

EMISSIONS OF CARBON DIOXIDE (CO₂)

Carbon dioxide (CO₂) makes up the largest share of “greenhouse gases”. The addition of man-made greenhouse gases to the atmosphere disturbs the earth’s radiative balance. This is leading to an increase in the earth’s surface temperature and to related effects on climate, sea level rise and world agriculture.

Definition

The table refers to emissions of CO₂ from burning oil, coal and gas for energy use. Carbon dioxide also enters the atmosphere from burning wood and waste materials and from some industrial processes such as cement production. Emissions of CO₂ from these sources are a relatively small part of global emissions and are

not included in these statistics. The Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories (see below) provide a fuller, technical definition of how CO₂ emissions have been estimated for this table. The forecasts provided in the table refer to the Reference Scenario of the World Energy Outlook.

Comparability

These emissions estimates are affected by the quality of the underlying energy data. For example, some countries, both OECD and non-OECD, 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 across countries. On the other hand, since the estimates have been made using the same method and emission factors for all countries, in general, the comparability across countries is quite good.

Long-term trends

Global emissions of carbon dioxide have risen by 88% since 1971 and are projected to rise by another 52% by 2030. In 1971, the current OECD countries were responsible for 66% of the total. As a consequence of rapidly increasing emissions in the developing world, the OECD contributed 49% to the total in 2004, but this is expected to fall to 38% by 2030. By far, the largest increases in non-OECD countries occurred in Asia, where emissions in China have risen by 5.5% per annum between 1971 and 2004. The use of coal in China increased levels of CO₂ by 3.2 billion tonnes over the 33-year period.

Two significant downturns can be seen in OECD CO₂ emissions, following the oil shocks of the mid-1970s and early 1980s. Emissions from the economies in transition declined over the last decade, helping to offset the OECD increases between 1990 and the present. However, this decline did not stabilise global emissions as emissions in developing countries grew.

Disaggregating the emissions data shows substantial variations within individual sectors. Between 1971 and 2004, the combined share of electricity and heat generation and transport shifted from one-half to two-thirds of global emissions.

Fossil fuel shares in overall emissions changed slightly during the period. The relative weight of coal in global emissions has remained at approximately 40% since the early 1970s. The share of natural gas has increased from 15% in 1971 to 20% in 2004. Oil’s share decreased from 49% to 40%. Fuel switching and the increasing use of non-fossil energy sources reduced the CO₂/total primary energy supply (TPES) ratio by 7% over the past 33 years.

Sources

- IEA (2006), *CO₂ Emissions from Fuel Combustion: 1971/2004*, IEA, Paris.
- IEA (2006), *World Energy Outlook 2006*, IEA, Paris.

Further information

Analytical publications

- IEA (2004), *Prospects for CO₂ Capture and Storage*, IEA, Paris.
- IEA (2005), *Act Locally, Trade Globally: Emissions trading for climate policy*, IEA, Paris.
- IEA (2006), *Energy Technology Perspectives: Scenarios and Strategies to 2050*, IEA, Paris.
- OECD (2004), *Can Cars Come Clean? Strategies for Low-Emission Vehicles*, OECD, Paris.

Statistical publications

- IEA (2006), *Energy Statistics of Non-OECD Countries*, IEA, Paris.
- IEA (2006), *Energy Statistics of OECD Countries*, IEA, Paris.

Methodological publications

- WMO, UNEP, OECD, IEA (1996), *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*, WMO, Geneva.

Online databases

- CO₂ Emissions from Fuel Combustion.

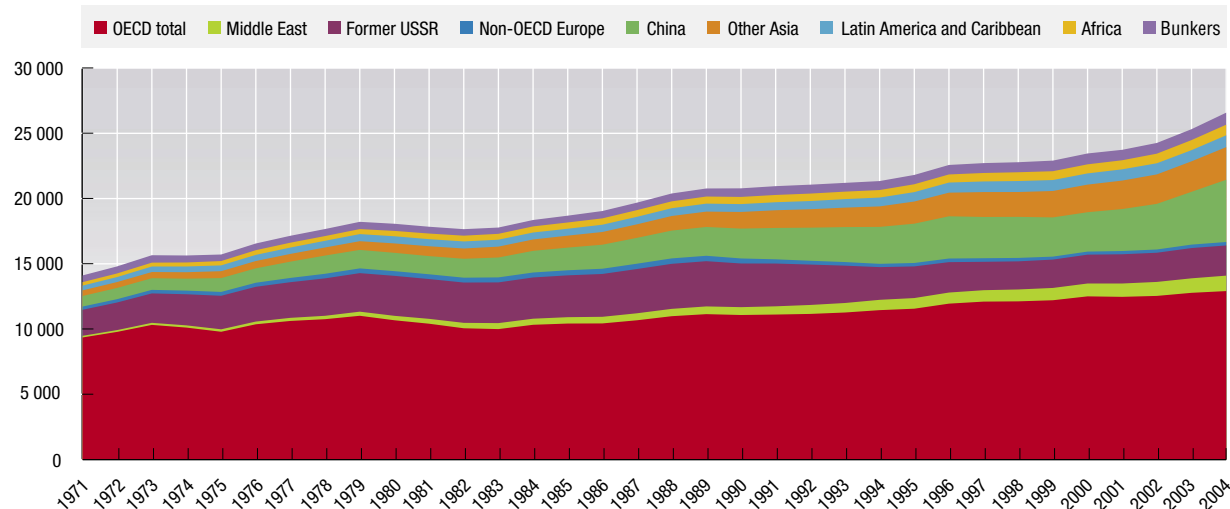
CO₂ emissions from energy use

Million tonnes

	1971	1990	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2030
Australia	143	260	280	296	311	327	334	339	342	347	348	354	..
Austria	49	58	60	65	64	65	64	64	68	70	75	75	..
Belgium	118	109	114	122	119	121	117	118	120	112	120	116	..
Canada	340	429	461	476	493	498	508	530	523	531	556	551	..
Czech Republic	151	154	121	125	121	115	109	118	118	115	118	119	..
Denmark	56	51	58	71	61	57	54	50	52	51	56	51	..
Finland	40	55	56	64	61	57	57	55	60	64	73	69	..
France	435	355	357	371	364	387	380	379	388	379	388	387	..
Germany	984	966	878	901	872	864	833	827	846	833	845	849	..
Greece	25	71	73	76	79	84	83	88	90	90	94	94	..
Hungary	62	71	59	60	57	58	58	56	56	56	58	57	..
Iceland	1	2	2	2	2	2	2	2	2	2	2	2	..
Ireland	22	30	32	34	36	38	39	41	43	42	41	41	..
Italy	295	398	411	407	411	422	422	426	427	434	453	462	..
Japan	743	1 058	1 140	1 155	1 155	1 123	1 166	1 185	1 167	1 206	1 215	1 215	1 154
Korea	51	226	361	392	418	362	397	428	441	442	452	462	..
Luxembourg	15	11	8	8	8	7	8	8	8	9	10	11	..
Mexico	97	293	310	316	329	350	343	357	356	360	368	374	..
Netherlands	130	158	172	179	175	174	169	174	180	180	185	186	..
New Zealand	14	22	25	27	28	27	29	30	32	32	33	33	..
Norway	24	29	33	34	36	37	39	34	34	33	36	36	..
Poland	298	349	333	348	338	315	305	293	292	281	292	296	..
Portugal	15	40	49	47	49	54	61	60	59	63	59	60	..
Slovak Republic	39	57	41	41	42	40	39	37	39	38	39	38	..
Spain	121	207	236	225	243	251	271	286	288	304	312	330	..
Sweden	83	52	54	60	54	55	53	50	51	53	54	52	..
Switzerland	39	41	42	42	41	43	43	42	43	42	44	45	..
Turkey	42	129	155	172	181	182	181	203	184	194	204	209	..
United Kingdom	627	558	528	543	520	524	518	525	538	522	534	537	..
United States	4 297	4 842	5 109	5 290	5 436	5 485	5 530	5 701	5 623	5 654	5 713	5 800	7 138
EU 25 total	3 701	3 809	3 736	3 749	3 696	3 709	3 779	3 755	3 867	3 891	4 216
OECD total	9 357	11 078	11 561	11 948	12 104	12 124	12 209	12 506	12 469	12 541	12 777	12 911	15 495
Brazil	91	193	239	258	276	284	295	305	314	313	306	323	551
China	800	2 256	2 976	3 202	3 130	3 106	2 962	2 978	3 179	3 460	4 005	4 732	10 425
India	199	588	785	834	877	872	930	971	981	1 011	1 042	1 103	2 544
Russian Federation	1 589	1 562	1 451	1 433	1 473	1 513	1 516	1 503	1 538	1 529	1 883
South Africa	174	255	277	286	300	310	291	299	284	295	321	343	..
World	14 112	20 783	21 810	22 575	22 716	22 784	22 908	23 455	23 735	24 263	25 316	26 583	40 420

StatLink <http://dx.doi.org/10.1787/843704411326>World CO₂ emissions from energy use, by region

Million tonnes

StatLink <http://dx.doi.org/10.1787/363278342610>