



Greenhouse Gas Emissions in Mexico

Mexico Numbers at a Glance (2013)

665.3 MtCO_{2e}^(a)

Total GHG emissions
(1.38% of world total)

World: 48,257 MtCO_{2e}

118,395,054 ^(b)

Population

World: 7,176,092,192

5.62

tCO_{2e} per capita

World: 6.72 tCO_{2e}

US\$ 1,153,059 Million
GDP ^(c)

World: US\$71,059 Billion

577

tCO_{2e}/million US\$ GDP

World: 679 tCO_{2e}/million US\$ GDP

+191.6 MtCO_{2e} (+40%)

Change in GHG emissions
(1990 - 2013)

World: +1,434 MtCO_{2e}
(+43%)

Sources:

World Figures: [WRI CAIT 2.0, 2017](#).
World emissions include Land-Use Change and Forestry.

(a) Mexico's BUR, 2015. Emissions in million metric tons of carbon dioxide equivalent; include LULUCF but exclude removals from permanent forests.

(b) Mexico's National Population Council, [Projections of the population 2010-2050](#).

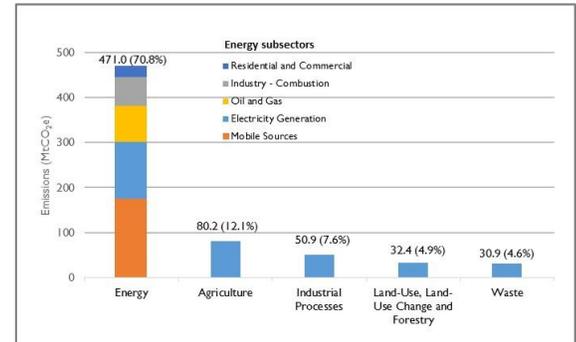
(c) Gross Domestic Product (GDP) in constant 2010 US\$, [WRI CAIT 2.0, 2017](#).

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Greenhouse Gas (GHG) Emissions by Sector¹

Mexico's [Biennial Update Report \(BUR\)](#) to the UNFCCC, submitted in 2015, includes an update of historical GHG emissions for the period 1990-2012, and a GHG inventory for year 2013 that shows 2013 total emissions to be 665.3 MtCO_{2e}.² The BUR notes that permanent forests absorbed approximately 173 MtCO_{2e} that year bringing Mexico's net GHG emissions to 492.3 MtCO_{2e} in 2013.³ Mobile sources (i.e., transportation) and electricity generation were the largest emitting sectors, contributing 26.2% and 19%, respectively of total GHG emissions in 2013.⁴ BUR data show that the total sources traditionally classified as energy emissions were jointly responsible for 70.8% of total emissions, followed by emissions from agriculture (12.1%), industrial processes (IP) (7.6%),⁵ land use, land-use change and forestry (LULUCF) (4.9%), and waste (4.9%) (See Figure 1). Within agriculture, enteric fermentation from livestock contributed 64% of sector emissions, followed by manure management (17%).

Figure 1: Mexico's GHG Emissions by Sector and Percent of Total Emissions (2013) – BUR data



Source: Mexico, BUR, 2015.

Change in GHG Emissions in Mexico (1990-2013)

BUR data show that total GHG emissions increased by 191.6 MtCO_{2e} between 1990 and 2013.⁶ The BUR notes that Mexico's GHG emissions increased 49.2% between 1990 and 2012 with an average annual change of 1.8% in total emissions during this period.⁷ Energy was the leading source of Mexico's GHG emissions during the same period (see Figure 2).⁸ The change in emissions in the energy, agriculture, and waste sectors is discussed below.

Energy: BUR data show that energy sector emissions increased by 165.7 MtCO_{2e} from 1990 to 2013, due to increased emissions from electricity production and transportation. Between 1990 and 2013, total electricity generation more than doubled with natural gas representing an increasing share of the electricity mix, and fuel oil and hydroelectric power a decreasing share.⁹ As of 2013, 56% of electricity was generated by natural gas, followed by fuel oil (16%), coal

¹ This Factsheet uses data from Mexico's [Biennial Update Report \(BUR\)](#) submitted to the UNFCCC in 2015. As explained in the [User Guide: Greenhouse Gas Emissions Fact Sheets](#), other factsheets use data from the World Resources Institute Climate Analysis Indicators Tool (WRI CAIT 2.0, 2017) to present countries' GHG emissions.

² Mexico. Mexico's [Biennial Update Report \(BUR\)](#) to the UNFCCC, 2015. The inventory uses GWPs from the IPCC [Fifth Assessment Report \(AR5\)](#). The BUR shows GHG emissions in Gg of CO_{2e}; converted to MtCO_{2e} in this factsheet (MtCO_{2e}=GgCO_{2e}/1000). The BUR notes that methodological changes were adopted in compiling the 2013 inventory, with respect to previous inventories (1990-2012). These changes generate information of greater resolution and significantly change the total emissions reported. For information about the methodological changes, see section III.2.1 of the BUR.

³ Total GHG emissions presented in the BUR and this factsheet exclude GHG removals by permanent forests.

⁴ The BUR shows mobile sources, electricity generation, oil and gas, industry, and residential and commercial as separate sectors in 2013. For ease of comparison between (1) the 2013 and the 1990-2012 BUR data, and (2) this and other factsheets, these emissions are grouped together as energy emissions.

⁵ Emissions from fuel consumption in the industrial sector are represented as an energy subsector (Industry – Combustion). Those from industrial processes are shown separately in Figure 1 as the "Industrial Processes" sector.

⁶ BUR data for year 1990 show the following sector emissions: energy (305.3 MtCO_{2e}), agriculture (77.1 MtCO_{2e}), IP (29.4 MtCO_{2e}), LULUCF (52.6 MtCO_{2e}), and waste (9.2 MtCO_{2e}). Total GHG emissions in 1990 are the sum of the five sectors.

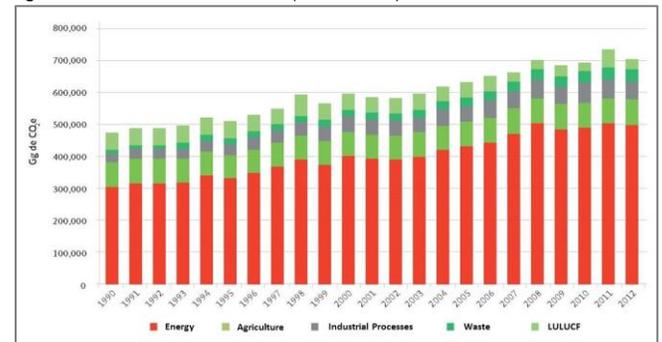
⁷ Mexico. Mexico's [BUR](#), 2015. The BUR provides a comparative analysis in total and sector emissions between 1990 and 2012.

⁸ Ibid.

⁹ International Energy Agency (IEA) Statistics: Mexico Electricity and Heat [2000](#) and [2013](#).

(11%), hydro (9%), nuclear (4%) and other renewable sources (4%).¹⁰ According to the [National Energy Balance](#), in 2013, Mexico's total installed electricity generation capacity was 53,496 MW, of which 11,509 MW (21.5%) was hydropower. Non-hydro renewables including wind, geothermal, solar photovoltaic, and biogas represented the lowest share in the country's total electricity generation.¹¹ According to the [National Energy Strategy 2013-2027](#), Mexico plans to increase the share of clean energy sources in the electricity generation mix to 35% by 2024. The Energy Transition Law of 2015, which provides a framework for clean energy, energy efficiency and GHG emission reductions, confirmed the 35% goal, with mandatory interim goals of 25% (2018) and 30% (2021).¹² In transportation, car use has grown dramatically. Vehicle-kilometers travelled (VKT) tripled from 106 million VKT in 1990 to 339 million VKT in 2010.¹³ In 2013, the total fleet of 24.6 million vehicles consisted of compact and subcompact cars (52%), light trucks (38%), heavy cargo trucks (3%), motorcycles (6%), and buses (1%).¹⁴ Mexico established the Public Transportation Federal Support Program (PROTRAM) which supports the financing of public transport projects nationally. Two urban and suburban train projects and nine Bus Rapid Transit (BRT) corridors are currently under development and thirty other projects are in the identification or evaluation phase.¹⁵ As part of the [C40 Cities](#) initiatives, the C40 Finance facility will assist Mexico in developing a green transportation corridor in Mexico City, with a fleet of clean electric buses.¹⁶

Figure 2: Mexico's GHG Emissions (1990–2012)



Source: Mexico, BUR, 2015.

Agriculture: BUR data show that agriculture emissions increased by 3.0 MtCO_{2e} between 1990 and 2013, with enteric fermentation driving this increase. According to Food and Agriculture Organization data, the number of cattle increased 1% in the same period, while the number of sheep increased 45%.¹⁷ In 2013, livestock represented 32.4% of agricultural Gross Domestic Product (GDP), and employed 10.1% of the workforce in the primary sector.¹⁸ The BUR notes that there are many opportunities to reduce GHG emissions in the agriculture sector including: improving animal nutrition, treatment of livestock waste in biodigesters with energy recovery, sustainable use of fertilizers, improving crop productivity and variety, use of alternative energy, reduction of burning crop residues, and restoration of degraded agricultural lands.

Waste: According to BUR data, waste sector emissions increased by 21.7 MtCO_{2e} between 1990 and 2013. Municipal solid waste (MSW) generation increased from 30.6 million tons (Mt) in 1990¹⁹ to 42.8 Mt in 2013.²⁰ The BUR notes that MSW composition is dominated by organic materials (49%) followed by paper (14%), textile (3%), diapers (3%), wood and straw (1%), and other waste (30%) that do not contribute to GHG emissions in final disposal sites. In 2012, 60.5% of MSW was disposed of in controlled sites and sanitary landfills, 15.9% in open dumps, and 9.6% recovered through recycling. The final disposal of the remaining 14% is not known.²¹ According to the BUR, the number of solid waste disposal sites with biogas recovery installations (flaring or energy recovery) could more than double by 2030. Mexico is also exploring the installation of anaerobic digesters to treat organic waste.²²

¹⁰ IEA Statistics: Mexico Electricity and Heat [2013](#).

¹¹ Mexico. [Mexico National Energy Balance](#), 2015.

¹² Secretary of Governance. [Energy Transition Law Decree](#), December 24, 2015.

¹³ Institute for Transportation and Development Policy. [Transforming Urban Mobility in Mexico](#), 2012.

¹⁴ Mexico. Mexico's BUR, 2015.

¹⁵ Ibid.

¹⁶ C40 Cities. [C40 Cities Finance Facility](#), viewed on May 205, 2017.

¹⁷ FAOSTAT. [Live Animals – Mexico](#), viewed on May 25, 2017.

¹⁸ Mexico. Mexico's BUR, 2015.

¹⁹ Mexico. [Mexico's Fifth National Communication](#) (NC5) to the UNFCCC, 2010.

²⁰ Mexico. Mexico's BUR to the UNFCCC, 2015.

²¹ Ibid. Biogas energy was recovered from five sites, mitigating 0.65 MtCO_{2e} in 2014 (calculated based on Table IV.15 in the BUR).

²² Government of Mexico - Ministry of Agriculture, Livestock, Rural Development, Fisheries and Food. [Gas y electricidad con basura en la Central de Abasto](#), viewed on May 25, 2017.

Carbon Intensity: GHG Emissions Relative to Gross Domestic Product (GDP)

Mexico's GHG emissions increased 40% between 1990 and 2013,²³ while GDP grew by 86% in the same period.²⁴ Despite Mexico's economy emitting fewer GHGs relative to GDP than the world average, Mexico enacted in 2012 the [General Law on Climate Change](#), which sets the technical, legal and financial basis to move towards a low carbon economy.

Climate Change Mitigation Targets and Plans

In 2013, Mexico prepared and adopted the [National Strategy on Climate Change \(NSCC\)](#) which sets the vision for the next 10, 20, and 40 years for the sustainable, equitable, and efficient management of the country's natural resources, the use of clean and renewable energy sources, and low GHG emission development. The NSCC identifies milestones including targets for GHG and Short Lived Climate Pollutant (SLCP)²⁵ reductions. Based on the NSCC, Mexico prepared its [2014-2018 Special Climate Change Program](#) with five objectives and several lines of actions. In its [Intended Nationally Determined Contribution \(INDC\)](#), submitted to the UNFCCC in March 2015, Mexico committed to unconditionally reduce by 25% its GHG and SLCP emissions by the year 2030 compared to a business-as-usual scenario. This commitment implies a reduction of 22% of GHG emissions and 51% of black carbon, an SLCP. It will be implemented through reductions in the energy, industry, agriculture, waste, and LULUCF sectors. The INDC notes that the 2030 target could be strengthened to 40%, with 36% of GHG and 70% black carbon reductions, subject to a global agreement addressing important topics including international carbon price, carbon border adjustments, technical cooperation, access to low cost financial resources and technology transfer.²⁶ Mexico ratified the [Paris Agreement](#) on September 21st, 2016.²⁷ Mexico's INDC was also ratified by the Mexican Senate in September 2016 to become Mexico's first NDC.

²³ Mexico. Mexico's BUR, 2015.

²⁴ WRI CAIT 2.0, 2017.

²⁵ SLCPs are a set of compounds composed primarily of those with short lifetimes in the atmosphere compared to the well-mixed greenhouse gases, and have been sometimes referred to as short-lived climate forcers or short-lived climate pollutants (IPCC, 5th Assessment Report, [Chapter 8](#), 2008).

²⁶ Mexico. Mexico's [Intended Nationally Determined Contribution \(INDC\)](#) to the UNFCCC, 2015.

²⁷ UNFCCC, [Paris Agreement – Status of Ratification](#); viewed on May 25, 2017.