

Overview

On December 20, 2012, the U.S. Environmental Protection Agency (EPA) finalized the reconsideration process for its Clean Air Act pollution standards **National Emissions Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters** (known as Boiler Maximum Achievable Control Technology (MACT)). This rule applies to boilers in a wide range of industrial facilities and institutions. The U.S. Department of Energy (DOE) offered technical assistance to ensure that major sources burning coal or oil have information on cost-effective clean energy strategies for compliance, including combined heat and power, and to promote cleaner, more efficient boilers to cut harmful pollution and reduce operational costs. EPA stated in the final rule that existing sources will have three years from issuance of the final reconsideration rule to implement the new requirements, and if needed, may request an additional year. This means that existing sources will have until January 31, 2016 to comply with the rule, or to request time through January 2017.

Background on Standards for Boilers and Process Heaters

The final **Major Source** Boiler MACT rule applies to all fuel types, with significant impact on coal, oil, and process gas fired boilers. A major source is defined as a facility that emits 10 tons per year (tpy) or more of any single Hazardous Air Pollutant, or 25 tpy or more of total Hazardous Air Pollutants (HAPs) – including mercury, non-mercury metals, non-metal inorganics, non-dioxin organics, and dioxins/furans. For its Outreach Program, DOE focused on major source facilities burning coal and/or oil in their boilers.



Photo courtesy of Energy Solutions Center

Resources

“Financial Incentives Available for Facilities that are Affected by the U.S. EPA ‘National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters: Proposed Rule’” written by ICF International for U.S. DOE: <http://www.energy.gov/eere/amo/downloads/financial-incentives-available-facilities-are-affected-us-epa-national-emission>

For DOE Boiler MACT Technical Assistance: <http://www.energy.gov/eere/amo/boiler-mact-technical-assistance-program>

U.S. EPA Emissions Standards for Boilers and Process Heaters and Commercial/Industrial Solid Waste Incinerators: <http://www.epa.gov/airquality/combustion/actions.html>

Expected Impact on Facilities and Institutions

EPA estimated that less than one percent of the 1.5 million boilers in the United States would need to take action to meet emissions limits under the final rule. Many are covered by the **Area Source Boiler Rule** (40 CFR part 63 subpart JJJJJ) and are located at small sources of air pollutants, such as hotels, hospitals, and commercial buildings. These sites would need

to conduct periodic tune-ups, and perform a one-time energy assessment; however, the remaining less than one percent are required to meet specific emissions limits.

The Boiler MACT rule was estimated by the EPA to result in \$25 to \$61 billion in health benefits through reduced exposure to fine particulates. Compliance costs for the major source boilers are estimated to be around \$5 billion for capital equipment and \$1.6 billion for annual operating, maintenance, and monitoring costs. Individual boiler costs will vary depending on the boiler age, size, location, fuel type, and other factors.

DOE Boiler MACT Technical Assistance Program

DOE currently provides technical assistance on CHP technologies to commercial and industrial facilities through its seven regional CHP Technical Assistance Partnerships (TAPs). Starting in January 2013, DOE supplemented this effort by providing site-specific technical and cost assistance to the major source facilities affected by the Boiler MACT that are burning coal or oil. Through the CHP TAPs – formerly known as Clean Energy Application Centers (CEACs) – DOE contacted nearly 700 facilities with over 1,500 affected boilers to discuss compliance strategies, as well as to provide information on potential funding and financing opportunities.

Boiler MACT compliance strategies can include installing emissions control technologies on existing boilers, replacing existing boilers with new natural gas boilers, converting existing boilers to operate on natural gas, and replacing the existing boiler with a natural gas fueled CHP system. Natural gas CHP, which is cleaner and more energy efficient than traditional separate heat and power, is a compliance strategy that can have a positive economic return for a facility over time.

Boiler MACT Technical Assistance Program Details

DOE began the Boiler MACT technical assistance program in February 2012 with a pilot program in partnership with the Public Utilities Commission of Ohio to provide site-specific technical and cost information to the more than 50 facilities in Ohio affected by Boiler MACT. DOE used the results and feedback on the outreach process in Ohio to scale up the program to the national level. To formulate a list of affected sites throughout the country, DOE began with the EPA Information Collection Rule (ICR) database that was released with the Boiler MACT rule. Using other public and private databases, the DOE affected facilities list contained nearly 700 industrial and commercial coal and oil burning facilities around the country.

DOE CEACs contacted each affected facility to explain the program and gauge interest in technical assistance. For sites interested in assistance evaluating their compliance strategies, the CEACs provided site-specific decision tree analyses that described the potential compliance strategies and provided indicators of the economic impact of each. If a site was interested in moving forward with analyzing CHP after review of the decision tree analysis, the CEACs provided a level 1 feasibility analysis.

Evaluating Sites

To aid in outreach, “decision trees” were constructed for each of the affected facilities in the outreach program. The decision tree is a site-specific spreadsheet with information about the site’s current boilers (capacity, operating hours, installation year) and cost information about each of the site’s compliance strategy options (upgrading boilers with emissions control technologies, converting existing boilers to natural gas, installing natural gas boilers, and natural gas fueled CHP). After the site was asked to verify the boiler information, the site was briefed on the various strategies available for complying with the rule and costs, as calculated in the decision trees.

Boiler MACT Technical Assistance Program Results

The results from DOE’s Boiler MACT Outreach Program are promising. More than 50 sites are considering CHP after utilizing DOE technical assistance resources. If all of these sites move forward with installing CHP, they would add more than 700 MW of CHP. Three facilities alone are moving forward with 71 MW of CHP. More than 290 sites reported they are already in compliance with the rule. More than half of those sites reported they have switched to natural gas, while the remainder reported they have either changed their operating characteristics to avoid being a major source facility or are converting to biomass. Only 11 sites reported that they plan to install emissions controls to come into compliance and 76 sites have been permanently closed.

Additional Resources

- U.S. DOE CHP Technical Assistance Partnerships: <http://energy.gov/eere/amo/chp-technical-assistance-partnerships-chp-taps>
- Read more about improving boiler and steam system efficiency on the Advanced Manufacturing Office website: <http://energy.gov/eere/amo/steam-systems>
- For information about DOE’s CHP Deployment Program, contact Claudia Tighe, U.S. DOE, claudia.tighe@ee.doe.gov

DOE Boiler MACT Technical Assistance Program Results

| Reported Description | # of Sites | Potential CHP Capacity (MW) |
|----------------------------------|------------|-----------------------------|
| In Compliance | 296 | 492 |
| Non-Responsive | 147 | 5 |
| Utilized DOE CHP Assistance | 53 | 724 |
| Not Interested in DOE Assistance | 124 | 71 |
| Total Sites | 620 | 1,292 |