

2. SECTORAL TRENDS OF ENVIRONMENTAL SIGNIFICANCE

Energy intensity and mix

Energy is a major component of OECD economies in and of itself and as a factor input to all other 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) per unit of GDP and per capita. Total primary energy supply (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 excluding heat output from non-specified combustible fuels, electricity and heat.

Overview

In the 1990s and 2000s, energy intensity per unit of GDP generally decreased for OECD countries overall as a consequence of structural changes in the economy and energy conservation measures, and, in some countries, decreases in economic activity and 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 much slower, reflecting an overall increase in energy supply (+26%) and energy demand for transport (+17%):

- Variations in energy intensity among OECD countries are wide (from 0.09 to 0.54 per unit of GDP, from 1.5 to 18 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.

Growth in total primary energy supply was accompanied by changes in the fuel mix. While OECD countries are still more than 80% reliant on fossil fuels, the shares of solid fuels and oil fell, while those of gas and other energy sources rose.

Several OECD countries have made progress in promoting renewables in their energy mixes. Overall however, the share of renewable energy has remained relatively stable for the OECD and accounts for about 9% of total supply, with a slight increase in recent years reflecting the growing role of bioenergy, liquid biofuels and wind in some countries. Biomass and hydro still represent the largest shares.

See Annex A for OECD decoupling trends and energy mix.

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.

For additional notes, see Annex B.

Source

IEA, "World energy balances" (2012), *IEA World Energy Statistics and Balances* (database), <http://dx.doi.org/10.1787/data-00512-en>.

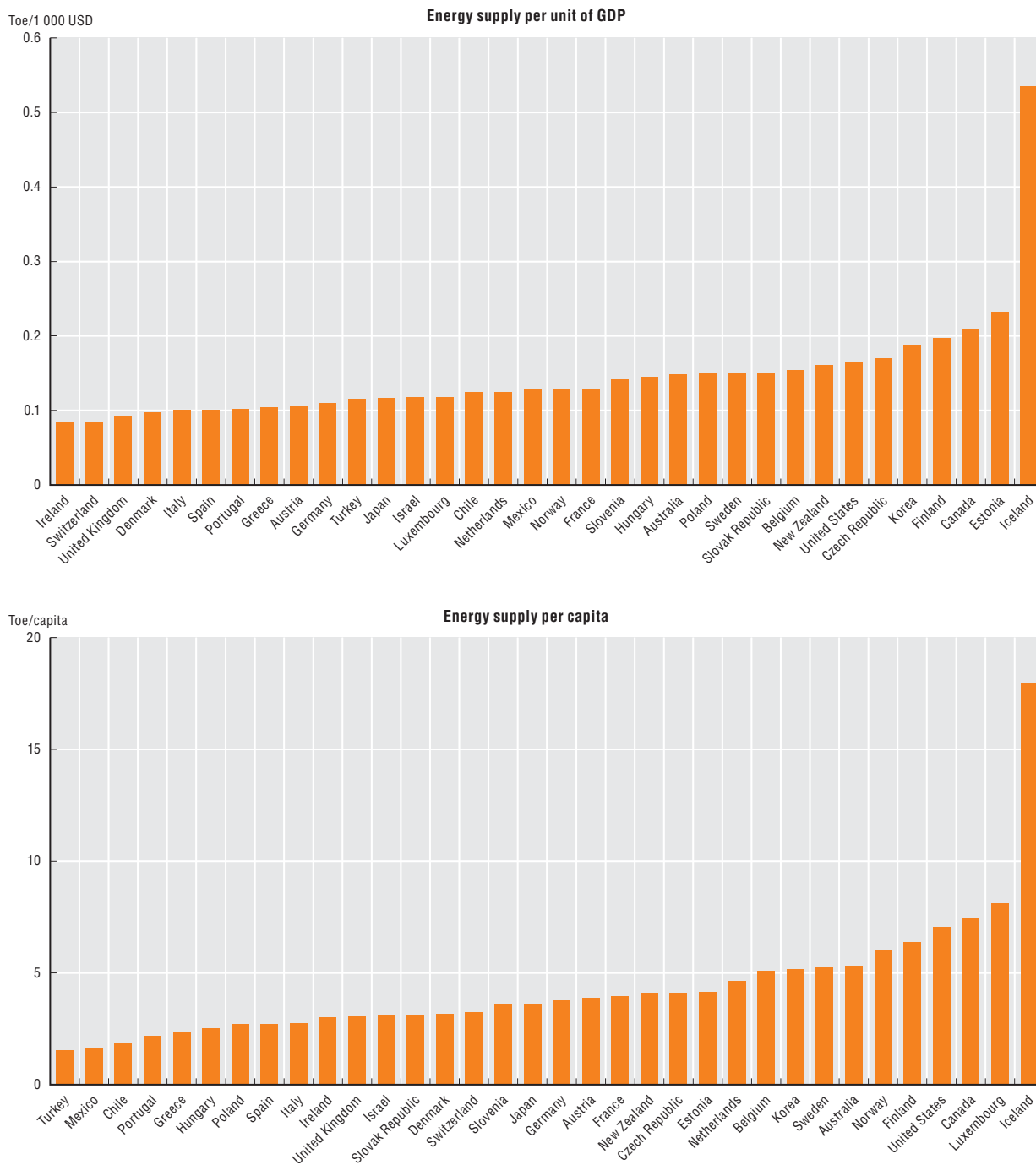
Further information

IEA (2012), *World Energy Outlook 2012*, OECD Publishing, Paris, <http://dx.doi.org/10.1787/weo-2012-en>.


IEA (2011), *IEA Scoreboard 2011: Implementing Energy Efficiency Policy: Progress and challenges in IEA member countries*, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264124653-en>.

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

Figure 2.1. **Energy intensity, 2011**



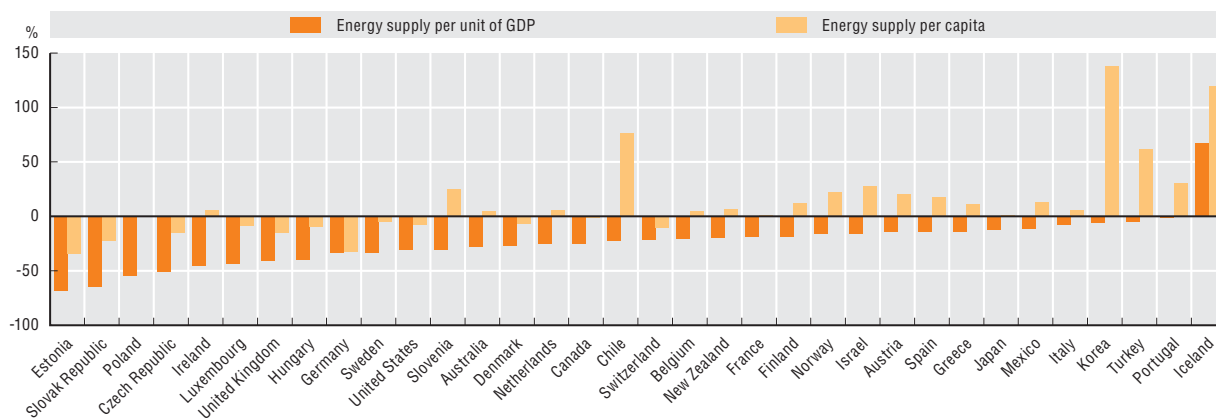
Source: IEA, Energy Balances of OECD Countries (2012) (database).

StatLink  <http://dx.doi.org/10.1787/888932977239>

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Energy intensity and mix

Figure 2.2. Change in energy intensity, since 1990



Source: IEA, Energy Balances of OECD Countries (2012) (database).

StatLink <http://dx.doi.org/10.1787/888932977258>

Table 2.1. Energy supply and intensity of use

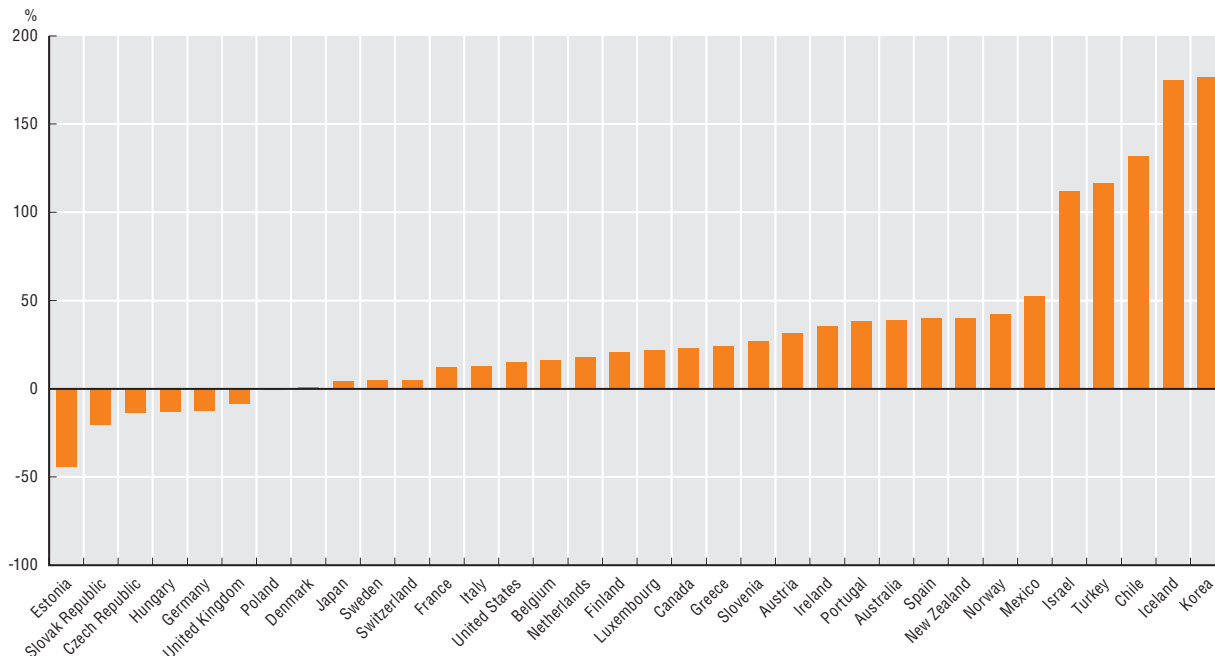
	Total supply (TPES)		Intensity per unit of GDP		Structure by source, share of total (%)				
	Mtoe	% change	Toe/1 000 USD	% change	Solid fuel	Oil	Gas	Nuclear	Other
	2011	1990-2011	2011	1990-2011					
Australia ¹	120	39	0.15	-28	35	33	27	0	6
Austria	33	31	0.11	-14	11	36	24	0	29
Belgium	56	16	0.15	-21	5	41	26	22	7
Canada	256	23	0.21	-25	8	32	34	9	17
Chile	32	131	0.12	-23	16	48	15	0	22
Czech Republic	43	-13	0.17	-51	41	20	17	17	4
Denmark ¹	18	1	0.10	-27	19	34	21	0	26
Estonia	6	-44	0.23	-69	74	9	9	0	8
Finland	34	21	0.20	-19	17	25	10	18	31
France ¹	251	12	0.13	-19	4	30	14	46	6
Germany	307	-13	0.11	-34	24	33	21	9	13
Greece	27	24	0.10	-14	30	47	14	0	8
Hungary	25	-13	0.15	-40	11	25	37	16	10
Iceland	6	175	0.54	67	2	14	0	0	84
Ireland	14	35	0.08	-45	16	47	30	0	6
Israel	24	112	0.12	-16	31	49	17	0	3
Italy ¹	165	13	0.10	-8	9	38	39	0	15
Japan ¹	458	4	0.12	-13	24	45	22	6	4
Korea	258	177	0.19	-6	31	36	16	15	2
Luxembourg	4	22	0.12	-44	2	60	25	0	13
Mexico	187	53	0.13	-11	5	54	30	1	9
Netherlands ¹	78	18	0.12	-25	10	39	44	1	6
New Zealand	18	40	0.16	-20	8	33	19	0	40
Norway	30	42	0.13	-16	3	37	20	0	40
Poland	103	0	0.15	-55	54	25	13	0	8
Portugal ¹	23	38	0.10	-2	10	47	19	0	24
Slovak Republic	17	-21	0.15	-65	22	20	27	23	8
Slovenia	7	27	0.14	-31	20	35	10	22	12
Spain ¹	126	40	0.10	-14	9	44	23	12	11
Sweden	49	5	0.15	-34	5	27	2	32	34
Switzerland ¹	26	5	0.09	-21	1	39	10	27	22
Turkey	114	116	0.12	-5	30	28	32	0	10
United Kingdom ¹	189	-8	0.09	-41	16	33	37	10	5
United States ¹	2 203	15	0.17	-31	22	36	26	10	6
OECD	5 305	17	0.14	-25	20	36	25	10	9
World	13 112	49	0.25	-13	29	32	21	5	13

1. See Annex B for country notes.

Source: IEA, Energy Balances of OECD Countries (2012) (database).

StatLink <http://dx.doi.org/10.1787/888932978360>

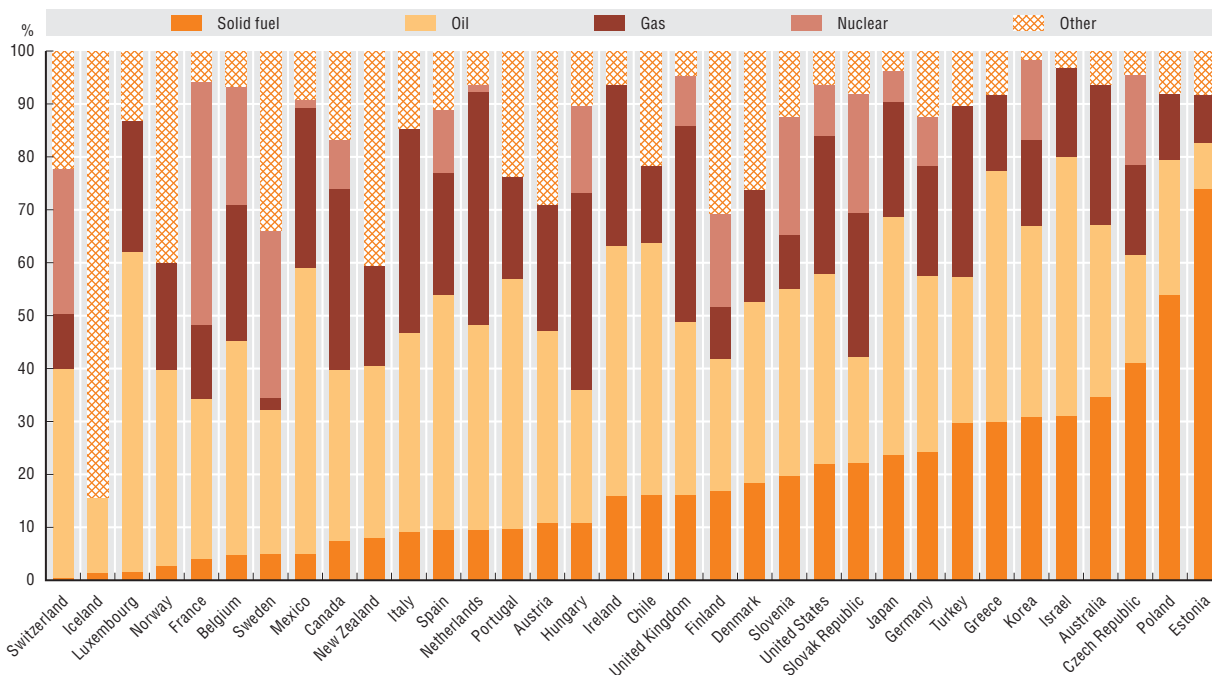
Figure 2.3. **Change in total energy supply (TPES), 1990-2011**
Percentage change



Source: IEA, Energy Balances of OECD Countries (2012) (database).

StatLink <http://dx.doi.org/10.1787/888932977277>

Figure 2.4. **Primary energy supply by source, 2011**



Source: IEA, Energy Balances of OECD Countries (2012) (database).

StatLink <http://dx.doi.org/10.1787/888932977296>



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