Environment at a Glance 2013

OECD INDICATORS

OECD

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Preface

This report forms part of the OECD's "At a Glance" series which provides snap-shots of key policy areas based on data and indicators. It does not attempt to assess progress in tackling key environmental challenges. Nevertheless, the picture that emerges is clear: while some progress has been made to mitigate environmental pressures in OECD countries, these pressures are continuing to increase. This requires more effective policies, as well as better indicators to establish targets and to measure progress in achieving them.

The OECD has been at the forefront of international efforts to develop environmental indicators since the early 1990s and published the first international sets of environmental indicators, including the OECD Core Set of environmental indicators on which this report is largely based. In recent years, the OECD has continued to develop and refine its environmental indicators. These include indicators to help integrate environmental considerations into sectoral policies, such as energy, transport and agriculture, and to measure progress in decoupling environmental pressures from economic growth. Most recently, the OECD has developed a set of indicators to monitor progress towards green growth.

The various sets of indicators are used in OECD country environmental performance reviews, economic surveys, as well as in other policy analysis work.

The report was prepared by the OECD Secretariat, within the framework of the OECD Working Party on Environmental Information. It would not have been possible to compile the data and to prepare the report without the contributions of many individuals in member countries. It is published on the responsibility of the Secretary-General of the OECD.

Simon Upton
Director, OECD Environment Directorate

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Executive summary

Our 21st century way of life, and growing global population, have put essential environmental resources under pressure, including air, water and land, together with the animal and plant life they support. How successful are we in breaking the link between economic growth and environmental damage? The answer is a mixed picture, showing some progress in key areas such as air pollution, transport, energy, water and biodiversity protection, but not enough to safeguard our natural resources for the future.

Pressure on the environment is still increasing, but since the 1990s it has generally been at a slower pace than economic growth in OECD economies, a process known as relative decoupling.

Energy intensity – the amount of energy needed to create a unit of GDP – has fallen in OECD countries in the past two decades. The share of gas in the fuel mix rose, but overall fossil fuels continued to dominate energy supply. The share of renewable energy has remained relatively stable for the OECD at about 9% of total supply, with a slight increase in recent years. Factors underlying reduced energy intensity include structural changes in the economy, energy conservation measures and environmental policy actions, technical progress, and in some countries, the transfer abroad of energy- and resource-intensive production.

Progress in reducing energy use in per capita terms has been much slower, partly due to a 17% increase in energy demand for transport. **Road transport** continues to dominate the transport sector, resulting in additional fuel consumption and road building, affecting health and nature. Countries' efforts to promote cleaner vehicles have been largely offset by an increase in the number of vehicles on the road and increased vehicle use. Overall, transport activities remained coupled to GDP growth, and in more than one-third of OECD countries, road traffic growth rates exceed economic growth.

Material intensity – the amount of material resources needed to produce a unit of GDP – has also decreased since 1990. Material use has been relatively decoupled from economic growth in the OECD area. This is due partly to the rise of the service sector and the economic crisis, and partly to increasing imports and the displacement of resource-intensive production abroad.

Agricultural production in the OECD area grew more slowly from 2000 to 2010 than during the 1990s. At the same time, a range of agriculture-related environmental pressures decreased: greenhouse gas (GHG) emissions, water and fertiliser use, and nutrient surpluses (the potential transfer of nutrients to soil, water and air). A reduction in the level of agricultural support, particularly the most environmentally harmful types, has been an important factor in achieving this improvement.

Overall, stronger efforts are needed to make a decisive shift from relative to absolute decoupling that would reverse environmental damage, to protect the natural asset base and to improve people's environmental quality of life.

Key findings

- Overall, **greenhouse gas (GHG) emissions** are still growing worldwide, with CO_2 predominant and the main driver of the overall trend. Since 1990, **energy-related carbon dioxide (CO_2) emissions** have grown more slowly in OECD countries than they have worldwide. Today OECD countries account for less than half of world GHG emissions, but still emit far more CO_2 per capita; 10 tonnes per person compared with with 4 tonnes per person in most other regions. Many OECD countries have decoupled their carbon dioxide (CO_2) emissions from GDP growth, though decoupling remains weak, and in many countries emissions have continued to rise.
- **Sulphur oxide (SO_x) and nitrogen oxide (NO_x)** emissions have decreased significantly since 1990 for the OECD as a whole (-69% and -36% respectively). Almost all OECD countries achieved an absolute decoupling of SO_x emissions from GDP while two-thirds achieved an absolute decoupling of NO_x emissions. However, in a few OECD countries, NO_x emissions continued to grow in line with GDP, and the steady growth in road traffic. Ground-level ozone, NO_2 concentrations, fine particulates, and toxic air pollutants continue to adversely affect human health, particularly in urban areas.
- **Freshwater abstractions** have remained generally stable in the OECD area since the 1990s, despite increasing demand for water from a range of sources. This is due to more efficient use and better pricing policies, but also to greater exploitation of alternative water sources such as re-used and desalinated water. Many OECD countries have achieved a relative decoupling of water abstractions from GDP growth, but results vary within and among countries.
- **Sewage treatment infrastructure** has significantly expanded; the share of the OECD population connected to a municipal wastewater treatment plant rose from about 60% in the early 1990s to almost 80% in 2010. A key challenge to further expansion of waste water treatment in some countries is finding other ways of serving small or isolated settlements. Many countries are facing increasing costs because of the need to maintain and upgrade ageing water supply and sanitation networks.
- The **area of protected land** has grown in almost all OECD countries to reach some 11% of the total. However, these areas are not always representative of national biodiversity, nor sufficiently connected. Threats to **biodiversity** are increasing, particularly from land use change and infrastructure development; many natural ecosystems have been degraded and many **animal and plant species** in OECD countries are endangered. Threat levels are particularly high in countries with a high population density.
- **Forest areas** have remained relatively stable at around 30% of the land area in the OECD. Most OECD countries present a picture of sustainable use of their forest resources in quantitative terms. There are however important variations within countries and many forests are threatened by degradation, fragmentation and conversion to other land types. Increased demand for wood to reach renewable energy targets is playing an increasingly important role in the commercial exploitation of forests.
- **Municipal waste** generated in the OECD area increased by 19% in the 1990s, but this rise slowed in the early 2000s. Today a person living in the OECD area generates on average 530 kg of waste per year; this is 30 kg more than in 1990, but 30 kg less than in 2000. OECD countries increasingly divert waste from landfills and incinerators and feed it back into the economy through recycling. Landfill nonetheless remains the major disposal method in many OECD countries.

Framework of OECD work on environmental data and indicators

Environment at a Glance presents selected environmental indicators. The report shows the progress that OECD countries have made since the 1990s in addressing a range of environmental challenges. These include air and water pollution, waste management, and the protection of biodiversity and other natural assets.

The indicators in this report are those that are regularly used in the OECD's work and for which data are available for a majority of OECD countries.

For more than 30 years, the OECD has prepared harmonised international data and sets of indicators on the environment, assisted countries to improve their environmental information systems. The main aims of this work have been to:

- Measure environmental progress and performance.
- Monitor and promote policy integration, in particular, the integration of environmental considerations into policy sectors, such as transport, energy and agriculture, and into economic policies more broadly.
- Help monitor progress towards sustainable development and green growth by measuring the extent of decoupling of environmental pressure from economic growth.

The OECD approach to indicators is based on the view that:

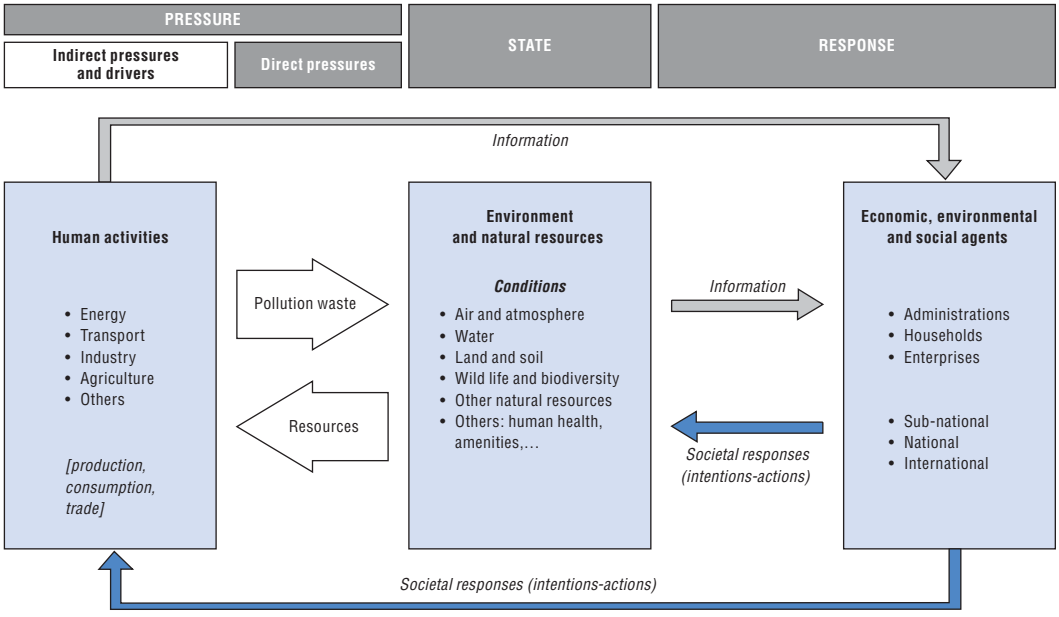
- There is no unique set of indicators; whether a given set of indicators is appropriate depends on its use.
- Indicators are only one tool among others and generally should be used with other information in order to draw robust conclusions.
- OECD environmental indicators are relatively small sets of indicators that have been identified for use at the international level, and should be complemented by national indicators when examining issues at national level.

The programme builds on agreement by OECD member countries to:

- Use the pressure-state-response (PSR) model as a common reference framework.
- Identify indicators on the basis of their policy relevance, analytical soundness and measurability.
- Use the OECD approach and adapt it to their national circumstances.

The development of environmental indicators in OECD has been grounded in the practical experience of OECD countries. Their development has benefited from strong support from member countries, and their representatives in the OECD Working Party on Environmental Information. OECD work on indicators also benefits from close co-operation with other international organisations, notably the United Nations Statistics Division (UNSD) and United Nations regional offices, the United Nations Environment programme (UNEP), the World Bank, the European Union (including Eurostat and the European Environment Agency), as well as international institutes.

The OECD Pressure-State-Response model



Reader's guide

The indicators in this report build on data provided regularly by member countries' authorities using an OECD questionnaire, and on data available from other OECD and international sources. Some indicators were updated on the basis of international information available in April 2013 and on the basis of comments from national delegates received by February 2013. Nevertheless, due to delays in the production of environmental data in most countries, the most recent data for many of the parametres examined in this report is 2010.

Comparability and interpretation

Each indicator presented in the report is preceded by a short text that explains in general terms what is measured and why, and by a description of the concept and definitions underlying the indicator. This is followed by a brief description of the main trends that can be observed. A paragraph on comparability highlights those areas where some caution may be needed when comparing indicators across countries or over time. Issues that cut across the subject areas are described below. Two annexes provide additional information and country notes.

The indicators presented here are of varying relevance for different countries and should be interpreted taking account of the context in which they were produced. It should be borne in mind that national averages can mask significant variations *within* countries. In addition, care should be taken when making international comparisons:

- Definitions and measurement methods vary among countries, hence inter-country comparisons may not compare the same things.
- There is a level of uncertainty associated with the data sources and measurement methods on which the indicators rely. Differences between two countries' indicators are thus not always statistically significant; and when countries are clustered around a relatively narrow range of outcomes, it may be misleading to establish an order of ranking.

No single approach has been used for normalising the indicators; different denominators are used in parallel to balance the message conveyed. Many of the indicators shown in this publication are expressed on a per capita and per unit of GDP basis:

- The population estimates used are based on the SNA notion of residency: namely they include persons who are resident in a country for one year or more, regardless of their citizenship. The data generally refer to mid-year estimates, and come from the OECD Annual Labour Force Statistics (ALFS): OECD (2012), "Labour Force Statistics: Summary tables", *OECD Employment and Labour Market Statistics* (database), *http://dx.doi.org/10.1787/data-00286-en*.

- The GDP figures used are expressed in USD and in 2005 prices and purchasing power parities (PPPs). PPPs are the rates of currency conversion that equalise the purchasing power of different countries by eliminating differences in price levels between countries. When converted by means of PPPs, expenditures on GDP across countries are expressed at the same set of prices, enabling comparisons between countries that reflect only differences in the volume of goods and services purchased.
- The data for OECD countries come from the *OECD Economic Outlook* (OECD, 2012), "OECD Economic Outlook No. 91", *OECD Economic Outlook: Statistics and Projections* (database), *http://dx.doi.org/10.1787/data-00606-en*; and the *OECD National Accounts Statistics* (database). The data for the BRIICS come from the World Bank (World Development Indicators; The World Bank; Washington, DC).

Online data

A database with selected environmental data and indicators is available on line and contains longer time series than the publication: *http://stats.oecd.org/Index.aspx*. The following is a list of the datasets which are available:

- Greenhouse gas (GHG) emissions: *http://dx.doi.org/10.1787/data-00594-en*.
- Emissions of air pollutants: *http://dx.doi.org/10.1787/data-00598-en*.
- CO_2 emissions from fuel combustion: *http://dx.doi.org/10.1787/co2-table-2012-1-en*.
- Threatened species: *http://dx.doi.org/10.1787/data-00605-en*.
- Forest resources: *http://dx.doi.org/10.1787/data-00600-en*.
- Municipal waste: *http://dx.doi.org/10.1787/data-00601-en*.
- Freshwater abstractions: *http://dx.doi.org/10.1787/data-00602-en*.
- Freshwater resources: *http://dx.doi.org/10.1787/data-00603-en*.
- Wastewater treatment: *http://dx.doi.org/10.1787/data-00604-en*.

Website

OECD Environment statistics and indicators: *www.oecd.org/env/indicators*.

Further reading

Useful references for "further reading" are available at the bottom of most sections.

For all sections, additional information can be found in:

- OECD (2014), *Green Growth Indicators*, OECD Green Growth Studies, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264202030-en*.
- OECD (2013), *OECD Factbook 2013: Economic, Environmental and Social Statistics*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/factbook-2013-en*.
- OECD (2012), *OECD Environmental Outlook to 2050: The Consequences of Inaction*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264122246-en*.
- OECD (2012), "Review of the OECD Environmental Strategy for the First Decade of the 21st Century", OECD, Paris, *www.oecd.org/env/50032165.pdf*.

Acronyms and abbreviations

Signs

The following signs are used in figures and tables:

..: Not available.

0: Nil or negligible.

.: Decimal point.

x: Not applicable.

Country aggregates

OECD Europe	This zone includes all European member countries of the OECD, i.e. Austria, Belgium, the Czech Republic, Denmark, Estonia,[1] Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, the Slovak Republic, Slovenia,[1] Spain, Sweden, Switzerland, Turkey and the United Kingdom.
OECD	This zone includes all member countries of the OECD, i.e. countries of OECD Europe plus Australia, Canada, Chile,[1] Israel,[1] Japan, Mexico, New Zealand, Korea and the United States.
BRIICS	Brazil, the Russian Federation, India, Indonesia, China, South Africa.

Country aggregates may include Secretariat estimates.

1. Chile has been a member of the OECD since 7 May 2010, Slovenia since 21 July 2010, Estonia since 9 December 2010 and Israel since 7 September 2010.

Country codes

AUS	Australia	FRA	France	NLD	Netherlands
AUT	Austria	GBR	United Kingdom	NZL	New Zealand
BEL	Belgium	GRC	Greece	NOR	Norway
CAN	Canada	HUN	Hungary	POL	Poland
CHE	Switzerland	ISL	Iceland	PRT	Portugal
CHL	Chile	IRL	Ireland	SVK	Slovak Republic
CZE	Czech Republic	ITA	Italy	SVN	Slovenia
DEU	Germany	ISR	Israel	SWE	Sweden
DNK	Denmark	JPN	Japan	TUR	Turkey
ESP	Spain	KOR	Korea	USA	United States
EST	Estonia	LUX	Luxembourg		
FIN	Finland	MEX	Mexico	EU	European Union

Abbreviations

cap	Capita
CBD	Convention on Biological Diversity
CFCs	Chlorofluorocarbons
CF_4	Tetrafluorocarbon
C_2F_6	Hexafluoroethane
CH_4	Methane
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CO_2	Carbon dioxide
CO_2 eq	Carbon dioxide equivalent
DAC	Development Assistance Committee, OECD
DEU	Domestic extraction used
DMC	Domestic material consumption
EEA	European Environment Agency
EU	European Union
FAO	Food and Agriculture Organisation of the UN
GBAORD	Government budget appropriations on R&D
GDP	Gross domestic product
GHG	Greenhouse gas
GNI	Gross national income
ICES	International Council for the Exploration of the Sea
IEA	International Energy Agency
IMO	International Maritime Organization
IPCC	Intergovernmental Panel on Climate Change
ISIC	International Standard Industrial Classification
IUCN	International Union for Conservation of Nature
IUU	Illegal, unreported and unregulated (fishing)
MFA	Material flow analysis
MFAcc	Material flow accounts
MJ	Megajoule
Mt	Million tonnes
Mtoe	Million tonnes of oil equivalent
MWh	Megawatt-hour
N	Nitrogen
NO_x	Nitrogen oxides
ODA	Official development assistance
ODS	Ozone-depleting substance
OSPAR	Convention for the Protection of the Marine Environment of the East Atlantic
P	Phosphorous
PCT	Patent Cooperation Treaty
PM	Particulate matter
PPP	Purchasing power parities
REDD	Reducing Emissions from Deforestation and Degradation
SF_6	Sulphur hexafluoride
SO_x	Sulphur oxides
t	Tonnes
TPES	Total primary energy supply
Toe	Tonnes of oil equivalent
UNECE	UN Economic Commission for Europe

UNEP	UN Environment Programme
UNFCCC	UN Framework Convention on Climate Change
UNSD	UN Statistics Division
USD	US dollar
WCMC	World Conservation Monitoring Centre, UNEP
WMO	World Meteorological Organization

1. ENVIRONMENTAL TRENDS

Greenhouse gas (GHG) emissions

Carbon dioxide (CO_2) emissions

Sulphur oxides (SO_x) and nitrogen oxides (NO_x) emissions

Particulate emissions and population exposure

Use of freshwater resources

Water pricing for public supply

Wastewater treatment

Biological diversity

Use of forest resources

Use of fish resources

Municipal waste

Industrial and hazardous waste

Use of material resources

Greenhouse gas (GHG) emissions

Emissions of greenhouses gases (GHG) from human activities disturb the radiative energy balance of the earth-atmosphere system. They exacerbate the natural greenhouse effect, leading to temperature changes and other consequences for the earth's climate. Land use changes and forestry also play a role by altering the amount of greenhouse gases captured or released by carbon sinks.

Climate change is of concern mainly as regards its impact on ecosystems (biodiversity), human settlements and agriculture, and on the frequency and scale of extreme weather events. It could have significant consequences for human well-being and socio-economic activities, which could in turn affect global economic output.

Definition

The indicators presented here refer to the sum of emissions of six GHGs that have direct effects on climate change and are considered responsible for a major part of global warming: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), chlorofluorocarbons (CFCs), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6).

They show total gross emissions expressed in CO_2 equivalents as well as emission intensities per unit of GDP and per capita, and related changes since 1990. They refer to GHG emitted within the national territory and exclude CO_2 emissions and removals from land use change and forestry. They do not cover international transactions of emission reduction units or certified emission reductions.

Overview

GHG emissions are still growing in many countries and overall, although at a slightly lower pace than CO_2 emissions from energy use. CO_2 remains predominant and determines the overall trend. Together with CH_4 and N_2O, it accounts for about 98% of GHG emissions. The other gases account for about 2%, but their emissions are growing.

- Global GHG emissions have doubled since the early 1970s, driven mainly by economic growth and increasing fossil energy use in developing countries. Historically, OECD countries emitted the bulk of GHGs, but the share of the BRIICS in global emissions has increased to 40%, from 30% in the 1970s (OECD, 2012).
- Individual OECD countries' contributions to the additional greenhouse effect, and their rates of progress, vary significantly. These differences partly reflect different national circumstances, such as composition and rate of economic growth, population growth, energy resource endowment, and the extent to which the countries have taken steps to reduce emissions from various sources.
- Emission intensities per unit of GDP and per capita are decreasing in most OECD countries, though decoupling remains weak. Many countries have not succeeded in meeting their commitments under the Kyoto Protocol.

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

The OECD Environmental Outlook projects that global CO_2 and other GHG emissions will continue to grow over the next few decades. GHG emissions could increase by another 50% by 2050, primarily driven by a projected 70% growth in CO_2 emissions from energy use.

See Annex A for decoupling trends.

Comparability

These indicators should be read in conjunction with indicators on CO_2 emissions, energy intensity, and energy prices and taxes. Their interpretation should take into account the structure of countries' energy supply and climatic factors.

Data on GHG emissions are reported annually to the Secretariat of the UNFCCC with 1990 as a base year but not by all OECD countries. They display a good level of comparability. 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.

Latest year available: years prior to 2006 were not considered. The OECD total does not include Israel.

For additional notes, see Annex B.

Sources

OECD Environment Statistics (database), *http://dx.doi.org/10.1787/data-00594-en*.

UNFCCC, *Greenhouse Gas Inventory Data* (2012), *http://unfccc.int/ghg_data/items/3800.php*.

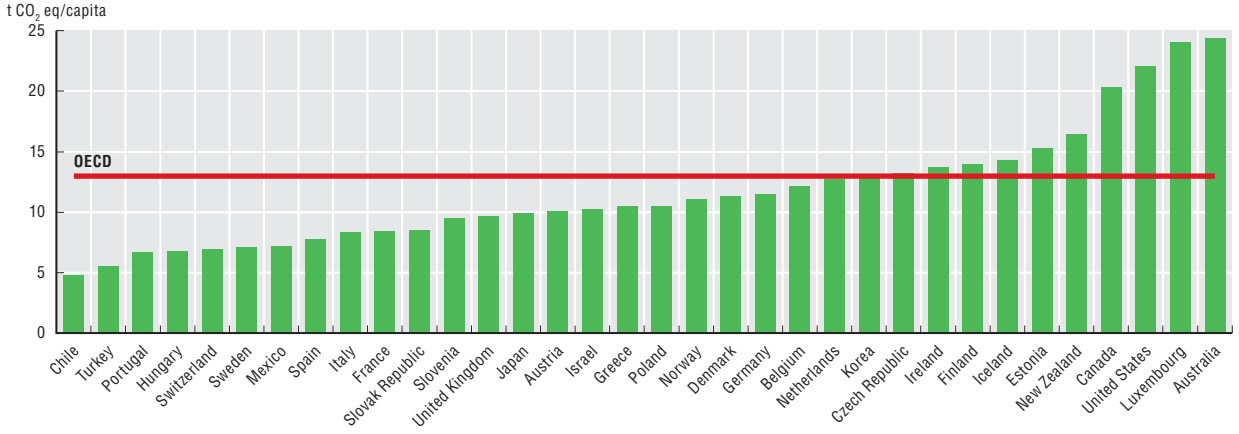
Further information

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

OECD (2012b), "Review of the OECD Environmental Strategy for the First Decade of the 21st Century", OECD, Paris, *www.oecd.org/env/50032165.pdf*.

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

Figure 1.1. **Greenhouse gas (GHG) emission intensities per capita, 2010**



Source: OECD Environment Statistics (database); UNFCCC, *Greenhouse Gas Inventory Data* (2012).

StatLink http://dx.doi.org/10.1787/888932976650

Table 1.1. **Greenhouse gas (GHG) emission intensities**

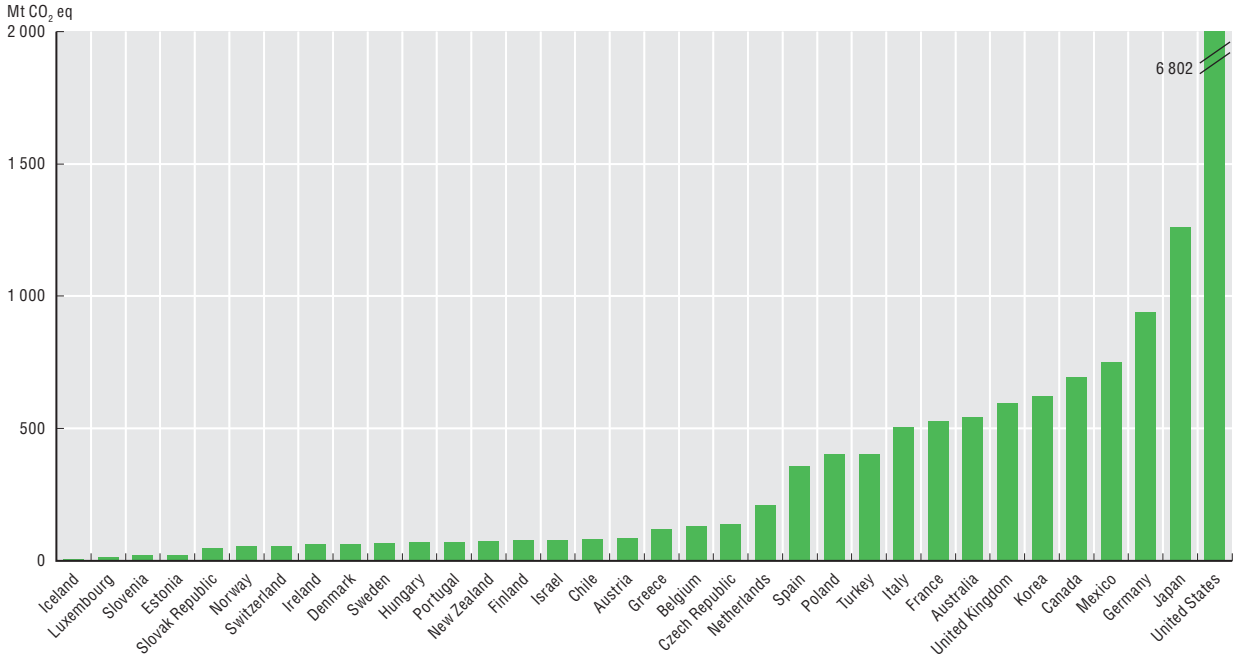
	Total GHG emissions		GHG emission intensities				GDP
	Million tonnes CO_2 equivalent	% change	Per unit of GDP		Per capita		% change
			t/1 000 USD	% change	t/cap	% change	
	2010	1990-2010	2010	1990-2010	2010	1990-2010	1990-2010
Australia	543	30	0.69	-31	24	-1	89
Austria	85	8	0.29	-27	10	0	49
Belgium	132	-8	0.37	-35	12	-15	43
Canada	692	17	0.58	-27	20	-5	61
Chile[1]	79	92	0.37	-32	5	35	182
Czech Republic	139	-29	0.56	-59	13	-30	73
Denmark	63	-11	0.35	-35	11	-17	37
Estonia	21	-50	0.92	-70	15	-41	67
Finland	75	6	0.44	-27	14	-1	44
France	528	-6	0.27	-31	8	-15	36
Germany	937	-25	0.34	-41	11	-27	28
Greece	118	13	0.43	-27	10	1	55
Hungary	68	-30	0.40	-51	7	-28	42
Iceland	5	30	0.44	-19	14	4	59
Ireland	61	11	0.38	-55	14	-13	146
Israel	76	..	0.39	..	10	..	141
Italy	501	-3	0.31	-21	8	-9	22
Japan	1 258	-1	0.32	-18	10	-3	20
Korea[1]	620	128	0.51	-22	13	79	183
Luxembourg	12	-6	0.35	-56	24	-28	114
Mexico	748	33	0.53	-19	7	7	65
Netherlands	210	-1	0.34	-37	13	-11	56
New Zealand	72	20	0.65	-30	16	-8	72
Norway	54	8	0.24	-35	11	-6	67
Poland	401	-12	0.61	-59	10	-13	112
Portugal	71	18	0.31	-18	7	11	43
Slovak Republic	46	-36	0.42	-71	9	-37	118
Slovenia	20	6	0.38	-42	10	3	83
Spain	356	26	0.29	-22	8	6	62
Sweden	66	-9	0.21	-40	7	-17	51
Switzerland	54	2	0.18	-22	7	-12	31
Turkey	402	115	0.44	3	6	62	110
United Kingdom	594	-23	0.29	-49	10	-28	53
United States	6 802	10	0.52	-32	22	-11	63
OECD[1]	**15 917**	**7**	**0.43**	**-30**	**13**	**-7**	**54**

1. See Annex B for country notes.

Source: OECD Environment Statistics (database); UNFCCC, *Greenhouse Gas Inventory Data* (2012).

StatLink http://dx.doi.org/10.1787/888932978094

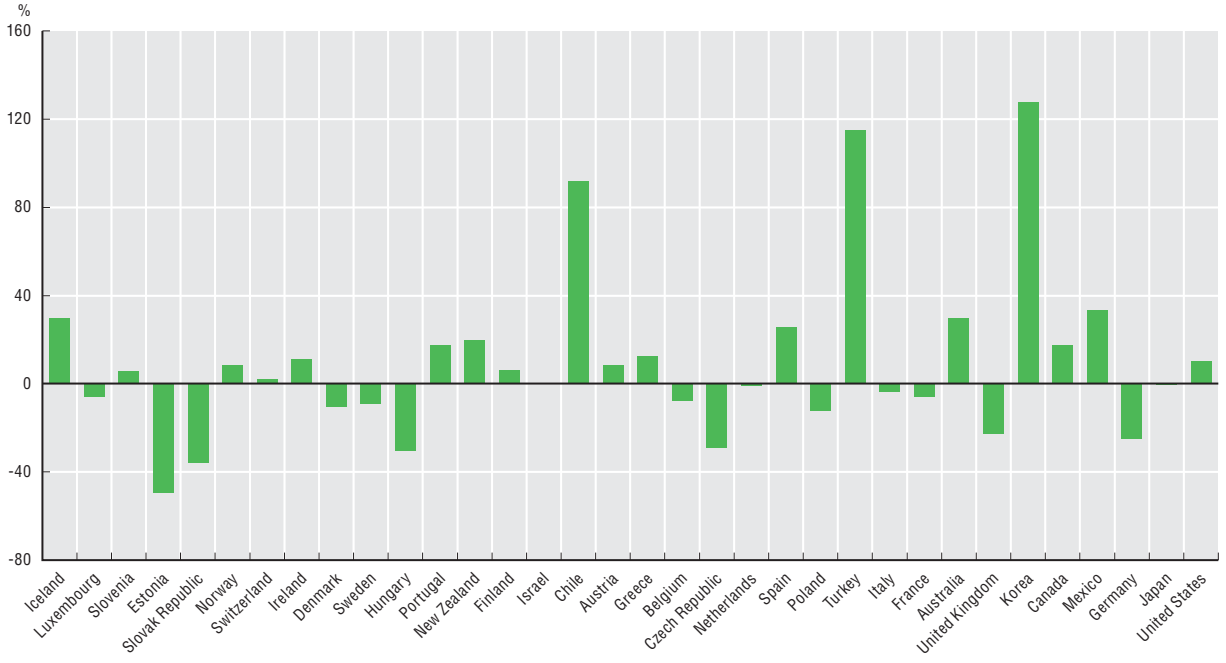
Figure 1.2. **Greenhouse gas (GHG) emission levels, 2010**



Source: OECD Environment Statistics (database); UNFCCC, *Greenhouse Gas Inventory Data* (2012).

StatLink http://dx.doi.org/10.1787/888932976669

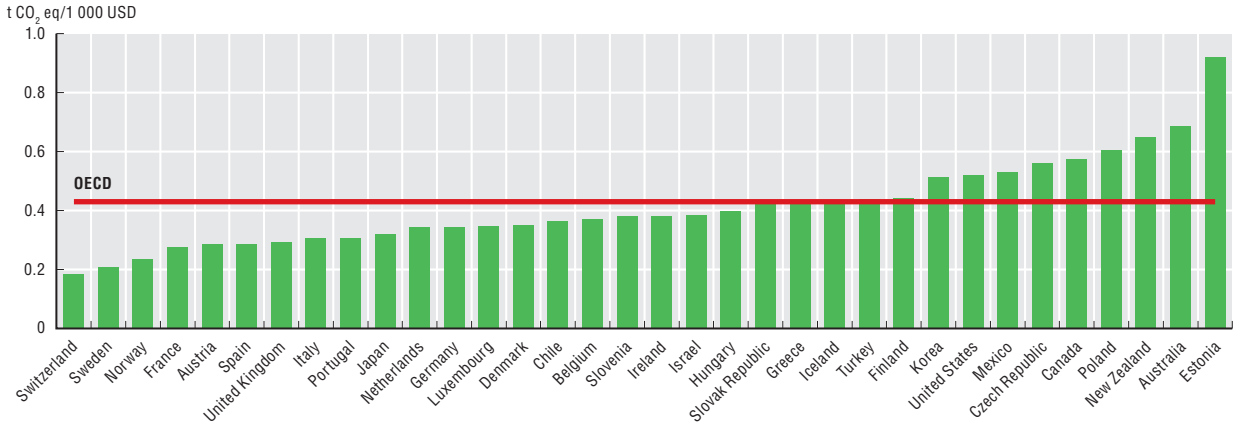
Figure 1.3. **Change in greenhouse gas (GHG) emissions, since 1990**



Source: OECD Environment Statistics (database); UNFCCC, *Greenhouse Gas Inventory Data* (2012).

StatLink http://dx.doi.org/10.1787/888932976688

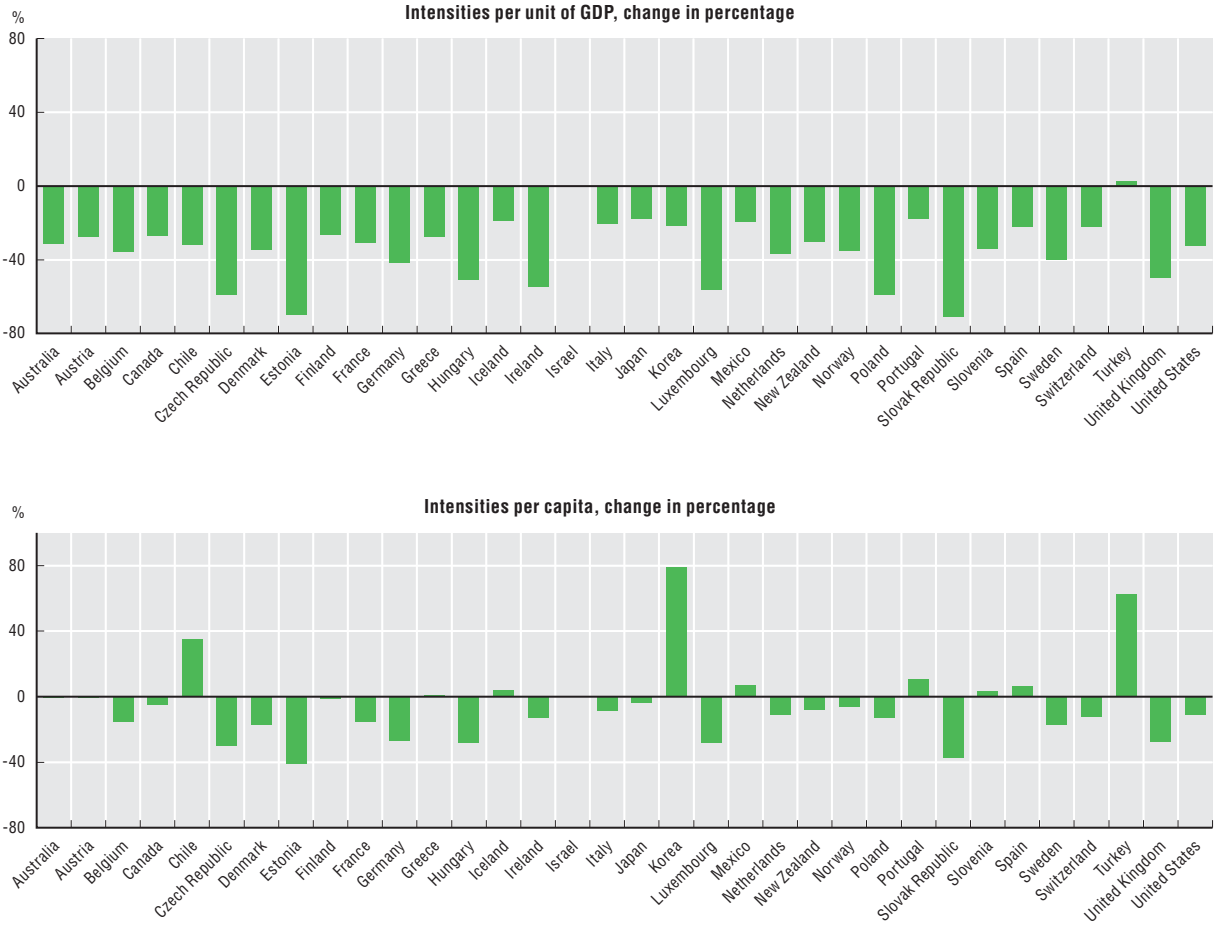
Figure 1.4. **Greenhouse gas (GHG) emission intensities per unit of GDP, 2010**



Source: OECD Environment Statistics (database); UNFCCC, *Greenhouse Gas Inventory Data* (2012).

StatLink http://dx.doi.org/10.1787/888932976707

Figure 1.5. **Change in greenhouse gas (GHG) emission intensities, since 1990**



Source: OECD Environment Statistics (database); UNFCCC, *Greenhouse Gas Inventory Data* (2012).

StatLink http://dx.doi.org/10.1787/888932976726

Carbon dioxide (CO_2) emissions

Carbon dioxide (CO_2) 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.

Definition

The indicators presented here refer to gross direct emissions of CO_2 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 since 1990.

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

CO_2 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 prices and taxes, and atmospheric concentrations of GHGs. Its interpretation should take into account the structure of countries' energy supply and the relative importance of renewable energy, as well as climatic factors.

Overview

CO_2 emissions from energy use are still growing in many countries and worldwide, mainly due to increases in the transport and the energy transformation sectors. In 2010 global energy-related CO_2 emissions accounted for around 75% of global GHG emissions, with fossil fuel combustion representing two-thirds of global CO_2 emissions.

Since 1990, energy-related CO_2 emissions have grown more slowly in OECD countries as a group than they have worldwide.

Today, OECD countries emit less than half the world's CO_2 emissions from energy use.

On a per capita basis, OECD countries still emit far more CO_2 than most other world regions, with 10 tonnes of CO_2 emitted per capita on average in OECD countries in 2009, compared to 4 tonnes in the rest of the world.

Individual OECD countries' rates of progress towards stabilisation vary significantly, regardless of whether they are considered in absolute numbers, per capita amounts or per unit of GDP.

CO_2 emissions from energy use continue to grow, particularly in the OECD Asia-Pacific region and in the Americas (see list of acronyms and abbreviations). This can be partly attributed to energy production and consumption patterns and trends, often combined with relatively low energy prices.

In OECD Europe, CO_2 emissions from energy use have stayed more or less stable due to changes in economic structures and the energy supply mix, energy savings, implementation of policies and, in some countries, decreases in economic activity over the period.

Overall OECD CO_2 emissions have grown at a lower rate than GDP (relative decoupling). This is due to structural changes in industry and energy supply and improvements in energy efficiency in production processes. In about one-third of OECD countries, emissions have decreased absolutely (absolute decoupling) since 2000.

Reductions in national emissions can 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.

See Annex A for CO_2 emissions and decoupling trends.

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.

Source

IEA (2012), *CO_2 Emissions from Fuel Combustion 2012*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/co2_fuel-2012-en*.

Further information

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

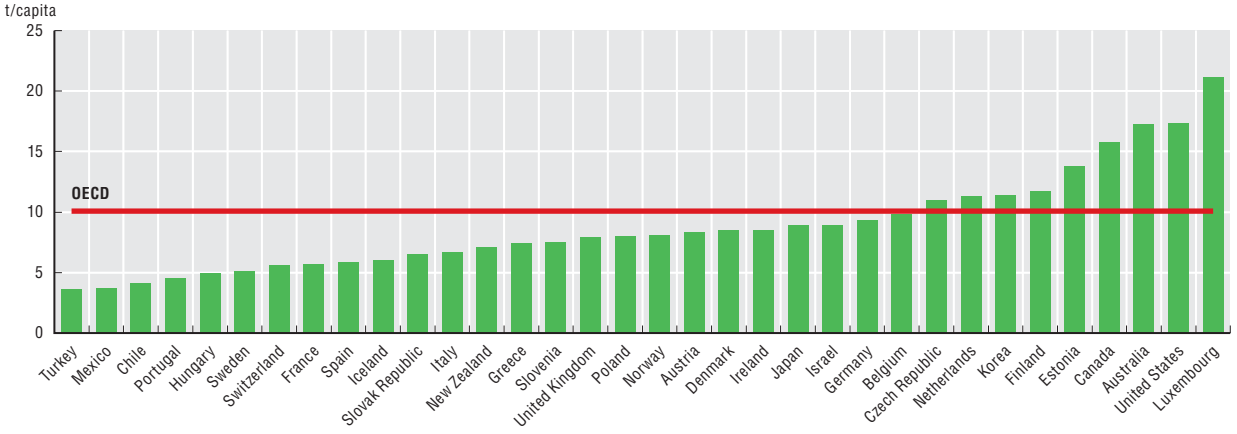
OECD (2012b), "Review of the OECD Environmental Strategy for the First Decade of the 21st Century", OECD, Paris, *www.oecd.org/env/50032165.pdf*.

OECD (2011), *OECD Regions at a Glance 2011*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/reg_glance-2011-en*.

WMO, UNEP, OECD and IEA (1996), Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, IPCC/OECD/IEA, Paris.

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

Figure 1.6. **Carbon dioxide (CO_2) emission intensities per capita, 2010**



Source: IEA, *CO_2 Emissions from Fuel Combustion* (2012) (database).

StatLink http://dx.doi.org/10.1787/888932976745

Table 1.2. **Carbon dioxide (CO_2) emissions from energy use**

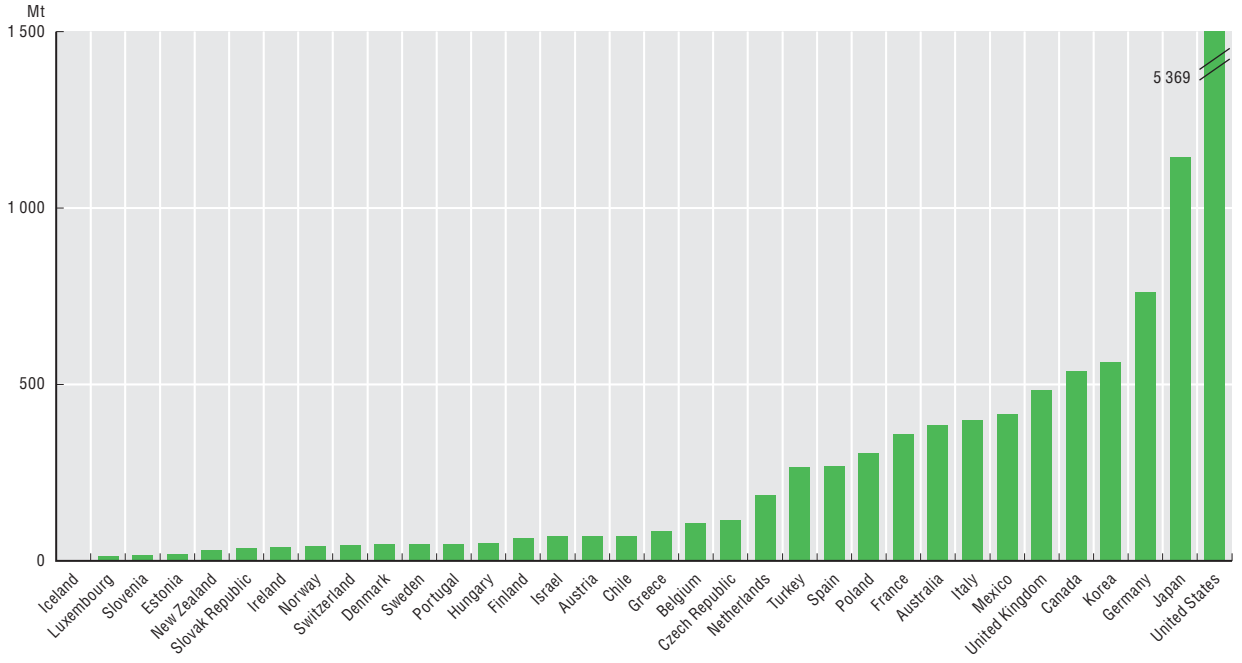
	CO_2 emissions from energy use							GDP
	Total			Intensities per unit of GDP		Intensities per capita		% change
	Million tonnes	% change	% change	t/1 000 USD	% change	t/cap	% change	
	2010	1980-2010	1990-2010	2010	1990-2010	2010	1990-2010	1990-2010
Australia	383	84	47	0.50	-20	17	15	89
Austria	69	25	23	0.24	-15	8	13	49
Belgium	106	-15	-1	0.30	-29	10	-9	43
Canada	537	26	24	0.46	-20	16	2	61
Chile	70	229	125	0.32	-10	4	80	182
Czech Republic	114	-31	-26	0.47	-56	11	-27	73
Denmark	47	-25	-7	0.27	-31	9	-13	37
Estonia	18	..	-49	0.85	-69	14	-40	67
Finland	63	14	16	0.39	-17	12	8	44
France	358	-22	2	0.19	-24	6	-8	36
Germany	762	-28	-20	0.29	-35	9	-22	28
Greece	84	86	20	0.30	-25	7	8	55
Hungary	49	-42	-26	0.29	-47	5	-24	42
Iceland	2	10	2	0.18	-38	6	-18	59
Ireland	39	49	30	0.24	-47	9	2	146
Israel	68	247	103	0.36	-12	9	26	141
Italy	398	11	0	0.25	-16	7	-5	22
Japan	1 143	30	7	0.30	-7	9	4	20
Korea	563	353	146	0.46	-5	12	117	183
Luxembourg	11	-11	2	0.31	-51	21	-21	114
Mexico	417	97	57	0.31	1	4	23	65
Netherlands	187	12	20	0.31	-22	11	9	56
New Zealand	31	88	32	0.29	-21	7	3	72
Norway	39	40	38	0.17	-17	8	22	67
Poland	305	-26	-11	0.48	-56	8	-11	112
Portugal	48	102	23	0.21	-13	5	15	43
Slovak Republic	35	-37	-38	0.33	-71	6	-40	118
Slovenia	15	..	23	0.30	-22	8	20	83
Spain	268	43	31	0.22	-19	6	11	62
Sweden	48	-35	-10	0.16	-37	5	-17	51
Switzerland	44	12	6	0.15	-17	6	-8	31
Turkey	266	275	110	0.32	9	4	60	110
United Kingdom	484	-15	-12	0.24	-41	8	-17	53
United States	5 369	15	10	0.42	-30	18	-10	63
OECD	**12 440**	**..**	**12**	**0.35**	**-25**	**10**	**-3**	**54**
World	30 276	68	44	0.44	-24	4	12	88

Source: IEA, *CO_2 Emissions from Fuel Combustion* (2012) (database).

StatLink http://dx.doi.org/10.1787/888932978113

Carbon dioxide (CO_2) emissions

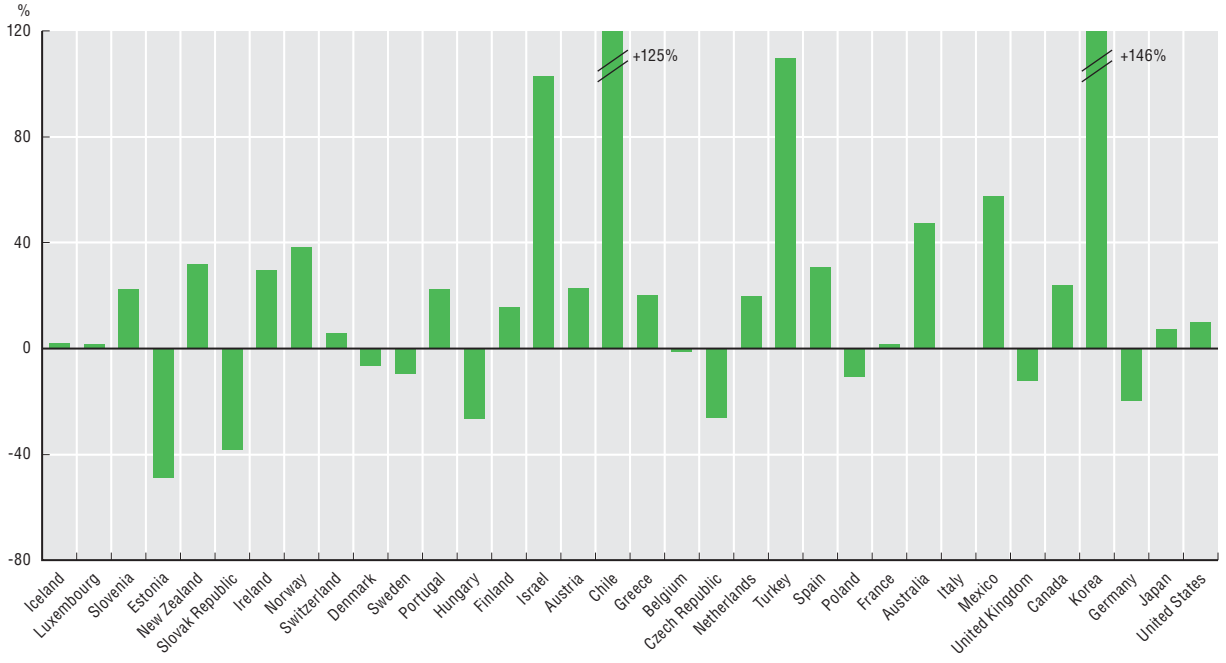
Figure 1.7. **Carbon dioxide (CO_2) emission levels, 2010**



Source: IEA, *CO_2 Emissions from Fuel Combustion* (2012) (database).

StatLink http://dx.doi.org/10.1787/888932976764

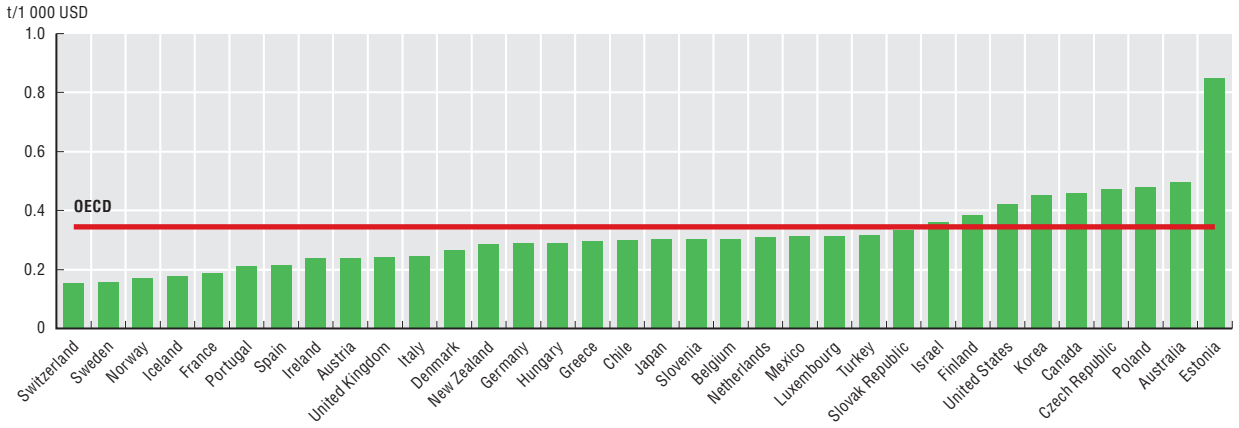
Figure 1.8. **Change in carbon dioxide (CO_2) emissions, since 1990**



Source: IEA, *CO_2 Emissions from Fuel Combustion* (2012) (database).

StatLink http://dx.doi.org/10.1787/888932976783

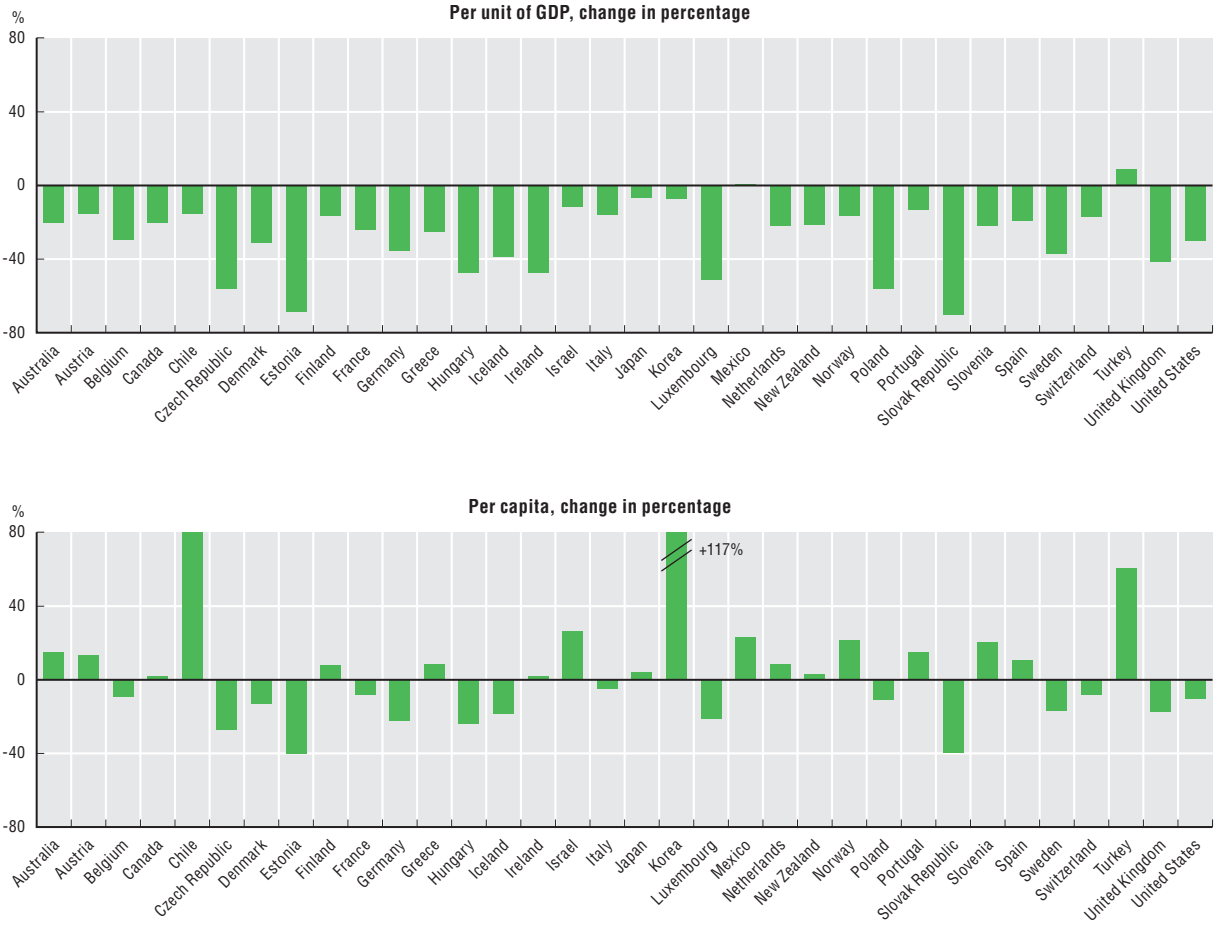
Figure 1.9. **Carbon dioxide (CO_2) emission intensities per unit of GDP, 2010**



Source: IEA, *CO_2 Emissions from Fuel Combustion* (2012) (database).

StatLink http://dx.doi.org/10.1787/888932976802

Figure 1.10. **Change in carbon dioxide (CO_2) emission intensities, since 1990**



Source: IEA, *CO_2 Emissions from Fuel Combustion* (2012) (database).

StatLink http://dx.doi.org/10.1787/888932976821

Sulphur oxides (SO_x) and nitrogen oxides (NO_x) emissions

Atmospheric pollutants from energy transformation and energy consumption, but also from industrial processes, are the main contributors to regional and local air pollution. Major concerns relate to their effects on human health and ecosystems.

In the atmosphere, emissions of sulphur and nitrogen compounds are transformed into acidifying substances such as sulphuric and nitric acid. When these substances reach the ground, acidification of soil, water and buildings arises. Soil acidification is one important factor causing forest damage; acidification of the aquatic environment may severely impair the life of plant and animal species.

Nitrogen oxides (NO_x) also contribute to ground-level ozone formation and are responsible for eutrophication, reduction in water quality and species richness. They are associated with adverse affects on human health as high concentrations cause respiratory illnesses.

Definition

The indicators presented here refer to total emissions from human activities of sulphur oxides (SO_x) and nitrogen oxides (NO_x), given as quantities of SO_2 and NO_2. They show changes in emissions over time, as well as emission intensities per unit of GDP and per capita.

It should be kept in mind that SO_x and NO_x emissions provide only a partial view of air pollution problems. They should be supplemented with information on the acidity of rain and snow in selected regions, and the excedance of critical loads in soil and water, which reflect the actual acidification of the environment.

Overview

Compared to 1990, SO_x emissions have decreased significantly for the OECD as a whole as a combined result of structural changes in the economy, changes in energy demand through energy savings and fuel substitution, pollution control policies and technical progress.

SO_x emission intensities per capita and per unit of GDP show significant variation among OECD countries. A strong decoupling of emissions from GDP is seen in many countries.

The Gothenburg Protocol, adopted in Europe and North America to reduce acid precipitation even further, has been in force since May 2005. Most countries reached the goal they fixed for 2010; some countries (mainly in Northern and Eastern Europe) reached the goal early.

NO_x emissions have decreased in the OECD overall since 1990, but less than SO_x emissions. Major progress in the early 1990s, particularly in OECD Europe, reflects changes in energy demand, pollution control policies and technical progress. However, these results have not compensated in all countries for steady growth in road traffic, fossil fuel use and other activities generating NO_x.

Several countries attained the emission ceilings of the Gothenburg Protocol for 2010, but other countries had difficulties in doing so.

Emission intensities per capita and per unit of GDP show significant variations among OECD countries. Two-thirds of the countries have achieved a strong decoupling from economic growth since the 1990s; in a few countries emissions continue to grow in line with GDP.

Despite large reductions SO_x and NO_x emissions and subsequent improvements in air quality, acid deposition remains a concern, in particular in North America, and more needs to be done to assure the recovery of aquatic and terrestrial ecosystems.

See Annex A for decoupling trends and emission structure.

Comparability

International data on SO_x and NO_x emissions are available for almost all OECD countries. The details of estimation methods for emissions such as emission factors and reliability, extent of sources and pollutants included in estimation, etc., may differ from one country to another.

The high emission levels of SO_x for Iceland are due to SO_x emissions from geothermal energy which represented 77% of total emissions in 2010.

OECD totals do not include Chile and Mexico.

For additional notes, see Annex B.

Sources

OECD Environment Statistics (database), *http://dx.doi.org/10.1787/data-00598-en*.

UNFCCC, "National Inventory Submissions 2012", *National Reports*, *http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/6598.php*.

European Monitoring and Evaluation Programme (EMEP) (2012), *www.emep.int/*.

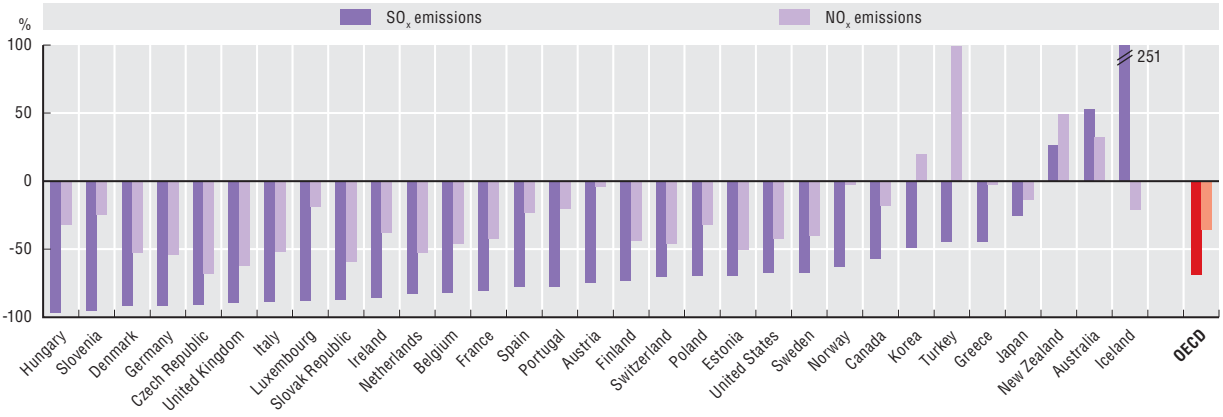
Further information

OECD (2012), "Review of the OECD Environmental Strategy for the First Decade of the 21st Century", OECD, Paris, *www.oecd.org/env/50032165.pdf*.

UNECE (2012), "Convention on Long-Range Transboundary Air Pollution", *www.unece.org/env/lrtap/multi_h1.html*.

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

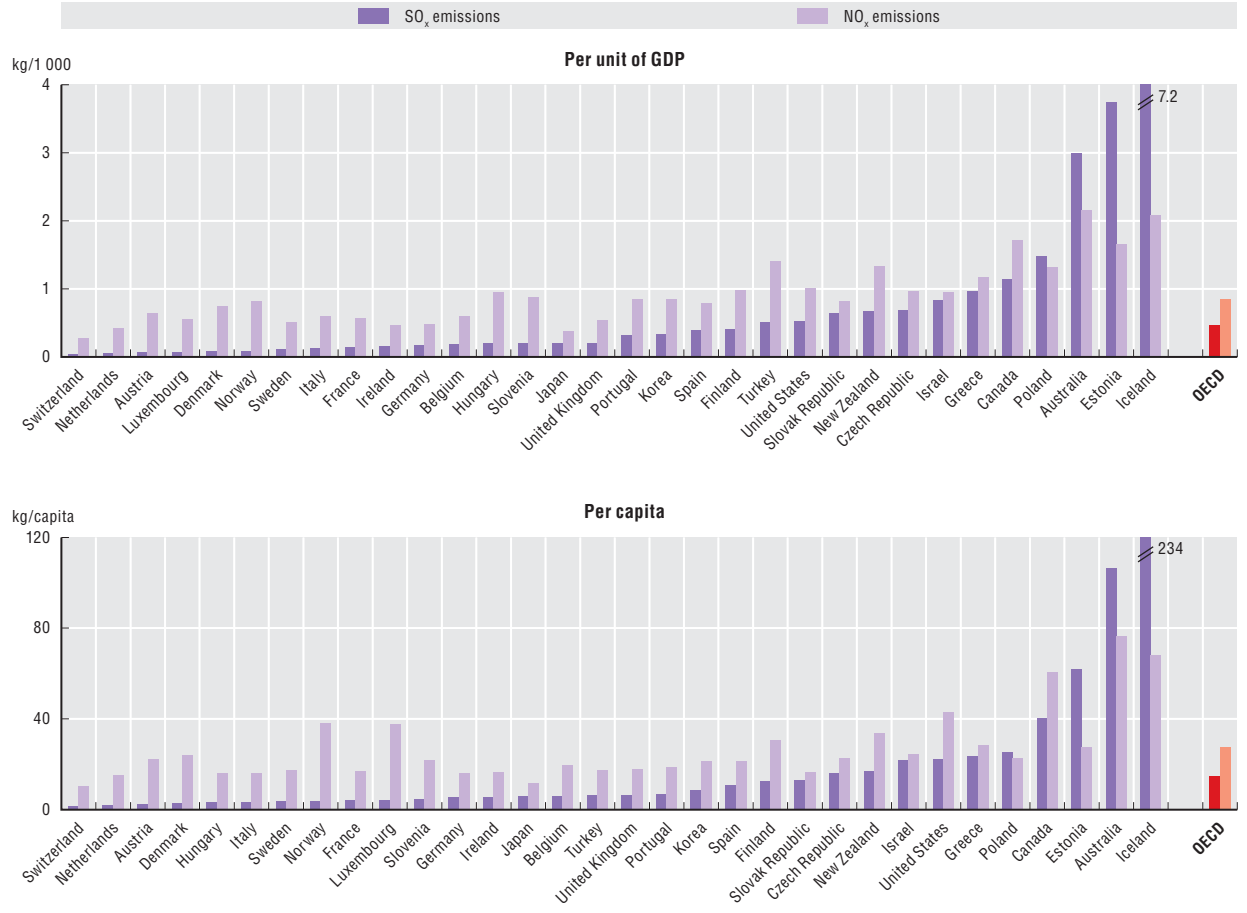
Figure 1.11. **Change in SO_x and NO_x emissions, since 1990**



Source: European Monitoring and Evaluation Programme (EMEP) (2012); *OECD Environment Statistics* (database); UNFCCC, "National Inventory Submissions 2012".

StatLink http://dx.doi.org/10.1787/888932976840

Figure 1.12. **SO_x and NO_x emission intensities, 2010**



Source: European Monitoring and Evaluation Programme (EMEP) (2012); *OECD Environment Statistics* (database); UNFCCC, "National Inventory Submissions 2012".

StatLink http://dx.doi.org/10.1787/888932976859

Table 1.3. **Sulphur oxides (SO_x) emissions and intensities**

	Total SO_x emissions		Emission intensities per unit of GDP		Emission intensities per capita		GDP
	1 000 tonnes	% change	kg/1 000 USD	% change	kg/cap	% change	% change
	2010	1990-2010	2010	1990-2010	2010	1990-2010	1990-2010
Australia	2 370	53	3.0	-19	106	17	89
Austria	19	-75	0.1	-83	2	-77	49
Belgium	66	-82	0.2	-87	6	-83	43
Canada	1 371	-57	1.1	-73	40	-65	61
Chile[1]	893	-61	4.1	-84	..	..	182
Czech Republic[1]	170	-91	0.7	-95	16	-91	73
Denmark	15	-92	0.1	-94	3	-92	37
Estonia	83	-70	3.7	-82	62	-64	67
Finland	67	-73	0.4	-81	12	-75	44
France	262	-81	0.1	-86	4	-83	36
Germany	449	-92	0.2	-93	5	-92	28
Greece	265	-44	1.0	-64	23	-50	55
Hungary[1]	32	-97	0.2	-98	3	-97	42
Iceland[1]	75	251	7.2	120	234	181	59
Ireland	26	-86	0.2	-94	6	-89	146
Israel	164	..	0.8	..	22	..	141
Italy	211	-88	0.1	-90	4	-89	22
Japan	756	-25	0.2	-38	6	-27	20
Korea[1]	418	-49	0.3	-81	9	-55	183
Luxembourg[1]	2	-88	0.1	-94	4	-91	114
Mexico	..	..	..	..	..	..	65
Netherlands	34	-82	0.1	-89	2	-84	56
New Zealand	74	26	0.7	-26	17	-3	72
Norway	19	-63	0.1	-78	4	-68	67
Poland[1]	974	-70	1.5	-86	25	-70	112
Portugal	72	-78	0.3	-84	7	-79	43
Slovak Republic	69	-87	0.6	-94	13	-87	118
Slovenia	10	-95	0.2	-97	5	-95	83
Spain	488	-78	0.4	-86	11	-81	62
Sweden	35	-67	0.1	-78	4	-70	51
Switzerland	12	-70	0.0	-77	2	-75	31
Turkey	463	-45	0.5	-74	6	-58	110
United Kingdom	406	-89	0.2	-93	7	-90	53
United States[1]	6 812	-67	0.5	-80	22	-74	63
OECD[1]	**16 288**	**-69**	**0.5**	**-80**	**15**	**-73**	**54**

1. See Annex B for country notes.

Source: European Monitoring and Evaluation Programme (EMEP) (2012); *OECD Environment Statistics* (database); UNFCCC, "National Inventory Submissions 2012".

StatLink http://dx.doi.org/10.1787/888932978132

Table 1.4. **Nitrogen oxides (NO_x) emissions and intensities**

	Total NO_x emissions		Emission intensities per unit of GDP		Emission intensities per capita		GDP
	1 000 tonnes	% change	kg/1 000 USD	% change	kg/cap	% change	% change
	2010	1990-2010	2010	1990-2010	2010	1990-2010	1990-2010
Australia[1]	1 703	32	2.2	-30	76	1	89
Austria	187	-4	0.6	-35	22	-11	49
Belgium	214	-46	0.6	-62	20	-51	43
Canada	2 066	-18	1.7	-49	61	-34	61
Chile[1]	302	100	1.4	-19	..	..	182
Czech Republic[1]	239	-68	1.0	-81	23	-68	73
Denmark	133	-52	0.7	-65	24	-56	37
Estonia	37	-50	1.7	-70	27	-42	67
Finland	165	-44	1.0	-61	31	-48	44
France	1 079	-42	0.6	-57	17	-48	36
Germany	1 319	-54	0.5	-64	16	-56	28
Greece	322	-2	1.2	-37	28	-12	55
Hungary[1]	162	-32	1.0	-52	16	-29	42
Iceland	22	-21	2.1	-50	68	-36	59
Ireland	75	-38	0.5	-75	17	-51	146
Israel	187	..	0.9	..	25	..	141
Italy	969	-52	0.6	-60	16	-55	22
Japan	1 479	-14	0.4	-28	12	-16	20
Korea[1]	1 045	20	0.8	-55	21	5	183
Luxembourg[1]	19	-19	0.5	-62	38	-38	114
Mexico	..	..	..	..	..	..	65
Netherlands	256	-53	0.4	-70	15	-58	56
New Zealand[1]	147	49	1.3	-13	34	15	72
Norway	186	-3	0.8	-42	38	-16	67
Poland[1]	867	-32	1.3	-68	23	-33	112
Portugal	197	-21	0.9	-44	19	-25	43
Slovak Republic	89	-59	0.8	-81	16	-60	118
Slovenia	45	-25	0.9	-59	22	-26	83
Spain	984	-23	0.8	-52	21	-35	62
Sweden	162	-40	0.5	-60	17	-45	51
Switzerland	81	-46	0.3	-59	10	-53	31
Turkey	1 281	99	1.4	-5	18	50	110
United Kingdom	1 101	-62	0.5	-75	18	-64	53
United States[1]	13 264	-42	1.0	-64	43	-53	63
OECD[1]	**30 082**	**-36**	**0.8**	**-58**	**27**	**-44**	**54**

1. See Annex B for country notes.

Source: European Monitoring and Evaluation Programme (EMEP) (2012); *OECD Environment Statistics* (database); UNFCCC, "National Inventory Submissions 2012".

StatLink http://dx.doi.org/10.1787/888932978151

Particulate emissions and population exposure

Degraded air quality can have substantial economic and social consequences, from health costs and building restoration needs to reduced agricultural output, forest damage and a generally lower quality of life.

The concentration of pollutants in air raises major concerns as to its effects on human health. Human exposure is particularly high in urban areas where economic activities are concentrated. Causes of growing concern are concentrations of fine particulates, nitrogen dioxide (NO_2), toxic air pollutants, and ground-level ozone pollution episodes.

Some groups of the population are especially vulnerable to air pollution. The very young and the very old are more at risk than the remainder of the population.

The OECD Environmental Outlook projects that, if no new policies are implemented, urban air quality will continue to deteriorate globally, and that with increasing urbanisation and population ageing, outdoor air pollution will become the top cause of environment-related deaths by 2050.

Definition

The indicators presented here refer to:

- Total emissions of small particulates from human activities, given as quantities of PM_{10}. They show changes in emissions over time, as well as emission intensities per capita.
- Small particulates (PM_{10}) refer to suspended particulates less than 10 microns in diameter (PM_{10}) that are capable of penetrating deep into the respiratory tract and causing significant health damage. Fine particulates smaller than 2.5 microns in diameter ($PM_{2.5}$) cause even more severe health effects because they penetrate deeper into the respiratory tract and because they are potentially more toxic and may include heavy metals and toxic organic substances.
- Population exposure to air pollution by small particulates is represented by urban-population weighted PM_{10} levels in residential areas of cities with more than 100 000 residents. The estimates represent the average annual exposure level of the average urban resident to outdoor particulate matter.

When interpreting these indicators, it should be kept in mind that they provide only a partial view of air pollution problems. They should be complemented with information on ground-level ozone and on other air pollutants, and be read in connection with information on air emissions in urban areas, socio-demographic patterns, climatic conditions, and emission and fuel standards.

Overview

Over the past two decades, urban air quality has continued to improve slowly with respect to sulphur dioxide (SO_2) concentrations, and the estimated average annual exposure level of an average urban resident to particulate matter (PM_{10}) has been decreasing.

But acute ground-level ozone pollution episodes in both urban and rural areas, NO_2 concentrations, fine particulates (i.e. those smaller than 2.5 microns in diametre) and toxic air pollutants are of growing concern. This is largely due to the concentration of pollution sources in urban areas and to the increasing use of private vehicles for urban trips.

Comparability

International data on particulate emissions are available for many but not all OECD countries. The details of estimation methods for emissions, the extent of sources and particles included in estimation, etc., may differ from one country to another. Though incomplete, data availability is best for PM_{10}. More needs to be done to estimate emissions of $PM_{2.5}$.

International data on exposure to air pollution exist but are scattered (EEA, World Bank, WHO, OECD). Efforts are needed to monitor or estimate overall population exposure and that of sensitive groups of the population.

Sources

OECD Environment Statistics (database), *http://dx.doi.org/10.1787/data-00598-en*.

European Monitoring and Evaluation Programme (EMEP) (2012), *www.emep.int/*.

World Bank, *World Development Indicators* (2012), *http://data.worldbank.org/data-catalog/world-development-indicators*.

Further information

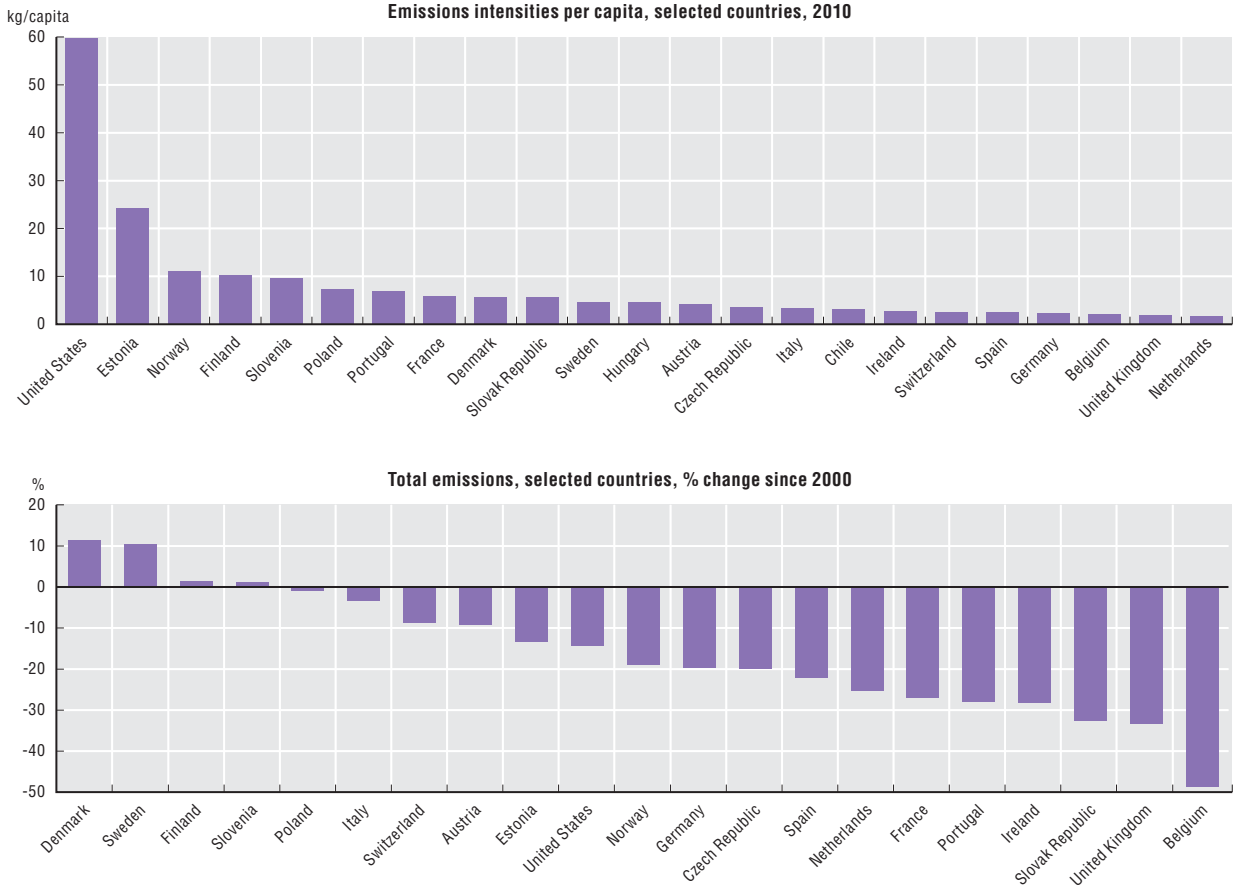
OECD (2012), *OECD Environmental Outlook to 2050: The Consequences of Inaction*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264122246-en*.

OECD (2011), *OECD Regions at a Glance 2011*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/reg_glance-2011-en*.

UNECE (2012), "Convention on Long-Range Transboundary Air Pollution", *www.unece.org/env/lrtap/multi_h1.html*.

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

Figure 1.13. **Emissions of small particulates (PM_{10})**

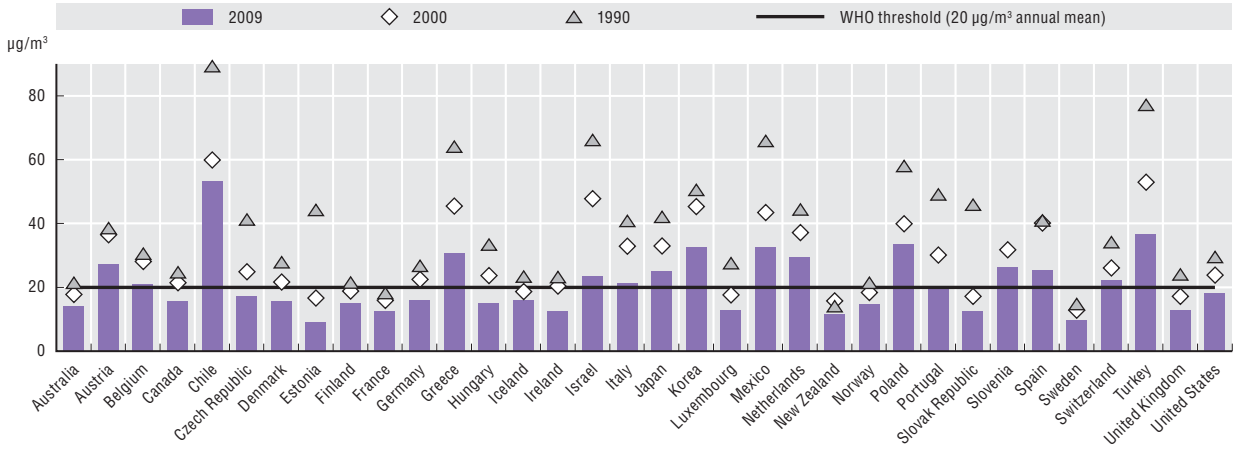


Source: European Monitoring and Evaluation Programme (EMEP) (2012); *OECD Environment Statistics* (database).

StatLink http://dx.doi.org/10.1787/888932976878

Figure 1.14. **Population exposure to small particulates (PM_{10})**

Average annual exposure levels of an average urban resident



Source: World Bank, *World Development Indicators* (2012) (database).

StatLink http://dx.doi.org/10.1787/888932976897

Use of freshwater resources

Freshwater resources are of major environmental, economic and social importance. Their distribution varies widely among and within countries. If a significant share of a country's water comes from transboundary rivers, tensions between countries can arise. In arid regions, freshwater resources may at times be limited to the extent that demand for water can be met only by going beyond sustainable use.

Freshwater abstractions, particularly for public water supplies, irrigation, industrial processes and cooling of electric power plants, exert a major pressure on water resources, with significant implications for their quantity and quality. Main concerns relate to overexploitation and inefficient use of water and to their environmental and socio-economic consequences.

Definitions

The indicator presented here refers to the intensity of use of freshwater resources (or water stress). It is expressed as gross abstractions of freshwater taken from ground or surface waters in % of total available renewable freshwater resources (including water inflows from neighbouring countries), in % of internal resources (i.e. precipitation – evapotranspiration), and per capita. Water used for hydroelectricity generation (which is considered an in situ use) is excluded. Water abstractions by major primary uses and water abstractions for public supply, expressed in m^3 per capita per day, are given as a complement.

This indicator gives insights into quantitative aspects of water resources, but may hide important variations at sub-national (e.g. river basin) level.

Overview

Most OECD countries increased their water abstractions throughout the 1970s in response to demand by the agricultural and energy sectors. In the 1980s, some countries stabilised their abstractions through more efficient irrigation techniques, the decline of water-intensive industries (e.g. mining, steel), increased use of more efficient technologies and reduced losses in pipe networks. Since the 1990s trends in water abstractions have been generally stable. In some countries this is due to increased use of alternative water sources, including water reuse and desalination.

Indicators of water stress show great variations among and within individual countries. In about one-third of OECD countries, freshwater resources are under medium to high stress. In a few countries water resources are abundant and population density is low.

Although at national level most OECD countries show sustainable use of water resources, most still face seasonal or local water quantity problems, and several have extensive arid or semi-arid regions where water availability is a constraint on economic development.

At world level, it is estimated that, over the last century, the growth in water demand was more than double the rate of population growth, with agriculture being the largest user of water. Since 2000, the use of irrigation water in the OECD area slightly declined compared to agricultural production, but in about half of the OECD countries agricultural water use increased driven by expansion in the irrigated area.

By 2050, global water demand is projected to increase by about 55% due to growing demand from manufacturing, thermal power plants and domestic use (OECD, 2012a).

Comparability

Information on the intensity of the use of water resources can be derived from water resource accounts and is available for most OECD countries. The definitions and estimation methods employed may vary considerably from country to country and over time. In general, data availability and quality are best for water abstractions for public supply, which represent about 15% of the total water abstracted in OECD countries. For some countries the data refer to water permits and not to actual abstractions.

OECD totals are estimates based on linear interpolations to fill missing values. Data for the United Kingdom refer to England and Wales only. Breaks in time series exist for Estonia, France, Hungary, Luxembourg, Mexico, Turkey and the United Kingdom.

For additional notes, see Annex B.

Sources

OECD Environment Statistics (database), *http://dx.doi.org/10.1787/data-00602-en*.

FAO, *AquaStat* (database), *www.fao.org/nr/water/aquastat/main/index.stm*.

The Water Information System for Europe (WISE), *http://water.europa.eu/*.

Further information

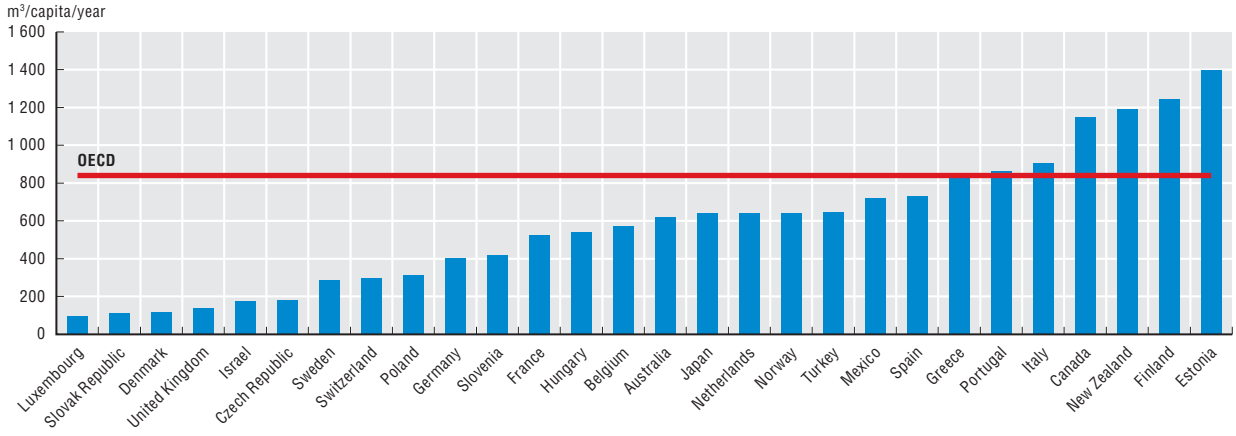
OECD (2014), *Water and Green Growth*, OECD Green Growth Studies, OECD Publishing, Paris, forthcoming.

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

OECD (2012b), "Review of the OECD Environmental Strategy for the First Decade of the 21st Century", OECD, Paris, *www.oecd.org/env/50032165.pdf*.

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

Figure 1.15. **Gross freshwater abstractions per capita, latest available year**



Source: OECD Environment Statistics (database).

StatLink http://dx.doi.org/10.1787/888932976916

Table 1.5. **Freshwater resources and abstractions**

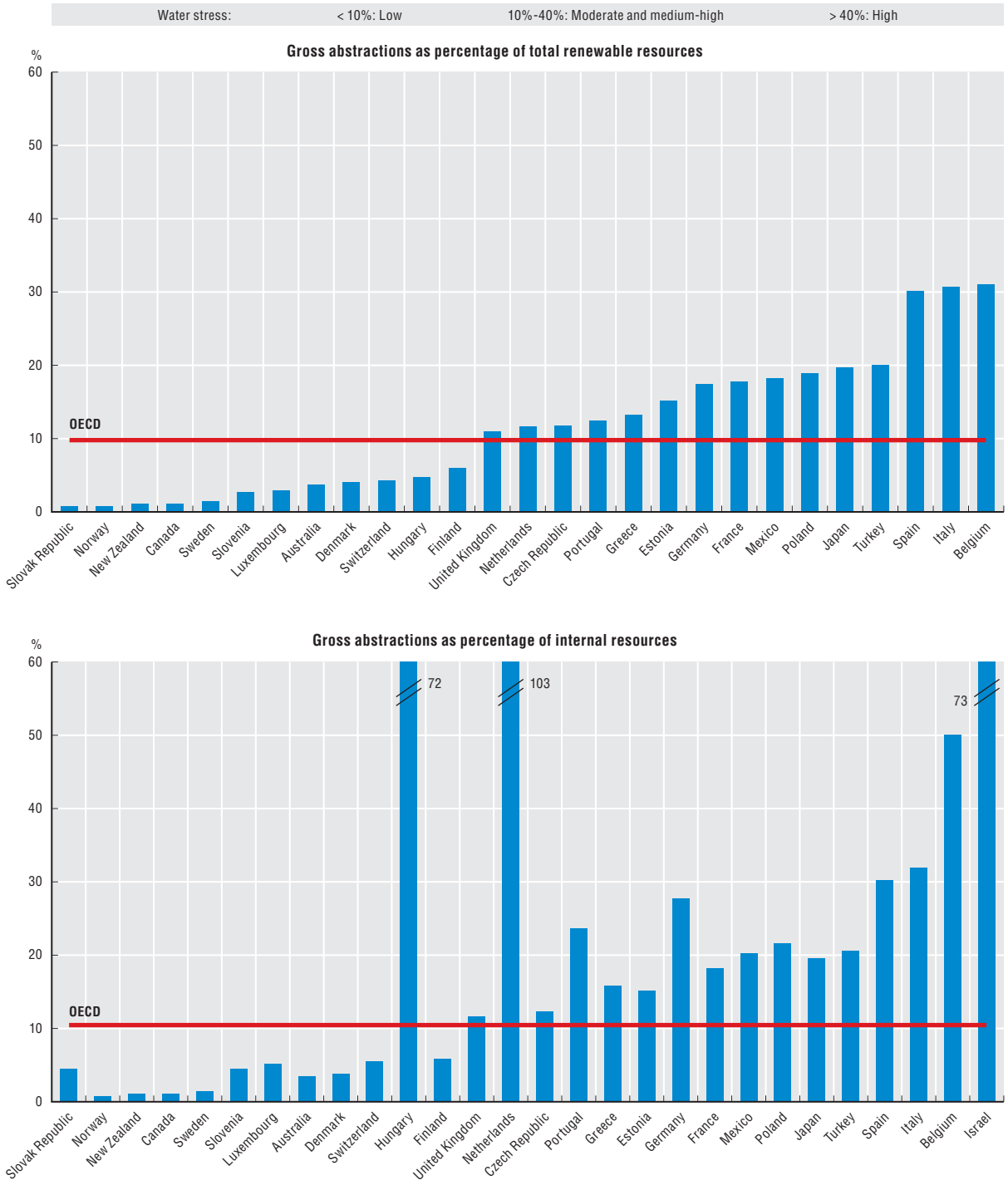
	Intensity of use of freshwater resources				Irrigation		
	Abstractions as % of available resources		Abstractions per capita		Abstractions per area of irrigated land	Irrigated area as % of cultivated land	
	%	Absolute change	m^3/cap/year	% change	m^3/ha/year	%	% change
	2011 or latest available	Since the mid-1990s	2011 or latest available	Since the mid-1990s	2011 or latest available	2011	1990-2011
Australia[1]	4	-3	622	-53	2 480	5	39
Austria	..	..	..	..	..	8	76
Belgium[1]	31	-10	572	-30	1 606	3	..
Canada	1	0	1 150	-29	2 400	2	29
Chile	..	..	..	..	12 050	107	104
Czech Republic[1]	12	-5	180	-32	680	1	..
Denmark[1]	4	-1	120	-29	430	17	5
Estonia	15	1	1 398	13	0	1	..
Finland[1]	6	4	1 246	146	0	3	9
France	18	1	526	1	1 170	13	31
Germany	17	-6	400	-25	350	4	10
Greece[1]	13	2	852	16	5 060	43	49
Hungary	5	0	541	-6	270	4	-2
Iceland	..	..	..	..	..	..	..
Ireland	..	..	..	..	..	..	..
Israel	73	-26	176	-46	300	59	23
Italy	31	..	906	..	..	42	32
Japan	20	-2	639	-10	21 550	54	0
Korea[1]	..	..	..	..	..	46	-1
Luxembourg	3	-1	95	-31	..	..	..
Mexico[1]	18	2	721	-10	9 180	23	8
Netherlands[1]	12	5	642	53	170	45	-6
New Zealand[1]	1	..	1 191	..	4 530	114	998
Norway[1]	1	0	643	16	980	11	-2
Poland[1]	19	-2	312	-8	720	1	-51
Portugal[1]	12	..	863	..	6 970	30	7
Slovak Republic[1]	1	-1	110	-58	120	7	..
Slovenia	3	..	418	..	400	4	..
Spain	30	0	728	-14	5 840	21	26
Sweden	1	0	287	-7	378	6	56
Switzerland[1]	4	-1	296	-19	..	13	123
Turkey[1]	20	6	643	15	7 793	22	50
United Kingdom[1]	11	-3	137	-27	1 240	2	-34
United States	..	..	..	..	..	16	14
OECD[1]	**10**	**0**	**840**	**-5**	**7 000**	**15**	**19**

1. See Annex B for country notes.

Source: OECD Environment Statistics (database); FAO, *AquaStat* (database).

StatLink http://dx.doi.org/10.1787/888932978170

Figure 1.16. **Intensity of use of freshwater resources**

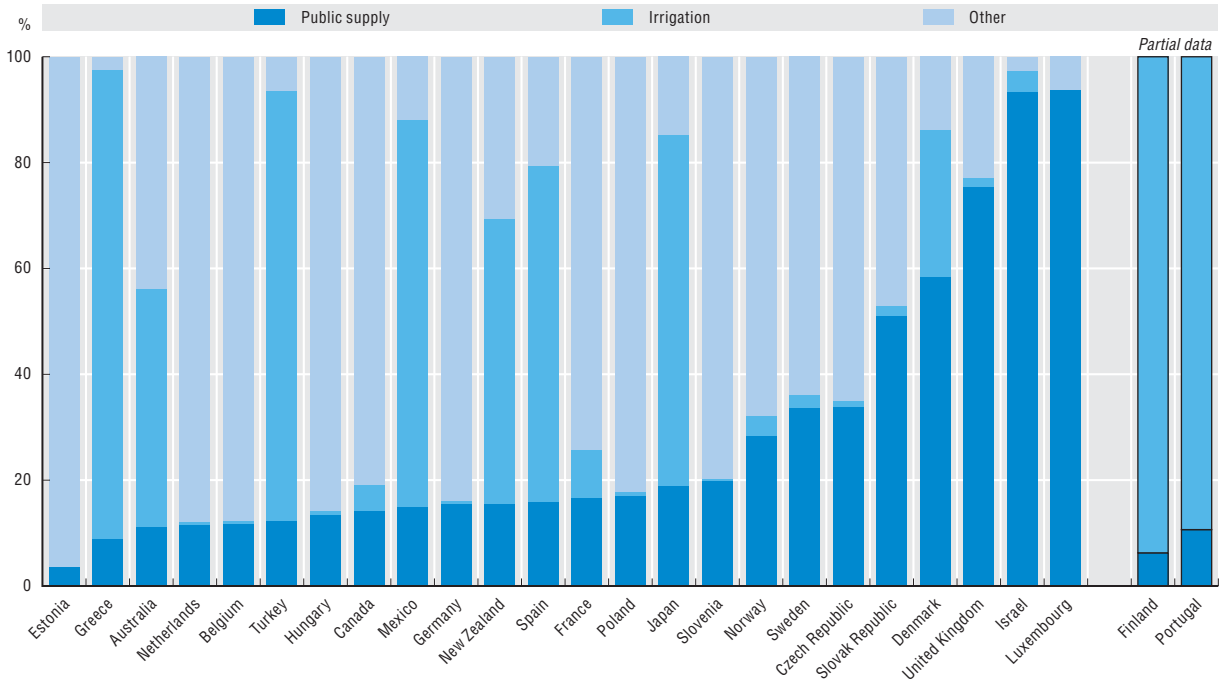


Source: *OECD Environment Statistics* (database).

StatLink http://dx.doi.org/10.1787/888932976935

Figure 1.17. **Freshwater abstractions by major primary uses, latest available year**

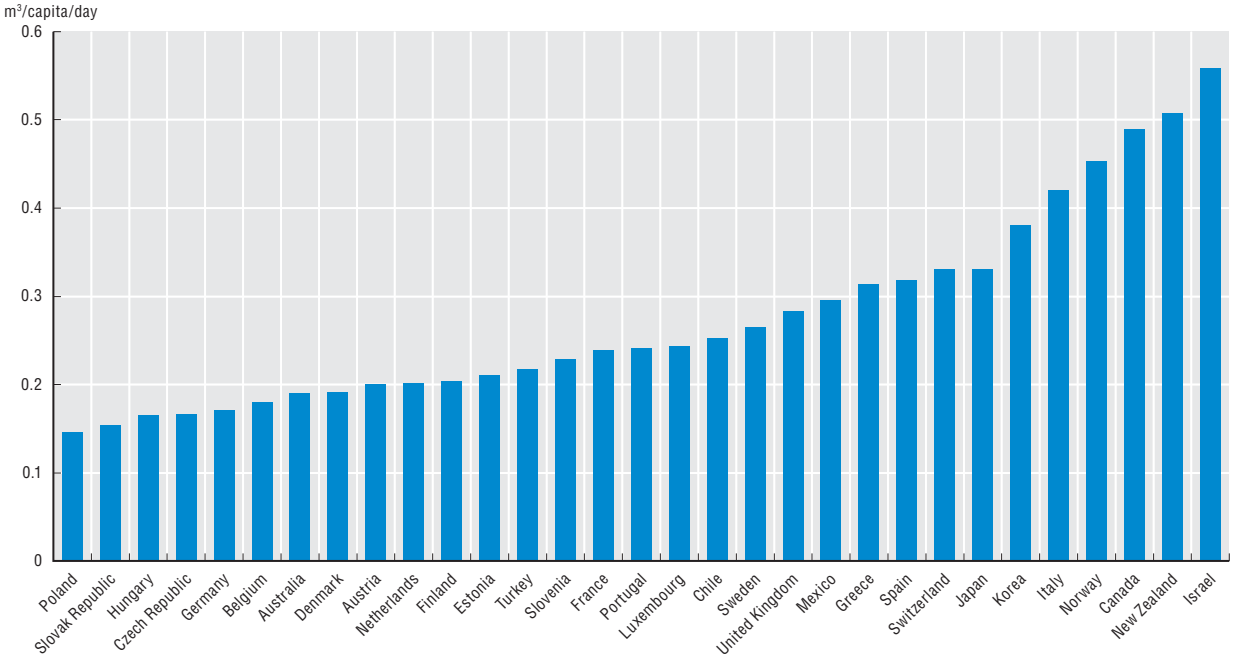
Selected countries



Source: OECD Environment Statistics (database).

StatLink http://dx.doi.org/10.1787/888932976954

Figure 1.18. **Abstractions for public supply per capita, 2010 or latest available year**



Source: OECD Environment Statistics (database).

StatLink http://dx.doi.org/10.1787/888932976973

Water pricing for public supply

Pricing of water and water-related services is an important mechanism for managing demand and promoting efficient use of water, for allocating water among competing uses and for generating finance to invest in water-related infrastructure and services. When consumers do not pay the full cost of water, they tend to use it inefficiently. At the same time, when the price levels are high, this may pose problems of continued access to water for poorer consumers, and the affordability of the water bill for low income households needs to be taken into account.

Definitions

The indicators presented here refer to prices for public water supply to households in selected cities, and their tariff structure.

The prices refer to 2009 figures, expressed in USD as of 31 December 2009. The data are expressed in US dollars per cubic metre supplied. They refer to the prices paid by customers and to an annual consumption of 200 m^3 per year, to facilitate comparison between cities. They do not necessarily reflect the full cost of water services.

It should be kept in mind that water prices show important local variations within countries, and that the indicator should be supplemented with information on water prices for other major users (industry, agriculture) and on cost recovery ratios.

Overview

Today OECD countries are covering more of the costs associated with the provision of water services (OECD, 2009). This is reflected in the level of prices, which have increased, at times substantially, over the last decade, and in the structure of tariffs, which better reflect consumption and treatment costs.

Tariff structures for water supply vary across and within countries. Diversity within a country reflects the degree of decentralisation of the tariff-setting process, as well as the varying costs of providing water services in different locations, especially in rural areas.

An emerging trend in some OECD countries is the increasing use of fixed charges alongside volumetric components, or the progressive increase in the weight of fixed charges in the overall bill. Water pricing is also increasingly complemented by a range of other approaches, including abstraction and pollution charges, tradable water permits, smart metering, water reuse and innovation (OECD, 2012b).

At the same time, demand for higher standards and technologies for drinking water purification and sanitation is rising because of the continued presence of nitrates and pesticides in many water bodies, along with new concerns about micro-pollutants and endocrine disruptors. Addressing these challenges will be costly, and could lead to an increase in water prices in many countries.

Comparability

Data on water prices and tariff structures are only partly available. The variations in water prices and price structures across and within countries and across different groups of consumers make it difficult to calculate meaningful national averages. Little coherent data exist on prices for industry and for agriculture.

Sources

International Water Association (2010), *International Statistics for Water Services*, *www.iwahq.org*.

Further information

OECD (2014), *Water and Green Growth*, OECD Green Growth Studies, OECD Publishing, Paris, forthcoming.

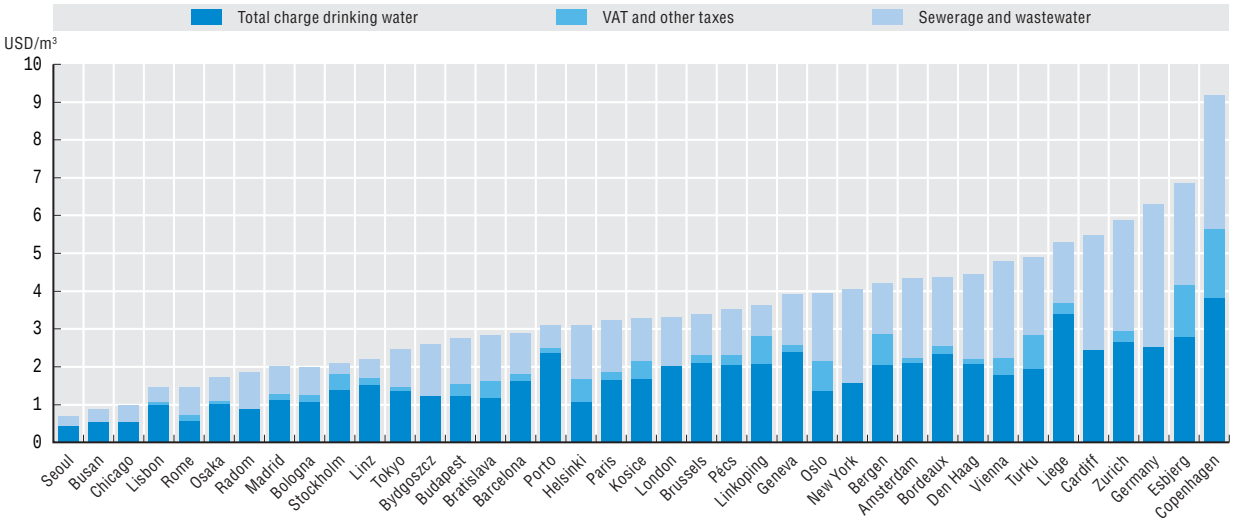
OECD (2012a), *OECD Environmental Outlook to 2050: The Consequences of Inaction*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264122246-en*.

OECD (2012b), "Review of the OECD Environmental Strategy for the First Decade of the 21st Century", OECD, Paris, *www.oecd.org/env/50032165.pdf* .

OECD (2009), *Managing Water for All: An OECD Perspective on Pricing and Financing*, OECD Studies on Water, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264059498-en*.

Figure 1.19. **Water prices in selected major cities, 2009**

Total annual charges and tariff structure



Source: International Water Association (2010), *International Statistics for Water Services*.

StatLink http://dx.doi.org/10.1787/888932976992

Table 1.6. **Water prices in selected major cities, 2009**

Total annual charges

	City	USD/m³		City	USD/m³		City	USD/m³
Austria	Graz	4.17	Italy	Bologna	2.00	Portugal	Lisbon	1.44
	Innsbruck	4.66		Milan	0.73		Porto	3.09
	Linz	2.20		Naples	1.56	Slovak Republic	Bratislava	2.83
	Salzburg	5.59		Rome	1.46	Republic	Kosice	3.29
	Vienna	4.78		Turin	1.71		Nitra	3.06
Belgium	Antwerp	4.92	Japan	Hiroshima	2.16	Spain	Barcelona	2.87
	Brussels	3.39		Nagoya	2.02		Bilbao	1.70
	Genk	4.33		Osaka	1.73		Madrid	2.00
	Liege	5.29		Sapporo	2.51		Sevilla	2.26
	Louvain	4.67		Tokyo	2.47	Sweden	Goteborg	3.38
Denmark	Aalborg	9.02	Korea	Busan	0.87		Linkoping	3.64
	Aarhus	8.56		Daejeon	0.66		Malmo	2.61
	Copenhagen	9.18		Gwangju	0.69		Stockholm	2.08
	Esbjerg	6.85		Gyeounggi	0.74		Uppsala	3.59
	Odense	8.04		Seoul	0.69	Switzerland	Basel	4.34
Finland	Helsinki	3.41	Netherlands	Amsterdam	4.56		Bern	4.98
	Oulu	4.45		Den Haag	4.66		Geneva	3.91
	Tampere	4.35		Eindhoven	3.65		Lausanne	4.59
	Turku	4.90		Rotterdam	4.61		Zurich	5.88
	Espoo	4.59	Norway	Bergen	4.22	United Kingdom	Birmingham	4.20
France	Bordeaux	4.60		Oslo	3.93		Cardiff	5.49
	Lille	4.78		Trondheim	3.18		Leeds	4.59
	Lyon	3.94	Poland	Bialystok	1.85		London	3.31
	Paris	4.27		Bydgoszcz	2.61		Manchester	5.03
Germany	Country average	6.30		Radom	1.85	United States	Chicago	0.99
Hungary	Budapest	2.92		Tarnow	2.35		Los Angeles	2.24
	Debrecen	2.55		Wroclaw	1.92		Miami	1.09
	Miskolc	2.89	Portugal	Braga	1.86		New York	4.04
	Pécs	3.57		Coimbra	2.10		Washington, DC	2.48
				Faro	2.06			

Source: International Water Association (2010), *International Statistics for Water Services*.

StatLink http://dx.doi.org/10.1787/888932978189

Wastewater treatment

Water quality (physical, chemical, microbial, biological) is affected by water abstraction, by pollution loads from human activities (agriculture, industry, households) and by climate and weather.

If pressure from human activities becomes so intense that water quality is impaired to the point that it requires ever more advanced and costly treatment, or that aquatic plant and animal species in rivers and lakes are greatly reduced, then the sustainability of water resource use is in question.

Definitions

The indicator presented here refers to sewage treatment connection rates, i.e. the percentage of the national population connected to a wastewater treatment plant. Sewerage connection rates are shown as complementary information.

"Connected" means actually connected to a wastewater treatment plant through a public sewage network. It does not take into account independent private facilities (e.g. septic tanks), used where public systems are not economic.

The data show total connection rates and the extent of secondary and/or tertiary sewage treatment to provide an indication of efforts to reduce pollution loads:

- Primary treatment: physical and/or chemical process involving settlement of suspended solids, or other process in which the BOD5 of the incoming wastewater is reduced by at least 20% before discharge and the total suspended solids are reduced by at least 50%.
- Secondary treatment: process generally involving biological treatment with a secondary settlement or other process, with a BOD removal of at least 70% and a COD removal of at least 75%.
- Tertiary treatment: treatment of nitrogen and/or phosphorous and/or any other pollutant affecting the quality or a specific use of water (microbiological pollution, colour, etc.).

This indicator should be read in connection with information on public wastewater treatment expenditure. It should be related to an optimal national connection rate, recognising that the optimal connection rate is not necessarily 100%: it may vary among countries and depends on geographical features and on the spatial distribution of habitats.

Overview

In recent decades, OECD countries have been progressing with basic domestic water pollution abatement and with sewerage and wastewater treatment infrastructure:

- The share of the population connected to a municipal wastewater treatment plant rose from about 50% in the early 1980s to about 60% in the early 1990s and has reached almost 80% today.
- Due to varying settlement patterns, economic and environmental conditions, starting dates and the rate at which the work was done, the share of population connected to wastewater treatment plants and the level of treatment vary significantly among OECD countries: secondary and tertiary treatment have progressed in some while primary treatment remains important in others.
- OECD countries with relatively low GDP per capita are still in the phase of infrastructure development, which can command investment of the order of 1% of GDP (OECD, 2012b).
- A number of OECD countries established their water infrastructure decades ago and now face the challenge of upgrading ageing networks. Some countries have reached the economic limit in terms of sewerage connection and must find other ways of serving small, isolated settlements.

Comparability

Data on the share of the population connected to wastewater treatment plants are available for almost all OECD countries. In some countries, data relate to population equivalent and are thus not fully comparable. Information on the level of treatment and on treatment charges remains partial.

Data on the population "connected to a sewerage network without treatment" and "not connected to a sewerage network" contain estimates for Belgium, Chile, Hungary, Ireland, Poland, Portugal and the United States.

For additional notes, see Annex B.

Source

OECD Environment Statistics (database), *http://dx.doi.org/10.1787/data-00604-en*.

Further information

OECD (2014), *Water and Green Growth*, OECD Green Growth Studies, OECD Publishing, Paris, forthcoming.

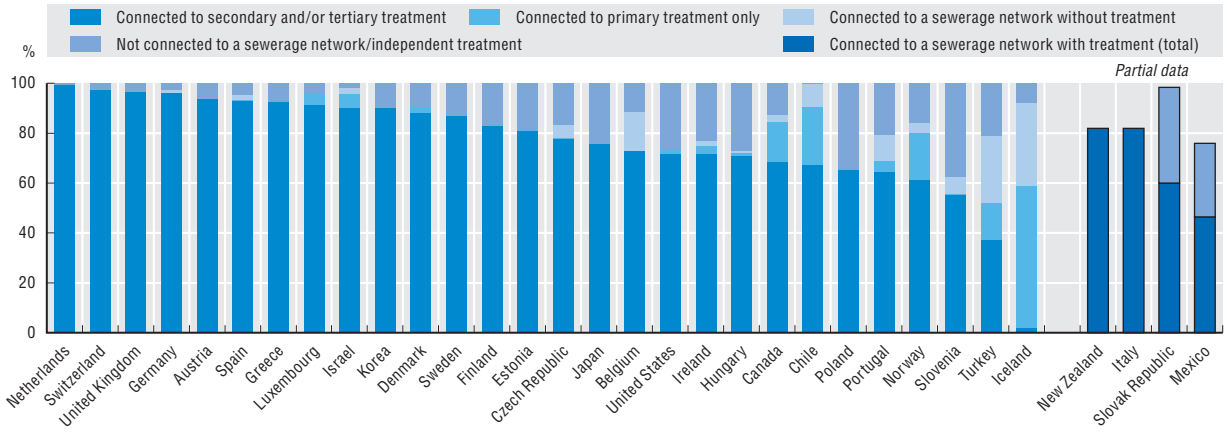
OECD (2012a), *OECD Environmental Outlook to 2050: The Consequences of Inaction*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264122246-en*.

OECD (2012b), "Review of the OECD Environmental Strategy for the First Decade of the 21st Century", OECD, Paris, *www.oecd.org/env/50032165.pdf*.

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

Figure 1.20. **Sewage treatment connection rates, latest available year**

% of national population connected to a wastewater treatment plant



Source: OECD *Environment Statistics* (database).

StatLink http://dx.doi.org/10.1787/888932977011

Table 1.7. **Sewage treatment connection rates, % of population**

	Sewage treatment connection rates						Sewerage network connection rates
	Early 1990s			2011 or latest			2009 or latest
	Total	*of which:*		Total	*of which:*		Total
		Secondary treatment	Tertiary treatment		Secondary treatment	Tertiary treatment	
Australia	..	..	..	..	..	..	..
Austria	72	60	7	94	1	93	94
Belgium	29	6	36	73	9	63	88
Canada	62	21	27	84	53	15	87
Chile[1]	72	2	8	91	4	63	96
Czech Republic	50	15	55	78	8	70	83
Denmark	85	42	29	90	2	86	90
Estonia	69	31	29	82	13	68	82
Finland[1]	76	0	76	83	0	83	83
France	69	51	27	..	..	..	..
Germany	88	32	49	96	3	93	97
Greece	11	11	0	92	6	86	92
Hungary	20	14	1	72	34	37	73
Iceland	2	0	0	59	1	1	92
Ireland	44	21	0	75	60	11	77
Israel	77	32	28	96	40	50	98
Italy[1]	63	36	24	82	..	..	..
Japan	44	42	2	76	55	20	76
Korea[1]	33	37	1	90	36	54	90
Luxembourg	90	67	8	96	62	29	96
Mexico[1]	22	19	0	47	..	..	71
Netherlands	94	84	8	99	1	98	99
New Zealand	80	33	40	82	..	..	..
Norway	57	1	43	80	2	60	84
Poland[1]	34	26	4	66	13	52	66
Portugal[1]	21	11	0	71	46	19	81
Slovak Republic	43	..	..	60	..	..	62
Slovenia	36	15	2	56	37	19	63
Spain[1]	53	38	4	94	33	60	96
Sweden	94	9	85	87	4	83	87
Switzerland	90	28	62	97	20	78	97
Turkey	7	1	0	52	20	18	73
United Kingdom[1]	83	62	13	97	49	47	97
United States	75	33	30	74	32	40	74
OECD[1]	**59**	**34**	**19**	**76**	**31**	**42**	**81**

1. See Annex B for country notes.

Source: OECD *Environment Statistics* (database).

StatLink http://dx.doi.org/10.1787/888932978208

Biological diversity

Biological resources are essential elements of ecosystems and of natural capital, providing the raw materials of production and growth in many sectors of the economy. Their diversity plays an essential role in maintaining life-support systems and quality of life.

Pressures on biodiversity can be physical (e.g. habitat alteration and fragmentation through changes in land use and cover), chemical (e.g. toxic contamination, acidification and oil spills) or biological (e.g. alteration of population dynamics and species structure through the release of exotic species or the commercial use of wildlife resources).

Definitions

The indicators presented here relate to selected aspects of biodiversity. They concern:

- The number of threatened species compared to the number of known or assessed species. "Threatened" refers to the "endangered", "critically endangered" and "vulnerable" species (definitions in Annex B). Data cover mammals, birds and vascular plants but exclude other major groups (e.g. fish, amphibians, reptiles, invertebrates, fungi).
- Major protected areas (terrestrial and marine), i.e. areas under management Categories I to VI of the World Conservation Union (IUCN) classification. Wilderness areas, strict nature reserves and national parks reflect the highest protection level.

These indicators should be read in connection with information on the density of population and of human activities as well as information on the sustainable use of biodiversity as a resource (e.g. forest, fish) and on habitat alteration.

Overview

Since the 1990s, terrestrial and marine protected areas have increased in many OECD countries. But, pressures on biodiversity and threats to global ecosystems and their species are increasing.

Many natural ecosystems have been degraded, limiting the services they provide. Many wetlands, highly valued habitats for biodiversity, have been converted to agricultural use, although at a declining rate.

The targets agreed in 2002 by parties to the CBD to "significantly reduce the rate of biodiversity loss" by 2010 have not been met at the global level.

- In most OECD countries, the number of animal and plant species identified as endangered is increasing. Many species are threatened by habitat alteration or loss, both within and outside protected areas (e.g. on farms and in forests). Threat levels are particularly high in countries with high population density and a high concentration of human activities.
- Total OECD terrestrial and marine protected areas reach about 11% of the total area and territorial sea. The areas protected vary significantly among OECD countries and are not always representative of national biodiversity, nor sufficiently connected. The challenges facing most countries are increasing marine protected areas, which are under-represented, and creating ecological "networks" with connecting corridors between protected areas
- Actual protection levels and related trends remain difficult to evaluate, as protected areas change over time as: new areas are designated, boundaries are revised and sites are destroyed or changed by economic activities or natural processes. Environmental performance depends both on the designation of the area and on management effectiveness.

See Annex A for trends of major terrestrial and marine protected areas.

Comparability

Data on threatened species are available for all OECD countries with varying degrees of completeness. The number of species known or assessed does not always accurately reflect the number of species in existence, and the definitions that should follow IUCN standards are applied with varying degrees of rigour in countries. Historical data are generally not comparable or not available.

International data on protected areas are available for all OECD countries. The definitions, although harmonised by the World Conservation Monitoring Centre (WCMC), may however still vary among countries.

For additional notes, see Annex B.

Sources

OECD Environment Statistics (database), *http://dx.doi.org/10.1787/data-00605-en*.

UNEP, *The World Database on Protected Areas* (WDPA), *www.protectedplanet.net*.

UNESCO, "Man and Biosphere Programme (MAB)", *www.unesco.org/new/en/natural-sciences/environment/ecological-sciences/man-and-biosphere-programme/*.

UNSD, *Millennium Development Goals Indicators*, *http://mdgs.un.org/unsd/mdg/Data.aspx*.

Further information

International Union for Conservation of Nature (IUCN), *www.iucn.org*.

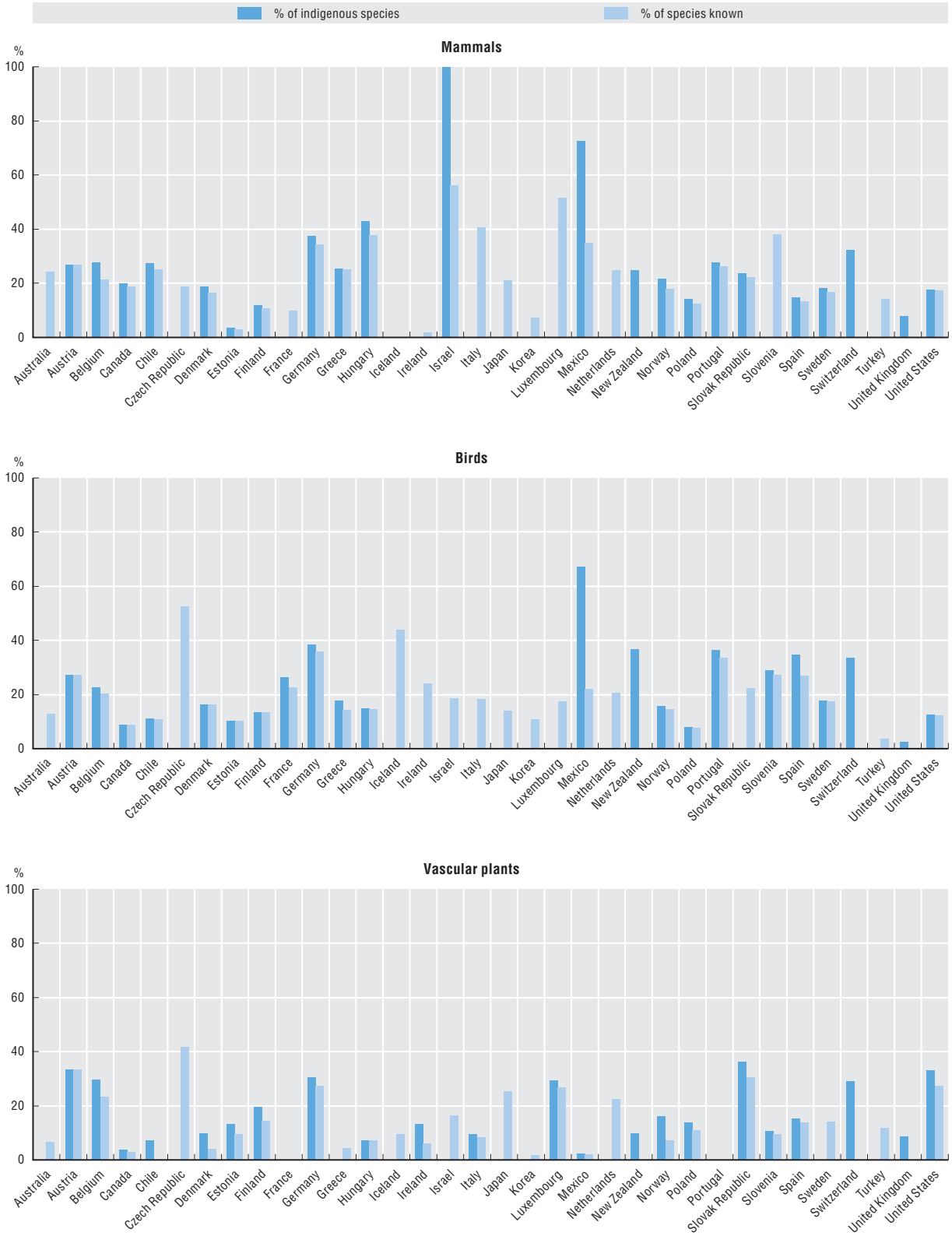
OECD (2012a), *OECD Environmental Outlook to 2050: The Consequences of Inaction*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264122246-en*.

OECD (2012b), "Review of the OECD Environmental Strategy for the First Decade of the 21st Century", OECD, Paris, *www.oecd.org/env/50032165.pdf*.

OECD (2011), "OECD Work on Biodiversity", *www.oecd.org/dataoecd/63/39/46226558.pdf*.

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

Figure 1.21. **Threatened species – mammals, birds and vascular plants, latest available year**



Source: OECD Environment Statistics (database).

StatLink http://dx.doi.org/10.1787/888932977030

Table 1.8. **Threatened species – mammals, birds and vascular plants, latest available year**

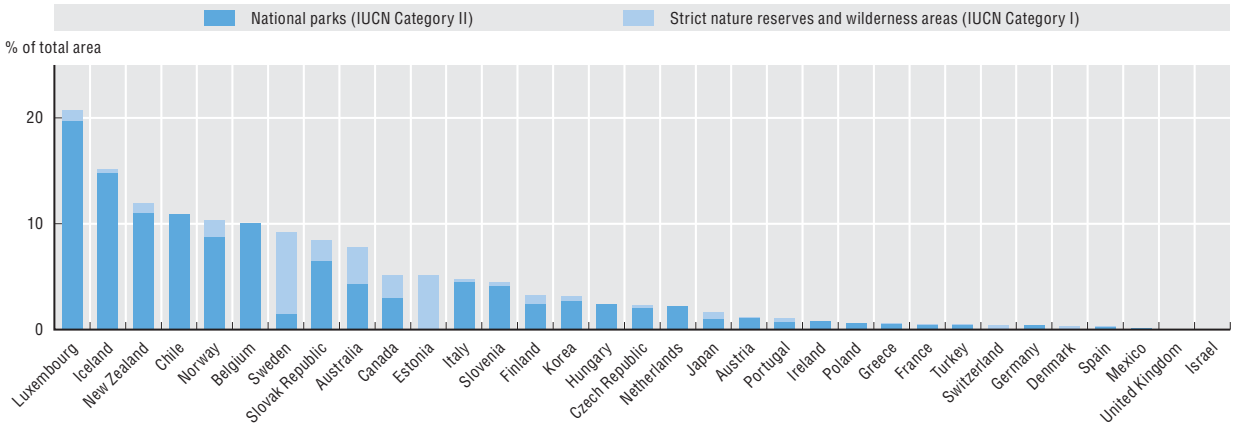
	Mammals		Birds		Vascular plants	
	Species known or assessed, number	Species threatened, %	Species known or assessed, number	Species threatened, %	Species known or assessed, number	Species threatened, %
Australia	387	24	872	13	19 462	7
Austria	101	27	242	27	2 950	33
Belgium	84	21	220	20	1 818	23
Canada	218	19	664	9	5 111	3
Chile	175	25	461	11	5 516	7
Czech Republic[1]	91	19	210	52	2 754	42
Denmark[1]	67	16	209	16	2 909	4
Estonia	69	3	386	10	1 943	9
Finland[1]	65	11	240	13	1 240	15
France[1]	99	10	389	23	11 730	..
Germany[1]	93	34	264	36	3 272	27
Greece[1]	115	25	440	14	5 850	4
Hungary[1]	90	38	393	15	2 510	7
Iceland[1]	..	..	75	44	490	10
Ireland[1]	57	2	457	24	2 001	6
Israel[1]	105	56	210	19	2 288	17
Italy	118	41	473	18	6 711	8
Japan	160	21	700	14	7 000	25
Korea[1]	124	7	515	11	4 296	2
Luxembourg[1]	64	52	132	17	1 323	27
Mexico[1]	535	35	1 096	22	25 008	2
Netherlands[1]	48	25	213	21	1 490	22
New Zealand[1]	32	25	161	37	2 319	10
Norway[1]	88	18	248	15	2 962	7
Poland	105	12	448	8	2 980	11
Portugal[1]	103	26	291	33	3 607	..
Slovak Republic[1]	90	22	219	22	3 352	30
Slovenia	89	38	387	27	3 452	10
Spain[1]	158	13	368	27	8 750	14
Sweden	66	17	246	17	2 272	14
Switzerland[1]	83	33	211	34	2 592	29
Turkey	161	14	460	4	11 000	12
United Kingdom[1]	76	8	247	2	1 530	9
United States[1]	453	17	831	12	19 569	27

1. See Annex B for country notes.

Source: *OECD Environment Statistics* (database).

StatLink http://dx.doi.org/10.1787/888932978227

Figure 1.22. **Nature reserves and national parks, OECD countries, 2010**



Source: UNEP, *The World Database on Protected Areas (WDPA)*; UNESCO, "Man and Biosphere Programme (MAB)"; UNSD, *Millennium Development Goals Indicators*.

StatLink http://dx.doi.org/10.1787/888932977049

Table 1.9. **Major protected areas, latest available year**

	Major protected areas, 2010		Strict nature reserves, wilderness areas, national parks, 2010		Biosphere reserves, 2012	Wetlands of international importance, 2012	
	Terrestrial	Marine					
	% of total area	% of territorial sea	Area, 1 000 km^2	% of total area	Number of sites	Number of sites	Area, km^2
Australia[1]	11	28	601	8	14	64	81 117
Austria	23	..	1	1	6	20	1 200
Belgium	14	..	3	10	..	9	429
Canada	8	1	513	5	16	37	130 666
Chile	17	4	82	11	10	12	3 590
Czech Republic[1]	15	..	2	2	6	12	547
Denmark[1]	5	3	0	0	1	42	23 031
Estonia	20	27	2	5	1	17	3 048
Finland	9	5	11	3	2	49	7 995
France[1]	17	21	3	0	10	41	33 083
Germany[1]	42	40	1	0	15	34	8 682
Greece	16	3	1	1	2	10	1 635
Hungary	5	..	2	2	5	29	2 450
Iceland	20	4	16	15	..	3	590
Ireland	2	0	1	1	2	45	670
Israel	18	1	0	0	2	2	4
Italy	15	17	14	5	8	52	602
Japan	16	6	6	2	4	46	1 370
Korea	6	4	3	3	4	18	177
Luxembourg	20	..	1	21	..	2	172
Mexico	11	17	3	0	40	121	88 264
Netherlands[1]	12	22	1	2	1	49	8 189
New Zealand	26	11	32	12	..	6	555
Norway[1]	15	2	34	10	..	51	8 404
Poland[1]	22	4	2	1	10	13	1 451
Portugal[1]	8	3	1	1	7	28	866
Slovak Republic[1]	23	..	4	8	4	14	407
Slovenia	13	1	1	4	3	3	82
Spain[1]	9	4	2	0	39	73	2 966
Sweden	11	5	41	9	4	51	5 147
Switzerland	25	..	0	0	2	11	1 469
Turkey	2	2	4	0	1	13	1 799
United Kingdom[1]	26	6	0	0	8	169	12 757
United States[1]	12	29	..	..	47	34	16 685
OECD	**11**	**11**	**..**	**..**	**274**	**1 180**	**450 099**
World	13	..	..	..	580	2 040	1 934 114

1. See Annex B for country notes.

Source: UNEP, *The World Database on Protected Areas (WDPA)*; UNESCO, "Man and Biosphere Programme (MAB)"; UNSD, *Millennium Development Goals Indicators*.

StatLink http://dx.doi.org/10.1787/888932978246

Use of forest resources

Forests are among the most diverse and widespread ecosystems on earth, and have many functions: they provide timber and other forest products; have cultural values; deliver recreation benefits and ecosystem services, including regulation of soil, air and water; are reservoirs for biodiversity; and act as carbon sinks.

The impact from human activities on forest health and on natural forest growth and regeneration raises widespread concern. Many forest resources are threatened by over-exploitation, fragmentation, degradation of environmental quality and conversion to other types of land use. The main pressures result from human activities, including agriculture expansion, transport infrastructure development, unsustainable forestry, air pollution and intentional burning of forests.

Definitions

The indicator presented here refers to the intensity of use of forest resources (timber). It relates actual harvest or fellings to annual productive capacity. Annual productive capacity is either a calculated value, such as annual allowable cut, or an estimate of annual growth for existing stock. It should be noted that the national averages presented here can conceal variations among forests.

Changes in annual harvest and annual growth, along with growing stock, forest area and exports of forestry products, are given as complements.

These indicators give insights into quantitative aspects of forest resources. They present national averages that may conceal important variations among forests. They should be read with information on forest quality (e.g. species diversity, including tree and non-tree species; forest degradation; forest fragmentation) and be complemented with data on forest management practices and protection measures.

Overview

At national level, most OECD countries present a picture of sustainable use of their forest resources in quantitative terms, but there is significant variation among and within countries. For countries in which longer-term trends are available, intensity of forest resource use does not generally show an increase and has even decreased in most countries from the 1950s. In recent years, wood requirements to achieve policy objectives for renewable energy resources have played an increasingly important role.

Forests are unevenly distributed: the ten most forest-rich countries account for two-thirds of the world's forest area. OECD countries account for about one-fourth of the world's forest area.

Over the past 50 years, the area of forests and wooded land has remained stable or has slightly increased in most OECD countries, but it has been decreasing at world level due in part to continued deforestation in tropical countries, often to provide land for agriculture, grazing and logging. "The Economics of Ecosystems and Biodiversity study" (TEEB) has indicated that the aggregate loss of biodiversity and ecosystem service benefits associated with the global loss of forests is between USD 2 trillion and USD 5 trillion per year.

See Annex A for trends of intensity of use of forest resources.

Comparability

Data on the intensity of use of forest resources can be derived from forest accounts and from international forest statistics and the FAO/UNECE Forest Resource Assessments for most OECD countries, although differences in the variables monitored result in interpretation difficulties. Historical data often lack comparability or are not available over longer periods.

Latest year available: data prior to 2005 were not considered.

For additional notes, see Annex B.

Sources

OECD Environment Statistics (database), *http://dx.doi.org/10.1787/data-00600-en*.

FAO, *Global Forest Resource Assessments* (2010), *www.fao.org/forestry/fra/en*.

FAO, *FAOSTAT* (2012) (database), *http://faostat.fao.org/*.

Further information

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

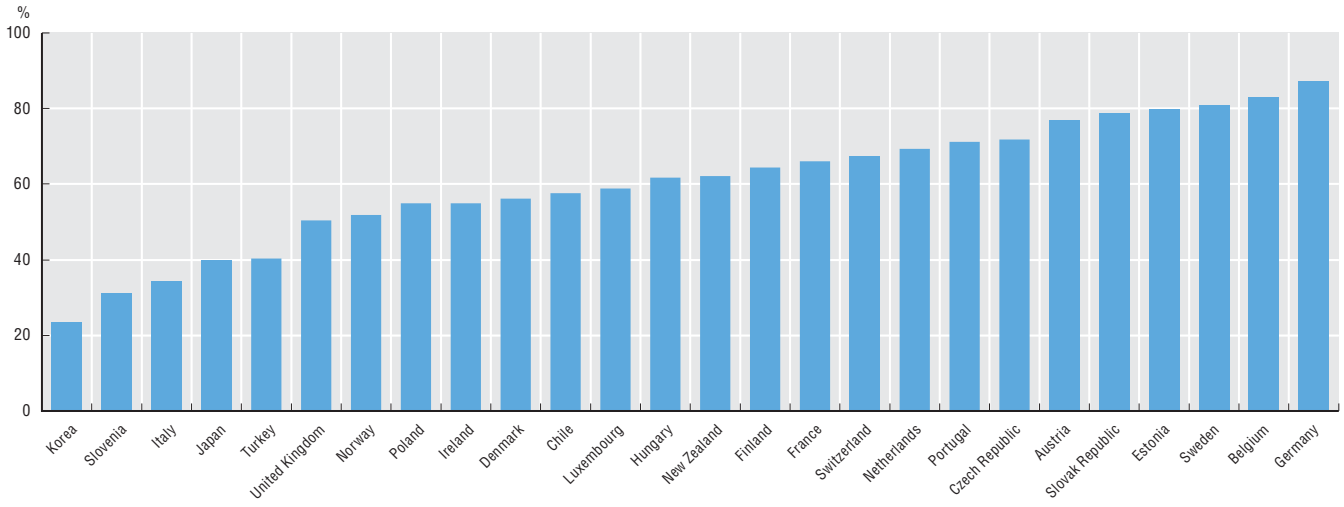
OECD (2011), *OECD Regions at a Glance 2011*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/reg_glance-2011-en*.

TEEB, The Economics of Ecosystems and Biodiversity, *www.teebweb.org*.

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

Figure 1.23. **Intensity of use of forest resources, latest year available**

Fellings as a % of annual growth



Source: FAO, *Global Forest Resource Assessments* (2010), *FAOSTAT* (2012) (database); *OECD Environment Statistics* (database).

StatLink http://dx.doi.org/10.1787/888932977068

Table 1.10. **Forest resources**

	Annual fellings, % change	Annual growth, % change	Intensity of use of forest resources, fellings as % of annual growth					Growing stock of wood on forest, m^3 per hectare	Forest land, % land area	Exports of forestry products, % of national exports
	1990-2010	1990-2010	1950s	1980s	1990s	2000s	2010s	2010	2011	2011
Australia	46	..	..	..	..	..	..	..	20	0.9
Austria[1]	..	..	..	..	66	56	77	292	47	3.5
Belgium[1]	..	..	..	..	85	65	83	248	22	1.5
Canada	-13	..	..	..	..	..	..	106	34	5.1
Chile[1]	129	19	183	..	30	45	58	185	22	6.5
Czech Republic	15	26	60	72	78	73	72	290	34	2.2
Denmark	27	..	85	75	..	..	56	222	13	0.4
Estonia[1]	141	29	46	40	43	111	80	247	52	5.1
Finland[1]	24	28	89	83	67	73	64	108	73	14.7
France[1]	1	26	..	81	82	..	66	162	29	1.2
Germany	51	-8	..	..	53	75	87	315	32	1.4
Greece	..	..	..	71	..	..	..	47	30	0.2
Hungary	9	19	..	70	67	62	62	177	22	0.8
Iceland	..	..	..	..	..	..	..	24	0	0.0
Ireland	61	..	..	..	..	71	55	101	11	0.3
Israel	..	..	..	..	..	..	..	38	7	0.1
Italy	-4	17	88	43	42	42	34	187	31	0.9
Japan	17	..	..	72	55	29	40	..	69	0.5
Korea	705	156	..	4	7	6	23	97	64	0.0
Luxembourg	-12	8	..	..	72	..	59	299	33	0.5
Mexico	-28	..	..	23	24	..	..	46	33	1.2
Netherlands	..	..	..	..	66	69	69	192	11	0.5
New Zealand[1]	118	45	..	..	41	54	62	535	31	4.6
Norway	-8	11	87	61	62	46	52	107	33	2.1
Poland	44	..	49	59	50	53	55	219	31	1.1
Portugal	-9	..	..	..	70	63	71	66	38	3.5
Slovak Republic	79	23	95	66	54	55	79	266	40	2.3
Slovenia	39	104	..	64	46	24	31	394	62	3.5
Spain	13	..	..	..	..	..	..	50	36	1.3
Sweden[1]	48	18	83	81	64	78	81	123	69	7.4
Switzerland	7	-8	..	..	58	75	67	345	31	0.7
Turkey	0	28	..	82	52	..	40	144	15	0.3
United Kingdom	32	15	..	32	44	46	50	182	12	0.3
United States	..	..	61	56	60	..	..	155	33	1.2
OECD	..	..	..	..	..	..	..	**5 969**	**31**	**1.5**

1. See Annex B for country notes.

Source: FAO, *Global Forest Resource Assessments* (2010), *FAOSTAT* (2012) (database); *OECD Environment Statistics* (database).

StatLink http://dx.doi.org/10.1787/888932978265

Use of fish resources

Fish resources play key roles for human food supply and aquatic ecosystems. In many countries fisheries make an important contribution to sustainable incomes and employment opportunities. In certain countries, including at least two OECD countries – Iceland and Japan – fish is the main source of animal protein intake.

Main pressures on fish resources include fishing, coastal development and pollution loads from land-based sources, maritime transport, and maritime dumping. They affect both freshwater and marine fish stocks and habitats, and have consequences for biodiversity and for the supply of fish for consumption and other uses. The sustainable management of fish resources has thus become a major concern.

Definitions

The indicators presented here refer to national fish captures expressed as % of world captures and as amounts per capita for 2007-09, and related changes since 1990-92.

Fish production from aquaculture is given as additional information to inform about shifts from using wild resources to more industrialised production. There are, however, important links between the two industries.

These indicators give insights into quantitative aspects of fish resources. They should be accompanied by information on the biological status of fish stocks.

Overview

The trend towards increased global fish catch has been achieved partly through exploitation of new and/or less valuable species and partly through aquaculture. Illegal, unreported and unregulated (IUU) fishing is widespread and hinders the achievement of sustainable fishery management objectives.

Capture fisheries and aquaculture supplied the world with over 156 million tonnes of food fish in 2011 and provided an apparent per capita supply of 18.5 kg in 2009 (in live weight equivalent).

Aquaculture has been growing and has surpassed capture fisheries as a source of fish production in many countries. In 2011 it accounted for about 40% of global fish production (i.e. 63 million tonnes). This growth has occurred more quickly in some regions of the world than in others. OECD countries produced around 8.8% of world aquaculture production with the largest producers being Korea, Japan, Chile and Norway.

Unlike capture fisheries, aquaculture offers opportunities to use farming systems and management practices to enhance food production while alleviating pressures on natural stocks. However, aquaculture also has negative effects on local ecosystems, and its dependence on fishmeal and fish oil products, at least in the case of farming carnivorous species, can add to the pressure on some fish stocks.

The proportion of moderately exploited or underexploited fish stocks is 13%. More than half of all stocks (57%) are fully exploited, producing catches at or close to their maximum sustainable limits. The remaining stocks are overexploited (30%), thus yielding less than their maximum potential owing to pressure from excess fishing in the past. It should be noted, however, that there is still a large number of stocks for which it has not yet been possible to determine stock status.

Global production of marine capture fisheries peaked in 1996 at about 74 million tonnes and has since declined slightly, to about 68 million tonnes in 2011. The stabilisation of production from marine capture fisheries in recent years arises from a combination of greater exploitation of some stocks and declines in stock size and productivity in others. The most caught species at global level remains the anchoveta.

See Annex A for world fish production, OECD fish captures and country trends.

Comparability

Fish production data are available from international sources (notably the FAO) at significant detail and for most OECD countries. The time series presented are relatively comprehensive and consistent across the years, but some of the variation over time may reflect changes in national reporting systems.

Data for Denmark exclude Greenland and Faroe Islands.

For additional notes, see Annex B.

Sources

FAO (2010), *FAO Yearbook: Fishery and Aquaculture Statistics*, *www.fao.org/docrep/015/ba0058t/ba0058t.pdf*.

FAO, *FISHSTAT* (database), *Annual Updates*, *www.fao.org/fishery/statistics/software/fishstatj/en*.

Further information

International Council for the Exploration of the Seas (ICES), *www.ices.dk*.

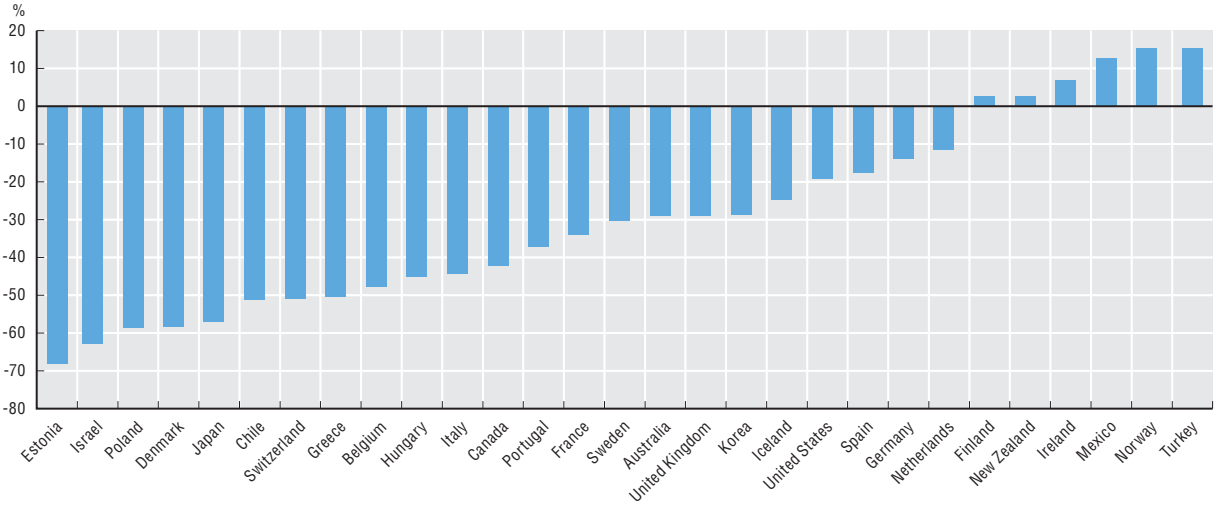
OECD work on fisheries, *www.oecd.org/fisheries*.

OECD (2011a), *OECD Review of Fisheries 2011: Policies and Summary Statistics*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264129306-en*.

OECD (2011b), *The Economics of Adapting Fisheries to Climate Change*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264090415-en*.

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

Figure 1.24. **Change in fish captures since 1990, OECD countries**



Source: FAO, *FAOSTAT* (2012) and *FISHSTAT* (2012) (databases).

StatLink http://dx.doi.org/10.1787/888932977087

Table 1.11. **Fish captures and aquaculture**

	Total fish captures					Marine catch	Aquaculture production	
	Total		Per capita		Share of world catch	Share of total	1 000 tonnes	% change
	1 000 tonnes	% change	kg/cap	% change	%	%		
	2011	1990-2011	2011	1990-2011	2011	2011	2011	1990-2011
Australia	163	-22	7.2	-41	0.2	66	71	476
Austria	0	-34	0.0	-40	0.0	x	2	-31
Belgium	22	-46	2.0	-51	0.0	86	0	-93
Canada	861	-48	25.0	-58	0.9	45	162	294
Chile	3 063	-41	177.6	-55	3.3	91	955	2 843
Czech Republic	4	..	0.4	..	0.0	x	21	..
Denmark	716	-51	128.7	-55	0.8	93	35	-17
Estonia	81	-77	60.2	-73	0.1	81	0	-59
Finland	154	8	28.5	0	0.2	75	11	-39
France	419	-32	6.6	-39	0.4	77	226	-12
Germany	234	-28	2.9	-30	0.3	85	39	-39
Greece	71	-46	6.3	-51	0.1	82	142	1 392
Hungary	7	-57	0.7	-55	0.0	x	16	-11
Iceland	1 138	-24	3 568.7	-40	1.2	99	5	88
Ireland	214	-1	47.7	-23	0.2	88	44	66
Israel	3	-70	0.3	-82	0.0	71	20	37
Italy	217	-42	3.6	-45	0.2	65	160	8
Japan	3 761	-61	29.4	-62	4.0	73	557	-31
Korea	1 747	-29	35.1	-39	1.9	71	507	35
Luxembourg	..	..		..	..	x	..	..
Mexico	1 566	15	13.8	-15	1.7	73	137	514
Netherlands	370	-9	22.2	-18	0.4	93	43	-58
New Zealand	428	23	97.1	-6	0.5	89	117	310
Norway	2 281	42	460.6	22	2.4	94	1 139	656
Poland	192	-57	5.0	-57	0.2	87	29	10
Portugal	216	-34	20.4	-37	0.2	92	9	84
Slovak Republic	2	..	0.4	..	0.0	x	1	..
Slovenia	1	..	0.4	..	0.0	74	1	..
Spain	993	-11	21.5	-25	1.1	92	272	33
Sweden	181	-28	19.2	-35	0.2	96	13	47
Switzerland	2	-48	0.2	-56	0.0	x.	1	18
Turkey	515	36	7.0	1	0.6	85	189	3 167
United Kingdom	605	-20	9.8	-26	0.6	74	177	254
United States	5 153	-7	16.5	-26	5.5	71	397	26
OECD	**25 383**	**-31**	**20.5**	**-41**	**27.1**	**79**	**5 501**	**95**
World	93 494	10	13.4	-16	100.0	73	62 700	380

Source: FAO, *FAOSTAT* (2012) and *FISHSTAT* (2012) (databases).

StatLink http://dx.doi.org/10.1787/888932978284

Municipal waste

Waste is generated at all stages of human activities. Its composition and amounts depend largely on consumption and production patterns.

Municipal waste is only part of total waste generated (about 10%), but its management and treatment often represents more than one-third of public sector financial efforts to abate and control pollution. The main concerns raised by municipal waste relate to the potential impact from inappropriate waste management on human health and the environment (soil and water contamination, air quality, climate, land use and landscape).

Definitions

The indicators presented here refer to total amounts of municipal waste generated as well as waste generation intensities expressed per capita. Treatment and disposal shares of municipal waste, along with private final consumption expenditure, are shown as complementary information.

Municipal waste is waste collected by or on behalf of municipalities. It includes household waste originating from households (i.e. waste generated by the domestic activity of households) and similar waste from small commercial activities, office buildings, institutions such as schools and government buildings, and small businesses that treat or dispose of waste at the same facilities used for municipally collected waste.

Waste generation intensities are first approximations of potential environmental pressure; more information is needed to describe the actual pressure. These indicators should be complemented with information on waste management practices and costs, and on consumption levels and patterns.

Overview

During the 1990s, municipal waste generated in the OECD area has risen (+19%) along with a rise in private consumption expenditure (+33%) and GDP (+31%). As of the early 2000s this rise has been slowing down. Today, the quantity of municipal waste generated exceeds an estimated 660 million tonnes. A person living in the OECD area generates on average 530 kg of waste per year; this is 30 kg more than in 1990, but 30 kg less than in 2000.

The amount and composition of municipal waste vary widely among OECD countries, being related to levels and patterns of consumption, the rate of urbanisation, lifestyles, and national waste management practices.

Over the last two decades, OECD countries have put significant efforts into curbing municipal solid waste generation. More and more waste is being diverted from landfills and incinerators and fed back into the economy through recycling. Landfill nonetheless remains the major disposal method in many OECD countries.

See Annex A for OECD trends in decoupling and treatment.

Comparability

The definition of municipal waste, the types of waste covered and the surveying methods used to collect information vary from country to country and over time.

The main problems in terms of data comparability relate to the coverage of waste from commerce and trade, and of separate waste collections that may include hazardous waste from households such as waste batteries or electric and electronic equipments.

In some cases the reference year refers to the closest available year.

For additional notes, see Annex B.

Source

OECD Environment Statistics (database), *http://dx.doi.org/10.1787/data-00601-en*.

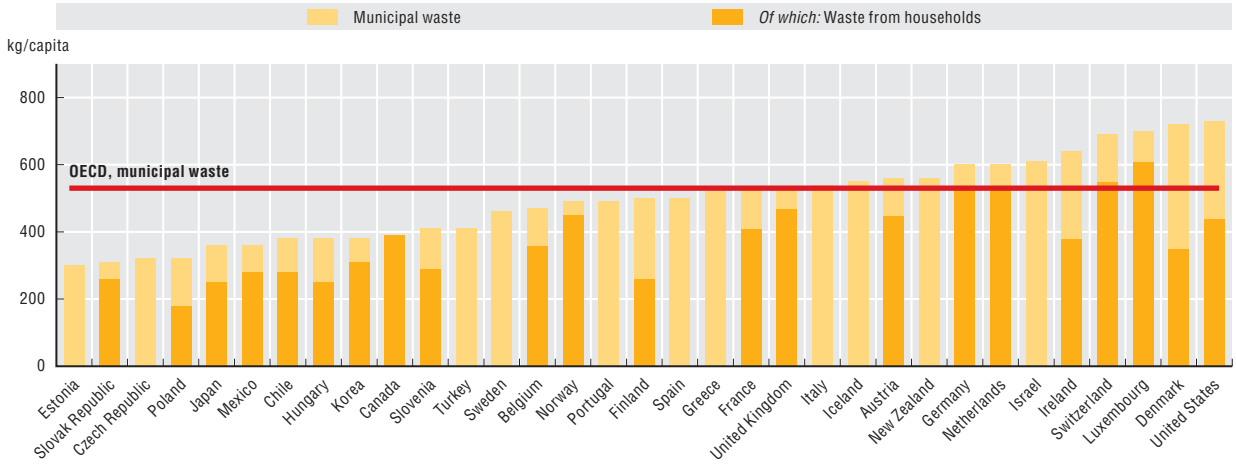
Further information

OECD Resource productivity and waste, *www.oecd.org/env/waste*.

OECD (2012), "Review of the OECD Environmental Strategy for the First Decade of the 21st Century", OECD, Paris, *www.oecd.org/env/50032165.pdf*.

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

Figure 1.25. **Municipal waste generation intensities per capita, 2011**



Source: OECD Environment Statistics (database).

StatLink http://dx.doi.org/10.1787/888932977106

Table 1.12. **Municipal waste generation and private consumption**

	Municipal waste generated, per capita			*of which:* From households	Private final consumption expenditure, per capita	
	kg/cap	% change	% change	kg/cap	1 000 USD/cap	% change
	2011	1990-2011	2000-2011	2011	2011	1990-2011
Australia	640	-7	-7	..	21	51
Austria[1]	560	33	6	450	19	29
Belgium[1]	470	38	-2	360	17	25
Canada[1]	..	..	..	390	21	42
Chile	380	52	15	280	9	155
Czech Republic	320	..	-3	..	11	..
Denmark	720	..	..	350	16	28
Estonia[1]	300	..	-20	..	9	..
Finland	500	..	0	260	17	39
France[1]	530	18	4	410	18	26
Germany	600	..	-6	530	19	..
Greece	520	73	27	..	17	..
Hungary[1]	380	..	-16	250	9	40
Iceland[1]	550	..	20	..	17	20
Ireland[1]	620	..	7	380	17	68
Israel	610	..	-3	..	15	..
Italy	540	..	6	..	17	18
Japan[1]	350	-7	-12	250	18	20
Korea[1]	380	..	6	310	14	117
Luxembourg	700	..	8	610	26	32
Mexico[1]	360	..	16	280	9	35
Netherlands	600	20	-2	530	17	26
New Zealand	560	..	-27	..	15	35
Norway[1]	490	..	34	450	22	70
Poland[1]	320	-10	-19	180	11	141
Portugal[1]	490	63	11	..	14	44
Slovak Republic[1]	310	..	15	260	11	..
Slovenia[1]	410	..	1	290	14	..
Spain[1]	500	..	-18	..	15	34
Sweden	460	24	7	..	17	34
Switzerland	690	13	5	550	22	13
Turkey[1]	410	14	-15	..	9	70
United Kingdom[1]	530	13	-9	470	21	45
United States[1]	730	-4	-6	440	30	42
OECD[1]	**530**	**6**	**-5**	**..**	**19**	**..**

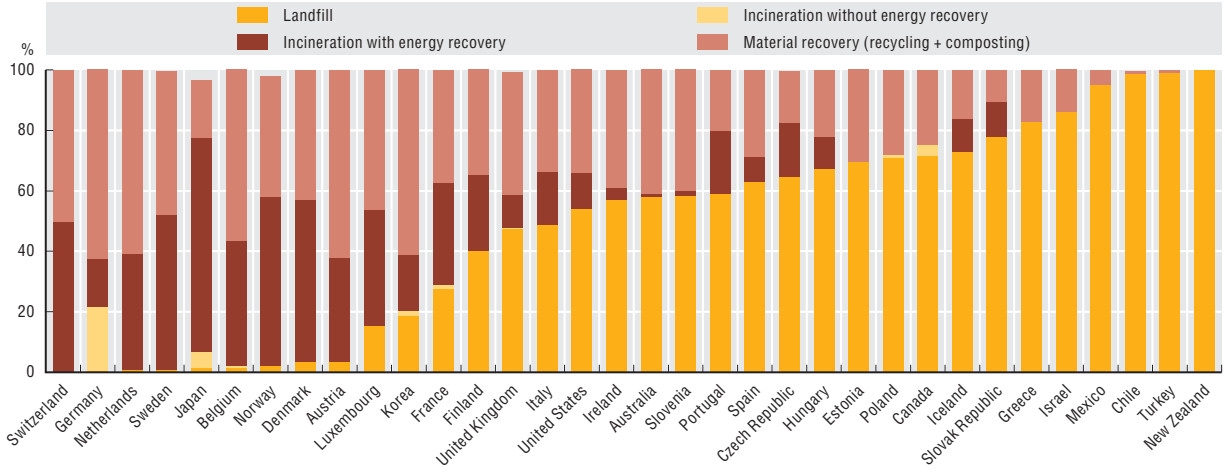
1. See Annex B for country notes.

Source: OECD Environment Statistics (database).

StatLink http://dx.doi.org/10.1787/888932978303

Figure 1.26. **Municipal waste disposal and recovery shares, 2011**

% of amounts treated



Source: OECD Environment Statistics (database).

StatLink http://dx.doi.org/10.1787/888932977125

Table 1.13. **Municipal waste disposal and recovery shares, 2011**

% of amounts treated

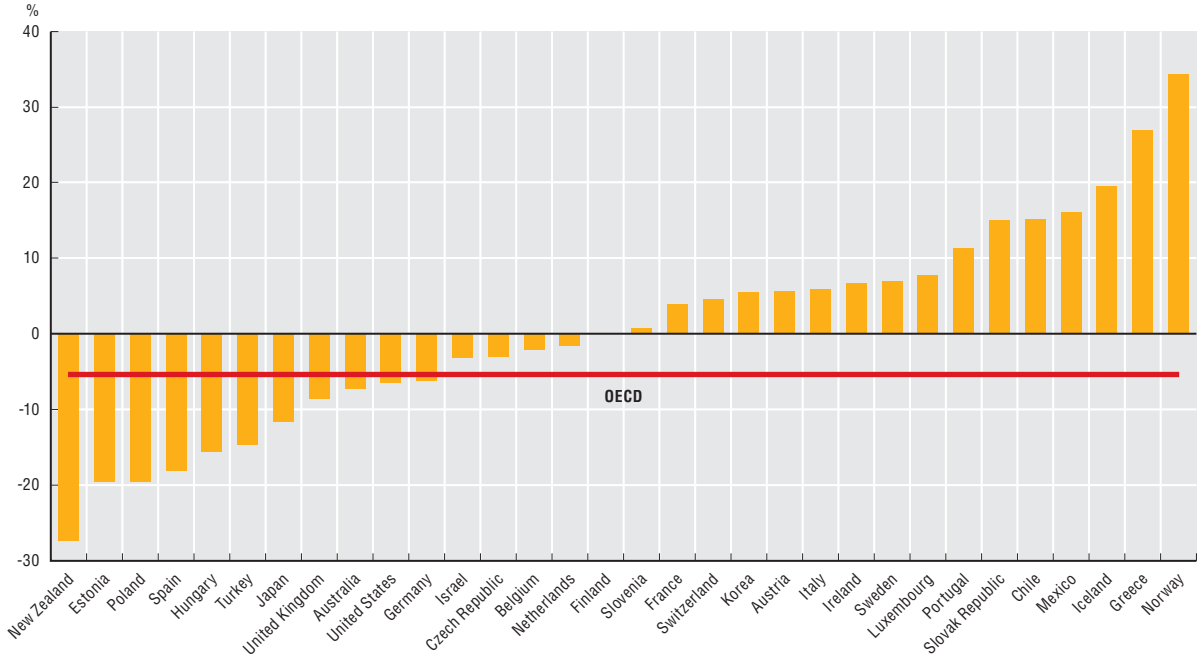
	Recycling and composting	Incineration with energy recovery	Incineration without energy recovery	Landfill
Australia	41	1	-	58
Austria[1]	62	34	-	3
Belgium[1]	57	41	1	1
Canada[1]	25	-	4	72
Chile	1	-	-	99
Czech Republic	17	18	-	65
Denmark	43	54	-	3
Estonia[1]	30	-	-	70
Finland	35	25	-	40
France[1]	37	34	1	28
Germany	63	16	21	-
Greece	17	-	-	83
Hungary[1]	22	11	-	67
Iceland[1]	16	11	-	73
Ireland[1]	39	4	-	57
Israel	14	-	-	86
Italy	34	17	-	49
Japan[1]	19	70	6	2
Korea[1]	61	19	2	19
Luxembourg	46	38	-	15
Mexico[1]	5	-	-	95
Netherlands	61	38	-	1
New Zealand	-	-	-	100
Norway[1]	40	56	-	2
Poland[1]	28	-	1	71
Portugal[1]	20	21	-	59
Slovak Republic[1]	11	11	-	78
Slovenia[1]	40	2	-	58
Spain[1]	29	8	-	63
Sweden	47	51	-	1
Switzerland	50	50	-	-
Turkey[1]	1	-	-	99
United Kingdom[1]	40	11	-	48
United States[1]	34	12	-	54
OECD[1]	**33**	**19**	**3**	**46**

1. See Annex B for country notes.

Source: OECD Environment Statistics (database).

StatLink http://dx.doi.org/10.1787/888932978322

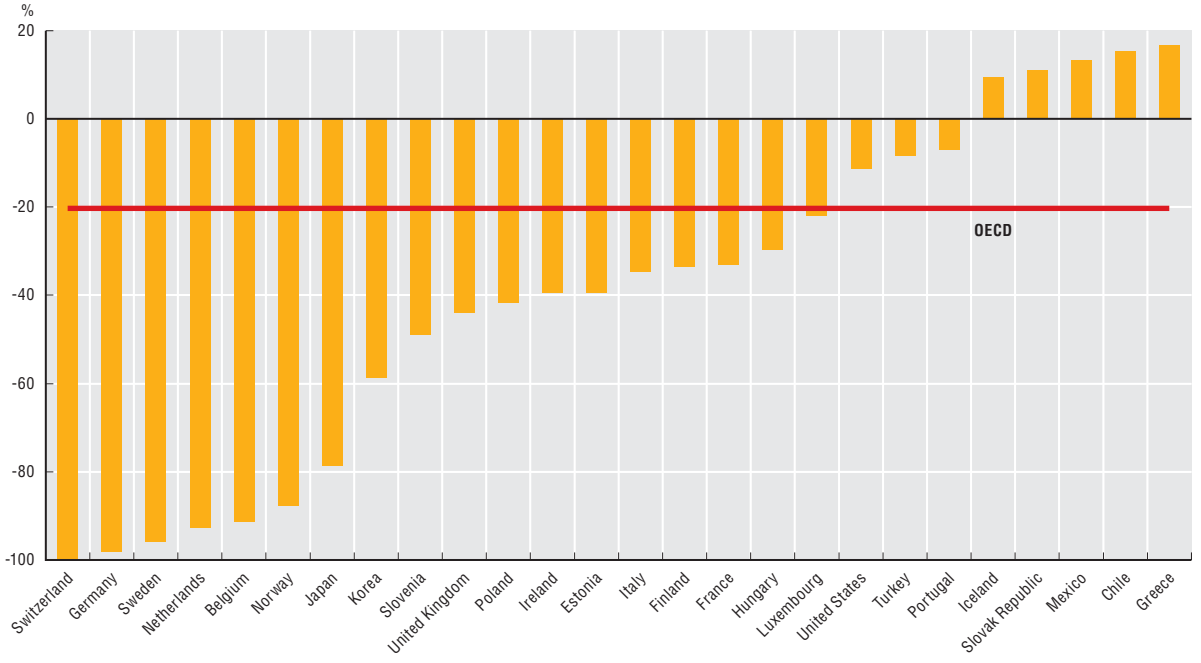
Figure 1.27. **Change in the amounts of municipal waste generated per capita, since 2000**



Source: OECD Environment Statistics (database);.

StatLink http://dx.doi.org/10.1787/888932977144

Figure 1.28. **Change in the amounts of municipal waste landfilled per capita, since 2000**



Source: OECD Environment Statistics (database).

StatLink http://dx.doi.org/10.1787/888932977163

Industrial and hazardous waste

Some waste streams, such as hazardous waste, nuclear waste and industrial waste are of particular concern since they entail serious environmental risks if badly managed. Hazardous waste is mainly generated by industrial activities. The amounts produced and their composition are largely driven by production patterns. Their impacts on the environment relate mainly to toxic contamination of soil, water and air.

Definitions

The indicators presented here relate to:

- Waste from manufacturing industries: the data refer to primary waste.
- Hazardous waste: the data refer to waste streams controlled according to the Basel Convention on Transboundary Movements of Hazardous Wastes and their Disposal. They do not reflect toxicity levels or other risks posed by such waste, nor its real impact on the environment. Transboundary movements are shown as complementary information.
- Nuclear waste: the data refer to spent fuel arisings in nuclear power plants and are expressed in tonnes of heavy metal. It should be noted that these data do not represent all radioactive waste generated.

When interpreting these indicators it should be kept in mind that waste generation intensities are first approximations of potential environmental pressure; more information is needed to describe the actual pressure. These indicators should be read in connection with information on waste management practices and costs.

Overview

The manufacturing industry has been generating increasing amounts of waste in recent decades. Changes in production patterns and related technologies, and in waste management practices, have altered the composition of such waste.

Generation intensities per unit of GDP reflect wide variations among OECD countries, in particular for hazardous waste.

Nuclear waste is directly related to the share of nuclear power in national energy supply and the types of nuclear technology adopted.

Little information is available on trends in the generation of industrial and hazardous waste.

E-waste has become one of the major environmental challenges of the 21st century: it is the fastest-growing waste stream in the world, estimated at 20-50 million tonnes per year (Schwarzer et al., 2005). It is of particular interest because it contains not only hazardous substances – such as heavy metals including mercury and lead, and endocrine-disrupting substances such as brominated flame retardants (BFRs) – but also many strategic metals such as gold, palladium and rare earth metals that can be recovered and recycled.

Comparability

Despite considerable progress, data on the generation and management of industrial and hazardous waste remain weak in many countries; the types of waste covered, the definitions and surveying methods employed may vary considerably among countries and over time.

Many European countries report data on hazardous waste according to the European Waste Catalogue.

Data on net transboundary movements of hazardous waste may refer to total authorisations (or notifications) and not to actual amounts moved.

For additional notes, see Annex B.

Sources

OECD Environment Statistics (database), *http://dx.doi.org/10.1787/data-00601-en*.

OECD (2012), *Nuclear Energy Data 2012*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/ned-2012-en-fr*.

Further information

Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, *www.basel.int/*.

European Commission, Environmental Data Centre on Waste, *http://epp.eurostat.ec.europa.eu/portal/page/portal/waste/introduction*.

OECD Resource productivity and waste, *www.oecd.org/env/waste*.

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

Table 1.14. **Industrial, hazardous and nuclear waste, 2010 or latest available year**

	Industrial waste		Hazardous waste			Nuclear waste	
	Waste from manufacturing industry		Production		Net transboundary movements (exports-imports)	Spent fuel arisings, 2011	
	Total	Per unit of GDP	Total	Per unit of GDP		Total	Per capita
	1 000 tonnes	kg/1 000 USD	1 000 tonnes	kg/1 000 USD	1 000 tonnes	Tonnes HM	kg/1 000 inh.
Australia	13 120	17	2 216	2.7	36	0	-
Austria[1]	2 950	10	..	..		0	-
Belgium[1]	14 520	40	4 479	12.5	..	129	12
Canada	..	..	..	0.0	-56	1 446	42
Chile	1 830	8	423	1.7	1	0	-
Czech Republic[1]	4 180	16	1 363	5.5	..	266	25
Denmark[1]	1 210	6	826	4.6	-12	0	-
Estonia[1]	3 720	147	6 784	311.7	-9	0	-
Finland[1]	15 200	86	2 559	15.2	103	62	12
France[1]	20 350	10	11 538	6.0	..	300	5
Germany[1]	48 690	18	19 931	7.3	-3 738	230	3
Greece[1]	4 920	17	295	1.1	..	0	-
Hungary[1]	3 130	17	368	2.2	48	49	5
Iceland	..	..	8	0.8	4	0	-
Ireland[1]	3 260	19	288	1.8	140	0	-
Israel	..	..	303	1.5	6	0	-
Italy[1]	39 040	23	7 179	4.4	..	0	-
Japan	115 813	29	..	..	83	822	6
Korea[1]	49 870	40	3 502	2.8	-148	641	13
Luxembourg[1]	500	14	379	10.9	..	0	-
Mexico	..	..	..	0.0	-1 067	24	0
Netherlands[1]	14 060	22	4 421	7.2	..	8	0
New Zealand	..	..	..	0.0	9	0	-
Norway[1]	2 690	12	..	0.0	-210	0	-
Poland[1]	28 560	46	1 492	2.3	..	0	-
Portugal[1]	9 760	42	1 624	7.0	53	0	-
Slovak Republic[1]	2 710	25	485	4.6	4	39	7
Slovenia[1]	1 450	26	117	2.3	..	15	7
Spain[1]	16 360	13	2 991	2.4	..	179	4
Sweden[1]	7 820	25	2 515	7.9	..	0	-
Switzerland[1]	1 570	5	1 753	6.0	183	59	7
Turkey	11 410	13	1 018	1.2	30	0	-
United Kingdom[1]	19 710	10	3 769	1.9	430	212	3
United States[1]	..	..	31 147	2.3	..	2 159	7

1. See Annex B.

Source: *OECD Environment Statistics* (database); OECD (2012), *Nuclear Energy Data 2012*.

StatLink http://dx.doi.org/10.1787/888932978341

Use of material resources

Material resources form the physical foundation of the economy; they provide essential raw materials and other commodities to support economic activity. Their use in economic activities and the related production and consumption processes have many environmental, economic and social consequences that often extend beyond the borders of individual countries or regions.

The intensity and nature of these consequences depend on the kind and amounts of natural resources and materials used, the stage of the resource cycle at which they occur, the way the material resources are used and managed, and the type and location of the natural environment from where they originate.

Efficient use of material resources all the way through the economy is important for assuring adequate supplies of materials to economic activities, diminishing the associated environmental burden and preventing the degradation and depletion of natural resources.

Definition

The indicators presented here refer to:

- Domestic material consumption (DMC), expressed in tonnes and per capita. It measures the mass of the materials that are physically used in the domestic economy, i.e. direct apparent consumption. It equals the sum of domestic extraction plus imports net of exports.
- Material intensity (DMC/GDP), expressed in tonnes per USD 1 000. It measures the physical material inputs used to generate value added.

These indicators do not reflect environmental impacts; they are first approximations of potential environmental pressure; more information is needed to describe the actual pressure. They should be read in conjunction with information on commodity prices, flows of secondary raw materials, waste recovery ratios, waste management practices and costs, and consumption levels and patterns.

Overview

Domestic material consumption (DMC) in OECD countries grew by 12% during the 1990s, stabilised at around 22 Gt per year in the early 2000s, and decreased in the late 2000s due to the 2008 economic downturn.

- Per capita material consumption in OECD countries remains high (about 17 tonnes per person per year) and is about three times that of the rest of the world.
- The materials mix is increasingly driven by demand for materials originating from non-renewable natural resource stocks, due to sectoral shifts in OECD economies. Given their weight, construction minerals dominate the material mix of OECD countries and often determine the overall trend.
- Material intensity is improving. This is due to improved efficiency but also to the economic downturn and the rise of the service sector. Other factors that play a role are increasing imports and the displacement of resource-intensive production to other countries. Once indirect flows are considered, i.e. raw materials embedded in traded goods but not physically imported, improvements are more moderate.

Imports accounted for almost one-third of domestic material inputs in 2010-11, compared to one-quarter in 1990. They make up 40% of material inputs in OECD Europe and OECD Asia-Pacific, and less than 15% in OECD Americas.

See Annex A for OECD decoupling and materials mix.

Comparability

Indicators presented are estimates. Their interpretation should take into account the properties and composition of material groups, as well as countries' endowments in natural resources and the structure of their economy.

Data coverage and completeness vary by variable and by country. In general, caution needs to be exercised when drawing conclusions based on country-level data. Although considerable progress has been made in the past decade to set up material flow accounts, missing information, including on physical flows of international trade, and a lack of consensus on conversion factors limit the calculation of some material flow indicators at international level.

For additional notes, see Annex B.

Source

OECD Environment Statistics (database), *http://dx.doi.org/10.1787/data-00601-en*.

SERI (Sustainable Europe Research Institute), Wuppertal Institute for Climate, Environment, Energy, online portal for data on global resource extraction, *www.materialflows.net*.

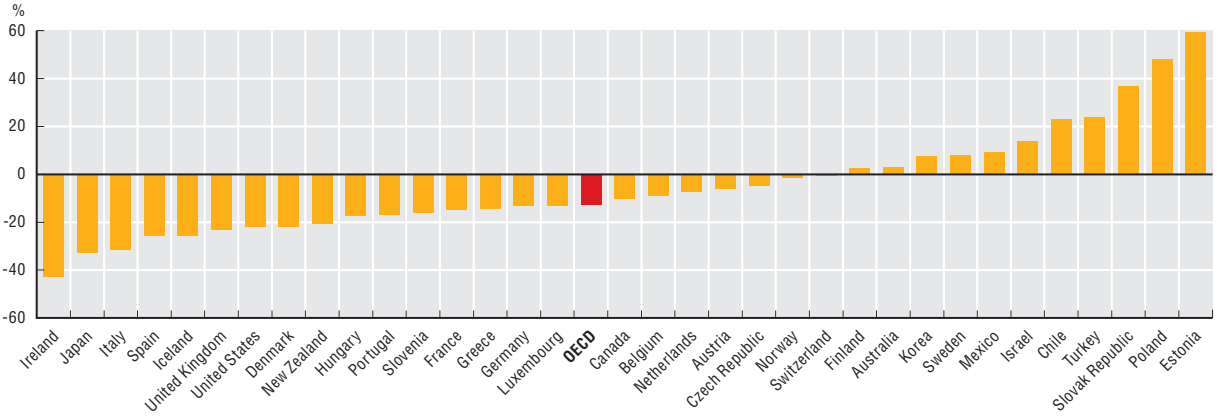
Further information

OECD (2014), *Material resources, productivity and the environment*, OECD Green Growth Studies, OECD Publishing, Paris, forthcoming.

OECD (2011), "Resource Productivity in the G8 and the OECD – A Report in the Framework of the Kobe 3R Action Plan", OECD, Paris, *www.oecd.org/env/waste/47944428.pdf*.

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

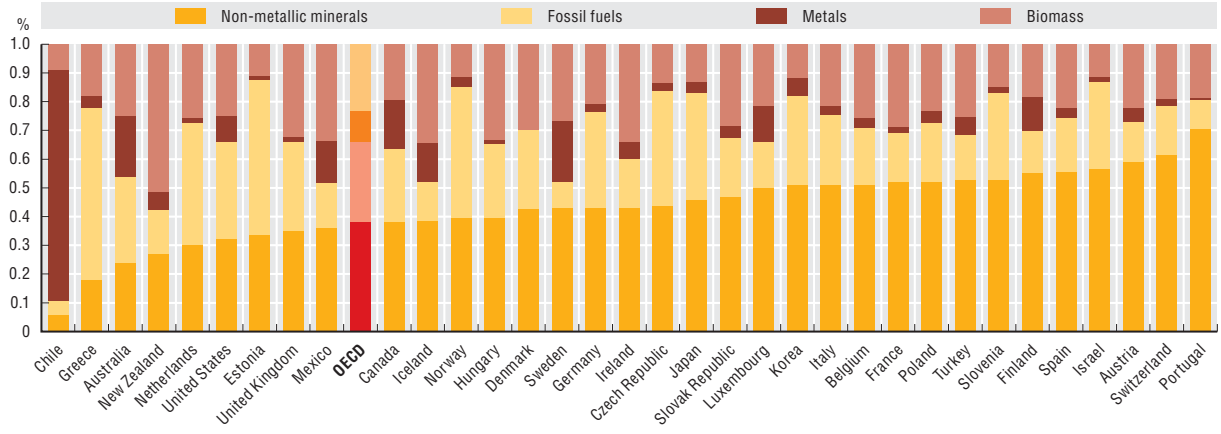
Figure 1.29. **Change in domestic material consumption per capita, since 2000**



Source: OECD Environment Statistics (database).

StatLink http://dx.doi.org/10.1787/888932977182

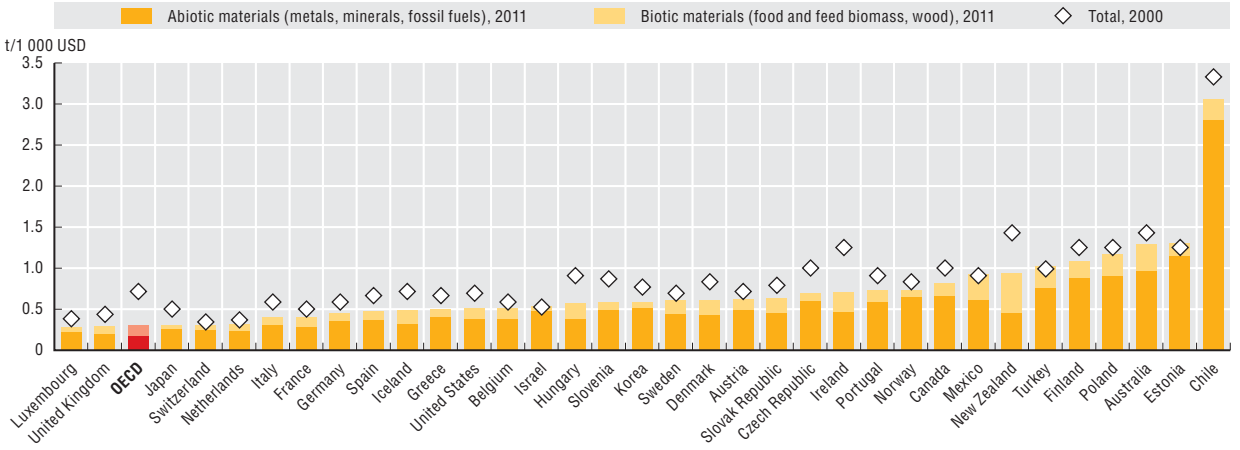
Figure 1.30. **Composition of domestic material consumption, 2011**



Source: OECD Environment Statistics (database).

StatLink http://dx.doi.org/10.1787/888932977201

Figure 1.31. **Domestic material intensity (DMC/GDP) by material categories, 2000-11**



Source: OECD Environment Statistics (database).

StatLink http://dx.doi.org/10.1787/888932977220

2. SECTORAL TRENDS OF ENVIRONMENTAL SIGNIFICANCE

Energy intensity and mix

Energy prices and taxes

Road traffic, vehicles and networks

Road fuel prices

Agricultural nutrient balances

GDP, population and consumption

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*.

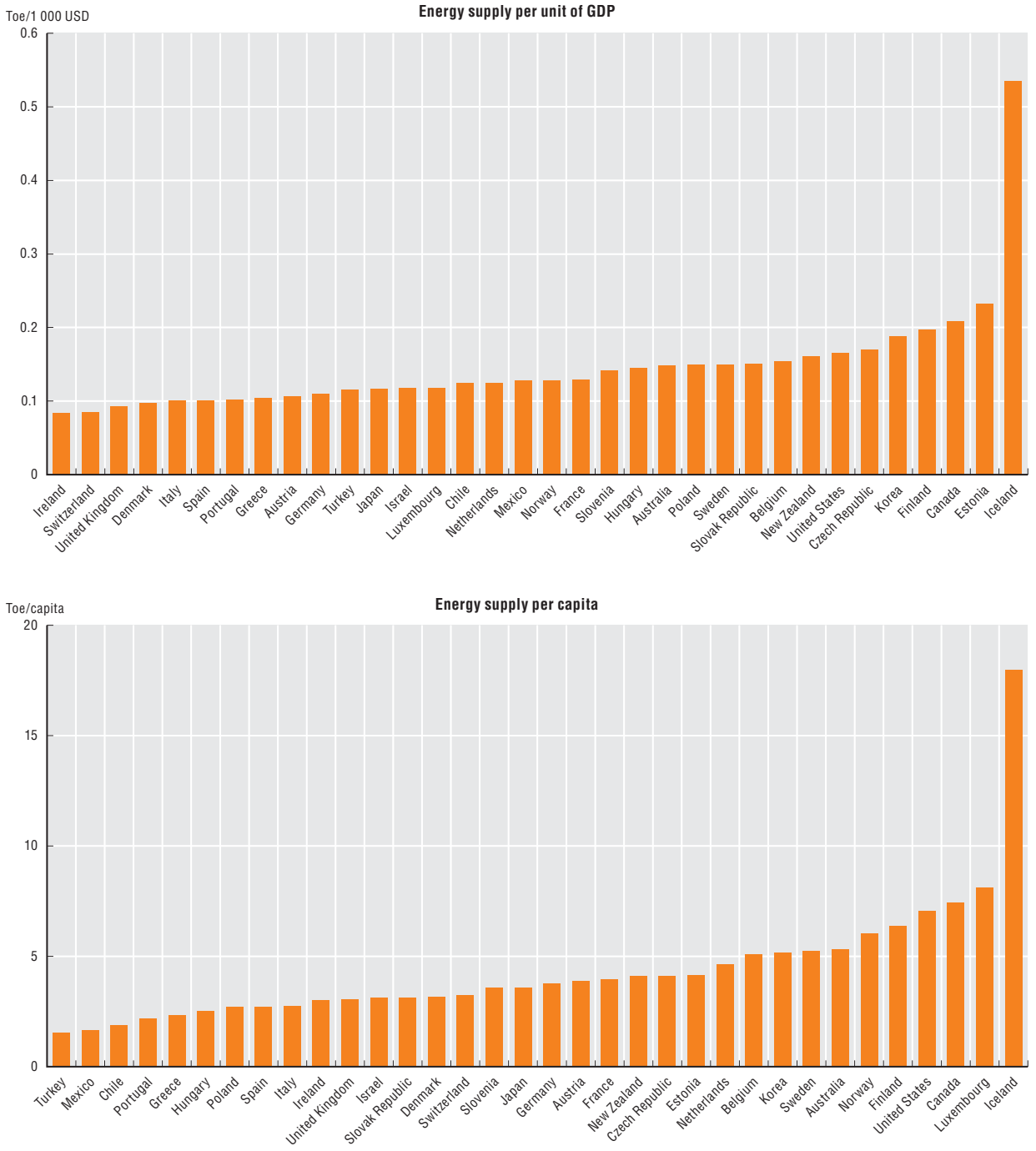
Further information

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*.

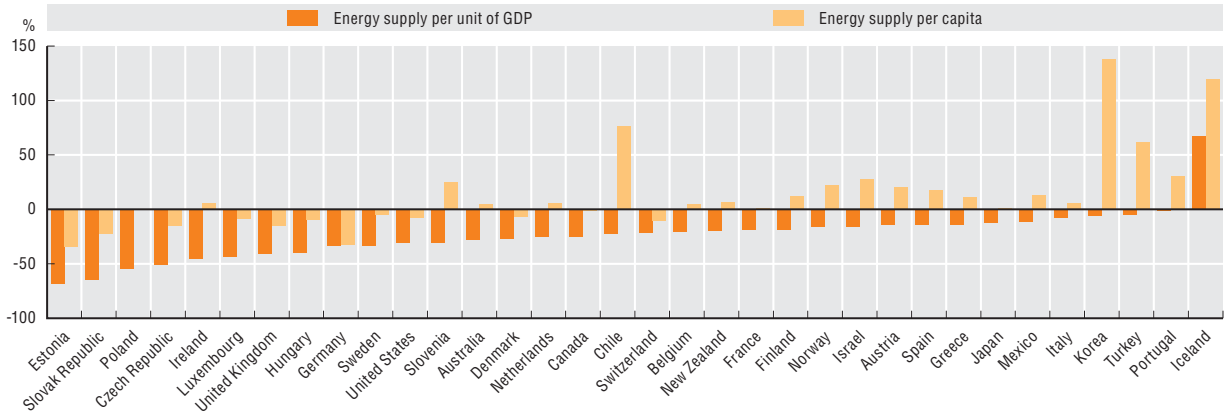
Figure 2.1. **Energy intensity, 2011**



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

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

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	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

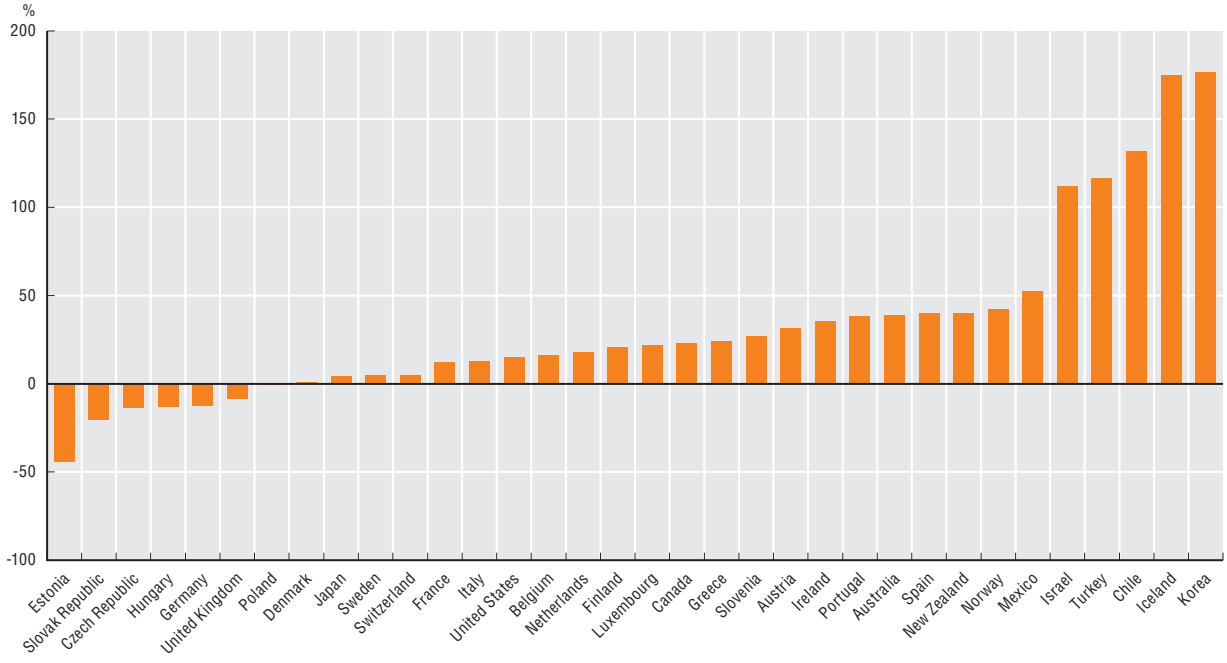
1. See Annex B for country notes.

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**

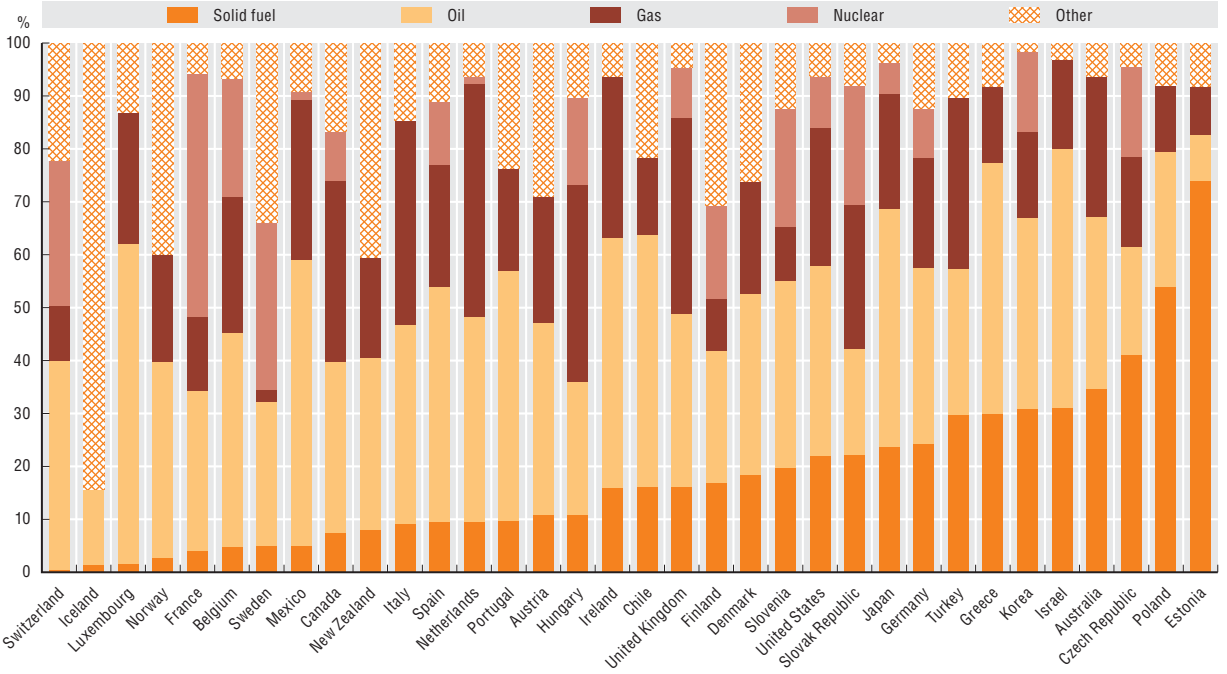
Percentage change



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

Energy prices and taxes

Energy end-use prices influence overall energy demand and the fuel mix, which in turn determine environmental pressures caused by energy activities. They also help internalise environmental costs. Though price elasticity varies considerably by end-use sector, historical and cross-country experience suggests that the overall price effect on energy demand is strong and that increases in energy prices have reduced energy use and hence its environmental impact.

Definitions

The indicators presented here relate to:

- Energy end-use prices and taxes for selected energy sources and for industry and households.
- Real price indices are calculated using the Paasche method and deflated using the country-specific producer price index (industrial sector) and the consumer price index (household sector).

When analysing energy end-use prices, consideration should be given to the various support measures that may provide a benefit or preference for a particular activity or product, either absolutely or relatively. Equally, when examining energy taxes, consideration should be given to the range of energy products taxed, tax base definitions, and tax rate levels and rebates.

Overview

Energy prices and related taxes, whether for industry or households, vary widely among countries for all types of energy.

Real end-use energy prices have been relatively stable in most OECD countries up to the early 2000s, though rates of change differ greatly among countries. Since then, real end-use prices have increased mainly due to a rise in crude oil prices.

Comparability

Care should be taken when comparing end-use energy prices, and the way that energy use is taxed. In view of the large number of factors involved, direct comparisons may be misleading. However, comparisons may be the starting point for analysis of differences observed.

For additional notes, see Annex B.

Sources

IEA on-line data service, *http://data.iea.org*.

IEA energy prices, *www.iea.org/stats/surveys/mps.pdf* .

IEA (2013), *Energy Prices and Taxes*, Vol. 2012/4, OECD Publishing, Paris, *http://dx.doi.org/10.1787/energy_tax-v2012-4-en*.

Further information

IEA (2012a), *Energy Statistics of OECD Countries 2012*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/energy_stats_oecd-2012-en*.

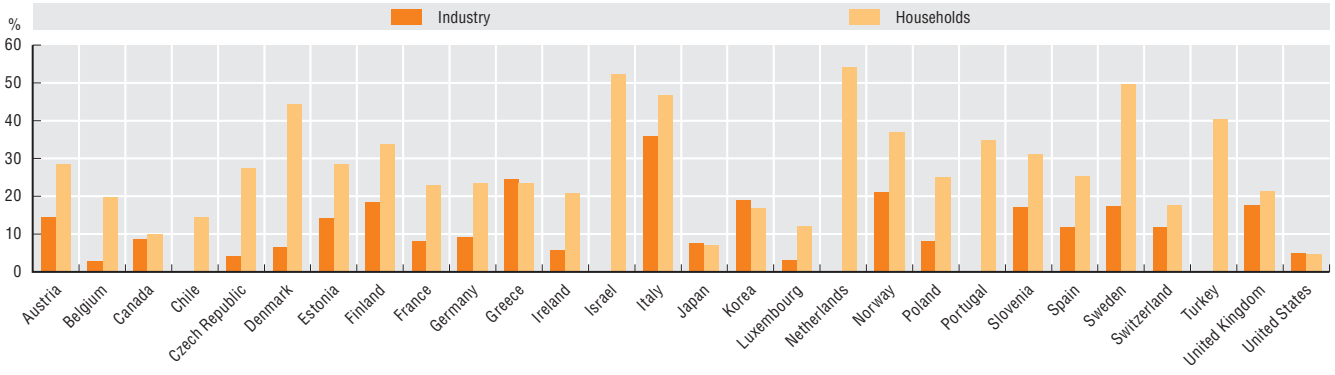
IEA (2012b), *World Energy Outlook 2012*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/weo-2012-en*.

OECD (2013a), *Inventory of Estimated Budgetary Support and Tax Expenditures for Fossil Fuels 2013*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264187610-en*.

OECD (2013b), *Taxing Energy Use: A Graphical Analysis*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264183933-en*.

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

Figure 2.5. **Tax component of oil prices for industry and households, 2011 or latest available year**



Source: IEA (2013), *Energy Prices and Taxes*, Vol. 2012/4, OECD Publishing, Paris.

StatLink http://dx.doi.org/10.1787/888932977315

Table 2.2. **Selected energy prices for industry and households, 2011 or latest available year**

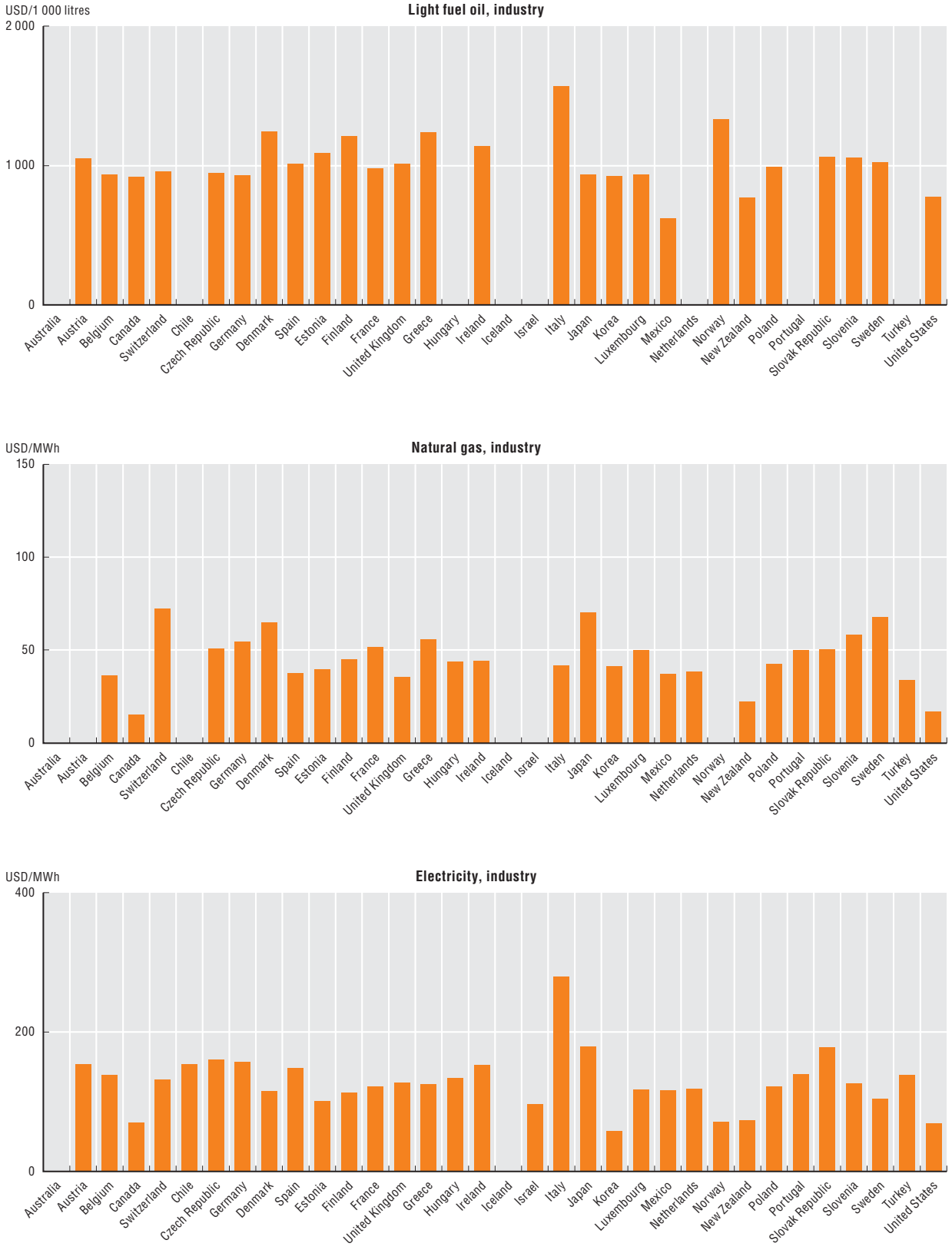
	Industry						Households					
	Oil		Gas		Electricity		Oil		Gas		Electricity	
	Price	Tax	Price	Tax	Price	Tax	Price	Tax	Price	Tax	Price	Tax
	USD/ 1 000 litres	*of which:* %	USD/MWh on a GCV basis	*of which:* %	USD/MWh	*of which:* %	USD/ 1 000 litres	*of which:* %	USD/MWh on a GCV basis	*of which:* %	USD/MWh	*of which:* %
Australia	..	..	..	..	..	..	..	..	..	..	..	..
Austria[1]	1 052	14	..	..	154	17	1 283	29	93	26	273	27
Belgium	934	3	36	2	139	12	1 130	20	95	20	264	27
Canada	918	9	15	5	70	9	1 116	10	37	5	95	8
Chile	..	..	..	..	154	..	1 211	14	138	16	211	16
Czech Republic	945	4	51	3	160	1	1 251	27	83	17	211	17
Denmark[1]	1 245	6	65	55	115	8	1 933	44	141	49	409	56
Estonia	1 091	14	40	4	101	13	1 309	28	60	22	137	27
Finland	1 209	18	45	25	114	9	1 487	34	62	37	214	30
France	981	8	52	4	122	14	1 235	23	87	17	187	29
Germany	925	9	54	10	157	29	1 136	23	93	24	352	45
Greece	1 236	24	56	4	126	14	1 220	23	108	14	173	18
Hungary	..	..	44	3	134	4	..	..	64	20	233	21
Iceland	..	..	..	..	..	..	..	..	..	..	..	..
Ireland	1 141	6	44	9	152	..	1 410	21	81	17	259	12
Israel	..	..	..	..	97	..	2 030	52	..	..	149	14
Italy	1 568	36	42	13	279	27	1 887	47	94	38	279	28
Japan	937	7	70	5	179	7	1 134	7	165	5	261	7
Korea[1]	923	19	41	12	58	..	1 198	17	50	19	89	..
Luxembourg	933	3	50	1	118	5	1 028	12	74	8	220	14
Mexico[1]	623	..	37	..	117	..	..	..	37	14	95	14
Netherlands[1]	..	..	39	8	118	13	926	54	97	40	238	19
New Zealand	772	..	22	6	74	..	..	..	100	14	212	13
Norway	1 330	21	..	..	71	20	1 663	37	..	..	171	32
Poland	988	8	43	..	122	6	1 245	25	72	19	199	22
Portugal	..	..	50	..	139	..	1 469	35	94	9	246	9
Slovak Republic	1 059	..	50	4	178	..	..	..	69	17	242	17
Slovenia	1 058	17	58	11	126	9	1 270	31	99	23	202	24
Spain[1]	1 015	12	38	..	149	5	1 198	25	89	15	295	19
Sweden	1 023	17	68	18	104	1	1 991	50	164	44	248	37
Switzerland	959	12	72	11	132	4	1 103	18	107	15	222	10
Turkey	..	..	34	19	139	19	1 820	40	42	15	169	22
United Kingdom	1 012	18	36	3	127	3	1 091	21	67	5	211	5
United States	773	5	17	..	70	..	1 032	5	36	..	118	..
OECD	**893**	**..**	**29**	**..**	**124**	**..**	**1 166**	**..**	**61**	**..**	**174**	**..**
OECD America	..	..	..	..	..	..	..	..	..	..	..	..
OECD Asia-Oceania	..	..	..	..	..	..	..	..	..	..	..	..
OECD Europe	1 084	..	45	..	150	..	1 228	..	81	..	245	..

1. See Annex B for country notes.

Source: IEA (2013), *Energy Prices and Taxes*, Vol. 2012/4, OECD Publishing, Paris.

StatLink http://dx.doi.org/10.1787/888932978379

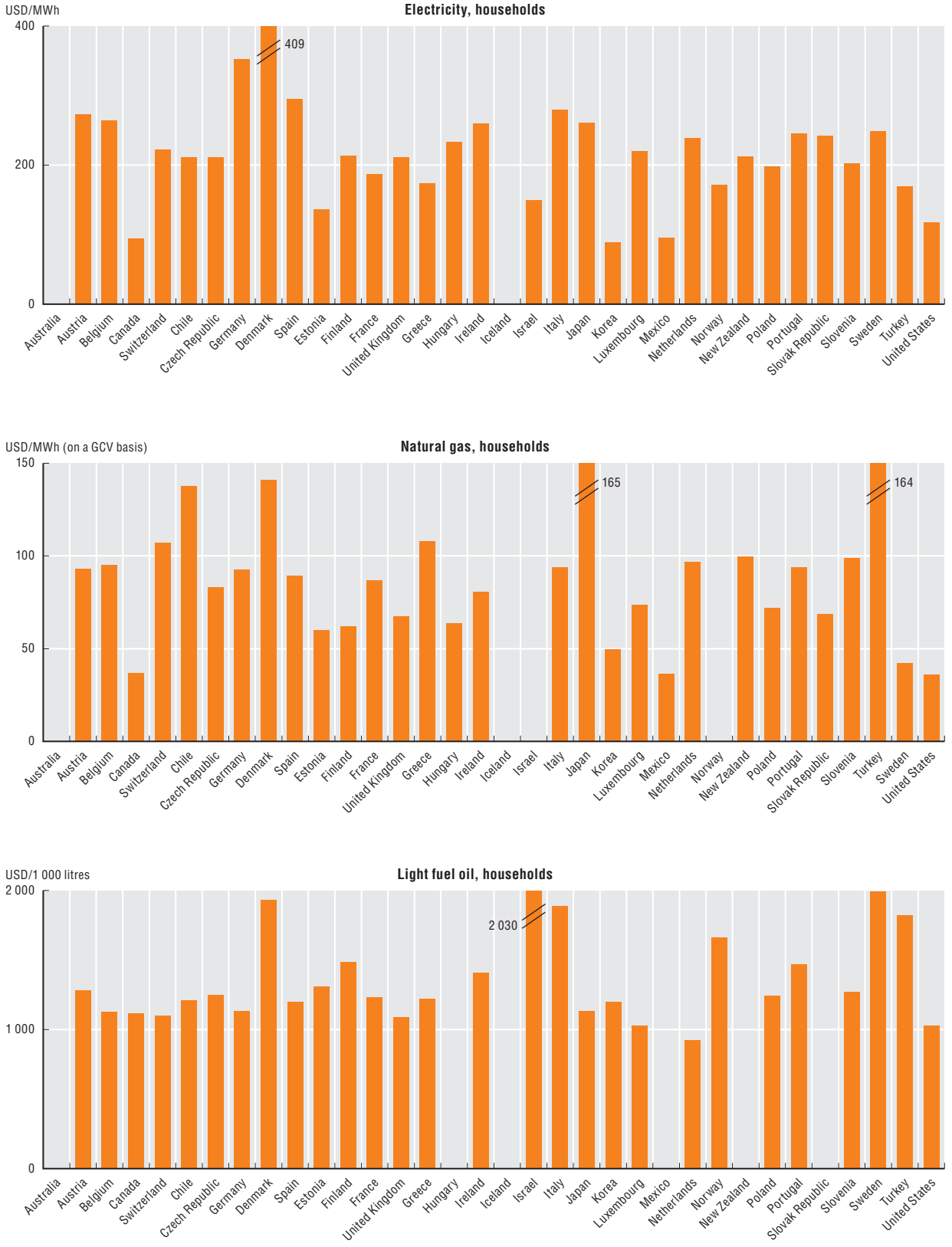
Figure 2.6. **Selected energy prices for industry, 2011 or latest available year**



Source: IEA (2013), *Energy Prices and Taxes*, Vol. 2012/4, OECD Publishing, Paris.

StatLink http://dx.doi.org/10.1787/888932977334

Figure 2.7. **Selected energy prices for households, 2011 or latest available year**



Source: IEA (2013), *Energy Prices and Taxes*, Vol. 2012/4, OECD Publishing, Paris.

StatLink http://dx.doi.org/10.1787/888932977353

Road traffic, vehicles and networks

Transport is a major component of economic activity in and of itself and as a factor input to most other economic activities. It has many effects on the environment: air pollution raises concern mainly in urban areas where road traffic and congestion are concentrated, though road transport also contributes to regional and global pollution problems such as acidification and climate change; vehicles present waste management issues; and transport infrastructure exerts pressures on the environment through use of space and physical transformation of the natural environment (e.g. fragmentation of natural habitats).

Road transport dominates compared to other transport modes. The volume of road traffic depends on the demand for transport (largely determined by economic activity and transport prices) and on transport supply (e.g. the development of road infrastructure).

Definitions

The indicators presented here relate to:

- Road traffic and vehicle intensities, i.e. traffic volumes per unit of GDP and per kilometre (km) of road, and vehicle numbers per capita and per kilometre of road.
- Traffic volumes are expressed in billions of km travelled by road vehicles. Data refer to total km travelled on all roads on national territory by national vehicles, with the exception of two- and three-wheeled vehicles, caravans and trailers. They are usually estimates: the average number of km travelled each year by road vehicles is multiplied by the number of motor vehicles in use.
- Road infrastructure densities, i.e. the length of road and motorway networks per km^2 of land area. The data describe the situation on 31 December of each year.
- The total road network includes all roads in a given area, i.e. motorways, main or national highways, secondary or regional roads, and others. Private roads are excluded.
- Motorways are a class of roads differing from main or national, secondary or regional, and other roads, and characterised by not serving properties bordering on them.

The indicators should be read in connection with information on the modal split of transport and on the structure of the vehicle fleet. They should further be complemented with information on congestion rates and air pollution from road traffic.

Overview

Since 1990, countries' efforts in introducing cleaner vehicles have been offset by growth in vehicle numbers and the increased scale of their use. This resulted in additional fuel consumption, CO_2 emissions and road building. Road traffic, both freight and passenger, is expected to increase further in a number of OECD countries.

- GHG emissions from the transport sector increased until the latest recession. After falling from 2007, they were at about the same level in 2009 as in 2000.
- In all OECD countries, private cars dominate the passenger transport mode, although there are notable differences in the modal shares. Since 1990, growth in private car use followed the same trend as GDP, but increased at a slightly lower rate.
- Overall, transport activities remained coupled to GDP growth. In more than one-third of OECD countries, road traffic growth rates exceeded economic growth.

Traffic intensities per unit of GDP and vehicle availability per capita show wide variations among OECD countries:

- Road density has progressed at a significantly slower pace than economic activity in most OECD countries, while the motorway density has rapidly increased, particularly in the last decade. Road density trends are similar for OECD Americas and OECD Europe, but the motorway density increased at a much higher rate in Europe, a fact perhaps related to the enlargement of the European Union (+17% between 2000 and 2008).

See Annex A for trends.

Comparability

Indicators on road traffic need to be interpreted carefully; many underlying statistics are estimates. Data on vehicle stocks and road networks should exhibit a reasonably good level of comparability among countries and over time, with a few exceptions due to differences in the definition of roads and of goods vehicles across countries.

OECD totals are based on Secretariat estimates.

For additional notes, see Annex B.

Sources

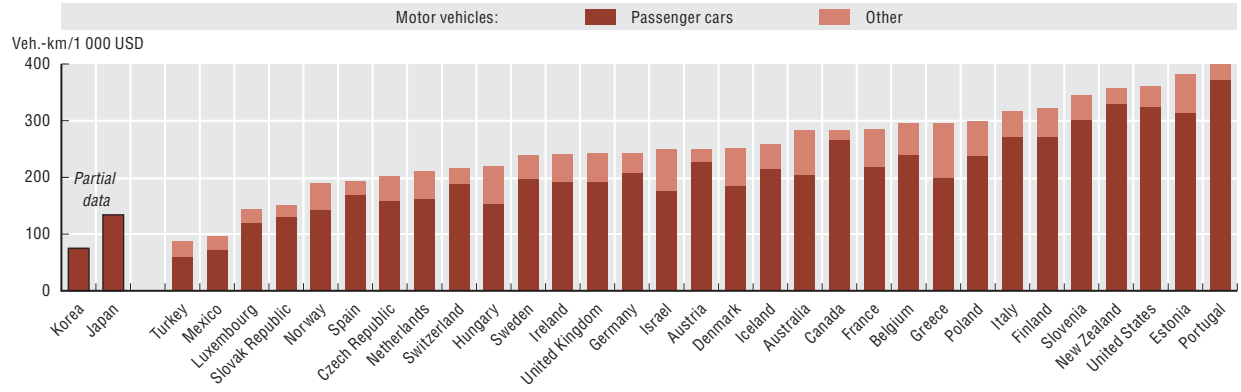
Eurostat, World Road Statistics, North American Transportation Statistics, UNECE and national sources.

OECD/International Transport Forum (2012a), *Trends in the Transport Sector 2012*, OECD Publishing, Paris/ITF, *http://dx.doi.org/10.1787/trend_transp-2012-en*.

OECD/International Transport Forum (2012b), *Transport Outlook 2012: Seamless Transport for Greener Growth*, *http://internationaltransportforum.org/Pub/pdf/12Outlook.pdf*.

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

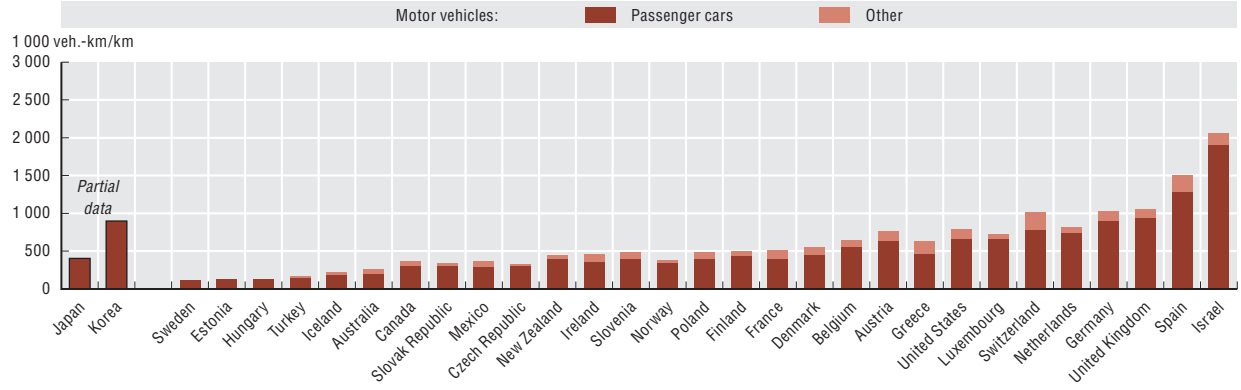
Figure 2.8. **Road traffic intensity per unit of gross domestic product (GDP), 2011 or latest available**



Source: Eurostat, World Road Statistics, UNECE and national sources.

StatLink http://dx.doi.org/10.1787/888932977372

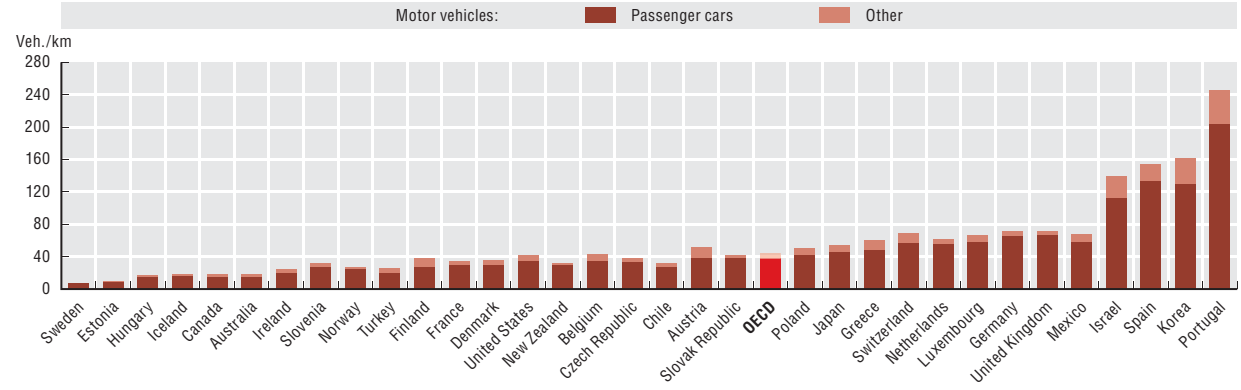
Figure 2.9. **Road traffic intensity per network length, 2011 or latest available**



Source: Eurostat, World Road Statistics, UNECE and national sources.

StatLink http://dx.doi.org/10.1787/888932977391

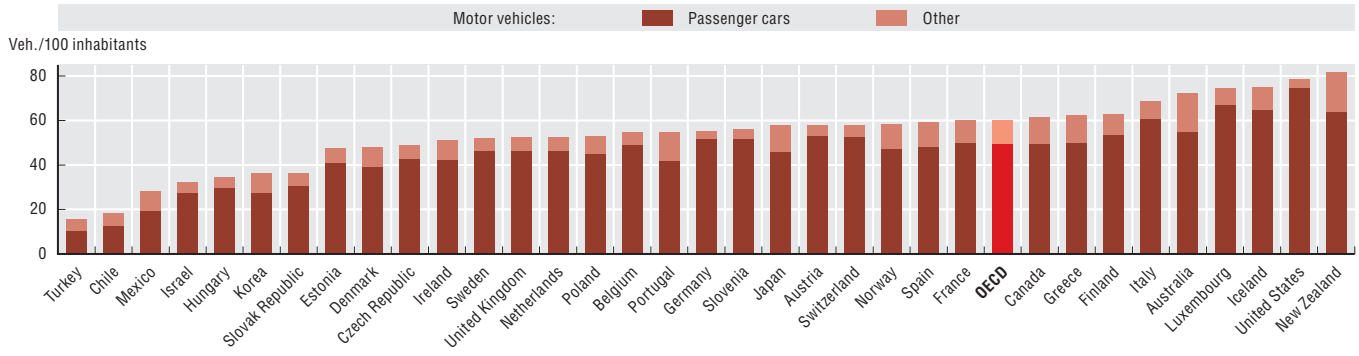
Figure 2.10. **Motor vehicle density per network length, 2011 or latest available**



Source: Eurostat, International Transport Forum, World Road Statistics, North American Transportation Statistics, UNECE and national sources.

StatLink http://dx.doi.org/10.1787/888932977410

Figure 2.11. **Motor vehicle ownership, 2011 or latest available**



Source: Eurostat, World Road Statistics, UNECE and national sources.

StatLink http://dx.doi.org/10.1787/888932977429

Table 2.3. **Road traffic and vehicles in use**

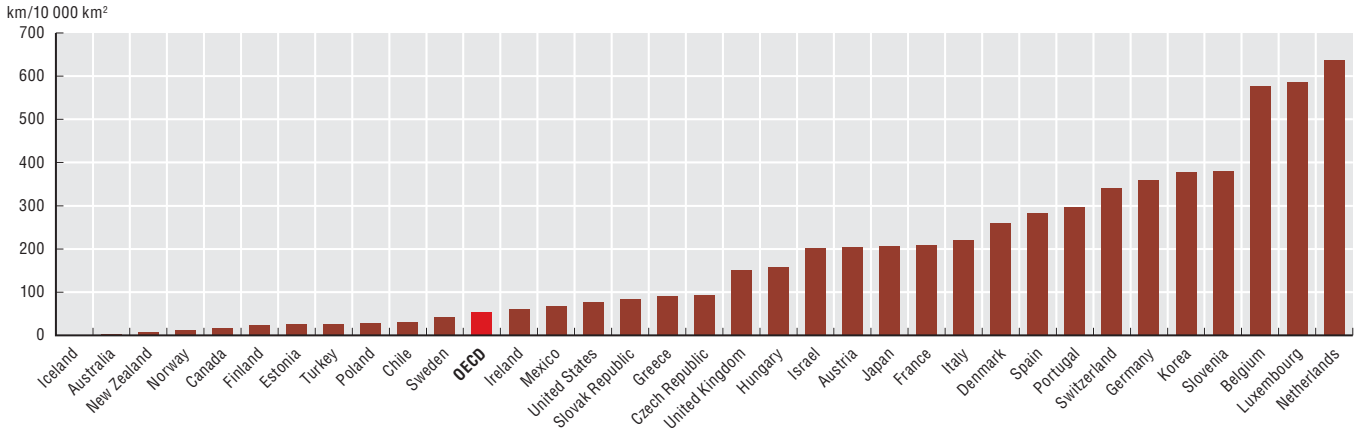
	Road traffic						Motor vehicles in use				GDP
	Total volume		Intensity		Goods vehicles		Total stock		Private car ownership		
	Billions veh.-km	% change	Per unit of GDP	Per network length	Volume	Share in total traffic	1 000 vehicles	% change	Veh./100 inh.	% change	% change
			Veh.-km/ 1 000 USD	1 000 veh.-km/ km	% change	%					
	2011 or latest	1990-2011 or latest	2011 or latest	2011 or latest	1990-2011 or latest	2011 or latest	2011 or latest	1990-2011 or latest	2011 or latest	1990-2011 or latest	1990-2011 or latest
Australia[1]	231	63	286	281	132	26	16 368	67	55	23	93
Austria	76	70	252	697	83	7	4 847	31	53	37	53
Belgium	107	52	298	687	101	18	5 951	40	49	26	46
Canada[1]	333	40	286	320	-53	9	20 707	25	50	9	64
Chile[1]	..	..	..	..	..	..	3 155	..	13	..	199
Czech Republic	54	114	204	386	295	24	5 057	90	43	46	76
Denmark	45	33	254	614	59	24	2 663	40	39	26	38
Estonia	10	84	367	167	3	17	638	63	41	168	80
Finland	55	38	324	517	24	13	3 365	51	54	38	48
France	553	36	288	527	41	22	37 745	33	50	20	38
Germany[1]	682	40	246	1 059	94	11	44 998	38	52	34	32
Greece	82	114	298	698	..	19	7 062	182	50	190	44
Hungary[1]	38	..	223	189	47	19	3 453	56	30	59	44
Iceland[1]	3	74	261	230	-32	5	238	78	65	37	64
Ireland	44	79	244	454	79	19	2 283	140	43	87	147
Israel	50	..	252	2 700	..	24	2 453	151	27	57	153
Italy	551	57	320	..	49	13	41 093	37	61	26	22
Japan	..	..	..	..	-11	..	73 641	30	46	62	20
Korea	..	..	..	..	172	..	17 941	428	28	470	193
Luxembourg	5	43	145	784	81	15	375	78	67	34	117
Mexico	143	160	98	383	75	20	31 817	231	19	146	72
Netherlands	137	44	223	1 015	107	20	8 751	44	47	26	58
New Zealand	40	25	361	424	..	6	3 598	95	64	39	74
Norway	44	57	191	467	192	21	2 855	47	47	24	70
Poland	199	234	301	490	60	17	20 319	218	45	226	122
Portugal	95	193	404	..	-43	4	5 833	165	42	158	41
Slovak Republic	16	48	152	361	10	12	1 975	85	31	79	126
Slovenia	18	98	347	456	129	11	1 148	71	52	79	83
Spain	241	113	194	1 454	-5	10	27 314	89	48	56	63
Sweden	77	19	241	133	61	15	4 874	24	46	10	57
Switzerland	64	29	218	896	25	9	4 567	41	53	19	34
Turkey	72	168	87	200	94	27	11 266	377	10	245	127
United Kingdom[1]	496	21	245	1 182	6	5	32 270	36	46	28	54
United States[1]	4 776	39	365	742	96	10	242 264	28	74	2	66
OECD[1]	**10 953**	**55**	**289**	**673**	**49**	**13**	**745 718**	**60**	**49**	**30**	**57**

1. See Annex B for country notes.

Source: Eurostat, World Road Statistics, UNECE and national sources.

StatLink http://dx.doi.org/10.1787/888932978398

Figure 2.12. **Motorway network density, 2011 or latest available**



Source: FAO, Eurostat, World Road Statistics, North American Transportation Statistics, UNECE and national sources.

StatLink http://dx.doi.org/10.1787/888932977448

Table 2.4. **Road and motorway networks**

	All roads				Motorways				GDP
	Total length			Density	Total length			Density	% change
	1 000 km	% change		km/100 km²	km	% change		km/10 000 km²	
	2011 or latest	1990-2011	2000-11	2011 or latest	2011 or latest	1990-2011	2000-11	2011 or latest	1990-2011
Australia	823	1.4	2	11	1 509	26	0	2	93
Austria	115	8.1	7	137	1 719	19	4	205	53
Belgium	155	10.9	5	508	1 763	6	2	577	46
Canada[1]	1 042	17.9	16	10	17 000	13	2	17	64
Chile	78		-2	10	2 385		1	32	199
Czech Republic	131	4.8	2	166	734	106	42	93	76
Denmark	74	4.4	3	170	1 122	87	16	260	38
Estonia	58	33.2	12	129	115	180	24	25	80
Finland	106	37.3	3	31	779	246	32	23	48
France	1 050	30.4	5	191	11 466	68	14	209	38
Germany	644	1.2	0	180	12 819	18	9	359	32
Greece	117	188.1	2	89	1 197	530	61	91	44
Hungary	200	88.7	24	215	1 477	453	230	159	44
Iceland[1]	13	3.3	-1	13	0			0	64
Ireland	97	4.8	1	138	423	1 527	238	60	147
Israel	18	32.6	11	83	447		255	203	153
Italy				..	6 668	8	3	221	22
Japan	1 267	13.7	8	335	7 800	67	14	206	20
Korea	105	85.1	15	105	3 776	143	43	378	193
Luxembourg					152	95	32	587	117
Mexico[1]	374	56.4	13	19	13 041	641	26	66	72
Netherlands[1]	137	17.2	5	329	2 646	26	6	637	58
New Zealand	94	1.4	2	35	183	17	10	7	74
Norway	94	5.6	1	29	381	422	166	12	70
Poland	407	12.1	8	130	857	233	115	27	122
Portugal	22		0	90	2 737	766	65	297	41
Slovak Republic	43		1	88	416	117	40	85	126
Slovenia[1]	39		1	193	771	238	77	380	83
Spain[1]	166	6.3	1	33	14 262	204	49	282	63
Sweden[1]	578		-1	33	1 927	105	28	43	57
Switzerland[1]	71	0.7	0	173	1 406	22	8	341	34
Turkey	367	-3.6	-14	47	2 080	640	23	27	127
United Kingdom	420	9.8	0	172	3 673	15	2	151	54
United States[1]	6 435	4.6	1	67	75 479		0	77	66
OECD[1]	**16 272**	**9.5**	**4**	**44**	**197 023**	**38**	**13**	**55**	**57**

1. See Annex B for country notes.

Source: FAO, Eurostat, World Road Statistics, North American Transportation Statistics, UNECE and national sources.

StatLink http://dx.doi.org/10.1787/888932978417

Road fuel prices

Prices are a key form of information for consumers. When fuel prices rise relative to other goods, this tends to reduce demand for fuels, as well as for vehicles with high fuel consumption. This stimulates energy saving, and may influence the fuel structure of energy consumption. However, there may be a rebound effect whereby greater use of more fuel-efficient vehicles encourages greater vehicle usage.

Definitions

The indicators presented here relate to road fuel prices and taxes, notably the relative price and taxation levels of diesel fuel and unleaded gasoline.

Information on energy consumption by road transport is given as a complement.

The indicators should be read in connection with information on the modal split of transport and on the structure of the vehicle fleet. They should further be complemented with information on congestion rates and air pollution from road traffic.

Overview

Energy consumption in road transport represents about 89% of total transport energy consumption. It has increased in conjunction with transport growth, but the overall energy intensity of transport has remained close to the 1990 level. This is partly due to the introduction of more fuel-efficient vehicles, which has partially offset emissions due to increased usage.

Differences across countries in energy intensity are more pronounced in freight than in passenger transport. Road transport almost entirely relies on oil.

OECD countries have deployed a mix of instruments to address the growing environmental pressures from car usage. Standards have been set for fuel economy and vehicle emissions, which have led to improvements in the amount of fuel required per unit of distance travelled, the quality of the fuel, and the resultant emissions. Market-based instruments have been applied such as taxes imposed on vehicles at the time of purchase and annually. The tax treatment of company cars and commuting also influence transport-related energy consumption.

The use of taxation to influence energy consumer behaviour and to internalise environmental costs is increasing in OECD countries. Many countries have introduced tax differentials in favour of unleaded gasoline and some have imposed environmental taxes (e.g. relating to sulphur content) on energy products. Many countries apply higher taxes for petrol than for diesel. Diesel-driven motors are more fuel efficient than petrol-driven motors, and emit less CO_2 per km driven. However they are responsible for more air pollutants like NO_x, particle matter (PM_{10}, $PM_{2.5}$) and the related health impacts than petrol-driven ones.

Comparability

Data on energy consumption by road transport and on road fuel prices should display a good level of comparability.

Care should be taken when comparing end-use energy prices, and the way that energy use is taxed. In view of the large number of factors involved, direct comparisons may be misleading. However, comparisons may be the starting point for analysis of differences observed.

For additional notes, see Annex B.

Sources

IEA online data service, *http://data.iea.org*.

IEA energy prices, *www.iea.org/stats/surveys/mps.pdf* .

IEA (2013), *Energy Prices and Taxes*, Vol. 2012/4, OECD Publishing, Paris, *http://dx.doi.org/10.1787/energy_tax-v2012-4-en*.

IEA (2012), *Energy Prices and Taxes*, Vol. 2012/2, OECD Publishing, Paris, *http://dx.doi.org/10.1787/energy_tax-v2012-2-en*.

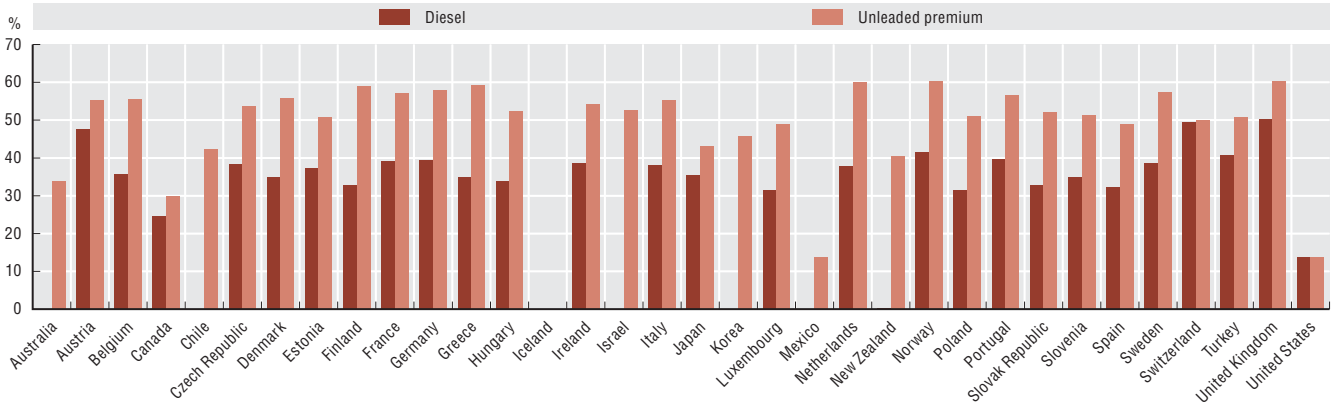
Further information

OECD (2013a), *Inventory of Estimated Budgetary Support and Tax Expenditures for Fossil Fuels 2013*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264187610-en*.

OECD (2013b), *Taxing Energy Use: A Graphical Analysis*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264183933-en*.

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

Figure 2.13. **Road fuel prices as percentage of price, diesel and unleaded premium, 2011**



Source: IEA, *Energy Prices and Taxes* (2012) (database).

StatLink http://dx.doi.org/10.1787/888932977467

Table 2.5. **Road fuel prices and energy consumption**

In constant 2005 prices and PPPs

	Diesel				Unleaded premium		Energy consumption by road transport		
	Price		Tax		Price	Tax	Share of total consumption	Total	% change
	USD/litre		% of price		USD/litre	% of price		Mtoe	
	1990	2011	1990	2011	2011	2011	2011	2011	1990-2011
Australia	0.32	..	..	..	0.92	33.9	83	24	28
Austria	0.65	0.89	45.4	47.5	1.36	55.3	93	7	69
Belgium	0.60	1.02	46.8	35.6	1.56	55.6	96	8	29
Canada	0.55	0.92	34.5	24.5	0.99	29.8	82	49	48
Chile	..	..	..	..	1.78	42.2	88	6	139
Czech Republic	2.02	1.83	55.1	38.3	2.06	53.8	94	6	139
Denmark	0.26	0.83	0.0	34.9	1.22	55.7	92	4	30
Estonia	..	1.65	..	37.2	1.86	50.8	91	1	-7
Finland	0.72	0.93	58.7	32.8	1.41	58.9	90	4	10
France	0.55	1.08	57.5	39.1	1.48	57.1	94	42	14
Germany	0.61	1.24	50.8	39.3	1.63	57.9	95	50	-1
Greece	0.47	1.26	26.6	34.8	1.91	59.3	87	6	66
Hungary	1.20	1.96	18.2	33.8	2.20	52.2	96	4	53
Iceland	..	..	..	..	..		94	0	46
Ireland	0.61	1.18	51.4	38.5	1.33	54.1	98	4	146
Israel	..	..	..	..	1.70	52.7	100	4	85
Italy	0.71	1.20	60.0	38.1	1.59	55.3	93	36	15
Japan	0.48	0.80	38.5	35.3	1.13	43.1	89	69	8
Korea	..	..	..	..	2.24	45.7	95	28	168
Luxembourg	0.39	0.87	32.7	31.5	1.17	48.9	99	2	149
Mexico	0.40	0.82	0.0	..	1.13	13.8	97	50	84
Netherlands	0.60	1.00	43.2	37.9	1.66	60.1	97	11	32
New Zealand	0.44	0.57	21.0	0.3	1.17	40.5	89	4	62
Norway	0.37	0.82	15.1	41.5	1.36	60.2	74	4	38
Poland	0.73	1.96	29.5	31.5	2.28	51.1	96	16	173
Portugal	0.98	1.57	52.1	39.6	2.00	56.4	95	6	101
Slovak Republic	2.05	1.95	55.4	32.8	2.14	52.1	83	2	58
Slovenia	..	1.48	..	34.8	1.80	51.2	98	2	98
Spain	0.63	1.17	48.8	32.2	1.49	48.8	87	30	67
Sweden	0.54	1.04	27.2	38.5	1.34	57.4	93	7	19
Switzerland	..	0.86	..	49.4	0.95	49.8	94	6	19
Turkey	1.30	2.87	54.3	40.7	3.12	50.8	91	13	58
United Kingdom	0.72	1.39	52.8	50.3	1.71	60.3	93	38	5
United States	..	0.81	..	13.7	0.84	13.8	87	505	29
OECD	..	..	..	..	..	..	**83**	**1 000**	**26**

Source: IEA, *Energy Prices and Taxes* (2012) (database).

StatLink http://dx.doi.org/10.1787/888932978436

Agricultural nutrient balances

Agriculture's environmental effects can be negative or positive. They depend on the scale, type and intensity of farming as well as on agro-ecological and physical factors, and on climate and weather. Farming can lead to deterioration in soil, water and air quality, and to loss of natural habitats and biodiversity. These environmental changes can in turn affect the level of agricultural production and food supply limiting the sustainable development of agriculture. Farming can also provide sinks for greenhouse gases, conserve biodiversity and landscapes and, help prevent floods and landslides.

Among the main environmental concerns are nitrogen (N) and phosphorus (P) runoff from excessive fertiliser use, intensive livestock farming and pesticides. N and P, while major plant nutrients, are responsible for water eutrophication. N further increases soil acidification, contributes to air pollution and alters the balance of greenhouse gases. The main challenge is to progressively decrease the negative and increase the positive environmental effects of agricultural production so that ecosystem functions can be maintained and food security ensured for the world's population.

Definitions

The indicators presented here relate to gross agricultural nutrient balances. They are expressed as N and P surplus intensities per km^2 of agricultural land. They describe the potential loss of nitrogen to the soil, to the air and to surface waters or groundwater in the absence of effective pollution abatement.

Changes in agricultural production and land are given as complements.

These indicators describe potential environmental pressures, and may hide important spatial variations. They reflect nutrient balances from primary agriculture neglecting nutrient flows from other food production systems, such as fisheries or total N cycles in the economy. They should be read with information on water use in agriculture, soil quality, biodiversity and farm management.

Overview

The economic and social significance of the agricultural sector has been declining in most OECD countries for decades. From 2000 to 2010, growth in OECD agricultural production slowed compared to the 1990s. In nearly all OECD countries, the land area used for agricultural purposes has decreased, mainly being converted to use for forestry and urban development. Nevertheless, for almost two-thirds of OECD countries, agriculture remains the major land use (over 40% of total land area).

For many OECD countries, fertiliser consumption and nutrient surpluses relative to changes in agricultural output declined, both in absolute tonnes of nutrients and in terms of nutrient surpluses per hectare of agricultural land:

- The rate of reduction in OECD nutrient surpluses was more rapid over the 2000s than the 1990s. Over the past decade, the overall OECD volume of agricultural production increased by more than 1% per year, whereas the N balance (tonnes) declined by over 1% per year, and the P balance (tonnes) decreased by over 5% per year.
- This signals a process of relative decoupling of agricultural production from N- and P-related environmental pressure. It reflects both improvements in nutrient use efficiency by farmers and slower growth in agricultural output for many countries over the 2000s.

Territorial variations within countries are explained by the spatial distribution of intensive livestock farming and cropping systems that require high nutrient inputs, such as maize and rice.

In a number of countries the absolute pressure on the environment (measured as the intensity of N and P surpluses per area) remains high.

Comparability

OECD and Eurostat data on N and P balances are available for all OECD countries, except Chile, until 2009. Improvements to the underlying methodology, nutrient conversion coefficients and primary data are being undertaken by OECD countries in co-operation with Eurostat and the FAO.

Cross-country comparisons of change in nutrient surplus intensities over time should take into account the absolute intensity levels during the reference period.

Agricultural land: 1990 data for Belgium, the Czech Republic, Estonia, Luxembourg, the Slovak Republic, Slovenia and OECD are estimated by the OECD Secretariat.

For additional notes, see Annex B.

Sources

OECD, "Agri-environmental indicators" (2012), *www.oecd.org/tad/env/indicators*.

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Further information

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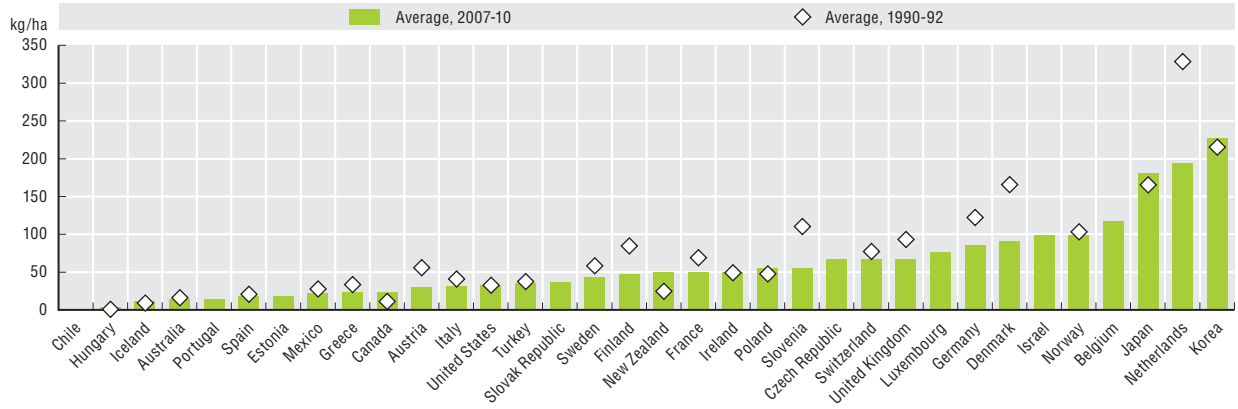
OECD/FAO (2012), *OECD-FAO Agricultural Outlook 2012*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/agr_outlook-2012-en*.

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

Figure 2.14. **Nitrogen surplus intensity, kg per hectare**

Agricultural area



Source: OECD, "Agri-environmental indicators" (2012); FAO, *FAOSTAT* (2012) (database).

StatLink http://dx.doi.org/10.1787/888932977486

Table 2.6. **Nutrient surplus intensities and agricultural production**

	Nutrient surplus intensity per agricultural area				Agriculture production		Agricultural land	
	Nitrogen		Phosphorous		Crops	Total agriculture	% total area	% total area
	kg/ha	% change	kg/ha	% change	% change	% change		
	Average 2007-10	Since 1990-92	Average 2007-10	Since 1990-92	1990-2010	1990-2010	1990	2010
Australia	13.7	-15	0.04	-93	78	38	60	51
Austria	29.7	-47	2.09	-77	30	14	42	38
Belgium	117.0	..	5.06	..	..	..	..	44
Canada	23.0	107	0.10	-183	30	37	7	6
Chile	..	..	..	..	91	95	21	21
Czech Republic	66.5	..	0.20	..	-5	-21	..	54
Denmark	90.6	-45	6.39	-60	-11	10	65	61
Estonia	18.4	..	-7.59	..	-10	-23	..	21
Finland	47.5	-44	4.02	-81	-9	-9	7	7
France	50.3	-27	2.19	-85	4	1	56	53
Germany	85.8	-30	0.25	-98	1	-2	51	47
Greece	23.0	-32	-1.98	-156	2	0	70	62
Hungary	3.7	313	-9.60	26	-17	-30	70	57
Iceland	10.9	19	1.88	-8	89	26	18	15
Ireland	50.4	3	3.39	-65	7	8	80	65
Israel	98.6	..	31.86	..	3	40	26	23
Italy	30.6	-25	-2.97	-156	9	6	56	48
Japan	180.2	9	49.05	-18	-31	-19	15	12
Korea	226.4	5	45.27	-5	5	26	22	18
Luxembourg	75.8	..	0.35	..	..		..	51
Mexico	21.8	-21	1.22	-41	36	57	53	52
Netherlands	193.3	-41	11.02	-70	26	14	48	46
New Zealand	49.0	98	9.91	109	40	53	60	43
Norway	98.6	-5	14.47	-10	-42	-12	3	3
Poland	55.0	15	5.10	-31	-27	-19	60	47
Portugal	14.5	..	4.22	..	-16	0	43	40
Slovak Republic	36.7	..	-1.74	..	-12	-26	..	40
Slovenia	55.5	-50	8.15	..	24	19	..	24
Spain	18.2	-12	1.05	-70	19	26	60	54
Sweden	43.1	-26	-0.25	-106	-23	-14	8	7
Switzerland	66.7	-14	3.16	-71	-4	1	38	37
Turkey	34.9	-7	5.07	-43	39	45	51	50
United Kingdom	67.4	-28	5.17	-42	-1	-2	75	71
United States	32.8	0	2.34	-15	24	28	44	42
OECD[1]	**61.5**	**-20**	**6.03**	**-50**	..	..	..	**34**

1. The OECD total is a simple average of available country values.

Source: OECD, "Agri-environmental indicators" (2012); FAO, *FAOSTAT* (2012) (database).

StatLink http://dx.doi.org/10.1787/888932978455

GDP, population and consumption

This section provides important socio-economic background information, particularly with regard to economic growth, population and consumption.

Definition

The indicators presented here refer to:

- Economic growth. They present total GDP, expressed at 2005 price levels and purchasing power parities, and GDP per capita, and the change in GDP per capita since 1990. The structure of GDP is given as a complement. It shows value added in agriculture (hunting, forestry and fishing); industry (mining and quarrying, manufacturing, gas, electricity and water, and construction); and services. Value added excludes financial intermediation services indirectly measured.
- Population growth and density. They present changes in national resident population (all nationals present in or temporarily absent from a country, and aliens permanently settled in the country), as well as population densities (the number of residents compared to the total area of the country) and an "ageing index" (the ratios between the population over 64 and under 15).
- Private consumption, i.e. by households and private non-profit institutions serving households. They present private final consumption expenditure expressed as % of GDP and per capita, as well as the structure of private consumption. Private final consumption expenditure is the largest component of final uses of GDP, representing in general around 60% of GDP. It represents the sum of: *i)* the outlays of resident households on new durable and non-durable goods and services less their net sales of second-hand goods, scraps and wastes; *ii)* he value of goods and services produced by private non-profit institutions for own use on current account. It is expressed at 2005 price levels and purchasing power parities. Rent refers to imputed rent.
- Government consumption, presenting general government final consumption expenditure expressed as percentage of GDP and per capita. Total general government final consumption is important as a component of total GDP, and reflects the government's direct role as a "consumer" of final goods and services. It represents the value of goods and services produced by governments for their own use on current account; and is expressed at 2005 price levels and purchasing power parities.

Comparability

The comparability of population and GDP estimates across countries is good. However, some care is needed in interpretation, for example Luxembourg and, to a lesser extent, Switzerland have a relatively large number of frontier workers. Such workers contribute to GDP but are excluded from the population figures, which is one of the reasons why cross-country comparisons of income per capita based on gross or net national income (GDI and NNI) are often preferred.

The comparability of private consumption expenditure is good, that of general government expenditure is high.

For additional notes, see Annex B.

Sources

OECD (2012a), "OECD Economic Outlook No. 91", *OECD Economic Outlook: Statistics and Projections* (database), *http://dx.doi.org/10.1787/data-00606-en*.

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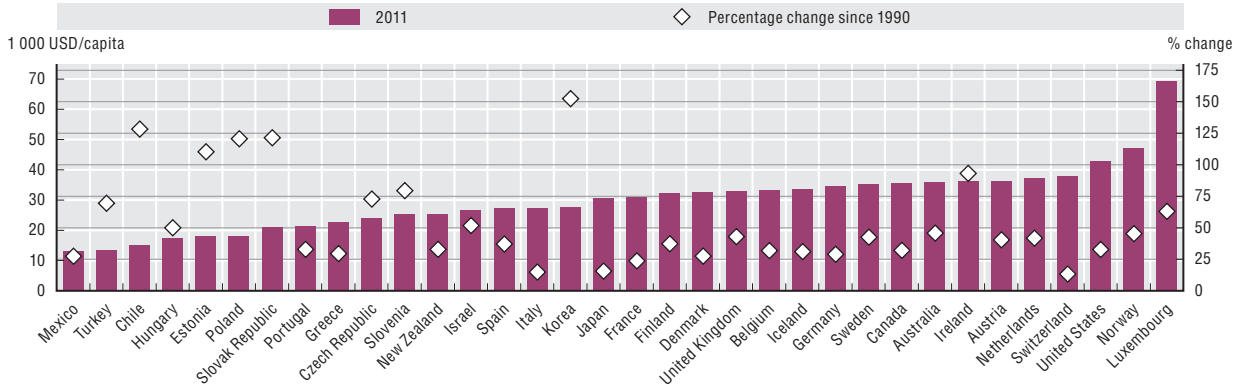
Information on data for Israel: *http://dx.doi.org/10.1787/888932315602*.

Figure 2.15. **Gross domestic product (GDP) per capita, 2011**



Source: OECD National Accounts Statistics (database); OECD (2012), "OECD Economic Outlook No. 91"; OECD (2012), "Labour Force Statistics: Summary tables".

StatLink http://dx.doi.org/10.1787/888932977505

Table 2.7. **Gross domestic product (GDP)**

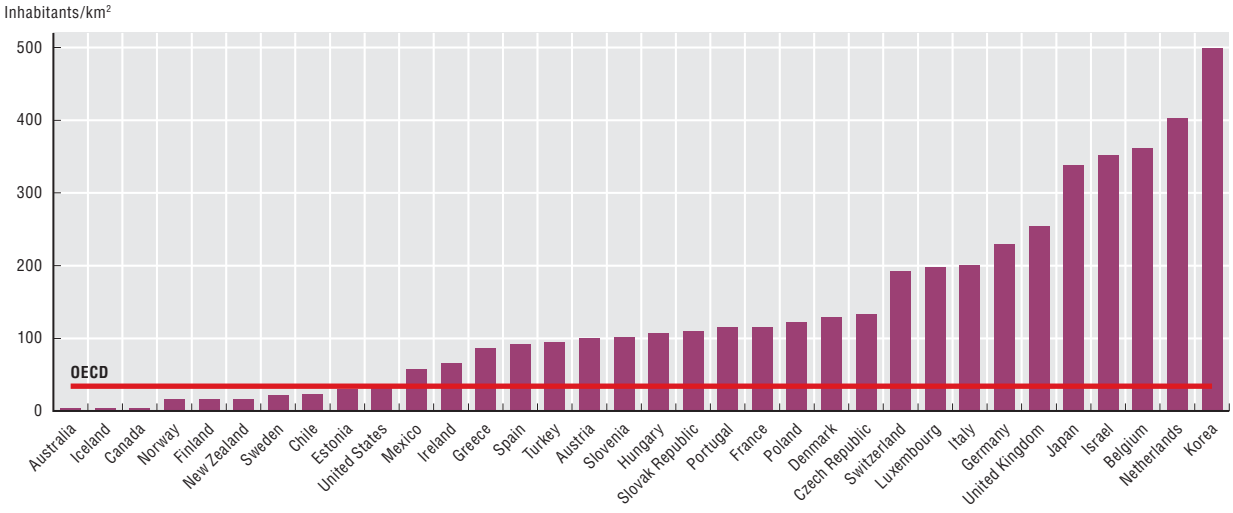
	Gross domestic product			Structure of GDP, value added as % of GDP		
	Total	Per capita		Agriculture	Industry	Services
	Billion USD	1 000 USD	% change	%	%	%
	2011	2011	1990-2011	2010	2010	2010
Australia[1]	808	35.7	45.8	2.8	27.8	69.4
Austria	306	36.3	40.4	1.5	29.0	69.4
Belgium	365	33.1	31.9	0.7	21.7	77.7
Canada	1 231	35.7	32.1	1.9	32.0	66.1
Chile[1]	261	15.1	128.3	3.4	39.1	57.5
Czech Republic[1]	253	24.1	72.8	2.3	36.2	61.5
Denmark	181	32.4	27.5	1.2	21.8	77.0
Estonia[1]	24	17.9	110.3	3.5	28.9	67.6
Finland	174	32.2	37.4	2.9	29.2	67.9
France[1]	1 955	30.9	23.8	1.8	19.1	79.2
Germany[1]	2 811	34.4	29.0	0.9	27.9	71.2
Greece[1]	255	22.6	29.5	3.1	18.0	78.9
Hungary[1]	173	17.3	50.1	3.5	31.0	65.4
Iceland[1]	11	33.6	31.1	7.2	25.1	67.7
Ireland[1]	162	36.1	93.1	1.0	31.9	67.1
Israel[1]	208	26.7	51.8	2.1	21.3	76.6
Italy	1 646	27.3	14.9	1.9	25.2	72.9
Japan[1]	3 917	30.7	15.7	1.2	27.4	71.5
Korea	1 371	27.5	152.4	2.7	39.2	58.1
Luxembourg	35	69.2	63.1	0.3	13.4	86.3
Mexico	1 466	12.9	27.4	3.5	34.3	62.2
Netherlands	622	37.3	41.7	2.0	23.9	74.2
New Zealand[1]	112	25.5	32.9	..	..	..
Norway	233	47.0	45.3	1.6	40.2	58.2
Poland	691	18.1	120.6	3.5	31.6	64.8
Portugal	227	21.5	32.9	2.4	23.1	74.5
Slovak Republic[1]	113	20.9	121.4	3.9	34.9	61.2
Slovenia[1]	51	25.2	79.5	2.5	31.6	65.9
Spain	1 251	27.1	37.2	2.7	26.1	71.2
Sweden	331	35.1	42.6	1.8	26.3	71.8
Switzerland	300	37.9	13.3	0.8	26.2	73.0
Turkey	991	13.4	69.4	9.1	27.9	63.0
United Kingdom	2 034	32.9	43.0	0.7	21.6	77.7
United States	13 314	42.7	32.8	1.2	20.0	78.8
OECD	**37 881**	**30.5**	**32.3**	**1.4**	**24.1**	**74.4**

1. See Annex B for country notes.

Source: OECD National Accounts Statistics (database); OECD (2012), "OECD Economic Outlook No. 91"; OECD (2012), "Labour Force Statistics: Summary tables".

StatLink http://dx.doi.org/10.1787/888932978474

Figure 2.16. **Population density, 2011**



Source: FAO, *FAOSTAT* (2012) (database); OECD (2012), "Labour Force Statistics: Summary tables".

StatLink http://dx.doi.org/10.1787/888932977524

Table 2.8. **Population density and ageing**

	Total	% change	Density	Ageing index	
	1 000 inhabitants		Inh./km²	Pop. > 64/pop. < 15	
	2011	1990-2011	2011	1990	2011
Australia	22 621	32.6	3	50	73
Austria	8 421	9.1	100	85	121
Belgium[1]	11 021	10.6	361	82	103
Canada	34 483	24.5	3	55	90
Chile	17 248	30.9	23	20	42
Czech Republic	10 496	1.6	133	59	109
Denmark	5 567	8.3	129	91	94
Estonia	1 340	-14.6	30	52	111
Finland	5 388	8.1	16	69	108
France[1]	63 294	11.6	115	70	94
Germany[1]	81 755	3.0	229	93	157
Greece[1]	11 300	11.3	86	71	136
Hungary	9 974	-3.9	107	66	114
Iceland	319	25.2	3	43	60
Ireland	4 486	28.1	64	42	58
Israel	7 766	66.6	352	29	36
Italy[1]	60 328	6.3	200	90	149
Japan[1]	127 799	3.4	338	66	178
Korea	49 779	16.1	498	20	73
Luxembourg[1]	512	33.1	198	77	83
Mexico	113 190	34.8	58	11	22
Netherlands[1]	16 693	11.6	402	70	89
New Zealand	4 405	31.0	16	49	66
Norway	4 953	16.8	15	86	82
Poland	38 196	0.4	122	41	92
Portugal[1]	10 557	5.7	115	66	130
Slovak Republic	5 398	1.9	110	41	88
Slovenia	2 035	1.7	100	52	119
Spain	46 125	18.7	91	69	118
Sweden	9 449	10.4	21	99	120
Switzerland	7 912	17.9	192	85	123
Turkey	73 950	34.2	94	15	31
United Kingdom	61 761	7.9	254	83	92
United States	311 592	24.8	32	58	68
OECD[1]	**1 240 114**	**18.3**	**34**	**52**	**82**

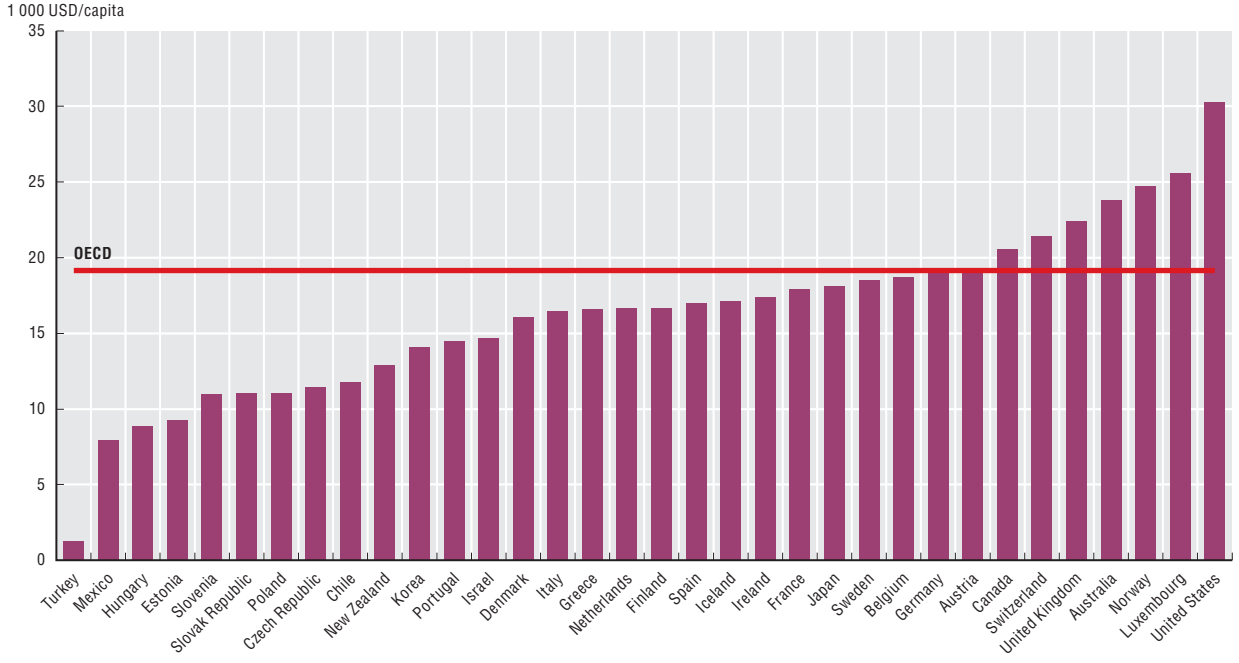
1. See Annex B for country notes.

Source: FAO, *FAOSTAT* (2012) (database); OECD (2012), "Labour Force Statistics: Summary tables".

StatLink http://dx.doi.org/10.1787/888932978493

Figure 2.17. **Private final consumption expenditure, 2011 or latest available year**

Per capita

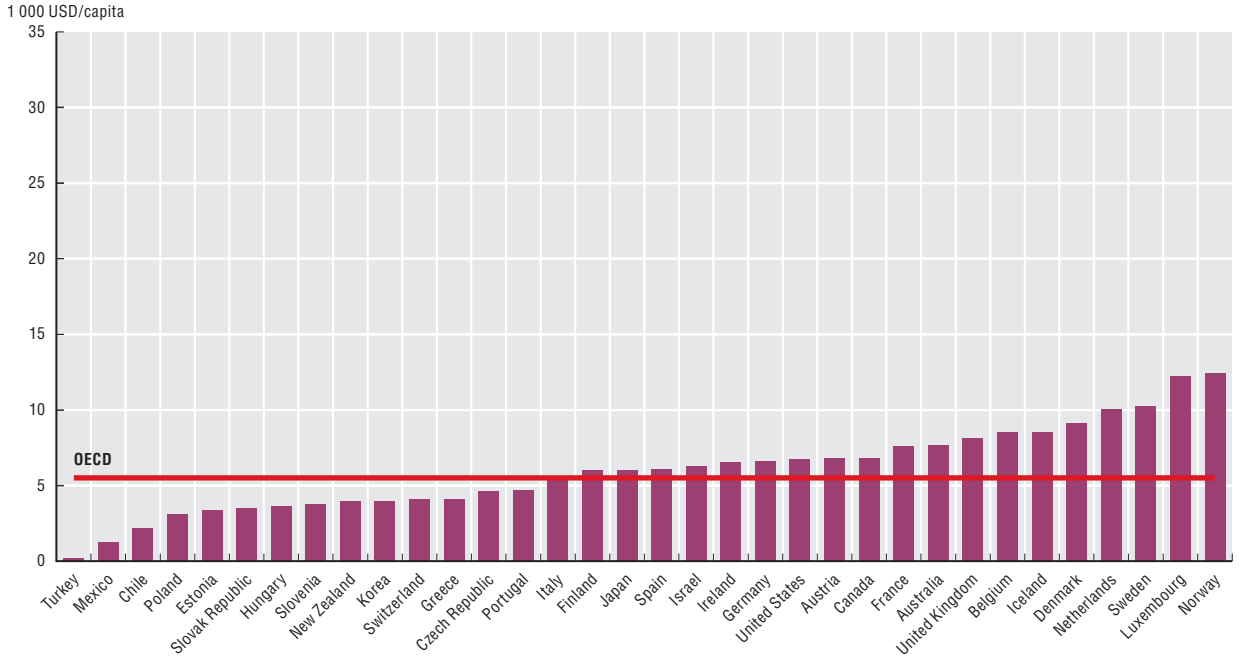


Source: OECD National Accounts Statistics (database); OECD (2012), "OECD Economic Outlook No. 91".

StatLink http://dx.doi.org/10.1787/888932977543

Figure 2.18. **Government final consumption expenditure, 2011 or latest available year**

Per capita



Source: OECD National Accounts Statistics (database); OECD (2012), "OECD Economic Outlook No. 91".

StatLink http://dx.doi.org/10.1787/888932977562

Table 2.9. **Private and government final consumption expenditure**

	Private final consumption expenditure			Government final consumption expenditure		
	Total	Per capita		Total	Per capita	
	% of GDP	1 000 USD	% change	% of GDP	1 000 USD	% change
	2011	2011	1990-2011	2011	2011	1990-2011
Australia[1]	56	24	52	18	8	37
Austria	53	19	28	19	7	38
Belgium	52	19	24	24	8	26
Canada	63	21	42	21	7	18
Chile[1]	65	12	96	12	2	65
Czech Republic[1]	47	11	47	19	5	27
Denmark	50	16	28	28	9	35
Estonia[1]	52	9	134	19	3	40
Finland	54	17	40	19	6	15
France	58	18	25	25	8	24
Germany[1]	56	19	19	19	7	34
Greece[1]	74	17	31	18	4	25
Hungary[1]	51	9	42	21	4	14
Iceland	51	17	21	25	9	31
Ireland	49	17	67	19	7	60
Israel[1]	55	15	32	23	6	2
Italy	60	16	17	21	6	10
Japan[1]	59	18	21	20	6	57
Korea	51	14	117	14	4	109
Luxembourg	37	26	32	18	12	69
Mexico	69	8	36	11	1	3
Netherlands	45	17	26	27	10	52
New Zealand[1]	61	13	36	19	4	33
Norway[1]	45	25	71	23	12	49
Poland	61	11	140	17	3	106
Portugal[1]	65	14	42	21	5	51
Slovak Republic[1]	53	11	102	17	4	42
Slovenia[1]	56	11	42	19	4	52
Spain	57	17	33	20	6	75
Sweden	48	19	33	26	10	12
Switzerland[1]	58	21	12	11	4	10
Turkey	69	1	70	10	0	76
United Kingdom	63	22	45	23	8	32
United States	71	30	42	16	7	7
OECD	**63**	**19**	**3**	**18**	**6**	**5**

1. See Annex B for country notes.

Source: OECD National Accounts Statistics (database); OECD (2012), "OECD Economic Outlook No. 91".

StatLink http://dx.doi.org/10.1787/888932978512

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ANNEX A

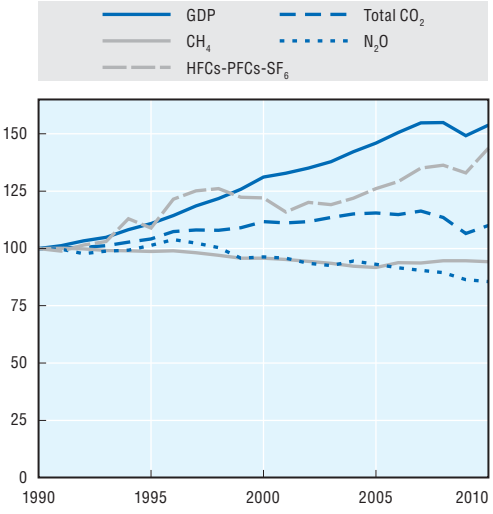
Additional OECD-wide and country trends

OECD wide trends

Greenhouse gas (GHG) emissions

Figure A.1. **Greenhouse gas emissions, decoupling trends, OECD**

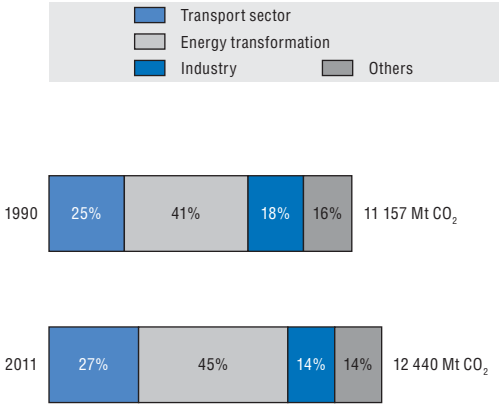
Index 1990 = 100



Source: OECD Environment Statistics (database); UNFCCC, *Greenhouse Gas Inventory Data* (2012).

StatLink http://dx.doi.org/10.1787/888932977581

Figure A.2. **Change in carbon dioxide (CO_2) emission structure, OECD, 1990-2011**



Source: IEA, *CO_2 Emissions from Fuel Combustion* (2012) (database).

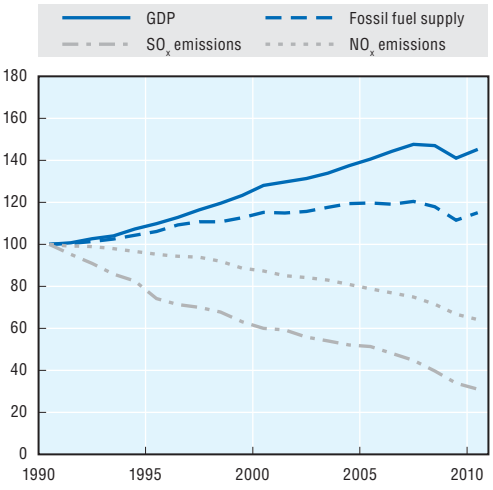
StatLink http://dx.doi.org/10.1787/888932977600

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

Sulphur oxides (SO_x) and nitrogen oxides (NO_x) emissions

Figure A.3. **SO_x and NO_x emissions, decoupling trends, OECD**

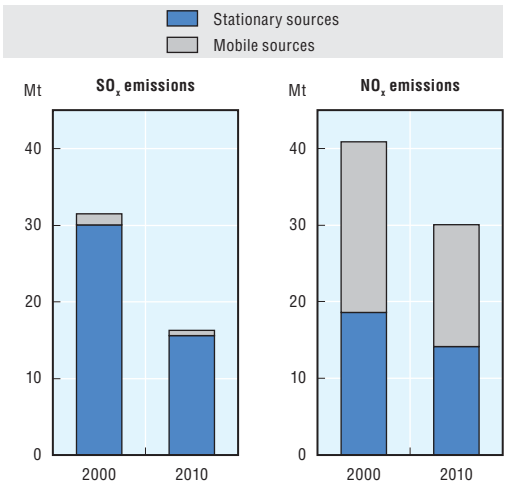
Index 1990 = 100



Source: European Monitoring and Evaluation Programme (EMEP) (2012); *OECD Environment Statistics* (database); OECD (2012), "OECD Economic Outlook No. 91"; IEA, *Energy Balances of OECD Countries* (2012) (database); UNECE (2012), "Convention on Long-Range Transboundary Air Pollution"; UNFCCC, "National Inventory Submissions 2012".

StatLink http://dx.doi.org/10.1787/888932977619

Figure A.4. **SO_x and NO_x emissions, structure, OECD**

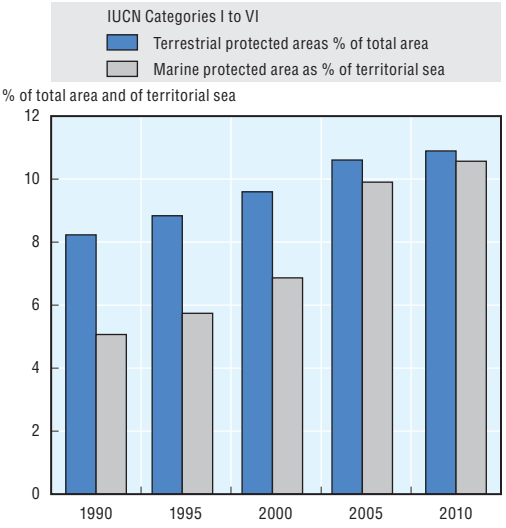


Source: European Monitoring and Evaluation Programme (EMEP) (2012); *OECD Environment Statistics* (database); OECD (2012), "OECD Economic Outlook No. 91"; IEA, *Energy Balances of OECD Countries* (2012) (database); UNECE (2012), "Convention on Long-Range Transboundary Air Pollution"; UNFCCC, "National Inventory Submissions 2012".

StatLink http://dx.doi.org/10.1787/888932977638

Protected areas

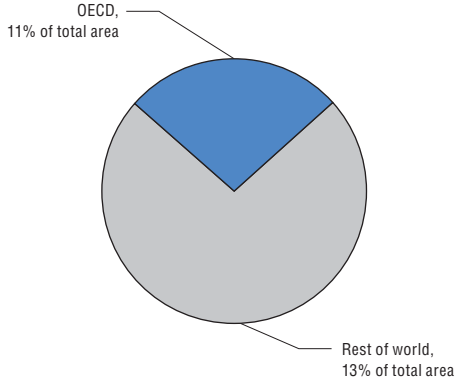
Figure A.5. **Terrestrial and marine protected areas, OECD**



Source: IUCN; UNEP, *The World Database on Protected Areas (WDPA)*; UNSD, *World Development Goals Indicators* (2012).

StatLink http://dx.doi.org/10.1787/888932977657

Figure A.6. **Terrestrial protected areas OECD and world**

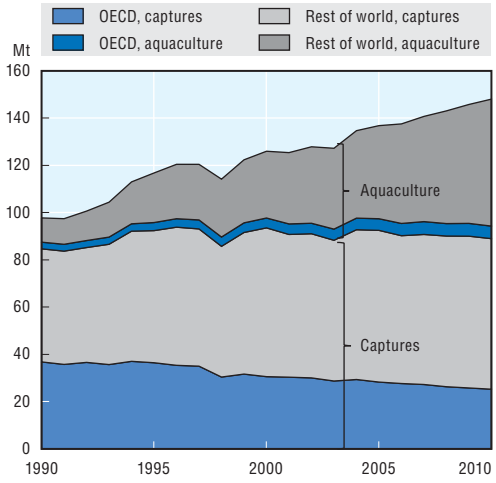


Source: IUCN; UNEP, *The World Database on Protected Areas (WDPA)*; UNSD, *World Development Goals Indicators* (2012).

StatLink http://dx.doi.org/10.1787/888932977676

Fish production

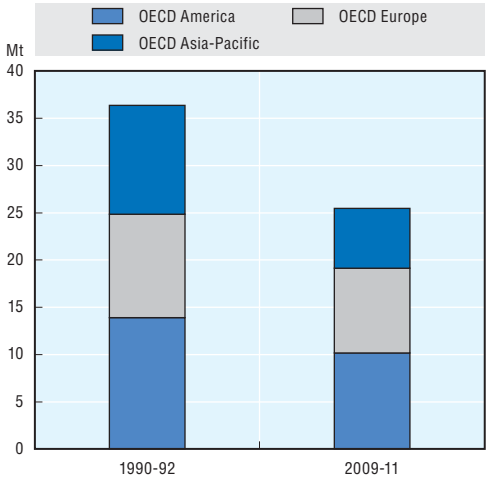
Figure A.7. **World fish production, 1990-2010**



Source: FAO, *FISHSTAT* (2012) (database).

StatLink http://dx.doi.org/10.1787/888932977695

Figure A.8. **OECD fish captures, 1990-92, 2009-11**



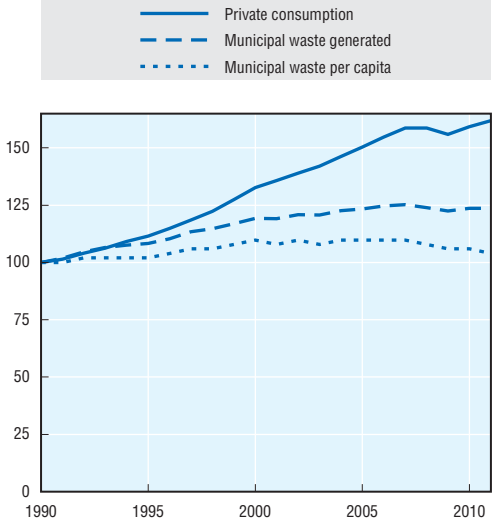
Source: FAO, *FISHSTAT* (2012) (database).

StatLink http://dx.doi.org/10.1787/888932977714

Municipal waste

Figure A.9. **Municipal waste, decoupling trends, OECD**

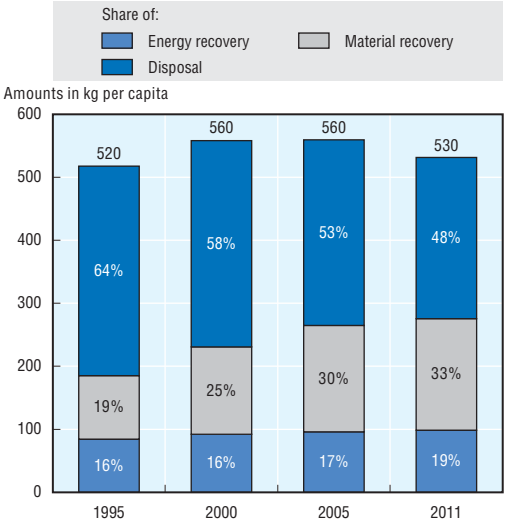
Index 1990 = 100



Source: OECD *Environment Statistics* (database).

StatLink http://dx.doi.org/10.1787/888932977733

Figure A.10. **Municipal waste, generation and treatment, OECD, 1995-2011**



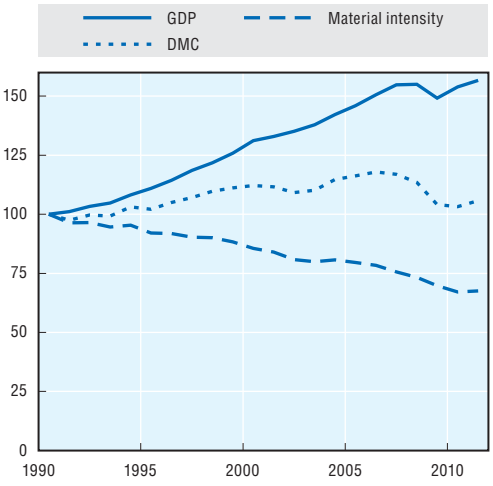
Source: OECD *Environment Statistics* (database).

StatLink http://dx.doi.org/10.1787/888932977752

Material consumption

Figure A.11. **Material consumption decoupling trends, OECD**

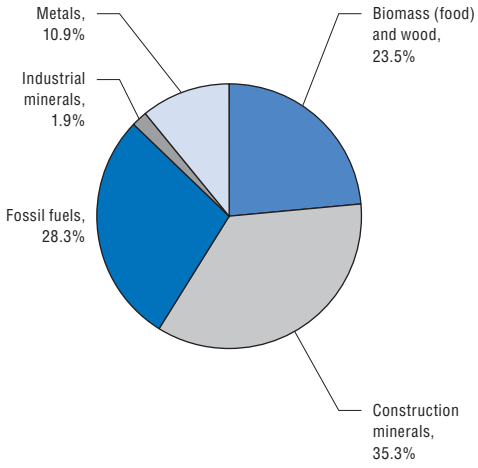
Index 1990 = 100



Source: OECD Environment Statistics (database).

StatLink http://dx.doi.org/10.1787/888932977771

Figure A.12. **Material consumption by type of material, OECD, 2011**



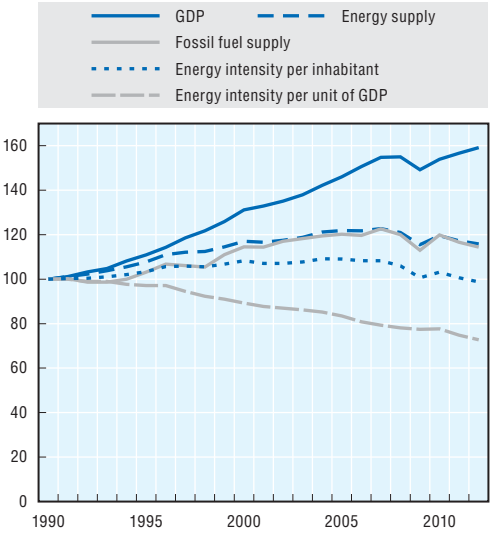
Source: OECD Environment Statistics (database).

StatLink http://dx.doi.org/10.1787/888932977790

Energy supply

Figure A.13. **Energy supply, decoupling trends, OECD**

Index 1990 = 100

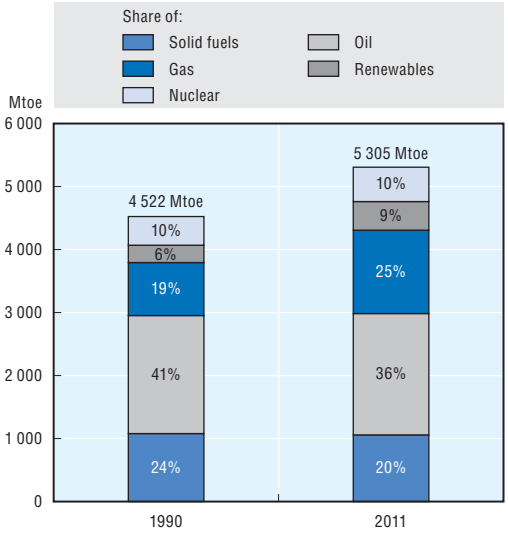


Source: IEA, *Energy Balances of OECD Countries* (2012) (database); OECD (2012), "OECD Economic Outlook No. 91".

StatLink http://dx.doi.org/10.1787/888932977809

Figure A.14. **Energy supply mix, OECD, 1990, 2011**

Energy supply by type of energy



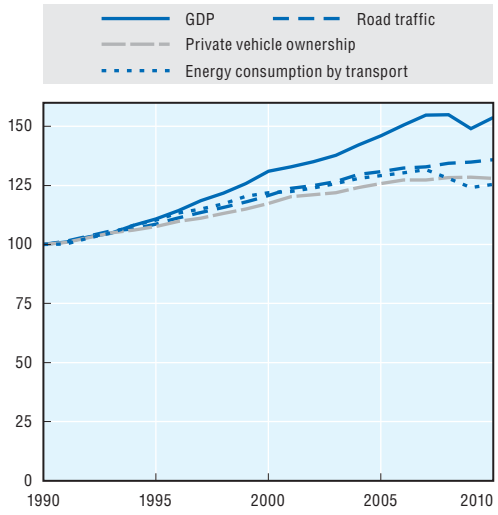
Source: IEA, *Energy Balances of OECD Countries* (2012) (database); OECD (2012), "OECD Economic Outlook No. 91".

StatLink http://dx.doi.org/10.1787/888932977828

Road transport

Figure A.15. **Road transport decoupling trends, OECD**

Index 1990 = 100

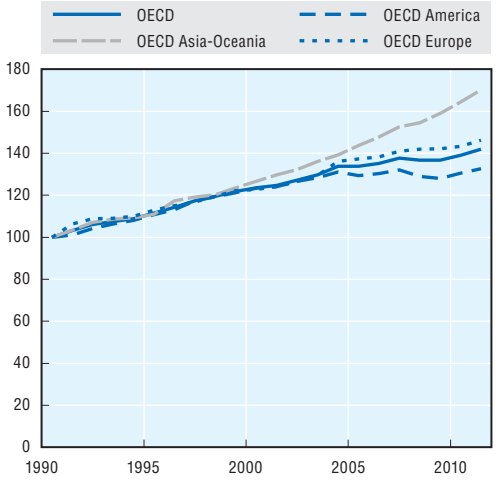


Source: Eurostat, World Road Statistics, UNECE and national sources.

StatLink http://dx.doi.org/10.1787/888932977847

Figure A.16. **Road traffic density per network length, OECD**

Index 1990 = 100

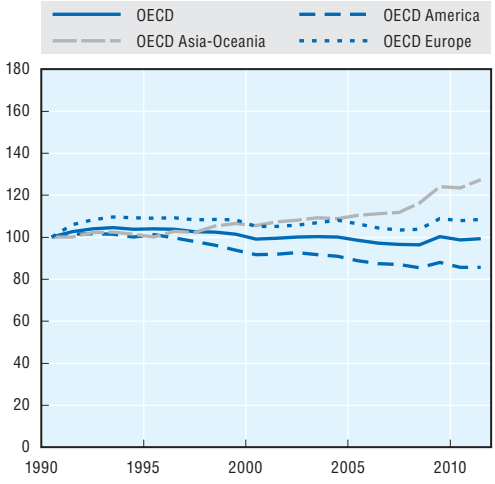


Source: Eurostat, International Transport Forum, World Road Statistics, North American Transportation Statistics, UNECE and national sources.

StatLink http://dx.doi.org/10.1787/888932977866

Figure A.17. **Road traffic intensity per GDP, OECD**

Index 1990 = 100

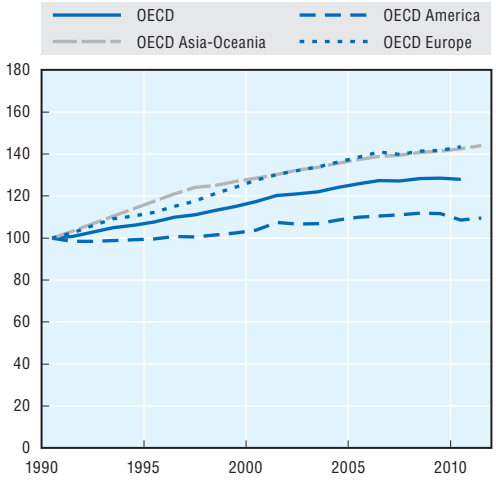


Source: Eurostat, World Road Statistics, UNECE and national sources.

StatLink http://dx.doi.org/10.1787/888932977885

Figure A.18. **Road motor vehicle ownership, OECD**

Index 1990 = 100

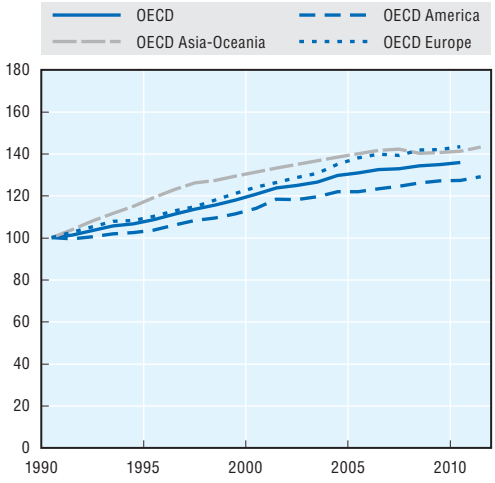


Source: Eurostat, North American Transportation Statistics, World Road Statistics; UNECE and national sources.

StatLink http://dx.doi.org/10.1787/888932977904

Figure A.19. **Road motor density per network length, OECD**

Index 1990 = 100

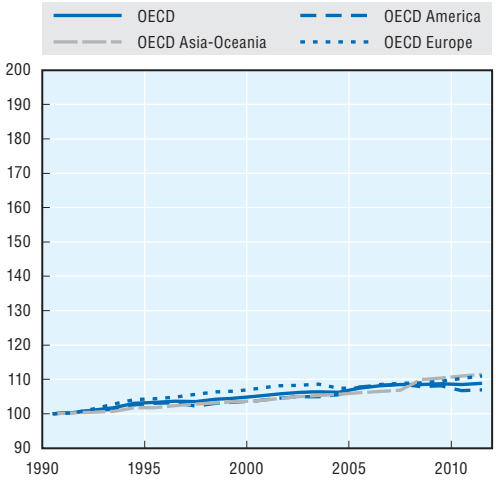


Source: Eurostat, International Transport Forum, World Road Statistics, North American Transportation Statistics; UNECE and national sources.

StatLink http://dx.doi.org/10.1787/888932977923

Figure A.20. **Road network density, OECD**

Index 1990 = 100

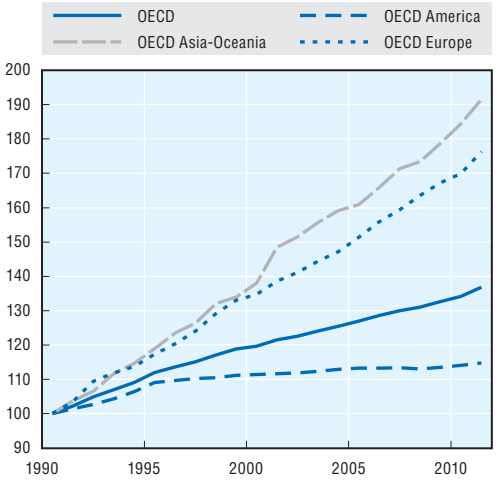


Source: Eurostat, World Road Statistics, North American Transportation Statistics; UNECE and national sources.

StatLink http://dx.doi.org/10.1787/888932977942

Figure A.21. **Motorway network density, OECD**

Index 1990 = 100



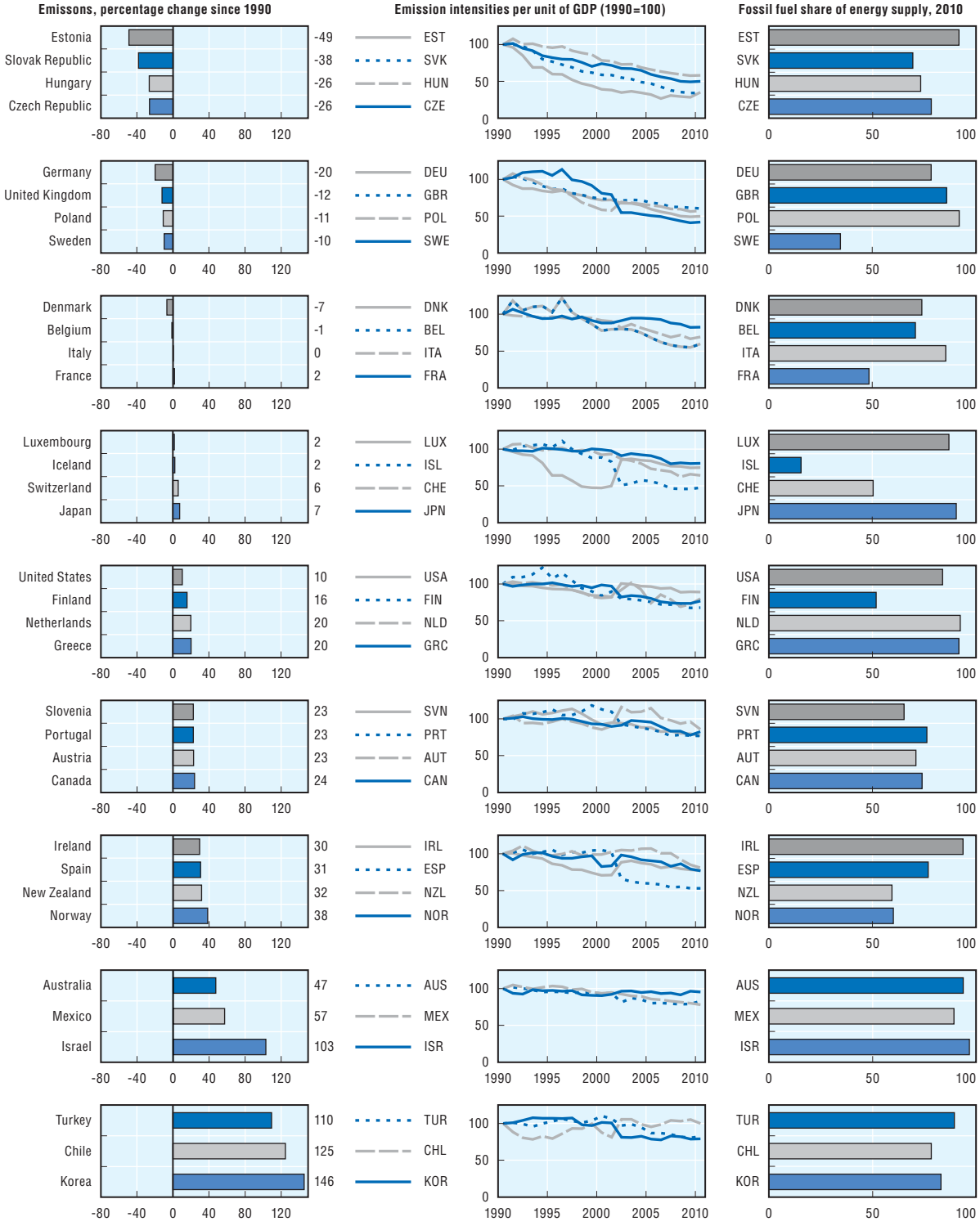
Source: Eurostat, World Road Statistics, North American Transportation Statistics; UNECE and national sources.

StatLink http://dx.doi.org/10.1787/888932977961

Selected country trends

Carbon dioxide (CO_2) emissions from energy use

Figure A.22. **Carbon dioxide (CO_2) emission trends**



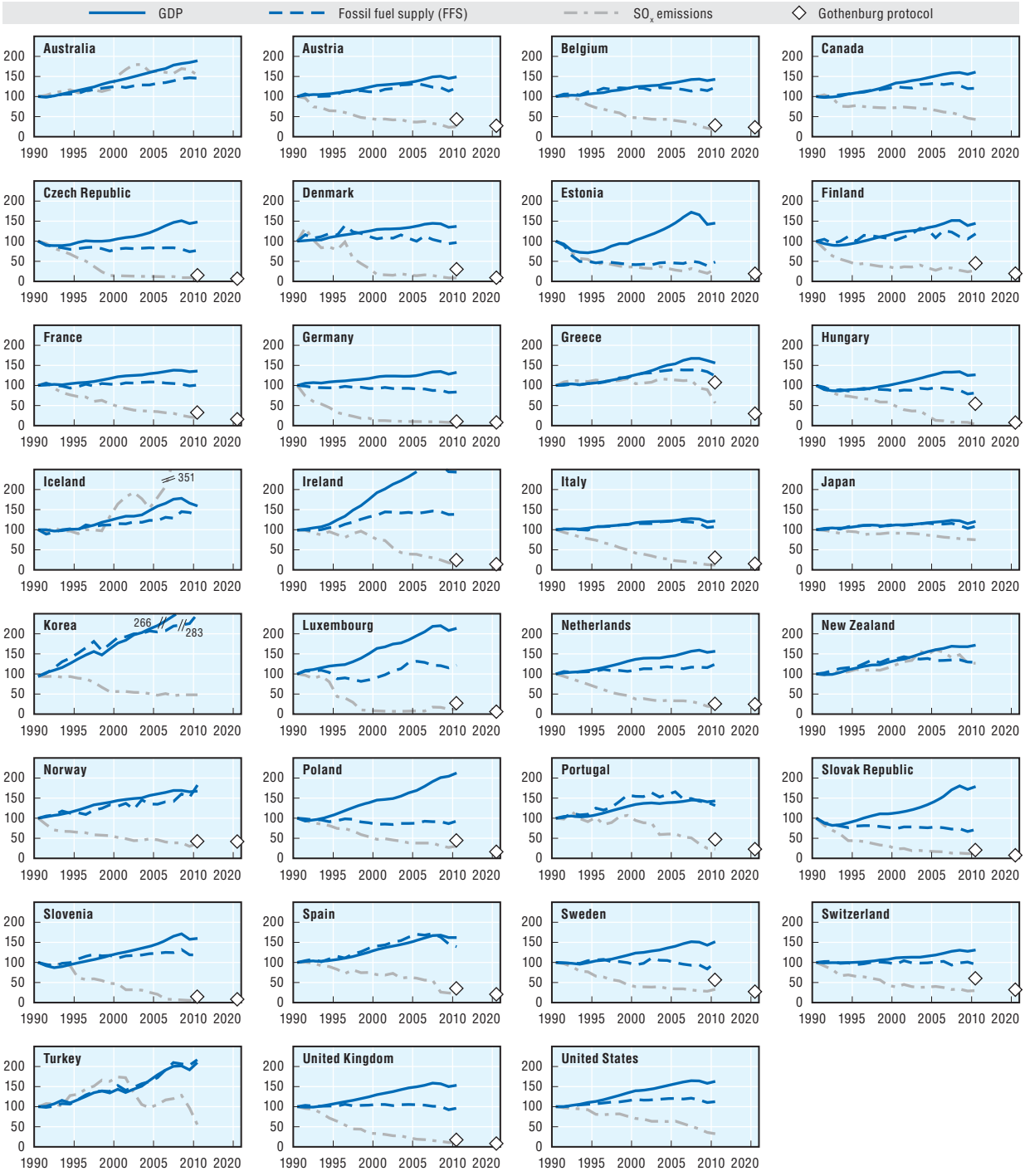
Source: OECD (2012), "OECD Economic Outlook No. 91"; IEA, *CO_2 Emissions from Fuel Combustion* (2012) (database); IEA, *Energy Balances of OECD Countries* (2012) (database).

StatLink http://dx.doi.org/10.1787/888932977980

Sulphur oxides (SO_x) and nitrogen oxides (NO_x) emissions

Figure A.23. **Trends in sulphur oxide (SO_x) emissions, OECD countries**

Index 1990 = 100



Source: European Monitoring and Evaluation Programme (EMEP) (2012); *OECD Environment Statistics* (database); OECD (2012), "OECD Economic Outlook No. 91"; IEA, *Energy Balances of OECD Countries* (2012) (database); UNFCCC, "National Inventory Submissions 2012".

StatLink http://dx.doi.org/10.1787/888932977999

Figure A.24. **Trends in nitrogen oxide (NO_x) emissions, OECD countries**

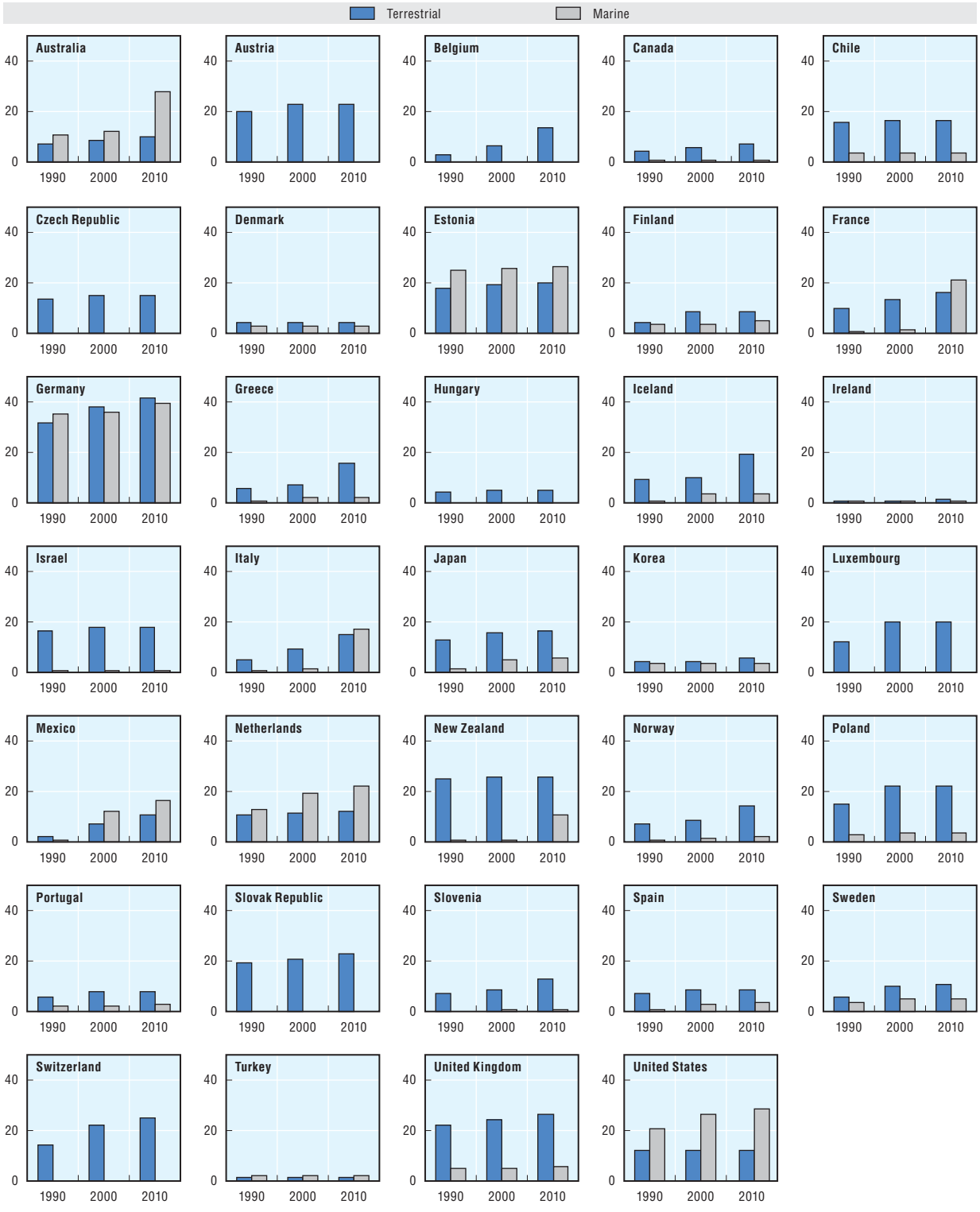
Index 1990 = 100

Source: European Monitoring and Evaluation Programme (EMEP) (2012); *OECD Environment Statistics* (database); OECD (2012), "OECD Economic Outlook No. 91"; IEA, *Energy Balances of OECD Countries* (2012) (database); UNFCCC, "National Inventory Submissions 2012".

StatLink http://dx.doi.org/10.1787/888932978018

Protected areas

Figure A.25. **Major terrestrial and marine protected areas, OECD countries, 1990-2010**



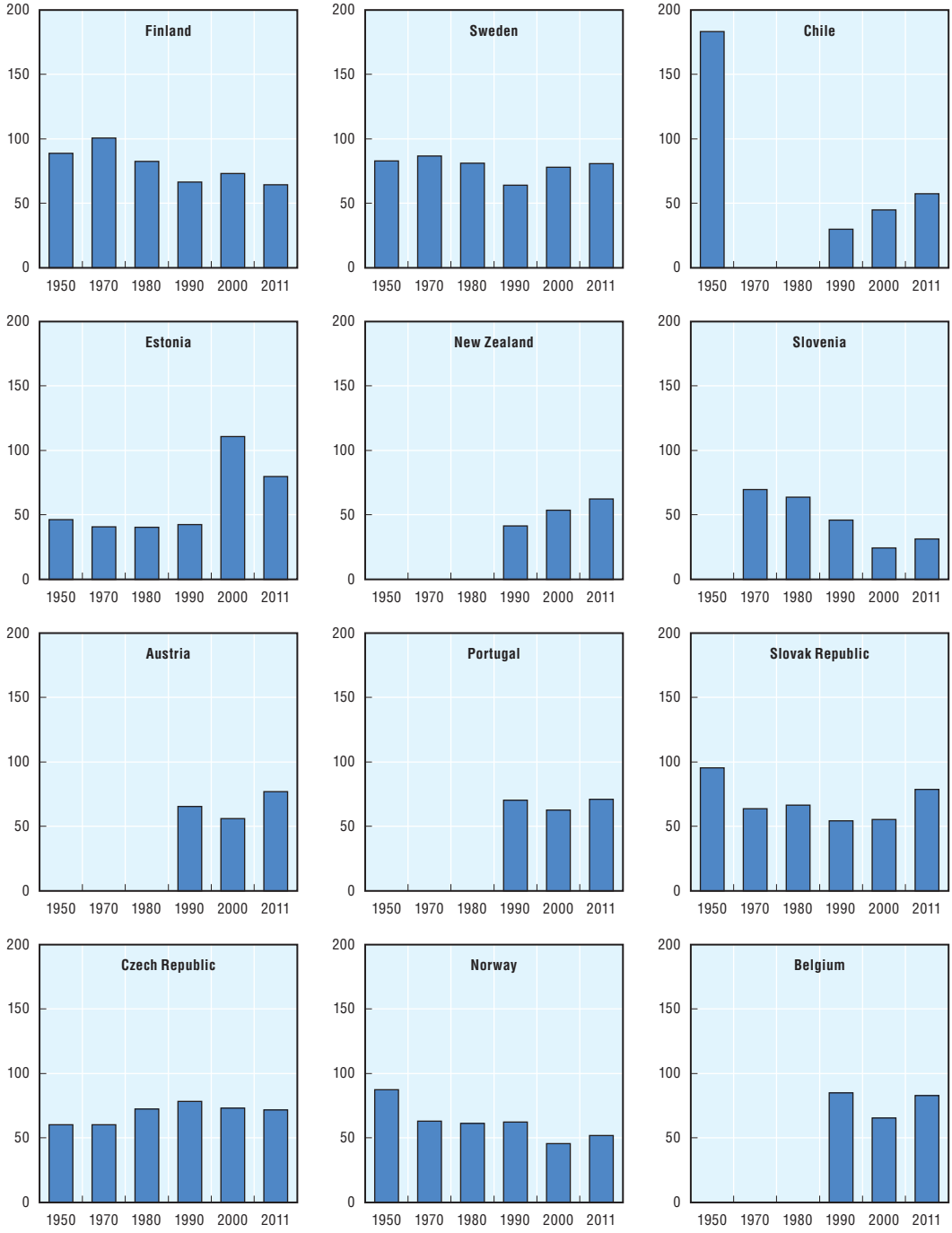
Source: UNEP, *The World Database on Protected Areas (WDPA)*.

StatLink http://dx.doi.org/10.1787/888932978037

Use of forest resources

Figure A.26. **Intensity of use of forest resources, selected countries, 1950-2011**

Fellings as percentage of gross increment

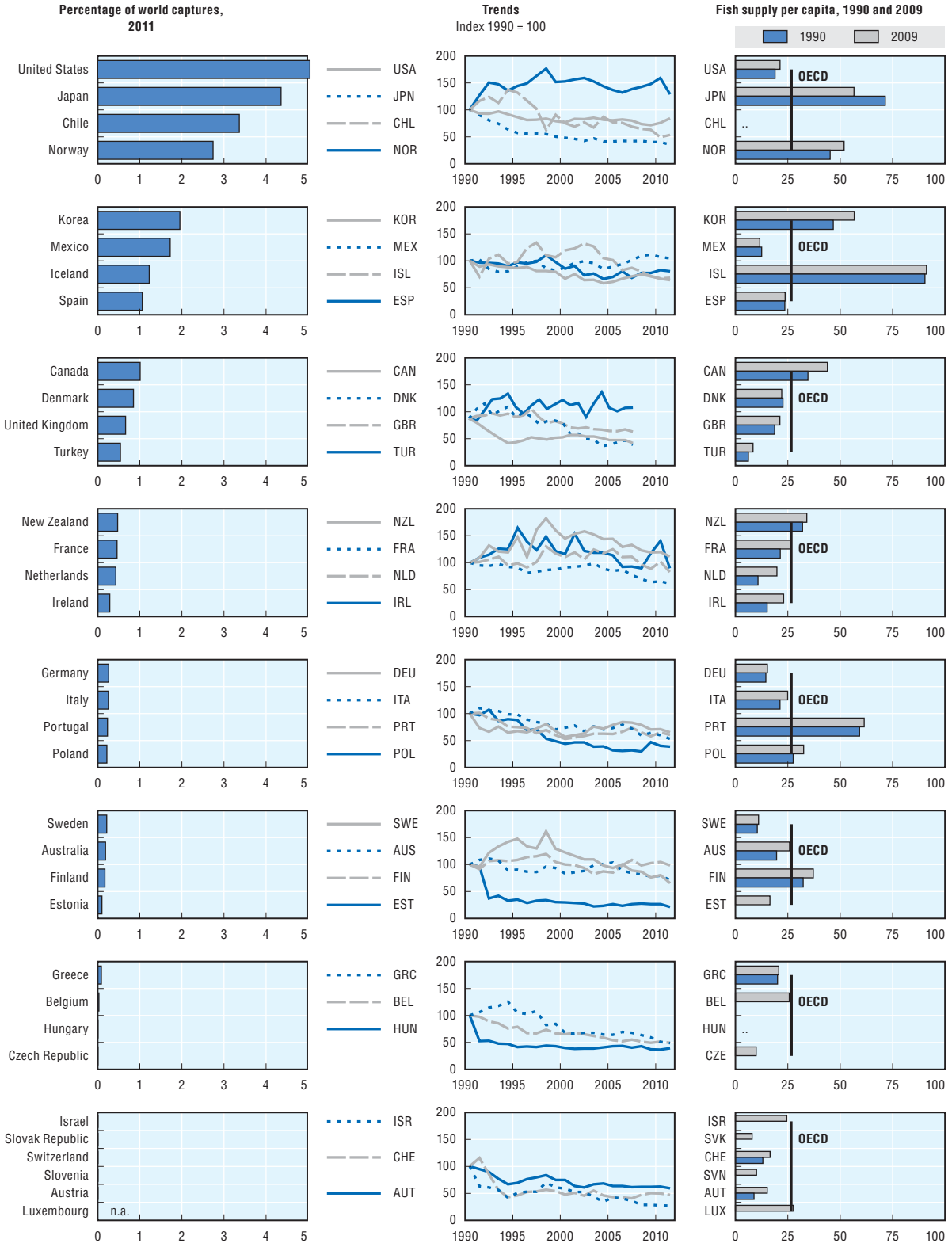


Source: *OECD Environment Statistics* (database); FAO (2012), *Global Forest Resource Assessments* and *FAOSTAT* (database).

StatLink http://dx.doi.org/10.1787/888932978056

Use of fish resources

Figure A.27. **Fish captures and fish supply, OECD countries**



Source: FAO, *FISHSTAT* (2012) (database).

StatLink http://dx.doi.org/10.1787/888932978075

ANNEX B

Additional information and country notes

Greenhouse gas (GHG) emissions

The main international agreement is the United Nations Framework Convention on Climate Change (Rio de Janeiro, 1992), ratified by 194 parties. Industrialised countries committed to taking measures aimed at stabilising GHG emissions by 2000 at 1990 levels. The 1997 Kyoto Protocol established differentiated national or regional emission reduction or limitation targets for the six major GHGs (CO_2, CH_4, N_2O, PFCs, HFCs and SF_6) for 2008-12, with 1990 as the reference year. The Kyoto Protocol has been ratified by 191 countries, including all but two OECD countries, and has been in force since 16 February 2005. In 2010 and 2011, negotiations in Copenhagen and Cancun led to progress on, among other things, goals for emission reductions, including from developing countries; finance; adaptation; and reducing emissions from deforestation and degradation (REDD).

Data presented in this report refer to the sum of all six "Kyoto gases" expressed in CO_2 equivalents (status of the UNFCCC and the Kyoto Protocol: as of May 2012). They do not, however, directly relate to the Kyoto targets; they refer to domestic emissions (i.e. emitted within the national territory) and exclude CO_2 emissions and removals from land use change and forestry; they do not take account of international transactions of emission reduction units or certified emission reductions.

- Latest available year: data prior to 2006 were not considered.

Chile. Latest available year: 2006.

Korea. Latest available year: 2007.

OECD. Does not include Israel.

Sulphur oxides (SO_x) and nitrogen oxides (NO_x) emissions

An important international agreement for Europe and North America is the Convention on Long-Range Transboundary Air Pollution (Geneva, 1979), and its protocols to reduce emissions of sulphur oxides (Helsinki, 1985; Oslo, 1994; Gothenburg, 1999), and nitrogen oxides (Sofia, 1988; Gothenburg, 1999). Other protocols aim at reducing emissions of VOCs (Geneva, 1991; Gothenburg, 1999), ammonia (Gothenburg, 1999), heavy metals (Aarhus, 1998) and persistent organic pollutants (Aarhus, 1998). In 2012, the Gothenburg

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

Table B.1. **Emission ceilings relating to the provision of Article 3, Paragraphs 1 and 10 of the Gothenburg Protocol**[1]

Sulphur emissions (1 000 tonnes of SO_2 per year)					Protocol status[2]	Nitrogen oxide emissions (1 000 tonnes of NO_2 per year)			
Party	Levels 1980	Levels 1990	Ceilings for 2010	% reductions for 2010 (base year 1990)		Levels 1990	Ceilings for 2010	% reductions for 2010 (base year 1990)	Party
Austria	400	91	39	-57	S	194	107	-45	Austria
Belgium	828	372	106	-72	R	339	181	-47	Belgium
Canada national	4 643	3 236	..	..	S	2 104	..	..	Canada
Canada PEMA[3]	3 135	1 873	..	..					
Czech Republic	2 257	1 876	283	-85	R	742	286	-61	Czech Republic
Denmark	450	182	55	-70	R	282	127	-55	Denmark
Finland	584	260	116	-55	R	300	170	-43	Finland
France	3 208	1 269	400	-68	R	1 882	860	-54	France
Germany	7 514	5 313	550	-90	R	2 693	1 081	-60	Germany
Greece	400	509	546	7	S	343	344	0	Greece
Hungary	1 633	1 010	550	-46	R	238	198	-17	Hungary
Ireland	222	178	42	-76	S	115	65	-43	Ireland
Italy	3 757	1 651	500	-70	S	1 938	1 000	-48	Italy
Luxembourg	24	15	4	-73	R	23	11	-52	Luxembourg
Netherlands	490	202	50	-75	R	580	266	-54	Netherlands
Norway	137	53	22	-58	R	218	156	-28	Norway
Poland	4 100	3 210	1 397	-56	S	1 280	879	-31	Poland
Portugal	266	362	170	-53	R	348	260	-25	Portugal
Slovak Republic	780	543	110	-80	R	225	130	-42	Slovak Republic
Slovenia	234	196	27	-86	R	63	45	-29	Slovenia
Spain	2 959	2 182	774	-65	R	1 113	847	-24	Spain [1]
Sweden	491	119	67	-44	R	338	148	-56	Sweden
Switzerland	116	43	26	-40	R	166	79	-52	Switzerland
United Kingdom	4 863	3 731	625	-83	R	2 673	1 181	-56	United Kingdom
United States	..	..	..	..	R	..	..	..	United States
European Community	26 456	16 436	4 059	-75	R	13 161	6 671	-49	European Community

1. 1980 and 1990 emission levels and the % reductions listed are given for information purposes only in the Annex II of the Gothenburg protocol. See the protocol text for details and country notes *www.unece.org/env/lrtap/*).
2. As of 24 May 2012, the date of entry into force of the protocol. S: signed, R: ratified. N.B.: In 1991 Canada and the United States signed a bilateral air quality agreement including an acid rain (1991) and an ozone annex (2000).
3. PEMA: pollutant emission management areas. The PEMA for sulphur for Canada is an area of 1 million square kilometres which includes all the territory of the Provinces of Prince Edward Island, Nova Scotia and New Brunswick, all the territory of the Province of Québec south of a straight line between Havre-St. Pierre on the north coast of the Gulf of Saint Lawrence and the point where the Québec-Ontario boundary intersects with the James Bay coastline, and all the territory of the Province of Ontario south of a straight line between the point where the Ontario-Québec boundary intersects the James Bay coastline and the Nipigon River near the north shore of Lake Superior.

Source: UNECE (2012), "Convention on Long-Range Transboundary Air Pollution".

StatLink http://dx.doi.org/10.1787/888932978531

Protocol was revised to set more ambitious targets to reduce emissions by 2020 and beyond, including targets for fine particulate matter (among which is black carbon, a climate-forcing pollutant).

- Data refer to man-made emissions only. SO_x and NO_x are given as quantities of SO_2 and NO_2 respectively. Emissions from international transport (aviation, marine) are excluded.
- Data may include provisional figures and Secretariat estimates. For some countries expert estimates from EMEP have been used: the Czech Republic 2010, Hungary 2006-latest; Luxembourg 2010; Poland 1990, 2010.
- Percentage change: change with respect to the latest available year since 1990. Latest available year: data prior to 2006 were not considered.

Australia. NO_x: excludes prescribed burning of savannas (423 000 tonnes in 2010).

Chile. Latest available year: 2006.

Iceland. SO_x: includes emissions from geothermal energy (58 000 tonnes in 2010, i.e. 77% of total).

Korea. Latest available year: 2008.

Luxembourg. Data exclude "fuel tourism" emissions.

New Zealand. NO_x: excludes prescribed burning of savannas.

United States. Emissions from wildfires are excluded.

OECD. Secretariat estimates, does not include Chile and Mexico.

Freshwater abstractions and intensity of use

The intensity of use of natural freshwater resources (or water stress) is expressed as gross abstractions in percentage of total available renewable freshwater resources (including inflows from neighbouring countries) or in percentage of internal freshwater resources (i.e. precipitation – evapotranspiration). The following stress levels can be distinguished:

- Low (less than 10%): generally there is no major stress on the available resources.
- Moderate (10% to 20%): indicates that water availability issues are becoming a constraint on development and significant investments are needed to provide adequate supplies.
- Medium-high (20% to 40%): implies the management of both supply and demand, and conflicts among competing uses need to be resolved.
- High (more than 40%): indicates serious scarcity, and usually shows unsustainable water use, which can become a limiting factor in social and economic development.

National water stress levels may hide important variations at subnational (e.g. river basin) level, in particular in countries with extensive arid and semi-arid regions.

For some countries the data refer to water permits (e.g. Chile, Mexico, New Zealand) and not to actual abstractions.

Freshwater resources: the data refer to long-term annual averages over a minimum period of 30 consecutive years.

- Latest year available: data prior to 2006 were not considered.

Australia. From 2000: data include reused water.

Belgium. Freshwater resources: do not include underground flows and include estimates.

Czech Republic. Freshwater resources: do not include underground flows.

Denmark. Irrigation: includes fish farming. 2009: partial total including public supply and manufacturing only.

Finland. Partial data.

Greece. Partial totals; exclude agricultural uses besides irrigation.

Korea. Irrigation includes other agricultural uses.

Mexico. 2001 onwards: volumes of water granted in concessions; prior data are estimates.

Netherlands. Freshwater resources: do not include underground flows (estimated at 2 billion m^3).

New Zealand. Estimates based on water permits, assuming that actual abstractions are equal to 50% of water allocations.

Norway. Abstractions: since 1996 data include water abstractions for aquaculture. Totals include estimates.

Poland. Abstractions for agriculture include aquaculture (areas over 10 ha) and irrigation (arable land and forest areas greater than 20 ha). Water for animal production is not included.

Slovak Republic. Freshwater resources: do not include underground flows (estimated at 946 million m^3). Irrigation data before 2000 include estimates.

Switzerland. Total renewable: inflow excludes Liechtenstein (about 1%). Freshwater abstractions: partial totals excluding all agricultural uses. Public supply includes total industry (ISIC 5-43 Rev. 4) and other activities.

Turkey. Totals are estimated on the basis of partial inventories, excluding agricultural uses besides irrigation and, until 1993, electrical cooling. Public supply: before 2008 data refer to urban areas only.

United Kingdom. Abstractions: England and Wales only. Financial year (April to March) until 2000, and from 2008.

OECD. Abstractions as a percentage of available resources: do not include Austria, Israel, Italy, Finland and Poland. Abstractions per capita are Secretariat estimates based on linear interpolations.

Population connected to wastewater treatment plants

"Connected" means actually connected to a wastewater treatment plant through a public sewage network. It does not take into account independent private facilities (e.g. septic tanks), used where public systems are not economic. The optimal connection rate is not necessarily 100%; it may vary among countries and depends on geographical features and on the spatial distribution of habitats.

- Primary treatment: physical or chemical process involving settlement of suspended solids, or other process in which the BOD5 of the incoming wastewater is reduced by at least 20% before discharge and the total suspended solids are reduced by at least 50%.
- Secondary treatment: process generally involving biological treatment with a secondary settlement or other process, with a BOD removal of at least 70% and a COD removal of at least 75%.
- Tertiary treatment: treatment of nitrogen or phosphorous or any other pollutant affecting the quality or a specific use of water (microbiological pollution, colour, etc.).

Chile. Data refer to population living in urban areas only. Include 2009 data for independent treatment.

Finland. Secondary treatment: 50-80% removal of BOD. Tertiary treatment: 70-90% removal of BOD.

Italy. Sewage connection rates are overestimated because it is assumed that the public sewerage serves the entire municipal population.

Korea. Population connected: includes population connected to public sewage treatment by pipe and some independent treatment.

Mexico. Estimates based on treated wastewater volumes.

Poland. Data also include population not connected by pipe, whose wastewater is collected in septic tanks and delivered to urban wastewater treatment plants by truck.

Portugal. Connection rates also cover preliminary treatment, undefined treatment and collective septic tanks.

Spain. Estimates based on original data expressed in terms of population equivalent (p.e.); refer to wastewater treatment in urban agglomerations of more than 2000 p.e.; may include industrial wastewater and thus overestimate the actual connection rates. From 2006: includes estimates for population living in agglomerations smaller than 2000 p.e. (about 4% of total population).

United Kingdom. England and Wales only.

OECD. Estimates based on partial data.

Threatened species

- "Threatened" refers to the sum of the "endangered", "critically endangered" and "vulnerable" species, i.e. species in danger of extinction and species soon likely to be in danger of extinction. Extinct species are excluded unless otherwise specified.
- "Endangered": species that are not "critically endangered" but face a very high risk of extinction in the wild in the near future.
- "Critically endangered": species that face an extremely high risk of extinction in the wild in the immediate future.
- "Vulnerable": species that are not "critically endangered" or "endangered" but face a high risk of extinction in the wild in the medium term.
- It should be noted that the number of species known does not always accurately reflect the number of species in existence, and that countries apply the definitions with varying degrees of rigour.
- For some countries data include extinct species: the Czech Republic, Korea, Switzerland, Finland, Greece (vascular plants).

Birds: for some countries the data refer to breeding species only (the Czech Republic, Denmark, Germany, Iceland, Luxembourg, the Netherlands).

Denmark. Vascular plants: apomictic species in the *genus hieracieum*, *rubus* and *taraxacum* are not included.

Finland. Vascular plants: includes indigenous species and established aliens, excludes apomictic species and casual aliens.

France. Metropolitan France. Birds: breeding species, other regular visitors and passage migrants. Vascular plants: *angiospermae*, *gymnospermae* and *pteridophyta*.

Greece. Vascular plants: include 8 extinct species.

Hungary. Birds: all species recorded in Hungary since 1800.

Iceland. Mammals: terrestrial species only. Birds: about 350 species have been recorded one or more times on national territory.

Ireland. Mammals: exclude marine mammals; threatened percentage is underestimated.

Israel. Threatened indigenous mammals: data refer to 3 indigenous species that are all threatened.

Luxembourg. Vascular plants: estimation of known species based on the total number of taxons of the red list.

Mexico. Data are estimated. Indigenous: endemic species only. Birds: resident and migratory species. Vascular plants: *pteridophytes*, *gymnosperms* and *angiosperms*.

New Zealand. Threatened: national standard; indigenous species only. Known species excludes vagrants and migrant.

Norway. Species known: indigenous species assessed for 2010 red list only.

Portugal. Data includes Azores and Madeira Islands. Birds: species assessed exclude vagrants.

Slovak Republic. Mammals: species known refer to taxons. Vascular plants: trees only.

Spain. Birds: indigenous birds include breeding species only. Vascular plants: the share of threatened species is estimated.

Switzerland. Indigenous species only.

United Kingdom. Indigenous species only. Threatened: national standard.

United States. Threatened: national definitions based on NatureServe Global Status Ranks. Species known: "indigenous" and "exotic" species.

Protected areas

Major protected areas

Protected areas are areas of land or sea especially dedicated to the protection and maintenance of biological diversity and of natural and associated cultural resources, and managed through legal or other effective means. The data refer to IUCN management Categories I-VI. National classifications may differ.

IUCN management Categories I-VI:

- Ia: strict nature reserves, managed mainly for science.
- Ib: wilderness areas, managed mainly for wilderness protection.
- II: national parks, managed mainly for ecosystem protection and recreation.
- III: natural monuments, managed mainly for conservation of specific natural features.
- IV: habitat orspecies management areas, managed mainly for habitat and species conservation through management intervention.
- V: protected landscapes orseascapes, managed mainly for landscape orseascape conservation and recreation.
- VI: managed resource protected areas, managed mainly for the sustainable use of natural ecosystems.

Australia. Includes the Great Barrier Reef Marine Park.

Denmark. Excludes Greenland.

France. Metropolitan France only.

Netherlands. Excludes the Netherlands Antilles.

Norway. Excludes Svalbard, Jan Mayen and Bouvet islands.

Portugal. Includes Azores and Madeira.

Spain. Includes Baleares and Canaries.

United Kingdom. Excludes overseas territories

United States. Includes Alaska. Excludes American Samoa, Guam, Minor Outlying Islands, Northern Mariana Islands, Puerto Rico and Virgin Islands.

Biosphere reserves

Biosphere Reserves are internationally recognised within the framework of UNESCO's Man and the Biosphere (MAB) Programme. They are areas of terrestrial and coastal or marine ecosystems, where, through appropriate zoning patterns and management mechanisms, the conservation of ecosystems and their biodiversity is combined with the

sustainable use of natural resources for the benefit of local communities, including relevant research, monitoring, education and training activities. Biosphere Reserves consist of a core area, a buffer zone and a transition area and only the core area requires legal protection. A number of Biosphere Reserves simultaneously encompass areas protected under other systems (such as national parks or nature reserves) and other internationally recognised sites (such as World Heritage or Ramsar wetland sites).

Czech Republic. Includes one site shared with Poland.

Denmark. Excludes Greenland.

France. Includes one site shared with Germany; excludes non-metropolitan areas (two biosphere reserves).

Germany. Includes one site shared with France.

Poland. Includes one site shared with the Czech Republic, one with the Slovak Republic and one with the Slovak Republic and Ukraine.

Portugal. Includes one site shared with Spain.

Slovak Republic. Includes one site shared with Poland and one with Poland and Ukraine.

Spain. Includes one site shared with Portugal.

Wetlands of international importance

Data refer to wetlands that are designated by the contracting parties of the 1971 Ramsar Convention on Wetlands of International Importance especially as Waterfowl Habitat. Wetlands are defined as "areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres". Such areas are of particular importance because of their ecological richness and diversity as well as that of the wildlife they support.

Denmark. Excludes Greenland.

France. Excludes non-metropolitan areas (three wetlands of 2 160 km^2).

Netherlands. Excludes the Netherlands Antilles and Aruba.

Norway. Includes Spitzbergen island.

United Kingdom. Excludes overseas territories.

Use of forest resources

Forest land

Forest land refers to land area spanning more than 0.5 ha and a canopy cover of more than 10%, or trees able to reach these thresholds *in situ*. It excludes woodland or forest predominantly under agricultural or urban land use and that used only for recreation.

Growing stock

Growing stock refers to volume over bark of all living trees more than a certain diameter at breast height (or above buttress if they are higher than breast height). The diametres used may vary across countries but generally the data refer to a diametre of more than 10 cm at breast height.

Intensity of use of forest resources

- Intensity of use: data refer to annual growth (gross increment) divided by annual harvest or fellings.
- 2010s: 2010 or latest available year (years prior to 2005 were not considered).
- Data exclude Iceland as there is no traditional forestry in this country.

Austria. 2010s: 2005 data. Annual averages over several years.

Belgium. 2010s: 2005 data.

Chile. 2010s: 2009 data.

Estonia. Averages over several years. 1950-95: total forest including other wooded land and trees outside the forests. Since 2000: forest available for wood supply.

Finland. All forests are included. The volumes include bark.

France. Data refer to volume collected in the forest, i.e. fellings plus dead wood harvested.

New Zealand. Gross Increment: data from planted production forests only.

Sweden. The area of forest available for wood supply has steadily decreased from 1990 as a result of environmental considerations including formally and informally protected areas.

Forestry products as a percentage of national exports of goods

- Ratio based on data expressed in monetary terms.
- Forestry products refers to wood forest products: roundwood, fuel wood and charcoal, industrial roundwood, sawn wood, wood-based panels, wood residue, and pulp for paper and paperboard.

Use of fish resources

- Total fish captures: fish production from capture fisheries; the data refer to nominal catches (landings converted to a live weight basis) of freshwater, brackish-water and marine species of fish, crustaceans, molluscs and other aquatic animals, killed, caught, trapped or collected for all commercial, industrial, recreational and subsistence purposes. Included are: crustaceans, diadromus fish, freshwater fish, marine fish, miscellaneous aquatic animals and molluscs. Excluded are: aquatic plants, whales, seals and other aquatic mammals.
- Marine captures: includes marine fish, crustaceans and molluscs.
- Aquaculture refers to the farming of aquatic organisms including fish, molluscs, crustaceans and aquatic plants with some sort of intervention in the rearing process to enhance production, such as regular stocking, feeding, protection from predators.

Municipal waste

- Municipal waste is waste collected by or on behalf of municipalities. It includes waste originating from households and similar waste from small commercial activities, office buildings, institutions such as schools and government buildings, municipal services, and small businesses that dispose of waste at the same facilities used for municipally collected waste. It does not include municipal construction waste, nor waste sludges from municipal sewage treatment facilities.
- National definitions may differ. For some countries it may include small amounts of special waste or waste electrical and electronic equipment.
- Values per capita are rounded.

- Management of municipal waste: categories do not necessarily add up to 100% because residue from some types of treatment (incineration, composting) is landfilled and because treatment types other than those presented may not be covered.

Austria. Municipal waste: excludes construction site waste and on-site composting of green waste from municipal service, which are included in national definition. Waste from households: includes a small part of waste from commerce and trade.

Belgium. Waste from households: includes waste from small enterprises.

Canada. 2008 data. 1 030 kg/cap of non-hazardous waste was generated from households, institutions, commercial establishments and industries (including construction and demolition w.). Management: percentage based on above non-hazardous waste. Percentage change: refers to household waste only.

Estonia. Percentage change: 2002-10.

France. Data include non-metropolitan areas (DOM).

Hungary. Municipal waste: includes estimates for population not served by municipal waste services. Management: percentage based on collected amounts. Recycling: include waste exported for recycling.

Iceland. Municipal waste: estimate for 2009.

Ireland. Waste from households: include estimates for households not served by waste collection.

Japan. Municipal waste: data cover municipal collection, waste directly delivered and in-house treatment; exclude separate collection for recycling by private sector. Management: percentage based on waste treated by municipalities and separate collection for recycling by private sector. Recycling: amounts directly recycled (including private collection) and recovered from intermediate processing. Landfill: direct disposal (excluding residue from other treatments).

Korea. 2009 data.

Mexico. Landfill: controlled, non-controlled and open landfills.

Norway. Per capita amounts based on population served by municipal waste services. Percentage change: 2001-10.

Poland. Waste from households: Secretariat estimate.

Portugal. Includes Azores and Madeira Islands.

Slovak Republic. Percentage change: 2002-10.

Slovenia. Percentage change: 2002-10.

Spain. Data include Baleares and Canary Islands.

Turkey. Includes estimates for population not served by waste services.

United Kingdom. Waste from households: includes hazardous and clinical waste from households and waste from street cleansing and litter bins. Management: 2009 data.

United States. Incineration: after recovery. Landfill: after recovery and incineration.

OECD. Estimates, which can differ from the sum of national data presented. Management: does not include Australia, Canada and Israel.

Industrial, nuclear and hazardous waste

- Industrial waste refers to waste generated by the manufacturing industry. National definitions often differ. Rounded data.
- Nuclear waste refers to spent fuel arisings in nuclear power plants. The data are expressed in tonnes of heavy metal. It should be noted that these data do not represent all radioactive waste generated.
- Hazardous waste refers to waste streams controlled according to the Basel Convention on Transboundary Movements of Hazardous Wastes and their Disposal (see Annex IV of the convention for details). National definitions often differ, and caution should be exercised when interpreting these data.
- Transboundary movements of hazardous waste: should refer to actual amounts moved, but may in some cases refer to total authorisations (notifications). Data sourced from the Basel Convention.
- Industrial waste: Austria, Belgium, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, the Slovak Republic, Slovenia, Spain, Sweden, United Kingdom: data sourced from the European Waste Statistics Regulation (Eurostat).
- Hazardous waste generated: Belgium, Czech Republic, Finland, France, Germany, Greece, Italy, Luxembourg, the Netherlands, Poland, Portugal, Slovenia, Spain and Sweden: data sourced from the European Waste Statistics Regulation (Eurostat). Ireland, Norway and Switzerland: national data.

Korea. Nuclear waste: includes LWR fuel and HWR fuel.

Switzerland. Industrial waste: recovered or landfilled industrial waste, including some special waste. Hazardous waste generated: all waste defined as special waste in Swiss legislation; includes imports.

United Kingdom. Hazardous waste: data refer to England and Wales only.

United States. Hazardous waste generated: includes some wastewater.

Use of material resources

The data presented here refer to the mass of materials or substances produced from renewable and non-renewable natural resource stocks that are used as inputs into human activities and the products that embody them. These "materials" include energy carriers (gas, oil, coal), metal ores and metals, construction minerals, industrial minerals, and biomass (food, feed, wood).

- The OECD database on material flows (unpublished) serves as the primary information basis. It builds on and expands Eurostat's economy-wide material flows database and makes use of various other international and national sources. It is complemented with data from the SERI material flow database. Although considerable progress has been made in the past decade to set up material flow accounts, missing information, including on physical flows of international trade, and a lack of consensus on conversion factors limit the calculation of some material flow indicators at international level.
- Data refer to the indicated year or to the latest available year. They may include provisional figures and estimates. Varying definitions can limit comparability across countries.
- Material categories: DMC of non-metallic minerals includes domestic extraction and trade of minerals used in industry and construction, plus trade of derived processed products; biomass includes domestic production from agriculture, forestry and fisheries,

plus trade of raw and processed products from these sectors; fossil fuels include coal, crude oil, natural gas, peat and traded-derived products; and metals include domestic extraction of metal ores, plus trade of metal ores, metal concentrates, refined metals, products mainly made of metals, and scrap.

Energy

Total primary energy supply (TPES)

TPES is made up of production + imports – exports – international marine bunkers – international aviation bunkers ± stock changes. Note that exports, bunkers and stock changes incorporate the algebraic sign directly in the number.

GDP expressed in USD PPP and constant 2005 prices.

Australia. Excludes the overseas territories.

Denmark. Excludes Greenland and the Danish Faroes.

France. Includes Monaco, and excludes the following overseas departments and territories: Guadeloupe, Guyana, Martinique, New Caledonia, French Polynesia, Reunion, and St.-Pierre and Miquelon.

Italy. Includes San Marino and the Vatican.

Japan. Includes Okinawa.

Netherlands. Excludes Suriname and the Netherlands Antilles.

Portugal. Includes the Azores and Madeira.

Spain. Includes the Canary Islands.

Switzerland. Includes oil data for Liechtenstein.

United Kingdom. Shipments of coal and oil to the Channel Islands and the Isle of Man from the United Kingdom are not classed as exports. Supplies of coal and oil to these islands are, therefore, included as part of UK supply. Exports of natural gas to the Isle of Man are included with the exports to Ireland.

United States. Includes the 50 states and the District of Columbia. Oil statistics and coal trade statistics also include Puerto Rico, Guam, the Virgin Islands, American Samoa, Johnston Atoll, Midway Islands, Wake Island and the Northern Mariana Islands.

End-use prices

Austria. 2008 data for electricity (industry).

Denmark. 2009 data for natural gas (industry).

Korea. 2009 data for natural gas (industry and households) and electricity (industry).

Mexico. 2008 data for natural gas (industry).

Netherlands. 2009 data for light fuel oil (industry and households).

Spain. 2009 data for electricity (industry and households).

Transport

Road traffic

Traffic volumes are expressed in billions of kilometres travelled by road vehicles; they are usually estimates and represent the average annual distance covered by vehicles, in kilometres, multiplied by the number of vehicles in operation. In principle, the data refer to the whole distance travelled on the whole network inside the national boundaries by national vehicles, with the exception of two- and three-wheeled vehicles, caravans and trailers.

The interpretation should take into account differences in the definition of road traffic volumes: e.g. inclusion or exclusion of kilometres travelled on national territory by foreign vehicles, and variations in the method of estimation.

- Data include Secretariat estimates and provisional data.
- Traffic per unit of GDP: 2007 data for the Czech Republic, Estonia, Iceland, Ireland, Italy, the Netherlands, Portugal and the Slovak Republic; 2008 data for Austria, Germany and Greece.
- Traffic per network length: 2005 data for Luxembourg and Portugal; 2007 data for the Czech Republic, Estonia, Iceland, Ireland, the Netherlands and the Slovak Republic; 2008 data for Austria, Germany and Greece.

United Kingdom. Break in series in 1992.

United States. Passenger cars include single-unit trucks and tractors.

OECD. OECD totals are based on Secretariat estimates. Totals exclude Chile.

Motor vehicles

- Total stock includes passenger cars, goods vehicles, buses and coaches. Data refer to autonomous road vehicles with four or more wheels, excluding caravans and trailers, military vehicles, special vehicles (for emergency services, construction machinery, etc.) and agricultural tractors.
- Private car ownership is expressed as passenger cars per capita. Data refer to road motor vehicles, other than a motor cycle, intended for the carriage of passengers and designed to seat no more than nine persons (including the driver), including microcars (need no permit to be driven), taxis and hired passenger cars, provided that they have fewer than ten seats.
- Goods vehicles: vans, lorries (trucks) and road tractors. Excludes caravans, trailers and semi-trailers, military or special vehicles, and agricultural tractors.
- Motor vehicles refer to the sum of passenger cars, goods vehicles (lorries and road tractors), and buses.

Australia. Goods vehicle: refers to light commercial vehicles, rigid trucks, articulated trucks and other trucks.

Canada. Goods vehicles: refers to vans, trucks of 4.5 tonnes and over.

Chile. Goods vehicles: excludes agricultural tractors and trailers and semi-trailers.

Germany. Passenger cars: break in series in 2007.

Hungary. Passenger cars: break in series in 1996.

Iceland. Goods vehicles: refers to lorries and vans.

United States. Passenger cars: include single-unit trucks and tractors.

OECD. OECD totals are based on Secretariat estimates.

Road network

Total road network includes all roads in a given area. “Roads” refers to motorways, main or national highways, secondary or regional roads, and others. In principle, the data refer to all public roads, streets and paths in urban and rural areas, but not private roads, and describe the situation on 31 December of each year.

Motorways: class of roads, specifically designed and built for motor traffic, which does not serve properties bordering on it, and which: *a)* is provided, except at special points or temporarily, with separate carriageways for the two directions of traffic, separated from each other, either by a dividing strip not intended for traffic, or exceptionally by other means; *b)* does not cross at level with any road, railway or tramway track, or footpath; and *c)* is especially sign-posted as a motorway and is reserved for specific categories of road motor vehicles.

Canada. Total road network: two-lane equivalent thousand kilometres.

Iceland. Total road network: includes national, major, collector (distributor), country and highland roads.

Mexico. Motorways: refers to roads with four or more lanes.

Netherlands. Motorways: break in series in 2001.

Slovenia. Motorways: 2009-10 data are provisional.

Spain. Total road network: excludes "other" roads.

Sweden. Total road network: excludes "other" roads.

Switzerland. Total road network: includes cantonal and municipal roads and national highways except motorways.

United States. Total road network: refers to all roads (paved and unpaved). Motorways: sum of principal arterials and Interstates in urban and rural areas, and principal arterials, other freeways, and expressways in urban areas.

OECD. OECD totals are based on Secretariat estimates.

Road fuel prices and taxes

- Taxes: includes taxes that have to be paid by the consumer as part of the transaction and are not refundable.
- Diesel fuel: diesel for commercial use.
- Unleaded gasoline: unleaded premium (95 RON) except as noted.
- Prices: expressed in USD at 2005 prices and PPPs.

Agriculture

Gross nitrogen and phosphorus balances

- The gross nutrient balances are calculated as the difference between the total quantity of nutrient inputs entering an agricultural system (mainly fertilisers and livestock manure) and the quantity of nutrient outputs leaving the system (mainly uptake of nutrients by crops and grassland).
- The nutrient balance indicator is expressed in terms of kilograms of nutrient surplus (deficit) per hectare of agricultural land per annum to facilitate the comparison of the relative intensity of nutrients in agricultural systems between countries. The nutrient balances are also expressed in terms of changes in the physical quantities of nutrient surpluses (deficits) to indicate the trend and level of potential physical pressure of nutrient surpluses into the environment. The spatial variations in nutrient balances are usually explained by regional differences in farming systems, differing climates and types of soil, farming types and crops types, and varying topography across the agricultural regions.

OECD. OECD totals represent the average percentage change.

Agricultural land

- Agricultural land as percentage of total area: the 1990 figures for Belgium, the Czech Republic, Estonia, Luxembourg, the Slovak Republic, Slovenia and OECD are estimated by the OECD Secretariat.

Agricultural production

- The agricultural production index is based on the sum of price-weighted quantities of different agricultural commodities produced, after deductions of quantities used as seed and feed weighted in a similar manner. The resulting aggregate represents, therefore, disposable production for any use except as seed and feed.
- The data are sourced from FAO; the indices shown may differ from those produced by the countries themselves because of differences in concepts of production, coverage, weights, time reference of data and methods of calculation.

Gross domestic product (GDP), population and consumption

Gross domestic product

- For GDP per capita change : 1991 data for Germany, 1993 for the Slovak Republic; 1995 for the Czech Republic, Estonia, Greece, Hungary and Israel; 1996 for Chile and Slovenia. For Value Added as a percentage of GDP: 2008 data for Canada, 2009 data for France, Iceland, Ireland and Israel. Data include estimates.

Japan. Break in series in 2004 for value added by sector.

Private final consumption expenditure

- Percentage change: with respect to 1991 data for Germany, 1993 for the Slovak Republic, 1995 for Chile, the Czech Republic, Estonia, Greece, Hungary and Israel, 1996 for Slovenia.
- Private consumption by type: 2009 data for Australia, Chile, Japan, New Zealand, Portugal and Switzerland; and Norway for rent and furniture.
- Data include estimates.

Government final consumption expenditure

- The percentage change is with respect to 1991 data for Germany, 1993 for the Slovak Republic, 1995 for Chile, the Czech Republic, Estonia, Greece, Hungary and Israel, 1996 for Slovenia.

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