



For information about what these numbers mean, please see page 2.

For many countries, 2011 data are presented in this section since it is the most recent year for which GHG emissions information is available for all sectors.

User Guide: Greenhouse Gas Emissions Fact Sheets

Numbers at a Glance (2011)

28 MtCO₂e*

Total GHG emissions
(0.06% of world total)
World: 46,906 MtCO₂e

3,839,322

Population
World: 6,964,618,177

7.29

tCO₂e per capita
World: 6.73 tCO₂e

US\$12,873 Million
GDP**

World: US\$54,034 Billion

1,588

tCO₂e/million US\$
GDP

World: 868 tCO₂e/million
US\$ GDP

+10 MtCO₂e (+56%)

Change in GHG
emissions (1990–2011)
World: +13,610 MtCO₂e
(+41%)

Source for all Numbers at a Glance values: WRI CAIT 2.0, 2015 Emissions including Land-Use Change and Forestry

*Million metric tons of carbon dioxide equivalent

**Gross Domestic Product (GDP) in constant 2005 US\$

This document has been prepared based on information available at the date of publication, and does not reflect official views of the U.S. government. Judgment and knowledge of the national context should be used to interpret and supplement this information. USAID assumes no liability for the contents or use of the information contained in this document.

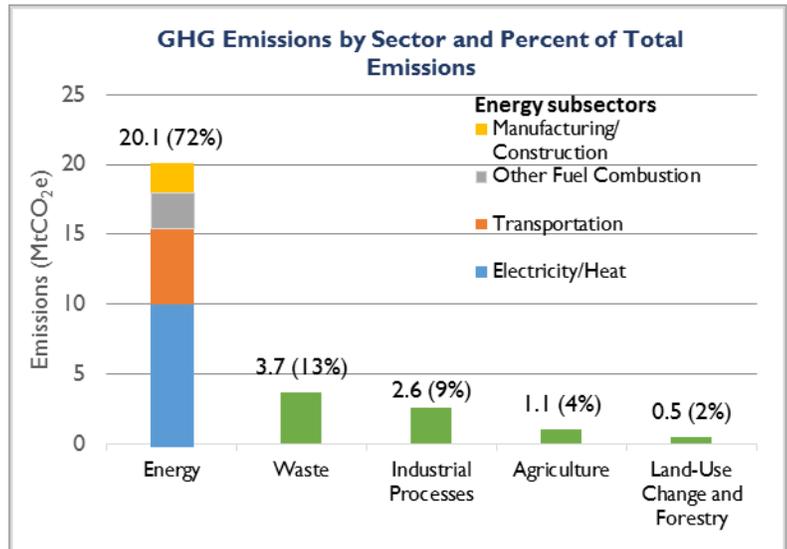
Greenhouse Gas (GHG) Emissions by Sector

The first section of the fact sheet presents the greenhouse gas (GHG) emissions in each country by sector and their proportion of total national emissions in order to show which sector(s) is the most significant source of GHG emissions.

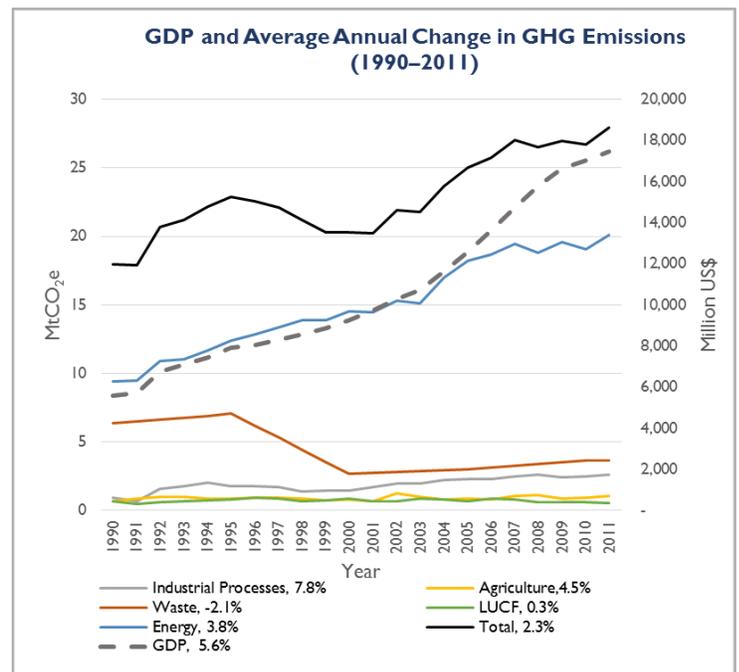
The fact sheet uses data from the most recent year for which complete data are available from the World Resources Institute Climate Analysis Indicators Tool (WRI CAIT) (see below). The emissions are categorized into sectors according to the Intergovernmental Panel on Climate Change (IPCC). As discussed below, the IPCC (1996) attributes emissions by sector: energy, industrial processes (IP), agriculture, land use change and forestry (LUCF), and waste; note, later versions of the IPCC guidelines (e.g, IPCC 2006) slightly modified the recommended sectoral groups. These sectors can be further divided into subsectors, as illustrated in the bar chart and described in the glossary.

Change in GHG Emissions (1990–2011)

This section shows the growth or decline of the country's GHG emissions over time. The time frame is usually from 1990 to 2011 or 2012, depending on data availability. This information conveys the trajectory of the country's emissions over time. To understand or anticipate future GHG emissions, the more recent trends can be more important than historical trends.



Source: World Resources Institute Climate Analysis Indicator Tool (WRI CAIT) 2.0, 2015



Source: World Resources Institute Climate Analysis Indicator Tool (WRI CAIT) 2.0, 2015

Sources used in the fact sheets are fully referenced. In some cases, hyperlinks are provided to facilitate access to the sources. See WRI CAIT information below.

<p>Numbers at a Glance (2011)</p>	<p>NUMBERS AT A GLANCE: The fact sheet provides figures as a quick overview of the country's GHG emissions. The figures are typically data from 2011 or 2012, the most recent year for which complete GHG emissions are available from the WRI CAIT database.</p>
<p>28 MtCO₂e* Total GHG emissions (0.06% of world total) World: 46,906 MtCO₂e</p>	<p>TOTAL GHG EMISSIONS: This figure shows the total national GHG emissions in units of million metric tons of carbon dioxide equivalent. Most countries' emissions represent only a small fraction of the world total. A ranking of all countries or regions by emissions can be developed using data from WRI CAIT; visit cait.wri.org.</p>
<p>3,839,322 Population World: 6,964,618,177</p>	<p>POPULATION: This shows the number of residents in the country.</p>
<p>7.29 tCO₂e per capita World: 6.73 tCO₂e</p>	<p>EMISSIONS PER CAPITA: This figure shows the country's GHG emissions per person. It is a frequently used metric that supplements national total GHG emissions information and is often used as an indicator of equity, responsibility, or opportunity to reduce emissions.</p>
<p>US\$12,873 Million GDP** World: US\$54,034 Billion</p>	<p>GROSS DOMESTIC PRODUCT: GDP shows the total value of the finished goods and services produced in the country in constant 2005 U.S. dollars. Constant dollars means the figure is adjusted to account for inflation. GDP gives an idea of the size of a country's economy</p>
<p>1,588 tCO₂e/million US\$ GDP World: 868 tCO₂e/million US\$ GDP</p>	<p>CARBON INTENSITY: This figure represents the country's GHG emissions relative to economic activity, as measured by GDP. In general, economies become less carbon intensive as they become more developed. Many countries aim to decouple GHG emissions from economic growth to reduce the GHG intensity of economic activity over time.</p>
<p>+10 MtCO₂e (+56%) Change in GHG emissions (1990–2011) World: +13,610 MtCO₂e (+41%)</p>	<p>CHANGE IN GHG EMISSIONS SINCE 1990: This figure shows how GHG emissions have grown or declined since 1990. The UN Framework Convention on Climate Change included a goal for developed countries to return their GHG emissions to 1990 levels by 2000. GHG emissions goals of some large emitters continue to refer to 1990 emission levels, including those of the European Union and its Member States.</p>

World Resources Institute Climate Analysis Indicators Tool (WRI CAIT)¹

The fact sheets use WRI CAIT due to its comprehensiveness, accessibility, and use of reputable sources. To the extent possible, WRI has followed the [1996 IPCC Common Reporting Framework](#) used by the United Nations Framework Convention on Climate Change (UNFCCC) to present emissions from six sectors: energy, IP, agriculture, LUCF, waste, and international bunkers. WRI CAIT draws energy sector and subsector GHG data from the International Energy Agency (IEA), the US Environmental Protection Agency (EPA) and the US Energy Information Administration (EIA). IP sector data sources include the Carbon Dioxide Information Analysis Center of the US Department of Energy, and EPA. WRI CAIT draws on data from the Food and Agriculture Organization (FAO) for agriculture and LUCF sector emissions. EPA and IEA data are retained for GHG emissions from the waste and bunkers sectors, respectively.

To the extent possible, the CAIT Country GHG Emissions dataset includes emissions from all GHGs and major emission sources for each country. WRI CAIT compiles data from a variety of non-governmental sources to complement the data reported by countries to the UNFCCC. Some data are missing from WRI CAIT if they are not available from the sources from which CAIT draws, or have been intentionally excluded from the fact sheets. For example, the fact sheets do not present emissions from bunker fuels since these emissions are excluded from national totals and are very low for most countries. For some countries, GHG emissions data are not available from 1990. For others, 2011 and 2012 data are missing for certain sectors. In rare cases, no country data are available from CAIT.

¹ World Resources Institute. CAIT Country Greenhouse Gas Emissions: Sources & Methods, June 2015: http://cait.wri.org/docs/CAIT2.0_CountryGHG_Methods.pdf.

Glossary

This glossary aims to explain technical language and acronyms that are commonly used in this series of fact sheets. The definitions are drawn from primary sources such as the United Nations Framework Convention on Climate Change (UNFCCC), the Intergovernmental Panel on Climate Change (IPCC), and the International Energy Agency (IEA), but the language has been edited for brevity and for the purposes of these fact sheets. For more information and precise definitions of each term, please reference the original source material.

International climate change terms

Biennial Update Report (BUR)² – [Biennial Update Reports](#) (BURs) are reports to be submitted every two years by developing countries (“non-Annex I” Parties) to the UNFCCC. BURs include national GHG inventory report updates and information on actions the country is taking to reduce its GHG emissions. The reports also describe the country’s needs and the international support it receives. For most developing countries, the first BUR should have been submitted by December 31, 2014. Countries that are considered least developed countries or small island developing states may submit BURs at their discretion.

National Communications³ – Countries that are Parties to the UNFCCC must submit [national reports](#) on their implementation of the Convention. The required content of national reports and the timetable for their submission are different for developed countries (those included in Annex I) and developing country Parties. Reporting for developing countries is implemented through national communications (NCs) and BURs. NCs from developing countries provide information on GHG inventories, including the emissions by sources and removals by sinks, measures to mitigate and to facilitate adequate adaptation to climate change, and any other information that the Party considers relevant to the achievement of the objective of the Convention. Developing countries are required to submit their first NC within three years of entering the Convention, and every four years thereafter. As of August 2016, most developing countries have submitted their Second National Communication and many have submitted their Third National Communication.

Nationally Determined Contributions (NDCs)⁴ – According to the Paris Agreement, each Party shall prepare, communicate and maintain successive [nationally determined contributions](#) (NDCs) that it intends to achieve. Countries shall pursue domestic mitigation measures with the aim of achieving the objectives of such contributions. Parties were invited to submit their intended nationally determined contributions⁵ (INDCs) well in advance of the Paris negotiations.

United Nations Framework Convention on Climate Change⁶ – The [United Nations Framework Convention on Climate Change](#) (UNFCCC or “Convention”) is an international treaty that was negotiated under the auspices of the United Nations in 1992. It serves as a framework for international cooperation to combat climate change, with the objective of limiting the increase of average global temperatures and thereby limiting climate change.

To strengthen the global response to climate change, the Kyoto Protocol to the UNFCCC was negotiated in 1997. It legally binds developed countries that ratify it to GHG emission targets. The Protocol’s first commitment period started in 2008 and ended in 2012. The second commitment period began on January 1, 2013 and will end in 2020.

There are now 197 Parties to the Convention and 192 Parties to the Kyoto Protocol.

The 2015 Paris Agreement is the latest step in the evolution of the UN climate change regime and builds on the work undertaken under the Convention. Its central aim is to strengthen the global response to the threat of climate change

² UNFCCC, Biennial Update Reports: http://unfccc.int/national_reports/non-annex_i_parties/biennial_update_reports/items/9186.php.

³ UNFCCC, National Reports: http://unfccc.int/national_reports/items/1408.php.

⁴ UNFCCC, NDC Registry: http://unfccc.int/focus/ndc_registry/items/9433.php.

⁵ UNFCCC, Intended Nationally Determined Contributions (INDCs): http://unfccc.int/focus/indc_portal/items/8766.php.

⁶ UNFCCC, Background on the UNFCCC: The international response to climate change: http://unfccc.int/essential_background/items/6031.php.

by keeping global temperature rise in the 21st century to well below 2 degrees Celsius (compared to pre-industrial levels) and to pursue efforts to limit temperature increase even further, to 1.5 degrees Celsius.

GHG Inventory Sectors

The IPCC develops methodology guidelines for national greenhouse gas inventories, which define the sectors that countries use in reporting emissions and removals of GHGs. There have been several versions of the IPCC guidelines and good practice guidance. This series of fact sheets refer to the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories (IPCC 1996), which are also used by WRI CAIT, and are the basis for the sector definitions below.⁷ Subsequent IPCC Guidelines introduced different sector definitions. Developed countries are required to use the 2006 IPCC Guidelines for National Greenhouse Gas Inventories (IPCC 2006), but developing countries may currently use either the 2006 or the Revised 1996 guidelines.

In addition to inventory sector definitions, this glossary provides definitions for selected subsectors or source categories that are common across these fact sheets. For a complete list of IPCC 1996 GHG inventory sectors and source categories, please see the table in [Section I.1 of the Common Reporting Framework](#), which describes the sectors and the activities that are included within each.⁸

Energy Sector – These are the total emissions of all GHGs from stationary and mobile energy activities. Energy subsectors are emissions from fuels combusted by fuel extraction or energy producing industries, from the combustion of fuels in industry, transportation, and other sectors, and fugitive emissions from the intentional or unintentional releases of gases from human activities such as the production, processing, transmission, storage and use of fuels.

WRI CAIT presents emissions for the following energy subsectors: electricity/heat, manufacturing/construction, transportation, other fuel combustion, and fugitive emissions.

Industrial Processes (IP) – These emissions are the by-product or fugitive emissions of GHGs from industrial processes. These include emissions from mineral products, the chemical industry, metal production, other production (pulp and paper, and food and drink), and the production and consumption of halocarbons and sulphur hexafluoride.

WRI CAIT presents emissions within this sector from cement manufacture, adipic and nitric acid production, other industrial processes (non-agriculture), and fluorinated gases (hydrofluorocarbons, perfluorocarbons, and sulphur hexafluoride).

Solvent and Other Product Use – This sector covers mainly emissions of non-methane volatile organic compounds resulting from the use of solvents and other products containing volatile compounds. These include emissions from paint application, degreasing and dry cleaning, chemical products, manufacturing and processing, and other.

IPCC 2006 combines emissions from the IP and solvent and other product use sector into the Industrial Processes and Product Use (IPPU) sector.

Agriculture – This sector includes all anthropogenic emissions from agriculture activities. These activities include enteric fermentation, manure management, rice cultivation, agricultural soils, the prescribed burning of savannas, field burning of agricultural residues, and other.

WRI CAIT presents agriculture emissions of methane and nitrous oxide from the following agriculture subsectors: enteric fermentation (livestock), livestock manure management, rice cultivation, agricultural soils, synthetic fertilizers, manure applied to soils, manure applied to pasture, crop residues, cultivation of organic soils, methane and nitrous oxide from other agricultural sources, burning of crop residues, and savanna burning.

⁷ To see the original definitions, please see Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories: Reporting Instructions: <http://www.ipcc-nggip.iges.or.jp/public/gl/guidelin/ch1ri.pdf>.

⁸ Ibid.

IPCC 2006 combines the agriculture and LUCF sectors into the Agriculture, Forestry and Other Land Use (AFOLU) sector.

Land-Use Change & Forestry (LUCF) – The LUCF sector includes total emissions and removals from forest and land-use change activities. These consist of changes in forest and other woody biomass stocks, forest and grassland conversion to other land uses, abandonment of managed lands, CO₂ emissions and removals from soil associated with land-use change and management, and other.

WRI CAIT shows estimates of carbon dioxide emissions by sources and removals by sinks from forest land, cropland, and grassland, as well as emissions of carbon dioxide and non-carbon dioxide GHGs from fires of biomass and organic soils. The sector contains total emissions and removals for each relevant GHG (carbon dioxide, methane, nitrous oxide), according to forest land, cropland, grassland, and biomass burning.

The IPCC Good Practice Guidance for Land Use, Land-Use Change and Forestry (LULUCF) was adopted in 2003 to strengthen the guidelines for estimating emissions from this sector. IPCC 2006 combines the agriculture and LULUCF sectors into the Agriculture, Forestry and Other Land Use (AFOLU) sector.⁹

Waste – This sector includes the total emissions from waste management. These activities consist of solid waste disposal on land, wastewater handling, waste incineration, and the release of GHGs from other waste handling activities.

WRI CAIT provides emissions from landfills, wastewater treatment, human sewage and other waste.

Bunker Fuels¹⁰ – Bunker fuels are fuels used for international aviation and maritime transport. Emissions from bunker fuels are calculated as part of a country's national GHG inventory but are excluded from national totals and are reported separately. The emissions are not subject to the limitation and reduction commitments of the countries that have taken on emission limitations under the Convention and the Kyoto Protocol.

Enteric Fermentation¹¹ – Enteric fermentation is the fermentation process that takes place as part of the digestive process of livestock, when microbes resident in an animal's digestive system ferments the feed consumed by the animal. Methane is emitted as a by-product of this process.

Within livestock, ruminant livestock (cattle, buffalo, sheep, and goats) are the primary source of enteric fermentation emissions. The number of animals and the type and amount of feed they consume are the primary drivers affecting these emissions. Consequently, improvements in management practices and changes in demand for livestock products (mainly meat and dairy products) will affect methane emissions from enteric fermentation.

Fugitive Emissions – These are intentional or unintentional releases of gases from anthropogenic activities, generally from industrial processes and oil and gas production.

Global Warming Potential (GWP)¹² – GWP is an index that defines the warming effect of the release of a unit mass (such as 1 kilogram) of a given GHG in the atmosphere over a specific time horizon, relative to that of carbon dioxide. The time horizon is typically 20, 100, or 500 years. The Kyoto Protocol is based on GWPs from emissions over a 100-year time frame.

⁹ The IPCC noted that the IPCC 2006 AFOLU sector would encompass the agriculture and LUCF sectors of the 1996 Guidelines with a structure consistent with the IPCC Good Practice Guidance on Land Use, Land-Use Change and Forestry. See IPCC Statement on Revision of the Revised 1996 IPCC Inventory Guidelines: <http://www.ipcc.ch/graphics/speeches/sbsta-19-statement-revision-1996.pdf>.

¹⁰ UNFCCC, Emissions from fuel used for international aviation and maritime transport (international bunker fuels): http://unfccc.int/methods/emissions_from_intl_transport/items/1057.php.

¹¹ IPCC, Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories, CH₄ Emissions from Enteric Fermentation: http://www.ipcc-nggip.iges.or.jp/public/gp/bgp/4_1_CH4_Enteric_Fermentation.pdf.

¹² IPCC, Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change: http://www.climatechange2013.org/images/report/WG1AR5_AnnexIII_FINAL.pdf.

Terms Used in the GHG Emissions Fact Sheets

Average Annual Change vs. Net Change – The GHG mitigation fact sheets present both average annual change in emissions and the change in emissions over the same time period, typically from 1990-2011 or 1990-2012. The average annual change takes into account the consecutive changes from one year to another. The net change shows the change between the first and last year of the time frame.

Carbon Intensity – As used in the GHG mitigation fact sheets, carbon intensity is a country's GHG emissions relative to economic activity as measured by Gross Domestic Product (GDP). The ratio of emissions to GDP provides data for the reader to use to interpret whether the national economy is becoming more or less carbon intensive.

Thermal Power Plants, Thermal Generation – A thermal power plant is a power plant in which heat energy is converted to electric power. Thermal generation refers to the conversion of heat energy to electric power.

Total Primary Energy Supply¹³ – This is made up of the production of primary energy such as coal, oil, natural gas, nuclear, hydro, solar, etc., energy imports minus exports and international bunker fuels, plus or minus stock changes.

¹³ IEA, Balance Definitions: <https://www.iea.org/statistics/resources/balancedefinitions/>.