

EMISSIONS OF CARBON DIOXIDE

Carbon dioxide (CO₂) makes up the largest share of man-made greenhouse gases. The addition of man-made greenhouse gases to the atmosphere disturbs the earth's radiative balance (i.e. the balance between the solar energy that the earth absorbs and radiates back into space). This is leading to an increase in the earth's surface temperature and to related effects on climate, sea level and world agriculture.

Definition

The indicator refers to emissions of CO₂ from burning oil, coal, natural gas and waste materials for energy use. Carbon dioxide also enters the atmosphere from deforestation and from some industrial processes such as

Overview

Global emissions of carbon dioxide have more than doubled since 1971, increasing on average 2% per year. In 1971, the current OECD countries were responsible for 67% of world CO₂ emissions. As a consequence of rapidly rising emissions in the developing world, the OECD contribution to the total fell to 39% in 2011. By far, the largest increase in non-OECD countries occurred in Asia, where China's emissions of CO₂ from fuel combustion have risen, on average, by 6% per annum between 1971 and 2011. Driven by the use of coal, China increased the levels of CO₂ emissions by 7.2 billion tonnes over the last 40 years.

Two significant downturns in OECD CO₂ emissions occurred following the oil shocks of the mid-1970s and early 1980s. Emissions from the economies in transition declined in the 1990s, helping to offset the OECD increases between 1990 and the present. However, this decline did not stabilise global emissions as emissions in developing countries continued to grow. With the economic crisis in 2008/2009, world CO₂ emissions declined by 2% in 2009. However, the growth in CO₂ emissions rebounded afterwards increasing by 5% in 2010 and 3% in 2011.

Disaggregating the emissions estimates shows substantial variations within individual sectors. Between 1971 and 2011, the combined share of electricity and heat generation and transport shifted from one-half to two-thirds of the total. The share of fossil fuels in overall emissions changed significantly during the period. The share of oil decreased from 48% to 35%, while the share of natural gas increased from 15% to 20% and that of coal in global emissions increased from 37% to 44%. Fuel switching, including the penetration of nuclear, and the increasing use of other non-fossil energy sources only reduced the CO₂/total primary energy supply ratio by 6% over the past 40 years.

cement production. However, emissions of CO₂ from these other sources are a relatively small part of global emissions, and are not included in the statistics shown here. The *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* provide a fuller, technical definition of how CO₂ emissions have been estimated for this indicator.

Comparability

These emissions estimates are affected by the quality of the underlying energy data. For example, some countries, both OECD and non-OECD members, have trouble reporting information on bunker fuels and incorrectly define bunkers as fuel used abroad by their own ships and planes. Since emissions from bunkers are excluded from the national totals, this affects the comparability of the estimates across countries. On the other hand, since these estimates have been made using the same method and emission factors for all countries, in general, the comparability across countries is quite good.

EU28 does not include Croatia.

Sources

- OECD (2013), *Effective Carbon Prices*, OECD Publishing.
- OECD (2013), *Taxing Energy Use, A Graphical Analysis*, OECD Publishing.

Further information

Analytical publications

- IEA (2013), *World Energy Outlook*, IEA, Paris.
- IEA (2012), *Electricity and a Climate-Constrained World: Data and Analyses*, IEA, Paris.
- IEA (2011), *Climate and Electricity Annual 2011: Data and Analyses*, IEA, Paris.
- OECD (2013), *Inventory of Estimated Budgetary Support and Tax Expenditures for Fossil Fuels 2013*, OECD Publishing.

Statistical publications

- IEA (2013), *CO₂ Emissions from Fuel Combustion*, OECD Publishing.

Methodological publications

- Intergovernmental Panel on Climate Change (IPCC) (1996), *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*, Intergovernmental Panel on Climate Change (IPCC), London, UK.

Online databases

- OECD Environment Statistics.



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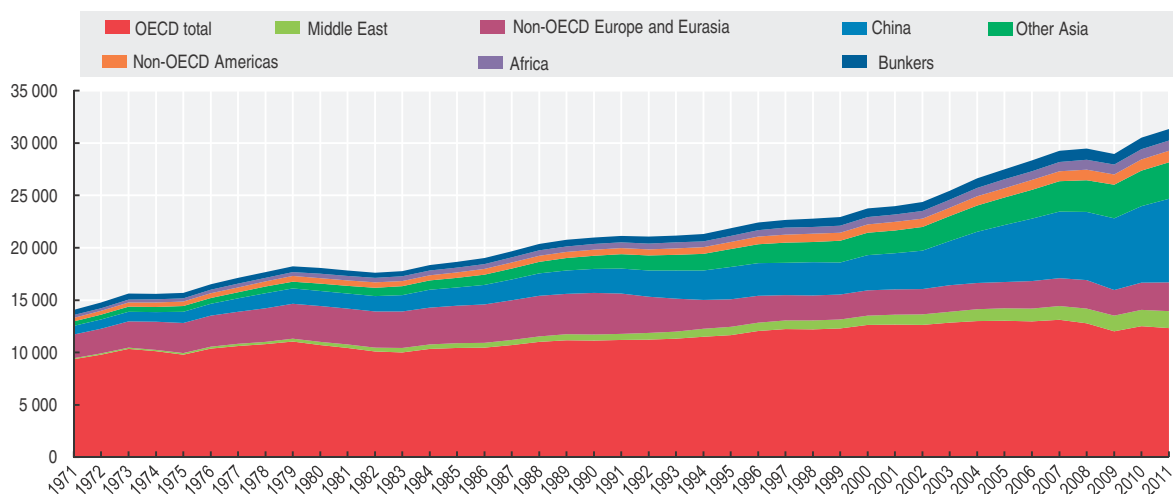
CO₂ emissions from fuel combustion

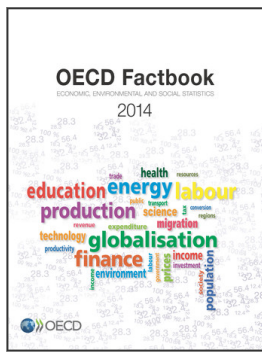
Million tonnes

	1971	1990	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Australia	144	260	351	359	362	376	380	385	395	397	405	396	397
Austria	49	56	66	67	73	74	75	72	70	71	64	70	68
Belgium	117	108	120	112	120	117	113	110	106	112	101	108	109
Canada	340	428	522	531	555	551	555	536	563	552	519	528	530
Chile	21	31	50	51	53	58	58	60	67	68	65	70	76
Czech Republic	151	155	121	117	121	122	120	121	122	117	110	114	113
Denmark	55	51	52	52	57	52	48	56	52	49	47	47	42
Estonia	..	36	15	15	17	17	17	16	19	18	15	18	19
Finland	40	54	61	63	71	67	55	67	65	57	55	63	56
France	432	353	385	378	385	385	388	380	373	370	349	357	328
Germany	979	950	843	831	824	828	800	813	787	794	737	769	748
Greece	25	70	90	90	94	93	95	94	98	94	90	84	84
Hungary	60	66	56	55	57	56	56	56	54	53	48	49	47
Iceland	1	2	2	2	2	2	2	2	2	2	2	2	2
Ireland	22	30	43	42	42	42	44	45	44	44	39	39	35
Israel	14	34	56	59	61	61	59	62	64	64	64	68	67
Italy	293	397	429	435	452	459	461	455	447	435	389	398	393
Japan	759	1 062	1 161	1 198	1 205	1 206	1 213	1 197	1 233	1 147	1 089	1 138	1 186
Korea	52	229	452	446	449	470	469	477	490	502	516	564	588
Luxembourg	15	10	9	9	10	11	11	11	11	11	10	11	10
Mexico	97	265	350	357	363	369	386	395	410	404	400	418	432
Netherlands	130	156	178	178	183	185	183	178	181	183	176	187	174
New Zealand	14	22	33	33	34	33	34	34	33	34	31	31	30
Norway	24	28	35	34	37	38	36	37	38	38	37	39	38
Poland	287	342	290	279	290	293	293	304	304	299	287	306	300
Portugal	14	39	59	63	58	60	63	56	56	53	53	48	48
Slovak Republic	39	57	38	38	38	37	38	37	37	36	33	35	34
Slovenia	..	13	15	15	15	15	16	16	16	17	15	15	15
Spain	120	205	286	302	310	327	339	332	344	317	282	268	270
Sweden	82	53	52	54	55	54	50	48	46	44	42	47	45
Switzerland	39	42	43	42	44	44	45	44	42	44	42	44	40
Turkey	41	127	182	192	202	207	216	240	265	264	256	266	286
United Kingdom	623	549	537	522	535	535	533	535	523	513	465	482	443
United States	4 291	4 869	5 678	5 605	5 680	5 764	5 772	5 685	5 763	5 587	5 185	5 429	5 287
EU 28	..	4 052	3 908	3 880	3 979	4 000	3 971	3 978	3 932	3 861	3 560	3 667	3 543
OECD	9 370	11 151	12 661	12 628	12 853	13 009	13 024	12 957	13 120	12 789	12 021	12 510	12 341
Brazil	90	192	309	309	303	321	323	328	343	362	338	389	408
China	816	2 245	3 396	3 605	4 177	4 837	5 403	5 913	6 316	6 490	6 793	7 253	7 955
India	200	582	984	1 014	1 040	1 118	1 164	1 258	1 357	1 452	1 641	1 710	1 745
Indonesia	25	146	291	297	325	331	336	354	368	361	379	410	426
Russian Federation	..	2 179	1 498	1 487	1 518	1 509	1 512	1 567	1 566	1 585	1 478	1 577	1 653
South Africa	157	254	282	293	320	336	329	330	355	383	364	371	368
World	14 080	20 989	23 980	24 359	25 440	26 628	27 502	28 333	29 269	29 479	28 967	30 510	31 343

 StatLink <http://dx.doi.org/10.1787/888933028520>
World CO₂ emissions from fuel combustion, by region

Million tonnes


 StatLink <http://dx.doi.org/10.1787/888933026107>



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