# Industrial Boiler Pollution in Minnesota

Evergreen Collaborative has published a first-of-its-kind map identifying nearly 14,000 industrial boilers across all 50 states and quantifying the air pollution they emit. Our analysis finds that industrial boilers are a massive pollution source in the U.S., generating 6% of all industrial nitrogen oxide ($NO_x$) emissions and 5-10% of all industrial carbon dioxide ($CO_2$) emissions. These boilers depend heavily on fossil fuels, especially fossil gas, to heat water for a wide range of industrial processes, including pulp and paper manufacturing, food processing, chemicals production, and more.

In burning fossil fuels to heat water, industrial boilers produce a dizzying array of air pollutants. These include not only $CO_2$, the primary driver of climate change, but also multiple contaminants that directly endanger human health, including $NO_x$ (the main constituent of ozone), particulate matter, mercury, and hydrochloric acid. These pollutants can penetrate deep in the lungs and, depending on the pollutant, cause respiratory illnesses, heart disease, cancer, and premature death. Industrial boiler pollution is a public health crisis, but it doesn't have to be this way: Evergreen and Sierra Club's new report accompanying the national boiler map, *Embracing Clean Heat: Opportunities for Zero-Emission Industrial Boilers*, lays out a pathway to electrifying America's industrial boilers.

The national map and report highlight key opportunities—and urgent needs—in Minnesota. **Minnesota is home to 951 industrial boilers**, the second-highest number of any state. Evergreen's Minnesota dataset indicates that boiler pollution is an acute issue in Minnesota:

- Minnesota's industrial boilers emit more than 5,700 tons of $NO_x$ annually.
- About 21% of Minnesota's industrial boilers are located in federally recognized disadvantaged communities (DACs).
    - Those DACs suffer higher volumes of industrial air pollution—on average, reported units in DACs in Minnesota emit 2x more $NO_x$, 5x more mercury, and an eye-popping 41x more hydrochloric acid than those in non-DACs.
- Across the board, Minnesota's industrial boilers emit 2x more hydrochloric acid than the national average.
- Hutchinson Technology, Hearth and Home Technologies, and Hormel Foods own the largest number of boilers in Minnesota, with a combined 86 units across the state.
- The food manufacturing industry operates the largest number of units in Minnesota with 238 units, followed by the fabricated metal products industry and the machinery manufacturing industry with 130 and 82 units, respectively.
- The top 5% emitted more than 90 tons of NOx on average annually, or 4,331 total tons of NOx annually.

- The highest emitting reported unit in Minnesota is owned by Southern Minnesota Beet Sugar Cooperative, a food manufacturing company. The unit is located in Renville and produces 939 tons of $NO_x$ annually. This makes this unit the 11th highest emitting unit in the U.S. and higher emitting than 99.9% of units in the U.S., by $NO_x$ emissions.

Evergreen and Sierra Club's report lays out a policy agenda to tackle the massive pollution burden of fossil-fueled industrial boilers. That agenda hinges on replacing the current boiler fleet, to the greatest extent possible, with electric alternatives. The report argues that those alternatives—industrial heat pumps, conventional electric boilers, and thermal energy storage—are commercially available and technologically viable replacements for high-polluting legacy boilers. Particularly for industrial processes below 200°C, these alternatives can provide cost-effective pollution reductions compared to fossil fueled units. The time is ripe for state and federal leaders to advance ambitious measures to electrify America's industrial boilers.

**Minnesota is especially well-positioned to take action on this issue.** The Minnesota Pollution Control Agency (MPCA) has broad authority to control air pollution and can establish uniform, statewide standards for industrial source categories, such as boilers. The state's Court of Appeals has cited that authority favorably, and has affirmed that the MPCA may set enforceable emission limits in pursuit of the state's economy-wide GHG reduction targets. Thus far, however, Minnesota has not adopted its own pollution limits for industrial boilers. Given MPCA's ample regulatory authority and the large climate footprint of the state's boiler fleet, the agency could help Minnesota achieve its climate goals by issuing pollution standards that require or incentivize the replacement of combustion boilers with electric alternatives.

*Embracing Clean Heat* recommends an ambitious policy approach to electrify America's industrial boilers. The policy tools detailed in the report include:

- **New State-Level Clean Air Rules** — States can put firm limits on criteria pollution from their industrial boilers, going above and beyond the Trump administration's standards.
- **Investments in Electrification** — State governments can make targeted investments to close the cost gap between fossil and electric boilers, clean up fenceline communities' air, and create jobs.
- **Utility Rate Reforms** — States' public utilities commissions can institute rates that reward industrial customers for electrifying equipment and deploying energy storage to enhance demand flexibility and grid stability.

See Evergreen Collaborative and Sierra Club's new report, *Embracing Clean Heat: Opportunities for Zero-Emission Industrial Boilers*, for more, including a detailed exploration of states' authorities to act on boiler pollution under the Clean Air Act.