

1. ENVIRONMENTAL TRENDS

Carbon dioxide (CO₂) emissions

Carbon dioxide (CO₂) from the combustion of fossil fuels and biomass for energy use is a major contributor to the enhanced greenhouse effect. It makes up the largest share of greenhouse gases and is a key factor in countries' ability to deal with climate change.

Definitions

The indicators presented here refer to gross direct emissions of CO₂ from fossil fuel combustion. Human-caused emissions from other sources are not included. They show total emissions as well as emission intensities per unit of GDP and per capita, and related changes.

Emissions from oil held in international marine and aviation bunkers are excluded at national level, but included at world level.

CO₂ removal by sinks, indirect emissions from land use changes and indirect effects through interactions in the atmosphere are not taken into account.

This indicator should be read in conjunction with indicators on total greenhouse gas emissions, energy intensity, energy pricing, and atmospheric concentrations of GHGs. Its interpretation should take into account the structure of countries' energy supply, the share of renewable energy, and climatic factors.

Overview

CO₂ emissions from energy use are still growing in many countries and worldwide, mainly due to increases in the transport and the energy sectors. In 2013, global energy-related CO₂ emissions reached a record high of 32.2 billion tonnes, and in 2010 accounted for around 75% of global GHG emissions. With current policies, these emissions are estimated to exceed 50 billion tonnes in 2050 – about three times more than what would be required to limit the long-term increase in global temperatures to 2 degree Celsius.

Since 1990, energy-related CO₂ emissions have grown more slowly in OECD countries as a group than they have worldwide. This trend was emphasised by the rapid growth of emissions in emerging economies. Today, OECD countries emit less than 40% of global CO₂ emissions from energy use, compared to more than 50% in 1990. Preliminary estimates for 2014 indicate a flattening of the CO₂ emission growth rate, independently of economic growth.

Since 2000, overall OECD energy-related CO₂ emissions have decreased or grown at a slower rate than economic growth. This is due to structural changes in industry and energy supply and improvements in energy efficiency in production processes. In more than half of OECD countries, emissions have decreased since 2000, displaying an absolute decoupling. Most

of this decrease occurred in the late 2000s following the 2008 economic crisis that led to reduced economic output in several countries.

On a per-capita basis, OECD countries still emit far more CO₂ than most other world regions, with 9.6 tonnes of CO₂ emitted per capita on average in OECD countries in 2013, compared to 3.4 tonnes in the rest of the world.

Individual OECD countries' rates of progress vary significantly. Today, emissions per capita range from 4 to 18 tonnes per person, and the related change since 2000 ranges from +48% to -33%.

Energy-related CO₂ emissions continue to grow in the OECD Asia-Oceania region. This is due to energy supply and consumption patterns and trends, often combined with relatively low energy prices.

Reductions in national emissions can also be achieved by offshoring domestic production and, thus, the related emissions. Evidence of decoupling based on domestic emissions per unit of GDP or per capita, therefore, may reveal only part of the story.

Comparability

The emission estimates are affected by the quality of the underlying energy data, but in general the comparability across countries is quite good. The high per-GDP emissions of Estonia result from the use of oil shale for electricity generation. Oil shale has a high carbon emission factor. The high per-capita emissions of Luxembourg result from the lower taxation of road fuels compared to neighbouring countries, which attracts drivers to refuel in the country.

Sources

IEA (2015), "CO₂ Emissions by Product and Flow", IEA CO₂ Emissions from Fuel Combustion Statistics (database), <http://dx.doi.org/10.1787/data-00430-en>.

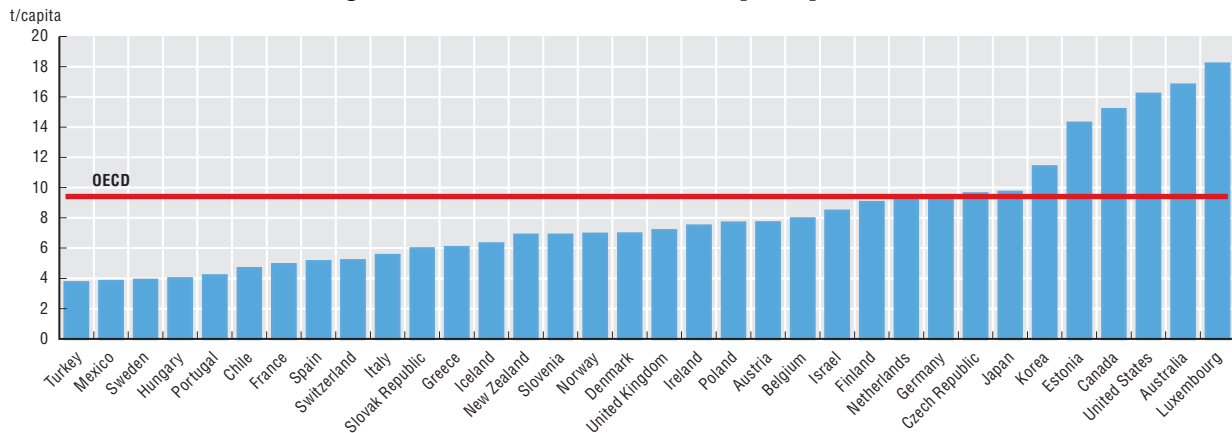
Further information

OECD (2015), *Aligning Policies for a Low-Carbon Economy*, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264233294-en>.

OECD (2013), *OECD Regions at a Glance 2013*, OECD Publishing, Paris, http://dx.doi.org/10.1787/reg_glance-2013-en.

OECD (2012), *OECD Environmental Outlook to 2050: The Consequences of Inaction*, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264122246-en>.

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

Figure 1.6. CO₂ emission intensities per capita, 2013

Source: IEA (2015), "CO₂ Emissions by Product and Flow", IEA CO₂ Emissions from Fuel Combustion Statistics (database).

StatLink <http://dx.doi.org/10.1787/888933261734>

Table 1.2. CO₂ emissions and intensities

	CO ₂ emissions from energy use							GDP
	Total		Intensities per unit of GDP		Intensities per capita		% change	
	Million tonnes	% change		t/1 000 USD	% change	t/cap		% change
	2013	1990-2013	2000-13	2013	2000-13	2013		2000-13
Australia	389	50	16	0.43	-21	17	-4	48
Austria	65	16	6	0.21	-13	8	0	21
Belgium	89	-16	-22	0.24	-34	8	-28	18
Canada	536	28	4	0.40	-20	15	-10	29
Chile	82	179	69	0.28	-3	5	48	74
Czech Republic	101	-33	-17	0.39	-39	10	-19	37
Denmark	39	-24	-24	0.21	-29	7	-27	7
Estonia	19	-48	30	0.74	-19	14	36	60
Finland	49	-8	-10	0.28	-23	9	-14	18
France	316	-9	-13	0.15	-25	5	-20	16
Germany	760	-19	-6	0.26	-18	9	-5	14
Greece	69	-1	-22	0.31	-20	6	-25	-3
Hungary	40	-40	-26	0.22	-40	4	-23	24
Iceland	2	7	-6	0.17	-33	6	-18	40
Ireland	34	14	-16	0.20	-36	7	-31	31
Israel	68	108	24	0.29	-19	8	-3	54
Italy	338	-13	-20	0.21	-19	6	-25	-1
Japan	1 235	18	7	0.30	-4	10	6	11
Korea	572	147	33	0.37	-21	11	24	68
Luxembourg	10	-9	21	0.27	-11	18	-2	36
Mexico	452	74	31	0.28	-0.3	4	12	32
Netherlands	156	8	-1	0.24	-13	9	-6	14
New Zealand	31	41	6	0.25	-23	7	-8	39
Norway	35	29	10	0.14	-9	7	-2	22
Poland	292	-15	1	0.41	-36	8	1	59
Portugal	45	19	-22	0.20	-23	4	-25	1
Slovak Republic	32	-41	-12	0.27	-48	6	-13	70
Slovenia	14	6	2	0.28	-19	7	-3	26
Spain	236	16	-15	0.19	-29	5	-26	20
Sweden	38	-28	-28	0.11	-43	4	-33	28
Switzerland	42	2	-1	0.12	-21	5	-11	26
Turkey	284	123	41	0.27	-17	4	25	69
United Kingdom	449	-18	-14	0.20	-30	7	-19	23
United States	5 120	7	-9	0.35	-27	16	-19	25
OECD	12 038	9	-3	0.30	-22	10	-11	24
OECD America	6 190	12	-6	0.35	-25	13	-17	27
OECD Asia-Oceania	2 295	44	14	0.33	-10	11	9	27
OECD Europe	3 553	-9	-9	0.23	-24	6	-14	20
World	32 200	54	36	0.57	-2	4	16	39

Note: See the Annex for country notes.

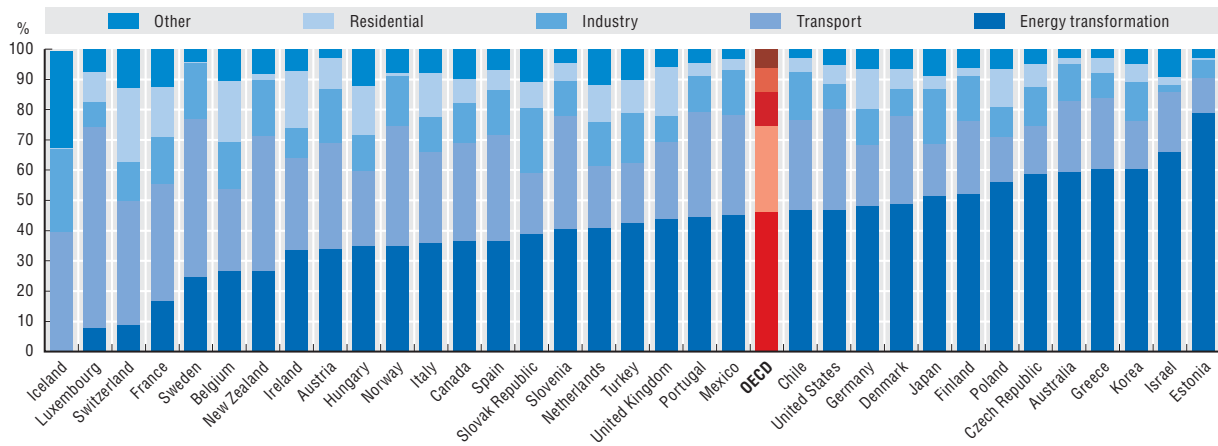
Source: IEA (2015), "CO₂ Emissions by Product and Flow", IEA CO₂ Emissions from Fuel Combustion Statistics (database).

StatLink <http://dx.doi.org/10.1787/888933262261>

1. ENVIRONMENTAL TRENDS

Carbon dioxide (CO₂) emissions

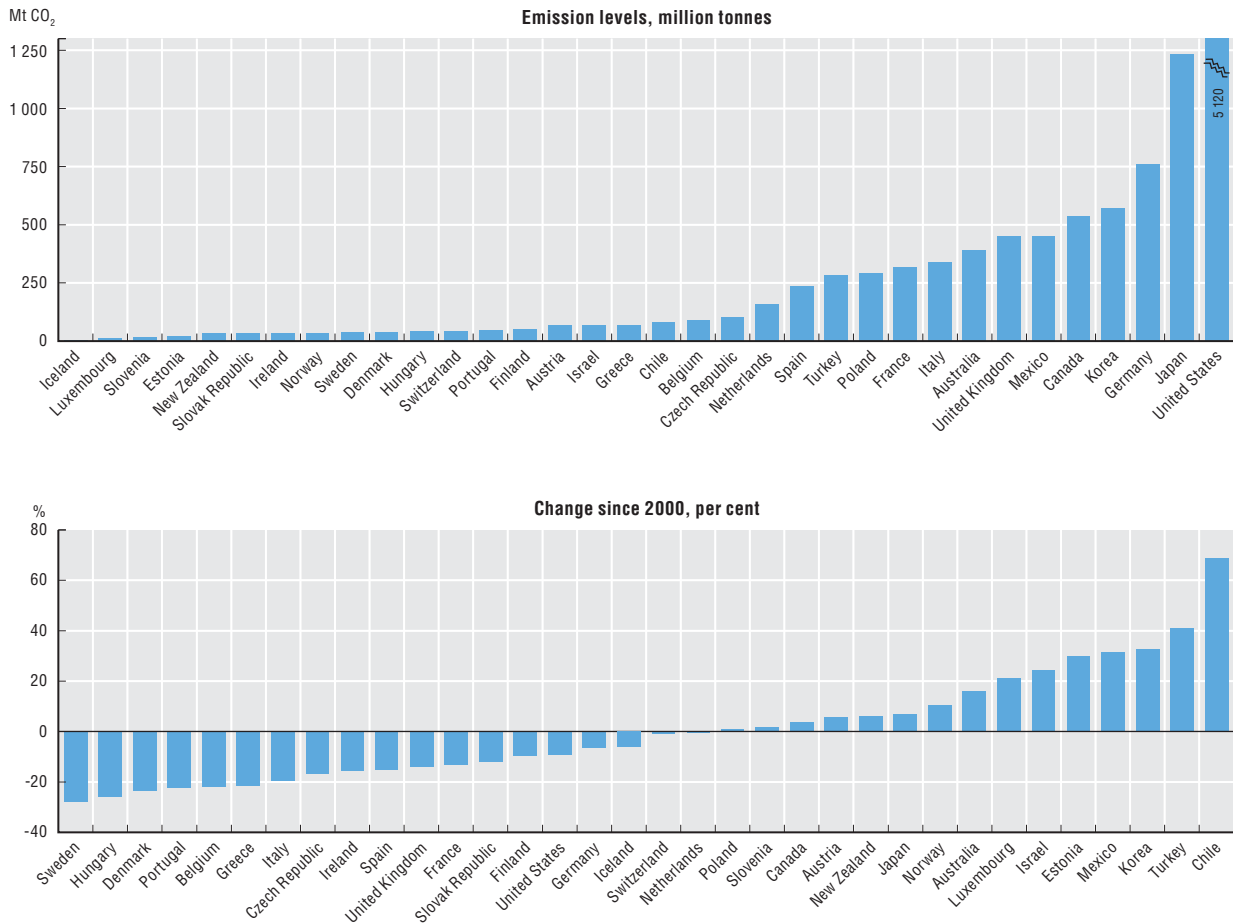
Figure 1.7. CO₂ emissions by source, 2013



Source: IEA (2015), "CO₂ Emissions by Product and Flow", IEA CO₂ Emissions from Fuel Combustion Statistics (database).

StatLink <http://dx.doi.org/10.1787/888933261746>

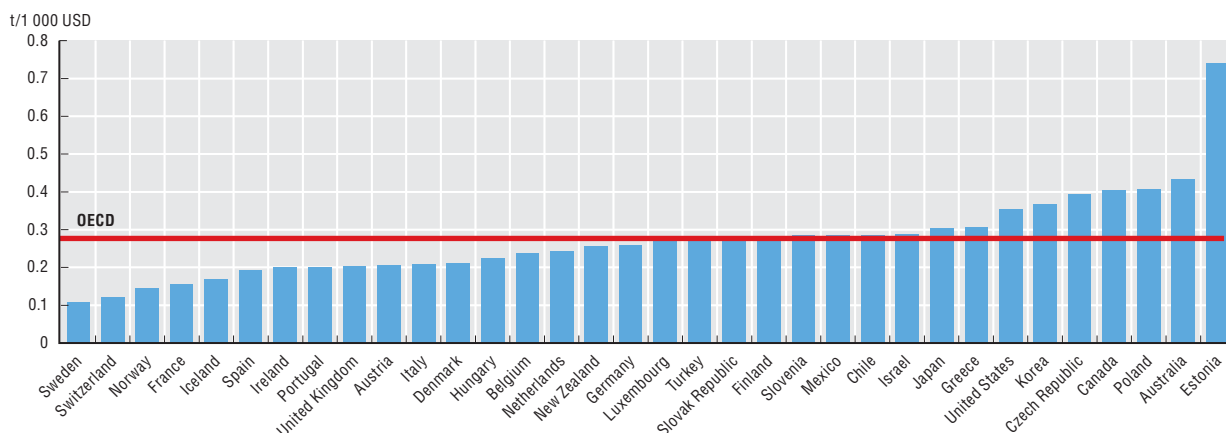
Figure 1.8. CO₂ emission levels



Source: IEA (2015), "CO₂ Emissions by Product and Flow", IEA CO₂ Emissions from Fuel Combustion Statistics (database).

StatLink <http://dx.doi.org/10.1787/888933261750>

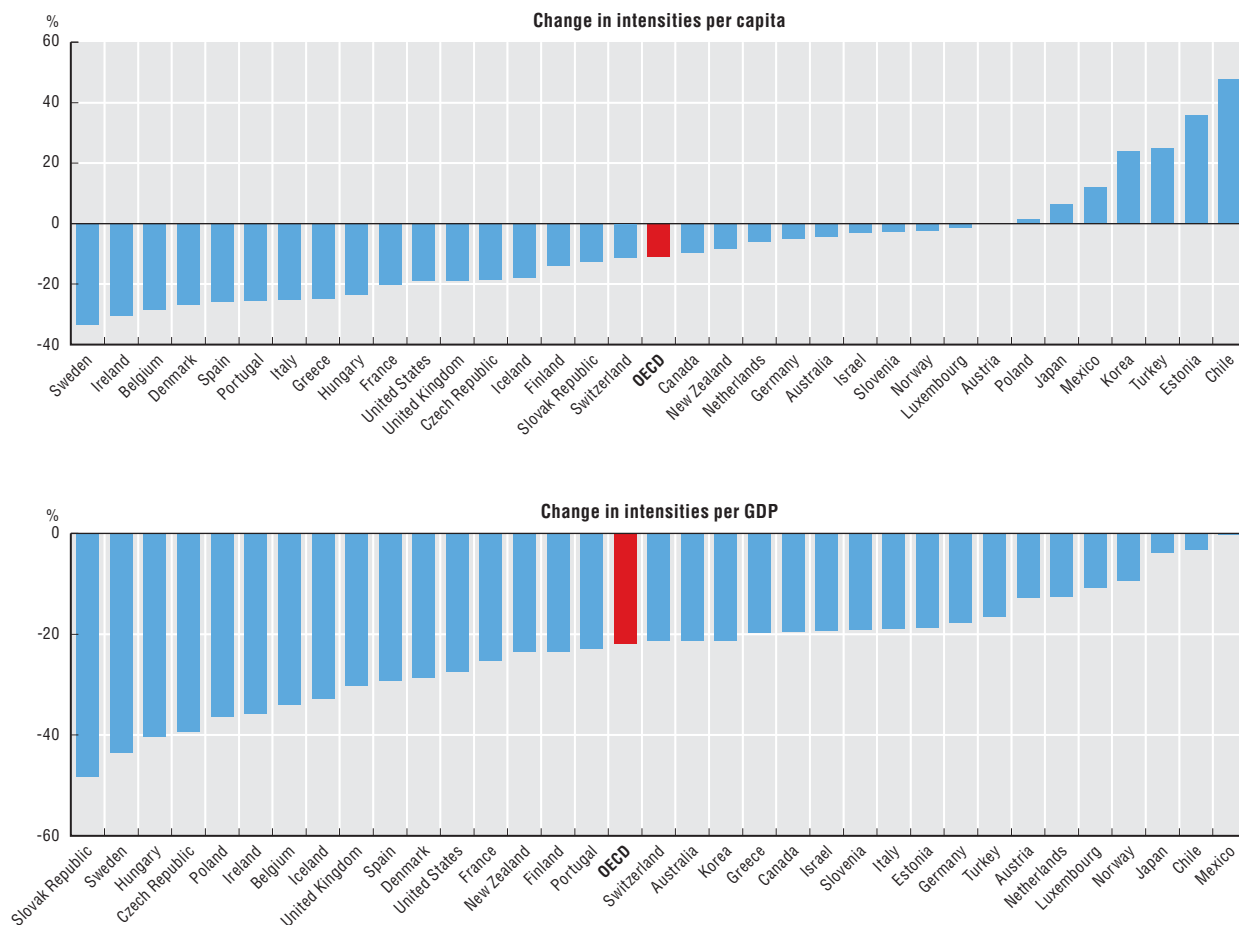
Figure 1.9. CO₂ emission intensities per GDP, 2013



Source: IEA (2015), "CO₂ Emissions by Product and Flow", IEA CO₂ Emissions from Fuel Combustion Statistics (database).

StatLink <http://dx.doi.org/10.1787/888933261763>

Figure 1.10. Change in CO₂ emission intensities, since 2000



Source: IEA (2015), "CO₂ Emissions by Product and Flow", IEA CO₂ Emissions from Fuel Combustion Statistics (database).

StatLink <http://dx.doi.org/10.1787/888933261770>



From:
Environment at a Glance 2015
OECD Indicators

Access the complete publication at:
<https://doi.org/10.1787/9789264235199-en>

Please cite this chapter as:

OECD (2015), "Carbon dioxide (CO₂) emissions", in *Environment at a Glance 2015: OECD Indicators*, OECD Publishing, Paris.

DOI: <https://doi.org/10.1787/9789264235199-5-en>

This work is published under the responsibility of the Secretary-General of the OECD. The opinions expressed and arguments employed herein do not necessarily reflect the official views of OECD member countries.

This document and any map included herein are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

You can copy, download or print OECD content for your own use, and you can include excerpts from OECD publications, databases and multimedia products in your own documents, presentations, blogs, websites and teaching materials, provided that suitable acknowledgment of OECD as source and copyright owner is given. All requests for public or commercial use and translation rights should be submitted to rights@oecd.org. Requests for permission to photocopy portions of this material for public or commercial use shall be addressed directly to the Copyright Clearance Center (CCC) at info@copyright.com or the Centre français d'exploitation du droit de copie (CFC) at contact@cfcopies.com.