EU energy mix and import dependency

Statistics Explained

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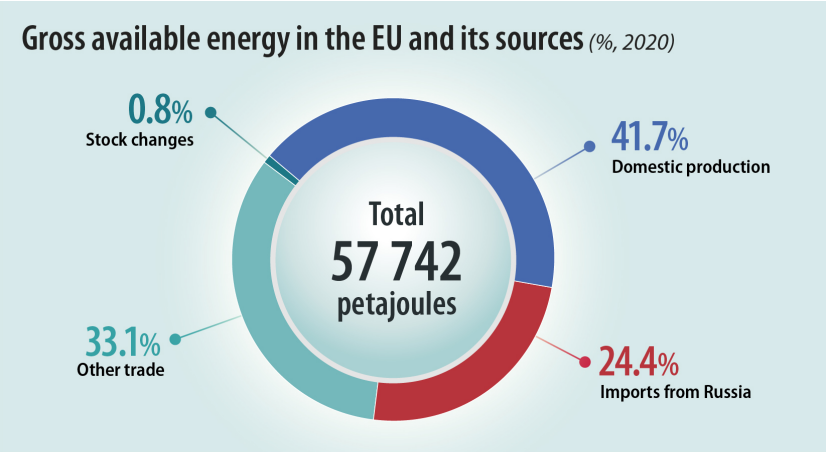


In 2020, the European Union imported 57.5% of the energy it consumed as its own production and stock changes satisfied only 42.5% of its needs. Russia is the leading supplier of natural gas, oil and coal to the EU. This article presents the EU's energy mix and dependency on the imports for the energy needs in 2020.

Energy mix and import dependency

The EU energy mix in 2020 consisted of 34.5% of oil and petroleum products, 23.7% of natural gas, 17.4% of renewables, 12.7% of nuclear energy and 10.5% of solid fossil fuels.

The energy mix has been changing over the last decades, with oil products decreasing, natural gas following the

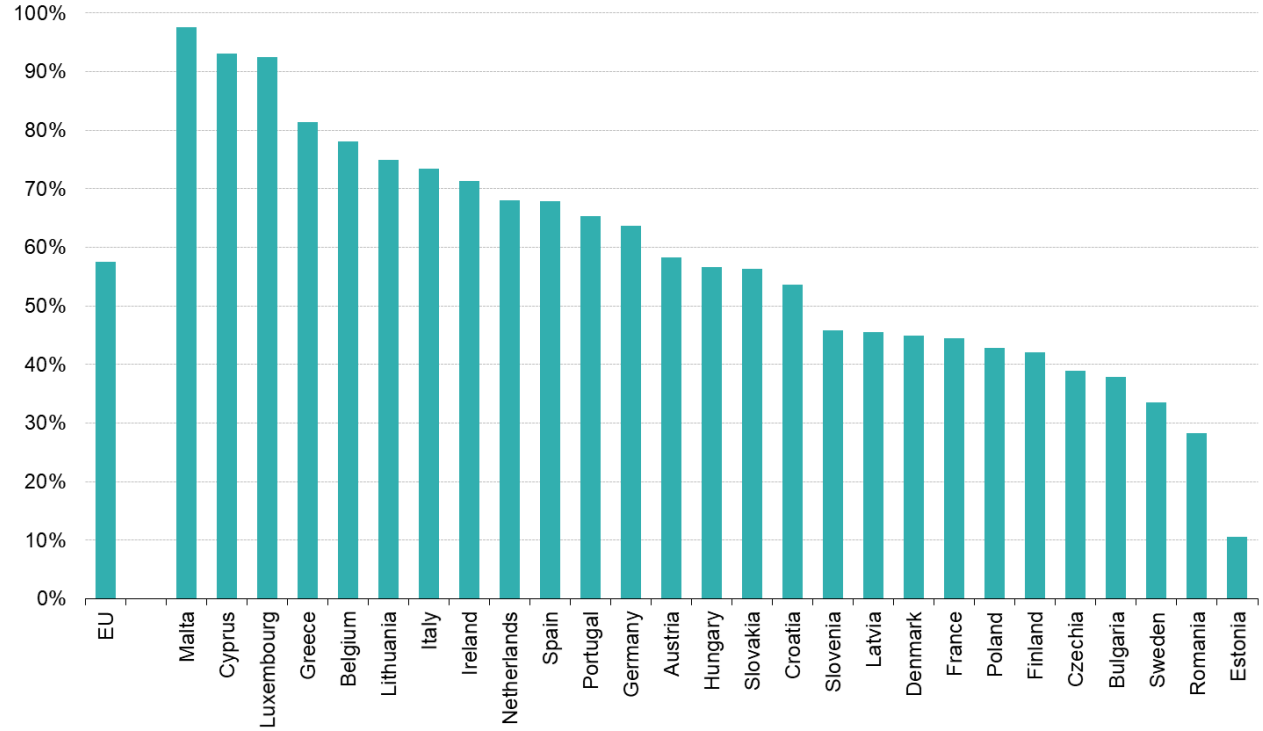
same tendency, but on a lesser scale, renewables continuing their long-term upward trend, nuclear and coal scaling down. These trends are at least partly the results of efforts to decarbonise the energy system.

In 2020, the EU imported 57.5% of the energy it consumed as its own production and stock changes satisfied only 42.5% of its needs.

The EU import dependency[1] increased over time due to trends in production and consumption and to the shifts in the energy mix. From the lowest value in 1990 (50.0%), it registered a peak in 2008 (58.4%) and a record high in 2019 (60.5%) before dropping in 2020 (57.5%) (see Tool 1).

Since 2013, all 27 Member States of the EU have been net importers of energy. In 2020, Malta, Cyprus and Luxembourg were almost entirely import dependent, with rates between 92.5% and 97.6%. The lowest energy dependency rates in 2020 were recorded by Estonia (10.5%), Romania (28.2%), and Sweden (33.5%).

Energy import dependency, EU, 2020



Source: Eurostat, calculation based on energy balances

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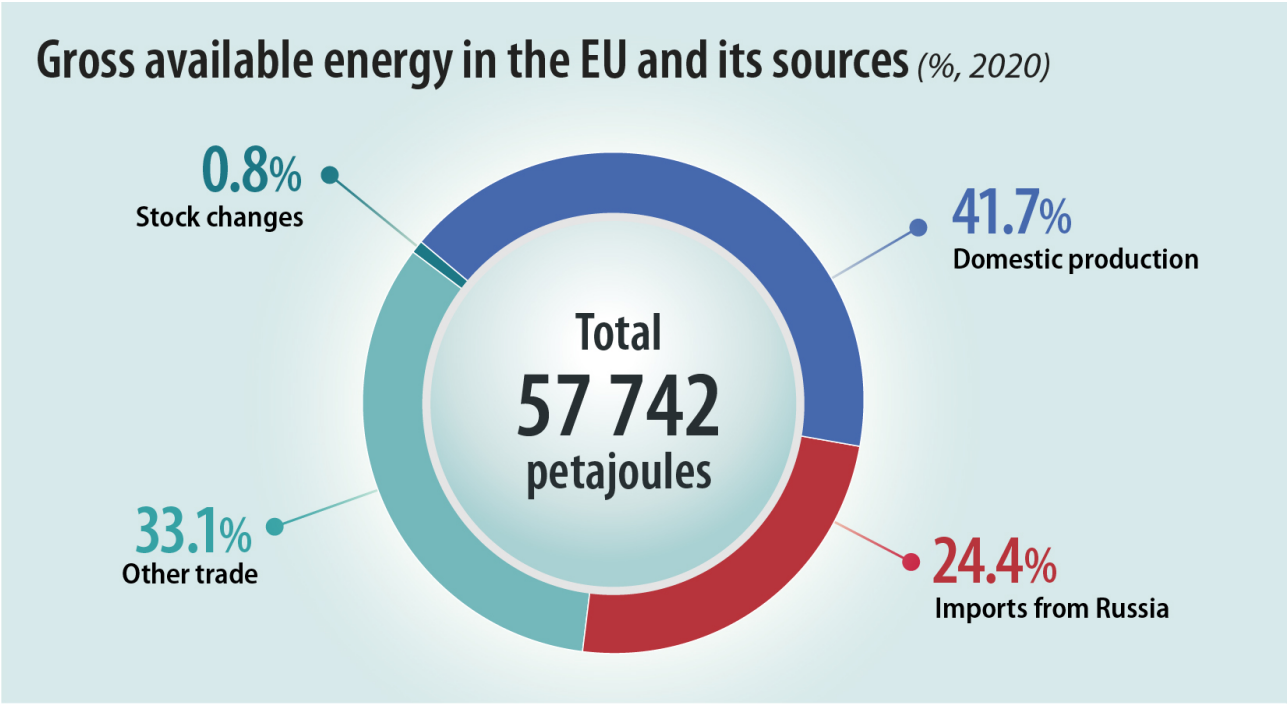
EU energy dependency on Russia

The EU depends on Russia for 24.4% of all its energy needs. The energy dependency on a specific country depends on the weight of the fuels in the energy mix and the dependency on imports of those fuels from a specific origin.

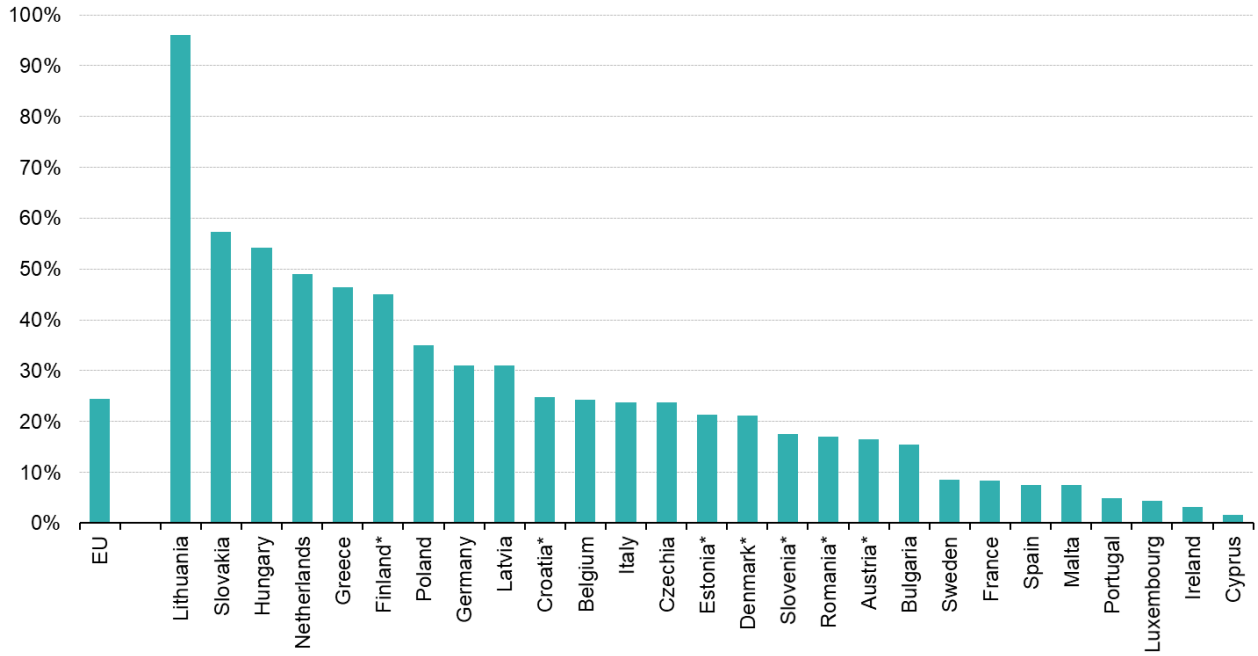
[1] The import dependency is the ratio of net imports (imports minus exports) to gross available energy. Gross available energy is the overall supply of energy for all activities on the territory of the country. This also includes energy transformation, losses and use of fossil fuel products for non-energy purposes.



The main origins of EU energy imports have changed in recent years, yet Russia has maintained its position as the leading supplier to the EU of all the main primary energy commodities: natural gas, crude oil and hard coal.

The countries' different energy mix and import dependencies create vastly different country-specific energy dependencies on Russia. In 2020, the country with the largest share of energy needs satisfied by Russian imports in the EU was Lithuania (96.1%), followed by Slovakia (57.3%) and Hungary (54.2%). The least dependent was Cyprus (1.7%), followed by Ireland (3.2%) and Luxembourg (4.3%).

Imports from Russia in gross available energy, EU, 2020



Source: Eurostat, including estimates for non-reported data for countries with *

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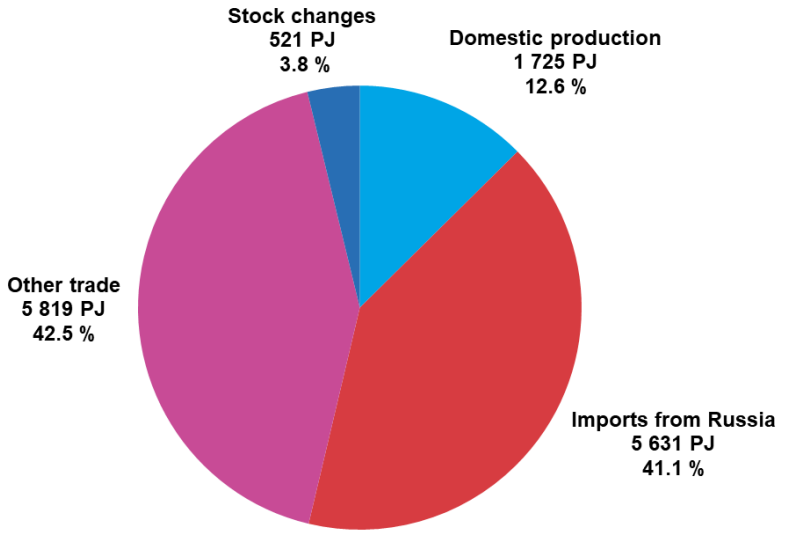
For a deeper look into the three main fuels with the highest dependency on Russian imports, please see the following sections.

Natural gas

Natural gas, a major fuel for electricity production and heating in the EU, represented 23.7% of the EU's gross available energy and had an import dependency rate of 83.6% in 2020 with imports of 400.6 billion cubic meters (bcm).

The reliance of the European Union on Russian natural gas has increased over the last decade reaching 41.1% of gross
available energy derived from natural gas in 2020, making it the fuel with the highest exposure to imports from Russia.

Natural gas: EU production, trade and imports, 2020
(in % and petajoules, PJ)

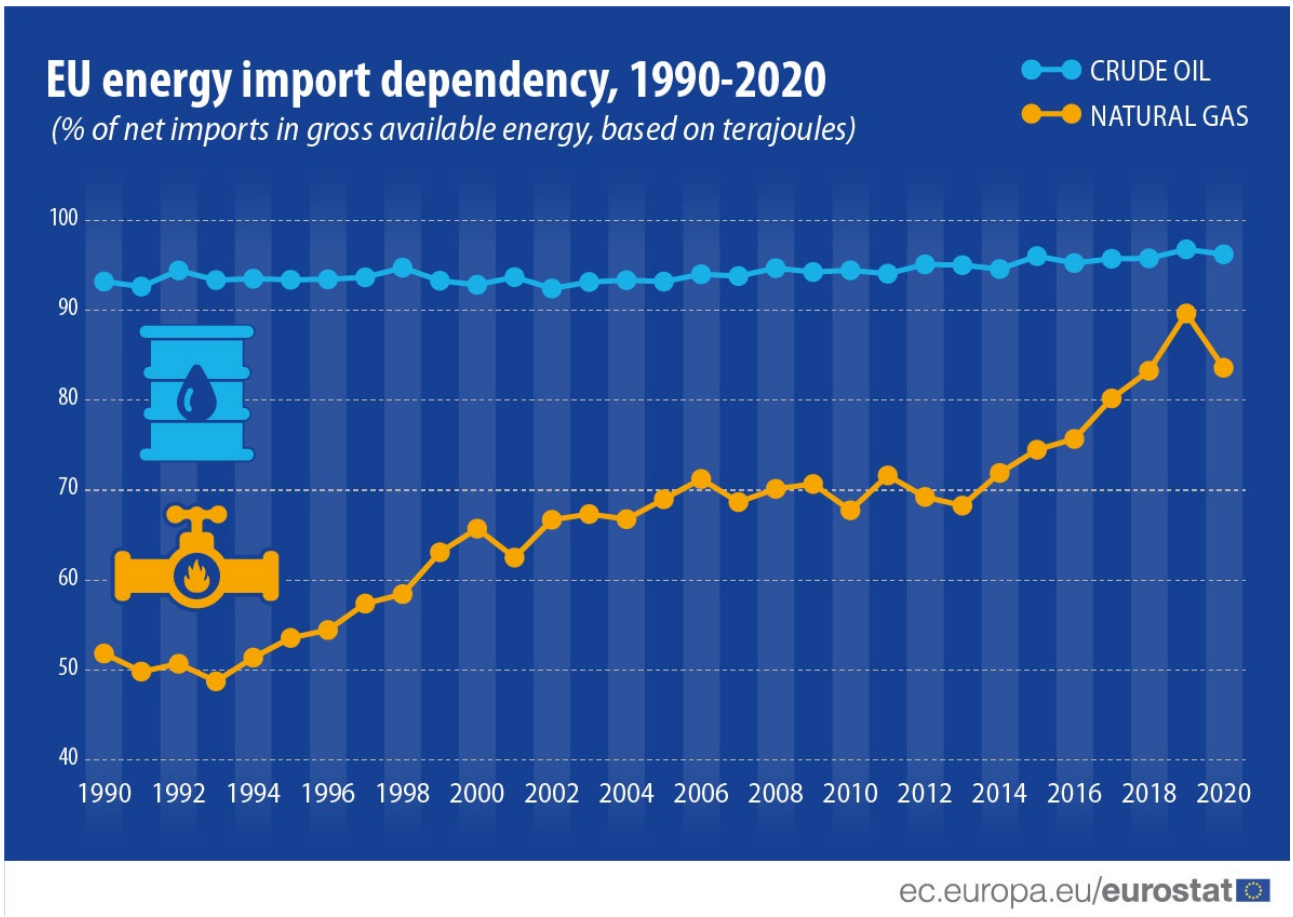


Source: Eurostat (including estimates for non-reported data)

eurostat

Natural gas consumption in the EU remained broadly flat over the last ten years, reaching 399.6 bcm in 2020, but EU production fell to almost a third to 55.7 bcm and the gap has been filled by increased imports. The EU received from Russia 46.1% of its natural gas imports. Other important providers are Norway, Algeria, Qatar, the USA, the United Kingdom, Nigeria and Libya making up collectively with Russia 90% of EU's total natural gas imports.

EU Member States' reliance on natural gas imported from Russia differs widely. While some countries did not report any imports of Russian gas in 2020, others cover all of their natural gas needs from this single source.



Source: Eurostat (nrg_ind_id)

Oil

Despite the decrease in consumption from the peak of two decades ago, crude oil and petroleum products still hold the largest share in the EU energy mix (34.5%).

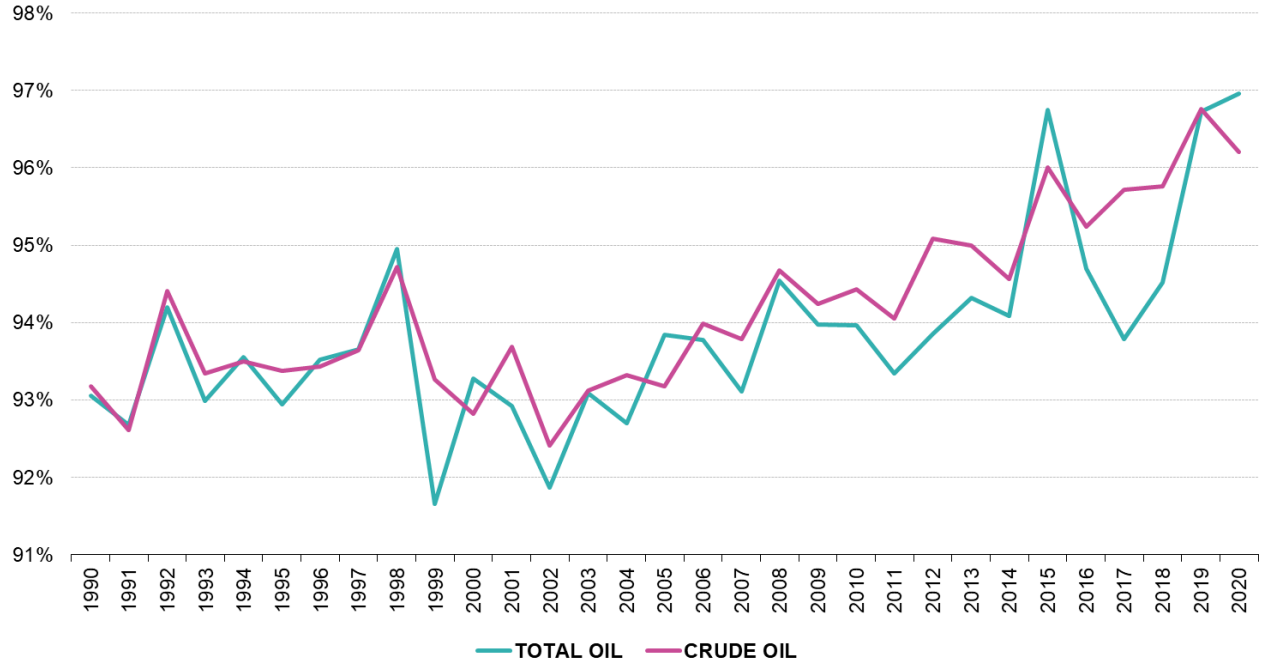
In 2020, EU production of crude oil, an essential commodity for the production of transport fuels and the petrochemical industry, reached the lowest point at 18.7 million tonnes (Mt) while the import dependency increased to 96.20%.

That same year EU refineries produced 504.8 million tonnes of oil equivalent (Mtoe) of petroleum products, the lowest quantity ever produced at the EU level since 1990.

In 2020, the final consumption of oil and petroleum products for energy and non-energy purposes in the EU Member States was 384.0 Mtoe, the lowest level ever recorded in the 31-year time series.

The import dependency for the entire family of crude oil and petroleum products fluctuated in the last decades and reached a record high in 2020 when the EU relied on net imports for 96.96 % of its energy needs.

Import dependency, crude oil and total oil, 1990-2020
(% of net imports to gross available energy)



Source: Eurostat (online data code nrg_ind_id)

Source: Eurostat (nrg_bal_c)

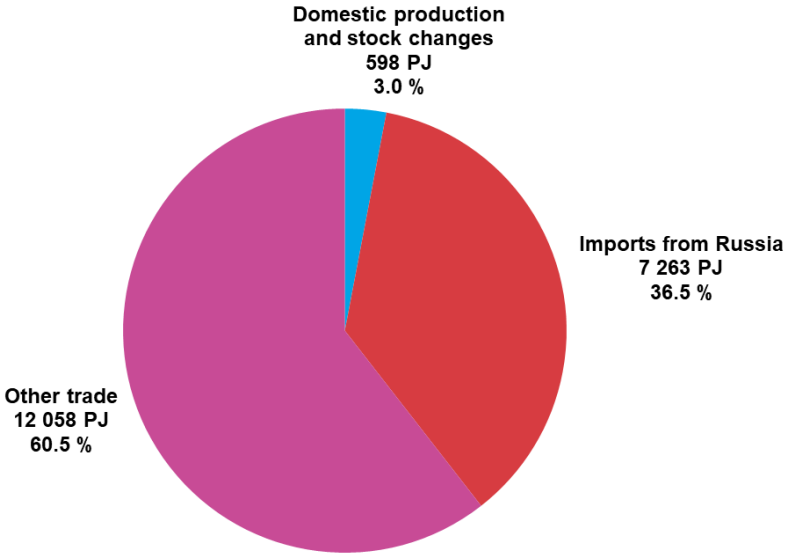
Russia is the world's third largest oil producer after the United States of America and Saudi Arabia and is the world's largest exporter.

In 2020, the EU relied on Russia for 25.7% of its crude oil imports (total 440.3 MT). (Commodity balance data)

The other main suppliers to the EU are Norway (8.7%), Kazakhstan (8.5%), USA (8.1%) and Saudi Arabia (7.9%). The origins of the crude oil imported to the EU have changed over the years. Imports from Russia continued declining since their last peak in 2005 but remain the highest.

Given the large share of oil in the EU energy mix, imports from Russia satisfied 36.5% of EU energy needs. This reliance on Russian oil has been fluctuating yet decreasing over the last five years from 42.3% to the current share of the gross available energy making it the fuel family with the second highest exposure.

Oil: EU production, trade and imports, 2020
(in % and petajoules, PJ)



Source: Eurostat (including estimates for non-reported data)

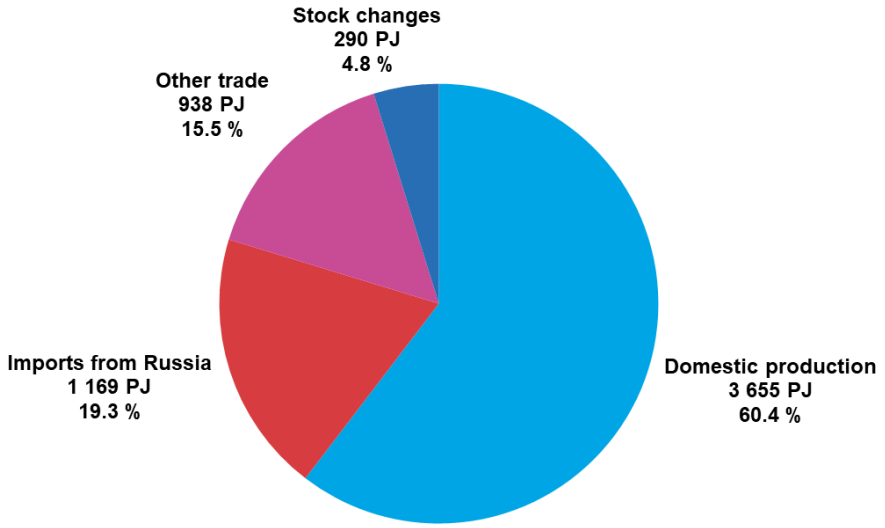
eurostat

Coal

Solid fossil fuels have been on a decreasing trend in the European Union for the past 30 years, and this decline accelerated from 2018 onwards. In 2020, solid fossil fuels accounted for 10.5% of the EU energy mix.

Compared to oil and natural gas, solid fossil fuels have a slightly lower total import dependency rate of 34.8%, with Russia covering 19.3% of the EU use of solid fossil fuels. However, this number accounts for all types of solid fossil fuels, including lignite (for which EU production and consumption is high, and trade is negligible) and coke oven coke (for which the EU is a net exporter).

Coal: EU production, trade and imports, 2020
(in % and petajoules, PJ)



Source: Eurostat (including estimates for non-reported data)

eurostat

The most import-dependent type of solid fossil fuel is hard coal, an aggregate of anthracite and bituminous coal. Many EU countries stopped their production of hard coal in recent years, and the consumption of hard coal decreased more slowly than its production. Consequently, the import dependency rate of hard coal increased, and it reached 57.4% in 2020.

From 2010 to 2020, EU imports from Russia mostly increased until 2018 when they started to decrease sharply. In 2020, a year when the EU imported 87.7 Mt of hard coal, 52.7% was imported from Russia, which accounted for 30.3% of the EU's hard coal consumption. During the last decade, other non-EU hard coal suppliers have seen their imports stay stable or decrease. In 2020, 17.5% of the EU's hard coal imports were from the United States, and 15.8% from Australia.

Glossary, concepts and methodology notes

Coal = Anthracite + Coking coal + Other bituminous coal + Sub-bituminous coal + Lignite + Coke oven coke + Patent fuel + Brown coal briquettes + Coal tar + Peat + Peat products + Oil shale and oil sands

Oil = Crude oil + Natural gas liquids + Refinery feedstocks + Additives and oxygenates (excluding biofuel portion) + Other hydrocarbons + Refinery gas + Ethane + Liquefied petroleum gases + Naphtha + Aviation gasoline + Motor gasoline (excluding biofuel portion) + Gasoline-type jet fuel + Kerosene-type jet fuel (excluding biofuel portion) + Other kerosene + Gas oil and diesel oil (excluding biofuel portion) + Fuel oil + White spirit and special boiling point industrial spirits + Lubricants + Paraffin waxes + Petroleum coke + Bitumen + Other oil products n.e.c.

Renewables = Hydro + Geothermal + Wind + Solar thermal + Solar photovoltaic + Tide, wave, ocean + Ambient heat (heat pumps) + Primary solid biofuels + Charcoal + Pure biogasoline + Blended biogasoline + Pure biodiesels + Blended biodiesels + Pure bio jet kerosene + Blended bio jet kerosene + Other liquid biofuels + Biogases + Renewable municipal waste

Total = Natural gas + Oil + Coal + Nuclear + Renewables + Industrial waste (non-renewable) + Non-renewable municipal waste + Electricity + Heat

Gross available energy = Primary production + Recovered and recycled products + Imports + Exports + Change in stock

Domestic production = Primary production + Recovered and recycled products

Imports from Russia is calculated based on import data for individual fuels and the individual shares are subsequently aggregated in common energy units (TJ).

Other trade = Imports - Exports - Imports from Russia

Gross available energy = Domestic production + Imports from Russia + Other trade + Change in stock

Source data for tables and graphs

- EU energy mix and import dependency: tables and figures

Data sources

In energy statistics, the following conventions apply:

- production of electricity and heat in nuclear installations is cosidered as domestic production, regardless the actual origin of uranium/plutonium
- production of biofuels from imported biomass feedstock is considered domestic production of biofuels, regardless the actual origin of biomass feedstock
- international trade (imports/exports) is considered based on physical border crossing regardless of customs procedures
- countries should report ultimate origin of fuels for imports (country where the fuel was extracted) and in egeneral reporting should exclude transit
- use of fossil fuels is including also non-energy consumption, such as use of natural gas in chemical industry, bitumen in construction or lubricants for lubrification
- EU aggregate is calculated as sum of individual countries and there for trade it includes intra-EU trade

Specific notes for reporting trade (imports/exports) in energy statistics:

- some countries report transit as imports and exports
- some quantities are considered confidential (e.g. reporting of Austria for natural gas trade)
- purchases on international spot markets (trade hubs) are sometimes allocated to the country of purchase, instead of country of origin
- some countries cannot identify exact origin and therefore report such quantities under the transit country (e.g. Germany) or under "non specified" category

Context

The dependency of the EU on single providers has long been a topic of concern and a large component of energy security which tops the EU agenda. The EU has sought to improve energy security by building a resilient, interconnected and open internal market, while pursuing a multilateral and rule-based perspective. The current geopolitical events are highlighting the vital importance of controlling and decreasing import dependency. Today's picture still shows a heavily dependent position of the EU towards Russia.

On March 8, 2022, the European Commission announced its REPowerEU initiative , a plan for Europe to rely less on imported fossil fuels.

See also

- Energy production and imports
- EU imports of energy products - latest developments
- Natural gas supply statistics
- Coal production and consumption statistics
- Oil and petroleum products - a statistical overview
- Emergency oil stocks statistics

Main tables

- Energy statistics - main indicators (t_nrg_indic) , see:

Gross available energy by product (ten00121)

Database

- Energy - detailed datasets (nrg) , see:

Energy statistics - quantities, annual data (nrg_quant)

Energy balances (nrg_bal)

Complete energy balances (nrg_bal_c)

Energy indicators (nrg_ind)

Energy imports dependency (nrg_ind_id)

Trade by partner country (nrg_t)

Imports (nrg_ti)

Imports of solid fossil fuels by partner country (nrg_ti_sff)
Imports of oil and petroleum products by partner country (nrg_ti_oil)
Imports of natural gas by partner country (nrg_ti_gas)
Imports of biofuels by partner country (nrg_ti_bio)
Imports of electricity and derived heat by partner country (nrg_ti_eh)

- International trade in goods , see:

International trade in goods - aggregated data (ext_go_agg)

International trade in goods - long-term indicators (ext_go_lti)

International trade in goods - short-term indicators (ext_go_sti)

International trade in goods - detailed data (detail)

Dedicated section

- Energy
- International trade in goods

Methodology

- Energy statistics - quantities (nrg_quant) (including national metadata)
- Energy balances (nrg_bal)
- Trade by partner country (nrg_t)
- Supply, transformation and consumption - commodity balances (nrg_cb)

Legislation

- Regulation (EC) No 1099/2008 on energy statistics
- Summaries of EU legislation: Common system for the production of energy statistics

Visualisations

- Discover the world of energy trade
- Energy indicators made easy
- Energy balances made easy
- Sankey diagram - Visualise energy flows

External links

- European Commission - DG Energy - Energy security
- European Commission - DG Energy - Energy Strategy
- Energy Community - Security of Supply Coordination Group
- International Energy Agency - Energy security

Notes