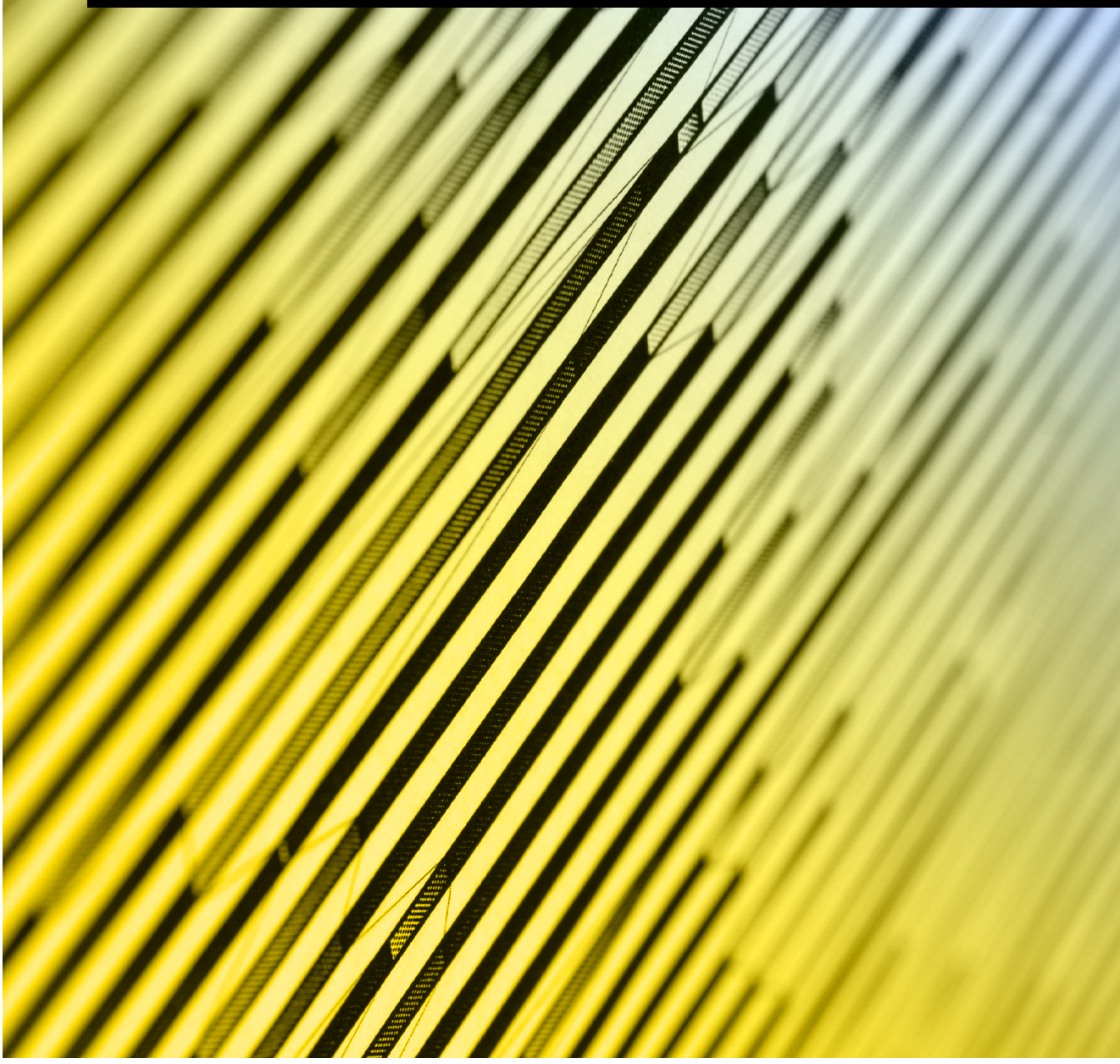
statistics

CO_2 emissions from fuel combustion

HIGHLIGHTS



IEA

2019

CO_2 emissions from fuel combustion

HIGHLIGHTS

2019

INTERNATIONAL ENERGY AGENCY

The IEA examines the full spectrum of energy issues including oil, gas and coal supply and demand, renewable energy technologies, electricity markets, energy efficiency, access to energy, demand side management and much more. Through its work, the IEA advocates policies that will enhance the reliability, affordability and sustainability of energy in its 30 member countries, 8 association countries and beyond.

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FOREWORD

IEA analysis shows that global energy-related CO_2 emissions rose to an all-time high in 2018, underpinned by robust economic growth. This trajectory is far out of step with the early peak in emissions that scientific knowledge says will be essential to tackle climate change. Of course any effort to reduce emissions and meet climate objectives must fundamentally include the energy sector, as energy accounts for over two-thirds of total greenhouse gas emissions and more than 80% of CO_2 emissions.

The increase in emissions that has taken place over the last two years underlines the critical importance of collecting reliable energy data and tracking CO_2 emissions from fuel combustion – accurate and detailed data is ultimately the foundation of both analysis and policies that will shape the energy sector for decades to come. To ensure this data is made available to policymakers and analysts alike, the IEA works with countries around the world to improve the reporting of energy data and increase understanding of the energy sector in general. Based on official energy data from more than 160 countries and regions worldwide, and internationally agreed IPCC methodologies, this publication represents the world's most comprehensive set of estimates of CO_2 emissions from fuel combustion by country for all sectors of the economy.

It is my hope that in the months leading up to this year's UN climate negotiations at COP25 in Madrid, Spain, this latest information proves to be helpful for all participants to the UNFCCC process. I also hope it helps people all over the world gain a better understanding of the evolution of emissions worldwide. The IEA will continue in its mission to provide accurate data to inform the global energy and climate debates and promote evidence-based policy recommendations aimed at mitigating the environmental impact of energy production and use.

Dr. Fatih Birol
Executive Director

What's new?

New OECD Member: Lithuania

Lithuania became an OECD Member in July 2018. Accordingly, Lithuania appears in the list of OECD Members and is not included in the non-OECD aggregates for data from 1990.

New Association country: South Africa

South Africa became an IEA Association country in November 2018. Accordingly, South Africa is now included in the IEA and Accession/Association countries aggregate.

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Important cautionary notes

The estimates of CO_2 emissions from fuel combustion presented in this publication are calculated using the IEA energy balances and the default methods and emission factors from the *2006 IPCC Guidelines for National Greenhouse Gas Inventories*. There are many reasons why **the IEA Secretariat estimates of CO_2 emissions from fuel combustion may not be the same as the figures that a country submits to the UNFCCC**, even if a country has accounted for all of its energy use and correctly applied the *IPCC Guidelines*.

In this publication, the IEA Secretariat presents CO_2 emissions from fuel combustion. IEA estimates include emissions from all reported energy use of fuels, but exclude emissions from non-energy use of fuels. Such totals may differ from those calculated using the Sectoral Approach of the *2006 IPCC Guidelines,* as under these guidelines some fuel combustion emissions have been reallocated out of the Source category energy and reclassified as industrial process emissions.

Information on "key sources" from fuel combustion, as developed in the *IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*, are only given for combustion sources and will not include key sources from fugitive emissions, industrial processes, solvents, agriculture and waste. Please see the chapters *IEA emissions estimates* and *IPCC methodologies* for further information.

Energy data on OECD member and non-member countries[1] are collected by the Energy Data Centre (EDC) of the IEA Secretariat, headed by Mr. Nick Johnstone. The IEA would like to thank and acknowledge the dedication and professionalism of the statisticians working on energy data in the respective countries.

Summary data for other greenhouse gases and sources are provided in cooperation with the PBL Netherlands Environmental Assessment Agency and the Joint Research Centre of the European Commission (JRC).

Mr. Francesco Mattion was responsible for the CO_2 emissions from fuel combustion estimates, and for the preparation of the publication. Input on international mitigation efforts was provided by Andrew Prague and Jinsun Lim. Desktop publishing support was provided by Ms. Sharon Burghgraeve. Ms. Roberta Quadrelli had overall responsibility for this publication.

CO_2 emission estimates from 1960 to 2017 by country and provisional values for 2018 for OECD countries are available on our online data service and on CD-ROM suitable for use on Windows-based systems. To order, please see the information provided at the end of this publication. Moreover, data can also be obtained on a pay-per-view basis. Details are available at www.iea.org/statistics.

Enquiries about data or methodology should be addressed to:

Energy Data Centre – CO_2 emissions
Telephone: (+33-1) 40-57-66-01
E-mail: emissions@iea.org

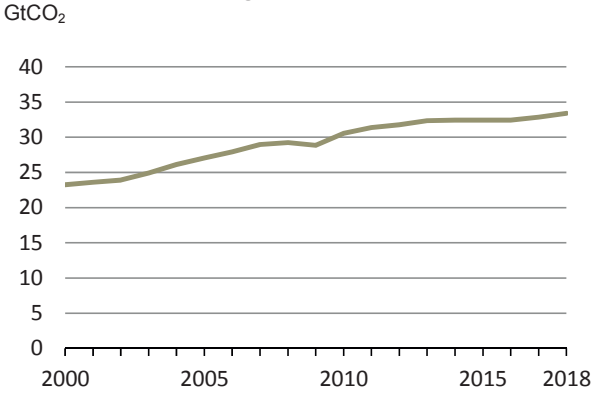
1. This document is without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area. In this publication, "country" refers to a country or a territory, as the case may be.

1. CO_2 EMISSIONS: AN OVERVIEW

CO_2 emissions from fuel combustion reach new heights

After three years of stability, global carbon dioxide (CO_2) emissions from fuel combustion started rising again in 2017, reaching 32.8 billion tons. Provisional data show they grew even faster in 2018 (Figure 1), with robust economic growth and the slowdown in renewables penetration more than offsetting some improvement in energy productivity.

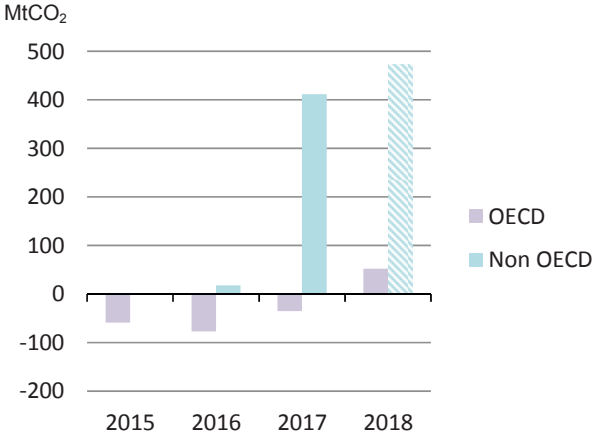
Figure 1. CO_2 emissions from fuel combustion: global trend



Source: values up to 2017 for World and 2018 for OECD are based on IEA (2019) *CO_2 emissions from fuel combustion*. The 2018 value for World is based on IEA (March 2019) *Global Energy & CO_2 Status Report* (https://www.iea.org/geco/).

As has been the case for the last several years, growth in 2017 and 2018 was largely due to non-OECD countries, mainly South-East Asia and Middle East. The non-OECD region as a whole showed growth rates higher than 2% for both years (Figure 2) and exceeded 20 billion tons in 2018. With changes ten times greater than in the OECD, non–OECD emissions are

Figure 2. Annual change in CO_2 emissions for OECD and non-OECD Countries



Source: values up to 2017 for World and 2018 for OECD are based on IEA (2019) *CO_2 emissions from fuel combustion*. The 2018 value for World is based on IEA (March 2019) *Global Energy & CO_2 Status Report* (https://www.iea.org/geco/).

rapidly approaching twice the emissions levels of the OECD.

For the first time since 2013, in 2018 OECD's emissions increased, due in large part to the stark increase in total primary energy supply which reached 5.4 billion tons of oil equivalent (toe), the highest value since 2010. Natural gas grew the most, with additional 70 Mtoe in 2018; despite the increase in renewable energy and the fall in coal, low-carbon energy sources did not keep pace with gas growth, resulting in a 0.5% increase in CO_2 emissions. After a 1% average annual drop in the 2010-2017 period, driven by improvements in energy efficiency and increased penetration of renewables, economic output has been the most important driver of the increase in the OECD region for 2018. In contrast with earlier years, improvements in energy efficiency have not been able to offset the growth in energy demand and consequently emissions (Figure 3).

Figure 3: Drivers of the annual changes in CO_2 emissions, selected OECD regions

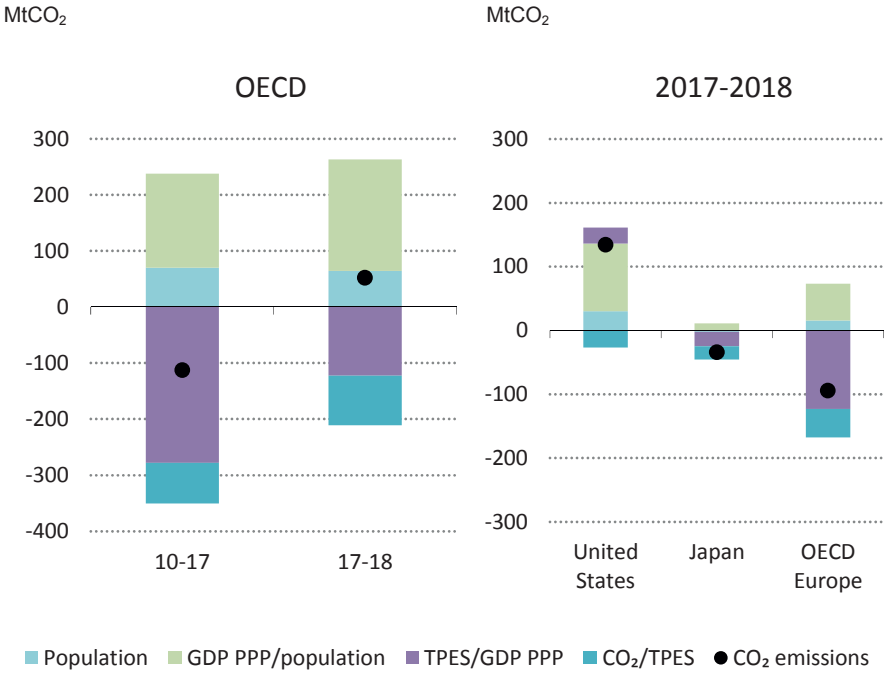
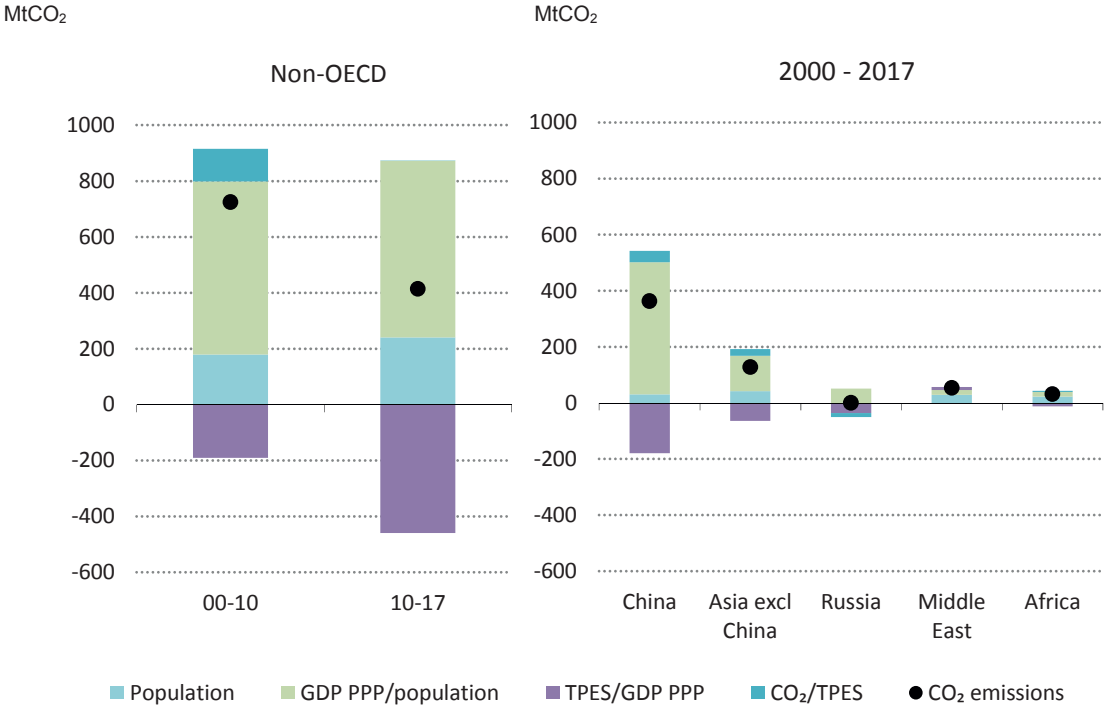


Figure 4. Drivers of the annual changes in CO_2 emissions, non-OECD and selected regions

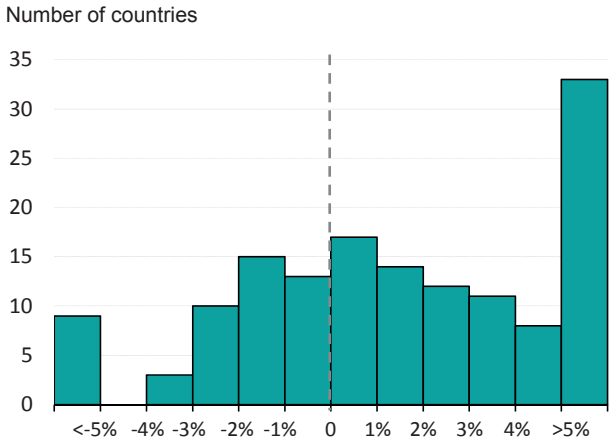


While trends in Europe and Japan were in line with those of recent years, the United States in 2018, for the first time ever, registered an increase in energy intensity. The extreme weather conditions that affected North America during winter may have played a role on this.

Since 2000, the trend in non-OECD countries has been of continuous and stable growth, excluding the period 2013-2016. Increases in economic output and population have been the largest drivers of this long-term growth; a high dependence on fossil fuels contributed too (Figure 4). Starting from the 2010s, improvements in energy efficiency and in carbon intensity of the energy mix, in particular in China, contributed to a reduction in emissions growth, which anyway remains considerable.

In total, two thirds of countries increased their emissions levels since 2010 (Figure 5). Thirty-three countries (more than 20% of the total) experienced annual growth rates higher than 5%; they account for five percent of global emissions and are homogeneously spread among the different regions.

Figure 5. 2010-2017 annual change in CO_2 emissions by number of countries

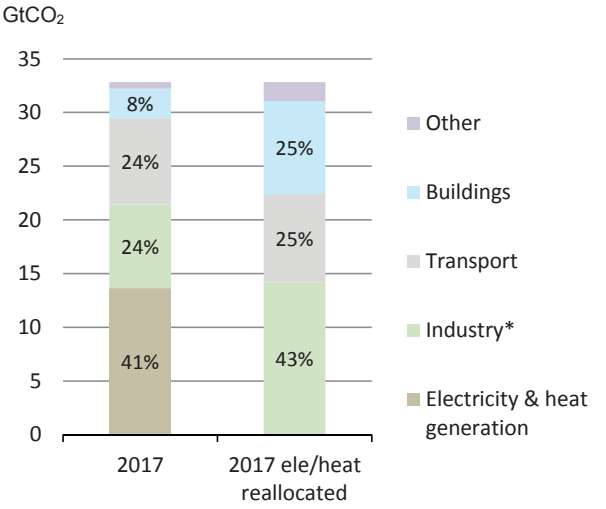


Global emissions grew annually by one percentage point between 2010 and 2017, mostly influenced by the offsetting trends of China (+ 2.4%) and the United States (- 1.7%) - which represent, respectively, 28% and 15% of the world total. India registered annual growth rates above 4%.

Electricity generation is still the largest emissions driver

Electricity/heat generation and transport account for two thirds of total CO_2 emissions (Figure 6) and were equally responsible of almost the entire global growth in emissions since 2010; the remaining third is split between industry and buildings[1]. Shares in final consumption vary across countries: while transport is predominant in many American countries, in Asia one-half of emissions derives from power generation and less than one sixth from transport.

Figure 6. Global CO_2 emissions by sector, 2017



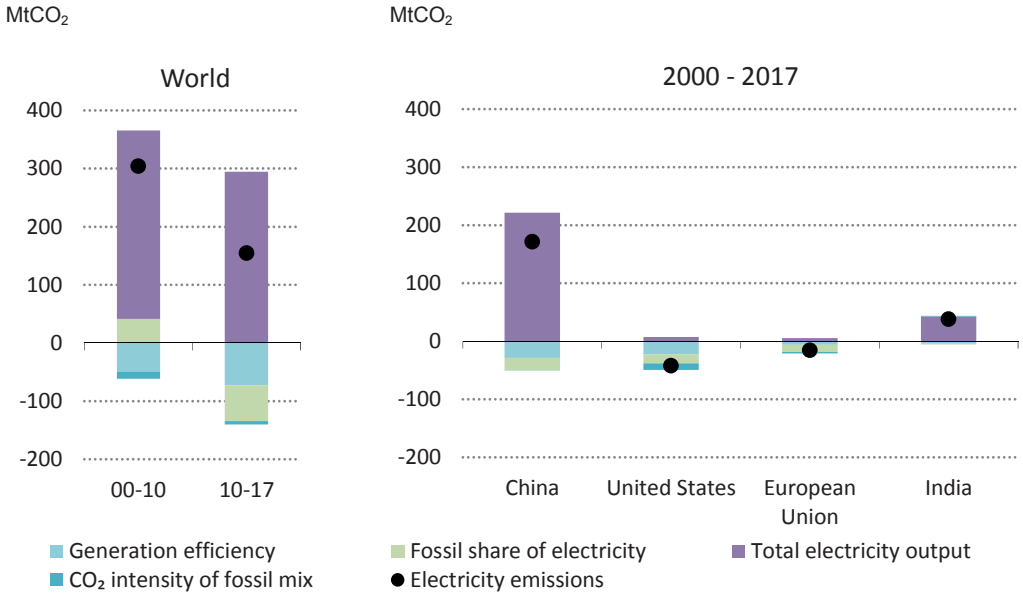
* Industry includes also energy industries own use

The picture changes after reallocating emissions from power generation to the final sectors: industry accounts for slightly less than one half of total emissions, buildings and transport for one quarter each. The buildings sector uses one half of the electricity that is consumed globally (21 000 TWh), industry the other half; transport is not yet visibly electrified. Most of the buildings consumption takes place in the OECD while most of industry in Asia: as these two regions have different carbon intensities of electricity generation, at the global level industry has slightly higher indirect emissions.

Around one half of the global increase in emissions between 2000 and 2017 came from power generation in Asia: India and China alone pushed emissions from electricity generation up by 200 $MtCO_2$ annually (Figure 7).

1. Buildings include residential and commercial and public services.

Figure 7. Drivers of the annual changes in emissions from electricity generation

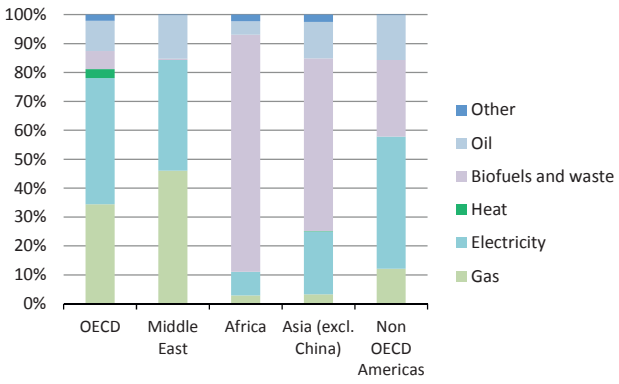


The huge increase in demand, +600 TWh annually since 2000, was the main driver of the increase in global emissions from electricity generation and was not offset by any notable decrease in the carbon intensity of generation. The increasing role of Asia, heavily reliant on coal-fired plants, meant that despite falling carbon intensities across most major producers in the last two decades, the world average remained relatively flat. The improvements in renewables penetration and efficiency of power plants registered in the 2010s contributed to decreasing the emissions per unit of electricity generated and lowered the annual growth rates of emissions between 2010 and 2017 to half the values of the previous decade.

Buildings are one of the two sectors responsible for the increase in electricity demand. However, despite the great reliance on electricity at the global level, differences exist in the energy mix among countries. In the OECD, 80% of the consumption derives from natural gas for heating and electricity for appliances, lighting and air conditioning (Figure 8). Among non-OECD countries, different patterns can be observed: shares of biomass, in particular traditional use of biomass for cooking often consumed non-sustainably, are usually high, in particular in Africa and Asia (excluding China).

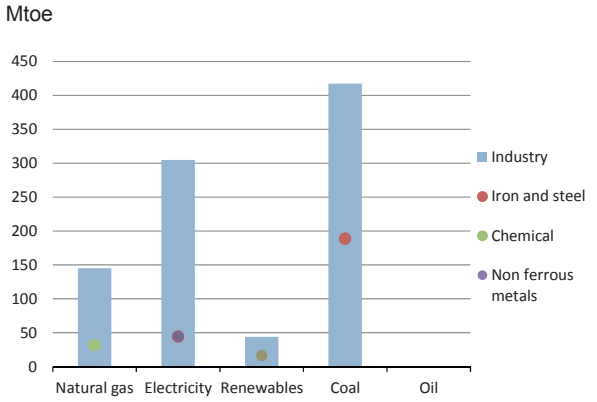
In most of the regions, the mix in the buildings sector remained almost unchanged since 2000, with the exception of China where consumption of biomass dropped by more than forty percentage points while electricity and gas grew.

Figure 8. Energy consumption by source in the buildings sector - 2017



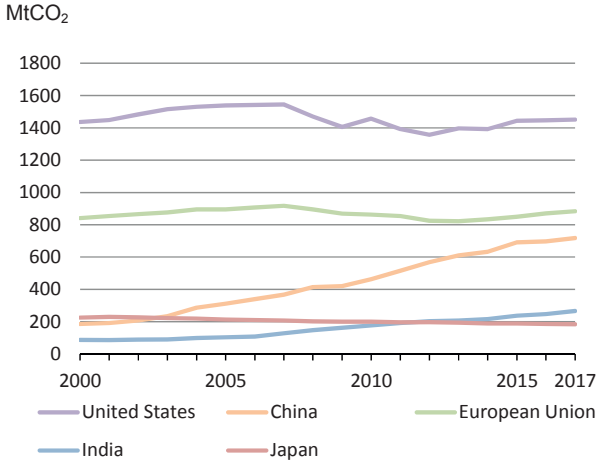
The other sector strongly relying on electricity is industry. Mostly driven by electricity and coal, industry's total energy consumption increased globally by 1 Gtoe in the last two decades (Figure 9) and reached almost 3 Gtoe, 30% of the global final consumption. While many countries experienced decreases, China and India tripled their consumptions touching respectively 1 Gtoe and 0.2 Gtoe; emissions from industry in China (including indirect emissions from electricity) exceeds the total emissions of the United States.

Figure 9. Industry energy consumption by source and sub-sector: 2000-2017 change



Much of the increase in energy demand for the iron and steel and non-ferrous metals industries is from coal; the chemical sector experienced a big increase in natural gas consumption and also coal (almost exclusively in China), while oil remained flat; electricity increased at comparable rates in all industrial sub-sectors. Globally, coal combustion in the iron and steel industry alone is responsible of 2 billion tons of CO_2.

Figure 10. Road transport CO_2 emissions by country



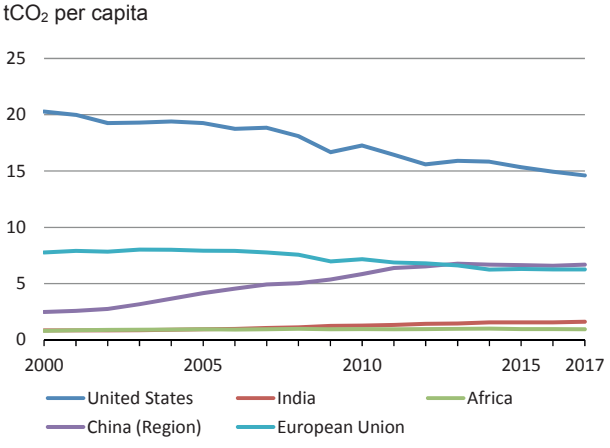
Emissions from transport increased by 2% annually at the global level in the period 2000-2017, reaching 8 $GtCO_2$. Transport did not experience any major decrease across any regions, except for the drop during the years of the crisis. Road transport, mostly for passenger travel, accounts for three quarter of total transport emissions and it is the mode that increased the most in absolute terms (+ 1.7 GtCO2), second only to international aviation for rate of growth (2% annually vs. 3%). Such a big increase was mostly propelled by Asian countries (Figure 10).

China and India increased their emissions from road transport by a factor of four and three respectively since 2000; similar growth rates were experienced by Cambodia, Indonesia, Viet Nam and Thailand. However, despite such increases, levels of road emissions per capita in many Asian countries still remain lower by an order of magnitude than in the United States where transport accounts for more than one third of total emissions.

Great differences on per capita emissions remain

Great differences exist in per capita emissions not only for transport, but overall: global emissions of CO_2 per capita amounted to 4.4t in 2017, but more than one-half of the global population is below 2 tons per capita (Figure 11). Per capita emissions in China almost tripled since 2000, reaching values similar to those of the European Union (EU) in the early 2010s; while population grew by less than 10%, total CO_2 emissions almost tripled. Between 2000 and 2017, India doubled emissions, but its per capita value is still one quarter of that of the European Union. Africa has the lowest per capita emissions among all regions - around one tenth of those of the US - and did not show any increase. Should India and Africa reach similar levels of per capita emissions than those of the EU, an additional 13 $GtCO_2$ (more than one third of current levels) would be released in the atmosphere.

Figure 11. Per capita CO_2 emissions in selected regions

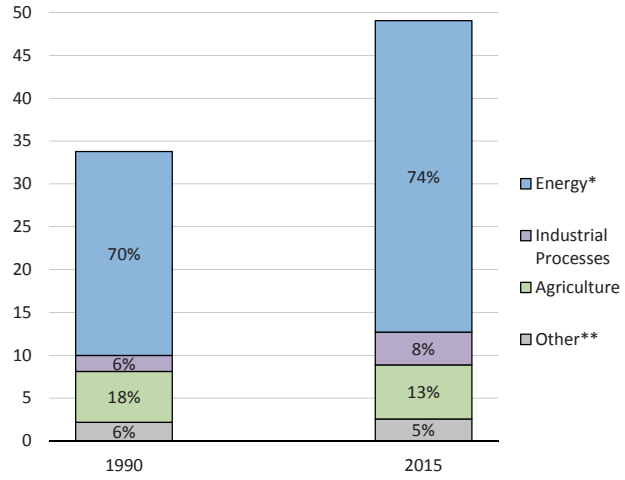


Energy as a key driver for emissions

Driven by CO2 emissions from fuel combustion, energy-related GHG emissions increased by 12.6 GtCO2 equivalent, and also as a percentage of total GHG emissions, between 1990 and 2015; the other GHG sources (industrial processes, agriculture and other) together increased by 2.7 $GtCO_2$ eq. (Figure 12).

Figure12. Global anthropogenic GHG emissions

$GtCO_2$ eq.



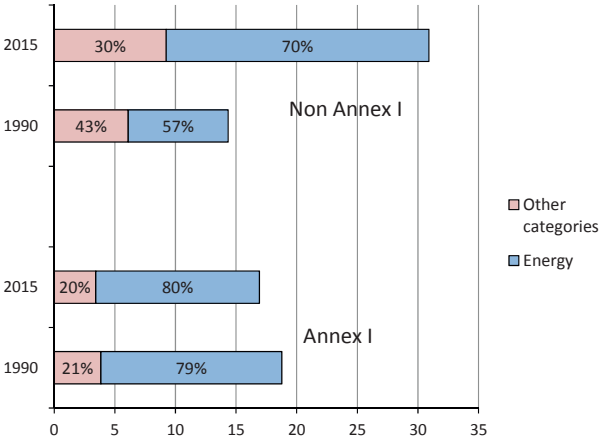
* Energy includes IPCC categories Fuel combustion and Fugitive emissions from fuels.
** Other includes large-scale biomass burning (excluding CO_2), post-burn decay, peat decay, indirect N_2O emissions from non-agricultural emissions of NO_x and NH_3, Waste, and Solvent use.

Source: based on IEA estimates for CO_2 from fuel combustion and EDGAR version 4.3.2FT2016 for CO_2, CH_4 and N_2O emissions and 4.2FT2010 for the F-gases; based on 100-year Global Warming Potential (GWP).

The share of energy-related emissions in the total GHG emissions grew mostly due to non-Annex I countries increasing their energy consumption, with energy-related emissions growing from 57% to 70% of total GHG emissions in 2015, after more than doubling (Figure 13). In the same period, Annex I countries reduced total GHGs by around 10% across both energy and other sources. As around 90% of energy-related emissions derived from the oxidation of carbon, CO_2 was the largest source of GHG emissions for the energy category.

Figure13. GHG emissions – energy and other sources

$GtCO_2$ eq.



Globally CO_2 emissions from the energy sector represented around three quarters of total GHG emissions in 2015, four percentage points more than in 1990. Thus, they remain at the core of the climate change mitigation debate and represent one of the main issues to address in the broader political agenda.

Developing a low-carbon world

With the energy sector accounting for around three quarters of global greenhouse gas (GHG) emissions, action in the energy sector can make or break efforts to achieve global climate goals. In the past, industrialised countries emitted the large majority of anthropogenic GHGs. In 2007 however, shares of emissions from non-Annex I countries surpassed those of Annex I countries, and have kept rising very rapidly (Figure 13). To shift towards a low-carbon world, mitigation efforts must occur across all countries, targeting energy demand as well as emission from energy supply.

The Paris Agreement: International action beyond 2020

The global community adopted the historic Paris Agreement in December 2015, which includes GHG mitigation actions covering the time period from 2020 onward. It is the first international climate agreement to extend mitigation obligations to all countries, both developed and developing.

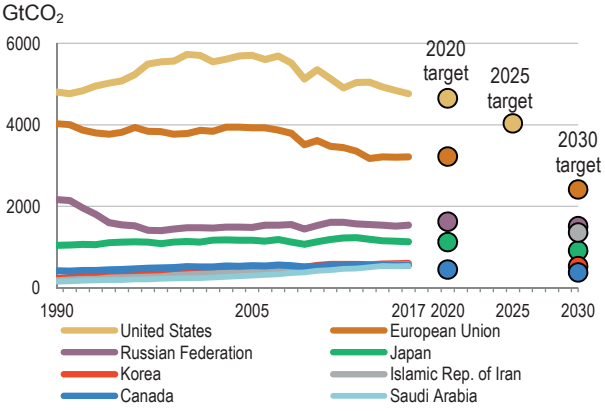
The long-term goals of the Paris Agreement are ambitious: to limit temperature rise to "well below 2°C above pre-industrial levels" and pursue efforts to limit the rise to 1.5°C. To achieve these goals, countries "aim to reach global peaking of GHG emissions as soon as possible" and "to undertake rapid reductions thereafter" to "achieve a balance between anthropogenic emissions by sources and removals by sinks of GHGs in the second half of this century," equating essentially to achieving net-zero emissions by this time.

The Agreement was ratified in record pace and came into force on the 4 November 2016. As of 20 September 2019, there are 197 signatories to the Paris Agreement of which 185 have ratified the agreement (UNFCCC, 2019).

In December 2018, countries concluded agreement on a "rulebook" for implementation of the Paris Agreement at COP24 in Katowice Poland. The rulebook provides guidelines on issues such as emissions accounting and transparency of mitigation action and financial support.

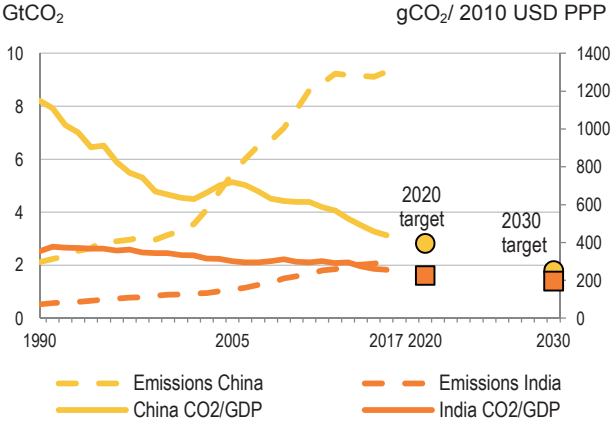
Countries have now shifted their focus to clear and transparent implementation of their commitments and enhancement of the levels of ambition. The Paris

Figure 14 A. Historical CO_2 emissions (1990-2017) and emissions reduction targets (2020, 2025, 2030) for the top ten emitting Parties, excluding China and India



Notes: The United States, the Russian Federation and the Islamic Republic of Iran have set emission reduction targets within a specified range (Table 1). Only the most ambitious ends of the targets are indicated in the graph. Korea has a target for 2030 only. Saudi Arabia has a target to achieve "annual mitigation co-benefits" of "up to 130 million tons of CO_2eq by 2030," not indicated on the graph. Historical emissions are indicated using $MtCO_2$, while numerous emissions targets use CO_2-equivalent (Table 1). China and India are excluded from this graph as these countries have specified emission intensity targets (see Figure 14B).

Figure 14 B. Historical CO_2 emissions (1990-2017) and emission-intensity reduction targets (2020, 2030) for China and India



Notes: Intensity targets for India and China are specified within a range for both 2020 and 2030 (Table 1). Only the most ambitious target levels are indicated in the graph. India's targets use CO_2-equivalent (CO_2e)/GDP, so the target levels indicated on the graph may not reflect the full range of GHGs covered by the targets.

Agreement is founded on Nationally Determined Contributions (NDCs) made by countries, which are intended outline their "highest possible ambition" to address climate change including reducing GHG emissions. Current NDCs cover the period from 2020 to 2030 or 2025, and most include quantitative emissions reductions targets, summarized in Table 1 and Figure 14 (A and B) for the top-ten emitting

countries and remaining IEA member countries. Countries that have submitted an (intended) NDC represent 96% of global CO_2 emissions.

NDCs are due to be updated every five years, each new NDC is to represent a progression from the previous one with a raised level of ambition The first round of revisions are due in 2020, inviting countries communicate or update their commitments for the next round of NDC.

Timely and accurate CO_2 and GHG statistics (complemented by other metrics to assess underlying transformation of the energy system) are central to taking stock of the implementation to assess the progress towards achieving climate targets and drive further ambition, both at the international and national levels. The IEA continues to support countries through provision of energy and emissions statistics, and training country officials in policy, modelling, and energy statistics, including in the context of their NDCs. The IEA's Clean Energy Transitions Programme enhances efforts to help countries – with a focus on key emerging countries including IEA Association and Partner countries – better collect, use, and communicate robust energy and emissions data.

Pre-2020 action

The delivery of the Paris Agreement's goals also calls for the enhanced implementation of the pre-2020 actions and commitments which builds on a long history of international cooperation on climate change. The first binding commitments to reduce greenhouse gas emissions were set under the Kyoto Protocol's first commitment period (2008-12), requiring participating industrialised countries (as a group) to curb emissions by about 5% relative to 1990 over this period. Thirty-eight Parties also agreed to take commitments under a second commitment period (2013-2020) set out by the Doha Amendment to the Kyoto Protocol; however, the Amendment has not reached its ratification threshold.

Alongside agreement of a second Kyoto Protocol commitment period, developed and developing countries submitted voluntary emission reduction pledges for 2020 under the Copenhagen Accord and Cancún Agreements, with the participating Parties producing over 80% of global GHG emissions (Table 1; Figure 14A and B). This marked a significant improvement in the coverage of countries taking action to address GHG emissions, compared with the Kyoto Protocol, and laid the groundwork for the Paris Agreement.

COP23 invited Parties to submit information on progress on enhanced action prior to 2020. At the High-level meeting on the Pre-2020 Stocktake of COP24, countries stressed the need to keep up the initiative with various approaches including further engagements with non-Party stakeholders, scale-up of mitigation and adaptation efforts, and provision of support for developing countries. The IEA supports the pre-2020 actions through identifying remaining gaps, supporting immediate climate actions and cooperating with non-Party stakeholders through the Marrakech Partnership for Global Climate Action.

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United Nations Framework Convention on Climate Change (2019). Paris Agreement – Status of Ratification, https://unfccc.int/process/the-paris-agreement/status-of-ratification

Table 1. Greenhouse gas reduction targets of the ten largest emitters emissions and IEA member countries

Ten highest emitting Parties *(as per IEA estimates of CO_2 emissions from fuel combustion)*	1990	2005	2017	2020 GHG target	Base year level	2017 level	% change to 2017	(I)NDC GHG target[1]
	$MtCO_2$							
China (incl. Hong Kong)	2 122	5 448	9 302	emissions/GDP 40-45% below 2005	0.72 $kgCO_2$ / 2010 USD PPP	0.44 $kgCO_2$ / 2010 USD PPP	-39%	Reduce CO_2 per unit of GDP by 60-65% below 2005
United States[2]	4 803	5 703	4 761	17% below 2005	5 703 Mt	4 761 Mt	-15%	26-28% reduction by 2025 below 2005 levels
European Union	4 027	3 922	3 209	20% below 1990[3]	4 027 Mt	3 209 Mt	-20%	40% reduction compared to 1990 levels
India	529	1 073	2 161	emissions/GDP 20-25% below 2005[4]	0.30$kgCO_2$ / 2010 USD PPP	0.26 $kgCO_2$ / 2010 USD PPP	-15%	Emissions/GDP 33-35% below 2005 levels[5]
Russian Federation	2 163	1 482	1 536	15-25% below 1990	2 164 Mt	1 536 Mt	-30%	25-30% below 1990 levels[6]
Japan	1 037	1 166	1 132	3.8% below 2005	1 164 Mt	1 147 Mt	-6%	26% below 2013 levels[7]
Republic of Korea (Korea)	232	458	600	*None*[8]		600 Mt		37% below BAU emissions of 850.6 $MtCO_2e$ in 2030[9]
Islamic Republic of Iran (Iran)	171	418	567	*None*		*x*		4% below BAU of 1540 Mt CO_2 in 2030; 12% with international support[10]
Canada	420	540	548	17% below 2005	540 Mt	548 Mt	+1%	30% below 2005 levels
Saudi Arabia	151	298	532	*None*		*X*		Annual GHG-emission abatement of up to 130 $MtCO_2e$
Other IEA member countries								
	1990	**2005**	**2017**	**2020 GHG target**	**base year level**	**2017 level**	**change % to 2017**	
	$MtCO_2$							
Australia	260	365	385	5% below 2000 levels	335 Mt	385 Mt	+5%	26-28% below 2005 levels
New Zealand	22	34	33	5% below 1990 levels	34 Mt	33 Mt	%	30% below 2005 levels
Norway	27	35	35	40% below 1990[11]	27 Mt	35 Mt	+29%	40% below 1990 levels
Switzerland	41	44	37	20% below 1990[12]	41 Mt	37 Mt	-9%	50% below 1990 levels. 35% anticipated reduction by 2025
Turkey	129	216	378	*None*				21% emission reduction below BAU of 1175 $MtCO_2e$[13]
Mexico	257	412	446	30% below BAU scenario.	906 $MtCO_2e$ (2020 BAU)	446 Mt		22% below BAU[14]

1. Targets are for the year 2030 and include total GHG reduction targets unless otherwise specified.
2. US: The United States announced on 1 June 2017 its intention to withdraw from the Paris Agreement.
3. EU 2020: The EU's 2020 target excludes LULUCF (included in 2030 target)
4. India's 2020 target excludes emissions from agriculture
5. India's 2030 NDC also includes mitigation of 2.5–3 GtCO2e by 2030 through carbon sequestration.
6. Based on Russia's nationally determined contribution (NDC).
7. Japan's 2030 target includes overseas credits.
8. In 2016, Korea replaced its 2020 target of 30% below business-as-usual with a 2030 target as defined in its NDC.
9. It is still to be decided by the Korean government whether LULUCF will be included in the 2030 target.
10. Target based on INDC and 2030 BAU emissions level from Iran's 2015 Third National Communication to UNFCCC.
11. Norway sets a minimum 16% reduction for any given year during 2013-2020 under the Kyoto Protocol second commitment period.
12. Switzerland sets a minimum 15.8% reduction for any given year during 2013-2020 under the Kyoto Protocol second commitment period.
13. Based on Turkey's INDC.
14. Mexico's 2030 target consists of a 22% GHG reduction and 51% reduction in black carbon, which together would result in a 25% emission reduction compared to its BAU scenario. Mexico aims to peak emissions in 2026 while reducing emission intensity by 40% between 2013 and 2030 (based on NDC).

2. CO_2 EMISSIONS AND INDICATORS: GLOBAL AND REGIONAL TOTALS

WORLD

World

Figure 1. CO_2 emissions by fuel

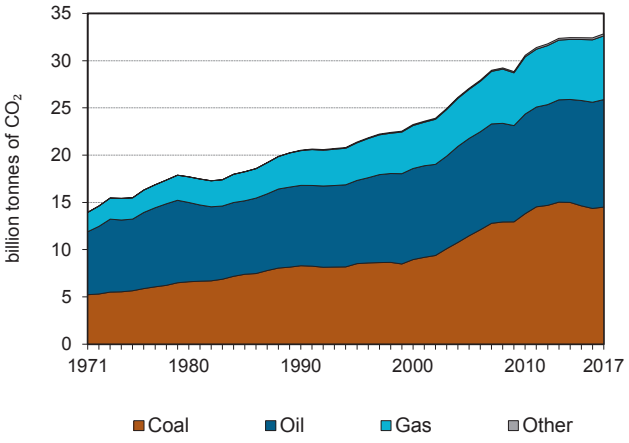


Figure 2. CO_2 emissions by sector

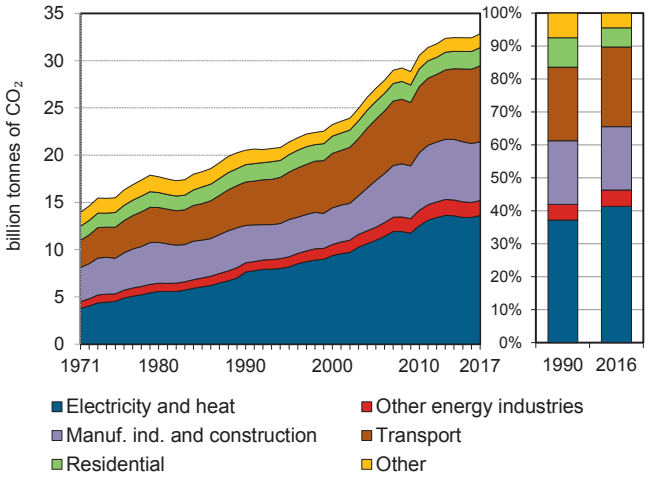


Figure 3. Electricity generation by fuel

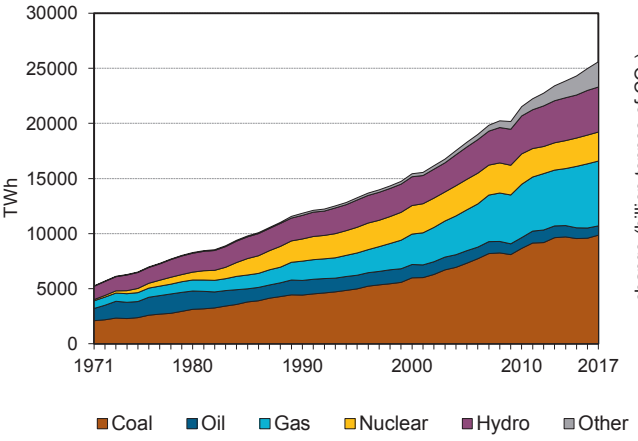


Figure 4. CO_2 from electricity generation: driving factors[1]

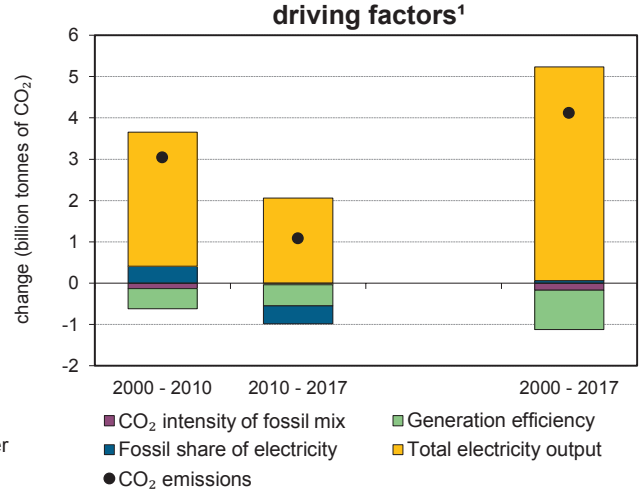


Figure 5. Changes in selected indicators

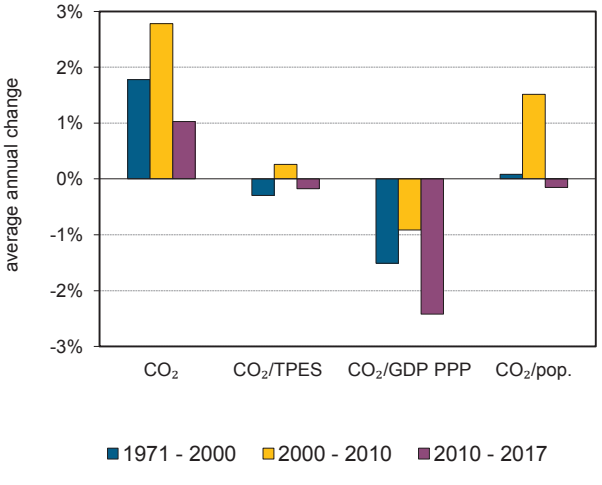
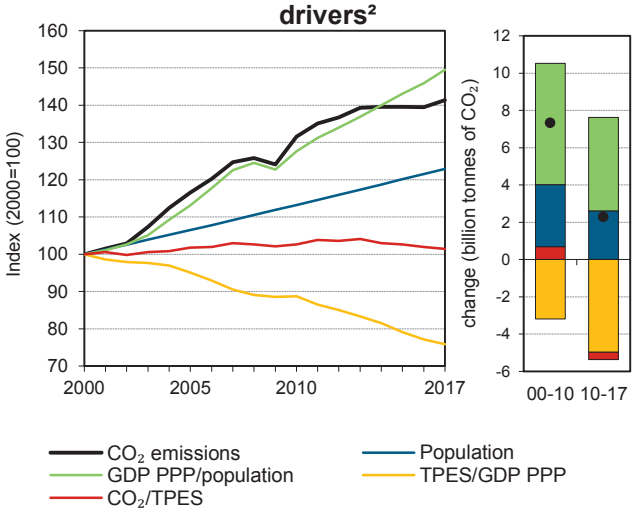


Figure 6. Total CO_2 emissions and drivers[2]



1. Electricity decomposition: CO_2 emissions = CO_2 intensity of fossil mix x fossil share of elec. x thermal efficiency x elec. output. See Chapter 6.
2. Kaya decomposition: CO_2 emissions = CO_2/TPES x TPES/GDP x GDP/population x population. See Chapter 6.

World

Key indicators

	1990	1995	2000	2005	2010	2015	2017	%change 90-17
CO_2 fuel combustion ($MtCO_2$)	20521.1	21 387.2	23 239.8	27 074.8	30 571.4	32 430.9	32 839.9	60%
Share of World CO_2 from fuel combustion	100%	100%	100%	100%	100%	100%	100%	
TPES (PJ)	367002	385 904	419 743	480 637	538 009	570 694	584 990	59%
GDP (billion 2010 USD)	37951.2	42 218.4	50 021.6	58 160.3	66 114.4	75 858.8	80 078.9	111%
GDP PPP (billion 2010 USD)	46097.5	51 513.0	61 778.6	74 409.7	89 251.2	106 129.7	113 555.3	146%
Population (millions)	5285.8	5 711.7	6 117.0	6 514.3	6 925.4	7 347.4	7 518.8	42%
CO_2 / TPES (tCO_2 per TJ)	55.9	55.4	55.4	56.3	56.8	56.8	56.1	0%
CO_2 / GDP ($kgCO_2$ per 2010 USD)	0.54	0.5	0.5	0.5	0.5	0.4	0.4	-24%
CO_2 / GDP PPP ($kgCO_2$ per 2010 USD)	0.45	0.4	0.4	0.4	0.3	0.3	0.3	-35%
CO_2 / population (tCO_2 per capita)	3.9	3.7	3.8	4.2	4.4	4.4	4.4	13%
Share of electricity output from fossil fuels	64%	62%	65%	67%	68%	67%	65%	
CO_2 / kWh of electricity (gCO_2/kWh)	532	533	537	541	528	505	485	-9%
CO_2 emissions and drivers - Kaya decomposition (1990=100) [1]								
CO_2 emissions index	100	104	113	132	149	158	160	60%
Population index	100	108	116	123	131	139	142	42%
GDP PPP per population index	100	103	116	131	148	166	173	73%
Energy intensity index - TPES / GDP PPP	100	94	85	81	76	68	65	-35%
Carbon intensity index - CO_2 / TPES	100	99	99	101	102	102	100	0%

1. Please see the chapter *Indicator sources and methods* for methodological notes. Based on GDP in 2010 USD, using purchasing power parities.

2017 CO_2 emissions by sector

million tonnes of CO_2	Coal	Oil	Natural gas	Other [2]	Total	%change 90-17
CO_2 fuel combustion	**14 502.0**	**11 377.1**	**6 743.0**	**217.8**	**32 839.9**	**60%**
Electricity and heat generation	9 761.4	714.9	2 975.1	151.8	13 603.3	78%
Other energy industry own use	328.3	577.4	675.9	1.2	1 582.8	62%
Manufacturing industries and construction	3 811.2	1 029.5	1 333.2	53.7	6 227.6	57%
Transport	0.3	7 793.7	246.0	x	8 039.9	75%
of which: road	*x*	*5 855.4*	*102.9*	*x*	*5 958.3*	80%
Other	600.8	1 261.6	1 512.8	11.1	3 386.3	1%
of which: residential	*298.6*	*598.0*	*1 034.8*	*0.0*	*1 931.4*	5%
of which: services	*132.1*	*253.1*	*447.0*	*7.5*	*839.6*	8%
Memo: international marine bunkers	*x*	*697.0*	*0.1*	*x*	*697.1*	*88%*
Memo: international aviation bunkers	*x*	*584.9*	*x*	*x*	*584.9*	*126%*

2. Other includes industrial waste and non-renewable municipal waste. 3. World includes international marine bunkers and international aviation bunkers.

Key categories for CO_2 emissions from fuel combustion in 2017

IPCC source category	CO_2 emissions ($MtCO_2$)	1990 CO_2 emissions ($MtCO_2$)	Share in total GHG[3] (%)	Cumulative total (%)
Main activity prod. elec. and heat - coal	9003.7	4613.8	18.1	18.1
Road - oil	5855.4	3299.2	11.8	29.9
Manufacturing industries - coal	3811.2	2060.9	7.7	37.5
Main activity prod. elec. and heat - gas	2467.0	1034.9	5.0	42.5
Other transport - oil	1938.3	1127.1	3.9	46.4
Manufacturing industries - gas	1333.2	849.6	2.7	49.0
Residential - gas	1034.8	645.6	2.1	51.1
Manufacturing industries - oil	1029.5	1039.2	2.1	53.2
Unallocated autoproducers - coal	757.8	389.4	1.5	54.7
Memo: total CO_2 from fuel combustion	*32839.9*	*20521.1*	*66.0*	*66.0*

3. Percent calculated using the total GHG estimate excluding CO_2 emissions/removals from agriculture, forestry and other land use.

UNFCCC ANNEXES

Annex I Parties

Figure 1. CO_2 emissions by fuel

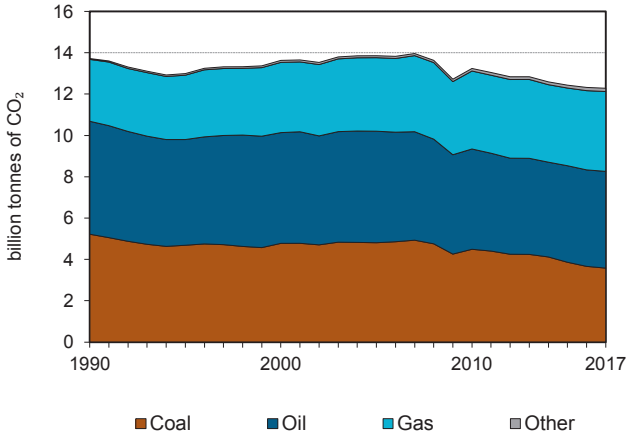


Figure 2. CO_2 emissions by sector

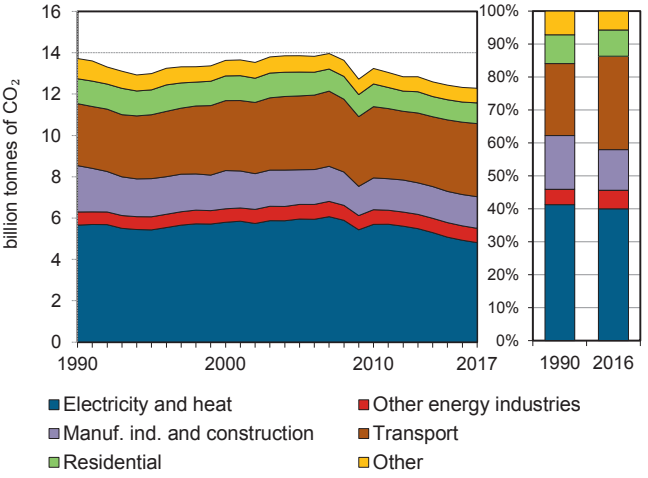


Figure 3. Electricity generation by fuel

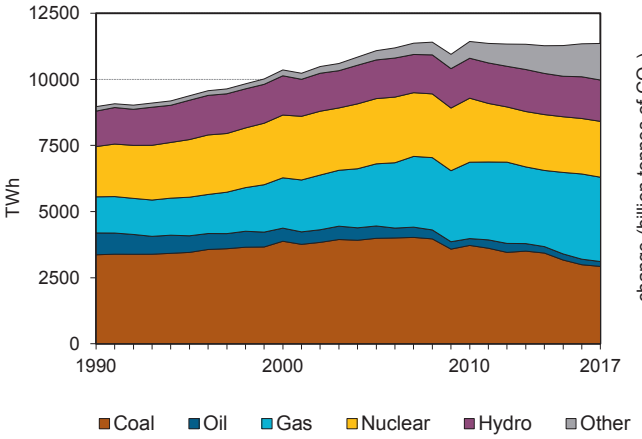


Figure 4. CO_2 from electricity generation: driving factors[1]

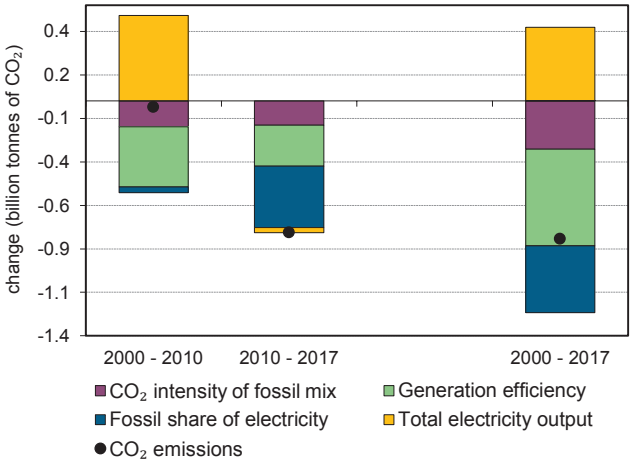


Figure 5. Changes in selected indicators

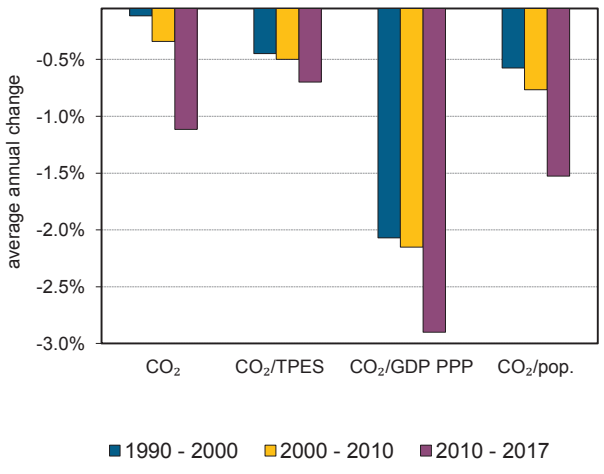
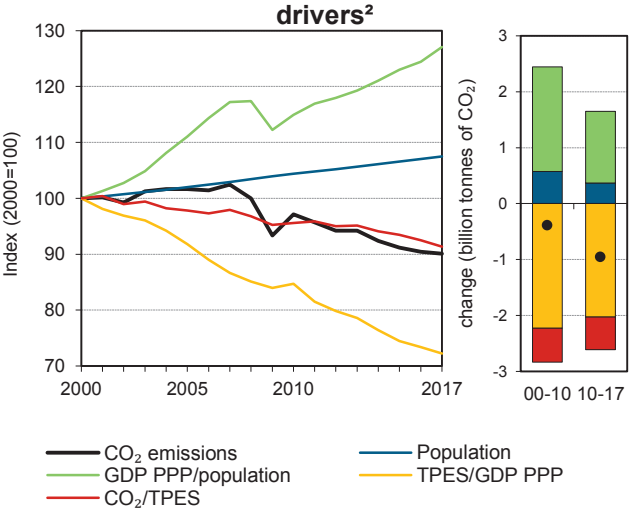


Figure 6. Total CO_2 emissions and drivers[2]



1. Electricity decomposition: CO_2 emissions = CO_2 intensity of fossil mix x fossil share of elec. x thermal efficiency x elec. output. See Chapter 6.
2. Kaya decomposition: CO_2 emissions = CO_2/TPES x TPES/GDP x GDP/population x population. See Chapter 6.

Annex I Parties

Key indicators

	1990	1995	2000	2005	2010	2015	2017	%change 90-17
CO_2 fuel combustion ($MtCO_2$)	13721.6	12 992.5	13 630.5	13 856.6	13 240.1	12 432.0	12 282.6	-10%
Share of World CO_2 from fuel combustion	67%	61%	59%	51%	43%	38%	37%	
TPES (PJ)	233840	229 661	241 732	251 185	245 626	235 932	238 487	2%
GDP (billion 2010 USD)	30021.1	32 220.8	37 616.7	42 111.4	44 283.1	48 216.1	50 175.0	67%
GDP PPP (billion 2010 USD)	30151	31 469.5	36 757.1	41 613.0	44 098.5	48 182.3	50 200.9	66%
Population (millions)	1176.9	1 208.2	1 232.3	1 256.7	1 286.4	1 313.1	1 324.3	13%
CO_2 / TPES (tCO_2 per TJ)	58.7	56.6	56.4	55.2	53.9	52.7	51.5	-12%
CO_2 / GDP ($kgCO_2$ per 2010 USD)	0.46	0.4	0.4	0.3	0.3	0.3	0.2	-46%
CO_2 / GDP PPP ($kgCO_2$ per 2010 USD)	0.46	0.4	0.4	0.3	0.3	0.3	0.2	-46%
CO_2 / population (tCO_2 per capita)	11.7	10.8	11.1	11.0	10.3	9.5	9.3	-20%
Share of electricity output from fossil fuels	62%	59%	61%	62%	61%	58%	56%	
CO_2 / kWh of electricity (gCO_2/kWh)	503	481	482	469	433	396	369	-27%
CO_2 emissions and drivers - Kaya decomposition (1990=100) [1]								
CO_2 emissions index	100	95	99	101	96	91	90	-10%
Population index	100	103	105	107	109	112	113	13%
GDP PPP per population index	100	102	116	129	134	143	148	48%
Energy intensity index - TPES / GDP PPP	100	94	85	78	72	63	61	-39%
Carbon intensity index - CO_2 / TPES	100	96	96	94	92	90	88	-12%

1. Please see the chapter *Indicator sources and methods* for methodological notes. Based on GDP in 2010 USD, using purchasing power parities.

2017 CO_2 emissions by sector

million tonnes of CO_2	Coal	Oil	Natural gas	Other [2]	Total	%change 90-17
CO_2 fuel combustion	**3 580.3**	**4 680.5**	**3 864.4**	**157.3**	**12 282.6**	**-10%**
Electricity and heat generation	2 923.5	157.0	1 623.8	109.1	4 813.4	-15%
Other energy industry own use	76.9	299.6	313.9	1.2	691.6	9%
Manufacturing industries and construction	495.3	305.3	692.2	38.2	1 531.1	-32%
Transport	0.1	3 400.0	136.7	-	3 536.8	18%
of which: road	-	*3 024.8*	*8.0*	-	*3 032.8*	24%
Other	84.5	518.8	1 097.8	8.7	1 709.7	-22%
of which: residential	*53.8*	*218.1*	*730.1*	*0.0*	*1 002.0*	-17%
of which: services	*25.7*	*143.5*	*347.9*	*5.1*	*522.2*	-18%
Memo: international marine bunkers	-	*273.0*	*0.1*	-	*273.2*	*15%*
Memo: international aviation bunkers	-	*302.1*	-	-	*302.1*	*76%*

2. Other includes industrial waste and non-renewable municipal waste.

Key categories for CO_2 emissions from fuel combustion in 2017

IPCC source category	CO_2 emissions ($MtCO_2$)	1990 CO_2 emissions ($MtCO_2$)	Share in total GHG[3] (%)	Cumulative total (%)
Road - oil	3024.8	2449.5	18.0	18.0
Main activity prod. elec. and heat - coal	2735.8	3402.6	16.3	34.3
Main activity prod. elec. and heat - gas	1327.6	814.0	7.9	42.3
Residential - gas	730.1	604.1	4.4	46.6
Manufacturing industries - gas	692.2	684.0	4.1	50.7
Manufacturing industries - coal	495.3	946.0	3.0	53.7
Other transport - oil	375.2	423.5	2.2	55.9
Non-specified other - gas	367.6	285.2	2.2	58.1
Other energy industry own use - gas	313.9	182.2	1.9	60.0
Memo: total CO_2 from fuel combustion	*12282.6*	*13721.6*	*73.2*	*73.2*

3. Percent calculated using the total GHG estimate excluding CO_2 emissions/removals from agriculture, forestry and other land use.

Annex II Parties

Figure 1. CO_2 emissions by fuel

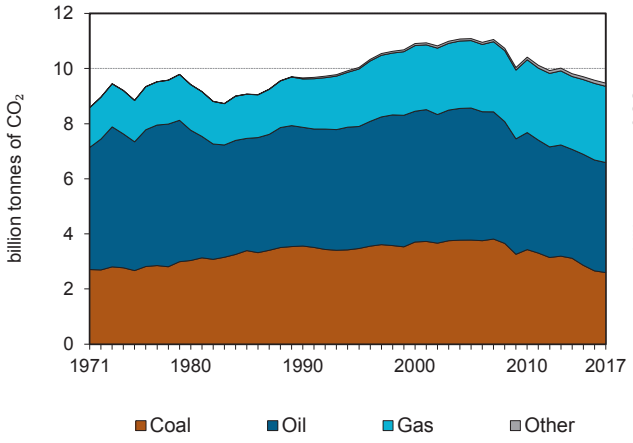


Figure 2. CO_2 emissions by sector

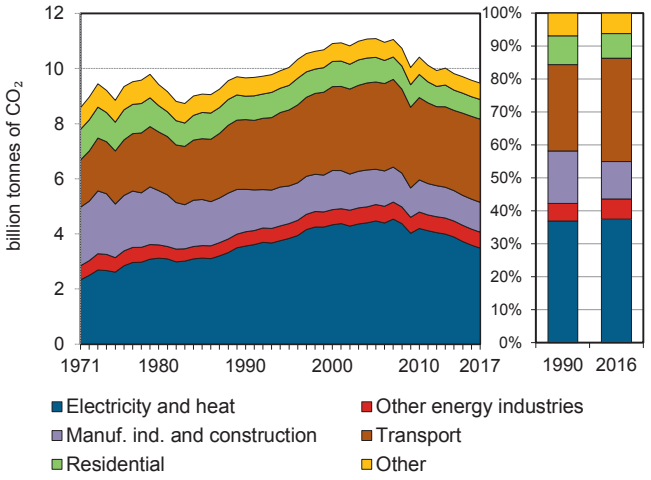
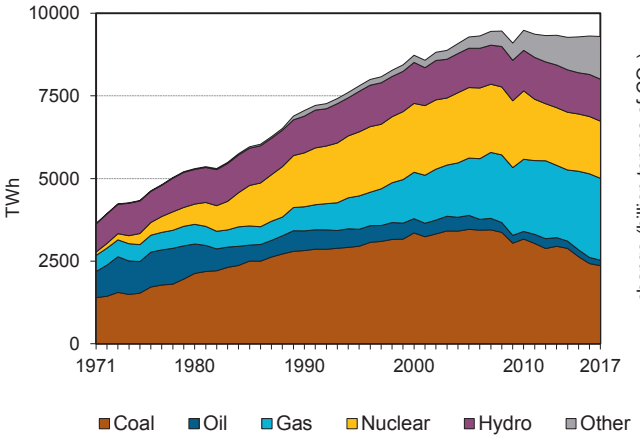


Figure 3. Electricity generation by fuel



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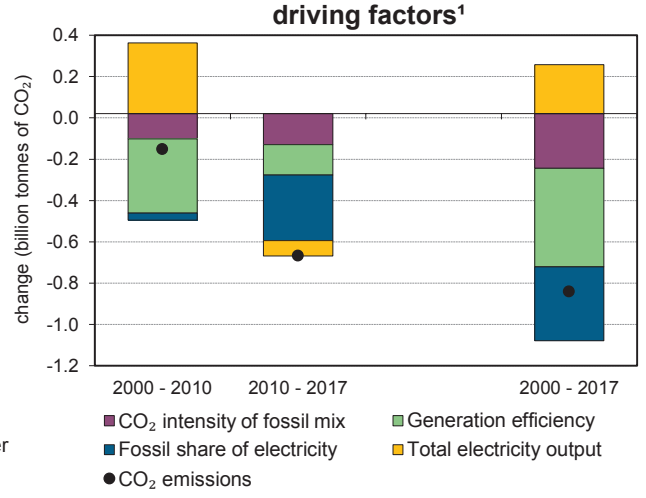


Figure 5. Changes in selected indicators

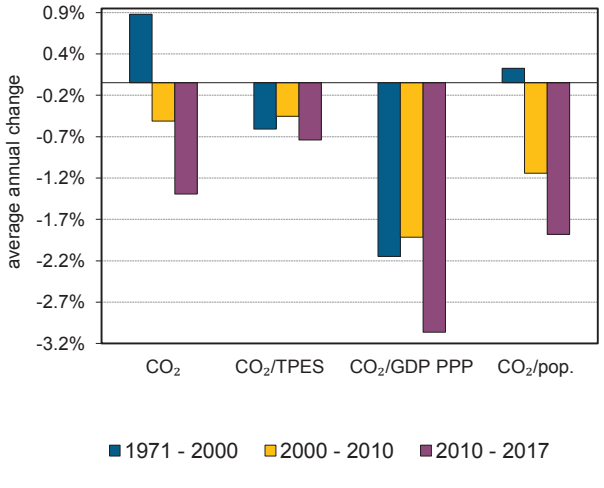
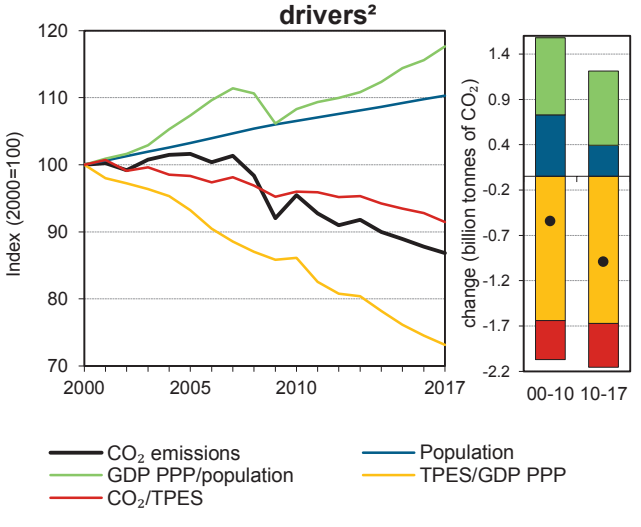


Figure 6. Total CO_2 emissions and drivers[2]



1. Electricity decomposition: CO_2 emissions = CO_2 intensity of fossil mix x fossil share of elec. x thermal efficiency x elec. output. See Chapter 6.
2. Kaya decomposition: CO_2 emissions = CO_2/TPES x TPES/GDP x GDP/population x population. See Chapter 6.

Annex II Parties

Key indicators

	1990	1995	2000	2005	2010	2015	2017	%change 90-17
CO_2 fuel combustion ($MtCO_2$)	9659.6	10 038.6	10 907.5	11 085.7	10 413.7	9 702.4	9 471.6	-2%
Share of World CO_2 from fuel combustion	47%	47%	47%	41%	34%	30%	29%	
TPES (PJ)	168017	180 444	195 044	201 563	193 930	185 570	185 171	10%
GDP (billion 2010 USD)	27208.3	29 989.8	35 079.0	38 833.7	40 445.1	43 772.5	45 462.8	67%
GDP PPP (billion 2010 USD)	24881.8	27 456.6	32 233.3	35 731.2	37 204.1	40 261.4	41 824.1	68%
Population (millions)	799.8	827.7	852.7	880.6	908.7	931.1	940.6	18%
CO_2 / TPES (tCO_2 per TJ)	57.5	55.6	55.9	55.0	53.7	52.3	51.2	-11%
CO_2 / GDP ($kgCO_2$ per 2010 USD)	0.36	0.3	0.3	0.3	0.3	0.2	0.2	-41%
CO_2 / GDP PPP ($kgCO_2$ per 2010 USD)	0.39	0.4	0.3	0.3	0.3	0.2	0.2	-42%
CO_2 / population (tCO_2 per capita)	12.1	12.1	12.8	12.6	11.5	10.4	10.1	-17%
Share of electricity output from fossil fuels	59%	58%	60%	61%	59%	57%	54%	
CO_2 / kWh of electricity (gCO_2/kWh)	494	478	483	466	426	388	361	-27%
CO_2 emissions and drivers - Kaya decomposition (1990=100) [1]								
CO_2 emissions index	100	104	113	115	108	100	98	-2%
Population index	100	103	107	110	114	116	118	18%
GDP PPP per population index	100	107	122	130	132	139	143	43%
Energy intensity index - TPES / GDP PPP	100	97	90	84	77	68	66	-34%
Carbon intensity index - CO_2 / TPES	100	97	97	96	93	91	89	-11%

1. Please see the chapter *Indicator sources and methods* for methodological notes. Based on GDP in 2010 USD, using purchasing power parities.

2017 CO_2 emissions by sector

million tonnes of CO_2	Coal	Oil	Natural gas	Other [2]	Total	%change 90-17
CO_2 fuel combustion	**2 596.7**	**3 992.1**	**2 766.8**	**116.0**	**9 471.6**	**-2%**
Electricity and heat generation	2 242.4	121.6	1 035.2	84.8	3 484.0	-2%
Other energy industry own use	56.1	247.0	275.0	0.3	578.5	12%
Manufacturing industries and construction	288.0	230.3	541.2	23.4	1 082.9	-30%
Transport	0.0	2 960.1	57.5	-	3 017.6	19%
of which: road	-	*2 619.9*	*6.8*	-	*2 626.7*	22%
Other	10.2	433.1	857.8	7.4	1 308.6	-14%
of which: residential	*6.6*	*184.6*	*522.7*	*0.0*	*713.9*	-16%
of which: services	*2.9*	*130.0*	*320.5*	*4.1*	*457.5*	-6%
Memo: international marine bunkers	-	*221.9*	*0.1*	-	*222.1*	*-2%*
Memo: international aviation bunkers	-	*265.4*	-	-	*265.4*	*100%*

2. Other includes industrial waste and non-renewable municipal waste.

Key categories for CO_2 emissions from fuel combustion in 2017

IPCC source category	CO_2 emissions ($MtCO_2$)	1990 CO_2 emissions ($MtCO_2$)	Share in total GHG[3] (%)	Cumulative total (%)
Road - oil	2619.9	2145.8	20.8	20.8
Main activity prod. elec. and heat - coal	2158.0	2575.4	17.2	38.0
Main activity prod. elec. and heat - gas	919.2	304.2	7.3	45.3
Manufacturing industries - gas	541.2	481.6	4.3	49.6
Residential - gas	522.7	449.0	4.2	53.8
Other transport - oil	340.2	339.3	2.7	56.5
Non-specified other - gas	335.1	245.1	2.7	59.1
Manufacturing industries - coal	288.0	612.5	2.3	61.4
Other energy industry own use - gas	275.0	152.9	2.2	63.6
Memo: total CO_2 from fuel combustion	*9471.6*	*9659.6*	*75.3*	*75.3*

3. Percent calculated using the total GHG estimate excluding CO_2 emissions/removals from agriculture, forestry and other land use.

Annex I: Economies in Transition

Figure 1. CO_2 emissions by fuel

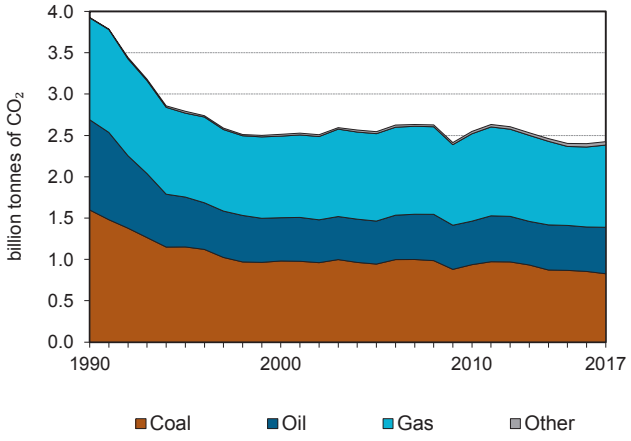


Figure 2. CO_2 emissions by sector

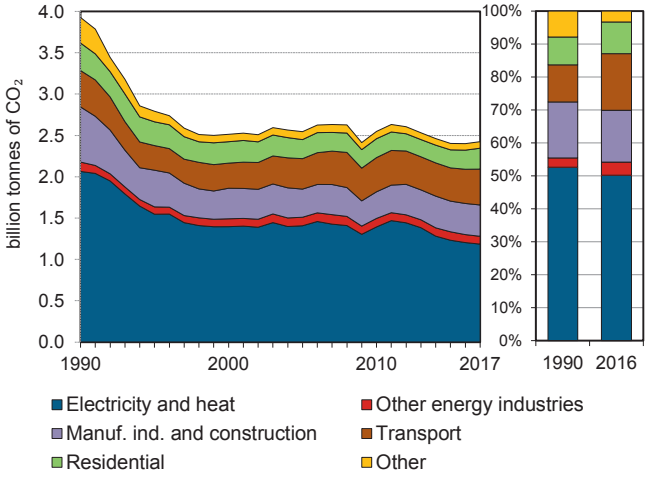


Figure 3. Electricity generation by fuel

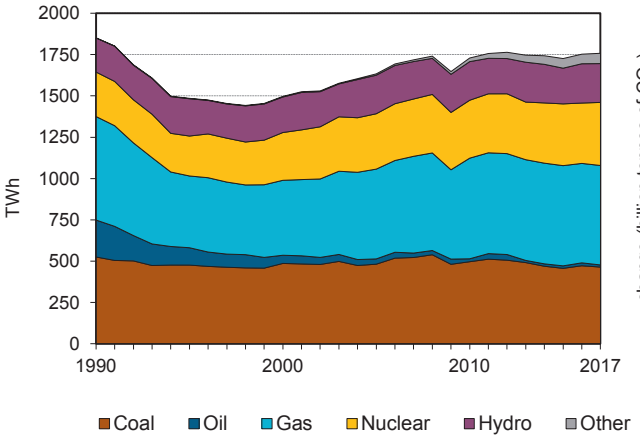


Figure 4. CO_2 from electricity generation: driving factors[1]

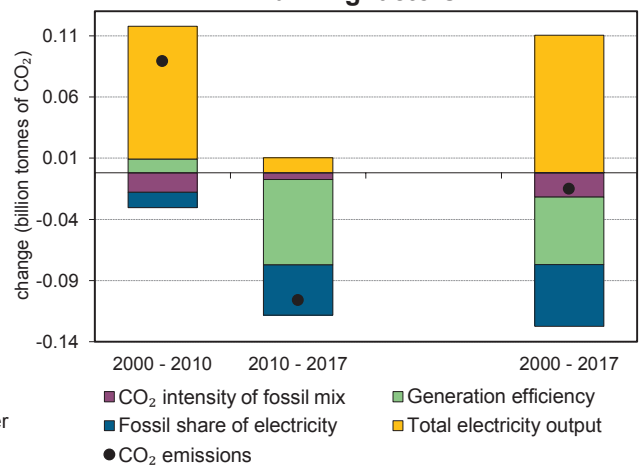


Figure 5. Changes in selected indicators

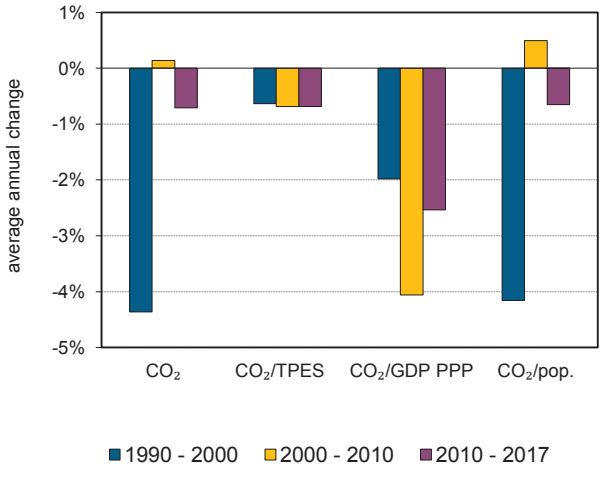
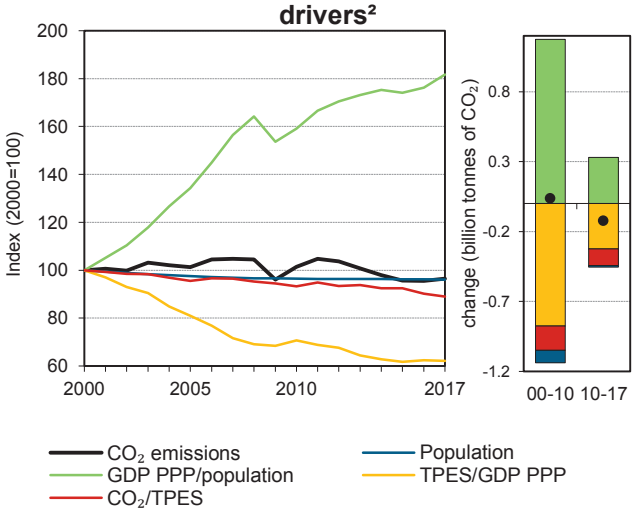


Figure 6. Total CO_2 emissions and drivers[2]



1. Electricity decomposition: CO_2 emissions = CO_2 intensity of fossil mix x fossil share of elec. x thermal efficiency x elec. output. See Chapter 6.
2. Kaya decomposition: CO_2 emissions = CO_2/TPES x TPES/GDP x GDP/population x population. See Chapter 6.

Annex I: Economies in Transition

Key indicators

	1990	1995	2000	2005	2010	2015	2017	%change 90-17
CO_2 fuel combustion ($MtCO_2$)	3927	2 792.4	2 513.3	2 545.4	2 548.7	2 403.1	2 424.4	-38%
Share of World CO_2 from fuel combustion	19%	13%	11%	9%	8%	7%	7%	
TPES (PJ)	63583	46 567	43 377	45 977	47 133	44 858	47 049	-26%
GDP (billion 2010 USD)	2432.8	1 784.1	1 991.1	2 589.1	3 031.9	3 320.9	3 467.8	43%
GDP PPP (billion 2010 USD)	4656.6	3 293.3	3 643.8	4 772.4	5 595.0	6 104.2	6 363.1	37%
Population (millions)	321.1	319.7	314.2	306.5	303.3	302.5	302.0	-6%
CO_2 / TPES (tCO_2 per TJ)	61.8	60.0	57.9	55.4	54.1	53.6	51.5	-17%
CO_2 / GDP ($kgCO_2$ per 2010 USD)	1.61	1.6	1.3	1.0	0.8	0.7	0.7	-57%
CO_2 / GDP PPP ($kgCO_2$ per 2010 USD)	0.84	0.8	0.7	0.5	0.5	0.4	0.4	-55%
CO_2 / population (tCO_2 per capita)	12.2	8.7	8.0	8.3	8.4	7.9	8.0	-34%
Share of electricity output from fossil fuels	74%	69%	66%	65%	65%	63%	62%	
CO_2 / kWh of electricity (gCO_2/kWh)	534	492	472	483	461	429	394	-26%
CO_2 emissions and drivers - Kaya decomposition (1990=100) [1]								
CO_2 emissions index	100	71	64	65	65	61	62	-38%
Population index	100	100	98	95	94	94	94	-6%
GDP PPP per population index	100	71	80	107	127	139	145	45%
Energy intensity index - TPES / GDP PPP	100	104	87	71	62	54	54	-46%
Carbon intensity index - CO_2 / TPES	100	97	94	90	88	87	83	-17%

1. Please see the chapter *Indicator sources and methods* for methodological notes. Based on GDP in 2010 USD, using purchasing power parities.

2017 CO_2 emissions by sector

million tonnes of CO_2	Coal	Oil	Natural gas	Other [2]	Total	%change 90-17
CO_2 fuel combustion	**826.8**	**562.2**	**994.6**	**40.9**	**2 424.4**	**-38%**
Electricity and heat generation	583.0	31.2	547.3	23.9	1 185.5	-43%
Other energy industry own use	13.4	45.1	35.2	0.9	94.6	-16%
Manufacturing industries and construction	179.3	57.8	126.9	14.7	378.7	-43%
Transport	0.0	355.5	78.2	-	433.8	-1%
of which: road	-	*325.5*	*1.0*	-	*326.6*	17%
Other	51.1	72.5	207.0	1.3	332.0	-48%
of which: residential	*39.2*	*32.5*	*181.3*	-	*253.0*	-24%
of which: services	*7.7*	*10.7*	*20.9*	*1.0*	*40.3*	-74%
Memo: international marine bunkers	-	*40.9*	-	-	*40.9*	*314%*
Memo: international aviation bunkers	-	*24.7*	-	-	*24.7*	*-34%*

2. Other includes industrial waste and non-renewable municipal waste.

Key categories for CO_2 emissions from fuel combustion in 2017

IPCC source category	CO_2 emissions ($MtCO_2$)	1990 CO_2 emissions ($MtCO_2$)	Share in total GHG[3] (%)	Cumulative total (%)
Main activity prod. elec. and heat - coal	491.6	804.9	13.7	13.7
Main activity prod. elec. and heat - gas	372.4	504.8	10.4	24.0
Road - oil	325.5	276.6	9.0	33.1
Residential - gas	181.3	155.0	5.0	38.1
Manufacturing industries - coal	179.3	313.1	5.0	43.1
Unallocated autoproducers - gas	174.9	222.0	4.9	47.9
Manufacturing industries - gas	126.9	201.2	3.5	51.5
Unallocated autoproducers - coal	91.4	169.6	2.5	54.0
Other transport - gas	77.1	77.7	2.1	56.2
Memo: total CO_2 from fuel combustion	*2424.4*	*3927*	*67.4*	*67.4*

3. Percent calculated using the total GHG estimate excluding CO_2 emissions/removals from agriculture, forestry and other land use.

Non-Annex I Parties

Figure 1. CO_2 emissions by fuel

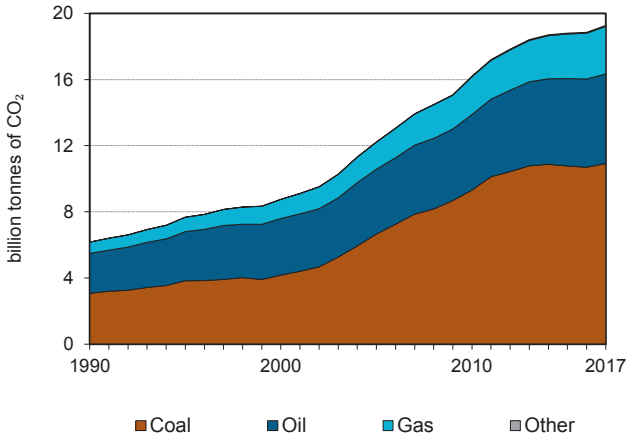


Figure 2. CO_2 emissions by sector

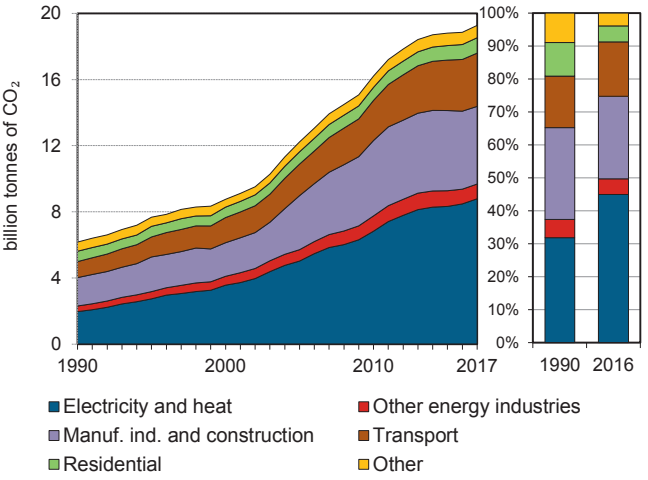


Figure 3. Electricity generation by fuel

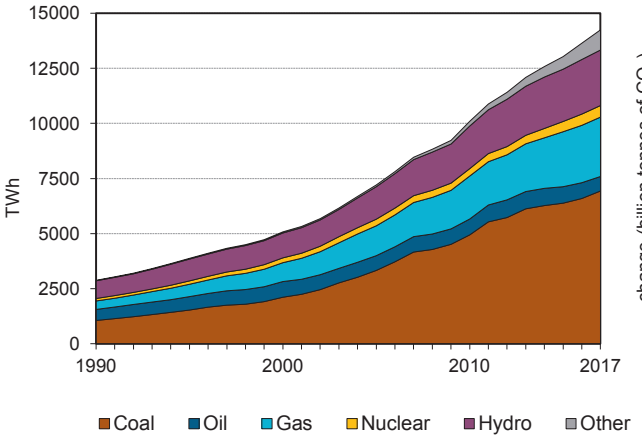


Figure 4. CO_2 from electricity generation: driving factors[1]

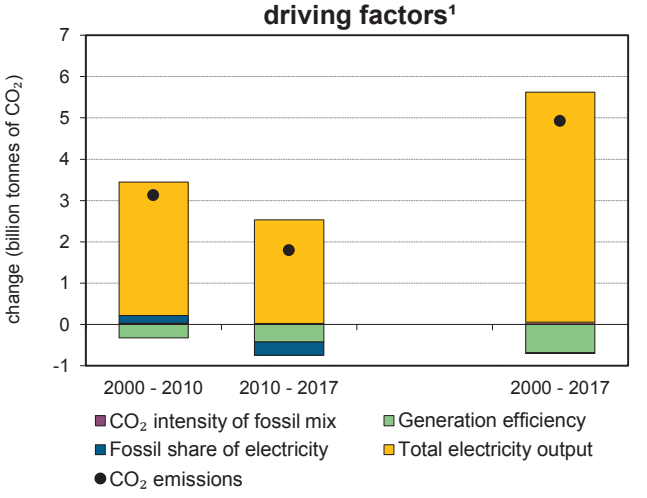


Figure 5. Changes in selected indicators

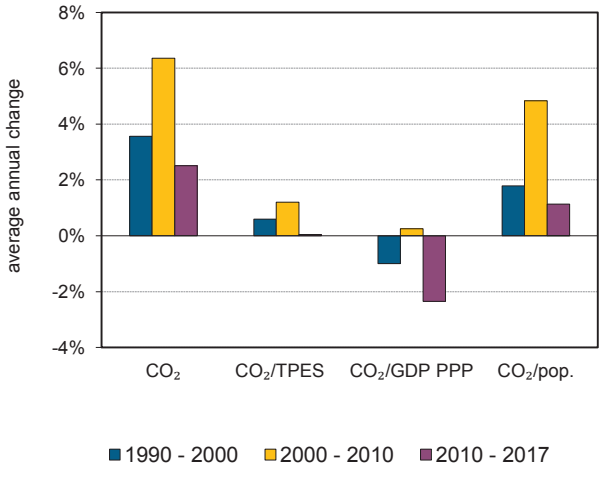
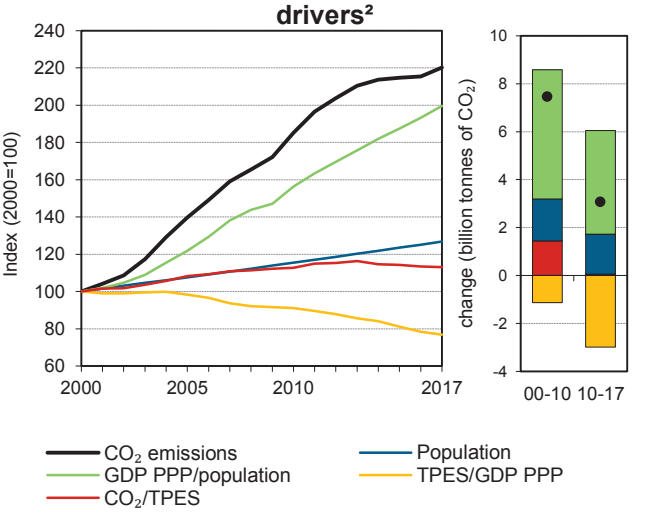


Figure 6. Total CO_2 emissions and drivers[2]



1. Electricity decomposition: CO_2 emissions = CO_2 intensity of fossil mix x fossil share of elec. x thermal efficiency x elec. output. See Chapter 6.
2. Kaya decomposition: CO_2 emissions = CO_2/TPES x TPES/GDP x GDP/population x population. See Chapter 6.

Non-Annex I Parties

Key indicators

	1990	1995	2000	2005	2010	2015	2017	%change 90-17
CO_2 fuel combustion ($MtCO_2$)	6170	7 677.1	8 756.3	12 226.4	16 210.9	18 808.4	19 275.3	212%
Share of World CO_2 from fuel combustion	30%	36%	38%	45%	53%	58%	59%	
TPES (PJ)	133161	156 243	178 010	229 453	292 382	334 762	346 503	160%
GDP (billion 2010 USD)	7930.1	9 997.6	12 404.9	16 049.0	21 831.3	27 642.7	29 903.8	277%
GDP PPP (billion 2010 USD)	15946.5	20 043.4	25 021.4	32 796.7	45 152.7	57 947.5	63 354.5	297%
Population (millions)	4108.9	4 503.5	4 884.8	5 257.7	5 639.0	6 034.3	6 194.5	51%
CO_2 / TPES (tCO_2 per TJ)	46.3	49.1	49.2	53.3	55.4	56.2	55.6	20%
CO_2 / GDP ($kgCO_2$ per 2010 USD)	0.78	0.8	0.7	0.8	0.7	0.7	0.6	-17%
CO_2 / GDP PPP ($kgCO_2$ per 2010 USD)	0.39	0.4	0.4	0.4	0.4	0.3	0.3	-21%
CO_2 / population (tCO_2 per capita)	1.5	1.7	1.8	2.3	2.9	3.1	3.1	107%
Share of electricity output from fossil fuels	68%	70%	73%	74%	76%	74%	72%	
CO_2 / kWh of electricity (gCO_2/kWh)	625	659	651	652	636	599	578	-8%
CO_2 emissions and drivers - Kaya decomposition (1990=100) [1]								
CO_2 emissions index	100	124	142	198	263	305	312	212%
Population index	100	110	119	128	137	147	151	51%
GDP PPP per population index	100	115	132	161	206	247	264	164%
Energy intensity index - TPES / GDP PPP	100	93	85	84	78	69	65	-35%
Carbon intensity index - CO_2 / TPES	100	106	106	115	120	121	120	20%

1. Please see the chapter *Indicator sources and methods* for methodological notes. Based on GDP in 2010 USD, using purchasing power parities.

2017 CO_2 emissions by sector

million tonnes of CO_2	Coal	Oil	Natural gas	Other [2]	Total	%change 90-17
CO_2 fuel combustion	**10 921.7**	**5 414.7**	**2 878.4**	**60.5**	**19 275.3**	**212%**
Electricity and heat generation	6 837.9	558.0	1 351.3	42.7	8 789.9	347%
Other energy industry own use	251.4	277.8	362.0	x	891.2	162%
Manufacturing industries and construction	3 315.9	724.2	640.9	15.5	4 696.5	173%
Transport	0.2	3 111.8	109.1	x	3 221.1	233%
of which: road	*x*	*2 830.6*	*94.9*	*x*	*2 925.5*	*244%*
Other	516.3	742.8	415.0	2.4	1 676.5	42%
of which: residential	*244.8*	*379.9*	*304.7*	*x*	*929.4*	*48%*
of which: services	*106.3*	*109.6*	*99.1*	*2.4*	*317.4*	*133%*
Memo: international marine bunkers	*x*	*424.0*	*x*	*x*	*424.0*	*215%*
Memo: international aviation bunkers	*x*	*282.8*	*x*	*x*	*282.8*	*225%*

2. Other includes industrial waste and non-renewable municipal waste.

Key categories for CO_2 emissions from fuel combustion in 2017

IPCC source category	CO_2 emissions ($MtCO_2$)	1990 CO_2 emissions ($MtCO_2$)	Share in total GHG[3] (%)	Cumulative total (%)
Main activity prod. elec. and heat - coal	6267.9	1211.1	19.8	19.8
Manufacturing industries - coal	3315.9	1114.9	10.5	30.2
Road - oil	2830.6	849.8	8.9	39.2
Main activity prod. elec. and heat - gas	1139.4	221.0	3.6	42.8
Manufacturing industries - oil	724.2	435.3	2.3	45.1
Manufacturing industries - gas	640.9	165.6	2.0	47.1
Unallocated autoproducers - coal	570.0	60.3	1.8	48.9
Main activity prod. elec. and heat - oil	448.8	403.4	1.4	50.3
Residential - oil	379.9	205.7	1.2	51.5
Memo: total CO_2 from fuel combustion	*19275.3*	*6170*	*60.8*	*60.8*

3. Percent calculated using the total GHG estimate excluding CO_2 emissions/removals from agriculture, forestry and other land use.

Annex B Kyoto Parties

Figure 1. CO_2 emissions by fuel

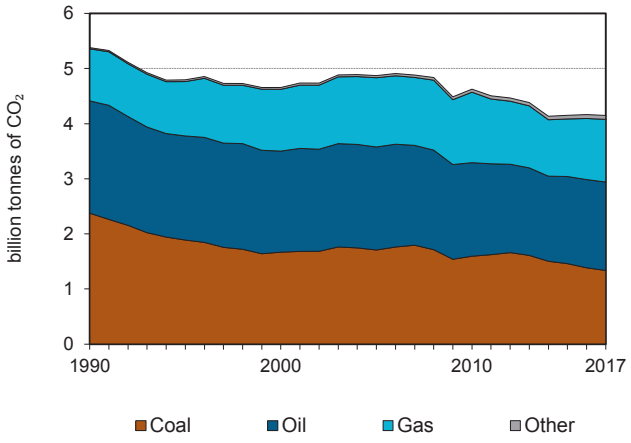


Figure 2. CO_2 emissions by sector

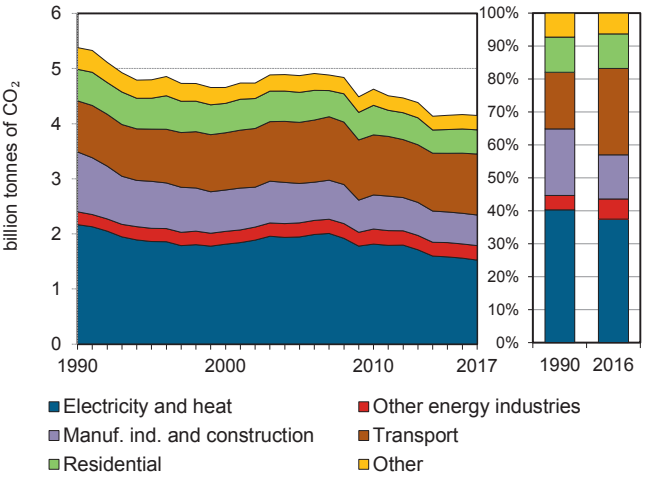


Figure 3. Electricity generation by fuel

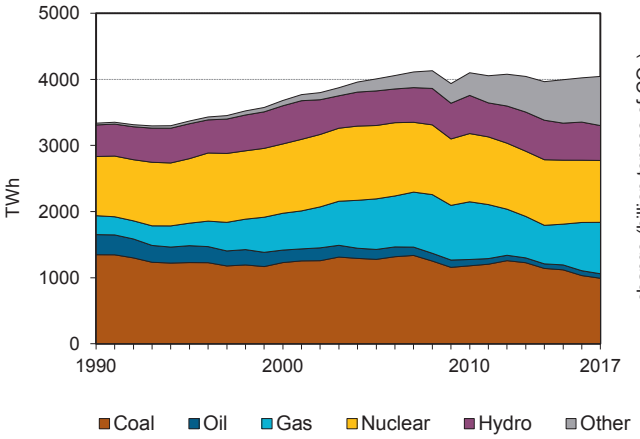


Figure 4. CO_2 from electricity generation: driving factors[1]

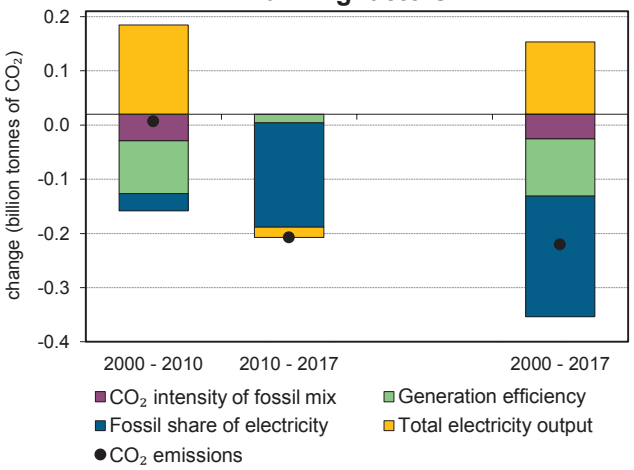


Figure 5. Changes in selected indicators

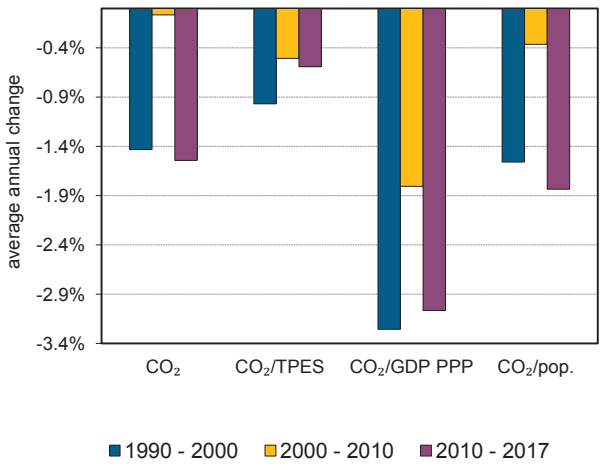
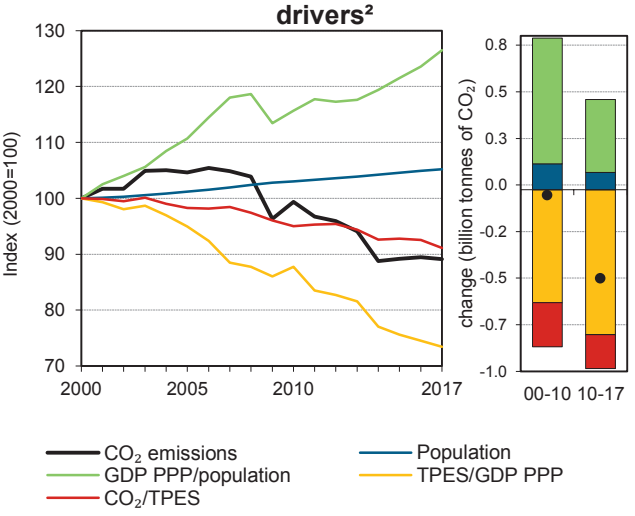


Figure 6. Total CO_2 emissions and drivers[2]



1. Electricity decomposition: CO_2 emissions = CO_2 intensity of fossil mix x fossil share of elec. x thermal efficiency x elec. output. See Chapter 6.
2. Kaya decomposition: CO_2 emissions = CO_2/TPES x TPES/GDP x GDP/population x population. See Chapter 6.

Annex B Kyoto Parties

Key indicators

	1990	1995	2000	2005	2010	2015	2017	%change 90-17
CO_2 fuel combustion ($MtCO_2$)	5379.7	4 795.7	4 656.2	4 871.6	4 625.9	4 151.1	4 149.1	-23%
Share of World CO_2 from fuel combustion	26%	22%	20%	18%	15%	13%	13%	
TPES (PJ)	90017	85 021	85 873	91 397	89 781	82 496	83 952	-7%
GDP (billion 2010 USD)	13537.5	14 493.8	16 785.3	18 613.4	19 678.4	20 988.2	21 941.1	62%
GDP PPP (billion 2010 USD)	13419.9	13 997.1	16 161.7	18 110.3	19 258.8	20 533.4	21 507.7	60%
Population (millions)	585	590.8	592.5	599.7	610.5	619.6	623.4	7%
CO_2 / TPES (tCO_2 per TJ)	59.8	56.4	54.2	53.3	51.5	50.3	49.4	-17%
CO_2 / GDP ($kgCO_2$ per 2010 USD)	0.4	0.3	0.3	0.3	0.2	0.2	0.2	-52%
CO_2 / GDP PPP ($kgCO_2$ per 2010 USD)	0.4	0.3	0.3	0.3	0.2	0.2	0.2	-52%
CO_2 / population (tCO_2 per capita)	9.2	8.1	7.9	8.1	7.6	6.7	6.7	-28%
Share of electricity output from fossil fuels	58%	54%	54%	55%	53%	46%	46%	
CO_2 / kWh of electricity (gCO_2/kWh)	508	458	417	408	370	336	318	-37%
CO_2 emissions and drivers - Kaya decomposition (1990=100) [1]								
CO_2 emissions index	100	89	87	91	86	77	77	-23%
Population index	100	101	101	103	104	106	107	7%
GDP PPP per population index	100	103	119	132	138	144	150	50%
Energy intensity index - TPES / GDP PPP	100	91	79	75	69	60	58	-42%
Carbon intensity index - CO_2 / TPES	100	94	91	89	86	84	83	-17%

1. Please see the chapter *Indicator sources and methods* for methodological notes. Based on GDP in 2010 USD, using purchasing power parities.

2017 CO_2 emissions by sector

million tonnes of CO_2	Coal	Oil	Natural gas	Other [2]	Total	%change 90-17
CO_2 fuel combustion	**1 336.7**	**1 603.6**	**1 137.9**	**70.8**	**4 149.1**	**-23%**
Electricity and heat generation	1 041.8	57.5	377.9	47.1	1 524.3	-30%
Other energy industry own use	42.0	106.2	114.9	0.3	263.4	13%
Manufacturing industries and construction	192.5	115.0	225.7	21.9	555.0	-49%
Transport	0.1	1 092.0	13.9	-	1 106.1	19%
of which: road	-	*1 030.5*	*4.3*	-	*1 034.8*	21%
Other	60.3	232.9	405.5	1.5	700.2	-28%
of which: residential	*48.5*	*110.4*	*280.1*	*0.0*	*439.0*	-23%
of which: services	*7.1*	*56.9*	*114.6*	*1.5*	*180.0*	-18%
Memo: international marine bunkers	-	*144.2*	*0.1*	-	*144.3*	*23%*
Memo: international aviation bunkers	-	*175.8*	-	-	*175.8*	*95%*

2. Other includes industrial waste and non-renewable municipal waste.

Key categories for CO_2 emissions from fuel combustion in 2017

IPCC source category	CO_2 emissions ($MtCO_2$)	1990 CO_2 emissions ($MtCO_2$)	Share in total GHG[3] (%)	Cumulative total (%)
Road - oil	1030.5	852.7	17.5	17.5
Main activity prod. elec. and heat - coal	980.9	1374.6	16.7	34.2
Main activity prod. elec. and heat - gas	302.2	226.7	5.1	39.4
Residential - gas	280.1	208.1	4.8	44.1
Manufacturing industries - gas	225.7	300.2	3.8	48.0
Manufacturing industries - coal	192.5	520.4	3.3	51.2
Non-specified other - gas	125.5	110.6	2.1	53.4
Non-specified other - oil	122.4	202.5	2.1	55.4
Manufacturing industries - oil	115.0	259.5	2.0	57.4
Memo: total CO_2 from fuel combustion	*4149.1*	*5379.7*	*70.6*	*70.6*

3. Percent calculated using the total GHG estimate excluding CO_2 emissions/removals from agriculture, forestry and other land use.

UN REGIONS

Africa

Figure 1. CO_2 emissions by fuel

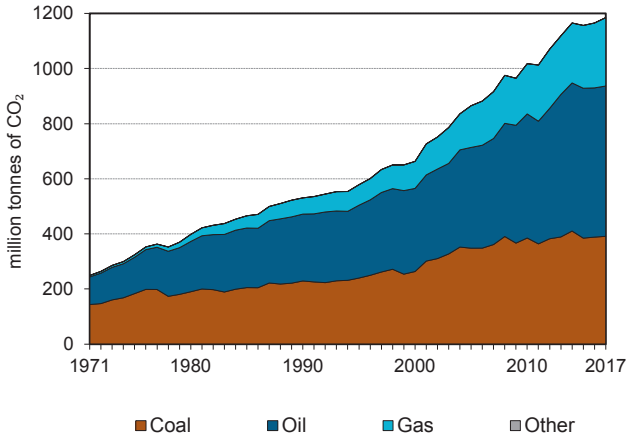
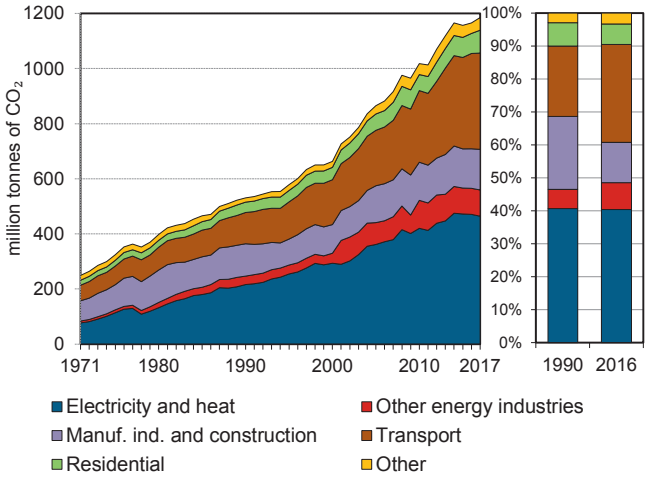


Figure 2. CO_2 emissions by sector



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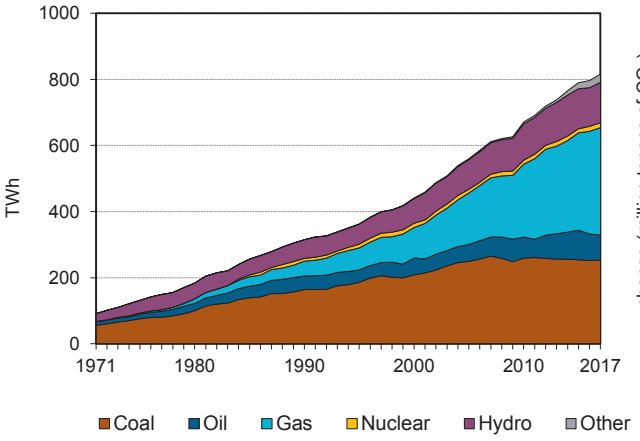

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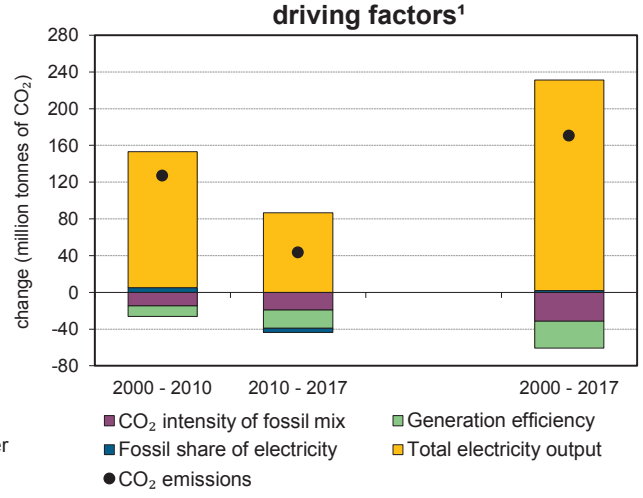

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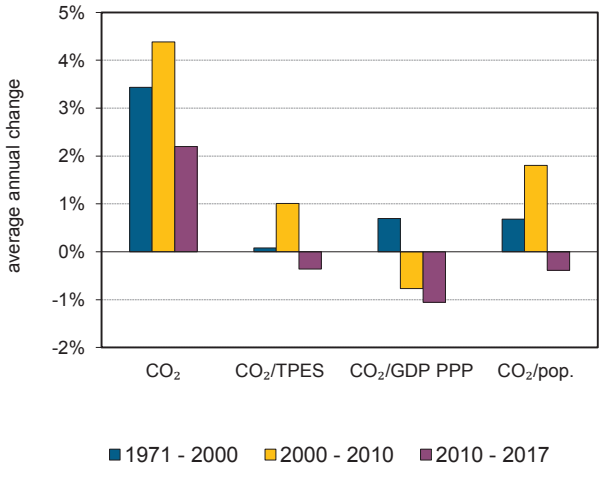
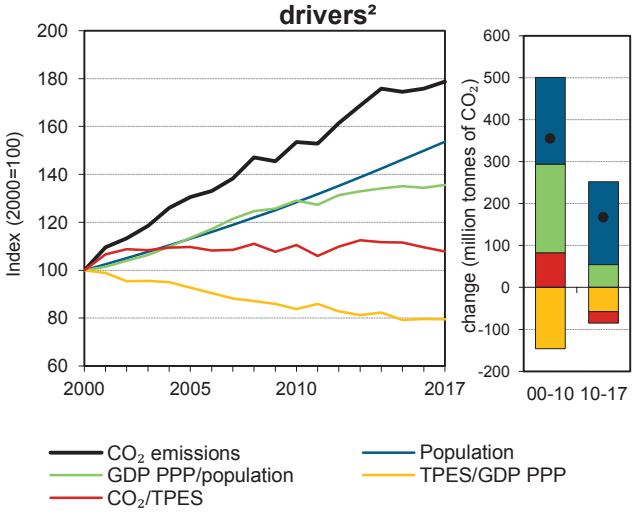


Figure 6. Total CO_2 emissions and drivers[2]



1. Electricity decomposition: CO_2 emissions = CO_2 intensity of fossil mix x fossil share of elec. x thermal efficiency x elec. output. See Chapter 6.
2. Kaya decomposition: CO_2 emissions = CO_2/TPES x TPES/GDP x GDP/population x population. See Chapter 6.

Africa

Key indicators

	1990	1995	2000	2005	2010	2015	2017	%change 90-17
CO_2 fuel combustion ($MtCO_2$)	530.6	578.4	663.0	865.2	1 017.9	1 156.7	1 185.1	123%
Share of World CO_2 from fuel combustion	3%	3%	3%	3%	3%	4%	4%	
TPES (PJ)	16136	18 301	20 505	24 400	28 475	32 052	33 997	111%
GDP (billion 2010 USD)	940.5	987.8	1 180.5	1 519.8	1 948.6	2 323.1	2 430.1	158%
GDP PPP (billion 2010 USD)	2140.4	2 270.4	2 739.2	3 516.2	4 536.9	5 404.7	5 707.8	167%
Population (millions)	630.5	721.9	816.4	923.3	1 047.9	1 192.7	1 254.6	99%
CO_2 / TPES (tCO_2 per TJ)	32.9	31.6	32.3	35.5	35.7	36.1	34.9	6%
CO_2 / GDP ($kgCO_2$ per 2010 USD)	0.56	0.6	0.6	0.6	0.5	0.5	0.5	-13%
CO_2 / GDP PPP ($kgCO_2$ per 2010 USD)	0.25	0.3	0.2	0.2	0.2	0.2	0.2	-16%
CO_2 / population (tCO_2 per capita)	0.8	0.8	0.8	0.9	1.0	1.0	0.9	12%
Share of electricity output from fossil fuels	79%	80%	80%	82%	81%	81%	80%	
CO_2 / kWh of electricity (gCO_2/kWh)	684	702	665	645	626	597	568	-17%
CO_2 emissions and drivers - Kaya decomposition (1990=100) [1]								
CO_2 emissions index	100	109	125	163	192	218	223	123%
Population index	100	114	129	146	166	189	199	99%
GDP PPP per population index	100	93	99	112	128	133	134	34%
Energy intensity index - TPES / GDP PPP	100	107	99	92	83	79	79	-21%
Carbon intensity index - CO_2 / TPES	100	96	98	108	109	110	106	6%

1. Please see the chapter *Indicator sources and methods* for methodological notes. Based on GDP in 2010 USD, using purchasing power parities.

2017 CO_2 emissions by sector

million tonnes of CO_2	Coal	Oil	Natural gas	Other [2]	Total	%change 90-17
CO_2 fuel combustion	**391.2**	**545.4**	**248.0**	**0.4**	**1 185.1**	**123%**
Electricity and heat generation	256.6	58.8	148.8	-	464.2	115%
Other energy industry own use	52.2	10.3	32.8	-	95.2	210%
Manufacturing industries and construction	48.1	60.5	38.2	0.4	147.3	25%
Transport	0.0	346.4	3.1	-	349.5	208%
of which: road	-	*335.9*	*0.8*	-	*336.6*	214%
Other	34.4	69.3	25.2	-	128.9	143%
of which: residential	*21.2*	*39.3*	*22.5*	-	*82.9*	121%
of which: services	*10.5*	*4.8*	*1.0*	-	*16.4*	191%
Memo: international marine bunkers	-	*14.8*	-	-	*14.8*	*-8%*
Memo: international aviation bunkers	-	*26.1*	-	-	*26.1*	*138%*

2. Other includes industrial waste and non-renewable municipal waste.

Key categories for CO_2 emissions from fuel combustion in 2017

IPCC source category	CO_2 emissions ($MtCO_2$)	1990 CO_2 emissions ($MtCO_2$)	Share in total GHG[3] (%)	Cumulative total (%)
Road - oil	335.9	107.3	10.4	10.4
Main activity prod. elec. and heat - coal	241.8	145.8	7.5	17.9
Main activity prod. elec. and heat - gas	141.2	25.1	4.4	22.3
Manufacturing industries - oil	60.5	45.0	1.9	24.2
Main activity prod. elec. and heat - oil	56.2	32.3	1.7	25.9
Other energy industry - coal	52.2	0.2	1.6	27.5
Manufacturing industries - coal	48.1	61.5	1.5	29.0
Residential - oil	39.3	28.6	1.2	30.2
Manufacturing industries - gas	38.2	10.8	1.2	31.4
Memo: total CO_2 from fuel combustion	*1185.1*	*530.6*	*36.8*	*36.8*

3. Percent calculated using the total GHG estimate excluding CO_2 emissions/removals from agriculture, forestry and other land use.

Americas

Figure 1. CO_2 emissions by fuel

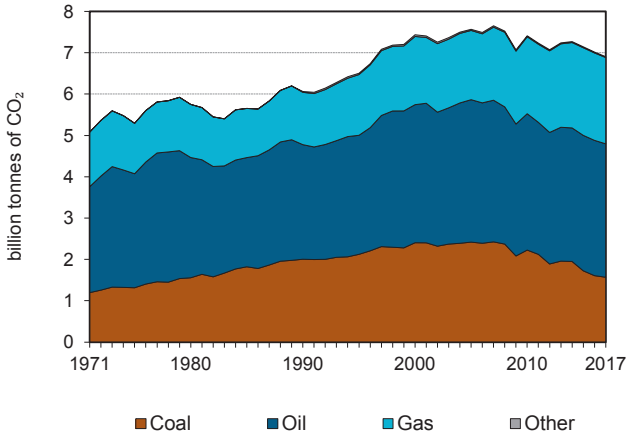


Figure 2. CO_2 emissions by sector

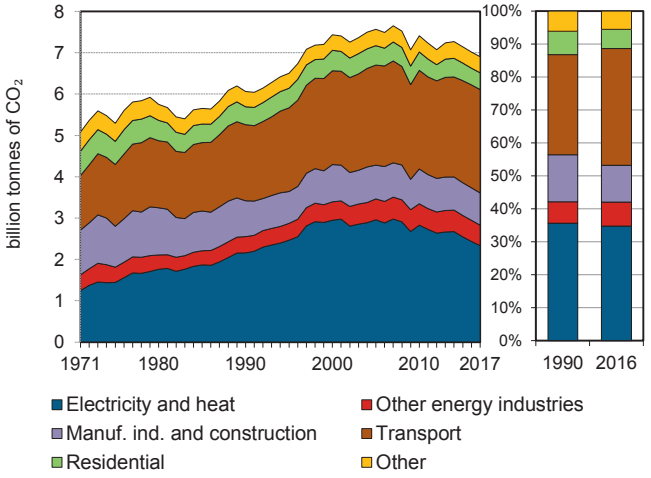


Figure 3. Electricity generation by fuel

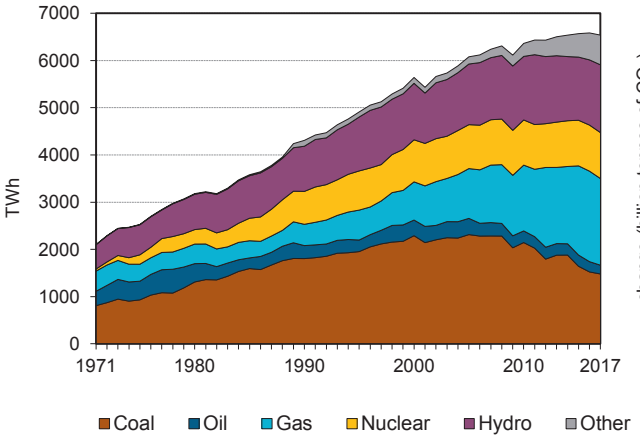


Figure 4. CO_2 from electricity generation: driving factors[1]

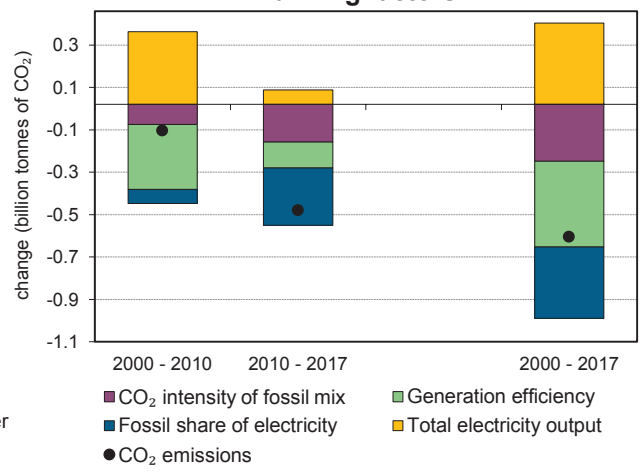


Figure 5. Changes in selected indicators

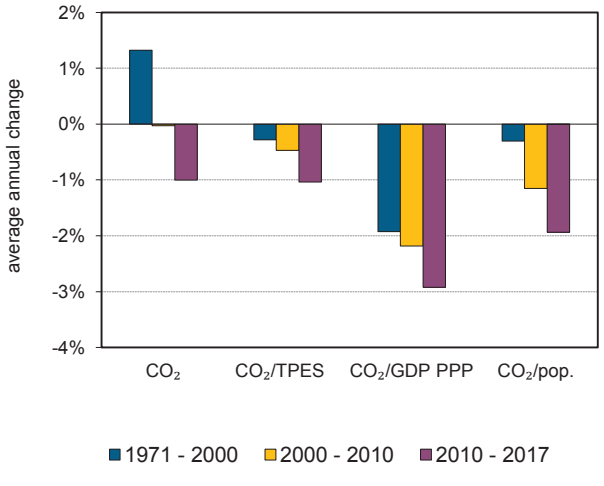
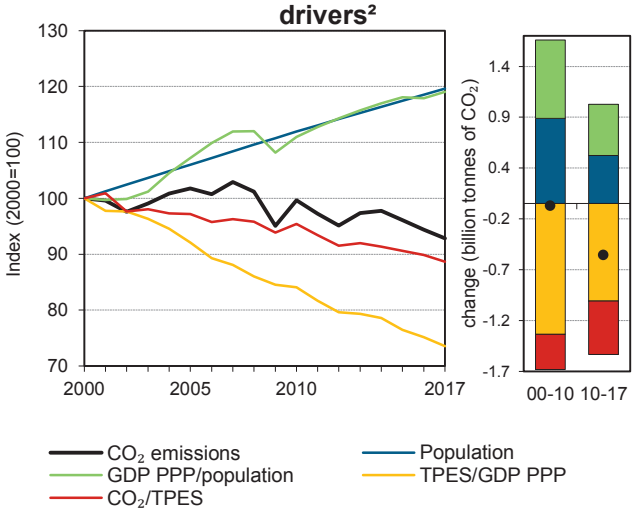


Figure 6. Total CO_2 emissions and drivers[2]



1. Electricity decomposition: CO_2 emissions = CO_2 intensity of fossil mix x fossil share of elec. x thermal efficiency x elec. output. See Chapter 6.
2. Kaya decomposition: CO_2 emissions = CO_2/TPES x TPES/GDP x GDP/population x population. See Chapter 6.

Americas

Key indicators

	1990	1995	2000	2005	2010	2015	2017	%change 90-17
CO_2 fuel combustion ($MtCO_2$)	6062.7	6 504.2	7 435.3	7 567.7	7 411.5	7 144.1	6 905.2	14%
Share of World CO_2 from fuel combustion	30%	30%	32%	28%	24%	22%	21%	
TPES (PJ)	108468	118 121	130 916	137 113	136 772	138 844	137 096	26%
GDP (billion 2010 USD)	12901	14 706.4	17 876.5	20 315.2	21 950.3	24 437.5	25 108.0	95%
GDP PPP (billion 2010 USD)	14178.5	16 193.8	19 620.5	22 305.1	24 371.3	27 216.0	27 938.4	97%
Population (millions)	724.5	782.3	837.2	887.5	937.1	983.3	1 001.3	38%
CO_2 / TPES (tCO_2 per TJ)	55.9	55.1	56.8	55.2	54.2	51.5	50.4	-10%
CO_2 / GDP ($kgCO_2$ per 2010 USD)	0.47	0.4	0.4	0.4	0.3	0.3	0.3	-41%
CO_2 / GDP PPP ($kgCO_2$ per 2010 USD)	0.43	0.4	0.4	0.3	0.3	0.3	0.2	-42%
CO_2 / population (tCO_2 per capita)	8.4	8.3	8.9	8.5	7.9	7.3	6.9	-18%
Share of electricity output from fossil fuels	59%	58%	61%	61%	60%	58%	54%	
CO_2 / kWh of electricity (gCO_2/kWh)	500	496	518	483	439	384	353	-30%
CO_2 emissions and drivers - Kaya decomposition (1990=100) [1]								
CO_2 emissions index	100	107	123	125	122	118	114	14%
Population index	100	108	116	122	129	136	138	38%
GDP PPP per population index	100	106	120	128	133	141	143	43%
Energy intensity index - TPES / GDP PPP	100	95	87	80	73	67	64	-36%
Carbon intensity index - CO_2 / TPES	100	99	102	99	97	92	90	-10%

1. Please see the chapter *Indicator sources and methods* for methodological notes. Based on GDP in 2010 USD, using purchasing power parities.

2017 CO_2 emissions by sector

million tonnes of CO_2	Coal	Oil	Natural gas	Other [2]	Total	%change 90-17
CO_2 fuel combustion	**1 569.6**	**3 227.0**	**2 088.2**	**20.3**	**6 905.2**	**14%**
Electricity and heat generation	1 399.7	131.2	786.6	16.1	2 333.6	8%
Other energy industry own use	15.8	186.5	293.7	-	495.9	26%
Manufacturing industries and construction	151.6	203.6	421.8	3.3	780.3	-10%
Transport	-	2 432.9	67.3	-	2 500.2	36%
of which: road	-	*2 141.2*	*16.1*	-	*2 157.3*	43%
Other	2.6	272.9	518.8	0.8	795.1	-1%
of which: residential	*0.3*	*101.3*	*304.6*	-	*406.1*	-6%
of which: services	*2.3*	*59.8*	*206.9*	*0.8*	*269.8*	2%
Memo: international marine bunkers	-	*121.7*	-	-	*121.7*	*6%*
Memo: international aviation bunkers	-	*117.2*	-	-	*117.2*	*107%*

2. Other includes industrial waste and non-renewable municipal waste.

Key categories for CO_2 emissions from fuel combustion in 2017

IPCC source category	CO_2 emissions ($MtCO_2$)	1990 CO_2 emissions ($MtCO_2$)	Share in total GHG[3] (%)	Cumulative total (%)
Road - oil	2141.2	1511.7	20.5	20.5
Main activity prod. elec. and heat - coal	1373.2	1663.5	13.1	33.6
Main activity prod. elec. and heat - gas	695.9	188.7	6.7	40.2
Manufacturing industries - gas	421.8	354.7	4.0	44.3
Residential - gas	304.6	279.4	2.9	47.2
Other energy industry own use - gas	293.7	166.8	2.8	50.0
Other transport - oil	291.7	285.5	2.8	52.8
Non-specified other - gas	214.2	169.2	2.0	54.8
Manufacturing industries - oil	203.6	249.8	1.9	56.8
Memo: total CO_2 from fuel combustion	*6905.2*	*6062.7*	*66.0*	*66.0*

3. Percent calculated using the total GHG estimate excluding CO_2 emissions/removals from agriculture, forestry and other land use.

Asia

Figure 1. CO_2 emissions by fuel

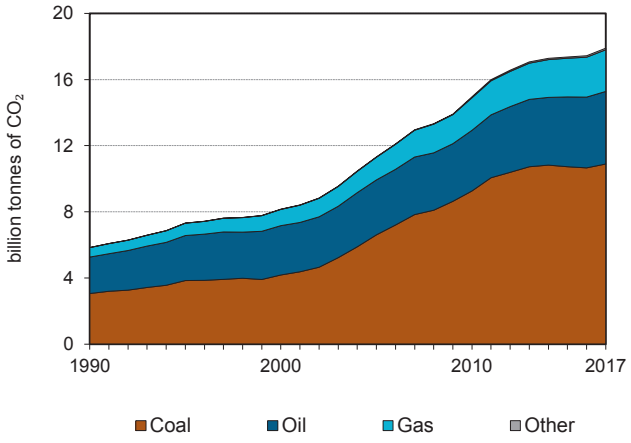


Figure 2. CO_2 emissions by sector

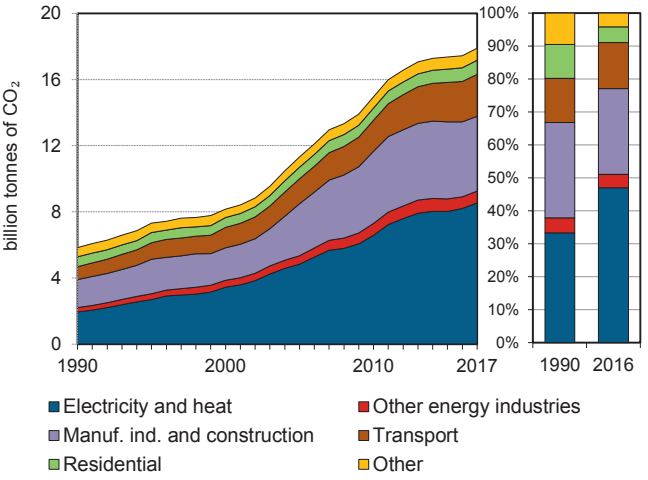


Figure 3. Electricity generation by fuel

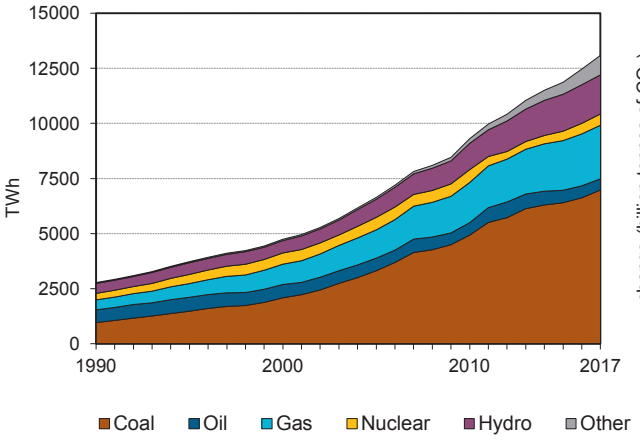


Figure 4. CO_2 from electricity generation: driving factors[1]

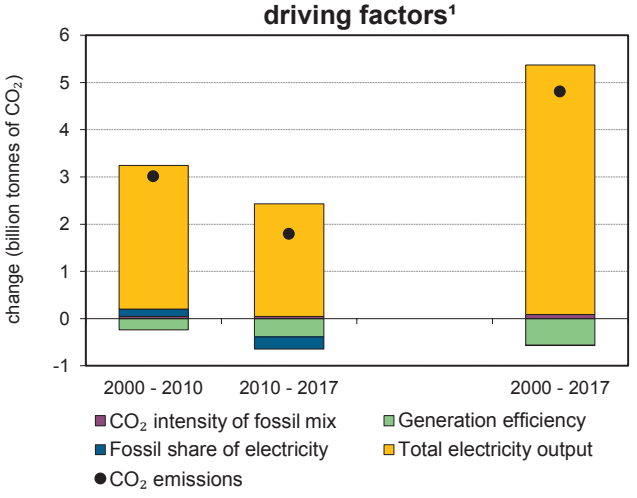


Figure 5. Changes in selected indicators

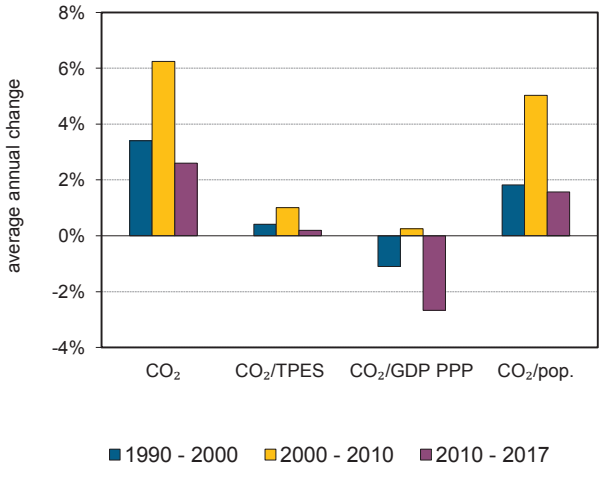
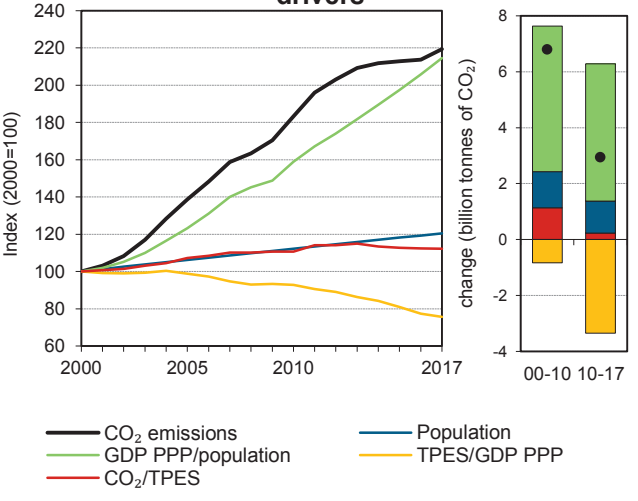


Figure 6. Total CO_2 emissions and drivers[2]



1. Electricity decomposition: CO_2 emissions = CO_2 intensity of fossil mix x fossil share of elec. x thermal efficiency x elec. output. See Chapter 6.
2. Kaya decomposition: CO_2 emissions = CO_2/TPES x TPES/GDP x GDP/population x population. See Chapter 6.

Asia

Key indicators

	1990	1995	2000	2005	2010	2015	2017	%change 90-17
CO_2 fuel combustion ($MtCO_2$)	5838.1	7 318.5	8 159.7	11 320.5	14 956.4	17 364.8	17 896.1	207%
Share of World CO_2 from fuel combustion	28%	34%	35%	42%	49%	54%	54%	
TPES (PJ)	107672	128 525	144 462	186 874	239 382	272 626	282 489	162%
GDP (billion 2010 USD)	9092.5	11 042.0	13 095.4	16 282.5	20 853.2	26 280.3	28 736.0	216%
GDP PPP (billion 2010 USD)	13593.3	17 240.7	21 273.2	27 851.3	37 972.2	49 608.4	54 976.0	304%
Population (millions)	3154	3 427.1	3 678.3	3 907.7	4 130.4	4 345.8	4 431.0	40%
CO_2 / TPES (tCO_2 per TJ)	54.2	56.9	56.5	60.6	62.5	63.7	63.4	17%
CO_2 / GDP ($kgCO_2$ per 2010 USD)	0.64	0.7	0.6	0.7	0.7	0.7	0.6	-3%
CO_2 / GDP PPP ($kgCO_2$ per 2010 USD)	0.43	0.4	0.4	0.4	0.4	0.4	0.3	-24%
CO_2 / population (tCO_2 per capita)	1.9	2.1	2.2	2.9	3.6	4.0	4.0	118%
Share of electricity output from fossil fuels	72%	73%	76%	78%	79%	78%	76%	
CO_2 / kWh of electricity (gCO_2/kWh)	642	674	670	679	663	632	610	-5%
CO_2 emissions and drivers - Kaya decomposition (1990=100) [1]								
CO_2 emissions index	100	125	140	194	256	297	307	207%
Population index	100	109	117	124	131	138	140	40%
GDP PPP per population index	100	117	134	165	213	265	288	188%
Energy intensity index - TPES / GDP PPP	100	94	86	85	80	69	65	-35%
Carbon intensity index - CO_2 / TPES	100	105	104	112	115	117	117	17%

1. Please see the chapter *Indicator sources and methods* for methodological notes. Based on GDP in 2010 USD, using purchasing power parities.

2017 CO_2 emissions by sector

million tonnes of CO_2	Coal	Oil	Natural gas	Other [2]	Total	%change 90-17
CO_2 fuel combustion	**10 893.4**	**4 387.3**	**2 519.8**	**95.5**	**17 896.1**	**207%**
Electricity and heat generation	6 839.8	441.3	1 192.7	66.6	8 540.4	340%
Other energy industry own use	215.4	245.4	251.2	-	712.0	164%
Manufacturing industries and construction	3 335.4	612.6	556.7	21.3	4 526.0	168%
Transport	0.1	2 443.2	90.3	-	2 533.7	224%
of which: road	-	*2 178.5*	*81.1*	-	*2 259.7*	237%
Other	502.6	644.8	428.9	7.7	1 584.1	37%
of which: residential	*229.6*	*324.1*	*301.2*	-	*854.9*	43%
of which: services	*110.4*	*124.7*	*119.8*	*4.4*	*359.4*	99%
Memo: international marine bunkers	-	*365.9*	-	-	*365.9*	*230%*
Memo: international aviation bunkers	-	*247.0*	-	-	*247.0*	*230%*

2. Other includes industrial waste and non-renewable municipal waste.

Key categories for CO_2 emissions from fuel combustion in 2017

IPCC source category	CO_2 emissions ($MtCO_2$)	1990 CO_2 emissions ($MtCO_2$)	Share in total GHG[3] (%)	Cumulative total (%)
Main activity prod. elec. and heat - coal	6263.1	1113.0	23.4	23.4
Manufacturing industries - coal	3335.4	1167.4	12.5	35.9
Road - oil	2178.5	670.3	8.1	44.0
Main activity prod. elec. and heat - gas	1019.8	240.2	3.8	47.9
Manufacturing industries - oil	612.6	414.9	2.3	50.2
Unallocated autoproducers - coal	576.7	85.8	2.2	52.3
Manufacturing industries - gas	556.7	105.2	2.1	54.4
Main activity prod. elec. and heat - oil	342.9	418.1	1.3	55.7
Residential - oil	324.1	170.9	1.2	56.9
Memo: total CO_2 from fuel combustion	*17896.1*	*5838.1*	*66.9*	*66.9*

3. Percent calculated using the total GHG estimate excluding CO_2 emissions/removals from agriculture, forestry and other land use.

Europe

Figure 1. CO_2 emissions by fuel

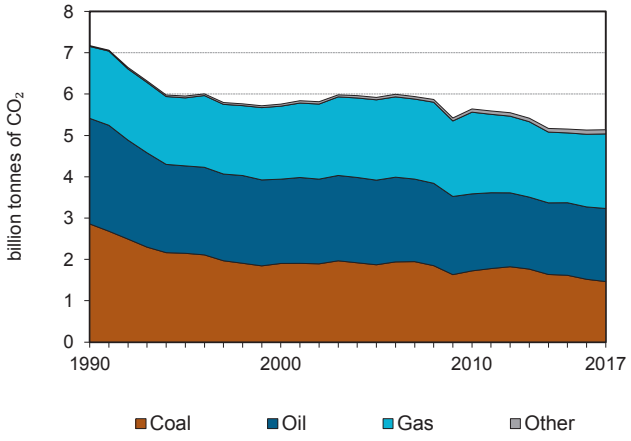


Figure 2. CO_2 emissions by sector

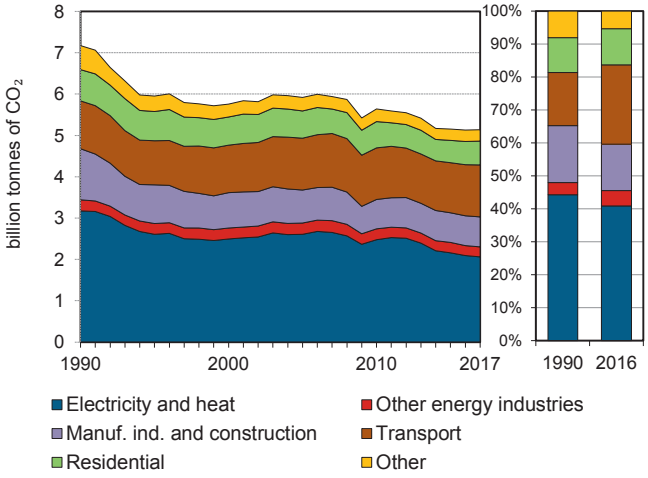


Figure 3. Electricity generation by fuel

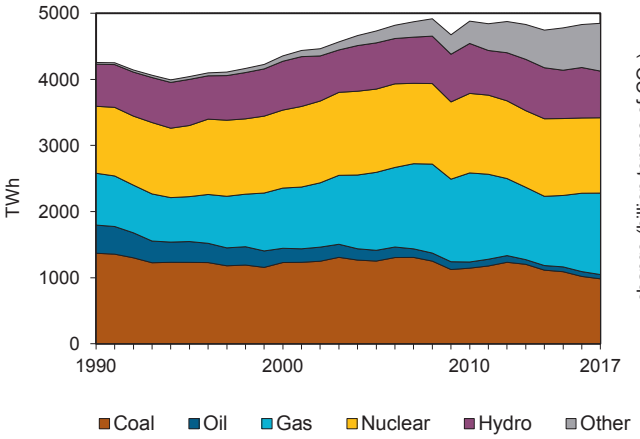


Figure 4. CO_2 from electricity generation: driving factors[1]

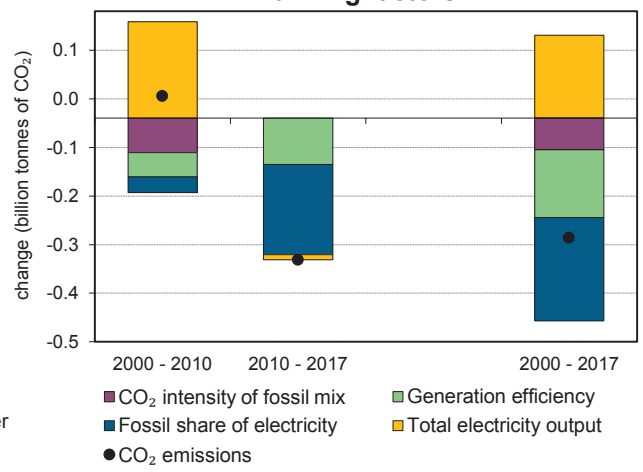


Figure 5. Changes in selected indicators

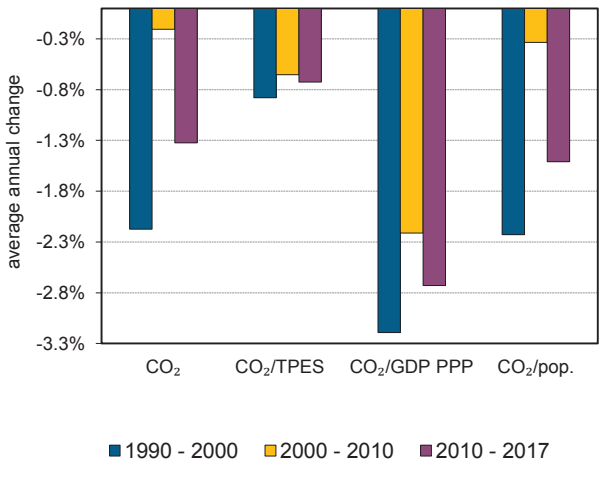
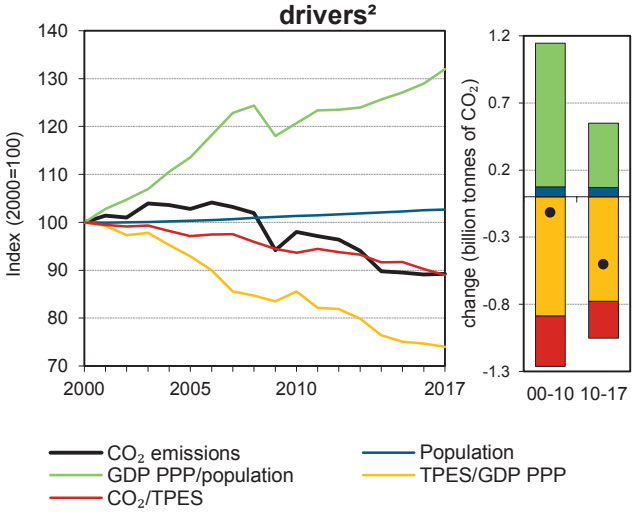


Figure 6. Total CO_2 emissions and drivers[2]



1. Electricity decomposition: CO_2 emissions = CO_2 intensity of fossil mix x fossil share of elec. x thermal efficiency x elec. output. See Chapter 6.
2. Kaya decomposition: CO_2 emissions = CO_2/TPES x TPES/GDP x GDP/population x population. See Chapter 6.

Europe

Key indicators

	1990	1995	2000	2005	2010	2015	2017	%change 90-17
CO_2 fuel combustion ($MtCO_2$)	7173.3	5 953.2	5 757.9	5 919.8	5 641.2	5 154.0	5 138.1	-28%
Share of World CO_2 from fuel combustion	35%	28%	25%	22%	18%	16%	16%	
TPES (PJ)	121839	106 543	106 822	113 082	111 751	104 230	107 108	-12%
GDP (billion 2010 USD)	14220.3	14 550.2	16 752.4	18 710.9	19 825.0	21 042.6	21 933.0	54%
GDP PPP (billion 2010 USD)	15541.9	15 062.7	17 259.0	19 665.6	21 105.6	22 428.6	23 377.7	50%
Population (millions)	722.6	727.5	726.6	729.2	736.1	743.0	746.0	3%
CO_2 / TPES (tCO_2 per TJ)	58.9	55.9	53.9	52.3	50.5	49.4	48.0	-19%
CO_2 / GDP ($kgCO_2$ per 2010 USD)	0.5	0.4	0.3	0.3	0.3	0.2	0.2	-54%
CO_2 / GDP PPP ($kgCO_2$ per 2010 USD)	0.46	0.4	0.3	0.3	0.3	0.2	0.2	-52%
CO_2 / population (tCO_2 per capita)	9.9	8.2	7.9	8.1	7.7	6.9	6.9	-31%
Share of electricity output from fossil fuels	61%	55%	54%	55%	53%	48%	48%	
CO_2 / kWh of electricity (gCO_2/kWh)	475	425	394	395	361	329	303	-36%
CO_2 emissions and drivers - Kaya decomposition (1990=100) [1]								
CO_2 emissions index	100	83	80	83	79	72	72	-28%
Population index	100	101	101	101	102	103	103	3%
GDP PPP per population index	100	96	110	125	133	140	146	46%
Energy intensity index - TPES / GDP PPP	100	90	79	73	68	59	58	-42%
Carbon intensity index - CO_2 / TPES	100	95	92	89	86	84	81	-19%

1. Please see the chapter *Indicator sources and methods* for methodological notes. Based on GDP in 2010 USD, using purchasing power parities.

2017 CO_2 emissions by sector

million tonnes of CO_2	Coal	Oil	Natural gas	Other [2]	Total	%change 90-17
CO_2 fuel combustion	**1 464.5**	**1 768.7**	**1 803.9**	**101.0**	**5 138.1**	**-28%**
Electricity and heat generation	1 102.3	75.1	815.5	69.1	2 062.0	-35%
Other energy industry own use	38.6	122.2	79.6	1.2	241.6	-10%
Manufacturing industries and construction	262.7	137.8	297.0	28.2	725.6	-41%
Transport	0.1	1 172.6	84.2	-	1 256.9	9%
of which: road	-	*1 100.4*	*4.7*	-	*1 105.2*	16%
Other	60.8	260.9	527.7	2.5	851.9	-36%
of which: residential	*47.4*	*131.8*	*397.9*	*0.0*	*577.1*	-24%
of which: services	*8.7*	*60.7*	*115.8*	*2.2*	*187.4*	-41%
Memo: international marine bunkers	-	*191.3*	*0.1*	-	*191.4*	*52%*
Memo: international aviation bunkers	-	*176.9*	-	-	*176.9*	*61%*

2. Other includes industrial waste and non-renewable municipal waste.

Key categories for CO_2 emissions from fuel combustion in 2017

IPCC source category	CO_2 emissions ($MtCO_2$)	1990 CO_2 emissions ($MtCO_2$)	Share in total GHG[3] (%)	Cumulative total (%)
Road - oil	1100.4	946.3	15.1	15.1
Main activity prod. elec. and heat - coal	964.1	1576.0	13.2	28.3
Main activity prod. elec. and heat - gas	587.1	571.0	8.1	36.4
Residential - gas	397.9	315.0	5.5	41.8
Manufacturing industries - gas	297.0	362.9	4.1	45.9
Manufacturing industries - coal	262.7	547.3	3.6	49.5
Unallocated autoproducers - gas	228.4	240.2	3.1	52.6
Unallocated autoproducers - coal	138.2	263.7	1.9	54.5
Manufacturing industries - oil	137.8	319.4	1.9	56.4
Memo: total CO_2 from fuel combustion	*5138.1*	*7173.3*	*70.5*	*70.5*

3. Percent calculated using the total GHG estimate excluding CO_2 emissions/removals from agriculture, forestry and other land use.

Oceania

Figure 1. CO_2 emissions by fuel

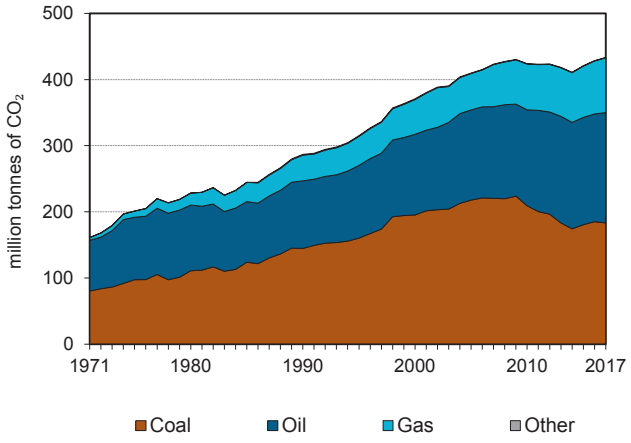


Figure 2. CO_2 emissions by sector

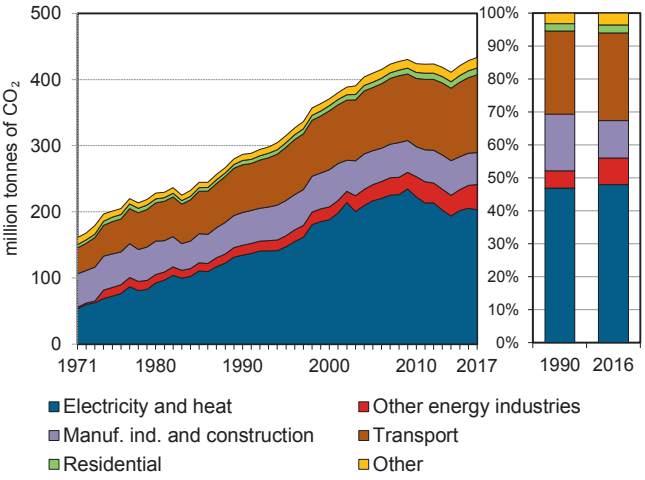


Figure 3. Electricity generation by fuel

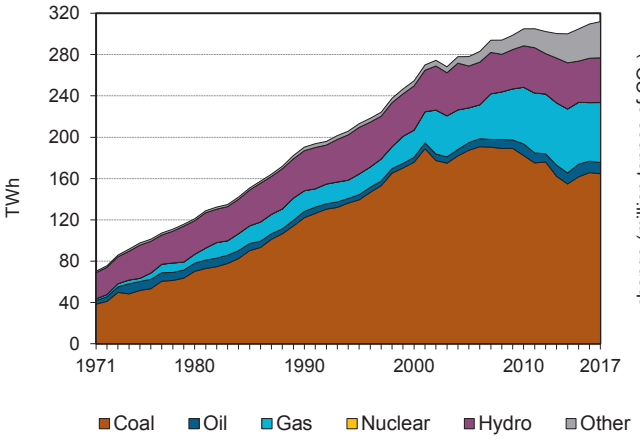


Figure 4. CO_2 from electricity generation: driving factors[1]

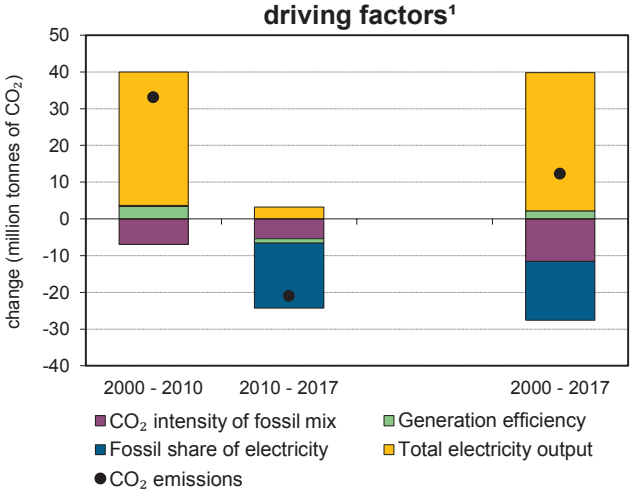


Figure 5. Changes in selected indicators

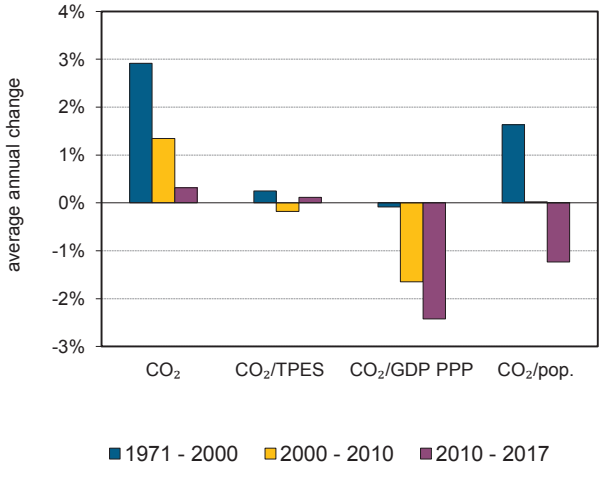
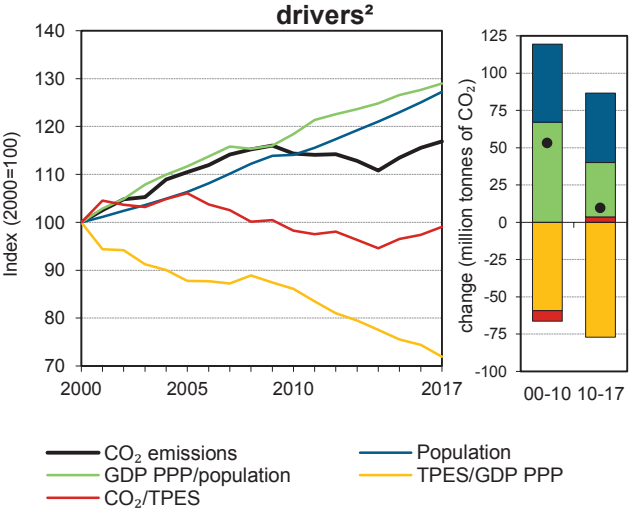


Figure 6. Total CO_2 emissions and drivers[2]



1. Electricity decomposition: CO_2 emissions = CO_2 intensity of fossil mix x fossil share of elec. x thermal efficiency x elec. output. See Chapter 6.
2. Kaya decomposition: CO_2 emissions = CO_2/TPES x TPES/GDP x GDP/population x population. See Chapter 6.

Oceania

Key indicators

	1990	1995	2000	2005	2010	2015	2017	%change 90-17
CO_2 fuel combustion ($MtCO_2$)	286.9	315.2	370.9	409.8	424.0	420.9	433.5	51%
Share of World CO_2 from fuel combustion	1%	1%	2%	2%	1%	1%	1%	
TPES (PJ)	4145	4 498	5 244	5 461	6 100	6 167	6 185	49%
GDP (billion 2010 USD)	758.1	887.9	1 069.5	1 268.3	1 446.0	1 665.4	1 754.7	131%
GDP PPP (billion 2010 USD)	566.9	663.9	798.8	948.0	1 079.2	1 243.1	1 310.1	131%
Population (millions)	20.7	21.9	23.1	24.6	26.4	28.5	29.4	42%
CO_2 / TPES (tCO_2 per TJ)	69.2	70.1	70.7	75.0	69.5	68.3	70.1	1%
CO_2 / GDP ($kgCO_2$ per 2010 USD)	0.38	0.4	0.3	0.3	0.3	0.3	0.2	-35%
CO_2 / GDP PPP ($kgCO_2$ per 2010 USD)	0.51	0.5	0.5	0.4	0.4	0.3	0.3	-35%
CO_2 / population (tCO_2 per capita)	13.9	14.4	16.0	16.7	16.1	14.8	14.7	6%
Share of electricity output from fossil fuels	78%	77%	81%	82%	81%	77%	75%	
CO_2 / kWh of electricity (gCO_2/kWh)	705	691	739	780	730	662	651	-8%
CO_2 emissions and drivers - Kaya decomposition (1990=100) [1]								
CO_2 emissions index	100	110	129	143	148	147	151	51%
Population index	100	106	112	119	128	138	142	42%
GDP PPP per population index	100	110	126	140	149	159	162	62%
Energy intensity index - TPES / GDP PPP	100	93	90	79	77	68	65	-35%
Carbon intensity index - CO_2 / TPES	100	101	102	108	100	99	101	1%

1. Please see the chapter *Indicator sources and methods* for methodological notes. Based on GDP in 2010 USD, using purchasing power parities.

2017 CO_2 emissions by sector

million tonnes of CO_2	Coal	Oil	Natural gas	Other [2]	Total	%change 90-17
CO_2 fuel combustion	**183.2**	**166.8**	**82.8**	**0.5**	**433.5**	**51%**
Electricity and heat generation	163.1	8.5	31.5	-	203.1	51%
Other energy industry own use	6.3	13.0	18.8	-	38.1	154%
Manufacturing industries and construction	13.4	14.9	19.5	0.5	48.3	-2%
Transport	-	116.7	0.9	-	117.6	63%
of which: road	-	*99.4*	*0.2*	-	*99.6*	56%
Other	0.4	13.6	12.3	-	26.3	68%
of which: residential	*0.0*	*1.6*	*8.7*	-	*10.3*	58%
of which: services	*0.1*	*3.1*	*3.4*	-	*6.6*	72%
Memo: international marine bunkers	-	*3.2*	-	-	*3.2*	*-6%*
Memo: international aviation bunkers	-	*17.7*	-	-	*17.7*	*187%*

2. Other includes industrial waste and non-renewable municipal waste.

Key categories for CO_2 emissions from fuel combustion in 2017

IPCC source category	CO_2 emissions ($MtCO_2$)	1990 CO_2 emissions ($MtCO_2$)	Share in total GHG[3] (%)	Cumulative total (%)
Main activity prod. elec. and heat - coal	161.5	115.5	22.8	22.8
Road - oil	99.4	63.7	14.0	36.8
Main activity prod. elec. and heat - gas	23.0	10.0	3.2	40.1
Manufacturing industries - gas	19.5	16.0	2.7	42.8
Other energy industry own use - gas	18.8	5.0	2.6	45.5
Other transport - oil	17.4	8.1	2.5	47.9
Manufacturing industries - oil	14.9	10.2	2.1	50.0
Manufacturing industries - coal	13.4	22.2	1.9	51.9
Other energy industry own use - oil	13.0	7.3	1.8	53.8
Memo: total CO_2 from fuel combustion	*433.5*	*286.9*	*61.2*	*61.2*

3. Percent calculated using the total GHG estimate excluding CO_2 emissions/removals from agriculture, forestry and other land use.

OTHER REGIONAL TOTALS

IEA and Accession/Association countries

Figure 1. CO_2 emissions by fuel

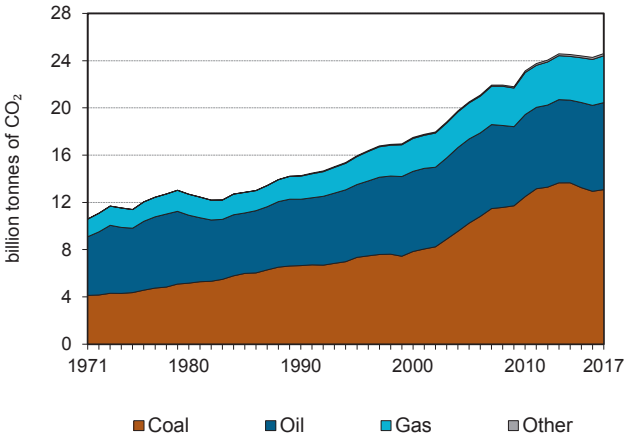


Figure 2. CO_2 emissions by sector

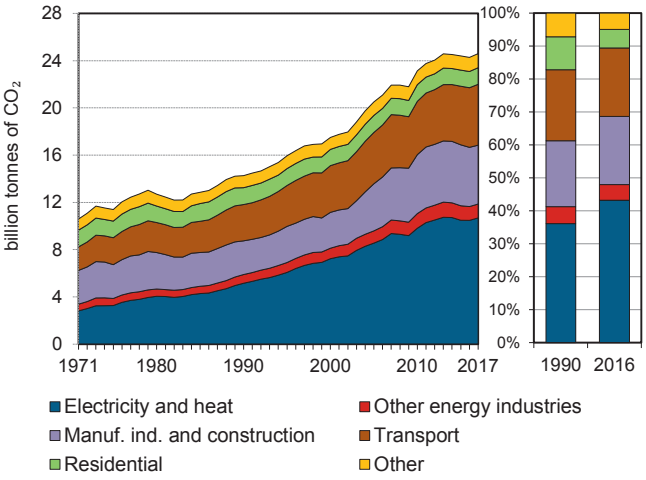


Figure 3. Electricity generation by fuel

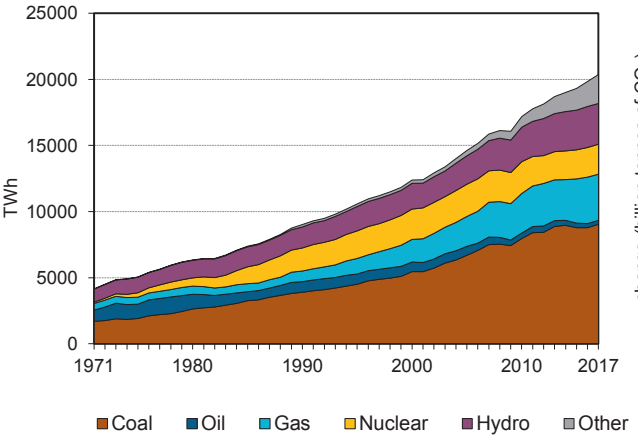


Figure 4. CO_2 from electricity generation: driving factors[1]

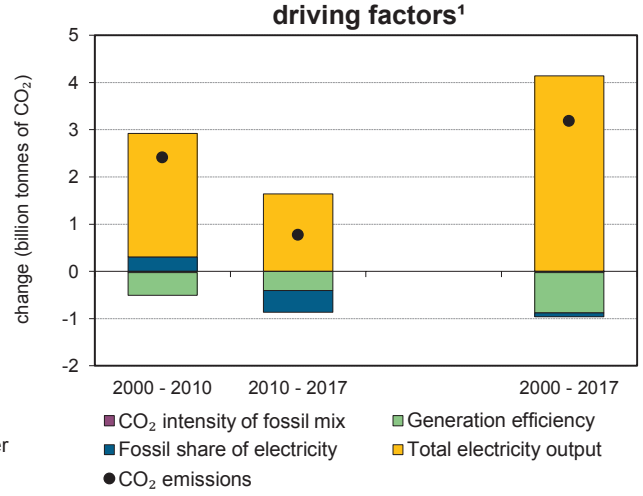


Figure 5. Changes in selected indicators

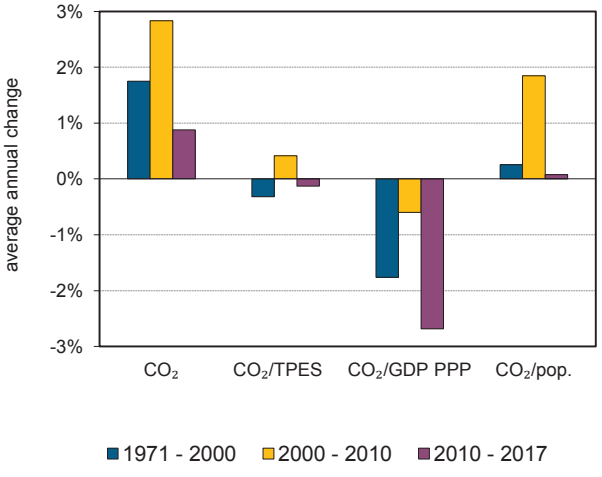
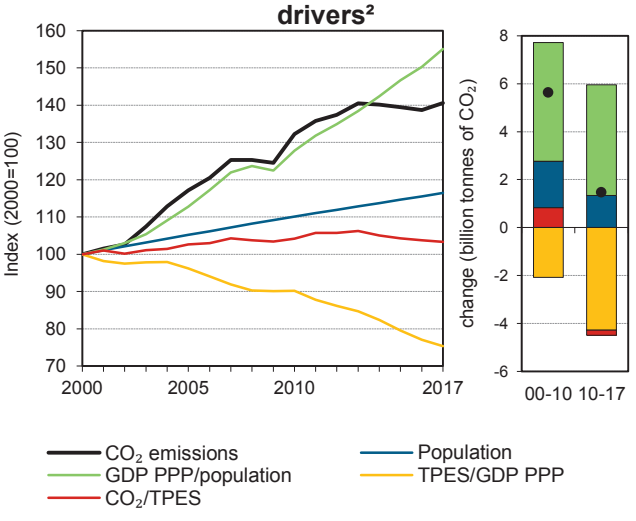


Figure 6. Total CO_2 emissions and drivers[2]



1. Electricity decomposition: CO_2 emissions = CO_2 intensity of fossil mix x fossil share of elec. x thermal efficiency x elec. output. See Chapter 6.
2. Kaya decomposition: CO_2 emissions = CO_2/TPES x TPES/GDP x GDP/population x population. See Chapter 6.

IEA and Accession/Association countries

Key indicators

	1990	1995	2000	2005	2010	2015	2017	%change 90-17
CO_2 fuel combustion ($MtCO_2$)	14265.1	15 945.4	17 499.8	20 506.5	23 136.6	24 402.3	24 596.7	72%
Share of World CO_2 from fuel combustion	70%	75%	75%	76%	76%	75%	75%	
TPES (PJ)	254331	282 813	309 762	353 609	393 018	414 211	421 563	66%
GDP (billion 2010 USD)	32461.5	36 807.9	43 722.9	50 201.8	56 268.1	64 407.5	68 124.2	110%
GDP PPP (billion 2010 USD)	34438.4	40 116.6	48 434.3	57 457.9	68 136.4	81 420.8	87 460.2	154%
Population (millions)	3521.6	3 763.7	3 989.7	4 195.9	4 392.3	4 573.2	4 645.4	32%
CO_2 / TPES (tCO_2 per TJ)	56.1	56.4	56.5	58.0	58.9	58.9	58.3	4%
CO_2 / GDP ($kgCO_2$ per 2010 USD)	0.44	0.4	0.4	0.4	0.4	0.4	0.4	-18%
CO_2 / GDP PPP ($kgCO_2$ per 2010 USD)	0.41	0.4	0.4	0.4	0.3	0.3	0.3	-32%
CO_2 / population (tCO_2 per capita)	4.1	4.2	4.4	4.9	5.3	5.3	5.3	31%
Share of electricity output from fossil fuels	61%	61%	64%	66%	67%	65%	63%	
CO_2 / kWh of electricity (gCO_2/kWh)	541	545	552	553	538	510	491	-9%
CO_2 emissions and drivers - Kaya decomposition (1990=100) [1]								
CO_2 emissions index	100	112	123	144	162	171	172	72%
Population index	100	107	113	119	125	130	132	32%
GDP PPP per population index	100	109	124	140	159	182	193	93%
Energy intensity index - TPES / GDP PPP	100	95	87	83	78	69	65	-35%
Carbon intensity index - CO_2 / TPES	100	101	101	103	105	105	104	4%

1. Please see the chapter *Indicator sources and methods* for methodological notes. Based on GDP in 2010 USD, using purchasing power parities.

2017 CO_2 emissions by sector

million tonnes of CO_2	Coal	Oil	Natural gas	Other [2]	Total	%change 90-17
CO_2 fuel combustion	**13 080.2**	**7 364.2**	**3 969.7**	**182.6**	**24 596.7**	**72%**
Electricity and heat generation	8 818.8	243.9	1 493.7	127.3	10 683.7	107%
Other energy industry own use	310.6	450.1	414.7	0.3	1 175.7	59%
Manufacturing industries and construction	3 399.7	681.1	857.9	45.5	4 984.3	75%
Transport	0.1	5 030.9	124.8	-	5 155.7	68%
of which: road	-	*4 445.5*	*68.3*	-	*4 513.8*	74%
Other	550.9	958.2	1 078.6	9.4	2 597.2	6%
of which: residential	*267.0*	*454.5*	*682.3*	*0.0*	*1 403.9*	-2%
of which: services	*121.0*	*207.9*	*380.0*	*6.1*	*714.9*	17%
Memo: international marine bunkers	-	*479.9*	*0.1*	-	*480.1*	*68%*
Memo: international aviation bunkers	-	*406.7*	-	-	*406.7*	*151%*

2. Other includes industrial waste and non-renewable municipal waste.

Key categories for CO_2 emissions from fuel combustion in 2017

IPCC source category	CO_2 emissions ($MtCO_2$)	1990 CO_2 emissions ($MtCO_2$)	Share in total GHG[3] (%)	Cumulative total (%)
Main activity prod. elec. and heat - coal	8185.4	3802.3	23.1	23.1
Road - oil	4445.5	2597.5	12.5	35.6
Manufacturing industries - coal	3399.7	1606.3	9.6	45.2
Main activity prod. elec. and heat - gas	1298.0	349.7	3.7	48.8
Manufacturing industries - gas	857.9	546.4	2.4	51.3
Residential - gas	682.3	472.1	1.9	53.2
Manufacturing industries - oil	681.1	690.9	1.9	55.1
Unallocated autoproducers - coal	633.4	277.8	1.8	56.9
Other transport - oil	585.4	395.1	1.7	58.5
Memo: total CO_2 from fuel combustion	*24596.7*	*14265.1*	*69.3*	*69.3*

3. Percent calculated using the total GHG estimate excluding CO_2 emissions/removals from agriculture, forestry and other land use.

OECD Total

Figure 1. CO_2 emissions by fuel

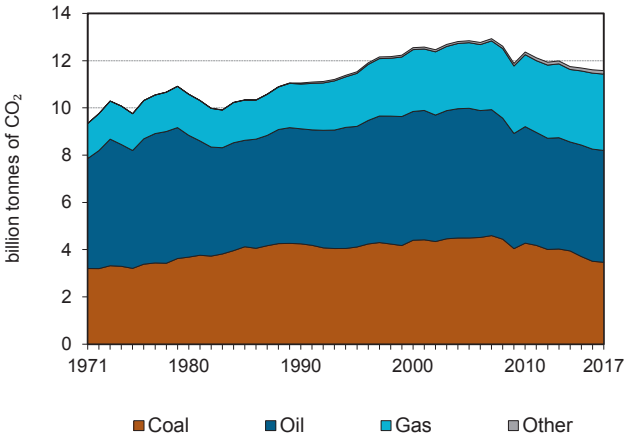


Figure 2. CO_2 emissions by sector

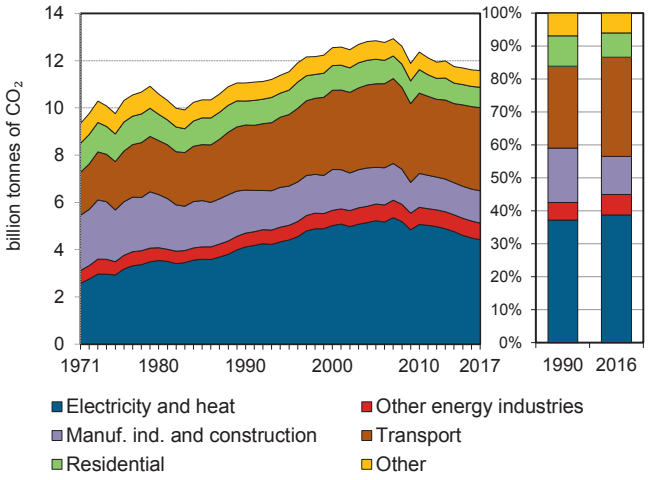


Figure 3. Electricity generation by fuel

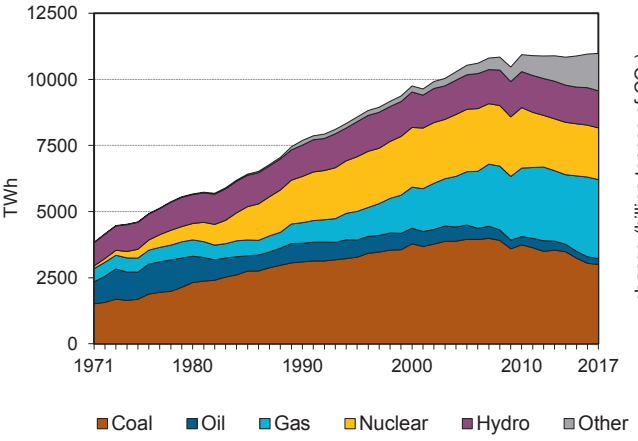


Figure 4. CO_2 from electricity generation: driving factors[1]

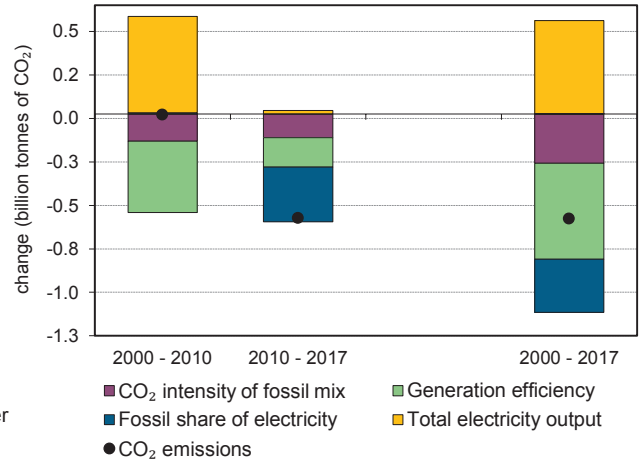


Figure 5. Changes in selected indicators

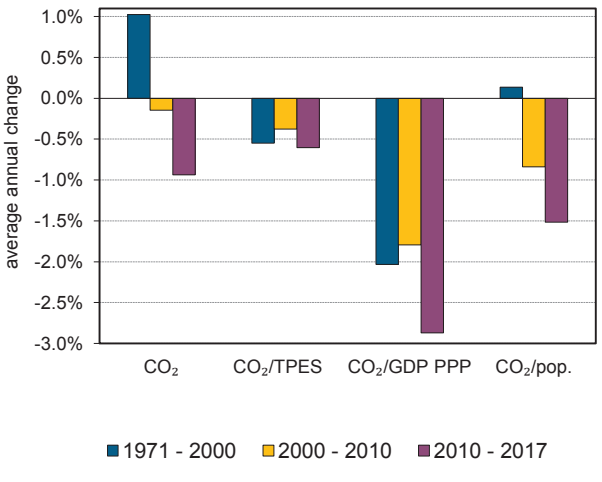
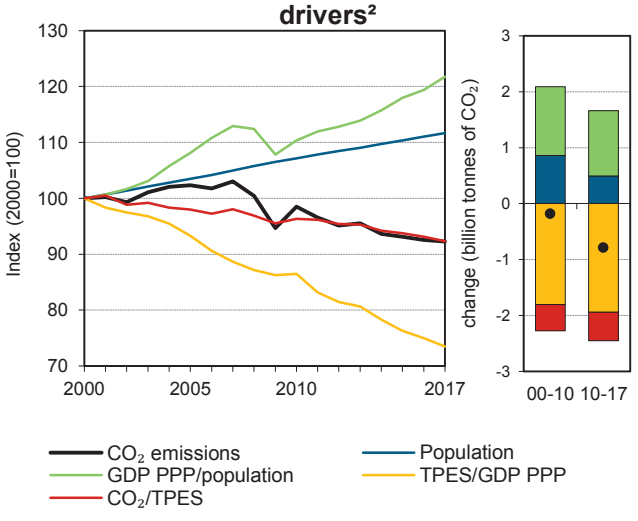


Figure 6. Total CO_2 emissions and drivers[2]



1. Electricity decomposition: CO_2 emissions = CO_2 intensity of fossil mix x fossil share of elec. x thermal efficiency x elec. output. See Chapter 6.
2. Kaya decomposition: CO_2 emissions = CO_2/TPES x TPES/GDP x GDP/population x population. See Chapter 6.

OECD Total

Key indicators

	1990	1995	2000	2005	2010	2015	2017	%change 90-17
CO_2 fuel combustion ($MtCO_2$)	11054.4	11 529.5	12 550.4	12 843.7	12 366.1	11 690.5	11 578.5	5%
Share of World CO_2 from fuel combustion	54%	54%	54%	47%	40%	36%	35%	
TPES (PJ)	190450	204 758	222 408	232 204	227 544	221 008	222 278	17%
GDP (billion 2010 USD)	29322.4	32 517.8	38 273.1	42 630.2	44 857.1	49 069.0	51 132.5	74%
GDP PPP (billion 2010 USD)	28153.6	31 293.2	37 079.6	41 482.4	43 865.1	48 278.6	50 410.2	79%
Population (millions)	1076.7	1 120.8	1 160.0	1 200.3	1 243.2	1 280.1	1 295.4	20%
CO_2 / TPES (tCO_2 per TJ)	58	56.3	56.4	55.3	54.3	52.9	52.1	-10%
CO_2 / GDP ($kgCO_2$ per 2010 USD)	0.38	0.4	0.3	0.3	0.3	0.2	0.2	-40%
CO_2 / GDP PPP ($kgCO_2$ per 2010 USD)	0.39	0.4	0.3	0.3	0.3	0.2	0.2	-41%
CO_2 / population (tCO_2 per capita)	10.3	10.3	10.8	10.7	9.9	9.1	8.9	-13%
Share of electricity output from fossil fuels	60%	59%	61%	62%	61%	59%	57%	
CO_2 / kWh of electricity (gCO_2/kWh)	507	491	495	475	441	405	384	-24%
CO_2 emissions and drivers - Kaya decomposition (1990=100) [1]								
CO_2 emissions index	100	104	114	116	112	106	105	5%
Population index	100	104	108	111	115	119	120	20%
GDP PPP per population index	100	107	122	132	135	144	149	49%
Energy intensity index - TPES / GDP PPP	100	97	89	83	77	68	65	-35%
Carbon intensity index - CO_2 / TPES	100	97	97	95	94	91	90	-10%

1. Please see the chapter *Indicator sources and methods* for methodological notes. Based on GDP in 2010 USD, using purchasing power parities.

2017 CO_2 emissions by sector

million tonnes of CO_2	Coal	Oil	Natural gas	Other [2]	Total	%change 90-17
CO_2 fuel combustion	**3 463.5**	**4 736.8**	**3 231.4**	**146.9**	**11 578.5**	**5%**
Electricity and heat generation	2 900.5	167.6	1 256.1	91.6	4 415.8	7%
Other energy industry own use	102.8	292.6	309.3	0.3	705.0	20%
Manufacturing industries and construction	387.0	299.3	640.6	45.5	1 372.4	-25%
Transport	0.1	3 455.0	63.1	-	3 518.1	28%
of which: road	-	*3 095.5*	*10.1*	-	*3 105.6*	32%
Other	73.1	522.3	962.3	9.4	1 567.1	-12%
of which: residential	*47.2*	*217.2*	*597.7*	*0.0*	*862.1*	-15%
of which: services	*21.3*	*146.5*	*348.6*	*6.1*	*522.6*	-4%
Memo: international marine bunkers	-	*264.9*	*0.1*	-	*265.0*	*12%*
Memo: international aviation bunkers	-	*313.5*	-	-	*313.5*	*118%*

2. Other includes industrial waste and non-renewable municipal waste.

Key categories for CO_2 emissions from fuel combustion in 2017

IPCC source category	CO_2 emissions ($MtCO_2$)	1990 CO_2 emissions ($MtCO_2$)	Share in total GHG[3] (%)	Cumulative total (%)
Road - oil	3095.5	2347.9	19.9	19.9
Main activity prod. elec. and heat - coal	2759.0	2892.9	17.7	37.6
Main activity prod. elec. and heat - gas	1100.4	339.5	7.1	44.7
Manufacturing industries - gas	640.6	535.5	4.1	48.8
Residential - gas	597.7	468.7	3.8	52.6
Manufacturing industries - coal	387.0	730.9	2.5	55.1
Non-specified other - gas	364.6	255.2	2.3	57.4
Other transport - oil	359.4	361.7	2.3	59.7
Other energy industry own use - gas	309.3	168.2	2.0	61.7
Memo: total CO_2 from fuel combustion	*11578.5*	*11054.4*	*74.3*	*74.3*

3. Percent calculated using the total GHG estimate excluding CO_2 emissions/removals from agriculture, forestry and other land use.

OECD Americas

Figure 1. CO_2 emissions by fuel

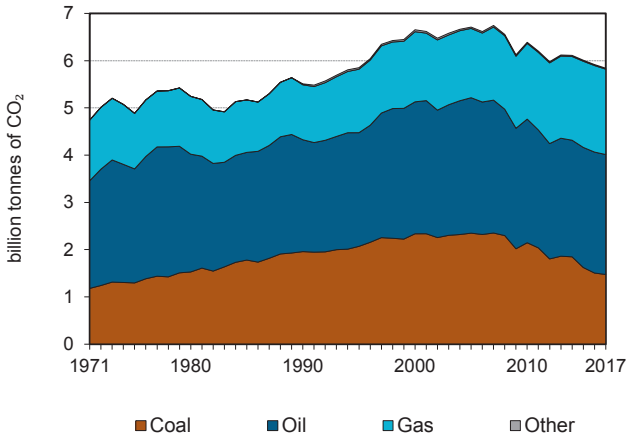


Figure 2. CO_2 emissions by sector

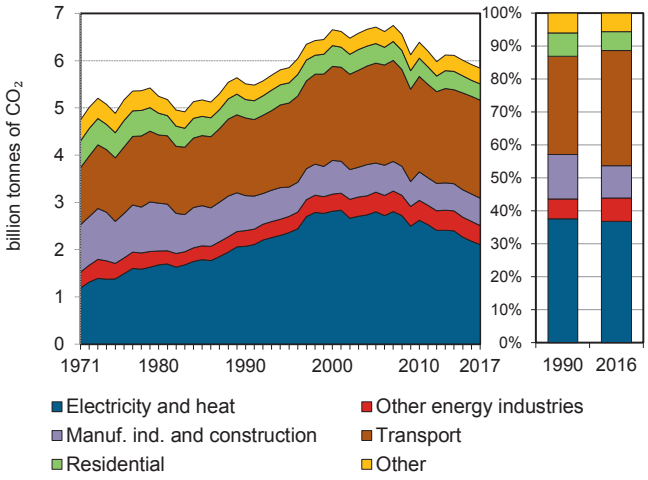


Figure 3. Electricity generation by fuel

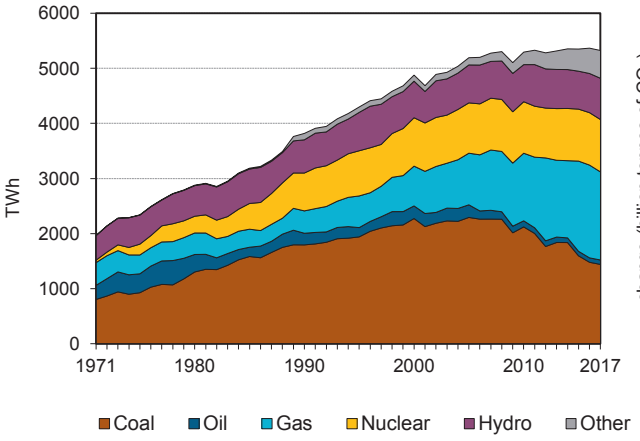


Figure 4. CO_2 from electricity generation: driving factors[1]

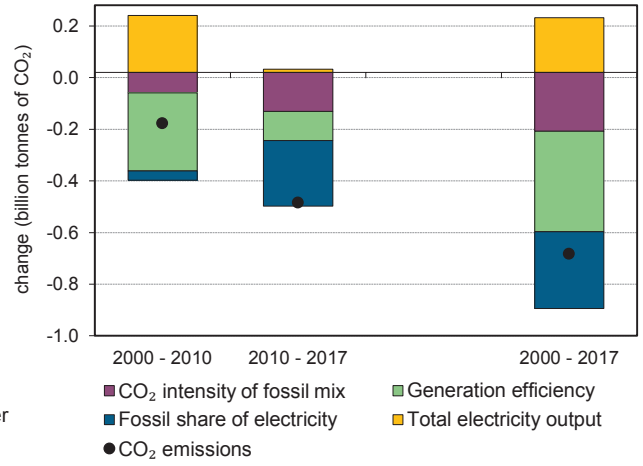


Figure 5. Changes in selected indicators

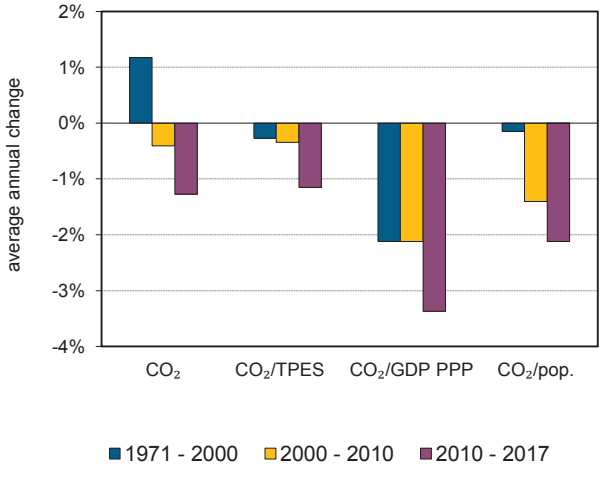
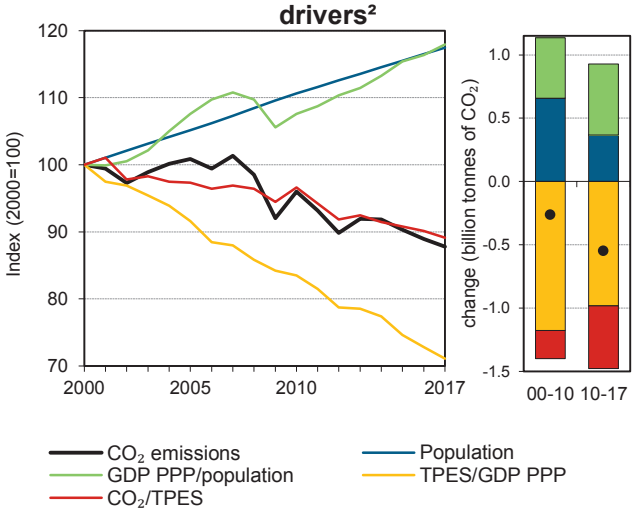


Figure 6. Total CO_2 emissions and drivers[2]



1. Electricity decomposition: CO_2 emissions = CO_2 intensity of fossil mix x fossil share of elec. x thermal efficiency x elec. output. See Chapter 6.
2. Kaya decomposition: CO_2 emissions = CO_2/TPES x TPES/GDP x GDP/population x population. See Chapter 6.

OECD Americas

Key indicators

	1990	1995	2000	2005	2010	2015	2017	%change 90-17
CO_2 fuel combustion ($MtCO_2$)	5509.1	5 851.3	6 654.5	6 710.5	6 389.8	6 009.8	5 841.2	6%
Share of World CO_2 from fuel combustion	27%	27%	29%	25%	21%	19%	18%	
TPES (PJ)	94789	102 631	113 183	117 287	112 471	112 587	111 483	18%
GDP (billion 2010 USD)	10734.6	12 143.1	15 024.8	17 024.2	17 885.7	19 997.4	20 779.3	94%
GDP PPP (billion 2010 USD)	11022.6	12 474.8	15 465.7	17 495.6	18 406.9	20 616.1	21 429.6	94%
Population (millions)	378.1	404.8	429.4	451.5	475.0	495.9	504.4	33%
CO_2 / TPES (tCO_2 per TJ)	58.1	57.0	58.8	57.2	56.8	53.4	52.4	-10%
CO_2 / GDP ($kgCO_2$ per 2010 USD)	0.51	0.5	0.4	0.4	0.4	0.3	0.3	-45%
CO_2 / GDP PPP ($kgCO_2$ per 2010 USD)	0.5	0.5	0.4	0.4	0.3	0.3	0.3	-45%
CO_2 / population (tCO_2 per capita)	14.6	14.5	15.5	14.9	13.5	12.1	11.6	-21%
Share of electricity output from fossil fuels	63%	63%	67%	67%	66%	62%	59%	
CO_2 / kWh of electricity (gCO_2/kWh)	541	542	571	535	488	418	390	-28%
CO_2 emissions and drivers - Kaya decomposition (1990=100) [1]								
CO_2 emissions index	100	106	121	122	116	109	106	6%
Population index	100	107	114	119	126	131	133	33%
GDP PPP per population index	100	106	124	133	133	143	146	46%
Energy intensity index - TPES / GDP PPP	100	96	85	78	71	64	60	-40%
Carbon intensity index - CO_2 / TPES	100	98	101	98	98	92	90	-10%

1. Please see the chapter *Indicator sources and methods* for methodological notes. Based on GDP in 2010 USD, using purchasing power parities.

2017 CO_2 emissions by sector

million tonnes of CO_2	Coal	Oil	Natural gas	Other [2]	Total	%change 90-17
CO_2 fuel combustion	**1 473.9**	**2 539.2**	**1 807.9**	**20.3**	**5 841.2**	**6%**
Electricity and heat generation	1 357.0	61.4	671.4	16.1	2 105.9	2%
Other energy industry own use	11.5	156.2	236.9	-	404.6	22%
Manufacturing industries and construction	103.5	111.1	361.4	3.3	579.2	-22%
Transport	-	2 023.6	50.7	-	2 074.3	26%
of which: road	-	*1 755.7*	*2.9*	-	*1 758.7*	32%
Other	1.9	186.9	487.6	0.8	677.2	-6%
of which: residential	*0.0*	*65.8*	*279.6*	-	*345.4*	-11%
of which: services	*1.9*	*52.2*	*202.4*	*0.8*	*257.4*	2%
Memo: international marine bunkers	-	*78.1*	-	-	*78.1*	*-18%*
Memo: international aviation bunkers	-	*89.9*	-	-	*89.9*	*88%*

2. Other includes industrial waste and non-renewable municipal waste.

Key categories for CO_2 emissions from fuel combustion in 2017

IPCC source category	CO_2 emissions ($MtCO_2$)	1990 CO_2 emissions ($MtCO_2$)	Share in total GHG[3] (%)	Cumulative total (%)
Road - oil	1755.7	1333.9	22.3	22.3
Main activity prod. elec. and heat - coal	1347.7	1656.3	17.1	39.4
Main activity prod. elec. and heat - gas	597.3	164.6	7.6	47.0
Manufacturing industries - gas	361.4	323.2	4.6	51.5
Residential - gas	279.6	269.8	3.5	55.1
Other transport - oil	267.9	267.3	3.4	58.5
Other energy industry own use - gas	236.9	139.1	3.0	61.5
Non-specified other - gas	208.0	164.7	2.6	64.1
Other energy industry own use - oil	156.2	185.9	2.0	66.1
Memo: total CO_2 from fuel combustion	*5841.2*	*5509.1*	*74.1*	*74.1*

3. Percent calculated using the total GHG estimate excluding CO_2 emissions/removals from agriculture, forestry and other land use.

OECD Asia Oceania

Figure 1. CO_2 emissions by fuel

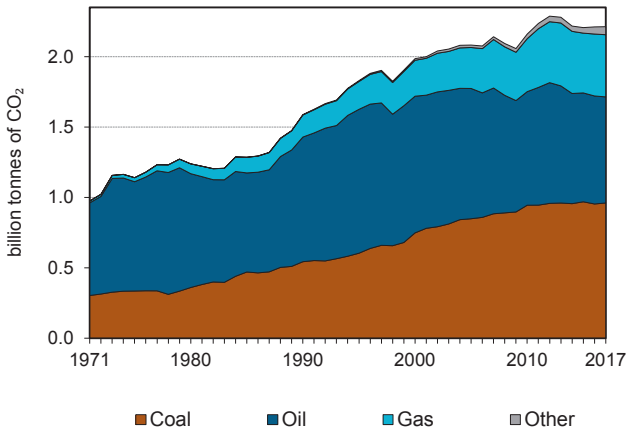


Figure 2. CO_2 emissions by sector

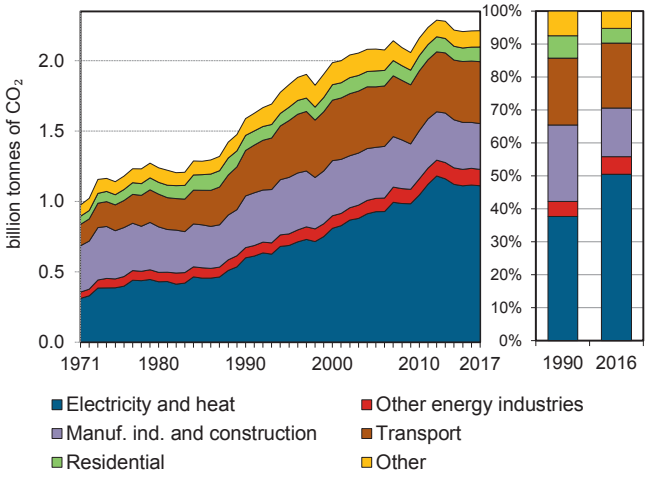


Figure 3. Electricity generation by fuel

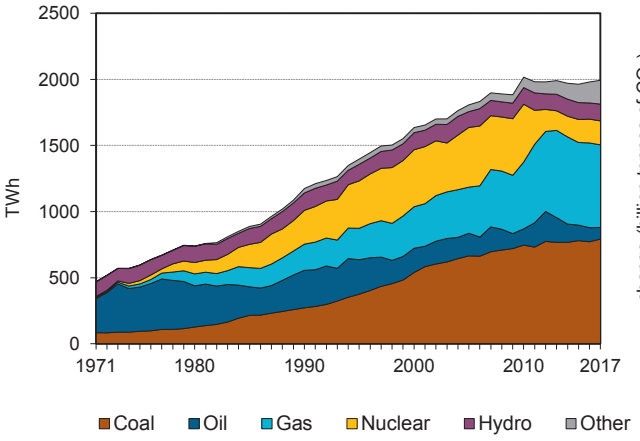


Figure 4. CO_2 from electricity generation: driving factors[1]

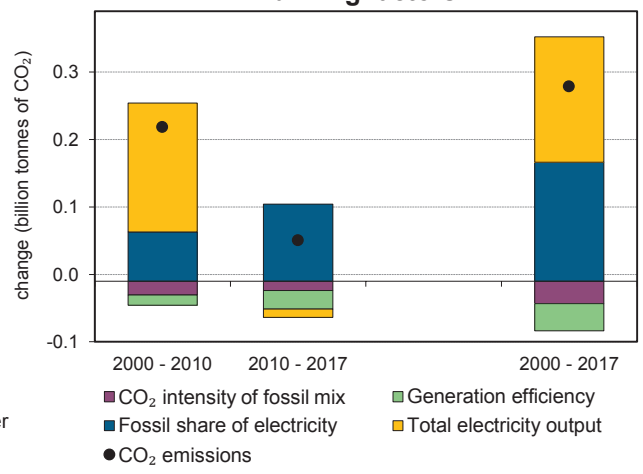


Figure 5. Changes in selected indicators

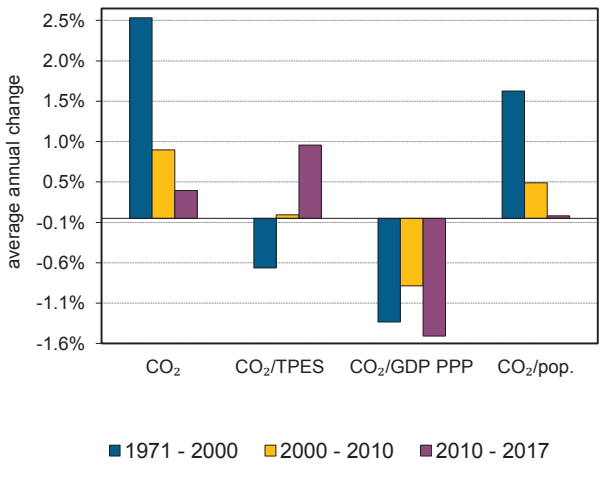
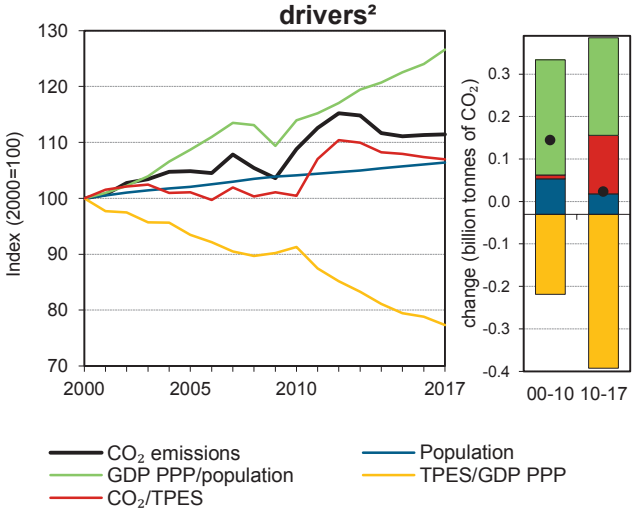


Figure 6. Total CO_2 emissions and drivers[2]



1. Electricity decomposition: CO_2 emissions = CO_2 intensity of fossil mix x fossil share of elec. x thermal efficiency x elec. output. See Chapter 6.
2. Kaya decomposition: CO_2 emissions = CO_2/TPES x TPES/GDP x GDP/population x population. See Chapter 6.

OECD Asia Oceania

Key indicators

	1990	1995	2000	2005	2010	2015	2017	%change 90-17
CO_2 fuel combustion ($MtCO_2$)	1588.4	1 829.7	1 986.0	2 082.5	2 160.5	2 206.7	2 213.1	39%
Share of World CO_2 from fuel combustion	8%	9%	9%	8%	7%	7%	7%	
TPES (PJ)	26881	31 856	35 580	36 904	38 531	36 623	37 055	38%
GDP (billion 2010 USD)	5920.8	6 628.4	7 299.4	8 024.2	8 474.4	9 202.1	9 542.5	61%
GDP PPP (billion 2010 USD)	4853.7	5 517.1	6 140.5	6 814.7	7 284.5	7 957.7	8 270.7	70%
Population (millions)	191.8	198.0	203.3	207.5	211.6	215.0	216.3	13%
CO_2 / TPES (tCO_2 per TJ)	59.1	57.4	55.8	56.4	56.1	60.3	59.7	1%
CO_2 / GDP ($kgCO_2$ per 2010 USD)	0.27	0.3	0.3	0.3	0.3	0.2	0.2	-13%
CO_2 / GDP PPP ($kgCO_2$ per 2010 USD)	0.33	0.3	0.3	0.3	0.3	0.3	0.3	-18%
CO_2 / population (tCO_2 per capita)	8.3	9.2	9.8	10.0	10.2	10.3	10.2	24%
Share of electricity output from fossil fuels	64%	63%	63%	66%	69%	78%	77%	
CO_2 / kWh of electricity (gCO_2/kWh)	509	489	489	504	510	557	547	7%
CO_2 emissions and drivers - Kaya decomposition (1990=100) [1]								
CO_2 emissions index	100	115	125	131	136	139	139	39%
Population index	100	103	106	108	110	112	113	13%
GDP PPP per population index	100	110	119	130	136	146	151	51%
Energy intensity index - TPES / GDP PPP	100	104	105	98	96	83	81	-19%
Carbon intensity index - CO_2 / TPES	100	97	94	95	95	102	101	1%

1. Please see the chapter *Indicator sources and methods* for methodological notes. Based on GDP in 2010 USD, using purchasing power parities.

2017 CO_2 emissions by sector

million tonnes of CO_2	Coal	Oil	Natural gas	Other [2]	Total	%change 90-17
CO_2 fuel combustion	**960.3**	**753.8**	**441.8**	**57.0**	**2 213.1**	**39%**
Electricity and heat generation	758.5	60.2	264.2	28.2	1 111.2	86%
Other energy industry own use	49.9	45.8	20.4	-	116.1	60%
Manufacturing industries and construction	148.9	89.0	66.3	21.7	325.9	-11%
Transport	0.0	436.0	3.8	-	439.8	36%
of which: road	-	*392.9*	*3.1*	-	*396.0*	41%
Other	3.0	122.7	87.2	7.1	220.0	-3%
of which: residential	*2.1*	*49.6*	*52.4*	-	*104.1*	-3%
of which: services	*0.7*	*40.8*	*34.4*	*3.9*	*79.7*	-8%
Memo: international marine bunkers	-	*50.1*	-	-	*50.1*	*87%*
Memo: international aviation bunkers	-	*56.6*	-	-	*56.6*	*162%*

2. Other includes industrial waste and non-renewable municipal waste.

Key categories for CO_2 emissions from fuel combustion in 2017

IPCC source category	CO_2 emissions ($MtCO_2$)	1990 CO_2 emissions ($MtCO_2$)	Share in total GHG[3] (%)	Cumulative total (%)
Main activity prod. elec. and heat - coal	691.0	242.4	24.6	24.6
Road - oil	392.9	281.0	14.0	38.6
Main activity prod. elec. and heat - gas	243.3	92.3	8.7	47.2
Manufacturing industries - coal	148.9	170.1	5.3	52.5
Manufacturing industries - oil	89.0	168.0	3.2	55.7
Non-specified other - oil	73.1	112.3	2.6	58.3
Unallocated autoproducers - coal	67.5	66.8	2.4	60.7
Manufacturing industries - gas	66.3	26.5	2.4	63.0
Residential - gas	52.4	23.0	1.9	64.9
Memo: total CO_2 from fuel combustion	*2213.1*	*1588.4*	*78.7*	*78.7*

3. Percent calculated using the total GHG estimate excluding CO_2 emissions/removals from agriculture, forestry and other land use.

OECD Europe

Figure 1. CO_2 emissions by fuel

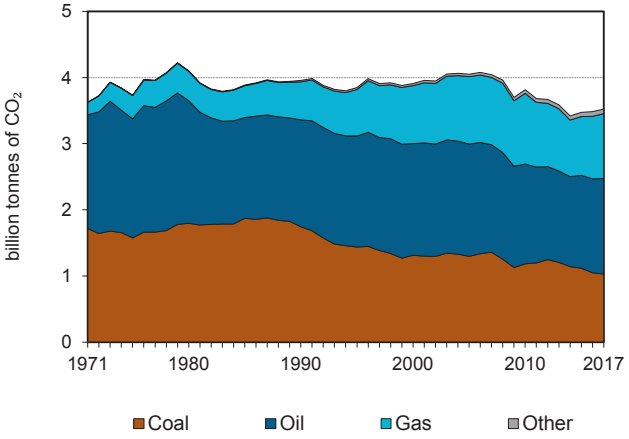


Figure 2. CO_2 emissions by sector

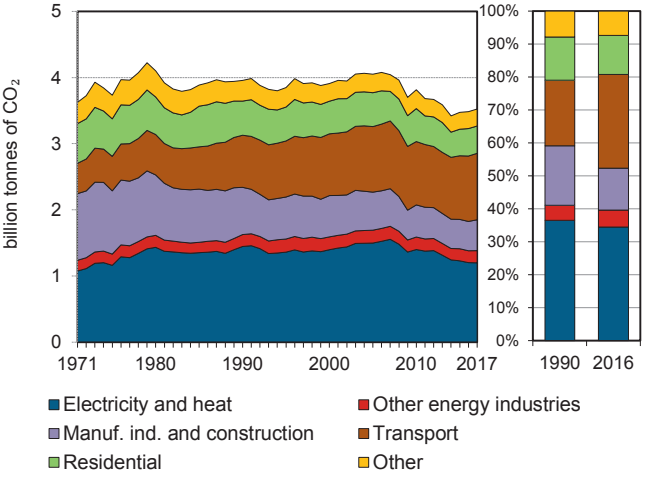


Figure 3. Electricity generation by fuel

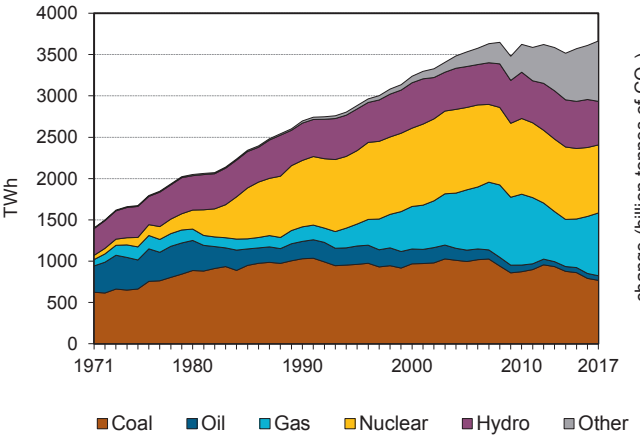


Figure 4. CO_2 from electricity generation: driving factors[1]

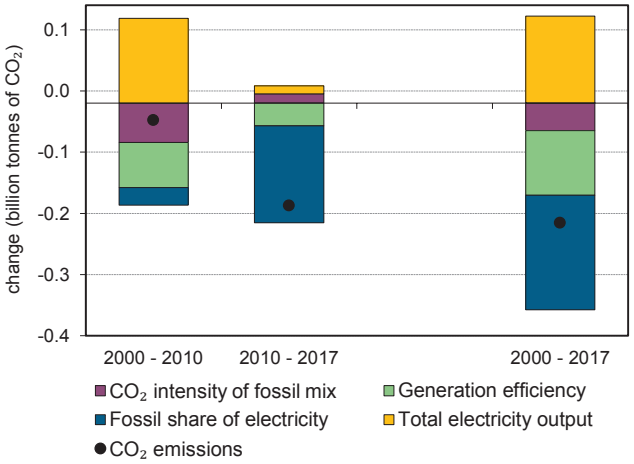


Figure 5. Changes in selected indicators

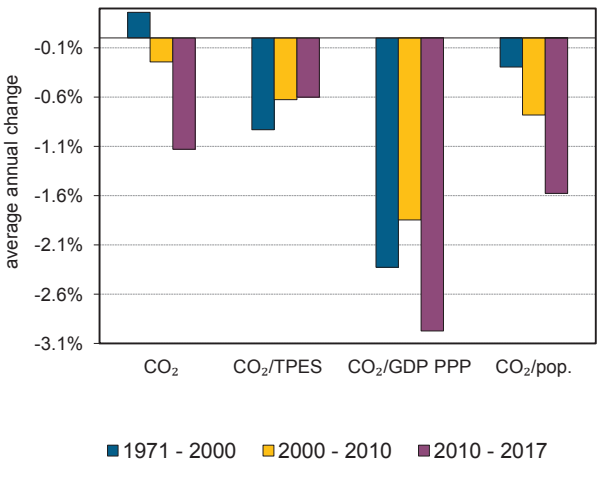
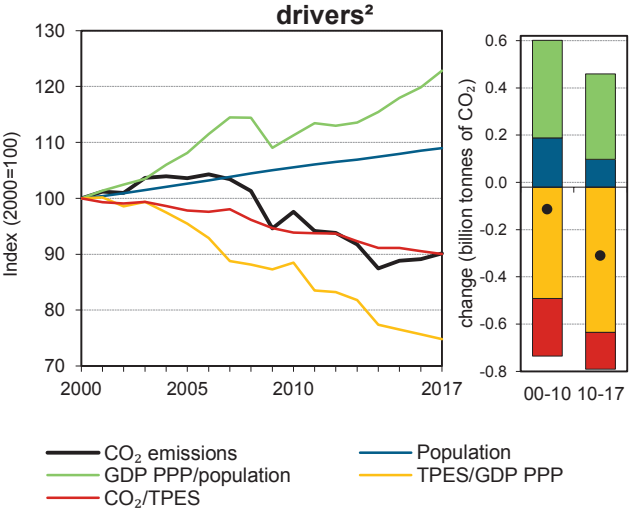


Figure 6. Total CO_2 emissions and drivers[2]



1. Electricity decomposition: CO_2 emissions = CO_2 intensity of fossil mix x fossil share of elec. x thermal efficiency x elec. output. See Chapter 6.
2. Kaya decomposition: CO_2 emissions = CO_2/TPES x TPES/GDP x GDP/population x population. See Chapter 6.

OECD Europe

Key indicators

	1990	1995	2000	2005	2010	2015	2017	%change 90-17
CO_2 fuel combustion ($MtCO_2$)	3956.9	3 848.5	3 909.9	4 050.7	3 815.8	3 474.0	3 524.3	-11%
Share of World CO_2 from fuel combustion	19%	18%	17%	15%	12%	11%	11%	
TPES (PJ)	68780	70 271	73 645	78 013	76 541	71 798	73 740	7%
GDP (billion 2010 USD)	12667.1	13 746.4	15 948.9	17 581.8	18 497.1	19 869.5	20 810.7	64%
GDP PPP (billion 2010 USD)	12277.3	13 301.3	15 473.4	17 172.2	18 173.7	19 704.8	20 709.9	69%
Population (millions)	506.8	518.1	527.3	541.2	556.6	569.3	574.7	13%
CO_2 / TPES (tCO_2 per TJ)	57.5	54.8	53.1	51.9	49.9	48.4	47.8	-17%
CO_2 / GDP ($kgCO_2$ per 2010 USD)	0.31	0.3	0.2	0.2	0.2	0.2	0.2	-46%
CO_2 / GDP PPP ($kgCO_2$ per 2010 USD)	0.32	0.3	0.3	0.2	0.2	0.2	0.2	-47%
CO_2 / population (tCO_2 per capita)	7.8	7.4	7.4	7.5	6.9	6.1	6.1	-21%
Share of electricity output from fossil fuels	53%	51%	52%	53%	51%	43%	44%	
CO_2 / kWh of electricity (gCO_2/kWh)	458	417	384	372	335	303	286	-37%
CO_2 emissions and drivers - Kaya decomposition (1990=100) [1]								
CO_2 emissions index	100	97	99	102	96	88	89	-11%
Population index	100	102	104	107	110	112	113	13%
GDP PPP per population index	100	106	121	131	135	143	149	49%
Energy intensity index - TPES / GDP PPP	100	94	85	81	75	65	64	-36%
Carbon intensity index - CO_2 / TPES	100	95	92	90	87	84	83	-17%

1. Please see the chapter *Indicator sources and methods* for methodological notes. Based on GDP in 2010 USD, using purchasing power parities.

2017 CO_2 emissions by sector

million tonnes of CO_2	Coal	Oil	Natural gas	Other [2]	Total	%change 90-17
CO_2 fuel combustion	**1 029.3**	**1 443.8**	**981.7**	**69.5**	**3 524.3**	**-11%**
Electricity and heat generation	785.0	46.0	320.6	47.3	1 198.8	-17%
Other energy industry own use	41.4	90.6	52.0	0.3	184.3	2%
Manufacturing industries and construction	134.6	99.2	213.0	20.5	467.3	-35%
Transport	0.0	995.3	8.7	-	1 004.1	27%
of which: road	-	*946.9*	*4.0*	-	*950.9*	30%
Other	68.2	212.7	387.5	1.5	669.9	-19%
of which: residential	*45.1*	*101.9*	*265.7*	*0.0*	*412.6*	-20%
of which: services	*18.8*	*53.5*	*111.7*	*1.5*	*185.5*	-9%
Memo: international marine bunkers	-	*136.7*	*0.1*	-	*136.8*	*19%*
Memo: international aviation bunkers	-	*167.0*	-	-	*167.0*	*123%*

2. Other includes industrial waste and non-renewable municipal waste.

Key categories for CO_2 emissions from fuel combustion in 2017

IPCC source category	CO_2 emissions ($MtCO_2$)	1990 CO_2 emissions ($MtCO_2$)	Share in total GHG[3] (%)	Cumulative total (%)
Road - oil	946.9	733.0	19.4	19.4
Main activity prod. elec. and heat - coal	720.3	994.1	14.7	34.1
Residential - gas	265.7	175.9	5.4	39.5
Main activity prod. elec. and heat - gas	259.8	82.6	5.3	44.8
Manufacturing industries - gas	213.0	185.8	4.4	49.2
Manufacturing industries - coal	134.6	324.7	2.8	51.9
Non-specified other - gas	121.8	84.5	2.5	54.4
Non-specified other - oil	110.8	159.3	2.3	56.7
Residential - oil	101.9	201.0	2.1	58.8
Memo: total CO_2 from fuel combustion	*3524.3*	*3956.9*	*72.0*	*72.0*

3. Percent calculated using the total GHG estimate excluding CO_2 emissions/removals from agriculture, forestry and other land use.

Non-OECD Total

Figure 1. CO_2 emissions by fuel

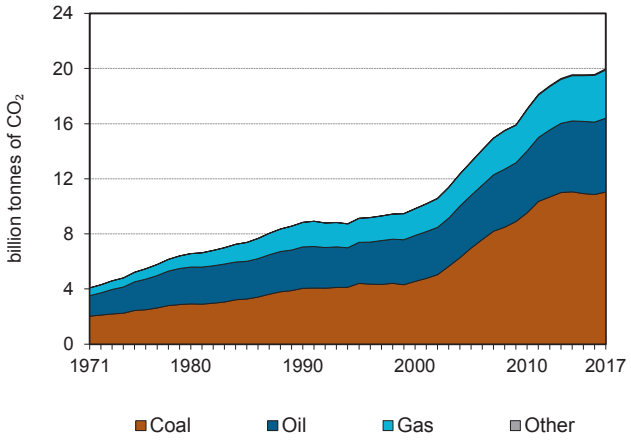


Figure 2. CO_2 emissions by sector

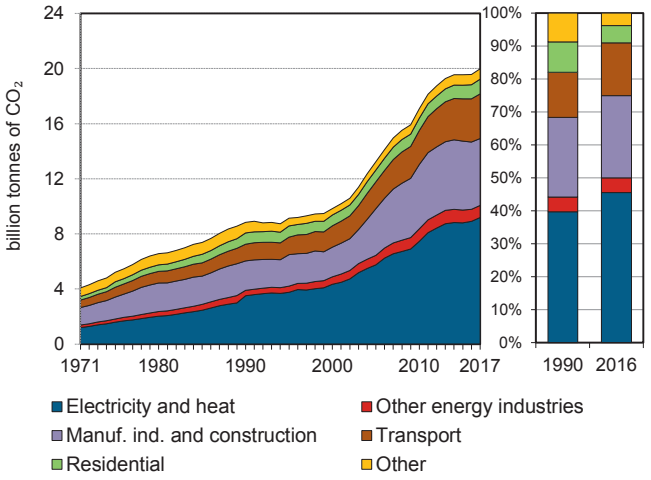


Figure 3. Electricity generation by fuel

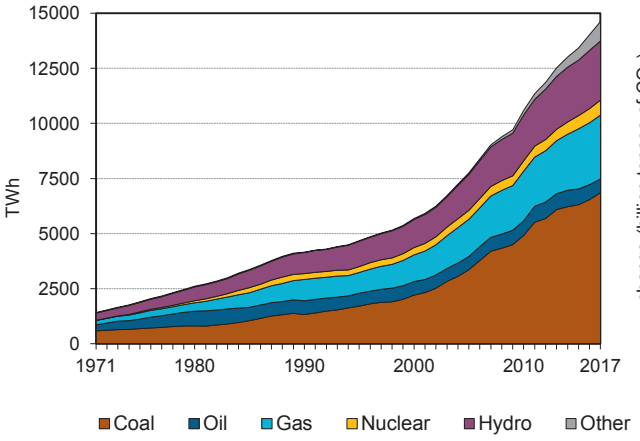


Figure 4. CO_2 from electricity generation: driving factors[1]

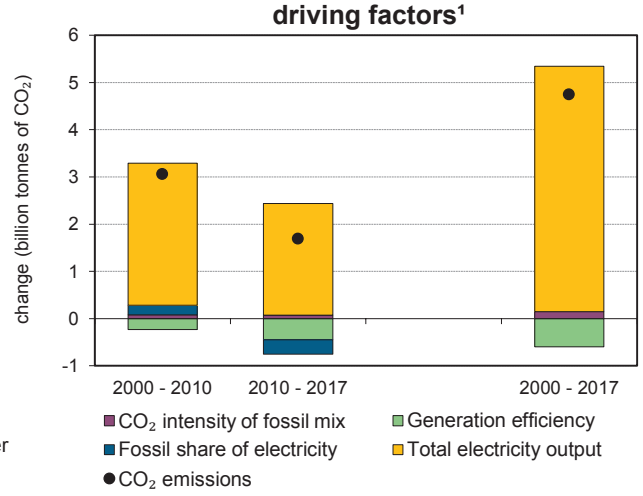


Figure 5. Changes in selected indicators

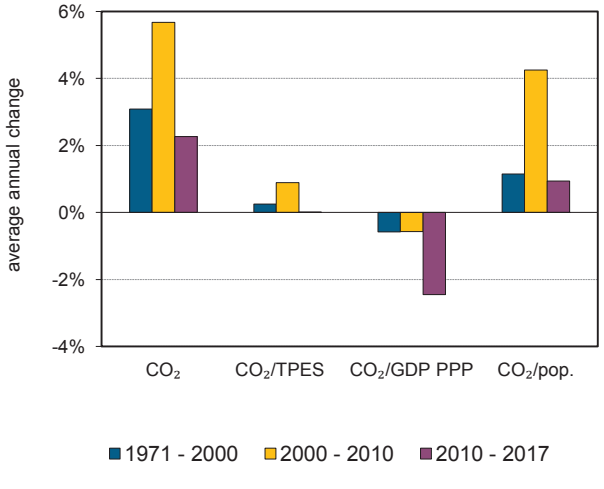
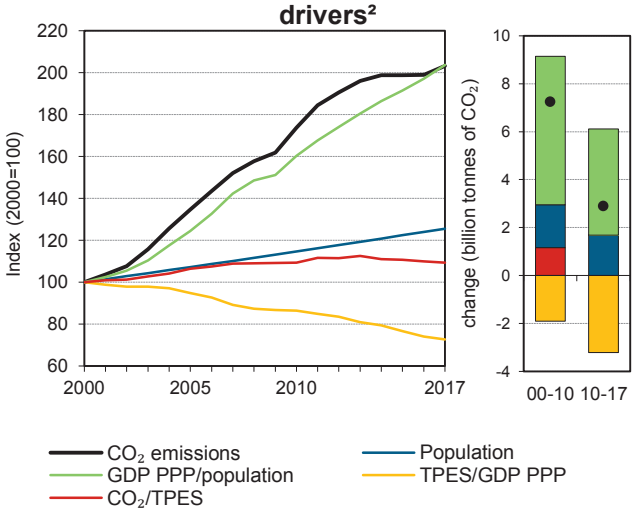


Figure 6. Total CO_2 emissions and drivers[2]



1. Electricity decomposition: CO_2 emissions = CO_2 intensity of fossil mix x fossil share of elec. x thermal efficiency x elec. output. See Chapter 6.
2. Kaya decomposition: CO_2 emissions = CO_2/TPES x TPES/GDP x GDP/population x population. See Chapter 6.

Non-OECD Total

Key indicators

	1990	1995	2000	2005	2010	2015	2017	%change 90-17
CO_2 fuel combustion ($MtCO_2$)	8837.1	9 140.1	9 836.4	13 239.4	17 084.9	19 549.9	19 979.3	126%
Share of World CO_2 from fuel combustion	43%	43%	42%	49%	56%	60%	61%	
TPES (PJ)	168098	171 520	185 886	235 124	295 450	333 655	345 440	105%
GDP (billion 2010 USD)	8628.9	9 700.5	11 748.5	15 530.1	21 257.3	26 789.8	28 946.3	235%
GDP PPP (billion 2010 USD)	17943.9	20 219.8	24 699.0	32 927.3	45 386.2	57 851.2	63 145.1	252%
Population (millions)	4209.2	4 590.8	4 957.0	5 314.1	5 682.2	6 067.2	6 223.4	48%
CO_2 / TPES (tCO_2 per TJ)	52.6	53.3	52.9	56.3	57.8	58.6	57.8	10%
CO_2 / GDP ($kgCO_2$ per 2010 USD)	1.02	0.9	0.8	0.9	0.8	0.7	0.7	-33%
CO_2 / GDP PPP ($kgCO_2$ per 2010 USD)	0.49	0.5	0.4	0.4	0.4	0.3	0.3	-36%
CO_2 / population (tCO_2 per capita)	2.1	2.0	2.0	2.5	3.0	3.2	3.2	53%
Share of electricity output from fossil fuels	70%	69%	71%	73%	74%	73%	71%	
CO_2 / kWh of electricity (gCO_2/kWh)	579	607	609	630	617	585	561	-3%
CO_2 emissions and drivers - Kaya decomposition (1990=100) [1]								
CO_2 emissions index	100	103	111	150	193	221	226	126%
Population index	100	109	118	126	135	144	148	48%
GDP PPP per population index	100	103	117	145	187	224	238	138%
Energy intensity index - TPES / GDP PPP	100	91	80	76	69	62	58	-42%
Carbon intensity index - CO_2 / TPES	100	101	101	107	110	111	110	10%

1. Please see the chapter *Indicator sources and methods* for methodological notes. Based on GDP in 2010 USD, using purchasing power parities.

2017 CO_2 emissions by sector

million tonnes of CO_2	Coal	Oil	Natural gas	Other [2]	Total	%change 90-17
CO_2 fuel combustion	**11 038.5**	**5 358.4**	**3 511.4**	**70.9**	**19 979.3**	**126%**
Electricity and heat generation	6 860.9	547.3	1 719.0	60.2	9 187.5	162%
Other energy industry own use	225.5	284.8	366.7	0.9	877.8	124%
Manufacturing industries and construction	3 424.2	730.1	692.6	8.3	4 855.1	127%
Transport	0.2	3 056.9	182.7	..	3 239.8	168%
of which: road	*..*	*2 759.9*	*92.8*	*..*	*2 852.7*	199%
Other	527.7	739.3	550.5	1.6	1 819.1	15%
of which: residential	*251.4*	*380.8*	*437.2*	*..*	*1 069.4*	31%
of which: services	*110.7*	*106.6*	*98.4*	*1.3*	*317.1*	38%
Memo: international marine bunkers	*..*	*432.1*	*..*	*..*	*432.1*	*220%*
Memo: international aviation bunkers	*..*	*271.4*	*..*	*..*	*271.4*	*138%*

2. Other includes industrial waste and non-renewable municipal waste.

Key categories for CO_2 emissions from fuel combustion in 2017

IPCC source category	CO_2 emissions ($MtCO_2$)	1990 CO_2 emissions ($MtCO_2$)	Share in total GHG[3] (%)	Cumulative total (%)
Main activity prod. elec. and heat - coal	6244.6	1720.9	19.0	19.0
Manufacturing industries - coal	3424.2	1330.0	10.4	29.4
Road - oil	2759.9	951.4	8.4	37.8
Main activity prod. elec. and heat - gas	1366.5	695.5	4.2	42.0
Manufacturing industries - oil	730.1	492.5	2.2	44.2
Manufacturing industries - gas	692.6	314.1	2.1	46.3
Unallocated autoproducers - coal	616.3	137.1	1.9	48.2
Residential - gas	437.2	176.8	1.3	49.5
Main activity prod. elec. and heat - oil	428.2	595.6	1.3	50.8
Memo: total CO_2 from fuel combustion	*19979.3*	*8837.1*	*60.8*	*60.8*

3. Percent calculated using the total GHG estimate excluding CO_2 emissions/removals from agriculture, forestry and other land use.

Non-OECD Europe and Eurasia

Figure 1. CO_2 emissions by fuel

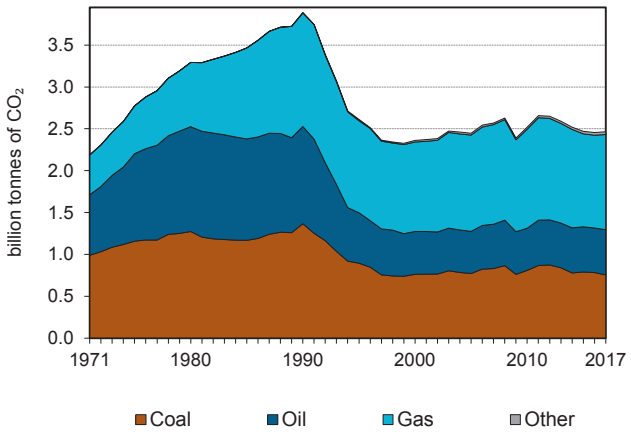


Figure 2. CO_2 emissions by sector

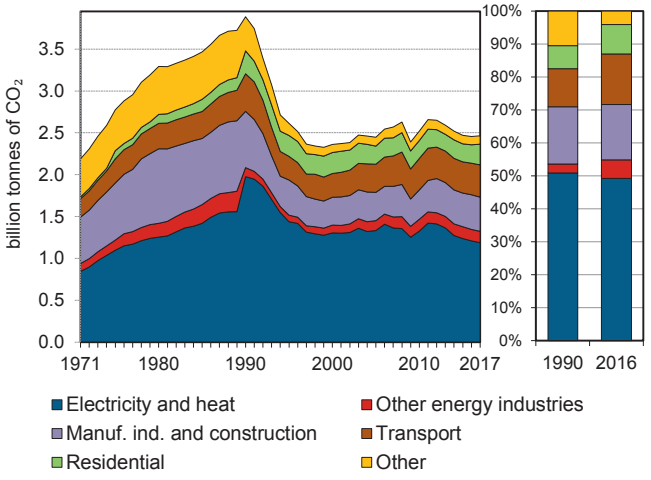


Figure 3. Electricity generation by fuel

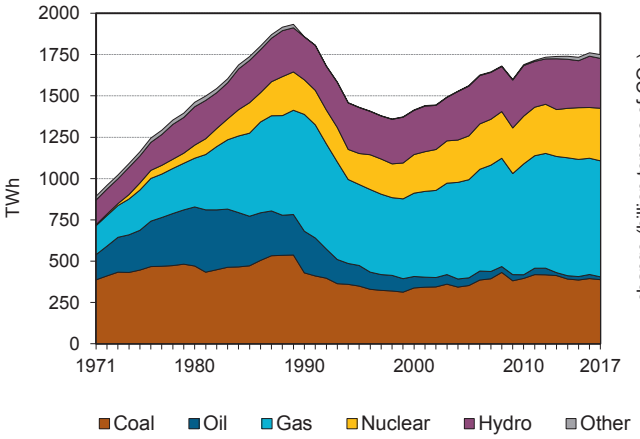


Figure 4. CO_2 from electricity generation: driving factors[1]

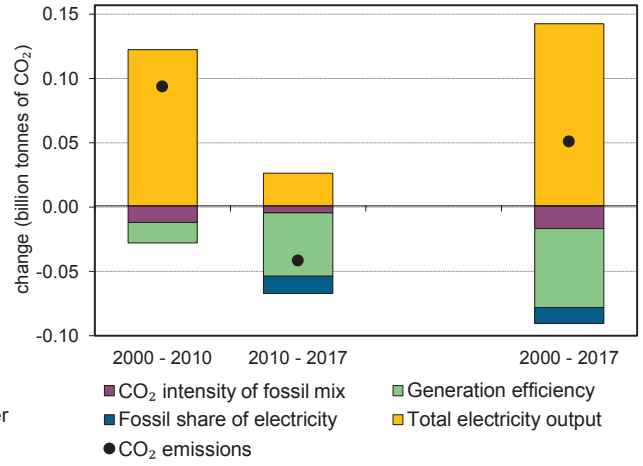


Figure 5. Changes in selected indicators

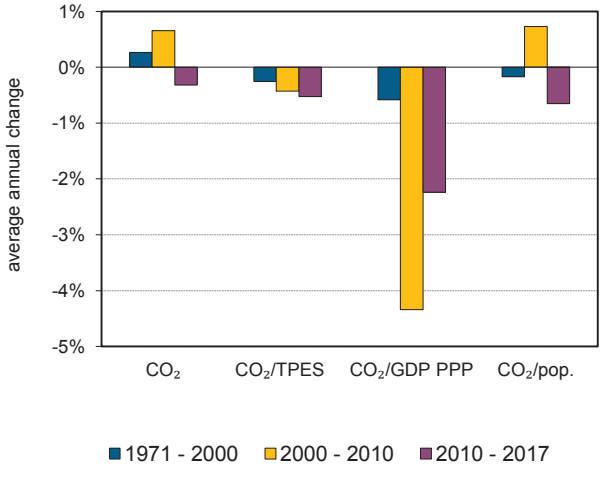
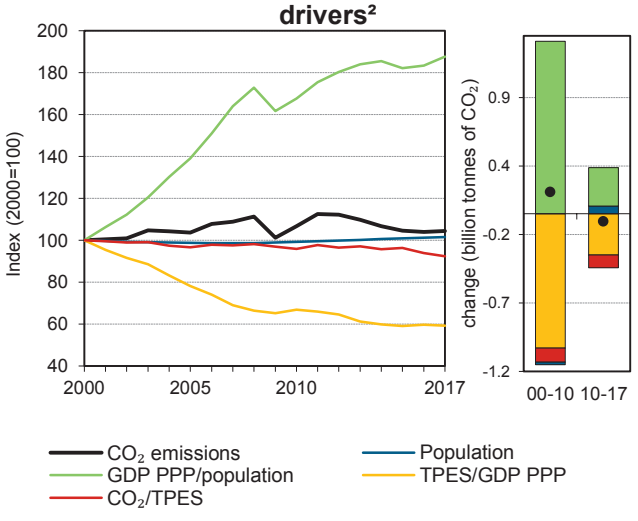


Figure 6. Total CO_2 emissions and drivers[2]



1. Electricity decomposition: CO_2 emissions = CO_2 intensity of fossil mix x fossil share of elec. x thermal efficiency x elec. output. See Chapter 6.
2. Kaya decomposition: CO_2 emissions = CO_2/TPES x TPES/GDP x GDP/population x population. See Chapter 6.

Non-OECD Europe and Eurasia

Key indicators

	1990	1995	2000	2005	2010	2015	2017	%change 90-17
CO_2 fuel combustion ($MtCO_2$)	3886.4	2 612.9	2 361.2	2 447.1	2 520.0	2 469.9	2 464.1	-37%
Share of World CO_2 from fuel combustion	19%	12%	10%	9%	8%	8%	8%	
TPES (PJ)	63348	44 444	41 558	44 570	46 289	45 153	46 969	-26%
GDP (billion 2010 USD)	2116.6	1 352.0	1 470.1	2 008.6	2 419.6	2 665.3	2 759.4	30%
GDP PPP (billion 2010 USD)	4316.7	2 728.4	2 960.6	4 064.3	4 926.4	5 441.6	5 641.1	31%
Population (millions)	337.2	338.6	335.0	330.7	332.4	338.0	340.3	1%
CO_2 / TPES (tCO_2 per TJ)	61.4	58.8	56.8	54.9	54.4	54.7	52.5	-14%
CO_2 / GDP ($kgCO_2$ per 2010 USD)	1.84	1.9	1.6	1.2	1.0	0.9	0.9	-51%
CO_2 / GDP PPP ($kgCO_2$ per 2010 USD)	0.9	1.0	0.8	0.6	0.5	0.5	0.4	-51%
CO_2 / population (tCO_2 per capita)	11.5	7.7	7.0	7.4	7.6	7.3	7.2	-37%
Share of electricity output from fossil fuels	75%	68%	65%	64%	65%	65%	63%	
CO_2 / kWh of electricity (gCO_2/kWh)	512	461	453	463	435	425	396	-23%
CO_2 emissions and drivers - Kaya decomposition (1990=100) [1]								
CO_2 emissions index	100	67	61	63	65	64	63	-37%
Population index	100	100	99	98	99	100	101	1%
GDP PPP per population index	100	63	69	96	116	126	130	30%
Energy intensity index - TPES / GDP PPP	100	111	96	75	64	57	57	-43%
Carbon intensity index - CO_2 / TPES	100	96	93	89	89	89	86	-14%

1. Please see the chapter *Indicator sources and methods* for methodological notes. Based on GDP in 2010 USD, using purchasing power parities.

2017 CO_2 emissions by sector

million tonnes of CO_2	Coal	Oil	Natural gas	Other [2]	Total	%change 90-17
CO_2 fuel combustion	**754.8**	**540.8**	**1 136.6**	**32.0**	**2 464.1**	**-37%**
Electricity and heat generation	511.5	35.2	618.3	22.3	1 187.3	-40%
Other energy industry own use	6.0	44.4	84.5	0.9	135.7	26%
Manufacturing industries and construction	205.4	71.1	124.4	7.8	408.7	-39%
Transport	0.1	301.4	83.6	..	385.1	-14%
of which: road	..	*270.1*	*2.4*	..	*272.5*	-4%
Other	31.8	88.7	225.8	1.1	347.3	-49%
of which: residential	*22.1*	*40.6*	*185.2*	..	*247.8*	-10%
of which: services	*8.3*	*12.1*	*34.5*	*0.7*	*55.6*	-57%
Memo: international marine bunkers	..	*58.8*	..	..	*58.8*	*388%*
Memo: international aviation bunkers	..	*25.4*	..	..	*25.4*	*-40%*

2. Other includes industrial waste and non-renewable municipal waste.

Key categories for CO_2 emissions from fuel combustion in 2017

IPCC source category	CO_2 emissions ($MtCO_2$)	1990 CO_2 emissions ($MtCO_2$)	Share in total GHG[3] (%)	Cumulative total (%)
Main activity prod. elec. and heat - gas	444.0	554.9	11.7	11.7
Main activity prod. elec. and heat - coal	425.8	710.5	11.3	23.0
Road - oil	270.1	280.0	7.1	30.1
Manufacturing industries - coal	205.4	317.0	5.4	35.6
Residential - gas	185.2	149.1	4.9	40.4
Unallocated autoproducers - gas	174.3	217.4	4.6	45.1
Manufacturing industries - gas	124.4	199.1	3.3	48.3
Unallocated autoproducers - coal	85.7	101.4	2.3	50.6
Other energy industry own use - gas	84.5	35.9	2.2	52.8
Memo: total CO_2 from fuel combustion	*2464.1*	*3886.4*	*65.1*	*65.1*

3. Percent calculated using the total GHG estimate excluding CO_2 emissions/removals from agriculture, forestry and other land use.

Non-OECD Asia (excluding China)

Figure 1. CO_2 emissions by fuel

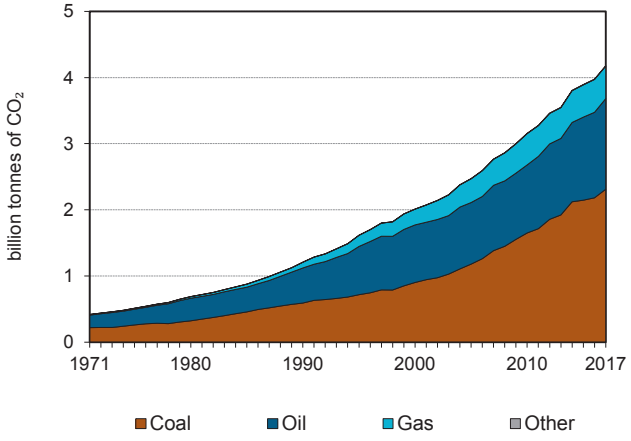


Figure 2. CO_2 emissions by sector

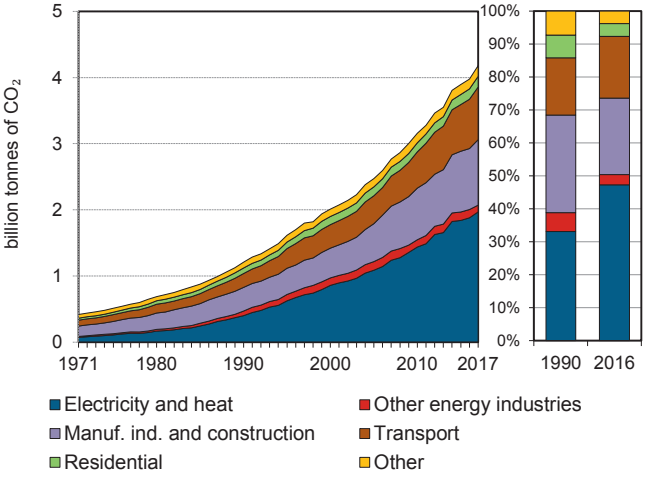


Figure 3. Electricity generation by fuel

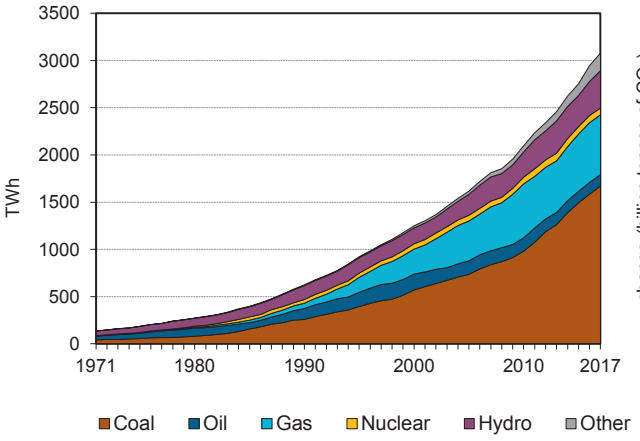


Figure 4. CO_2 from electricity generation: driving factors[1]

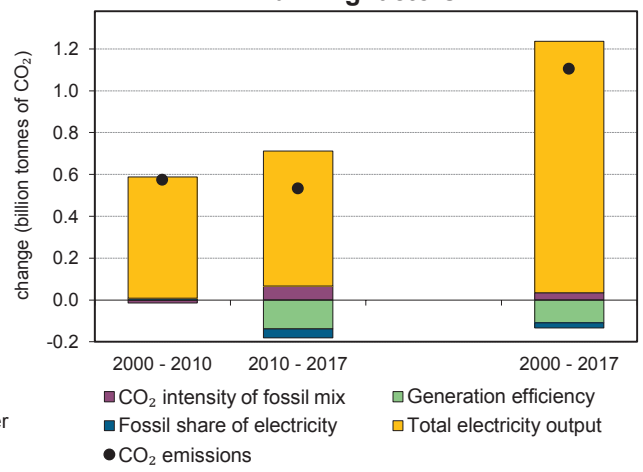


Figure 5. Changes in selected indicators

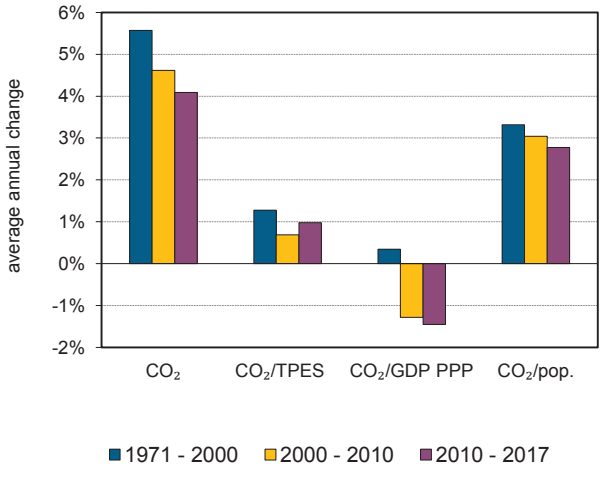
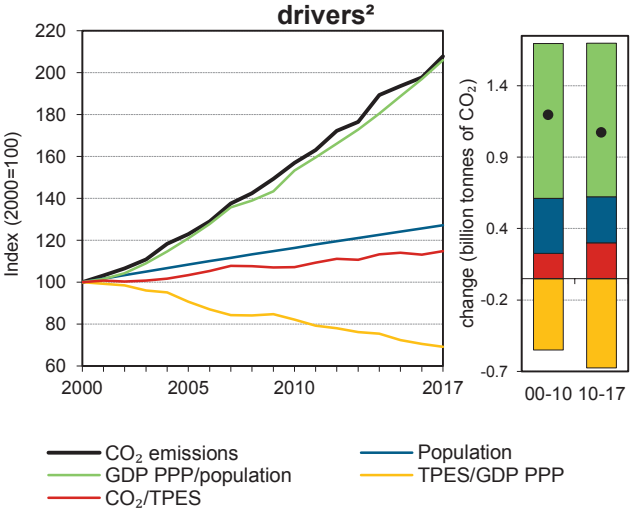


Figure 6. Total CO_2 emissions and drivers[2]



1. Electricity decomposition: CO_2 emissions = CO_2 intensity of fossil mix x fossil share of elec. x thermal efficiency x elec. output. See Chapter 6.
2. Kaya decomposition: CO_2 emissions = CO_2/TPES x TPES/GDP x GDP/population x population. See Chapter 6.

Non-OECD Asia (excluding China)

Key indicators

	1990	1995	2000	2005	2010	2015	2017	%change 90-17
CO_2 fuel combustion ($MtCO_2$)	1208.4	1 615.1	2 011.6	2 472.4	3 157.5	3 894.6	4 179.2	246%
Share of World CO_2 from fuel combustion	6%	8%	9%	9%	10%	12%	13%	
TPES (PJ)	29160	36 273	43 414	51 604	63 599	73 667	78 607	170%
GDP (billion 2010 USD)	1599.1	2 142.3	2 598.1	3 384.3	4 571.1	5 951.4	6 618.6	314%
GDP PPP (billion 2010 USD)	4457.2	5 893.0	7 158.4	9 387.4	12 768.0	16 772.1	18 743.1	321%
Population (millions)	1626.6	1 797.7	1 966.8	2 132.4	2 288.7	2 441.8	2 500.9	54%
CO_2 / TPES (tCO_2 per TJ)	41.4	44.5	46.3	47.9	49.6	52.9	53.2	28%
CO_2 / GDP ($kgCO_2$ per 2010 USD)	0.76	0.8	0.8	0.7	0.7	0.7	0.6	-17%
CO_2 / GDP PPP ($kgCO_2$ per 2010 USD)	0.27	0.3	0.3	0.3	0.2	0.2	0.2	-18%
CO_2 / population (tCO_2 per capita)	0.7	0.9	1.0	1.2	1.4	1.6	1.7	125%
Share of electricity output from fossil fuels	69%	76%	80%	81%	81%	81%	79%	
CO_2 / kWh of electricity (gCO_2/kWh)	634	673	684	670	683	666	638	1%
CO_2 emissions and drivers - Kaya decomposition (1990=100) [1]								
CO_2 emissions index	100	134	166	205	261	322	346	246%
Population index	100	111	121	131	141	150	154	54%
GDP PPP per population index	100	120	133	161	204	251	273	173%
Energy intensity index - TPES / GDP PPP	100	94	93	84	76	67	64	-36%
Carbon intensity index - CO_2 / TPES	100	107	112	116	120	128	128	28%

1. Please see the chapter *Indicator sources and methods* for methodological notes. Based on GDP in 2010 USD, using purchasing power parities.

2017 CO_2 emissions by sector

million tonnes of CO_2	Coal	Oil	Natural gas	Other [2]	Total	%change 90-17
CO_2 fuel combustion	**2 311.7**	**1 370.1**	**491.7**	**5.7**	**4 179.2**	**246%**
Electricity and heat generation	1 582.9	94.8	285.4	5.1	1 968.2	392%
Other energy industry own use	13.5	50.2	38.8	-	102.5	48%
Manufacturing industries and construction	651.2	222.8	116.1	0.0	990.2	177%
Transport	0.1	777.2	18.3	-	795.6	280%
of which: road	-	*712.4*	*17.3*	-	*729.7*	304%
Other	63.9	225.1	33.1	0.6	322.7	88%
of which: residential	*19.6*	*115.0*	*26.9*	-	*161.5*	93%
of which: services	*19.8*	*30.5*	*5.8*	*0.6*	*56.6*	149%
Memo: international marine bunkers	-	*176.6*	-	-	*176.6*	*282%*
Memo: international aviation bunkers	-	*86.8*	-	-	*86.8*	*281%*

2. Other includes industrial waste and non-renewable municipal waste.

Key categories for CO_2 emissions from fuel combustion in 2017

IPCC source category	CO_2 emissions ($MtCO_2$)	1990 CO_2 emissions ($MtCO_2$)	Share in total GHG[3] (%)	Cumulative total (%)
Main activity prod. elec. and heat - coal	1371.1	249.7	18.8	18.8
Road - oil	712.4	180.4	9.8	28.5
Manufacturing industries - coal	651.2	248.4	8.9	37.4
Main activity prod. elec. and heat - gas	237.7	34.8	3.3	40.7
Manufacturing industries - oil	222.8	95.5	3.0	43.7
Unallocated autoproducers - coal	211.9	16.8	2.9	46.6
Manufacturing industries - gas	116.1	14.1	1.6	48.2
Residential - oil	115.0	65.9	1.6	49.8
Non-specified other - oil	110.1	40.8	1.5	51.3
Memo: total CO_2 from fuel combustion	*4179.2*	*1208.4*	*57.2*	*57.2*

3. Percent calculated using the total GHG estimate excluding CO_2 emissions/removals from agriculture, forestry and other land use.

China (incl. Hong Kong, China)

Figure 1. CO_2 emissions by fuel

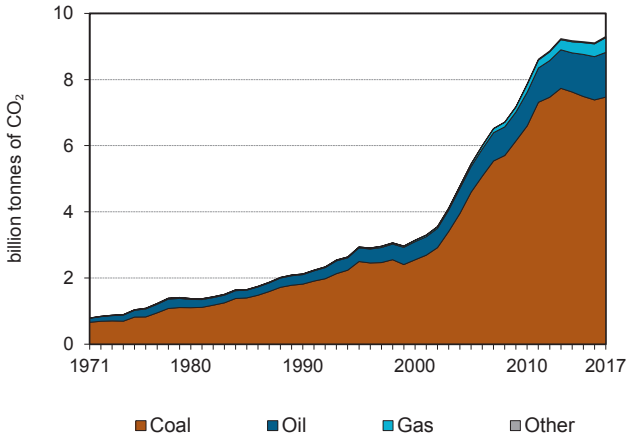


Figure 2. CO_2 emissions by sector

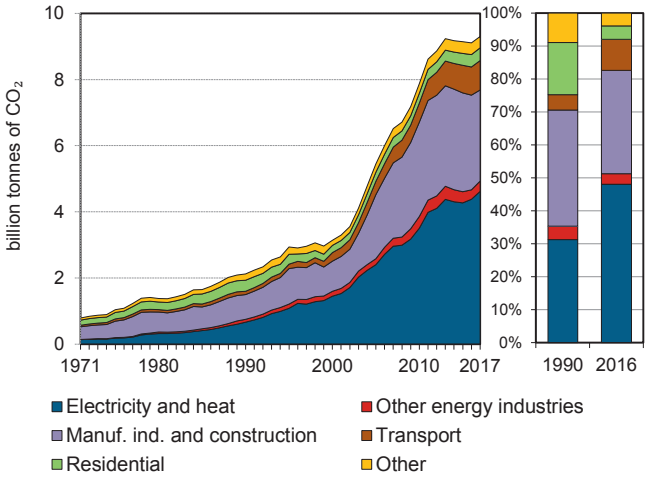


Figure 3. Electricity generation by fuel

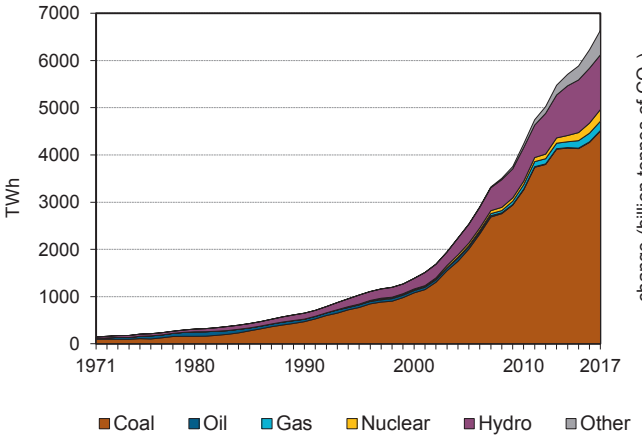


Figure 4. CO_2 from electricity generation: driving factors[1]

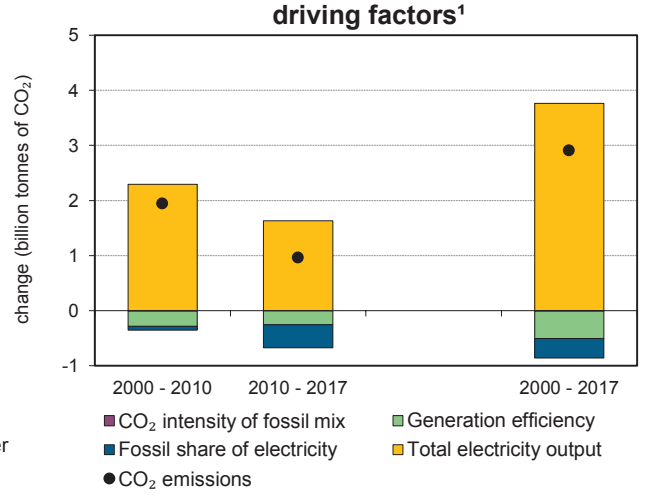


Figure 5. Changes in selected indicators

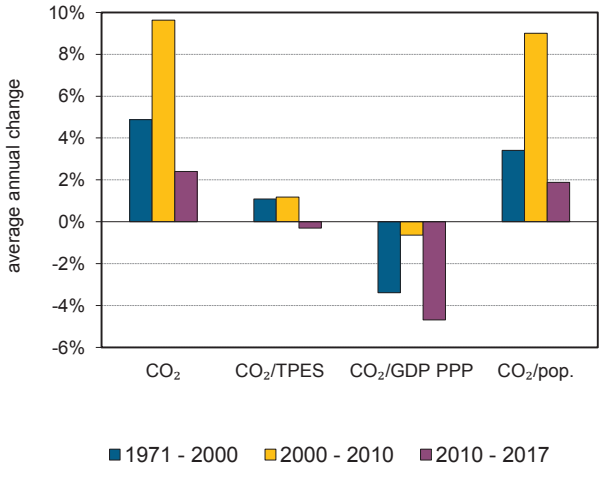
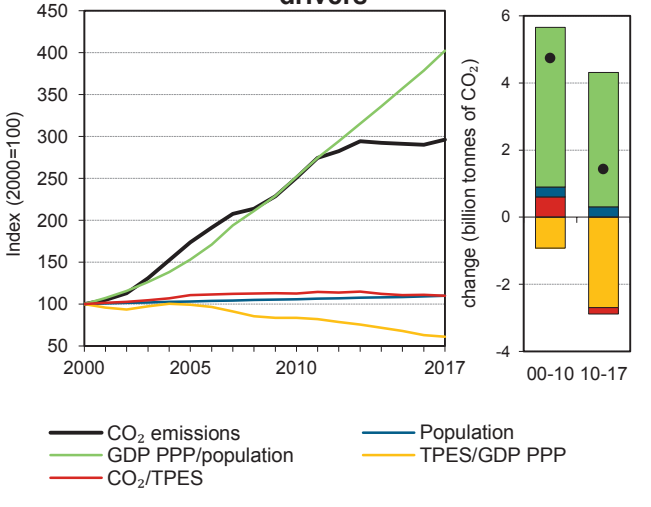


Figure 6. Total CO_2 emissions and drivers[2]



1. Electricity decomposition: CO_2 emissions = CO_2 intensity of fossil mix x fossil share of elec. x thermal efficiency x elec. output. See Chapter 6.
2. Kaya decomposition: CO_2 emissions = CO_2/TPES x TPES/GDP x GDP/population x population. See Chapter 6.

China (incl. Hong Kong, China)

Key indicators

	1990	1995	2000	2005	2010	2015	2017	%change 90-17
CO_2 fuel combustion ($MtCO_2$)	2122.2	2 936.8	3 140.0	5 448.9	7 874.7	9 145.3	9 302.0	338%
Share of World CO_2 from fuel combustion	10%	14%	14%	20%	26%	28%	28%	
TPES (PJ)	36938	44 172	47 875	75 111	106 758	125 874	128 847	249%
GDP (billion 2010 USD)	933.7	1 613.8	2 390.5	3 758.5	6 329.3	9 172.7	10 441.4	1018%
GDP PPP (billion 2010 USD)	1848.5	3 222.0	4 800.3	7 578.9	12 816.1	18 613.8	21 200.6	1047%
Population (millions)	1140.9	1 211.0	1 269.3	1 310.5	1 344.7	1 378.5	1 393.8	22%
CO_2 / TPES (tCO_2 per TJ)	57.5	66.5	65.6	72.5	73.8	72.7	72.2	26%
CO_2 / GDP ($kgCO_2$ per 2010 USD)	2.27	1.8	1.3	1.5	1.2	1.0	0.9	-61%
CO_2 / GDP PPP ($kgCO_2$ per 2010 USD)	1.15	0.9	0.7	0.7	0.6	0.5	0.4	-62%
CO_2 / population (tCO_2 per capita)	1.9	2.4	2.5	4.2	5.9	6.6	6.7	259%
Share of electricity output from fossil fuels	81%	80%	83%	82%	80%	73%	71%	
CO_2 / kWh of electricity (gCO_2/kWh)	911	918	893	846	749	651	623	-32%
CO_2 emissions and drivers - Kaya decomposition (1990=100) [1]								
CO_2 emissions index	100	138	148	257	371	431	438	338%
Population index	100	106	111	115	118	121	122	22%
GDP PPP per population index	100	164	233	357	588	833	939	839%
Energy intensity index - TPES / GDP PPP	100	69	50	50	42	34	30	-70%
Carbon intensity index - CO_2 / TPES	100	116	114	126	128	126	126	26%

1. Please see the chapter *Indicator sources and methods* for methodological notes. Based on GDP in 2010 USD, using purchasing power parities.

2017 CO_2 emissions by sector

million tonnes of CO_2	Coal	Oil	Natural gas	Other [2]	Total	%change 90-17
CO_2 fuel combustion	**7 469.9**	**1 351.1**	**448.2**	**32.8**	**9 302.0**	**338%**
Electricity and heat generation	4 465.1	22.5	97.8	32.8	4 618.2	596%
Other energy industry own use	148.4	104.1	60.3	-	312.9	263%
Manufacturing industries and construction	2 459.4	162.3	132.0	-	2 753.7	268%
Transport	0.0	844.3	44.9	-	889.2	801%
of which: road	-	*682.3*	*44.0*	-	*726.3*	+
Other	396.9	218.0	113.1	-	728.0	39%
of which: residential	*188.2*	*113.8*	*83.4*	-	*385.3*	15%
of which: services	*71.7*	*48.1*	*29.5*	-	*149.3*	193%
Memo: international marine bunkers	-	*67.3*	-	-	*67.3*	*655%*
Memo: international aviation bunkers	-	*49.3*	-	-	*49.3*	*606%*

2. Other includes industrial waste and non-renewable municipal waste.

Key categories for CO_2 emissions from fuel combustion in 2017

IPCC source category	CO_2 emissions ($MtCO_2$)	1990 CO_2 emissions ($MtCO_2$)	Share in total GHG[3] (%)	Cumulative total (%)
Main activity prod. elec. and heat - coal	4180.4	607.7	31.3	31.3
Manufacturing industries - coal	2459.4	676.0	18.4	49.7
Road - oil	682.3	63.1	5.1	54.8
Unallocated autoproducers - coal	284.7	1.4	2.1	56.9
Non-specified other sectors - coal	208.7	129.6	1.6	58.5
Residential - coal	188.2	322.4	1.4	59.9
Manufacturing industries - oil	162.3	66.3	1.2	61.1
Other transport - oil	162.0	9.6	1.2	62.3
Other energy industry - coal	148.4	51.8	1.1	63.4
Memo: total CO_2 from fuel combustion	*9302.0*	*2122.2*	*69.6*	*69.6*

3. Percent calculated using the total GHG estimate excluding CO_2 emissions/removals from agriculture, forestry and other land use.

Non-OECD Americas

Figure 1. CO_2 emissions by fuel

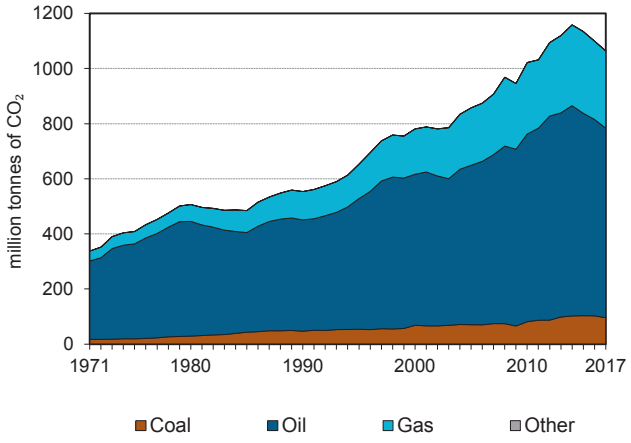


Figure 2. CO_2 emissions by sector

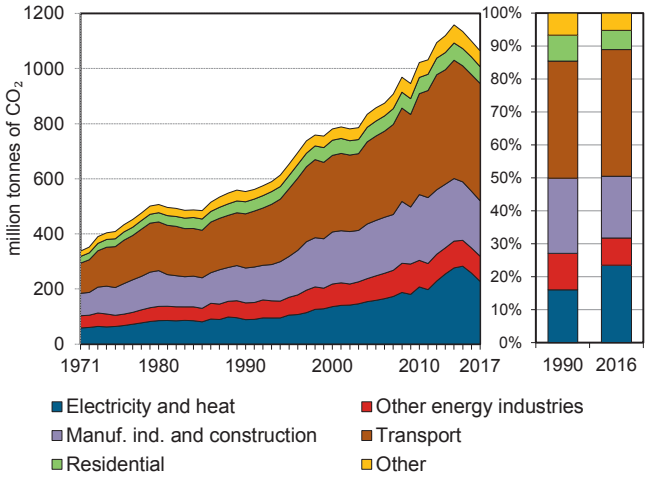


Figure 3. Electricity generation by fuel

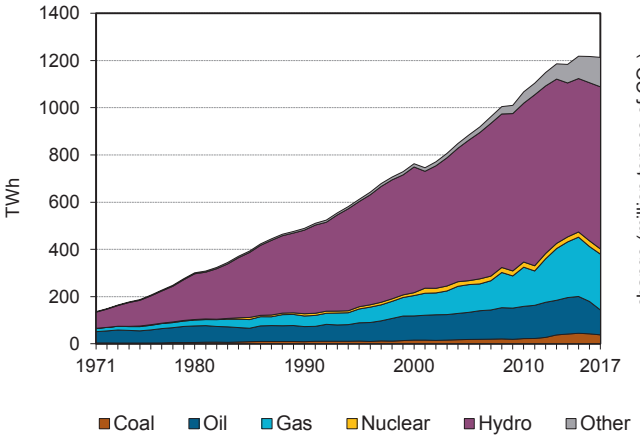


Figure 4. CO_2 from electricity generation: driving factors[1]

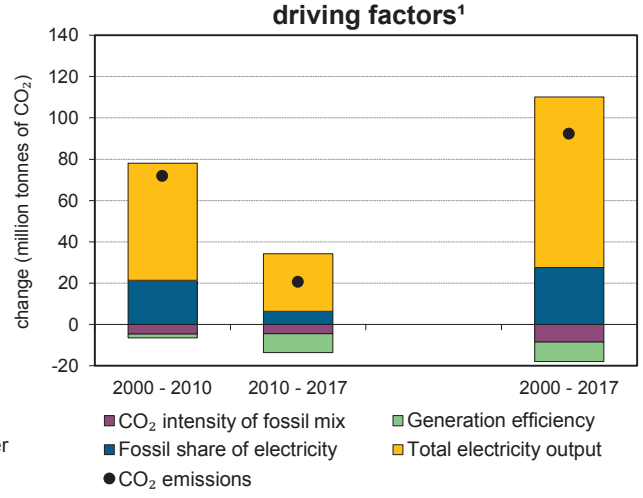


Figure 5. Changes in selected indicators

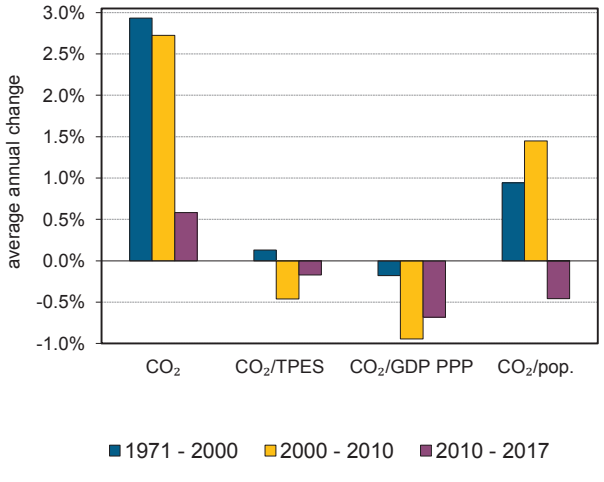
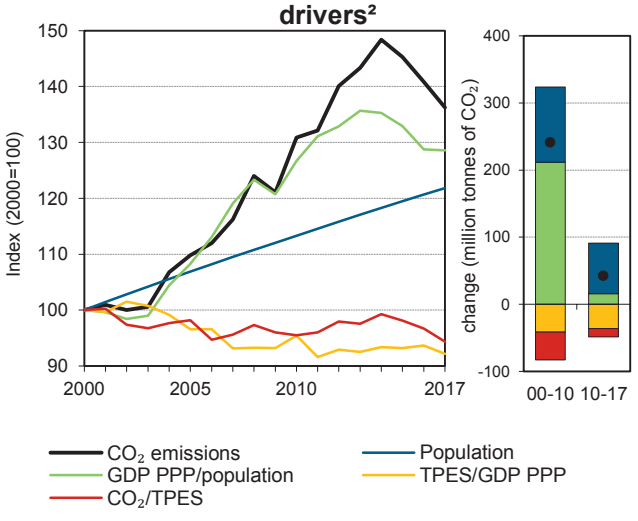


Figure 6. Total CO_2 emissions and drivers[2]



1. Electricity decomposition: CO_2 emissions = CO_2 intensity of fossil mix x fossil share of elec. x thermal efficiency x elec. output. See Chapter 6.
2. Kaya decomposition: CO_2 emissions = CO_2/TPES x TPES/GDP x GDP/population x population. See Chapter 6.

Non-OECD Americas

Key indicators

	1990	1995	2000	2005	2010	2015	2017	%change 90-17
CO_2 fuel combustion ($MtCO_2$)	553.6	652.9	780.8	857.2	1 021.7	1 134.3	1 064.0	92%
Share of World CO_2 from fuel combustion	3%	3%	3%	3%	3%	4%	3%	
TPES (PJ)	13678	15 490	17 733	19 825	24 300	26 257	25 613	87%
GDP (billion 2010 USD)	2166.4	2 563.3	2 851.7	3 291.1	4 064.6	4 440.1	4 328.7	100%
GDP PPP (billion 2010 USD)	3155.9	3 718.9	4 154.8	4 809.5	5 964.4	6 599.9	6 508.8	106%
Population (millions)	346.4	377.5	407.8	436.0	462.1	487.3	496.9	43%
CO_2 / TPES (tCO_2 per TJ)	40.5	42.1	44.0	43.2	42.0	43.2	41.5	3%
CO_2 / GDP ($kgCO_2$ per 2010 USD)	0.26	0.3	0.3	0.3	0.3	0.3	0.2	-4%
CO_2 / GDP PPP ($kgCO_2$ per 2010 USD)	0.18	0.2	0.2	0.2	0.2	0.2	0.2	-7%
CO_2 / population (tCO_2 per capita)	1.6	1.7	1.9	2.0	2.2	2.3	2.1	34%
Share of electricity output from fossil fuels	24%	24%	27%	28%	30%	37%	31%	
CO_2 / kWh of electricity (gCO_2/kWh)	182	172	178	179	194	232	188	3%
CO_2 emissions and drivers - Kaya decomposition (1990=100) [1]								
CO_2 emissions index	100	118	141	155	185	205	192	92%
Population index	100	109	118	126	133	141	143	43%
GDP PPP per population index	100	108	112	121	142	149	144	44%
Energy intensity index - TPES / GDP PPP	100	96	98	95	94	92	91	-9%
Carbon intensity index - CO_2 / TPES	100	104	109	107	104	107	103	3%

1. Please see the chapter *Indicator sources and methods* for methodological notes. Based on GDP in 2010 USD, using purchasing power parities.

2017 CO_2 emissions by sector

million tonnes of CO_2	Coal	Oil	Natural gas	Other [2]	Total	%change 90-17
CO_2 fuel combustion	**95.8**	**687.9**	**280.4**	**-**	**1 064.0**	**92%**
Electricity and heat generation	42.7	69.8	115.3	-	227.7	156%
Other energy industry own use	4.3	30.2	56.8	-	91.3	50%
Manufacturing industries and construction	48.1	92.6	60.4	-	201.1	59%
Transport	-	409.3	16.7	-	425.9	117%
of which: road	-	*385.5*	*13.1*	-	*398.6*	124%
Other	0.7	86.0	31.2	-	117.9	46%
of which: residential	*0.3*	*35.5*	*25.0*	-	*60.8*	39%
of which: services	*0.4*	*7.6*	*4.4*	-	*12.4*	16%
Memo: international marine bunkers	-	*43.6*	-	-	*43.6*	*121%*
Memo: international aviation bunkers	-	*27.3*	-	-	*27.3*	*213%*

2. Other includes industrial waste and non-renewable municipal waste.

Key categories for CO_2 emissions from fuel combustion in 2017

IPCC source category	CO_2 emissions ($MtCO_2$)	1990 CO_2 emissions ($MtCO_2$)	Share in total GHG[3] (%)	Cumulative total (%)
Road - oil	385.5	177.8	14.9	14.9
Main activity prod. elec. and heat - gas	98.6	24.1	3.8	18.7
Manufacturing industries - oil	92.6	68.7	3.6	22.3
Manufacturing industries - gas	60.4	31.5	2.3	24.6
Other energy industry own use - gas	56.8	27.6	2.2	26.8
Main activity prod. elec. and heat - oil	55.6	36.2	2.2	29.0
Non-specified other - oil	50.5	32.6	2.0	31.0
Manufacturing industries - coal	48.1	26.4	1.9	32.8
Residential - oil	35.5	33.6	1.4	34.2
Memo: total CO_2 from fuel combustion	*1064.0*	*553.6*	*41.2*	*41.2*

3. Percent calculated using the total GHG estimate excluding CO_2 emissions/removals from agriculture, forestry and other land use.

Middle East

Figure 1. CO_2 emissions by fuel

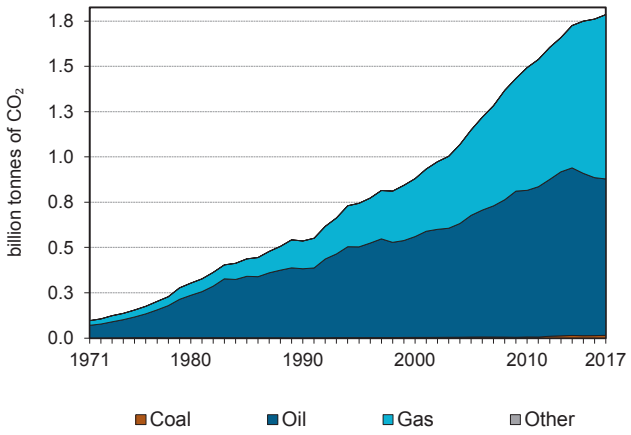


Figure 2. CO_2 emissions by sector

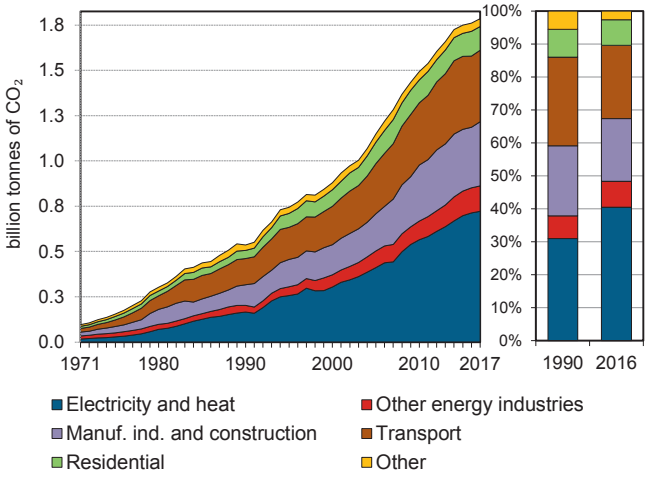


Figure 3. Electricity generation by fuel

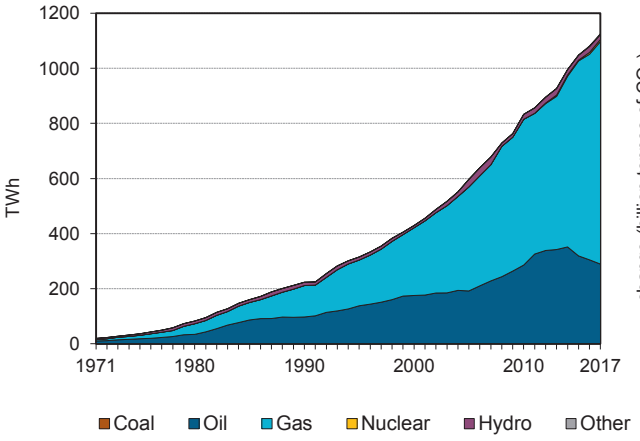


Figure 4. CO_2 from electricity generation: driving factors[1]

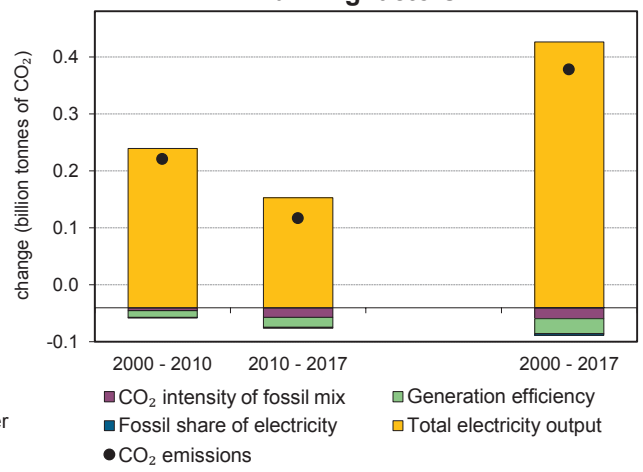


Figure 5. Changes in selected indicators

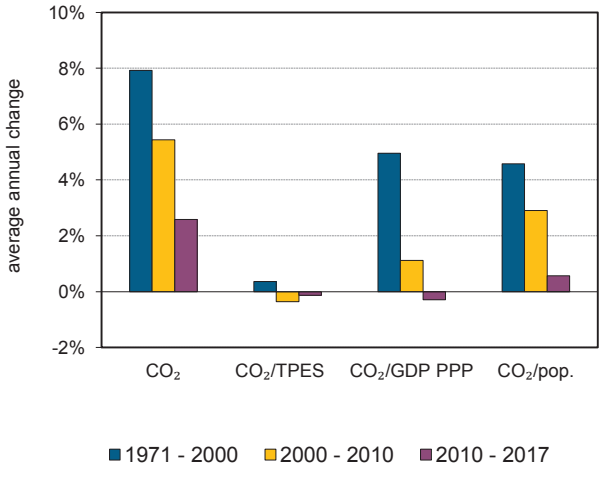
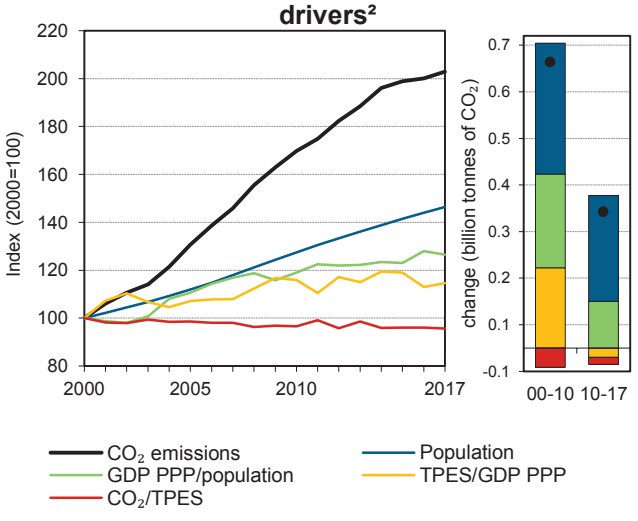


Figure 6. Total CO_2 emissions and drivers[2]



1. Electricity decomposition: CO_2 emissions = CO_2 intensity of fossil mix x fossil share of elec. x thermal efficiency x elec. output. See Chapter 6.
2. Kaya decomposition: CO_2 emissions = CO_2/TPES x TPES/GDP x GDP/population x population. See Chapter 6.

Middle East

Key indicators

	1990	1995	2000	2005	2010	2015	2017	%change 90-17
CO_2 fuel combustion ($MtCO_2$)	536	744.0	879.7	1 148.6	1 493.1	1 749.1	1 785.0	233%
Share of World CO_2 from fuel combustion	3%	3%	4%	4%	5%	5%	5%	
TPES (PJ)	8837	12 839	14 801	19 614	26 029	30 651	31 408	255%
GDP (billion 2010 USD)	872.6	1 041.3	1 257.7	1 568.0	1 924.1	2 237.2	2 368.3	171%
GDP PPP (billion 2010 USD)	2025.3	2 387.0	2 885.7	3 571.1	4 374.5	5 019.1	5 343.7	164%
Population (millions)	127.5	144.1	161.8	181.0	206.2	228.8	237.0	86%
CO_2 / TPES (tCO_2 per TJ)	60.7	57.9	59.4	58.6	57.4	57.1	56.8	-6%
CO_2 / GDP ($kgCO_2$ per 2010 USD)	0.61	0.7	0.7	0.7	0.8	0.8	0.8	23%
CO_2 / GDP PPP ($kgCO_2$ per 2010 USD)	0.27	0.3	0.3	0.3	0.3	0.3	0.3	26%
CO_2 / population (tCO_2 per capita)	4.2	5.2	5.4	6.3	7.2	7.6	7.5	79%
Share of electricity output from fossil fuels	95%	97%	98%	95%	98%	98%	98%	
CO_2 / kWh of electricity (gCO_2/kWh)	742	814	708	689	678	666	641	-14%
CO_2 emissions and drivers - Kaya decomposition (1990=100) [1]								
CO_2 emissions index	100	139	164	214	279	326	333	233%
Population index	100	113	127	142	162	179	186	86%
GDP PPP per population index	100	104	112	124	134	138	142	42%
Energy intensity index - TPES / GDP PPP	100	123	118	126	136	140	135	35%
Carbon intensity index - CO_2 / TPES	100	96	98	97	95	94	94	-6%

1. Please see the chapter *Indicator sources and methods* for methodological notes. Based on GDP in 2010 USD, using purchasing power parities.

2017 CO_2 emissions by sector

million tonnes of CO_2	Coal	Oil	Natural gas	Other [2]	Total	%change 90-17
CO_2 fuel combustion	**15.2**	**863.2**	**906.6**	**-**	**1 785.0**	**233%**
Electricity and heat generation	2.1	266.3	453.5	-	721.9	335%
Other energy industry own use	1.1	45.5	93.5	-	140.1	280%
Manufacturing industries and construction	12.0	120.8	221.4	-	354.2	211%
Transport	-	378.3	16.1	-	394.4	173%
of which: road	-	*373.7*	*15.3*	-	*388.9*	172%
Other	0.0	52.2	122.1	-	174.3	133%
of which: residential	*0.0*	*36.7*	*94.3*	-	*131.0*	191%
of which: services	-	*3.6*	*23.1*	-	*26.7*	158%
Memo: international marine bunkers	-	*71.0*	-	-	*71.0*	*124%*
Memo: international aviation bunkers	-	*56.6*	-	-	*56.6*	*153%*

2. Other includes industrial waste and non-renewable municipal waste.

Key categories for CO_2 emissions from fuel combustion in 2017

IPCC source category	CO_2 emissions ($MtCO_2$)	1990 CO_2 emissions ($MtCO_2$)	Share in total GHG[3] (%)	Cumulative total (%)
Road - oil	373.7	142.8	14.2	14.2
Main activity prod. elec. and heat - gas	347.2	54.6	13.1	27.3
Main activity prod. elec. and heat - oil	237.2	82.0	9.0	36.3
Manufacturing industries - gas	221.4	52.8	8.4	44.7
Manufacturing industries - oil	120.8	60.5	4.6	49.2
Unallocated autoproducers - gas	106.3	24.8	4.0	53.3
Residential - gas	94.3	6.1	3.6	56.8
Other energy industry own use - gas	93.5	13.1	3.5	60.4
Other energy industry own use - oil	45.5	23.2	1.7	62.1
Memo: total CO_2 from fuel combustion	*1785.0*	*536*	*67.6*	*67.6*

3. Percent calculated using the total GHG estimate excluding CO_2 emissions/removals from agriculture, forestry and other land use.

European Union - 28

Figure 1. CO_2 emissions by fuel

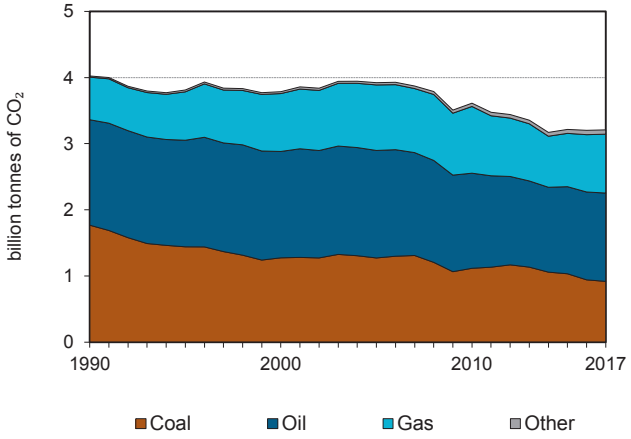


Figure 2. CO_2 emissions by sector

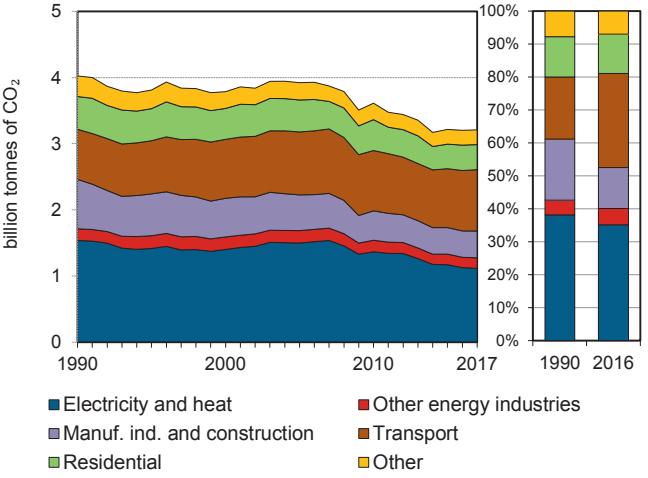


Figure 3. Electricity generation by fuel

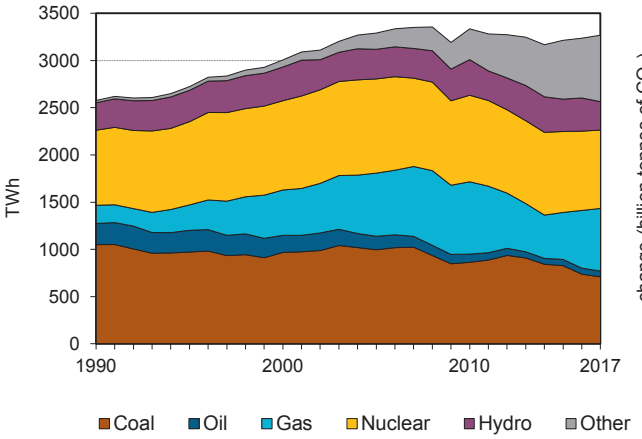


Figure 4. CO_2 from electricity generation: driving factors[1]

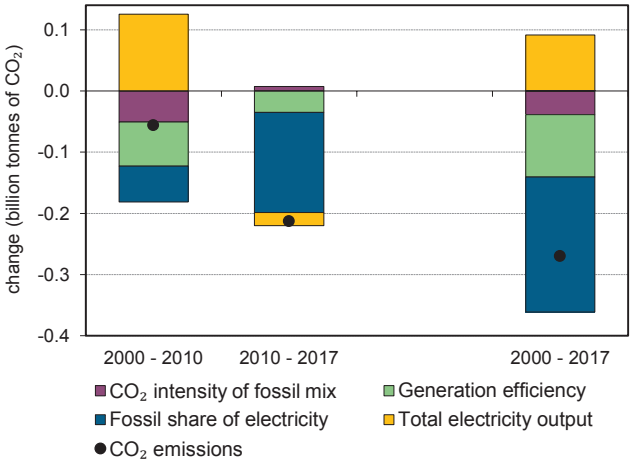


Figure 5. Changes in selected indicators

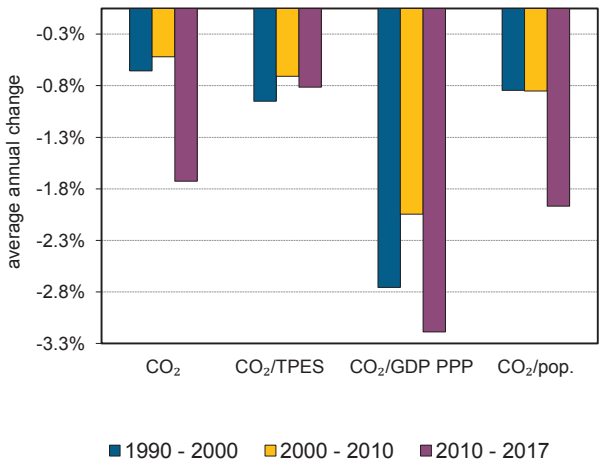
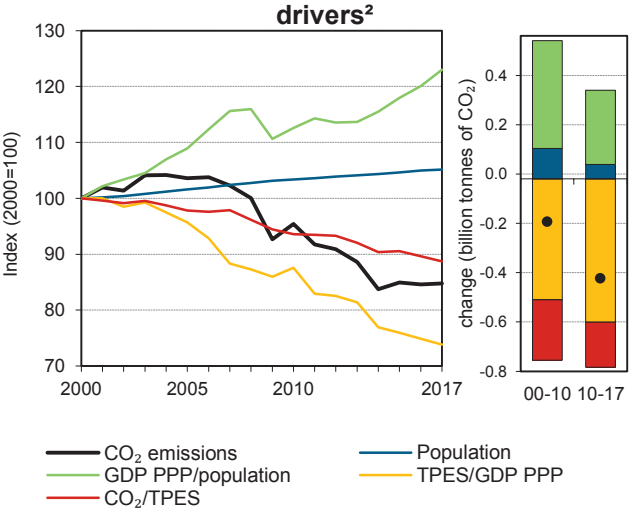


Figure 6. Total CO_2 emissions and drivers[2]



1. Electricity decomposition: CO_2 emissions = CO_2 intensity of fossil mix x fossil share of elec. x thermal efficiency x elec. output. See Chapter 6.
2. Kaya decomposition: CO_2 emissions = CO_2/TPES x TPES/GDP x GDP/population x population. See Chapter 6.

European Union - 28

Key indicators

	1990	1995	2000	2005	2010	2015	2017	%change 90-17
CO_2 fuel combustion ($MtCO_2$)	4024.2	3 812.2	3 786.3	3 922.8	3 612.6	3 216.1	3 209.3	-20%
Share of World CO_2 from fuel combustion	20%	18%	16%	14%	12%	10%	10%	
TPES (PJ)	68882	68 985	70 948	75 148	72 316	66 543	67 786	-2%
GDP (billion 2010 USD)	11831.8	12 773.2	14 778.0	16 254.1	17 009.6	18 005.6	18 826.9	59%
GDP PPP (billion 2010 USD)	11621.4	12 464.7	14 417.7	15 953.4	16 780.1	17 795.7	18 650.1	60%
Population (millions)	478	483.4	487.2	495.0	503.7	509.7	512.4	7%
CO_2 / TPES (tCO_2 per TJ)	58.4	55.3	53.4	52.2	50.0	48.3	47.3	-19%
CO_2 / GDP ($kgCO_2$ per 2010 USD)	0.34	0.3	0.3	0.2	0.2	0.2	0.2	-50%
CO_2 / GDP PPP ($kgCO_2$ per 2010 USD)	0.35	0.3	0.3	0.2	0.2	0.2	0.2	-50%
CO_2 / population (tCO_2 per capita)	8.4	7.9	7.8	7.9	7.2	6.3	6.3	-26%
Share of electricity output from fossil fuels	57%	54%	55%	55%	52%	44%	45%	
CO_2 / kWh of electricity (gCO_2/kWh)	501	453	410	396	352	316	294	-41%
CO_2 emissions and drivers - Kaya decomposition (1990=100) [1]								
CO_2 emissions index	100	95	94	97	90	80	80	-20%
Population index	100	101	102	104	105	107	107	7%
GDP PPP per population index	100	106	122	133	137	144	150	50%
Energy intensity index - TPES / GDP PPP	100	93	83	79	73	63	61	-39%
Carbon intensity index - CO_2 / TPES	100	95	91	89	86	83	81	-19%

1. Please see the chapter *Indicator sources and methods* for methodological notes. Based on GDP in 2010 USD, using purchasing power parities.

2017 CO_2 emissions by sector

million tonnes of CO_2	Coal	Oil	Natural gas	Other [2]	Total	%change 90-17
CO_2 fuel combustion	**918.2**	**1 335.4**	**890.7**	**64.9**	**3 209.3**	**-20%**
Electricity and heat generation	730.9	50.2	289.8	44.0	1 115.0	-27%
Other energy industry own use	33.9	86.0	38.9	0.3	159.2	-10%
Manufacturing industries and construction	107.4	84.8	194.1	19.2	405.5	-46%
Transport	0.0	920.3	7.9	-	928.2	22%
of which: road	-	*879.5*	*4.0*	-	*883.4*	25%
Other	45.9	194.1	360.0	1.3	601.4	-25%
of which: residential	*37.8*	*97.0*	*243.8*	*0.0*	*378.6*	-24%
of which: services	*3.6*	*48.5*	*106.2*	*1.3*	*159.6*	-20%
Memo: international marine bunkers	-	*141.2*	*0.1*	-	*141.2*	*25%*
Memo: international aviation bunkers	-	*151.8*	-	-	*151.8*	*109%*

2. Other includes industrial waste and non-renewable municipal waste.

Key categories for CO_2 emissions from fuel combustion in 2017

IPCC source category	CO_2 emissions ($MtCO_2$)	1990 CO_2 emissions ($MtCO_2$)	Share in total GHG[3] (%)	Cumulative total (%)
Road - oil	879.5	706.6	20.5	20.5
Main activity prod. elec. and heat - coal	678.0	1024.9	15.8	36.2
Residential - gas	243.8	180.1	5.7	41.9
Main activity prod. elec. and heat - gas	232.3	105.7	5.4	47.3
Manufacturing industries - gas	194.1	229.0	4.5	51.8
Non-specified other - gas	116.2	85.8	2.7	54.5
Manufacturing industries - coal	107.4	320.3	2.5	57.0
Non-specified other - oil	97.2	156.5	2.3	59.3
Residential - oil	97.0	182.6	2.3	61.6
Memo: total CO_2 from fuel combustion	*3209.3*	*4024.2*	*74.7*	*74.7*

3. Percent calculated using the total GHG estimate excluding CO_2 emissions/removals from agriculture, forestry and other land use.

G20

Figure 1. CO_2 emissions by fuel

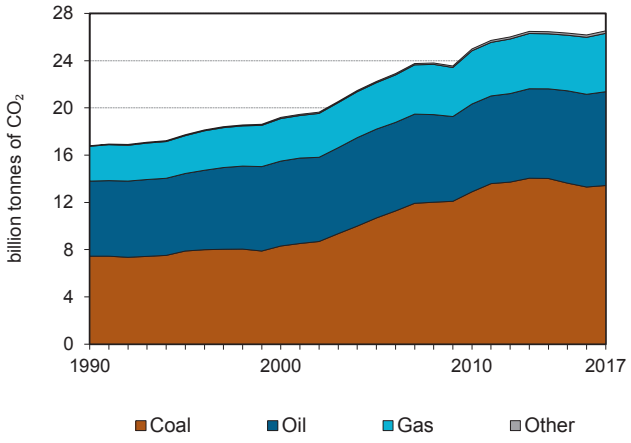


Figure 2. CO_2 emissions by sector

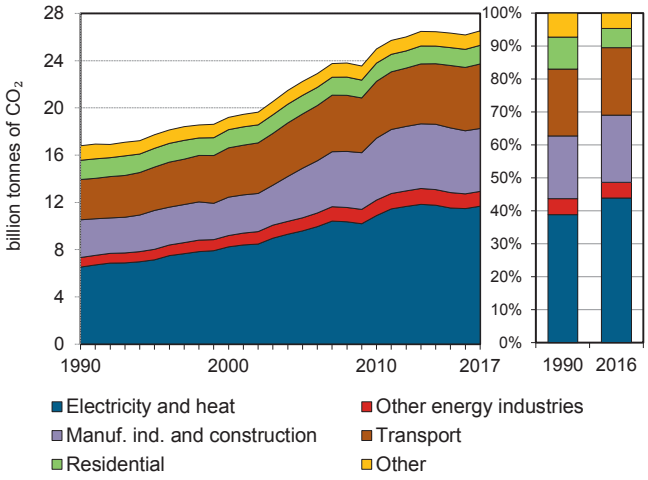


Figure 3. Electricity generation by fuel

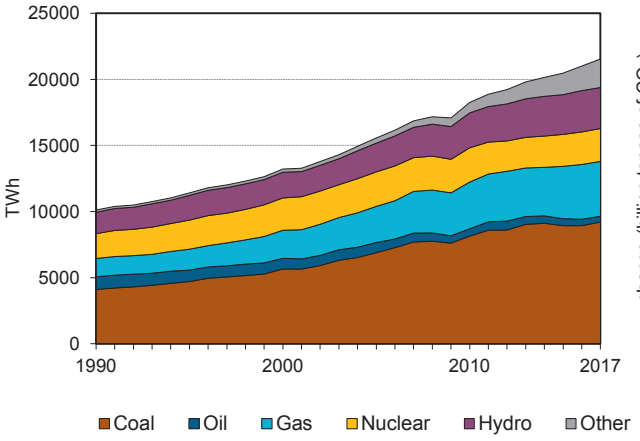


Figure 4. CO_2 from electricity generation: driving factors[1]

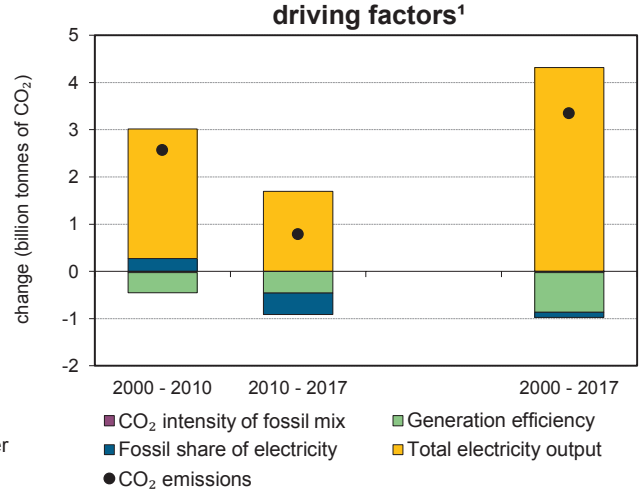


Figure 5. Changes in selected indicators

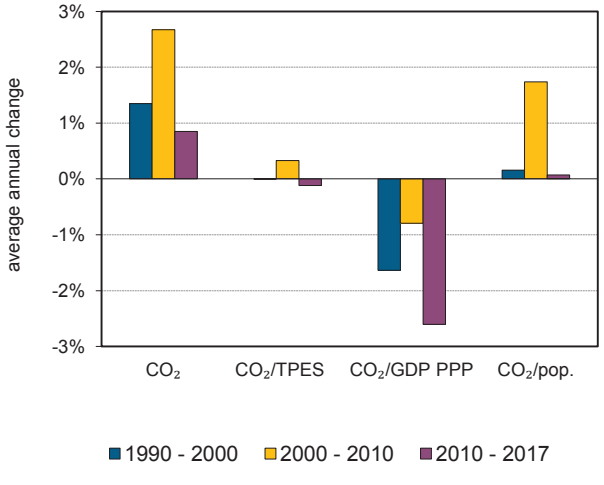
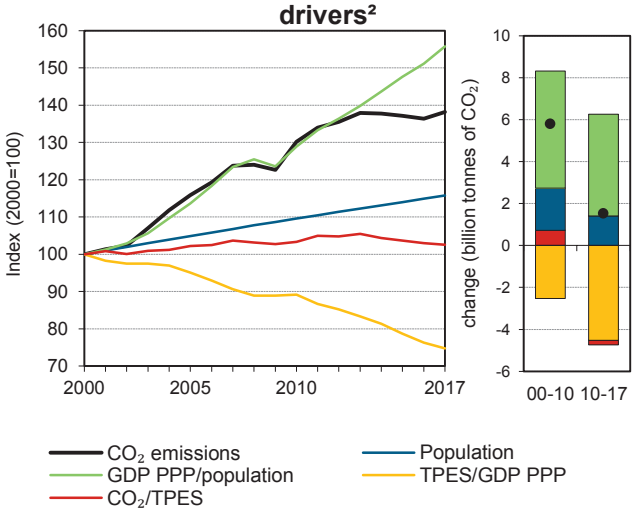


Figure 6. Total CO_2 emissions and drivers[2]



1. Electricity decomposition: CO_2 emissions = CO_2 intensity of fossil mix x fossil share of elec. x thermal efficiency x elec. output. See Chapter 6.
2. Kaya decomposition: CO_2 emissions = CO_2/TPES x TPES/GDP x GDP/population x population. See Chapter 6.

G20

Key indicators

	1990	1995	2000	2005	2010	2015	2017	%change 90-17
CO_2 fuel combustion ($MtCO_2$)	16794.3	17 730.7	19 197.7	22 238.4	24 992.1	26 334.7	26 521.7	58%
Share of World CO_2 from fuel combustion	82%	83%	83%	82%	82%	81%	81%	
TPES (PJ)	295774	312 721	338 252	383 461	426 034	447 692	455 786	54%
GDP (billion 2010 USD)	33634.2	37 390.4	44 282.5	51 068.7	57 344.6	65 592.2	69 294.2	106%
GDP PPP (billion 2010 USD)	37613	42 178.1	50 607.7	60 325.5	71 506.9	85 173.0	91 217.9	143%
Population (millions)	3658.5	3 897.2	4 117.9	4 318.7	4 512.5	4 693.8	4 766.0	30%
CO_2 / TPES (tCO_2 per TJ)	56.8	56.7	56.8	58.0	58.7	58.8	58.2	2%
CO_2 / GDP ($kgCO_2$ per 2010 USD)	0.5	0.5	0.4	0.4	0.4	0.4	0.4	-23%
CO_2 / GDP PPP ($kgCO_2$ per 2010 USD)	0.45	0.4	0.4	0.4	0.4	0.3	0.3	-35%
CO_2 / population (tCO_2 per capita)	4.6	4.6	4.7	5.1	5.5	5.6	5.6	21%
Share of electricity output from fossil fuels	64%	63%	65%	67%	67%	66%	64%	
CO_2 / kWh of electricity (gCO_2/kWh)	540	542	552	554	539	512	492	-9%
CO_2 emissions and drivers - Kaya decomposition (1990=100) [1]								
CO_2 emissions index	100	106	114	132	149	157	158	58%
Population index	100	107	113	118	123	128	130	30%
GDP PPP per population index	100	105	120	136	154	176	186	86%
Energy intensity index - TPES / GDP PPP	100	94	85	81	76	67	64	-36%
Carbon intensity index - CO_2 / TPES	100	100	100	102	103	104	102	2%

1. Please see the chapter *Indicator sources and methods* for methodological notes. Based on GDP in 2010 USD, using purchasing power parities.

2017 CO_2 emissions by sector

million tonnes of CO_2	Coal	Oil	Natural gas	Other [2]	Total	%change 90-17
CO_2 fuel combustion	**13 430.1**	**7 941.4**	**4 942.2**	**208.1**	**26 521.7**	**58%**
Electricity and heat generation	9 060.4	400.7	2 068.1	145.4	11 674.5	79%
Other energy industry own use	312.9	502.0	439.1	1.2	1 255.3	55%
Manufacturing industries and construction	3 494.6	787.1	996.1	51.2	5 328.9	67%
Transport	0.1	5 261.9	198.5	-	5 460.5	60%
of which: road	-	*4 654.9*	*69.3*	-	*4 724.2*	69%
Other	562.2	989.7	1 240.4	10.3	2 802.5	-2%
of which: residential	*274.2*	*473.3*	*831.4*	*0.0*	*1 578.9*	-3%
of which: services	*124.9*	*209.2*	*389.4*	*6.7*	*730.2*	1%
Memo: international marine bunkers	-	*410.0*	*0.1*	-	*410.0*	*53%*
Memo: international aviation bunkers	-	*408.0*	-	-	*408.0*	*121%*

2. Other includes industrial waste and non-renewable municipal waste.

Key categories for CO_2 emissions from fuel combustion in 2017

IPCC source category	CO_2 emissions ($MtCO_2$)	1990 CO_2 emissions ($MtCO_2$)	Share in total GHG[3] (%)	Cumulative total (%)
Main activity prod. elec. and heat - coal	8357.1	4221.1	21.8	21.8
Road - oil	4654.9	2787.8	12.2	34.0
Manufacturing industries - coal	3494.6	1716.0	9.1	43.1
Main activity prod. elec. and heat - gas	1651.8	745.1	4.3	47.5
Manufacturing industries - gas	996.1	685.3	2.6	50.1
Residential - gas	831.4	596.3	2.2	52.2
Manufacturing industries - oil	787.1	784.9	2.1	54.3
Unallocated autoproducers - coal	703.3	375.6	1.8	56.1
Other transport - oil	607.0	462.6	1.6	57.7
Memo: total CO_2 from fuel combustion	*26521.7*	*16794.3*	*69.3*	*69.3*

3. Percent calculated using the total GHG estimate excluding CO_2 emissions/removals from agriculture, forestry and other land use.

3. SUMMARY TABLES

CO_2 emissions from fuel combustion

million tonnes of CO_2

	1971	1975	1980	1985	1990	1995	2000	2005	2010	2015	2017	% change 90-17
World [1]	**13 945.2**	**15 486.6**	**17 708.4**	**18 249.0**	**20 521.1**	**21 387.2**	**23 239.8**	**27 074.8**	**30 571.4**	**32 430.9**	**32 839.9**	**60.0%**
Annex I Parties	..	..	..	..	*13 721.6*	*12 992.5*	*13 630.5*	*13 856.6*	*13 240.1*	*12 432.0*	*12 282.6*	*-10.5%*
Annex II Parties	*8 580.8*	*8 845.0*	*9 419.3*	*9 072.9*	*9 659.6*	*10 038.6*	*10 907.5*	*11 085.7*	*10 413.7*	*9 702.4*	*9 471.6*	*-1.9%*
North America	*4 629.3*	*4 732.9*	*5 018.1*	*4 908.2*	*5 222.7*	*5 522.9*	*6 246.1*	*6 243.7*	*5 880.7*	*5 486.3*	*5 309.1*	*1.7%*
Europe	*3 043.6*	*3 066.3*	*3 307.4*	*3 059.4*	*3 113.2*	*3 088.2*	*3 162.2*	*3 276.0*	*2 991.8*	*2 655.4*	*2 613.3*	*-16.1%*
Asia Oceania	*907.9*	*1 045.8*	*1 093.8*	*1 105.3*	*1 323.8*	*1 427.5*	*1 499.2*	*1 566.0*	*1 541.1*	*1 560.8*	*1 549.3*	*17.0%*
Annex I EIT	..	..	..	..	*3 927.0*	*2 792.4*	*2 513.3*	*2 545.4*	*2 548.7*	*2 403.1*	*2 424.4*	*-38.3%*
Non-Annex I Parties	..	..	..	..	*6 170.0*	*7 677.1*	*8 756.3*	*12 226.4*	*16 210.9*	*18 808.4*	*19 275.3*	*212.4%*
Annex B Kyoto Parties	..	..	..	..	*5 379.7*	*4 795.7*	*4 656.2*	*4 871.6*	*4 625.9*	*4 151.1*	*4 149.1*	*-22.9%*
Intl. aviation bunkers	**168.8**	**173.2**	**201.4**	**224.2**	**258.3**	**289.7**	**354.5**	**420.3**	**457.5**	**530.4**	**584.9**	**126.4%**
Intl. marine bunkers	**354.0**	**341.2**	**357.2**	**306.4**	**371.3**	**428.0**	**498.4**	**571.5**	**662.9**	**660.1**	**697.1**	**87.8%**
Non-OECD Total	**4 078.5**	**5 214.5**	**6 566.2**	**7 377.5**	**8 837.1**	**9 140.1**	**9 836.4**	**13 239.4**	**17 084.9**	**19 549.9**	**19 979.3**	**126.1%**
OECD Total	**9 343.9**	**9 757.7**	**10 583.7**	**10 340.9**	**11 054.4**	**11 529.5**	**12 550.4**	**12 843.7**	**12 366.1**	**11 690.5**	**11 578.5**	**4.7%**
Canada	340.2	377.1	422.3	393.9	419.6	449.0	516.3	540.4	528.6	557.7	547.8	30.6%
Chile	21.0	17.1	21.4	19.6	29.4	37.1	48.6	54.4	68.6	81.1	86.1	192.5%
Mexico	93.7	134.6	204.6	241.2	257.0	291.3	359.7	412.4	440.5	442.4	446.0	73.6%
United States	4 289.0	4 355.8	4 595.8	4 514.3	4 803.1	5 073.9	5 729.9	5 703.2	5 352.1	4 928.6	4 761.3	-0.9%
OECD Americas	**4 744.1**	**4 884.6**	**5 244.1**	**5 169.0**	**5 509.1**	**5 851.3**	**6 654.5**	**6 710.5**	**6 389.8**	**6 009.8**	**5 841.2**	**6.0%**
Australia	143.4	179.5	206.7	220.1	259.7	285.3	334.6	365.5	383.6	373.8	384.6	48.1%
Israel [2]	13.8	16.4	18.9	24.3	32.8	44.9	54.8	58.8	68.4	63.9	63.8	94.3%
Japan	751.0	849.9	870.6	866.2	1 042.3	1 118.2	1 135.6	1 166.8	1 127.2	1 155.7	1 132.4	8.6%
Korea	52.9	77.7	125.6	155.7	231.8	357.3	431.9	457.7	550.9	582.0	600.0	158.9%
New Zealand	13.5	16.4	16.5	18.9	21.7	23.9	29.0	33.7	30.3	31.3	32.2	48.2%
OECD Asia Oceania	**974.6**	**1 139.9**	**1 238.3**	**1 285.3**	**1 588.4**	**1 829.7**	**1 986.0**	**2 082.5**	**2 160.5**	**2 206.7**	**2 213.1**	**39.3%**
Austria	48.6	49.5	54.4	52.6	56.2	59.5	61.8	74.8	68.6	62.2	64.9	15.4%
Belgium	118.0	115.6	125.5	101.0	106.5	111.3	114.0	107.7	103.9	92.8	90.4	-15.1%
Czech Republic	153.5	155.0	168.0	175.3	150.2	123.2	121.2	118.4	112.5	99.4	101.7	-32.3%
Denmark	55.4	52.6	63.1	61.0	51.0	58.4	50.8	48.5	47.3	31.9	31.3	-38.7%
Estonia	..	..	..	..	35.0	15.9	14.4	16.7	18.6	15.1	16.0	-54.4%
Finland	39.9	44.2	54.9	48.3	53.8	55.7	54.6	54.9	62.0	42.4	42.6	-20.9%
France	423.4	423.1	455.2	351.8	345.6	343.6	364.7	371.9	340.2	299.6	306.1	-11.4%
Germany	978.1	973.4	1 048.2	1 004.3	940.0	856.6	812.3	786.7	758.8	729.7	718.8	-23.5%
Greece	25.1	34.1	45.2	54.5	69.9	76.5	87.9	95.2	83.4	64.5	63.2	-9.5%
Hungary	60.3	70.2	82.6	79.8	65.7	56.2	53.3	54.7	47.1	42.7	45.8	-30.3%
Iceland	1.4	1.6	1.7	1.6	1.9	2.0	2.2	2.2	1.9	2.1	2.2	14.6%
Ireland	21.6	21.1	25.9	26.5	30.1	32.6	40.9	44.4	39.5	35.3	35.7	18.6%
Italy	289.4	317.1	355.4	342.0	389.4	401.1	420.4	456.4	392.0	329.7	321.5	-17.4%
Latvia	..	..	..	..	18.8	8.9	6.8	7.6	8.1	6.8	6.7	-64.4%
Lithuania	..	..	..	..	32.2	13.4	10.2	12.4	12.3	10.6	10.8	-66.4%
Luxembourg	16.5	12.7	12.5	10.3	10.7	8.2	8.1	11.5	10.7	8.8	8.6	-19.7%
Netherlands	127.7	132.0	145.4	138.4	147.8	163.6	161.6	167.5	170.8	157.9	155.6	5.3%
Norway	23.0	23.6	27.2	26.4	27.5	31.4	31.9	34.5	37.3	35.9	34.8	26.6%
Poland	287.4	338.9	416.0	422.4	344.8	333.3	289.6	296.3	307.5	282.7	305.8	-11.3%
Portugal	14.4	18.0	23.8	23.9	37.9	47.2	57.9	61.4	47.6	46.9	50.8	34.0%
Slovak Republic	38.9	43.2	55.8	54.4	54.8	41.2	36.9	37.3	34.6	29.4	32.2	-41.2%
Slovenia	..	..	..	..	13.5	14.1	14.1	15.4	15.4	12.8	13.4	-0.9%
Spain	119.1	155.8	186.3	173.0	202.6	228.2	278.6	333.7	262.1	247.1	253.4	25.1%
Sweden	82.0	79.0	73.1	58.4	52.1	56.9	52.0	49.1	46.1	37.1	37.6	-27.7%
Switzerland	38.9	36.8	39.3	41.8	40.7	41.5	42.0	44.0	43.3	37.3	37.1	-8.9%
Turkey	41.7	59.6	71.5	95.4	128.8	154.0	201.2	215.9	267.8	319.0	378.6	194.0%
United Kingdom	*621.1*	*576.0*	*570.6*	*543.5*	*549.4*	*513.8*	*520.6*	*531.6*	*476.6*	*394.1*	*358.7*	*-34.7%*
OECD Europe	***3 625.3***	***3 733.1***	***4 101.3***	***3 886.6***	***3 956.9***	***3 848.5***	***3 909.9***	***4 050.7***	***3 815.8***	***3 474.0***	***3 524.3***	***-10.9%***
IEA/Accession/Association	*10 588.7*	*11 395.9*	*12 694.1*	*12 855.7*	*14 265.1*	*15 945.4*	*17 499.8*	*20 506.5*	*23 136.6*	*24 402.3*	*24 596.7*	*72.4%*
European Union - 28	..	..	..	..	*4 024.2*	*3 812.2*	*3 786.3*	*3 922.8*	*3 612.6*	*3 216.1*	*3 209.3*	*-20.3%*
G20	..	..	..	..	*16 794.3*	*17 730.7*	*19 197.7*	*22 238.4*	*24 992.1*	*26 334.7*	*26 521.7*	*57.9%*
Africa	*249.2*	*324.3*	*397.9*	*465.6*	*530.6*	*578.4*	*663.0*	*865.2*	*1 017.9*	*1 156.7*	*1 185.1*	*123.3%*
Americas	*5 081.6*	*5 293.1*	*5 750.6*	*5 653.3*	*6 062.7*	*6 504.2*	*7 435.3*	*7 567.7*	*7 411.5*	*7 144.1*	*6 905.2*	*13.9%*
Asia	..	..	..	..	*5 838.1*	*7 318.5*	*8 159.7*	*11 320.5*	*14 956.4*	*17 364.8*	*17 896.1*	*206.5%*
Europe	..	..	..	..	*7 173.2*	*5 953.2*	*5 757.9*	*5 919.8*	*5 641.2*	*5 154.0*	*5 138.1*	*-28.4%*
Oceania	*161.12*	*201.11*	*228.35*	*244.57*	*286.90*	*315.24*	*370.90*	*409.81*	*423.98*	*420.88*	*433.46*	*51.1%*

1. Total world includes non-OECD total, OECD total as well as international marine bunkers and international aviation bunkers.
2. Please refer to the chapter Geographical coverage.

CO_2 emissions from fuel combustion

million tonnes of CO_2

	1971	1975	1980	1985	1990	1995	2000	2005	2010	2015	2017	% change 90-17
Non-OECD Total	**4 078.5**	**5 214.5**	**6 566.2**	**7 377.5**	**8 837.1**	**9 140.1**	**9 836.4**	**13 239.4**	**17 084.9**	**19 549.9**	**19 979.3**	**126.1%**
Albania	3.9	4.3	6.8	6.9	5.7	1.8	3.1	3.8	3.9	3.8	4.3	-23.5%
Armenia	..	..	..	..	19.8	3.4	3.4	4.1	4.0	4.7	5.2	-74.0%
Azerbaijan	..	..	..	..	53.5	32.4	27.3	29.0	23.5	30.8	30.8	-42.4%
Belarus	..	..	..	..	99.9	57.0	52.1	55.0	59.5	52.6	54.1	-45.9%
Bosnia and Herzegovina	..	..	..	..	24.0	3.3	13.7	15.9	20.5	19.3	22.3	-6.8%
Bulgaria	63.8	73.3	85.0	82.2	71.5	52.7	42.1	46.5	44.4	43.7	42.8	-40.1%
Croatia	..	..	..	..	20.3	14.8	16.8	19.9	18.2	15.5	16.2	-20.3%
Cyprus [1]	1.7	1.7	2.6	2.8	3.9	5.0	6.3	7.0	7.3	5.9	6.4	63.6%
Georgia	..	..	..	..	33.5	8.1	4.6	4.1	5.0	8.4	8.7	-74.0%
Gibraltar	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.4	0.5	0.6	0.7	393.0%
Kazakhstan	..	..	..	..	237.3	170.5	112.0	156.9	221.1	245.8	255.8	7.8%
Kosovo	..	..	..	..	..	..	5.1	6.6	8.7	8.6	8.2	..
Kyrgyzstan	..	..	..	..	22.8	4.5	4.5	4.9	6.0	9.9	8.9	-60.9%
Malta	0.7	0.7	1.0	1.2	2.3	2.4	2.1	2.6	2.6	1.6	1.5	-34.5%
Republic of Moldova	..	..	..	..	30.5	11.9	6.5	7.8	7.9	7.6	7.5	-75.3%
Montenegro	..	..	..	..	..	..	..	2.0	2.6	2.4	2.2	..
Republic of North Macedonia	..	..	..	..	8.6	8.3	8.5	8.9	8.3	7.1	7.4	-13.4%
Romania	114.7	140.6	177.4	174.9	168.2	117.6	86.2	92.6	74.7	69.6	70.8	-57.9%
Russian Federation	..	..	..	..	2 163.5	1 548.3	1 474.4	1 481.9	1 529.2	1 534.5	1 536.9	-29.0%
Serbia	..	..	..	..	61.9	44.5	42.9	50.3	45.6	44.5	46.1	-25.5%
Tajikistan	..	..	..	..	11.0	2.5	2.2	2.3	2.3	4.2	5.8	-47.0%
Turkmenistan	..	..	..	..	44.6	33.3	36.7	48.1	56.9	69.1	69.0	54.5%
Ukraine	..	..	..	..	688.6	395.8	295.1	290.6	266.6	187.6	171.3	-75.1%
Uzbekistan	..	..	..	..	114.9	94.6	115.1	105.6	100.6	92.2	81.2	-29.4%
Former Soviet Union	1 941.7	2 480.7	2 935.7	3 078.3	..	..	..	..	..	..	..	..
Former Yugoslavia	61.8	73.5	84.2	119.6	..	..	..	..	..	..	..	..
Non-OECD Europe and Eurasia	**2 188.3**	**2 774.8**	**3 292.7**	**3 465.9**	**3 886.4**	**2 612.9**	**2 361.2**	**2 447.1**	**2 520.0**	**2 469.9**	**2 464.1**	**-36.6%**
Algeria	8.6	13.6	27.7	42.1	51.2	55.3	61.5	77.5	95.5	130.4	130.5	155.0%
Angola	1.6	2.0	2.7	2.8	3.9	3.9	4.6	6.1	15.2	21.5	18.0	359.5%
Benin	0.3	0.5	0.4	0.5	0.3	0.2	1.4	2.7	4.6	5.3	6.8	+
Botswana	..	..	..	1.5	2.8	3.2	4.0	4.3	3.3	7.1	7.7	174.9%
Cameroon	0.7	1.0	1.7	2.4	2.6	2.5	2.8	2.9	5.1	5.9	6.2	132.7%
Congo	0.6	0.6	0.7	0.8	0.6	0.5	0.5	0.8	1.8	3.2	2.8	345.7%
Côte d'Ivoire	2.4	3.0	3.4	3.0	2.7	3.3	6.3	5.8	6.2	9.5	10.2	278.3%
Dem. Rep. of the Congo	2.6	2.6	3.2	3.3	3.0	1.1	0.9	1.3	1.9	2.7	2.2	-26.4%
Egypt	20.1	25.6	40.8	64.5	77.9	81.5	100.1	145.0	176.4	199.5	209.2	168.7%
Eritrea	..	..	..	..	..	0.8	0.6	0.6	0.5	0.6	0.6	..
Ethiopia	1.3	1.2	1.4	1.4	2.2	2.3	3.2	4.5	5.9	10.1	13.1	501.5%
Gabon	0.5	0.8	1.3	1.7	0.9	1.3	1.5	1.7	2.7	3.3	3.4	270.1%
Ghana	1.9	2.3	2.2	2.1	2.5	3.2	4.9	6.3	10.4	14.1	13.8	447.5%
Kenya	3.2	3.5	4.4	4.6	5.5	5.7	7.8	7.5	11.2	14.7	16.3	194.8%
Libya	3.7	8.7	17.6	21.2	25.8	33.0	36.7	43.1	48.2	42.7	41.5	60.7%
Mauritius	0.3	0.4	0.6	0.6	1.2	1.6	2.4	3.0	3.7	4.0	4.2	259.3%
Morocco	6.6	9.7	13.7	16.3	19.7	26.1	29.6	39.2	46.4	55.4	58.1	195.8%
Mozambique	2.9	2.4	2.3	1.5	1.1	1.1	1.3	1.5	2.4	6.2	7.6	602.9%
Namibia	..	..	..	..	..	1.8	1.9	2.5	3.1	3.9	4.0	..
Niger	..	..	..	..	..	..	0.7	0.7	1.4	2.0	2.0	..
Nigeria	5.7	10.8	25.4	31.8	28.1	32.8	43.8	56.6	55.4	82.6	86.0	206.4%
Senegal	1.2	1.6	2.0	2.1	2.1	2.5	3.5	4.6	5.5	7.5	8.3	289.6%
South Africa	157.1	203.0	208.4	223.0	243.8	259.8	280.5	372.3	418.8	418.3	421.7	72.9%
South Sudan	..	..	..	..	..	..	..	..	..	2.0	1.5	..
Sudan	3.2	3.2	3.7	4.0	5.3	4.3	5.5	9.9	15.1	16.4	18.8	254.6%
United Rep. of Tanzania	1.4	1.4	1.5	1.5	1.7	2.5	2.6	5.1	6.2	10.5	10.1	506.5%
Togo	0.3	0.3	0.4	0.3	0.6	0.6	0.9	1.0	2.1	1.9	2.1	262.0%
Tunisia	3.7	4.8	7.9	9.7	12.2	14.0	17.6	19.5	23.3	25.6	26.2	114.5%
Zambia	3.4	4.3	3.3	2.7	2.6	2.0	1.7	2.1	1.6	3.5	6.0	134.6%
Zimbabwe	7.2	7.2	8.0	9.7	16.2	15.1	13.3	10.3	9.5	11.8	9.7	-40.2%
Other Africa	8.6	9.9	13.5	10.8	14.2	16.5	20.8	26.7	34.7	34.6	36.3	155.8%
Africa	**249.2**	**324.3**	**397.9**	**465.6**	**530.6**	**578.4**	**663.0**	**865.2**	**1 017.9**	**1 156.7**	**1 185.1**	**123.3%**

1. Please refer to the chapter Geographical coverage.

CO_2 emissions from fuel combustion

million tonnes of CO_2

	1971	1975	1980	1985	1990	1995	2000	2005	2010	2015	2017	% change 90-17
Bangladesh	2.9	4.4	6.6	7.7	11.4	16.5	20.9	32.0	49.9	70.9	78.3	585.1%
Brunei Darussalam	0.4	1.4	2.6	2.9	3.3	4.5	4.4	4.8	6.9	6.0	6.7	105.8%
Cambodia	..	..	..	..	..	1.5	2.0	2.6	4.6	8.0	10.8	..
DPR of Korea	69.2	78.6	108.1	129.4	116.8	76.5	70.0	75.3	49.3	22.5	19.6	-83.2%
India	181.1	217.2	263.3	376.2	529.1	703.3	885.1	1 073.7	1 583.4	2 026.7	2 161.6	308.6%
Indonesia	25.2	37.8	67.6	84.2	134.2	204.2	255.4	317.8	357.6	459.1	496.4	269.8%
Malaysia	12.8	16.2	23.7	32.9	49.6	79.6	115.1	155.8	189.9	220.4	211.0	325.5%
Mongolia	..	..	..	11.8	12.8	10.2	9.0	11.0	14.1	17.1	19.3	50.1%
Myanmar	4.5	3.9	5.1	5.7	3.9	6.7	9.3	10.5	7.9	18.7	30.4	676.8%
Nepal	0.2	0.3	0.5	0.6	0.9	1.8	3.1	3.1	4.1	5.7	10.1	+
Pakistan	15.9	20.0	24.3	36.5	56.0	79.2	94.4	115.0	129.2	150.7	183.4	227.7%
Philippines	23.8	29.2	32.6	29.3	38.1	57.3	68.1	71.5	77.1	103.9	126.5	232.4%
Singapore	6.1	8.4	12.7	16.6	29.0	37.6	42.1	36.9	42.4	45.5	47.4	63.6%
Sri Lanka	2.8	2.6	3.6	3.5	3.7	5.5	10.5	13.4	12.4	19.5	23.1	528.5%
Chinese Taipei	29.8	40.7	71.4	69.1	111.1	154.0	214.4	254.0	256.4	250.7	268.9	142.0%
Thailand	16.2	21.2	33.7	42.1	80.9	139.9	152.3	200.2	223.4	248.0	244.3	202.0%
Viet Nam	16.3	17.0	14.9	17.4	17.4	27.5	44.2	79.2	126.7	182.6	191.2	999.8%
Other non-OECD Asia	10.6	12.8	16.7	10.2	10.3	9.3	11.4	15.6	22.1	38.4	50.2	389.5%
Non OECD Asia (excl. China)	**417.6**	**511.8**	**687.5**	**876.1**	**1 208.4**	**1 615.1**	**2 011.6**	**2 472.4**	**3 157.5**	**3 894.6**	**4 179.2**	**245.8%**
People's Rep. of China	780.2	1 029.3	1 363.8	1 626.0	2 088.9	2 900.3	3 099.7	5 407.5	7 832.7	9 101.4	9 257.9	343.2%
Hong Kong, China	9.2	10.9	14.6	22.3	33.3	36.5	40.3	41.3	42.0	43.9	44.0	32.2%
China	**789.4**	**1 040.2**	**1 378.4**	**1 648.3**	**2 122.2**	**2 936.8**	**3 140.0**	**5 448.9**	**7 874.7**	**9 145.3**	**9 302.0**	**338.3%**
Argentina	82.5	85.2	95.2	87.8	99.4	117.3	139.4	149.5	173.8	190.4	183.4	84.5%
Bolivia	2.2	3.2	4.2	4.3	5.2	6.9	7.1	9.0	13.6	18.1	21.9	325.0%
Brazil	87.5	129.6	167.8	156.3	184.5	228.0	292.8	311.6	372.0	453.6	427.6	131.8%
Colombia	26.7	28.3	34.8	39.5	45.8	54.5	54.2	53.6	60.2	77.6	75.3	64.4%
Costa Rica	1.3	1.7	2.2	1.9	2.6	4.4	4.5	5.5	6.6	6.9	7.6	191.3%
Cuba	20.8	24.2	30.5	32.2	34.1	22.4	27.3	25.1	29.5	26.8	26.2	-23.2%
Curaçao [1]	14.5	10.2	8.7	4.5	2.7	2.6	5.6	6.0	4.4	4.7	3.7	40.7%
Dominican Republic	3.5	5.2	6.3	6.2	7.4	11.2	17.6	17.5	19.0	21.5	21.4	189.5%
Ecuador	3.5	5.9	10.4	11.7	13.3	16.7	18.1	23.9	32.7	37.4	34.3	157.5%
El Salvador	1.3	1.9	1.6	1.6	2.1	4.6	5.2	6.3	5.8	6.4	5.7	172.3%
Guatemala	2.3	3.0	4.2	3.2	3.2	5.9	8.6	10.6	10.3	15.2	15.7	389.7%
Haiti	0.4	0.4	0.6	0.8	0.9	0.9	1.4	2.0	2.1	3.2	3.3	252.5%
Honduras	1.1	1.3	1.7	1.7	2.2	3.6	4.5	7.2	7.5	9.6	9.4	333.0%
Jamaica	5.5	7.4	6.5	4.7	7.2	8.4	9.8	10.3	6.9	7.0	7.0	-3.8%
Nicaragua	1.5	1.8	1.8	1.8	1.8	2.5	3.5	4.0	4.3	5.1	5.1	177.6%
Panama	2.5	3.1	2.9	2.7	2.6	4.1	4.9	6.8	8.9	10.1	9.6	275.0%
Paraguay	0.6	0.7	1.3	1.4	1.9	3.5	3.3	3.5	4.8	5.8	7.7	296.7%
Peru	15.4	18.2	20.4	18.1	19.2	23.3	26.4	28.6	41.5	49.7	49.7	159.5%
Suriname	..	..	..	..	..	..	1.5	1.7	1.7	2.1	1.9	..
Trinidad and Tobago	5.4	4.6	6.4	6.7	7.9	8.2	9.8	17.2	21.8	21.3	18.0	127.9%
Uruguay	5.1	5.3	5.3	3.0	3.6	4.4	5.1	5.2	6.0	6.4	5.9	63.1%
Venezuela	45.9	56.1	83.4	85.1	93.6	106.1	116.2	137.7	171.5	140.5	113.7	21.5%
Other non-OECD Americas	8.2	10.9	10.3	9.2	12.4	13.4	14.1	14.7	16.7	14.9	9.8	-21.0%
Non-OECD Americas	**337.6**	**408.5**	**506.6**	**484.4**	**553.6**	**652.9**	**780.8**	**857.2**	**1 021.7**	**1 134.3**	**1 064.0**	**92.2%**
Bahrain	2.9	5.2	7.2	9.1	10.7	13.5	15.8	20.6	25.6	30.1	29.8	179.2%
Islamic Republic of Iran	38.9	68.0	88.5	145.0	171.2	244.6	312.3	417.8	498.6	553.3	567.1	231.2%
Iraq	10.3	15.5	26.2	38.0	52.4	95.1	70.5	73.2	103.6	130.8	139.9	166.9%
Jordan	1.4	2.2	4.3	7.5	9.2	12.2	14.2	17.9	18.8	23.8	25.6	178.5%
Kuwait	14.0	15.1	26.4	36.7	27.8	32.4	46.3	64.8	77.0	91.6	89.4	221.6%
Lebanon	4.6	5.7	6.7	6.6	5.5	12.8	14.0	14.5	18.3	24.6	26.9	388.4%
Oman	0.3	0.7	2.2	5.6	10.2	14.7	20.4	25.2	42.4	63.6	65.5	544.5%
Qatar	2.2	4.9	7.0	10.7	12.4	16.8	21.3	33.2	55.5	77.6	80.1	544.4%
Saudi Arabia	12.7	22.5	99.4	117.8	151.1	191.7	234.6	298.0	419.2	531.6	532.2	252.2%
Syrian Arab Republic	5.4	8.3	12.3	19.5	27.2	31.1	37.0	53.5	57.3	23.9	23.0	-15.4%
United Arab Emirates	2.5	4.9	19.2	35.6	51.9	69.7	79.9	111.1	154.6	186.6	196.5	278.7%
Yemen	1.2	1.8	3.5	4.9	6.3	9.4	13.3	18.8	22.4	11.7	8.9	41.7%
Middle East	**96.4**	**154.9**	**303.1**	**437.1**	**536.0**	**744.0**	**879.7**	**1 148.6**	**1 493.1**	**1 749.1**	**1 785.0**	**233.0%**

1. Please refer to the chapter Geographical coverage.

CO_2 emissions from fuel combustion - coal

million tonnes of CO_2

	1971	1975	1980	1985	1990	1995	2000	2005	2010	2015	2017	% change 90-17
World [1]	**5 229.1**	**5 647.6**	**6 601.1**	**7 393.9**	**8 295.8**	**8 516.3**	**8 946.1**	**11 464.1**	**13 807.2**	**14 634.9**	**14 502.0**	**74.8%**
Annex I Parties	..	..	..	..	*5 220.2*	*4 685.7*	*4 778.1*	*4 808.8*	*4 491.5*	*3 862.8*	*3 580.3*	*-31.4%*
Annex II Parties	*2 704.6*	*2 668.3*	*3 033.8*	*3 392.9*	*3 559.7*	*3 469.8*	*3 705.1*	*3 776.3*	*3 429.1*	*2 859.6*	*2 596.7*	*-27.1%*
North America	*1 169.7*	*1 285.2*	*1 515.6*	*1 762.9*	*1 933.3*	*2 039.3*	*2 297.9*	*2 290.5*	*2 074.8*	*1 539.3*	*1 393.4*	*-27.9%*
Europe	*1 254.1*	*1 080.5*	*1 209.2*	*1 251.5*	*1 183.6*	*950.1*	*865.4*	*867.0*	*723.5*	*688.4*	*575.6*	*-51.4%*
Asia Oceania	*280.8*	*302.6*	*309.0*	*378.5*	*442.7*	*480.4*	*541.8*	*618.7*	*630.8*	*631.9*	*627.7*	*41.8%*
Annex I EIT	..	..	..	..	*1 598.3*	*1 151.1*	*981.3*	*943.8*	*936.7*	*867.7*	*826.8*	*-48.3%*
Non-Annex I Parties	..	..	..	..	*3 075.6*	*3 830.5*	*4 168.0*	*6 655.2*	*9 315.6*	*10 772.1*	*10 921.7*	*255.1%*
Annex B Kyoto Parties	..	..	..	..	*2 375.3*	*1 888.4*	*1 668.6*	*1 708.2*	*1 594.9*	*1 459.9*	*1 336.7*	*-43.7%*
Intl. aviation bunkers	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**
Intl. marine bunkers	**0.1**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**
Non-OECD Total	**2 028.8**	**2 440.9**	**2 917.8**	**3 272.1**	**4 049.8**	**4 404.9**	**4 548.7**	**6 969.8**	**9 532.4**	**10 926.0**	**11 038.5**	**172.6%**
OECD Total	**3 200.2**	**3 206.7**	**3 683.3**	**4 121.8**	**4 246.0**	**4 111.4**	**4 397.4**	**4 494.3**	**4 274.8**	**3 708.9**	**3 463.5**	**-18.4%**
Canada	63.9	59.0	82.1	100.8	96.2	100.7	125.9	111.3	92.6	74.1	69.2	-28.0%
Chile	5.1	3.6	4.8	5.0	9.8	8.9	11.7	10.3	17.5	27.8	29.4	200.5%
Mexico	5.2	6.7	7.3	11.7	15.1	21.8	26.4	48.1	53.6	55.0	51.0	236.7%
United States	1 105.8	1 226.2	1 433.5	1 662.0	1 837.2	1 938.6	2 172.0	2 179.2	1 982.2	1 465.2	1 324.2	-27.9%
OECD Americas	**1 180.0**	**1 295.5**	**1 527.8**	**1 779.5**	**1 958.3**	**2 070.0**	**2 335.9**	**2 348.9**	**2 145.9**	**1 622.1**	**1 473.9**	**-24.7%**
Australia	75.2	92.9	106.6	119.4	140.8	156.4	190.1	208.1	202.0	172.9	175.5	24.6%
Israel [2]	0.0	0.0	0.0	7.3	9.5	16.5	25.6	29.5	29.3	25.6	19.8	109.1%
Japan	201.6	205.5	198.4	255.2	298.5	320.6	347.2	401.7	423.3	453.4	447.2	49.8%
Korea	22.2	32.1	50.5	84.0	90.8	106.5	180.5	200.1	284.3	311.4	312.8	244.6%
New Zealand	4.0	4.2	3.9	4.0	3.4	3.4	4.5	9.0	5.6	5.6	5.0	47.3%
OECD Asia Oceania	**303.0**	**334.7**	**359.5**	**469.8**	**542.9**	**603.4**	**747.9**	**848.3**	**944.5**	**968.8**	**960.3**	**76.9%**
Austria	16.3	13.9	14.2	17.4	16.5	14.3	15.0	16.4	14.4	12.8	12.2	-26.3%
Belgium	44.2	38.6	41.9	39.2	40.4	34.7	30.3	20.6	14.0	12.3	11.4	-71.8%
Czech Republic	132.0	124.2	132.1	138.9	116.6	91.4	86.2	78.0	74.1	62.9	62.6	-46.3%
Denmark	6.1	8.1	24.2	29.0	24.2	25.8	15.7	14.7	15.5	7.3	6.2	-74.2%
Estonia	..	..	..	..	23.6	11.3	10.4	12.0	14.2	10.9	11.6	-51.0%
Finland	8.7	9.6	20.1	20.3	21.7	23.8	21.6	20.8	28.8	16.3	16.6	-23.7%
France	140.1	108.3	125.6	94.5	75.9	59.3	59.6	55.9	45.6	33.5	35.0	-53.9%
Germany	558.0	499.5	561.2	591.5	516.2	380.3	345.9	334.5	314.3	316.0	284.3	-44.9%
Greece	6.7	10.8	13.2	24.8	33.5	37.1	38.3	38.5	33.6	23.6	20.0	-40.4%
Hungary	35.9	33.8	37.3	35.6	24.6	17.5	15.6	12.5	10.7	9.3	8.9	-63.8%
Iceland	0.0	-	0.1	0.3	0.3	0.2	0.4	0.4	0.4	0.4	0.4	59.3%
Ireland	8.9	7.3	8.1	10.7	14.7	12.5	10.6	11.0	8.2	9.0	7.4	-49.4%
Italy	32.6	31.3	44.4	59.8	56.6	45.5	43.9	63.8	52.4	47.9	37.1	-34.5%
Latvia	..	..	..	..	2.8	1.1	0.5	0.3	0.4	0.2	0.2	-94.3%
Lithuania	..	..	..	..	3.2	1.0	0.4	0.8	0.8	0.7	0.8	-74.7%
Luxembourg	12.3	8.1	8.4	6.7	5.2	2.1	0.4	0.3	0.3	0.2	0.2	-96.5%
Netherlands	15.2	12.4	14.4	24.0	29.9	33.7	29.7	31.1	29.1	43.1	36.0	20.7%
Norway	3.8	4.0	4.0	4.5	3.5	3.9	4.0	2.9	2.6	2.9	3.1	-11.6%
Poland	254.5	292.7	356.9	365.9	291.1	273.5	221.4	215.5	214.6	193.5	195.7	-32.8%
Portugal	2.5	1.7	1.7	2.9	10.8	14.2	15.0	13.4	6.5	12.9	12.9	19.1%
Slovak Republic	24.2	24.2	32.8	34.2	31.4	21.6	16.4	16.0	14.5	12.1	12.4	-60.4%
Slovenia	..	..	..	..	6.6	5.8	5.6	6.3	6.0	4.4	4.7	-28.8%
Spain	38.2	38.8	49.0	70.7	75.2	72.9	83.4	81.9	32.4	53.2	48.9	-35.0%
Sweden	5.5	7.0	5.5	10.7	10.5	9.6	8.3	10.1	9.2	6.9	6.9	-34.8%
Switzerland	1.9	1.0	1.4	2.0	1.4	0.8	0.6	0.6	0.6	0.5	0.5	-67.9%
Turkey	16.4	21.2	27.6	46.4	61.2	64.6	91.6	88.6	125.6	135.5	156.8	156.2%
United Kingdom	*352.9*	*280.1*	*271.9*	*242.4*	*247.1*	*179.5*	*142.6*	*150.1*	*115.7*	*89.6*	*36.5*	*-85.2%*
OECD Europe	***1 717.1***	***1 576.6***	***1 796.0***	***1 872.5***	***1 744.8***	***1 437.9***	***1 313.6***	***1 297.1***	***1 184.4***	***1 117.9***	***1 029.3***	***-41.0%***
IEA/Accession/Association	*4 124.3*	*4 360.4*	*5 159.9*	*5 987.5*	*6 646.8*	*7 344.4*	*7 841.9*	*10 243.0*	*12 494.7*	*13 249.2*	*13 080.2*	*96.8%*
European Union - 28	..	..	..	..	*1 768.0*	*1 441.0*	*1 274.4*	*1 272.4*	*1 116.3*	*1 033.7*	*918.2*	*-48.1%*
G20	..	..	..	..	*7 445.2*	*7 883.3*	*8 307.3*	*10 681.1*	*12 896.5*	*13 629.2*	*13 430.1*	*80.4%*
Africa	*143.7*	*183.4*	*190.0*	*205.0*	*229.2*	*239.8*	*263.5*	*348.2*	*385.0*	*384.7*	*391.2*	*70.7%*
Americas	*1 197.3*	*1 314.7*	*1 556.8*	*1 822.8*	*2 005.2*	*2 123.8*	*2 404.2*	*2 419.2*	*2 227.2*	*1 725.2*	*1 569.6*	*-21.7%*
Asia	..	..	..	..	*3 058.3*	*3 844.2*	*4 180.4*	*6 608.2*	*9 262.8*	*10 728.4*	*10 893.4*	*256.2%*
Europe	..	..	..	..	*2 858.4*	*2 148.2*	*1 902.7*	*1 870.8*	*1 723.1*	*1 616.0*	*1 464.5*	*-48.8%*
Oceania	*80.20*	*97.40*	*110.90*	*123.83*	*144.66*	*160.27*	*195.29*	*217.70*	*209.03*	*180.53*	*183.24*	*26.7%*

1. Total world includes non-OECD total, OECD total as well as international marine bunkers and international aviation bunkers.
2. Please refer to the chapter Geographical coverage.

CO_2 emissions from fuel combustion - coal

million tonnes of CO_2

	1971	1975	1980	1985	1990	1995	2000	2005	2010	2015	2017	% change 90-17
Non-OECD Total	**2 028.8**	**2 440.9**	**2 917.8**	**3 272.1**	**4 049.8**	**4 404.9**	**4 548.7**	**6 969.8**	**9 532.4**	**10 926.0**	**11 038.5**	**172.6%**
Albania	1.2	1.6	2.5	3.7	2.4	0.1	0.1	0.1	0.5	0.4	0.5	-80.9%
Armenia	..	..	..	..	1.0	0.0	-	-	0.0	0.0	0.0	-99.9%
Azerbaijan	..	..	..	..	0.4	0.0	-	-	-	-	-	-100.0%
Belarus	..	..	..	..	9.6	5.5	3.8	2.4	2.1	2.9	3.3	-66.1%
Bosnia and Herzegovina	..	..	..	..	17.7	1.5	10.1	12.0	15.6	14.5	16.9	-4.3%
Bulgaria	34.0	35.9	38.8	43.3	34.6	30.2	26.0	28.6	28.6	27.0	25.3	-27.1%
Croatia	..	..	..	..	3.4	0.7	1.7	2.7	2.7	2.4	1.6	-53.8%
Cyprus [1]	-	-	-	0.2	0.3	0.1	0.1	0.1	0.1	0.0	0.0	-95.3%
Georgia	..	..	..	..	3.5	0.1	0.0	0.0	0.1	1.2	1.2	-65.0%
Gibraltar	-	-	-	-	-	-	-	-	-	-	-	-
Kazakhstan	..	..	..	..	158.7	114.3	74.7	102.7	137.6	141.9	146.8	-7.5%
Kosovo	..	..	..	..	..	..	4.1	5.2	7.1	6.6	6.0	..
Kyrgyzstan	..	..	..	..	10.2	1.3	1.9	2.2	2.8	4.5	3.6	-65.1%
Malta	-	-	-	0.5	0.7	0.1	-	-	-	-	-	-100.0%
Republic of Moldova	..	..	..	..	7.9	2.3	0.5	0.4	0.4	0.4	0.4	-94.8%
Montenegro	..	..	..	..	..	..	..	1.2	1.8	1.6	1.3	..
Republic of North Macedonia	..	..	..	..	5.6	6.0	5.7	6.2	5.5	4.1	4.0	-27.9%
Romania	32.5	39.5	50.8	59.7	50.7	41.3	29.5	36.3	29.7	25.7	22.9	-54.9%
Russian Federation	..	..	..	..	707.2	483.7	443.1	413.6	405.0	411.1	387.9	-45.1%
Serbia	..	..	..	..	42.1	36.9	35.7	34.8	32.1	32.3	33.0	-21.6%
Tajikistan	..	..	..	..	2.5	0.1	0.0	0.2	0.4	1.8	3.5	38.9%
Turkmenistan	..	..	..	..	1.2	-	-	-	-	-	-	-100.0%
Ukraine	..	..	..	..	292.9	166.4	120.5	118.7	133.2	104.6	89.0	-69.6%
Uzbekistan	..	..	..	..	14.0	4.5	4.6	4.3	4.2	6.6	7.6	-45.6%
Former Soviet Union	884.5	1 039.4	1 137.7	986.5	..	..	..	..	..	..	..	..
Former Yugoslavia	36.7	41.5	43.6	74.0	..	..	..	..	..	..	..	..
Non-OECD Europe and Eurasia	**989.0**	**1 157.9**	**1 273.4**	**1 167.9**	**1 366.6**	**895.1**	**762.1**	**771.8**	**809.5**	**789.7**	**754.8**	**-44.8%**
Algeria	0.4	0.3	0.2	1.0	1.3	1.4	0.7	1.1	0.8	0.3	0.5	-63.4%
Angola	-	-	-	-	-	-	-	-	-	-	-	-
Benin	-	-	-	-	-	-	-	-	-	0.1	0.3	x
Botswana	..	..	..	1.0	1.8	2.0	2.3	2.3	0.7	3.9	4.4	144.3%
Cameroon	-	-	-	-	-	-	-	-	-	-	-	-
Congo	-	-	-	-	-	-	-	-	-	-	-	-
Côte d'Ivoire	-	-	-	-	-	-	-	-	-	-	-	-
Dem. Rep. of the Congo	1.0	0.8	0.9	0.8	0.9	-	-	-	-	-	-	-100.0%
Egypt	1.4	2.3	2.2	2.9	2.9	3.0	3.5	3.7	1.8	1.5	1.5	-48.3%
Eritrea	..	..	..	..	..	-	-	-	-	-	-	..
Ethiopia	-	-	-	-	-	-	-	-	0.1	1.0	1.4	x
Gabon	-	-	-	-	-	-	-	-	-	-	-	-
Ghana	-	-	-	-	-	-	-	-	-	-	-	-
Kenya	0.2	0.1	0.0	0.2	0.4	0.4	0.3	0.4	0.7	2.0	1.8	397.3%
Libya	-	-	-	-	-	-	-	-	-	-	-	-
Mauritius	-	-	-	0.1	0.1	0.2	0.6	0.9	1.6	1.8	1.9	+
Morocco	1.2	1.7	1.6	2.7	4.2	6.9	10.5	12.4	11.1	17.6	17.6	318.2%
Mozambique	1.5	1.2	0.7	0.3	0.1	0.1	-	-	0.0	0.0	0.1	-35.8%
Namibia	..	..	..	..	..	0.0	0.0	0.0	0.0	0.0	0.1	..
Niger	..	..	..	..	..	..	0.2	0.2	0.3	0.3	0.3	..
Nigeria	0.5	0.6	0.5	0.3	0.2	0.0	0.0	0.0	0.1	0.1	0.1	-39.3%
Senegal	-	-	-	-	-	-	-	0.4	0.7	1.5	1.5	x
South Africa	129.3	168.6	174.5	186.0	200.7	211.5	231.4	314.9	355.8	342.6	346.9	72.8%
South Sudan	..	..	..	..	..	..	..	..	..	-	-	..
Sudan	-	-	0.0	-	-	-	-	-	-	-	-	-
United Rep. of Tanzania	-	-	0.0	0.0	0.0	0.1	0.2	0.1	-	0.6	1.4	+
Togo	-	-	-	-	-	-	-	-	-	-	-	-
Tunisia	0.3	0.4	0.3	0.3	0.3	0.3	0.3	-	-	-	-	-100.0%
Zambia	2.0	1.9	1.4	1.1	0.9	0.3	0.3	0.3	0.0	0.4	1.9	112.6%
Zimbabwe	5.8	5.2	6.2	7.7	13.7	11.5	10.3	8.2	7.4	8.1	6.3	-53.6%
Other Africa	0.1	0.2	1.5	0.5	1.7	2.0	2.8	3.2	3.9	3.0	3.2	92.5%
Africa	**143.7**	**183.4**	**190.0**	**205.0**	**229.2**	**239.8**	**263.5**	**348.2**	**385.0**	**384.7**	**391.2**	**70.7%**

1. Please refer to the chapter Geographical coverage.

CO_2 emissions from fuel combustion - coal

million tonnes of CO_2

	1971	1975	1980	1985	1990	1995	2000	2005	2010	2015	2017	% change 90-17
Bangladesh	0.4	0.5	0.5	0.2	1.1	1.3	1.3	1.9	3.2	9.0	7.9	605.1%
Brunei Darussalam	-	-	-	-	-	-	-	-	-	-	-	-
Cambodia	..	..	..	..	..	-	-	-	0.1	2.4	4.0	..
DPR of Korea	66.6	74.3	100.0	122.0	108.9	72.6	66.8	72.5	46.7	19.5	16.6	-84.7%
India	127.2	157.0	181.6	261.5	364.8	477.0	571.5	709.8	1 088.2	1 446.7	1 507.0	313.1%
Indonesia	0.5	0.5	0.6	5.1	18.5	26.6	52.5	87.6	107.9	165.0	194.4	951.3%
Malaysia	0.0	0.0	0.2	1.4	5.3	6.6	9.8	27.3	58.5	68.9	82.3	+
Mongolia	..	..	..	9.6	10.4	9.2	7.7	9.3	11.6	13.6	15.4	47.7%
Myanmar	0.6	0.6	0.6	0.6	0.3	0.1	1.3	1.3	1.6	1.8	2.5	843.7%
Nepal	0.0	0.1	0.2	0.0	0.2	0.3	1.0	1.0	1.2	2.2	3.1	+
Pakistan	2.6	2.2	2.7	5.0	7.3	8.0	6.9	14.6	16.4	20.0	40.0	446.1%
Philippines	0.1	0.2	1.5	5.6	5.1	6.9	19.9	22.7	29.8	49.4	65.7	+
Singapore	0.0	0.0	0.0	0.1	0.1	0.1	-	0.0	0.0	1.6	1.9	+
Sri Lanka	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	5.5	6.0	+
Chinese Taipei	10.2	8.6	14.9	26.6	42.7	64.4	111.3	147.7	155.1	149.7	159.0	272.7%
Thailand	0.5	0.6	1.9	6.7	16.4	29.9	32.0	47.8	65.4	68.2	66.0	303.1%
Viet Nam	5.7	10.2	9.4	11.5	9.1	13.7	18.0	34.0	60.2	110.1	115.3	+
Other non-OECD Asia	4.5	4.9	7.8	1.0	0.8	0.6	1.4	1.7	4.4	12.5	24.4	+
Non OECD Asia (excl. China)	**218.9**	**259.8**	**321.9**	**456.8**	**591.0**	**717.1**	**901.5**	**1 179.3**	**1 650.7**	**2 146.1**	**2 311.7**	**291.2%**
People's Rep. of China	659.4	818.3	1 101.4	1 384.7	1 790.8	2 472.9	2 532.6	4 567.8	6 574.3	7 462.0	7 444.2	315.7%
Hong Kong, China	0.1	0.0	0.0	12.6	24.1	23.7	16.8	26.4	25.2	27.3	25.6	6.2%
China	**659.5**	**818.4**	**1 101.4**	**1 397.3**	**1 814.9**	**2 496.6**	**2 549.4**	**4 594.2**	**6 599.5**	**7 489.3**	**7 469.9**	**311.6%**
Argentina	3.4	3.5	3.2	3.6	3.6	4.9	4.8	5.9	6.1	5.3	4.4	22.4%
Bolivia	-	-	-	0.3	-	-	-	-	-	-	-	-
Brazil	6.0	6.9	15.1	26.4	27.7	32.8	46.5	45.6	54.1	68.0	64.5	133.2%
Colombia	6.1	6.7	8.8	10.2	12.2	13.9	12.1	10.5	10.8	15.6	13.7	11.6%
Costa Rica	0.0	0.0	0.0	0.0	-	-	0.0	0.2	0.3	0.3	0.4	x
Cuba	0.4	0.3	0.4	0.5	0.6	0.3	0.1	0.1	0.1	0.0	0.0	-98.5%
Curaçao [1]	-	-	-	-	-	-	-	-	-	-	-	-
Dominican Republic	-	-	-	0.5	0.0	0.2	0.3	2.3	3.2	4.3	4.1	+
Ecuador	-	-	-	-	-	-	-	-	-	-	-	-
El Salvador	-	-	0.0	-	-	0.0	0.0	0.0	-	-	-	-
Guatemala	-	-	0.1	-	-	-	0.5	1.0	1.2	3.7	3.7	x
Haiti	-	-	-	0.1	0.0	-	-	-	-	-	-	-100.0%
Honduras	-	-	-	-	0.0	0.0	0.3	0.6	0.6	0.6	1.0	+
Jamaica	-	-	-	-	0.1	0.1	0.1	0.1	0.1	0.2	0.2	57.8%
Nicaragua	-	-	-	-	-	-	-	-	-	-	-	-
Panama	0.0	0.0	-	0.1	0.1	0.1	0.1	-	-	0.8	0.2	161.2%
Paraguay	-	-	-	-	-	-	-	-	-	0.0	0.0	x
Peru	0.6	0.6	0.7	0.7	0.6	1.4	2.5	3.6	3.6	3.5	3.0	397.8%
Suriname	..	..	..	..	..	..	-	-	-	-	-	..
Trinidad and Tobago	-	-	-	-	-	-	-	-	-	-	-	-
Uruguay	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-100.0%
Venezuela	0.6	1.1	0.7	0.8	1.9	0.0	0.5	0.1	0.8	0.5	0.5	-73.4%
Other non-OECD Americas	0.1	0.1	0.1	0.0	0.0	0.0	0.3	0.4	0.4	0.0	0.0	-30.2%
Non-OECD Americas	**17.3**	**19.2**	**29.1**	**43.3**	**46.9**	**53.9**	**68.3**	**70.4**	**81.3**	**103.1**	**95.8**	**104.1%**
Bahrain	-	-	-	-	-	-	-	-	-	-	-	-
Islamic Republic of Iran	0.4	2.1	2.0	1.7	1.2	1.9	3.4	4.7	2.7	4.6	5.1	320.4%
Iraq	-	-	-	-	-	-	-	-	-	-	-	-
Jordan	-	-	-	-	-	-	-	-	-	0.7	0.7	x
Kuwait	-	-	-	-	-	-	-	-	-	-	-	-
Lebanon	0.0	0.0	0.0	-	-	0.5	0.5	0.5	0.6	0.7	0.7	x
Oman	-	-	-	-	-	-	-	-	-	-	-	-
Qatar	-	-	-	-	-	-	-	-	-	-	-	-
Saudi Arabia	-	-	-	-	-	-	-	-	-	-	-	-
Syrian Arab Republic	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	x
United Arab Emirates	-	-	-	-	-	-	-	0.6	2.6	6.8	8.4	x
Yemen	-	-	-	-	-	-	-	-	0.4	0.4	0.3	x
Middle East	**0.5**	**2.2**	**2.0**	**1.7**	**1.2**	**2.3**	**3.9**	**5.8**	**6.3**	**13.2**	**15.2**	**+**

1. Please refer to the chapter Geographical coverage.

CO_2 emissions from fuel combustion - oil

million tonnes of CO_2

	1971	1975	1980	1985	1990	1995	2000	2005	2010	2015	2017	% change 90-17
World [1]	**6 670.7**	**7 583.6**	**8 390.8**	**7 774.7**	**8 504.9**	**8 807.2**	**9 639.7**	**10 307.5**	**10 545.3**	**11 150.5**	**11 377.1**	**33.8%**
Annex I Parties	..	..	..	..	*5 464.0*	*5 115.5*	*5 358.1*	*5 395.8*	*4 852.5*	*4 672.0*	*4 680.5*	*-14.3%*
Annex II Parties	*4 432.6*	*4 672.9*	*4 728.6*	*4 072.9*	*4 306.5*	*4 427.5*	*4 745.5*	*4 790.9*	*4 247.3*	*4 028.9*	*3 992.1*	*-7.3%*
North America	*2 195.4*	*2 298.2*	*2 320.5*	*2 087.4*	*2 155.5*	*2 164.7*	*2 510.6*	*2 578.0*	*2 323.4*	*2 253.8*	*2 246.9*	*4.2%*
Europe	*1 622.9*	*1 660.0*	*1 693.0*	*1 370.1*	*1 421.5*	*1 495.6*	*1 498.2*	*1 498.6*	*1 309.1*	*1 185.8*	*1 178.6*	*-17.1%*
Asia Oceania	*614.3*	*714.6*	*715.2*	*615.4*	*729.4*	*767.2*	*736.7*	*714.3*	*614.9*	*589.3*	*566.7*	*-22.3%*
Annex I EIT	..	..	..	..	*1 091.0*	*603.4*	*523.5*	*520.4*	*526.5*	*543.8*	*562.2*	*-48.5%*
Non-Annex I Parties	..	..	..	..	*2 411.3*	*2 974.1*	*3 428.6*	*3 920.0*	*4 572.5*	*5 288.0*	*5 414.7*	*124.6%*
Annex B Kyoto Parties	..	..	..	..	*2 038.2*	*1 888.3*	*1 833.8*	*1 869.1*	*1 697.3*	*1 581.3*	*1 603.6*	*-21.3%*
Intl. aviation bunkers	**168.8**	**173.2**	**201.4**	**224.2**	**258.3**	**289.7**	**354.5**	**420.3**	**457.5**	**530.4**	**584.9**	**126.4%**
Intl. marine bunkers	**353.9**	**341.2**	**357.2**	**306.4**	**371.3**	**428.0**	**498.4**	**571.5**	**662.9**	**660.0**	**697.0**	**87.7%**
Non-OECD Total	**1 490.8**	**2 078.4**	**2 675.1**	**2 736.8**	**3 005.9**	**2 983.1**	**3 335.6**	**3 826.3**	**4 492.4**	**5 241.0**	**5 358.4**	**78.3%**
OECD Total	**4 657.3**	**4 990.8**	**5 157.1**	**4 507.3**	**4 869.4**	**5 106.5**	**5 451.1**	**5 489.4**	**4 932.5**	**4 719.1**	**4 736.8**	**-2.7%**
Canada	208.1	230.3	243.6	184.4	204.0	204.3	227.2	261.4	263.7	270.2	265.6	30.2%
Chile	14.6	12.4	15.1	13.1	18.7	27.2	30.3	33.6	42.3	45.1	47.5	154.0%
Mexico	69.0	103.4	156.8	178.9	193.4	213.2	251.3	255.1	251.7	243.1	244.8	26.5%
United States	1 987.3	2 067.9	2 076.9	1 903.0	1 951.5	1 960.4	2 283.4	2 316.6	2 059.7	1 983.6	1 981.3	1.5%
OECD Americas	**2 279.0**	**2 414.1**	**2 492.4**	**2 279.4**	**2 367.6**	**2 405.1**	**2 792.2**	**2 866.8**	**2 617.4**	**2 541.9**	**2 539.2**	**7.2%**
Australia	64.1	78.0	83.8	77.0	85.5	90.4	99.9	109.1	119.9	131.9	134.8	57.7%
Israel [2]	13.7	16.4	18.8	17.0	23.4	28.4	29.3	26.1	28.9	22.0	24.0	2.9%
Japan	540.9	625.1	620.7	528.8	632.1	662.7	621.1	587.4	477.7	438.9	412.1	-34.8%
Korea	30.7	45.6	75.1	71.8	133.0	226.6	205.4	185.3	163.0	162.4	163.1	22.7%
New Zealand	9.3	11.5	10.7	9.6	11.8	14.1	15.8	17.8	17.3	18.5	19.8	68.2%
OECD Asia Oceania	**658.7**	**776.7**	**809.1**	**704.1**	**885.7**	**1 022.2**	**971.4**	**925.8**	**806.8**	**773.6**	**753.8**	**-14.9%**
Austria	26.9	28.5	31.9	25.4	27.2	29.5	30.7	37.8	32.8	30.2	31.3	15.2%
Belgium	62.4	59.5	64.1	44.9	46.3	51.2	52.0	52.7	49.6	46.8	44.3	-4.4%
Czech Republic	19.6	27.6	30.2	27.2	22.0	17.0	17.4	21.5	19.9	20.3	20.9	-5.2%
Denmark	49.3	44.3	38.6	30.3	22.0	24.3	23.4	21.8	19.8	16.4	16.8	-23.6%
Estonia	..	..	..	..	9.0	3.5	2.7	3.1	3.0	3.1	3.2	-64.6%
Finland	31.2	33.1	33.0	26.1	27.0	25.3	24.7	25.2	24.2	20.5	21.1	-22.0%
France	265.5	284.1	285.5	206.2	214.1	218.8	223.6	220.4	195.2	181.9	178.3	-16.7%
Germany	381.7	386.7	372.1	309.0	303.7	323.9	301.9	276.6	249.4	242.5	244.2	-19.6%
Greece	18.4	23.3	32.0	29.6	36.2	39.1	45.6	51.3	42.9	35.0	34.3	-5.4%
Hungary	18.4	26.7	29.0	26.1	21.9	18.8	16.4	15.2	14.7	16.1	17.3	-21.3%
Iceland	1.4	1.6	1.7	1.4	1.6	1.7	1.7	1.8	1.6	1.7	1.7	7.2%
Ireland	12.7	13.9	16.1	11.2	12.1	15.8	23.2	25.4	20.5	17.6	17.9	47.9%
Italy	232.7	244.7	264.6	225.2	244.8	253.1	242.5	227.3	177.6	148.7	137.2	-44.0%
Latvia	..	..	..	..	10.4	5.5	3.8	4.0	4.1	3.9	4.1	-60.5%
Lithuania	..	..	..	..	19.7	8.9	6.4	7.1	6.8	7.1	7.7	-60.9%
Luxembourg	4.1	3.8	3.0	2.9	4.5	4.8	5.9	8.2	7.4	6.6	6.6	48.9%
Netherlands	65.2	50.4	64.0	42.1	48.0	51.8	52.6	55.2	51.7	48.4	49.1	2.3%
Norway	19.2	19.2	21.2	19.0	19.1	19.2	20.2	22.0	21.4	19.2	17.8	-7.0%
Poland	21.4	32.8	41.6	37.8	33.5	39.4	49.7	56.6	65.3	60.2	76.0	127.2%
Portugal	11.9	16.4	22.1	21.0	27.1	33.1	38.0	38.7	29.8	24.3	24.7	-8.8%
Slovak Republic	12.0	14.4	17.9	13.8	11.6	6.6	5.4	8.4	9.1	8.7	10.4	-10.6%
Slovenia	..	..	..	..	5.1	6.8	6.8	7.2	7.5	6.6	6.6	30.9%
Spain	80.2	115.2	134.1	97.8	117.1	137.3	160.2	184.3	157.3	136.5	141.2	20.5%
Sweden	76.5	72.0	67.3	46.9	39.5	44.8	40.7	35.4	31.9	26.0	26.1	-33.9%
Switzerland	37.0	34.8	36.0	35.9	33.2	32.9	32.6	33.5	32.1	26.5	25.6	-23.1%
Turkey	25.3	38.4	43.9	48.8	61.3	77.3	80.7	74.9	68.9	91.8	119.0	94.3%
United Kingdom	*246.5*	*228.4*	*205.8*	*195.4*	*197.9*	*189.0*	*178.8*	*181.0*	*163.8*	*157.1*	*160.4*	-19.0%
OECD Europe	***1 719.6***	***1 800.0***	***1 855.6***	***1 523.7***	***1 616.0***	***1 679.2***	***1 687.5***	***1 696.8***	***1 508.3***	***1 403.5***	***1 443.8***	**-10.7%**
IEA/Accession/Association	*4 968.8*	*5 454.8*	*5 753.9*	*5 115.8*	*5 620.9*	*6 165.8*	*6 785.1*	*7 126.5*	*6 942.8*	*7 207.5*	*7 364.2*	*31.0%*
European Union - 28	..	..	..	..	*1 594.4*	*1 611.2*	*1 608.2*	*1 625.7*	*1 437.6*	*1 316.2*	*1 335.4*	*-16.2%*
G20	..	..	..	..	*6 357.5*	*6 563.8*	*7 188.7*	*7 523.3*	*7 433.2*	*7 817.8*	*7 941.4*	*24.9%*
Africa	*100.3*	*131.9*	*182.3*	*216.3*	*242.7*	*264.2*	*301.5*	*365.6*	*450.4*	*543.9*	*545.4*	*124.7%*
Americas	*2 563.5*	*2 758.6*	*2 908.8*	*2 641.0*	*2 771.5*	*2 879.3*	*3 340.2*	*3 445.4*	*3 298.5*	*3 276.5*	*3 227.0*	*16.4%*
Asia	..	..	..	..	*2 204.9*	*2 721.3*	*2 983.5*	*3 321.2*	*3 667.5*	*4 221.5*	*4 387.3*	*99.0%*
Europe	..	..	..	..	*2 554.1*	*2 114.9*	*2 039.5*	*2 047.1*	*1 863.4*	*1 756.0*	*1 768.7*	*-30.8%*
Oceania	*76.68*	*94.42*	*99.31*	*91.66*	*102.11*	*109.87*	*121.96*	*136.42*	*145.19*	*162.25*	*166.83*	*63.4%*

1. Total world includes non-OECD total, OECD total as well as international marine bunkers and international aviation bunkers.
2. Please refer to the chapter Geographical coverage.

CO_2 emissions from fuel combustion - oil

million tonnes of CO_2

	1971	1975	1980	1985	1990	1995	2000	2005	2010	2015	2017	% change 90-17
Non-OECD Total	**1 490.8**	**2 078.4**	**2 675.1**	**2 736.8**	**3 005.9**	**2 983.1**	**3 335.6**	**3 826.3**	**4 492.4**	**5 241.0**	**5 358.4**	**78.3%**
Albania	2.4	2.2	3.5	2.4	2.8	1.7	3.0	3.8	3.4	3.4	3.8	37.4%
Armenia	..	..	..	..	10.5	0.7	0.8	1.0	1.0	0.8	0.9	-91.6%
Azerbaijan	..	..	..	..	20.9	16.8	16.9	11.9	7.4	10.5	10.9	-48.0%
Belarus	..	..	..	..	65.6	27.7	17.3	15.7	17.7	15.7	16.1	-75.5%
Bosnia and Herzegovina	..	..	..	..	5.4	1.5	3.2	3.2	4.5	4.4	5.0	-7.5%
Bulgaria	29.2	35.1	38.8	28.0	25.8	13.3	10.1	11.8	10.9	11.5	12.2	-52.9%
Croatia	..	..	..	..	12.8	10.6	11.0	12.6	10.4	9.3	9.9	-22.3%
Cyprus [1]	1.7	1.7	2.6	2.6	3.6	5.0	6.2	6.9	7.2	5.8	6.3	72.3%
Georgia	..	..	..	..	19.3	5.9	2.4	2.1	2.8	3.3	3.6	-81.6%
Gibraltar	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.4	0.5	0.6	0.7	393.0%
Kazakhstan	..	..	..	..	53.6	32.6	22.0	25.6	29.7	41.9	43.3	-19.3%
Kosovo	..	..	..	..	..	..	1.0	1.4	1.6	2.0	2.2	..
Kyrgyzstan	..	..	..	..	9.0	1.4	1.2	1.4	2.7	4.9	4.8	-46.8%
Malta	0.7	0.7	1.0	0.7	1.6	2.3	2.1	2.6	2.6	1.6	1.0	-38.6%
Republic of Moldova	..	..	..	..	15.0	3.1	1.3	1.9	2.2	2.3	2.6	-82.8%
Montenegro	..	..	..	..	..	..	..	0.8	0.8	0.8	0.9	..
Republic of North Macedonia	..	..	..	..	3.0	2.3	2.7	2.6	2.6	2.8	2.9	-4.0%
Romania	29.8	38.2	50.5	40.2	49.8	32.0	26.6	27.1	22.3	23.6	26.4	-47.0%
Russian Federation	..	..	..	..	618.7	340.9	318.1	294.0	297.5	329.5	322.4	-47.9%
Serbia	..	..	..	..	13.7	4.8	4.1	11.5	9.6	8.6	9.0	-34.5%
Tajikistan	..	..	..	..	5.2	1.2	0.7	0.9	1.6	2.4	2.3	-55.5%
Turkmenistan	..	..	..	..	14.7	6.9	11.1	14.6	16.2	19.0	18.9	28.3%
Ukraine	..	..	..	..	185.2	72.5	31.9	35.8	37.4	28.3	29.0	-84.4%
Uzbekistan	..	..	..	..	25.0	18.5	17.8	13.3	10.2	6.9	6.1	-75.5%
Former Soviet Union	635.7	937.4	1 120.1	1 102.9	..	..	..	..	..	..	..	..
Former Yugoslavia	23.8	29.9	35.6	34.5	..	..	..	..	..	..	..	..
Non-OECD Europe and Eurasia	**723.4**	**1 045.1**	**1 252.2**	**1 211.5**	**1 161.1**	**602.1**	**511.7**	**502.9**	**502.8**	**539.7**	**540.8**	**-53.4%**
Algeria	5.8	8.6	14.1	19.2	23.7	22.7	24.9	31.4	43.5	57.6	54.5	130.2%
Angola	1.5	1.8	2.5	2.6	2.9	2.8	3.5	4.9	13.7	20.1	16.4	468.6%
Benin	0.3	0.5	0.4	0.5	0.3	0.2	1.4	2.7	4.6	5.1	6.4	+
Botswana	..	..	..	0.5	1.0	1.2	1.7	2.0	2.6	3.2	3.3	231.2%
Cameroon	0.7	1.0	1.7	2.4	2.6	2.5	2.8	2.9	4.6	5.0	5.0	89.3%
Congo	0.6	0.6	0.7	0.8	0.6	0.5	0.5	0.8	1.6	2.2	1.6	155.6%
Côte d'Ivoire	2.4	3.0	3.4	3.0	2.7	3.2	3.4	2.9	3.1	5.5	5.8	114.7%
Dem. Rep. of the Congo	1.6	1.8	2.3	2.4	2.1	1.1	0.9	1.3	1.8	2.7	2.2	5.6%
Egypt	18.5	23.2	35.8	55.0	61.6	57.7	66.8	78.5	100.8	120.0	113.6	84.4%
Eritrea	..	..	..	..	..	0.8	0.6	0.6	0.5	0.6	0.6	..
Ethiopia	1.3	1.2	1.4	1.4	2.2	2.3	3.2	4.5	5.8	9.1	11.6	436.3%
Gabon	0.5	0.8	1.3	1.6	0.7	1.1	1.2	1.4	2.0	2.5	2.6	264.4%
Ghana	1.9	2.3	2.2	2.1	2.5	3.2	4.9	6.3	9.6	11.6	11.5	357.8%
Kenya	3.0	3.3	4.4	4.4	5.1	5.3	7.5	7.1	10.6	12.8	14.4	180.3%
Libya	1.6	6.2	12.3	15.0	17.7	26.0	29.9	34.7	38.0	30.8	28.1	58.6%
Mauritius	0.3	0.4	0.6	0.5	1.0	1.4	1.8	2.1	2.0	2.2	2.3	125.4%
Morocco	5.3	7.8	12.0	13.4	15.3	19.2	19.0	25.6	33.6	35.0	37.7	145.7%
Mozambique	1.5	1.2	1.7	1.3	0.9	1.0	1.3	1.5	2.2	3.5	6.1	544.0%
Namibia	..	..	..	..	..	1.8	1.9	2.4	3.1	3.8	3.9	..
Niger	..	..	..	..	..	..	0.5	0.5	1.1	1.7	1.8	..
Nigeria	4.8	9.1	22.0	24.6	21.0	23.5	29.1	37.9	36.0	53.6	56.7	170.3%
Senegal	1.2	1.6	2.0	2.1	2.1	2.4	3.5	4.2	4.7	6.0	6.8	218.9%
South Africa	27.8	34.4	33.9	36.9	43.1	48.3	49.1	57.4	61.0	71.5	70.9	64.3%
South Sudan	..	..	..	..	..	..	..	..	..	2.0	1.5	..
Sudan	3.2	3.2	3.7	4.0	5.3	4.3	5.5	9.9	15.1	16.4	18.8	254.6%
United Rep. of Tanzania	1.4	1.4	1.5	1.4	1.7	2.4	2.4	4.3	4.7	8.1	7.2	335.7%
Togo	0.3	0.3	0.4	0.3	0.6	0.6	0.9	1.0	2.1	1.9	2.1	262.0%
Tunisia	3.4	4.0	6.8	7.2	9.0	9.1	10.9	11.7	11.4	13.8	13.5	49.9%
Zambia	1.4	2.4	1.8	1.6	1.7	1.7	1.4	1.8	1.6	3.1	4.1	146.0%
Zimbabwe	1.5	2.0	1.7	2.0	2.6	3.6	3.0	2.1	2.0	3.7	3.4	31.1%
Other Africa	8.5	9.7	12.0	10.3	12.5	14.5	18.0	21.3	26.9	28.9	30.8	145.9%
Africa	**100.3**	**131.9**	**182.3**	**216.3**	**242.7**	**264.2**	**301.5**	**365.6**	**450.4**	**543.9**	**545.4**	**124.7%**

1. Please refer to the chapter Geographical coverage.

CO_2 emissions from fuel combustion - oil

million tonnes of CO_2

	1971	1975	1980	1985	1990	1995	2000	2005	2010	2015	2017	% change 90-17
Bangladesh	2.2	3.3	4.6	4.4	4.9	7.1	7.9	11.0	10.9	16.1	18.2	269.2%
Brunei Darussalam	0.2	0.2	0.5	0.6	0.7	1.1	1.2	1.3	1.7	1.9	1.9	162.3%
Cambodia	..	..	..	..	..	1.5	2.0	2.6	4.6	5.7	6.7	..
DPR of Korea	2.6	4.3	8.1	7.5	8.0	4.0	3.2	2.9	2.6	3.0	2.9	-63.0%
India	52.8	58.9	80.0	110.0	151.1	201.3	277.4	309.4	398.9	520.4	579.1	283.1%
Indonesia	24.6	36.8	61.6	70.4	91.4	130.3	157.5	179.3	178.5	216.3	228.0	149.4%
Malaysia	12.8	16.1	23.3	26.9	37.6	48.9	56.7	64.6	68.2	80.9	80.8	115.0%
Mongolia	..	..	..	2.2	2.4	1.1	1.3	1.7	2.5	3.5	3.9	60.5%
Myanmar	3.8	3.0	3.9	3.5	2.1	4.0	5.4	6.2	3.3	10.3	19.5	846.0%
Nepal	0.2	0.2	0.3	0.5	0.7	1.5	2.1	2.1	2.9	3.5	7.0	858.0%
Pakistan	8.4	10.5	12.7	20.7	30.8	45.6	56.6	47.7	60.3	76.5	81.5	165.0%
Philippines	23.7	29.1	31.1	23.7	33.0	50.3	48.2	42.1	40.1	47.8	53.1	61.1%
Singapore	6.0	8.4	12.5	16.4	28.6	34.0	38.9	24.1	26.2	22.6	23.5	-17.9%
Sri Lanka	2.8	2.6	3.6	3.5	3.7	5.4	10.5	13.1	12.1	14.0	17.1	368.3%
Chinese Taipei	18.0	30.0	53.2	41.1	65.4	82.2	89.3	83.6	68.7	61.9	65.2	-0.4%
Thailand	15.8	20.6	31.9	28.5	52.8	89.5	79.4	91.5	83.2	95.2	100.3	90.1%
Viet Nam	10.6	6.7	5.5	5.8	8.2	13.3	23.6	34.2	47.4	51.8	57.6	599.2%
Other non-OECD Asia	5.6	7.4	8.6	8.0	8.8	8.2	9.5	13.4	16.9	23.8	23.8	169.2%
Non OECD Asia (excl. China)	**190.0**	**238.0**	**341.5**	**373.6**	**530.2**	**729.3**	**870.5**	**931.0**	**1 029.0**	**1 255.3**	**1 370.1**	**158.4%**
People's Rep. of China	113.4	193.6	234.3	225.1	278.2	400.5	531.3	768.2	1 011.1	1 261.8	1 339.8	381.5%
Hong Kong, China	9.1	10.8	14.4	9.3	8.4	11.6	16.5	8.4	8.8	9.7	11.4	35.1%
China	**122.5**	**204.4**	**248.7**	**234.4**	**286.6**	**412.1**	**547.8**	**776.6**	**1 019.9**	**1 271.5**	**1 351.1**	**371.4%**
Argentina	67.0	64.7	70.3	53.7	52.4	60.2	64.4	66.4	80.3	88.4	80.2	53.0%
Bolivia	2.0	2.9	3.7	3.3	3.7	4.6	4.7	5.6	8.0	10.4	13.5	263.4%
Brazil	80.9	121.7	151.1	126.1	151.0	187.5	229.6	227.9	266.6	306.8	292.5	93.7%
Colombia	18.0	18.4	20.2	22.0	26.0	32.1	29.2	28.7	30.9	42.2	42.5	63.4%
Costa Rica	1.3	1.7	2.2	1.9	2.6	4.4	4.5	5.3	6.3	6.6	7.2	175.0%
Cuba	20.3	23.7	30.0	31.5	33.4	22.0	26.1	23.5	27.4	24.5	24.2	-27.5%
Curaçao [1]	14.5	10.2	8.7	4.5	2.7	2.6	5.6	6.0	4.4	4.7	3.7	40.7%
Dominican Republic	3.5	5.2	6.3	5.7	7.4	11.0	17.3	14.8	14.2	15.0	14.9	102.9%
Ecuador	3.5	5.9	10.4	11.7	13.3	16.7	18.1	23.3	31.8	36.0	33.0	147.9%
El Salvador	1.3	1.9	1.6	1.6	2.1	4.6	5.2	6.2	5.8	6.4	5.7	172.3%
Guatemala	2.3	3.0	4.2	3.2	3.2	5.9	8.1	9.6	9.1	11.4	12.1	275.8%
Haiti	0.4	0.4	0.6	0.6	0.9	0.9	1.4	2.0	2.1	3.2	3.3	263.9%
Honduras	1.1	1.3	1.7	1.7	2.2	3.6	4.2	6.6	6.9	9.0	8.4	286.8%
Jamaica	5.5	7.4	6.5	4.7	7.1	8.3	9.7	10.1	6.8	6.8	6.6	-7.2%
Nicaragua	1.5	1.8	1.8	1.8	1.8	2.5	3.5	4.0	4.3	5.1	5.1	177.6%
Panama	2.5	3.1	2.9	2.6	2.5	4.0	4.7	6.8	8.9	9.3	9.4	278.6%
Paraguay	0.6	0.7	1.3	1.4	1.9	3.5	3.3	3.5	4.8	5.8	7.7	296.4%
Peru	14.2	16.8	18.7	16.0	17.5	21.3	22.8	21.1	25.1	28.2	30.1	71.8%
Suriname	..	..	..	..	..	..	1.5	1.7	1.7	2.1	1.9	..
Trinidad and Tobago	2.6	2.3	2.5	2.2	2.1	2.2	2.3	3.6	4.3	4.4	4.0	95.3%
Uruguay	5.0	5.3	5.3	3.0	3.6	4.4	5.0	5.0	5.8	6.3	5.7	60.1%
Venezuela	28.4	35.3	56.2	53.1	54.1	58.7	64.0	83.9	111.0	90.0	66.4	22.8%
Other non-OECD Americas	8.1	10.8	10.2	9.2	12.4	13.3	13.0	13.0	14.7	12.0	9.7	-21.2%
Non-OECD Americas	**284.5**	**344.6**	**416.3**	**361.5**	**403.8**	**474.2**	**548.0**	**578.6**	**681.1**	**734.5**	**687.9**	**70.3%**
Bahrain	1.1	1.1	1.5	1.6	2.0	2.3	2.4	3.5	3.8	4.4	4.5	128.5%
Islamic Republic of Iran	33.0	57.8	77.9	126.5	136.2	166.4	190.8	223.4	221.6	206.1	181.7	33.3%
Iraq	8.5	12.4	23.8	36.3	48.6	89.1	64.5	69.7	93.7	118.0	119.3	145.5%
Jordan	1.4	2.2	4.3	7.5	8.9	11.7	13.7	14.7	13.4	18.5	16.6	86.0%
Kuwait	4.1	5.2	13.2	27.0	16.2	14.6	27.9	41.2	49.1	51.5	46.0	183.3%
Lebanon	4.6	5.7	6.6	6.6	5.5	12.4	13.5	14.0	17.2	24.0	26.3	376.1%
Oman	0.3	0.7	1.5	3.5	5.2	7.9	8.7	10.4	11.3	18.1	19.1	265.0%
Qatar	0.3	0.7	1.4	1.6	1.9	2.4	2.8	6.6	12.5	15.0	15.6	722.0%
Saudi Arabia	10.0	17.1	78.5	89.0	107.9	137.0	167.8	196.5	288.3	375.2	361.0	234.6%
Syrian Arab Republic	5.4	8.3	12.2	19.2	24.0	27.1	29.6	44.5	41.5	16.6	16.7	-30.3%
United Arab Emirates	0.4	1.7	9.5	15.7	18.6	20.9	21.0	28.3	36.6	39.2	49.0	163.4%
Yemen	1.2	1.8	3.5	4.9	6.3	9.4	13.3	18.8	20.1	9.6	7.4	17.5%
Middle East	**70.1**	**114.5**	**234.1**	**339.4**	**381.4**	**501.1**	**556.1**	**671.5**	**809.2**	**896.1**	**863.2**	**126.3%**

1. Please refer to the chapter Geographical coverage.

CO_2 emissions from fuel combustion - natural gas

million tonnes of CO_2

	1971	1975	1980	1985	1990	1995	2000	2005	2010	2015	2017	% change 90-17
World [1]	**2 044.2**	**2 250.1**	**2 710.0**	**3 071.0**	**3 676.7**	**3 981.1**	**4 550.8**	**5 197.2**	**6 057.3**	**6 456.4**	**6 743.0**	**83.4%**
Annex I Parties	..	..	..	..	*2 995.4*	*3 113.7*	*3 398.3*	*3 557.3*	*3 773.8*	*3 757.8*	*3 864.4*	*29.0%*
Annex II Parties	*1 443.6*	*1 500.7*	*1 652.7*	*1 600.9*	*1 756.3*	*2 086.3*	*2 382.7*	*2 447.7*	*2 643.5*	*2 711.0*	*2 766.8*	*57.5%*
North America	*1 264.1*	*1 149.5*	*1 182.0*	*1 057.8*	*1 114.0*	*1 287.5*	*1 396.7*	*1 347.6*	*1 458.4*	*1 671.6*	*1 648.6*	*48.0%*
Europe	*166.7*	*322.6*	*401.1*	*432.1*	*491.9*	*620.3*	*770.8*	*876.2*	*909.8*	*724.3*	*799.0*	*62.4%*
Asia Oceania	*12.8*	*28.6*	*69.6*	*111.0*	*150.4*	*178.5*	*215.2*	*224.0*	*275.3*	*315.2*	*319.2*	*112.2%*
Annex I EIT	..	..	..	..	*1 232.8*	*1 015.3*	*986.6*	*1 057.2*	*1 057.1*	*955.3*	*994.6*	*-19.3%*
Non-Annex I Parties	..	..	..	..	*681.3*	*867.4*	*1 152.5*	*1 640.0*	*2 283.4*	*2 698.6*	*2 878.4*	*322.5%*
Annex B Kyoto Parties	..	..	..	..	*944.3*	*987.0*	*1 121.1*	*1 255.9*	*1 279.0*	*1 044.6*	*1 137.9*	*20.5%*
Intl. aviation bunkers	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**
Intl. marine bunkers	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**0.1**	**0.1**	**x**
Non-OECD Total	**558.9**	**695.2**	**973.3**	**1 368.7**	**1 781.3**	**1 735.7**	**1 932.1**	**2 418.6**	**3 008.8**	**3 318.9**	**3 511.4**	**97.1%**
OECD Total	**1 485.3**	**1 554.9**	**1 736.6**	**1 702.4**	**1 895.4**	**2 245.4**	**2 618.7**	**2 778.6**	**3 048.4**	**3 137.5**	**3 231.4**	**70.5%**
Canada	68.2	87.8	96.5	108.6	119.1	143.4	162.6	167.1	171.4	212.3	211.9	77.9%
Chile	1.3	1.1	1.4	1.6	0.9	1.0	6.7	10.6	8.7	8.3	9.2	874.9%
Mexico	19.6	24.5	40.5	50.5	48.4	56.3	82.0	109.2	135.2	144.2	150.1	210.2%
United States	1 195.9	1 061.7	1 085.4	949.2	994.9	1 144.1	1 234.2	1 180.5	1 287.0	1 459.3	1 436.7	44.4%
OECD Americas	**1 285.0**	**1 175.1**	**1 223.9**	**1 110.0**	**1 163.3**	**1 344.8**	**1 485.4**	**1 467.3**	**1 602.3**	**1 824.1**	**1 807.9**	**55.4%**
Australia	4.0	8.6	16.3	23.8	32.3	37.4	43.6	47.7	61.2	68.6	73.8	128.7%
Israel [2]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2	10.2	16.4	19.9	+
Japan	8.6	19.3	51.5	81.9	111.5	134.7	162.9	169.4	206.7	239.5	238.0	113.3%
Korea	-	-	-	-	6.4	19.5	40.1	64.1	91.2	93.4	102.7	+
New Zealand	0.2	0.6	1.9	5.3	6.6	6.4	8.7	6.9	7.5	7.1	7.4	13.0%
OECD Asia Oceania	**12.9**	**28.6**	**69.6**	**111.0**	**156.8**	**198.0**	**255.3**	**291.3**	**376.7**	**424.9**	**441.8**	**181.8%**
Austria	5.4	7.1	8.3	9.5	11.4	14.5	14.7	18.2	18.2	15.4	17.5	52.8%
Belgium	11.3	17.4	19.6	16.2	18.3	23.4	29.5	31.9	36.8	30.4	31.6	72.0%
Czech Republic	1.9	3.1	5.6	9.2	11.5	14.6	17.1	17.9	17.3	14.7	16.5	43.2%
Denmark	-	0.0	0.0	1.5	4.2	7.4	10.4	10.5	10.3	6.7	6.6	57.7%
Estonia	..	..	..	..	2.4	1.1	1.3	1.6	1.3	0.9	1.0	-60.9%
Finland	-	1.5	1.7	1.9	5.1	6.6	8.0	8.4	8.3	4.6	3.7	-26.7%
France	17.7	30.8	44.2	51.1	53.4	62.8	77.9	91.5	94.6	78.6	86.8	62.8%
Germany	38.4	84.1	111.3	101.1	115.2	144.9	155.9	168.4	176.7	152.2	170.2	47.7%
Greece	-	-	-	0.0	0.1	0.1	3.7	5.2	6.7	5.4	8.9	+
Hungary	6.0	9.7	16.2	18.0	19.1	19.8	21.2	26.6	21.4	16.6	18.7	-1.7%
Iceland	-	-	-	-	-	-	-	-	-	-	-	-
Ireland	-	-	1.7	4.5	3.3	4.4	7.1	8.0	10.8	8.5	9.9	199.2%
Italy	24.1	41.0	46.4	57.0	87.1	101.9	133.2	162.5	157.4	127.9	142.3	63.4%
Latvia	..	..	..	..	5.6	2.3	2.5	3.2	3.4	2.6	2.3	-58.7%
Lithuania	..	..	..	..	9.4	3.5	3.5	4.6	4.7	2.6	2.2	-76.8%
Luxembourg	0.0	0.8	1.0	0.7	1.0	1.3	1.6	2.8	2.8	1.8	1.6	62.6%
Netherlands	47.3	69.1	67.0	72.4	69.0	76.8	77.1	78.5	87.2	63.3	67.1	-2.7%
Norway	-	0.4	2.0	2.8	4.6	8.1	7.4	9.3	12.5	12.6	12.7	174.7%
Poland	10.3	11.5	15.2	15.6	15.5	15.4	17.8	23.2	25.5	26.1	29.6	90.5%
Portugal	-	-	-	-	-	-	4.6	8.7	10.5	9.0	12.2	x
Slovak Republic	2.7	4.4	4.9	6.4	11.7	11.8	13.2	12.6	10.9	7.6	8.2	-30.0%
Slovenia	..	..	..	..	1.8	1.5	1.6	1.9	1.8	1.5	1.7	-4.4%
Spain	0.7	1.8	3.1	4.5	10.0	16.9	34.1	66.8	71.6	56.4	62.3	522.9%
Sweden	-	-	-	0.2	1.3	1.6	1.6	1.7	3.0	1.8	1.5	19.1%
Switzerland	0.0	1.0	1.9	2.9	3.8	5.1	5.7	6.5	7.1	6.7	7.1	87.3%
Turkey	-	-	-	0.1	6.3	12.2	28.9	52.3	73.3	91.5	102.5	+
United Kingdom	*21.7*	*67.6*	*92.8*	*105.8*	*104.1*	*144.5*	*198.3*	*197.3*	*195.2*	*143.0*	*156.9*	50.6%
OECD Europe	***187.5***	***351.3***	***443.1***	***481.4***	***575.3***	***702.6***	***878.0***	***1 020.1***	***1 069.4***	***888.4***	***981.7***	**70.6%**
IEA/Accession/Association	*1 494.4*	*1 575.4*	*1 773.8*	*1 743.0*	*1 953.7*	*2 368.6*	*2 789.1*	*3 054.5*	*3 564.3*	*3 789.2*	*3 969.7*	*103.2%*
European Union - 28	..	..	..	..	*643.5*	*732.1*	*875.5*	*990.8*	*1 009.0*	*806.3*	*890.7*	*38.4%*
G20	..	..	..	..	*2 950.4*	*3 204.2*	*3 603.3*	*3 935.0*	*4 508.8*	*4 708.0*	*4 942.2*	*67.5%*
Africa	*5.3*	*9.0*	*25.6*	*44.3*	*58.8*	*74.5*	*98.0*	*151.1*	*182.0*	*227.7*	*248.0*	*321.9%*
Americas	*1 320.8*	*1 219.8*	*1 285.0*	*1 189.6*	*1 266.1*	*1 469.6*	*1 650.0*	*1 675.6*	*1 861.6*	*2 120.8*	*2 088.2*	*64.9%*
Asia	..	..	..	..	*572.9*	*747.7*	*984.1*	*1 371.8*	*1 967.7*	*2 341.6*	*2 519.8*	*339.9%*
Europe	..	..	..	..	*1 739.9*	*1 645.3*	*1 766.1*	*1 943.7*	*1 976.7*	*1 688.7*	*1 803.9*	*3.7%*
Oceania	*4.25*	*9.29*	*18.14*	*29.09*	*39.01*	*43.99*	*52.57*	*55.08*	*69.16*	*77.54*	*82.85*	*112.4%*

1. Total world includes non-OECD total, OECD total as well as international marine bunkers and international aviation bunkers.
2. Please refer to the chapter Geographical coverage.

CO_2 emissions from fuel combustion - natural gas

million tonnes of CO_2

	1971	1975	1980	1985	1990	1995	2000	2005	2010	2015	2017	% change 90-17
Non-OECD Total	**558.9**	**695.2**	**973.3**	**1 368.7**	**1 781.3**	**1 735.7**	**1 932.1**	**2 418.6**	**3 008.8**	**3 318.9**	**3 511.4**	**97.1%**
Albania	0.2	0.6	0.8	0.8	0.5	0.1	0.0	0.0	0.0	0.1	0.1	-81.6%
Armenia	..	..	..	..	8.4	2.7	2.6	3.1	3.0	3.9	4.3	-48.9%
Azerbaijan	..	..	..	..	32.2	15.5	10.4	17.2	16.1	20.2	19.8	-38.5%
Belarus	..	..	..	..	24.7	23.7	30.9	36.8	39.5	33.8	34.6	40.2%
Bosnia and Herzegovina	..	..	..	..	0.9	0.3	0.5	0.7	0.5	0.4	0.5	-49.8%
Bulgaria	0.6	2.3	7.5	10.8	11.0	9.2	6.0	5.7	4.8	5.1	5.2	-52.7%
Croatia	..	..	..	..	4.2	3.4	4.0	4.5	5.1	3.7	4.6	11.2%
Cyprus [1]	-	-	-	-	-	-	-	-	-	-	-	-
Georgia	..	..	..	..	10.7	2.2	2.2	1.9	2.1	3.9	3.9	-63.2%
Gibraltar	-	-	-	-	-	-	-	-	-	-	-	-
Kazakhstan	..	..	..	..	24.9	23.6	15.3	28.6	53.8	62.0	65.7	163.4%
Kosovo	..	..	..	..	..	..	-	-	-	-	-	..
Kyrgyzstan	..	..	..	..	3.6	1.7	1.3	1.2	0.5	0.5	0.6	-84.2%
Malta	-	-	-	-	-	-	-	-	-	-	0.5	x
Republic of Moldova	..	..	..	..	7.6	6.5	4.8	5.5	5.3	4.9	4.5	-40.6%
Montenegro	..	..	..	..	..	..	..	-	-	-	-	..
Republic of North Macedonia	..	..	..	..	-	-	0.1	0.1	0.2	0.3	0.5	x
Romania	52.3	63.0	76.1	75.0	67.7	42.3	29.5	28.7	22.6	19.8	21.0	-69.0%
Russian Federation	..	..	..	..	837.6	709.6	695.3	753.8	802.8	765.4	795.7	-5.0%
Serbia	..	..	..	..	6.1	2.8	3.2	4.0	3.8	3.5	4.1	-32.3%
Tajikistan	..	..	..	..	3.3	1.2	1.5	1.3	0.4	0.0	0.0	-99.9%
Turkmenistan	..	..	..	..	28.8	26.3	25.6	33.5	40.7	50.1	50.1	74.2%
Ukraine	..	..	..	..	210.5	156.9	142.7	136.1	96.0	54.7	53.3	-74.7%
Uzbekistan	..	..	..	..	75.9	71.6	92.7	88.0	86.2	78.6	67.4	-11.2%
Former Soviet Union	421.5	503.8	677.9	988.9	..	..	..	..	..	..	..	..
Former Yugoslavia	1.3	2.1	5.0	11.0	..	..	..	..	..	..	..	..
Non-OECD Europe and Eurasia	**475.9**	**571.8**	**767.1**	**1 086.5**	**1 358.7**	**1 099.7**	**1 068.7**	**1 150.8**	**1 183.3**	**1 111.0**	**1 136.6**	**-16.3%**
Algeria	2.4	4.6	13.5	21.8	26.2	31.3	35.9	45.0	51.3	72.6	75.5	188.1%
Angola	0.1	0.1	0.2	0.2	1.0	1.1	1.1	1.2	1.4	1.5	1.6	55.6%
Benin	-	-	-	-	-	-	-	-	-	0.1	0.1	x
Botswana	..	..	..	-	-	-	-	-	-	-	-	-
Cameroon	-	-	-	-	-	-	-	-	0.5	1.0	1.1	x
Congo	0.0	0.0	-	0.0	-	-	-	0.0	0.2	1.0	1.2	x
Côte d'Ivoire	-	-	-	-	-	0.1	3.0	2.9	3.1	4.0	4.4	x
Dem. Rep. of the Congo	-	-	-	-	-	-	-	-	0.0	0.0	0.0	x
Egypt	0.2	0.1	2.8	6.6	13.4	20.8	29.8	62.8	73.8	78.1	94.1	603.1%
Eritrea	..	..	..	..	..	-	-	-	-	-	-	..
Ethiopia	-	-	-	-	-	-	-	-	-	-	-	-
Gabon	-	-	0.0	0.1	0.2	0.3	0.2	0.3	0.6	0.7	0.8	289.3%
Ghana	-	-	-	-	-	-	-	-	0.8	2.5	2.3	x
Kenya	-	-	-	-	-	-	-	-	-	-	-	-
Libya	2.1	2.5	5.3	6.2	8.1	7.0	6.9	8.4	10.2	11.9	13.4	65.3%
Mauritius	-	-	-	-	-	-	-	-	-	-	-	-
Morocco	0.1	0.1	0.1	0.2	0.1	0.0	0.1	0.9	1.3	2.4	2.4	+
Mozambique	-	-	-	-	-	0.0	0.0	0.0	0.2	2.7	1.4	x
Namibia	..	..	..	..	..	-	-	-	-	-	-	..
Niger	..	..	..	..	..	..	-	-	-	-	-	..
Nigeria	0.4	1.0	2.9	7.0	6.9	9.3	14.7	18.7	19.3	28.9	29.2	322.4%
Senegal	-	-	-	-	0.0	0.1	0.0	0.0	0.0	0.0	0.0	263.3%
South Africa	-	-	-	-	-	-	-	-	1.9	4.1	3.9	x
South Sudan	..	..	..	..	..	..	..	..	..	-	-	..
Sudan	-	-	-	-	-	-	-	-	-	-	-	-
United Rep. of Tanzania	-	-	-	-	-	-	-	0.8	1.5	1.7	1.5	x
Togo	-	-	-	-	-	-	-	-	-	-	-	-
Tunisia	0.0	0.5	0.8	2.2	2.8	4.6	6.4	7.8	11.9	11.8	12.6	348.1%
Zambia	-	-	-	-	-	-	-	-	-	-	-	-
Zimbabwe	-	-	-	-	-	-	-	-	-	-	-	-
Other Africa	-	-	-	-	0.0	0.0	0.0	2.2	3.9	2.7	2.3	+
Africa	**5.3**	**9.0**	**25.6**	**44.3**	**58.8**	**74.5**	**98.0**	**151.1**	**182.0**	**227.7**	**248.0**	**321.9%**

1. Please refer to the chapter Geographical coverage.

CO_2 emissions from fuel combustion - natural gas

million tonnes of CO_2

	1971	1975	1980	1985	1990	1995	2000	2005	2010	2015	2017	% change 90-17
Bangladesh	0.3	0.6	1.5	3.1	5.4	8.1	11.7	19.1	35.8	45.8	52.2	870.1%
Brunei Darussalam	0.2	1.2	2.1	2.3	2.5	3.4	3.2	3.5	5.1	4.1	4.8	89.3%
Cambodia	..	..	..	..	..	-	-	-	-	-	-	..
DPR of Korea	-	-	-	-	-	-	-	-	-	-	-	-
India	1.0	1.3	1.8	4.7	13.1	25.0	36.2	54.3	95.7	58.1	74.1	465.0%
Indonesia	0.1	0.5	5.4	8.7	24.3	47.4	45.4	50.9	71.3	77.8	73.5	202.0%
Malaysia	0.0	0.1	0.2	4.6	6.8	24.1	48.5	63.9	63.1	70.6	48.0	608.9%
Mongolia	..	..	..	-	-	-	-	-	-	-	-	-
Myanmar	0.1	0.3	0.6	1.6	1.6	2.7	2.6	3.0	3.0	6.6	8.4	428.2%
Nepal	-	-	-	-	-	-	-	-	-	-	-	-
Pakistan	4.9	7.2	8.9	10.8	17.9	25.6	30.9	52.6	52.5	54.2	61.9	246.2%
Philippines	-	-	-	-	-	0.0	0.0	6.7	7.2	6.8	7.6	x
Singapore	0.0	0.1	0.1	0.1	0.1	3.2	2.9	12.0	15.0	20.1	20.8	+
Sri Lanka	-	-	-	-	-	-	-	-	-	-	-	-
Chinese Taipei	1.6	2.2	3.3	1.5	3.0	7.4	12.9	20.8	30.6	36.6	42.1	+
Thailand	-	-	-	6.9	11.7	20.5	40.8	60.9	74.8	84.7	77.9	564.1%
Viet Nam	-	-	-	0.1	0.0	0.4	2.6	11.0	19.1	20.6	18.3	+
Other non-OECD Asia	0.5	0.5	0.2	1.2	0.6	0.5	0.5	0.5	0.9	2.2	2.0	250.2%
Non OECD Asia (excl. China)	**8.7**	**14.0**	**24.2**	**45.7**	**87.1**	**168.2**	**238.3**	**359.3**	**473.9**	**488.0**	**491.7**	**464.5%**
People's Rep. of China	7.4	17.4	28.1	16.2	19.8	26.8	35.8	71.5	224.7	348.8	441.1	+
Hong Kong, China	0.1	0.1	0.2	0.4	0.8	1.2	7.1	6.5	8.0	6.9	7.0	825.7%
China	**7.4**	**17.5**	**28.3**	**16.6**	**20.6**	**28.0**	**42.9**	**78.0**	**232.6**	**355.7**	**448.2**	**+**
Argentina	12.1	17.1	21.7	30.4	43.4	52.2	70.2	77.2	87.3	96.6	98.7	127.7%
Bolivia	0.1	0.3	0.6	0.8	1.5	2.3	2.4	3.4	5.7	7.7	8.4	482.0%
Brazil	0.5	1.0	1.6	3.8	5.8	7.8	16.8	38.1	51.3	78.8	70.6	+
Colombia	2.6	3.3	5.7	7.4	7.6	8.4	12.8	14.4	18.5	19.8	19.1	153.3%
Costa Rica	-	-	-	-	-	-	-	-	-	-	-	-
Cuba	0.1	0.2	0.1	0.1	0.1	0.2	1.1	1.4	2.0	2.4	2.0	+
Curaçao [1]	-	-	-	-	-	-	-	-	-	-	-	-
Dominican Republic	-	-	-	-	-	-	-	0.4	1.6	2.2	2.4	x
Ecuador	-	-	-	-	-	-	-	0.7	1.0	1.3	1.3	x
El Salvador	-	-	-	-	-	-	-	-	-	-	-	-
Guatemala	-	-	-	-	-	-	-	-	-	-	-	-
Haiti	-	-	-	-	-	-	-	-	-	-	-	-
Honduras	-	-	-	-	-	-	-	-	-	-	-	-
Jamaica	-	-	-	-	-	-	-	-	-	-	0.2	x
Nicaragua	-	-	-	-	-	-	-	-	-	-	-	-
Panama	-	-	-	-	-	-	-	-	-	-	-	-
Paraguay	-	-	-	-	-	-	-	-	-	-	-	-
Peru	0.6	0.8	1.0	1.3	1.0	0.6	1.1	3.9	12.9	18.0	16.6	+
Suriname	..	..	..	..	..	..	-	-	-	-	-	..
Trinidad and Tobago	2.8	2.3	3.9	4.5	5.8	6.0	7.5	13.6	17.6	16.9	14.0	139.4%
Uruguay	-	-	-	-	-	-	0.1	0.2	0.1	0.1	0.1	x
Venezuela	16.9	19.7	26.5	31.2	37.6	47.3	51.7	53.6	59.7	50.0	46.8	24.5%
Other non-OECD Americas	0.0	-	0.0	0.1	0.0	0.0	0.7	1.4	1.6	3.0	0.1	58.0%
Non-OECD Americas	**35.8**	**44.7**	**61.2**	**79.6**	**102.8**	**124.8**	**164.5**	**208.2**	**259.3**	**296.7**	**280.4**	**172.6%**
Bahrain	1.8	4.1	5.7	7.5	8.7	11.2	13.4	17.1	21.7	25.7	25.3	190.6%
Islamic Republic of Iran	5.5	8.1	8.6	16.9	33.8	76.3	118.0	189.7	274.3	342.5	380.3	+
Iraq	1.8	3.2	2.5	1.6	3.8	6.1	6.0	3.5	9.8	12.8	20.5	440.6%
Jordan	-	-	-	-	0.2	0.5	0.5	3.3	5.4	4.6	8.2	+
Kuwait	10.0	9.9	13.2	9.7	11.6	17.8	18.4	23.6	27.9	40.1	43.4	275.4%
Lebanon	-	-	-	-	-	-	-	-	0.5	-	-	-
Oman	-	-	0.7	2.1	4.9	6.8	11.7	14.8	31.1	45.6	46.4	839.6%
Qatar	1.9	4.2	5.6	9.1	10.5	14.4	18.5	26.6	43.0	62.6	64.5	512.5%
Saudi Arabia	2.7	5.4	20.9	28.8	43.2	54.7	66.8	101.5	130.9	156.4	171.1	296.1%
Syrian Arab Republic	-	-	0.1	0.3	3.2	4.0	7.4	8.9	15.7	7.3	6.3	95.4%
United Arab Emirates	2.1	3.3	9.7	19.9	33.3	48.8	58.8	82.2	115.4	140.6	139.1	317.8%
Yemen	-	-	-	-	-	-	-	-	1.9	1.7	1.2	x
Middle East	**25.8**	**38.2**	**67.0**	**96.0**	**153.3**	**240.5**	**319.6**	**471.2**	**677.6**	**839.8**	**906.6**	**491.4%**

1. Please refer to the chapter Geographical coverage.

CO_2 emissions from international marine bunkers

million tonnes of CO_2

	1971	1975	1980	1985	1990	1995	2000	2005	2010	2015	2017	% change 90-17
World	**353.95**	**341.22**	**357.16**	**306.38**	**371.28**	**427.96**	**498.43**	**571.50**	**662.89**	**660.11**	**697.14**	**87.8%**
Annex I Parties	..	..	..	..	*236.69*	*231.49*	*252.96*	*271.85*	*268.66*	*249.75*	*273.18*	*15.4%*
Annex II Parties	*205.24*	*219.57*	*237.69*	*173.47*	*226.16*	*227.95*	*247.18*	*262.31*	*254.35*	*195.91*	*222.09*	*-1.8%*
North America	*26.69*	*36.50*	*94.90*	*57.03*	*94.53*	*94.67*	*93.21*	*85.48*	*85.71*	*54.23*	*75.20*	*-20.4%*
Europe	*121.89*	*111.95*	*98.49*	*89.15*	*110.51*	*111.18*	*133.07*	*153.02*	*150.52*	*124.91*	*130.43*	*18.0%*
Asia Oceania	*56.66*	*71.11*	*44.30*	*27.30*	*21.11*	*22.10*	*20.91*	*23.81*	*18.12*	*16.77*	*16.47*	*-22.0%*
Annex I EIT	..	..	..	..	*9.88*	*2.60*	*1.82*	*3.18*	*7.91*	*45.45*	*40.88*	*313.7%*
Non-Annex I Parties	..	..	..	..	*134.58*	*196.47*	*245.47*	*299.65*	*394.23*	*410.36*	*423.96*	*215.0%*
Annex B Kyoto Parties	..	..	..	..	*116.90*	*116.96*	*140.57*	*161.98*	*161.01*	*135.86*	*144.31*	*23.4%*
Non-OECD Total	**144.39**	**118.20**	**115.63**	**127.50**	**134.83**	**171.84**	**211.22**	**262.62**	**370.74**	**424.49**	**432.13**	**220.5%**
OECD Total	**209.57**	**223.02**	**241.53**	**178.87**	**236.44**	**256.11**	**287.21**	**308.88**	**292.15**	**235.63**	**265.01**	**12.1%**
Canada	3.10	2.61	4.76	1.19	2.90	3.20	3.37	2.86	2.20	0.69	1.20	-58.5%
Chile	0.61	0.37	0.27	0.09	0.58	1.13	1.96	3.33	1.30	0.41	0.44	-23.7%
Mexico	0.26	0.39	1.01	1.34	-	2.58	3.88	2.73	2.53	2.65	2.47	x
United States	23.59	33.90	90.14	55.84	91.64	91.47	89.84	82.62	83.51	53.54	74.00	-19.2%
OECD Americas	**27.56**	**37.26**	**96.19**	**58.46**	**95.11**	**98.37**	**99.05**	**91.54**	**89.53**	**57.29**	**78.12**	**-17.9%**
Australia	5.15	5.08	3.72	2.31	2.16	2.82	2.99	2.76	2.18	1.77	1.81	-16.4%
Israel [1]	-	-	-	0.35	0.38	0.65	0.59	0.81	1.07	0.81	0.73	91.3%
Japan	50.46	64.93	39.39	24.25	17.90	18.14	17.15	20.05	14.86	13.93	13.73	-23.3%
Korea	1.54	0.17	0.31	1.71	5.32	21.58	30.78	33.59	29.05	30.38	32.89	517.8%
New Zealand	1.05	1.09	1.19	0.74	1.05	1.14	0.76	1.00	1.08	1.08	0.93	-11.9%
OECD Asia Oceania	**58.21**	**71.28**	**44.61**	**29.36**	**26.82**	**44.33**	**52.27**	**58.22**	**48.24**	**47.96**	**50.09**	**86.8%**
Austria	-	-	-	-	0.05	0.06	0.07	0.08	0.07	0.06	0.07	29.8%
Belgium	8.17	8.76	7.64	7.41	13.04	12.44	17.20	24.65	24.55	18.65	24.11	84.9%
Czech Republic	-	-	-	-	-	-	-	-	-	-	-	-
Denmark	2.11	1.69	1.34	1.36	3.05	5.02	4.08	2.43	2.19	2.42	1.67	-45.4%
Estonia	..	..	..	..	0.57	0.28	0.33	0.38	0.70	0.93	0.99	73.0%
Finland	0.24	0.31	1.86	1.47	1.80	1.05	2.12	1.61	0.67	0.94	1.12	-37.6%
France	12.90	14.72	12.72	7.66	7.86	6.79	8.99	8.25	7.41	5.29	5.33	-32.1%
Germany	13.14	10.71	11.23	11.06	7.95	6.58	6.99	7.93	8.84	7.61	7.23	-9.0%
Greece	1.90	2.83	2.66	3.54	8.12	11.34	11.46	9.15	8.73	5.73	6.87	-15.4%
Hungary	-	-	-	-	-	-	-	-	-	-	-	-
Iceland	-	-	-	0.02	0.10	0.14	0.21	0.20	0.18	0.15	0.19	95.3%
Ireland	0.24	0.21	0.24	0.09	0.06	0.37	0.47	0.33	0.26	0.49	0.46	717.6%
Italy	23.11	18.22	13.30	10.93	8.53	7.76	5.30	7.24	9.60	6.12	7.42	-13.0%
Latvia	..	..	..	..	1.50	0.48	0.03	0.82	0.80	0.80	0.82	-45.2%
Lithuania	..	..	..	..	0.30	0.45	0.29	0.46	0.45	0.24	0.56	85.6%
Luxembourg	-	-	-	-	-	-	-	-	-	-	-	-
Netherlands	28.62	33.29	29.79	27.83	34.95	34.71	41.43	49.22	43.65	37.55	36.61	4.8%
Norway	1.94	1.52	0.89	1.04	1.41	2.22	2.59	2.19	1.05	0.42	0.55	-61.2%
Poland	1.65	2.23	2.24	1.65	1.25	0.44	0.91	1.02	0.69	0.60	0.83	-33.8%
Portugal	2.34	2.02	1.36	1.50	1.93	1.53	2.11	1.84	1.48	2.06	2.49	29.3%
Slovak Republic	-	-	-	-	-	-	-	-	-	-	-	-
Slovenia	..	..	..	..	-	-	-	0.07	0.06	0.20	0.49	x
Spain	6.01	3.48	5.13	6.84	11.58	10.10	19.17	25.27	26.81	23.78	21.26	83.6%
Sweden	3.62	3.49	2.69	1.77	2.11	3.33	4.33	6.19	6.26	5.75	7.41	250.3%
Switzerland	-	-	-	-	0.06	0.05	0.03	0.04	0.03	0.02	0.01	-77.8%
Turkey	0.27	0.29	-	0.25	0.38	0.58	1.27	3.34	1.16	2.69	2.69	614.4%
OECD Europe [1]	17.55	10.71	7.65	6.63	7.92	7.70	6.51	6.41	8.75	7.87	7.62	-3.8%
OECD Europe	**123.80**	**114.48**	**100.73**	**91.05**	**114.51**	**113.41**	**135.89**	**159.11**	**154.38**	**130.37**	**136.80**	**19.5%**
IEA/Accession/Association	*234.76*	*246.89*	*268.95*	*204.65*	*285.34*	*319.19*	*376.80*	*430.72*	*477.08*	*437.63*	*480.07*	*68.2%*
European Union - 28	..	..	..	..	*113.18*	*111.73*	*134.74*	*156.79*	*157.56*	*133.21*	*141.25*	*24.8%*
G20	..	..	..	..	*267.18*	*293.13*	*332.90*	*371.58*	*404.20*	*380.75*	*410.01*	*53.5%*
Africa	*22.21*	*16.04*	*16.67*	*14.02*	*16.13*	*23.99*	*23.50*	*20.55*	*18.88*	*19.05*	*14.81*	*-8.2%*
Americas	*58.39*	*61.52*	*117.30*	*77.86*	*114.89*	*122.75*	*132.35*	*129.65*	*136.81*	*102.48*	*121.75*	*6.0%*
Asia	..	..	..	..	*110.84*	*157.06*	*193.10*	*246.11*	*327.15*	*348.09*	*365.93*	*230.1%*
Europe	..	..	..	..	*126.00*	*119.90*	*145.39*	*170.98*	*176.37*	*187.14*	*191.44*	*51.9%*
Oceania	*6.78*	*6.71*	*5.37*	*3.25*	*3.42*	*4.26*	*4.09*	*4.21*	*3.67*	*3.35*	*3.22*	*-6.0%*

1. Please refer to the chapter Geographical coverage.

CO_2 emissions from international marine bunkers

million tonnes of CO_2

	1971	1975	1980	1985	1990	1995	2000	2005	2010	2015	2017	% change 90-17
Non-OECD Total	**144.39**	**118.20**	**115.63**	**127.50**	**134.83**	**171.84**	**211.22**	**262.62**	**370.74**	**424.49**	**432.13**	**220.5%**
Albania	-	-	-	-	-	-	-	-	-	0.06	0.11	x
Armenia	..	..	..	..	-	-	-	-	-	-	-	-
Azerbaijan	..	..	..	..	-	-	-	-	0.23	0.16	0.14	x
Belarus	..	..	..	..	-	-	-	-	-	-	-	-
Bosnia and Herzegovina	..	..	..	..	-	-	-	-	-	-	-	-
Bulgaria	-	-	-	0.72	0.18	0.86	0.20	0.35	0.31	0.27	0.25	38.4%
Croatia	..	..	..	..	0.15	0.10	0.06	0.08	0.02	0.01	0.02	-86.3%
Cyprus [1]	0.01	0.07	0.05	0.11	0.18	0.21	0.60	0.91	0.58	0.76	0.80	340.2%
Georgia	..	..	..	..	-	0.16	-	-	-	-	-	-
Gibraltar	3.54	3.85	4.20	4.68	5.51	5.98	8.41	12.67	13.29	11.71	13.25	140.4%
Kazakhstan	..	..	..	..	-	-	-	-	-	0.30	0.51	x
Kosovo	..	..	..	..	..	..	-	-	-	-	-	..
Kyrgyzstan	..	..	..	..	-	-	-	-	-	-	-	-
Malta	0.19	0.08	0.09	0.06	0.09	0.14	2.09	2.11	4.65	4.94	6.73	+
Republic of Moldova	..	..	..	..	-	-	-	-	-	-	-	-
Montenegro	..	..	..	..	..	..	..	-	-	-	-	..
Republic of North Macedonia	..	..	..	..	-	-	-	-	-	-	-	-
Romania	-	-	-	-	-	-	-	-	0.05	0.14	0.09	x
Russian Federation	..	..	..	..	5.93	-	-	-	4.84	42.26	36.83	521.3%
Serbia	..	..	..	..	-	-	-	-	-	0.08	0.05	x
Tajikistan	..	..	..	..	-	-	-	-	-	-	-	-
Turkmenistan	..	..	..	..	-	-	-	-	-	-	-	-
Ukraine	..	..	..	..	-	-	-	-	-	-	-	-
Uzbekistan	..	..	..	..	-	-	-	-	-	-	-	-
Former Soviet Union	13.31	14.24	14.24	13.93	..	..	..	..	..	..	..	..
Former Yugoslavia	-	-	-	-	..	..	..	..	..	..	..	..
Non-OECD Europe and Eurasia	**17.05**	**18.24**	**18.58**	**19.50**	**12.04**	**7.45**	**11.37**	**16.12**	**23.97**	**60.68**	**58.77**	**388.0%**
Algeria	0.62	0.78	1.30	1.17	1.37	1.18	0.78	1.18	1.02	0.87	0.74	-46.1%
Angola	0.78	0.49	0.84	0.11	0.02	0.03	-	0.34	0.56	1.28	1.06	+
Benin	-	-	-	-	-	-	-	-	-	-	0.00	x
Botswana	..	..	..	-	-	-	-	-	-	-	-	-
Cameroon	-	-	0.12	0.03	0.04	0.09	0.06	0.04	0.14	-	-	-100.0%
Congo	-	-	-	-	-	-	-	-	-	-	-	-
Côte d'Ivoire	0.06	0.01	1.36	0.73	0.12	0.27	0.29	0.36	0.06	0.23	0.24	98.4%
Dem. Rep. of the Congo	0.41	0.22	0.08	0.09	0.11	0.01	-	-	-	-	-	-100.0%
Egypt	0.06	1.11	3.28	4.83	5.39	7.93	8.79	4.63	1.40	0.58	0.60	-88.9%
Eritrea	..	..	..	..	..	0.43	-	-	-	-	-	..
Ethiopia	0.07	0.02	0.01	0.03	0.03	0.03	-	-	-	-	-	-100.0%
Gabon	0.20	0.14	0.20	0.23	0.08	0.44	0.61	0.61	0.66	0.58	0.50	521.5%
Ghana	0.16	0.14	0.10	-	-	-	0.16	0.12	0.13	-	-	-
Kenya	1.49	1.07	0.57	0.45	0.56	0.17	0.21	0.22	0.12	0.13	0.15	-73.7%
Libya	0.01	0.01	0.02	0.04	0.25	0.28	0.87	1.16	1.17	0.26	0.68	174.6%
Mauritius	0.05	0.11	0.17	0.22	0.19	0.27	0.69	0.60	0.75	0.89	1.46	668.6%
Morocco	0.24	0.18	0.21	0.04	0.06	0.04	0.05	0.07	0.43	0.43	0.43	570.1%
Mozambique	0.76	0.36	0.27	0.10	0.09	0.01	0.00	0.01	-	-	-	-100.0%
Namibia	..	..	..	..	..	-	-	-	-	-	-	..
Niger	..	..	..	..	..	..	-	-	-	-	-	..
Nigeria	0.02	0.12	0.25	0.35	0.59	1.43	1.21	1.29	1.32	1.18	0.99	68.8%
Senegal	3.02	2.11	0.85	0.33	0.11	0.09	0.30	0.36	0.21	0.38	0.37	226.9%
South Africa	10.92	7.22	5.31	3.44	6.02	10.41	8.60	8.61	9.83	10.97	6.32	5.1%
South Sudan	..	..	..	..	..	..	..	..	..	-	-	..
Sudan	-	0.01	0.02	0.02	0.02	0.03	0.03	0.05	0.07	0.08	0.09	287.3%
United Rep. of Tanzania	0.05	0.05	0.12	0.08	0.08	0.07	0.08	0.11	0.14	0.17	0.04	-52.0%
Togo	-	-	-	-	-	-	0.01	0.01	0.05	0.06	0.06	x
Tunisia	0.06	0.02	0.02	0.01	0.07	0.06	0.06	0.05	0.04	0.01	0.02	-65.8%
Zambia	-	-	-	-	-	-	-	-	-	-	-	-
Zimbabwe	-	-	-	-	-	-	-	-	-	-	-	-
Other Africa	3.23	1.88	1.58	1.72	0.94	0.72	0.70	0.73	0.81	0.95	1.04	10.6%
Africa	**22.21**	**16.04**	**16.67**	**14.02**	**16.13**	**23.99**	**23.50**	**20.55**	**18.88**	**19.05**	**14.81**	**-8.2%**

1. Please refer to the chapter Geographical coverage.

CO_2 emissions from international marine bunkers

million tonnes of CO_2

	1971	1975	1980	1985	1990	1995	2000	2005	2010	2015	2017	% change 90-17
Bangladesh	0.07	0.05	0.19	0.07	0.06	0.11	0.14	0.18	0.25	0.33	0.38	504.9%
Brunei Darussalam	-	-	0.00	-	0.12	0.21	0.22	0.27	0.28	0.29	-	-100.0%
Cambodia	..	..	..	..	..	-	-	-	-	-	-	..
DPR of Korea	-	-	-	-	-	-	-	-	-	-	-	-
India	0.72	0.58	0.73	0.34	1.38	1.71	2.20	3.09	4.27	4.49	5.01	263.7%
Indonesia	0.71	1.10	0.80	0.69	1.70	1.30	0.36	0.43	0.56	0.74	0.82	-52.1%
Malaysia	0.11	0.22	0.19	0.31	0.30	0.54	0.70	0.19	0.19	1.12	1.25	324.0%
Mongolia	..	..	..	-	-	-	-	-	-	-	-	-
Myanmar	0.01	0.00	-	-	-	0.01	0.01	0.01	0.01	0.01	0.00	x
Nepal	-	-	-	-	-	-	-	-	-	-	-	-
Pakistan	0.29	0.22	0.47	0.08	0.11	0.05	0.08	0.26	0.56	0.16	0.12	14.2%
Philippines	1.31	0.45	0.59	0.50	0.21	0.36	0.68	0.38	0.59	0.09	0.31	48.8%
Singapore	8.98	10.54	15.11	15.30	34.23	35.65	58.18	79.43	127.27	140.67	157.75	360.9%
Sri Lanka	1.20	1.30	1.12	1.02	1.22	1.10	0.51	0.54	0.66	1.30	1.83	49.8%
Chinese Taipei	0.39	0.33	0.67	1.64	4.90	7.64	11.11	7.57	5.50	3.40	3.75	-23.6%
Thailand	0.21	0.26	0.51	0.66	1.72	3.05	2.49	5.23	4.47	3.78	3.81	121.9%
Viet Nam	-	-	-	0.07	0.09	0.22	0.46	0.80	1.03	0.88	0.69	693.2%
Other non-OECD Asia	0.57	0.54	0.47	0.20	0.21	0.30	0.33	0.44	0.41	0.88	0.91	335.0%
Non OECD Asia (excl. China)	**14.57**	**15.59**	**20.84**	**20.88**	**46.23**	**52.24**	**77.48**	**98.82**	**146.04**	**158.12**	**176.63**	**282.0%**
People's Rep. of China	2.41	2.82	3.32	3.95	4.34	8.96	9.58	16.31	27.92	29.84	32.91	658.6%
Hong Kong, China	2.00	1.72	2.88	3.14	4.57	7.24	10.73	17.98	39.00	27.48	34.37	652.0%
China	**4.41**	**4.54**	**6.20**	**7.09**	**8.91**	**16.20**	**20.30**	**34.29**	**66.91**	**57.32**	**67.28**	**655.2%**
Argentina	0.66	0.29	1.34	2.02	2.25	1.73	1.50	2.22	3.80	2.93	2.57	14.4%
Bolivia	-	-	-	-	-	-	-	-	-	-	-	-
Brazil	1.01	1.18	1.43	1.73	1.73	3.67	9.25	11.04	12.74	13.30	10.81	523.2%
Colombia	0.96	0.50	0.31	0.22	0.33	0.58	0.75	1.15	2.04	0.80	0.84	152.7%
Costa Rica	0.10	-	0.13	0.14	0.24	0.37	0.34	0.36	0.09	0.00	-	-100.0%
Cuba	-	-	-	0.12	0.06	0.04	0.05	0.06	2.41	2.09	1.28	+
Curaçao [1]	7.79	7.42	7.35	6.19	5.23	5.37	6.36	6.79	7.27	5.05	5.01	-4.3%
Dominican Republic	-	-	-	-	-	-	-	-	-	-	-	-
Ecuador	0.28	-	0.35	0.12	0.50	1.00	0.88	2.10	1.78	1.13	1.19	138.0%
El Salvador	-	-	-	-	-	-	-	-	-	-	-	-
Guatemala	0.18	0.27	0.41	0.39	0.43	0.53	0.64	0.75	0.90	1.08	1.15	166.9%
Haiti	-	-	-	-	-	-	-	-	-	-	-	-
Honduras	-	-	-	-	-	-	-	-	0.00	0.02	0.12	x
Jamaica	0.16	0.27	0.10	0.04	0.10	0.12	0.12	0.26	0.27	0.86	0.81	701.1%
Nicaragua	-	-	-	-	-	-	-	-	-	-	-	-
Panama	1.70	3.40	3.09	4.02	4.94	6.42	8.15	7.37	9.56	11.60	14.46	192.4%
Paraguay	-	-	-	-	-	-	-	-	-	-	-	-
Peru	0.07	0.08	0.09	0.09	0.08	0.12	0.18	0.29	0.34	0.35	0.43	412.1%
Suriname	..	..	..	..	..	..	0.07	0.11	0.13	0.16	0.14	..
Trinidad and Tobago	5.18	3.58	1.44	0.31	0.11	0.16	1.21	1.49	1.08	1.58	1.64	+
Uruguay	0.28	0.20	0.25	0.33	0.37	1.22	0.93	1.14	1.43	0.56	0.33	-11.8%
Venezuela	9.23	4.87	2.01	1.78	2.53	2.32	2.08	2.36	2.82	2.84	2.04	-19.1%
Other non-OECD Americas	3.25	2.21	2.82	1.89	0.87	0.72	0.80	0.64	0.61	0.84	0.83	-4.2%
Non-OECD Americas	**30.83**	**24.26**	**21.11**	**19.40**	**19.78**	**24.37**	**33.30**	**38.11**	**47.28**	**45.19**	**43.63**	**120.6%**
Bahrain	0.56	0.56	0.61	0.48	0.25	0.26	0.25	0.24	0.25	0.26	0.26	4.5%
Islamic Republic of Iran	1.14	1.38	1.36	1.01	1.37	2.06	2.37	3.00	7.38	15.05	4.47	226.7%
Iraq	0.26	0.30	0.37	0.47	0.40	0.02	0.49	0.33	0.45	0.71	0.89	120.1%
Jordan	-	-	-	-	-	0.03	0.14	0.25	0.05	0.02	0.25	x
Kuwait	6.36	6.38	5.66	2.40	0.56	1.84	1.44	2.17	1.70	3.87	3.00	436.5%
Lebanon	0.72	0.03	-	-	-	-	-	-	-	-	-	-
Oman	3.89	2.57	0.72	0.35	0.06	0.08	0.20	0.12	3.62	4.01	3.18	+
Qatar	-	-	-	-	-	-	-	-	-	-	-	-
Saudi Arabia	40.47	26.14	13.77	28.31	5.80	6.02	6.67	7.16	8.19	9.89	10.35	78.5%
Syrian Arab Republic	0.78	1.27	1.99	2.56	2.85	3.47	3.72	3.20	3.47	0.55	0.43	-85.0%
United Arab Emirates	-	-	5.59	9.79	19.19	33.51	29.69	37.83	42.03	49.34	47.85	149.3%
Yemen	1.14	0.92	2.16	1.25	1.25	0.32	0.31	0.43	0.52	0.41	0.33	-73.4%
Middle East	**55.32**	**39.55**	**32.22**	**46.62**	**31.74**	**47.60**	**45.26**	**54.73**	**67.66**	**84.13**	**71.01**	**123.7%**

1. Please refer to the chapter Geographical coverage.

CO_2 emissions from international aviation bunkers

million tonnes of CO_2

	1971	1975	1980	1985	1990	1995	2000	2005	2010	2015	2017	% change 90-17
World	**168.82**	**173.24**	**201.39**	**224.18**	**258.31**	**289.69**	**354.52**	**420.26**	**457.47**	**530.38**	**584.86**	**126.4%**
Annex I Parties	..	..	..	..	*171.40*	*181.92*	*226.62*	*256.74*	*254.56*	*278.05*	*302.07*	*76.2%*
Annex II Parties	*59.17*	*62.37*	*71.49*	*82.30*	*132.60*	*161.39*	*206.49*	*231.29*	*225.10*	*244.67*	*265.39*	*100.1%*
North America	*16.77*	*17.70*	*21.39*	*22.05*	*41.92*	*49.03*	*60.81*	*71.41*	*68.72*	*73.54*	*76.14*	*81.6%*
Europe	*36.32*	*38.05*	*43.13*	*49.09*	*71.57*	*88.16*	*116.89*	*127.91*	*127.37*	*137.64*	*150.99*	*111.0%*
Asia Oceania	*6.07*	*6.61*	*6.96*	*11.16*	*19.12*	*24.20*	*28.80*	*31.97*	*29.01*	*33.50*	*38.26*	*100.2%*
Annex I EIT	..	..	..	..	*37.32*	*18.73*	*17.37*	*21.05*	*24.68*	*21.65*	*24.72*	*-33.8%*
Non-Annex I Parties	..	..	..	..	*86.91*	*107.77*	*127.90*	*163.52*	*202.92*	*252.32*	*282.80*	*225.4%*
Annex B Kyoto Parties	..	..	..	..	*90.24*	*100.38*	*129.50*	*143.34*	*145.33*	*157.78*	*175.77*	*94.8%*
Non-OECD Total	**104.53**	**104.37**	**119.99**	**131.14**	**114.25**	**113.48**	**130.79**	**162.15**	**200.64**	**242.85**	**271.38**	**137.5%**
OECD Total	**64.29**	**68.87**	**81.40**	**93.05**	**144.06**	**176.21**	**223.73**	**258.11**	**256.84**	**287.53**	**313.48**	**117.6%**
Canada	1.27	1.95	1.36	1.23	2.73	2.61	3.12	2.51	3.41	2.59	1.91	-30.2%
Chile	0.44	0.35	0.55	0.50	0.57	0.65	1.06	1.07	1.54	1.70	1.85	223.4%
Mexico	1.40	2.42	4.28	4.58	5.29	6.83	8.13	8.60	8.16	10.33	11.90	125.2%
United States	15.51	15.76	20.03	20.82	39.19	46.42	57.69	68.90	65.31	70.95	74.23	89.4%
OECD Americas	**18.62**	**20.48**	**26.22**	**27.12**	**47.77**	**56.50**	**70.00**	**81.08**	**78.42**	**85.56**	**89.89**	**88.2%**
Australia	1.59	1.91	2.43	2.79	4.34	5.80	7.22	8.16	10.19	11.65	13.40	209.1%
Israel [1]	1.81	1.90	2.23	2.02	1.60	2.15	2.40	3.24	2.43	2.70	3.25	103.3%
Japan	3.83	4.36	3.96	7.71	13.45	16.78	19.77	21.58	16.48	19.33	21.16	57.4%
Korea	-	0.37	0.83	1.71	0.85	2.07	1.71	7.32	12.01	13.19	15.09	+
New Zealand	0.65	0.34	0.58	0.66	1.33	1.61	1.81	2.23	2.33	2.52	3.69	177.1%
OECD Asia Oceania	**7.88**	**8.88**	**10.03**	**14.89**	**21.57**	**28.42**	**32.92**	**42.53**	**43.45**	**49.39**	**56.60**	**162.5%**
Austria	0.28	0.25	0.39	0.65	0.86	1.29	1.65	1.91	1.98	2.07	2.19	153.7%
Belgium	1.23	1.06	1.24	1.64	3.01	2.82	4.52	3.47	4.12	4.33	4.73	57.5%
Czech Republic	0.70	0.59	0.86	0.64	0.66	0.57	0.48	0.95	0.93	0.88	1.05	60.2%
Denmark	1.94	1.57	1.61	1.57	1.72	1.85	2.31	2.53	2.40	2.61	2.90	68.3%
Estonia	..	..	..	..	0.10	0.05	0.06	0.15	0.10	0.15	0.18	70.8%
Finland	0.18	0.40	0.46	0.49	0.98	0.87	1.03	1.25	1.60	1.90	2.02	105.6%
France	4.62	5.77	5.67	6.50	9.42	11.56	15.22	16.27	16.49	18.98	19.23	104.2%
Germany	7.65	8.24	8.30	9.55	13.31	15.64	19.33	22.39	23.90	24.09	28.65	115.3%
Greece	1.31	1.33	2.25	2.36	2.36	2.55	2.44	2.33	2.04	2.47	2.95	24.9%
Hungary	0.15	0.21	0.37	0.45	0.49	0.54	0.70	0.80	0.70	0.54	0.66	35.0%
Iceland	0.22	0.14	0.09	0.18	0.22	0.20	0.40	0.40	0.37	0.66	1.12	412.2%
Ireland	0.97	0.74	0.61	0.57	1.04	1.12	1.74	2.38	2.16	2.45	2.97	185.0%
Italy	3.50	2.46	4.19	4.38	4.54	5.86	8.46	8.97	9.48	9.48	10.24	125.4%
Latvia	..	..	..	..	0.22	0.08	0.08	0.18	0.35	0.32	0.42	91.0%
Lithuania	..	..	..	..	0.40	0.12	0.07	0.14	0.14	0.24	0.32	-21.8%
Luxembourg	0.11	0.15	0.19	0.22	0.39	0.57	0.96	1.29	1.29	1.37	1.71	335.7%
Netherlands	2.03	2.29	2.75	3.50	4.55	7.52	9.77	10.79	10.09	11.25	11.88	160.8%
Norway	0.70	0.51	0.68	0.93	1.26	1.10	1.06	1.05	1.32	1.79	1.61	28.1%
Poland	0.53	0.53	0.68	0.68	0.66	0.81	0.82	0.96	1.52	1.94	2.55	285.2%
Portugal	0.71	0.81	0.89	1.28	1.38	1.56	1.94	2.18	2.63	3.13	3.83	178.3%
Slovak Republic	-	-	-	-	-	0.12	0.08	0.12	0.12	0.13	0.12	x
Slovenia	..	..	..	..	0.08	0.06	0.07	0.07	0.08	0.08	0.08	-2.5%
Spain	1.76	2.80	2.60	2.69	3.35	6.07	8.11	9.28	9.11	11.55	13.37	298.6%
Sweden	0.33	0.34	0.49	0.51	1.09	1.77	2.08	1.89	2.06	2.21	2.67	145.6%
Switzerland	1.64	1.81	2.04	2.44	3.03	3.66	4.61	3.52	4.20	4.86	5.26	73.4%
Turkey	0.09	0.14	0.12	0.18	0.54	0.79	1.56	3.25	3.64	10.67	10.62	+
OECD Europe [1]	7.15	7.39	8.68	9.63	19.05	22.14	31.24	36.01	32.13	32.44	33.65	76.7%
OECD Europe	**37.79**	**39.51**	**45.16**	**51.03**	**74.72**	**91.29**	**120.82**	**134.51**	**134.97**	**152.58**	**166.99**	**123.5%**
IEA/Accession/Association	*66.98*	*73.86*	*89.85*	*104.37*	*162.22*	*201.52*	*257.26*	*303.69*	*321.51*	*369.39*	*406.75*	*150.7%*
European Union - 28	..	..	..	..	*72.51*	*88.34*	*115.19*	*128.60*	*127.80*	*137.16*	*151.76*	*109.3%*
G20	..	..	..	..	*184.59*	*212.12*	*260.25*	*311.43*	*329.22*	*371.30*	*408.00*	*121.0%*
Africa	*5.04*	*7.13*	*10.07*	*10.68*	*10.96*	*12.79*	*16.73*	*15.76*	*21.18*	*23.68*	*26.07*	*137.8%*
Americas	*23.24*	*25.68*	*33.78*	*34.62*	*56.51*	*68.87*	*85.89*	*99.97*	*100.70*	*113.00*	*117.19*	*107.4%*
Asia	..	..	..	..	*74.80*	*92.83*	*107.23*	*143.68*	*169.50*	*218.83*	*247.01*	*230.2%*
Europe	..	..	..	..	*109.87*	*107.47*	*135.03*	*149.67*	*152.69*	*160.06*	*176.88*	*61.0%*
Oceania	*2.62*	*2.51*	*3.29*	*3.89*	*6.17*	*7.73*	*9.63*	*11.19*	*13.39*	*14.80*	*17.71*	*187.0%*

1. Please refer to the chapter Geographical coverage.

CO_2 emissions from international aviation bunkers

million tonnes of CO_2

	1971	1975	1980	1985	1990	1995	2000	2005	2010	2015	2017	% change 90-17
Non-OECD Total	**104.53**	**104.37**	**119.99**	**131.14**	**114.25**	**113.48**	**130.79**	**162.15**	**200.64**	**242.85**	**271.38**	**137.5%**
Albania	-	-	-	-	-	-	0.12	0.18	0.05	0.01	0.02	x
Armenia	..	..	..	..	0.60	0.10	0.19	0.14	0.13	0.10	0.17	-72.0%
Azerbaijan	..	..	..	..	1.05	0.31	0.30	1.11	1.21	0.81	0.49	-53.4%
Belarus	..	..	..	..	-	-	-	-	-	0.34	0.39	x
Bosnia and Herzegovina	..	..	..	..	0.08	0.11	0.03	0.02	0.02	0.02	0.03	-60.0%
Bulgaria	0.61	0.61	0.92	1.13	0.71	0.99	0.24	0.56	0.50	0.53	0.71	-0.1%
Croatia	..	..	..	..	0.49	0.24	0.20	0.25	0.29	0.34	0.43	-10.9%
Cyprus [1]	0.15	0.02	0.23	0.44	0.73	0.80	0.82	0.89	0.83	0.72	0.92	26.8%
Georgia	..	..	..	..	0.61	0.01	0.05	0.11	0.12	0.21	0.29	-51.8%
Gibraltar	0.02	0.02	0.01	0.01	0.02	0.01	0.01	0.02	0.02	0.02	0.02	15.1%
Kazakhstan	..	..	..	..	2.70	0.79	0.23	0.49	0.62	0.95	1.46	-45.8%
Kosovo	..	..	..	..	..	..	-	-	0.04	0.01	0.02	..
Kyrgyzstan	..	..	..	..	0.26	0.19	0.12	0.39	0.83	0.32	0.06	-77.4%
Malta	0.18	0.18	0.23	0.14	0.22	0.22	0.37	0.26	0.30	0.34	0.42	93.9%
Republic of Moldova	..	..	..	..	0.22	0.03	0.06	0.04	0.06	0.07	0.14	-34.7%
Montenegro	..	..	..	..	..	..	..	0.04	0.01	0.06	0.06	..
Republic of North Macedonia	..	..	..	..	0.02	0.09	0.09	0.02	0.02	0.04	0.06	303.2%
Romania	0.06	0.05	-	-	0.70	0.55	0.38	0.33	0.43	0.63	0.90	28.6%
Russian Federation	..	..	..	..	26.63	14.13	13.40	15.43	18.67	15.17	16.14	-39.4%
Serbia	..	..	..	..	0.43	0.11	0.09	0.15	0.13	0.19	0.39	-8.5%
Tajikistan	..	..	..	..	0.05	0.02	0.01	0.03	0.09	0.14	0.05	18.5%
Turkmenistan	..	..	..	..	0.76	0.62	0.98	1.35	1.63	1.45	1.45	90.3%
Ukraine	..	..	..	..	6.18	0.48	0.78	1.12	0.83	0.37	0.77	-87.5%
Uzbekistan	..	..	..	..	-	-	-	-	-	-	-	-
Former Soviet Union	67.33	62.72	71.33	77.48	..	..	..	..	..	..	..	..
Former Yugoslavia	0.65	0.89	1.01	1.00	..	..	..	..	..	..	..	..
Non-OECD Europe and Eurasia	**69.00**	**64.50**	**73.74**	**80.20**	**42.43**	**19.81**	**18.48**	**22.93**	**26.82**	**22.84**	**25.41**	**-40.1%**
Algeria	0.29	0.67	0.94	1.32	1.10	0.97	1.18	1.17	1.44	1.45	1.27	15.7%
Angola	0.23	0.31	0.26	1.00	1.04	1.18	1.43	0.57	0.99	1.29	0.96	-7.9%
Benin	0.02	0.01	0.03	0.06	0.05	0.07	0.07	0.03	0.47	0.11	0.09	82.8%
Botswana	..	..	..	0.01	0.04	0.02	0.02	0.03	0.04	0.04	0.04	3.4%
Cameroon	0.17	0.10	0.15	0.15	0.15	0.17	0.18	0.20	0.21	0.31	0.05	-64.7%
Congo	-	0.05	0.11	0.09	0.08	0.05	0.08	0.11	0.14	0.16	0.10	30.6%
Côte d'Ivoire	0.13	0.21	0.26	0.29	0.27	0.26	0.37	0.28	0.18	0.40	0.51	89.6%
Dem. Rep. of the Congo	0.28	0.25	0.38	0.40	0.32	0.35	0.24	0.51	0.47	0.39	0.37	15.2%
Egypt	0.21	0.28	0.52	0.13	0.46	0.82	1.77	2.31	2.64	1.65	1.44	216.3%
Eritrea	..	..	..	..	..	0.02	0.03	0.03	0.03	0.02	0.03	..
Ethiopia	0.14	0.16	0.20	0.34	0.54	0.17	0.21	0.40	0.96	1.45	1.92	258.9%
Gabon	0.03	0.04	0.07	0.09	0.20	0.20	0.24	0.21	0.22	0.20	0.20	3.9%
Ghana	0.13	0.15	0.12	0.10	0.14	0.18	0.33	0.40	0.36	0.35	0.51	260.7%
Kenya	0.58	0.90	1.11	0.83	0.84	1.38	1.38	1.78	1.72	2.02	2.07	147.0%
Libya	0.27	0.54	0.90	1.06	0.64	0.92	1.34	0.49	0.50	0.16	0.18	-71.9%
Mauritius	0.06	0.10	0.14	0.18	0.21	0.21	0.61	0.73	0.73	0.82	0.98	358.0%
Morocco	0.35	0.44	0.78	0.70	0.79	0.74	0.91	1.17	1.79	2.05	2.16	172.3%
Mozambique	0.12	0.05	0.08	0.10	0.13	0.06	0.13	0.14	0.20	0.11	0.12	-7.7%
Namibia	..	..	..	..	..	0.10	0.13	0.03	0.09	0.12	0.12	..
Niger	..	..	..	..	..	..	0.04	0.04	0.04	0.12	0.14	..
Nigeria	0.25	0.71	1.15	1.35	0.96	1.26	0.59	0.71	1.16	1.08	1.31	35.8%
Senegal	0.30	0.37	0.59	0.43	0.46	0.46	0.76	0.75	0.69	0.87	0.70	52.1%
South Africa	0.53	0.74	0.88	0.94	1.11	1.59	2.82	2.18	4.25	4.34	6.04	446.6%
South Sudan	..	..	..	..	..	..	..	..	..	0.18	0.20	..
Sudan	0.34	0.15	0.20	0.22	0.10	0.11	0.33	0.32	0.51	0.52	0.67	600.6%
United Rep. of Tanzania	0.09	0.20	0.18	0.13	0.22	0.19	0.18	0.16	0.25	0.33	0.42	89.9%
Togo	-	-	-	-	0.11	0.12	0.04	0.15	0.22	0.26	0.29	176.0%
Tunisia	0.39	0.38	0.57	0.31	0.57	0.75	0.86	0.66	0.76	0.63	0.78	35.6%
Zambia	0.04	0.14	0.23	0.12	0.20	0.10	0.13	0.17	0.09	0.12	0.12	-38.9%
Zimbabwe	0.09	0.19	0.21	0.33	0.25	0.35	0.36	0.03	0.03	0.09	0.19	-23.6%
Other Africa	-	-	-	-	-	-	-	-	-	2.03	2.08	x
Africa	**5.04**	**7.13**	**10.07**	**10.68**	**10.96**	**12.79**	**16.73**	**15.76**	**21.18**	**23.68**	**26.07**	**137.8%**

1. Please refer to the chapter Geographical coverage.

CO_2 emissions from international aviation bunkers

million tonnes of CO_2

	1971	1975	1980	1985	1990	1995	2000	2005	2010	2015	2017	% change 90-17
Bangladesh	0.06	0.09	0.15	0.22	0.27	0.30	0.38	0.81	0.92	1.08	1.20	338.0%
Brunei Darussalam	0.00	0.06	0.07	0.05	0.11	0.21	0.21	0.25	0.33	0.26	0.23	97.2%
Cambodia	..	..	..	..	..	0.03	0.04	0.06	0.13	0.28	0.33	..
DPR of Korea	-	-	-	-	-	-	-	-	-	-	-	-
India	1.69	2.00	2.51	3.24	3.74	4.65	5.02	6.63	9.69	10.75	12.09	223.0%
Indonesia	0.17	0.33	0.73	0.66	0.97	1.16	1.21	2.34	3.74	4.16	4.84	398.0%
Malaysia	0.42	0.75	0.76	0.86	1.51	2.78	3.77	4.81	5.70	7.51	7.71	411.4%
Mongolia	..	..	..	-	0.01	0.06	0.06	0.06	0.05	0.07	0.09	574.1%
Myanmar	0.03	0.02	0.03	0.03	0.02	0.02	0.05	0.03	0.06	0.14	0.23	+
Nepal	0.01	0.02	0.04	0.06	0.05	0.11	0.17	0.19	0.26	0.21	0.50	906.0%
Pakistan	1.14	1.09	1.71	1.42	1.41	1.72	1.98	2.46	2.28	2.19	2.46	74.4%
Philippines	0.71	0.83	0.66	1.03	1.02	1.17	1.43	2.14	2.96	3.64	4.73	365.3%
Singapore	0.70	1.33	2.73	3.23	5.69	7.89	12.01	13.59	17.19	22.09	24.84	336.7%
Sri Lanka	-	0.00	0.00	-	-	-	0.32	0.94	0.35	1.17	1.70	x
Chinese Taipei	1.49	1.64	1.67	0.92	1.81	4.13	5.42	6.51	6.30	8.14	9.07	401.0%
Thailand	1.27	2.19	2.41	3.16	5.64	7.59	8.35	10.27	10.00	11.84	13.23	134.6%
Viet Nam	6.98	2.63	-	-	-	0.12	0.30	0.84	1.50	2.06	2.66	x
Other non-OECD Asia	0.40	0.28	0.33	0.47	0.52	0.33	0.62	0.84	0.91	0.89	0.84	61.8%
Non OECD Asia (excl. China)	**15.07**	**13.26**	**13.83**	**15.35**	**22.78**	**32.28**	**41.34**	**52.76**	**62.37**	**76.48**	**86.75**	**280.8%**
People's Rep. of China	-	-	0.10	0.85	1.30	2.22	4.22	10.07	15.56	23.35	28.63	+
Hong Kong, China	1.43	1.85	2.27	2.58	5.68	9.31	8.39	14.86	16.35	19.17	20.67	264.0%
China	**1.43**	**1.85**	**2.37**	**3.43**	**6.98**	**11.53**	**12.61**	**24.93**	**31.91**	**42.52**	**49.30**	**606.0%**
Argentina	-	-	-	-	-	1.59	2.86	2.17	1.87	2.81	3.10	x
Bolivia	-	-	-	-	-	-	0.14	0.24	0.22	0.29	0.25	x
Brazil	-	-	0.61	0.75	1.43	2.08	2.02	3.34	5.83	7.28	6.61	362.8%
Colombia	0.60	0.93	1.32	1.32	1.58	2.17	1.91	1.85	2.36	4.03	4.02	155.0%
Costa Rica	-	-	-	-	0.01	0.32	0.37	0.57	0.50	0.53	0.60	+
Cuba	0.27	0.44	0.66	0.90	0.99	0.54	0.65	0.54	0.44	0.31	0.41	-58.5%
Curaçao [1]	0.16	0.13	0.17	0.13	0.12	0.20	0.24	0.26	0.27	0.19	0.19	58.2%
Dominican Republic	0.08	0.10	0.17	0.17	0.11	0.18	1.17	1.32	1.30	1.53	1.68	+
Ecuador	0.27	0.14	0.45	0.45	0.39	0.55	0.49	0.97	0.45	0.58	0.79	101.1%
El Salvador	0.04	0.05	0.06	0.11	0.11	0.16	0.22	0.24	0.34	0.48	0.53	360.4%
Guatemala	0.15	0.11	0.13	0.12	0.13	0.14	0.15	0.23	0.19	0.18	0.29	121.6%
Haiti	0.02	0.03	0.05	0.04	0.07	0.07	0.09	0.07	0.06	0.07	0.07	-3.7%
Honduras	0.02	0.03	0.06	0.12	0.09	0.07	0.11	0.07	0.11	0.21	0.15	60.7%
Jamaica	0.42	0.33	0.30	0.40	0.47	0.53	0.54	0.61	0.59	0.59	0.65	38.4%
Nicaragua	0.05	0.06	0.06	0.04	0.08	0.06	0.08	0.05	0.06	0.07	0.07	-6.5%
Panama	0.44	1.12	0.42	0.26	0.20	0.32	0.55	0.57	1.04	2.02	2.15	953.4%
Paraguay	0.03	0.04	0.06	0.06	0.03	0.03	0.04	0.04	0.07	0.10	0.17	476.1%
Peru	0.52	0.75	0.92	0.72	0.65	1.11	1.07	0.97	1.51	1.69	2.25	246.6%
Suriname	..	..	..	..	..	..	-	-	-	-	-	..
Trinidad and Tobago	0.21	0.12	0.17	0.22	0.20	0.18	0.33	1.21	0.85	0.76	0.71	260.8%
Uruguay	-	-	-	-	-	-	0.12	0.12	0.23	0.29	0.30	x
Venezuela	0.33	0.32	1.03	0.81	1.03	1.01	0.95	2.05	1.90	2.18	1.14	10.0%
Other non-OECD Americas	1.01	0.50	0.91	0.87	1.03	1.07	1.81	1.40	2.08	1.24	1.17	13.7%
Non-OECD Americas	**4.63**	**5.20**	**7.56**	**7.50**	**8.73**	**12.37**	**15.90**	**18.89**	**22.29**	**27.43**	**27.29**	**212.5%**
Bahrain	0.43	0.85	1.55	1.22	1.44	1.16	1.13	1.74	1.97	1.36	1.40	-3.4%
Islamic Republic of Iran	7.10	7.08	2.17	1.66	1.50	1.99	2.73	2.71	3.84	4.15	4.91	227.4%
Iraq	0.24	0.82	1.06	0.59	0.99	1.28	1.64	2.00	2.52	1.68	2.04	105.4%
Jordan	0.12	0.18	0.57	0.62	0.67	0.76	0.75	0.98	1.09	0.91	1.35	101.4%
Kuwait	0.35	0.35	1.06	0.98	0.52	1.14	1.16	1.84	2.26	2.35	2.90	461.3%
Lebanon	0.29	0.24	0.15	0.32	0.16	0.66	0.40	0.47	0.71	0.65	0.86	439.3%
Oman	0.01	0.15	0.38	0.58	0.94	0.47	0.65	0.69	1.30	1.61	0.95	0.5%
Qatar	-	0.16	0.23	0.24	0.35	0.43	0.57	1.45	3.61	3.86	8.76	+
Saudi Arabia	0.48	1.42	3.49	4.61	4.84	5.74	5.91	5.50	6.23	8.41	9.79	102.3%
Syrian Arab Republic	0.24	0.66	0.72	0.88	0.88	0.63	0.42	0.33	0.10	0.02	0.02	-97.9%
United Arab Emirates	0.02	0.34	0.81	1.82	9.89	10.19	9.97	8.81	12.07	24.85	23.57	138.3%
Yemen	0.09	0.18	0.22	0.47	0.18	0.28	0.38	0.36	0.37	0.04	0.02	-89.7%
Middle East	**9.36**	**12.43**	**12.42**	**13.98**	**22.36**	**24.72**	**25.72**	**26.87**	**36.06**	**49.90**	**56.55**	**153.0%**

1. Please refer to the chapter Geographical coverage.

CO_2 emissions by sector in 2017 [1]

million tonnes of CO_2

	Total CO_2 emissions from fuel combustion	Electricity and heat production	Other energy ind. own use [2]	Manufacturing industries and construction	Transport	*of which: road*	Residential	Commercial and public services
World [3]	**32 839.9**	**13 603.3**	**1 582.8**	**6 227.6**	**8 039.9**	**5 958.3**	**1 931.4**	**839.6**
Annex I Parties	*12 282.6*	*4 813.4*	*691.6*	*1 531.1*	*3 536.8*	*3 032.8*	*1 002.0*	*522.2*
Annex II Parties	*9 471.6*	*3 484.0*	*578.5*	*1 082.9*	*3 017.6*	*2 626.7*	*713.9*	*457.5*
North America	*5 309.1*	*1 917.6*	*361.7*	*496.5*	*1 895.5*	*1 587.0*	*324.5*	*250.1*
Europe	*2 613.3*	*814.9*	*145.5*	*336.4*	*803.6*	*759.3*	*320.6*	*144.8*
Asia Oceania	*1 549.3*	*751.5*	*71.4*	*250.0*	*318.5*	*280.3*	*68.7*	*62.5*
Annex I EIT	*2 424.4*	*1 185.5*	*94.6*	*378.7*	*433.8*	*326.6*	*253.0*	*40.3*
Non-Annex I Parties	*19 275.3*	*8 789.9*	*891.2*	*4 696.5*	*3 221.1*	*2 925.5*	*929.4*	*317.4*
Annex B Kyoto Parties	*4 149.1*	*1 524.3*	*263.4*	*555.0*	*1 106.1*	*1 034.8*	*439.0*	*180.0*
Non-OECD Total	**19 979.3**	**9 187.5**	**877.8**	**4 855.1**	**3 239.8**	**2 852.7**	**1 069.4**	**317.1**
OECD Total	**11 578.5**	**4 415.8**	**705.0**	**1 372.4**	**3 518.1**	**3 105.6**	**862.1**	**522.6**
Canada	547.8	94.8	120.0	67.1	171.5	136.7	38.3	38.5
Chile	86.1	34.6	1.9	14.4	27.4	24.5	4.0	2.5
Mexico	446.0	153.7	41.0	68.3	151.4	147.2	16.9	4.7
United States	4 761.3	1 822.8	241.7	429.4	1 724.0	1 450.4	286.3	211.6
OECD Americas	**5 841.2**	**2 105.9**	**404.6**	**579.2**	**2 074.3**	**1 758.7**	**345.4**	**257.4**
Australia	384.6	191.5	34.9	38.1	97.7	81.9	9.3	5.6
Israel [4]	63.8	37.6	1.7	4.1	17.9	17.8	0.4	0.3
Japan	1 132.4	554.9	34.6	205.4	205.1	184.2	58.8	56.0
Korea	600.0	322.1	43.1	71.8	103.5	97.9	35.0	16.9
New Zealand	32.2	5.1	1.9	6.5	15.7	14.3	0.6	1.0
OECD Asia Oceania	**2 213.1**	**1 111.2**	**116.1**	**325.9**	**439.8**	**396.0**	**104.1**	**79.7**
Austria	64.9	14.6	5.9	11.3	24.4	23.5	6.7	1.2
Belgium	90.4	15.9	6.2	18.5	25.2	24.6	15.8	6.9
Czech Republic	101.7	53.9	4.2	12.2	18.5	18.1	8.3	3.2
Denmark	31.3	9.3	2.1	3.7	12.0	11.0	2.0	0.6
Estonia	16.0	12.1	0.1	0.6	2.4	2.4	0.2	0.3
Finland	42.6	16.5	3.4	7.4	11.3	10.7	1.2	0.9
France	306.1	45.8	13.5	41.1	125.8	121.5	42.9	26.1
Germany	718.8	303.9	23.9	93.9	163.5	158.8	87.5	45.9
Greece	63.2	29.6	4.5	6.0	16.9	14.4	4.7	0.7
Hungary	45.8	12.0	1.6	7.2	12.9	12.6	7.8	2.9
Iceland	2.2	0.0	-	0.6	1.0	0.9	0.0	0.0
Ireland	35.7	11.6	0.4	4.0	11.6	11.3	5.6	1.9
Italy	321.5	109.1	12.1	31.9	97.6	91.9	46.5	17.0
Latvia	6.7	1.6	-	0.6	3.2	3.1	0.5	0.4
Lithuania	10.8	1.1	1.5	1.2	5.7	5.5	0.8	0.3
Luxembourg	8.6	0.3	-	0.9	5.7	5.6	1.1	0.6
Netherlands	155.6	57.9	9.9	25.9	30.8	29.7	16.3	7.9
Norway	34.8	1.9	12.2	6.3	12.2	8.7	0.2	0.9
Poland	305.8	151.6	7.8	30.7	61.5	60.3	36.2	7.4
Portugal	50.8	21.9	2.6	5.7	16.7	15.9	1.7	1.0
Slovak Republic	32.2	6.8	5.1	7.8	7.8	7.4	2.9	1.7
Slovenia	13.4	4.9	0.0	1.8	5.5	5.4	0.7	0.3
Spain	253.4	78.8	19.8	30.2	91.7	81.7	16.8	9.5
Sweden	37.6	7.1	2.7	6.5	19.7	19.1	0.2	1.2
Switzerland	37.1	2.7	0.4	5.3	15.7	15.4	8.3	4.1
Turkey	378.6	140.0	18.5	68.8	82.8	77.0	34.8	24.3
United Kingdom	358.7	88.0	26.0	37.0	121.8	114.6	63.1	18.5
OECD Europe [4]	**3 524.3**	**1 198.8**	**184.3**	**467.3**	**1 004.1**	**950.9**	**412.6**	**185.5**
IEA/Accession/Association	*24 596.7*	*10 683.7*	*1 175.7*	*4 984.3*	*5 155.7*	*4 513.8*	*1 403.9*	*714.9*
European Union - 28	*3 209.3*	*1 115.0*	*159.2*	*405.5*	*928.2*	*883.4*	*378.6*	*159.6*
G20	*26 521.7*	*11 674.5*	*1 255.3*	*5 328.9*	*5 460.5*	*4 724.2*	*1 578.9*	*730.2*
Africa	*1 185.1*	*464.2*	*95.2*	*147.3*	*349.5*	*336.6*	*82.9*	*16.4*
Americas	*6 905.2*	*2 333.6*	*495.9*	*780.3*	*2 500.2*	*2 157.3*	*406.1*	*269.8*
Asia	*17 896.1*	*8 540.4*	*712.0*	*4 526.0*	*2 533.7*	*2 259.7*	*854.9*	*359.4*
Europe	*5 138.1*	*2 062.0*	*241.6*	*725.6*	*1 256.9*	*1 105.2*	*577.1*	*187.4*
Oceania	*433.5*	*203.1*	*38.1*	*48.3*	*117.6*	*99.6*	*10.3*	*6.6*

1. This table shows CO_2 emissions for the same sectors which are present throughout this publication. In particular, the emissions from electricity and heat production are shown separately and not reallocated. 2. Includes emissions from own use in oil refining, the manufacture of solid fuels, coal mining, oil and gas extraction and other energy-producing industries. 3. World includes international bunkers in the transport sector. 4. Please refer to the chapter Geographical coverage.

CO_2 emissions by sector in 2017

million tonnes of CO_2

	Total CO_2 emissions from fuel combustion	Electricity and heat production	Other energy ind. own use	Manufacturing industries and construction	Transport	*of which: road*	Residential	Commercial and public services
Non-OECD Total	**19 979.3**	**9 187.5**	**877.8**	**4 855.1**	**3 239.8**	**2 852.7**	**1 069.4**	**317.1**
Albania	4.3	-	0.2	1.1	2.3	2.2	0.3	0.2
Armenia	5.2	1.2	0.0	0.5	1.7	1.7	1.2	0.3
Azerbaijan	30.8	12.3	2.0	1.7	7.6	6.4	5.6	0.5
Belarus	54.1	28.0	2.9	4.6	11.3	9.6	4.5	0.4
Bosnia and Herzegovina	22.3	14.7	0.7	2.2	3.8	3.8	0.7	0.4
Bulgaria	42.8	26.4	1.2	4.3	9.2	8.7	0.9	0.3
Croatia	16.2	3.1	1.3	2.4	6.5	6.3	1.5	0.6
Cyprus [1]	6.4	3.2	-	0.6	2.0	2.0	0.4	0.1
Georgia	8.7	1.1	0.0	1.7	3.7	3.6	1.8	0.4
Gibraltar	0.7	0.2	-	-	0.5	0.5	-	-
Kazakhstan	255.8	102.0	50.7	63.2	14.5	13.6	16.1	7.3
Kosovo	8.2	5.6	-	0.8	1.3	1.3	0.1	0.4
Kyrgyzstan	8.9	1.6	0.0	0.9	1.9	1.8	4.2	0.4
Malta	1.5	0.7	-	0.1	0.6	0.6	0.0	0.1
Republic of Moldova	7.5	3.0	0.0	1.0	2.1	2.0	0.9	0.3
Montenegro	2.2	1.2	-	0.2	0.7	0.7	0.0	0.0
Republic of North Macedonia	7.4	4.1	0.0	0.9	2.1	2.1	0.0	0.2
Romania	70.8	27.4	3.4	11.8	17.6	17.0	6.6	2.2
Russian Federation	1 536.9	773.5	62.2	262.1	246.1	149.2	160.3	18.1
Serbia	46.1	32.0	0.7	4.4	6.2	6.2	1.5	0.8
Tajikistan	5.8	1.0	-	1.5	1.2	1.2	1.1	0.0
Turkmenistan	69.0	20.7	5.2	2.4	11.8	7.9	0.5	16.8
Ukraine	171.3	83.1	3.2	31.4	25.5	21.2	22.0	2.2
Uzbekistan	81.2	41.0	2.0	9.1	5.1	3.0	17.8	3.5
Non-OECD Europe and Eurasia [1]	**2 464.1**	**1 187.3**	**135.7**	**408.7**	**385.1**	**272.5**	**247.8**	**55.6**
Algeria	130.5	37.7	10.3	12.0	44.7	42.4	21.8	0.6
Angola	18.0	5.3	1.0	1.4	6.7	6.6	1.6	1.9
Benin	6.8	0.2	-	0.4	6.0	6.0	0.1	0.0
Botswana	7.7	4.3	-	0.7	2.5	2.5	0.0	0.1
Cameroon	6.2	2.2	0.1	0.2	3.1	3.1	0.5	-
Congo	2.8	1.3	-	0.1	1.3	1.2	0.1	0.0
Côte d'Ivoire	10.2	3.8	0.1	1.4	3.6	3.2	0.5	0.4
Dem. Rep. of the Congo	2.2	0.0	-	0.1	2.1	1.8	0.0	-
Egypt	209.2	83.1	15.1	32.4	58.4	55.7	17.0	-
Eritrea	0.6	0.4	-	0.0	0.2	0.2	0.0	0.0
Ethiopia	13.1	0.0	-	4.7	6.5	6.3	0.6	0.2
Gabon	3.4	1.0	0.0	1.2	0.8	0.8	0.2	0.1
Ghana	13.8	3.5	0.0	2.0	7.1	6.6	0.7	0.1
Kenya	16.3	1.9	0.1	3.8	8.7	8.6	1.5	-
Libya	41.5	20.9	0.6	1.5	17.2	17.2	1.2	-
Mauritius	4.2	2.5	-	0.3	1.1	1.1	0.1	0.0
Morocco	58.1	22.5	-	8.1	17.7	17.6	6.7	0.4
Mozambique	7.6	1.2	0.1	0.8	4.2	3.9	0.1	0.1
Namibia	4.0	0.1	-	0.3	2.1	2.0	0.0	0.0
Niger	2.0	0.5	-	0.2	1.2	1.2	0.0	0.0
Nigeria	86.0	13.5	11.8	6.8	51.3	50.4	1.8	0.0
Senegal	8.3	3.1	0.1	1.6	3.2	3.0	0.4	0.0
South Africa	421.7	225.5	54.0	45.9	53.7	51.0	23.0	10.9
South Sudan	1.5	0.4	0.2	0.1	0.8	0.7	0.0	0.0
Sudan	18.8	4.9	0.2	1.5	11.2	10.9	0.4	0.2
United Rep. of Tanzania	10.1	2.4	-	1.8	5.4	5.2	0.4	-
Togo	2.1	0.0	-	0.2	1.6	1.6	0.2	-
Tunisia	26.2	8.8	0.5	5.2	7.6	7.0	2.1	0.7
Zambia	6.0	1.9	0.0	1.7	1.1	1.1	0.0	0.1
Zimbabwe	9.7	5.3	0.1	1.1	2.2	2.1	0.3	0.0
Other Africa	36.3	5.8	1.0	9.6	16.0	15.7	1.7	0.3
Africa	**1 185.1**	**464.2**	**95.2**	**147.3**	**349.5**	**336.6**	**82.9**	**16.4**

1. Please refer to the chapter Geographical coverage.

CO_2 emissions by sector in 2017

million tonnes of CO_2

	Total CO_2 emissions from fuel combustion	Electricity and heat production	Other energy ind. own use	Manufacturing industries and construction	Transport	*of which: road*	Residential	Commercial and public services
Bangladesh	78.3	36.9	0.1	17.3	10.9	8.4	9.1	0.5
Brunei Darussalam	6.7	2.6	2.1	0.4	1.3	1.3	0.1	-
Cambodia	10.8	4.1	-	0.7	5.3	4.5	0.2	0.4
DPR of Korea	19.6	3.3	0.0	11.4	1.4	1.4	0.1	-
India	2 161.6	1 100.4	32.2	563.1	291.4	265.7	84.8	26.1
Indonesia	496.4	195.9	23.2	102.9	141.7	124.5	22.0	3.0
Malaysia	211.0	106.9	2.4	32.4	60.9	58.9	3.0	2.4
Mongolia	19.3	12.8	0.0	1.8	2.1	1.4	1.5	0.0
Myanmar	30.4	8.1	1.2	8.2	5.9	4.3	0.0	1.5
Nepal	10.1	0.0	-	3.2	4.8	4.8	0.8	0.6
Pakistan	183.4	54.5	1.3	52.6	53.9	52.6	16.5	3.8
Philippines	126.5	63.1	1.0	17.8	34.4	30.0	3.1	6.2
Singapore	47.4	20.7	5.7	13.5	6.9	6.7	0.2	0.4
Sri Lanka	23.1	9.9	0.0	0.7	11.0	10.6	0.8	0.2
Chinese Taipei	268.9	165.3	15.8	41.1	37.3	36.4	4.1	3.9
Thailand	244.3	88.2	15.9	49.9	75.3	71.6	4.5	2.2
Viet Nam	191.2	71.6	-	64.3	38.2	35.8	10.2	5.6
Other non-OECD Asia	50.2	23.9	1.4	8.9	12.9	10.8	0.6	0.1
Non OECD Asia (excl. China)	**4 179.2**	**1 968.2**	**102.5**	**990.2**	**795.6**	**729.7**	**161.5**	**56.6**
People's Rep. of China	9 257.9	4 591.3	312.9	2 746.5	880.9	718.0	384.6	148.5
Hong Kong, China	44.0	26.9	-	7.2	8.3	8.3	0.8	0.8
China	**9 302.0**	**4 618.2**	**312.9**	**2 753.7**	**889.2**	**726.3**	**385.3**	**149.3**
Argentina	183.4	51.0	18.7	29.4	46.6	42.0	22.3	3.5
Bolivia	21.9	4.3	1.1	2.1	8.6	8.2	1.4	0.1
Brazil	427.6	68.7	30.0	90.1	203.2	185.8	18.3	2.2
Colombia	75.3	10.6	6.3	16.4	31.4	31.3	3.7	0.9
Costa Rica	7.6	0.0	0.0	0.8	5.8	5.8	0.2	0.5
Cuba	26.2	10.5	0.5	10.6	1.5	1.5	0.6	0.0
Curaçao [1]	3.7	0.4	1.7	0.4	1.1	1.1	0.1	-
Dominican Republic	21.4	9.9	0.1	3.2	6.5	5.1	1.3	0.2
Ecuador	34.3	5.2	1.6	2.5	18.9	17.7	2.4	1.2
El Salvador	5.7	0.9	-	1.1	3.4	3.4	0.4	0.0
Guatemala	15.7	4.0	0.1	2.3	8.3	8.3	0.9	0.0
Haiti	3.3	1.0	0.0	0.6	1.4	1.4	0.3	0.0
Honduras	9.4	2.9	-	1.6	4.4	4.4	0.2	0.2
Jamaica	7.0	2.6	-	2.0	2.0	2.0	0.1	0.3
Nicaragua	5.1	1.4	0.0	0.7	2.3	2.1	0.2	0.5
Panama	9.6	2.1	-	2.0	4.8	4.7	0.6	0.2
Paraguay	7.7	0.0	-	0.2	7.3	7.2	0.2	-
Peru	49.7	11.7	3.1	7.7	23.4	22.5	2.6	0.8
Suriname	1.9	0.8	0.0	0.1	0.6	0.4	0.0	0.0
Trinidad and Tobago	18.0	5.2	7.0	2.5	3.0	2.7	0.4	0.0
Uruguay	5.9	0.2	0.1	0.8	3.8	3.7	0.4	0.1
Venezuela	113.7	30.8	21.0	23.4	33.7	33.7	3.7	1.2
Other non-OECD Americas	9.8	3.6	0.0	0.6	3.9	3.5	0.6	0.4
Non-OECD Americas	**1 064.0**	**227.7**	**91.3**	**201.1**	**425.9**	**398.6**	**60.8**	**12.4**
Bahrain	29.8	20.4	3.5	1.9	3.7	3.6	0.3	-
Islamic Republic of Iran	567.1	163.9	37.7	96.8	132.0	131.0	107.6	17.1
Iraq	139.9	79.3	13.0	9.4	28.8	28.8	9.4	-
Jordan	25.6	10.3	0.6	2.4	9.1	9.1	1.9	0.5
Kuwait	89.4	43.3	13.6	18.4	13.2	13.2	0.9	-
Lebanon	26.9	15.7	-	1.2	9.3	9.3	0.7	-
Oman	65.5	16.5	8.5	16.5	12.2	12.2	0.6	8.5
Qatar	80.1	22.2	30.8	13.2	13.5	13.5	0.4	-
Saudi Arabia	532.2	246.6	29.1	127.3	124.3	121.2	4.9	-
Syrian Arab Republic	23.0	11.8	0.6	2.4	5.1	4.9	1.9	0.4
United Arab Emirates	196.5	88.6	2.6	63.6	40.7	39.6	1.0	-
Yemen	8.9	3.4	0.1	1.1	2.6	2.6	1.4	0.2
Middle East	**1 785.0**	**721.9**	**140.1**	**354.2**	**394.4**	**388.9**	**131.0**	**26.7**

1. Please refer to the chapter Geographical coverage.

CO_2 emissions with electricity and heat allocated to consuming sectors [1] in 2017

million tonnes of CO_2

	Total CO_2 emissions from fuel combustion	Other energy ind. own use [2]	Manufacturing industries and construction	Transport	*of which: road*	Residential	Commercial and public services
World [3]	**32 839.9**	**2 133.0**	**12 030.0**	**8 239.1**	**5 993.4**	**5 390.0**	**3 280.6**
Annex I Parties	*12 282.6*	*937.4*	*2 995.7*	*3 616.8*	*3 035.4*	*2 472.6*	*1 918.7*
Annex II Parties	*9 471.6*	*700.5*	*2 057.2*	*3 054.9*	*2 629.1*	*1 811.6*	*1 582.1*
North America	*5 309.1*	*432.7*	*907.5*	*1 902.0*	*1 589.1*	*991.2*	*902.3*
Europe	*2 613.3*	*172.4*	*639.1*	*819.6*	*759.7*	*545.8*	*374.8*
Asia Oceania	*1 549.3*	*95.3*	*510.6*	*333.3*	*280.3*	*274.5*	*304.9*
Annex I EIT	*2 424.4*	*216.7*	*803.3*	*475.7*	*326.8*	*594.6*	*271.7*
Non-Annex I Parties	*19 275.3*	*1 195.6*	*9 034.3*	*3 340.4*	*2 957.9*	*2 917.3*	*1 361.9*
Annex B Kyoto Parties	*4 149.1*	*345.6*	*1 110.1*	*1 139.5*	*1 035.5*	*855.4*	*587.5*
Non-OECD Total	**19 979.3**	**1 278.6**	**9 259.7**	**3 393.9**	**2 885.0**	**3 232.3**	**1 402.3**
OECD Total	**11 578.5**	**854.4**	**2 770.3**	**3 563.3**	**3 108.4**	**2 157.7**	**1 878.3**
Canada	547.8	124.9	99.5	172.9	136.9	67.5	59.4
Chile	86.1	2.3	34.8	27.9	24.7	10.1	8.8
Mexico	446.0	43.2	150.5	152.0	147.2	49.8	17.9
United States	4 761.3	307.8	808.0	1 729.2	1 452.2	923.7	843.0
OECD Americas	**5 841.2**	**478.2**	**1 092.8**	**2 081.9**	**1 761.0**	**1 051.2**	**929.0**
Australia	384.6	50.6	100.8	102.6	81.9	58.7	62.7
Israel [4]	63.8	2.2	12.6	17.9	17.8	12.6	12.1
Japan	1 132.4	42.8	401.6	215.0	184.2	213.6	239.9
Korea	600.0	51.7	237.1	105.1	97.9	79.7	109.8
New Zealand	32.2	2.0	8.3	15.7	14.3	2.2	2.2
OECD Asia Oceania	**2 213.1**	**149.2**	**760.4**	**456.2**	**396.1**	**366.8**	**426.8**
Austria	64.9	6.3	16.8	24.9	23.5	11.2	4.7
Belgium	90.4	6.8	26.2	25.5	24.6	19.0	10.8
Czech Republic	101.7	5.7	32.4	19.8	18.1	24.7	16.9
Denmark	31.3	2.3	5.1	12.1	11.0	6.5	3.6
Estonia	16.0	0.8	3.9	2.5	2.4	3.6	4.5
Finland	42.6	3.8	13.6	11.4	10.7	6.9	4.7
France	306.1	14.0	54.4	126.7	121.5	59.4	39.9
Germany	718.8	31.3	223.5	169.6	158.9	167.5	126.7
Greece	63.2	5.3	12.5	17.0	14.4	15.3	10.9
Hungary	45.8	1.9	12.0	13.1	12.6	11.8	5.3
Iceland	2.2	0.0	0.6	1.0	0.9	0.0	0.0
Ireland	35.7	0.4	8.6	11.6	11.3	9.1	5.1
Italy	321.5	18.7	75.5	101.2	91.9	69.4	47.4
Latvia	6.7	-	0.9	3.2	3.1	1.2	0.8
Lithuania	10.8	1.6	1.5	5.7	5.5	1.2	0.6
Luxembourg	8.6	-	1.0	5.7	5.6	1.1	0.7
Netherlands	155.6	13.3	46.7	31.6	29.9	27.5	25.0
Norway	34.8	12.3	6.8	12.2	8.7	0.8	1.6
Poland	305.8	18.8	79.2	64.3	60.3	79.5	51.9
Portugal	50.8	3.7	13.2	16.9	15.9	7.2	8.2
Slovak Republic	32.2	5.5	10.2	7.9	7.4	5.2	3.2
Slovenia	13.4	0.0	3.9	5.5	5.4	2.0	1.6
Spain	253.4	22.2	56.1	93.4	81.7	39.7	33.2
Sweden	37.6	2.8	7.9	19.8	19.1	3.9	3.0
Switzerland	37.1	0.4	6.2	15.8	15.4	9.3	4.8
Turkey	378.6	20.3	134.1	83.6	77.0	64.6	62.9
United Kingdom	358.7	29.1	64.3	123.1	114.7	92.2	44.7
OECD Europe [4]	**3 524.3**	**227.0**	**917.2**	**1 025.2**	**951.4**	**739.8**	**522.5**
IEA/Accession/Association	*24 596.7*	*1 568.4*	*9 825.0*	*5 308.4*	*4 548.7*	*3 888.0*	*2 564.4*
European Union - 28	*3 209.3*	*204.3*	*808.4*	*949.4*	*884.0*	*695.5*	*470.7*
G20	*26 521.7*	*1 761.5*	*10 441.0*	*5 645.2*	*4 758.9*	*4 408.8*	*2 797.1*
Africa	*1 185.1*	*108.4*	*344.5*	*354.9*	*336.7*	*222.0*	*93.0*
Americas	*6 905.2*	*573.7*	*1 379.1*	*2 508.7*	*2 159.6*	*1 185.1*	*998.0*
Asia	*17 896.1*	*1 004.5*	*8 717.2*	*2 655.6*	*2 291.8*	*2 748.5*	*1 463.4*
Europe	*5 138.1*	*392.5*	*1 470.8*	*1 315.4*	*1 105.8*	*1 172.4*	*660.9*
Oceania	*433.5*	*53.8*	*117.4*	*122.5*	*99.6*	*62.4*	*65.8*

1. Emissions from electricity and heat generation have been allocated to final consuming sectors multiplying the amounts of electricity and heat consumed per electricity/heat country-specific carbon intensities.
2. Includes emissions from own use in oil refining, the manufacture of solid fuels, coal mining, oil and gas extraction and other energy-producing industries. 3. World includes international bunkers in the transport sector. 4. Please refer to the chapter Geographical coverage.

CO_2 emissions with electricity and heat allocated to consuming sectors in 2017

million tonnes of CO_2

	Total CO_2 emissions from fuel combustion	Other energy ind. own use	Manufacturing industries and construction	Transport	*of which: road*	Residential	Commercial and public services
Non-OECD Total	**19 979.3**	**1 278.6**	**9 259.7**	**3 393.9**	**2 885.0**	**3 232.3**	**1 402.3**
Albania	4.3	0.2	1.1	2.3	2.2	0.3	0.2
Armenia	5.2	0.0	0.8	1.7	1.7	1.6	0.6
Azerbaijan	30.8	3.7	3.9	7.8	6.4	10.2	3.5
Belarus	54.1	5.2	13.5	11.8	9.6	13.5	6.7
Bosnia and Herzegovina	22.3	1.1	7.4	3.9	3.8	6.8	3.1
Bulgaria	42.8	2.9	12.1	9.5	8.8	10.5	7.3
Croatia	16.2	1.4	3.1	6.6	6.3	2.8	1.6
Cyprus [1]	6.4	0.0	1.0	2.0	2.0	1.5	1.6
Georgia	8.7	0.0	2.0	3.7	3.6	2.0	0.7
Gibraltar	0.7	-	-	0.5	0.5	-	0.0
Kazakhstan	255.8	66.3	108.2	18.1	13.7	30.9	23.5
Kosovo	8.2	0.0	2.1	1.3	1.3	3.1	1.5
Kyrgyzstan	8.9	0.0	1.1	1.9	1.8	5.2	0.7
Malta	1.5	-	0.2	0.6	0.6	0.3	0.4
Republic of Moldova	7.5	0.0	1.8	2.1	2.0	2.2	1.0
Montenegro	2.2	-	0.5	0.7	0.7	0.6	0.4
Republic of North Macedonia	7.4	0.1	1.8	2.1	2.1	2.1	1.2
Romania	70.8	5.8	22.6	18.1	17.0	15.3	6.7
Russian Federation	1 536.9	160.4	542.4	279.0	149.2	376.4	147.3
Serbia	46.1	1.9	13.6	6.6	6.2	16.7	6.5
Tajikistan	5.8	0.0	1.8	1.2	1.2	1.6	0.1
Turkmenistan	69.0	8.3	8.5	12.2	7.9	4.0	16.8
Ukraine	171.3	6.6	65.5	28.7	21.2	46.8	17.4
Uzbekistan	81.2	3.3	21.5	6.0	3.0	26.9	6.4
Non-OECD Europe and Eurasia [1]	**2 464.1**	**267.4**	**836.4**	**428.3**	**272.7**	**581.4**	**255.2**
Algeria	130.5	10.6	25.4	45.5	42.4	36.2	3.0
Angola	18.0	1.0	3.2	6.7	6.6	5.1	1.9
Benin	6.8	-	0.5	6.0	6.0	0.2	0.1
Botswana	7.7	-	2.2	2.5	2.5	1.4	1.2
Cameroon	6.2	0.1	1.5	3.1	3.1	0.9	0.2
Congo	2.8	-	0.2	1.3	1.2	0.6	0.7
Côte d'Ivoire	10.2	0.1	2.7	3.6	3.2	1.7	1.7
Dem. Rep. of the Congo	2.2	0.0	0.1	2.1	1.8	0.0	0.0
Egypt	209.2	15.1	55.0	58.7	55.7	51.9	21.3
Eritrea	0.6	-	0.1	0.2	0.2	0.2	0.1
Ethiopia	13.1	-	4.7	6.5	6.3	0.6	0.2
Gabon	3.4	0.1	1.4	0.8	0.8	0.7	0.3
Ghana	13.8	0.0	2.9	7.1	6.6	2.4	0.9
Kenya	16.3	0.1	4.8	8.7	8.6	2.1	0.3
Libya	41.5	0.6	3.4	17.2	17.2	10.1	2.3
Mauritius	4.2	0.0	1.2	1.1	1.1	0.9	0.9
Morocco	58.1	-	16.3	17.9	17.6	14.3	4.3
Mozambique	7.6	0.1	1.8	4.2	3.9	0.2	0.1
Namibia	4.0	-	0.3	2.1	2.0	0.0	0.0
Niger	2.0	-	0.4	1.2	1.2	0.4	0.1
Nigeria	86.0	11.9	9.0	51.3	50.4	9.6	3.4
Senegal	8.3	0.1	2.4	3.2	3.0	1.3	0.8
South Africa	421.7	66.4	173.9	57.8	51.1	65.3	41.7
South Sudan	1.5	0.2	0.2	0.8	0.7	0.2	0.0
Sudan	18.8	0.2	2.2	11.2	10.9	2.9	1.6
United Rep. of Tanzania	10.1	0.0	2.5	5.4	5.2	1.6	0.5
Togo	2.1	-	0.2	1.6	1.6	0.2	0.0
Tunisia	26.2	0.7	8.1	7.7	7.0	4.7	3.1
Zambia	6.0	0.0	2.7	1.2	1.1	0.6	0.2
Zimbabwe	9.7	0.1	3.5	2.2	2.1	2.0	0.9
Other Africa	36.3	1.1	12.0	16.0	15.7	3.5	1.3
Africa	**1 185.1**	**108.4**	**344.5**	**354.9**	**336.7**	**222.0**	**93.0**

1. Please refer to the chapter Geographical coverage.

CO_2 emissions with electricity and heat allocated to consuming sectors in 2017

million tonnes of CO_2

	Total CO_2 emissions from fuel combustion	Other energy ind. own use	Manufacturing industries and construction	Transport	*of which: road*	Residential	Commercial and public services
Bangladesh	78.3	0.1	37.8	10.9	8.4	21.6	2.9
Brunei Darussalam	6.7	2.4	0.5	1.3	1.3	1.0	1.3
Cambodia	10.8	-	1.6	5.3	4.5	1.8	1.9
DPR of Korea	19.6	0.0	13.0	1.4	1.4	0.1	-
India	2 161.6	35.8	1 002.2	305.0	265.7	356.6	130.7
Indonesia	496.4	23.2	166.3	141.7	124.5	102.7	52.6
Malaysia	211.0	2.4	84.6	61.2	58.9	25.1	34.3
Mongolia	19.3	0.0	7.7	2.1	1.4	5.3	1.8
Myanmar	30.4	1.2	10.7	5.9	4.3	4.1	3.0
Nepal	10.1	-	3.2	4.8	4.8	0.8	0.6
Pakistan	183.4	1.3	66.6	53.9	52.6	44.0	11.6
Philippines	126.5	1.0	38.5	34.5	30.0	24.8	24.7
Singapore	47.4	5.7	21.8	8.1	6.7	3.2	8.4
Sri Lanka	23.1	0.0	3.9	11.0	10.6	4.8	2.9
Chinese Taipei	268.9	18.5	136.1	38.3	36.4	36.1	23.0
Thailand	244.3	15.9	91.7	75.4	71.6	25.6	23.7
Viet Nam	191.2	-	106.3	38.2	35.8	34.1	9.5
Other non-OECD Asia	50.2	1.4	19.5	12.9	10.8	7.3	5.5
Non OECD Asia (excl. China)	**4 179.2**	**109.1**	**1 812.1**	**811.8**	**729.7**	**699.2**	**338.2**
People's Rep. of China	9 257.9	537.9	5 485.5	969.0	750.0	1 143.5	419.9
Hong Kong, China	44.0	-	9.1	8.3	8.3	8.0	18.6
China	**9 302.0**	**537.9**	**5 494.6**	**977.3**	**758.3**	**1 151.5**	**438.5**
Argentina	183.4	18.7	49.3	46.9	42.0	40.0	16.2
Bolivia	21.9	1.1	3.2	8.6	8.2	3.1	1.2
Brazil	427.6	32.9	116.5	203.6	185.8	36.0	19.8
Colombia	75.3	7.2	19.5	31.4	31.3	7.3	3.4
Costa Rica	7.6	0.0	0.8	5.8	5.8	0.2	0.5
Cuba	26.2	0.5	12.7	1.7	1.5	6.6	2.0
Curaçao [1]	3.7	1.7	0.6	1.1	1.1	0.1	-
Dominican Republic	21.4	0.1	6.7	6.5	5.1	4.5	2.8
Ecuador	34.3	1.6	4.7	18.9	17.7	3.9	2.3
El Salvador	5.7	-	1.4	3.4	3.4	0.6	0.3
Guatemala	15.7	0.1	3.8	8.3	8.3	2.3	1.1
Haiti	3.3	0.0	1.0	1.4	1.4	0.7	0.1
Honduras	9.4	-	2.3	4.4	4.4	1.4	1.2
Jamaica	7.0	-	3.6	2.0	2.0	0.9	0.4
Nicaragua	5.1	0.0	1.1	2.3	2.1	0.6	0.9
Panama	9.6	-	2.1	4.8	4.7	1.3	1.4
Paraguay	7.7	-	0.2	7.3	7.2	0.2	0.0
Peru	49.7	3.1	14.5	23.4	22.5	5.0	3.1
Suriname	1.9	0.0	0.5	0.6	0.4	0.3	0.2
Trinidad and Tobago	18.0	7.0	5.6	3.0	2.7	1.8	0.6
Uruguay	5.9	0.1	0.9	3.8	3.7	0.5	0.1
Venezuela	113.7	21.5	33.0	33.7	33.7	14.5	10.8
Other non-OECD Americas	9.8	0.0	2.3	3.9	3.5	1.9	0.4
Non-OECD Americas	**1 064.0**	**95.6**	**286.3**	**426.8**	**398.6**	**133.9**	**69.0**
Bahrain	29.8	3.5	12.2	3.7	3.6	6.4	4.0
Islamic Republic of Iran	567.1	39.6	148.7	132.3	131.0	161.2	44.7
Iraq	139.9	13.0	19.7	28.8	28.8	46.0	4.6
Jordan	25.6	0.6	4.6	9.1	9.1	6.6	2.2
Kuwait	89.4	20.0	18.4	13.2	13.2	25.6	12.2
Lebanon	26.9	-	5.2	9.3	9.3	6.9	2.6
Oman	65.5	8.5	19.1	12.2	12.2	8.2	14.7
Qatar	80.1	30.8	19.5	13.5	13.5	10.3	4.1
Saudi Arabia	532.2	40.8	155.9	124.3	121.2	127.0	83.9
Syrian Arab Republic	23.0	0.6	6.3	5.1	4.9	7.3	1.6
United Arab Emirates	196.5	2.6	75.2	40.7	39.6	34.9	33.2
Yemen	8.9	0.1	1.1	2.6	2.6	4.1	0.6
Middle East	**1 785.0**	**160.2**	**485.8**	**394.8**	**388.9**	**444.3**	**208.3**

1. Please refer to the chapter Geographical coverage.

CO_2 emissions / TPES

tonnes CO_2 / terajoule

	1971	1975	1980	1985	1990	1995	2000	2005	2010	2015	2017	% change 90-17
World [1]	**60.3**	**59.9**	**58.7**	**56.4**	**55.9**	**55.4**	**55.4**	**56.3**	**56.8**	**56.8**	**56.1**	**0.4%**
Annex I Parties	..	..	..	..	*58.7*	*56.6*	*56.4*	*55.2*	*53.9*	*52.7*	*51.5*	*-12.2%*
Annex II Parties	*65.8*	*63.9*	*61.5*	*58.9*	*57.5*	*55.6*	*55.9*	*55.0*	*53.7*	*52.3*	*51.2*	*-11.0%*
North America	*64.0*	*62.1*	*60.0*	*59.6*	*58.7*	*57.3*	*59.0*	*57.5*	*56.7*	*53.1*	*51.9*	*-11.6%*
Europe	*68.7*	*65.8*	*63.7*	*57.7*	*55.1*	*52.4*	*50.8*	*49.9*	*47.4*	*45.8*	*44.6*	*-19.0%*
Asia Oceania	*66.5*	*66.8*	*61.7*	*59.1*	*58.8*	*56.8*	*55.7*	*57.3*	*56.9*	*64.3*	*63.8*	*8.5%*
Annex I EIT	..	..	..	..	*61.8*	*60.0*	*57.9*	*55.4*	*54.1*	*53.6*	*51.5*	*-16.6%*
Non-Annex I Parties	..	..	..	..	*46.3*	*49.1*	*49.2*	*53.3*	*55.4*	*56.2*	*55.6*	*20.1%*
Annex B Kyoto Parties	..	..	..	..	*59.8*	*56.4*	*54.2*	*53.3*	*51.5*	*50.3*	*49.4*	*-17.3%*
Non-OECD Total	**49.2**	**51.9**	**53.0**	**51.4**	**52.6**	**53.3**	**52.9**	**56.3**	**57.8**	**58.6**	**57.8**	**10.0%**
OECD Total	**66.2**	**64.4**	**62.1**	**59.9**	**58.0**	**56.3**	**56.4**	**55.3**	**54.3**	**52.9**	**52.1**	**-10.3%**
Canada	57.5	54.3	52.5	48.7	47.4	45.9	48.6	47.2	48.6	47.3	45.3	-4.6%
Chile	57.7	53.5	53.9	48.9	50.2	48.3	46.1	45.8	53.1	54.5	53.6	6.9%
Mexico	52.1	54.3	51.4	53.0	49.6	52.8	57.0	54.5	58.9	57.2	59.1	19.2%
United States	64.5	62.9	60.8	60.8	59.9	58.6	60.2	58.7	57.7	53.8	52.8	-11.9%
OECD Americas	**63.6**	**61.8**	**59.6**	**59.2**	**58.1**	**57.0**	**58.8**	**57.2**	**56.8**	**53.4**	**52.4**	**-9.8%**
Australia	66.3	71.0	70.9	72.1	72.0	73.7	73.9	76.9	72.0	70.5	72.3	0.4%
Israel [2]	57.3	55.8	57.6	76.7	68.4	69.1	71.8	76.1	70.4	67.3	66.2	-3.2%
Japan	67.0	66.5	60.4	57.0	56.8	54.2	52.3	53.4	53.7	63.9	62.6	10.3%
Korea	74.5	75.9	72.7	70.0	59.6	59.0	54.8	52.0	52.6	51.0	50.8	-14.8%
New Zealand	47.2	45.9	43.8	40.3	40.4	38.3	40.4	47.4	39.4	36.1	37.2	-7.9%
OECD Asia Oceania	**66.8**	**67.2**	**62.6**	**60.5**	**59.1**	**57.4**	**55.8**	**56.4**	**56.1**	**60.3**	**59.7**	**1.1%**
Austria	61.7	58.7	56.1	54.5	54.0	53.0	51.6	53.4	48.8	45.5	46.3	-14.3%
Belgium	71.1	65.2	64.1	54.7	53.1	49.8	46.9	44.3	41.5	42.2	39.1	-26.5%
Czech Republic	80.8	84.8	85.4	85.0	72.0	70.5	70.2	62.5	59.5	56.5	56.1	-22.2%
Denmark	71.5	72.0	78.7	75.5	70.1	71.9	65.1	61.3	57.9	46.8	43.9	-37.4%
Estonia	..	..	..	..	87.2	73.4	73.2	76.7	78.7	66.3	66.8	-23.3%
Finland	52.4	53.6	53.3	44.6	45.3	46.0	40.3	38.1	40.5	31.2	30.6	-32.5%
France	63.8	61.3	56.7	41.2	36.9	34.7	34.6	32.6	30.9	28.4	29.6	-19.8%
Germany	76.6	74.2	70.1	67.2	63.9	60.8	57.6	55.7	55.5	56.6	55.2	-13.7%
Greece	68.9	69.3	72.0	74.1	77.8	80.5	77.5	75.1	72.1	66.5	64.8	-16.7%
Hungary	75.6	73.2	69.6	64.0	54.5	52.0	50.9	46.6	42.5	40.5	41.0	-24.7%
Iceland	37.2	34.9	27.9	22.0	19.9	21.2	16.5	17.1	8.6	8.8	9.5	-52.4%
Ireland	76.9	76.0	75.1	73.2	72.6	73.2	70.8	72.6	65.5	63.5	62.6	-13.8%
Italy	65.6	64.9	64.9	63.2	63.5	60.2	58.5	58.5	53.9	51.6	50.0	-21.1%
Latvia	..	..	..	..	56.8	46.3	42.6	40.0	42.8	38.4	36.3	-36.2%
Lithuania	..	..	..	..	47.9	36.8	34.2	33.5	41.7	35.8	34.2	-28.5%
Luxembourg	96.9	80.7	83.5	80.6	75.7	62.4	57.5	62.6	60.1	56.3	54.6	-27.9%
Netherlands	59.9	53.4	54.0	54.5	53.1	53.4	51.6	50.1	49.3	52.3	50.1	-5.6%
Norway	41.2	38.5	35.4	31.6	31.1	31.9	29.1	30.7	30.3	30.2	27.7	-11.1%
Poland	79.7	78.6	78.5	80.9	79.9	80.0	77.9	76.8	73.1	71.1	70.3	-11.9%
Portugal	54.8	56.0	56.8	52.1	53.9	55.9	56.2	55.4	48.3	51.0	53.2	-1.3%
Slovak Republic	65.1	61.4	67.1	62.7	61.4	55.4	49.6	47.3	46.3	42.9	44.2	-28.0%
Slovenia	..	..	..	..	56.6	55.4	52.3	50.6	50.4	46.6	46.4	-18.1%
Spain	66.8	64.7	65.7	58.3	53.7	54.1	54.6	56.2	49.0	49.6	48.0	-10.6%
Sweden	54.4	48.4	43.1	29.5	26.4	27.0	26.1	22.7	21.6	19.8	18.3	-30.6%
Switzerland	56.7	51.1	46.8	45.2	40.1	41.2	40.3	40.7	39.8	36.9	37.5	-6.5%
Turkey	51.0	53.2	54.3	57.9	59.8	60.4	63.0	61.4	60.5	59.1	61.6	3.0%
United Kingdom	71.1	69.0	68.7	64.7	63.7	56.7	55.8	57.0	55.9	51.8	48.7	-23.5%
OECD Europe	**69.7**	**67.3**	**65.6**	**60.7**	**57.5**	**54.8**	**53.1**	**51.9**	**49.9**	**48.4**	**47.8**	**-16.9%**
IEA/Accession/Association	*62.0*	*60.8*	*59.1*	*57.1*	*56.1*	*56.4*	*56.5*	*58.0*	*58.9*	*58.9*	*58.3*	4.0%
European Union - 28	..	..	..	..	*58.4*	*55.3*	*53.4*	*52.2*	*50.0*	*48.3*	*47.3*	-19.0%
G20	..	..	..	..	*56.8*	*56.7*	*56.8*	*58.0*	*58.7*	*58.8*	*58.2*	2.5%
Africa	*31.6*	*35.4*	*34.9*	*33.2*	*32.9*	*31.6*	*32.3*	*35.5*	*35.7*	*36.1*	*34.9*	6.0%
Americas	*61.6*	*59.8*	*57.7*	*56.7*	*55.9*	*55.1*	*56.8*	*55.2*	*54.2*	*51.5*	*50.4*	-9.9%
Asia	..	..	..	..	*54.2*	*56.9*	*56.5*	*60.6*	*62.5*	*63.7*	*63.4*	16.8%
Europe	..	..	..	..	*58.9*	*55.9*	*53.9*	*52.3*	*50.5*	*49.4*	*48.0*	-18.5%
Oceania	*65.85*	*69.69*	*69.40*	*69.48*	*69.21*	*70.08*	*70.73*	*75.04*	*69.50*	*68.25*	*70.08*	1.3%

1. The ratio for the world has been calculated to include international marine bunkers and international aviation bunkers.
2. Please refer to the chapter Geographical coverage.

CO_2 emissions / TPES

tonnes CO_2 / terajoule

	1971	1975	1980	1985	1990	1995	2000	2005	2010	2015	2017	% change 90-17
Non-OECD Total	**49.2**	**51.9**	**53.0**	**51.4**	**52.6**	**53.3**	**52.9**	**56.3**	**57.8**	**58.6**	**57.8**	**10.0%**
Albania	53.7	52.1	53.0	60.9	50.7	33.2	41.1	42.2	44.2	41.7	44.1	-13.1%
Armenia	..	..	..	..	61.5	48.9	40.6	39.3	38.9	37.8	38.7	-37.1%
Azerbaijan	..	..	..	..	56.4	55.6	57.7	51.6	48.5	51.2	51.3	-8.9%
Belarus	..	..	..	..	52.4	54.8	50.4	48.9	51.7	49.8	50.6	-3.3%
Bosnia and Herzegovina	..	..	..	..	81.6	52.4	75.4	75.1	75.5	74.7	78.9	-3.3%
Bulgaria	80.1	75.3	71.5	64.1	61.0	54.6	54.1	55.8	59.3	56.1	54.6	-10.5%
Croatia	..	..	..	..	51.3	45.1	47.8	48.8	46.4	44.1	44.2	-13.8%
Cyprus [1]	71.0	70.1	71.1	71.8	68.1	71.1	70.5	75.9	71.0	70.0	68.6	0.7%
Georgia	..	..	..	..	64.4	52.2	38.6	34.2	38.2	43.2	43.3	-32.8%
Gibraltar	55.4	47.4	68.8	59.3	59.3	64.0	63.5	64.6	65.5	66.4	66.7	12.5%
Kazakhstan	..	..	..	..	77.1	78.0	75.0	73.7	76.4	75.2	71.9	-6.8%
Kosovo	..	..	..	..	..	..	78.9	81.5	83.2	81.7	76.0	..
Kyrgyzstan	..	..	..	..	72.6	44.7	45.8	45.4	52.4	59.4	55.4	-23.8%
Malta	74.3	74.3	74.5	80.3	79.6	80.1	75.3	73.9	73.6	61.4	53.3	-33.0%
Republic of Moldova	..	..	..	..	73.7	60.2	54.1	52.9	50.9	48.8	46.7	-36.7%
Montenegro	..	..	..	..	..	..	..	46.9	54.7	55.8	51.8	..
Republic of North Macedonia	..	..	..	..	82.8	79.4	76.3	73.0	69.2	64.4	65.3	-21.2%
Romania	65.0	64.8	64.9	64.3	64.8	60.3	56.8	57.3	50.9	52.2	50.7	-21.7%
Russian Federation	..	..	..	..	58.8	58.1	56.9	54.3	53.0	52.9	50.1	-14.7%
Serbia	..	..	..	..	75.7	78.3	75.7	75.0	69.8	72.0	70.6	-6.7%
Tajikistan	..	..	..	..	49.6	26.4	24.2	24.0	25.3	36.5	43.0	-13.3%
Turkmenistan	..	..	..	..	60.9	58.0	58.8	59.9	59.9	59.7	59.7	-1.9%
Ukraine	..	..	..	..	65.3	57.8	52.7	49.2	48.1	48.2	45.7	-29.9%
Uzbekistan	..	..	..	..	59.2	52.8	54.4	53.7	56.5	57.1	57.3	-3.2%
Former Soviet Union	60.4	63.0	63.2	58.9	..	..	..	..	..	..	..	..
Former Yugoslavia	67.4	68.8	59.6	69.4	..	..	..	..	..	..	..	..
Non-OECD Europe and Eurasia	**61.2**	**63.5**	**63.4**	**59.6**	**61.4**	**58.8**	**56.8**	**54.9**	**54.4**	**54.7**	**52.5**	**-14.5%**
Algeria	59.3	58.6	59.1	56.6	55.1	54.5	54.4	57.1	56.9	57.4	56.1	1.9%
Angola	10.0	11.3	13.9	13.5	15.9	14.8	16.2	19.6	32.3	33.6	29.3	84.2%
Benin	6.6	8.9	7.0	7.3	3.7	2.9	17.2	25.6	29.5	28.5	31.7	759.5%
Botswana	..	..	..	41.6	55.0	52.6	53.7	54.8	36.4	62.4	66.3	20.5%
Cameroon	6.5	8.0	10.9	12.7	12.7	10.6	10.6	9.6	17.3	15.6	15.9	25.1%
Congo	26.9	26.2	26.7	23.7	19.4	15.9	16.7	18.5	26.1	26.5	22.9	18.2%
Côte d'Ivoire	23.4	24.5	22.7	19.7	14.9	15.1	22.3	14.4	17.9	23.5	23.4	57.3%
Dem. Rep. of the Congo	9.2	8.4	8.9	7.8	6.1	2.1	1.5	1.8	2.2	2.3	1.8	-70.8%
Egypt	61.4	62.4	64.5	60.0	57.7	55.4	59.6	56.3	57.7	60.1	53.9	-6.6%
Eritrea	..	..	..	..	..	18.6	20.7	18.1	15.5	16.9	17.3	..
Ethiopia	2.9	2.4	2.5	2.2	2.9	2.6	3.1	3.7	4.2	6.1	7.4	153.1%
Gabon	10.6	13.9	22.4	29.5	18.4	23.4	23.8	13.8	12.5	14.9	16.0	-12.9%
Ghana	15.3	15.0	13.0	11.3	11.4	11.8	18.7	25.6	32.8	35.9	35.6	213.5%
Kenya	14.7	13.8	14.4	12.8	12.4	11.4	13.2	11.1	13.6	13.8	14.4	15.5%
Libya	56.6	56.5	59.6	50.1	55.3	56.3	55.5	57.7	57.5	67.3	74.3	34.5%
Mauritius	17.1	25.2	31.7	33.0	41.7	47.4	57.5	60.9	66.6	66.1	70.4	68.8%
Morocco	53.2	58.3	60.5	62.9	61.6	66.7	64.1	63.2	64.9	67.7	67.7	9.9%
Mozambique	10.2	8.5	8.3	5.6	4.4	4.4	4.4	4.3	8.0	13.9	17.2	292.0%
Namibia	..	..	..	..	..	45.5	43.0	43.6	46.4	47.7	47.7	..
Niger	..	..	..	..	..	..	10.6	10.1	14.6	15.7	15.5	..
Nigeria	4.1	6.7	12.4	13.3	10.1	10.7	12.0	12.8	10.4	13.6	13.1	29.5%
Senegal	23.4	27.7	31.2	32.5	30.2	31.7	35.1	39.6	32.9	41.4	46.0	52.3%
South Africa	82.6	89.3	73.2	60.2	64.9	59.9	61.5	76.5	75.9	78.6	76.2	17.4%
South Sudan	..	..	..	..	..	..	..	..	..	56.3	55.3	..
Sudan	10.9	10.3	10.5	10.0	11.9	8.6	9.8	15.6	23.1	21.2	23.9	101.2%
United Rep. of Tanzania	4.4	4.4	4.4	4.0	4.1	5.4	4.6	7.9	8.6	12.6	11.8	188.9%
Togo	11.3	9.7	9.9	7.2	10.9	8.8	10.7	9.7	15.9	13.3	13.7	26.3%
Tunisia	53.7	53.3	57.9	55.4	58.9	57.8	57.7	55.9	54.1	56.3	55.2	-6.2%
Zambia	22.8	26.3	17.2	12.9	11.3	8.2	6.3	6.7	4.5	7.6	11.9	5.4%
Zimbabwe	31.8	28.9	29.3	31.4	41.7	36.6	31.7	25.5	23.3	25.0	20.5	-50.8%
Other Africa	9.3	9.8	11.5	8.6	8.3	8.6	10.2	10.7	11.9	11.0	10.7	28.6%
Africa	**31.6**	**35.4**	**34.9**	**33.2**	**32.9**	**31.6**	**32.3**	**35.5**	**35.7**	**36.1**	**34.9**	**6.0%**

1. Please refer to the chapter Geographical coverage.

CO_2 emissions / TPES

tonnes CO_2 / terajoule

	1971	1975	1980	1985	1990	1995	2000	2005	2010	2015	2017	% change 90-17
Bangladesh	12.1	15.7	18.7	18.5	21.4	24.9	27.0	32.8	39.7	44.8	46.1	115.6%
Brunei Darussalam	53.6	45.4	46.7	39.5	45.1	47.8	44.3	51.9	50.6	52.5	44.4	-1.6%
Cambodia	..	..	..	..	..	12.4	13.7	18.4	20.7	27.2	31.8	..
DPR of Korea	85.2	84.3	85.1	85.9	84.0	83.1	84.8	84.3	79.5	68.7	30.7	-63.5%
India	28.5	30.2	31.4	36.4	41.3	45.3	47.9	49.8	54.0	57.9	58.5	41.6%
Indonesia	17.2	22.0	29.0	30.6	32.5	37.3	39.2	42.4	41.4	48.8	48.6	49.5%
Malaysia	50.5	56.2	49.3	52.3	55.8	56.0	56.9	57.3	62.6	62.2	59.5	6.5%
Mongolia	..	..	..	90.0	90.0	90.7	89.3	87.6	85.6	87.9	89.8	-0.2%
Myanmar	13.6	11.2	12.9	12.5	8.8	13.6	17.3	17.0	13.6	24.2	31.8	263.5%
Nepal	1.2	1.9	2.7	2.6	3.7	6.3	9.1	8.0	9.6	11.6	17.9	385.0%
Pakistan	22.2	23.4	23.5	27.0	31.0	35.4	35.5	36.2	36.5	37.9	41.9	35.1%
Philippines	37.1	38.3	34.8	29.4	31.7	40.7	40.7	44.0	45.6	48.2	52.0	64.2%
Singapore	53.0	54.3	58.9	58.6	60.0	47.6	53.9	41.9	43.6	35.2	30.9	-48.5%
Sri Lanka	17.3	15.3	19.1	16.7	15.9	21.7	30.2	35.5	30.4	40.2	45.9	188.3%
Chinese Taipei	71.1	68.0	61.1	49.7	55.6	57.9	60.3	59.3	55.3	54.9	58.3	4.9%
Thailand	28.3	29.1	36.6	40.6	46.1	54.0	50.3	48.3	45.3	43.8	42.2	-8.3%
Viet Nam	29.4	29.1	24.7	26.1	23.2	30.0	36.8	45.8	51.2	59.5	58.4	151.4%
Other non-OECD Asia	44.6	46.8	51.4	37.8	35.5	32.3	32.9	39.1	43.1	51.7	59.6	67.8%
Non OECD Asia (excl. China)	**32.0**	**33.9**	**36.5**	**38.5**	**41.4**	**44.5**	**46.3**	**47.9**	**49.6**	**52.9**	**53.2**	**28.3%**
People's Rep. of China	47.6	50.9	54.5	56.2	57.1	66.3	65.5	72.5	73.8	72.7	72.2	26.4%
Hong Kong, China	73.4	71.7	75.4	81.0	92.3	82.4	70.9	78.6	73.4	69.9	75.0	-18.7%
China	**47.8**	**51.0**	**54.6**	**56.4**	**57.5**	**66.5**	**65.6**	**72.5**	**73.8**	**72.7**	**72.2**	**25.7%**
Argentina	58.6	56.6	54.4	50.7	51.5	51.8	54.1	53.3	52.8	53.1	51.3	-0.4%
Bolivia	51.1	52.0	41.1	40.9	47.1	43.7	34.5	41.4	51.9	52.1	58.7	24.5%
Brazil	29.9	34.0	35.2	28.9	31.4	33.8	37.3	34.5	33.3	36.6	35.2	12.1%
Colombia	46.0	43.8	47.0	47.2	45.1	47.1	50.1	47.3	46.1	47.9	46.9	3.8%
Costa Rica	37.6	41.7	41.0	36.8	37.1	45.0	37.4	33.7	34.8	33.6	36.1	-2.6%
Cuba	47.4	49.3	49.7	50.3	46.8	49.4	51.3	56.1	62.3	58.2	58.8	25.6%
Curaçao [1]	63.4	63.4	52.8	60.2	43.6	47.9	63.7	68.3	51.2	55.4	53.2	21.8%
Dominican Republic	35.6	40.4	44.0	44.0	44.1	51.1	57.2	59.0	60.1	62.1	58.8	33.5%
Ecuador	37.3	45.1	49.8	49.6	50.3	50.7	49.1	61.2	66.2	59.9	56.5	12.4%
El Salvador	17.8	20.4	15.1	14.9	20.4	32.5	38.7	39.3	32.5	37.0	33.2	63.1%
Guatemala	19.8	21.6	26.5	20.2	17.4	26.3	29.1	32.5	22.3	28.7	27.4	57.6%
Haiti	6.0	5.8	7.1	10.1	14.3	12.7	16.4	13.9	13.2	17.5	17.5	22.6%
Honduras	19.3	20.6	21.7	19.9	21.9	30.2	35.7	41.7	39.0	38.7	37.4	71.1%
Jamaica	65.8	66.3	68.6	64.7	66.0	66.8	66.9	68.7	66.5	63.2	61.3	-7.1%
Nicaragua	29.2	30.0	28.1	22.3	21.8	26.6	33.6	33.4	34.5	31.3	30.8	41.4%
Panama	35.9	43.7	49.2	40.8	41.4	49.3	48.9	58.3	59.6	56.5	49.5	19.6%
Paraguay	10.0	11.4	15.4	15.0	15.0	21.2	20.4	20.9	23.6	25.5	25.9	72.7%
Peru	40.3	42.1	43.3	40.8	47.0	50.7	51.6	50.1	50.8	49.9	48.3	2.7%
Suriname	..	..	..	..	..	..	56.9	64.3	57.7	76.8	130.6	..
Trinidad and Tobago	48.6	47.1	39.7	31.2	31.5	32.6	23.4	25.5	26.4	26.8	25.7	-18.4%
Uruguay	50.4	52.1	48.2	36.0	38.2	40.8	39.3	41.6	34.8	30.4	27.4	-28.3%
Venezuela	61.5	58.2	61.1	56.1	56.6	54.2	54.3	60.3	56.6	56.0	54.5	-3.7%
Other non-OECD Americas	40.3	43.1	42.4	61.2	58.1	63.5	65.4	67.2	62.7	63.9	46.9	-19.3%
Non-OECD Americas	**42.4**	**43.0**	**43.6**	**39.1**	**40.5**	**42.1**	**44.0**	**43.2**	**42.0**	**43.2**	**41.5**	**2.6%**
Bahrain	49.1	58.6	61.6	52.2	48.8	50.1	47.5	47.7	48.3	50.6	50.8	4.0%
Islamic Republic of Iran	56.1	61.1	55.6	64.4	59.0	57.7	60.6	57.8	58.3	55.7	51.8	-12.3%
Iraq	61.4	60.9	64.4	61.6	62.5	67.7	64.9	66.1	67.2	66.8	54.3	-13.0%
Jordan	65.6	68.2	67.7	68.2	66.9	67.7	69.9	64.1	63.2	65.9	65.8	-1.6%
Kuwait	54.8	55.7	60.4	62.6	72.9	52.2	59.1	58.8	57.3	63.4	62.8	-13.9%
Lebanon	59.2	63.0	64.2	67.8	67.4	69.3	68.1	68.5	68.1	70.8	71.2	5.6%
Oman	72.1	72.2	46.7	63.8	57.5	57.5	64.4	60.7	54.2	60.5	59.2	2.9%
Qatar	57.8	57.7	50.3	45.2	45.5	49.3	46.5	47.6	47.9	42.3	44.3	-2.5%
Saudi Arabia	41.2	61.3	76.4	61.2	62.2	54.2	57.3	58.1	54.0	57.3	60.2	-3.3%
Syrian Arab Republic	54.6	64.6	65.9	59.6	62.1	61.5	57.3	61.4	63.1	56.6	61.8	-0.5%
United Arab Emirates	58.1	60.6	63.5	62.0	60.7	60.1	60.5	59.6	60.5	57.2	69.4	14.4%
Yemen	39.1	60.6	65.3	66.8	59.8	66.0	67.2	68.3	68.5	75.8	65.4	9.3%
Middle East	**53.6**	**60.7**	**63.8**	**61.9**	**60.6**	**57.9**	**59.4**	**58.6**	**57.4**	**57.1**	**56.8**	**-6.3%**

1. Please refer to the chapter Geographical coverage.

CO_2 emissions / TFC

tonnes CO_2 / terajoule

	1971	1975	1980	1985	1990	1995	2000	2005	2010	2015	2017	% change 90-17
World [1]	**78.5**	**78.7**	**78.8**	**77.6**	**78.2**	**78.1**	**79.0**	**81.1**	**82.7**	**82.3**	**80.7**	**3.2%**
Annex I Parties	..	..	..	..	*85.6*	*83.1*	*82.7*	*81.9*	*79.6*	*76.8*	*74.0*	*-13.5%*
Annex II Parties	*86.3*	*86.0*	*84.5*	*82.7*	*83.8*	*81.7*	*81.3*	*80.8*	*78.5*	*75.4*	*72.8*	*-13.1%*
North America	*82.2*	*83.1*	*81.7*	*82.6*	*85.7*	*84.8*	*85.8*	*84.8*	*82.5*	*76.8*	*73.9*	*-13.8%*
Europe	*92.0*	*88.1*	*87.1*	*81.3*	*78.7*	*74.7*	*71.9*	*71.3*	*67.3*	*64.7*	*62.3*	*-20.8%*
Asia Oceania	*90.2*	*93.8*	*90.3*	*87.7*	*89.4*	*86.6*	*86.3*	*89.1*	*91.7*	*96.0*	*95.1*	*6.3%*
Annex I EIT	..	..	..	..	*90.7*	*88.9*	*88.8*	*87.2*	*83.9*	*82.1*	*77.2*	*-14.8%*
Non-Annex I Parties	..	..	..	..	*60.5*	*65.5*	*67.6*	*74.3*	*79.7*	*81.0*	*80.0*	*32.2%*
Annex B Kyoto Parties	..	..	..	..	*87.3*	*82.8*	*79.4*	*78.3*	*75.8*	*73.5*	*71.4*	*-18.2%*
Non-OECD Total	**64.4**	**67.3**	**69.8**	**70.0**	**71.7**	**73.5**	**75.5**	**81.2**	**85.5**	**86.6**	**85.3**	**19.0%**
OECD Total	**87.1**	**86.9**	**85.8**	**84.3**	**84.7**	**82.5**	**82.3**	**81.6**	**79.7**	**76.8**	**74.5**	**-12.0%**
Canada	69.7	68.3	65.0	62.5	61.9	60.5	64.4	65.9	66.3	68.8	66.8	7.8%
Chile	76.8	68.9	70.1	61.4	63.3	58.1	57.0	59.5	68.7	77.4	77.0	21.5%
Mexico	65.2	69.7	74.1	72.8	73.7	80.0	90.2	92.9	89.7	88.2	87.1	18.2%
United States	83.4	84.7	83.7	84.9	88.7	88.0	88.5	87.1	84.5	77.9	74.8	-15.7%
OECD Americas	**81.7**	**82.6**	**81.4**	**81.9**	**84.9**	**84.3**	**85.8**	**84.9**	**82.7**	**77.6**	**74.8**	**-11.9%**
Australia	94.9	104.3	105.5	106.6	109.5	109.4	114.9	120.9	119.6	109.9	112.2	2.5%
Israel [2]	100.0	100.9	99.8	114.8	112.5	109.3	109.4	117.5	110.2	103.3	97.6	-13.2%
Japan	90.0	92.8	88.3	84.8	86.6	83.5	81.6	83.2	86.3	94.3	92.4	6.6%
Korea	92.9	98.5	95.9	97.3	85.3	81.5	81.2	77.8	83.4	80.3	78.3	-8.3%
New Zealand	63.4	60.4	57.0	56.8	53.2	50.1	53.5	64.1	55.7	52.7	52.6	-1.2%
OECD Asia Oceania	**90.5**	**94.2**	**91.0**	**89.1**	**89.1**	**86.0**	**85.6**	**86.9**	**89.9**	**91.5**	**89.9**	**0.8%**
Austria	79.7	74.0	69.6	66.3	68.1	67.0	63.0	66.2	60.2	55.2	55.9	-17.9%
Belgium	96.4	89.7	92.9	79.9	78.9	70.1	65.1	61.6	58.7	54.0	53.0	-32.9%
Czech Republic	112.4	114.9	115.8	112.2	108.8	107.2	110.9	100.7	100.1	93.5	89.5	-17.8%
Denmark	90.3	92.5	102.2	102.4	92.4	96.1	85.2	77.6	75.4	57.0	53.8	-41.8%
Estonia	..	..	..	..	147.5	140.3	133.6	131.2	149.6	127.5	130.2	-11.7%
Finland	58.6	60.7	67.7	60.7	57.6	59.5	53.4	51.9	56.0	41.4	39.7	-31.0%
France	80.5	78.2	77.0	61.4	58.3	54.3	53.7	53.0	50.8	47.2	47.4	-18.7%
Germany	107.1	102.7	100.7	96.6	93.2	87.7	83.8	81.4	79.2	79.2	75.6	-18.9%
Greece	88.6	99.8	100.8	108.9	115.1	119.0	113.8	109.3	102.5	94.1	91.0	-20.9%
Hungary	97.3	94.8	91.5	86.7	75.8	77.9	73.9	63.8	59.4	53.9	54.1	-28.7%
Iceland	39.7	36.8	32.5	27.4	33.4	32.4	29.2	27.8	18.4	17.2	17.5	-47.6%
Ireland	103.0	101.5	97.5	97.8	95.2	96.2	90.7	86.7	82.1	80.4	78.3	-17.8%
Italy	80.1	81.4	83.0	81.2	80.9	79.5	77.9	77.2	70.0	66.3	64.6	-20.2%
Latvia	..	..	..	..	69.9	55.1	49.5	44.6	47.4	43.1	40.3	-42.4%
Lithuania	..	..	..	..	73.9	63.0	55.5	55.6	54.5	42.8	40.1	-45.7%
Luxembourg	160.3	119.5	109.6	101.4	92.4	70.2	59.2	67.1	64.6	58.8	56.4	-39.0%
Netherlands	81.2	68.8	63.9	65.4	65.5	67.7	65.1	63.5	62.5	66.7	63.2	-3.5%
Norway	44.2	42.2	40.7	36.5	37.6	40.4	38.5	40.3	41.8	42.1	40.3	7.1%
Poland	122.8	121.4	127.4	130.5	134.0	123.4	119.7	114.4	105.0	101.5	97.3	-27.4%
Portugal	68.2	70.2	71.7	64.5	67.6	74.2	71.4	71.7	60.0	69.0	73.8	9.3%
Slovak Republic	94.8	88.6	102.3	99.9	83.1	89.7	77.1	76.0	72.2	70.1	69.6	-16.2%
Slovenia	..	..	..	..	87.5	80.7	72.2	71.5	70.7	63.9	64.3	-26.5%
Spain	86.7	92.6	92.5	87.1	79.8	79.2	77.8	78.1	67.9	74.0	72.5	-9.2%
Sweden	60.2	54.0	50.5	42.8	38.7	38.0	35.2	33.9	31.6	27.5	26.7	-31.0%
Switzerland	61.3	59.8	56.4	55.9	53.3	53.2	52.0	51.8	50.3	48.0	47.6	-10.7%
Turkey	61.6	64.4	64.9	73.8	76.1	76.5	83.1	78.9	81.5	81.4	86.1	13.1%
United Kingdom	110.4	103.3	103.8	97.5	95.0	85.3	82.5	85.4	82.5	74.6	67.3	-29.1%
OECD Europe	**94.2**	**90.8**	**90.6**	**86.1**	**82.7**	**78.5**	**75.6**	**74.3**	**70.9**	**68.5**	**66.9**	**-19.1%**
IEA/Accession/Association	*79.7*	*79.7*	*79.5*	*78.3*	*79.8*	*80.8*	*81.8*	*84.8*	*87.3*	*86.8*	*85.5*	*7.2%*
European Union - 28	..	..	..	..	*84.8*	*80.5*	*76.8*	*75.5*	*71.6*	*68.8*	*66.4*	*-21.7%*
G20	..	..	..	..	*80.8*	*81.3*	*82.5*	*85.4*	*87.5*	*87.0*	*85.5*	*5.8%*
Africa	*37.7*	*42.7*	*43.9*	*45.2*	*44.1*	*43.1*	*43.5*	*47.9*	*49.1*	*49.1*	*47.7*	*8.0%*
Americas	*79.1*	*79.5*	*78.3*	*78.0*	*80.5*	*79.9*	*81.3*	*80.1*	*77.5*	*73.6*	*70.8*	*-12.1%*
Asia	..	..	..	..	*73.5*	*79.1*	*82.0*	*88.4*	*94.3*	*95.5*	*95.0*	*29.3%*
Europe	..	..	..	..	*85.4*	*81.2*	*79.0*	*77.9*	*74.5*	*72.4*	*69.2*	*-19.0%*
Oceania	*93.49*	*100.92*	*101.57*	*102.02*	*103.17*	*102.18*	*107.34*	*115.45*	*113.03*	*105.37*	*107.29*	*4.0%*

1. The ratio for the world has been calculated to include international marine bunkers and international aviation bunkers.
2. Please refer to the chapter Geographical coverage.

CO_2 emissions / TFC

tonnes CO_2 / terajoule

	1971	1975	1980	1985	1990	1995	2000	2005	2010	2015	2017	% change 90-17
Non-OECD Total	**64.4**	**67.3**	**69.8**	**70.0**	**71.7**	**73.5**	**75.5**	**81.2**	**85.5**	**86.6**	**85.3**	**19.0%**
Albania	65.2	62.4	60.4	71.8	62.2	45.2	47.9	47.2	47.1	45.1	49.5	-20.3%
Armenia	..	..	..	..	73.2	70.1	73.9	57.5	53.0	56.9	55.3	-24.5%
Azerbaijan	..	..	..	..	76.5	81.1	99.9	86.0	81.3	84.4	82.8	8.3%
Belarus	..	..	..	..	69.1	74.1	69.1	69.0	72.4	68.9	68.4	-1.1%
Bosnia and Herzegovina	..	..	..	..	117.0	63.2	145.1	145.0	152.0	136.4	150.0	28.2%
Bulgaria	103.6	103.6	103.5	104.8	97.8	105.5	105.5	107.0	116.2	105.0	100.8	3.0%
Croatia	..	..	..	..	69.0	58.6	60.7	60.6	56.4	52.9	52.8	-23.5%
Cyprus [1]	95.2	102.1	100.7	102.1	105.9	100.1	104.5	106.0	101.2	98.5	97.1	-8.3%
Georgia	..	..	..	..	89.1	86.5	48.2	43.8	44.8	48.9	47.7	-46.5%
Gibraltar	63.8	59.6	88.0	79.3	74.7	75.4	74.9	75.4	77.4	79.2	79.8	6.9%
Kazakhstan	..	..	..	..	95.0	101.0	123.8	122.5	136.2	146.2	150.1	58.0%
Kosovo	..	..	..	..	..	..	158.9	161.6	174.7	148.5	124.9	..
Kyrgyzstan	..	..	..	..	78.7	59.8	62.3	63.5	63.5	70.2	60.1	-23.6%
Malta	123.3	127.7	145.3	211.0	207.4	150.5	160.2	159.0	149.7	84.6	73.0	-64.8%
Republic of Moldova	..	..	..	..	109.2	91.1	97.6	77.9	69.9	67.2	59.5	-45.5%
Montenegro	..	..	..	..	..	..	..	62.7	81.7	81.7	69.4	..
Republic of North Macedonia	..	..	..	..	136.0	134.0	129.7	119.7	109.3	89.9	91.6	-32.6%
Romania	84.0	83.1	73.2	85.9	93.4	104.7	86.6	85.4	76.5	73.7	71.2	-23.8%
Russian Federation	..	..	..	..	82.7	80.7	84.3	85.9	81.8	81.0	75.2	-9.0%
Serbia	..	..	..	..	123.0	171.9	143.4	123.5	114.9	125.0	119.2	-3.1%
Tajikistan	..	..	..	..	56.2	30.3	28.9	28.8	28.1	40.8	51.6	-8.1%
Turkmenistan	..	..	..	..	85.4	89.2	95.0	95.5	93.6	91.7	91.7	7.4%
Ukraine	..	..	..	..	109.5	101.9	97.4	84.7	86.1	88.1	82.0	-25.2%
Uzbekistan	..	..	..	..	78.5	68.8	74.7	73.7	75.6	84.3	85.0	8.3%
Former Soviet Union	92.4	91.8	91.3	88.8	..	..	..	..	..	..	..	..
Former Yugoslavia	88.2	92.5	98.3	119.0	..	..	..	..	..	..	..	..
Non-OECD Europe and Eurasia	**92.1**	**91.6**	**90.5**	**89.7**	**87.9**	**85.8**	**87.3**	**87.0**	**85.4**	**85.7**	**81.1**	**-7.7%**
Algeria	96.6	98.7	112.6	111.1	96.1	99.0	95.4	89.8	86.3	83.1	81.2	-15.4%
Angola	13.3	15.2	18.6	17.6	20.7	19.1	20.9	24.3	39.7	48.1	44.3	114.3%
Benin	7.5	10.2	8.0	8.4	4.3	3.3	20.4	28.3	36.1	35.5	38.7	808.4%
Botswana	..	..	..	48.4	75.3	70.6	68.4	68.5	46.8	87.5	92.5	22.8%
Cameroon	6.8	8.4	11.5	13.4	13.3	11.2	11.2	10.3	20.7	19.9	19.8	49.3%
Congo	32.2	31.7	32.4	30.6	24.8	21.5	24.6	26.9	35.1	38.6	35.2	41.7%
Côte d'Ivoire	33.9	35.7	32.7	28.7	22.2	23.7	34.9	27.5	26.1	33.8	33.8	52.2%
Dem. Rep. of the Congo	9.7	8.9	9.3	8.3	6.7	2.3	1.5	1.9	2.4	3.0	2.1	-69.1%
Egypt	70.2	72.7	73.2	80.0	80.2	77.1	75.8	82.2	79.7	85.9	82.1	2.4%
Eritrea	..	..	..	..	..	25.2	27.6	29.0	23.4	27.2	28.0	..
Ethiopia	3.1	2.5	2.6	2.4	3.1	2.8	3.3	3.9	4.5	6.4	7.8	153.1%
Gabon	18.3	23.7	30.6	32.9	21.5	25.3	25.8	14.8	13.3	16.4	17.2	-20.1%
Ghana	17.7	17.9	15.3	14.2	13.9	14.6	21.9	31.6	47.7	49.6	47.3	240.1%
Kenya	20.9	19.6	20.2	17.7	17.9	16.4	19.7	16.8	20.5	21.9	22.9	28.0%
Libya	114.3	107.0	105.3	102.3	112.4	100.6	93.5	98.6	86.7	126.8	112.1	-0.3%
Mauritius	18.1	27.1	35.4	38.4	52.5	61.8	89.6	98.7	117.8	117.1	119.5	127.6%
Morocco	58.1	70.1	73.6	81.5	83.2	88.4	82.6	83.5	83.8	87.6	86.3	3.8%
Mozambique	12.9	10.8	10.6	7.2	5.5	5.5	4.8	4.7	11.3	20.3	31.8	483.9%
Namibia	..	..	..	..	..	48.4	45.9	47.6	50.6	51.8	52.1	..
Niger	..	..	..	..	..	..	11.3	10.8	15.7	17.1	16.9	..
Nigeria	4.3	7.0	13.2	14.5	11.3	11.6	13.3	14.4	12.5	15.6	15.5	37.3%
Senegal	35.6	43.9	46.4	47.8	47.1	49.4	57.2	64.2	51.0	62.0	64.2	36.2%
South Africa	113.0	121.7	113.8	116.5	114.1	118.7	122.7	148.3	163.8	153.0	148.5	30.2%
South Sudan	..	..	..	..	..	..	..	..	..	81.1	78.4	..
Sudan	20.2	18.8	18.8	18.0	20.8	16.0	17.5	25.2	30.6	32.5	34.8	67.2%
United Rep. of Tanzania	5.0	4.9	5.0	4.5	4.6	6.1	5.2	9.1	9.9	14.6	13.7	199.9%
Togo	17.3	14.8	14.8	11.0	16.2	14.2	17.7	15.8	24.4	20.4	20.9	28.8%
Tunisia	69.3	70.7	80.0	78.3	80.0	76.4	76.4	69.5	74.9	77.6	74.8	-6.5%
Zambia	27.7	29.4	21.4	16.3	14.2	10.3	7.9	8.4	5.7	9.5	15.1	6.0%
Zimbabwe	35.0	31.1	31.2	34.6	48.8	44.9	36.7	30.3	26.5	29.5	23.4	-52.1%
Other Africa	9.5	10.0	12.0	9.0	9.2	9.5	11.7	12.5	14.3	13.4	12.9	39.8%
Africa	**37.7**	**42.7**	**43.9**	**45.2**	**44.1**	**43.1**	**43.5**	**47.9**	**49.1**	**49.1**	**47.7**	**8.0%**

1. Please refer to the chapter Geographical coverage.

CO_2 emissions / TFC

tonnes CO_2 / terajoule

	1971	1975	1980	1985	1990	1995	2000	2005	2010	2015	2017	% change 90-17
Bangladesh	12.8	16.5	20.2	21.3	25.1	29.3	33.0	41.7	52.2	60.4	60.7	141.9%
Brunei Darussalam	97.6	328.2	297.1	250.3	221.8	202.0	183.8	183.2	124.9	110.1	120.6	-45.6%
Cambodia	..	..	..	..	..	13.8	15.9	22.0	24.2	32.3	38.8	..
DPR of Korea	101.6	103.5	102.7	103.3	102.6	98.3	99.3	98.7	92.2	81.8	77.6	-24.4%
India	31.5	34.0	36.2	44.0	52.0	60.6	67.3	71.6	78.1	87.3	87.3	67.8%
Indonesia	18.8	24.0	32.5	35.0	40.1	49.0	50.7	57.3	60.4	65.3	68.2	70.2%
Malaysia	66.1	73.6	81.8	86.4	88.4	86.6	94.4	99.8	108.6	103.8	83.2	-5.8%
Mongolia	..	..	..	117.0	109.6	136.1	146.1	131.1	126.3	131.0	130.4	18.9%
Myanmar	15.1	12.5	14.5	14.5	9.9	15.2	19.3	19.4	14.7	27.1	36.7	269.0%
Nepal	1.2	1.9	2.7	2.6	3.7	6.3	9.2	8.1	9.7	11.7	18.0	385.6%
Pakistan	24.2	25.8	25.8	30.2	36.9	42.6	44.2	43.9	43.9	44.7	48.6	31.7%
Philippines	44.0	46.0	47.8	43.4	46.2	59.3	68.0	74.9	77.7	85.6	90.4	95.5%
Singapore	132.2	135.5	142.1	109.0	138.2	148.1	121.1	65.5	66.3	57.9	45.9	-66.8%
Sri Lanka	18.2	16.0	20.2	17.3	16.6	22.9	34.1	39.7	33.7	46.8	54.3	228.2%
Chinese Taipei	97.4	93.7	92.1	79.7	90.2	94.1	105.2	99.4	89.9	86.3	91.7	1.6%
Thailand	40.5	39.6	53.1	57.1	66.9	75.3	71.9	68.4	62.9	60.4	59.0	-11.9%
Viet Nam	31.2	31.0	27.3	29.2	25.9	32.8	42.1	53.8	62.5	74.3	71.3	175.7%
Other non-OECD Asia	46.5	50.3	56.9	43.2	41.5	37.3	38.4	47.5	50.1	66.1	82.6	98.9%
Non OECD Asia (excl. China)	**36.3**	**39.1**	**43.7**	**47.8**	**53.5**	**60.1**	**64.8**	**67.7**	**70.8**	**76.0**	**76.0**	**42.0%**
People's Rep. of China	55.3	60.0	66.8	69.0	75.9	88.3	94.8	105.3	113.7	110.8	110.8	46.1%
Hong Kong, China	104.1	109.0	120.1	144.5	152.4	126.9	102.7	132.3	122.4	117.1	112.1	-26.4%
China	**55.6**	**60.3**	**67.2**	**69.5**	**76.5**	**88.7**	**94.9**	**105.4**	**113.8**	**110.9**	**110.8**	**44.9%**
Argentina	84.9	81.5	77.6	72.1	79.0	67.8	70.5	70.3	73.2	73.3	71.8	-9.1%
Bolivia	61.0	61.9	51.2	49.0	57.0	60.4	58.5	63.0	66.5	65.8	70.4	23.4%
Brazil	33.5	38.9	41.8	36.8	39.6	42.2	45.6	43.2	42.1	47.6	44.8	13.4%
Colombia	54.7	54.4	57.8	59.4	57.8	57.7	61.3	59.0	64.1	64.0	61.1	5.8%
Costa Rica	44.2	47.9	45.1	39.2	42.4	54.5	47.4	43.5	46.2	44.4	45.5	7.4%
Cuba	56.0	60.8	65.3	65.1	58.5	70.1	67.4	86.6	100.3	90.1	80.0	36.8%
Curaçao [1]	163.1	155.9	189.9	122.4	101.5	81.4	154.4	153.6	105.2	162.8	129.5	27.6%
Dominican Republic	46.5	60.5	64.5	70.3	74.4	84.1	88.7	84.9	83.4	88.2	82.0	10.1%
Ecuador	39.4	52.5	62.5	56.4	57.0	67.8	64.5	70.9	76.1	74.3	66.7	17.0%
El Salvador	18.9	23.8	18.5	17.9	24.8	41.8	55.5	60.7	59.4	64.9	57.4	130.9%
Guatemala	22.5	23.4	30.6	22.5	19.0	29.2	34.3	40.0	28.9	35.6	32.9	73.5%
Haiti	7.2	6.9	8.7	12.4	18.1	15.9	19.3	17.7	17.2	23.4	23.4	29.8%
Honduras	20.4	21.4	22.7	20.5	22.3	33.4	39.3	51.6	47.5	45.5	43.7	96.0%
Jamaica	92.4	81.0	87.2	90.5	91.3	127.4	116.2	92.2	93.8	87.5	87.0	-4.7%
Nicaragua	33.0	34.2	32.1	28.4	29.9	37.2	44.3	48.3	49.9	48.7	47.3	58.0%
Panama	74.5	78.1	61.7	53.3	50.1	62.3	64.5	69.1	73.8	68.7	63.3	26.3%
Paraguay	10.6	12.1	16.3	15.7	15.7	22.3	21.5	22.7	26.2	28.0	28.8	82.8%
Peru	46.6	49.3	53.2	47.7	53.4	58.4	59.5	62.3	65.1	65.6	61.8	15.7%
Suriname	..	..	..	..	..	..	66.4	86.0	74.6	83.7	83.1	..
Trinidad and Tobago	145.3	95.0	86.6	54.0	50.8	48.0	32.4	36.1	37.2	38.2	35.4	-30.4%
Uruguay	63.5	67.0	60.2	41.0	44.5	46.6	48.5	51.6	39.2	34.0	29.5	-33.6%
Venezuela	115.9	94.0	92.4	86.4	86.6	80.0	84.6	80.8	83.3	87.9	91.2	5.3%
Other non-OECD Americas	64.6	69.2	67.0	62.9	62.3	64.0	63.0	63.6	75.2	77.7	68.6	10.1%
Non-OECD Americas	**54.4**	**54.6**	**56.4**	**51.3**	**53.2**	**54.2**	**56.5**	**55.5**	**55.6**	**57.9**	**54.8**	**3.1%**
Bahrain	235.9	112.7	136.0	151.0	121.8	123.2	123.9	116.1	119.3	115.0	113.4	-6.9%
Islamic Republic of Iran	74.8	74.8	76.7	78.3	74.8	74.9	78.7	78.7	75.6	73.1	69.7	-6.8%
Iraq	95.9	86.6	80.6	80.7	82.1	131.0	88.9	95.0	129.7	179.3	164.8	100.7%
Jordan	84.2	85.6	88.5	97.6	94.1	98.3	96.1	93.5	98.9	102.4	92.6	-1.6%
Kuwait	98.4	103.3	100.9	108.2	168.0	109.7	135.7	127.0	122.2	120.9	110.5	-34.2%
Lebanon	77.2	83.7	107.3	97.0	116.0	84.9	101.2	97.7	111.9	115.4	117.6	1.4%
Oman	75.0	84.9	97.4	97.3	131.7	138.7	160.4	120.9	82.6	74.8	73.6	-44.1%
Qatar	117.1	111.6	87.1	70.6	78.7	93.9	87.3	93.7	104.3	100.3	104.6	32.9%
Saudi Arabia	145.6	136.3	112.3	105.1	91.4	89.6	88.2	85.3	83.0	88.0	90.3	-1.2%
Syrian Arab Republic	77.9	71.8	76.4	78.3	85.5	89.7	86.4	92.2	98.0	97.9	103.3	20.8%
United Arab Emirates	61.0	72.9	82.5	79.9	76.5	77.2	82.8	95.8	82.3	79.6	88.8	16.0%
Yemen	89.3	81.7	83.6	87.3	83.0	88.5	96.1	90.7	99.7	102.8	94.5	13.7%
Middle East	**88.3**	**86.2**	**91.0**	**88.3**	**85.2**	**88.0**	**87.3**	**87.6**	**85.9**	**86.9**	**86.5**	**1.5%**

1. Please refer to the chapter Geographical coverage.

CO_2 emissions / GDP using exchange rates

kilogrammes CO_2 / US dollar using 2010 prices

	1971	1975	1980	1985	1990	1995	2000	2005	2010	2015	2017	% change 90-17
World [1]	**0.69**	**0.66**	**0.62**	**0.57**	**0.54**	**0.51**	**0.47**	**0.47**	**0.46**	**0.43**	**0.41**	**-24.2%**
Annex I Parties	..	..	..	..	*0.46*	*0.40*	*0.36*	*0.33*	*0.30*	*0.26*	*0.25*	*-46.4%*
Annex II Parties	*0.57*	*0.52*	*0.47*	*0.40*	*0.36*	*0.34*	*0.31*	*0.29*	*0.26*	*0.22*	*0.21*	*-41.4%*
North America	*0.85*	*0.78*	*0.69*	*0.58*	*0.52*	*0.49*	*0.45*	*0.39*	*0.35*	*0.30*	*0.28*	*-47.0%*
Europe	*0.44*	*0.39*	*0.36*	*0.31*	*0.27*	*0.24*	*0.22*	*0.20*	*0.18*	*0.15*	*0.14*	*-46.4%*
Asia Oceania	*0.36*	*0.36*	*0.31*	*0.25*	*0.24*	*0.24*	*0.23*	*0.23*	*0.22*	*0.20*	*0.20*	*-19.0%*
Annex I EIT	..	..	..	..	*1.61*	*1.57*	*1.26*	*0.98*	*0.84*	*0.72*	*0.70*	*-56.7%*
Non-Annex I Parties	..	..	..	..	*0.78*	*0.77*	*0.71*	*0.76*	*0.74*	*0.68*	*0.65*	*-17.1%*
Annex B Kyoto Parties	..	..	..	..	*0.40*	*0.33*	*0.28*	*0.26*	*0.24*	*0.20*	*0.19*	*-52.4%*
Non-OECD Total	**0.94**	**0.95**	**0.96**	**0.98**	**1.02**	**0.94**	**0.84**	**0.85**	**0.80**	**0.73**	**0.69**	**-32.6%**
OECD Total	**0.59**	**0.54**	**0.49**	**0.42**	**0.38**	**0.36**	**0.33**	**0.30**	**0.28**	**0.24**	**0.23**	**-40.1%**
Canada	0.62	0.58	0.54	0.44	0.41	0.41	0.38	0.35	0.33	0.31	0.29	-29.5%
Chile	0.49	0.47	0.41	0.36	0.39	0.32	0.34	0.30	0.31	0.31	0.32	-19.0%
Mexico	0.32	0.35	0.38	0.41	0.40	0.41	0.39	0.42	0.42	0.36	0.35	-13.0%
United States	0.87	0.80	0.71	0.59	0.53	0.50	0.45	0.40	0.36	0.30	0.27	-48.7%
OECD Americas	**0.82**	**0.75**	**0.67**	**0.56**	**0.51**	**0.48**	**0.44**	**0.39**	**0.36**	**0.30**	**0.28**	**-45.2%**
Australia	0.37	0.41	0.41	0.38	0.38	0.36	0.35	0.32	0.30	0.25	0.24	-36.5%
Israel [2]	0.31	0.29	0.28	0.31	0.34	0.34	0.32	0.31	0.29	0.23	0.21	-37.8%
Japan	0.37	0.35	0.29	0.23	0.22	0.22	0.21	0.21	0.20	0.19	0.18	-17.1%
Korea	0.82	0.83	0.89	0.71	0.64	0.66	0.61	0.51	0.50	0.46	0.45	-30.2%
New Zealand	0.23	0.24	0.24	0.23	0.26	0.25	0.26	0.25	0.21	0.18	0.18	-31.9%
OECD Asia Oceania	**0.38**	**0.37**	**0.33**	**0.28**	**0.27**	**0.28**	**0.27**	**0.26**	**0.26**	**0.24**	**0.23**	**-13.4%**
Austria	0.32	0.28	0.26	0.24	0.22	0.21	0.18	0.20	0.18	0.15	0.15	-30.6%
Belgium	0.59	0.50	0.46	0.36	0.32	0.31	0.28	0.24	0.22	0.18	0.17	-46.7%
Czech Republic	1.53	1.36	1.32	1.31	1.04	0.89	0.80	0.64	0.54	0.44	0.42	-59.4%
Denmark	0.36	0.32	0.34	0.29	0.22	0.23	0.17	0.15	0.15	0.09	0.09	-61.0%
Estonia	..	..	..	..	2.34	1.51	1.02	0.84	0.95	0.65	0.63	-73.1%
Finland	0.46	0.42	0.45	0.34	0.32	0.34	0.26	0.23	0.25	0.17	0.16	-49.4%
France	0.39	0.34	0.31	0.22	0.18	0.17	0.16	0.15	0.13	0.11	0.11	-41.8%
Germany	0.62	0.56	0.51	0.46	0.37	0.30	0.26	0.25	0.22	0.20	0.19	-49.5%
Greece	0.20	0.23	0.25	0.29	0.35	0.36	0.35	0.31	0.28	0.26	0.26	-27.8%
Hungary	0.99	0.90	0.89	0.79	0.63	0.61	0.50	0.41	0.36	0.30	0.30	-52.7%
Iceland	0.37	0.36	0.29	0.24	0.24	0.24	0.21	0.17	0.14	0.13	0.12	-47.5%
Ireland	0.56	0.44	0.43	0.39	0.35	0.31	0.24	0.21	0.18	0.11	0.10	-71.7%
Italy	0.30	0.29	0.26	0.23	0.22	0.22	0.20	0.21	0.18	0.16	0.15	-31.8%
Latvia	..	..	..	..	..	0.70	0.42	0.31	0.34	0.24	0.22	..
Lithuania	..	..	..	..	..	0.70	0.42	0.36	0.33	0.24	0.23	..
Luxembourg	1.39	0.96	0.84	0.61	0.45	0.27	0.20	0.24	0.20	0.14	0.14	-69.4%
Netherlands	0.39	0.36	0.34	0.31	0.28	0.27	0.22	0.21	0.20	0.18	0.17	-39.4%
Norway	0.17	0.15	0.14	0.11	0.11	0.10	0.09	0.08	0.09	0.08	0.07	-32.7%
Poland	1.68	1.55	1.82	1.84	1.52	1.32	0.89	0.78	0.64	0.51	0.51	-66.5%
Portugal	0.18	0.19	0.20	0.19	0.23	0.26	0.26	0.27	0.20	0.21	0.21	-6.6%
Slovak Republic	1.12	1.09	1.26	1.14	1.07	0.88	0.67	0.53	0.39	0.29	0.30	-72.2%
Slovenia	..	..	..	..	0.44	0.47	0.38	0.35	0.32	0.26	0.25	-42.2%
Spain	0.25	0.26	0.29	0.25	0.23	0.24	0.24	0.25	0.18	0.17	0.17	-27.6%
Sweden	0.38	0.33	0.28	0.20	0.16	0.17	0.13	0.11	0.09	0.07	0.07	-59.3%
Switzerland	0.12	0.12	0.11	0.11	0.09	0.10	0.09	0.08	0.07	0.06	0.06	-39.4%
Turkey	0.27	0.31	0.33	0.34	0.35	0.36	0.39	0.33	0.35	0.29	0.31	-11.3%
United Kingdom	0.60	0.53	0.47	0.40	0.34	0.29	0.25	0.22	0.19	0.15	0.13	-62.2%
OECD Europe	**0.48**	**0.44**	**0.41**	**0.36**	**0.31**	**0.28**	**0.25**	**0.23**	**0.21**	**0.18**	**0.17**	**-45.8%**
IEA/Accession/Association	*0.62*	*0.58*	*0.54*	*0.47*	*0.44*	*0.43*	*0.40*	*0.41*	*0.41*	*0.38*	*0.36*	*-17.8%*
European Union - 28	..	..	..	..	*0.34*	*0.30*	*0.26*	*0.24*	*0.21*	*0.18*	*0.17*	*-50.0%*
G20	..	..	..	..	*0.50*	*0.47*	*0.43*	*0.44*	*0.44*	*0.40*	*0.38*	*-23.2%*
Africa	*0.43*	*0.50*	*0.50*	*0.56*	*0.56*	*0.59*	*0.56*	*0.57*	*0.52*	*0.50*	*0.49*	*-13.5%*
Americas	*0.73*	*0.66*	*0.59*	*0.51*	*0.47*	*0.44*	*0.42*	*0.37*	*0.34*	*0.29*	*0.28*	*-41.5%*
Asia	..	..	..	..	*0.64*	*0.66*	*0.62*	*0.70*	*0.72*	*0.66*	*0.62*	*-3.0%*
Europe	..	..	..	..	*0.50*	*0.41*	*0.34*	*0.32*	*0.29*	*0.25*	*0.23*	*-53.6%*
Oceania	*0.36*	*0.40*	*0.40*	*0.37*	*0.38*	*0.36*	*0.35*	*0.32*	*0.29*	*0.25*	*0.25*	*-34.7%*

1. The ratio for the world has been calculated to include international marine bunkers and international aviation bunkers.
2. Please refer to the chapter Geographical coverage.

CO_2 emissions / GDP using exchange rates

kilogrammes CO_2 / US dollar using 2010 prices

	1971	1975	1980	1985	1990	1995	2000	2005	2010	2015	2017	% change 90-17
Non-OECD Total	**0.94**	**0.95**	**0.96**	**0.98**	**1.02**	**0.94**	**0.84**	**0.85**	**0.80**	**0.73**	**0.69**	**-32.6%**
Albania	1.17	1.05	1.25	1.15	0.92	0.34	0.45	0.42	0.33	0.29	0.31	-66.2%
Armenia	..	..	..	..	3.12	1.00	0.79	0.54	0.44	0.41	0.42	-86.6%
Azerbaijan	..	..	..	..	2.40	3.46	2.08	1.17	0.45	0.52	0.54	-77.5%
Belarus	..	..	..	..	3.08	2.69	1.81	1.33	1.01	0.85	0.87	-71.7%
Bosnia and Herzegovina	..	..	..	..	7.06	0.98	1.21	1.06	1.19	1.05	1.14	-83.8%
Bulgaria	4.11	3.46	2.98	2.44	1.97	1.66	1.30	1.09	0.88	0.80	0.73	-63.1%
Croatia	..	..	..	..	0.42	0.37	0.36	0.34	0.31	0.26	0.26	-39.5%
Cyprus [1]	0.56	0.45	0.40	0.33	0.33	0.33	0.34	0.31	0.28	0.25	0.25	-24.9%
Georgia	..	..	..	..	1.98	1.71	0.73	0.45	0.43	0.57	0.55	-72.4%
Gibraltar	0.15	0.13	0.17	0.15	0.20	0.36	0.37	0.39	0.45	0.51	0.52	159.2%
Kazakhstan	..	..	..	..	2.46	2.88	1.68	1.43	1.49	1.32	1.31	-47.0%
Kosovo	..	..	..	..	..	..	1.56	1.40	1.49	1.26	1.10	..
Kyrgyzstan	..	..	..	..	4.73	1.83	1.39	1.27	1.26	1.63	1.34	-71.6%
Malta	0.56	0.39	0.34	0.37	0.54	0.43	0.30	0.33	0.30	0.15	0.12	-77.9%
Republic of Moldova	..	..	..	..	3.06	2.98	1.86	1.57	1.37	1.08	0.98	-68.0%
Montenegro	..	..	..	..	..	..	..	0.58	0.62	0.52	0.45	..
Republic of North Macedonia	..	..	..	..	1.12	1.37	1.21	1.15	0.88	0.67	0.68	-39.1%
Romania	2.15	1.74	1.53	1.29	1.36	1.06	0.78	0.64	0.45	0.36	0.33	-75.9%
Russian Federation	..	..	..	..	1.53	1.76	1.55	1.16	1.00	0.93	0.92	-40.2%
Serbia	..	..	..	..	2.52	1.85	1.68	1.46	1.16	1.11	1.10	-56.5%
Tajikistan	..	..	..	..	1.63	0.95	0.84	0.57	0.41	0.53	0.64	-60.5%
Turkmenistan	..	..	..	..	3.26	3.85	3.41	3.49	2.52	1.86	1.64	-49.8%
Ukraine	..	..	..	..	3.35	4.01	3.30	2.24	1.96	1.55	1.35	-59.8%
Uzbekistan	..	..	..	..	5.62	5.70	5.74	4.05	2.56	1.59	1.23	-78.0%
Former Soviet Union	1.72	1.76	1.71	1.61	..	..	..	..	..	..	..	..
Former Yugoslavia	0.79	0.76	0.65	0.91	..	..	..	..	..	..	..	..
Non-OECD Europe and Eurasia	**1.71**	**1.72**	**1.64**	**1.55**	**1.84**	**1.93**	**1.61**	**1.22**	**1.04**	**0.93**	**0.89**	**-51.4%**
Algeria	0.25	0.26	0.40	0.48	0.56	0.59	0.56	0.55	0.59	0.69	0.66	17.8%
Angola	0.06	0.07	0.10	0.10	0.12	0.15	0.13	0.11	0.18	0.21	0.18	43.9%
Benin	0.18	0.26	0.18	0.17	0.09	0.06	0.30	0.46	0.66	0.60	0.70	725.9%
Botswana	..	..	..	0.49	0.53	0.48	0.47	0.42	0.26	0.44	0.45	-15.2%
Cameroon	0.12	0.12	0.15	0.13	0.17	0.17	0.16	0.13	0.19	0.18	0.17	1.2%
Congo	0.24	0.19	0.17	0.11	0.10	0.08	0.07	0.09	0.15	0.22	0.21	115.6%
Côte d'Ivoire	0.22	0.23	0.21	0.18	0.15	0.17	0.28	0.26	0.25	0.28	0.26	70.4%
Dem. Rep. of the Congo	0.11	0.11	0.14	0.13	0.12	0.07	0.06	0.08	0.09	0.09	0.07	-46.3%
Egypt	0.77	0.83	0.85	0.94	0.89	0.79	0.73	0.89	0.81	0.80	0.77	-13.6%
Eritrea	..	..	..	..	..	0.47	0.32	0.26	0.23	0.22	0.22	..
Ethiopia	0.17	0.15	0.16	0.18	0.22	0.22	0.25	0.25	0.20	0.21	0.23	3.7%
Gabon	0.10	0.08	0.15	0.17	0.09	0.11	0.12	0.13	0.19	0.18	0.18	105.8%
Ghana	0.19	0.25	0.23	0.22	0.21	0.21	0.27	0.27	0.32	0.31	0.27	30.1%
Kenya	0.39	0.32	0.30	0.28	0.25	0.24	0.30	0.24	0.28	0.28	0.28	10.7%
Libya	0.07	0.19	0.24	0.41	0.55	0.73	0.77	0.70	0.64	1.13	0.89	61.7%
Mauritius	0.20	0.25	0.26	0.22	0.30	0.31	0.37	0.39	0.37	0.33	0.32	9.1%
Morocco	0.38	0.46	0.50	0.49	0.46	0.55	0.51	0.54	0.50	0.49	0.49	7.0%
Mozambique	1.12	1.08	1.04	0.86	0.47	0.43	0.28	0.21	0.23	0.44	0.50	4.4%
Namibia	..	..	..	..	..	0.30	0.26	0.27	0.27	0.26	0.27	..
Niger	..	..	..	..	..	..	0.18	0.17	0.24	0.25	0.24	..
Nigeria	0.05	0.09	0.17	0.28	0.20	0.23	0.26	0.22	0.15	0.18	0.19	-4.1%
Senegal	0.23	0.27	0.33	0.30	0.27	0.28	0.32	0.34	0.34	0.37	0.36	36.6%
South Africa	1.09	1.23	1.09	1.09	1.09	1.12	1.05	1.16	1.12	1.00	0.99	-9.6%
South Sudan	..	..	..	..	..	..	..	..	..	0.40	10.47	..
Sudan	0.29	0.23	0.24	0.25	0.27	0.17	0.16	0.21	0.23	0.23	0.24	-11.6%
United Rep. of Tanzania	0.23	0.19	0.18	0.16	0.14	0.19	0.16	0.22	0.20	0.24	0.20	47.4%
Togo	0.28	0.21	0.19	0.16	0.27	0.27	0.36	0.35	0.61	0.41	0.41	50.5%
Tunisia	0.53	0.51	0.61	0.61	0.67	0.63	0.61	0.55	0.53	0.53	0.53	-20.8%
Zambia	0.51	0.58	0.43	0.35	0.31	0.24	0.17	0.16	0.08	0.13	0.22	-29.5%
Zimbabwe	0.96	0.82	0.85	0.84	1.12	0.98	0.77	0.88	0.79	0.69	0.54	-51.9%
Other Africa	0.21	0.23	0.28	0.22	0.26	0.31	0.31	0.28	0.28	0.23	0.23	-12.8%
Africa	**0.43**	**0.50**	**0.50**	**0.56**	**0.56**	**0.59**	**0.56**	**0.57**	**0.52**	**0.50**	**0.49**	**-13.5%**

1. Please refer to the chapter Geographical coverage.

CO_2 emissions / GDP using exchange rates

kilogrammes CO_2 / US dollar using 2010 prices

	1971	1975	1980	1985	1990	1995	2000	2005	2010	2015	2017	% change 90-17
Bangladesh	0.12	0.19	0.23	0.22	0.27	0.31	0.31	0.37	0.43	0.45	0.44	61.7%
Brunei Darussalam	0.07	0.20	0.23	0.31	0.34	0.40	0.37	0.36	0.50	0.44	0.50	46.5%
Cambodia	..	..	..	..	..	0.40	0.38	0.32	0.41	0.50	0.59	..
DPR of Korea	8.35	6.05	4.83	3.61	2.74	2.28	2.35	2.61	1.84	0.84	0.71	-73.9%
India	0.88	0.93	0.97	1.08	1.13	1.18	1.10	0.97	0.96	0.88	0.82	-27.5%
Indonesia	0.27	0.31	0.37	0.37	0.43	0.47	0.56	0.56	0.47	0.47	0.46	5.1%
Malaysia	0.56	0.53	0.52	0.56	0.61	0.62	0.71	0.76	0.75	0.67	0.58	-4.5%
Mongolia	..	..	..	3.67	3.34	3.05	2.34	2.09	1.97	1.47	1.55	-53.6%
Myanmar	0.97	0.76	0.72	0.64	0.49	0.63	0.58	0.36	0.16	0.27	0.38	-21.9%
Nepal	0.06	0.09	0.12	0.10	0.13	0.20	0.28	0.24	0.26	0.29	0.47	251.5%
Pakistan	0.58	0.62	0.56	0.61	0.70	0.79	0.80	0.77	0.73	0.70	0.76	8.7%
Philippines	0.50	0.49	0.41	0.39	0.40	0.54	0.54	0.46	0.39	0.39	0.42	3.5%
Singapore	0.40	0.40	0.39	0.37	0.43	0.37	0.31	0.22	0.18	0.16	0.15	-64.3%
Sri Lanka	0.31	0.25	0.27	0.20	0.18	0.20	0.31	0.32	0.22	0.26	0.28	57.3%
Chinese Taipei	1.11	1.00	1.01	0.70	0.72	0.69	0.72	0.70	0.58	0.50	0.51	-28.9%
Thailand	0.45	0.47	0.51	0.49	0.57	0.67	0.70	0.71	0.66	0.63	0.58	1.2%
Viet Nam	1.03	1.06	0.88	0.75	0.59	0.63	0.72	0.93	1.09	1.18	1.09	84.9%
Other non-OECD Asia	0.45	0.47	0.53	0.30	0.26	0.21	0.24	0.25	0.24	0.35	0.43	63.1%
Non OECD Asia (excl. China)	**0.73**	**0.74**	**0.74**	**0.75**	**0.76**	**0.75**	**0.77**	**0.73**	**0.69**	**0.65**	**0.63**	**-16.5%**
People's Rep. of China	3.90	4.14	4.00	2.87	2.52	1.96	1.39	1.52	1.28	1.02	0.91	-63.8%
Hong Kong, China	0.38	0.35	0.27	0.31	0.32	0.27	0.26	0.22	0.18	0.17	0.16	-50.9%
China	**3.51**	**3.71**	**3.48**	**2.58**	**2.27**	**1.82**	**1.31**	**1.45**	**1.24**	**1.00**	**0.89**	**-60.8%**
Argentina	0.46	0.43	0.43	0.42	0.49	0.44	0.46	0.45	0.41	0.42	0.40	-18.4%
Bolivia	0.33	0.39	0.46	0.52	0.55	0.61	0.53	0.57	0.69	0.71	0.79	42.0%
Brazil	0.18	0.18	0.17	0.15	0.16	0.16	0.19	0.18	0.17	0.19	0.19	21.3%
Colombia	0.41	0.35	0.33	0.33	0.31	0.30	0.28	0.23	0.21	0.22	0.20	-34.8%
Costa Rica	0.17	0.19	0.18	0.16	0.17	0.22	0.18	0.19	0.18	0.16	0.16	-7.6%
Cuba	0.98	0.95	1.02	0.71	0.76	0.72	0.71	0.51	0.46	0.36	0.35	-54.5%
Curaçao [1]	13.75	8.53	6.31	3.09	1.55	1.37	2.40	2.39	1.64	2.52	2.03	30.9%
Dominican Republic	0.41	0.44	0.42	0.37	0.38	0.45	0.51	0.43	0.35	0.31	0.28	-27.6%
Ecuador	0.22	0.25	0.35	0.35	0.35	0.38	0.39	0.41	0.47	0.43	0.39	12.3%
El Salvador	0.13	0.16	0.14	0.16	0.19	0.32	0.33	0.37	0.32	0.30	0.26	39.8%
Guatemala	0.20	0.22	0.23	0.19	0.16	0.24	0.29	0.31	0.25	0.30	0.30	84.5%
Haiti	0.08	0.08	0.09	0.12	0.14	0.16	0.21	0.31	0.32	0.41	0.41	189.4%
Honduras	0.30	0.31	0.29	0.26	0.28	0.40	0.43	0.54	0.48	0.51	0.46	63.7%
Jamaica	0.63	0.79	0.82	0.58	0.70	0.67	0.79	0.76	0.53	0.51	0.50	-28.6%
Nicaragua	0.28	0.28	0.34	0.33	0.39	0.49	0.54	0.53	0.49	0.44	0.41	4.1%
Panama	0.44	0.47	0.33	0.26	0.26	0.31	0.29	0.33	0.30	0.24	0.20	-20.0%
Paraguay	0.13	0.12	0.13	0.13	0.13	0.19	0.17	0.17	0.18	0.18	0.21	63.6%
Peru	0.33	0.31	0.32	0.28	0.33	0.31	0.31	0.27	0.28	0.27	0.25	-23.5%
Suriname	..	..	..	..	..	..	0.54	0.48	0.39	0.44	0.42	..
Trinidad and Tobago	0.78	0.59	0.62	0.74	0.99	0.95	0.79	0.94	0.99	0.93	0.86	-13.3%
Uruguay	0.32	0.31	0.25	0.17	0.17	0.17	0.17	0.17	0.15	0.13	0.12	-29.8%
Venezuela	0.27	0.29	0.39	0.41	0.40	0.38	0.40	0.42	0.44	0.36	0.40	0.8%
Other non-OECD Americas	0.18	0.22	0.15	0.13	0.15	0.13	0.12	0.11	0.13	0.12	0.08	-47.3%
Non-OECD Americas	**0.30**	**0.28**	**0.27**	**0.25**	**0.26**	**0.26**	**0.27**	**0.26**	**0.25**	**0.26**	**0.25**	**-3.9%**
Bahrain	1.15	1.12	0.95	1.28	1.20	1.09	1.04	1.05	0.99	0.98	0.90	-24.8%
Islamic Republic of Iran	0.17	0.23	0.48	0.64	0.73	0.89	0.99	1.04	1.02	1.16	1.01	37.7%
Iraq	0.67	0.72	0.57	0.93	0.74	2.03	0.69	0.70	0.75	0.69	0.67	-8.7%
Jordan	0.39	0.63	0.60	0.81	1.06	1.00	0.99	0.92	0.71	0.79	0.81	-23.0%
Kuwait	0.23	0.30	0.50	0.89	0.68	0.48	0.63	0.59	0.67	0.66	0.64	-5.8%
Lebanon	0.36	0.46	0.63	0.45	0.65	0.69	0.64	0.55	0.48	0.59	0.62	-4.7%
Oman	0.04	0.08	0.20	0.24	0.38	0.41	0.48	0.57	0.72	0.89	0.88	132.7%
Qatar	0.12	0.25	0.31	0.56	0.66	0.79	0.59	0.62	0.44	0.47	0.46	-29.8%
Saudi Arabia	0.08	0.09	0.28	0.57	0.51	0.55	0.62	0.65	0.79	0.78	0.78	51.4%
Syrian Arab Republic	0.67	0.60	0.65	0.91	1.13	0.86	0.96	1.13	0.96	1.40	1.74	54.7%
United Arab Emirates	0.11	0.09	0.16	0.32	0.41	0.46	0.40	0.43	0.53	0.50	0.51	22.8%
Yemen	0.43	0.44	0.50	0.49	0.54	0.60	0.66	0.75	0.72	0.48	0.46	-15.1%
Middle East	**0.18**	**0.21**	**0.36**	**0.60**	**0.61**	**0.71**	**0.70**	**0.73**	**0.78**	**0.78**	**0.75**	**22.8%**

1. Please refer to the chapter Geographical coverage.

CO_2 emissions / GDP using purchasing power parities

kilogrammes CO_2 / US dollar using 2010 prices

	1971	1975	1980	1985	1990	1995	2000	2005	2010	2015	2017	% change 90-17
World [1]	**0.58**	**0.55**	**0.52**	**0.47**	**0.45**	**0.42**	**0.38**	**0.36**	**0.34**	**0.31**	**0.29**	**-35.1%**
Annex I Parties	..	..	..	..	*0.46*	*0.41*	*0.37*	*0.33*	*0.30*	*0.26*	*0.25*	*-46.2%*
Annex II Parties	*0.63*	*0.57*	*0.51*	*0.43*	*0.39*	*0.37*	*0.34*	*0.31*	*0.28*	*0.24*	*0.23*	*-41.8%*
North America	*0.86*	*0.79*	*0.70*	*0.59*	*0.53*	*0.50*	*0.45*	*0.40*	*0.36*	*0.30*	*0.28*	*-47.2%*
Europe	*0.48*	*0.43*	*0.39*	*0.34*	*0.29*	*0.27*	*0.24*	*0.22*	*0.20*	*0.17*	*0.16*	*-46.0%*
Asia Oceania	*0.47*	*0.46*	*0.39*	*0.32*	*0.31*	*0.31*	*0.30*	*0.29*	*0.28*	*0.26*	*0.25*	*-18.7%*
Annex I EIT	..	..	..	..	*0.84*	*0.85*	*0.69*	*0.53*	*0.46*	*0.39*	*0.38*	*-54.8%*
Non-Annex I Parties	..	..	..	..	*0.39*	*0.38*	*0.35*	*0.37*	*0.36*	*0.33*	*0.30*	*-21.4%*
Annex B Kyoto Parties	..	..	..	..	*0.40*	*0.34*	*0.29*	*0.27*	*0.24*	*0.20*	*0.19*	*-51.9%*
Non-OECD Total	**0.47**	**0.48**	**0.49**	**0.49**	**0.49**	**0.45**	**0.40**	**0.40**	**0.38**	**0.34**	**0.32**	**-35.8%**
OECD Total	**0.61**	**0.56**	**0.51**	**0.44**	**0.39**	**0.37**	**0.34**	**0.31**	**0.28**	**0.24**	**0.23**	**-41.5%**
Canada	0.73	0.69	0.64	0.52	0.49	0.48	0.46	0.42	0.39	0.37	0.35	-29.2%
Chile	0.35	0.33	0.29	0.25	0.28	0.23	0.24	0.21	0.22	0.22	0.22	-18.9%
Mexico	0.19	0.21	0.23	0.25	0.24	0.25	0.24	0.26	0.25	0.22	0.21	-13.2%
United States	0.87	0.80	0.71	0.59	0.53	0.50	0.45	0.40	0.36	0.30	0.27	-48.7%
OECD Americas	**0.80**	**0.73**	**0.65**	**0.55**	**0.50**	**0.47**	**0.43**	**0.38**	**0.35**	**0.29**	**0.27**	**-45.4%**
Australia	0.51	0.57	0.57	0.52	0.53	0.50	0.48	0.45	0.41	0.34	0.34	-36.4%
Israel [2]	0.33	0.30	0.30	0.33	0.36	0.36	0.34	0.33	0.31	0.24	0.23	-37.7%
Japan	0.47	0.44	0.37	0.30	0.28	0.28	0.27	0.26	0.25	0.25	0.24	-16.7%
Korea	0.60	0.60	0.65	0.51	0.47	0.48	0.44	0.37	0.37	0.33	0.32	-30.3%
New Zealand	0.25	0.26	0.25	0.25	0.28	0.27	0.28	0.27	0.22	0.20	0.19	-32.4%
OECD Asia Oceania	**0.47**	**0.46**	**0.41**	**0.34**	**0.33**	**0.33**	**0.32**	**0.31**	**0.30**	**0.28**	**0.27**	**-18.0%**
Austria	0.35	0.31	0.29	0.26	0.24	0.23	0.21	0.23	0.20	0.17	0.17	-30.7%
Belgium	0.65	0.55	0.51	0.40	0.36	0.35	0.31	0.27	0.24	0.20	0.19	-46.9%
Czech Republic	1.10	0.97	0.95	0.94	0.74	0.63	0.57	0.46	0.39	0.32	0.30	-59.4%
Denmark	0.48	0.44	0.46	0.39	0.30	0.31	0.23	0.21	0.20	0.13	0.12	-61.0%
Estonia	..	..	..	..	1.59	1.03	0.69	0.57	0.65	0.44	0.43	-73.1%
Finland	0.55	0.50	0.53	0.41	0.38	0.41	0.31	0.28	0.30	0.20	0.19	-49.5%
France	0.44	0.38	0.35	0.25	0.21	0.19	0.18	0.17	0.15	0.12	0.12	-41.5%
Germany	0.66	0.60	0.55	0.49	0.39	0.32	0.28	0.26	0.24	0.21	0.20	-49.5%
Greece	0.19	0.22	0.23	0.28	0.34	0.35	0.33	0.30	0.27	0.25	0.24	-27.8%
Hungary	0.60	0.55	0.54	0.48	0.38	0.37	0.30	0.25	0.22	0.18	0.18	-52.7%
Iceland	0.41	0.39	0.31	0.26	0.26	0.26	0.22	0.19	0.16	0.14	0.14	-47.3%
Ireland	0.63	0.50	0.49	0.44	0.40	0.34	0.27	0.23	0.20	0.13	0.11	-71.9%
Italy	0.31	0.29	0.26	0.23	0.23	0.22	0.21	0.22	0.19	0.16	0.16	-32.0%
Latvia	..	..	..	..	0.54	0.45	0.27	0.20	0.22	0.16	0.14	-73.3%
Lithuania	..	..	..	..	..	0.42	0.25	0.21	0.20	0.14	0.14	..
Luxembourg	1.71	1.17	1.03	0.75	0.55	0.33	0.24	0.30	0.25	0.18	0.17	-69.4%
Netherlands	0.44	0.40	0.38	0.35	0.31	0.31	0.25	0.24	0.23	0.20	0.19	-39.0%
Norway	0.26	0.23	0.21	0.17	0.16	0.16	0.13	0.13	0.13	0.12	0.11	-33.1%
Poland	1.01	0.93	1.09	1.10	0.91	0.79	0.53	0.47	0.38	0.30	0.31	-66.5%
Portugal	0.15	0.16	0.16	0.16	0.19	0.22	0.22	0.22	0.17	0.17	0.18	-6.9%
Slovak Republic	0.74	0.72	0.84	0.76	0.71	0.59	0.44	0.35	0.26	0.19	0.20	-72.2%
Slovenia	..	..	..	..	0.37	0.40	0.32	0.30	0.27	0.22	0.21	-42.2%
Spain	0.24	0.25	0.27	0.24	0.22	0.23	0.23	0.24	0.18	0.17	0.16	-27.4%
Sweden	0.48	0.41	0.35	0.26	0.20	0.21	0.16	0.14	0.12	0.09	0.08	-59.1%
Switzerland	0.17	0.16	0.16	0.16	0.13	0.13	0.12	0.12	0.10	0.08	0.08	-39.8%
Turkey	0.17	0.19	0.20	0.21	0.22	0.22	0.24	0.20	0.21	0.18	0.19	-11.5%
United Kingdom	0.66	0.57	0.51	0.43	0.37	0.32	0.27	0.24	0.21	0.16	0.14	-62.2%
OECD Europe	**0.50**	**0.45**	**0.43**	**0.37**	**0.32**	**0.29**	**0.25**	**0.24**	**0.21**	**0.18**	**0.17**	**-47.2%**
IEA/Accession/Association	*0.60*	*0.56*	*0.52*	*0.45*	*0.41*	*0.40*	*0.36*	*0.36*	*0.34*	*0.30*	*0.28*	*-32.1%*
European Union - 28	..	..	..	..	*0.35*	*0.31*	*0.26*	*0.25*	*0.22*	*0.18*	*0.17*	*-50.3%*
G20	..	..	..	..	*0.45*	*0.42*	*0.38*	*0.37*	*0.35*	*0.31*	*0.29*	*-34.9%*
Africa	*0.20*	*0.23*	*0.22*	*0.25*	*0.25*	*0.26*	*0.24*	*0.25*	*0.22*	*0.21*	*0.21*	*-16.1%*
Americas	*0.67*	*0.60*	*0.53*	*0.46*	*0.43*	*0.40*	*0.38*	*0.34*	*0.30*	*0.26*	*0.25*	*-42.3%*
Asia	..	..	..	..	*0.43*	*0.42*	*0.38*	*0.41*	*0.39*	*0.35*	*0.33*	*-24.0%*
Europe	..	..	..	..	*0.46*	*0.40*	*0.33*	*0.30*	*0.27*	*0.23*	*0.22*	*-52.4%*
Oceania	*0.48*	*0.53*	*0.53*	*0.49*	*0.51*	*0.48*	*0.46*	*0.43*	*0.39*	*0.34*	*0.33*	*-34.6%*

1. The ratio for the world has been calculated to include international marine bunkers and international aviation bunkers.
2. Please refer to the chapter Geographical coverage.

CO_2 emissions / GDP using purchasing power parities

kilogrammes CO_2 / US dollar using 2010 prices

	1971	1975	1980	1985	1990	1995	2000	2005	2010	2015	2017	% change 90-17
Non-OECD Total	**0.47**	**0.48**	**0.49**	**0.49**	**0.49**	**0.45**	**0.40**	**0.40**	**0.38**	**0.34**	**0.32**	**-35.8%**
Albania	0.50	0.45	0.53	0.49	0.39	0.15	0.19	0.18	0.14	0.13	0.13	-66.2%
Armenia	..	..	..	..	1.53	0.49	0.39	0.26	0.21	0.20	0.21	-86.6%
Azerbaijan	..	..	..	..	0.90	1.30	0.78	0.44	0.17	0.20	0.20	-77.6%
Belarus	..	..	..	..	1.20	1.04	0.70	0.52	0.39	0.33	0.34	-71.7%
Bosnia and Herzegovina	..	..	..	..	3.50	0.49	0.60	0.53	0.59	0.52	0.57	-83.8%
Bulgaria	1.88	1.59	1.36	1.12	0.90	0.76	0.60	0.50	0.40	0.37	0.33	-63.1%
Croatia	..	..	..	..	0.30	0.26	0.25	0.24	0.22	0.18	0.18	-39.6%
Cyprus [1]	0.52	0.42	0.37	0.30	0.31	0.31	0.32	0.29	0.26	0.23	0.23	-24.9%
Georgia	..	..	..	..	0.89	0.77	0.33	0.20	0.19	0.26	0.25	-72.4%
Gibraltar	0.18	0.15	0.21	0.18	0.25	0.45	0.44	0.46	0.52	0.59	0.60	145.5%
Kazakhstan	..	..	..	..	1.14	1.33	0.77	0.66	0.69	0.61	0.60	-47.0%
Kosovo	..	..	..	..	..	..	0.66	0.59	0.63	0.53	0.47	..
Kyrgyzstan	..	..	..	..	1.52	0.59	0.45	0.41	0.41	0.52	0.43	-71.6%
Malta	0.43	0.29	0.26	0.28	0.41	0.32	0.23	0.25	0.22	0.11	0.09	-77.9%
Republic of Moldova	..	..	..	..	1.30	1.27	0.79	0.67	0.58	0.46	0.42	-68.0%
Montenegro	..	..	..	..	..	..	..	0.29	0.31	0.26	0.22	..
Republic of North Macedonia	..	..	..	..	0.45	0.55	0.49	0.46	0.36	0.27	0.27	-39.1%
Romania	1.04	0.84	0.74	0.62	0.66	0.51	0.38	0.31	0.22	0.18	0.16	-76.0%
Russian Federation	..	..	..	..	0.80	0.92	0.81	0.60	0.52	0.48	0.48	-40.3%
Serbia	..	..	..	..	1.13	0.83	0.75	0.65	0.52	0.50	0.49	-56.5%
Tajikistan	..	..	..	..	0.58	0.34	0.30	0.21	0.15	0.19	0.23	-60.4%
Turkmenistan	..	..	..	..	1.49	1.75	1.55	1.59	1.15	0.85	0.75	-49.8%
Ukraine	..	..	..	..	1.29	1.55	1.28	0.87	0.76	0.60	0.52	-59.8%
Uzbekistan	..	..	..	..	1.86	1.89	1.90	1.34	0.85	0.53	0.41	-78.0%
Former Soviet Union	0.96	0.98	0.95	0.89	..	..	..	..	..	..	..	..
Former Yugoslavia	0.49	0.48	0.40	0.56	..	..	..	..	..	..	..	..
Non-OECD Europe and Eurasia	**0.95**	**0.95**	**0.91**	**0.86**	**0.90**	**0.96**	**0.80**	**0.60**	**0.51**	**0.45**	**0.44**	**-51.4%**
Algeria	0.09	0.09	0.14	0.17	0.20	0.21	0.20	0.19	0.21	0.24	0.23	17.8%
Angola	0.04	0.04	0.06	0.06	0.07	0.08	0.07	0.06	0.10	0.12	0.10	43.7%
Benin	0.08	0.11	0.08	0.07	0.04	0.03	0.13	0.20	0.28	0.26	0.30	727.8%
Botswana	..	..	..	0.24	0.26	0.24	0.23	0.21	0.13	0.22	0.22	-15.3%
Cameroon	0.05	0.06	0.07	0.06	0.08	0.08	0.07	0.06	0.09	0.08	0.08	1.3%
Congo	0.13	0.10	0.09	0.06	0.05	0.04	0.04	0.05	0.08	0.12	0.11	113.5%
Côte d'Ivoire	0.10	0.10	0.10	0.08	0.07	0.08	0.13	0.12	0.12	0.13	0.12	71.4%
Dem. Rep. of the Congo	0.06	0.06	0.07	0.07	0.06	0.04	0.03	0.04	0.05	0.05	0.03	-46.9%
Egypt	0.21	0.22	0.23	0.25	0.24	0.21	0.20	0.24	0.22	0.22	0.21	-13.8%
Eritrea	..	..	..	..	..	0.16	0.11	0.09	0.08	0.08	0.08	..
Ethiopia	0.05	0.05	0.05	0.06	0.07	0.07	0.08	0.08	0.06	0.07	0.07	2.8%
Gabon	0.06	0.05	0.09	0.10	0.05	0.06	0.07	0.08	0.11	0.10	0.10	106.0%
Ghana	0.09	0.11	0.10	0.10	0.09	0.09	0.12	0.12	0.14	0.14	0.12	30.8%
Kenya	0.16	0.13	0.12	0.11	0.10	0.10	0.12	0.10	0.11	0.11	0.11	10.9%
Libya	0.03	0.08	0.10	0.17	0.23	0.30	0.32	0.29	0.27	0.47	0.37	61.7%
Mauritius	0.10	0.13	0.13	0.11	0.15	0.16	0.19	0.20	0.19	0.17	0.17	9.2%
Morocco	0.17	0.21	0.23	0.22	0.20	0.25	0.23	0.24	0.22	0.22	0.22	7.4%
Mozambique	0.52	0.50	0.48	0.40	0.22	0.20	0.13	0.10	0.11	0.20	0.23	4.5%
Namibia	..	..	..	..	..	0.19	0.17	0.17	0.17	0.16	0.17	..
Niger	..	..	..	..	..	..	0.08	0.07	0.10	0.11	0.11	..
Nigeria	0.02	0.04	0.08	0.13	0.09	0.10	0.12	0.10	0.07	0.08	0.09	-4.4%
Senegal	0.11	0.13	0.15	0.14	0.13	0.13	0.15	0.16	0.16	0.18	0.17	36.0%
South Africa	0.68	0.77	0.68	0.68	0.68	0.70	0.66	0.72	0.70	0.62	0.62	-9.7%
South Sudan	..	..	..	..	..	..	..	..	..	0.50	0.41	..
Sudan	0.13	0.10	0.11	0.11	0.12	0.08	0.07	0.10	0.10	0.10	0.11	-11.7%
United Rep. of Tanzania	0.08	0.07	0.06	0.05	0.05	0.06	0.05	0.08	0.07	0.08	0.07	46.8%
Togo	0.12	0.09	0.09	0.07	0.12	0.12	0.16	0.15	0.27	0.18	0.18	50.0%
Tunisia	0.22	0.21	0.25	0.25	0.27	0.26	0.25	0.22	0.21	0.22	0.21	-20.8%
Zambia	0.23	0.27	0.20	0.16	0.14	0.11	0.08	0.07	0.04	0.06	0.10	-29.5%
Zimbabwe	0.48	0.41	0.43	0.42	0.56	0.49	0.39	0.44	0.40	0.35	0.27	-52.0%
Other Africa	0.08	0.09	0.11	0.09	0.11	0.12	0.13	0.12	0.12	0.09	0.09	-13.2%
Africa	**0.20**	**0.23**	**0.22**	**0.25**	**0.25**	**0.26**	**0.24**	**0.25**	**0.22**	**0.21**	**0.21**	**-16.1%**

1. Please refer to the chapter Geographical coverage.

CO_2 emissions / GDP using purchasing power parities

kilogrammes CO_2 / US dollar using 2010 prices

	1971	1975	1980	1985	1990	1995	2000	2005	2010	2015	2017	% change 90-17
Bangladesh	0.04	0.06	0.07	0.07	0.09	0.10	0.10	0.12	0.14	0.14	0.14	62.4%
Brunei Darussalam	0.03	0.09	0.10	0.14	0.15	0.18	0.17	0.16	0.22	0.20	0.22	46.1%
Cambodia	..	..	..	..	..	0.13	0.12	0.10	0.13	0.16	0.19	..
DPR of Korea	2.23	1.61	1.29	0.96	0.73	0.61	0.63	0.70	0.49	0.22	0.19	-73.9%
India	0.28	0.29	0.30	0.34	0.35	0.37	0.34	0.30	0.30	0.27	0.26	-27.7%
Indonesia	0.10	0.12	0.14	0.14	0.16	0.18	0.21	0.21	0.18	0.18	0.17	5.5%
Malaysia	0.25	0.23	0.23	0.25	0.27	0.27	0.31	0.33	0.33	0.29	0.25	-4.5%
Mongolia	..	..	..	1.29	1.17	1.07	0.82	0.73	0.69	0.51	0.54	-53.5%
Myanmar	0.26	0.21	0.20	0.17	0.13	0.17	0.16	0.10	0.04	0.07	0.10	-21.2%
Nepal	0.02	0.03	0.04	0.03	0.04	0.06	0.09	0.07	0.08	0.09	0.14	248.8%
Pakistan	0.14	0.15	0.14	0.15	0.17	0.20	0.20	0.19	0.18	0.17	0.19	8.6%
Philippines	0.20	0.19	0.16	0.15	0.16	0.21	0.21	0.18	0.15	0.15	0.16	3.8%
Singapore	0.26	0.26	0.26	0.25	0.28	0.24	0.21	0.14	0.12	0.10	0.10	-64.3%
Sri Lanka	0.10	0.08	0.09	0.07	0.06	0.07	0.10	0.11	0.07	0.09	0.09	56.7%
Chinese Taipei	0.57	0.51	0.52	0.36	0.37	0.36	0.37	0.36	0.30	0.25	0.26	-28.9%
Thailand	0.17	0.18	0.20	0.19	0.22	0.26	0.27	0.27	0.25	0.24	0.22	1.4%
Viet Nam	0.31	0.32	0.27	0.23	0.18	0.19	0.22	0.28	0.33	0.36	0.33	84.9%
Other non-OECD Asia	0.22	0.23	0.26	0.15	0.13	0.12	0.13	0.13	0.12	0.17	0.21	53.0%
Non OECD Asia (excl. China)	**0.25**	**0.26**	**0.27**	**0.27**	**0.27**	**0.27**	**0.28**	**0.26**	**0.25**	**0.23**	**0.22**	**-17.7%**
People's Rep. of China	1.91	2.02	1.95	1.40	1.23	0.96	0.68	0.74	0.63	0.50	0.45	-63.8%
Hong Kong, China	0.26	0.24	0.19	0.22	0.22	0.19	0.18	0.15	0.13	0.12	0.11	-51.1%
China	**1.77**	**1.87**	**1.77**	**1.31**	**1.15**	**0.91**	**0.65**	**0.72**	**0.61**	**0.49**	**0.44**	**-61.8%**
Argentina	0.26	0.24	0.24	0.24	0.27	0.25	0.26	0.25	0.23	0.23	0.22	-18.6%
Bolivia	0.12	0.15	0.17	0.19	0.21	0.23	0.20	0.21	0.26	0.26	0.29	42.0%
Brazil	0.14	0.14	0.13	0.12	0.12	0.13	0.15	0.14	0.13	0.15	0.15	21.3%
Colombia	0.24	0.21	0.19	0.20	0.18	0.17	0.17	0.14	0.12	0.13	0.12	-35.0%
Costa Rica	0.11	0.12	0.12	0.10	0.11	0.14	0.12	0.12	0.11	0.10	0.10	-8.2%
Cuba	0.32	0.31	0.33	0.23	0.25	0.23	0.23	0.16	0.15	0.12	0.11	-54.5%
Curaçao [1]	15.33	9.51	7.03	3.45	1.73	1.53	2.68	2.66	1.82	2.81	2.27	30.9%
Dominican Republic	0.21	0.22	0.21	0.19	0.19	0.22	0.26	0.22	0.18	0.16	0.14	-27.6%
Ecuador	0.11	0.13	0.18	0.18	0.18	0.19	0.20	0.21	0.24	0.22	0.20	12.4%
El Salvador	0.07	0.08	0.07	0.08	0.09	0.16	0.16	0.18	0.15	0.15	0.13	40.0%
Guatemala	0.09	0.09	0.10	0.08	0.07	0.10	0.12	0.13	0.11	0.13	0.13	85.5%
Haiti	0.04	0.04	0.04	0.05	0.06	0.07	0.10	0.14	0.14	0.19	0.19	189.1%
Honduras	0.15	0.16	0.14	0.13	0.14	0.20	0.21	0.27	0.24	0.25	0.23	63.6%
Jamaica	0.38	0.48	0.49	0.34	0.42	0.40	0.47	0.45	0.31	0.31	0.30	-28.6%
Nicaragua	0.11	0.11	0.13	0.13	0.15	0.19	0.21	0.20	0.19	0.17	0.16	4.6%
Panama	0.23	0.25	0.18	0.14	0.14	0.17	0.16	0.17	0.16	0.13	0.11	-20.7%
Paraguay	0.06	0.05	0.06	0.06	0.06	0.09	0.08	0.08	0.08	0.08	0.10	62.7%
Peru	0.17	0.16	0.16	0.14	0.17	0.16	0.16	0.14	0.15	0.14	0.13	-23.7%
Suriname	..	..	..	..	..	..	0.32	0.28	0.23	0.26	0.25	..
Trinidad and Tobago	0.43	0.32	0.34	0.41	0.54	0.52	0.43	0.51	0.54	0.51	0.47	-13.4%
Uruguay	0.23	0.22	0.18	0.12	0.12	0.12	0.12	0.12	0.11	0.10	0.08	-30.0%
Venezuela	0.23	0.24	0.32	0.34	0.33	0.32	0.34	0.35	0.36	0.30	0.34	0.6%
Other non-OECD Americas	0.15	0.18	0.13	0.11	0.12	0.11	0.10	0.09	0.10	0.09	0.06	-46.6%
Non-OECD Americas	**0.20**	**0.19**	**0.18**	**0.17**	**0.18**	**0.18**	**0.19**	**0.18**	**0.17**	**0.17**	**0.16**	**-6.9%**
Bahrain	0.60	0.58	0.50	0.67	0.63	0.57	0.54	0.55	0.52	0.51	0.47	-24.8%
Islamic Republic of Iran	0.06	0.09	0.18	0.24	0.27	0.33	0.37	0.39	0.38	0.43	0.38	37.7%
Iraq	0.24	0.26	0.21	0.34	0.27	0.73	0.25	0.25	0.27	0.25	0.24	-9.0%
Jordan	0.15	0.25	0.24	0.32	0.42	0.40	0.39	0.36	0.28	0.31	0.32	-23.2%
Kuwait	0.12	0.16	0.26	0.46	0.36	0.25	0.33	0.31	0.35	0.35	0.34	-5.6%
Lebanon	0.20	0.25	0.35	0.25	0.36	0.38	0.35	0.30	0.26	0.32	0.34	-4.7%
Oman	0.02	0.04	0.09	0.11	0.16	0.18	0.21	0.25	0.31	0.39	0.38	133.1%
Qatar	0.07	0.14	0.18	0.32	0.38	0.46	0.34	0.36	0.25	0.27	0.27	-29.7%
Saudi Arabia	0.04	0.04	0.12	0.25	0.22	0.24	0.27	0.28	0.34	0.34	0.34	51.8%
Syrian Arab Republic	0.31	0.27	0.30	0.41	0.51	0.39	0.43	0.51	0.43	0.64	0.79	54.7%
United Arab Emirates	0.07	0.05	0.10	0.20	0.26	0.29	0.25	0.27	0.33	0.31	0.32	22.9%
Yemen	0.13	0.13	0.15	0.15	0.16	0.18	0.20	0.23	0.22	0.14	0.14	-15.0%
Middle East	**0.08**	**0.09**	**0.16**	**0.26**	**0.27**	**0.31**	**0.31**	**0.32**	**0.34**	**0.35**	**0.33**	**26.0%**

1. Please refer to the chapter Geographical coverage.

CO_2 emissions / population

tonnes CO_2 / capita

	1971	1975	1980	1985	1990	1995	2000	2005	2010	2015	2017	% change 90-17
World [1]	**3.71**	**3.81**	**3.99**	**3.77**	**3.88**	**3.74**	**3.80**	**4.16**	**4.41**	**4.41**	**4.37**	**12.5%**
Annex I Parties	..	..	..	..	*11.66*	*10.75*	*11.06*	*11.03*	*10.29*	*9.47*	*9.28*	*-20.4%*
Annex II Parties	*12.16*	*12.12*	*12.47*	*11.69*	*12.08*	*12.13*	*12.79*	*12.59*	*11.46*	*10.42*	*10.07*	*-16.6%*
North America	*20.16*	*19.79*	*19.89*	*18.57*	*18.80*	*18.67*	*19.95*	*19.02*	*17.11*	*15.37*	*14.65*	*-22.1%*
Europe	*8.58*	*8.48*	*8.99*	*8.23*	*8.24*	*8.03*	*8.12*	*8.19*	*7.29*	*6.34*	*6.19*	*-24.9%*
Asia Oceania	*7.50*	*8.12*	*8.10*	*7.89*	*9.18*	*9.69*	*10.00*	*10.28*	*9.98*	*10.03*	*9.92*	*8.1%*
Annex I EIT	..	..	..	..	*12.23*	*8.74*	*8.00*	*8.31*	*8.40*	*7.95*	*8.03*	*-34.4%*
Non-Annex I Parties	..	..	..	..	*1.50*	*1.71*	*1.79*	*2.33*	*2.88*	*3.12*	*3.11*	*107.2%*
Annex B Kyoto Parties	..	..	..	..	*9.20*	*8.12*	*7.86*	*8.12*	*7.58*	*6.70*	*6.66*	*-27.6%*
Non-OECD Total	**1.43**	**1.67**	**1.90**	**1.93**	**2.10**	**1.99**	**1.98**	**2.49**	**3.01**	**3.22**	**3.21**	**52.9%**
OECD Total	**10.40**	**10.39**	**10.75**	**10.08**	**10.27**	**10.29**	**10.82**	**10.70**	**9.95**	**9.13**	**8.94**	**-12.9%**
Canada	15.49	16.30	17.22	15.24	15.15	15.32	16.82	16.76	15.55	15.62	14.99	-1.1%
Chile	2.16	1.64	1.92	1.62	2.23	2.58	3.16	3.34	4.01	4.49	4.65	108.2%
Mexico	1.75	2.21	2.91	3.06	2.95	3.08	3.57	3.85	3.86	3.66	3.62	22.5%
United States	20.65	20.17	20.18	18.93	19.20	19.03	20.29	19.27	17.28	15.34	14.61	-23.9%
OECD Americas	**16.20**	**15.74**	**15.71**	**14.55**	**14.57**	**14.46**	**15.50**	**14.86**	**13.45**	**12.12**	**11.58**	**-20.5%**
Australia	10.86	12.85	13.96	13.94	15.03	15.66	17.36	17.87	17.41	15.70	15.63	4.0%
Israel [2]	4.52	4.75	4.86	5.74	7.04	8.09	8.70	8.45	8.98	7.63	7.32	4.0%
Japan	7.15	7.60	7.44	7.16	8.43	8.92	8.95	9.13	8.80	9.09	8.94	6.0%
Korea	1.61	2.20	3.30	3.82	5.41	7.92	9.19	9.50	11.12	11.41	11.66	115.7%
New Zealand	4.71	5.32	5.24	5.78	6.45	6.48	7.50	8.12	6.96	6.74	6.67	3.5%
OECD Asia Oceania	**6.21**	**6.80**	**7.00**	**6.94**	**8.28**	**9.24**	**9.77**	**10.04**	**10.21**	**10.27**	**10.23**	**23.5%**
Austria	6.48	6.53	7.20	6.96	7.33	7.49	7.72	9.09	8.20	7.21	7.38	0.7%
Belgium	12.21	11.81	12.74	10.25	10.68	10.98	11.12	10.28	9.54	8.26	7.96	-25.5%
Czech Republic	15.61	15.40	16.27	16.95	14.49	11.92	11.80	11.57	10.69	9.43	9.60	-33.8%
Denmark	11.17	10.40	12.31	11.94	9.92	11.16	9.52	8.95	8.52	5.62	5.42	-45.3%
Estonia	..	..	..	..	22.06	10.97	10.31	12.32	13.93	11.54	12.14	-45.0%
Finland	8.64	9.38	11.48	9.85	10.80	10.91	10.55	10.47	11.56	7.73	7.73	-28.4%
France	8.07	7.85	8.25	6.21	5.93	5.77	5.99	5.89	5.23	4.50	4.57	-23.0%
Germany	12.49	12.37	13.39	12.93	11.84	10.54	9.97	9.67	9.45	8.93	8.70	-26.6%
Greece	2.81	3.73	4.64	5.43	6.81	7.24	8.14	8.66	7.50	5.97	5.88	-13.6%
Hungary	5.81	6.66	7.72	7.54	6.34	5.45	5.22	5.43	4.72	4.34	4.68	-26.2%
Iceland	6.82	7.40	7.66	6.76	7.44	7.36	7.69	7.55	6.13	6.22	6.34	-14.8%
Ireland	7.27	6.66	7.61	7.47	8.59	9.06	10.76	10.68	8.67	7.53	7.44	-13.4%
Italy	5.35	5.72	6.30	6.04	6.87	7.06	7.38	7.84	6.55	5.43	5.31	-22.7%
Latvia	..	..	..	..	7.05	3.58	2.89	3.39	3.86	3.46	3.44	-51.2%
Lithuania	..	..	..	..	8.71	3.70	2.92	3.75	3.98	3.63	3.83	-56.0%
Luxembourg	48.16	35.49	34.20	28.16	28.13	20.06	18.46	24.66	20.99	15.47	14.46	-48.6%
Netherlands	9.68	9.66	10.28	9.55	9.89	10.58	10.15	10.26	10.28	9.32	9.08	-8.2%
Norway	5.89	5.89	6.67	6.36	6.48	7.21	7.10	7.46	7.63	6.91	6.59	1.7%
Poland	8.76	9.96	11.69	11.35	9.07	8.71	7.57	7.76	7.98	7.35	7.96	-12.2%
Portugal	1.65	1.96	2.41	2.37	3.79	4.71	5.62	5.85	4.50	4.53	4.93	30.0%
Slovak Republic	8.53	9.11	11.20	10.54	10.35	7.69	6.83	6.92	6.37	5.43	5.92	-42.7%
Slovenia	..	..	..	..	6.77	7.07	7.06	7.72	7.54	6.21	6.49	-4.1%
Spain	3.44	4.33	4.90	4.45	5.15	5.75	6.87	7.64	5.63	5.32	5.45	5.7%
Sweden	10.13	9.65	8.80	6.99	6.09	6.45	5.86	5.44	4.91	3.79	3.74	-38.5%
Switzerland	6.14	5.74	6.15	6.39	6.00	5.84	5.79	5.88	5.51	4.51	4.39	-26.7%
Turkey	1.15	1.49	1.61	1.90	2.34	2.58	3.13	3.16	3.66	4.08	4.71	101.8%
United Kingdom	11.11	10.25	10.13	9.61	9.60	8.86	8.84	8.80	7.59	6.05	5.43	-43.4%
OECD Europe	**8.08**	**8.10**	**8.65**	**8.01**	**7.81**	**7.43**	**7.41**	**7.48**	**6.86**	**6.10**	**6.13**	**-21.5%**
IEA/Accession/Association	*4.08*	*4.07*	*4.19*	*3.94*	*4.05*	*4.24*	*4.39*	*4.89*	*5.27*	*5.34*	*5.30*	30.7%
European Union - 28	..	..	..	..	*8.42*	*7.89*	*7.77*	*7.93*	*7.17*	*6.31*	*6.26*	*-25.6%*
G20	..	..	..	..	*4.59*	*4.55*	*4.66*	*5.15*	*5.54*	*5.61*	*5.57*	21.2%
Africa	*0.67*	*0.78*	*0.83*	*0.85*	*0.84*	*0.80*	*0.81*	*0.94*	*0.97*	*0.97*	*0.95*	12.2%
Americas	*9.70*	*9.39*	*9.33*	*8.44*	*8.37*	*8.31*	*8.88*	*8.53*	*7.91*	*7.27*	*6.90*	*-17.6%*
Asia	..	..	..	..	*1.85*	*2.14*	*2.22*	*2.90*	*3.62*	*4.00*	*4.04*	118.2%
Europe	..	..	..	..	*9.93*	*8.18*	*7.92*	*8.12*	*7.66*	*6.94*	*6.89*	*-30.6%*
Oceania	*10.03*	*11.79*	*12.72*	*12.83*	*13.89*	*14.38*	*16.03*	*16.66*	*16.06*	*14.79*	*14.73*	6.0%

1. The ratio for the world has been calculated to include international marine bunkers and international aviation bunkers.
2. Please refer to the chapter Geographical coverage.

CO_2 emissions / population

tonnes CO_2 / capita

	1971	1975	1980	1985	1990	1995	2000	2005	2010	2015	2017	% change 90-17
Non-OECD Total	**1.43**	**1.67**	**1.90**	**1.93**	**2.10**	**1.99**	**1.98**	**2.49**	**3.01**	**3.22**	**3.21**	**52.9%**
Albania	1.77	1.80	2.55	2.34	1.73	0.58	1.00	1.27	1.35	1.33	1.51	-12.5%
Armenia	..	..	..	..	5.61	1.05	1.12	1.39	1.41	1.61	1.76	-68.6%
Azerbaijan	..	..	..	..	7.47	4.21	3.39	3.46	2.60	3.19	3.12	-58.2%
Belarus	..	..	..	..	9.80	5.59	5.22	5.69	6.27	5.55	5.69	-42.0%
Bosnia and Herzegovina	..	..	..	..	5.37	0.85	3.64	4.19	5.50	5.46	6.37	18.6%
Bulgaria	7.48	8.41	9.60	9.17	8.20	6.27	5.16	6.07	6.00	6.09	6.05	-26.2%
Croatia	..	..	..	..	4.25	3.16	3.79	4.48	4.13	3.69	3.93	-7.7%
Cyprus [1]	2.83	3.28	5.09	5.14	6.79	7.83	9.14	9.62	8.87	6.97	7.45	9.7%
Georgia	..	..	..	..	6.97	1.72	1.05	0.97	1.27	2.26	2.35	-66.4%
Gibraltar	2.64	2.39	3.34	3.22	5.10	9.68	11.73	13.09	15.30	17.34	20.70	306.0%
Kazakhstan	..	..	..	..	14.51	10.78	7.53	10.36	13.55	14.01	14.18	-2.3%
Kosovo	..	..	..	..	..	..	3.00	3.89	4.90	4.78	4.46	..
Kyrgyzstan	..	..	..	..	5.18	0.98	0.91	0.95	1.11	1.66	1.44	-72.3%
Malta	2.16	2.14	3.13	3.45	6.54	6.31	5.46	6.49	6.22	3.71	3.26	-50.1%
Republic of Moldova	..	..	..	..	8.26	3.24	1.80	2.17	2.23	2.13	2.12	-74.3%
Montenegro	..	..	..	..	..	..	..	3.27	4.18	3.79	3.55	..
Republic of North Macedonia	..	..	..	..	4.30	4.19	4.19	4.33	4.02	3.43	3.57	-17.0%
Romania	5.60	6.60	7.97	7.69	7.25	5.18	3.84	4.35	3.69	3.51	3.61	-50.1%
Russian Federation	..	..	..	..	14.59	10.44	10.06	10.33	10.71	10.65	10.64	-27.1%
Serbia	..	..	..	..	6.16	4.34	5.29	6.76	6.26	6.27	6.57	6.7%
Tajikistan	..	..	..	..	2.09	0.43	0.35	0.34	0.30	0.49	0.66	-68.6%
Turkmenistan	..	..	..	..	12.12	7.90	8.12	10.12	11.19	12.42	11.98	-1.1%
Ukraine	..	..	..	..	13.27	7.68	6.00	6.17	5.81	4.15	3.82	-71.2%
Uzbekistan	..	..	..	..	5.60	4.15	4.67	4.04	3.52	2.95	2.51	-55.3%
Former Soviet Union	7.97	9.83	11.12	11.16	..	..	..	..	..	..	..	..
Former Yugoslavia	3.09	3.54	3.86	5.27	..	..	..	..	..	..	..	..
Non-OECD Europe and Eurasia	**7.40**	**9.05**	**10.28**	**10.37**	**11.52**	**7.72**	**7.05**	**7.40**	**7.58**	**7.31**	**7.24**	**-37.2%**
Algeria	0.58	0.81	1.43	1.86	1.98	1.92	1.97	2.33	2.65	3.27	3.16	59.9%
Angola	0.23	0.26	0.30	0.27	0.32	0.27	0.28	0.31	0.65	0.77	0.61	87.9%
Benin	0.10	0.14	0.11	0.11	0.05	0.04	0.21	0.34	0.50	0.50	0.61	+
Botswana	..	..	..	1.26	2.04	2.03	2.33	2.31	1.62	3.20	3.37	65.3%
Cameroon	0.11	0.14	0.19	0.24	0.23	0.18	0.18	0.17	0.25	0.26	0.26	13.3%
Congo	0.41	0.38	0.38	0.36	0.26	0.19	0.15	0.23	0.42	0.63	0.54	106.5%
Côte d'Ivoire	0.44	0.46	0.41	0.30	0.22	0.22	0.38	0.32	0.31	0.41	0.42	90.5%
Dem. Rep. of the Congo	0.13	0.11	0.12	0.11	0.09	0.03	0.02	0.02	0.03	0.04	0.03	-68.6%
Egypt	0.56	0.65	0.92	1.28	1.36	1.28	1.43	1.89	2.10	2.13	2.15	58.2%
Eritrea	..	..	..	..	..	0.25	0.18	0.15	0.11	0.12	0.13	..
Ethiopia	0.05	0.04	0.04	0.03	0.05	0.04	0.05	0.06	0.07	0.10	0.12	175.6%
Gabon	0.79	1.17	1.77	2.03	0.96	1.21	1.19	1.24	1.62	1.69	1.66	74.0%
Ghana	0.22	0.24	0.20	0.16	0.17	0.19	0.26	0.29	0.43	0.51	0.48	177.9%
Kenya	0.28	0.26	0.27	0.23	0.24	0.21	0.25	0.21	0.27	0.31	0.33	38.6%
Libya	1.67	3.28	5.46	5.48	5.83	6.66	6.86	7.44	7.81	6.85	6.51	11.8%
Mauritius	0.31	0.47	0.59	0.60	1.10	1.38	2.05	2.41	2.93	3.14	3.31	200.8%
Morocco	0.40	0.54	0.68	0.72	0.79	0.96	1.02	1.29	1.43	1.59	1.63	105.9%
Mozambique	0.31	0.23	0.20	0.12	0.08	0.07	0.07	0.07	0.10	0.22	0.26	213.4%
Namibia	..	..	..	..	..	1.08	1.00	1.23	1.42	1.59	1.59	..
Niger	..	..	..	..	..	..	0.06	0.05	0.08	0.10	0.10	..
Nigeria	0.10	0.17	0.35	0.38	0.30	0.30	0.36	0.41	0.35	0.46	0.45	52.5%
Senegal	0.28	0.33	0.37	0.33	0.28	0.28	0.36	0.41	0.42	0.50	0.52	85.8%
South Africa	6.69	7.75	7.00	6.61	6.49	6.17	6.14	7.63	8.12	7.57	7.44	14.5%
South Sudan	..	..	..	..	..	..	..	..	..	0.17	0.12	..
Sudan	0.22	0.20	0.19	0.18	0.20	0.15	0.16	0.25	0.34	0.42	0.46	127.0%
United Rep. of Tanzania	0.10	0.09	0.08	0.07	0.07	0.08	0.08	0.13	0.14	0.19	0.18	168.2%
Togo	0.16	0.13	0.14	0.09	0.15	0.14	0.19	0.17	0.32	0.26	0.27	75.7%
Tunisia	0.72	0.86	1.24	1.32	1.48	1.54	1.82	1.93	2.19	2.27	2.27	53.1%
Zambia	0.78	0.87	0.56	0.39	0.32	0.22	0.16	0.18	0.12	0.22	0.35	10.0%
Zimbabwe	1.35	1.17	1.11	1.12	1.60	1.33	1.09	0.79	0.67	0.75	0.59	-63.2%
Other Africa	0.13	0.13	0.15	0.11	0.12	0.13	0.15	0.17	0.19	0.16	0.16	31.5%
Africa	**0.67**	**0.78**	**0.83**	**0.85**	**0.84**	**0.80**	**0.81**	**0.94**	**0.97**	**0.97**	**0.95**	**12.2%**

1. Please refer to the chapter Geographical coverage.

CO_2 emissions / population

tonnes CO_2 / capita

	1971	1975	1980	1985	1990	1995	2000	2005	2010	2015	2017	% change 90-17
Bangladesh	0.04	0.06	0.08	0.08	0.11	0.14	0.16	0.22	0.33	0.44	0.48	339.8%
Brunei Darussalam	2.93	8.69	13.60	13.09	12.59	15.16	13.29	13.21	17.64	14.30	15.64	24.3%
Cambodia	..	..	..	..	..	0.14	0.16	0.20	0.32	0.52	0.67	..
DPR of Korea	4.67	4.83	6.19	6.86	5.76	3.50	3.05	3.15	2.00	0.89	0.77	-86.7%
India	0.32	0.35	0.38	0.48	0.61	0.73	0.84	0.94	1.29	1.55	1.61	165.5%
Indonesia	0.21	0.29	0.46	0.51	0.74	1.04	1.21	1.40	1.48	1.78	1.88	154.1%
Malaysia	1.16	1.33	1.72	2.11	2.75	3.88	4.96	6.07	6.75	7.18	6.67	142.7%
Mongolia	..	..	..	6.12	5.88	4.45	3.74	4.35	5.21	5.75	6.27	6.6%
Myanmar	0.17	0.13	0.15	0.15	0.10	0.16	0.20	0.22	0.16	0.36	0.57	493.8%
Nepal	0.02	0.02	0.04	0.03	0.05	0.08	0.13	0.12	0.15	0.20	0.35	618.8%
Pakistan	0.27	0.30	0.31	0.40	0.52	0.65	0.68	0.75	0.76	0.80	0.93	79.0%
Philippines	0.65	0.71	0.69	0.54	0.61	0.82	0.87	0.83	0.82	1.02	1.21	96.4%
Singapore	2.87	3.73	5.24	6.07	9.51	10.66	10.46	8.65	8.35	8.22	8.45	-11.2%
Sri Lanka	0.22	0.19	0.24	0.22	0.21	0.30	0.56	0.69	0.61	0.93	1.08	408.0%
Chinese Taipei	1.98	2.51	4.03	3.61	5.47	7.25	9.82	11.24	11.10	10.68	11.38	108.0%
Thailand	0.43	0.50	0.71	0.81	1.43	2.35	2.42	3.06	3.32	3.61	3.54	147.6%
Viet Nam	0.37	0.35	0.27	0.29	0.26	0.37	0.55	0.94	1.43	1.95	2.00	685.1%
Other non-OECD Asia	0.38	0.42	0.54	0.34	0.31	0.30	0.32	0.37	0.47	0.71	0.89	189.9%
Non OECD Asia (excl. China)	**0.40**	**0.44**	**0.53**	**0.60**	**0.74**	**0.90**	**1.02**	**1.16**	**1.38**	**1.60**	**1.67**	**124.9%**
People's Rep. of China	0.93	1.12	1.39	1.55	1.84	2.41	2.46	4.15	5.86	6.64	6.68	262.9%
Hong Kong, China	2.28	2.44	2.89	4.09	5.84	5.93	6.05	6.07	5.98	6.02	5.96	2.1%
China	**0.93**	**1.13**	**1.40**	**1.56**	**1.86**	**2.43**	**2.47**	**4.16**	**5.86**	**6.63**	**6.67**	**258.8%**
Argentina	3.39	3.27	3.39	2.89	3.04	3.35	3.76	3.82	4.22	4.39	4.14	36.4%
Bolivia	0.47	0.64	0.75	0.69	0.75	0.91	0.85	0.98	1.38	1.69	1.98	163.4%
Brazil	0.90	1.21	1.39	1.15	1.24	1.41	1.67	1.67	1.89	2.20	2.04	65.4%
Colombia	1.18	1.14	1.26	1.27	1.34	1.45	1.34	1.24	1.31	1.61	1.54	14.9%
Costa Rica	0.67	0.83	0.90	0.71	0.84	1.26	1.15	1.29	1.46	1.44	1.55	83.8%
Cuba	2.35	2.56	3.10	3.19	3.22	2.06	2.45	2.22	2.60	2.34	2.28	-29.2%
Curaçao [1]	90.15	60.33	50.15	24.58	14.10	13.23	26.77	27.17	19.12	29.69	23.28	65.1%
Dominican Republic	0.75	1.01	1.09	0.96	1.03	1.42	2.06	1.90	1.92	2.04	1.99	93.0%
Ecuador	0.56	0.85	1.31	1.29	1.30	1.46	1.44	1.74	2.19	2.31	2.06	58.2%
El Salvador	0.35	0.47	0.35	0.33	0.40	0.82	0.88	1.04	0.95	1.01	0.90	124.2%
Guatemala	0.39	0.47	0.58	0.39	0.35	0.56	0.74	0.81	0.70	0.93	0.93	168.2%
Haiti	0.08	0.08	0.11	0.13	0.13	0.12	0.16	0.21	0.21	0.30	0.30	127.3%
Honduras	0.40	0.42	0.46	0.39	0.44	0.63	0.69	0.98	0.92	1.07	1.02	131.7%
Jamaica	2.91	3.67	3.03	2.00	2.99	3.32	3.69	3.75	2.46	2.44	2.41	-19.3%
Nicaragua	0.60	0.66	0.56	0.49	0.44	0.55	0.71	0.75	0.75	0.83	0.82	84.9%
Panama	1.59	1.78	1.47	1.20	1.04	1.49	1.61	2.04	2.44	2.55	2.35	126.1%
Paraguay	0.23	0.25	0.42	0.39	0.46	0.73	0.62	0.60	0.77	0.88	1.12	145.4%
Peru	1.12	1.20	1.18	0.92	0.88	0.97	1.02	1.04	1.41	1.59	1.55	76.2%
Suriname	..	..	..	..	..	..	3.08	3.31	3.22	3.73	3.43	..
Trinidad and Tobago	5.62	4.53	5.87	5.68	6.47	6.51	7.71	13.24	16.45	15.65	13.15	103.4%
Uruguay	1.81	1.89	1.83	1.00	1.16	1.36	1.53	1.55	1.77	1.86	1.70	46.8%
Venezuela	3.85	4.20	5.43	4.86	4.71	4.78	4.75	5.14	5.91	4.51	3.56	-24.5%
Other non-OECD Americas	1.64	2.05	1.83	1.58	2.04	2.10	2.29	2.34	2.65	2.39	1.60	-21.8%
Non-OECD Americas	**1.46**	**1.61**	**1.79**	**1.54**	**1.60**	**1.73**	**1.92**	**1.97**	**2.21**	**2.33**	**2.14**	**34.0%**
Bahrain	13.15	19.59	20.11	21.72	21.53	23.86	23.82	23.13	20.59	21.92	19.97	-7.3%
Islamic Republic of Iran	1.33	2.08	2.29	3.06	3.05	4.04	4.72	5.93	6.69	6.97	6.99	129.4%
Iraq	1.01	1.33	1.92	2.44	3.00	4.71	2.99	2.71	3.37	3.62	3.66	21.8%
Jordan	0.75	1.04	1.82	2.58	2.58	2.67	2.79	3.14	2.62	2.60	2.63	2.2%
Kuwait	17.53	14.74	19.27	21.13	13.24	20.08	22.58	28.44	25.69	23.28	21.62	63.3%
Lebanon	1.95	2.22	2.55	2.47	2.04	4.23	4.34	3.64	4.22	4.21	4.43	117.1%
Oman	0.34	0.82	1.95	3.76	5.61	6.67	9.00	10.03	13.93	15.15	14.13	151.9%
Qatar	18.83	30.05	31.17	28.80	26.12	32.81	35.91	38.40	31.18	31.28	30.36	16.2%
Saudi Arabia	2.08	3.03	10.21	8.93	9.26	10.23	11.30	12.47	15.28	16.84	16.16	74.6%
Syrian Arab Republic	0.83	1.10	1.38	1.84	2.19	2.17	2.26	2.92	2.73	1.27	1.26	-42.4%
United Arab Emirates	8.83	8.88	18.45	25.62	27.90	28.44	25.31	24.27	18.69	20.38	20.91	-25.1%
Yemen	0.19	0.26	0.43	0.49	0.52	0.62	0.75	0.92	0.95	0.43	0.32	-39.5%
Middle East	**1.49**	**2.10**	**3.43**	**4.06**	**4.20**	**5.16**	**5.44**	**6.35**	**7.24**	**7.64**	**7.53**	**79.2%**

1. Please refer to the chapter Geographical coverage.

Per capita emissions by sector in 2017 [1]

kilogrammes CO_2 / capita

	Total CO_2 emissions from fuel combustion	Electricity and heat production	Other energy ind. own use [2]	Manufacturing industries and construction	Transport	*of which: road*	Residential	*Commercial and public services*
World [3]	**4 368**	**1 809**	**211**	**828**	**1 069**	**792**	**257**	**112**
Annex I Parties	*9 275*	*3 635*	*522*	*1 156*	*2 671*	*2 290*	*757*	*394*
Annex II Parties	*10 069*	*3 704*	*615*	*1 151*	*3 208*	*2 792*	*759*	*486*
North America	*14 645*	*5 290*	*998*	*1 370*	*5 229*	*4 378*	*895*	*690*
Europe	*6 193*	*1 931*	*345*	*797*	*1 904*	*1 799*	*760*	*343*
Asia Oceania	*9 922*	*4 813*	*457*	*1 601*	*2 040*	*1 796*	*440*	*400*
Annex I EIT	*8 028*	*3 925*	*313*	*1 254*	*1 436*	*1 081*	*838*	*133*
Non-Annex I Parties	*3 112*	*1 419*	*144*	*758*	*520*	*472*	*150*	*51*
Annex B Kyoto Parties	*6 655*	*2 445*	*423*	*890*	*1 774*	*1 660*	*704*	*289*
Non-OECD Total	**3 210**	**1 476**	**141**	**780**	**521**	**458**	**172**	**51**
OECD Total	**8 938**	**3 409**	**544**	**1 059**	**2 716**	**2 397**	**666**	**403**
Canada	14 992	2 595	3 283	1 836	4 694	3 740	1 047	1 054
Chile	4 648	1 865	102	777	1 478	1 323	214	134
Mexico	3 615	1 246	332	554	1 227	1 193	137	38
United States	14 606	5 592	742	1 317	5 289	4 449	878	649
OECD Americas	**11 580**	**4 175**	**802**	**1 148**	**4 112**	**3 487**	**685**	**510**
Australia	15 632	7 784	1 418	1 550	3 970	3 331	378	226
Israel [4]	7 322	4 317	191	474	2 052	2 043	40	39
Japan	8 938	4 380	273	1 621	1 619	1 453	464	442
Korea	11 663	6 260	838	1 396	2 011	1 903	681	328
New Zealand	6 673	1 059	385	1 341	3 242	2 950	123	210
OECD Asia Oceania	**10 232**	**5 137**	**537**	**1 507**	**2 033**	**1 831**	**481**	**369**
Austria	7 376	1 658	672	1 283	2 772	2 674	764	142
Belgium	7 963	1 404	546	1 633	2 221	2 168	1 395	605
Czech Republic	9 602	5 086	398	1 153	1 751	1 707	785	298
Denmark	5 421	1 612	368	639	2 087	1 914	353	109
Estonia	12 137	9 202	46	474	1 844	1 788	125	200
Finland	7 734	2 995	612	1 349	2 053	1 935	213	163
France	4 565	683	201	613	1 876	1 811	640	389
Germany	8 696	3 676	289	1 136	1 978	1 921	1 059	555
Greece	5 878	2 749	415	562	1 570	1 335	436	66
Hungary	4 678	1 226	168	735	1 314	1 285	794	293
Iceland	6 336	20	-	1 669	2 925	2 768	31	2
Ireland	7 439	2 417	82	843	2 419	2 345	1 159	399
Italy	5 310	1 802	200	527	1 612	1 518	768	280
Latvia	3 441	810	-	319	1 669	1 575	238	188
Lithuania	3 831	377	547	409	2 030	1 936	266	118
Luxembourg	14 458	447	-	1 585	9 531	9 451	1 833	960
Netherlands	9 081	3 381	576	1 513	1 795	1 734	950	459
Norway	6 587	358	2 311	1 198	2 309	1 641	41	178
Poland	7 960	3 945	202	800	1 602	1 570	941	193
Portugal	4 928	2 126	253	551	1 619	1 540	167	97
Slovak Republic	5 924	1 249	933	1 425	1 434	1 352	527	310
Slovenia	6 491	2 391	-	848	2 638	2 623	330	154
Spain	5 446	1 694	426	649	1 970	1 756	362	205
Sweden	3 743	705	270	645	1 963	1 896	15	117
Switzerland	4 394	324	43	627	1 863	1 827	985	479
Turkey	4 714	1 743	231	857	1 032	959	433	302
United Kingdom	5 432	1 333	393	560	1 845	1 736	955	280
OECD Europe [4]	***6 133***	***2 086***	***321***	***813***	***1 747***	***1 655***	***718***	***323***
IEA/Accession/Association	*5 295*	*2 300*	*253*	*1 073*	*1 110*	*972*	*302*	*154*
European Union - 28	*6 263*	*2 176*	*311*	*791*	*1 812*	*1 724*	*739*	*311*
G20	*5 565*	*2 450*	*263*	*1 118*	*1 146*	*991*	*331*	*153*
Africa	*945*	*370*	*76*	*117*	*279*	*268*	*66*	*13*
Americas	*6 896*	*2 331*	*495*	*779*	*2 497*	*2 155*	*406*	*269*
Asia	*4 039*	*1 927*	*161*	*1 021*	*572*	*510*	*193*	*81*
Europe	*6 888*	*2 764*	*324*	*973*	*1 685*	*1 482*	*774*	*251*
Oceania	*14 726.0*	*6 902.0*	*1 294.0*	*1 641.0*	*3 996.0*	*3 383.0*	*350.0*	*225.0*

1. This table shows per capita emissions for the same sectors which are present throughout this publication. In particular, the emissions from electricity and heat production are shown separately and not reallocated. 2. Includes emissions from own use in oil refining, the manufacture of solid fuels, coal mining, oil and gas extraction and other energy-producing industries. 3. World includes international bunkers in the transport sector. 4. Please refer to the chapter *Geographical Coverage*.

Per capita emissions by sector in 2017

kilogrammes CO_2 / capita

	Total CO_2 emissions from fuel combustion	Electricity and heat production	Other energy ind. own use	Manufacturing industries and construction	Transport	*of which: road*	Residential	*Commercial and public services*
Non-OECD Total	**3 210**	**1 476**	**141**	**780**	**521**	**458**	**172**	**51**
Albania	1 511	-	80	372	801	761	96	60
Armenia	1 763	423	6	154	571	571	413	114
Azerbaijan	3 124	1 247	201	177	771	652	570	53
Belarus	5 687	2 949	308	488	1 186	1 008	476	40
Bosnia and Herzegovina	6 367	4 178	187	622	1 074	1 074	189	104
Bulgaria	6 051	3 725	177	614	1 305	1 233	121	49
Croatia	3 925	761	326	571	1 583	1 528	374	152
Cyprus [1]	7 448	3 768	-	710	2 321	2 321	415	105
Georgia	2 346	292	-	456	989	977	478	112
Gibraltar	20 703	6 105	-	-	14 598	14 598	-	-
Kazakhstan	14 179	5 657	2 810	3 502	804	754	890	404
Kosovo	4 461	3 086	-	416	689	683	41	201
Kyrgyzstan	1 437	251	1	138	300	295	676	62
Malta	3 261	1 525	-	114	1 303	1 211	93	191
Republic of Moldova	2 120	848	-	270	580	565	257	77
Montenegro	3 547	2 004	-	308	1 142	1 142	20	57
Republic of North Macedonia	3 572	1 987	2	416	1 022	1 020	19	102
Romania	3 614	1 398	173	603	899	868	335	111
Russian Federation	10 636	5 353	430	1 814	1 703	1 032	1 109	125
Serbia	6 569	4 560	93	629	888	880	216	118
Tajikistan	655	109	-	172	132	132	122	-
Turkmenistan	11 983	3 602	901	408	2 043	1 367	81	2 926
Ukraine	3 821	1 853	71	701	568	473	491	50
Uzbekistan	2 506	1 266	63	281	157	93	548	108
Non-OECD Europe and Eurasia [1]	**7 242**	**3 489**	**399**	**1 201**	**1 132**	**801**	**728**	**163**
Algeria	3 158	913	248	291	1 083	1 025	527	16
Angola	605	180	35	47	226	220	53	65
Benin	605	18	-	38	536	536	8	1
Botswana	3 367	1 869	-	323	1 110	1 092	15	29
Cameroon	256	92	2	10	128	128	20	-
Congo	541	254	-	22	251	229	11	4
Côte d'Ivoire	421	156	5	58	148	132	22	15
Dem. Rep. of the Congo	27	-	-	1	26	22	-	-
Egypt	2 145	852	155	333	599	571	174	-
Eritrea	125	72	-	4	38	38	10	2
Ethiopia	124	-	-	45	62	60	5	2
Gabon	1 663	474	22	585	407	402	89	62
Ghana	478	121	-	70	246	227	23	3
Kenya	327	38	2	76	175	174	30	-
Libya	6 514	3 285	88	243	2 705	2 697	194	-
Mauritius	3 306	2 005	-	257	889	843	113	36
Morocco	1 627	630	-	227	494	491	187	12
Mozambique	257	40	3	25	140	133	3	4
Namibia	1 593	36	-	130	820	782	3	3
Niger	95	24	-	10	58	57	2	1
Nigeria	450	71	62	36	269	264	9	-
Senegal	524	193	4	98	200	191	26	1
South Africa	7 435	3 976	952	810	947	900	405	193
South Sudan	123	33	17	4	61	58	1	1
Sudan	463	122	4	36	275	269	9	6
United Rep. of Tanzania	177	42	-	32	94	90	7	-
Togo	267	3	-	25	210	210	30	-
Tunisia	2 268	764	41	449	660	609	182	60
Zambia	351	109	2	99	67	67	1	6
Zimbabwe	588	322	6	69	135	126	16	-
Other Africa	163	26	5	43	72	70	8	1
Africa	**945**	**370**	**76**	**117**	**279**	**268**	**66**	**13**

1. Please refer to the chapter *Geographical Coverage* .

Per capita emissions by sector in 2017

kilogrammes CO_2 / capita

	Total CO_2 emissions from fuel combustion	Electricity and heat production	Other energy ind. own use	Manufacturing industries and construction	Transport	*of which: road*	Residential	*Commercial and public services*
Bangladesh	475	224	1	105	66	51	55	3
Brunei Darussalam	15 641	6 165	4 991	989	3 102	3 102	214	-
Cambodia	672	259	-	41	330	279	11	24
DPR of Korea	768	128	2	447	55	55	5	-
India	1 614	822	24	420	218	198	63	19
Indonesia	1 880	742	88	390	537	472	83	11
Malaysia	6 674	3 381	76	1 026	1 924	1 863	94	76
Mongolia	6 267	4 149	3	575	685	457	487	-
Myanmar	570	151	22	154	111	81	1	27
Nepal	345	-	-	109	163	163	26	19
Pakistan	931	277	7	267	273	267	84	19
Philippines	1 206	602	10	170	328	285	29	59
Singapore	8 447	3 687	1 019	2 398	1 237	1 195	36	70
Sri Lanka	1 077	463	2	33	512	495	36	9
Chinese Taipei	11 381	6 997	670	1 738	1 580	1 541	172	164
Thailand	3 538	1 277	231	723	1 091	1 037	66	31
Viet Nam	2 002	749	-	673	400	375	107	58
Other non-OECD Asia	887	422	24	158	227	191	10	1
Non OECD Asia (excl. China)	**1 671**	**787**	**41**	**396**	**318**	**292**	**65**	**23**
People's Rep. of China	6 678	3 312	226	1 981	635	518	277	107
Hong Kong, China	5 957	3 637	-	975	1 129	1 126	106	111
China	**6 674**	**3 313**	**224**	**1 976**	**638**	**521**	**276**	**107**
Argentina	4 142	1 152	423	664	1 052	948	504	78
Bolivia	1 981	390	97	190	776	746	127	12
Brazil	2 043	328	144	431	971	888	88	10
Colombia	1 535	216	128	334	639	637	75	19
Costa Rica	1 546	6	6	156	1 180	1 176	38	106
Cuba	2 283	911	40	923	133	131	54	2
Curaçao [1]	23 280	2 339	10 762	2 476	6 789	6 789	914	-
Dominican Republic	1 990	921	10	297	601	478	121	22
Ecuador	2 063	315	93	151	1 138	1 064	143	74
El Salvador	899	139	-	174	527	527	55	3
Guatemala	928	235	9	138	492	490	54	1
Haiti	300	88	-	56	131	131	24	-
Honduras	1 017	318	-	177	477	474	20	17
Jamaica	2 412	889	-	697	695	694	23	96
Nicaragua	821	226	4	105	377	335	26	76
Panama	2 345	503	-	476	1 164	1 153	149	43
Paraguay	1 124	-	-	27	1 065	1 062	32	-
Peru	1 545	365	95	241	728	699	80	26
Suriname	3 425	1 422	32	121	1 152	723	77	45
Trinidad and Tobago	13 154	3 765	5 078	1 809	2 225	1 998	261	16
Uruguay	1 699	54	43	233	1 086	1 080	119	24
Venezuela	3 556	963	656	731	1 053	1 052	115	39
Other non-OECD Americas	1 596	593	-	105	632	575	95	61
Non-OECD Americas	**2 141**	**458**	**184**	**405**	**857**	**802**	**122**	**25**
Bahrain	19 969	13 658	2 328	1 303	2 502	2 444	178	-
Islamic Republic of Iran	6 987	2 019	464	1 192	1 626	1 614	1 325	210
Iraq	3 655	2 071	340	246	751	751	246	-
Jordan	2 633	1 065	58	249	940	937	199	50
Kuwait	21 615	10 471	3 289	4 451	3 189	3 189	215	-
Lebanon	4 428	2 577	-	190	1 533	1 533	115	-
Oman	14 128	3 555	1 827	3 560	2 633	2 633	126	1 843
Qatar	30 359	8 396	11 690	5 020	5 097	5 097	155	-
Saudi Arabia	16 157	7 486	884	3 864	3 774	3 679	149	-
Syrian Arab Republic	1 261	647	32	129	279	269	103	22
United Arab Emirates	20 905	9 422	276	6 769	4 332	4 216	107	-
Yemen	316	119	5	37	92	92	51	7
Middle East	**7 532**	**3 046**	**591**	**1 495**	**1 664**	**1 641**	**553**	**113**

1. Please refer to the chapter *Geographical Coverage* .

Share of electricity output from non fossil sources [1]

[%]

	1990	1995	2000	2005	2010	2011	2012	2013	2015	2016	2017	% change 90-17
World	**36.5**	**37.6**	**35.3**	**33.3**	**32.5**	**31.7**	**31.8**	**32.4**	**33.5**	**34.3**	**34.9**	**-4.4%**
Annex I Parties	*37.8*	*40.6*	*39.1*	*38.3*	*39.5*	*39.1*	*39.0*	*40.5*	*42.1*	*42.9*	*44.0*	*16.4%*
Annex II Parties	*41.0*	*42.4*	*40.2*	*39.1*	*40.7*	*40.4*	*40.1*	*41.7*	*43.3*	*44.2*	*45.6*	*11.2%*
North America	*36.8*	*37.3*	*33.9*	*33.6*	*35.2*	*37.2*	*37.1*	*38.3*	*38.9*	*40.6*	*42.6*	*15.8%*
Europe	*50.8*	*52.7*	*52.2*	*50.3*	*53.4*	*54.4*	*56.7*	*59.4*	*61.8*	*61.4*	*61.2*	*20.5%*
Asia Oceania	*34.4*	*38.2*	*37.2*	*34.4*	*32.5*	*21.2*	*14.7*	*15.5*	*18.6*	*19.4*	*21.8*	*-36.6%*
Annex I EIT	*25.7*	*31.5*	*33.8*	*35.1*	*34.9*	*34.0*	*34.6*	*36.0*	*37.4*	*37.5*	*38.4*	*49.4%*
Non-Annex I Parties	*32.5*	*30.3*	*27.5*	*25.7*	*24.5*	*23.9*	*24.7*	*24.8*	*26.0*	*27.2*	*27.7*	*-14.8%*
Annex B Kyoto Parties	*41.7*	*45.6*	*46.0*	*44.9*	*47.1*	*47.5*	*49.5*	*51.8*	*54.1*	*53.7*	*53.9*	*29.3%*
Non-OECD Total	**29.8**	**30.7**	**28.9**	**27.1**	**25.9**	**25.2**	**26.0**	**26.2**	**27.2**	**28.4**	**28.9**	**-3.0%**
OECD Total	**40.2**	**41.4**	**38.9**	**37.9**	**38.8**	**38.4**	**38.2**	**39.5**	**41.2**	**42.0**	**42.9**	**6.7%**
Canada	77.5	78.5	72.6	74.9	76.9	77.8	79.0	80.0	78.9	80.2	81.0	4.5%
Chile	53.8	72.4	48.5	53.9	40.4	39.6	36.4	35.9	43.6	43.3	43.9	-18.4%
Mexico	27.2	29.2	23.8	19.5	18.7	18.2	16.6	17.3	19.0	18.6	19.4	-28.7%
United States	30.6	30.9	28.0	27.6	29.5	31.3	30.9	31.9	32.7	34.5	36.6	19.6%
OECD Americas	**36.6**	**37.3**	**33.5**	**33.1**	**34.4**	**36.2**	**35.9**	**37.1**	**37.8**	**39.3**	**41.2**	**12.6%**
Australia	9.7	9.6	8.4	8.8	8.6	10.4	10.5	13.1	13.3	14.5	15.6	60.8%
Israel [2]	-	0.1	0.1	0.1	0.3	0.6	0.8	0.9	1.9	2.5	2.9	x
Japan	37.2	41.6	41.7	38.5	36.2	21.5	13.3	13.7	17.3	17.9	20.9	-43.8%
Korea	56.2	38.7	39.2	38.9	31.2	31.3	29.7	27.6	32.2	32.1	30.0	-46.6%
New Zealand	80.2	84.0	71.7	64.5	73.4	76.3	71.9	74.4	80.2	84.4	81.3	1.4%
OECD Asia Oceania	**35.8**	**37.4**	**36.6**	**34.4**	**31.3**	**23.2**	**18.3**	**18.3**	**21.8**	**22.4**	**23.5**	**-34.4%**
Austria	66.2	70.5	72.6	63.4	66.2	65.6	74.5	78.1	76.7	78.0	75.4	13.9%
Belgium	61.6	57.2	59.4	58.3	58.3	63.7	62.5	66.6	59.7	68.9	68.5	11.2%
Czech Republic	22.1	24.2	21.8	34.0	39.8	41.0	44.4	46.7	44.0	40.9	44.3	100.5%
Denmark	3.2	5.1	15.6	27.1	32.0	40.3	48.3	46.0	65.5	60.4	70.6	+
Estonia	-	0.1	0.2	1.1	8.1	9.1	12.3	9.2	14.4	12.4	13.8	x
Finland	64.8	60.5	65.8	66.6	58.6	64.8	73.7	69.5	78.7	78.4	80.5	24.2%
France	88.7	92.2	90.5	88.9	89.8	89.5	90.0	90.8	92.2	89.9	88.3	-0.5%
Germany	31.3	33.6	35.8	37.2	39.5	38.5	39.3	39.7	43.8	42.7	45.4	45.0%
Greece	5.1	8.6	7.8	10.8	18.3	13.8	16.7	25.1	28.7	27.4	25.0	390.2%
Hungary	49.0	41.9	41.0	43.9	50.3	51.1	53.2	60.0	63.0	60.8	59.8	22.0%
Iceland	99.9	99.8	99.9	99.9	100.0	100.0	100.0	100.0	100.0	100.0	100.0	0.1%
Ireland	4.9	4.1	5.0	7.3	13.2	20.0	19.4	22.0	28.0	24.9	28.9	489.8%
Italy	16.4	17.6	19.1	16.7	26.0	27.9	31.3	39.2	38.9	37.8	35.6	117.1%
Latvia	67.6	73.8	68.3	69.6	54.9	50.5	66.6	56.9	50.2	54.2	72.5	7.2%
Lithuania	61.6	90.4	79.6	76.3	23.2	32.2	31.1	41.8	45.6	64.3	77.3	25.5%
Luxembourg	13.2	22.1	40.7	6.3	8.3	9.3	11.2	20.0	32.3	58.3	66.8	406.1%
Netherlands	6.2	7.0	8.0	11.7	12.8	14.6	16.0	14.9	16.2	16.4	17.9	188.7%
Norway	99.9	99.8	99.8	99.6	95.8	96.6	98.0	97.9	97.9	98.0	98.0	-1.9%
Poland	1.1	1.4	1.6	2.7	7.0	8.1	10.5	10.5	13.9	13.8	14.2	+
Portugal	34.7	28.3	29.7	17.9	52.8	46.5	42.5	58.3	47.5	54.6	39.1	12.7%
Slovak Republic	54.6	61.7	68.5	71.5	74.8	72.4	74.3	77.7	79.9	80.3	79.3	45.2%
Slovenia	60.8	62.2	63.6	62.6	64.0	63.4	63.4	65.8	67.5	66.4	66.9	10.0%
Spain	53.1	48.2	43.8	36.2	53.6	49.9	50.6	59.7	55.6	60.2	53.6	0.9%
Sweden	97.7	94.7	96.7	97.0	94.3	96.2	97.5	97.5	98.1	97.7	97.9	0.2%
Switzerland	98.0	97.4	97.0	96.2	96.6	96.6	96.8	97.0	97.1	96.5	96.7	-1.3%
Turkey	40.4	41.6	25.0	24.6	26.4	25.4	27.3	28.9	32.1	33.1	29.6	-26.7%
United Kingdom	22.5	28.8	25.4	24.9	23.3	28.5	30.9	34.8	45.7	46.0	50.6	124.9%
OECD Europe	**47.3**	**49.4**	**48.3**	**46.8**	**49.5**	**50.1**	**52.4**	**54.8**	**57.0**	**56.5**	**56.1**	**18.6%**
IEA/Accession/Association	*38.8*	*38.8*	*36.0*	*33.9*	*33.5*	*32.5*	*32.8*	*33.4*	*35.1*	*36.1*	*36.6*	*-5.7%*
European Union - 28	*42.9*	*45.7*	*45.4*	*44.6*	*48.0*	*48.5*	*50.6*	*53.6*	*56.0*	*55.6*	*55.4*	*29.1%*
G20	*36.1*	*37.1*	*34.8*	*33.0*	*32.7*	*31.7*	*31.8*	*32.5*	*34.1*	*35.1*	*35.6*	*-1.4%*
Africa	*20.7*	*20.0*	*20.3*	*18.5*	*19.1*	*19.0*	*18.2*	*19.2*	*19.4*	*19.4*	*19.9*	*-3.9%*
Americas	*41.0*	*42.1*	*38.9*	*38.7*	*40.3*	*42.3*	*41.7*	*42.4*	*42.5*	*44.3*	*46.3*	*12.9%*
Asia	*28.3*	*26.7*	*23.8*	*22.1*	*21.1*	*18.8*	*19.3*	*19.8*	*22.1*	*23.3*	*23.9*	*-15.5%*
Europe	*39.2*	*44.7*	*45.6*	*44.8*	*46.6*	*46.5*	*48.2*	*50.5*	*52.5*	*52.2*	*52.4*	*33.7%*
Oceania	*22.20*	*22.80*	*18.70*	*17.80*	*18.60*	*20.40*	*20.00*	*22.40*	*23.30*	*24.60*	*25.10*	*13.1%*

1.This indicator was calculated as the ratio between electricity output from non fossil sources and the total electricity output. Both main activity producers and autoproducers have been included in the calculation. 2. Please refer to the chapter Geographical coverage.

Share of electricity output from non fossil sources

[%]

	1990	1995	2000	2005	2010	2011	2012	2013	2015	2016	2017	% change 90-17
Non-OECD Total	**29.8**	**30.7**	**28.9**	**27.1**	**25.9**	**25.2**	**26.0**	**26.2**	**27.2**	**28.4**	**28.9**	**-3.0%**
Albania	86.4	94.0	96.1	98.7	100.0	98.6	100.0	100.0	100.0	100.0	100.0	15.7%
Armenia	15.0	40.0	54.8	71.1	77.8	67.8	57.7	58.8	64.1	64.7	63.0	320.0%
Azerbaijan	7.2	9.1	8.2	13.2	18.4	13.2	7.9	6.7	7.0	8.4	7.8	8.3%
Belarus	0.1	0.1	0.1	0.1	0.4	0.4	0.6	0.8	0.8	1.2	2.2	+
Bosnia and Herzegovina	20.9	82.8	48.8	47.6	46.9	28.7	29.9	41.5	35.5	31.9	24.4	16.7%
Bulgaria	39.3	46.8	51.3	52.3	45.7	40.5	45.4	49.0	49.6	51.3	48.3	22.9%
Croatia	44.3	61.4	57.3	54.1	62.8	47.0	49.7	66.5	66.8	66.3	60.4	36.3%
Cyprus [1]	-	-	-	-	1.4	3.6	5.4	7.6	8.8	8.7	8.7	x
Georgia	55.2	63.8	78.9	85.8	92.5	77.4	74.5	82.2	78.0	80.7	80.6	46.0%
Gibraltar	-	-	-	-	-	-	-	-	-	-	-	-
Kazakhstan	8.4	12.5	14.7	11.6	9.7	9.1	8.2	7.5	8.9	11.2	11.3	34.5%
Kosovo	100.0	100.0	1.8	2.5	3.0	1.8	1.6	2.2	2.3	4.1	3.0	-97.0%
Kyrgyzstan	63.5	77.8	85.9	85.9	91.8	93.3	93.5	93.5	85.2	86.7	91.6	44.3%
Malta	-	-	-	-	-	0.5	1.1	1.6	7.8	15.7	10.0	x
Republic of Moldova	1.6	4.2	6.7	6.3	6.7	6.1	4.6	7.0	4.7	4.3	6.4	300.0%
Montenegro	100.0	100.0	100.0	65.2	68.4	45.3	51.9	63.5	49.7	58.7	45.1	-54.9%
Republic of North Macedonia	8.5	13.1	17.2	21.5	33.5	21.2	16.7	26.1	35.9	36.7	23.1	171.8%
Romania	17.7	28.5	39.7	43.4	52.7	45.3	44.9	54.3	57.4	59.2	56.0	216.4%
Russian Federation	26.3	32.0	33.6	33.9	32.6	32.2	32.2	33.5	34.2	35.1	35.7	35.7%
Serbia	19.2	30.8	30.7	31.8	31.8	22.8	25.7	26.1	26.9	28.1	25.5	32.8%
Tajikistan	90.9	98.5	98.4	99.3	99.8	99.8	99.6	99.7	99.1	96.5	94.6	4.1%
Turkmenistan	4.8	-	-	-	-	-	-	-	-	-	-	-100.0%
Ukraine	29.0	41.5	51.7	54.4	54.3	52.0	51.1	50.8	58.7	55.4	62.5	115.5%
Uzbekistan	11.8	13.0	7.5	18.7	15.8	10.8	12.6	10.4	12.3	12.4	13.6	15.3%
Former Soviet Union	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	-
Former Yugoslavia	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	-
Non-OECD Europe and Eurasia	**25.3**	**32.5**	**35.4**	**36.3**	**35.4**	**33.5**	**33.4**	**34.6**	**35.5**	**36.1**	**36.6**	**44.7%**
Algeria	0.8	1.0	0.2	1.6	0.4	1.0	1.1	0.6	0.3	0.5	0.8	x
Angola	86.2	93.7	63.1	79.6	68.0	70.9	60.8	58.0	53.2	56.1	71.4	-17.2%
Benin	-	-	2.4	0.9	0.9	-	-	-	1.8	3.6	2.0	x
Botswana	-	-	-	-	-	-	-	0.2	0.1	0.1	0.1	x
Cameroon	98.5	98.9	98.9	94.2	73.2	75.3	75.4	68.2	55.0	52.9	51.3	-47.9%
Congo	99.4	99.4	99.7	82.0	54.7	64.7	61.0	62.4	50.8	48.7	44.2	-55.5%
Côte d'Ivoire	66.7	60.5	36.7	27.2	28.3	30.1	26.4	21.9	16.7	21.4	16.6	-75.1%
Dem. Rep. of the Congo	99.6	99.7	99.9	99.9	98.9	98.9	99.9	99.9	99.8	99.8	99.9	0.3%
Egypt	23.5	21.9	17.7	12.1	10.0	9.3	8.9	8.8	8.5	8.4	8.6	-63.4%
Eritrea	100.0	-	0.5	0.3	0.6	0.6	0.6	0.5	0.5	0.5	0.5	-99.5%
Ethiopia	88.4	93.5	98.6	99.6	99.4	99.4	99.8	99.9	100.0	100.0	100.0	13.1%
Gabon	72.4	70.2	61.6	52.1	47.3	41.6	42.5	45.1	43.7	41.4	39.7	-45.2%
Ghana	100.0	99.7	91.5	82.9	68.8	67.5	67.1	64.0	50.9	56.3	40.1	-59.9%
Kenya	92.9	89.8	47.1	71.7	69.1	67.0	74.9	69.4	87.6	79.4	79.7	-14.2%
Libya	-	-	-	-	-	-	-	-	-	-	-	-
Mauritius	31.2	26.8	29.6	25.0	24.3	20.2	20.7	20.6	22.7	21.8	20.9	-33.0%
Morocco	12.7	5.1	6.1	6.1	17.4	10.8	8.6	19.4	18.5	18.8	18.1	42.5%
Mozambique	62.6	92.9	99.5	99.8	99.9	99.9	99.9	97.7	76.7	71.6	82.8	32.3%
Namibia	100.0	96.8	99.2	99.8	95.6	98.2	97.8	95.6	97.8	95.6	96.0	-4.0%
Niger	100.0	100.0	-	0.9	1.0	-	-	0.9	0.8	1.0	1.0	-99.0%
Nigeria	32.6	34.7	38.2	33.0	24.4	21.8	19.8	18.5	17.7	17.6	17.2	-47.2%
Senegal	4.7	4.1	10.0	18.2	13.7	14.1	13.4	12.4	11.1	12.5	12.3	161.7%
South Africa	5.7	6.4	6.9	5.3	5.7	6.1	5.3	6.2	7.4	9.1	9.5	66.7%
South Sudan	100.0	100.0	100.0	100.0	100.0	100.0	0.4	0.4	0.3	0.3	0.6	-99.4%
Sudan	63.2	52.1	46.0	33.0	82.7	76.5	70.1	80.9	64.5	55.8	60.1	-4.9%
United Rep. of Tanzania	95.1	80.0	86.4	50.1	51.7	39.6	31.9	29.5	33.1	30.5	30.0	-68.5%
Togo	60.1	82.5	57.1	40.2	54.2	86.7	84.7	81.7	75.3	90.1	90.5	50.6%
Tunisia	0.8	0.5	0.8	1.5	4.1	2.1	2.9	3.7	4.0	4.3	4.0	400.0%
Zambia	99.2	99.3	99.4	99.4	99.9	99.9	99.9	99.9	97.0	94.3	86.0	-13.3%
Zimbabwe	46.7	29.3	45.7	52.4	68.0	57.9	60.4	54.0	52.7	44.2	54.6	16.9%
Other Africa	54.5	54.0	54.5	51.0	45.3	52.5	56.9	60.5	59.4	57.5	57.4	5.3%
Africa	**20.7**	**20.0**	**20.3**	**18.5**	**19.1**	**19.0**	**18.2**	**19.2**	**19.4**	**19.4**	**19.9**	**-3.9%**

1. Please refer to the chapter Geographical coverage.

Share of electricity output from non fossil sources

[%]

	1990	1995	2000	2005	2010	2011	2012	2013	2015	2016	2017	% change 90-17
Bangladesh	11.4	3.4	4.9	2.9	1.9	2.1	1.7	2.0	1.3	1.7	1.7	-85.1%
Brunei Darussalam	-	-	-	-	-	0.1	0.1	-	-	-	-	-
Cambodia	100.0	-	0.2	6.1	5.5	7.1	37.7	57.9	46.4	47.6	39.9	-60.1%
DPR of Korea	56.3	61.7	52.6	57.3	61.9	68.7	70.2	75.8	72.8	75.6	78.5	39.4%
India	26.6	19.1	16.6	19.1	18.9	20.3	18.8	20.3	18.4	19.3	19.7	-25.9%
Indonesia	20.9	16.5	16.0	13.6	15.9	12.0	11.2	12.3	10.7	12.6	12.5	-40.2%
Malaysia	17.3	13.7	10.1	6.3	6.0	6.7	7.4	8.6	10.0	13.5	16.9	-2.3%
Mongolia	-	-	0.1	0.1	1.0	1.4	1.3	2.5	4.0	3.9	6.6	x
Myanmar	48.1	40.0	37.0	49.8	67.7	76.2	72.4	72.0	58.9	54.6	56.2	16.8%
Nepal	99.9	96.9	98.4	99.4	99.9	99.9	99.5	99.7	100.0	100.0	100.0	0.1%
Pakistan	45.7	41.6	28.2	35.6	37.3	35.5	35.8	35.9	36.6	33.9	31.7	-30.6%
Philippines	45.4	36.8	42.9	32.4	26.3	28.7	28.4	26.4	25.4	24.2	24.6	-45.8%
Singapore	0.5	1.1	0.8	1.3	1.3	1.3	1.4	1.5	1.8	1.9	1.9	280.0%
Sri Lanka	99.8	92.7	45.8	37.2	53.1	40.8	29.2	59.9	48.5	32.6	29.1	-70.8%
Chinese Taipei	44.4	31.1	24.3	20.4	20.0	19.8	20.0	20.4	17.8	16.3	12.5	-71.8%
Thailand	11.3	8.7	6.8	5.5	5.6	8.0	8.3	8.1	8.4	15.1	16.4	45.1%
Viet Nam	61.8	72.2	54.8	31.7	29.1	39.5	45.0	43.2	35.1	36.2	45.0	-27.2%
Other non-OECD Asia	54.8	54.2	59.6	53.0	64.5	78.0	79.5	80.3	71.1	63.7	61.6	12.4%
Non OECD Asia (excl. China)	**31.0**	**23.6**	**19.7**	**19.4**	**19.1**	**20.5**	**20.0**	**21.1**	**19.2**	**20.4**	**21.1**	**-31.9%**
People's Rep. of China	20.4	20.5	17.9	18.3	20.4	18.6	21.9	22.3	26.8	28.3	28.9	41.7%
Hong Kong, China	-	-	-	-	0.2	0.2	0.2	0.2	0.3	0.3	0.3	x
China	**19.5**	**19.9**	**17.5**	**18.0**	**20.2**	**18.4**	**21.8**	**22.2**	**26.7**	**28.2**	**28.8**	**47.7%**
Argentina	49.8	50.8	40.1	40.0	34.3	37.2	34.0	35.9	33.1	32.6	33.6	-32.5%
Bolivia	52.4	43.3	51.5	41.3	34.0	34.2	32.2	33.8	29.4	21.9	25.8	-50.8%
Brazil	95.5	95.1	91.3	89.8	87.6	90.2	85.4	79.5	76.6	83.2	81.9	-14.2%
Colombia	76.4	76.4	75.5	80.2	72.1	83.5	79.6	69.4	64.0	65.9	79.6	4.2%
Costa Rica	97.5	82.7	99.1	96.7	93.3	91.2	91.8	88.3	99.0	98.2	99.7	2.3%
Cuba	10.3	6.1	6.9	3.2	3.2	3.2	3.7	4.4	3.9	4.0	3.8	-63.1%
Curaçao [1]	-	0.8	0.7	5.7	4.8	4.8	22.0	22.9	26.5	25.9	38.6	x
Dominican Republic	10.1	11.8	7.7	14.8	10.2	10.2	11.6	12.5	7.5	10.7	15.1	49.5%
Ecuador	78.5	61.2	71.7	55.1	45.5	55.6	54.9	49.0	52.8	60.2	70.4	-10.3%
El Salvador	93.2	57.8	58.1	58.2	65.0	62.9	60.2	60.4	57.9	58.3	74.4	-20.2%
Guatemala	91.6	66.4	51.7	47.5	63.8	64.4	66.5	67.3	58.0	59.8	70.1	-23.5%
Haiti	79.4	51.1	51.7	47.7	30.2	17.6	20.1	13.4	8.0	6.5	12.1	-84.8%
Honduras	98.3	61.3	62.0	34.9	49.0	43.2	44.8	43.3	41.8	49.9	58.2	-40.8%
Jamaica	7.6	5.2	4.8	3.7	7.7	8.7	10.5	9.6	10.3	12.3	17.1	125.0%
Nicaragua	61.4	45.4	21.4	34.6	37.0	34.0	42.8	52.3	50.1	52.2	56.0	-8.8%
Panama	85.3	69.1	70.4	64.3	57.1	52.7	62.9	57.9	65.3	66.6	71.8	-15.8%
Paraguay	100.0	99.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	-
Peru	76.8	80.3	82.0	72.3	57.7	56.8	55.3	53.9	52.7	50.5	59.4	-22.7%
Suriname	100.0	100.0	88.4	52.7	70.2	60.6	63.3	60.0	60.1	60.0	60.1	-39.9%
Trinidad and Tobago	0.9	0.8	0.4	0.3	-	-	-	-	-	-	-	-100.0%
Uruguay	94.9	93.5	93.4	87.5	87.6	72.0	61.7	83.6	92.8	96.7	98.3	3.6%
Venezuela	62.3	70.1	73.7	73.3	67.5	70.9	67.4	67.9	61.1	58.4	60.7	-2.6%
Other non-OECD Americas	7.0	5.5	1.4	5.7	3.5	1.9	1.7	2.0	2.0	2.0	2.7	-61.4%
Non-OECD Americas	**75.9**	**75.9**	**73.2**	**71.7**	**69.6**	**72.0**	**68.6**	**66.0**	**62.9**	**66.1**	**68.7**	**-9.5%**
Bahrain	-	-	-	-	-	-	-	-	-	-	-	-
Islamic Republic of Iran	10.3	8.6	3.0	9.1	4.2	5.3	5.7	7.4	6.1	8.1	7.5	-27.2%
Iraq	10.8	1.9	1.9	19.7	9.7	6.3	9.5	8.1	3.7	4.2	1.7	-84.3%
Jordan	0.3	0.3	0.6	0.7	0.5	0.5	0.4	0.4	1.0	4.7	6.7	+
Kuwait	-	-	-	-	-	-	-	-	-	-	-	-
Lebanon	33.3	13.6	4.6	8.5	5.3	4.9	6.8	7.3	2.5	2.0	1.7	-94.9%
Oman	-	-	-	-	-	-	-	-	-	-	-	-
Qatar	-	-	-	-	-	-	-	-	-	-	-	-
Saudi Arabia	-	-	-	-	-	-	-	-	-	-	-	-
Syrian Arab Republic	23.5	15.1	12.8	12.4	5.6	7.8	9.2	11.9	2.3	5.1	4.1	-82.6%
United Arab Emirates	-	-	-	-	-	-	-	0.1	0.2	0.3	0.6	x
Yemen	-	-	-	-	-	-	-	-	1.8	10.6	13.8	x
Middle East	**5.3**	**3.5**	**1.9**	**4.6**	**2.2**	**2.4**	**2.6**	**3.1**	**2.0**	**2.8**	**2.5**	**-52.8%**

1. Please refer to the chapter Geographical coverage.

4. UNDERSTANDING THE IEA CO_2 EMISSIONS ESTIMATES

The importance of estimating emissions

The ultimate objective of the UNFCCC (the Convention) is the stabilisation of GHG concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. The Convention also calls for all Parties to commit themselves to the following objectives:

- to develop, update periodically, publish and make available to the Conference of the Parties (COP) their national inventories of anthropogenic emissions by sources and removals by sinks, of all greenhouse gases not controlled by the Montreal Protocol.
- to use comparable methodologies for inventories of GHG emissions and removals, to be agreed upon by the COP.

As a response to the objectives of the UNFCCC, the IEA Secretariat, together with the IPCC, the OECD and numerous international experts, has helped to develop and refine an internationally-agreed methodology for the calculation and reporting of national GHG emissions from fuel combustion. This methodology was published in 1995 in the *IPCC Guidelines for National Greenhouse Gas Inventories*. After the initial dissemination of the methodology, revisions were added to several chapters, and published as the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (*1996 GLs*). In April 2006, the IPCC approved the *2006 IPCC Guidelines for National Greenhouse Gas Inventories (2006 GLs)* at the 25th session of the IPCC in Mauritius. Until 2015, most Parties, as well as the IEA, still calculated their inventories using the *1996 GLs*. In December 2011, Parties adopted Decision 15/CP.17 to update their reporting tables so as to implement the *2006 GLs*. The new reporting tables have been mandatory since 15 April 2015.

The IEA estimates of CO_2 emissions from fuel combustion

Energy is at the core of the greenhouse gas estimation. It is estimated that for Annex I Parties energy accounts for 70%[1] of total GHG emissions, while for the world the share is over two thirds, although shares vary greatly by country. Within energy, CO_2 from fuel combustion accounts for the largest fraction, around 90% for Annex I countries, once again varying depending on the economic structure of the country.

Given its extensive work in global energy data collection and compilation, the IEA is able to produce comparable estimates of CO_2 emissions from fuel combustion across countries and regions, providing a reference database for countries with more and less advanced national systems.

The estimates of CO_2 emissions from fuel combustion presented in this publication are calculated using the IEA energy data[2] and the default methods and emission factors from the *2006 GLs*[3].

1. Based on data reported to the UNFCCC .
2. Published in *World Energy Statistics* and *World Energy Balances*, OECD/IEA, Paris, 2016.
3. See www.ipcc-nggip.iges.or.jp/public/2006gl/vol2.html.

Prior to the 2015 edition of this publication, the IEA used the methods and emission factors of the *Revised 1996 IPCC Guidelines,* in line with UNFCCC recommendations for the reporting under the Kyoto Protocol. The IEA implementation of the *2006 GLs* in this edition follows the decision of UNFCCC Parties to update their reporting tables and to implement the *2006 GLs* starting on 15 April 2015.

The implications of changes in methods and emissions factors on the IEA emissions estimates for this edition are discussed in the chapter *IEA estimates: Changes under the 2006 IPCC Guidelines*.

Data in this publication and its corresponding database may have been revised with respect to previous editions also because the IEA reviews its energy databases each year. In the light of new assessments, revisions may be made to the energy data time series for any individual country.

CO_2 emissions from fuel combustion: key concepts

The IEA uses the simplest (Tier 1) methodology to estimate CO_2 emissions from fuel combustion based on the *2006 GLs*. The computation follows the concept of conservation of carbon, from the fuel combusted into CO_2. While for the complete methodology the reader should refer to the full IPCC documents, a basic description follows.

Generally, the Tier 1 estimation of CO_2 emissions from fuel combustion for a given fuel can be summarised as follows:

CO_2 emissions from fuel combustion
CO_2 = Fuel consumption * Emission factor

where:

Fuel consumption = amount of fuel combusted;
Emission factor = default emission factor

Emissions are then summed across all fuels and all sectors of consumption to obtain national totals. A more detailed explanation of the step by step calculation is presented in the chapter *IEA estimates: Changes under the 2006 IPCC Guidelines*.

IEA estimates vs. UNFCCC submissions

Based on the IEA globally collected energy data, the IEA estimates of CO_2 emissions from fuel combustion are a global database obtained following harmonised definitions and comparable methodologies across countries. They do not represent an official source for national submissions, as national administrations should use the best available country-specific information to complete their emissions reporting.

The IEA CO_2 estimates can be compared with those reported by countries to the UNFCCC Secretariat to highlight possible problems in methods, input data or emission factors. Still, care should be used in interpreting the results of any comparison since the IEA estimates may differ from a country's official submission for many reasons.

For most Annex II countries, the two calculations are expected to be within 5-10%, depending on the coverage of the fuel combustion sector in the national inventory. For some EIT and non-Annex I countries, differences may be larger. If the underlying energy data are different, more work is needed on the collecting and reporting of energy statistics.

In case of systematic biases in the energy data or emission factors, emission trends will usually be more reliable than the absolute emission levels. By comparing trends in the IEA estimates with trends in emissions as reported to the UNFCCC, it should be possible to identify definition problems or methodological differences.

Some of the reasons for these differences are:

- **The IEA uses a Tier 1 method to compute emissions estimates.**

For the calculation of CO_2 emissions from fuel combustion, the IEA uses a Tier 1 method. Countries may be using a more sophisticated Tier 2 or Tier 3 method that takes into account more detailed country-specific information available (e.g. on different technologies or processes).

- **Energy activity data based on IEA energy balances may differ from those used for the UNFCCC calculations.**

Countries often have several "official" data sources such as a Ministry, a Central Bureau of Statistics, a nationalised electricity company, etc. Data can also be

collected from the energy suppliers, the energy consumers or customs statistics. The IEA Secretariat tries to collect the most accurate data, but does not necessarily have access to the complete data set that may be available to national experts calculating emission inventories for the UNFCCC. In addition to different sources, the methodology used by the national bodies providing the data to the IEA and to the UNFCCC may differ. For example, general surveys, specific surveys, questionnaires, estimations, combined methods and classifications of data used in national statistics and in their subsequent reclassification according to international standards may result in different series.

- **The IEA uses average net calorific values for oil products.**

To transform fuel consumption data from physical units to energy units, the IEA uses an average net calorific value (NCV) for each secondary oil product. These NCVs are region-specific and constant over time. Country-specific NCVs that can vary over time are used for NGL, refinery feedstocks and additives. Crude oil NCVs are further split into production, imports, exports and average. Different coal types have specific NCVs for production, imports, exports, inputs to main activity power plants and coal used in coke ovens, blast furnaces and industry, and can vary over time for each country.

Country experts may have more detailed data on calorific values available when calculating the energy content of the fuels. This in turn could produce different values than those of the IEA.

- **The IEA uses average carbon content values.**

The IEA uses the default carbon content values given in the *2006 GLs*. Country experts may have better information available, allowing them to use country-specific values.

- **The IEA cannot allocate emissions from autoproducers into the end-use sectors.**

The *2006 GLs* recommend that emissions from autoproduction should be included with emissions from other fuel use by end-consumers. At the same time, the emissions from the autoproduction of electricity and heat should be excluded from the energy transformation source category to avoid double counting. The IEA is not able to allocate the fuel use from autoproducers between industry and *other*. Therefore, this publication shows a category called "Unallocated autoproducers". However, this should not affect the total emissions for a country.

- **Military emissions may be treated differently.**

According to the *2006 GLs*, military emissions should be reported in Source/Sink Category 1 A 5, *Non-Specified*. Previously, the IEA questionnaires requested that warships be included in international marine bunkers and that the military use of aviation fuels be included in domestic air. All other military use should have been reported in *non-specified other*.

At the IEA/Eurostat/UNECE Energy Statistics Working Group meeting (Paris, November 2004), participants decided to harmonise the definitions used to collect energy data on the joint IEA/Eurostat/UNECE questionnaires with those used by the IPCC to report GHG inventories. As a result, starting in the 2006 edition of this publication, all military consumption should be reported in *non-specified other*. Sea-going versus coastal is no longer a criterion for splitting international and domestic navigation.

However, it is not clear whether countries are reporting on the new basis, and if they are, whether they will be able to revise their historical data. The IEA has found that in practice most countries consider information on military consumption as confidential and therefore either combine it with other information or do not include it at all.

- **The IEA estimates include all CO_2 emissions from fuel combustion. Countries may have included parts of these emissions in the IPCC category industrial processes and product use.**

Although emissions totals would not differ, the allocation to the various sub-totals of a national inventory could. National GHG inventories submitted to the UNFCCC divide emissions according to source categories. Two of these IPCC Source/Sink Categories are energy, and industrial processes and product use. Care must be taken not to double count emissions from fuel combustion that occur within certain industrial processes (e.g. iron and steel). The IEA estimates in this publication include all the CO_2 emissions from fuel combustion, while countries are asked to report some of them within the industrial processes and product use category under the *2006 GLs*. See a more detailed discussion in the chapter *IEA Estimates: Changes under the 2006 IPCC Guidelines*.

- **The units may be different.**

The *2006 GLs* ask that CO_2 emissions be reported in Gg of CO_2 (1 Gg = 1 kilotonne). A million tonnes of CO_2 is equal to 1 000 Gg of CO_2, so to compare the numbers in this publication with national inventories expressed in Gg, the IEA emissions must be multiplied by 1 000.

Inventory quality: identifying key categories

The *IPCC Guidelines* allow Parties to the UNFCCC to prepare and periodically update national inventories that are accurate, complete, comparable and transparent. Inventory quality is an important issue since countries are now implementing legally-binding commitments.

To reduce the overall inventory uncertainty in a cost-effective way, it is useful to identify those categories (key categories[4]) that have the greatest contribution to overall inventory uncertainty. By identifying key categories in the national inventory, inventory compilers can prioritise their efforts and improve their overall estimates. It is good practice for each country to identify its national key categories in a systematic and objective manner. Such a process will lead to improved inventory quality, as well as greater confidence in the estimates that are developed.

The *2006 GLs* identify a key category as one that is prioritised within the national inventory system because its estimate has a significant influence on a country's total inventory of greenhouse gases in terms of the absolute level, the trend, or the uncertainty in emissions and removals.

For a more complete description of the IPCC methodology for determining key categories, see Volume 1, Chapter 4 of the 2006 GLs.

The IEA has disaggregated the key category analysis to the same level of detail presented in the country tables of this publication. For each country, the nine largest categories are shown, split by the various fuel types: coal, oil, gas and other.

For the level assessment, the CO_2 emissions from fuel combustion as calculated by the IEA are supplemented, where possible, by the figures submitted by the Annex I Parties to the UNFCCC in their latest GHG inventory submissions for CO_2 (fugitive emissions), CH_4, N_2O, HFCs, PFCs and SF_6, not taking into account CO_2 emissions/removals from land use, land use change and forestry.[5]

For the non-Annex I Parties, CO_2 emissions from fuel combustion are taken from IEA estimates, and are supplemented by data for other sources and provided by JRC and PBL (see Part III of full book for further information). As this database only covers emission to 2015, the 2017 level of GHG emissions was extrapolated based on the growth rate from 2012 to 2016 of each source and gas.

Notes on tables and graphs

This publication presents for each country and regional aggregate a set of six graphs and three tables with key indicators (Part II, Country Tables). A selection of key indicators is also presented in summary tables for country-to-country comparison (Part II, Summary Tables).

Table 1: Key indicators

Row 1: CO_2 *fuel combustion* presents total CO_2 emissions from fuel combustion as calculated using the IEA energy balances and the methodologies outlined in the 2006 IPCC Guidelines for National Greenhouse Gas Inventories. For notes on methods and sources, see the chapter *IEA estimates: Changes under the 2006 IPCC Guidelines*.

Row 2: Share of World CO_2 from fuel combustion presents national/regional CO_2 emissions from fuel combustion divided by World CO_2 emissions from fuel combustion, expressed as a percentage.

Row 3: TPES presents the Total Primary Energy Supply, calculated as production + imports - exports - international marine bunkers - international aviation bunkers ± stock changes.

Row 4: GDP presents the Gross Domestic Product in 2010 US dollars using exchange rates. For notes on methods and sources, please see the chapter on Indicator sources and methods.

Row 5: GDP PPP presents the Gross Domestic Product in 2010 US dollars using purchasing power parities. For notes on methods and sources, see the chapter on Indicator sources and methods.

Row 6: Population. For notes on sources see the chapter on Indicator sources and methods.

Row 7: CO_2/TPES presents the carbon intensity of the energy mix. For notes on methods see the chapter on Indicator sources and methods.

Row 8: CO_2/GDP presents the carbon intensity of the economy, using exchange rates. For notes on methods and sources, see the chapter on Indicator sources and methods.

4. In the *2000 IPCC Good Practice Guidance for National Greenhouse Gas Inventories*, the concept was named 'key source categories'.
5. As recommended in the IPCC *Good Practice Guidance*.

Row 9: CO_2/GDP PPP presents the carbon intensity of the economy, using purchasing power parities. For notes on methods and sources, see the chapter on Indicator sources and methods.

Row 10: CO_2/population presents the per capita CO_2 emissions, based on CO_2 fuel combustion. For notes on sources, see the chapter on Indicator sources and methods.

Row 11: Share of electricity output from fossil fuels presents electricity output from fossil fuels divided by total electricity output, expressed as a percentage. For notes on sources, see the chapter on Indicator sources and methods.

Row 12: CO_2/kWh of electricity presents CO_2 emissions from total fossil fuel inputs to electricity generation divided by total electricity output.

Row 13-17: CO_2 emissions and drivers - Kaya decomposition present indices of CO_2 emissions (CO_2 fuel combustion), population, GDP/population, TPES/GDP and CO_2/TPES, (based on GDP PPP time series). It represents the decomposition of CO_2 emissions into drivers (Kaya identity) explained in the chapter on Indicator sources and methods.

Table 2: CO_2 emissions by sector

Row 1: *CO_2 fuel combustion*: as in Row 1 of Table 1.

Row 2: Electricity and heat generation contains the sum of emissions from main activity producers and autoproducers of electricity and/or heat. Emissions from own on-site use of fuel are included.

Main activity producers are defined as those undertakings whose primary activity is to supply the public. They may be publicly or privately owned. This corresponds to IPCC Source/Sink Category 1 A 1 a.

Autoproducers are defined as undertakings that generate electricity and/or heat, wholly or partly for their own use as an activity which supports their primary activity. They may be privately or publicly owned. Under the *2006 IPCC Guidelines*, these emissions would normally be distributed between industry, transport and *other*.

Row 3: *Other energy industry own use* contains emissions from fuel combusted in oil refineries, for the manufacture of solid fuels, coal mining, oil and gas extraction and other energy-producing industries. This corresponds to the IPCC Source/Sink Categories 1 A 1 b and 1 A 1 c.

According to the *2006 IPCC Guidelines*, emissions from coke inputs to blast furnaces, may be reported under the source/sink category industrial processes and product use rather than energy. In the reduction of iron in a blast furnace through the combustion of coke, the primary purpose of the coke oxidation is to produce pig iron and the emissions can be considered as resulting from an industrial process. In the IEA estimations, emissions from energy industry own use in blast furnaces have been included in this category. Care must be taken not to double count these emissions in both energy, and industrial processes and product use.

Row 4: *Manufacturing industries and construction* contains the emissions from combustion of fuels in industry. The IPCC Source/Sink Category 1 A 2 includes these emissions. However, in the *2006 IPCC Guidelines,* the IPCC category also includes emissions from industry autoproducers that generate electricity and/or heat. The IEA data are not collected in a way that allows the energy consumption to be split by specific end-use and therefore, in this publication autoproducers are excluded from this category. See Row 2, *Electricity and heat generation*.

According to the 2006 IPCC GLs, emissions resulting from the combustion of certain fuels in specific sectors (see below) may be reported under industrial processes and product use rather than energy. However, in IEA estimates, these emissions have been included in this category. Care must be taken not to double count these emissions in both energy, and industrial processes and product use.

- Coke oven coke deliveries to the iron and steel and non-ferrous metals sectors.
- Coke oven gas, blast furnace gas and other recovered gases deliveries to iron and steel.

Similarly, under the 2006 IPCC GLs coal tar deliveries to the chemical and petrochemical, and construction sectors may be completely excluded from energy sector emissions calculations, as they are deemed to be destined for non-energy use. However, where these fuels have been reported under energy-use they have been included in IEA estimates.

Row 5: *Transport* contains emissions from the combustion of fuel for all transport activity, regardless of the sector, except for *international marine bunkers* and *international aviation bunkers*, which are not included in *transport* emissions at a national or regional level (except for World transport emissions). This includes domestic aviation, domestic navigation, road, rail and pipeline transport, and corresponds to IPCC Source/

Sink Category 1 A 3. The IEA data are not collected in a way that allows the autoproducer consumption to be split by specific end-use and therefore, in this publication autoproducers are excluded from this category. See Row 2, *Electricity and heat generation*.

Note: Starting in the 2006 edition, military consumption previously included in *domestic aviation* and in *road* should be reported under *non-specified other*. See the section *IEA estimates vs. UNFCCC submissions* earlier in the chapter, for further details.

Row 6: *Road* contains the emissions arising from fuel use in road vehicles, including the use of agricultural vehicles on highways. This corresponds to the IPCC Source/Sink Category 1 A 3 b.

Row 7: *Other* contains the emissions from commercial/institutional activities, agriculture/forestry, fishing, residential and other emissions not specified elsewhere that are included in the IPCC Source/Sink Categories 1 A 4 and 1 A 5. In the *2006 IPCC Guidelines,* the category also includes emissions from autoproducers in commercial/public services, residential and agriculture that generate electricity and/or heat. The IEA data are not collected in a way that allows the energy consumption to be split by specific end-use, and therefore, in this publication autoproducers are excluded from this category. See Row 2, *Electricity and heat generation*.

Row 8: *Residential* contains all emissions from fuel combustion in households. This corresponds to IPCC Source/Sink Category 1 A 4 b.

Row 9: *Services* (i.e. commercial and public services) contains emissions from all activities of ISIC Rev. 4 Divisions 33, 36-39, 45-47, 52, 53, 55-56, 58-66, 68-75, 77-82, 84 (excluding Class 8422), 85-88, 90-96 and 99.

Row 10: *International marine bunkers* contains emissions from fuels burned by ships of all flags that are engaged in international navigation. The international navigation may take place at sea, on inland lakes and waterways, and in coastal waters. Consumption by ships engaged in domestic navigation is excluded. The domestic/international split is determined on the basis of port of departure and port of arrival, and not by the flag or nationality of the ship. Consumption by fishing vessels and by military forces is also excluded. Emissions from international marine bunkers should be excluded from the national totals. This corresponds to IPCC Source/Sink Category 1 A 3 d i.

Row 11: *International aviation bunkers* contains emissions from fuels used by aircraft for international aviation. Fuels used by airlines for their road vehicles are excluded. The domestic/international split should be determined on the basis of departure and landing locations and not by the nationality of the airline. Emissions from international aviation should be excluded from the national totals. This corresponds to IPCC Source/Sink Category 1 A 3 a i.

Table 3: Key categories for CO_2 emissions from fuel combustion

See section *Inventory quality: identifying key categories* earlier in this chapter for methodological explanations. This table only shows the nine largest key sources of CO_2 from fuel combustion. As a result, in most cases the cumulative contribution will not be 95% as recommended in the *Good Practice Guidance.* Key categories from fugitive emissions; industrial processes and product use; agriculture, forestry and other land use; and waste are not shown. The percentage of CO_2 emissions from fuel combustion in total GHG emissions is included as a memo item at the bottom of the table.

Figure 1: CO_2 emissions by fuel

Based on CO_2 fuel combustion emissions. The product *coal* refers to the aggregate of coal, peat and oil shale. The product *gas* refers to natural gas. The product *other* includes industrial waste and non-renewable municipal waste.

Figure 2: CO_2 emissions by sector

Based on CO_2 fuel combustion emissions. The sector *other* includes emissions from commercial/public services, agriculture/forestry and fishing. Emissions from unallocated autoproducers are included in *Electricity and heat*.

Figure 3: Electricity generation by fuel

The product *other* includes geothermal, solar, wind, combustible renewables and waste, etc. Electricity generation includes both main activity producer and autoproducer electricity.

Figure 4: CO_2 from electricity generation: driving factors

Presents the change in CO_2 emissions from electricity generation over time, for four time periods, as the sum of the change in four driving factors: CO_2 intensity of the fossil fuel mix, fossil share of electricity, thermal efficiency of fossil fired generation, and total electricity output. For notes on methodologies and sources, see the chapter on Indicator sources and methods.

Figure 5: Changes in selected indicators

Presents average annual changes, computed as compounded annual growth rates, for three different periods, for the following variables: CO_2 emissions, CO_2/TPES, CO_2/GDP PPP, CO_2/population. For notes on methodologies and sources, see the chapter on Indicator sources and methods.

Figure 6: Total CO_2 emissions and drivers

Presents indices of CO_2 emissions and of four drivers of emission trends, as identified in the Kaya identity: population, GDP/population, TPES/GDP, CO_2/TPES (1990=100 unless otherwise specified), based on GDP PPP time series. The quantitative impact of each driver on total CO_2 emissions over time is also presented. This has been calculated using the logarithmic mean divisia (LMDI) method as described in the section Drivers of electricity generation emissions trends earlier in the chapter. For methodology and notes on sources, see the chapter on Indicator sources and methods.

Note: in the tables and figures presented in this publication, peat and oil shale are aggregated with *coal*; the product *gas* refers to natural gas; and with the exception of figure 4, the product other includes industrial waste and non-renewable municipal waste.

Country notes

Detailed country notes and sources for the underlying energy data are available in the IEA World Energy balances publication[6].

Armenia

Data for Armenia are available starting in 1990. Prior to that, they are included in Former Soviet Union.

Australia

Excludes the overseas territories.

Data are reported on a fiscal year basis. By convention data for the fiscal year that starts on 1 July Y-1 and ends on 30 June Y are labelled as year Y.

Azerbaijan

Data for Azerbaijan are available starting in 1990. Prior to that, they are included in Former Soviet Union.

Bangladesh

Data are reported on a fiscal year basis. By convention data for the fiscal year that starts on 1 July Y-1 and ends on 30 June Y are labelled as year Y.

Belarus

Data for Belarus are available starting in 1990. Prior to that, they are included in Former Soviet Union.

Bosnia and Herzegovina

Data for Bosnia and Herzegovina are available starting in 1990. Prior to that, they are included in Former Yugoslavia.

Botswana

Data for Botswana are available starting in 1995. Prior to that, they are included in Other Africa.

Brazil

Brazil joined the IEA as an Association country in October 2017. Accordingly, Brazil is now included in the IEA and Accession/Association countries regional aggregate for data starting in 1971 and for the entire time series.

Bulgaria

According to the provisions of Article 4.6 of the Convention and Decisions 9/CP.2 and 11/CP.4, Bulgaria is allowed to use 1988 as the base year.

Cambodia

Data for Cambodia are available starting in 1995. Prior to that, they are included in Other Asia.

Chile

Data start in 1971.

Croatia

Data for Croatia are available starting in 1990. Prior to that, they are included in Former Yugoslavia.

Curaçao

The Netherlands Antilles was dissolved on 10 October 2010 resulting in two new "constituent countries" (Curaçao and Sint Maarten) with the other islands

6. http://wds.iea.org/wds/pdf/WORLDBAL_Documentation.pdf.

joining The Netherlands as 'special municipalities'. However, due to lack of detailed data the IEA Secretariat's data and estimates under the "Curaçao" still refer to the whole territory of the Netherlands Antilles as it was known prior to 10 October 2010 up to the end of 2011. Data refer only to the island of Curaçao from 2012. The other islands of the former Netherlands Antilles are added to Other Non-OECD Americas from 2012.

Czech Republic

Data start in 1971.

Democratic Republic of the Congo

For data in the GHG tables, The high GHG / GDP PPP ratio is due to high levels of forest fires and subsequent post-burn decay.

Egypt

By convention, data for the fiscal year that starts on 1 July Y and ends on 30 June Y+1 are labelled as year Y.

Eritrea

Data for Eritrea are available from 1992. Prior to that, they are included in Ethiopia.

Estonia

Data start in 1990. Prior to that, they are included within Former Soviet Union.

Note: Estonia joined the IEA in May 2014.

Ethiopia

Ethiopia energy data include Eritrea from 1971 to 1991. From 1992 onwards the two countries are reported separately.

France

Includes Monaco and excludes the overseas collectivities: New Caledonia; French Polynesia; Saint Barthélemy; Saint Martin; Saint Pierre and Miquelon; and Wallis and Futuna. Energy data for the following overseas departments: Guadeloupe; French Guiana; Martinique; Mayotte; and Réunion are included for the years from 2011 onwards, and excluded for earlier years.

Georgia

Data for Georgia are available starting in 1990. Prior to that, they are included in Former Soviet Union.

Hungary

Data start in 1965.

According to the provisions of Article 4.6 of the Convention and Decisions 9/CP.2 and 11/CP.4, Hungary is allowed to use average 1985-1987 as the base year.

India

Data are reported on a fiscal year basis. By convention data for the fiscal year that starts on 1 April Y and ends on 31 March Y+1 are labelled as year Y.

Islamic Republic of Iran

Data are reported according to the Iranian calendar year. Data for 2015 correspond to 20 March 2015 – 19 March 2016.

Japan

Starting 1990, data are reported on a fiscal year basis. By convention data for the fiscal year that starts on 1 April Y and ends on 31 March Y+1 are labelled as year Y.

Kazakhstan

Data for Kazakhstan are available starting in 1990. Prior to that they are included in Former Soviet Union.

Korea

Data start in 1971.

Kosovo

Data for Kosovo are available starting in 2000. From 1990-1999, data for Kosovo are included in Serbia. Prior to 1990, they are included in Former Yugoslavia.

For data in the GHG tables, from 2000 onwards, all emissions other than CO_2 from fuel combustion are included in Serbia.

Kyrgyzstan

Data for Kyrgyzstan are available starting in 1990. Prior to that, they are included in Former Soviet Union.

Latvia

Data for Latvia are available starting in 1990. Prior to that, they are included in Former Soviet Union.

GDP data are not available for the years prior to 1994 and have not been included in any of the relevant regional aggregates and derived indicators.

Lithuania

Lithuania became an OECD Member in July 2018. Accordingly, Lithuania appears in the list of OECD Members and is included in the zone aggregates for data starting in 1990, starting with the 2019 edition.

Data for Lithuania are available starting in 1990. Prior to that, they are included in Former Soviet Union.

GDP and GDP PPP data are not available for the years prior to 1995 and have not been included in any of the relevant regional aggregates and derived indicators.

Malta

At its fifteenth session, the Conference of the Parties decided to amend Annex I to the Convention to include Malta (Decision 3/CP.15). The amendment entered into force on 26 October 2010.

Mexico

Data start in 1971.

Mexico became the International Energy Agency's 30th member country on 17 February 2018. Accordingly, starting with the 2018 edition, Mexico appears in the list of IEA Members and is included in the IEA zone aggregates for data starting in 1971 and for the entire time series.

Moldova

Data for the Republic of Moldova are available starting in 1990. Prior to that, they are included in Former Soviet Union.

Mongolia

Data for Mongolia are available starting in 1985. Prior to that, they are included in Other Asia.

For data in the GHG tables, the high GHG / GDP PPP ratio for Mongolia is due to high levels of peat decay.

Montenegro

Data for Montenegro are available starting in 2005. From 1990 to 2004, data for Montenegro are included in Serbia. Prior to 1990, data are included in Former Yugoslavia.

For data in the GHG tables, from 2005 onwards, all emissions other than CO_2 from fuel combustion are included in Serbia.

Myanmar

Data are reported on a fiscal year basis. By convention data for the fiscal year that starts on 1 April Y and ends on 31 March Y+1 are labelled as year Y.

Namibia

Data for Namibia are available starting in 1991. Prior to that, they are included in Other Africa.

Nepal

Data for Nepal are reported on a fiscal year basis. Data for 2016 are for 16 July 2016 - 15 July 2017.

Niger

Data for Niger are available starting in 2000. Prior to that, they are included in Other Africa.

For data in the GHG tables, for 1990 and 1995, Other Africa includes Niger for all CO_2 emissions from fuel combustion.

Republic of North Macedonia

Data for the Republic of North Macedonia (North Macedonia) are available starting in 1990. Prior to that, they are included in Former Yugoslavia.

Norway

Discrepancies between Reference and Sectoral Approach estimates (as presented in the database) and the difference in the resulting growth rates arise from statistical differences between supply and consumption data for oil and natural gas. For Norway, supply of these fuels is the residual of two very large and opposite terms, production and exports.

Pakistan

Data are reported on a fiscal year basis. By convention, fiscal year Y/Y+1 is labelled as year Y.

Poland

According to the provisions of Article 4.6 of the Convention and Decisions 9/CP.2 and 11/CP.4, Poland is allowed to use 1988 as the base year.

Romania

According to the provisions of Article 4.6 of the Convention and Decisions 9/CP.2 and 11/CP.4, Romania is allowed to use 1989 as the base year.

Russia

Data for Russian Federation are available starting in 1990. Prior to that, they are included in Former Soviet Union.

Serbia

Data for Serbia are available starting in 1990. Prior to that, they are included in Former Yugoslavia. Serbia includes Kosovo from 1990 to 1999 and Montenegro from 1990 to 2004.

For data in the GHG tables, Serbia includes Kosovo for all emissions other than CO_2 from fuel combustion from 2000 onwards, and Montenegro for all emissions other than CO_2 from fuel combustion from 2005 onwards.

Singapore

Due to Singapore's large trade volume in comparison to its final consumption, a slight misalignment of trade figures can have a significant impact on the energy balance of Singapore. As a result, large discrepancies between the Reference and Sectoral Approach estimates (as presented in the database) arise from statistical differences between supply and consumption of oil and oil products.

The IEA Secretariat, the Energy Market Authority and the National Climate Change Secretariat (NCCS) are working closely together on improving data quality for Singapore. Efforts are continuing on this project, therefore breaks in time series between 2008 and 2009 and differences in trends when compared to previous publications may occur for some products.

Slovenia

Data for Slovenia are available from 1990. Prior to that, they are included in Former Yugoslavia in the full publication.

According to the provisions of Article 4.6 of the Convention and Decisions 9/CP.2 and 11/CP.4, Slovenia is allowed to use 1986 as the base year.

South Africa

South Africa became an IEA Association country in November 2018. Accordingly, South Africa is now included in the IEA and Accession/Association countries aggregate.

Large differences between the Reference and Sectoral Approach estimates (as presented in the database) are due to losses associated with coal-to-liquid and to a lesser extent gas-to-liquid transformation.

South Sudan

South Sudan became an independent country on 9 July 2011. Data for South Sudan are available from 2012. Prior to 2012, they are included in Sudan.

For data in the GHG tables, data for South Sudan is included in Sudan for all years.

Sudan

South Sudan became an independent country on 9 July 2011. Data for South Sudan are available from 2012. Prior to 2012, they are included in Sudan.

For data in the GHG tables, data for South Sudan is included in Sudan for all years.

Suriname

Data for Suriname are available from 2000. Prior to 2000, data for Suriname are presented in Other non-OECD Americas.

For data in the GHG tables, for 1990 and 1995, Other non-OECD Americas includes Suriname for all CO_2 emissions from fuel combustion.

Tanzania

Oil data are reported on a fiscal year basis, beginning on 1 July Y and ending on 30 June Y+1.

Tajikistan

Data for Tajikistan are available starting in 1990. Prior to that, they are included in Former Soviet Union.

Turkmenistan

Data for Turkmenistan are available starting in 1990. Prior to that, they are included in Former Soviet Union.

Ukraine

Data for Ukraine are available starting in 1990. Prior to that, they are included in Former Soviet Union.

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 but generally excludes all territories, and all trade between the U.S. and its territories. Oil statistics include Guam, Puerto Rico[7] and the United States Virgin Islands; trade statistics for coal include international trade to and from Puerto Rico and the United States Virgin Islands. Starting with 2017 data, inputs to and outputs from electricity and heat generation include Puerto Rico.

Uzbekistan

Data for Uzbekistan are available starting in 1990. Prior to that, data are included in Former Soviet Union.

Zambia

For data in the GHG tables, the high GHG / GDP PPP ratio is due to high levels of forest fires and subsequent post-burn decay.

7. Inputs to and outputs from electricity and heat generation up to 2016, and natural gas data for the entire time series for Puerto Rico are included under Other non-OECD Americas.

5. GEOGRAPHICAL COVERAGE

In this publication:

World includes OECD Total; Africa; Non-OECD Americas; Non-OECD Asia (excluding China); China (People's Republic of China and Hong Kong, China); Non-OECD Europe and Eurasia; Middle East; World aviation bunkers and World marine bunkers. It is also the sum of Africa, Americas, Asia, Europe, Oceania, World aviation bunkers and World marine bunkers.

Africa includes Algeria; Angola; Benin; Botswana; Burkina Faso; Burundi; Cabo Verde; Cameroon; Central African Republic; Chad; Comoros; the Republic of the Congo (Congo); Côte d'Ivoire; the Democratic Republic of the Congo; Djibouti; Egypt; Equatorial Guinea; Eritrea; the Kingdom of Eswatini; Ethiopia; Gabon; Gambia; Ghana; Guinea; Guinea-Bissau; Kenya; Lesotho; Liberia; Libya; Madagascar; Malawi; Mali; Mauritania; Mauritius; Morocco; Mozambique; Namibia; Niger; Nigeria; Réunion (until 2010); Rwanda; Sao Tome and Principe; Senegal; the Seychelles; Sierra Leone; Somalia; South Africa; South Sudan (from 2012); Sudan; the United Republic of Tanzania (Tanzania); Togo; Tunisia; Uganda; Zambia; Zimbabwe.

Americas includes Antigua and Barbuda; Argentina; Aruba; the Bahamas; Barbados; Belize; Bermuda; the Plurinational State of Bolivia (Bolivia); Bonaire (from 2012); the British Virgin Islands; Brazil; Canada; the Cayman Islands; Chile; Colombia; Costa Rica; Cuba; Curaçao[8]; Dominica; the Dominican Republic; Ecuador; El Salvador; the Falkland Islands (Malvinas); Guatemala; French Guiana (until 2010); Grenada; Guadeloupe (until 2010); Guyana; Haiti; Honduras; Jamaica; Martinique (until 2010); Mexico; Montserrat; Nicaragua; Panama; Paraguay; Peru; Puerto Rico; Saba (from 2012); Saint Kitts and Nevis; Saint Lucia; Saint Pierre and Miquelon; Saint Vincent and the Grenadines; Sint Eustatius (from 2012); Sint Maarten (from 2012); Suriname; Trinidad and Tobago; the Turks and Caicos Islands; the United States; Uruguay; the Bolivarian Republic of Venezuela (Venezuela).

Asia (from 1990) includes Afghanistan; Armenia; Azerbaijan; Bahrain; Bangladesh; Bhutan; Brunei Darussalam; Cambodia; the People's Republic of China; Cyprus[9]; Georgia; Hong Kong, China; India; Indonesia; the Islamic Republic of Iran; Iraq; Israel[10]; Japan; Jordan; the Democratic People's Republic of Korea; Korea; Kazakhstan; Kuwait; Kyrgyzstan; Lao People's Democratic Republic; Lebanon; Macau, China; Malaysia; the Maldives; Mongolia; Myanmar; Nepal; Oman; Pakistan; the Philippines; Qatar; Saudi Arabia; Singapore; Sri Lanka; the Syrian Arab Republic; Tajikistan; Chinese Taipei; Thailand; Timor-Leste;

8. The Netherlands Antilles was dissolved on 10 October 2010 resulting in two new 'constituent countries' (Curaçao and Sint Maarten) with the other islands joining The Netherlands as "special municipalities'. However, due to lack of detailed data the IEA Secretariat's data and estimates under the "Netherlands Antilles" still refer to the whole territory of the Netherlands Antilles as it was known prior to 10 October 2010 up to the end of 2011. Data refer only to the island of Curaçao from 2012. The other islands of the former Netherlands Antilles are added to Other non-OECD Americas from 2012.

9. Note by Turkey:
The information in this document with reference to "Cyprus" relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Turkey recognises the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Turkey shall preserve its position concerning the "Cyprus issue".
Note by all the European Union member states of the OECD and the European Union:
The Republic of Cyprus is recognised by all members of the United Nations with the exception of Turkey. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus.

10. 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.

Turkey; Turkmenistan; the United Arab Emirates; Uzbekistan; Viet Nam; and Yemen.

Europe (from 1990) includes Albania; Austria; Belarus; Belgium; Bosnia and Herzegovina; Bulgaria; Croatia; the Czech Republic; Denmark; Estonia; Finland; France[11]; Germany; Gibraltar; Greece; Hungary; Iceland; Ireland; Italy; Kosovo[12]; Latvia; Lithuania; Luxembourg; Malta; the Republic of Moldova (Moldova); Montenegro; the Netherlands; the Republic of North Macedonia; Norway; Poland; Portugal; Romania; the Russian Federation; Serbia[13]; the Slovak Republic; Slovenia; Spain; Sweden; Switzerland; Ukraine; the United Kingdom.

Oceania includes Australia; New Zealand; Cook Islands; Fiji; French Polynesia; Kiribati; New Caledonia; Palau; Papua New Guinea; Samoa; the Solomon Islands; Tonga; Vanuatu.

The **International Energy Agency (IEA)** includes Australia; Austria; Belgium; Canada; the Czech Republic; Denmark; Estonia[14]; Finland; France; Germany; Greece; Hungary; Ireland; Italy; Japan; Korea; Luxembourg; Mexico; the Netherlands; New Zealand; Norway; Poland; Portugal; the Slovak Republic; Spain; Sweden; Switzerland; Turkey; the United Kingdom; the United States.

The **IEA and Accession/Association countries** includes: IEA member countries: Australia; Austria; Belgium; Canada; the Czech Republic; Denmark; Estonia[7]; Finland; France; Germany; Greece; Hungary; Ireland; Italy; Japan; Korea; Luxembourg; Mexico; the Netherlands; New Zealand; Norway; Poland; Portugal; the Slovak Republic; Spain; Sweden; Switzerland; Turkey; the United Kingdom and the United States; Accession country: Chile; Association countries: Brazil; the People's Republic of China; India; Indonesia; Morocco; Singapore; South Africa; Thailand.

The **Organisation for Economic Co-Operation and Development (OECD)** includes Australia; Austria; Belgium; Canada; Chile; the Czech Republic; Denmark; Estonia; Finland; France; Germany; Greece; Hungary; Iceland; Ireland; Israel; Italy; Japan; Korea; Latvia[15]; Lithuania[16]; Luxembourg; Mexico; the Netherlands; New Zealand; Norway; Poland; Portugal; the Slovak Republic; Slovenia; Spain; Sweden; Switzerland; Turkey; the United Kingdom; the United States.

OECD Americas includes Canada; Chile; Mexico; the United States.

OECD Asia Oceania includes Australia; Israel; Japan; Korea; New Zealand.

OECD Europe includes Austria; Belgium; the Czech Republic; Denmark; Estonia; Finland; France; Germany; Greece; Hungary; Iceland; Ireland; Italy; Latvia[15]; Lithuania[16]; Luxembourg; the Netherlands; Norway; Poland; Portugal; the Slovak Republic; Slovenia; Spain; Sweden; Switzerland; Turkey; the United Kingdom.

Estonia, Latvia, Lithuania and Slovenia are included starting in 1990. Prior to 1990, Estonia, Latvia and Lithuania are included in Former Soviet Union and Slovenia is included in Former Yugoslavia.

Within the **OECD**:

- **Australia** excludes the overseas territories;
- **Denmark** excludes Greenland and the Faroe Islands, except prior to 1990, where data on oil for Greenland were included with the Danish statistics. The administration is planning to revise the series back to 1974 to exclude these amounts;
- **France** includes Monaco and excludes the overseas collectivities: New Caledonia; French Polynesia; Saint Barthélemy; Saint Martin; Saint Pierre and Miquelon; and Wallis and Futuna. Energy[17] data for the following overseas departments (DOM): Guadeloupe; French Guiana; Martinique; Mayotte; and Réunion are included for the years 2011-2017, and excluded for earlier years;
- **Germany** includes the new federal states of Germany from 1970 onwards;
- 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;

11. Data for the overseas departments are included in Europe starting with 2011, and in other regions as appropriate (America or Africa) until 2010.

12. This designation is without prejudice to positions on status, and is in line with United Nations Security Council Resolution 1244/99 and the Advisory Opinion of the International Court of Justice on Kosovo's declaration of independence.

13. Serbia includes Montenegro until 2004 and Kosovo until 1999.

14. Estonia is included starting in 1990. Prior to 1990, data for Estonia are included in Former Soviet Union.

15. Latvia is included starting in 1990. Prior to 1990, data for Latvia are included in Former Soviet Union.

16. Lithuania became an OECD Member in July 2018. Accordingly, Lithuania appears in the list of OECD Members and is included in the zone aggregates for data starting in 1990, starting with the 2019 edition.

17. GDP and population data include DOM for the whole time series.

- **Italy** includes San Marino and the Holy See;
- **Japan** includes Okinawa;
- **Netherlands** excludes Suriname, Aruba and the other former Netherlands Antilles (Bonaire, Curaçao, Saba, Saint Eustatius and Sint Maarten);
- **Portugal** includes the Azores and Madeira;
- **Spain** includes the Canary Islands;
- **Switzerland** includes Liechtenstein for oil data; data for other fuels do not include Liechtenstein;
- 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 but generally excludes all territories, and all trade between the U.S. and its territories. Oil statistics include Guam, Puerto Rico[18] and the United States Virgin Islands; trade statistics for coal include international trade to and from Puerto Rico and the United States Virgin Islands; starting with 2017 data, inputs to and outputs from electricity and heat generation include Puerto Rico.

Non-OECD Europe and Eurasia includes Albania; Armenia; Azerbaijan; Belarus; Bosnia and Herzegovina; Bulgaria; Croatia; Cyprus[9]; Georgia; Gibraltar; Kazakhstan; Kosovo[12]; Kyrgyzstan; Malta; the Republic of Moldova (Moldova); Montenegro; the Republic of North Macedonia; Romania; the Russian Federation; Serbia[13]; Tajikistan; Turkmenistan; Ukraine; Uzbekistan; the Former Soviet Union; the Former Yugoslavia.

Non-OECD Asia excluding China includes Bangladesh; Brunei Darussalam; Cambodia (from 1995); India; Indonesia; the Democratic People's Republic of Korea; Malaysia; Mongolia (from 1985); Myanmar; Nepal; Pakistan; the Philippines; Singapore; Sri Lanka; Chinese Taipei; Thailand; Viet Nam; **Other non-OECD Asia**.

China includes the (People's Republic of) China; Hong Kong, China.

Non-OECD Americas includes Argentina; the Plurinational State of Bolivia (Bolivia); Brazil; Colombia; Costa Rica; Cuba; Curaçao[8]; the Dominican Republic; Ecuador; El Salvador; Guatemala; Haiti; Honduras; Jamaica; Nicaragua; Panama; Paraguay; Peru; Suriname (from 2000), Trinidad and Tobago; Uruguay; the Bolivarian Republic of Venezuela (Venezuela); **Other non-OECD Americas**.

Middle East includes Bahrain; the Islamic Republic of Iran; Iraq; Jordan; Kuwait; Lebanon; Oman; Qatar; Saudi Arabia; the Syrian Arab Republic; the United Arab Emirates; Yemen.

Other Africa includes Botswana (until 1980); Burkina Faso; Burundi; Cabo Verde; Central African Republic; Chad; Comoros; Djibouti; Equatorial Guinea; the Kingdom of Eswatini; Gambia; Guinea; Guinea-Bissau; Lesotho; Liberia; Madagascar; Malawi; Mali; Mauritania; Namibia (until 1990); Niger (until 1999); Réunion (until 2010); Rwanda; Sao Tome and Principe; the Seychelles; Sierra Leone; Somalia; Uganda.

Other non-OECD Americas includes Anguilla, Antigua and Barbuda; Aruba; the Bahamas; Barbados; Belize; Bermuda; Bonaire (from 2012); the British Virgin Islands; the Cayman Islands; Dominica; the Falkland Islands (Malvinas); French Guiana (until 2010); Grenada; Guadeloupe (until 2010); Guyana; Martinique (until 2010); Montserrat; Puerto Rico (for natural gas and – up to 2016 data - electricity)[18]; Saba (from 2012); Saint Eustatius (from 2012); Saint Kitts and Nevis; Saint Lucia; Saint Pierre and Miquelon; Saint Vincent and the Grenadines; Sint Maarten (from 2012); Suriname (until 1999); the Turks and Caicos Islands.

Other non-OECD Asia includes Afghanistan; Bhutan; Cambodia (until 1994); Cook Islands; Fiji; French Polynesia; Kiribati; Lao People's Democratic Republic; Macau, China; the Maldives; Mongolia (until 1984); New Caledonia; Palau (from 1994); Papua New Guinea; Samoa; the Solomon Islands; Timor-Leste; Tonga; Vanuatu.

The **European Union - 28 (EU-28)** (from 1990) includes Austria; Belgium; Bulgaria; Croatia; Cyprus[9]; the Czech Republic; Denmark; Estonia; Finland; France; Germany; Greece; Hungary; Ireland; Italy; Latvia; Lithuania; Luxembourg; Malta; the Netherlands; Poland; Portugal; Romania; the Slovak Republic; Slovenia; Spain; Sweden; the United Kingdom.

18. Natural gas and electricity data for Puerto Rico are included under Other non-OECD Americas, except for input to and output to electricity and heat generation, included under the United States starting with 2017 data.

Please note that in the interest of having comparable data, all these countries are included since 1990 despite different entry dates into the European Union.

G20 includes Argentina; Australia; Brazil; Canada; China (including Hong Kong, China); India; Indonesia; Japan; Korea; Mexico; the Russian Federation; Saudi Arabia; South Africa; Turkey; the United States; the European Union – 28.

The **Organisation of the Petroleum Exporting Countries (OPEC)** includes Algeria; Angola; Ecuador; Equatorial Guinea (starting with 1981 data); Gabon; the Islamic Republic of Iran; Iraq; Kuwait; Libya; Nigeria; Qatar; Saudi Arabia; the United Arab Emirates; the Bolivarian Republic of Venezuela (Venezuela). [19]

Annex I Parties[20] includes Australia, Austria, Belarus, Belgium, Bulgaria, Canada, Croatia, Cyprus[21], the Czech Republic[22,23], Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Liechtenstein (not available in this publication)[24], Lithuania, Luxembourg, Malta, Monaco (included with France), the Netherlands, New Zealand, Norway, Poland, Portugal, Romania, the Russian Federation, the Slovak Republic[23,25], Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, the United Kingdom and the United States.

The countries that are listed above are included in Annex I of the United Nations Framework Convention on Climate Change as amended on 11 December 1997 by the 12th Plenary meeting of the Third Conference of the Parties in Decision 4/CP.3. This includes the countries that were members of the OECD at the time of the signing of the Convention, the EEC, and fourteen countries in Central and Eastern Europe and the Former Soviet Union that were undergoing the process of transition to market economies. During subsequent sessions, the Conference of the Parties agreed to amend Annex I to the Convention to include Malta (Decision 3/CP.15, effective from 26 October 2010) and Cyprus[26] (Decision 10/CP.17, effective from 9 January 2013).

Annex II Parties includes Australia, Austria, Belgium, Canada, Denmark, Finland, France[27], Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland[28], the United Kingdom and the United States.

According to Decision 26/CP.7 in document FCCC/CP/2001/13/Add.4, Turkey has been deleted from the list of Annex II countries to the Convention. This amendment entered into force on 28 June 2002.

Annex II North America includes Canada and the United States.

Annex II Europe includes Austria, Belgium, Denmark, Finland, France[27], Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland[28] and the United Kingdom.

Annex II Asia Oceania includes Australia, Japan and New Zealand.

Annex I: Economies in Transition (EIT) are those countries in Annex I that were undergoing the process of transition to a market economy. This includes Belarus, Bulgaria, Croatia, the Czech Republic[22,23], Estonia, Hungary, Latvia, Lithuania, Poland, Romania, the Russian Federation, the Slovak Republic[23,25], Slovenia and Ukraine.

Annex B Kyoto Parties[20] includes Australia, Austria, Belarus, Belgium, Bulgaria, Croatia, Cyprus[26], the Czech Republic[22,23], Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Kazakhstan, Latvia, Liechtenstein (not available in this publication) Lithuania, Luxembourg, Malta, Monaco (included with France), the Netherlands, Norway, Poland, Portugal, Romania, the Slovak Republic[23,25], Slovenia, Spain, Sweden, Switzerland, Ukraine and the United Kingdom.

Refers to countries with emissions targets under the second commitment period (CP) of the Kyoto Protocol (2013-2020) as per the Doha Amendment. This differs from the list of countries with targets under the first

19. Data for Congo, that joined OPEC in June 2018, are not included in the OPEC aggregate in this edition.
20. The European Union is also an Annex I Party in its own right. The EU was assigned an overall reduction target under the Kyoto Protocol, which by agreement, was used to determine the individual targets of the fifteen states that were EU members in 1997 when the Kyoto Protocol was adopted.
21. Refer to the country note for Cyprus earlier in this chapter.
22. Czechia in official UN documents.
23. Czechoslovakia was in the original list of Annex I countries.
24. Oil data for Liechtenstein are included under Switzerland.
25. Slovakia in official UN documents.
26. Refer to the country note for Cyprus earlier in this chapter.
27. In IEA data, France also includes Monaco, which is not in the list of Annex II Parties.
28. In IEA data, Switzerland includes Oil data for Liechtenstein, which is not in the list of Annex II Parties.

CP (2008-2012). Please note that the Doha Amend-Amendment has not yet entered into force. Membership of Annex B in the second CP of the Kyoto Protocol differs from that in Annex I. In particular, Annex B excludes, or does not contain targets for Canada, Japan, New Zealand, the Russian Federation, Turkey and the United States (all Annex I member states), but includes Kazakhstan (a non-Annex I Party under the Convention, but an Annex I Party under the Kyoto Protocol (as per decision 9/CMP.8).

Please note that the following countries have not been considered:

- **Non-OECD Europe and Eurasia**: Andorra; Faroe Islands (after 1990); Liechtenstein[29] (except for oil data); the Palestinian Authority; Svalbard; Jan Mayen Islands;
- **Africa:** British Indian Ocean Territory; French Southern and Antarctic Lands; Mayotte (until 2010); Saint Helena; Western Sahara;
- **Non-OECD Americas**: Bouvet Island; Saint Barthélemy; Greenland (after 1990); Saint Martin (French Part); South Georgia and the South Sandwich Islands;
- Antarctica;
- **Non-OECD Asia excluding China:** American Samoa; Cocos (Keeling) Islands; Christmas Island; Heard Island and McDonald Islands; Marshall Islands; Micronesia (Federated States of); Nauru; Niue; Norfolk Island; Northern Mariana Islands; Pitcairn; Tokelau; Tuvalu; United States Minor Outlying Islands; Wallis and Futuna Islands.

29. Oil data for Liechtenstein are included under Switzerland.

6. INDICATOR SOURCES AND METHODS

CO_2 emissions

The estimates of CO_2 emissions in this publication are based on the *2006 IPCC Guidelines* and represent the total emissions from fuel combustion. This is in contrast to estimates presented prior to the 2015 edition of this publication which were based on the *Revised 1996 IPCC Guidelines*. For details on the impact of this change in methodologies see the chapter *IEA estimates: Changes under the 2006 IPCC Guidelines.*

National totals do not include emissions from international marine and aviation bunkers. See the Country Notes in the chapter *Understanding the IEA CO_2 emissions estimates* for further details.

Population

For OECD countries, the main source of these series for 1970 to 2018 when available is the OECD *National Accounts Statistics* database [ISSN: 2074-3947 (online)], last published in book format as *National Accounts of OECD Countries, Volume 2019 Issue 1: Main Aggregates*, OECD 2019. Data for 1960 to 1969 have been estimated using the growth rates from the population series published in the *OECD Factbook 2015* (online database version). Growth rates from the *OECD Factbook 2015* were also used to estimate data for **Chile** (prior to 1986), **Estonia** (prior to 1993), **Israel** (prior to 1995), the **Slovak Republic** (prior to 1990) and **Slovenia** (prior to 1995). Data for **Latvia** (prior to 1995) and **Lithuania** (prior to 1995) are IEA Secretariat estimates based on GDP growth rates from the World Bank.

For non-OECD countries, the main source of the population data is *World Development Indicators*, The World Bank, Washington D.C., 2018.

Population data for **Former Soviet Union** (before 1990), **Chinese Taipei**, **Former Yugoslavia** (before 1990), **Eritrea** (2012-2017), **Kuwait** (1992-1994) and for a few countries within the regions **Other Africa, Other non-OECD Americas** and **Other non-OECD Asia** are based on the CHELEM-CEPII online database, Bureau van Dijk, Paris, 2018. Population data for **Cyprus**[30]are taken from the Eurostat online database. Population data for **Gibraltar** are taken from the government of Gibraltar *Key Indicators* publication available online.

GDP and GDP PPP

GDP using exchanges rates: expressed in billion 2010 USD.

For OECD countries, the main source of these series for 1970 to 2018 is the OECD *National Accounts Statistics* database [ISSN: 2074-3947 (online)], last published in book format as *National Accounts of OECD Countries*, *Volume 2019 Issue1: Main Aggregates*, OECD 2019. GDP data for **Australia**, **France**, **Greece, Korea**, **Sweden** and the **United Kingdom** for 1960 to 1969 and **Denmark** for 1966 to 1969 as well as for **Netherlands** for 1969 were taken from the same source. GDP data for 1960 to 1969 for the other countries have been estimated using the growth rates from the series in the *OECD Economic Outlook* No 98 and other data previously published by the OECD. Growth rates from these sources were also used to estimate data for the **Czech Republic** (prior to 1990), **Hungary** (prior to 1991) and **Poland** (prior to 1990) and the **Slovak Republic** (prior to 1992). Data for **Chile** (prior to 1986) and **Estonia** (prior to 1992)

30 Please refer to the section on Geographical coverage.

are IEA Secretariat estimates based on GDP growth rates from the World Bank.

The GDP data have been compiled for all individual countries at market prices in 2010 US dollars.

For non-OECD countries, the main source of the GDP data is *World Development Indicators*, The World Bank, Washington D.C., 2019. GDP figures for **Democratic People's Republic of Korea**, Palestinian Authority, **Former Soviet Union** (before 1990), **Gibraltar**, **Syrian Arab Republic, Chinese Taipei**, **Former Yugoslavia** (before 1990) and a few countries within the regions **Other Africa**, **Other non-OECD Americas** and **Other non-OECD Asia** are based on the CHELEM-CEPII online databases, Bureau van Dijk, 2019.

GDP figures for **Albania** (1971-1979), **Angola** (1971-1984), **Bahrain** (1971-1980 and 2016), **Bosnia and Herzegovina** (1990-1993), **Brunei** (1971-1974), **Bulgaria** (1971-1979), **Croatia** (1990-1994), **Cuba** (2016), **Cyprus** (1971-1974), **Eritrea** (2012-2017), **Ethiopia** (1971-1980), **Equatorial Guinea** (1971-1979), **Haiti** (1971-1997), **Iran** (2016), **Jordan** (1971-1974), **Kuwait** (1971-1991), **Lao People's Democratic Republic** (1971-1983), **Lebanon** (1971-1987), **Libya** (1971-1998 and 2012-2016), **Mauritius** (1971-1975), **Moldova** (1990-1994), **Mozambique** (1971-1979), **Qatar** (1971-1999), **Romania** (1971-1989), **Tanzania** (1971-1987), **Uganda** (1971-1981), **United Arab Emirates** (1971-1974), **Venezuela** (2015-2017), **Vietnam** (1971-1983) and **Yemen** (1971-1989), have been estimated based on the growth rates of the CHELEM-CEPII online database, Bureau van Dijk, 2019. The GDP 2017 figure for **Greenland** is calculated based on the growth rates of the Statbank Greenland online database, Statistics Greenland, 2019. For **Curaçao**, GDP figures are based on historical CHELEM-CEPII GDP data for Netherlands Antilles before the country's dissolution, and on Curaçao/Sint Maarten.

The GDP data have been compiled for all individual countries at market prices in 2010 US dollars.

GDP using purchasing power parities: expressed in billion 2010 USD. Purchasing power parities are the rates of currency conversion that equalise the purchasing power of different currencies. A given sum of money, when converted into different currencies at the PPP rates, buys the same basket of goods and services in all countries. In other words, PPPs are the rates of currency conversion which eliminate the differences in price levels between different countries. The PPPs selected to convert the GDP from national currencies to US dollars were aggregated using the Èltetö, Köves and Szulc (EKS) Eurostat-OECD method and rebased on the United States. For a more detailed description of the methodology please see *Eurostat-OECD Methodological Manual on Purchasing Power Parities*, 2012 edition, European Union / OECD 2012.

For OECD countries, See *GDP using exchange rates* for sources. Note that data for **Latvia** (prior to 1994) and Lithuania (prior to 1995) are IEA Secretariat estimates based on GDP growth rates from the World Bank.

For non-OECD countries, the main source of the GDP PPP data is *World Development Indicators*, The World Bank, Washington, D.C., 2019. However, this source is available for GDP PPP (constant 2011 US dollars scaled to the levels of 2010 using current PPP US dollars) only from 1990. Therefore, prior to 1990 GDP PPP data have been calculated based on the PPP conversion factor (GDP) to market exchange rate ratio.

GDP PPP figures for **Democratic People's Republic of Korea**, **Palestinian Authority, Former Soviet Union** (before 1990), **Syrian Arab Republic, Chinese Taipei**, **Former Yugoslavia** (before 1990) and a few countries within the regions **Other Africa**, **Other non-OECD Americas** and **Other non-OECD Asia** are based on the CHELEM-CEPII online databases, Bureau van Dijk, 2018. The GDP PPP data have been converted from GDP using purchasing power parity rates. These data have been scaled to the price levels of 2010.

For **Gibraltar**, GDP PPP figures are based on historical CHELEM-CEPII GDP PPP data and government of Gibraltar national accounts. For **Curaçao**, GDP PPP figures are based on historical CHELEM-CEPII GDP data for Netherlands Antilles before its dissolving, and for 2012-2017 GDP PPP is calculated based on historical GDP PPP / GDP ratio. For **South Sudan**, GDP PPP figures are based on International Monetary Fund data.

GDP PPP figures for **Bosnia and Herzegovina** (1990-1993), **Croatia** (1900- 1994), **Cuba**, **Eritrea** (2012-2017), **Haiti** (1990-1997), **Iraq** (1990-1999), **Kuwait** (1990- 1991), **Libya** (1990-1998 and 2012-2017), **Moldova** (1990-1994), **Serbia** (1990-1994), **Qatar** (1990-2000) and **Venezuela** (2015-2017) have been estimated using the ratio of GDP PPP and GDP data

based on CHELEM-CEPII online database, Bureau van Dijk, 2019. These data have been scaled to the price levels of 2010.

The GDP PPP reflect the changes to power purchasing parity rates based on the 2011 International Comparison Program (ICP), published in 2014. The ICP has worked for 6 years to better estimate the value of the PPP 'basket of goods' for all countries for which the World Bank calculates GDP PPP. For many countries, this value has significantly changed in comparison to previous ICP exercises. This leads to significant revisions to GDP PPP for many countries compared to previous publications.

Please note that the regional totals shown for OECD and other regions were calculated by summing individual countries' GDP data. This calculation yields slightly different results to the GDP totals published by OECD in its national accounts which are derived from chained-linked indices. GDP data from the World Bank have also been summed rather than using chain-linked indices.

Electricity output

Total output includes electricity generated using fossil fuels, nuclear, hydro (excluding pumped storage), geothermal, solar, biofuels, etc.

Both **main activity**[31] **producer** and **autoproducer**[32] **plants** have been included where available.

Data include the total amount of electricity in TWh generated by both **electricity plants** and **CHP plants**. Heat production from CHP plants is not included.

CO_2 / TPES

This ratio is expressed in tonnes of CO_2 per terajoule. It has been calculated using the CO_2 fuel combustion emissions and total primary energy supply (including biofuels and other non-fossil forms of energy).

CO_2 / TFC

This ratio is expressed in tonnes of CO_2 per terajoule. It has been calculated using the CO_2 fuel combustion emissions and total final consumption (including biofuels and other non-fossil forms of energy).

CO_2 / GDP

This ratio is expressed in kilogrammes of CO_2 per 2010 US dollar. It has been calculated using CO_2 fuel combustion emissions and is shown with both GDP calculated using exchange rates and GDP calculated using purchasing power parities.

CO_2 / population

This ratio is expressed in tonnes of CO_2 per capita. It has been calculated using CO_2 fuel combustion emissions.

Per capita CO_2 emissions by sector

These ratios are expressed in kilogrammes of CO_2 per capita. They have been calculated in two different ways. In the first ratio, the emissions from electricity and heat production are shown separately. In the second ratio, the emissions from electricity and heat have been allocated to final consuming sectors in proportion to the electricity and heat consumed by those sectors.

Key categories

It is good practice for each inventory agency to identify its national key source categories in a systematic and objective manner, by performing a quantitative analysis of the relationships between the level and the trend of each source category's emissions and total national emissions.

In this publication, a **Tier 1 Level Assessment** based on CO_2 emissions from fuel combustion is presented in Table 3 for each country and region for the most

31. Main activity producers generate electricity and/or heat for sale to third parties, *as their primary activity*. They may be privately or publicly owned. Note that the sale need not take place through the public grid.

32. Autoproducer undertakings generate electricity and/or heat, wholly or partly for their own use as an activity which supports their primary activity. They may be privately or publicly owned.

recent year of data. The contribution of each category to the total national inventory level is calculated as follows:

Category Level Assessment = Category Estimate / Total Estimate
$$L_x = E_x / E$$

where:

L_x is the Level Assessment for category x in the most recent year of data

E_x is the Category estimate - the CO_2 emissions estimate of category x in in the most recent year of data

E is the Total estimate - the total estimated inventory GHG in the most recent year of data.

The value of the source category Level Assessment is calculated separately for each category, and the cumulative sum of all the entries is calculated.

Macroeconomic drivers of CO_2 emissions trends

Tables and graphs for drivers refer to the decomposition of CO_2 emissions into four driving factors (Kaya identity)[33], which is generally presented in the form:

Kaya identity
$$C = P\ (G/P)\ (E/G)\ (C/E)$$

where:

C = CO_2 emissions;
P = population;
G = GDP;
E = primary energy consumption.

The identity expresses, for a given time, CO_2 emissions as the product of population, per capita economic output (G/P), energy intensity of the economy (E/G) and carbon intensity of the energy mix (C/E). Because of possible non-linear interactions between terms, the sum of the percentage changes of the four factors, e.g. $(P_y\text{-}P_x)/P_x$, will not generally add up to the percentage change of CO_2 emissions $(C_y\text{-}C_x)/C_x$. However, relative changes of CO_2 emissions in time can be obtained from relative changes of the four factors as follows:

Kaya identity: relative changes in time
$$C_y/C_x = P_y/P_x\ (G/P)_y/(G/P)_x\ (C/E)_y/(C/E)_x$$

where x and y represent for example two different years.

In this publication, the Kaya decomposition is presented as:

CO_2 emissions and drivers
$$CO_2 = P\ (GDP/P)\ (TPES/GDP)\ (CO_2/TPES)$$

where:

CO_2 = CO_2 emissions;
P = population;
GDP[34]/P = GDP/population;
TPES/GDP[34] = Total Primary Energy Supply per GDP;
CO_2/TPES = CO_2 emissions per unit TPES.

Indices of all terms (1990 = 100 unless otherwise specified) are shown for each country and regional aggregate in Part II, both in the Summary tables and in the individual country/region pages (Table 1, Key indicators, and Figure 6, CO_2 emissions and drivers). Note that in its index form, CO_2/TPES corresponds to the Energy Sector Carbon Intensity Index (ESCII)[35].

The Kaya identity can be used to discuss the primary driving forces of CO_2 emissions. For example, it shows that, globally, increases in population and GDP per capita have been driving upwards trends in CO_2 emissions, more than offsetting the reduction in energy intensity. In fact, the carbon intensity of the energy mix is almost unchanged, due to the continued dominance of fossil fuels - particularly coal - in the energy mix, and to the slow uptake of low-carbon technologies.

However, it should be noted that there are important caveats in the use of the Kaya identity. Most important, the four terms on the right-hand side of equation should be considered neither as fundamental driving forces in themselves, nor as generally independent from each other.

33. Yamaji, K., Matsuhashi, R., Nagata, Y. Kaya, Y., *An integrated system for CO_2/Energy/GNP analysis: case studies on economic measures for CO_2 reduction in Japan*. Workshop on CO_2 reduction and removal: measures for the next century, March 19, 1991, International Institute for Applied Systems Analysis, Laxenburg, Austria.

34. GDP based on purchasing power parities (PPP).
35. See the IEA publication *Tracking Clean Energy Progress 2016*.

Drivers of electricity generation emissions trends

In this edition, new graphs present the change in CO_2 emissions from electricity generation over time decomposed into the respective changes of four driving factors[36]:

CO_2 emissions from electricity generation
C = (C/E) (E/ELF) (ELF/EL) (EL)

where:
C = CO_2 emissions;
E = fossil fuel inputs to thermal generation;
ELF = electricity output from fossil fuels;
EL = total electricity output;

This can be rewritten as:

CO_2 emissions from electricity generation
C = (CF) (EI) (EFS) (EL)

where:
C = CO_2 emissions;
CF = carbon intensity of the fossil fuel mix;
EI = the reciprocal of fossil fuel based electricity generation efficiency;
EFS = share of electricity from fossil fuels;
EL = total electricity output.

This decomposition expresses, for a given time, CO_2 emissions from electricity generation as the product of the carbon intensity of the fossil fuel mix (CF), the reciprocal of fossil fuel based thermal electricity generation efficiency (1/EF), the share of electricity from fossil fuels (EFS) and total electricity output (EL).

However, due to non-linear interactions between terms, if a simple decomposition is used, the sum of the percentage changes of the four factors, e.g. $(CF_y\text{-}CF_x)/CF_x$ may not perfectly match the percentage change of total CO_2 emissions $(C_y\text{-}C_x)/C_x$. To avoid this, a more complex decomposition method is required. In this case, the logarithmic mean divisia (LMDI) method proposed by Ang (2004)[37] has been used.

Using this method, the change in total CO_2 emissions from electricity generation (C_{TOT})between year t and a base year 0, can be computed as the sum of the changes in each of the individual factors as follows:

$$C_{TOT} = C_{CF} + C_{EI} + C_{EFS} + C_{EL}$$

where:

$$C_{CF} = L(CF^t, CF^0) ln\left(\frac{CF^t}{CF^0}\right)$$

$$C_{EI} = L(EI^t, EI^0) ln\left(\frac{EI^t}{EI^0}\right)$$

$$C_{EFS} = L(EFS^t, EFS^0) ln\left(\frac{EFS^t}{EFS^0}\right)$$

$$C_{EL} = L(EL^t, EL^0) ln\left(\frac{EL^t}{EL^0}\right)$$

and:

$$L(x, y) = (y - x)/(ln\, y - ln\, x)$$

This decomposition can be useful when analysing the trends in CO_2 emissions from electricity generation. For instance, it shows that globally, since 1990, the main driver of increased CO_2 emissions from electricity generation has been increased electricity output, with improvements in the overall thermal efficiency, and the CO_2 intensity of the electricity generation mix being offset by an increase in the share of electricity derived from fossil fuel sources.

However, as is the case with the Kaya decomposition, it should be noted that the four terms on the right-hand side of equation should be considered neither as fundamental driving forces in themselves, nor as generally independent from each other. For instance, substituting coal with gas as a source of electricity generation would likely affect both the CO_2 intensity of the electricity generation mix and the thermal efficiency of generation.

CO_2 emissions per kWh

The indicator: definition

In the total CO_2 emissions per kWh, the numerator presents the CO_2 emissions from fossil fuels consumed for electricity generation, while the denominator presents the total electricity generated, coming from fossil fuels, but also from nuclear, hydro,

36. M. Zhang, X. Liu, W. Wang, M. Zhou. *Decomposition analysis of CO_2 emissions from electricity generation in China.* Energy Policy, 52 (2013), pp. 159–165.

37. B. W. Ang, *Decomposition analysis for policymaking in energy: which is the preferred method?*, Energy Policy, 32 (9) (2004), pp. 1131–1139.

geothermal, solar, biofuels, etc. As a result, the emissions per kWh vary a lot across countries and from year to year, depending on the generation mix.

In the CO_2 emissions per kWh **by fuel**:

- Coal includes primary and secondary coal, and coal gases. Peat and oil shale have also been aggregated with coal, where applicable.
- Oil includes oil products (and crude oil for some countries).
- Gas represents natural gas.

Note: Emissions per kWh should be used with caution due to data quality problems relating to electricity efficiencies for some countries.

Methodological choices: electricity-only versus combined electricity and heat

In previous editions of this publication, the IEA had published a combined electricity and heat CO_2 emissions per kWh indicator. The indicator was useful as an overall carbon intensity measure of a country's electricity and heat generating sectors, and it was easy to calculate. However, there were a number of drawbacks. As the efficiency of heat generation is almost always higher than electricity generation, countries with large amounts of district heating (generally colder countries) tended to have a higher efficiency (therefore lower CO_2 intensity) than warmer countries with less district heating. Further, the applications of a combined indicator for electricity and heat are limited; many users have been searching for an electricity-only CO_2 emissions per kWh indicator.

Unfortunately, it is not possible to obtain such an electricity-only indicator directly from IEA energy balance data without any assumption. In fact, for combined heat and power (CHP) plants, there is only one combined input available. While various methods exist to split this input into separate amounts for electricity and heat generation, none has previously been used by the IEA for the purposes of calculating a CO_2 emissions per kWh indicator.

It would be possible to calculate an electricity-only indicator using data for electricity-only plants, which would not encounter the problem of assigning CHP inputs between electricity and heat. However, this would not allow a fair cross-country comparison; some countries get

Fixed-heat-efficiency approach

$$CO_2kWh = \frac{CO_{2\,ELE} + (CO_{2\,CHP} \times \%\ \text{from elec.}) + OWNUSE_{ELE}}{ELoutput_{ELE} + ELoutput_{CHP}}$$

where:

$$\%\ \text{from elec.} = \frac{CHPinputs - ((HEoutput_{CHP} \times 0.02388) \div EFF_{HEAT})}{CHPinputs}$$

and:

$$OWNUSE_{ELE} = OWNUSE \times \frac{ELoutput}{ELoutput + (HEoutput \div 3.6)}$$

$CO_{2\,ELE}$ = CO_2 emissions from electricity only plants in $ktCO_2$

$CO_{2\,CHP}$ = CO_2 emissions from CHP plants in $ktCO_2$

OWNUSE = CO_2 emissions from own use in electricity, CHP and heat plants in $ktCO_2$

ELoutput = total electricity output from electricity and CHP plants in GWh

$ELoutput_{ELE}$ = electricity output from electricity only plants in GWh

$ELoutput_{CHP}$ = electricity output from CHP plants in GWh

HEoutput = total heat output from CHP and heat plants in TJ

$HEoutput_{CHP}$ = heat output from CHP plants in TJ

CHPinputs = energy inputs to CHP plants in ktoe

EFF_{HEAT} = efficiency of heat generation - assumed to be 0.9 (*i.e.* 90%) except when the observed efficiency of CHP generation is higher than 90%, in which case emissions are allocated using the proportionality approach ($EFF_{HEAT} = EFF_{ELEC} = EFF_{CHP}$).

a majority of their electricity from CHP, while others from electricity-only plants. As non-thermal renewables are solely electricity-only plants, and over 99% of non-emitting global nuclear generation is from electricity-only plants, then calculating this electricity-only plants indicator would significantly understate the electricity carbon intensity for many countries.

Electricity-only indicator: allocation of emissions from CHP plants

To allocate the CHP input to electricity and heat separately, the simplest method would be a **proportionality approach,** allocating inputs based on the proportion of electricity and heat in the output, also used by the IEA electricity questionnaire. This is equivalent to fixing the efficiency of electricity and heat to be equal. With the advantage of simplicity and transparency, the proportionality approach however tends to overstate electricity efficiency and to understate heat efficiency. For example, for CHP generation in OECD countries, total efficiency is around 60%. However, total electricity-only plant efficiency is around 41% in OECD countries. Similarly, 60% is quite low for heat generation (given typical heat-only plant efficiencies of 80-95%).

An alternative method to avoid unrealistic efficiencies is a **fixed-heat-efficiency approach,** fixing the efficiency of heat generation to compute the input to heat, and calculating the input to electricity as a residual from the total input. The standard heat efficiency was set to that of a typical heat boiler, 90%.

Implementation problems arise in two cases: i) when the observed efficiency is over 100% (i.e. there are problems in data quality), and ii) when the observed efficiency is between 90% and 100% (the total efficiency may be correct or it may be overstated).

In the first case, when the total efficiency is over 100% because the data are not reported correctly, it is not possible to use the fixed-heat-efficiency approach and by default the proportionality approach was used to allocate the inputs based on the output shares.

In the second case, where the total CHP efficiency was between 90% and 100% (which may or may not indicate a data quality problem), assuming a 90% efficiency for heat generation would incorrectly imply that the efficiency of power generation was equal to or higher than that of heat generation. However, as the real heat efficiency cannot be determined, the proportionality approach was used also here by default.

In general, the fixed-heat-efficiency approach attributes larger emissions to electricity than the proportionality approach, with values much closer to those of electricity-only plants. The IEA has used the fixed-heat-efficiency approach for several editions of its *World Energy Outlook*.

Comparison between electricity-only and combined electricity and heat ratios (2014 data, from the 2016 edition)

Implied carbon emission factors from electricity generation (CO_2 / kWh) for selected products

Average implied carbon emission factors from electricity generation by product are presented below, for selected products. The values below represent the average amount of CO_2 per kWh of electricity produced in OECD member countries between 2011 and 2015. As they are very sensitive to the quality of underlying data, including net calorific values, and of reported input/output efficiencies, they should be taken as indicative; actual values may vary considerably.

Product	gCO_2 / kWh
Anthracite*	860
Coking coal*	845
Other bituminous coal	870
Sub-bituminous coal	940
Lignite	1020
Gas works gas*	330
Coke oven gas*	390
Blast furnace gas*	2430
Other recovered gases*	1585
Oil shale*	1195
Peat*	765
Natural gas	400
Crude oil*	600
Refinery gas*	460
Liquefied petroleum gases*	540
Kerosene*	655
Gas/diesel oil*	700
Fuel oil	675
Petroleum coke*	940
Municipal waste (non-renew.)*	1195

* The electricity output from these products represents less than 1% of electricity output in the average of OECD member countries for the years 2011-2015. Values will be less reliable and should be used with caution.

For the majority of OECD countries, the electricity-only indicator is not significantly different from the combined electricity and heat indicator, shown in previous editions of this publication and in the online database. For the OECD total in 2014, the electricity-only indicator is 4% higher, while 19 of the OECD's 34 countries saw a difference of 5% or less. Of the 15 countries with differences of more than 5%, 7 countries had large amounts of non-emitting electricity generation, giving them a small ratio to begin with (thus more prone to change). In addition, non-emitting generation is generally electricity-only, and so when the heat-only and heat CHP emissions are removed from the calculation, greater weight is attached to the non-emitting generation, with a lower level for the final indicator.

The countries in the OECD with larger differences are generally coal-intensive countries with large amounts of heat generation. As mentioned, in general, heat plants are more efficient than electricity-only or CHP plants; therefore, excluding heat plants from the calculation increases CO_2 intensity. The same is true if we allocate a high efficiency to the heat part of CHP generation; this decreases the efficiency of the electricity part and thus increases electricity's carbon intensity. Further, CHP and heat plants are more likely to be powered by CO_2-light natural gas while electricity-only plants tend to be powered by CO_2-heavy coal, making the new ratio more CO_2 intensive for these countries.

Specific country examples

The country with the largest difference between the two ratios within the OECD was **Sweden**; in 2014, the electricity only indicator was 64% lower than the combined electricity and heat indicator. This is due to the high share of non-emitting sources such as hydro (42%) and nuclear (also 42%) in Sweden's electricity generation mix.

Similarly, the electricity only indicator for **Norway** in 2014 was 36% lower than the combined indicator, as the vast majority of the electricity output (96%) is from non-emitting hydroelectric generation.

Conversely, for **Estonia** in 2014 the electricity-only indicator was 36% higher than the combined electricity and heat indicator. This can be explained by the fact that the majority of electricity-only generation comes from oil shale, a fuel with a relatively high carbon emission factor, while heat plants (with a relatively large share of output) are largely fuelled by natural gas and primary solid biofuels.

Another OECD country with a higher electricity-only ratio was **Denmark** (25% higher in 2014). The majority of fossil generation in Denmark is from CHP and the output from these plants is approximately half electricity and half heat. In addition, CHP plants in Denmark have efficiencies of 60-70%. When the heat part of CHP is set to be 90%, the efficiency of the electricity generation is lowered and the indicator is increased.

In many non-member countries, heat data are either zero or not available, which leads to changes of less than 1% in almost 80% of the non-member countries in 2014. The majority of countries which do change are the European and former Soviet Union countries.

7. IEA ESTIMATES: CHANGES UNDER THE 2006 IPCC GUIDELINES

The 2006 IPCC Guidelines methodology: key concepts

This section briefly presents the Tier 1 methodology to estimate CO_2 emissions from fuel combustion based on the *2006 GLs,* outlining the main differences with the *1996 GLs* - used for previous editions of this publication. The focus is on the key points relevant to the IEA estimation. For the complete methodology, the reader should refer to the full IPCC documents.[38]

Generally, the Tier 1 estimation of CO_2 emissions from fuel combustion for a given fuel can be summarised as follows:

CO_2 emissions from fuel combustion
$CO_2 = AD * NCV * CC * COF$

where:

CO_2 = CO_2 emissions from fuel combustion;
AD = Activity data;
NCV = Net calorific value;
CC = Carbon content;
COF = Carbon oxidation factor.

Emissions are then summed over all fuels.

While the basic concept of the calculation - the conservation of carbon - is unchanged, the *2006 GLs* differ from the 1996 *GLs* in the:

- default **net calorific values** by product;
- default **carbon content** by product;
- default **carbon oxidation factors**;
- treatment of fuels used for **non-energy** purposes;
- **allocation** of fuel combustion emissions across the Energy and IPPU categories.

2006 Guidelines: overview of changes

This section describes the key methodological changes *2006 GLs* for a Tier 1 estimation of CO_2 emissions from fuel combustion, with a short assessment of their impact on results.

Net calorific values

Net calorific values (NCVs) are used to convert the activity data for all the different fuels from "physical" units (e.g. tonnes) to "energy" units (e.g. Joules).

In the *1996 GLs*, country-specific net calorific values were given for primary oil (crude oil and NGL), for primary coal and for a few secondary coal products. These NCVs were based on the average 1990 values of the 1993 edition of the *IEA Energy Balances*.

In the *2006 GLs*, those country-specific NCVs were removed, and one default is provided for each fuel (with upper and lower limits, as done for the carbon content). Large differences were therefore observed for products whose quality varies a lot from country to country, such as primary oil and coal products. Replacing country-specific values with one default value would significantly affect emissions calculations if the default values were used.

38. Both the *1996 GLs* and the *2006 GLs* are available from the IPCC Greenhouse Gas Inventories Programme (www.ipcc-nggip.iges.or.jp).

The IEA CO_2 emissions from fuel combustion estimates are based on the IEA energy balances, computed using time-varying country-specific NCVs. Therefore, they are not affected by changes to the default net calorific values of the *2006 GLs*.

Carbon content

Carbon content is the quantity of carbon per unit of energy of a given fuel. Some of the fuel-specific default values for carbon content, called "carbon emission factors" in the *1996 GLs*, were revised in the *2006 GLs*. In addition, values were added for some fuels not directly mentioned in the *1996 GLs*.

As the carbon content may vary considerably for some fuels, the *2006 GLs* introduced ranges of values, i.e. providing for each fuel a default value with lower and upper limits. The IEA CO_2 emissions are calculated using the IPCC default values.

A summary of the default carbon content values in the two set of guidelines is shown in Table 1. Relative changes between the 200*6 GLs* and the 199*6 GLs* range between -13.7% (refinery gas) and + 7.3% (blast furnace gas), although for many fuels the variation is minimal, or zero. Such systematic changes are reflected in Tier 1 CO_2 emissions estimates.

Carbon oxidation factors

A small fraction of the carbon contained in fuels entering the combustion process (typically less than 1-2%) is not oxidised. Under the *1996 GLs,* this amount was subtracted from emissions in the calculations by multiplying the calculated carbon content of a fuel by a "fraction of carbon oxidised". The fraction of carbon oxidised had a value of less than 1.0, which had the effect of reducing the emissions estimate. However, in most instances, emissions inventory compilers had no "real" information as to whether this correction was actually applicable.

Therefore, in the *2006 GLs*, it was decided that all carbon is assumed to be emitted by default, unless more specific information is available. Therefore, under the *2006 GLs*, the default carbon oxidation factor is equal to 1 for all fuels.

A summary of the default carbon oxidation factors in the two set of guidelines is shown in Table 2. Relative changes from the *1996 GLs* and the *2006 GLs* are +0.5% for natural gas; +1% for oil, oil products and peat; and +2% for coal. Such changes are reflected in systematic increases in Tier 1 CO_2 emissions estimates.

Table 1. Comparison of default carbon content values*

Kilogrammes / gigajoule

Fuel Type	*1996 Guidelines*	*2006 Guidelines***	Percent Change
Anthracite	26.8	26.8	0.0%
Coking Coal	25.8	25.8	0.0%
Other Bituminous Coal	25.8	25.8	0.0%
Sub-Bituminous Coal	26.2	26.2	0.0%
Lignite	27.6	27.6	0.0%
Patent Fuel	25.8	26.6	+3.1%
Coke oven coke	29.5	29.2	-1.0%
Gas Coke	29.5	29.2	-1.0%
Coal Tar	..	22.0	x
BKB	25.8	26.6	+3.1%
Gas Works Gas	..	12.1	x
Coke Oven Gas	13.0	12.1	-6.9%
Blast Furnace Gas	66.0	70.8	+7.3%
Other recovered gases	..	49.6	x
Peat	28.9	28.9	0.0%
Oil shale	29.1	29.1	0.0%
Natural Gas	15.3	15.3	0.0%
Crude Oil	20.0	20.0	0.0%
Natural Gas Liquids	17.2	17.5	+1.7%
Refinery Feedstocks	20.0	20.0	0.0%
Orimulsion	22.0	21.0	-4.5%
Refinery Gas	18.2	15.7	-13.7%
Ethane	16.8	16.8	0.0%
Liquefied petroleum gases (LPG)	17.2	17.2	0.0%
Motor Gasoline excl. bio	18.9	18.9	0.0%
Aviation Gasoline		19.1	+1.1%
Gasoline type jet fuel		19.1	+1.1%
Kerosene type jet fuel excl. bio	19.5	19.5	0.0%
Other Kerosene	19.6	19.6	0.0%
Gas/Diesel Oil excl. bio	20.2	20.2	0.0%
Fuel Oil	21.1	21.1	0.0%
Naphtha	20.0	20.0	0.0%
Lubricants	20.0	20.0	0.0%
Bitumen	22.0	22.0	0.0%
Petroleum Coke	27.5	26.6	-3.3%
Non-specified oil products	20.0	20.0	0.0%
Other hydrocarbons			
White Spirit & SBP		20.0	0.0%
Paraffin Waxes		20.0	0.0%
Industrial Waste	..	39.0	x
Municipal Waste (non-renewable)	..	25.0	x

* "Carbon content" was referred to as the "carbon emission factor" in the *1996 GLs*.

** The *2006 GLs* also give the lower and upper limits of the 95 percent confidence intervals, assuming lognormal distributions.

Table 2. Comparison of default carbon oxidation factors*

Fuel Type	*1996 Guidelines*	*2006 Guidelines***	Percent Change
Coal	0.980	1.00	+2.0%
Oil and oil products	0.990	1.00	+1.0%
Natural gas	0.995	1.00	+0.5%
Peat **	0.990	1.00	+1.0%

* "Carbon oxidation factor" was referred to as "fraction of carbon oxidised" in the 1996 GLs.

** The 1996 GLs specified a carbon oxidation factor for peat used for electricity generation only.

Treatment of fuels used for non-energy purposes

Many hydrocarbons are used for non-energy purposes e.g. petrochemical feedstocks, lubricants, solvents, and bitumen. In some of these cases, the carbon in the fuel is quickly oxidised to CO_2, in other cases, it is stored (or sequestered) in the product, sometimes for as long as centuries.

In the *1996 IPCC GLs*, Tier 1 Sectoral Approach emissions included emissions from fuels used for non-energy purposes. The share of carbon assumed to be stored (not emitted) was estimated based on default "fractions of carbon stored" (shown for reference in Table 3).

Table 3. Fraction of carbon stored in the *1996 GLs*

Fuel Type	*1996 Guidelines*
Naphtha*	0.8
Lubricants	0.5
Bitumen	1.0
Coal Oils and Tars (from coking coal)	0.75
Natural Gas*	0.33
Gas/Diesel Oil*	0.5
LPG*	0.8
Ethane*	0.8
Other fuels for non-energy use	To be specified

* When used as feedstocks.

Note: this table is included only for reference. CO_2 emissions from fuel combustion in this publication do not include emissions from non-energy use of fuels.

In the *2006 GLs,* all deliveries for non-energy purposes are excluded. Numerically, excluding all non-energy use of fuel from energy sector emissions calculations is equivalent to applying a fraction of carbon stored equal to 1 to all quantities delivered for non-energy purposes.

In the case of a complete greenhouse gas inventory covering all IPCC Source/Sink categories, any emissions associated with non-energy use of fuels would be accounted in another Source/Sink category. However, as this publication only deals with CO_2 emissions from fuel combustion, emissions associated with non-energy use of fuels are not any longer included in the IEA CO_2 emissions estimates.

Within the IEA estimates, the effect of this change is mainly noticeable for countries whose petrochemical sectors are large in comparison to the size of their economies, e.g. the Netherlands.

Allocation of fuel combustion emissions across the Energy and the IPPU sectors

To avoid possible double counting, the *2006 GLs* state that combustion emissions from fuels obtained directly or indirectly from the feedstock for an Industrial Processes and Product Use (IPPU) process will be allocated to the source category in which the process occurs, unless the derived fuels are transferred for combustion in another source category.

In the case of a complete inventory, this reallocation would not affect total emissions. Still, the effect on individual source categories could be quite significant, especially in countries with large IPPU sectors (e.g. the iron and steel, and non-ferrous metals industries).

To provide continuity with previous editions of this publication and to fully account for fuel combustion emissions, the IEA CO_2 emissions from fuel combustion include all emissions from fuel combustion, irrespective of the category of reporting (Energy or IPPU) under the *2006 GLs*.

To ensure comparability with submissions from Parties, an additional online database provides a summary of CO_2 emissions calculated according to the IPCC Reference and Sectoral Approaches, and a breakdown of the fuel combustion emissions which would be reallocated to IPPU under the *2006 GLs*.[39]

Assessing the overall impact of methodological changes on IEA estimates

Table 4 shows IEA estimates of total CO_2 emissions from fuel combustion for OECD countries, for the 2014 data (from the 2016 edition). Emissions are calculated using: i) the *1996 GLs* Sectoral Approach, methodology as in previous publications, and ii) the *2006 GLs*[40] - which correspond to the data published in this edition.

39. Note that the data available to the IEA do not allow assessing whether fuels derived from IPPU processes are transferred for combustion in another source category.

40. Including the emissions which may be reallocated from Energy to IPPU under the *2006 GLs*.

The overall impact of the change in methodology on the IEA estimates of CO_2 emissions from fuel combustion varies from country to country, mainly depending on the underlying fuel mix and on the relative importance of non-energy use of fuels in the total.

Most countries show a decrease in CO_2 emissions levels under the new methodology, as the reductions due to the removal of non-energy use emissions are generally larger than the systematic increase due to changes in the oxidation factor.

For the year 2014, reductions of 1% or greater are observed for sixty-five countries, with thirteen showing a decrease of 5% or more. The largest relative decreases are observed in countries with high non-energy use of fuels (mainly oil products and natural gas) relative to their total energy consumption: Trinidad and Tobago (-39%), Gibraltar (-17%), Lithuania (-14%), and Singapore, the Netherlands, Belarus and Brunei Darussalam (all -11%). As emissions from non-energy use of fuels are not included in energy sector emissions under the 2006 GLs, emissions previously attributed to non-energy use of oil products and natural gas are no longer included in IEA CO_2 emissions from fuel combustion estimates for these countries. One country, Curaçao presented a large increase (27%) in 2014. This was due to the inclusion of emissions from reported energy use of bitumen, which had been excluded (considered carbon stored / non-energy use) under the 1996 GLs.

Within the IEA databases, these changes will also be reflected in all indicators derived from CO_2 emissions totals (e.g. CO_2/TPES, CO_2/GDP). Impacts on trends should be visible when the relative weight of the non-energy use of fuels changes in time.

However, as mentioned, most of the methodological changes would not have significant impact in the case of a complete inventory covering all IPCC source/sink categories; in particular, the reallocation of emissions between categories would not affect total emissions estimates, nor the overall trends.

Table 4. Comparison of IEA CO_2 emissions estimates (2014 data, 2016 edition)

$MtCO_2$

Country	*1996 GLs CO_2 Sectoral Approach*	*2006 GLs CO_2 Fuel Combustion*	Percent Change
World	**32903.3**	**32381.0**	**-1.6%**
Annex I Parties	**12852.2**	**12628.4**	**-2%**
Non-Annex I Parties	**18932.1**	**18622.2**	**-2%**
OECD			
Australia	375.2	373.8	-0.4%
Austria	60.8	60.8	0.0%
Belgium	95.0	87.4	-8.0%
Canada	574.6	554.8	-3.4%
Chile	76.4	75.8	-0.8%
Czech Republic	98.4	96.6	-1.8%
Denmark	34.7	34.5	-0.6%
Estonia	17.5	17.5	0.0%
Finland	46.4	45.3	-2.4%
France	295.8	285.7	-3.4%
Germany	734.6	723.3	-1.5%
Greece	66.4	65.9	-0.8%
Hungary	41.3	40.3	-2.4%
Iceland	2.0	2.0	0.0%
Ireland	33.7	33.9	0.6%
Israel	66.3	64.7	-2.4%
Italy	325.7	319.7	-1.8%
Japan	1193.3	1188.6	-0.4%
Korea	589.5	567.8	-3.7%
Luxembourg	9.2	9.2	0.0%
Mexico	432.1	430.9	-0.3%
Netherlands	166.6	148.3	-11.0%
New Zealand	33.2	31.2	-6.0%
Norway	36.9	35.3	-4.3%
Poland	281.3	279.0	-0.8%
Portugal	43.2	42.8	-0.9%
Slovak Republic	29.9	29.3	-2.0%
Slovenia	12.6	12.8	1.6%
Spain	234.8	232.0	-1.2%
Sweden	38.7	37.4	-3.4%
Switzerland	37.7	37.7	0.0%
Turkey	304.8	307.1	0.8%
United Kingdom	409.0	407.8	-0.3%
United States	5235.9	5176.2	-1.1%
OECD Total	**12033.5**	**11855.6**	**-1.5%**

Country	*1996 GLs CO_2 Sectoral Approach*	*2006 GLs CO_2 Fuel Combustion*	Percent Change
Non-OECD Europe and Eurasia			
Albania	4.3	4.1	-4.7%
Armenia	5.2	5.2	0.0%
Azerbaijan	31.3	30.8	-1.6%
Belarus	64.3	57.4	-10.7%
Bosnia and Herzegovina	21.2	21.6	1.9%
Albania	42.2	42.1	-0.2%
Croatia	15.8	15.1	-4.4%
Cyprus[41]	5.7	5.8	1.8%
Georgia	8.0	7.7	-3.8%
Gibraltar	0.6	0.5	-16.7%
Kazakhstan	220.3	223.7	1.5%
Kosovo	7.3	7.4	1.4%
Kyrgyzstan	8.3	8.4	1.2%
Latvia	6.7	6.7	0.0%
Lithuania	12.0	10.3	-14.2%
FYR of Macedonia	7.3	7.4	1.4%
Malta	2.3	2.3	0.0%
Republic of Moldova	7.2	7.2	0.0%
Montenegro	2.2	2.2	0.0%
Romania	69.0	68.2	-1.2%
Russian Federation	1525.3	1467.6	-3.8%
Serbia	37.9	38.1	0.5%
Tajikistan	4.6	4.7	2.2%
Turkmenistan	66.6	67.0	0.6%
Ukraine	239.6	236.5	-1.3%
Uzbekistan	101.0	97.9	-3.1%
Non-OECD Europe and Eurasia	**2516.4**	**2446.1**	**-2.8%**

41. Please refer to the chapter *Geographical coverage*.

Table 4. Comparison of IEA CO_2 emissions estimates for Non-OECD Countries (2014 data, 2016 edition)

$MtCO_2$

Country	*1996 GLs CO_2 Sectoral Approach*	*2006 GLs CO_2 Fuel Combustion*	Percent Change
Africa			
Algeria	126.4	122.9	-2.8%
Angola	19.5	19.3	-1.0%
Benin	5.7	5.7	0.0%
Botswana	6.8	6.9	1.5%
Cameroon	6.0	6.0	0.0%
Congo	2.7	2.6	-3.7%
Cote d'Ivoire	4.6	4.7	2.2%
Dem. Rep. of Congo	9.3	9.4	1.1%
Egypt	181.1	173.3	-4.3%
Eritrea	0.6	0.6	0.0%
Ethiopia	9.2	9.1	-1.1%
Gabon	3.5	3.5	0.0%
Ghana	13.3	13.1	-1.5%
Kenya	12.3	12.4	0.8%
Libya	48.1	47.9	-0.4%
Mauritius	3.9	4.0	2.6%
Morocco	53.0	53.1	0.2%
Mozambique	3.8	3.9	2.6%
Namibia	3.6	3.6	0.0%
Niger	2.0	2.0	0.0%
Nigeria	61.9	60.2	-2.7%
Senegal	6.4	6.3	-1.6%
South Africa	442.3	437.4	-1.1%
South Sudan	13.9	13.3	-4.3%
Sudan	1.5	1.5	0.0%
United Rep. of Tanzania	10.4	10.4	0.0%
Togo	1.7	1.7	0.0%
Tunisia	25.0	25.0	0.0%
Zambia	3.3	3.2	-3.0%
Zimbabwe	11.4	11.5	0.9%
Other Africa	32.3	31.0	-4.0%
Africa	**1125.6**	**1105.3**	**-1.8%**
Asia (excl. China)			
Bangladesh	63.9	62.3	-2.5%
Brunei Darussalam	7.5	6.7	-10.7%
Cambodia	6.0	6.1	1.7%
DPR of Korea	37.0	37.8	2.2%
India	2038.9	2019.7	-0.9%
Indonesia	442.3	436.5	-1.3%
Malaysia	227.5	220.5	-3.1%
Mongolia	17.8	18.2	2.2%
Myanmar	19.6	19.6	0.0%
Nepal	5.8	5.9	1.7%
Pakistan	141.0	137.4	-2.6%
Philippines	94.5	95.7	1.3%
Singapore	50.9	45.3	-11.0%
Sri Lanka	16.5	16.7	1.2%
Chinese Taipei	260.9	249.7	-4.3%
Thailand	263.1	243.5	-7.4%
Viet Nam	143.7	143.3	-0.3%
Other Asia	41.7	42.1	1.0%
Asia (excl. China)	**3878.8**	**3807.0**	**-1.9%**

Country	*1996 GLs CO_2 Sectoral Approach*	*2006 GLs CO_2 Fuel Combustion*	Percent Change
China			
People's Republic of China	9199.1	9087.0	-1.2%
Hong Kong (China)	47.3	47.9	1.3%
China (incl. Hong Kong)	**9246.4**	**9134.9**	**-1.2%**
Non-OECD Americas			
Argentina	195.3	192.4	-1.5%
Bolivia	18.2	18.3	0.5%
Brazil	492.6	476.0	-3.4%
Colombia	73.0	72.5	-0.7%
Costa Rica	7.1	7.2	1.4%
Cuba	29.6	29.4	-0.7%
Curaçao	3.7	4.7	27.0%
Dominican Republic	19.5	19.3	-1.0%
Ecuador	38.7	38.7	0.0%
El Salvador	5.9	5.9	0.0%
Guatemala	16.1	16.1	0.0%
Haiti	2.7	2.8	3.7%
Honduras	8.7	8.7	0.0%
Jamaica	7.1	7.2	1.4%
Nicaragua	4.5	4.5	0.0%
Panama	10.6	10.6	0.0%
Paraguay	5.2	5.2	0.0%
Peru	48.4	47.8	-1.2%
Suriname	2.0	2.0	0.0%
Trinidad and Tobago	38.0	23.2	-38.9%
Uruguay	6.5	6.3	-3.1%
Venezuela	155.5	155.0	-0.3%
Other Non-OECD Americas	19.9	20.1	1.0%
Non-OECD Americas	**1209.0**	**1173.9**	**-2.9%**
Middle East			
Bahrain	31.8	29.7	-6.6%
Islamic Republic of Iran	576.1	556.1	-3.5%
Iraq	140.2	141.0	0.6%
Jordan	23.9	24.1	0.8%
Kuwait	88.4	86.1	-2.6%
Lebanon	22.1	22.4	1.4%
Oman	63.1	59.9	-5.1%
Qatar	82.7	77.6	-6.2%
Saudi Arabia	521.4	506.6	-2.8%
Syrian Arab Republic	28.1	27.6	-1.8%
United Arab Emirates	175.8	175.4	-0.2%
Yemen	21.1	21.3	0.9%
Middle East	**1774.7**	**1727.8**	**-2.6%**

8. UNITS AND CONVERSIONS

General conversion factors for energy

To:	TJ	Gcal	Mtoe	MBtu	GWh
From:	multiply by:				
terajoule (TJ)	1	2.388×10^{2}	2.388×10^{-5}	9.478×10^{2}	2.778×10^{-1}
gigacalorie (Gcal)	4.187×10^{-3}	1	1.000×10^{-7}	3.968	1.163×10^{-3}
million tonnes of oil equivalent (Mtoe)	4.187×10^{4}	1.000×10^{7}	1	3.968×10^{7}	1.163×10^{4}
million British thermal units (MBtu)	1.055×10^{-3}	2.520×10^{-1}	2.520×10^{-8}	1	2.931×10^{-4}
gigawatt hour (GWh)	3.600	8.598×10^{2}	8.598×10^{-5}	3.412×10^{3}	1

Conversion factors for mass

To:	kg	t	lt	st	lb
From:	multiply by:				
kilogramme (kg)	1	1.000×10^{-3}	9.842×10^{-4}	1.102×10^{-3}	2.205
tonne (t)	1.000×10^{3}	1	9.842×10^{-1}	1.102	2.205×10^{3}
long ton (lt)	1.016×10^{3}	1.016	1	1.120	2.240×10^{3}
short ton (st)	9.072×10^{2}	9.072×10^{-1}	8.929×10^{-1}	1	2.000×10^{3}
pound (lb)	4.536×10^{-1}	4.536×10^{-4}	4.464×10^{-4}	5.000×10^{-4}	1

Conversion factors for volume

To:	gal U.S.	gal U.K.	bbl	ft^3	l	m^3
From:	multiply by:					
U.S. gallon (gal U.S.)	1	8.327×10^{-1}	2.381×10^{-2}	1.337×10^{-1}	3.785	3.785×10^{-3}
U.K. gallon (gal U.K.)	1.201	1	2.859×10^{-2}	1.605×10^{-1}	4.546	4.546×10^{-3}
barrel (bbl)	4.200×10^{1}	3.497×10^{1}	1	5.615	1.590×10^{2}	1.590×10^{-1}
cubic foot (ft^3)	7.481	6.229	1.781×10^{-1}	1	2.832×10^{1}	2.832×10^{-2}
litre (l)	2.642×10^{-1}	2.200×10^{-1}	6.290×10^{-3}	3.531×10^{-2}	1	1.000×10^{-3}
cubic metre (m^3)	2.642×10^{2}	2.200×10^{2}	6.290	3.531×10^{1}	1.000×10^{3}	1

Decimal prefixes

10^{1}	deca (da)	10^{-1}	deci (d)
10^{2}	hecto (h)	10^{-2}	centi (c)
10^{3}	kilo (k)	10^{-3}	milli (m)
10^{6}	mega (M)	10^{-6}	micro (μ)
10^{9}	giga (G)	10^{-9}	nano (n)
10^{12}	tera (T)	10^{-12}	pico (p)
10^{15}	peta (P)	10^{-15}	femto (f)
10^{18}	exa (E)	10^{-18}	atto (a)

Tonne of CO_2

The *2006 GLs* and the UNFCCC *Reporting Guidelines on Annual Inventories* both ask that CO_2 emissions be reported in Gg (gigagrammes) of CO_2. A million tonnes of CO_2 is equal to 1 000 Gg of CO_2, so to compare the numbers in this publication with national inventories expressed in Gg, multiply the IEA emissions by 1 000.

Other organisations may present CO_2 emissions in tonnes of carbon instead of tonnes of CO_2. To convert from tonnes of carbon, multiply by 44/12, which is the molecular weight ratio of CO_2 to C.

Energy Data Officer/Statistician

Possible staff vacancies

International Energy Agency, Paris, France

The IEA

The International Energy Agency, based in Paris, acts as energy policy advisor to 30 member countries in their effort to ensure reliable, affordable and clean energy for their citizens. Founded during the oil crisis of 1973-74, the initial role of the IEA was to co-ordinate measures in times of oil supply emergencies. As energy markets have changed, so has the IEA. Its mandate has broadened to incorporate the "Three E's" of balanced energy policy making: energy security, economic development and environmental protection. Current work focuses on climate change policies, market reform, energy technology collaboration and outreach to the rest of the world, especially major consumers and producers of energy like China, India, Russia and the OPEC countries.

The Energy Data Centre, with a staff of around 30 people, provides a dynamic environment for young people just finishing their studies or with one to two years of work experience.

Job description

The data officers/statisticians compile, verify and disseminate information on all aspects of energy including production, transformation and consumption of all fuels, energy efficiency indicators, CO_2 emissions, and energy prices and taxes. The data officers are responsible for the production of data sets through receiving, reviewing and inputting data submissions from member countries and other sources. They check for completeness, correct calculations, internal consistency, accuracy and consistency with definitions. Often this entails proactively investigating and helping to resolve anomalies in collaboration with national administrations. The data officers/statisticians also design and implement computer macros used in the preparation of their energy statistics publication(s) alongside analysis of the data.

Principal qualifications

- University degree in a topic relevant to energy, or statistics. We currently have staff with degrees in mathematics, statistics, information technology, economics, engineering, physics, environmental studies, etc.
- Experience in the basic use of databases and computer software. Experience in Visual Basic is an advantage.
- Ability to work accurately, pay attention to detail and work to deadlines; ability to deal simultaneously with a wide variety of tasks and to organise work efficiently.
- Good communication skills; ability to work well in a team and in a multicultural environment, particularly in liaising with contacts in national administrations and industry; ability to understand, and communicate data.
- An excellent written and oral command of English; knowledge of other languages would be an asset.
- Some knowledge of energy industry operations and terminology would also be an advantage, but is not required.

Nationals of any IEA member country are eligible for appointment. Basic salaries start at 3 400 euros per month. The possibilities for advancement are good for candidates with appropriate qualifications and experience. Tentative enquiries about future vacancies are welcomed from men and women with relevant qualifications and experience. Applications in English, accompanied by a curriculum vitae, should be sent to:

Office of Management and Administration
International Energy Agency
9 rue de la Fédération
75739 Paris Cedex 15, France

Online data services

Users can instantly access not only all the data published in this book, but also all the time series used for preparing this publication and all the other statistics publications of the IEA. The data are available online, either through annual subscription or pay-per-view access. More information on this service can be found on our website at *http://data.iea.org*.

Nine annual publications

■ World Energy Statistics 2019

World Energy Statistics provides comprehensive world energy statistics on all energy sources – coal, gas, oil, electricity, renewables and waste. It covers energy supply and consumption for over 160 countries and regions, including all OECD countries, and more than 100 other key energy producing and consuming countries, as well as world totals and various regional aggregates. The book includes detailed tables by country in original units, and summary time series on production, trade, and final consumption by sector.

Published August 2019 - Price: Print €120; PDF €96

■ World Energy Balances 2019

World Energy Balances provides comprehensive energy balances for all the world's largest energy producing and consuming countries. It contains detailed data on the supply and consumption of energy for over 160 countries and regions, including all OECD countries, and more than 100 other key energy producing and consuming countries, as well as world totals and various regional aggregates. The book includes graphs and detailed data by country for all energy sources – coal, gas, oil, electricity, renewables and waste - expressed in balance format. Alongside this, there are summary time series on production, trade, final consumption by sector, as well as key energy and economic indicators and an overview of trends in global energy production and use.

Published August 2019 - Price: Print €120; PDF €96

■ Coal Information 2019

Coal Information provides a comprehensive review of historical and current market trends in the world coal sector. It provides an overview of world coal developments covering coal production and coal reserves, coal demand by type, coal trade and coal prices. A detailed and comprehensive statistical picture of historical and current coal developments in the OECD member countries, by region and individually is presented in tables and charts. Complete coal balances and coal trade data for selected years are presented on major non-OECD coal-producing and -consuming countries, with summary statistics on coal supply and end-use statistics for many other countries and regions worldwide.

Published August 2019 - Price: Print €165; PDF €132

■ Electricity Information 2019

Electricity Information provides a comprehensive review of historical and current market trends in the OECD electricity sector. It provides an overview of the world electricity developments covering world electricity and heat production, input fuel mix, supply and consumption, and electricity imports and exports. More detail is provided for the OECD countries with information covering production, installed capacity, input energy mix to electricity and heat production, consumption, electricity trades, input fuel prices and end-user electricity prices. It provides comprehensive statistical details on overall energy consumption, economic indicators, electricity and heat production by energy form and plant type, electricity imports and exports, sectoral energy and electricity consumption, as well as prices for electricity and electricity input fuels for each country and regional aggregate.

Published August 2019 - Price: Print €150; PDF €120

■ Natural Gas Information 2019

Natural Gas Information is a detailed reference work on gas supply and demand covering OECD countries and the rest of the world. The publication contains essential information on LNG and pipeline trade, gas reserves, storage capacity and prices. The main part of the book concentrates on OECD countries, showing a detailed supply and demand balance for each country and for the three OECD regions: Americas, Asia-Oceania and Europe, as well as a breakdown of gas consumption by end user. Import and export data are reported by source and destination.

Published August 2019 - Price: Print €165; PDF €132

■ Oil Information 2019

Oil Information is a comprehensive reference book on current developments in oil supply and demand. This publication contains key data on world production, trade, prices and consumption of major oil product groups, with time series back to the early 1970s. Its core consists of a detailed and comprehensive picture of oil supply, demand, trade, production and consumption by end-user for each OECD country individually and for the OECD regions. Trade data are reported extensively by origin and destination.

Published August 2019 - Price: Print €165; PDF €132

■ Renewables Information 2019

Renewables Information provides a comprehensive review of historical and current market trends in OECD countries. It provides an overview of the development of renewables and waste in the world since 1990. A greater focus is given to the OECD countries with a review of electricity generation and capacity from renewable and waste energy sources, including detailed tables. However, an overview of developments in the world and OECD renewable and waste market is also presented. The publication encompasses energy indicators, generating capacity, electricity and heat production from renewable and waste sources, as well as production and consumption of renewables and waste.

Published August 2019 - Price: Print €110; PDF €88

CO_2 Emissions from Fuel Combustion 2019

CO_2 Emissions from Fuel Combustion provides a full analysis of emissions stemming from energy use. The data in this book cover the emissions of CO_2 for over 160 countries and regions by sector and by fuel. The publication contains estimates of CO_2 emissions, selected indicators such as CO_2/GDP, CO_2/capita and CO_2/TPES and a decomposition of CO_2 emissions into driving factors for all countries and regions. Emissions are calculated using IEA energy databases and the default methods and emission factors from the *2006 IPCC Guidelines for National Greenhouse Gas Inventories.* The IEA CO_2 emissions estimates are complemented by the EDGAR greenhouse gas data.

Published November 2019 - Price: Print €165; PDF €132

Energy Efficiency Indicators Highlights 2019

This statistical report is designed to help understand what drives final energy use in IEA member countries in order to improve and track national energy efficiency policies. This publication contains a comprehensive selection of data that the IEA has been collecting each year, after its members recognised in 2009 the need to better monitor energy efficiency policies. This report also expands its scope to countries beyond IEA. The report includes country-specific analysis of end uses across the largest four sectors – residential, services, industry and transport. It answers questions such as:

- What are the largest drivers for energy-use trends in each country?
- Was energy saved because of efficiency progress over time?
- How much energy is used for space heating, appliances or cooking?
- What are the most energy-intensive industries?

This publication is complemented by the Energy Efficiency Indicators database which contains annual data from 2000 to 2017 covering end-use energy consumption by energy product, end-use energy efficiency indicators and carbon intensity indicators for the four sectors.

Published December 2019 - Free pdf

Quarterly report

Energy Prices and Taxes

Energy Prices and Taxes provides up-to-date information on prices and taxes in national and international energy markets. It contains crude oil import prices by crude stream, industry prices and consumer prices. The end-user prices for OECD member countries cover main oil products, gas, coal and electricity. Every issue includes full notes on sources and methods and a description of price and tax components in each country.

Published Quarterly - Price €120, annual subscription: Print €380; PDF €304

Electronic editions

The Energy Data Centre produces online data services containing the complete databases which are used for preparing the statistics publications. Built-in software allows you to access and manipulate all these data in a very user-friendly manner and includes graphic facilities.

Annual Databases

- World Energy Statistics 2019 — Price: €800 (single user)
- World Energy Balances 2019 — Price: €800 (single user)
- **World Energy Statistics and Balances 2019** — Price: €1 400 (single user)
  (Combined subscription of the above two series)
- Coal Information 2019 — Price: €550 (single user)
- Electricity Information 2019 — Price: €550 (single user)
- Natural Gas Information 2019 — Price: €550 (single user)
- Oil Information 2019 — Price: €550 (single user)
- Renewables Information 2019 — Price: €400 (single user)
- CO_2 Emissions from Fuel Combustion 2019 — Price: €400 (single user)
- Energy Efficiency Indicators 2019 — Price: €400 (single user)

Quarterly Databases

- Energy Prices and Taxes — Price: (four quarters) €900 (single user)

Other services

Emissions Factors 2019

The *Emissions Factors* database includes a series of indicators related to emissions from electricity and heat generation for over 160 countries and regions, based on the IEA *World Energy Balances* and *CO_2 Emissions from Fuel Combustion* data. The main factors included are: CO_2, CH_4 and N_2O emissions per kWh of electricity and heat; adjustments due to trade (for OECD) and to losses; emission factors by fuel for sectors other than electricity. The database is available in Excel format.

Price: €550 (single user)

World Energy Prices 2019

The *World Energy Prices* data service contains annual end-use energy prices for selected products and sectors for over one hundred countries in the world. Complementing the quarterly OECD *Energy Prices and Taxes*, the world database focuses on prices for gasoline and diesel for transport; as well as electricity for households and industry.

Price: €400 (single user)

Energy Prices & Taxes and World Energy Prices package

This service is a package containing both the *Energy Prices and Taxes* and *World Energy Prices* online data services offered at a reduced rate.

Price: €1 100 (single user)

Detailed descriptions of all these data services are available on our website at ***http://data.iea.org***.

The Monthly Oil Data Service

The *Monthly Oil Data Service* provides the detailed databases of historical and projected information which is used in preparing the IEA's monthly *Oil Market Report* (OMR). The *Monthly Oil Data Service* is available as an annual subscription and includes twelve monthly updates. The service comprises three packages available separately or combined. The data are released on the same day as the official release of the *Oil Market Report.*

The packages include:

- Supply, Demand, Balances and Stocks — Price: €6 150 (single user)
- Trade — Price: €2 050 (single user)
- Field-by-Field Supply — Price: €3 080 (single user)
- **Complete Service** — **Price: €9 200 (single user)**

A description of this service is available on our website at ***www.iea.org/statistics/mods***.

The Monthly Gas Data Service

The *Monthly Gas Data Service* provides the following monthly natural gas data for OECD countries:

- Supply balances in terajoules and cubic metres;
- Production, trade, stock changes and levels where available, gross inland deliveries, own use and losses;
- Highly detailed trade data with about 50 import origins and export destinations;
- LNG trade detail available from January 2002,
- From 2011 onwards, transit volumes are included and trade data corresponds to entries/exits.

The databases cover the time period January 1984 to current month with a time lag of two months for the most recent data.

Price: €800 (single user)

For more information consult ***http://data.iea.org/payment/products/112-monthly-gas-data-service.aspx***

Moreover, the IEA statistics website contains a wealth of free statistics covering oil, natural gas, coal, electricity, renewables, energy-related CO2 emissions, prices, energy technology RD&D budgets, energy efficiency and more. It also contains Sankey flows to enable users to explore visually how a country's energy balance shifts over up to 40 years, starting with production and continuing through transformation to see important changes in supply mix or share of consumption. The IEA Energy Atlas offers panoramas on every aspect of energy on a global basis and for 150 individual countries, with interactive maps and customisable charts that detail and compare a host of data based on the Agency's authoritative statistics. The website also includes free headline energy data in excel format for all OECD countries and global regions from 1971 onwards as well as for Association countries from 1990 onwards.

The IEA statistics website can be accessed at *www.iea.org/statistics/*

IEA Publications
International Energy Agency
Website: www.iea.org
Contact information: www.iea.org/about/contact

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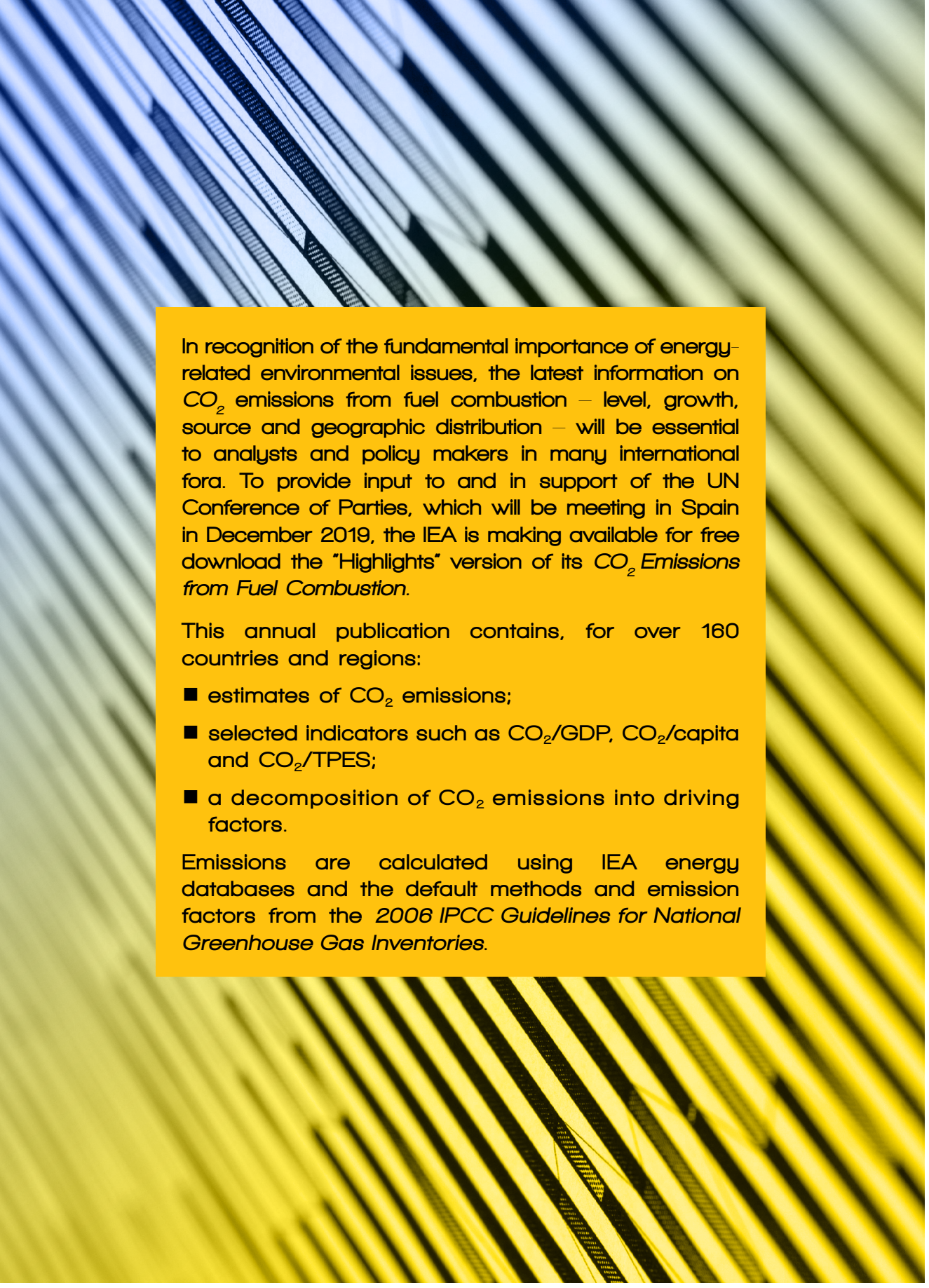

In recognition of the fundamental importance of energy-related environmental issues, the latest information on CO_2 emissions from fuel combustion – level, growth, source and geographic distribution – will be essential to analysts and policy makers in many international fora. To provide input to and in support of the UN Conference of Parties, which will be meeting in Spain in December 2019, the IEA is making available for free download the "Highlights" version of its *CO_2 Emissions from Fuel Combustion*.

This annual publication contains, for over 160 countries and regions:

- estimates of CO_2 emissions;
- selected indicators such as CO_2/GDP, CO_2/capita and CO_2/TPES;
- a decomposition of CO_2 emissions into driving factors.

Emissions are calculated using IEA energy databases and the default methods and emission factors from the *2006 IPCC Guidelines for National Greenhouse Gas Inventories*.

statistics

2019