Industrial Boiler Pollution in Michigan

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 Michigan. **Michigan is home to 394 industrial boilers, which collectively produce about 4,800 tons of NO_x annually**. Evergreen's Michigan dataset indicates that boiler pollution is an acute issue in the Wolverine State:

- About 37% of Michigan'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 Michigan emit higher levels of particulate matter and volatile organic compounds, more than 2x more lead, and 7x more formaldehyde than non-DACs in Michigan. Nationally, boilers in DACs are on average twice as polluting as boilers in non-DACs.
- Only about 5% of Michigan's industrial boilers are located in nonattainment areas, where ozone pollution already exceeds legal limits under the Clean Air Act, compared to about 25% at the national level.
- Stellantis North America, General Motors, and Hemlock Semiconductor Operations own the largest number of boilers in Michigan, with a combined 55 boilers across the state.
- The food manufacturing industry operates the largest number of units in Michigan with 85 units, followed by transportation equipment manufacturing and chemical manufacturing with 84 and 73 units, respectively.

- The top 1% of highest-emitting reported units in Michigan emitted more than 330 tons of NOx on average annually, cumulatively generating 1,321 total tons of NOx every year. The top 5% emitted more than 123 tons of NOx on average annually, totaling 2,466 tons of NOx.
- The highest emitting reported unit in Michigan is owned by Billerud, a paper manufacturing company. The unit is located in Escanaba and produces 573 tons of NOx annually. This makes this unit higher emitting than 99.67% of units in the U.S., by NOx 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.

The report 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 have the authority to set their own emission limits for stationary sources, provided that they are no less stringent than EPA's limits. That means Michigan and other states can put firm and declining 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. Those investments can take the form of clean heat production tax credits, workforce development assistance, and other support mechanisms.
- **Utility Rate Reforms** — The current utility rate structures for industrial customers do not reflect the grid benefits that electrification and onsite energy storage can bring. 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 information on all of the above, including a detailed exploration of states' authorities to act on boiler pollution under the Clean Air Act.