# Energy efficiency statistics

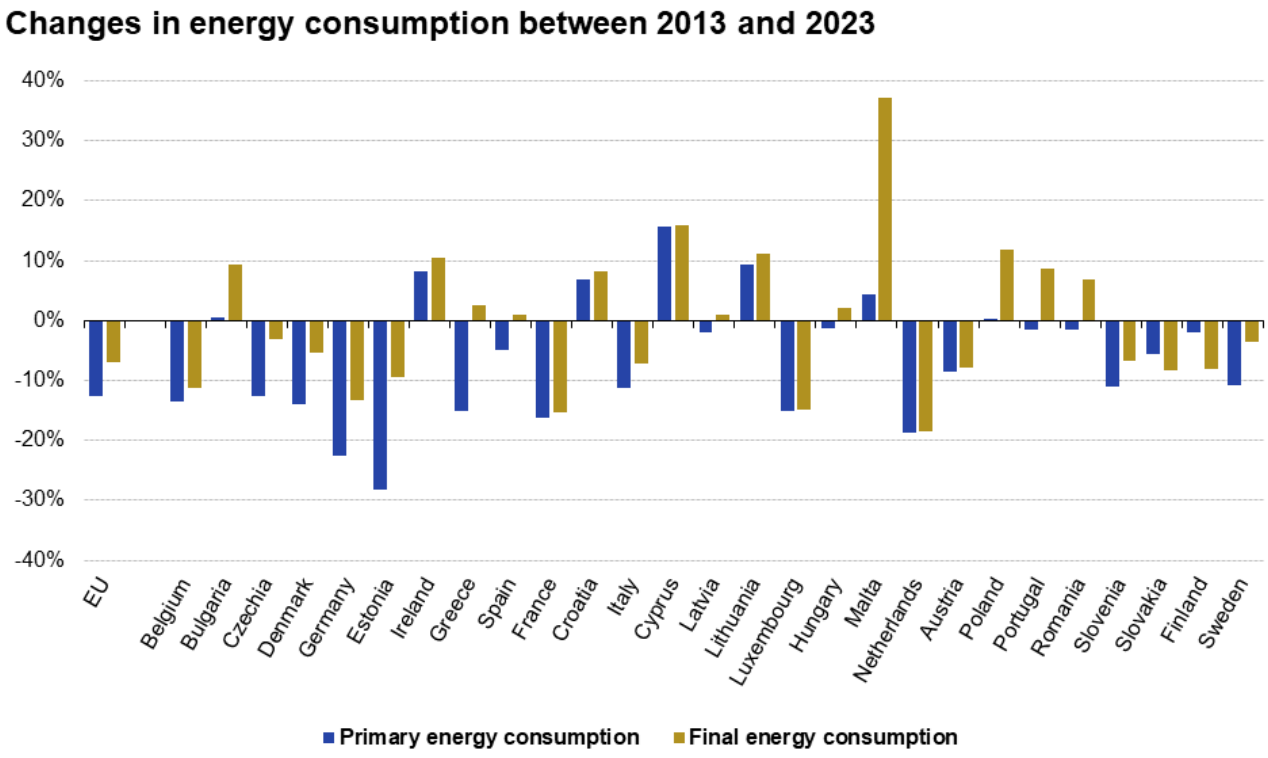
Statistics Explained

*Data from December 2024*
*Planned article update: 19 December 2025*

## Highlights

**" In 2023, primary energy consumption in the EU hit a record low of 1 211 Mtoe, or 22.0% away from the 2030 target. "**

**" In 2023, final energy consumption in the EU was 17.2% away from the 2030 target. "**




**Changes in primary and final energy consumption Source: Eurostat (nrg_ind_eff)**

**Energy efficiency targets for 2020 and 2030**

In 2012 the European Union (EU) adopted Directive 2012/27/EU on energy efficiency and made a commitment to a

20% reduction of energy consumption by the year 2020 compared with baseline[1] projections. This objective is also known as the 20% energy efficiency target. In other words, the EU made a commitment[2] to have a primary energy consumption of no more than 1 483 million tonnes of oil equivalent (Mtoe) and a final energy consumption of no more than 1 086 Mtoe in 2020. For 2030 the binding target was initially set as a reduction of at least 32.5%. This translated into a primary energy consumption of no more than 1 273 Mtoe and a final energy consumption of no more than 956 Mtoe in 2030. With the withdrawal of the United Kingdom from the EU, the Union's energy consumption figures for 2020 and 2030 had to be adjusted[3] to the situation of 27 EU countries. A technical adaptation of targets results in a primary energy consumption of no more than 1 312 Mtoe in 2020 and 1 128 Mtoe in 2030 and a final energy consumption of no more than 959 Mtoe in 2020 and 846 Mtoe in 2030. The 2023 revision of the directive followed on a proposal put forward by the Commission in July 2021, as part of the European Green Deal package . The 2021 proposal was further enhanced as part of the REPowerEU plan, presented by the Commission in May 2022, aiming to decrease the EU's dependency on fossil fuel imports from Russia. The outcome of the 2023 revision of Directive on energy efficiency established the 2030 targets as follows: final energy consumption of no more than 763 Mtoe and primary energy consumption of no more than 992.5 Mtoe. This article provides a statistical evaluation of the energy consumption trends in relation to these objectives and describes the statistical method for their measurement.

## Primary energy consumption and distance to 2020 and 2030 targets

Over the years, primary energy consumption has fluctuated as energy needs are influenced by economic developments, structural changes in industry, implementation of energy efficiency measures as well as specific weather conditions (such as cold vs. warm winters). In 2020, for example, the key factor affecting the EU energy consumption were COVID-19 related restrictions (e.g. lockdowns, curfews and travel restrictions). Due to these restrictions, 2020 saw what were at the time the lowest levels of energy consumption in the EU since 1990 (the first year for which data are available).

Primary energy consumption in the EU dropped sharply to 1 236 million tonnes of oil equivalent (Mtoe) in 2020, outperforming the 2020 efficiency target by 5.8%. Yet, this was still 24.5% above the 2030 target, indicating that efforts to improve efficiency need to be maintained in the years to come. The year 2021 clearly demonstrated this challenge, as primary energy consumption increased compared with 2020 by 6.3%, reaching 1 313 Mtoe. In 2022 primary energy consumption dropped to 1 260 Mtoe, while in 2023 it further decreased to 1 211 Mtoe, which is 2.0% lower than in 2020 (and 3.9% lower compared with 2022).

Primary energy consumption peaked in 2006 and in 2023 it was 19.9% lower than the peak value. The gap between the level of primary energy consumption and the target level set for 2030 was 52.3% in 2006. In 2020 this gap decreased to 24.5%, subsequently increasing to 32.3% in 2021 and then decreasing again to 26.9% in 2022 and 22.0% in 2023 (see data shown in Table 1 and Figure 1).

[1] Projections made in years 2007 for energy consumption in year 2020. The target was set as 20% reduction from the projected value.

[2] See the original Directive 2012/27/EU of 25 October 2012 on energy efficiency and also Council Directive 2013/12/EU of 13 May 2013 adapting Directive 2012/27/EU on energy efficiency, by reason of the accession of the Republic of Croatia.

[3] See Decision (EU) 2019/504 of 19 March 2019 on amending Directive 2012/27/EU on energy efficiency and Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action, by reason of the withdrawal of the United Kingdom of Great Britain and Northern Ireland from the Union.

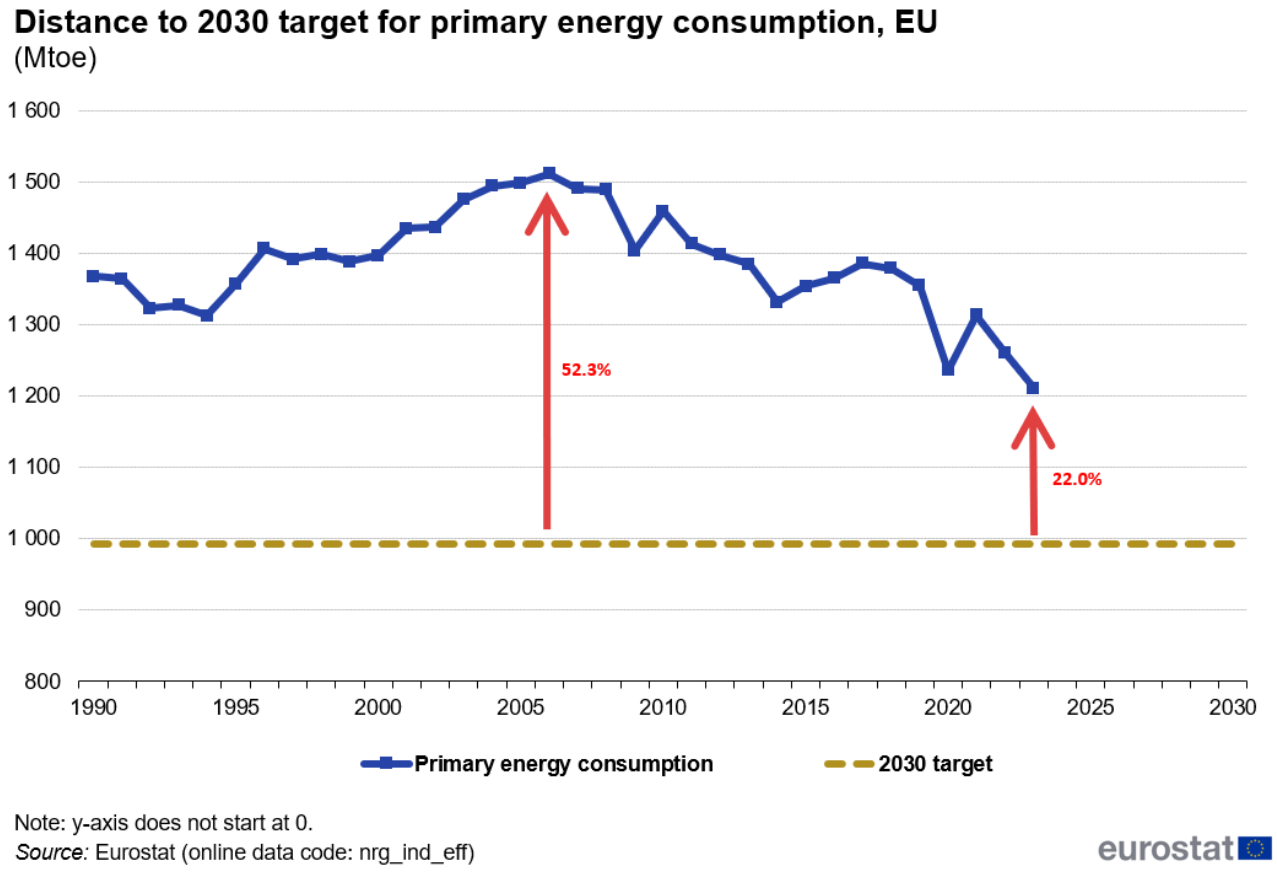
Primary energy consumption and distance to 2020 and 2030 targets, EU

| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Energy consumption (Mtoe) | 1 458.3 | 1 412.8 | 1 397.0 | 1 384.8 | 1 330.8 | 1 353.4 | 1 364.9 | 1 385.1 | 1 378.3 | 1 354.4 | 1 235.7 | 1 313.1 | 1 259.9 | 1 210.8 |
| Index (2005=100) | 97.4 | 94.3 | 93.3 | 92.5 | 88.9 | 90.4 | 91.1 | 92.5 | 92.0 | 90.4 | 82.5 | 87.7 | 84.1 | 80.8 |
| Distance to 2020 target (Mtoe) | 146.3 | 100.8 | 85.0 | 72.8 | 18.8 | 41.4 | 52.9 | 73.1 | 66.3 | 42.4 | -76.3 | 1.1 | -52.1 | -101.2 |
| Distance to 2020 target (%) | 11.1 | 7.7 | 6.5 | 5.5 | 1.4 | 3.2 | 4.0 | 5.6 | 5.0 | 3.2 | -5.8 | 0.1 | -4.0 | -7.7 |
| Distance to 2030 target (Mtoe) | 465.8 | 420.3 | 404.5 | 392.3 | 338.3 | 360.9 | 372.4 | 392.6 | 385.8 | 361.9 | 243.2 | 320.6 | 267.4 | 218.3 |
| Distance to 2030 target (%) | 46.9 | 42.3 | 40.8 | 39.5 | 34.1 | 36.4 | 37.5 | 39.6 | 38.9 | 36.5 | 24.5 | 32.3 | 26.9 | 22.0 |

*Source:* Eurostat (online data code: nrg_ind_eff)

eurostat

**Table 1: Primary energy consumption and distance to 2020 and 2030 targets, EU Source: Eurostat (nrg_ind_eff)**




Note: y-axis does not start at 0.
*Source:* Eurostat (online data code: nrg_ind_eff)

eurostat

**Figure 1: Distance to 2030 target for primary energy consumption, EU Source: Eurostat (nrg_ind_eff)**

## Final energy consumption and distance to 2020 and 2030 targets

Final energy consumption peaked in 2006 (6.6% away from the 2020 target and 33.9% away from the 2030 target). In 2020 the final energy consumption was 7.1% below the 2020 target level (a year significantly affected by the COVID-19 pandemic). In 2021 it reached 948 Mtoe: 1.2% below the efficiency target for 2020 and 24.2% away from the 2030 target. In 2022 final consumption dropped to 922 Mtoe (20.8% away from the 2030 target), and in 2023 it further decreased to 894 Mtoe (17.2% away from the 2030 target), the second lowest level since 1990, and only by 3 Mtoe higher than in 2020 (shown in Table 2 and in Figure 2).

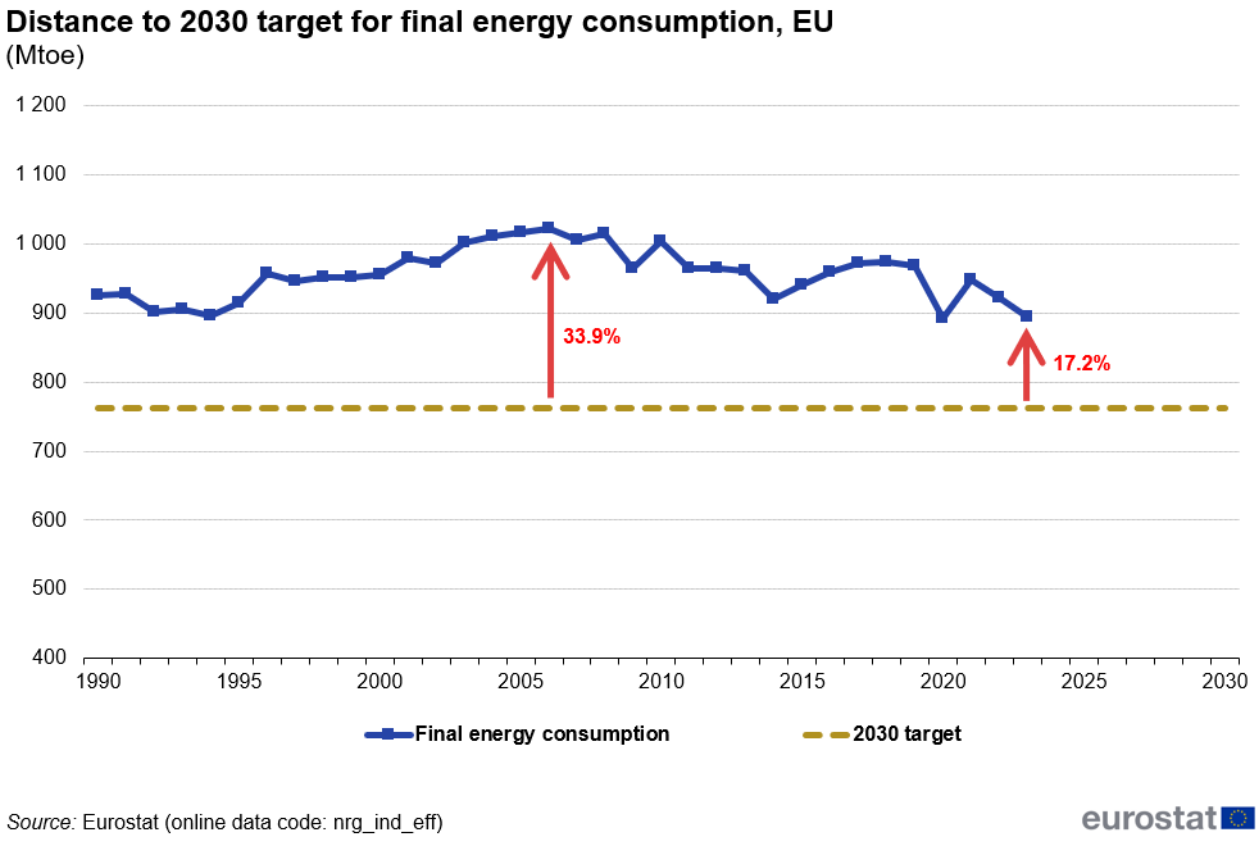
Final energy consumption and distance to 2020 and 2030 targets, EU

| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Energy consumption (Mtoe) | 1 003.6 | 965.1 | 963.5 | 961.5 | 919.0 | 939.9 | 959.3 | 970.9 | 973.9 | 968.8 | 891.4 | 947.7 | 921.8 | 894.4 |
| Index (2005=100) | 98.7 | 94.9 | 94.7 | 94.5 | 90.3 | 92.4 | 94.3 | 95.5 | 95.7 | 95.2 | 87.6 | 93.2 | 90.6 | 87.9 |
| Distance to 2020 target (Mtoe) | 44.6 | 6.1 | 4.5 | 2.5 | -40.0 | -19.1 | 0.3 | 11.9 | 14.9 | 9.8 | -67.6 | -11.3 | -37.2 | -64.6 |
| Distance to 2020 target (%) | 4.7 | 0.6 | 0.5 | 0.3 | -4.2 | -2.0 | 0.0 | 1.2 | 1.6 | 1.0 | -7.1 | -1.2 | -3.9 | -6.7 |
| Distance to 2030 target (Mtoe) | 240.6 | 202.1 | 200.5 | 198.5 | 156.0 | 176.9 | 196.3 | 207.9 | 210.9 | 205.8 | 128.4 | 184.7 | 158.8 | 131.4 |
| Distance to 2030 target (%) | 31.5 | 26.5 | 26.3 | 26.0 | 20.4 | 23.2 | 25.7 | 27.3 | 27.6 | 27.0 | 16.8 | 24.2 | 20.8 | 17.2 |

*Source:* Eurostat (online data code: nrg_ind_eff)

eurostat

**Table 2: Final energy consumption and distance to 2020 and 2030 targets, EU Source: Eurostat (nrg_ind_eff)**




*Source:* Eurostat (online data code: nrg_ind_eff)

eurostat

**Figure 2: Distance to 2030 target for final energy consumption, EU Source: Eurostat (nrg_ind_eff)**

## Country specific evolution in the last decade

The first Energy Efficiency Directive was adopted in 2012. With the availability of data for year 2023, we can compare the latest data on energy consumption with those 10 years ago - a year after the Directive was adopted.

When comparing 2023 with 2013, primary energy consumption decreased in the Union by 12.6%. In 9 EU countries primary energy consumption decreased more than that, most notably in Estonia (-28.1%), Germany (-22.5%) and the Netherlands (-18.7%). On the other side, there were 7 countries where primary energy consumption was higher in 2023 than in 2013. In
4 of these 7, the increase was above 5%: Cyprus (+15.8%), Lithuania (+9.3%), Ireland (+8.3%) and Croatia (+6.8%).

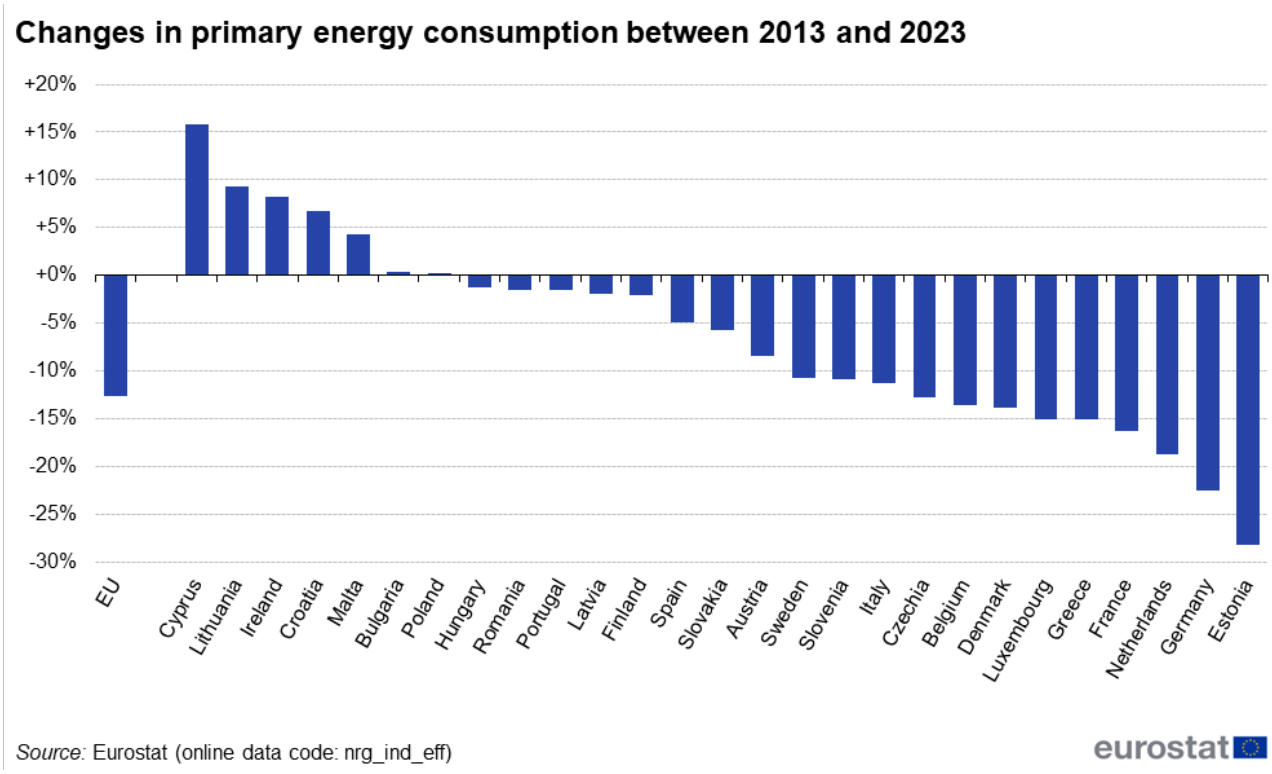



**Figure 3: Changes in primary energy consumption Source: Eurostat (nrg_ind_eff)**

Final energy consumption of the EU in 2023 was 7.0% lower than in 2013. In 10 countries the decrease was even more pronounced, with the Netherlands (-18.5%), France (-15.2%) and Luxembourg (-14.9%) registering the most decreases. On the other side, the highest increases were seen in Malta (+37.1%), Cyprus (+15.8%) and Poland (+11.7%).

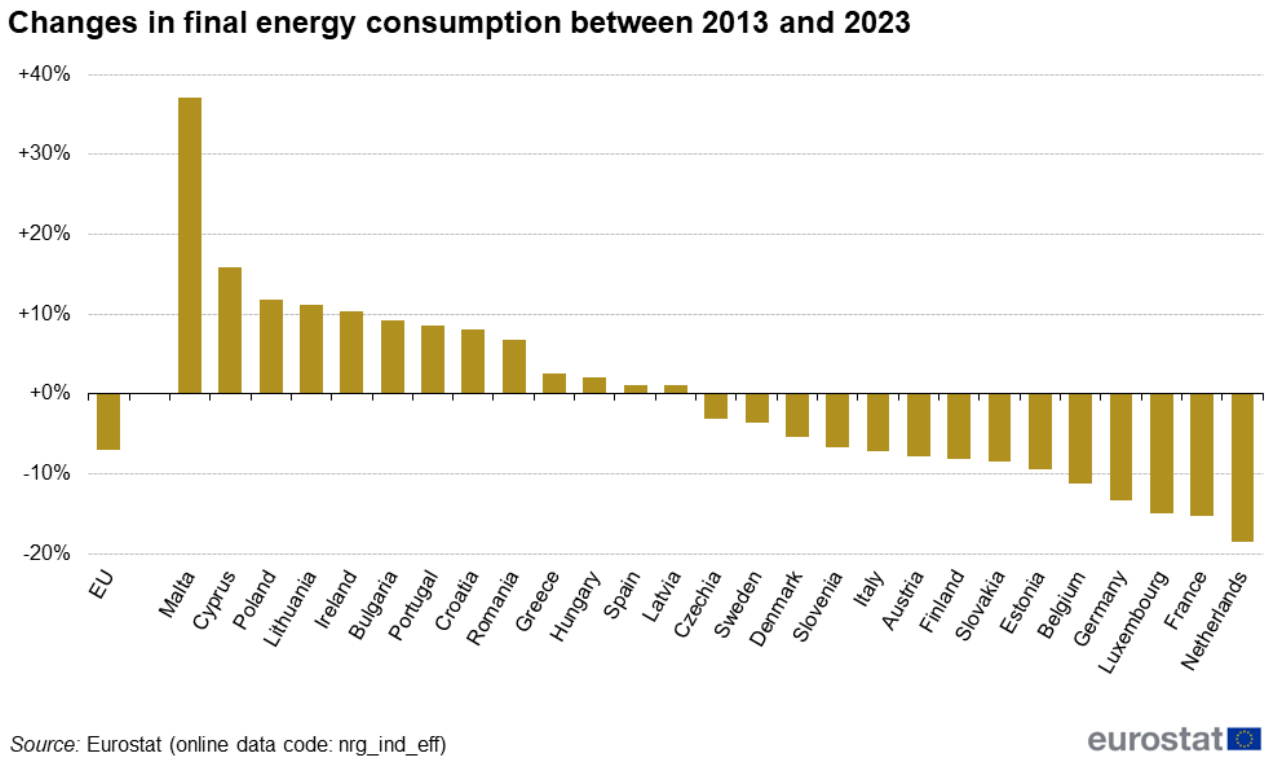



**Figure 4: Changes in final energy consumption Source: Eurostat (nrg_ind_eff)**

Diverging trends between primary energy consumption and final energy consumption are often the result of fundamental changes in the energy system. Most notably, the switch between electricity generation from fossil fuels and nuclear power (low efficiency) to wind and solar PV (100% efficiency, according to the methodology used). Such a shift will cause a decrease in the primary energy consumption, but nearly no change in the final energy consumption. Additionally, transformation losses are part of the transformation sector of the producing country (thus in primary energy consumption). Any changes in transformation losses affect primary and final energy consumption of net exporters differently than that of net importers. For example, when a net exporter of electricity increases its exports, the transformation losses related to electricity production increase and thus, the net exporter would see an increase in their primary energy consumption without any change in their final energy consumption; while for net importers the same absolute value would change both. Similarly for countries without oil refineries, changes in final energy consumption of oil products would result in exactly the same absolute changes in primary energy consumption. For final energy consumption, the trend reflects the actual consumption of end-users without including losses occurred during energy transformation. For example, the way in which electricity is generated affects only primary energy consumption. However, the amount of electricity consumed affects both primary energy consumption (resources needed to produce or import electricity) and final energy consumption (its actual consumption by end-users). In addition, as primary energy consumption has to be greater than or equal to final energy consumption (and in practice it is always more), the same absolute value changes will cause higher percentage changes in the final energy consumption.

## Source data for tables and graphs

- Energy efficiency statistics - graphs and tables

## Data sources

Data from energy balances have been used for all calculations. Data are available for all EU countries and for all time periods from 1990. The most recent data available are for 2023. In general, data are complete, recent and highly comparable across countries. This results in high accuracy and accountability of EU aggregate figures. Please note that countries regularly provide revisions of recent years, however their impact on indicators presented in this article is very small.

**Methodology**

The target values for 2020 are fixed in Article 3 of Directive 2012/27/EU and for 2030 in Article 4 of Directive (EU) 2023/1791 :

- the Union's 2020 energy consumption has to be no more than 1 483 Mtoe of primary energy or no more than 1 086 Mtoe of final energy
- the Union's 2030 energy consumption has to be no more than 992.5 Mtoe of primary energy and/or no more than 763 Mtoe of final energy

The 2020 values noted above were in use before the withdrawal of the United Kingdom from the EU. Following the UK's withdrawal, the EU's energy consumption figures for 2020 and 2030 need to be adjusted to the situation of 27 EU countries. A technical adaptation, respecting the same calculation principles, results in a primary energy consumption of no more than 1 312 Mtoe in 2020 and a final energy consumption of no more than 959 Mtoe in 2020. Additional information is available on the website of DG Energy .

Primary energy consumption used for monitoring the progress towards 2020 and 2030 targets is taken from energy balances : Primary energy consumption - Energy Efficiency Directive [code: PEC_EED]. Primary energy consumption has to be measured in Mtoe.

Final energy consumption used for monitoring the progress towards 2020 and 2030 targets is taken from energy balances : Final energy consumption - Energy Efficiency Directive [code: FEC_EED]. Final energy consumption has to be measured in Mtoe.

The distance to target in absolute terms (Mtoe) is calculated as a difference between the observed energy consumption in a given year and the absolute primary and final energy consumption targets in 2020 according to Directive 2012/27/EU and in 2030 according to Directive (EU) 2023/1791.

The distance to target in relative terms (as percentage) is calculated as a ratio of the distance in a given year to primary and final energy consumption targets in 2020 according to Directive 2012/27/EU and in 2030 according to Directive (EU) 2023/1791.

## Context

Europe cannot afford to waste energy. Energy efficiency is the most cost effective way to reduce emissions, improve energy security, enhance competitiveness and make energy consumption more affordable for all consumers. Energy efficiency is also one of the key factors in achieving our long-term energy and climate goals.

On 25 October 2012, the EU adopted Directive 2012/27/EU on energy efficiency. This Directive established a common framework of measures for the promotion of energy efficiency within the Union in order to ensure the achievement of the 20% headline target on energy efficiency.

On 11 December 2018, the EU amended Directive 2012/27/EU on energy efficiency and set a 2030 target of 32.5%, also with a possible upward revision in 2023.

The revised Directive on energy efficiency (EU/2023/1791), published in the Official Journal on 20 September 2023, raised the EU's ambition on energy efficiency. It established 'energy efficiency first' as a fundamental principle of EU energy policy, giving it a legal standing for the first time. In practical terms, this means that energy efficiency must be considered by EU countries in all relevant policy and major investment decisions taken in the energy and non-energy sectors. For EU countries, the 2023 targets are to collectively ensure an additional 11.7% reduction in energy consumption by 2030, compared with the 2020 reference scenario projections. As a result, overall EU energy consumption by 2030 should not exceed 992.5 Mtoe for primary energy and 763 Mtoe for final energy.

## Notes

# Explore further

## Other articles

- Sustainable development in the European Union
- Statistics for European policies and high-priority initiatives
- Energy statistics - an overview

## Database

- Energy (nrg) , see:

Energy statistics - quantities, annual data (nrg_quant)

Energy indicators (nrg_ind)

Energy efficiency (nrg_ind_eff)

## Dedicated section

- Energy
- Sustainable Development Goals

## Publications

- Shedding light on energy in the EU – 2024 interactive publication
- Sustainable development in the European Union – Monitoring report on progress towards the SDGs in an EU context – 2024 edition

## Methodology

- Energy efficiency (nrg_ind_eff)
- Energy statistics - quantities (nrg_quant)
- Energy balances (nrg_bal)

## External links

- European Commission - DG Energy - Energy Efficiency
- European Commission - DG Energy - Energy Strategy
- Concerted Action - Energy Efficiency Directive
- ODYSSEE indicators on energy efficiency
- MURE database on energy efficiency policies and measures
- International Energy Agency: Energy Efficiency and Demand

## Legislation

- Directive 2012/27/EU on energy efficiency
- Directive (EU) 2018/2002 on energy efficiency
- Directive (EU) 2023/1791 on energy efficiency (recast)
- Regulation (EC) No 1099/2008 on energy statistics

## Visualisation

- Energy balances made easy
- Energy indicators made easy
- Sankey diagram - Visualise energy flows
- Visualise energy scenarios with an interactive tool