



# GHG Emissions At A Glance



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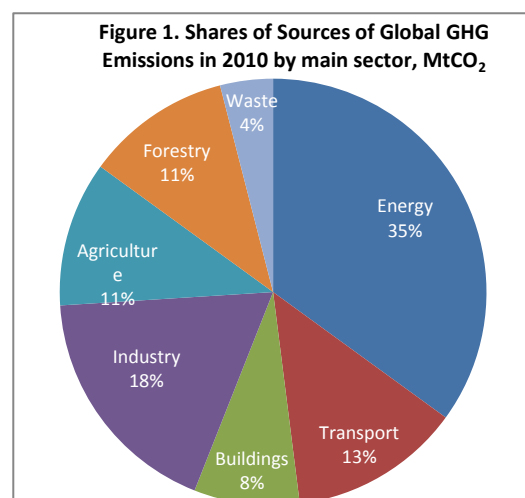
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Greenhouse gases (GHGs<sup>1</sup>) are gaseous constituents of the atmosphere, either natural or anthropogenic (as a result of human activity), that absorb and emit radiation at specific wavelengths within the spectrum of thermal infrared radiation emitted by the Earth's surface, the atmosphere itself, and by clouds. These gases surround the planet preventing the loss of heat into outer space. By trapping the heat, they contribute to the warming of the earth's surface causing changes in weather conditions, sea levels, and land use patterns, commonly referred to as "climate change" (IPCC<sup>2</sup>, 2007). Increased concentration of GHGs into the atmosphere has the potential to cause catastrophic problems for Earth and its inhabitants. It is expected to have substantial impacts on the environment and the economy, particularly on food supplies, water resources, infrastructure, ecosystems and even human health.

## Global and Philippines' GHG Emissions

Global GHG emissions have grown markedly from 1990 to 2010. From its value of 38,258 MtCO<sub>2</sub><sup>3</sup> in 1990, it has grown by 11,844 MtCO<sub>2</sub> or 31% to 49,329 MtCO<sub>2</sub> in 2010 largely attributed to the energy and industry sectors. Based on the 2010 figures, the energy sector accounted for 35% of the total global emissions trailed by the industry sector with 18% contribution and the agriculture and forestry sectors with the same contribution of 11%. Other sources were transport (13%), buildings (8%) and waste (4%).

The top emitter in the world is China, with an average GHG emissions of 7,666 MtCO<sub>2</sub> and a global share of 17.15%. It is followed by the United States of America with GHG emissions of 6,668 MtCO<sub>2</sub> and a global share of 14.91%. Other countries in the top 5 emitters are Russia, India and Indonesia with average GHG emissions of 2,721 MtCO<sub>2</sub>, 2,103 MtCO<sub>2</sub> and 1,912 MtCO<sub>2</sub>, respectively.



Source: European Commission Joint Research Centre (JRC)/ Netherlands Environmental Assessment Agency (PBL), Emission Database for Global Atmospheric Research (EDGAR).

**Table 1. GHG Emissions of the World, ASEAN Countries and the Philippines, MtCO<sub>2</sub>, 1990-2010**

Country	1990	1995	2000	2005	2008	2009	2010	Average	Average Global Shares (%)
<b>World Total</b>	38,258	39,028	40,234	47,269	48,748	49,329	50,101	44,710	100.00
<b>Top Country Emitters</b>									
China	3,870	5,013	5,073	7,853	10,060	10,608	11,182	7,666	17.15
USA	6,115	6,342	6,983	7,082	6,923	6,515	6,715	6,668	14.91
Russia	3,582	2,637	2,647	2,585	2,605	2,481	2,510	2,721	6.09
India	1,376	1,637	1,873	2,128	2,434	2,584	2,692	2,103	4.70
Indonesia	1,161	1,312	1,445	2,884	2,015	2,620	1,946	1,912	4.28
<b>Southeast Asian Countries</b>									
Myanmar	875	943	562	511	340	344	362	562	1.26
Thailand	208	282	283	349	360	362	413	322	0.72
Malaysia	198	252	254	336	334	356	330	294	0.66
Viet Nam	99	121	156	225	258	283	306	207	0.46
Philippines	96	125	140	146	153	154	159	139	0.31
Cambodia	20	21	22	61	172	138	192	89	0.20
Singapore	33	45	48	48	50	47	50	46	0.10
Brunei	18	21	17	23	19	20	20	20	0.04

Source: European Commission JRC/PBL, EDGAR.

<sup>1</sup> The primary natural GHGs in the Earth's atmosphere are water vapor (H<sub>2</sub>O), carbon dioxide (CO<sub>2</sub>), nitrous oxide (N<sub>2</sub>O), methane (CH<sub>4</sub>) and ozone (O<sub>3</sub>) while anthropogenic (i.e. human-induced) GHGs include halocarbons and other chlorine and bromine containing substances.

<sup>2</sup> The Intergovernmental Panel on Climate Change (IPCC) is a scientific intergovernmental body that assesses the scientific, technical and socio-economic information relevant for the understanding of the risk of human-induced climate change, its potential impacts and options for mitigation and adaptation.

<sup>3</sup> Metric Ton Carbon Dioxide equivalent (MtCO<sub>2</sub>) is a weight of carbon dioxide released into the atmosphere having the same estimated global warming potential as a given weight of another gas. GHG emissions are converted into CO<sub>2</sub> equivalents so they can be compared.

In Southeast Asia, Myanmar comes second to Indonesia with 562 MtCO<sub>2</sub> and with a global share of 1.26% while the rest of the countries only account for 1% of the world total.

The Philippines, which is considered as a net emitter of GHGs, ranked 6<sup>th</sup> in the region with a share of only 0.31% of the world total. From 1990 to 2010, the Philippines' GHG emissions (Figure 2) were still below the 200 MtCO<sub>2</sub> level growing annually by 3.25% on the average for the past 20 years.

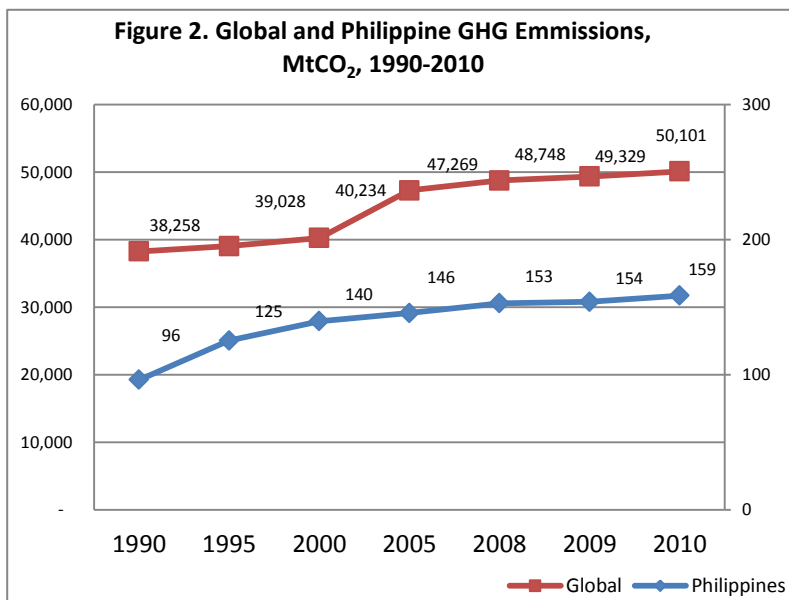
### Philippines' GHG Reduction Strategies

Under the United Nations Framework Convention on Climate Change (UNFCCC),<sup>4</sup> developed country parties or the so-called Annex I parties<sup>5</sup> have the primary responsibility to adopt policies and measures to limit their anthropogenic emissions of GHGs.

In contrast, developing country parties or the Non-Annex 1 parties,<sup>6</sup> like the Philippines, have no binding obligations to reduce GHG emissions. Despite this, the Philippines adopted a model mitigation plan patterned after previous commitments made by Annex I countries for the first commitment period (2008-2012) of the Kyoto Protocol<sup>7</sup> to the UNFCCC. It adopted a voluntary GHG emission reduction target of 5% by 2012 from its 1990 levels, utilizing similar mechanisms found under the Kyoto Protocol but adopted to the Philippine-setting. For the second commitment period (2013-2017) of the Protocol, however, the Philippines is not committing any GHG emission reduction target to the UNFCCC. Nevertheless, efforts to reduce GHG emissions are being undertaken.

As early as 1991, the Philippines has been proactive in responding to the impact of climate change, which include the reduction of GHG emissions in the atmosphere.

The strategies are embedded in various laws, statutes and government issuances (Table 2).



Source: European Commission JRC/PBL, EDGAR.

Table 2. Philippines' GHG Emissions Reduction Strategies

Strategy/Activity	Year of Implementation
Formulation of the Philippine Strategy for Sustainable Development (PSSD) and adoption of the Philippine Agenda 21	1991
Creation of the Inter-Agency Committee on Climate Change (IACCC)	1991
Enactment of the Clean Air Act of 1999 (RA 8749)	1999
Enactment of the Ecological Solid Waste Management Act of 2000 (RA 9003)	2000
Signing of the UNFCCC on June 1992 and ratification on 20 November 2003	2003
Designation of the Department of Environment and Natural Resources (DENR) as the National Authority for Clean Development Mechanism (CDM) by virtue of Executive Order No. 320	2004
Enactment of the Biofuels Act of 2006 (RA 9367)	2006
Enactment of the Climate Change Act of 2009 (RA 9729)	2009
Signing of the National Framework Strategy on Climate Change (NFSCC)	2010
Mainstreaming climate change in the Philippine Development Plan (PDP) 2011-2016	2010
Signing of the National Climate Change Action Plan (NCCAP)	2011

Source: Environment and Climate Change Division, National Economic and Development Authority (NEDA)-Agriculture Staff

<sup>4</sup> The United Nations Framework Convention on Climate Change (UNFCCC) is an international environmental treaty with the objective to "stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system."

<sup>5</sup> Annex I parties are made up of mostly industrialized countries, including some economies in transition (EIT), with an obligation to reduce their GHG emissions to 1990 levels.

<sup>6</sup> Non-Annex I parties are mostly developing countries recognized as being especially vulnerable to the adverse impacts of climate change, including those with low-lying coastal areas and those prone to desertification and drought.

<sup>7</sup> The Kyoto Protocol, an international agreement to the UNFCCC, sets binding obligations on industrialized countries to reduce emissions of greenhouse gases.

## Way Forward

The Philippines has gone a long way in its efforts to address climate change. But while GHG emissions mitigation efforts have been initiated, it is deemed that climate change efforts should focus more on adaptation measures given the country's vulnerability to climate extremes and variability. In the 2013 background report to the Philippine Development Forum (PDF), the Climate Change Commission (CCC) stated the need to focus on climate change adaptation due to the increasing exposure and sensitivity of the country to climate-related hazards.

Based on the Global Climate Risk Index 2013 released by Germanwatch, for the past 20 years (1992-2011), the Philippines ranked 14<sup>th</sup> among the most affected countries by the adverse impact of climate change. During the said period, the country registered an annual average loss of US\$655.78 million, equivalent to 0.28 percent of the gross domestic product (GDP) and an average death toll of 576 per year.

**Table 3. Climate Risk Index (CRI) for 1992-2011**

Rank	Country	Overall CRI Score	Death Toll		Death per 100,000 Inhabitants		Losses in Million US\$		Losses per GDP (in %)	
			Average	Rank	Average	Rank	Average	Rank	Average	Rank
1	Honduras	10.83	329.25	14	4.96	2	679.92	27	2.84	10
2	Myanmar	11	7,137.25	1	13.79	1	640.58	29	1.41	17
3	Nicaragua	18.5	160	22	2.82	4	223.12	49	1.89	16
4	Bangladesh	20.83	824.4	7	0.58	31	1,721.08	14	1.18	21
5	Haiti	21.17	301.1	15	3.43	3	148.68	60	1.08	23
6	Vietnam	23.67	433.15	13	0.55	34	1,741.95	13	1.06	24
7	Korea, DPR	26	76.65	35	0.33	55	3,188.58	5	7.64	3
8	Pakistan	30.5	545.9	10	0.38	47	2,183.10	9	0.73	35
9	Thailand	31.17	160.4	21	0.26	63	5,413.27	4	1.38	18
10	Dominican Republic	31.33	211.6	19	2.47	5	185.25	53	0.35	53
11	Guatemala	32.33	82.65	34	0.72	23	318.76	38	0.62	38
12	Mongolia	32.83	12.85	74	0.52	36	315.74	39	4.11	6
13	Tajikistan	34.5	31.3	63	0.48	39	283.87	42	2.29	12
14	Philippines	35.17	576.2	9	0.72	23	655.78	28	0.28	64

Source: Global Climate Risk Index 2013, Germanwatch.

The country still remains an insignificant source of GHG based on the results of the GHG Inventory undertaken by the CCC and DENR for the preparation of the Second National Communication. Contributing to global emission reductions thus becomes secondary and adapting to climate change should be the priority (Passe, 2009). The country, together with other developing countries, may not also be able to afford the current high cost of mitigation measures and other low-carbon technologies.

It could also be worthwhile for the Philippines to conduct its own annual inventory of GHG emissions to monitor annual reduction accomplishment and see how far the country is from achieving its voluntary GHG reduction target. So far, most GHG inventories in the country were conducted by foreign research institutions. The latest available data generated by the Philippines through the CCC and DENR were in year 2000. It is interesting to note that the CCC is currently implementing two foreign assisted projects from 2012 to 2014 with project component on GHG emissions inventory. The first project, entitled "Low Emission Capacity Building Project (LECB Philippines Project)", is funded by the European Union, Germany and Australia through the United Nations Development Programme (UNDP). It aims to conduct GHG emissions inventory on the transport, agriculture, waste and industry sectors. The second project, entitled "Enhancing Capacities for Low Emissions Development Strategies: Philippine Experience", is funded by the United States Agency for International Development (USAID). It aims to conduct GHG emissions inventory on the forestry and energy sectors.

On the legislative front, the enactment of relevant measures in the Senate such as the proposed "Low Carbon Economy Act" and "Greenhouse Gas Emission Atmospheric Removal Act" may abet in minimizing GHG emissions through the setting up of an emission cap-and-trade system in the industry sector, and in facilitating the development, demonstration and implementation of technology that shall remove GHGs from the atmosphere.