

2. SECTORAL AND ECONOMIC TRENDS OF ENVIRONMENTAL SIGNIFICANCE

Energy intensity and mix

Energy is a major component of OECD economies as a sector and as a factor input to all economic activities. Energy production and use have environmental effects that differ greatly by energy source. Fuel combustion is the main source of local and regional air pollution and GHG emissions. Other effects involve water quality, land use, risks related to the nuclear fuel cycle and risks related to the extraction, transport and use of fossil fuels.

The structure of a country's energy supply and the intensity of its energy use, along with changes over time, are key determinants of environmental performance and the sustainability of economic development. The supply structure varies considerably among countries. It is influenced by demand from industry, transport and households, by national energy policies and by national and international energy prices.

Definitions

The indicators presented here relate to:

- Energy intensities, expressed as total primary energy supply (TPES) in tonnes of oil equivalent (toe) per unit of GDP and per capita. TPES equals production plus imports minus exports minus international bunkers plus or minus stock changes.

Energy intensity does not reflect energy efficiency, as the latter depends on numerous elements (climate, output composition, outsourcing of goods produced by energy-intensive industries, etc.) that are not considered by the simple measure of energy supply to GDP.

- The energy supply mix, i.e. the structure of energy supply in terms of primary energy source as a percentage of total energy supply.
- The share of renewables in the energy supply mix and in the production of electricity. The main renewable forms are hydro, geothermal, wind, biomass, waste and solar energy.

Overview

In the 1990s and 2000s, energy intensity per unit of GDP decreased for OECD countries overall as a consequence of structural changes in the economy and energy conservation measures, and, since 2009, as a consequence of the slowdown in economic activity following the economic crisis. In some countries the decrease was due to the transfer of energy-intensive industries to other countries. Such outsourcing may increase pressures on the global environment if less energy efficient techniques are involved.

Progress in per capita terms has been slower, reflecting overall trends in energy supply (+16% since 1990; -1% since 2000) and energy demand for transport (+27% since 1990; +4% since 2000).

- Variations in energy intensity among OECD countries are wide (from 0.07 to 0.46 toe per 1 000 unit of GDP, from 1.6 to 18 toe per capita). They depend on national

economic structure and income, geography, energy policies and prices, and countries' endowment in different types of energy resources.

- While some decoupling of environmental effects from growth in energy use has been achieved, results to date are insufficient to effectively reduce air and GHG emissions from energy use.

Developments in TPES were accompanied by changes in the fuel mix. OECD countries' reliance on fossil fuels declined although it remains close to 80%, the shares of solid fuels and gas slightly fell, while those of renewable energy rose. Renewables account for 9% of total OECD supply (compared to 6% in 2000), and 22% of total OECD electricity production (compared to 15.6% in 2000). Biofuels and waste, followed by hydro represent the largest shares (60% and 25% respectively). Renewables with the lowest shares (i.e. solar, wind, liquid biofuels and biogases) exhibited the highest growth rates over the last decade.

The growth in renewables was not affected by the economic crisis and was driven by OECD Europe, mostly due to the implementation of policies that promote renewable energy (IEA, 2014a).

Comparability

Data quality is not homogeneous for all countries. In some countries, data are based on secondary sources, and where incomplete, estimates were made by the IEA. In general, data are likely to be more accurate for production and trade than for international bunkers or stock changes; and statistics for biofuels and waste are less accurate than those for traditional commercial energy data.

The high values for Iceland are due to a significant increase in the production of hydro- and geothermal power mainly used in aluminium smelters (+113% between 2000 and 2014).

For additional notes, see the Annex.

Source

IEA (2015), "World Energy Balances", *IEA World Energy Statistics and Balances* (database), <http://dx.doi.org/10.1787/data-00512-en>.

Further information

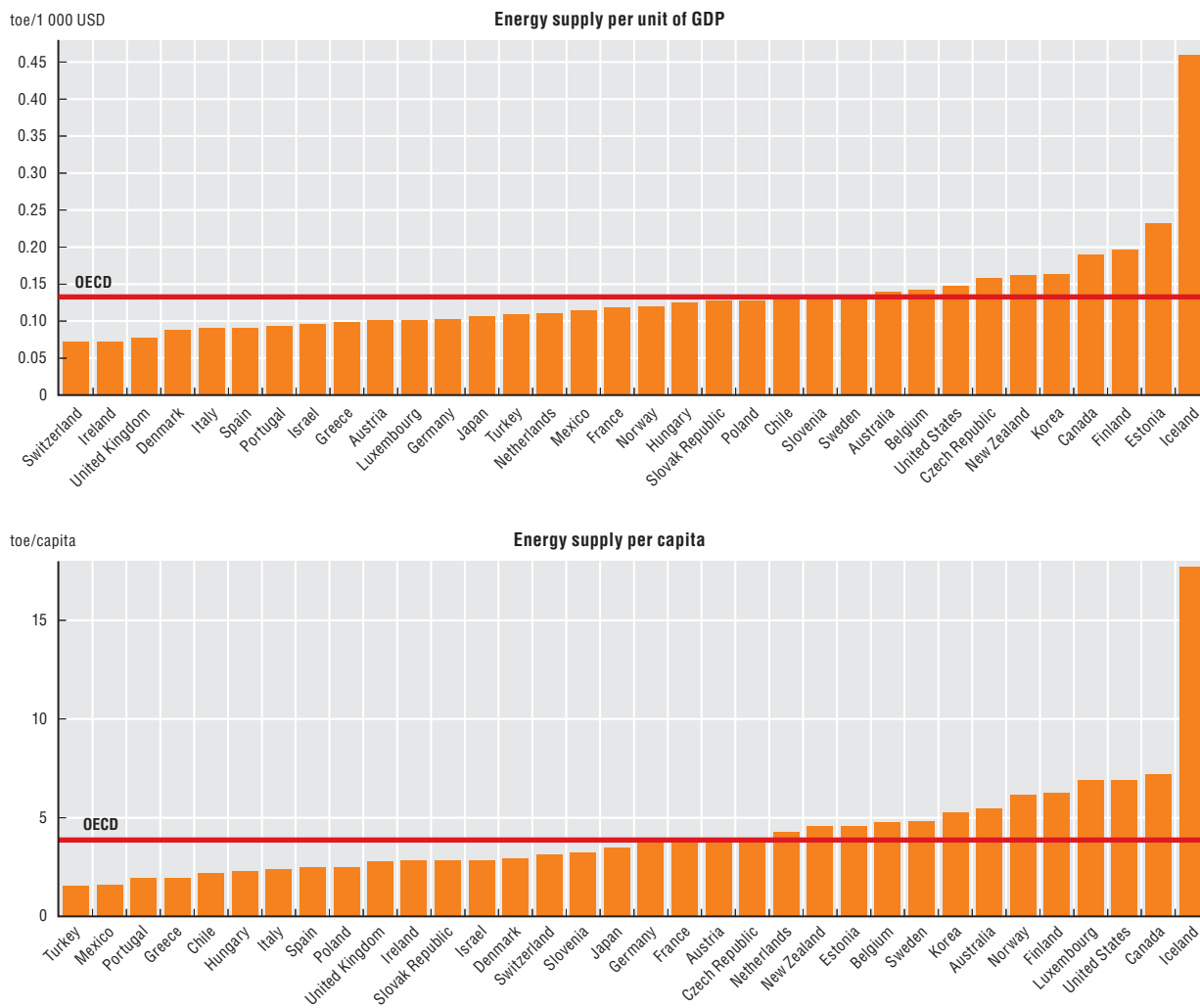
IEA (2015), *World Energy Outlook Special Report 2015: Energy and Climate Change*, IEA, Paris.

IEA (2014a), *Renewables Information 2014*, IEA, Paris, <http://dx.doi.org/10.1787/renew-2014-en>.

IEA (2014b), *World Energy Outlook 2014*, IEA, Paris, <http://dx.doi.org/10.1787/weo-2014-en>.

Information on data for Israel: <http://dx.doi.org/10.1787/888932315602>.

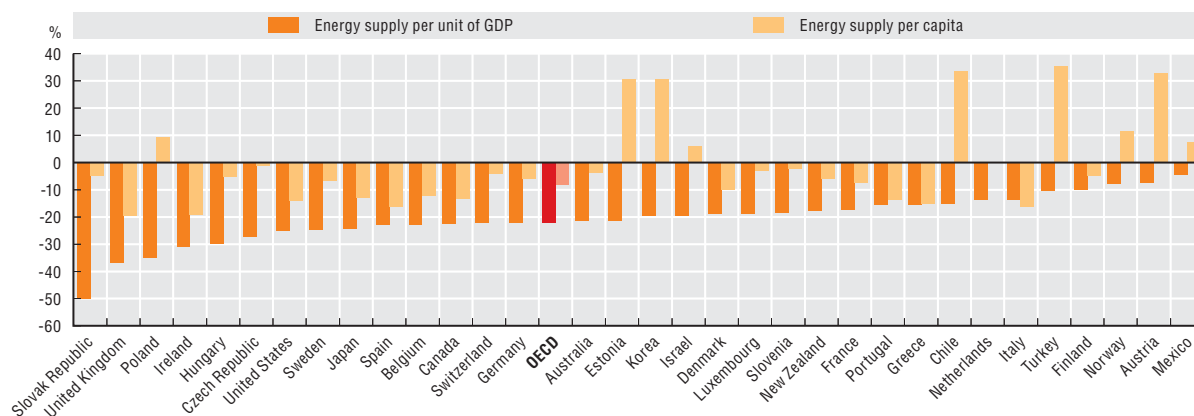
Figure 2.1. **Energy intensity, 2014**



Source: IEA (2015), "World Energy Balances", IEA World Energy Statistics and Balances (database).

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Figure 2.2. **Change in energy intensity, since 2000**



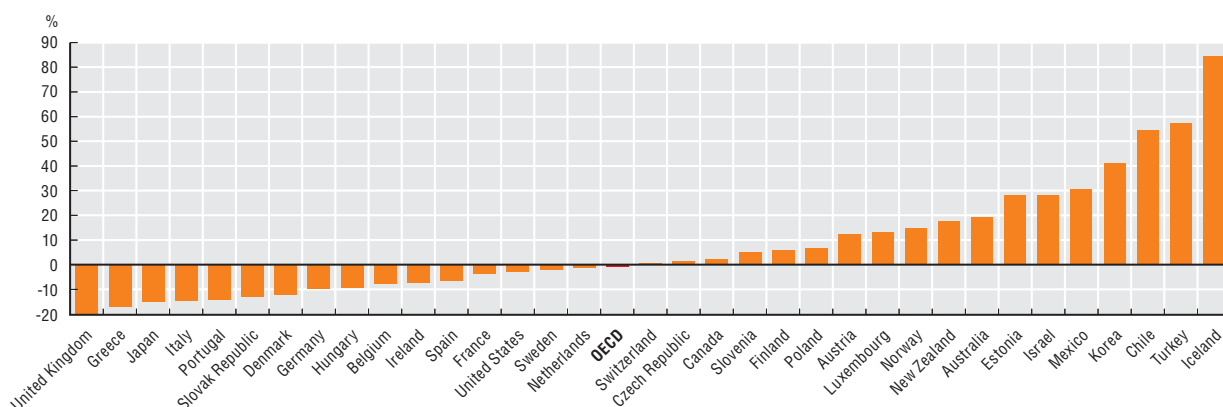
Source: IEA (2015), "World Energy Balances", IEA World Energy Statistics and Balances (database).

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2. SECTORAL AND ECONOMIC TRENDS OF ENVIRONMENTAL SIGNIFICANCE

Energy intensity and mix

Figure 2.3. Change in total primary energy supply, since 2000



Source: IEA (2015), "World Energy Balances", IEA World Energy Statistics and Balances (database).

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Table 2.1. Primary energy supply and intensity of use

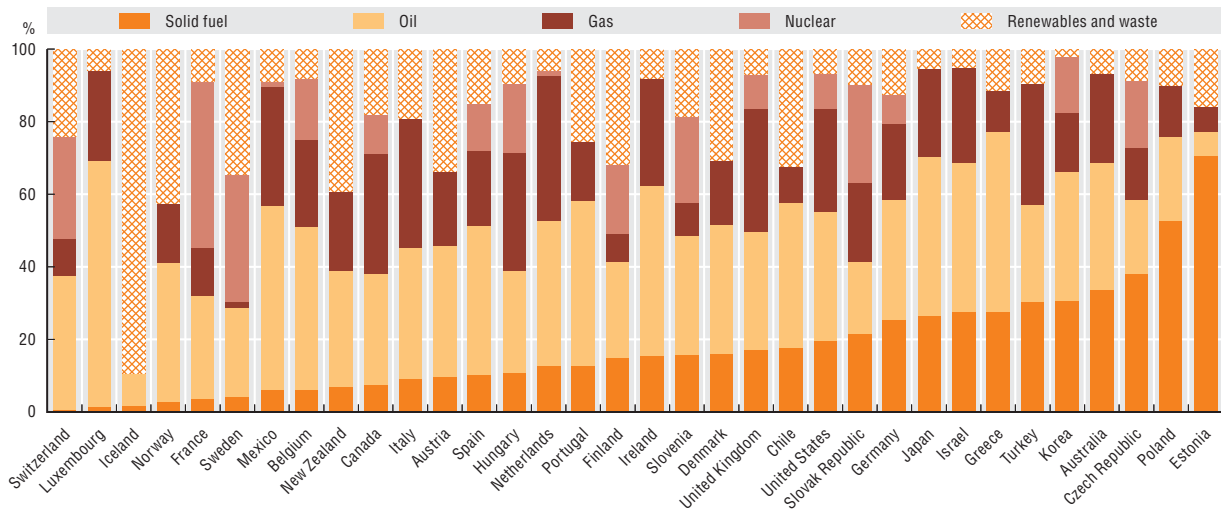
	Total supply		Intensity per unit of GDP		Structure by source, share of the total (%)				
	Mtoe	% change	toe/1 000 USD	% change	Solid fossil fuels	Oil	Gas	Nuclear	Renewables and waste
	2014	2000-14	2014	2000-14	2014				
Australia	129	19.1	0.14	-21.6	33.8	34.9	24.7	-	6.7
Austria	32	12.4	0.10	-7.4	9.7	36.2	20.4	-	33.7
Belgium	54	-7.8	0.14	-22.9	6.0	44.9	24.1	16.7	8.2
Canada	258	2.4	0.19	-22.7	7.4	30.4	33.3	10.7	18.1
Chile	39	54.3	0.13	-15.0	17.7	39.8	10.0	-	32.4
Czech Republic	42	1.5	0.16	-27.5	38.1	20.3	14.4	18.5	8.8
Denmark	16	-12.1	0.09	-18.7	16.1	35.6	17.5	-	30.8
Estonia	6	28.3	0.23	-21.5	70.6	6.7	6.9	-	15.8
Finland	34	6.0	0.20	-10.1	14.8	26.7	7.7	18.9	31.9
France	242	-3.9	0.12	-17.4	3.7	28.4	13.0	45.9	8.9
Germany	304	-9.8	0.10	-22.0	25.5	32.9	20.9	8.3	12.5
Greece	22	-17.1	0.10	-15.6	27.6	49.6	11.4	-	11.3
Hungary	23	-9.5	0.12	-29.7	10.8	28.2	32.5	19.0	9.5
Iceland	6	84.6	0.46	28.0	1.6	9.0	-	-	89.3
Ireland	13	-7.4	0.07	-30.8	15.5	46.8	29.6	-	8.0
Israel	23	28.4	0.10	-19.4	27.6	41.2	26.2	-	5.0
Italy	146	-14.7	0.09	-13.7	9.2	36.2	35.6	-	19.0
Japan	441	-15.0	0.11	-24.4	26.7	43.6	24.4	-	5.3
Korea	265	41.0	0.16	-19.5	30.6	35.7	16.3	15.4	2.1
Luxembourg	4	13.2	0.10	-18.7	1.6	67.5	25.0	-	5.9
Mexico	189	30.8	0.11	-4.6	6.0	51.0	32.6	1.3	9.1
Netherlands	72	-1.2	0.11	-13.8	12.6	40.1	40.0	1.5	5.8
New Zealand	20	17.6	0.16	-17.8	6.8	32.2	21.8	-	39.3
Norway	30	14.9	0.12	-7.9	2.7	38.5	16.1	-	42.6
Poland	95	6.9	0.13	-34.9	52.5	23.4	14.2	-	10.0
Portugal	21	-14.2	0.09	-15.7	12.8	45.3	16.5	-	25.5
Slovak Republic	15	-13.1	0.13	-50.0	21.4	20.0	21.8	27.0	9.8
Slovenia	7	5.2	0.13	-18.7	15.7	32.9	9.0	23.8	18.6
Spain	114	-6.6	0.09	-23.0	10.2	41.1	20.7	13.1	14.9
Sweden	47	-1.9	0.13	-24.8	4.4	24.3	1.7	35.1	34.6
Switzerland	25	0.7	0.07	-22.1	0.5	36.9	10.4	28.1	24.1
Turkey	119	57.2	0.11	-10.5	30.4	26.6	33.5	-	9.5
United Kingdom	178	-20.3	0.08	-37.0	17.0	32.7	33.9	9.4	6.9
United States	2 206	-3.0	0.15	-25.0	19.6	35.7	28.1	9.8	6.8
OECD	5 238	-1.0	0.13	-22.0	19.3	35.7	25.6	9.9	9.6
OECD America	2 692	-0.1	0.15	-23.7	17.4	36.3	28.7	9.2	8.4
OECD Asia-Oceania	879	3.3	0.12	-20.1	28.4	39.6	22.0	4.6	5.3
OECD Europe	1 667	-4.5	0.10	-21.4	17.5	32.5	22.4	13.7	13.9
World	13 555	34.8	0.16	-16.5	29.0	31.1	21.4	4.8	13.5

Note: See the Annex for country notes.

Source: IEA (2015), "World Energy Balances", IEA World Energy Statistics and Balances (database).

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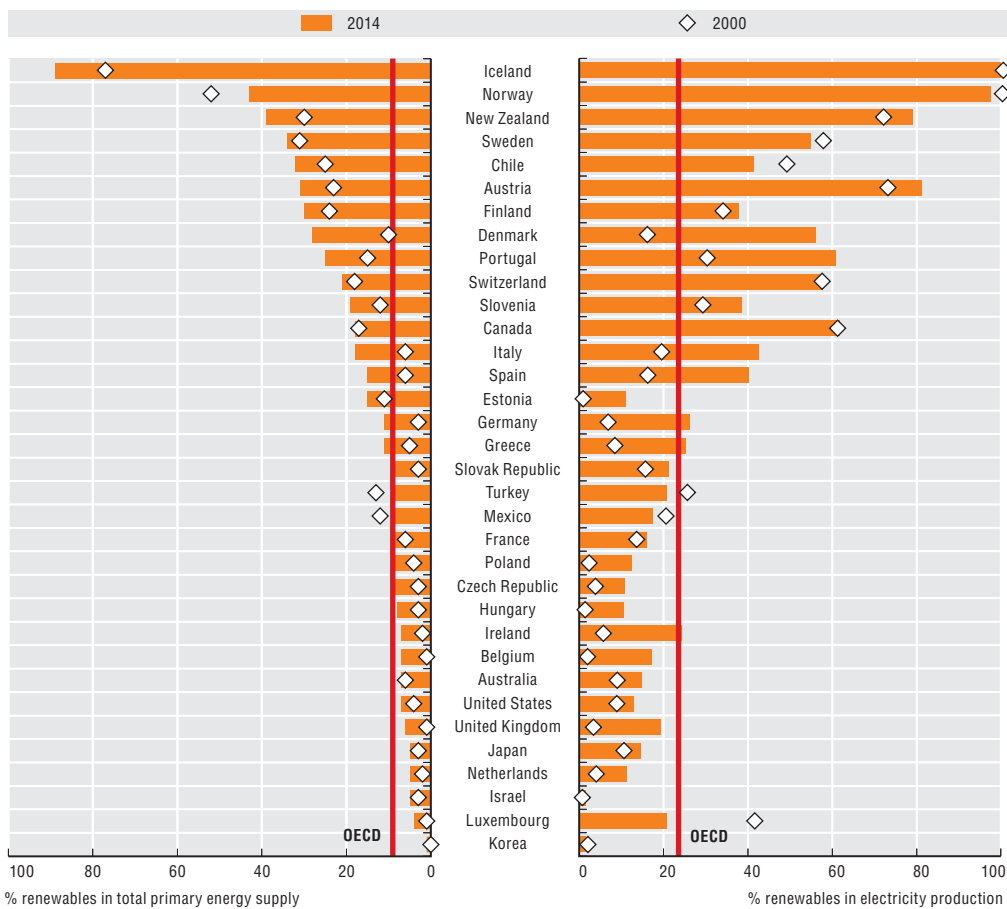
Figure 2.4. Primary energy supply by source, 2014



Source: IEA (2015), "World Energy Balances", IEA World Energy Statistics and Balances (database).

StatLink <http://dx.doi.org/10.1787/888933262050>

Figure 2.5. Share of renewables in TPES and in electricity production, 2000, 2014



Source: IEA (2015), "World Energy Balances", IEA World Energy Statistics and Balances (database).

StatLink <http://dx.doi.org/10.1787/888933262064>



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