



# Greenhouse Gas Emissions in Tajikistan

## Tajikistan Numbers at a Glance (2014)

**11.96 MtCO<sub>2</sub>e\***

Total GHG emissions  
(0.02% of world total)  
World: 48,892 MtCO<sub>2</sub>e

**8,362,745**

Population  
World: 7,268,986,176

**1.43**

tCO<sub>2</sub>e per capita  
World: 6.73 tCO<sub>2</sub>e

**US\$ 7,465 Million**  
GDP\*\*

World: US\$73,479 Billion

**1,602**

tCO<sub>2</sub>e/million US\$ GDP  
World: 665 tCO<sub>2</sub>e/million US\$ GDP

**-5.45 MtCO<sub>2</sub>e (-31%)**

Change in GHG emissions  
(1990-2014)

World: +15,069 MtCO<sub>2</sub>e  
(+45%)

Sources: WRI CAIT 4.0, 2017.  
Emissions including Land-Use Change and Forestry. Global Warming Potentials are from the Intergovernmental Panel on Climate Change Second Assessment Report.

\*Million metric tons of carbon dioxide equivalent.

\*\*Gross Domestic Product (GDP) in constant 2010 US\$

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## Greenhouse Gas (GHG) Emissions by Sector

According to the World Resources Institute Climate Analysis Indicators Tool (WRI CAIT), Tajikistan's GHG emissions in 2014 were primarily from agriculture and energy, which accounted for 46.3% and 41.4% of the country's total emissions, respectively.<sup>1</sup> Within the agriculture sector, 57% of GHG emissions were due to enteric fermentation from livestock.<sup>2</sup> Within the energy sector, 59% of emissions were due to "other fuel combustion," followed by transportation (32%). Industrial processes (IP), waste, and Land-Use Change and Forestry (LUCF) contributed 7.1%, 5.2%, and 0% of total emissions, respectively.

Tajikistan's [Third National Communication](#) (TNC) to the UNFCCC, submitted in 2014, includes a GHG inventory for the years 1990 to 2010 and shows agriculture to have been the greatest source of emissions in 2010, followed by IP and energy, and waste. It shows activities from Land Use, Land Use Change and Forest Management to have absorbed more carbon dioxide than they emitted, resulting in net removals during the entire time period.<sup>3</sup>

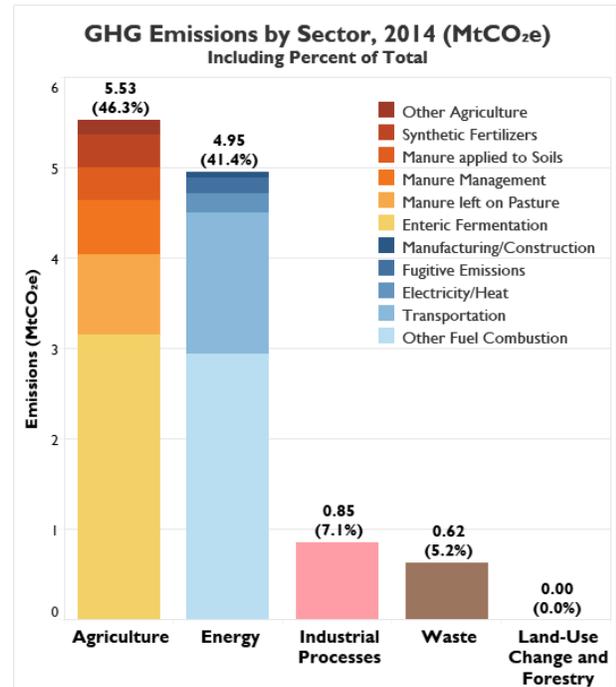
## Change in GHG Emissions in Tajikistan (1990-2014)<sup>4</sup>

According to WRI CAIT, Tajikistan's GHG emissions decreased by 31% (5.45 MtCO<sub>2</sub>e) from 1990 to 2014, with an average annual change of -1.0%. The change in emissions from Tajikistan's most significant sources is discussed below.

**Agriculture:** With 70% of the population living in rural areas, Tajikistan's agriculture sector accounts for half of total employment, 39% of tax revenues, and a quarter of gross domestic product (GDP).<sup>5</sup> It is a key sector for economic growth, food security, poverty reduction, and rural development.<sup>6</sup> WRI CAIT data show emissions from agriculture increased by 27% (1.18 MtCO<sub>2</sub>e) from 1990 to 2014, due to increases from enteric fermentation, followed by manure left on pasture, and manure management.<sup>7</sup> From 1992 to 2014, the number of cattle, goats, and sheep increased by around 53%, 110%, and 30%, respectively.<sup>8</sup>

Agricultural production dropped after the fall of the Soviet Union due to stoppages of centralized supplies of machinery, fertilizers, pesticides, and seeds, political turmoil and civil war.<sup>9</sup> Emissions from synthetic fertilizers stopped all together by 2002 and despite picking up again, 2014 emissions remain 3% lower than in 1992.<sup>10</sup> Over the last 10 years some areas of agricultural production such as livestock have regained pre-independence levels.<sup>11</sup> Nonetheless, achieving food security and access to good quality nutrition remain a core government policy.<sup>12</sup>

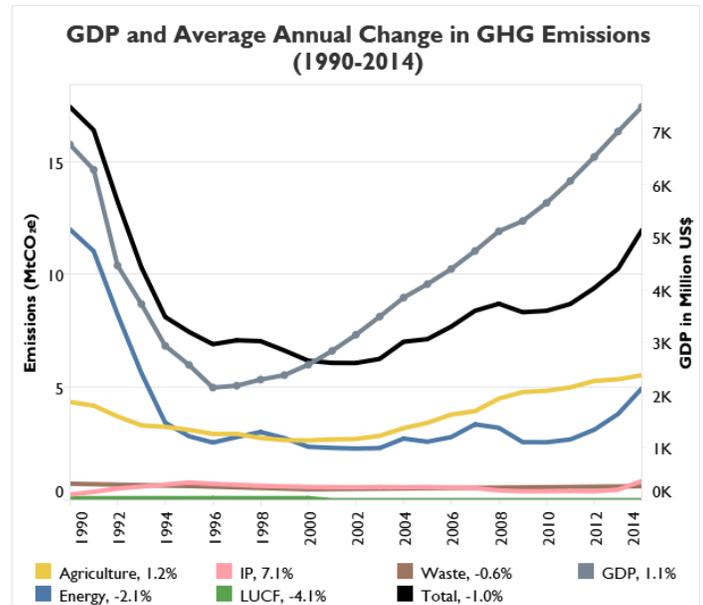
**Energy:** Energy emissions decreased by 59% (7.04 MtCO<sub>2</sub>e) from 1990 to 2014. The largest decrease occurred from 1990 to 1996, averaging -22% per year, and began consistently increasing after 2010, averaging 18% annually. Emissions from other fuel combustion, which includes biomass combustion,<sup>13</sup> have decreased since the early 1990s but there have been no further reductions in emissions since around 1995. Due to limited access to natural gas and unreliability of year-round electricity across seasons, the TNC notes that wood is the main energy source for heating (40%) and is an important fuel for cooking (20%). In rural households, wood supplies 35% to 85% of energy needs. Transportation emissions have begun to grow



Sources: WRI CAIT 4.0, 2017, FAOSTAT, 2018  
Note: Emission totals have been rounded

rapidly due to major transportation infrastructure projects which have reduced the country's geographical isolation. The share of GDP from the transport sector grew from 1% in 1998 to 14.3% in 2011.<sup>14</sup>

Since 1991, the energy mix has changed considerably with significant reductions in both the production and consumption of natural gas and oil. Despite having coal, oil, and gas deposits, water is the most promising energy source.<sup>15</sup> Hydropower supplies more than 90% of energy consumption.<sup>16</sup> According to the TNC, less than 4-5% of Tajikistan's hydro potential is being realized and there are ongoing developments to expand installed capacity. Due to seasonal fluctuations in hydroelectric output, the country experiences acute energy deficits and must diversify energy sources. In the winter, Tajikistan relies on imported fuels such as natural gas and oil for power generation, heating, industrial production, and transportation. The TNC notes that Tajikistan is constructing new coal fired thermal power plants. In 2016, construction of a new plant was completed and there are ongoing plans to build more.<sup>17</sup> Dependence on imported energy is expensive and adversely impacts energy security, economy, and development. Within the [Sustainable Energy for All](#) framework, Tajikistan identifies long-term energy development directions, goals, and steps to reach them by the year 2030. The goals include: ensure access to regular and reliable electricity to 5.6 million people living in rural areas, reduce energy losses up to 10% in power grids and up to 20% in thermal grids, increase the efficiency of energy use in all economic sectors, irrigation systems and final users up to 20% relative to the 2010 baseline, and increase energy production from renewable energy sources up to 20% relative to the 2010 baseline.<sup>18</sup> Another key strategic goal in the energy sector is to increase its export of electricity to neighboring countries.<sup>19</sup>



Source: WRI CAIT 4.0, 2017

## Carbon Intensity: GHG Emissions Relative to Gross Domestic Product

According to WRI CAIT, Tajikistan's GDP increased 11% from 1990 to 2014, while GHG emissions decreased 31%. However, GDP first decreased 68% from 1990 to 1997 while GHG emissions decreased 59% during the civil war and the transition to a market-based economy.<sup>20</sup> Since 1997, GDP growth has resumed, increasing 226%, while GHG emissions increased 70%. Although GDP grew faster than GHG emissions, in 2014 Tajikistan's emissions relative to GDP were more than two times the world average. Per capita emissions remain one fifth of the world average.

## Climate Change Mitigation Targets and Plans

In its [Intended Nationally Determined Contribution \(INDC\)](#), Tajikistan set a target to limit GHG emissions to 65-75% of 1990 levels by 2030, conditioned upon receipt of substantial international funding and technology transfer. Tajikistan also set an unconditional target not to exceed 80-90% of its 1990 emission level by 2030.<sup>21</sup> Tajikistan would achieve these targets through actions in the following areas: power industry and water resources; industry and construction; land use, agriculture and gardening and grazing; forestry and biodiversity; and transportation and infrastructure. Upon ratification of the [Paris agreement](#) in March 2017, the INDC became Tajikistan's first NDC.

<sup>1</sup> World Resources Institute Climate Analysis Indicators Tool (WRI CAIT 4.0, 2017). Global Warming Potentials (GWPs) are the 100-year GWPs from the Intergovernmental Panel on Climate Change (IPCC) [Second Assessment Report \(SAR\)](#).

<sup>2</sup> Food and Agriculture Organization of the United Nations Statistics Division (FAOSTAT). Tajikistan, [Emissions – Land use total](#) and [Emissions – Agriculture total](#), viewed on August 19, 2018.

<sup>3</sup> Republic of Tajikistan. [Third National Communication \(TNC\) under the UNFCCC](#), 2014. The ranking of 2010 emission sources is visually estimated based on graphs on pp. 59 and 62 since source-specific figures are provided only for agriculture (60%) and energy (15%). IP and energy emissions appear to be about equal in 2010.

<sup>4</sup> Tajikistan gained independence in 1991 and became a [UN member state](#) in 1992. National total emissions are approximated for 1990-1991 according to the methodology WRI uses to calculate emissions for newly formed countries (WRI. [CAIT Country Greenhouse Gas Emissions: Sources & Methods](#), 2015).

<sup>5</sup> Asian Development Bank (ADB). [Sector Assessment \(Summary\): Agriculture and Natural Resources](#). Country Partnership Strategy: Tajikistan, 2016-2020.

<sup>6</sup> FAO, 2016. [Tajikistan and FAO](#) Country Leaflet.

<sup>7</sup> WRI CAIT 4.0, 2017. Emissions from manure management consist of methane and nitrous oxide gases from aerobic and anaerobic manure decomposition processes. Emissions from manure left on pastures consist of direct and indirect nitrous oxide emissions from manure nitrogen left on pastures by grazing livestock.

<sup>8</sup> FAOSTAT, 2018. Data for Tajikistan are not available for 1990 and 1991.

<sup>9</sup> Ashurov, Ikhtiyor. [Development of Agriculture in Tajikistan: Peculiarities and Prospects](#), viewed on November 2018.

<sup>10</sup> WRI CAIT 4.0, 2017.

<sup>11</sup> Republic of Tajikistan. TNC, 2014.

<sup>12</sup> Ashurov, 2018. The [Living Standards Improvement Strategy of Tajikistan, 2013–2015](#) outlines 16 agriculture sector goals regarding food security.

<sup>13</sup> Emissions from other fuel combustion include emissions from stationary and mobile sources other than from energy industries, manufacturing and construction, and transport (i.e., from commercial/institutional, residential, or agricultural/forestry/fishing/fish farm sources). It also includes biomass combustion.

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<sup>14</sup> Sustainable Energy for All, 2013. [Tajikistan: Rapid assessment and gap analysis](#).

<sup>15</sup> Republic of Tajikistan. TNC, 2014. IEA data also show that natural gas and oil have decreased since 1991, whereas hydro and coal stayed the same.

<sup>16</sup> Sustainable Energy for All, 2013.

<sup>17</sup> Idrisova, Natalia. 2018. A second coal fired power plant for the Tajik capital. CEE Bankwatch Network. See <https://bankwatch.org/blog/a-second-coal-fired-power-plant-for-the-tajik-capital>, accessed March 5, 2019.

<sup>18</sup> Sustainable Energy for All, 2013.

<sup>19</sup> Republic of Tajikistan. TNC, 2014.

<sup>20</sup> Republic of Tajikistan, 2017. [Intended Nationally Determined Contribution \(INDC\)](#).

<sup>21</sup> Ibid. As of 2014, Tajikistan's GHG emissions were 69% of 1990 levels. The country could continue to increase emissions and achieve its unconditional target.