



## Industrial Boiler Pollution in Pennsylvania

Evergreen Collaborative has published a <u>first-of-its-kind map</u> 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.

The national map highlights key opportunities—and urgent needs—in Pennsylvania. **Pennsylvania is home to 798 industrial boilers, the seventh-highest number of any state**. <u>Evergreen's National boiler map</u><sup>1</sup> indicates that boiler pollution is an acute issue in the Keystone State:

- About 20% of Pennsylvania's industrial boilers are **located in federally** recognized disadvantaged communities (DACs).
  - Those DACs suffer higher volumes of industrial air pollution—on average, reported boiler units in Pennsylvania located in DACs emit more NO<sub>x</sub>,
    3.5x more formaldehyde, 6x more cadmium, and 7x more mercury than reported units located in non-DACs.
- **20.9% of Pennsylvania's industrial boilers are located in nonattainment areas,** where ozone pollution already exceeds legal limits under the Clean Air Act.
- **U.S. Steel, Carpenter Tech, and GlaxoSmithKline (GSK)** own the largest number of boilers in Pennsylvania, with a combined 78 boilers across the state.
- The **chemical manufacturing industry** operates the largest number of boilers in Pennsylvania with 149 units, followed by the **primary metal manufacturing industry** and the **food manufacturing industry** with 147 and 111 units, respectively.
- The top 1% of highest-emitting reported units in Pennsylvania each emitted more than 216 tons of NO<sub>x</sub> on average annually, cumulatively generating 1,728 total tons of NO<sub>x</sub> every year. The top 5% emitted more than 80 tons of NO<sub>x</sub> on average annually, or 3,068 total tons of NO<sub>x</sub> annually.
- The highest emitting reported boiler unit in Pennsylvania is owned by U.S. Steel, a primary metal manufacturing company. The unit is located in Clairton and produces 349 tons of NO<sub>x</sub> annually. This means the **unit has higher NO<sub>x</sub>** emissions than 99% of units in the U.S.

In burning fossil fuels to heat water, **industrial boilers produce a dizzying array of air pollutants.** These include not only CO<sub>2</sub>, the primary driver of climate change, but also

<sup>&</sup>lt;sup>1</sup> Filtered for Pennsylvania

multiple contaminants that directly endanger human health, including NO<sub>x</sub> (the main constituent of ozone in the atmosphere), 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, <u>Embracing Clean Heat: Opportunities for Zero-Emission Industrial Boilers</u>, lays out a pathway to electrifying America's industrial boilers.

**The solution:** Replace the current boiler fleet, to the greatest extent possible, with electric alternatives. These 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 leaders to advance ambitious measures to electrify America's industrial boilers.

**Pennsylvania is especially well-positioned for action on this issue.** RISE PA, the state's new \$396 million industrial decarbonization grant program, is offering tiered grants available to small, medium, and large manufacturers to implement a diverse range of facility retrofits to cut GHG emissions and invest in Pennsylvania's industrial economy. A portion of those funds could go to support manufacturers replacing their fossil-fueled boilers with more efficient electric alternatives. As state lawmakers prioritize cutting industrial pollution, an emphasis on boiler electrification would help them achieve their goals.

<u>Embracing Clean Heat</u> 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 the federal 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 <u>Embracing Clean Heat:</u> <u>Opportunities for Zero-Emission Industrial Boilers</u> for more, including a detailed exploration of states' authorities to act on boiler pollution under the Clean Air Act.

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