

Emission Trends for Power Plants

The Greenhouse Gas Reporting Program (GHGRP) emissions reported by the power plants sector decreased significantly from 2011 to 2022, from 2,222 million metric tons (MMT) CO₂e in 2011 to 1,585 MMT CO₂e in 2022, a decrease of 28.7%. This overall decrease in emissions resulted from longer-term trends related to changes in the composition of fuels used in electricity generation and an increase in renewable electricity generation. Reported emissions for 2022 only decreased by 0.8% from 2021. In comparison, emissions increased by 6.9% between 2020 and 2021. The annual increase in emissions observed in 2021 resulted from the increased demand for electricity generation during 2021 as the economy recovered from the COVID-19 pandemic.

For the period 2011 to 2022, national net generation of electricity increased by 3.5%, and increased by 3.2% between 2021 and 2022. [1, 2] This year-over-year increase in net generation follows a decrease of 2.9% between 2019 and 2020 due to the COVID-19 pandemic, which began in 2020. Although the national net generation of electricity remained relatively constant from 2011 to 2022, the GHG emissions per unit of electricity generation decreased from 541.9 to 385.8 MT CO₂e per thousand megawatt-hours (MWh), a 29% drop. Several factors contributed to this reduction in emissions per unit of electricity generated, including increased generation from renewable energy sources and from natural gas combustion, and a corresponding decrease in generation from coal. [3] In 2011, 42.3% of U.S. electricity was generated from coal and 24.7% from natural gas; but by 2022 these values had changed significantly, with 19.5% of electricity generated from coal and 39.8% from natural gas. Over the same timeframe, electricity from utility-scale renewable sources increased from 4.7% to 15.3% of total power plant generation. [1, 2] The observed changes in GHG emissions are due to the fact that electricity generated from renewable energy results in no GHG emissions from the power plant sector, and because generation from natural gas—particularly more efficient combined-cycle generators—produces lower GHG emissions per unit of electricity generated than generation from coal. [4]

[1] U.S. Energy Information Administration, Electric Power Monthly Table 1.1. Net Generation by Energy Source: Total (All Sectors), 2011- June 2023 (accessed September 25, 2023) at: https://www.eia.gov/electricity/annual/html/epa_03_01_a.html

[2] U.S. Energy Information Administration, Electric Power Monthly Table 1.1. Net Generation by Energy Source: Total (All Sectors), 2013- June 2023 (accessed September 25, 2023) at: https://www.eia.gov/electricity/monthly/epm_table_grapher.php?t=epmt_1_01

[3] Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2021. U.S. Environmental Protection Agency. April 2023. EPA 430-R-23-002. Available at: <https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2020>

[4] U.S. Department of Energy, Environment Baseline, Volume 1: Greenhouse Gas Emissions from the U.S. Power Sector. June 2016. Available at: [https://energy.gov/sites/prod/files/2017/01/f34/Environment Baseline Vol. 1--Greenhouse Gas Emissions from the U.S. Power Sector.pdf](https://energy.gov/sites/prod/files/2017/01/f34/Environment%20Baseline%20Vol.%201--Greenhouse%20Gas%20Emissions%20from%20the%20U.S.%20Power%20Sector.pdf)

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