

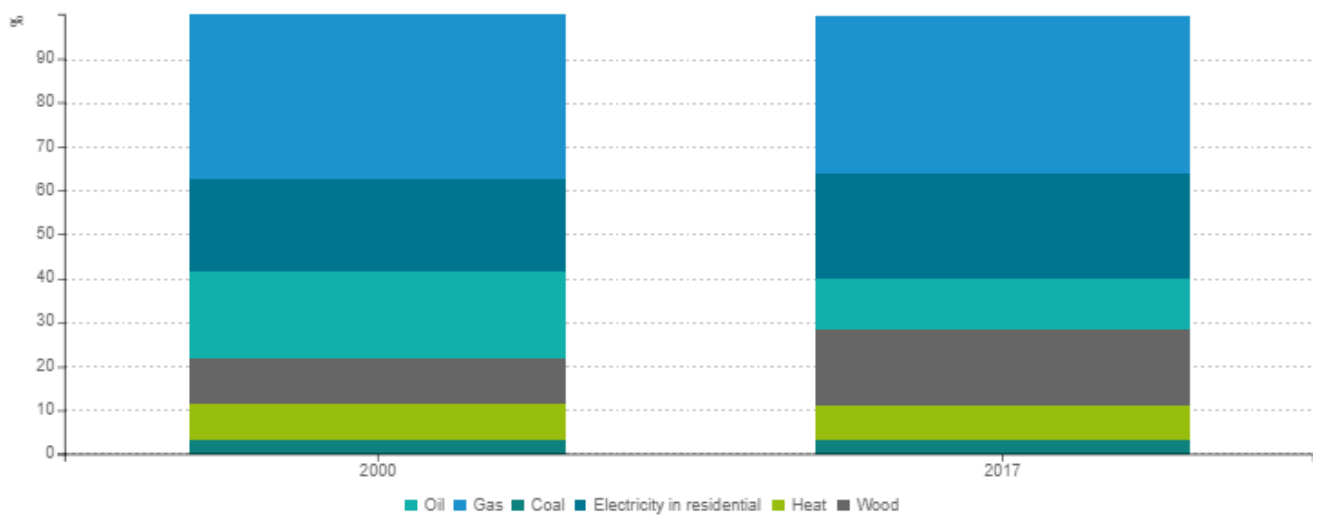
Sectoral Profile - Households

Energy consumption

Household energy consumption by energy in the EU

- Natural gas is the dominant source of energy for households in the EU (36%).
- Electricity ranks second and its share is increasing rapidly (from 21% in 2000 to 24% in 2017)
- Oil is slowly being phased out by other energy sources (e.g. wood) at EU average (11% in 2017 compared to 20% in 2000) but remains significant in island countries.
- The share of wood increased by 8% points since 2000 to 18% in 2017.

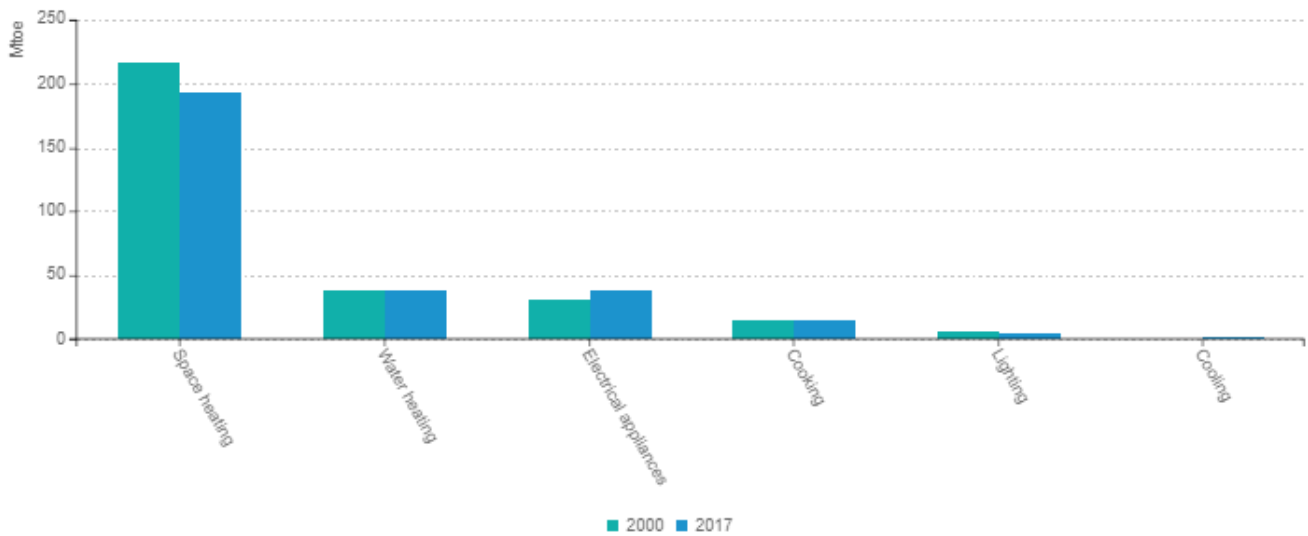
Household energy consumption by energy in the EU



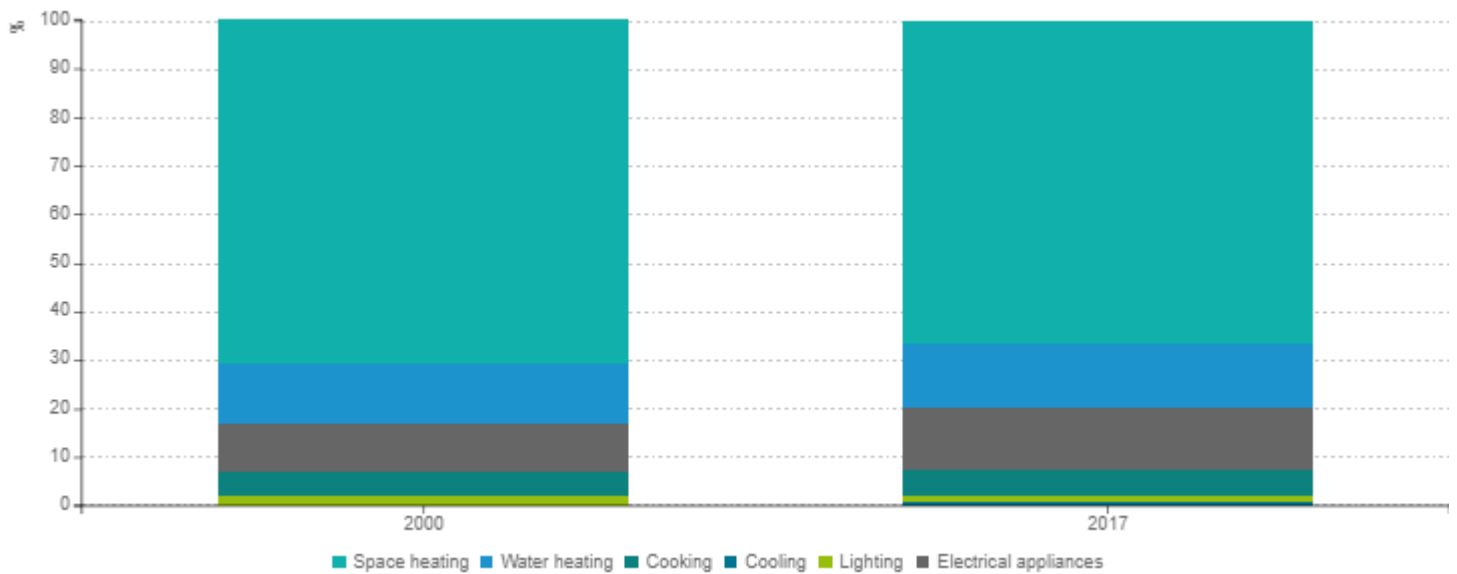
Declining share of space heating in EU

- Declining space heating consumption (-0.7%/year since 2000)
- The share of space heating in household consumption has decreased from 71% in 2000 to 67% in 2017.
- The second end-use is water heating (increasing share from 12% to 13%), but it is almost overtaken by electrical appliances;
- Increasing consumption of electrical appliances (+1.5%/year since 2000), with a share rising from 10% in 2000 to 12.5% in 2017;
- Lighting is around 2% (6.5% of electricity consumption).
- Cooling has still a modest role (2.5% of electricity consumption).

Household energy consumption in the EU



Household energy consumption in the EU, in %

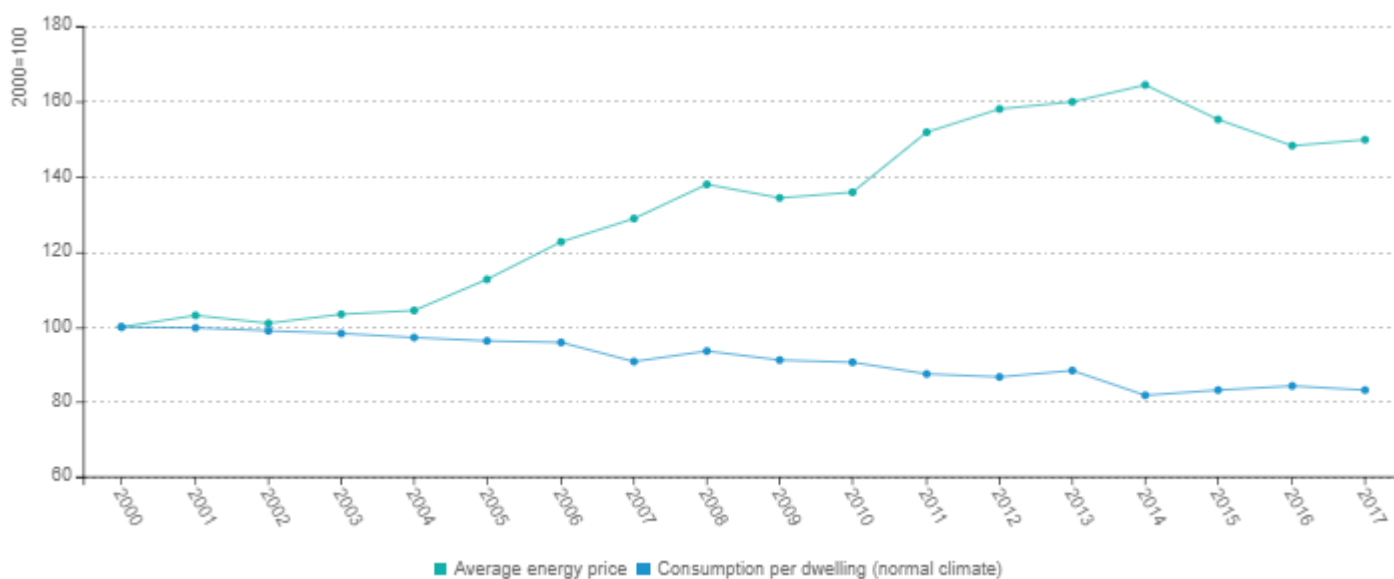


Energy consumption per dwelling

Consumption per dwelling, energy price and income

- Regular decrease of the household energy consumption per dwelling between 2000 -2014: -1.2%/year.
- Trend explained by energy efficiency measures, higher energy prices, and a stable income per household between 2008 and 2016.
- Stable household energy consumption per dwelling since 2014 despite a sharp fall in energy prices between 2014-2016.

Specific consumption per dwelling, energy price and income

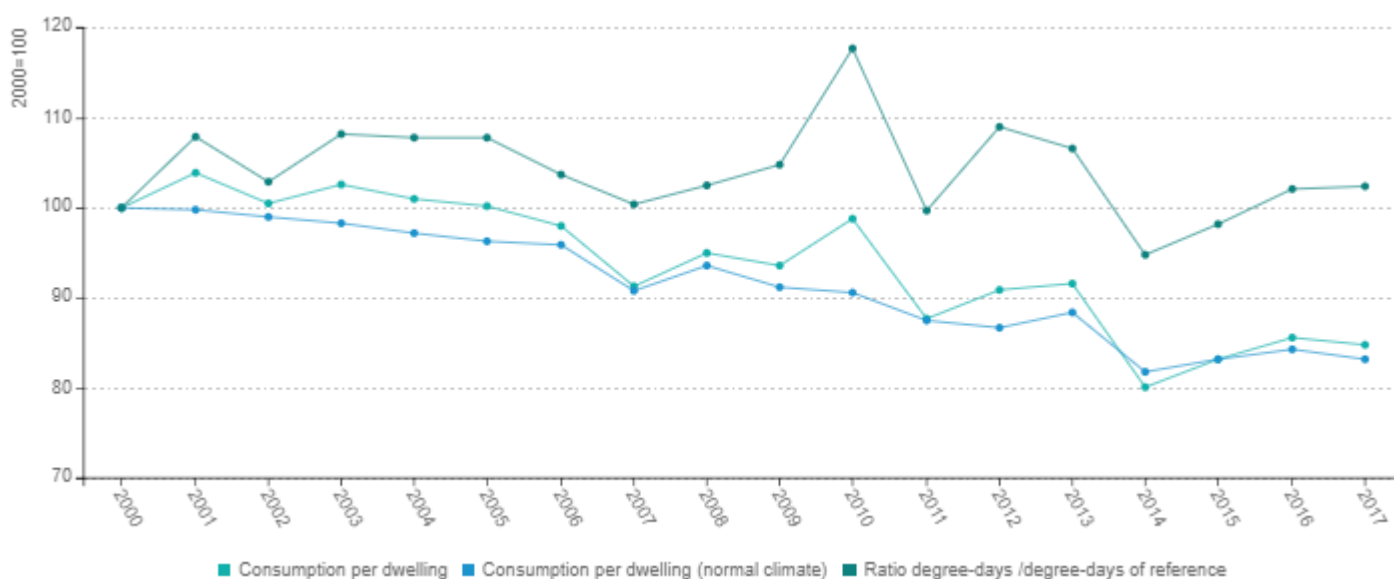


Consumption at normal climate

Influence of climate on the consumption per dwelling

- Large climatic variations from one winter to the other can influence the energy consumption: higher consumption in a cold winter and vice versa for a mild winter, all things being equal.
- Climatic corrections provide a measurement of the consumption that is independent of yearly climatic variations.
- Climatic corrections are based on the ratio actual degree days over normal degree days (i.e. reference degree days).
- Energy efficiency indicators should be corrected from climate and measured at normal climate.

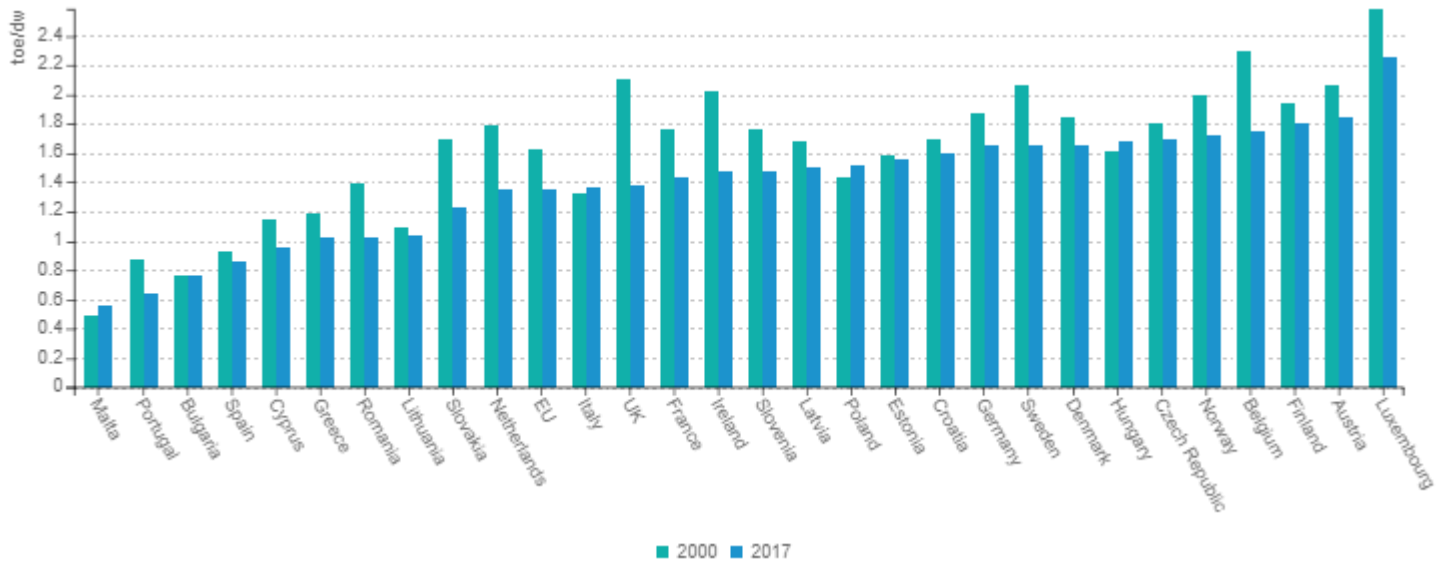
Specific consumption per dwelling : actual value vs climatic corrected



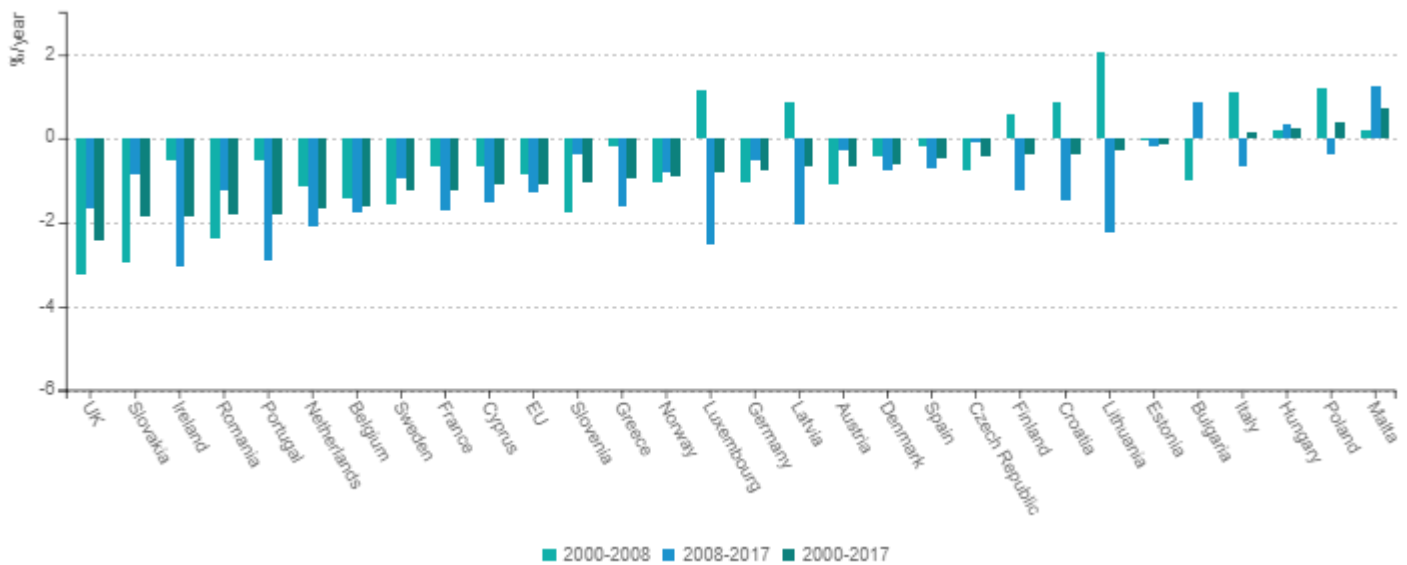
Average energy consumption per dwelling

- Decreasing energy consumption per dwelling in almost all countries (above 1.1 %/year at EU level since 2000)
- Stronger reduction since 2008 in most countries (-1.3%/year at EU level)
- Values in a range of 1 to 2 toe/dwelling (1.4 toe for the EU average in 2017) (values not adjusted to the same climate).

Average consumption per dwelling (at normal climate)

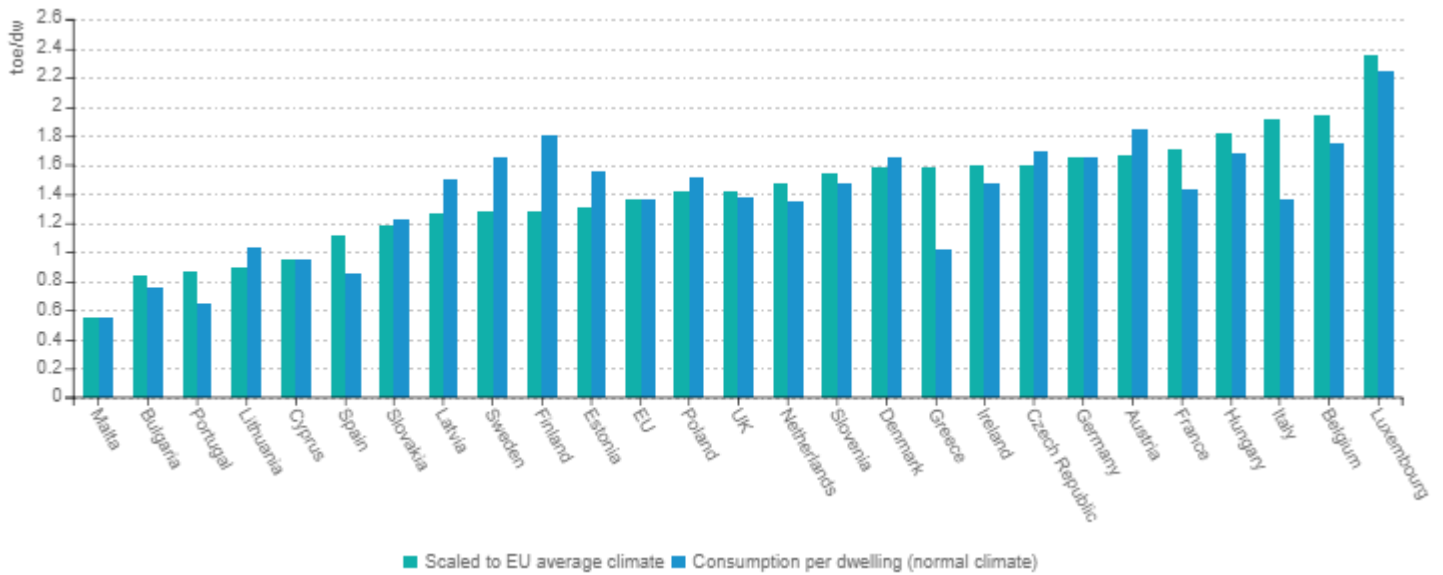


Variation of the average consumption per dwelling (normal climate)



- The comparison between countries is more relevant if the heating consumption is adjusted to the same climate (EU average).
- After adjustment to the EU average climate, Luxembourg, Belgium, Italy, Hungary or France for instance turn out to have the highest consumption.

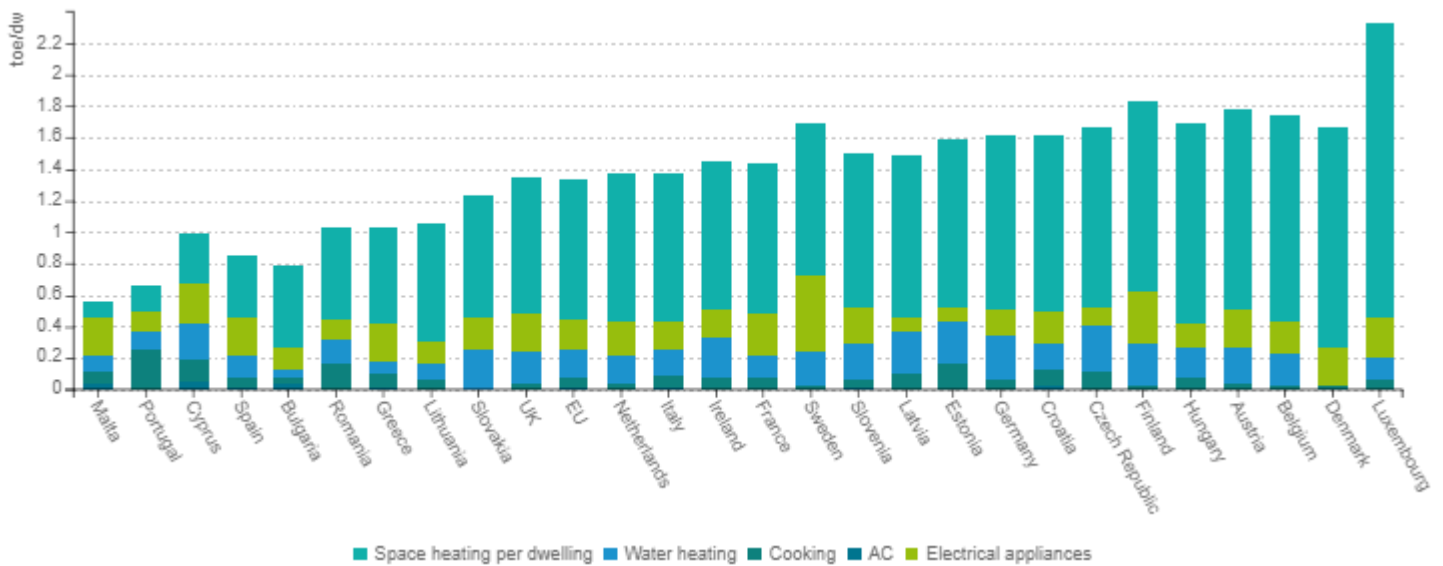
Average consumption per dwelling (adjusted to EU climate)



Energy consumption by end-use

- The breakdown of the household energy consumption by end-use differs substantially between member states.
- For space heating a correlation with cold winters can be expected.
- AC still represents a marginal share of dwelling consumption.

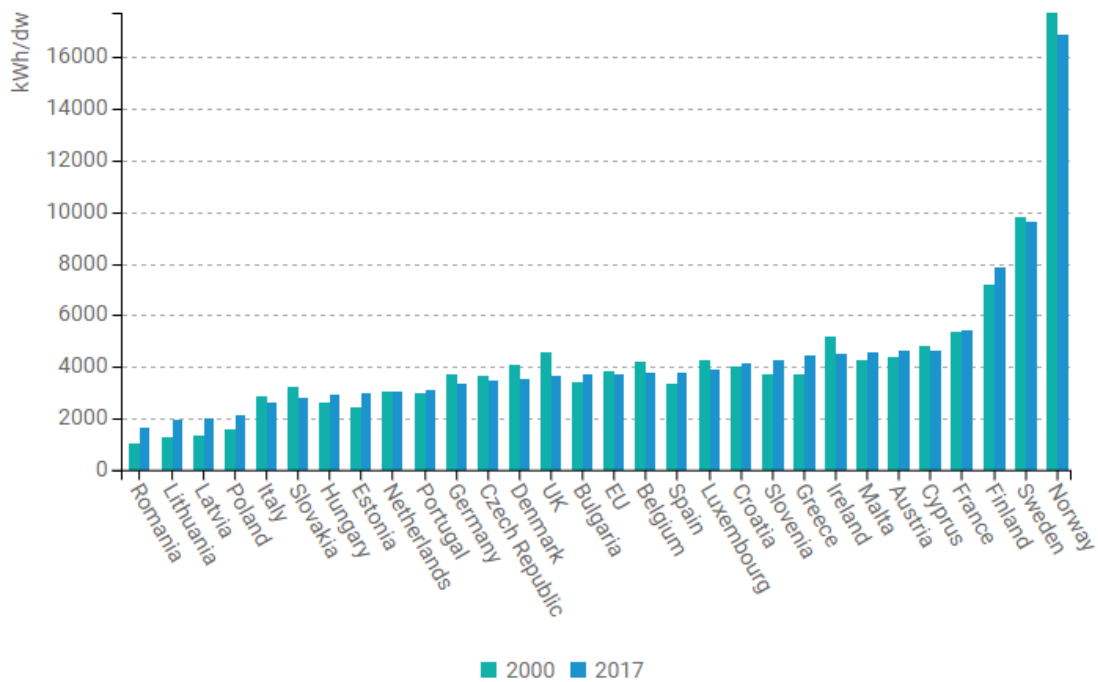
Specific consumption of households by end-use (2017)



Electricity consumption per dwelling

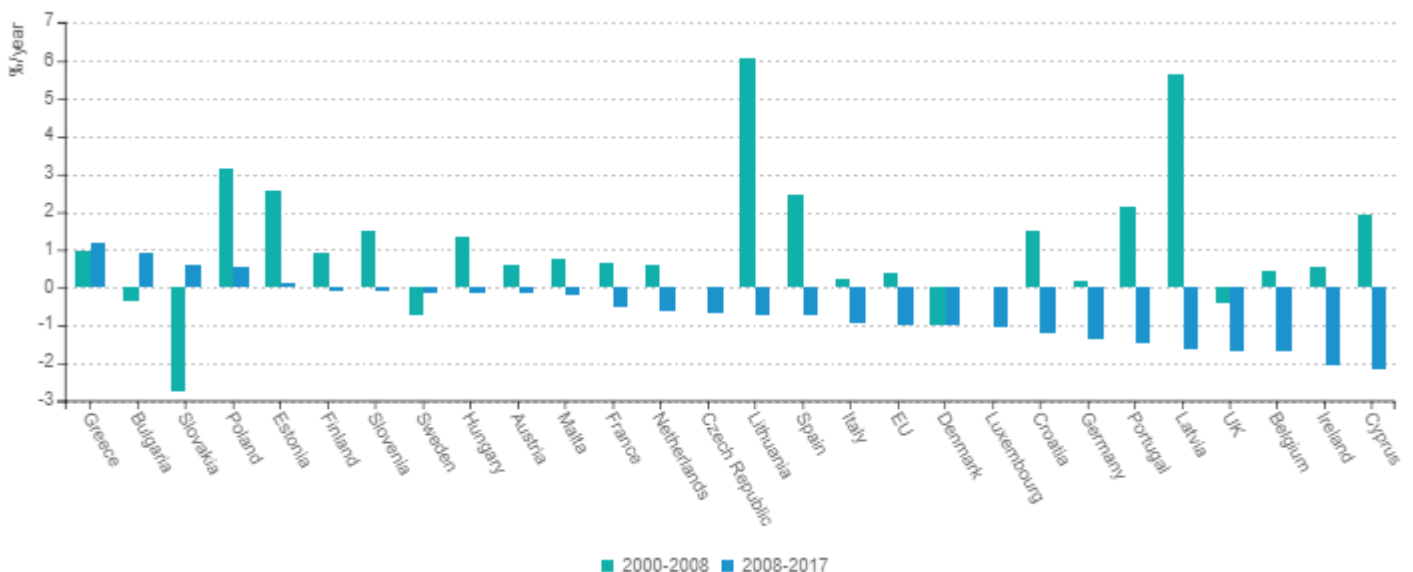
- Very unequal level of electricity consumption per household: from around 1600 kWh in Romania, 2000 kWh in Poland and Baltic countries, around 4000 kWh for the EU average to 8,000-10,000 kWh in Finland and Sweden, and even 17,000 kWh in Norway.
- Heterogeneity due to thermal uses (e.g. electricity main source of space heating in some countries, such as in France, Norway), different levels of equipment rates for electrical appliances and energy efficiency.

Electricity consumption per dwelling



- Since 2008, decrease of the electricity consumption per household in 22 countries and at EU level (-1%/year);
- Strong reduction in Cyprus, Ireland, Belgium, UK, Latvia and Portugal (> 1.5%/year);
- Strong progression until 2008 in Southern countries (e.g. Spain, Portugal, Cyprus) due to air conditioning or Lithuania, Latvia, Poland, Estonia.

Trends in electricity consumption per dwelling

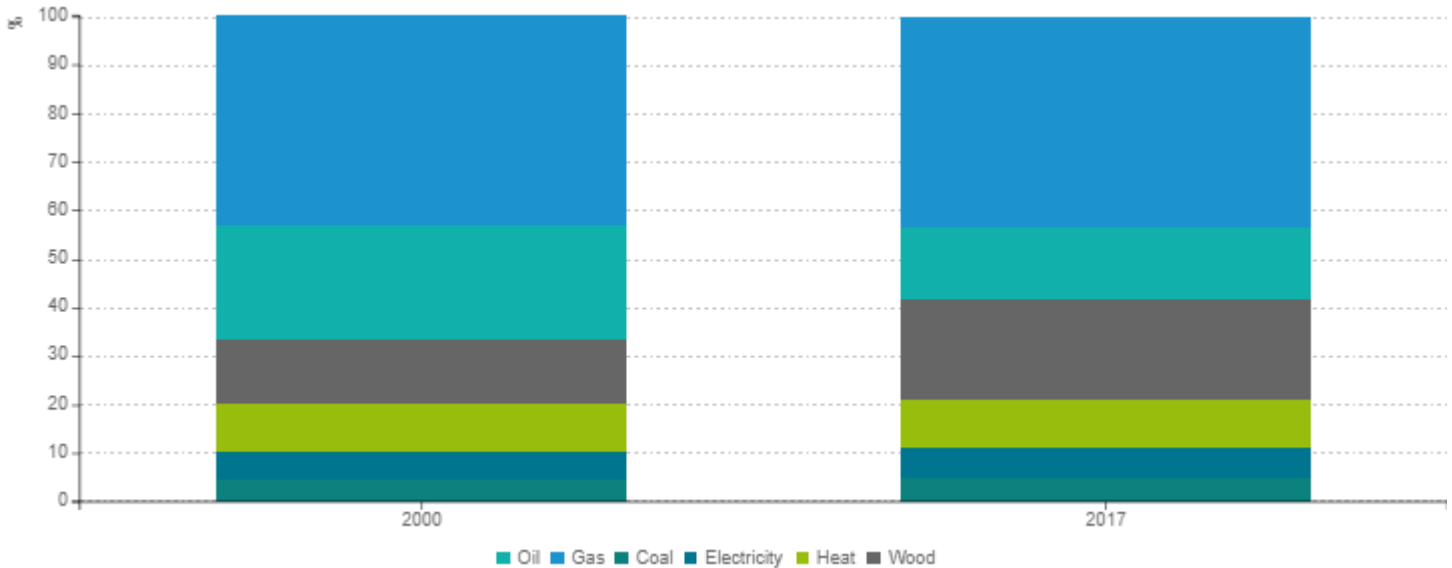


Space heating

Heating energy consumption by energy source

- Natural gas is the dominant energy for households heating in the EU, with a rather stable share (43% in 2017).
- Oil is slowly being phased out by wood(-9% points for oil and +7% pts for wood), but remains significant in island countries for instance.

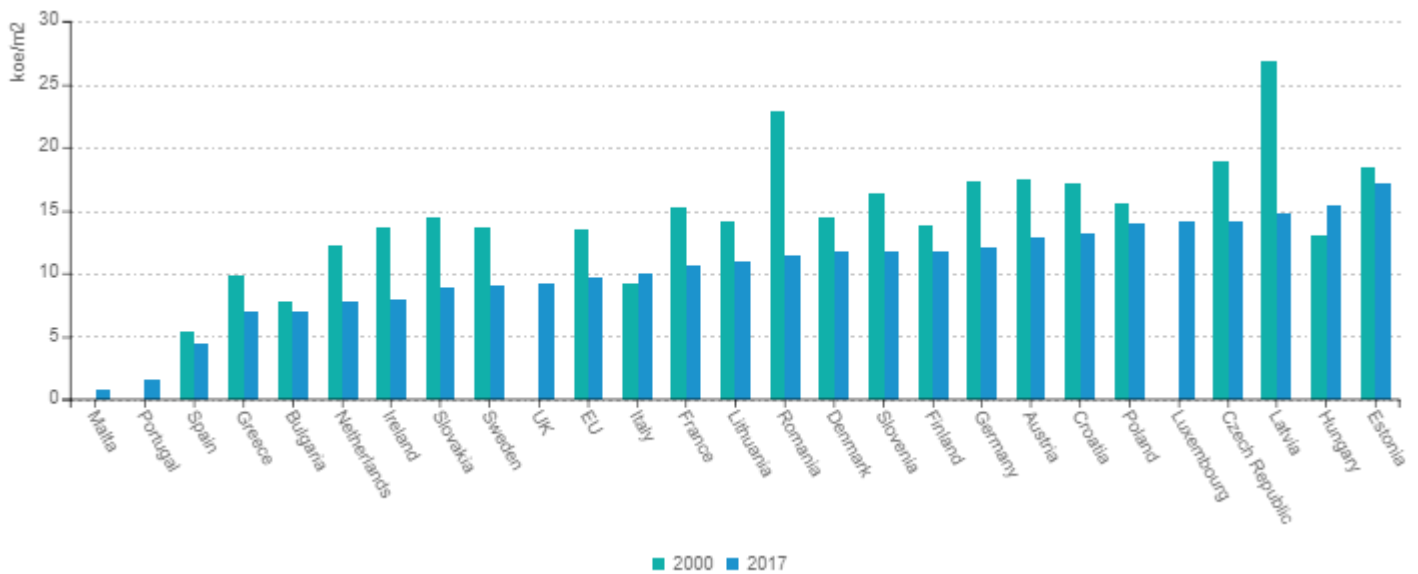
Household energy consumption for heating by energy



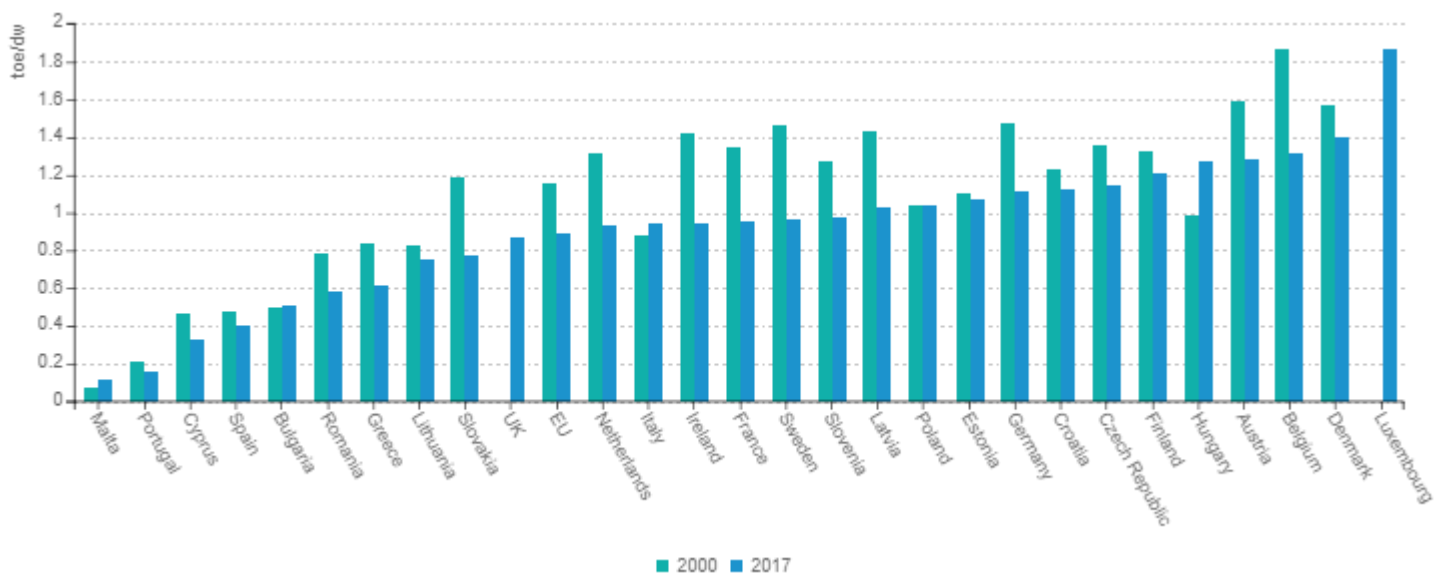
Heating consumption per m2

- Decreasing heating consumption per m2 or per dwelling in most countries thanks to the implementation of tightening building codes, coupled with financial incentives to promote thermal retrofitting of existing dwellings and the adoption of more efficient heating systems (e.g. gas condensing boilers, heat pumps, pellet boilers).
- Large discrepancy among countries from less than 5 koe/m2 in Spain, Portugal and Malta to 15-18 koe/m2 in Latvia, Hungary and Estonia, due to the different climatic conditions.
- The energy consumption per dwelling decreased less than the consumption per m2 because of an increase in the average dwelling size (-1.5%/year for the consumption per dwelling and -1.9%/year for the consumption per m2 at EU level as the dwelling size increased by 6% since 2000): this means that 20% of the energy efficiency progress for heating at EU level has been offset by the larger size of dwellings. This phenomenon was especially important in the less developed EU MS (e.g. Romania or Lithuania).

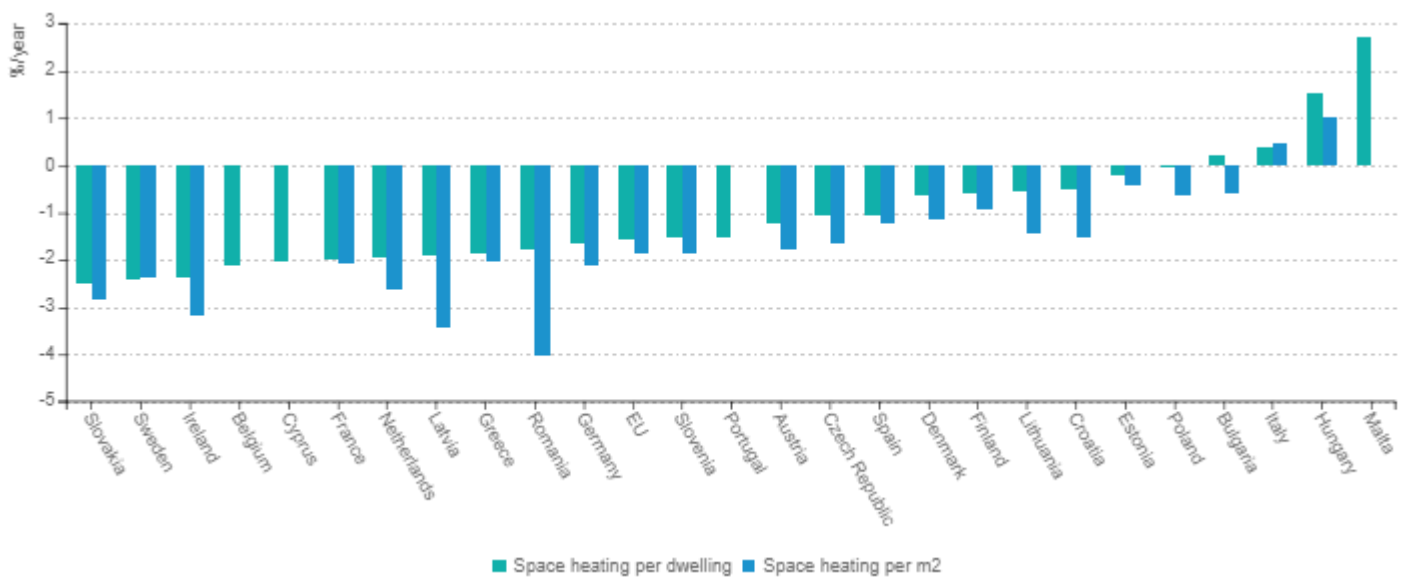
Heating consumption per m²



Heating consumption per dwelling



Average consumption per m² vs consumption per dwelling: effect of change in dwelling size



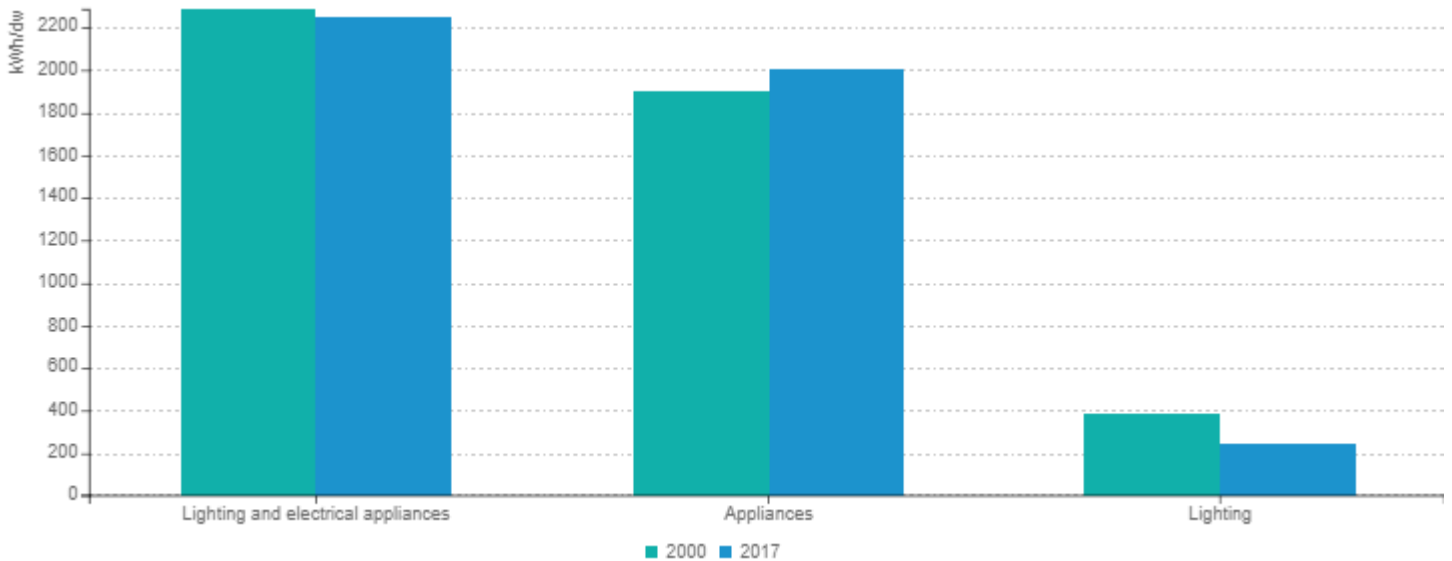
Note: Energy consumption at normal climate (e.g. climate corrected).

Appliances and lighting

Energy consumption of appliances and lighting per dwelling

Electrical appliances (e.g. large and small appliances) represent the highest share of the captive uses of electricity (i.e. without thermal uses). Their share is increasing over years. The specific consumption per dwelling for lighting is decreasing thanks to the phase out of incandescent lamps.

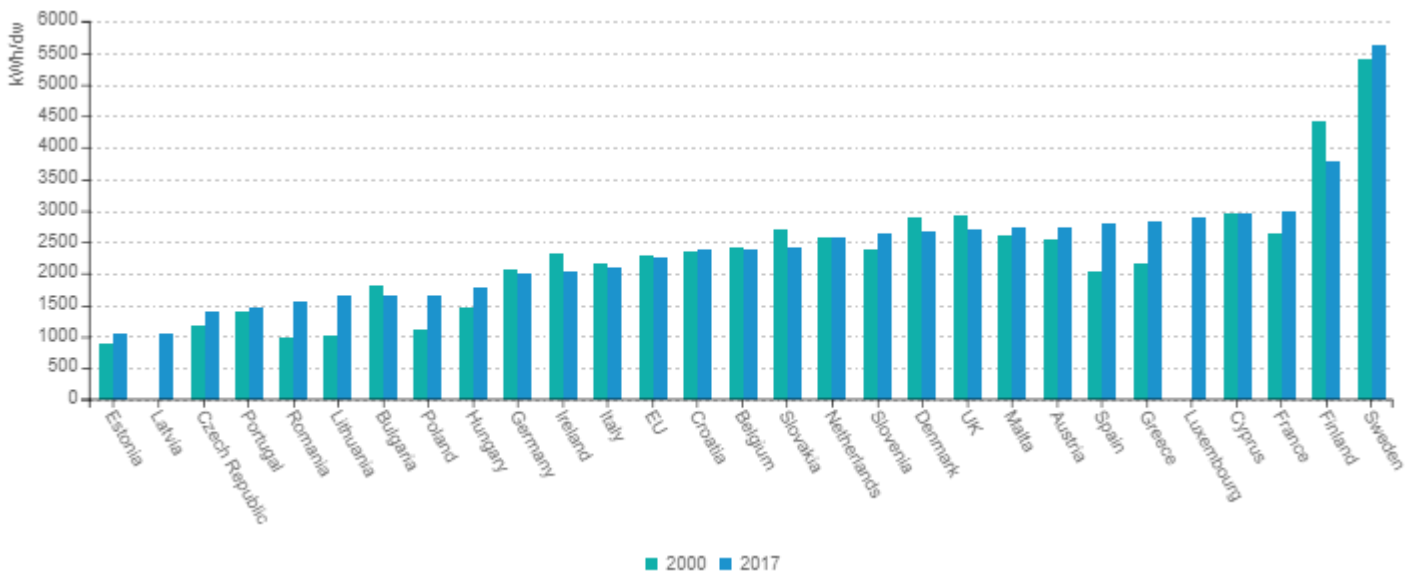
Consumption of electrical appliances per dwelling by type of appliance (EU)



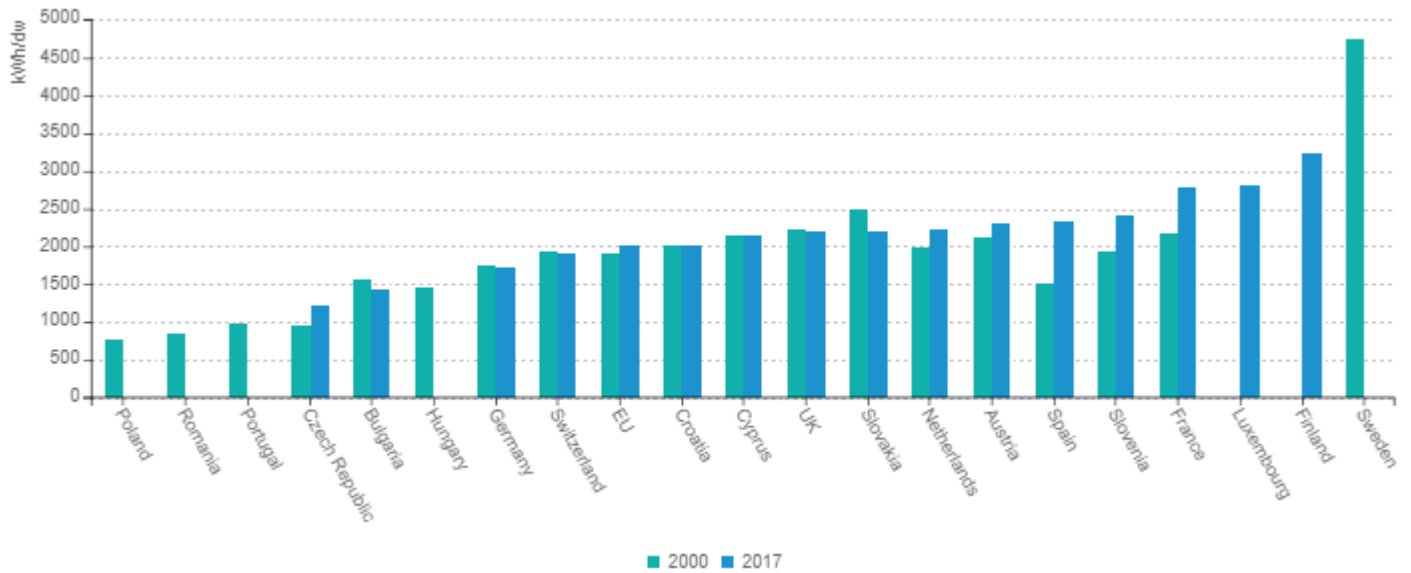
Electricity consumption per dwelling for electrical appliances and lighting

Significant discrepancies in the electricity consumption for electrical appliances and lighting: in a range from 1000-1500 kWh (Estonia, Portugal, Latvia, Czech Republic) to around 3000 kWh in Cyprus, France, Luxembourg and up to 3500-4500 kWh in Finland and 5600 kWh Sweden

Electricity consumption per dwelling for electrical appliances & lighting

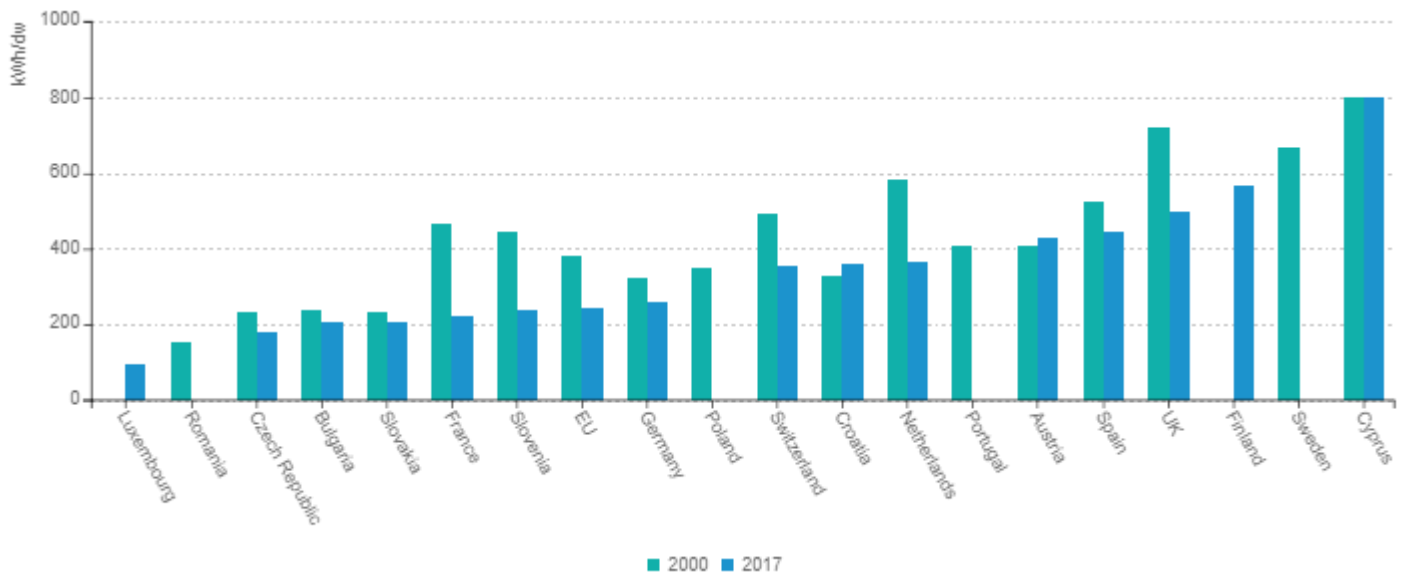


Electricity consumption per dwelling for electrical appliances



- Decreasing trends of electricity consumption for lighting in most countries due to the diffusion of CFL.
- Large discrepancies among countries: from less than 200 kWh/dwelling in Luxembourg, Czech Republic, Bulgaria and Slovakia to around 800 kWh in Cyprus.

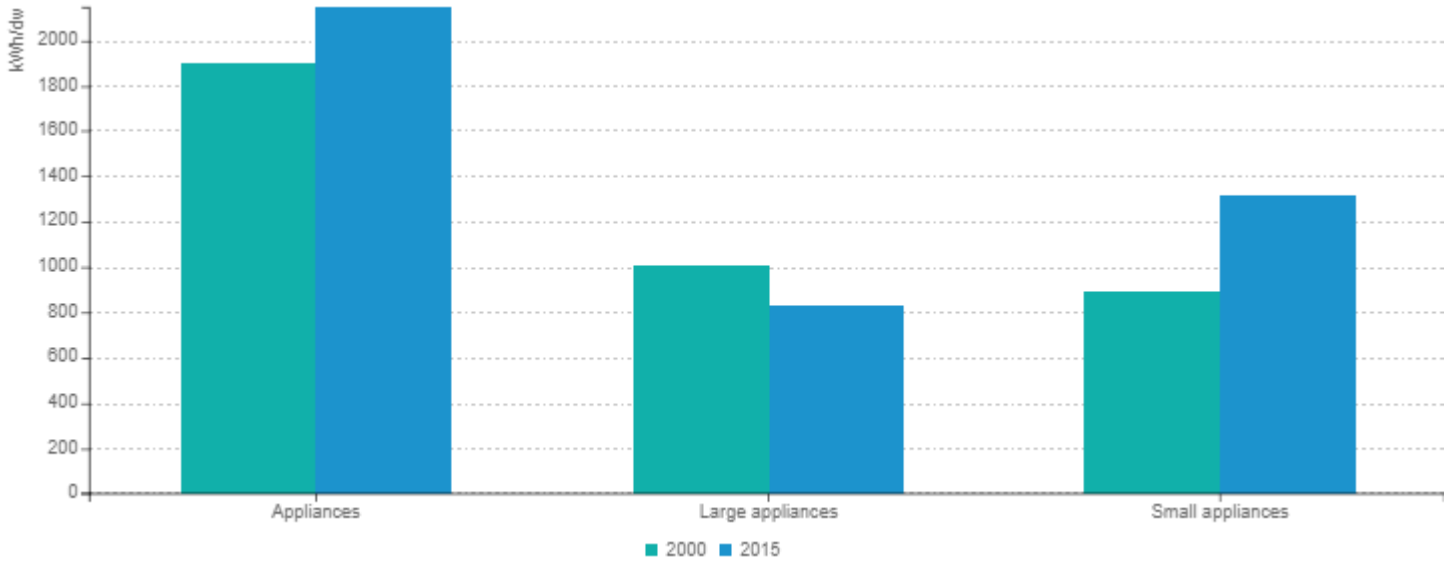
Electricity consumption per dwelling for lighting



Energy consumption of large appliances per dwelling

- In 2015 EU households consume around 20% more for small appliances than in 2000 (~ 1200 kWh/year in 2015);
- On the opposite, energy consumption of large appliances has decreased (by 18% between 2000 and 2015);
- Small appliances represent an increasing share of the consumption of appliances almost 60% of the specific consumption of appliances in 2015 compared to 50% in 2000.

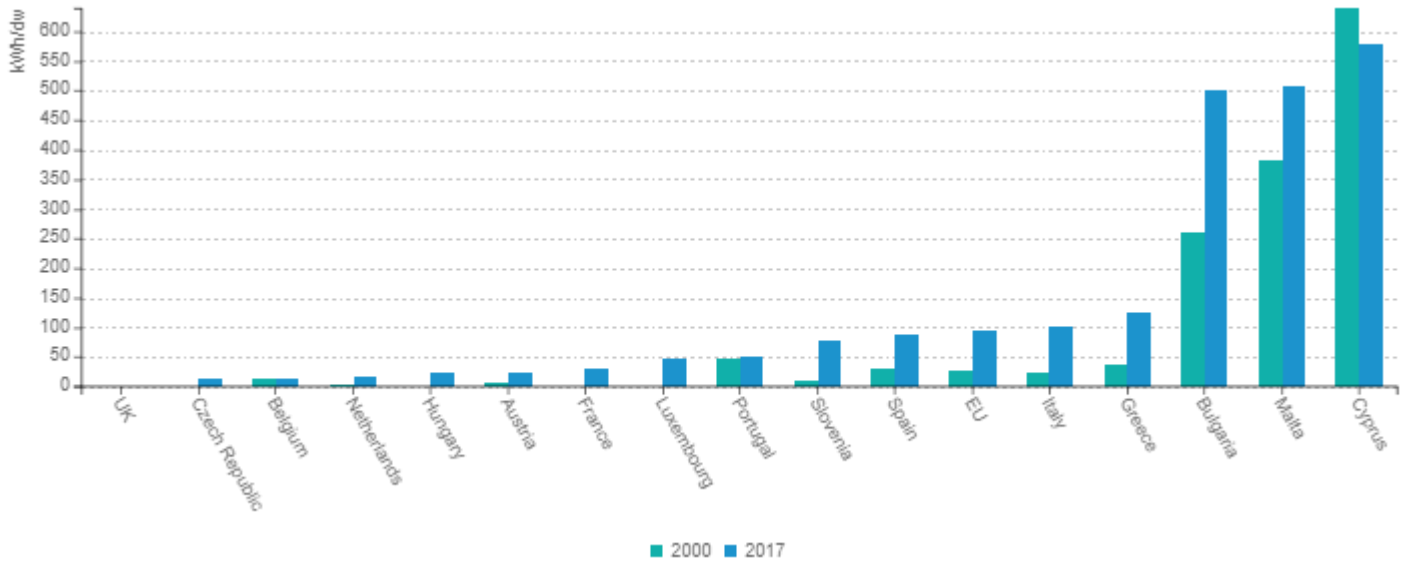
Consumption of large electrical appliances (EU)



Unit consumption of air conditioning

Even if AC represent only 2.5% of total electricity consumption at EU level, the average consumption per dwelling for air conditioning is increasing with the diffusion of AC appliances.

Unit consumption for air conditioning

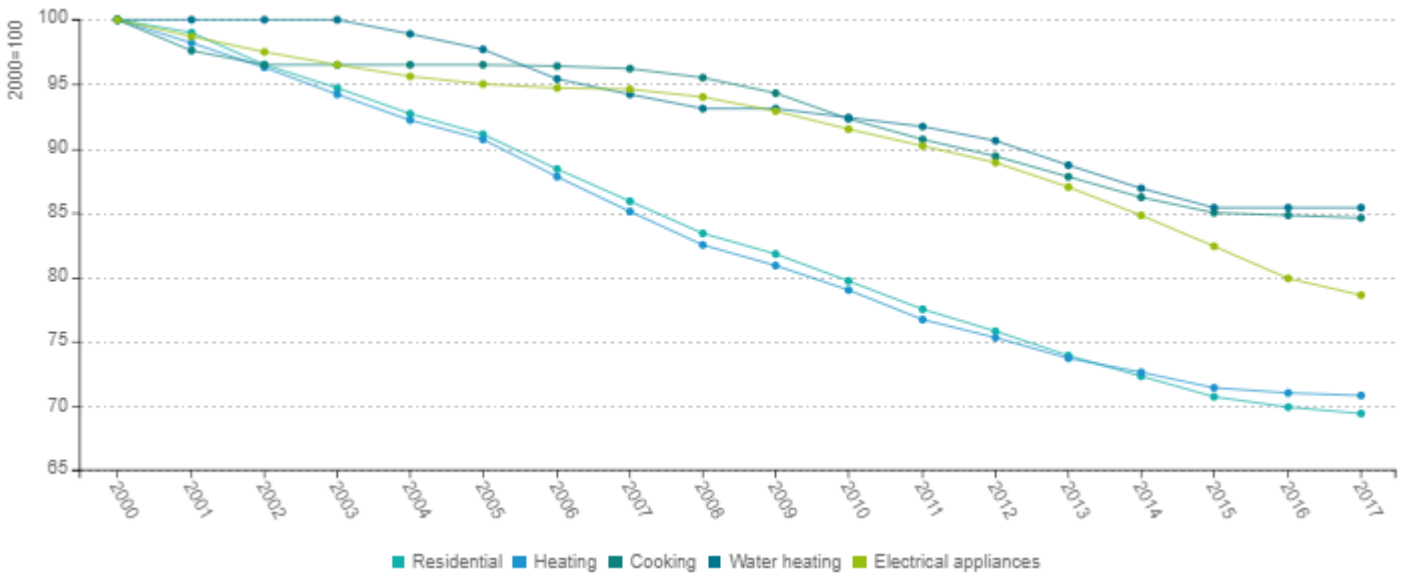


Energy efficiency and savings

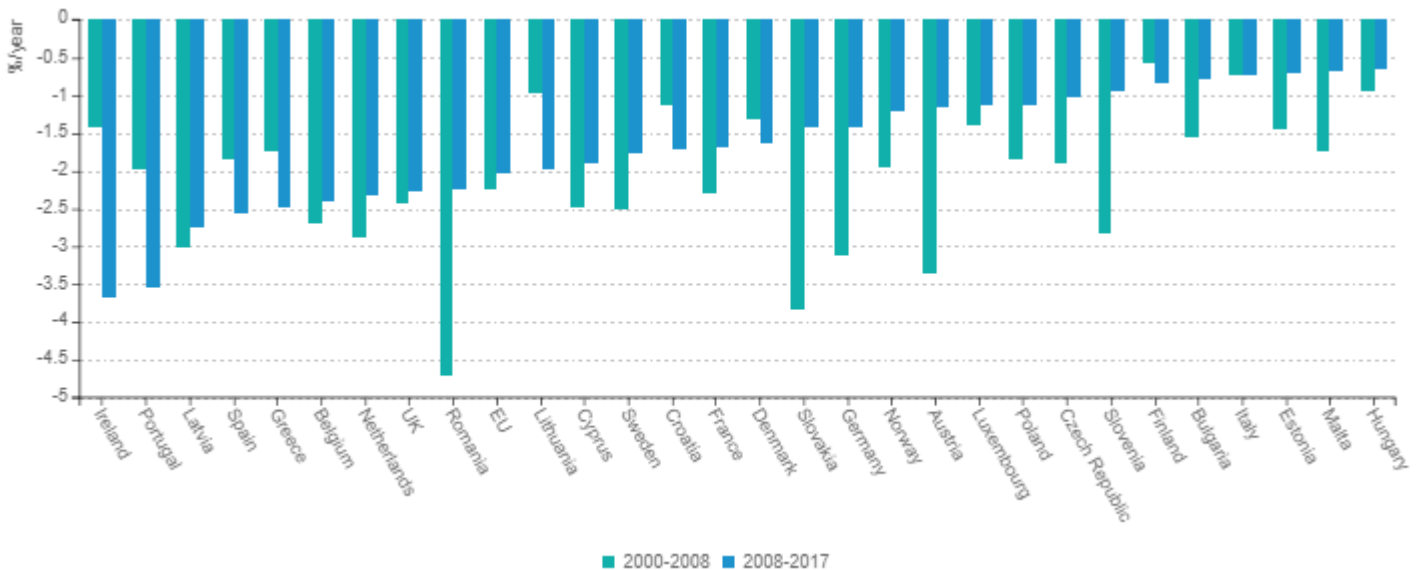
Energy efficiency trends for households in the EU

- Energy efficiency, as measured by ODEX, improved by around 29% (2.1%/year) over the period 2000-2017 (ODEX equal 71 in 2017), mainly due to heating.
- ODEX aggregates the energy efficiency gains by end-use measured by the reduction in unit consumption. ODEX is calculated on the basis of 11 end-uses/large appliances : heating (toe/m²) (separation new/ existing dwellings), water heating, cooking (toe/dwelling), cooling, lighting, refrigerator, freezer, washing machine, dishwasher, dryer and TV (kWh/appliance)
- Increasing energy efficiency gains since 2008 at EU level and in almost half of countries, despite the economic crisis, because of the multiple regulations on buildings and appliances. On the opposite, important slow down for around 10 countries, such as Romania, Slovakia, Norway, Germany, Austria, and Slovenia.

Energy efficiency progress in the EU



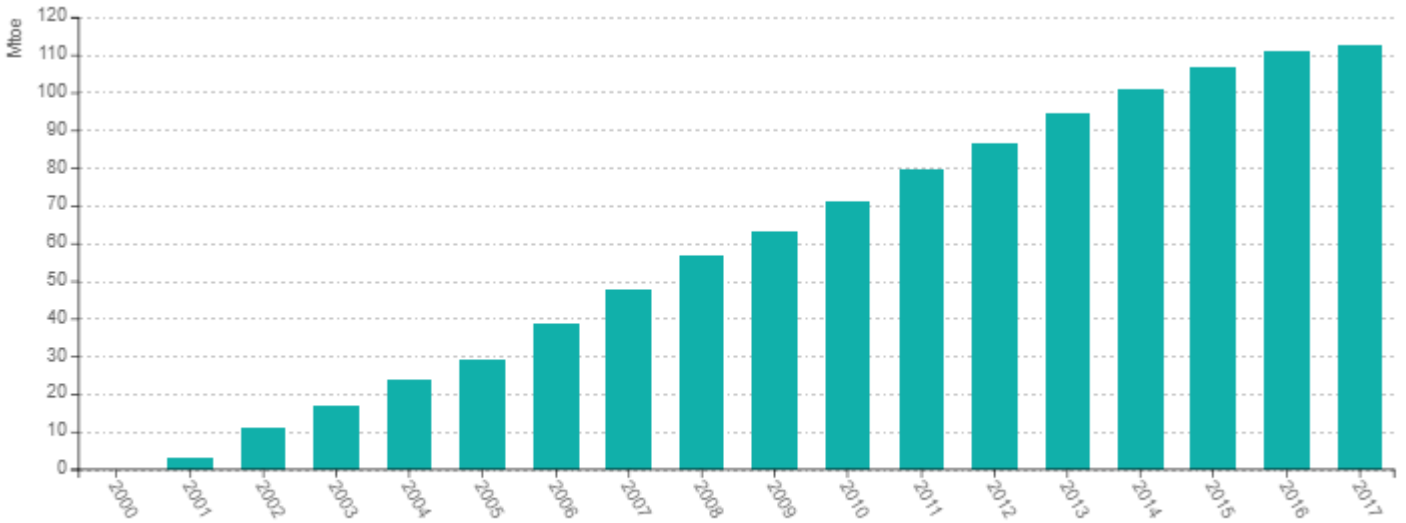
Energy efficiency progress in EU countries



Energy savings for households (EU)

Cumulated annual energy savings for households reached 113 Mtoe since 2000: without energy efficiency improvement, the energy consumption would have been 113 Mtoe higher in 2017.

Energy savings for households (EU)

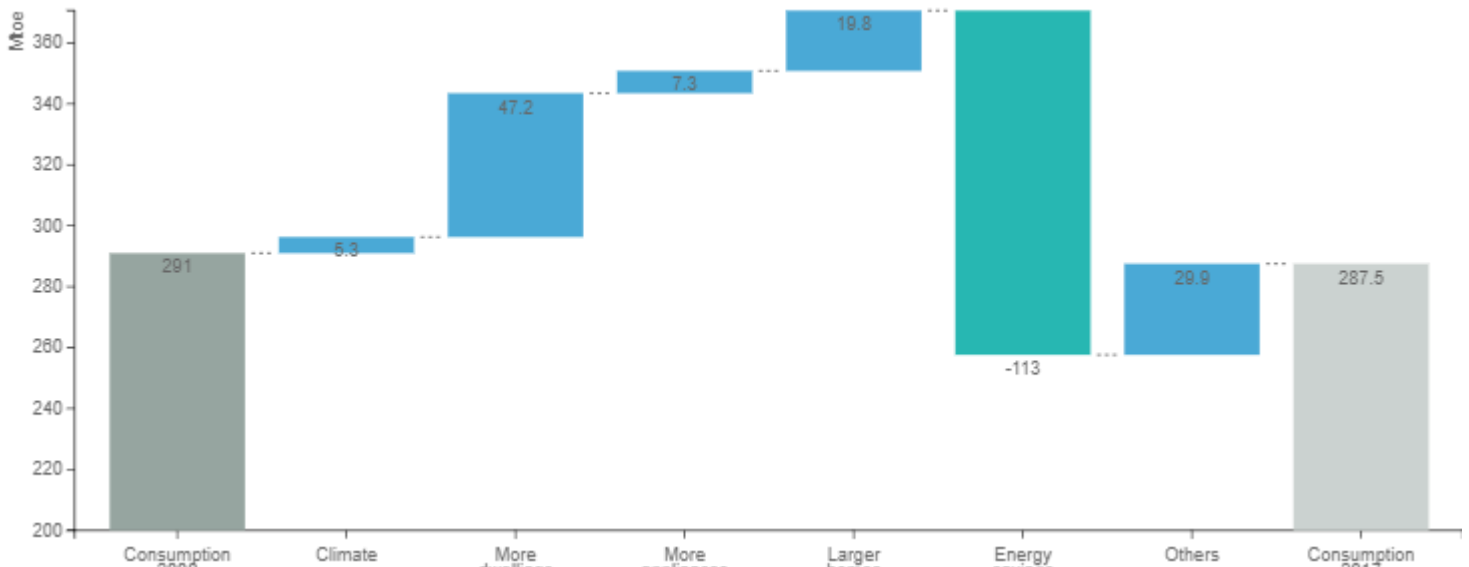


Decomposition of energy consumption

Drivers of energy consumption per dwelling (EU)

Decreasing energy consumption (-3.5 Mtoe in 2017 compared to 2000) as energy savings (113 Mtoe) more than offset the activity effect, i.e. more dwelling, larger homes and more appliances, which tend to increase this consumption by around 110 Mtoe);

Drivers of energy consumption variation in residential at EU level



Drivers of heating consumption per dwelling (EU)

Larger dwellings and the diffusion of central heating in the south of Europe have offset around 1/3 of energy efficiency gains at EU level.

Drivers of the variation in heating consumption per dwelling

