

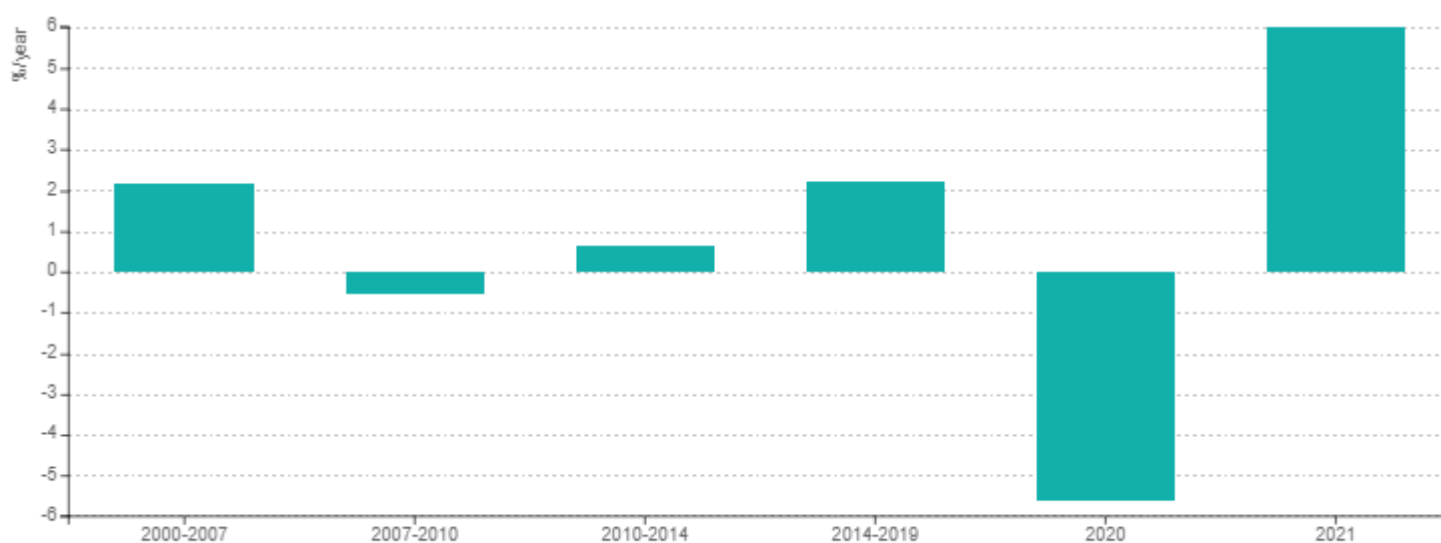
Sectoral Profile - Overview

Energy consumption pattern and drivers

Economic growth

- GDP recovered in 2021 (+5.6%) , after an historic decrease in 2020 due to Covid crisis (-5.6%).
- Economic growth almost returned since 2014 (1.5%/year), to the pace observed between 2000 and 2007, i.e. before the global economic crisis in 2008-2009.
- Slow growth between 2010 and 2014: 0.4%/year.

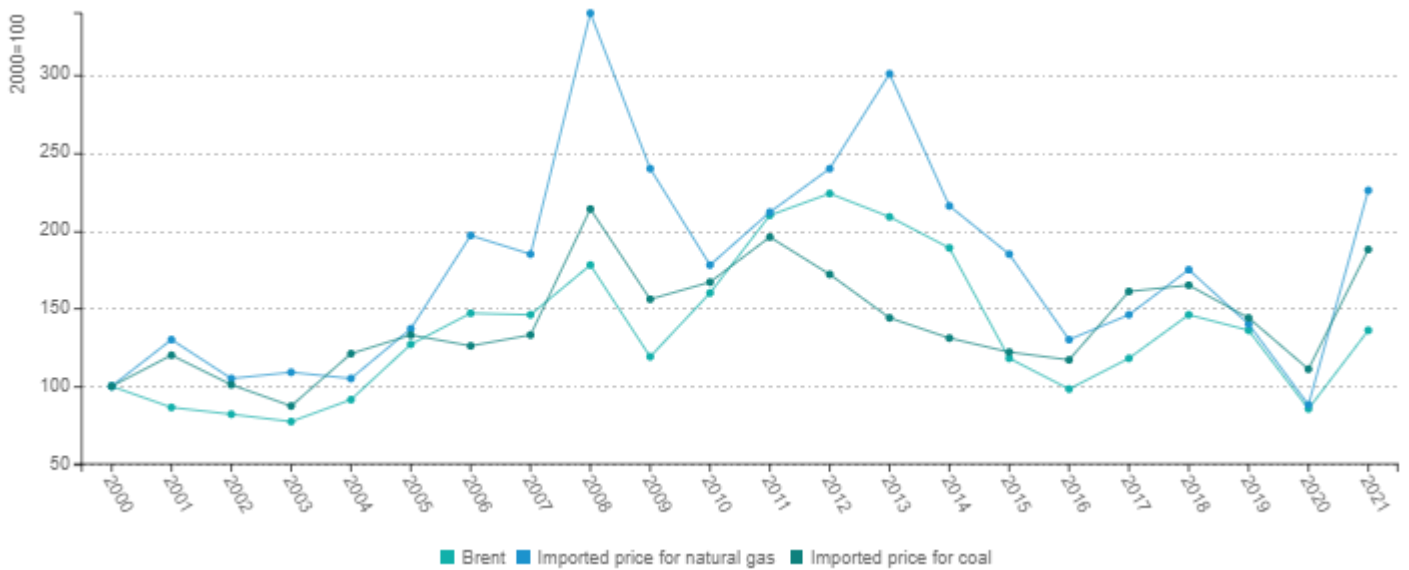
GDP growth in the EU



Energy prices

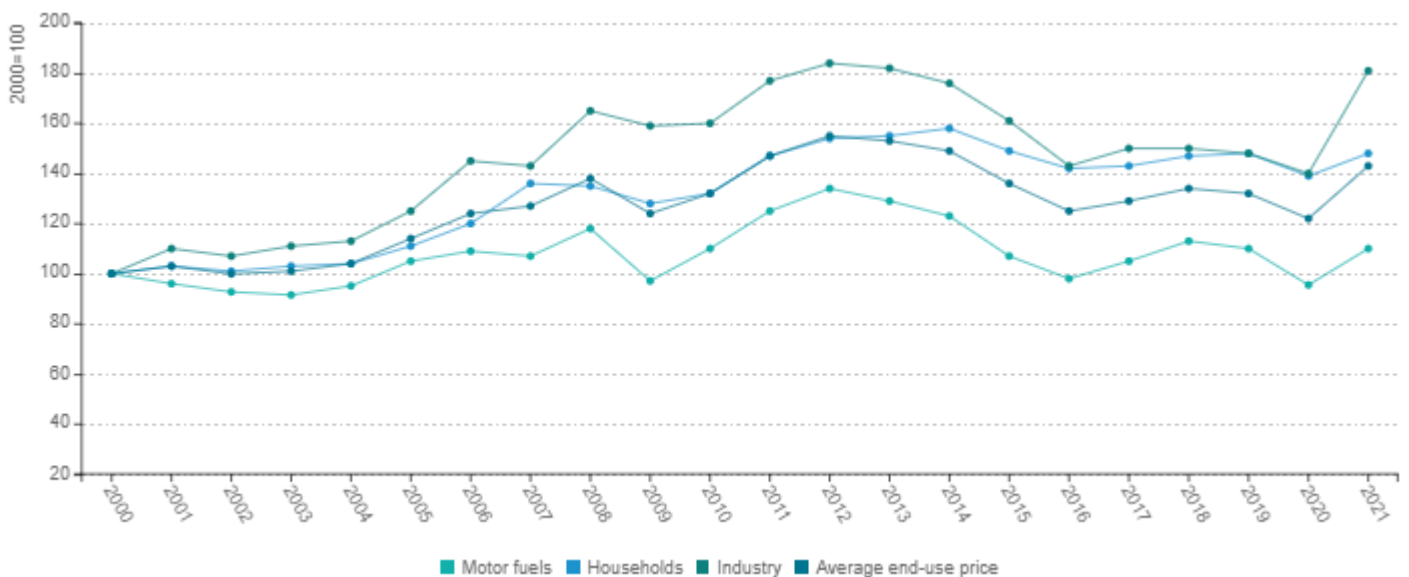
- High rise international energy prices in 2021, particularly for gas (+62% compared to 2019)
- Upward trend in international energy prices from 2016 to 2018 and decrease in 2019 and 2020.
- Significant decline in international prices over the period 2012-2016 after the sharp rise driven by the financial crisis.

International energy prices (EU)



- Rebound of end-use energy prices in 2021 after the 2020 drop due to the Covid crisis, especially in industry (+29%) because of natural gas price increase. Prices increased by 15% in the transport sector, and by 7% in the residential sector.
- Slight progression of end-use energy prices between 2016 and 2018.
- Between 2012 and 2016, rapid decrease of the average energy prices for final consumers (-4.7%/year), mainly in transport (-7.4%/year for motor fuels) and industry (-4.1%/year). Moderate reduction for households (-1.7%/year).
- Very rapid increase of average end-use energy prices by sector between 2000 and 2012 (around 70%).

Average energy prices by sector (EU)

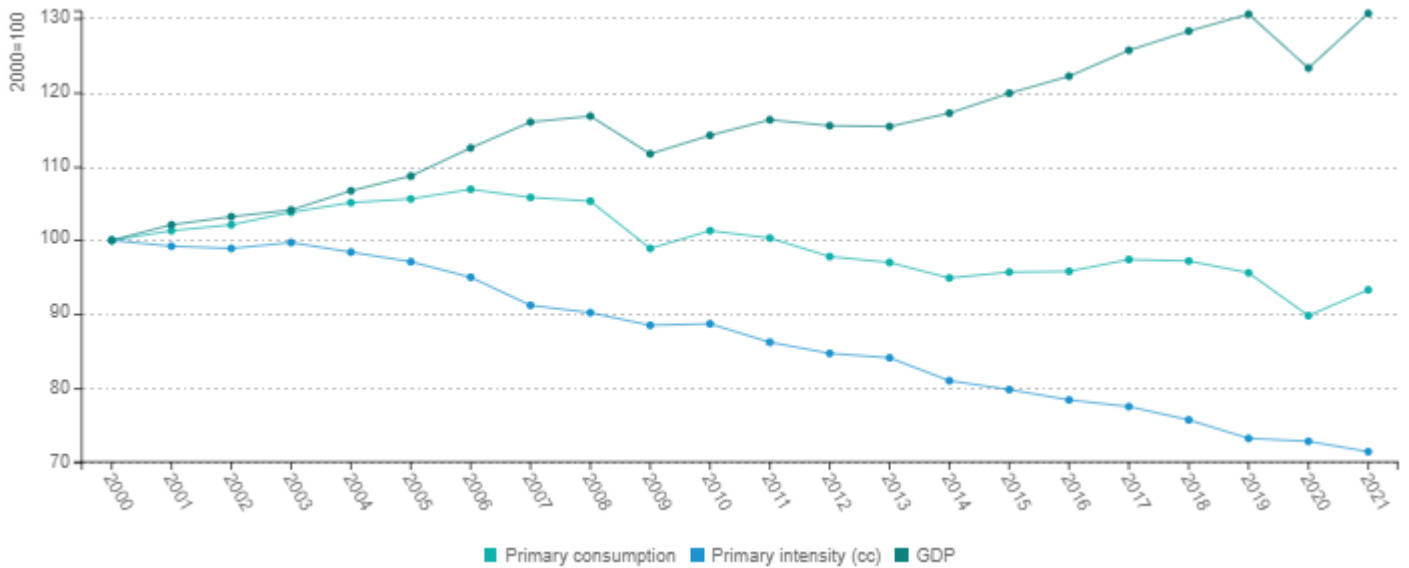


Source: Eurostat; energy prices by sector (at constant prices): weighted average prices by energy (electricity, gas, fuel, coal) on the basis of energy market shares.

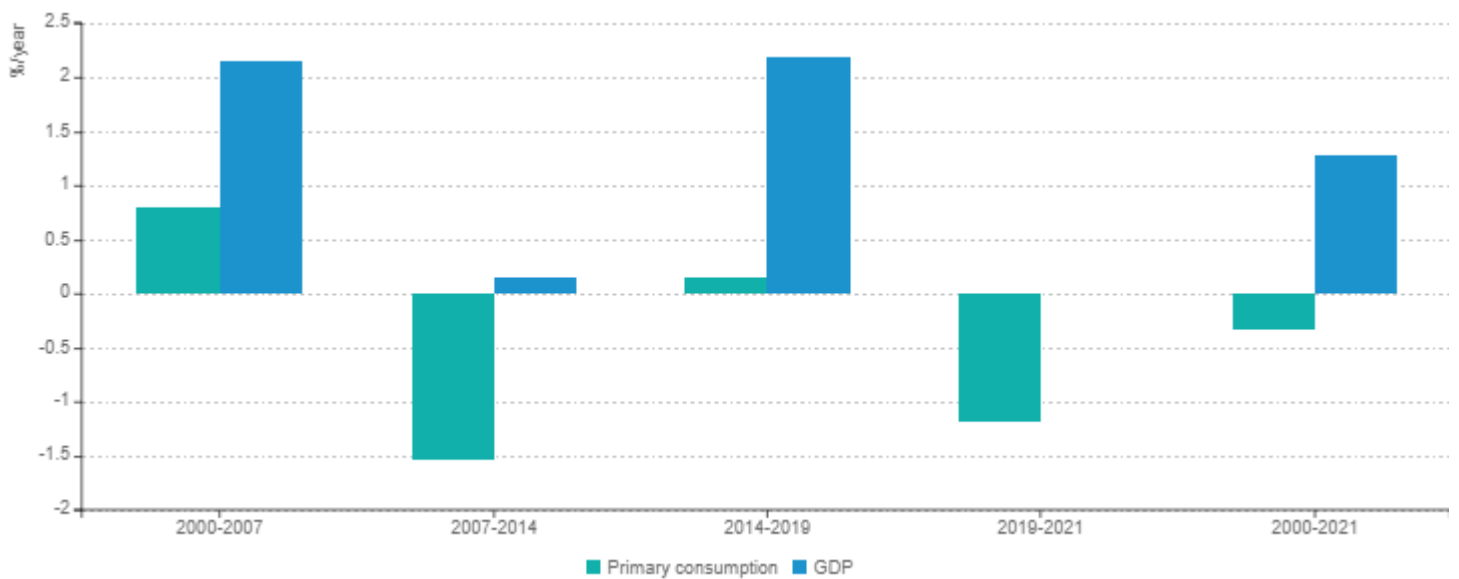
Primary consumption and GDP

- Rebound of primary consumption (at normal climate) in 2021 (+2.9%), after a sharp drop in 2020 (-6.1%)
- Stagnation of primary consumption between 2014 and 2019, although GDP increased by 2.2%/year.
- This follows a decrease of 1.6%/year between 2007 and 2014.
- Regular and rapid decrease in primary energy intensity since 2007 (-1.8%/year)

Primary consumption (normal climate) and GDP trends in the EU

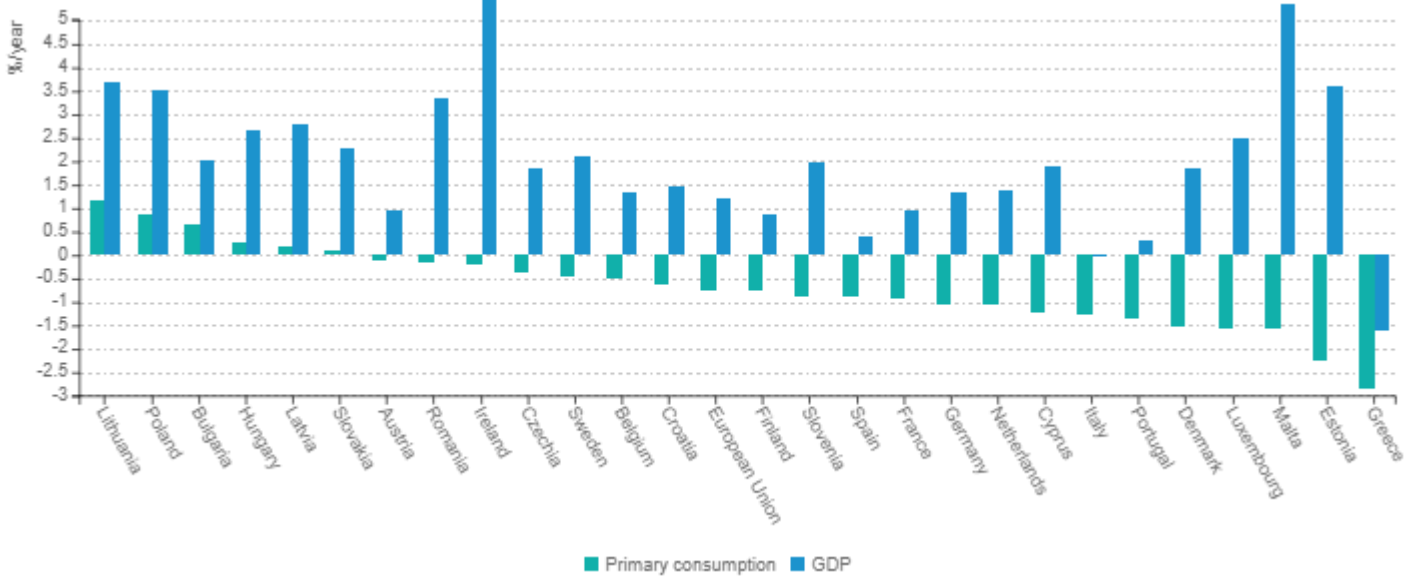


Annual growth rate of primary consumption (normal climate) and GDP trends (EU)



- Declining trend in primary consumption (at normal climate) in most countries since 2010: between -1% and -2% per year in 8 Member States and less than -2%/year in Estonia and Greece.

Primary consumption (normal climate) and GDP trends (2010-2021)

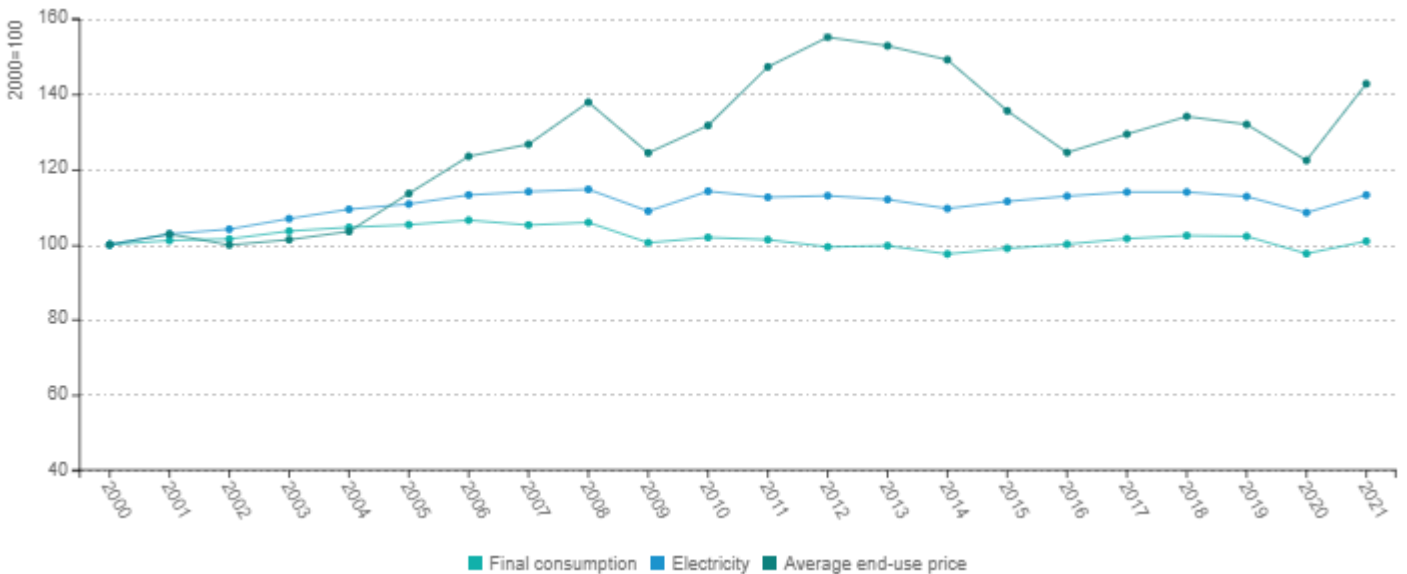


Final consumption

Consumption and energy prices

- Final energy consumption rebounded by 3.4% in 2021 after a drop by 4.5% in 2020 due to Covid.
- Increasing trend of final energy consumption between 2014 and 2019 (0.9%/year), driven by a strong economic growth (2.2%/year) and decreasing energy prices.
- Before, that, the trend was decreasing between 2007 and 2014 (-1.2%/year) and increasing before 2007 (+0.6%/year).
- Strong reduction of the final energy consumption between 2011 and 2014 (-1.4%/year)
- Electricity consumption follows final energy consumption trends: after a decreasing period between 2007 and 2014 (-0.6%/year), it has been increasing again (+0.5%/year).

Final energy trends and prices (EU)

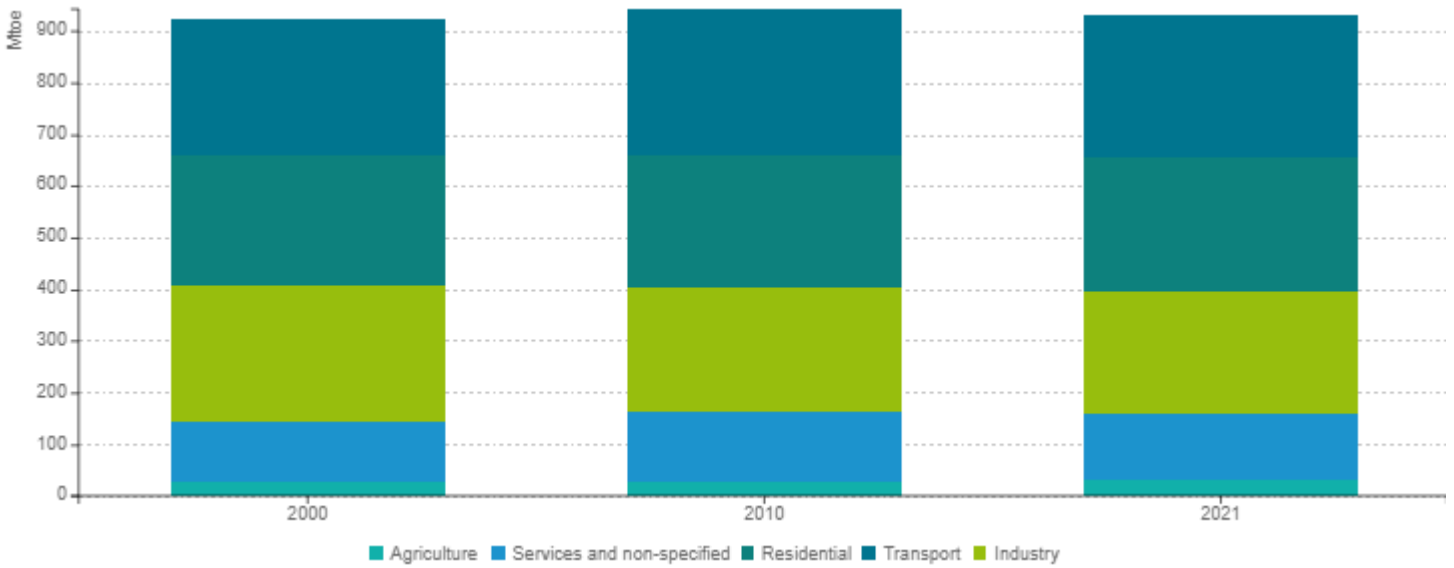


Note: Final consumption at normal climate.

Final energy consumption by sector in EU

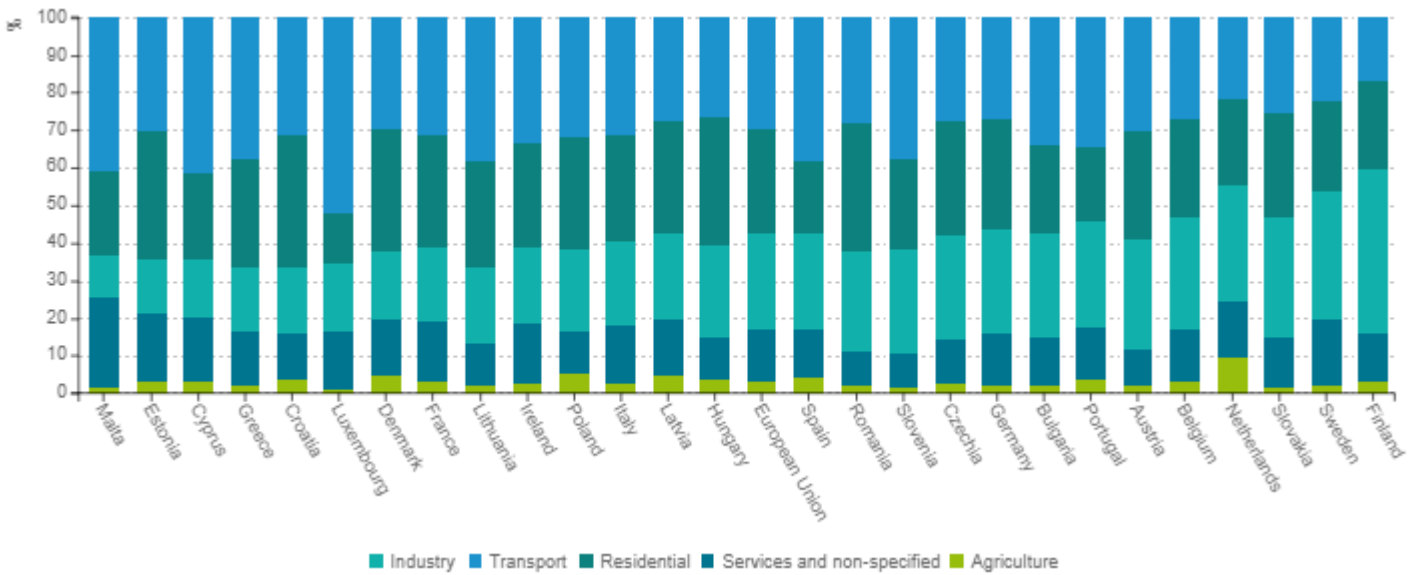
- Increasing share of transport (from 28% in 2000 to 30% in 2010 and 2021) and services (from 12 to 14%). The share of industry has decreased by 4 points, from 29% in 2000 to 25% in 2010 and 2021. The share of households is stable at around 28%, as is the share of agriculture at around 3%.

Final consumption by sector (EU)



In half of EU Member States (14), transport is the largest energy consumer sector. In 8 MS, namely Germany, Croatia, Denmark, Estonia, Hungary, Latvia, Czechia, and Romania, the residential sector is the largest consumer. For the 5 remaining MS (Sweden, Finland, Belgium, Netherlands, and Slovakia), industry is the largest consumer.

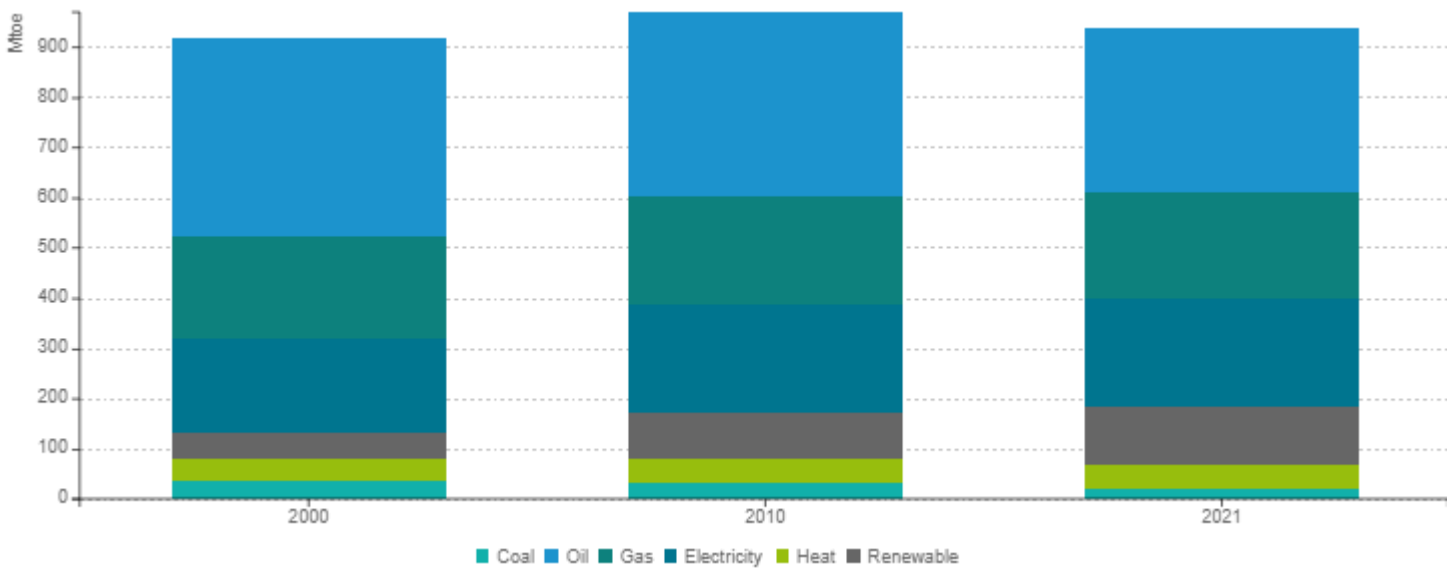
Final consumption by sector (EU countries, 2021)



Final consumption by energy (EU)

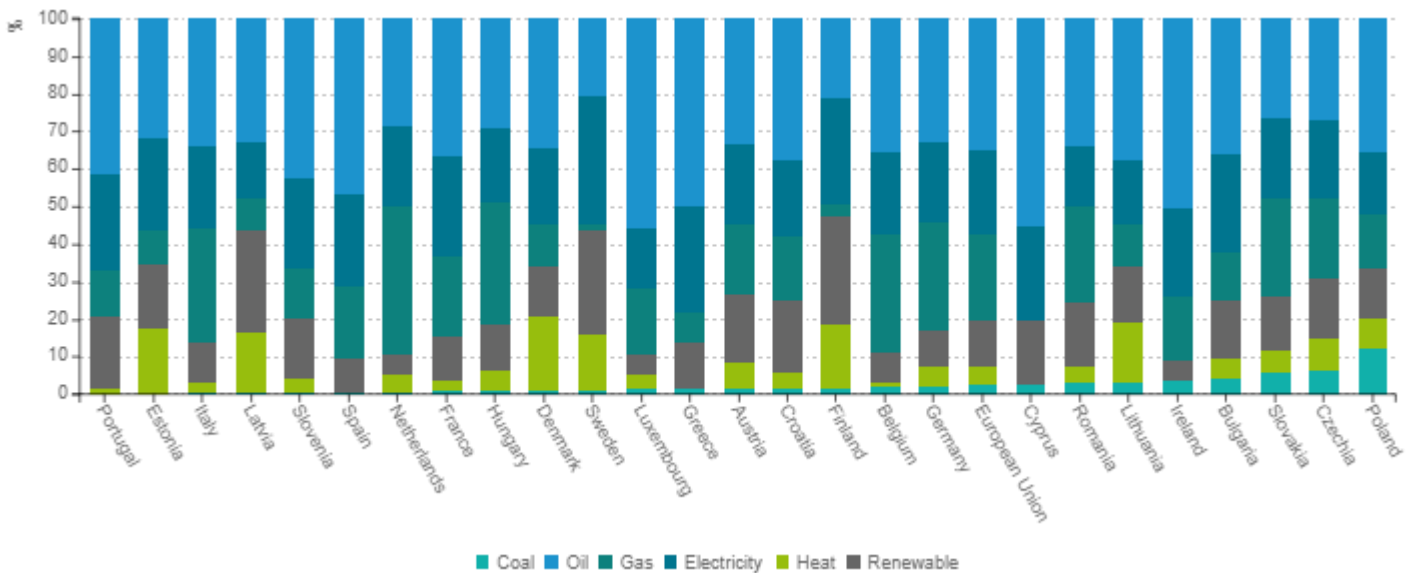
Increasing share for electricity (from 21% in 2000 to 22% in 2010 and 23% in 2021), for renewable (from 5% to 10%), and for heat (4.7% in 2000, 5.2% in 2021). Decreasing share for oil (from 43% in 2000 to 37% in 2021) and for coal (4% to 3%). Stable share for gas (22%)

Fuel mix in the EU



- Oil is the main energy source consumed by final consumers in the EU, except in the Netherlands (main energy is gas), Finland (renewable) and Sweden (electricity).

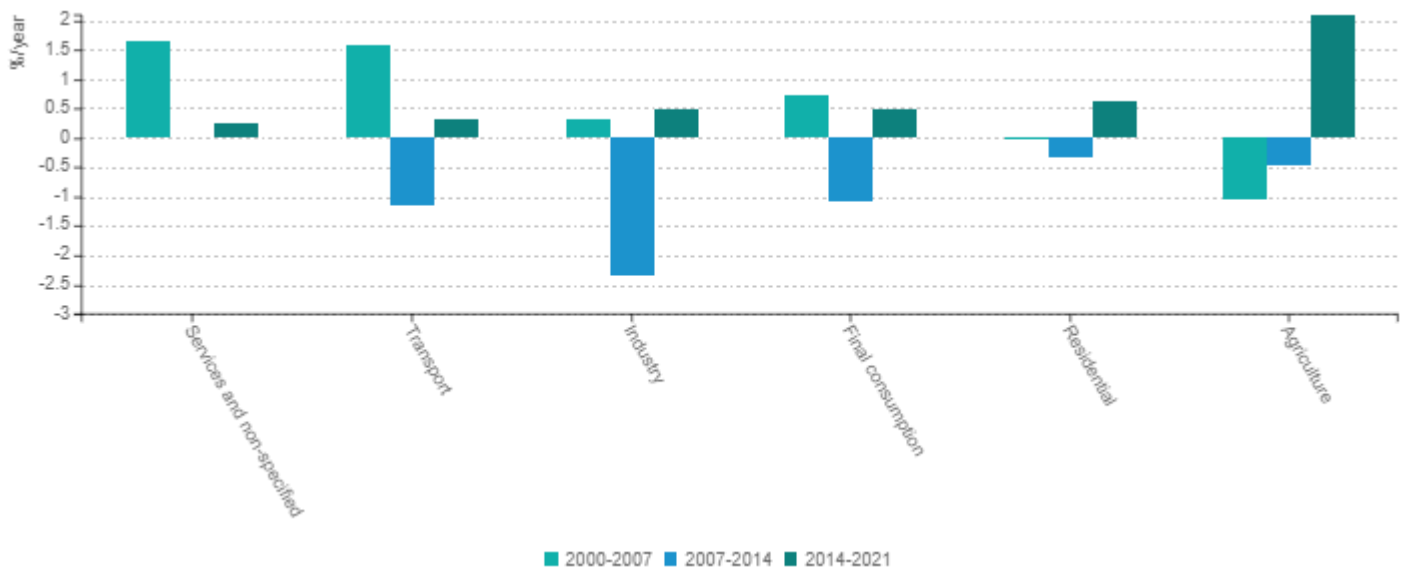
Fuel mix in the EU, 2021 (in %)



Decreasing energy consumption in all sectors except services

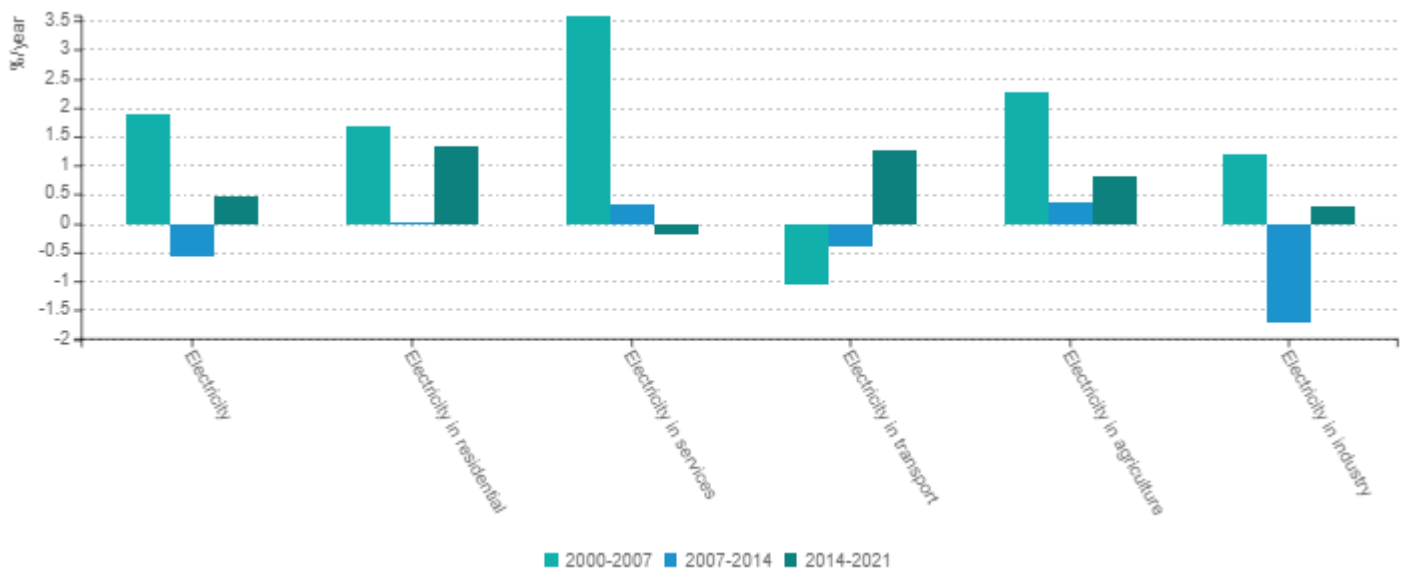
- Final energy consumption for all sectors is increasing at EU level since 2014 (+0.5%/year for total final consumption). The increase is especially high for agriculture (+2.1%/year).
- Following the financial crisis of 2008/2009, this consumption was on the contrary decreasing for all sectors between 2007 and 2014.

Final energy consumption trends (EU, normal climate)



- Electricity consumption recovered its pre-Covid level in 2021, after a strong rebound (+4%).
- Increase in electricity consumption since 2014 (+0.5%/year) after a decreasing trend between 2007 and 2014 (-0.6%/year) and a strong growth before 2007 (+1.9%/year), that was mainly explained by residential and services sectors.

Final electricity consumption trends (EU)



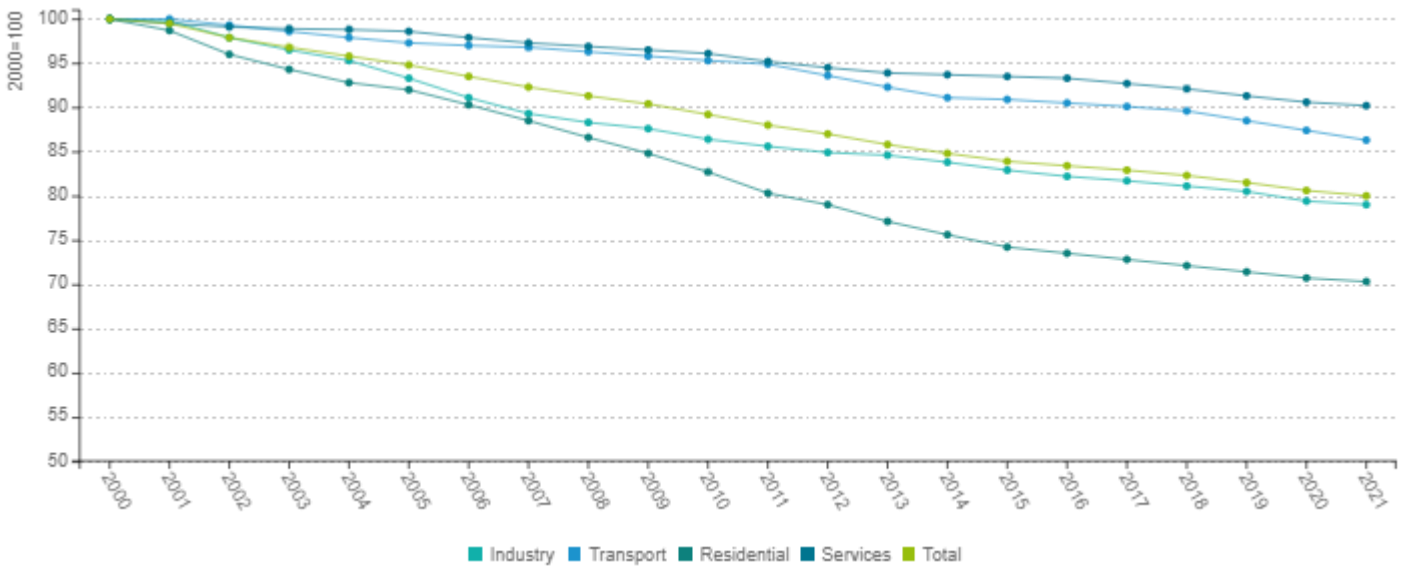
Energy efficiency trends

Energy efficiency trends of final consumers

- Energy efficiency of final consumers improved by 1.1%/year between 2000 and 2021, with a net slowdown since 2014 (0.8%/year, compared to 1.2%/year between 2000 and 2014).
- The largest gains are for households (1.7%/year since 2000), although progress has been halved since 2014 (1%/year against 2%/year previously).

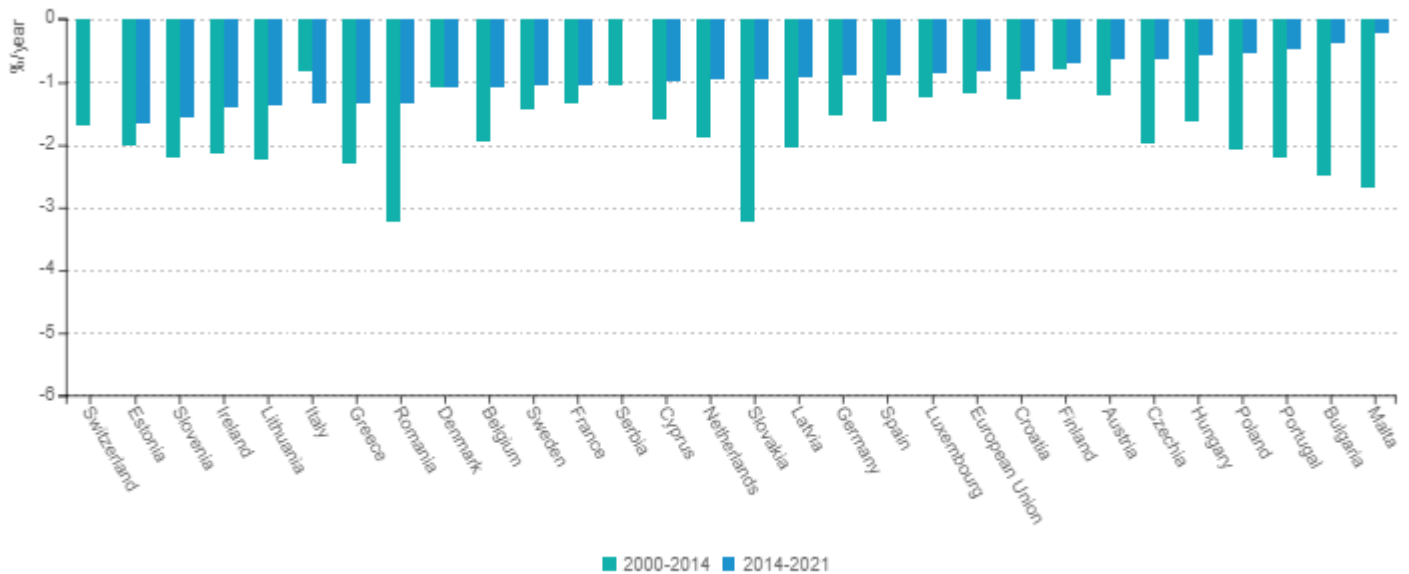
- A similar slowdown is visible for industry since the economic crisis (0.9%/year since 2008 against 1.5%/year previously).
- Slower improvement in transport (0.7%/year), with, however, a strong acceleration since 2018 (1.1%/year).
- Energy efficiency in services has improved at an average pace of 0.6%/year since 2010.

Energy efficiency trends of final consumers (EU)



- In most countries, energy efficiency has also been progressing much slower since 2014. Only Italy is improving faster since 2014.
- Estonia, Slovenia, and Ireland show the steadiest progress since 2014, higher than 1.4%/year, compared to the EU average of 0.8%/year.

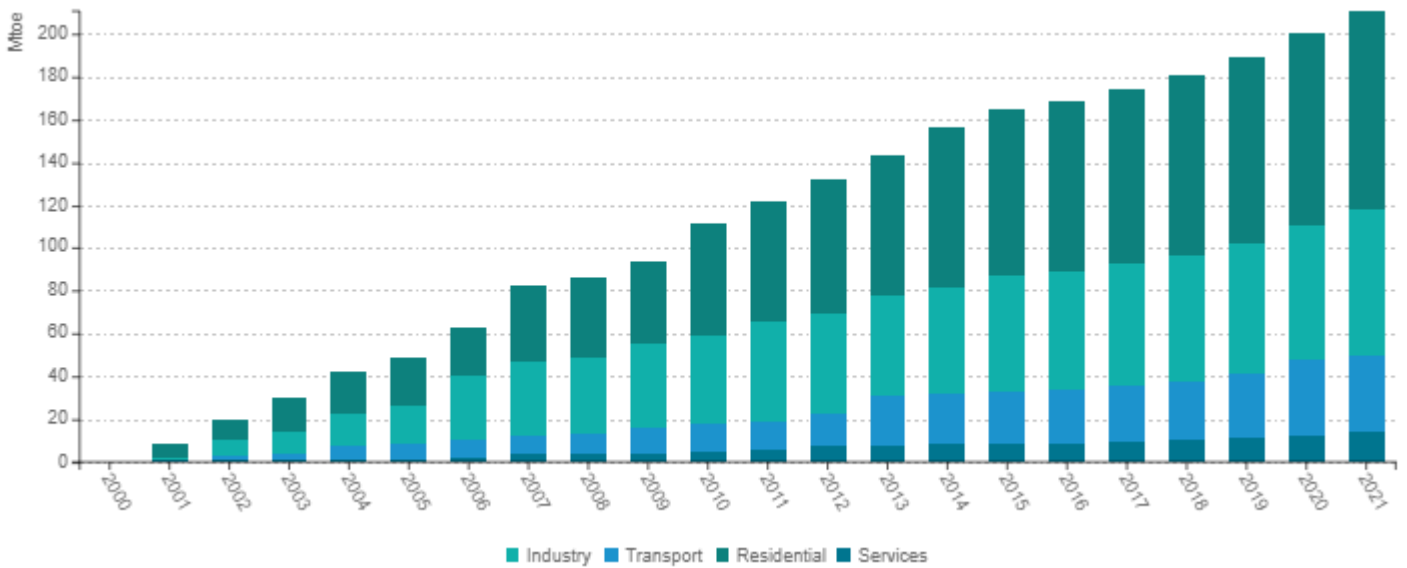
Energy efficiency trends of final consumers (All countries)



Evaluation of energy savings

Around 210 Mtoe of energy has been saved in 2021 compared to 2000 (22% of final energy consumption). Without these savings the final energy consumption would have been 22% higher in 2019. Households, which is the sector with the highest number of regulations and financial measures, is overrepresented, with a share of total savings (44%) much higher than its share in consumption (28%). Industry comes in second position with 33% of total savings. Savings in transport are lower than their share in consumption (17% vs 25%).

Energy savings in the EU

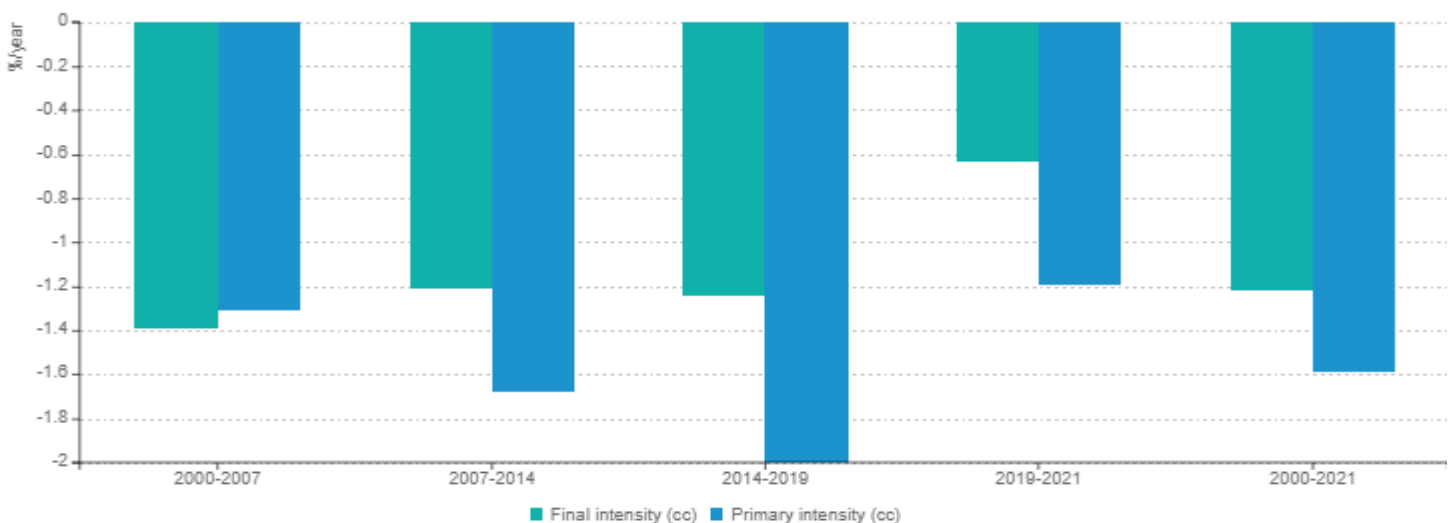


Energy intensity

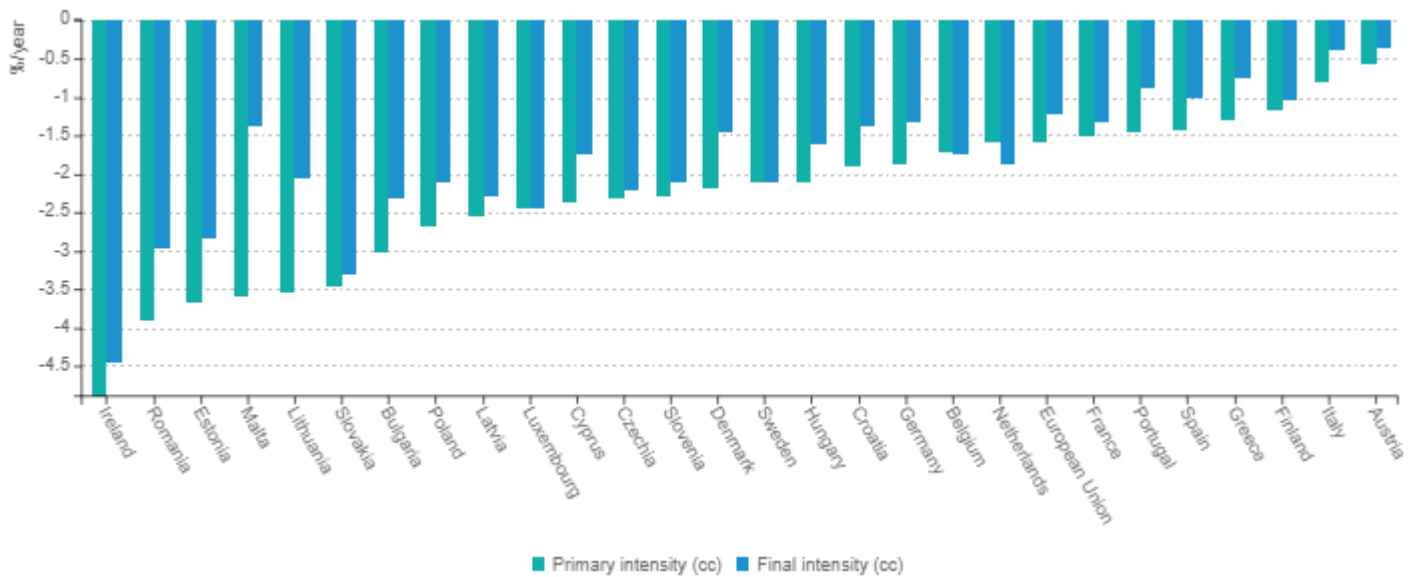
Primary and final energy intensities trends in the EU (normal climate)

- Since 2000, primary intensity has decreased faster than final intensity at EU level and in most EU Member States due to decreasing losses in the power sector (increasing efficiency of thermal generation, diffusion of renewables, increasing imports, etc.). This is especially significant since 2014, and even since 2019, with the very rapid penetration of renewables.
- An opposite trend can be seen in Belgium and in the Netherlands, due to specific factors.

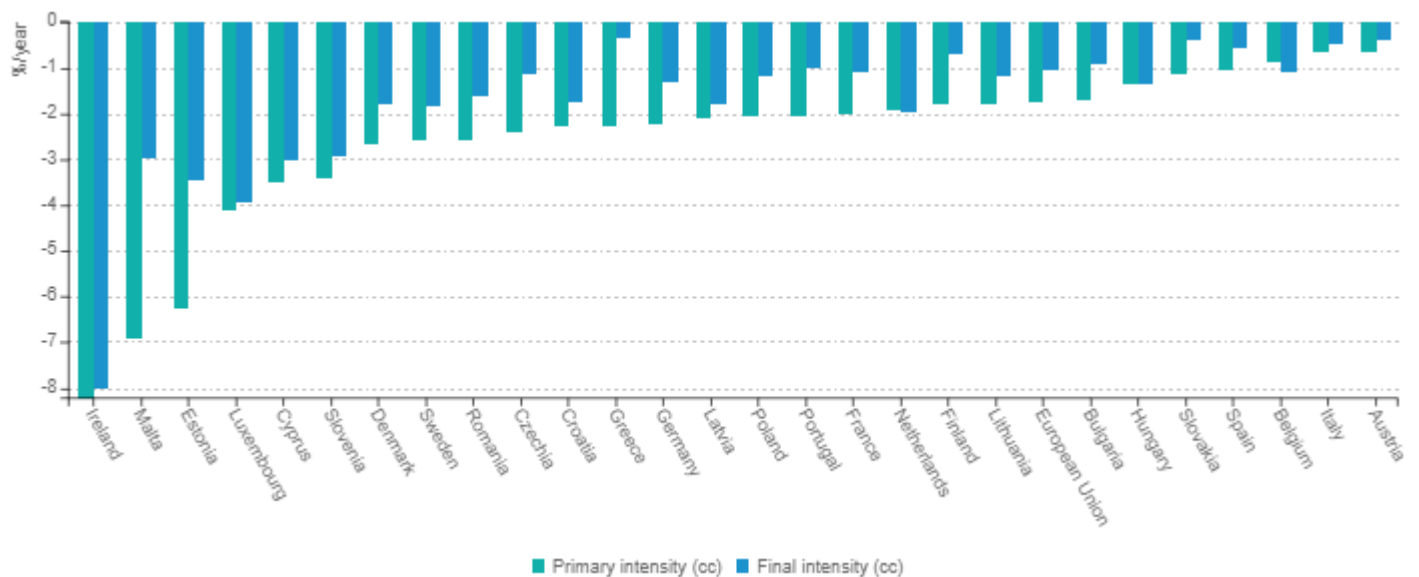
Primary and final energy intensities trends in the EU (normal climate)



Primary and final energy intensities trends (2000-2021)



Primary and final energy intensities (2014-2021)

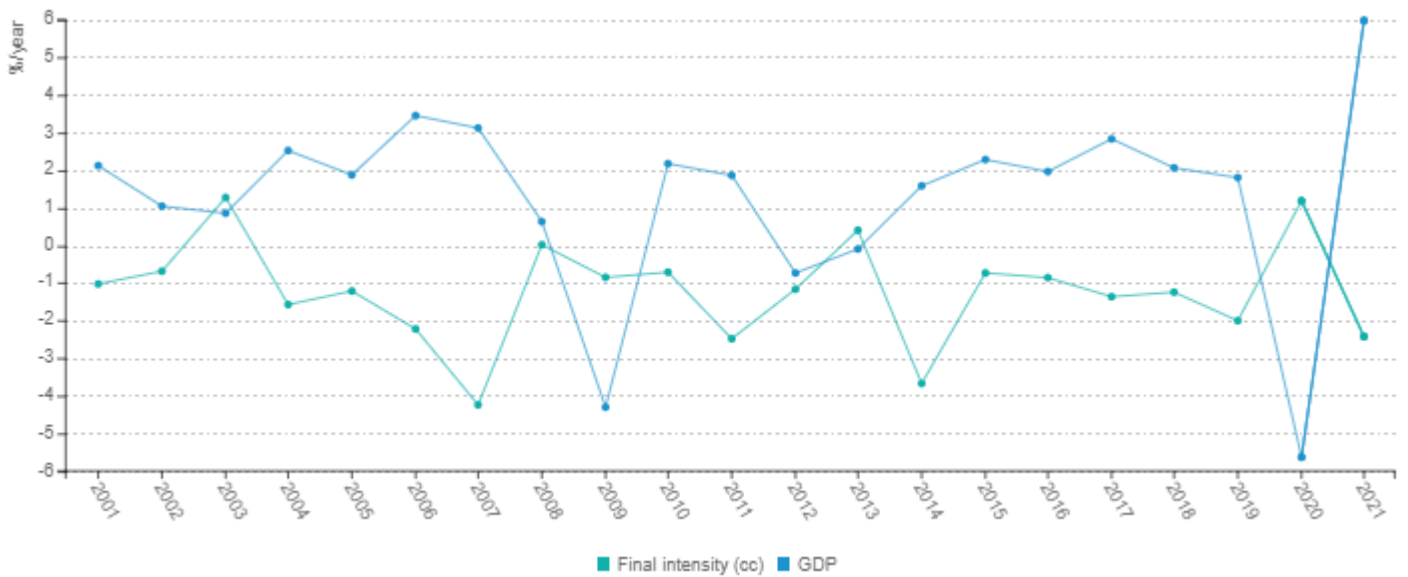


Note: Energy consumption at normal climate.

GDP and final energy intensity growth (EU)

- In general, the highest the economic growth, the more rapid the decrease of the intensity.
- Increasing final energy intensity when GDP growth falls under 2%: part of final consumption is not dependant on GDP; 2020 is a good example of this phenomenon, 2009 did not follow that trend because of deep structural changes in industry (greater contraction of activity in energy intensive branches).

GDP and final energy intensity growth (EU)

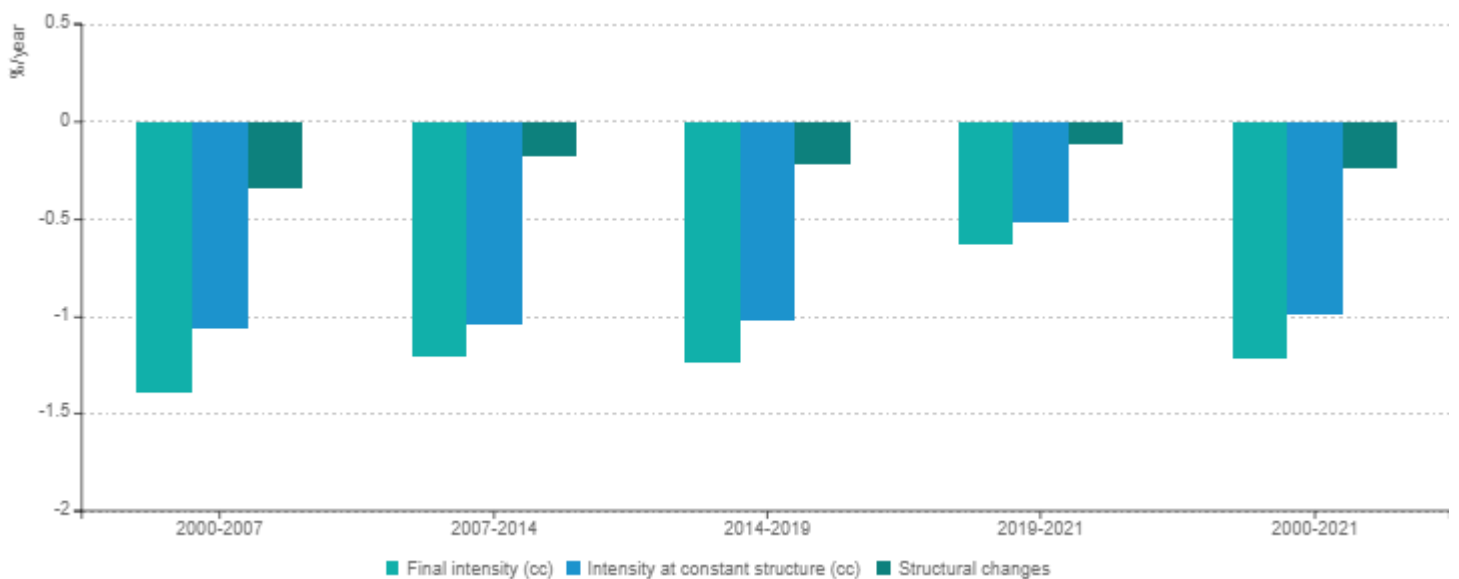


Note: Final energy intensity at normal climate.

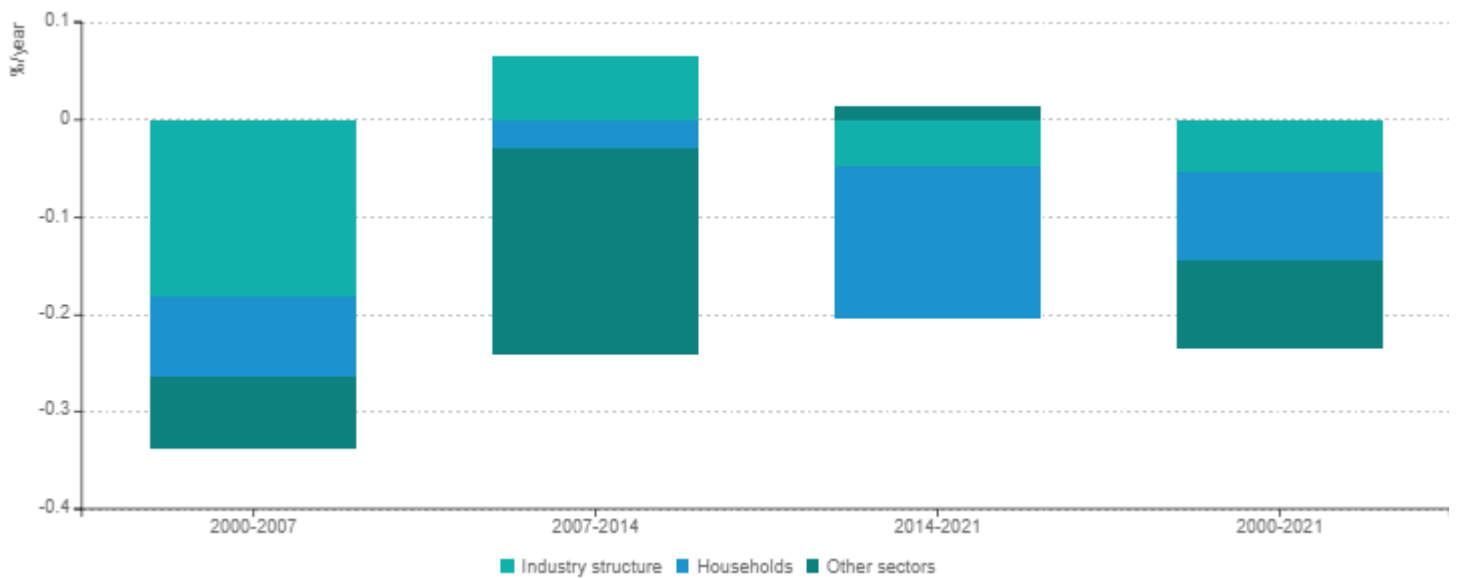
Impact of structural changes on final intensity

- The difference between the variations of the intensity and of the intensity at constant structure measures the effect of structural changes.
- Structural changes explain only 21% of the decrease in final intensity since 2000 (rather stable share over the period).
- The structural changes are mainly due to changes in the structure of GDP (higher share of services) and within industry (higher share of less energy intensive branches).

Impact of structural changes on the final intensity (EU)

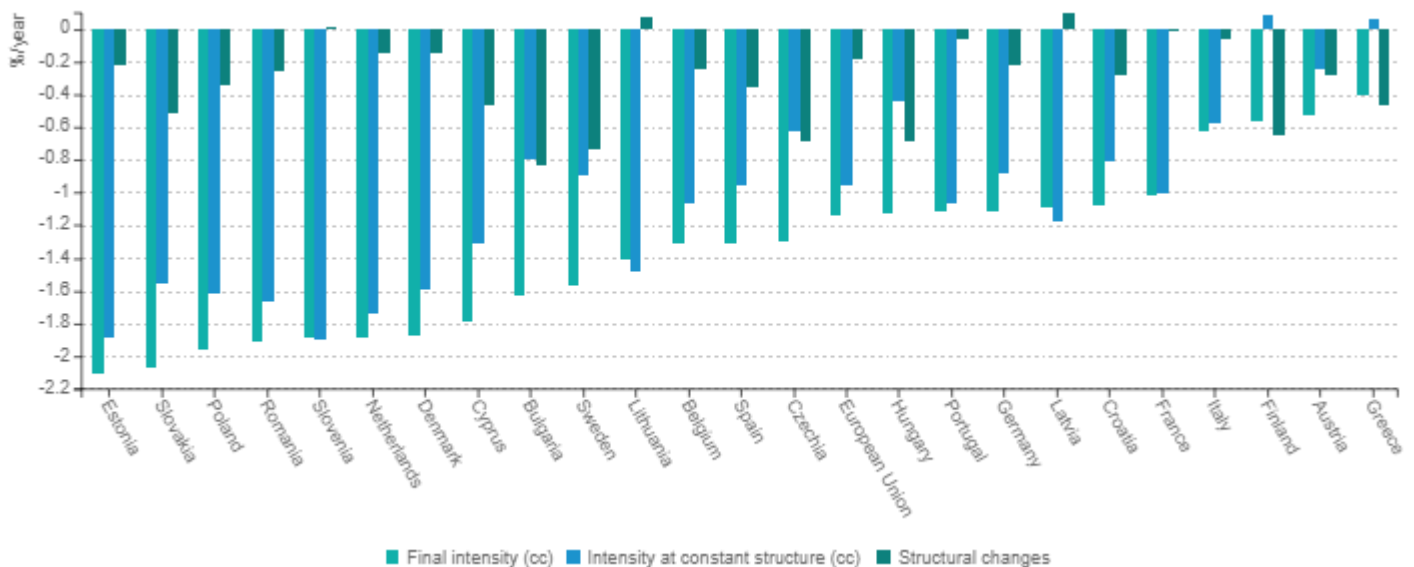


Contribution of structural changes (EU)



- Most countries have shifted to less energy-intensive sectors. Structural changes were negligible in the Netherlands, Portugal and the UK. They contributed to slowing down the decrease in final intensity in Slovakia, Italy, France and Slovenia.
- In half of the EU MS, structural changes explain more than 20% of the decrease in final energy intensity.
- In Austria and Hungary, they explain a large part of the intensity decrease (more than 70%), as well as in Croatia and Finland (more than 60%) and Sweden (around 50%).

Impact of structural changes on the final intensity in EU countries (2007-2021)



Note: Final energy intensity at normal climate.

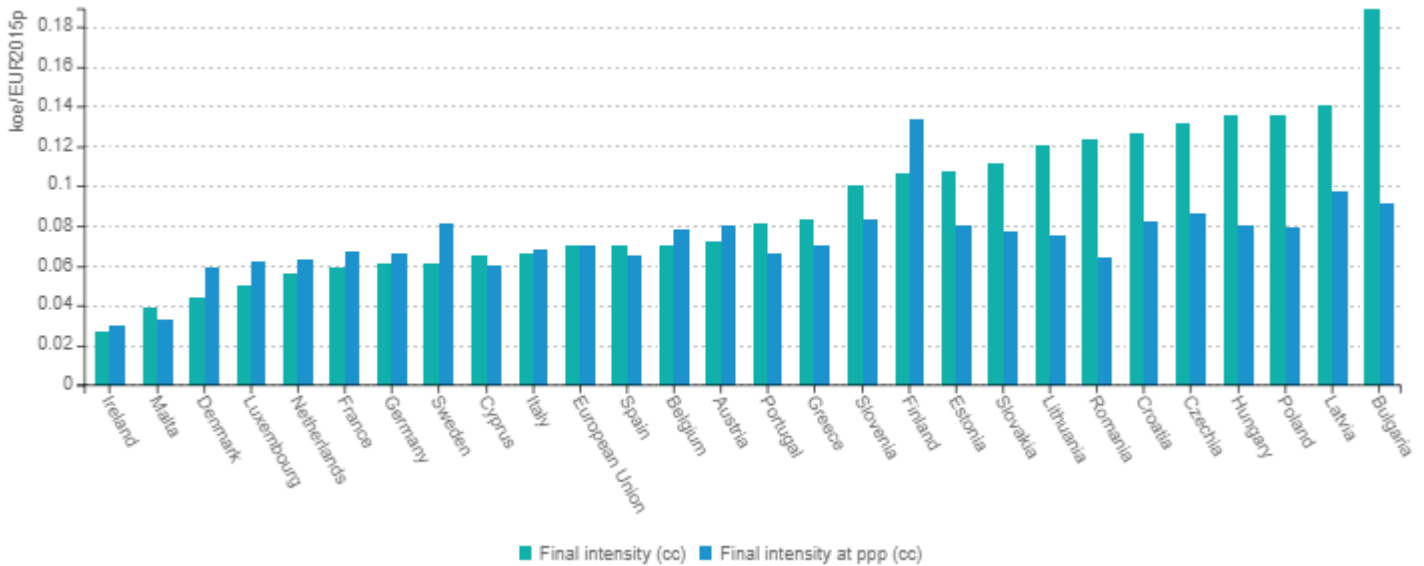
Adjusted energy intensities

- After adjusting for differences in general price levels, by converting GDP at purchasing power parities (ppp), final intensities decrease for countries with low prices (such as the central-eastern or southern countries). For example, in

Romania, Lithuania, Poland and Latvia the adjusted intensity is about twice as low as the observed intensity; in Bulgaria it is about 40% lower than the the observed intensity.

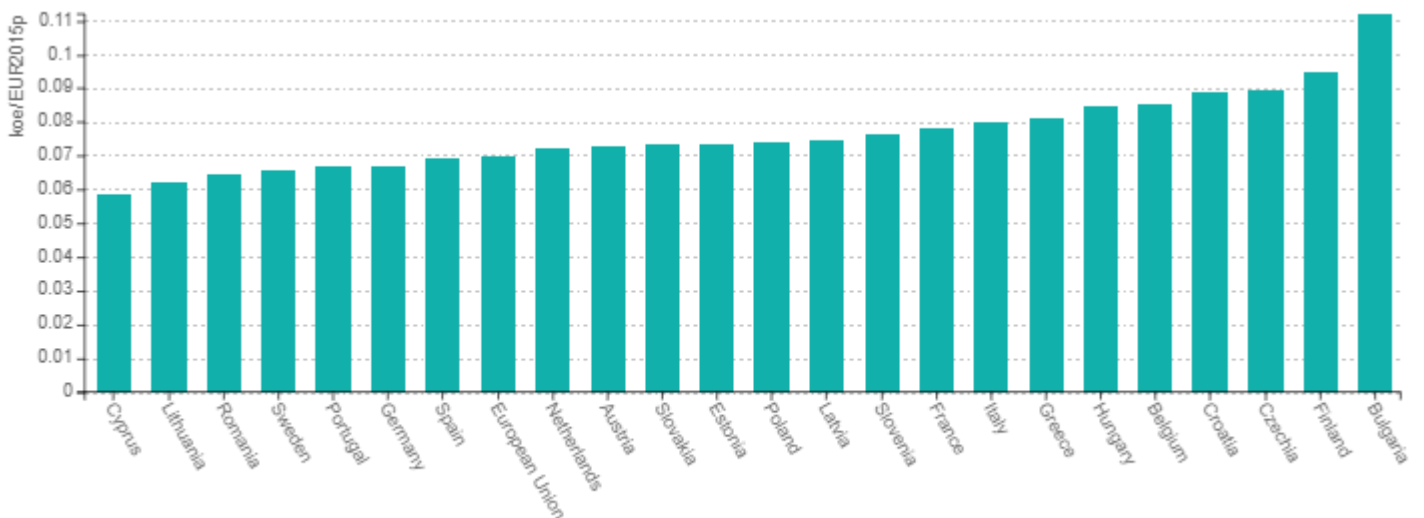
- After adjustment, the gap between EU countries is significantly reduced. For instance, Bulgaria, which has an intensity without adjustment 5 times higher than the average of the 3 countries with the lowest intensity, has an intensity only twice higher than the lowest countries after adjustment. Before adjustment Lithuania, is among the countries with the highest intensity and after adjustment, it is the second lowest. The other countries the most affected by the adjustment, in terms of ranking, are Romania, Latvia and Poland.

Final energy intensities at ppp in 2021 (normal climate)



- Some of the observed differences in final energy intensity levels after ppp corrections can be further adjusted to account for some other quantifiable national characteristics, such as climate and the structure of economic and industrial activities. The adjustment to the average economic structure and climate of the EU makes the comparison of final energy intensities more meaningful and reduces the gap between countries.

Final energy intensities adjusted at ppp and EU average structure and climate (2021)

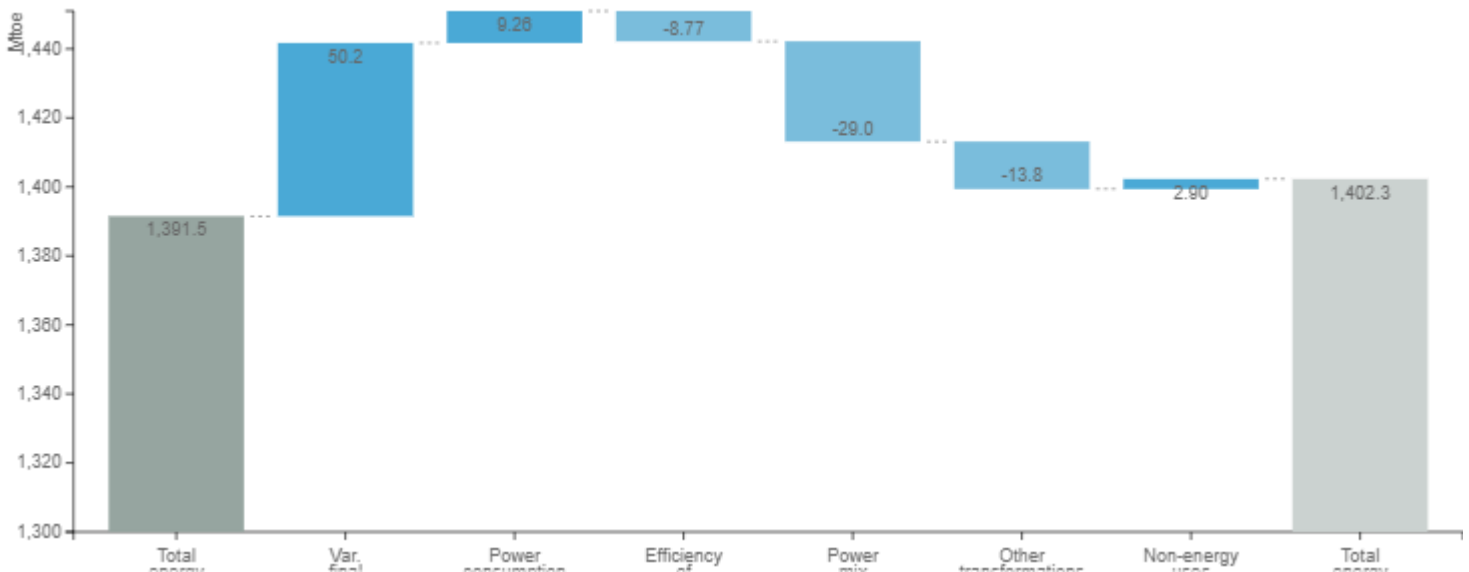


Decomposition of energy consumption

Drivers of total energy supply variation

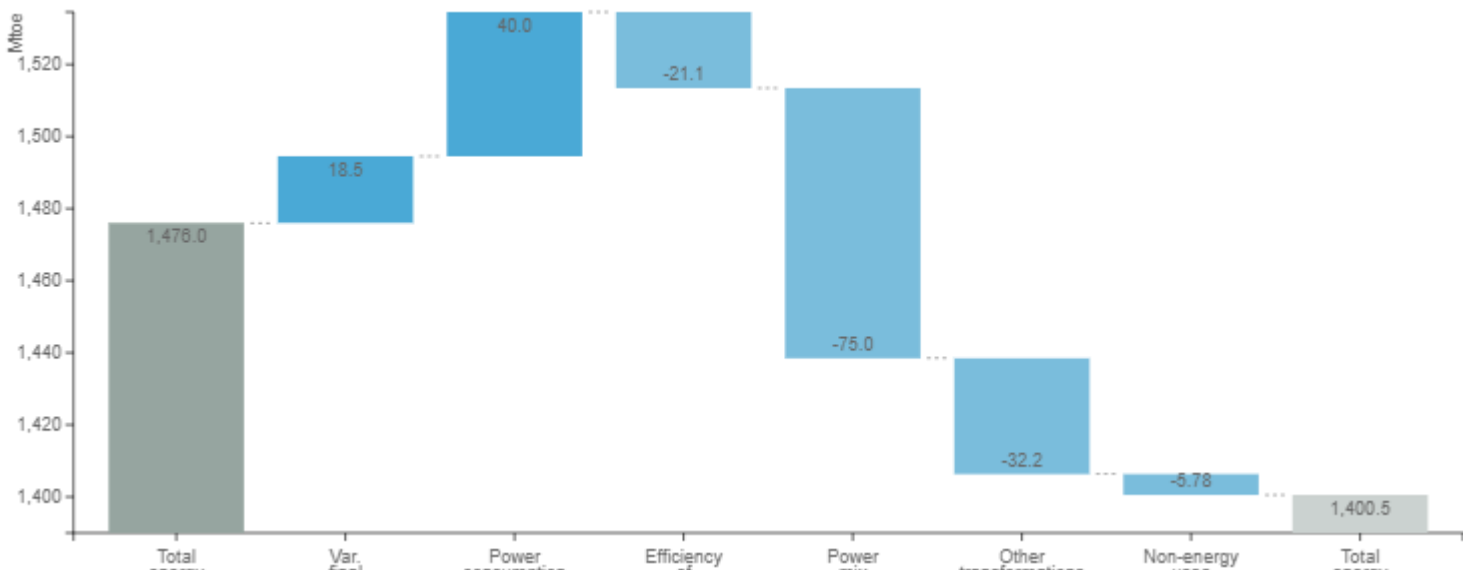
- Between 2014 and 2021, total energy supply decreased by 14 Mtoe at EU level while final consumption increased by 50 Mtoe.
- This decrease was explained by changes in the power mix (-29 Mtoe), improved efficiency of thermal generation (-19 Mtoe) and changes in other transformations (-27 Mtoe).

Variation in total energy supply 2014-2021 (EU)



- Between 2000 and 2021, total energy supply decreased by 92 Mtoe at EU level while final consumption increased by 18 Mtoe.
- This decrease was explained by changes in the power mix (-75 Mtoe), improved efficiency of thermal generation (-24 Mtoe) and changes in other transformations (-46 Mtoe).

Variation in total energy supply 2000-2021 (EU)



Drivers of final energy consumption variation

- In 2021, final energy consumption (936 Mtoe) is slightly higher than in 2000 (+18 Mtoe).
- This is the result of two contradictory effects. On the one hand, an activity effect (evolution of the value added of services and agriculture, of the production index of industry, of the traffic in transport, of the number of dwellings and their size as well as of the number of appliances used by the households) which increased the final energy consumption by 180 Mtoe.
- On the other hand, technical energy savings reduced consumption by about 211 Mtoe.
- Structural effects (mainly the transition to less energy-intensive branches in industry) had a marginal effect (-5.5 Mtoe).
- Climate differences (2000 being warmer than 2010) contributed to increase consumption by 11 Mtoe.
- Other effects, mainly linked to greater comfort, and other behavioral changes increased consumption by 44 Mtoe.

Variation in final energy consumption 2000-2021 (EU)

