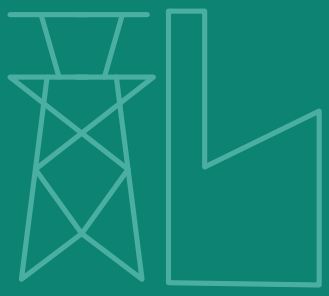
European Environment Agency

8th Environment Action Programme

Energy consumption: primary and final energy consumption in Europe



8TH EAP HEADLINE INDICATOR, 2025

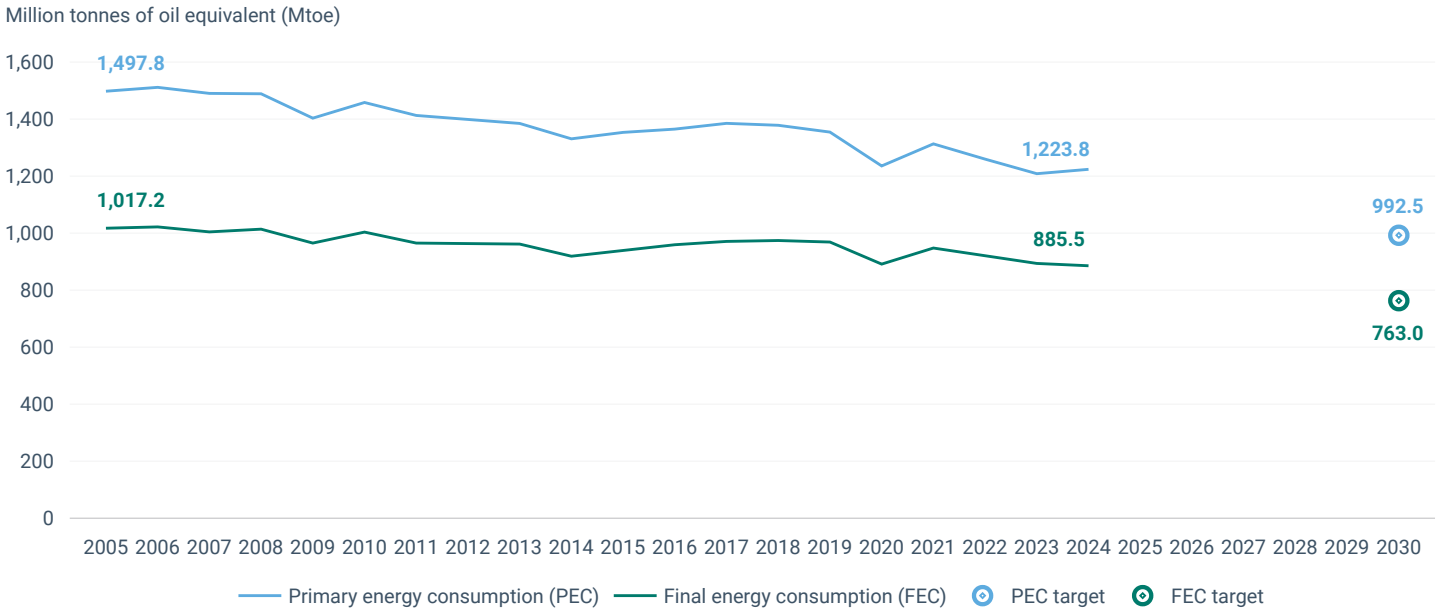
European Environment Agency

Primary and final energy consumption in the European Union

Published 06 Nov 2025

The European Union's primary energy consumption (PEC) in 2024 is estimated to have increased by 1.3% compared to 2023, while final energy consumption (FEC) decreased by 0.9%. PEC represents the total energy demand within a country, including losses, while FEC represents the energy used by final consumers. These estimates, and the historical energy consumption trends across Europe, show that more ambitious developments and decisive action is required to achieve the 2030 PEC and FEC targets set by the EU Energy Efficiency Directive.

Figure 1. Primary and final energy consumption in the European Union



Reducing energy consumption typically leads to a reduction in **environmental pressures** associated with the production and consumption of energy. It supports the achievement of EU renewable energy and GHG targets, lowers emissions of air pollutants with its associated health benefits, enhances energy security and reduces import energy dependency.

The EU's recast Energy Efficiency Directive sets an indicative **EU-wide target** of 992.5 million tonnes of oil equivalent (Mtoe) for PEC, and a binding EU-wide target of 763Mtoe for FEC to be achieved by 2030.

EU PEC levels in 2024 are estimated to have been 1210Mtoe, while EU FEC levels were estimated at 894Mtoe. This represents a increase of 1.3% and decrease of 0.9% respectively compared to 2023. The slight increase in PEC is partially driven by France's increase in electricity production predominantly derived from nuclear sources.

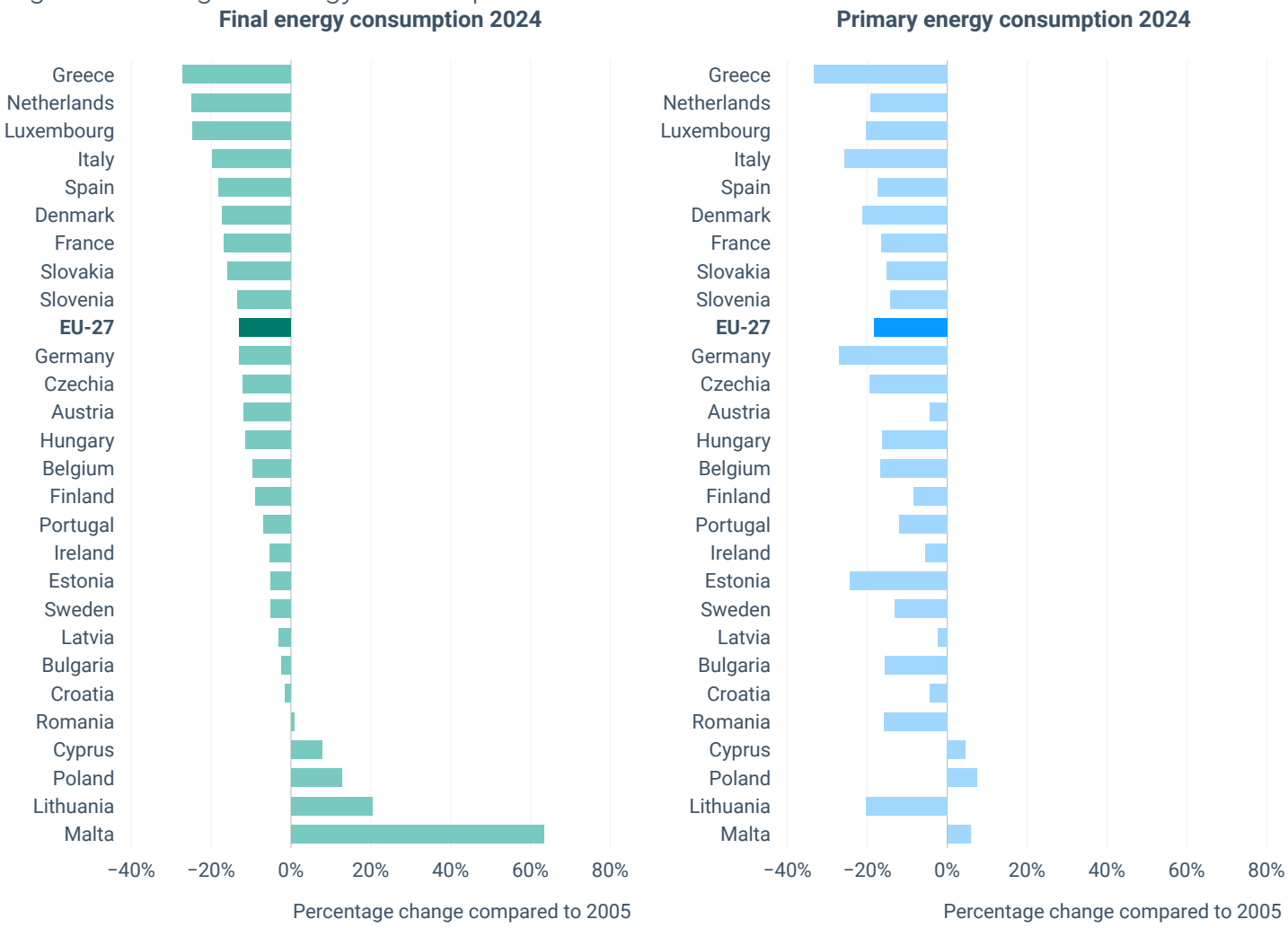
Policies to address energy efficiency improvements and to reduce reliance on fossil fuels have contributed to general decreasing trends in both PEC and FEC in recent years, compared to historical figures. The EU has taken **active measures** to save energy, e.g. via the Council Regulation on coordinated demand reduction measures for gas, where Member States agreed to reduce gas demand by 15% from 1 August 2022 to 31 March 2023 compared to average consumption in the same period over the preceding five years (2017-2022). This collectively led to notable decreases in energy consumption by industry and households.

The full time series of developments show that overall reductions in energy efficiency in Europe since 2005 have been more pronounced for PEC (-18.3%) than for FEC (-12.9%). The replacement of fossil fuels and nuclear energy by **renewables** in electricity generation typically reduces PEC without affecting FEC.

The share of renewable energy in the EU has **more than doubled** since 2005. Other factors contributed to a reduction in energy demand, such as energy saving measures, energy transformation improvements, structural changes toward less energy intensive industries, increased energy prices after Russia's invasion of Ukraine, and warmer winters due to climate change.

Compared to average annual reductions of the last 10 years, reaching ambitious **2030 targets** will require continued introduction of robust measures. Based on this historical trend, the EU is likely **not on track** to meet the 2030 targets on energy consumption.

Figure 2. Change in energy consumption of EU Member States between 2005 and 2024



Based on 2024 estimates, 24 Member States have **decreased their PEC** between 2005 and 2024. Greece was the highest achiever in relative terms at -33.4%, followed by Germany (-27.1%) and Italy (-25.8%). PEC levels in 2024 grew in Poland (+7.5%), Malta (+5.8%) and Cyprus (+4.7%) compared to 2005.

In the same time frame, 22 Member States **decreased their FEC**. Greece (-27.0%) also represents the greatest decrease in this category, followed by the Netherlands (-24.9%) and Luxembourg (-24.7%). Five Member States had higher FEC levels compared to 2005, with Malta leading at 63.2%.

For the year between 2023-2024, nine Member States estimated to have decreased their PEC, with Czechia and Slovakia having the largest relative reductions of -3.5% and -3.3% respectively. For 18 Member States whose PEC is estimated to have increased, Austria had the highest proportion of +6.6% and France had the highest absolute PEC increase at 8.3Mtoe.

Between 2023 and 2024, 15 Member States reduced their estimated FEC. Poland reported the greatest relative reduction at -6.3%. Of the 11 Member States whose estimated FEC increased in 2024, Lithuania and Cyprus led in relative terms with +5.7% and +5.4% respectively.

Supporting information

Definition

Final energy consumption (FEC) represents the energy used by final consumers (such as households, transport, industry etc) for all energy uses. It is the energy that reaches the final consumer's door.

Primary energy consumption (PEC) represents the total energy demand within a country, excluding the energy products consumed for purposes other than producing useful energy (non-energy uses, e.g., oil for plastics). For example, the electricity consumed by a household counts towards FEC; the fuel burned to generate that electricity and bring it to the household counts towards PEC.

Methodology

PEC-FEC

To ensure comparability with energy efficiency targets, this indicator is defined according to Eurostat methodology for final energy consumption (Europe 2020-2030) [FEC2020-2030] and primary energy consumption (Europe 2020-2030) [PEC2020-2030].

Primary energy consumption (Europe 2020-2030) = gross inland consumption (all products total) - gross inland consumption (ambient heat (heat pumps)) - final non-energy consumption (all products total).

Final energy consumption (Europe 2020-2030)= final energy consumption (all products total) - final energy consumption (ambient heat (heat pumps)) + international aviation (all products total) + transformation input blast furnaces (all products total) - transformation output blast furnaces (all products total) + energy sector blast furnaces (solid fossil fuels) + energy sector blast furnaces (manufactured gases) + energy sector blast furnaces (peat and peat products) + energy sector blast furnaces (oil shale and oil sands) + energy sector blast furnaces (oil and petroleum products) + energy sector blast furnaces (Natural gas).

Data set used: 'Complete energy balances nrg_bal_c'

Codes:

- FEC2020-2030 Final energy consumption (Europe 2020-2030)/all products;
- PEC2020-2030 Primary energy consumption (Europe 2020-2030)/all products;
- GIC Gross inland consumption/all products;
- NRG_BF_E Energy sector — blast furnaces — energy use/all products;
- FC_NE Final non-energy consumption/all products;
- FC_TRA_E Final consumption — transport sector — energy use/renewables and biofuels;
- FC_E Final consumption — energy use/ambient heat;
- PPRD Primary production/ambient heat.

Details about this methodology are available from Eurostat at: ENERGY BALANCE GUIDE (Draft 31 January 2019).

The time series for the EU-27 was made by summing the values for each year of the 27 countries that are currently Member States, regardless of whether they were members of the EU in any given year.

Proxy data

Values for 2005-2022 are compiled by Eurostat. Approximated figures for 2023 are based on EEA estimates.

Policy/environmental relevance

The Energy Efficiency Directive (2012/27/EU) established a set of binding measures to help the EU reach its target of decreasing energy consumption by 20% by 2020, compared with projected levels. This was amended by Directive (EU) 2018/2002, which provides a policy framework for 2030 and beyond. A new amendment was agreed in 2023, which set new targets for 2030.

The composition of the energy mix and the level of consumption provide an indication of the environmental pressures associated with energy consumption. The type and magnitude of the environmental impacts associated with energy consumption, such as resource depletion, greenhouse gas emissions, air pollutant emissions, water pollution and the accumulation of radioactive waste, strongly depend on the types and amounts of fuels consumed, as well as on the abatement technologies applied.

This indicator is a headline indicator for monitoring progress towards achieving the aims of the 8th Environment Action Programme (8th EAP). It contributes mainly to monitoring progress towards energy efficiency aspects of Article 2.f of the 8th EAP which requires: 'promoting environmental aspects of sustainability and significantly reducing key environmental and climate pressures related to the Union's production and consumption, in particular in the areas of energy, industry, buildings and infrastructure, mobility, tourism, international trade and the food system' . The European Commission Communication on the 8th EAP monitoring framework specifies that this indicator should monitor the achievement by 2030 of the recently agreed 2030 EU targets as detailed in the next paragraph [1].

Targets

On 20 September 2023, the EU officially published the recast Energy Efficiency Directive (EU) 2023/1791, which set a target for the reduction of final energy consumption (FEC) of at least 11.7% in 2030, compared with the energy consumption forecasts for 2030 made in 2020. This translates into a mandatory target of 763Mtoe for FEC, and an indicative target of 993Mtoe for primary energy consumption (PEC). Member states will benefit from flexibilities in reaching the target.

For more information, see the European Commission website on the Energy Efficiency Directive and the recent agreement.

Sources:

EC, 2022a, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on the monitoring framework for the 8th Environment Action Programme: Measuring progress towards the attainment of the Programme's 2030 and 2050 priority objectives, COM/2022/357 final, EUR-Lex - 52022DC0357 - EN - EUR-Lex (europa.eu)

Eurostat, 2023. Complete energy balances (NRG_BAL_C), PEC (2020-2030) and FEC (2020-2030). https://ec.europa.eu/eurostat/databrowser/bookmark/dea184ea-4883-453d-ba24-71e960a4f161?lang=en. Accessed May 2024.

Accuracy and uncertainties

Methodology uncertainty
No uncertainty has been specified.

Data sets uncertainty
No uncertainty has been specified.

Rationale uncertainty
No uncertainty has been specified.

Data sources and providers

- Simplified Energy Balances: Primary Energy Consumption - Energy Efficiency Directive, EUROSTAT -Statistical Office of the European Union
- Simplified Energy Balances: Final Energy Consumption - Energy Efficiency Directive, EUROSTAT - Statistical Office of the European Union
- Primary energy consumption, Statistical Office of the European Union (Eurostat)

- Final energy consumption, Statistical Office of the European Union (Eurostat)
- Approximated estimates for the primary and final consumption of energy, 2024, European Environment Agency (EEA)

Metadata

DPSIR

Driving forces

Topics

Energy # Climate change mitigation # Energy efficiency

Tags

8th EAP # ENER016 # Energy # Energy efficiency # Targets

Temporal coverage

2005-2030

Geographic coverage

Austria
Belgium
Bulgaria
Croatia
Cyprus
Czechia
Denmark
Estonia
Finland
France
Germany
Greece
Hungary
Ireland
Italy
Latvia
Lithuania
Luxembourg
Malta
Netherlands
Poland
Portugal
Romania
Slovakia
Slovenia
Spain
Sweden

Typology

Efficiency indicator (Type C - Are we improving?)

UN SDGs

SDG7: Affordable and clean energy

Unit of measure

FIG1: Million tonnes of oil equivalent (Mtoe);

FIG2: Percentage change compared to 2005

Frequency of dissemination

Once a year

References and footnotes

1. EC, 2022, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on the monitoring framework for the 8th Environment Action Programme: Measuring progress towards the attainment of the Programme's 2030 and 2050 priority objectives. COM(2022) 357 final
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