

City of Dubuque, IA: 2022 Greenhouse Gas Emissions Inventory Results

Introduction

The City of Dubuque hired Lotus Engineering and Sustainability (Lotus) to complete a greenhouse gas (GHG) emissions inventory for community-wide emissions in 2022. Dubuque has been measuring community GHG emissions since 2003. The inventory completed by Lotus in 2022 included all of the same sources as in previous years and added several new sources.

Between 2003 and 2018, the emission sources measured by Dubuque included residential electricity, residential natural gas, commercial and industrial (C&I) electricity, C&I natural gas, gasoline on-road vehicles, diesel on-road vehicles, and landfill gas.

For the 2022 inventory, Lotus added the following sources: residential propane, residential fugitive emissions, residential transmission & distribution (T&D) losses, C&I propane, C&I stationary diesel, C&I T&D losses, on-road electricity, on-road T&D losses, transit, railways, aviation, waterborne, composted waste, wastewater, and refrigerant leakage.

2022 GHG Inventory Results

TOTAL EMISSIONS

The City of Dubuque's GHG emissions totaled 744,112 mt CO₂e in 2022.

This value includes emissions from all sources listed in the previous section. Dubuque's per capita emissions in 2022 totaled 13 mt CO₂e per person.

EMISSIONS BY SECTOR

The three largest sectors, or categories, of emissions in 2022 were C&I building energy usage (43% of total emissions), transportation (30%), and residential building energy usage (23%). The waste and wastewater sector and the industrial processes and product use (IPPU) sector each made up 2% of total emissions. See Figure 1.

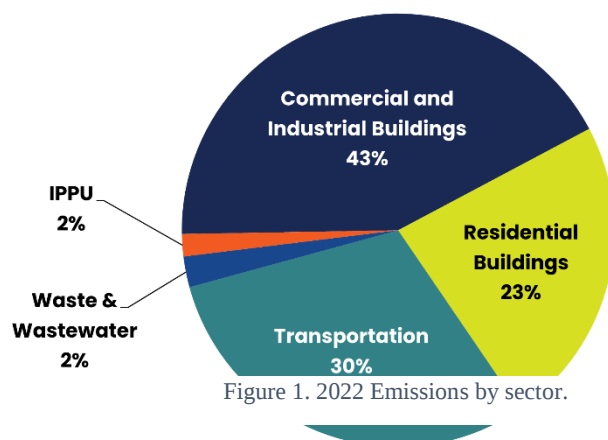


Figure 1. 2022 Emissions by sector.

EMISSIONS BY SOURCE

Breaking down sectors into individual sources, the three largest sources of emissions for Dubuque in 2022 were natural gas usage (32% of total emissions), electricity usage (31%), and on-road fossil fuel vehicles (29%). Solid waste and refrigerant leakage each made up 2% of total emissions, and the remaining sources together comprised less than 3% of total emissions. See Figure 2.

Emissions Over Time

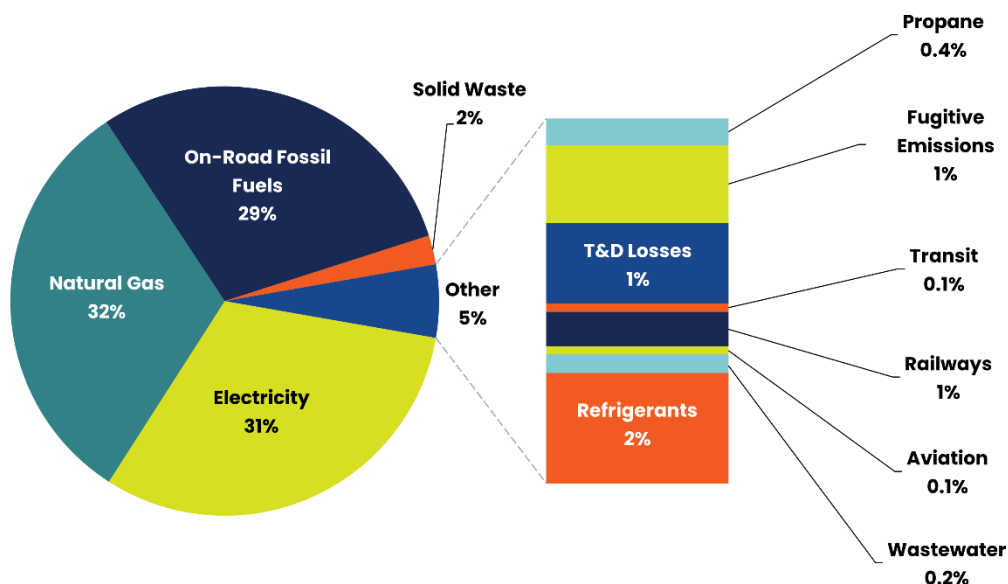


Figure 2. 2022 Emissions by source. Sources comprising less than 0.1% of total not included.

TOTAL EMISSIONS 2018-2022

Looking at total emissions (including the new sources added by Lotus), **Dubuque's emissions decreased 9% between 2018 and 2022**. Excluding the new sources (only looking at comparable sources), Dubuque's emissions decreased 14% between the two years. In other words, despite the addition of several new sources, Dubuque's total emissions still decreased. See Figure 3. One important change to note is that Dubuque's landfill began collecting landfill gas between 2018 and 2022, decreasing the landfill's emissions by 76%.

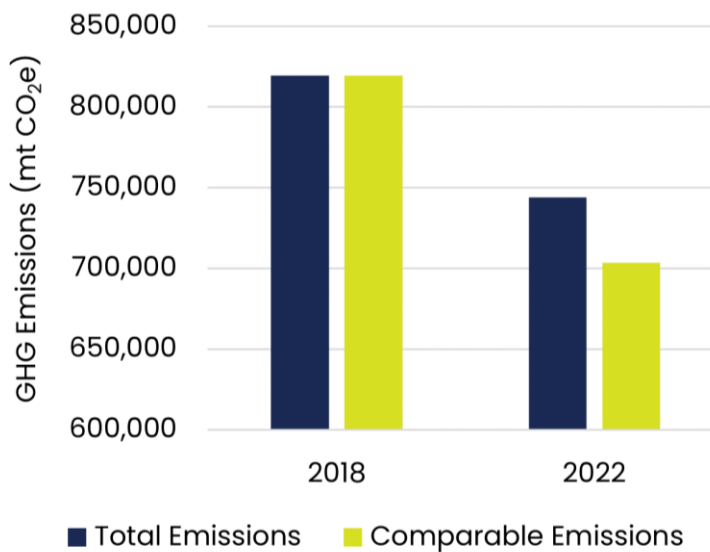


Figure 3. Total and comparable emissions in 2018 and 2022.

EMISSIONS BY SOURCE 2018-2022

Focusing on only comparable sources between 2018 and 2022, all emission sources decreased except for on-road gasoline and diesel vehicle emissions. See Figure 4. Emissions reductions for electricity can be attributed to reductions in Alliant Energy's emission factors. **Between 2018 and 2022, the emission factor for electricity decreased from 0.538 mt CO₂/MWh to 0.382 mt CO₂/MWh.**

TOTAL EMISSIONS 2003-2022

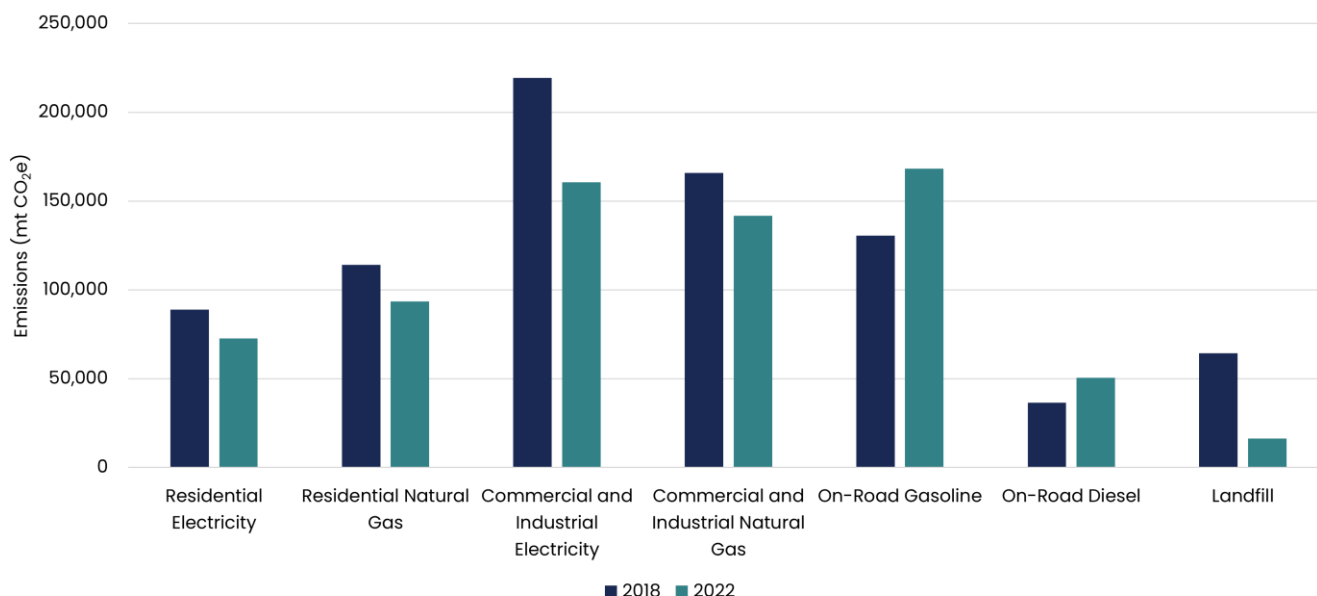


Figure 4. Comparable emission sources in 2018 and 2022.

Looking at Dubuque's total emissions (including new sources added by Lotus), **between the baseline year of 2003 and the most recent inventory year of 2022, Dubuque's emissions decreased by 34%.** Excluding the new emission sources added in 2022, Dubuque's emissions decreased 37% between 2003 and 2022. See Figure 5 on the following page.

Science-based Target

Lotus used the One Planet City Challenge's (OPCC) approach to calculate a science-based emissions reduction target for Dubuque. This approach uses the US Human Development Index Score (HDI) and population growth projections, as well as the community's total scope 1 and 2 emissions and population during the baseline year. For Dubuque, the

baseline year is 2018. Using the methodology from OPCC, Lotus calculated Dubuque’s science-based target to be 62.4% emissions reduction from 2018 levels by 2030.

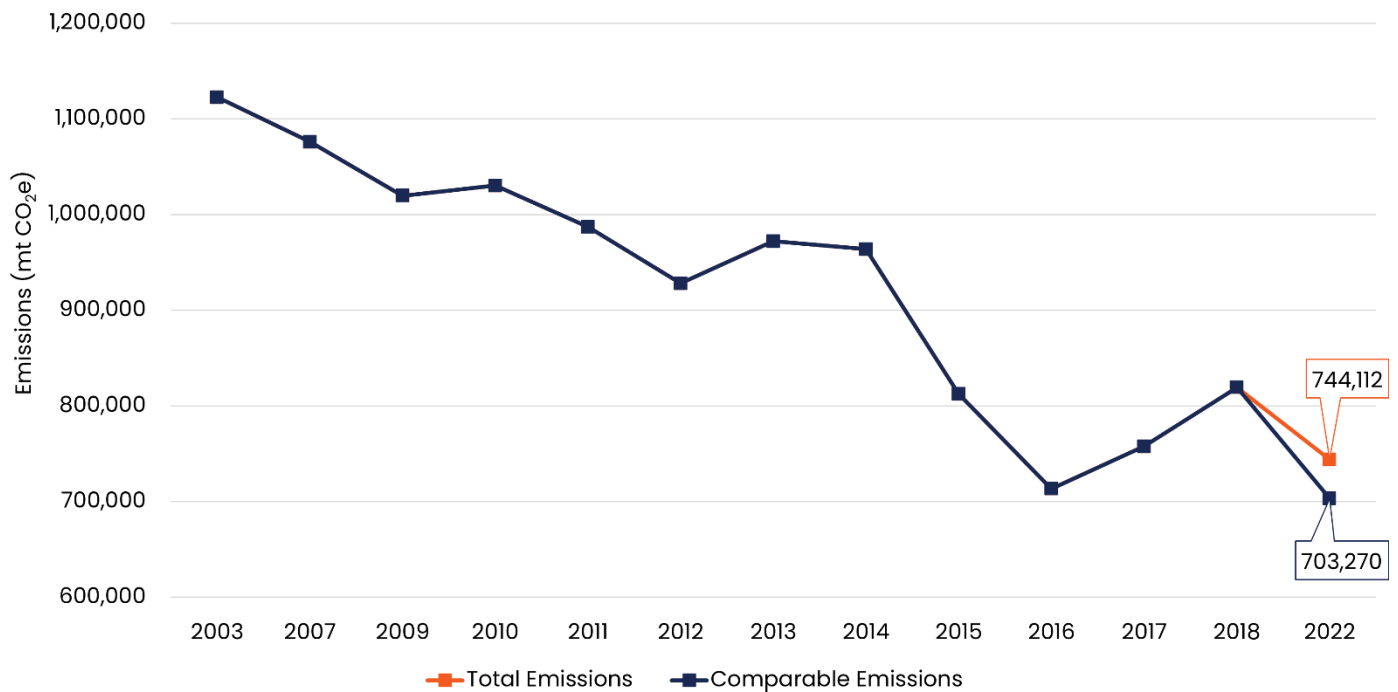


Figure 5. Emission trends from 2003 to 2022. Emission sources remain identical from 2022 to 2018. “Total emissions” value in orange reflects the additional emission sources added by Lotus in the 2022 inventory.

What’s Next?

In addition to this overview of Dubuque’s 2022 GHG inventory, Lotus will be creating a business-as-usual model (BAU) and a final report. The BAU will help Dubuque visualize what the future of GHG emissions in the city would look like if no further climate action work were to occur. This information will be vital in targeting emission sources for future reduction work. The final report will provide a more in-depth analysis of the 2022 inventory results, including tables and more figures. These final products will be essential in supporting Dubuque’s future climate action work and will help Dubuque reach its target for emissions reduction.