# NEW JERSEY GREENHOUSE GAS INVENTORY

## MID-CYCLE UPDATE REPORT

*February 2021*

## Introduction

New Jersey's Global Warming Response Act (GWRA) (P.L. 2007, c.112, as amended 2019) calls for an annual compilation of statewide greenhouse gas (GHG) emissions data. This data is used to monitor and track progress towards New Jersey's goal of reducing GHG emissions 80% from their 2006 levels by 2050 (known as the 80x50 goal).[1]

Since 2008, the New Jersey Department of Environmental Protection (DEP) has released a comprehensive statewide GHG inventory report approximately every two years. Following the 2019 amendments to the GWRA, the DEP is also committed to releasing updated data annually to help inform the state's climate mitigation planning and implementation efforts.

The DEP will therefore continue to release a full Emissions Inventory Report every other year and will also provide a "Mid-Cycle Update" during the intervening years. The Emissions Inventory Reports[2] contain detailed analysis, including updated emissions calculations, review of GHG trends, adjustments to baselines (when necessary), and discussion of any changes in emission calculation methodologies. In contrast, the Mid-Cycle Update is a brief summary of the latest emissions data, with concise complementary analysis. The inventory presented below is a Mid-Cycle Update.

> ### New Jersey's Greenhouse Gas Reporting Framework
>
> **Emissions Inventory Report**
> - Full report released every two years
> - Includes the latest emissions estimates and projections
> - Includes a detailed discussion on:
>   - Statewide Greenhouse Gas trends
>   - Federal and International trends and policy
>   - Changes in methodologies
>   - Adjustment of Baselines
>
> **Mid-Cycle Update**
> - Brief summary released between Emissions Inventory Reports
> - Includes the latest emissions estimates and projections
> - Features a discussion of key findings

## Greenhouse Gas Inventory Emissions Estimates and Projections

Data used to develop the New Jersey greenhouse gas inventory is gathered from multiple sources, including state, local and federal agencies, as well as global organizations such as the International Panel on Climate Change. Timeframes for obtaining data extend as long as two years after the end of a given calendar year. In order to provide timely support for mitigation of climate change, when final data is not available New Jersey develops projections based on reference reports and modeling tools provided by the federal government. Later, when final data becomes available, those projections are updated to incorporate the newly released information. Estimates for earlier years may also be revised should the originating source release adjusted figures.

The 2018 NJ Greenhouse Gas Emissions Inventory Report (released October 2019) included projected values for some sectors for the years 2017 and 2018 due to the unavailability of final data at the time of

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[1] Based on current estimates, the emissions goal for 2050 is 24.1 MMT $CO_2$e. Future refinements to assessment methods could lead to small adjustments in the 2006 estimate, and therefore the 2050 figure.
[2] In October of 2019, the NJDEP released the 2018 Statewide Greenhouse Emissions Inventory Report, found at:
https://www.nj.gov/dep/aqes/pdf/GHG%20Inventory%20Update%20Report%202018_Final.pdf

publication. However, final data has recently been released, and this mid-cycle update to the 2018 report incorporates that new data. This mid-cycle update also includes projected emissions for 2019.

## 2017 and 2018 Inventory Updates

Adjusted net greenhouse gas emissions are as follows: 96.7 MMT $CO_2e$ in 2017, and 101.9 MMT $CO_2e$ in 2018. Final emissions estimates for 2017 were 0.3 MMT $CO_2e$ lower than projected, and final emissions estimates for 2018 were 4.9 MMT $CO_2e$ higher. As shown in Table 1, differences between the 2017-18 projections and actual data are generally small and reflect reporting updates, natural variability in the underlying data, varying average temperatures and the closure of the Oyster Creek Nuclear Generating Station in September 2018. Below is a brief evaluation of these variations by sector.

### Commercial and Residential Sector

Overall, emissions from the commercial sector were 1 MMT $CO_2e$ greater than had been projected during 2017 and 1.6 MMT $CO_2e$ greater than projected during 2018. Residential emissions were 0.4 MMT $CO_2e$ lower in 2017 than projected but 0.9 MMT greater than projected during 2018. These changes arose primarily from differences in projected versus actual amounts of natural gas consumed. Consumption of fuel oil in the residential sector in 2018 was also greater than projected, contributing to increased emissions. However, this increase in fuel oil consumption was offset to a limited extent by decreased consumption in the commercial and industrial sectors compared to projected values.

### Industrial Sector

Industrial sector emissions for 2017 and 2018 were lower than projected, primarily due to lower than expected consumption of hydrocarbon gas liquids and distillate fuel oil. These decreases were offset to a limited extent by greater consumption of natural gas than projected. However, natural gas produces fewer GHG emissions per unit of energy than hydrocarbon gas liquids or distillate fuel oil. Overall, emissions were 1.1 and 1.0 MMT $CO_2e$ lower in 2017 and 2018 than projected, respectively.

### Electric Generation Sector

Final emissions calculations for the electric generation sector for 2017 remain unchanged. However, emissions estimates for 2018 are 1.0 MMT $CO_2e$ higher than previously reported. In-state generating resources emitted 0.5 MMT more than previously reported due to revisions in emissions statement data. The previous report also assumed New Jersey retail sales of electricity would not exceed in-state generation. The difference between retail sales and in-state generation is used to estimate net imported electricity. In 2018, the state's retail sales exceeded in-state generation, resulting in New Jersey being a net importer of electricity. Emissions associated with imported electricity were estimated to be 0.4 MMT during 2018.

### Transportation Sector

Transportation sector emissions were 0.7 MMT $CO_2e$ lower than originally projected for 2017 and 1.5 MMT $CO_2e$ higher than projected for 2018. This variability was largely due to changes in estimated consumption of residual fuel oil. Records of retail sales of residual fuel oil have varied from year to year throughout the historical record, and this has made projections subject to greater uncertainty. Residual fuel oil sold in New Jersey is used primarily for cargo ships.

## Publicly Owned Treatment Works

Estimated emissions from publicly owned treatment works (POTWs) were 0.6 MMT greater than previously projected for both 2017 and 2018. This arose from differences in how projected and final estimates are calculated using USEPA methodology. Projected values are based on a top-down approach in which national emissions estimates are allocated to each state in proportion to their population. Final values are calculated using the EPA State Inventory Tool Wastewater Module which applies per capita waste generation rates to population size and then assumes a proportion of that waste is treated anaerobically.

## 2019 Emissions Estimates

Table 1 also includes preliminary emissions estimates for 2019, with projected values noted by asterisks. In 2019, New Jersey emitted an estimated 97.7 MMT $CO_2e$. 2019 emissions are presented graphically by sector in Figure 1. Emissions from on-road transportation decreased 1.4 MMT CO2e from 2018 values, while distillate (diesel) emissions increased 0.8 MMT. In addition, residential emissions are projected to decrease by 1.5 MMT year-on-year. However, there is substantial uncertainty with these projections, and they should be applied with caution. Overall, 2019 total emissions are projected to decrease by 4.2 MMT from 2018 levels.

*Figure 1. Projected Greenhouse Gas Emissions for 2019*
*In millions of metric tons $CO_2e$. Total net emissions 97.7 MMT $CO_2e$.*
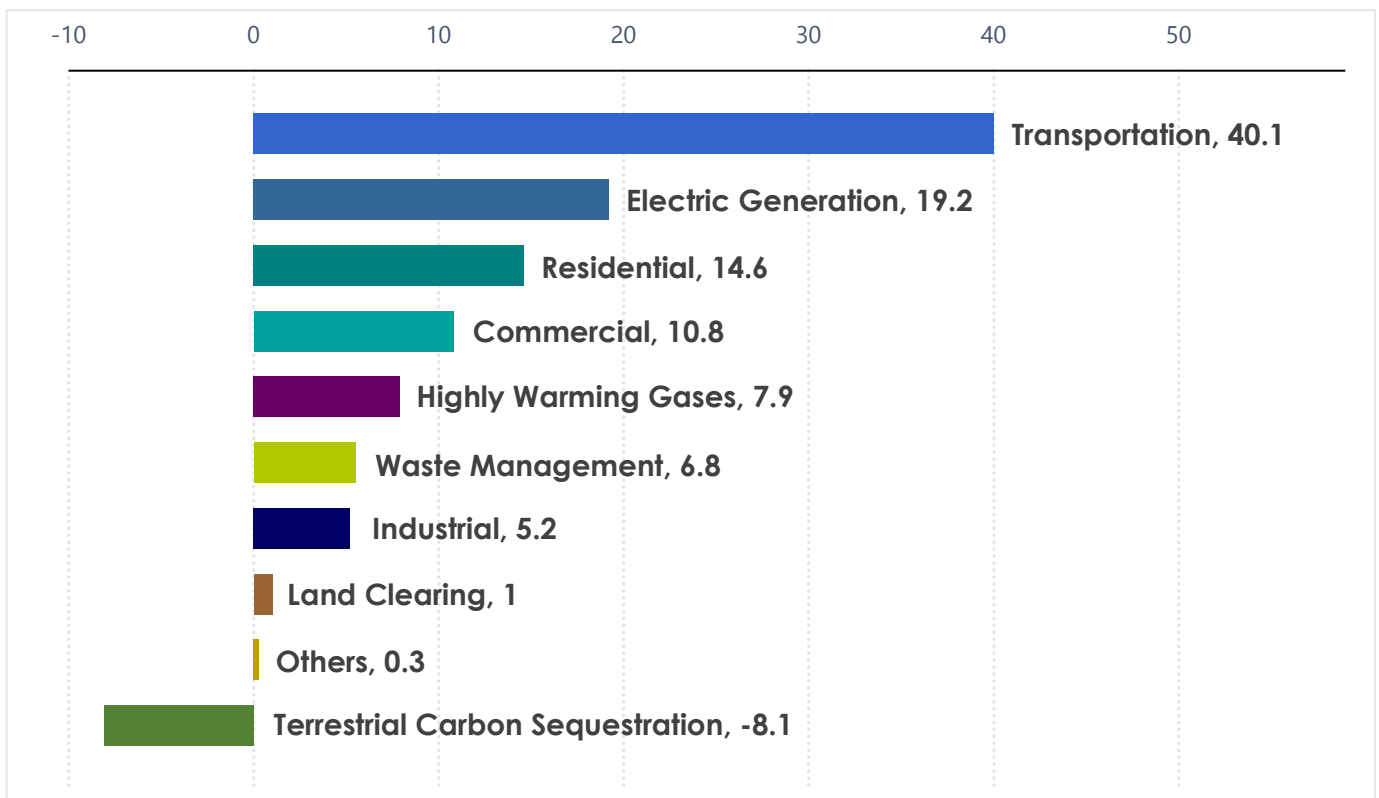
*Table 1. Estimated NJ Greenhouse Gas Emissions, 2017-2019 (100-year GWP)*
Values are in millions of metric tons $CO_2e$. 2019 projected values are noted with an asterisk.

| | 1990 | 2006 | 2017 | | 2018 | | 2019 | |
|---|---|---|---|---|---|---|---|---|
| | From Previous Report | From Previous Report | Previous Report (Projected) | **Final** | Previous Report (Projected) | **Final** | (Projected) | |
| **ENERGY** | | | | | | | | |
| Commercial | 10.7 | 9.2 | 9.0 | **10.0** | 9.4 | **11.0** | 10.8 | * |
| Industrial | 19.8 | 16.3 | 6.8 | **5.7** | 7.2 | **6.2** | 5.2 | * |
| Residential | 15.2 | 13.7 | 14.5 | **14.1** | 15.2 | **16.1** | 14.6 | * |
| **Transportation** | | | | | | | | |
| On-Road Gasoline | 28.9 | 34.0 | 30.8 | **30.8** | 29.4 | **30.0** | 28.6 | |
| Distillate | 5.6 | 7.8 | 8.0 | **8.0** | 7.9 | **7.2** | 8.0 | |
| Jet Fuel | 1.0 | 1.0 | 1.0 | **1.0** | 1.0 | **1.0** | 1.0 | |
| Residual Fuel | 1.0 | 0.8 | 2.2 | **1.5** | 2.0 | **3.6** | 2.1 | * |
| Other | 0.4 | 0.3 | 0.4 | **0.4** | 0.3 | **0.3** | 0.3 | * |
| **Electricity** | | | | | | | | |
| In-State Electric | 12.4 | 18.5 | 17.2 | **17.2** | 17.4 | **17.9** | 17.3 | |
| Imported Electric | 14.1 | 11.7 | 0.0 | **0.0** | 0.0 | **0.4** | 1.1 | |
| MSW Incineration | n/a | 0.8 | 0.8 | **0.8** | 0.7 | **0.8** | 0.8 | |

| | 1990 | 2006 | 2017 | | 2018 | | 2019 |
|---|---|---|---|---|---|---|---|
| | From Previous Report | From Previous Report | Previous Report (Projected) | **Final** | Previous Report (Projected) | **Final** | (Projected) |
| **NON-ENERGY** | | | | | | | |
| Halogenated Gases (excl. SF$_6$) | 0.0 | 2.3 | 4.8 | **4.8** | 5.0 | **5.0** | 5.2 * |
| SF$_6$ | 1.0 | 0.3 | 0.1 | **0.1** | 0.1 | **0.1** | 0.1 * |
| Agriculture | 0.6 | 0.5 | 0.4 | **0.4** | 0.4 | **0.4** | 0.3 * |
| Natural Gas Transmission & Distribution | 2.5 | 2.6 | 2.5 | **2.4** | 2.5 | **2.4** | 2.3 |
| **Landfills** | | | | | | | |
| In-State | 11.7 | 3.5 | 3.1 | **3.3** | 3.1 | **3.4** | 3.4 * |
| Out-of-State | 2.6 | 1.0 | 1.6 | **1.8** | 1.6 | **1.9** | 2.2 * |
| Industrial | 1.1 | 0.2 | 0.2 | **0.2** | 0.2 | **0.2** | 0.2 * |
| POTWs | 0.2 | 0.2 | 0.4 | **1.0** | 0.4 | **1.0** | 1.0 * |
| Released through Land Clearing | 0.6 | 1.8 | 1.0 | **1.0** | 1.0 | **1.0** | 1.0 |
| Other Industrial and Non-Fuel Related | 0.3 | 0.1 | 0.3 | **0.3** | 0.3 | **0.3** | 0.3 |
| **TOTAL GROSS EMISSIONS** | 129.7 | 126.6 | 105.1 | **104.8** | 105.1 | **110.0** | 105.8 |
| **Sequestered** | -4.0 | -6.0 | -8.1 | **-8.1** | -8.1 | **-8.1** | -8.1 |
| **TOTAL NET EMISSIONS** | 125.7 | 120.6 | 97.0 | **96.7** | 97.0 | **101.9** | 97.7 |
| **BLACK CARBON** | | | | 2.8 | | 2.7 | 2.6 |

\* = 2019 Projected value

Notes

Previously reported values for 2017 and 2018 in the 2018 NJ GHG Inventory Report were projections. Final values presented here are based on data released through December 18, 2020 by the US Energy Information Agency and US EPA, and NJ emissions statements.

Black carbon estimates are presented for informational purposes but are not included in the total net emissions of the greenhouse gas inventory report because it is an aerosol component of particulate matter (PM), and not a gas.