

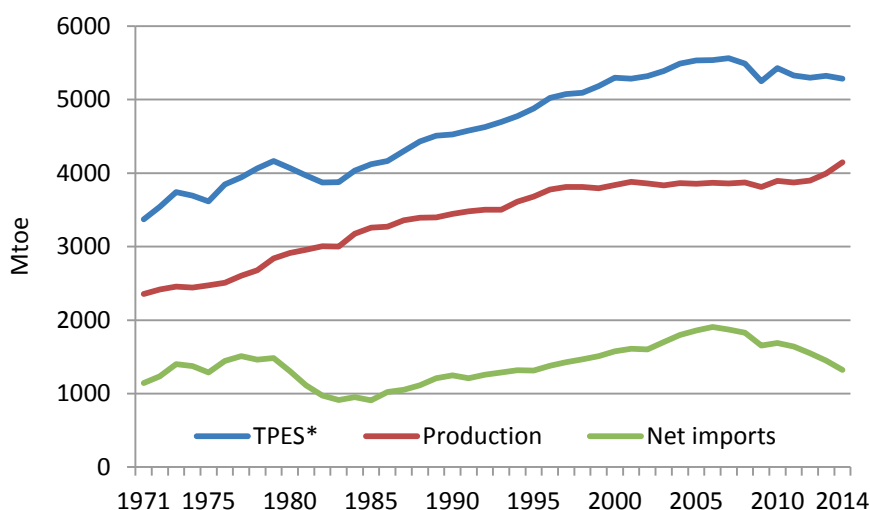
Recent trends in the OECD: energy and CO₂ emissions¹

1. Data based on the 2016 preliminary editions of the IEA *World Energy Balances*, and the IEA *CO₂ Emissions from Fuel Combustion* databases (for OECD Countries).

OECD energy production above 4000 Mtoe in 2014

In 2014, total energy production in the OECD rose 4% to 4147 Mtoe, exceeding the 4000 Mtoe mark for the first time (Figure 1).

Figure 1. OECD energy supply: 1971-2014



*TPES: Total primary energy supply

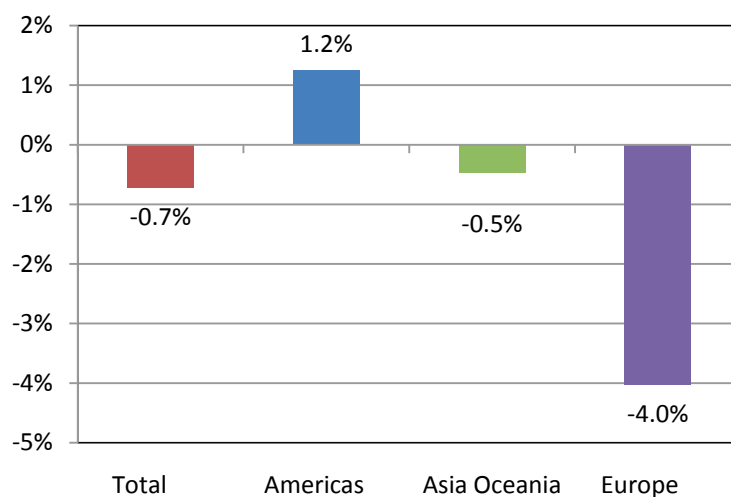
Energy production increased significantly in OECD Americas (+6%) and OECD Asia Oceania (+6%), but decreased slightly in OECD Europe (-2%). At the country-level, the United States (+7%, driven by oil), Canada (+5%, driven by oil and gas) and Australia (+6%, driven by coal) showed the largest production increases.

Overall, OECD Total Primary Energy Supply (TPES) decreased in 2014 by nearly 1%, driven by OECD Europe (- 3.5%). Net OECD imports kept declining to reach levels comparable to those of 1995.

Lower final energy consumption in 2014

In 2014, total final consumption in the OECD decreased by 0.7%, compared to the 2% increase in 2013 (Figure 2).

Figure 2. OECD Total Final Consumption: 2013-14 change



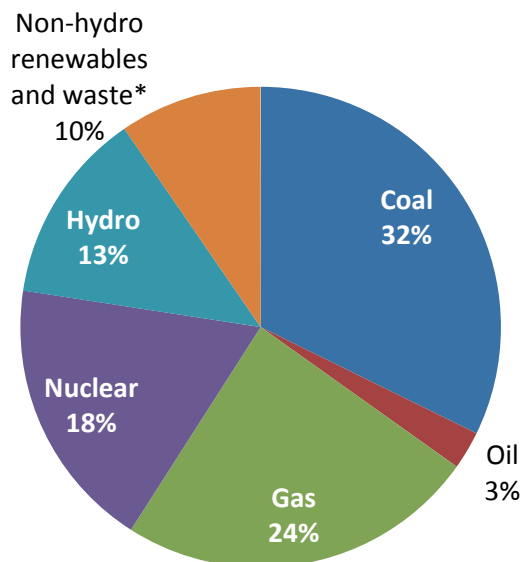
A warmer winter in Europe was the main cause for the 4% decrease of OECD Europe. Significant reductions at the country-level were reported for the Netherlands (-7%), France (-6%), Switzerland (-8%) and the United Kingdom (-6%).

On the other hand, final consumption in OECD Americas rose by 1.3%, led by a 2% increase in the United States.

A rising share of renewables in the electricity mix

Overall, the OECD electricity generation mix was still dominated by fossil fuels (59%), mainly coal and gas. In 2014, hydro electricity generation accounted for 13%, while non-hydro renewables and waste rose to 10% (Figure 3).

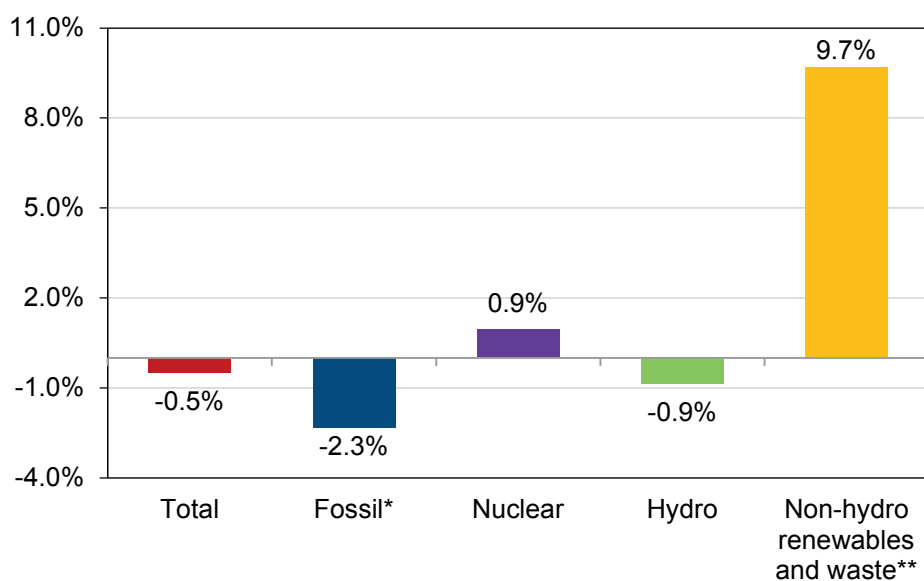
Figure 3. OECD electricity generation mix 2014



*Includes geothermal, solar, wind, tide, biofuels, waste and heat.

Still, as generation from other sources increased by almost 10% in 2014, led by solar photovoltaics (+26%) and wind (+9%), the share of fossil fuel in total electricity generation decreased by 2% in a year.

Figure 4. OECD electricity generation: 2013-2014 change

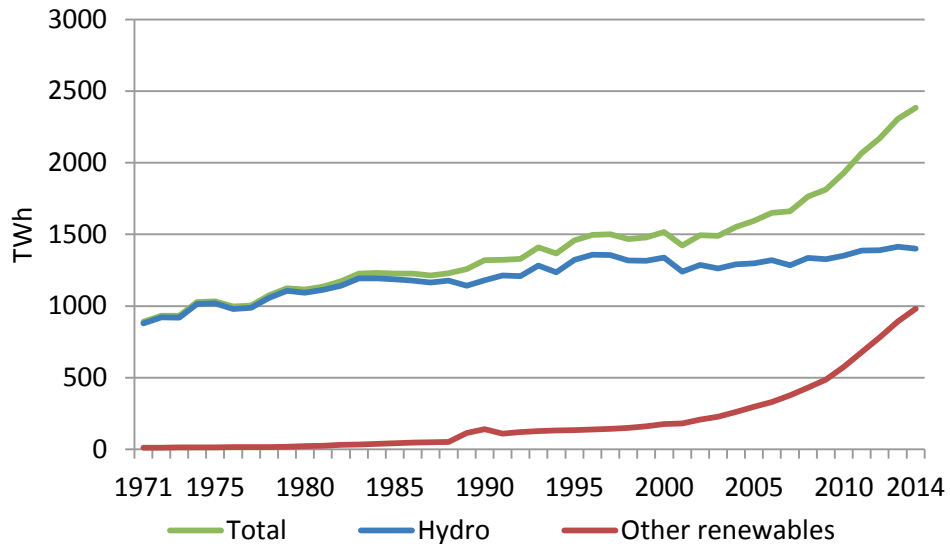


*Fossil includes coal, peat, oil shale, oil and gas.

**Includes geothermal, solar, wind, tide, biofuels, waste and heat.

Non-hydro renewable electricity generation rose very fast over the last decade, bringing its contribution to 10% of total generation in 2014 (Figure 4). Total renewable electricity generation accounted for 2 383 TWh in 2014 across OECD, which is an all-time high (Figure 5).

Figure 5. OECD electricity generation from renewables: 1971-2014



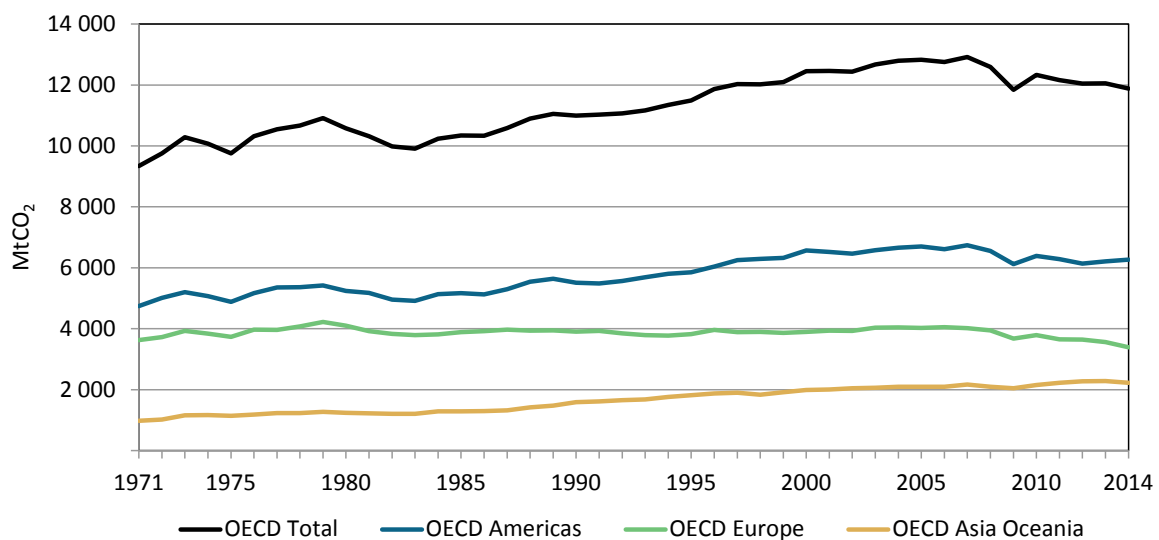
Specifically in OECD Europe, non-hydro renewable electricity generation (533 TWh) reached comparable levels than hydro (568 TWh).

OECD emissions down 8% since 2007

Total OECD CO₂ emissions from fuel combustion fell by 1.4% to 11.9 GtCO₂ in 2014, having remained stable in 2013. In total OECD emissions have decreased by 8% (or 1.0 GtCO₂) since their pre-economic crisis level of 12.9 GtCO₂ in 2007.

On a regional basis, trends differed. CO₂ emissions in OECD Europe fell by 5% in 2014, helped by decreased space heating requirements due to warmer weather. In OECD Asia Oceania, emissions fell by 2.5%, primarily due to a drop in power sector emissions. Conversely, in OECD Americas, emissions rose by 0.9%, with transport showing the largest year-on-year increase.

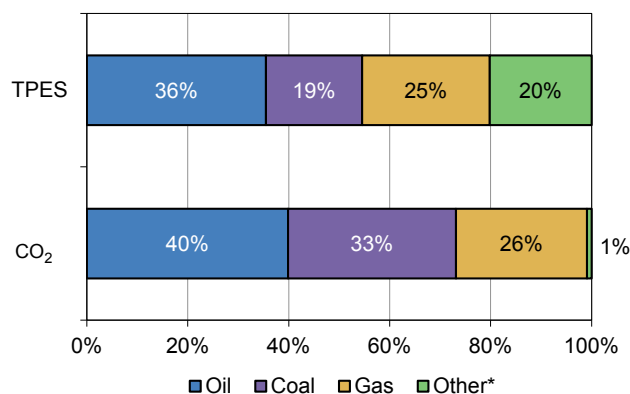
Figure 6: OECD CO₂ emissions from fuel combustion (1971-2014)



Oil remains the largest source of OECD emissions

Across the OECD as a whole, oil was responsible for the largest share of CO₂ emissions from fuel combustion (40%) in 2014, followed by coal (33%) and gas (26%). Although coal represented 19% of OECD TPES, it accounted for 33% of CO₂ emissions due to its heavy carbon content per unit of energy released, and due to the fact that 20% of the TPES derives from carbon neutral sources (Figure 7).

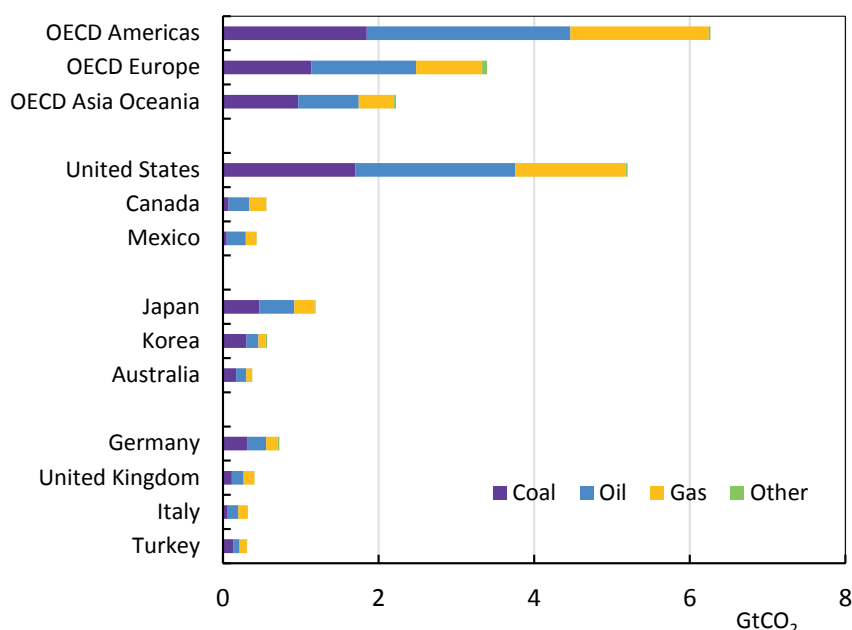
Figure 7: 2014 OECD primary energy supply and CO₂ emissions by fuel:



* Other includes nuclear, hydro, geothermal, solar, tide, wind, biofuels and waste.

The relative weight of emissions sources varied for the top-ten emitting OECD countries (Figure 8). The share of gas was above one third for the United Kingdom, Italy and Canada, while the share of coal was above 40% in Turkey, Germany, Australia and Korea. In this group, Mexico had the largest share of emissions from oil (57%).

Figure 8: CO₂ emissions from fuel combustion by source in 2014: top-10 OECD emitting countries



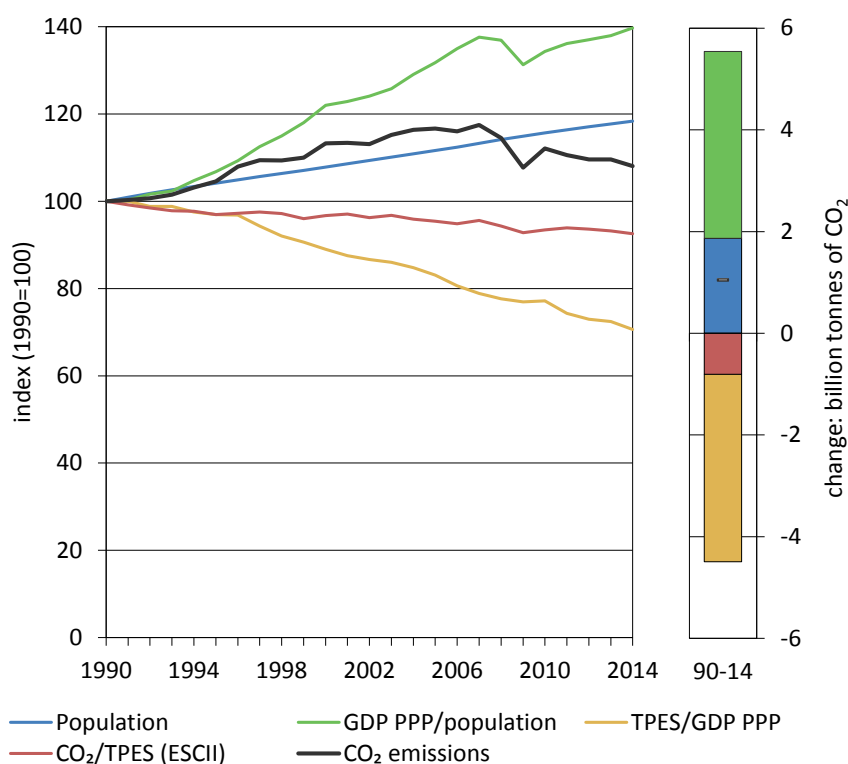
Decoupling of CO₂ emissions from GDP growth over time

In 2014, CO₂ emissions from fuel combustion declined to 11.9 GtCO₂, a level comparable to their 2009 dip – and the lowest level since the mid-1990s.

While total emissions in 2009 and 2014 were comparable, there have been changes to the underlying drivers (Figure 9). Over that period, the economic output grew by 10%, but this was mainly offset by a decline in the energy intensity (TPES/GDP: -8%)², although the carbon intensity of the energy mix did not change much with CO₂/TPES 0.3% lower than in 2009. Declines in energy intensity - which measures the energy needed per economic output - can be driven by improvements in efficiency, structural changes in the economy and variations in weather patterns, among other factors.

Over the longer period of 1990-2014, decoupling of economic growth from energy consumption was significant (TPES/GDP: -29%). The carbon intensity of the mix declined less (CO₂/TPES: -7%) due to a continuing reliance on fossil fuels as a source of energy. Compared with their 1990 levels, OECD CO₂ emissions from fuel combustion were 8% higher in 2014.

Figure 9: CO₂ emissions and drivers

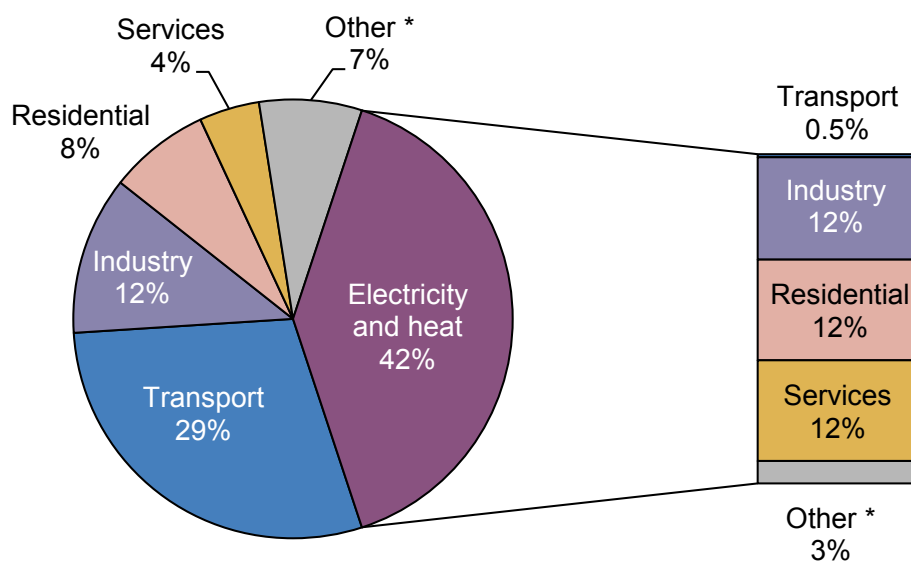


2. CO₂ emissions from fuel combustion can be broken down into the product of four driving factors: population, per-capita economic output (GDP/population), energy intensity of the economy (TPES/GDP) and carbon intensity of the energy mix (CO₂/TPES), through a decomposition known as the "Kaya identity": CO₂ = CO₂/TPES x TPES/GDP x GDP/population x population.

Power generation remains the largest emitting sector

In 2014, power generation was the largest emitting sector (40% in the region and above 45% in nine OECD countries), followed by transport (29%). Emissions from electricity and heat generation were driven almost equally by industry, residential and services use. In 2014, the OECD produced 10 785 TWh of electricity (almost three times as much as in 1971), of which 59% was derived from fossil fuels.

Figure 10: OECD CO₂ emissions by sector in 2014



* Other includes agriculture/forestry, fishing, energy industries other than electricity and heat generation, and other emissions not specified elsewhere.

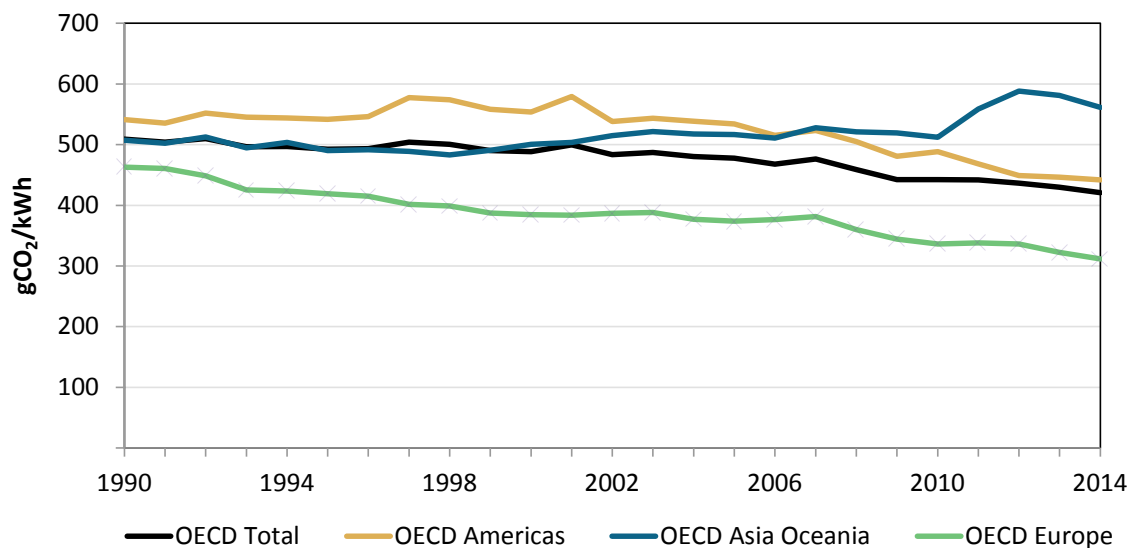
Carbon intensity of electricity generation declining

In 2014, OECD electricity generation produced 420 gCO₂/kWh, 2% less than in 2013 and almost 20% less than in 1990, to reach its lowest levels to date³, with the levels reached in both OECD Europe and OECD Americas record lows for the respective regions.

In OECD Europe, which has the least carbon-intensive electricity of the OECD regions, recent per-kWh emissions reductions have been primarily driven by an increased share of renewables in the mix (2014: 31% vs. 2008: 21%). By comparison, in OECD Americas, the decline was caused by both an increased share of renewable output (2014: 20% vs. 2008: 16%) and the impact of fuel switching between coal and natural gas.

In OECD Asia Oceania, where the carbon intensity of electricity generation increased sharply following the Fukushima Daiichi accident in Japan, emissions per kWh of electricity generation also declined in 2014.

Figure 11: CO₂ emissions per kWh of electricity generation



3. CO₂/kWh of electricity generation data are available from 1990.

Geographical Coverage⁴:

OECD Americas includes Canada, Chile, Mexico and the United States.

OECD Asia Oceania includes Australia, Israel⁵, Japan, Korea and New Zealand.

OECD Europe includes Austria, Belgium, the Czech Republic, Denmark, Estonia (from 1990), Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, the Slovak Republic, Slovenia (from 1990), Spain, Sweden, Switzerland, Turkey and the United Kingdom.

OECD Total includes Australia, Austria, Belgium, Canada, Chile, the Czech Republic, Denmark, Estonia (from 1990), Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, the Slovak Republic, Slovenia (from 1990), Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States.

Sources:

- 2016 preliminary edition of *World Energy Balances (OECD Countries)*, OECD/IEA, Paris,
- 2016 preliminary edition of *CO₂ Emissions from Fuel Combustion (OECD Countries)*, OECD/IEA, Paris,.

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