

2018 GHG Inventory Executive Summary

The 2018 Greenhouse Gas (GHG) Inventory Report presents the annually updated GHG emissions estimates and projections for the state of Delaware. The inventory includes GHG emission estimates from 1990 to 2018 as well as emission projections from 2019 to 2050 in a business as usual (BAU) scenario. In addition to the emissions data, the report provides information on emission sources and activities, as well as inventory methods. It is important to understand that the data presented in this GHG inventory report are estimates and projections that include a degree of uncertainty. The modeling and analysis provide a tool to assess the current state and possible projection of future GHG emissions in Delaware.

Many key updates were included in the 2018 GHG Inventory that strengthen the overall accounting of emissions in Delaware. The 2018 GHG Inventory includes emission reductions estimates associated with two currently active policies in Delaware – Delaware’s Renewable Energy Portfolio Standards (RPS) and Delaware’s hydrofluorocarbon (HFC) prohibitions regulation. Emissions estimates and projections associated with the consumption of electricity are also included. These additions, in particular, had the greatest impact on the results presented. Other updates included updated accounting of HFC emissions, additional subsector analyses, and updated accounting of the land-use, land-use change, and forestry sector.

The 2018 GHG inventory estimates GHG emissions from various sources across economic sectors in Delaware. The economic sectors that were assessed are electric power¹, transportation, industrial, residential and commercial buildings, agriculture, waste management, and land-use, land-use change, and forestry (LULUCF). Delaware’s gross total GHG emissions were estimated at 16.89 MmtCO₂e, which represents approximately 0.25% of the national gross GHG emissions (U.S. gross total was 6,677 MmtCO₂e in 2018). While including the described updates in methodology, an increase in GHG emissions of 6.4% was realized in 2018 in Delaware relative to 2017.

Figure 1 shows the breakdown of GHG emissions (in MmtCO₂e) in 2018 by economic sector, as well as end uses (where available). The largest source of GHG emissions in Delaware in 2018 was the transportation sector, which represented 30% of the gross GHG emissions. When including electricity consumption-based emissions, the electric power sector is the second largest contributor of GHG emissions. Greenhouse gas emissions from the electric power sector in 2018 accounted for 25% of the total gross GHG emissions in Delaware. The electric power sector was split roughly in half for emissions from in-state generation (13% of total) and imported power for consumption (12% of total). The industrial sector accounted for 24% of the total GHG emissions in the state in 2018 (third highest sector). The buildings sector accounted for a total of 15% of statewide GHG emissions, with 7% from the residential sector and 8% from the commercial sector. Finally, the waste management and agriculture sectors each contributed 3% to the total GHG emissions in 2018.

The largest emission sectors are generally made up of one to two significant end uses. For example, the majority of GHG emissions in the transportation sector are sources from on-road vehicles, such as passenger cars and heavy-duty vehicles. Greenhouse gas emissions estimated in the industrial sector are primarily sourced from operations at the refinery.

¹ Including electricity consumption-based GHG emissions

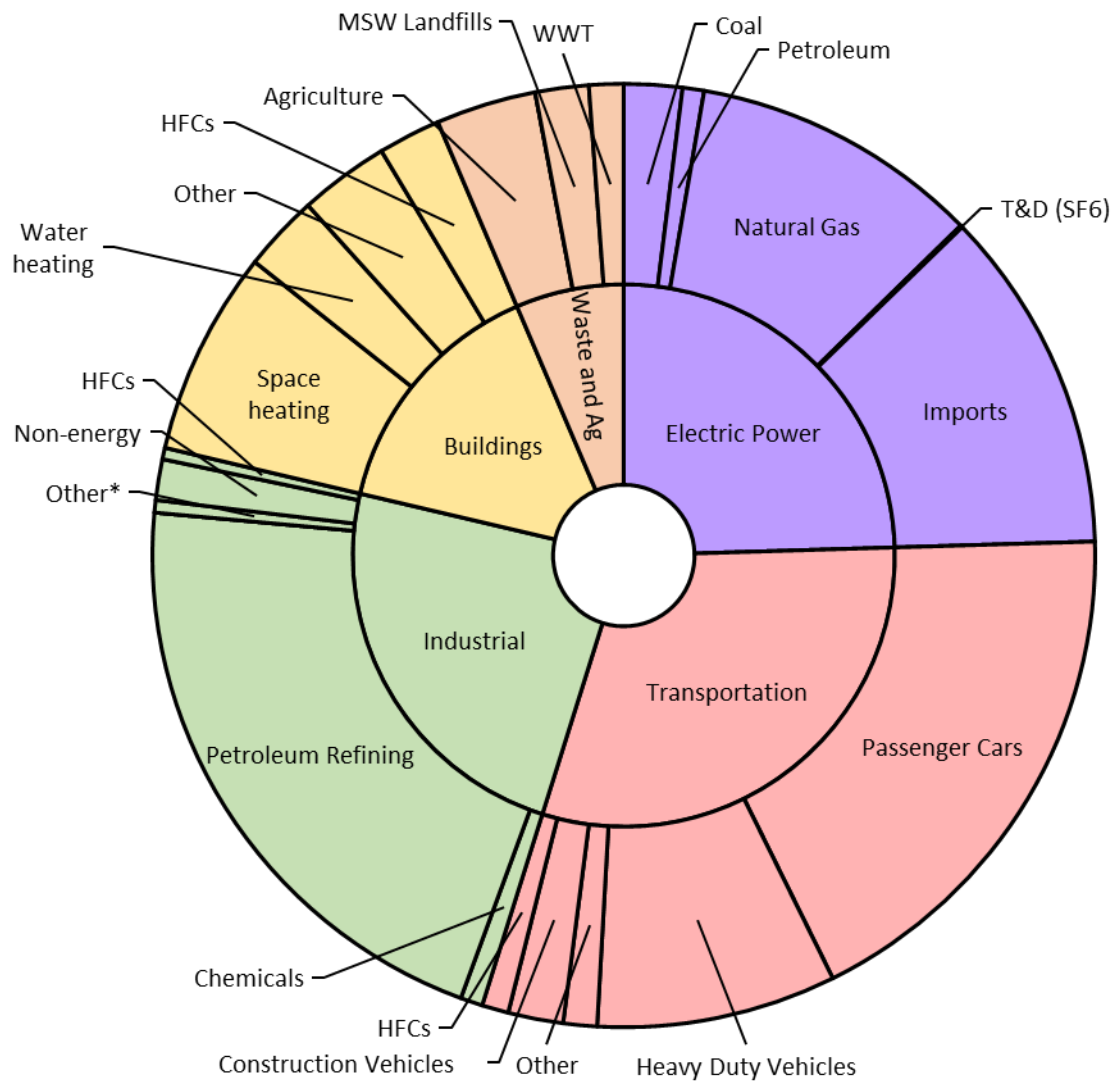


Figure 1. Gross GHG emissions in Delaware in 2018 broken out by sector and end-use (where applicable)

The overall trends of GHG emissions in each of the sectors can be seen in Figure 2. In Figure 2, the overall electric power sector is broken out to emissions from in-state generation (labeled electric power) and electricity consumption. Emissions from each have been trending downwards in recent years, likely caused by factors such as decreasing demand for electricity as well as fuel shifting to power generation from natural gas as opposed to coal. In addition, emission reductions associated with Delaware's RPS contribute to the declining trends in electric power sector emissions. Transportation sector GHG emissions have remained fairly constant since 1990. The industrial sector had a sharp decline in 2009 which was primarily caused by the economic recession as well as the refinery shutting down operations. Each other sector had experienced minor fluctuations since 1990, with the residential and commercial sectors slightly trending upwards from increased HFC emissions. The driving force for GHG emissions was largely energy consumption in the relevant economic sectors. Energy-related activities – specifically

fossil fuel combustion – were the largest source of GHG emissions in 2018 as they represented 88.7% of gross GHG emissions in Delaware.

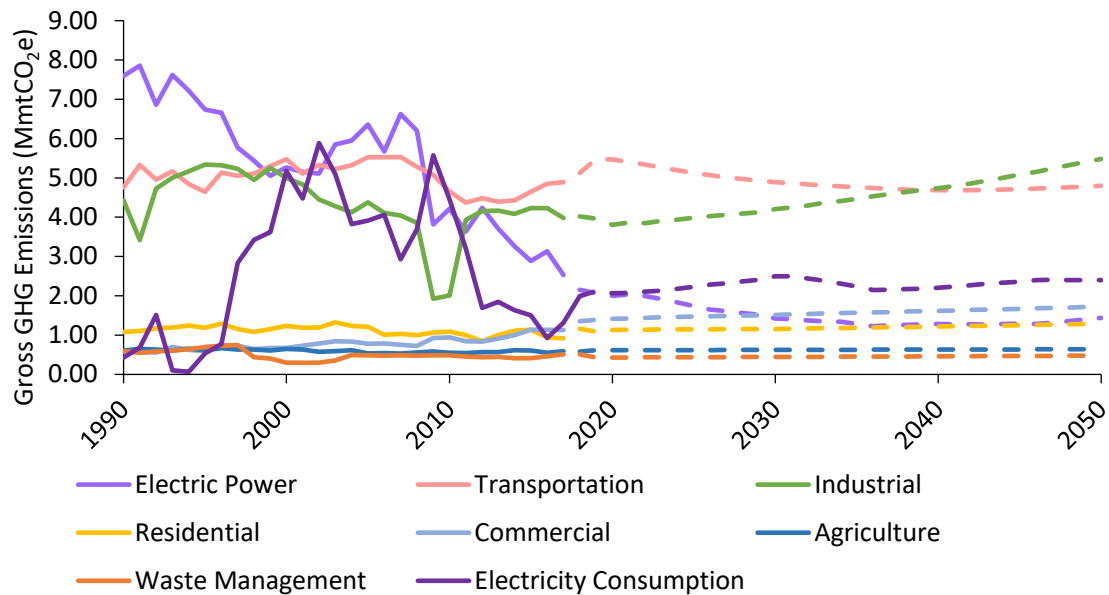


Figure 2. Gross GHG emission trends and projections in Delaware by economic sector from 1990 to 2050

Greenhouse gas emissions in Delaware are projected to increase from 2019 to 2050. The GHG emissions estimates and projections by sector from 1990 to 2050 are shown in Figure 2. The greatest increase in GHG emissions over the time period is in the industrial sector. The U.S. EIA Annual Energy Outlook (AEO) 2020 shows projected increases fossil fuel consumption in the industrial sector that relate to increased GHG emissions. Greenhouse gas emissions from in-state electricity generation show a declining through 2035 and then flatline through 2050. This can be expected as the RPS in Delaware is held constant after 2035. Projected emissions from in-state electricity generation fall below those in the commercial sector. The transportation sector shows a declining trend in GHG emissions, but emissions appear to flatline as the projection approaches 2050. The residential and commercial sectors each see increases in GHG emissions throughout the projection period. This increase is in part caused by the projected HFC emissions in these sectors. Emission reductions associated with Delaware’s HFC prohibitions do not apply to the residential sector. In the case of the commercial sector, HFC emissions are partly mitigated; however, energy-related GHG emissions are also expect to rise, which can be associated with growth in the sector as projected in the U.S. EIA AEO 2020. The agriculture and waste sectors are projected to remain constant through 2050.

Greenhouse gas emissions from 2005 were considered as the baseline to assess reductions in Delaware. Gross GHG emissions in Delaware in 2005 were estimated at 23.19 MmtCO₂e. As the current target for Delaware’s GHG emissions reduction is 26-28% of 2005 levels by 2025, emissions in 2025 should be between 16.69 and 17.16 MmtCO₂e. Figure 3 shows the gross GHG emission estimates and projections in Delaware from 1990 to 2050. The baseline emissions are shown as a reference as if no policy reductions were accounted. The BAU case shown includes respective reductions from Delaware’s RPS and HFC prohibitions (denoted as HFC reg). Emission reductions associated with the RPS are the bulk of reductions in the BAU case, while the reduction contribution from the HFC prohibitions is less. Notably, Figure 3 shows that the 26% reduction target is achieved by 2025 when accounting for these policy

reductions. Without these reductions, the target is not achieved, showing the necessity of these policies to continue to mitigate the harmful effects from climate change. After 2035, emission increases begin to overcome the reductions achieved through policy. The RPS requirements are held constant after 2035 and can no longer keep up with the emission increases. By about 2044, the emission reduction from 2005 levels no longer achieves 26%. Further policy may be needed to reduce GHG emissions throughout 2050 to continue to avoid harmful impacts from climate change.

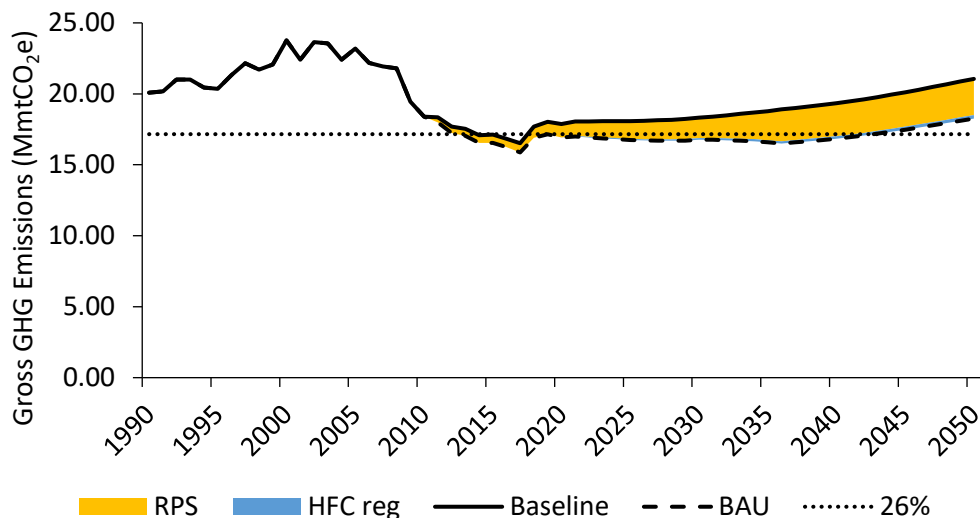


Figure 3. Baseline and BAU GHG emission estimates and projections in Delaware from 1990 to 2050, showing emissions reductions associated with currently active policies

As Delaware is already experiencing harmful impacts from the effects of climate change, it is important to continue to reduce GHG emissions. Further policy may be needed to continue to have meaningful mitigation of GHG emissions in the state. Like past reports, the three largest emitting sectors in Delaware are electric power, transportation, and industry. The electric power sector has been showing significant declines from shifts to lower emitting combustion fuels and zero-emitting sources of power. The transportation sector remains consistent in GHG emissions, showing a trajectory that averages out to a flat line from current levels. The industrial sector is projected to continue to increase in GHG emissions through 2050, becoming the largest sector of GHG emissions in Delaware. The transportation and industrial sectors are major sectors to look to emissions reductions for a meaningful effect on overall emissions reductions in Delaware. Additional, in-depth methodology and data sources for each sector are provided in the relevant sector section in the 2018 GHG Inventory Report.