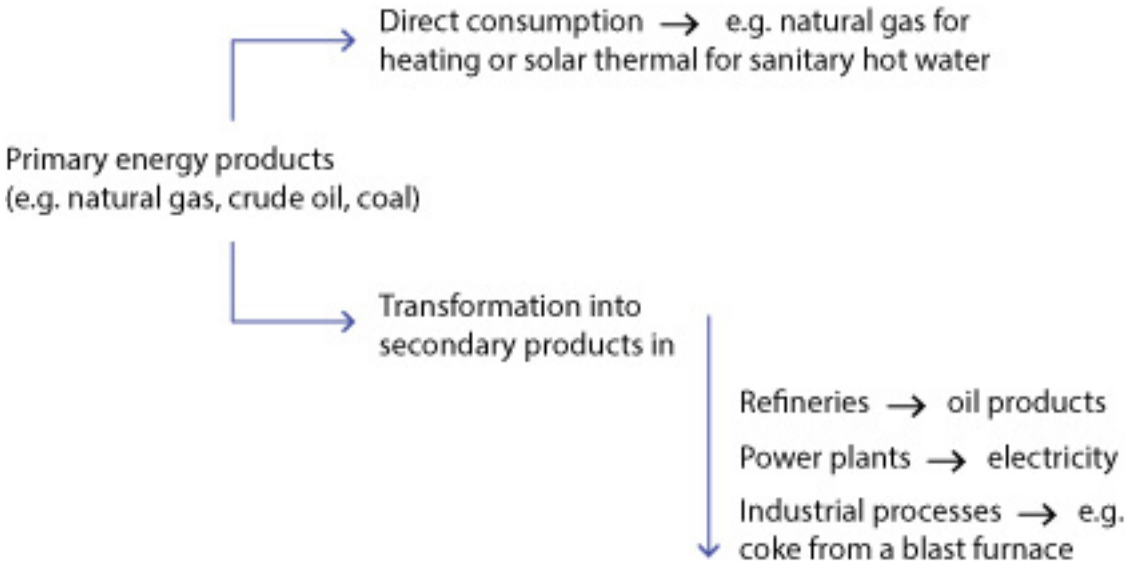
3. WHICH TYPE OF ENERGY DO WE CONSUME?

1. What kind of energy do we consume in the EU?

Out of the total energy available in the EU, just under two thirds is consumed by end users, for example EU citizens, industry, transport, etc. The difference – around one third – is mainly used for electricity generation and in other energy transformation processes. An example of a transformation process is crude oil being refined at refineries to become petroleum products.

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.

Flow of energy products from production to final consumption



Petroleum products are the most consumed

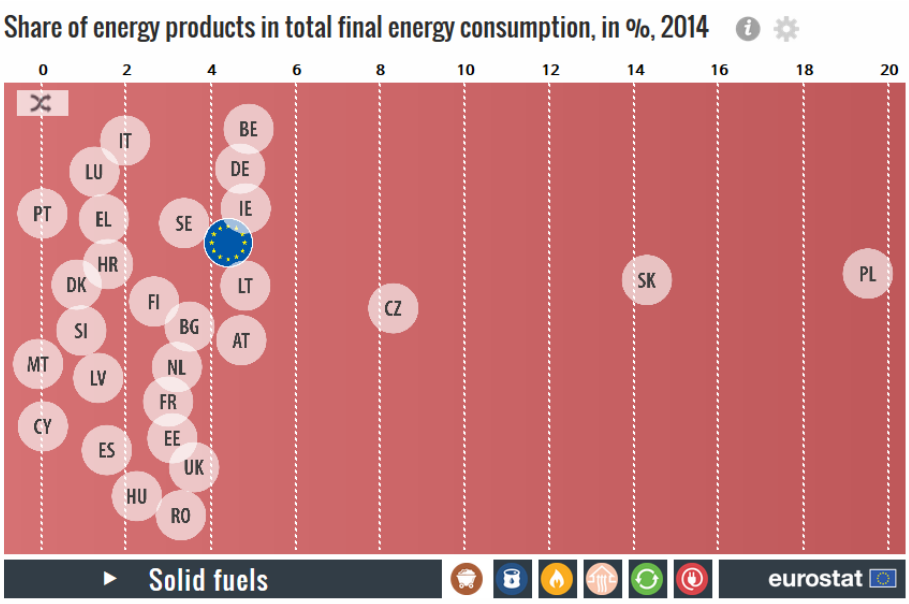
In the EU in 2014, petroleum products (such as heating oil, petrol, diesel fuel), which represent 40 % of final energy consumption were the most consumed, followed by electricity and natural gas (22 % each), direct use of renewables (not transformed into electricity, e.g. wood, solar thermal, geothermal or biogas for space heating or hot water production) (8 %), solid fossil fuels (mostly coal) and derived heat (such as district heating) (4 % each). The real consumption of renewable energy is higher than 8 %, because other renewable sources are included in electricity (e.g. hydropower, wind power or solar photovoltaic).

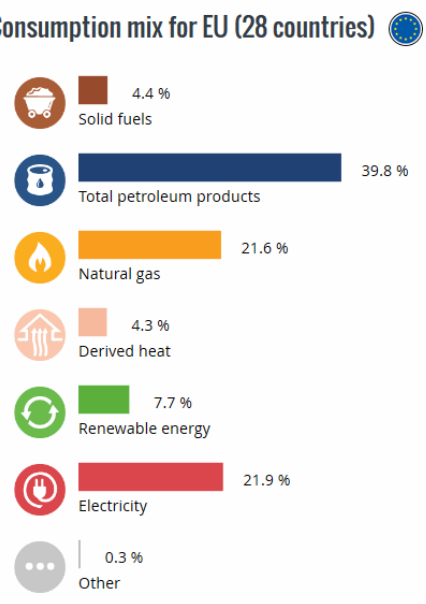
Within the EU Member States, the final energy consumption pattern varies considerably. Petroleum products reach over 65 % of final energy consumption in Cyprus, Luxembourg and Malta, while gas accounts for over 30 % in the Netherlands, Hungary and Slovakia. Renewable energies reach over 20 % in Latvia and Finland, while the consumption of electricity in Sweden and Malta accounts for over 30 % of their final energy consumption.

The transport sector consumes 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 the residential sector), 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 transport sector (33 % of final energy consumption) consumes the most energy, followed by industry (26 %), households (25 %), services (13 %) and agriculture & forestry (2 %).


Share of energy products in total final energy consumption, in %, 2014
0
2
4
6
8
10
12
14
16
18
20
BE
IT
DE
LU
IE
PT
EL
SE
HR
DK
LT
FI
CZ
SK
PL
SI
BG
AT
MT
LV
NL
FR
CY
EE
ES
UK
HU
RO
Solid fuels
eurostat

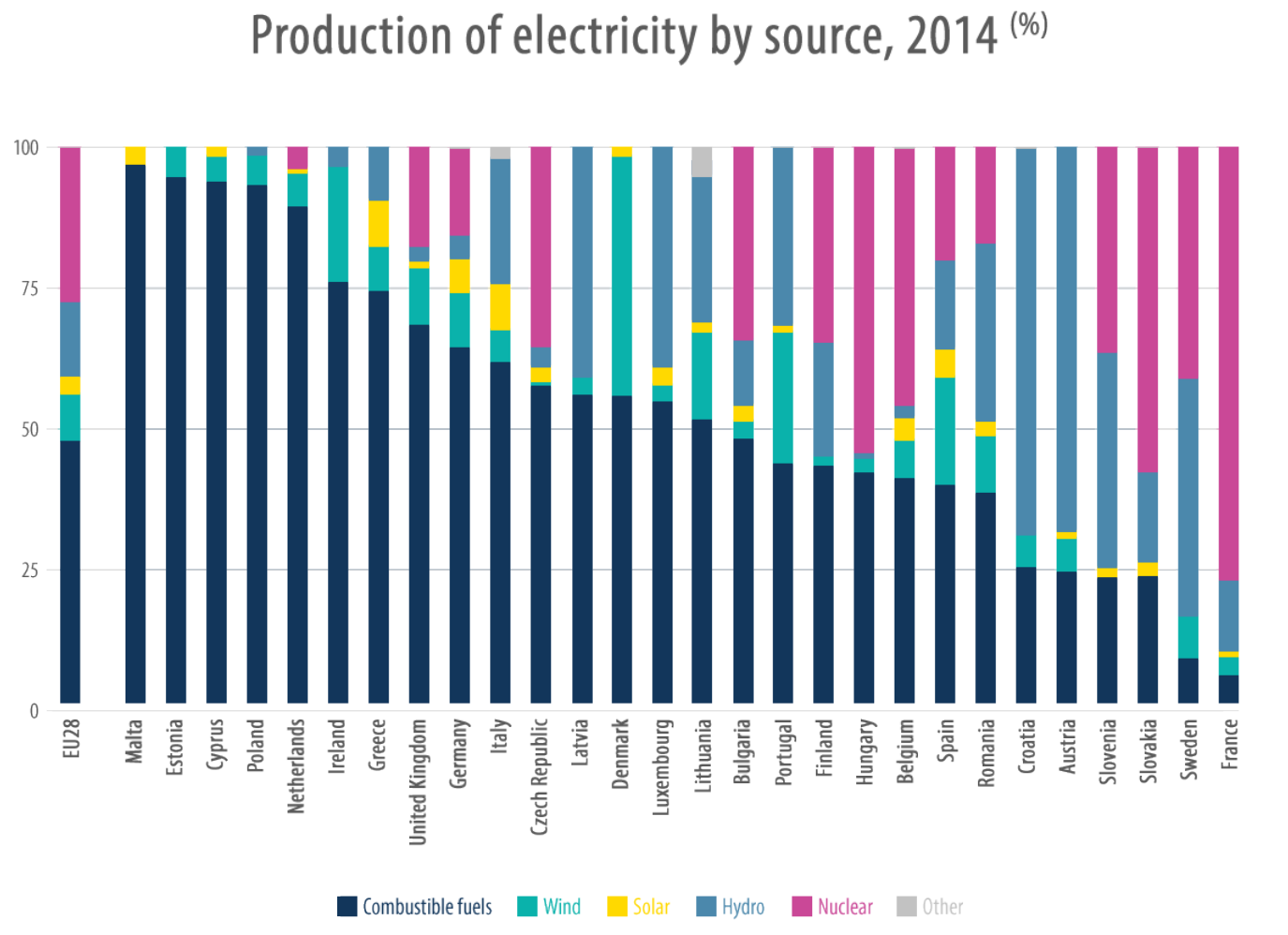

Consumption mix for EU (28 countries)
4.4 %
Solid fuels
39.8 %
Total petroleum products
21.6 %
Natural gas
4.3 %
Derived heat
7.7 %
Renewable energy
21.9 %
Electricity
0.3 %
Other

2. What is the source of the electricity we consume?

Almost half of the electricity consumed in the EU comes from power stations burning combustible (renewable and non-renewable) fuels

Around 22 % of the final energy we consume is electricity and it comes from different sources. Almost half (48 %) of the electricity consumed in the EU in 2014 came from power stations burning combustible fuels (such as natural gas, coal, biofuels and oil), while 27 % came from nuclear power plants and 25 % from renewable energy sources. Among these renewable energy sources, the highest share of electricity consumed came from hydropower plants (13 %), wind turbines (8 %) and solar power (3 %).

The sources of electricity consumption vary among the Member States: over 90 % of electricity consumption came from combustible fuels in Malta, Estonia, Cyprus and Poland, while three quarters (77 %) of electricity consumption came from nuclear power plants in France, followed by 58 % in Slovakia and 54 % in Hungary. In Croatia and Austria almost 70 % of electricity consumption came from hydro power plants, while 42 % of electricity consumption in Denmark came from wind energy.



Source: EUROSTAT

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.

For medium size household consumers, electricity prices including taxes and levies were the highest in the second semester of 2015 in Denmark (EUR 0.30 per kWh), Germany (EUR 0.29 per kWh) and Ireland (EUR 0.25 per kWh), while the lowest prices were recorded in Bulgaria (EUR 0.10 per kWh) and Hungary (EUR 0.11 per kWh). It should however be noted that over half of the electricity price in Denmark and Germany consists of taxes and levies, however 19% in Ireland. On the other hand, in Bulgaria taxes and levies account for 17% and in Hungary for 21%.

For medium size household consumers, natural gas prices including taxes and levies were highest in the second semester of 2015 in Sweden (EUR 0.12 per kWh) and Portugal (EUR 0.10 per kWh) and lowest in Romania (EUR 0.03 per kWh). Taxes and levies make up just below half of gas prices in both Sweden and Romania.

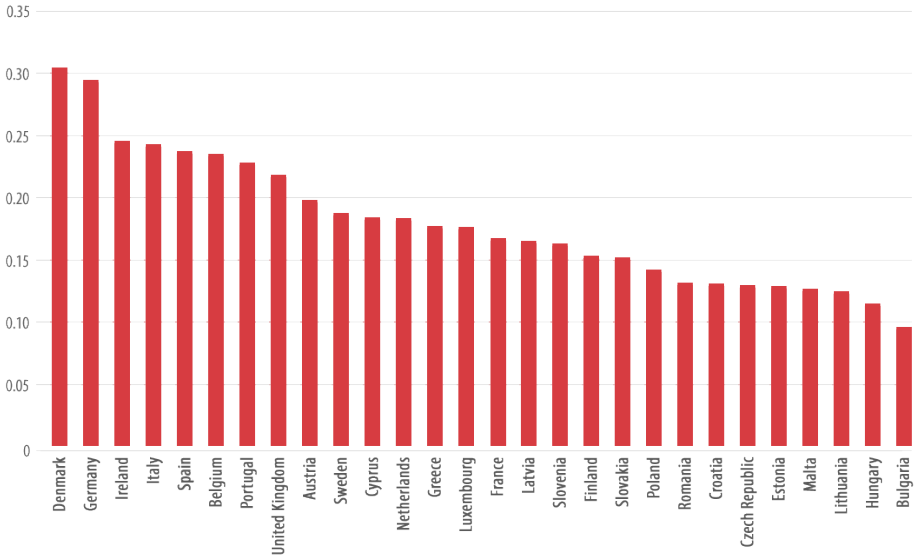
Gas prices for industrial consumers highest in Sweden and Findland

For industrial consumers, electricity prices (excluding VAT and other recoverable taxes and levies) in the second semester of 2015 ranged from EUR 0.16 per kWh in Italy and EUR 0.15 kWh in Germany and the United Kingdom to EUR 0.06 per kWh in Sweden and EUR 0.07 per kWh in Finland.
For industrial consumers, natural gas prices (excluding VAT and other recoverable taxes and levies) in the second semester of 2015 were highest in Finland and Sweden (both EUR 0.042 per kWh) and lowest in Lithuania (EUR 0.022 per kWh).

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
Households

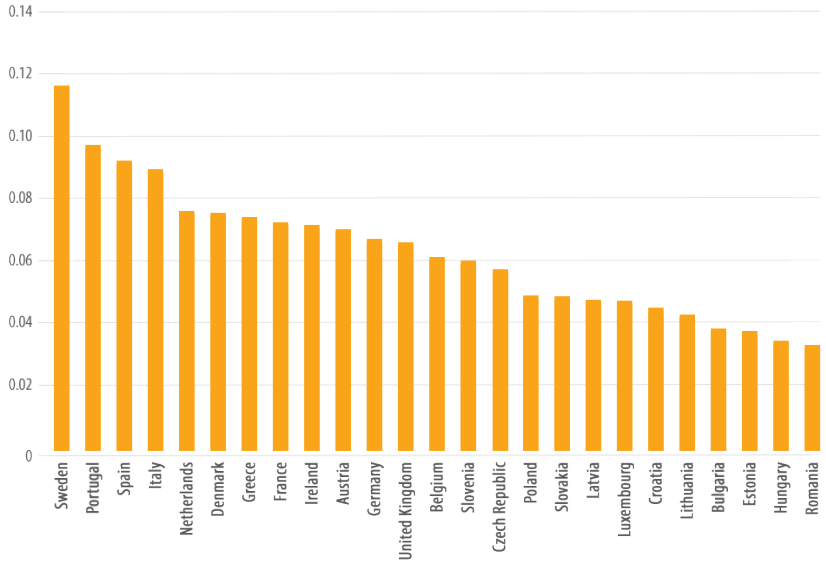
Electricity prices for households, 2nd semester 2015 (€/kWh)
(all taxes and levies included)



For Member States not belonging to the euro area, the exchange rate to the euro may have an impact

Source : Eurostat

Gas prices for households, 2nd semester 2015 (€/kWh)
(all taxes and levies included)

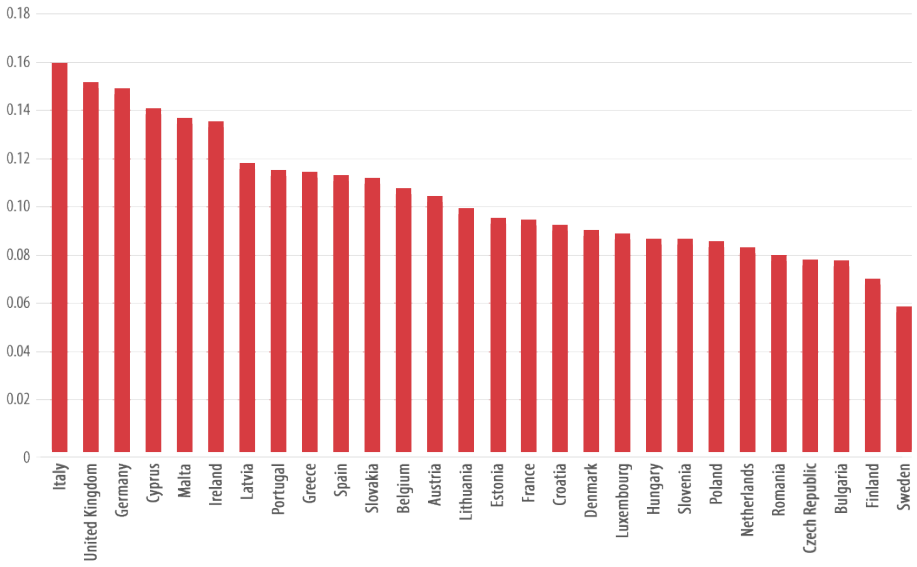


For Member States not belonging to the euro area, the exchange rate to the euro may have an impact
Not applicable for Cyprus, Malta and Finland due to very small volumes of gas

Source : Eurostat

Electricity and gas prices
Households

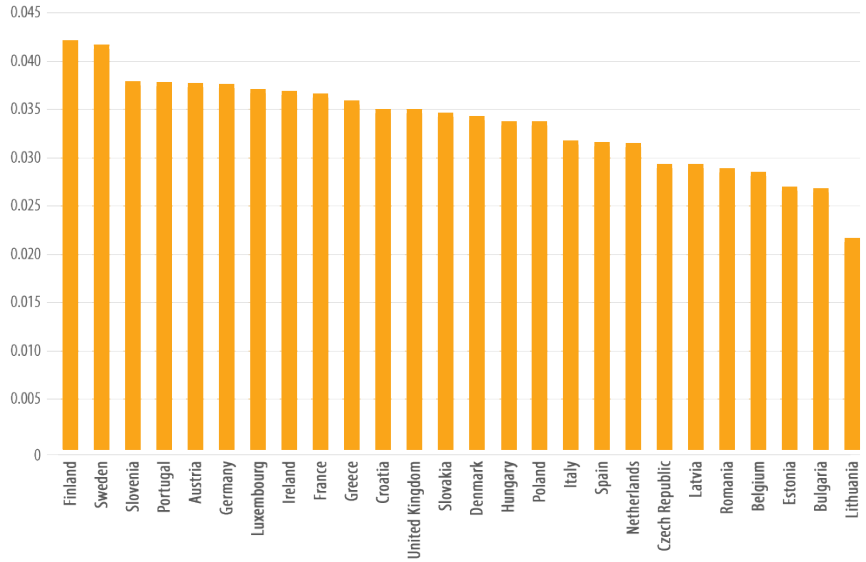
Electricity prices for industries, 2nd semester 2015 (€/kWh)
(excluding VAT and other recoverable taxes and levies)



For Member States not belonging to the euro area, the exchange rate to the euro may have an impact

Source : Eurostat

Gas prices for industries, 2nd semester 2015 (€/kWh)
(excluding VAT and other recoverable taxes and levies)



For Member States not belonging to the euro area, the exchange rate to the euro may have an impact
Not applicable for Cyprus and Malta due to very small volumes of gas

Source : Eurostat

4. WHAT ARE THE LINKS BETWEEN ENERGY AND THE ENVIRONMENT?

1. How are emissions of greenhouse gases by the EU evolving and how does each source contribute?

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.

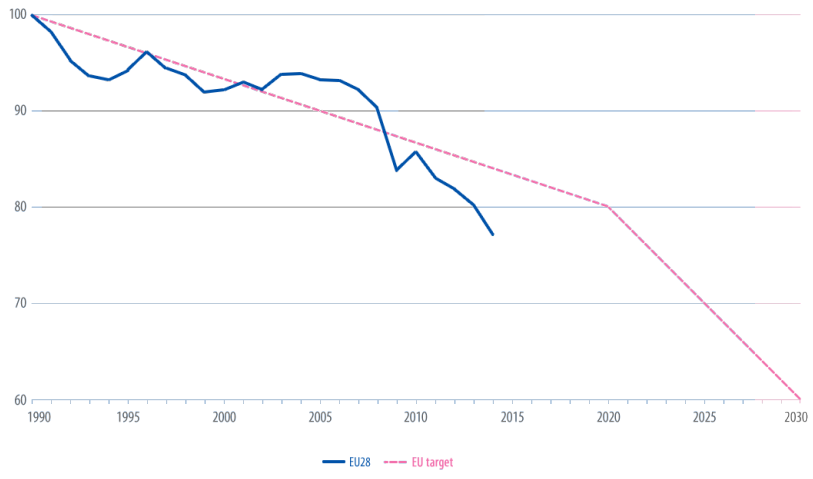
EU greenhouse gas emissions have been declining continuously since 2006. This is partly due to improved energy efficiency, growing shares of renewable energy, the use of less carbon intensive fuels, and the fact that GHG emissions follow economic developments.

In 2014, EU GHG emissions were down by 22.9 % compared with 1990 levels, representing an absolute reduction of 1 316 million tonnes of CO_2 equivalents, putting the EU on track to surpass its 2020 target, which is to reduce GHG emissions by 20 % by 2020 and by 40 % by 2030 compared with 1990.

In 2014, the energy producing industries had the largest share (30 %) of total greenhouse gas emissions, followed by fuel combustion by users (25 %) and the transport sector (23 %). Compared with 1990, the share of most sources decreased, transport increased however from 15 % in 1990 to 23% in 2014 and agriculture increased slightly.

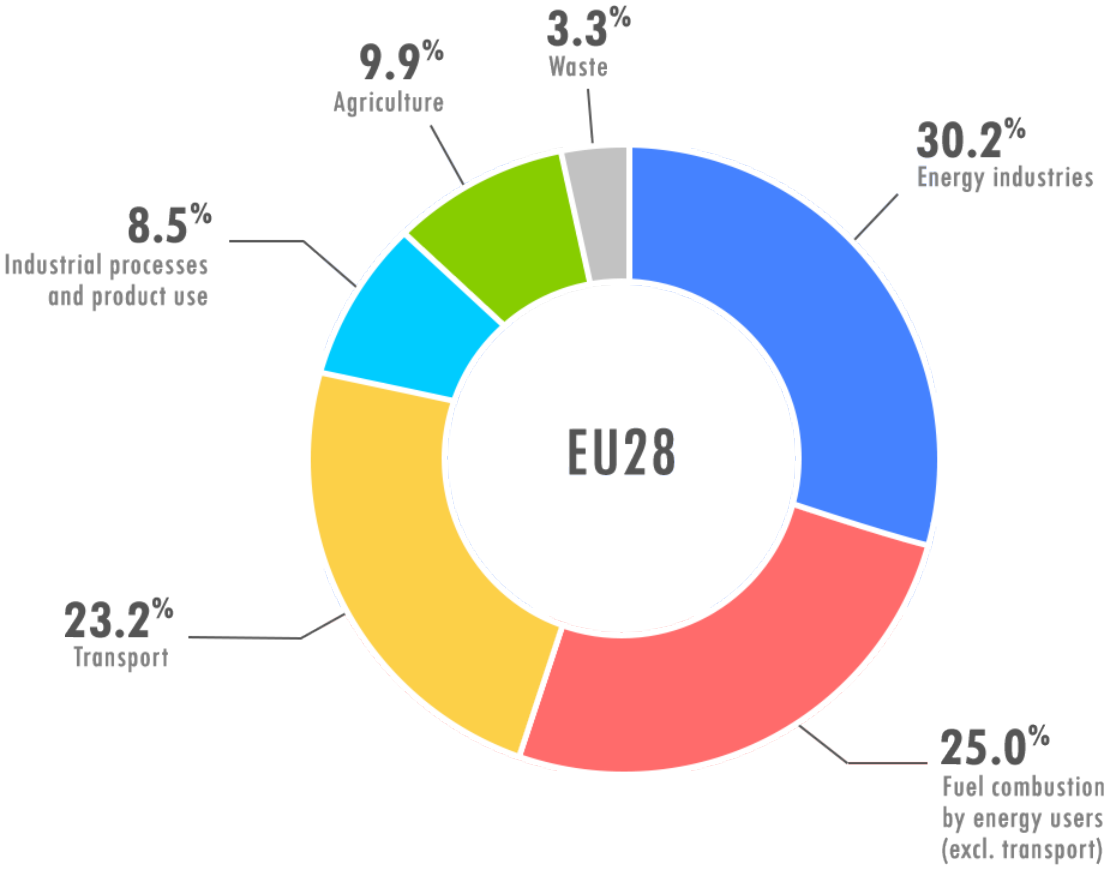
Greenhouse gas emissions, 1990-2014 (%)

(index 1990 = 100)



Source: European Environment Agency
Data including international aviation and indirect CO_2 emissions, excluding land use, land use change and forestry

Share of greenhouse gas emissions by source, 2014 (%)



Energy industries: Emissions from fuel combustion and to a certain extent fugitive emissions from energy industries, for example in public electricity, heat production and petroleum refining.
Fuel combustion by users (excl. transport): Emissions from fuel combustion by manufacturing industries and construction and small scale fuel combustion, for example, space heating and hot water production for households, commercial buildings, agriculture and forestry.
Transport: Emissions from fuel combustion of domestic and international aviation, road transport, railways and domestic navigation.
Industrial processes: Emissions occurring from chemical reactions during the production of e.g.: cement, glass etc.
Agriculture: This includes among others emissions from livestock-enteric fermentation – greenhouse gases that are produced when animals digest their food, emissions from manure management and emissions from agricultural soils
Waste: Emissions from landfills, wastewater treatment and composting among others.

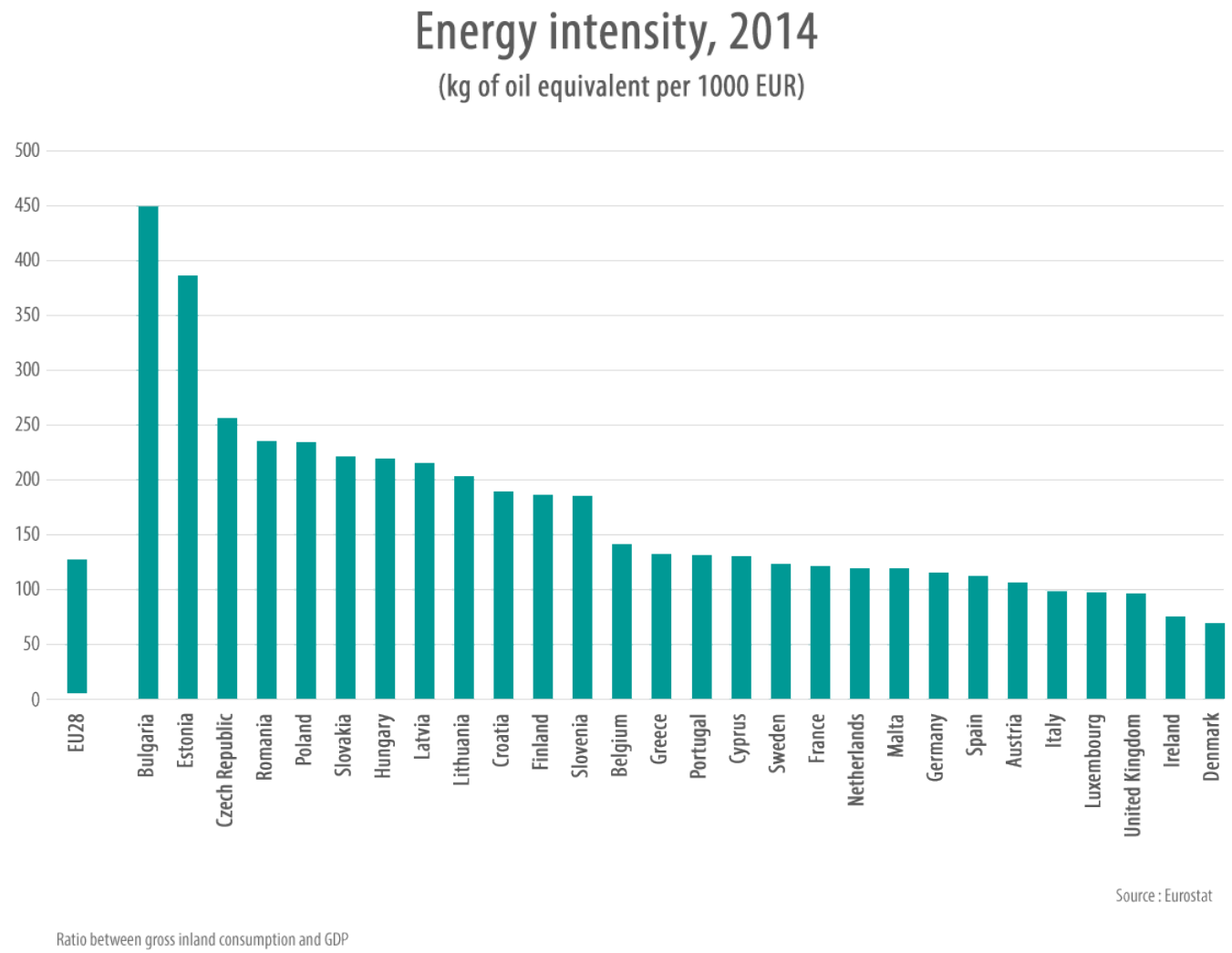
Source : European Environment Agency
Data including international aviation, excludinvg indirect CO_2 emissions and land use, land use charge and forestry

2. How efficient are we in our consumption of energy?

One of the priorities of the Energy Union strategy is to increase energy efficiency in an attempt to reduce energy consumption by 20 % by 2020.

Energy intensity is a measure of an economy's energy efficiency and shows how much energy is needed in order to produce a unit of gross domestic product (GDP). For instance, if an economy becomes more efficient in its use of energy and its GDP remains constant, then the ratio for this indicator should fall. It is expressed in kilograms of oil equivalent per EUR 1 000 of GDP.

The least intensive economies in the EU in 2014, i.e. those using the least amount of energy relative to their overall economic size (based on GDP), were Denmark, Ireland, the United Kingdom, Luxembourg and Italy. The most energy-intensive EU Member States were Bulgaria and Estonia. It should be noted that the economic structure of an economy plays an important role in determining energy intensity, as service based economies will, a priori, display relatively low energy intensities, while economies with heavy industries (such as iron and steel production) may have a considerable proportion of their economic activity within industrial sectors, thus leading to higher energy intensity.

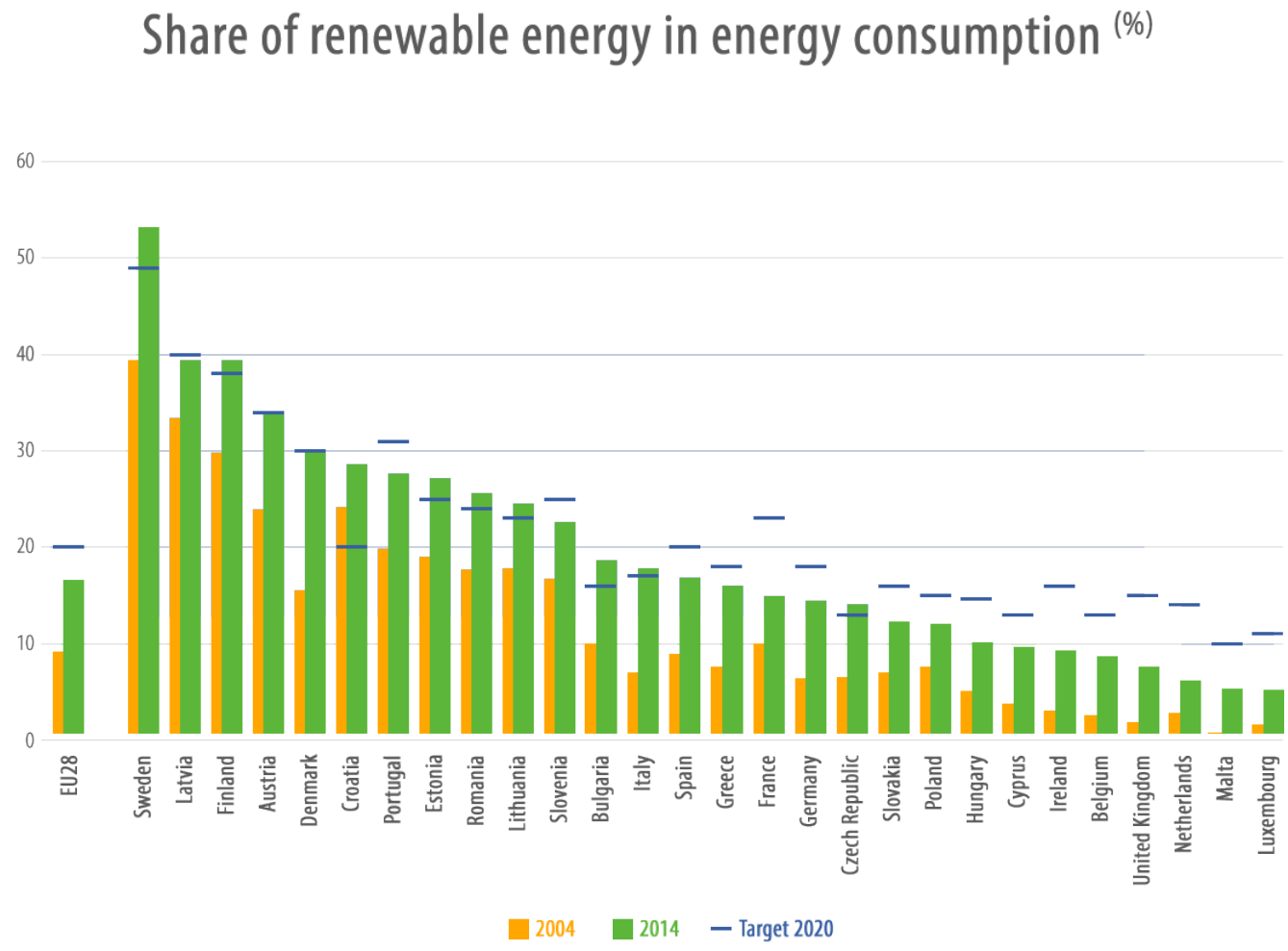


Ratio between gross inland consumption and GDP

3. What is the share of renewable energy in the EU?

The share of renewable energy in energy consumption increased continuously between 2004 and 2014, from 8.5 % to 16.0 %, approaching the Europe 2020 target of 20 % by 2020.

The share of renewable energy in the Member States was highest in Sweden (52.6 %) of energy consumption followed by Latvia and Finland (both 38.7 %). This share was lowest in Luxembourg (4.5 %) followed by Malta (4.7 %), the Netherlands (5.5 %) and the United Kingdom (7.0 %). 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 2014, twelve have at least doubled their share.



Energy consumption relates to Gross final energy consumption

Source: EUROSTAT

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.

Glossary

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.

Glossary

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.

Shedding light on energy in the EU - A guided tour of energy statistics is a digital publication released by Eurostat, the statistical office of the European Union.

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The dedicated section on energy on the Eurostat website.

Articles on energy in Statistics Explained.

Information on data:
Date of data extraction: August 2016 for text and all infographics, maps and animations. The Sankey diagram is continuously updated.

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

Identifiers of the digital publication:

Catalogue number: KS-01-16-784-EN-Q
ISBN 978-92-79-59528-8
Doi: 10.2785/84924