ANNEX

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 196 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 192 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 2014). They do however not 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, 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 2009 were not considered.

  Israel and Korea. Latest available year: 2011.

  Mexico. Latest available year: 2010. Data include emissions or removals from land-use change and forestry (LUCF)

  OECD and OECD Asia-Oceania. Do not include Israel.

SO_X and 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 (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 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: Czech Republic forthe year 2012; Poland for the year 1990.
- Percentage change: change with respect to the latest available year since 1990. Latest available year: data prior to 2009 were not considered.

Australia. NO_X: excludes prescribed burning of savannas (681 000 tonnes in 2012).

Iceland. SO_X: includes H_2S emissions from geothermal power plants (expressed as SO_2; these emissions represented 68 000 tonnes in 2012, i.e. 80% of total emissions).

Israel and Korea. Latest available year: 2011.

Luxembourg. Data exclude "fuel tourism" emissions (resulting from lower taxation of road fuels compared to neighbouring countries).

New Zealand. NO_X: excludes prescribed burning of savannas.

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

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

	Sulphur emissions (1 000 tonnes of SO_2 per year)				Protocol status[b]	Nitrogen oxide emissions (1 000 tonnes of NO_2 per year)			
	Levels 1980	Levels 1990	Ceilings for 2010	% reductions for2010 (base year 1990)		Levels 1990	Ceilings for 2010	% reductions for 2010 (base year 1990)	
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[c]	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*
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
USA	..	..	..	..	R	..	..	..	USA
European Community	26 456	16 436	4 059	-75	R	13 161	6 671	-49	European Community

a) 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*).

b) 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).

c) 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.

Particulate emissions and population exposure

Emissions of fine particulates

The main international agreement is the Protocol to Abate Acidification, Eutrophication and Ground-level Ozone (Gothenburg Protocol) under the UNECE Convention on Long-Range Transboundary Air Pollution (Air Convention). This protocol, signed in 1999 and revised in 2012, includes national emission reductions targets for $PM_{2.5}$ to be achieved by 2020.

- The data presented refer to man-made emissions of fine particulates smaller than 2.5 microns.

Population exposure to fine particulates

The data presented in the report refer to population weighted concentrations of fine particulates and to the population exposed to concentration levels above WHO guideline values. They should be considered as a general indication of air quality, intended for cross-country comparisons of the relative risk of particulate matter pollution. Actual concentrations and exposure levels may differ, as pollutant concentrations are very sensitive to local conditions, and measurement methods are not the same for all countries.

- Population-weighted exposure to ambient $PM_{2.5}$ pollution is defined as the average level of exposure of a nation's population to outdoor concentrations of suspended particulates measuring less than 2.5 microns in diameter. Exposure is calculated by weighting mean annual concentrations of $PM_{2.5}$ by population in both urban and rural areas and by aggregating them at the national level. Estimates of annual concentrations of very fine particulates are produced by the *Global Burden of Diseases, Injuries, and Risk Factors Study* (GBD), an international scientific effort led by the Institute for Health Metrics and Evaluation at the University of Washington (*http://www.healthdata.org/gbd/about*). They are generated by combining data from atmospheric chemistry transport models, satellite observations of aerosols in the atmosphere, and ground-level monitoring of particulates. More details can be found in the van Donkelaar et al. 2015 article, "Use of Satellite Observations for Long-Term Exposure Assessment of Global Concentrations of Fine Particulate Matter", in the journal *Environmental Health Perspectives*, 123:135-143; *http://dx.doi.org/10.1289/chp.1408646*.

  See also: Mean annual exposure to $PM_{2.5}$ (micrograms per cubic meter): *http://data.worldbank.org/indicator/EN.ATM.PM25.MC.M3*.

- The population exposed to ambient concentrations of $PM_{2.5}$ that exceed the WHO guideline value is defined as the portion of a country's population living in places where mean annual concentrations of $PM_{2.5}$ are greater than 10 micrograms per cubic meter. The data are obtained by overlaying $PM_{2.5}$ concentration estimates with gridded population data. The per cent of inhabitants that live in areas where $PM_{2.5}$ concentrations exceed recommended levels is calculated by summing the population for grid cells where $PM_{2.5}$ concentrations are beyond a threshold value, and then dividing by total population.

  See also: Population exposed to $PM_{2.5}$ levels exceeding the WHO guideline value (% of total): *http://data.worldbank.org/indicator/EN.ATM.PM25.MC.ZS*.

- 10 micrograms per cubic meter is the long-term guideline value recommended by the World Health Organization (WHO) as the lower end of the range of concentrations over which adverse health effects due to $PM_{2.5}$ exposure have been observed. The value recommended in the European Union is a three-year running annual average exposure concentration inferior to 20 $\mu g/m^3$ (legally binding in 2015). It is based on averages over selected monitoring stations in agglomerations and larger urban areas set in urban

background locations to best assess the $PM_{2.5}$ exposure to the general population: *http://ec.europa.eu/environment/air/quality/standards.htm*.

Freshwater abstraction and intensity of use

The intensity of use of natural freshwater resources (or water stress) is expressed as gross abstraction in % of total available renewable freshwater resources (including inflows from neighbouring countries) or in % 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 2009 were not considered.
- Data on irrigated areas refer to the area equipped for irrigation. *Source:* FAO.

Austria. Data for freshwater abstractions as a % of resources represent a 1981-2010 long-term average.

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

Czech Republic. Freshwater resources: do not include underground flows. Total abstractions decreased in 2013 due to lower water abstraction for cooling in electricity production.

Denmark. Irrigation includes abstractions for fish farming.

France. Data refer to metropolitan France and to overseas departments.

Germany. Freshwater abstractions: totals up to 1998 do not include agricultural uses other than irrigation.

Ireland. Break in series in 2005 (change in methodology).

Japan. Public supply: data refer to abstractions supplied to households and the service sector only.

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

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

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 and domestic needs of rural inhabitants is not covered (abstractions for self-supply).

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

Spain. Totals exclude abstractions for aquaculture.

Switzerland. Total renewable resources: exclude inflows from Liechtenstein (about 1%). Freshwater abstractions: partial totals excluding all agricultural uses. Data for 2012 include estimates.

Turkey. Totals are estimated on the basis of partial inventories, excluding agricultural uses other than irrigation and, until 1993, electrical cooling.

United Kingdom. Data refer to England and Wales only. Financial year (April to March) until 2000, and from 2008 onwards. Breaks in series in 1991 and 1999 (changes in reporting methods and classifications). Public supply: data include estimates.

OECD. Time series data include Secretariat estimates based on linear interpolations. OECD totals for water abstraction exclude Chile.

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 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.).

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.

France. Break in time series between 2004 and 2011.

Germany. Since 2007, total treatment includes population with storage tanks and transport to treatment plants by trucks, and "no treatment" refers to pre-treatment in independent treatment plants but with connection to the wastewater collecting system.

Greece. Data refer to agglomerations with more than 2000 population equivalent.

Ireland. Before 1999, data exclude some agglomerations of less than 2 000 population equivalents (p.e.). Since 1999, data refer to urban wastewater treatment delivered to agglomerations greater than or equal to 500 p.e. In 2011, data include agglomerations of less than 500 p.e. Before 2011, the population connected to on-site wastewater treatment installations (such as septic tanks) is not included.

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

Japan. Secondary treatment may include some primary and tertiary treatment.

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. Data refer to urban agglomerations of more than 2 000 population equivalent (p.e., approximately 1 300 inhabitants) and to estimates for agglomerations of less than 2 000 p.e. Systems of septic tanks are included in urban wastewater treatment. Connection rates may thus be overestimated.

Sweden. Break in series in 2000. Based on register studies on wastewater conditions in rural areas, it is assumed that everybody living in urban areas is connected to a wastewater treatment plant.

Turkey. Break in series in 2010. Before 2010, data referred only to municipalities; after 2010, also to villages.

United Kingdom. England and Wales only.

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, and Greece (vascular plants).

Birds: for some countries the data refer to breeding species only (Austria, Belgium, Czech Republic, Denmark, France, Germany, Iceland, Luxembourg, the Netherlands, the Slovak Republic, Switzerland, United Kingdom).

Australia. Mammals: includes monotremes and marsupials.

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

Finland. Vascular plants: include indigenous species and established aliens; exclude apomictic species and casual aliens.

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

Greece. Vascular plants: include 8 extinct species. Mammals: exclude marine mammals; the share threatened is underestimated.

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

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

Luxembourg. Vascular plants: species known are estimated 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 exclude vagrants and migrant.

Norway. Species known: include only species that breed in Norway.

Portugal. Data include 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.

Sweden. Indigenous species only.

Switzerland. Assessed species.

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

Protected areas are areas of land and/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/species management areas, managed mainly for habitat and species conservation through management intervention.
- V: protected landscapes/seascapes, managed mainly for landscape/seascape 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.

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.

Intensity of use of forest resources

- Intensity of use: refer to actual harvest or fellings divided by the annual productive capacity (gross increment).
- Fellings: average annual standing volume of all trees, living or dead, measured overbark to a minimum diameter of 0 cm (d.b.h.) that are felled during the given reference period, including the volume of trees or part of trees that are not removed from the forest, other wooded land or other felling site.
- Gross increment: average annual volume of increment over the reference period of all trees, measured to a minimum diameter breast height (d.b.h) of 0 cm.
- 2013: 2013 or latest available year (years prior to 2009 were not considered).

Austria. Annual averages over several years.

Denmark. Break in time series in 2012.

Estonia. Annual 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.

France. Data refer to volumes removed from the forest, i.e. fellings plus dead wood harvested. Operating losses excluded.

Iceland. No data presented, as there is no traditional forestry in the country.

Netherlands. Before 2013, data refer to 5-year averages.

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

Portugal. Data are estimates.

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

Forestry products as % of national exports of goods

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

Fish resources

- Total fish captures: fish production from capture fisheries; the data refer to nominal catches (landings converted to a live weight basis). Excluded are: aquatic plants, miscellaneous aquatic products, crocodiles, whales, seals and other aquatic mammals.
- Aquaculture refer to the farming of aquatic organisms with some sort of intervention in the rearing process to enhance production, such as regular stocking, feeding, protection from predators, etc.

Municipal waste

- Municipal waste refers to household and similar 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 the data may include small amounts of special waste or waste electrical and electronic equipment (WEEE), or amounts of waste collected by the private sector, not on behalf of municipalities, in the framework of extended producer responsibility schemes. The inclusion of such amounts may lead to an overestimation of the amounts generated compared to the amounts reported by other countries.
- Disposal and recovery shares do not necessarily add up to 100%, because residue from some treatment operations (incineration, composting) are landfilled and because treatment operations other than those presented may not be covered.
- Recycling is defined as any reprocessing of material in a production process that diverts it from the waste stream, except reuse as fuel. Both reprocessing as the same type of product, and for different purposes are included. Direct recycling within industrial plants at the place of generation are excluded.
- Composting is defined as a biological process that submits biodegradable waste to anaerobic or aerobic decomposition, and that results in a product that is recovered.

Data refer to 2013 or the latest available year. The percentage changes are expressed with respect to 1990 and 2000, or to the closest available years. It should be noted that changes in definitions and methodologies create breaks in time series for several countries. When possible the periods used to calculate the percentage changes have been adapted to avoid these breaks in the calculation. See Tables A.2 and A.3 below for details about the years and periods covered.

Austria. Municipal waste: excludes construction site waste and green waste from municipal services that is composted on-site, which are included in the 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. Percentage change: refers to household waste only. In 2010, 965 kg/capita of non-hazardous waste was generated from households, institutions, commercial establishments and industries (including construction and demolition waste). Disposal and recovery shares: estimates based on the above non-hazardous waste.

Chile. The share landfilled includes "other disposal".

Estonia. Data exclude packaging waste separately collected for recycling and thus under estimate the amount of municipal waste generated compared to other European countries.

France. Data include non-metropolitan areas (DOM, oversea departments). Recycling: before 2010, data refer to amount entering facilities; after 2010, they refer to amounts leaving facilities.

Germany. Share of incineration without energy recovery: include other disposal.

Greece. Landfill: as of 2010, includes amounts previously sent to uncontrolled dumping areas that were closed in 2009.

Hungary. Municipal waste generated: includes estimates for population not served by municipal waste services. Disposal and recovery: percentage based on collected amounts. Recycling: includes waste exported for recycling.

Ireland. Waste from households: includes estimates for households not served by waste collection. Disposal and recovery: include waste exported for treatment.

Italy. Composting: includes anaerobic treatments. Incineration with energy recovery: includes waste sent to industrial plants to produce energy (cement plants). Landfill: includes waste from sorting operations that is sent to landfill.

Japan. Municipal waste: data cover municipal collection, waste directly delivered and in-house treatment; exclude separate collection for recycling by private sector. Disposal and recovery shares: 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.

Luxembourg. Recycling: around 97% of the non-organic municipal waste recycled is exported for treatment.

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

New Zealand. Data refer to amount going to landfill.

Norway. Per capita amounts based on population served by municipal waste services. Landfill: includes residues from other operations.

Poland. Waste generated: country estimates.

Portugal. Includes Azores and Madeira Islands. Recycling: separate collection.

Slovenia. Recycling: includes waste exported for recycling; excludes waste imported for recycling. Landfill: includes residues from other treatment operations.

Spain. Data include Baleares and Canary Islands. Recycling: separately collected amounts.

Sweden. Composting: includes on-site composting of kitchen, canteen, park and garden waste.

Turkey. Includes estimates for population not served by municipal waste services. Recycling and composting: refers to composting only.

United Kingdom. Waste from households: includes hazardous and clinical waste from households and waste from municipal services from street cleansing and litter bins.

OECD. Data are estimated: may differ from the sum of national data presented. Disposal and recovery: does not include Australia, Canada and Israel.

Table A.2. **Municipal waste generation**

Year or period shown

	Municipal waste generated per capita			*Of which:* From households
	Kg/cap	% change 1990-2013[a]	% change 2000-13[a]	Kg/cap
Australia	2009	1992-2009	2000-09	..
Austria	2012	1990-2012	2000-12	2012
Belgium	2013	1990-2013	2000-13	..
Canada	..	..	..	2010

Table A.2. **Municipal waste generation** *(cont.)*

Year or period shown

	Municipal waste generated per capita			*Of which:* From households
	Kg/cap	% change 1990-2013[a]	% change 2000-13[a]	Kg/cap
Chile	2009	1990-2009	2000-09	2009
Czech Republic	2013	..	2000-13	2013
Denmark	2013	..	2000-10	2013
Estonia	2013	..	..	..
Finland	2013	..	2000-13	2013
France	2013	1992-2013	2000-13	2013
Germany	2013	1990-2013	2000-13	2013
Greece	2012	1990-2009	2000-09	..
Hungary	2013	..	2000-13	2013
Iceland	2013	..	2000-13	..
Ireland	2012	..	2003-12	2012
Israel	2013	..	2000-13	..
Italy	2013	1991-2013	2000-13	..
Japan	2010	1990-2010	2000-10	2010
Korea	2012	1992-2012	2000-12	2012
Luxembourg	2013	..	2000-13	2013
Mexico	2012	1993-2012	2000-12	2012
Netherlands	2013	1990-2013	2000-13	2013
New Zealand	2013	1990-2011	2002-11	..
Norway	2013	..	2001-13	2013
Poland	2013	..	..	..
Portugal	2013	1990-2013	2000-13	..
Slovak Republic	2013	..	2002-13	2013
Slovenia	2013	..	..	2013
Spain	2013	..	2000-13	..
Sweden	2013	1990-2013	2000-13	..
Switzerland	2013	1990-2013	2000-13	2013
Turkey	2013	..	..	..
United Kingdom	2013	1990-2013	2000-13	2013
United States	2012	1990-2012	2000-12	2012
OECD	**2013**	**1990-2013**	**2000-13**	**..**
OECD America	2013	1990-2013	2000-13	..
OECD Asia-Oceania	2013	1990-2013	2000-13	..
OECD Europe	2013	1990-2013	2000-13	..

a) The periods used to calculate the percentage changes have been adapted to avoid that breaks in time series affect the calculation.

Table A.3. **Municipal waste disposal and recovery shares**

Year or period shown

	% of amounts treated	% change since 2000[a]	
		Recycling and composting	Landfill
Australia	2009	break	2003-09
Austria	2012	2000-12	2000-12
Belgium	2013	2000-13	2000-13
Canada	2010	2002-10	2002-10
Chile	2009	2000-09	2000-09
Czech Republic	2013	..	..
Denmark	2013	2000-10	2000-10
Estonia	2011	2000-11	2001-11
Finland	2013	2000-13	2000-13
France	2013	2000-13	2000-13
Germany	2013	2000-13	2000-13

Table A.3. **Municipal waste disposal and recovery shares** *(cont.)*

Year or period shown

	% of amounts treated	% change since 2000[a]	
		Recycling and composting	Landfill
Greece	2012	2000-12	2000-09
Hungary	2013	..	..
Iceland	2013	2000-13	2000-13
Ireland	2012	2000-12	2000-12
Israel	2013	2004-13	2004-13
Italy	2013	..	..
Japan	2010	2000-10	2000-10
Korea	2012	2000-12	2000-12
Luxembourg	2013	2000-13	2000-13
Mexico	2012	2000-12	2000-12
Netherlands	2013	..	..
New Zealand	2013	..	..
Norway	2013	2001-13	2001-13
Poland	2013	2000-10	2000-13
Portugal	2013	2000-13	2000-13
Slovak Republic	2013	..	..
Slovenia	2013	2000-13	2000-13
Spain	2013	..	..
Sweden	2013	2000-13	2000-13
Switzerland	2013	2000-13	2000-13
Turkey	2013	2000-13	2000-13
United Kingdom	2013	2000-13	2000-13
United States	2012	2000-12	2000-12
OECD	**2013**	**2000-13**	**2000-13**
OECD Europe	2013	2000-13	2000-13

a) The periods used to calculate the percentage changes have been adapted to avoid that breaks in time series affect the calculation.

Energy

Total primary energy supply (TPES)

TPES is made up of *production + imports – exports – international marine bunkers – international aviation bunkers ± stock changes*. Primary energy comprises coal, peat and peat products, oil shale, natural gas, crude oil and oil products, nuclear, and renewable energy (bioenergy, geothermal, hydropower, ocean, solar and wind). Electricity trade is also included in total primary energy supply, but excluded from the calculation of the breakdown by source.

GDP expressed in USD at 2005 prices and PPPs.

Australia. Excludes overseas territories.

Denmark. Excludes Greenland and the Danish Faroes.

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

Italy. Includes San Marino and the Vatican.

Japan. Includes Okinawa.

Netherlands. Excludes Suriname, Aruba and the former 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.

World. Data refer to 2013.

End-use prices

Prices are expressed in USD at current prices and exchange rates. Prices for natural gas are expressed per gross calorific value (GCV). The data refer to the year 2014, unless otherwise specified below.

Austria. 2013 data for natural gas (households).

Canada. 2013 data for natural gas and electricity (industry and households).

Chile. 2013 data.

Finland. 2011 data for natural gas (households).

Germany. 2013 data for natural gas (industry) and electricity (industry and households).

Greece. 2013 data for electricity (industry and households).

Israel. 2013 data for electricity (industry and households) and 2011 data for natural gas (households).

Italy. 2011 data for natural gas (households).

Japan. 2013 data for natural gas (industry and households).

Korea. 2013 data for natural gas (industry and households).

Luxembourg. 2013 data for natural gas and electricity (industry and households).

Netherlands. 2013 data for electricity (households).

New Zealand. 2013 data for natural gas (industry and households), 2012 and 2013 data for electricity (industry and households).

Norway. 2011 data for natural gas (households).

Spain. 2011 data for electricity (industry and households).

Sweden. 2013 data for light fuel oil (households).

United Kingdom. 2013 data for light fuel oil and electricity (industry).

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, motorcycles, agricultural tractors, caravans and trailers.

The interpretation should take into account differences in the definition of road traffic volumes, such as the 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.

GDP data are expressed in USD at 2005 prices and PPPs.

Data refer to 2014 or to the latest available year. Data older than 2009 are not taken into consideration. The percentage changes are expressed with respect to 1990 and/or 2000, or to the closest available years (two years back and forth with respect to 1990 and 2000).

United Kingdom. Break in series in 1992.

United States. Data refer to passenger cars, motorcycles, light trucks, commercial freight vehicles and buses.

OECD. OECD totals are based on Secretariat estimates, and do not include Chile.

Motor vehicles

- Total stock of road motor vehicles: data include passenger cars, goods vehicles, buses and coaches; they 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: data refer to vans, lorries (trucks) and road tractors. Excluded are caravans, trailers and semi-trailers, military or special vehicles, and agricultural tractors.

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

Canada. The total refers to all vehicles. Goods vehicles: refer to vans, trucks of 4.5 tonnes and over.

Belgium. Goods vehicles: include special vehicles, all-terrain vehicles and tankers.

Czech Republic. Goods vehicles: refer to lorries and road tractors.

Estonia. The total includes special vehicles. Goods vehicles refer to lorries and special vehicles.

Germany. Passenger cars: break in series in 2007.

Hungary. Passenger cars: break in series in 1996.

Iceland. Goods vehicles: refers to lorries and vans.

Israel. The total includes special vehicles.

Luxembourg. Passenger cars: include mixed-use vehicles.

New Zealand. Passenger cars: include vans.

Poland. The total is the sum of passenger cars, lorries and buses.

United States. Light trucks include vans, pickup trucks and sport utility vehicles. The total is the sum of light duty vehicles, short wheel base, motorcycle, light duty vehicle, long wheel base, truck, single-unit 2-axle 6-tire or more, trucks and buses.

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, excluding 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.

Australia. Motorways: the methodology has changed with respect to previously published data (no time series available).

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

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

Mexico. Motorways: refers to roads with 4 or more lanes.

Netherlands. Motorways: break in series in 2001.

Spain. 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: refers to roads with 4 or more lanes.

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 PPP.

Chile. Gasoline: 2013 data.

Japan. Gasoline: regular unleaded.

Agriculture

Commercial fertilisers

The intensity of use of fertilisers is expressed as the apparent consumption of fertilisers for agriculture production (in nutrient contents). The apparent consumption *equals* production *plus* imports *minus* non-fertiliser use *minus* exports. Apparent consumption figures are developed based on the underlying assumption that supply equals consumption.

The data are sourced from FAO. They build on official country data. In the case where official data were not available from the country for certain products or certain years, reliable information from other sources was used for the period not covered by official data. Detailed country data was analysed for building a harmonised trend in the time series on total production, imports, exports, and consumption, starting with the year 2002.

All figures are calculated in weight of plant nutrients. Nitrogen is generally expressed in the elemental form (N). Phosphate is expressed as the oxide form P_2O_5.

Livestock density

Livestock densities are estimated and expressed as the number of live animals (in sheep equivalent heads) per hectare of agricultural land. The data include sheep, goats, pigs, asses, mules, horses, cattle, buffaloes and poultry birds. The coefficients used to convert to sheep equivalents are: cattle = 6; sheep and Goats = 1; horses = 4.8; pigs = 1, poultry birds = 0.06. *Source:* FAO.

Organic farming

Agricultural land includes arable land, permanent crops and permanent meadows and pastures.

The agricultural land under organic farming includes areas under certified organic farming and areas in conversion to organic farming. Areas under certified organic farming refer to the area of "arable land" exclusively dedicated to organic agriculture and managed by applying organic agriculture methods. It is the portion of land area managed (cultivated) or wild harvested in accordance with specific organic standards or technical regulations and that has been inspected and approved by a certification body. *Source:* FAO.

Israel. Data refer to certified organic farming.

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. All the indices shown at the country, regional and world levels are calculated by the Laspeyres formula. They 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. *Source:* FAO (see FAOSTAT for more details).

Environmentally related taxation

Environmentally related tax revenue is expressed as a percentage of total tax revenue and percentage of GDP. Environmentally related taxes include taxes on:

- Energy products for transport purposes (gasoline and diesel) and for stationary purposes (fossil fuels and electricity).
- Motor vehicles and transport, i.e. one-off import or sales taxes, recurrent taxes on registration or road use and other transport taxes.
- Other environmentally related taxes include taxes on waste management (final disposal, packaging and other waste-related product taxes), ozone-depleting substances and other environmentally related taxes that could not be allocated among these fields.

Data refer to the year 2013 or the latest available year; data prior to 2010 were not considered. Changes are calculated from the year 2000 or from the first available year (after 2000); data posterior to 2003 were not considered for the calculation of the change.

Environmentally related tax revenue as % total tax revenue: for some countries, the latest available year for this indicator is 2012, due to missing data on total tax revenue (Australia, Japan, Mexico, Netherlands, Poland).

Monetary values are expressed in million USD at 2005 prices and PPPs.

OECD. Data refer to the weighted average of all OECD countries.

Environmentally related R&D

Public environmentally related R&D

The data refer to Government Budget Appropriations or Outlays for Research and Development (GBAORD), that measure the funds that governments allocate to R&D to meet various socio-economic objectives. These objectives are based on the Nomenclature for the Analysis and Comparison of Scientific Programmes and Budgets (NABS 2007). The indicator presented refers to the socio-economic objective "environment", which includes research directed at the control of pollution and at developing monitoring facilities to measure, eliminate and prevent pollution. It is expressed as a percentage of all-purpose GBAORD. Details can be found in OECD (2015), *Frascati Manual 2015: Guidelines for Collecting and Reporting Data on Research and Experimental Development*, "The Measurement of Scientific and Technological Activities", OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264239012-en*.

Estimates of environmentally-related government R&D are reported from the primary funder perspective, i.e. as budgets rather than as expenditure from the performer perspective. Estimated budgets and actual expenditures by governments might differ because projected amounts of R&D at the appropriations stage vary from what is actually measured by the performers of the R&D. Differences may also be due to an imprecision in the budget appropriations that impede the identification of appropriations that are specifically targeted at R&D.

Monetary values are expressed in million USD at 2005 prices and PPPs.

Data refer to two-year averages (2012-13) or the latest available average, data prior to 2010 were not considered. Changes are calculated from the 2000-01 average or from the first available average (after 2000), data posterior to 2003 were not considered for the calculation of the change.

For the **Czech Republic, Estonia** and **Poland,** the change is calculated from the 2001-02 average. For **Korea** and **Mexico,** the latest available average refers to 2011-12.

OECD. Data refer to the weighted average of the two-period country averages shown. The OECD average does not include Turkey, and the change from 2000-01 does not inlude Chile and Hungary.

Renewable energy RD&D

The data refer to public budgets directed at research, development and demonstration (RD&D) related to hydro, geothermal, solar (thermal and photovoltaic), wind and tide/wave/ocean energy, as well as combustible renewables (solid biomass, liquid biomass, biogas) and other renewable energy technologies (all supporting measuring, monitoring and verifying technologies in renewable energies). It is expressed as a percentage of total energy RD&D public budgets (directed at all forms of energy).

Total energy RD&D budgets of public entities (government, public agencies and state-owned enterprises, as defined by the IEA) cover research, (basic research oriented towards the development of energy-related technologies, and applied research), and development and demonstration related to the production, storage, transportation, distribution and rational use of all forms of energy. Deployment is excluded. They concern one of the following seven main branches of energy-related developments: i) energy efficiency; ii) fossil fuels (oil, gas and coal); iii) renewables; iv) nuclear fission and fusion; v) hydrogen and fuel cells; vi) other power and storage techniques; and vii) other cross-cutting technologies or research.

The data are sourced from International Energy Agency (IEA). As for GBAORD, estimates are reported from the funder perspective as budgets (rather than as expenditure from the performer perspective). The data on energy RD&D should however not be confused with the data on GBAORD allocated to the socio-economic objective "Production, distribution and rational utilisation of energy", which is a narrower concept defined in the Frascati Manual.

Data refer to two-year averages (2012-13) or the latest available average, data prior to 2010 were not considered. Changes are calculated from the 2000-01 average or from the first available average (after 2000), data posterior to 2003 were not considered for the calculation of the change.

Monetary values are expressed in million USD at 2005 prices and PPPs.

Czech Republic. Latest available data refers to the 2010-11 average, the change is calculated from the 2002-03 average.

For **Estonia, Greece, Italy, Japan** and **Korea,** the latest available average refers to 2011-12. For Ireland and Korea, the change is calculated from the 2001-02 average

OECD. Data refer to the weighted average of the two-period country averages shown. The OECD average does not include Chile, Iceland, Israel, Mexico and Slovenia. The change from 2000-01 excludes Estonia, Luxembourg, Poland and the Slovak Republic.

Environmentally related Official Development Assistance (ODA)

The OECD Development Assistance Committee (DAC) has established a comprehensive system for measuring aid targeting the environment, renewable energy and the objectives of the Rio Conventions. The DAC currently has 29 members, including 28 OECD member countries and the European Union.

ODA allocated to environmentally related sectors

The data refer to bilateral ODA and do not include core contributions by donors to multilateral organisations. They represent ODA allocated to environmentally related sectors expressed as a share of total sector-allocable ODA:

- The environment sector refers to general environmental protection activities, i.e. environmental policy and administrative management, biosphere protection, biodiversity, site preservation, flood prevention/control, environmental education/ training and environmental research.
- The water supply and sanitation sector refers to water sector policy and administrative management, water resources conservation, water supply and sanitation, basic drinking water supply and basic sanitation, river basin' development, waste management/ disposal, education and training in water supply and sanitation.
- The renewable energy sector refers to activities that promote the development and deployment of energy generation facilities with reduced pressure on the environment. It includes hydro-electric power plants, geothermal energy, solar energy, wind power, ocean power and biomass.

Sector-allocable ODA comprises aid directed to social infrastructure and services, economic infrastructure and services, production sectors and multi-sector/cross cutting aid. The data represent gross disbursements (not commitments), which best reflect efforts by donors. The sector of destination of the ODA does not refer to the type of goods or services provided by the donor, but to the sector of the recipient's economic structure that the transfer is intended to foster. Sector specific environmental activities are reported

under the sector to which they are directed, not under the environmentally related sectors described above. For example, water related ODA such as dams and reservoirs for irrigation and hydropower, and activities related to river transport, are classed under *aid to agriculture*, *energy* and *transport*, respectively.

Data refer to the year 2013 or the latest available year, data prior to 2010 were not considered. Changes are calculated from 2002 or from 2003, data posterior to 2003 were not considered for the calculation of the change.

Denmark. The change for the 3 environmentally related sectors is calculated from the year 2003.

Greece. Data on renewable energy ODA refer to 2010.

Iceland. Data on the environment sector refer to 2012.

Italy. The change for renewable energy ODA is calculated from the year 2003.

Switzerland. The change for environment sector is calculated from the year 2003.

OECD. For each sector, data refers to the unweighted average of the information shown for all OECD member countries. This average includes non-DAC members (e.g. Estonia).

Net ODA

Net ODA is expressed as a percentage of Gross National Income (GNI). Net ODA consists of disbursements of loans made on concessional terms (net of repayments of principal) and grants to developing countries and territories on the OECD/DAC list of aid recipients that are undertaken by the official sector with promotion of economic development and welfare as the main objective. Technical co-operation is included. Grants, loans and credits for military purposes are excluded. Concessional loans are defined as loans with a grant element of at least 25 per cent (calculated at a rate of discount of 10 per cent).

Gross national income (GNI) is expressed at market prices and is the sum of gross primary incomes receivable by resident institutional units and sectors. In contrast to gross domestic product (GDP), GNI is a concept of income (primary income) rather than value added. GNI is equal to GDP (which at market prices represents the final result of the production activity of resident producer units) less taxes (less subsidies) on production and imports, compensation of employees and property income payable to the rest of the world plus the corresponding items receivable from the rest of the world.

The best known target in international aid, agreed in 1970, proposes to raise ODA to 0.7% of donors' national income. In 2005, the 15 countries that were members of the European Union by 2004 agreed to reach the target by 2015.

Net ODA as % of Gross National Income (GNI)

Data refer to the year 2013 or the latest available year, data prior to 2010 were not considered. Changes are calculated from the year 2000 or from the first available year (after 2000); data posterior to 2003 were not considered for the calculation of the change.

Hungary. Change is calculated from the year 2003.

OECD. Data refer to the unweighted average of the information shown for all OECD member countries. This average includes non-DAC members. The change is calculated excluding Slovenia.