

MATS Compliance: Retrospective

https://www.andovertechnology.com/wp-content/uploads/2021/08/PM-and-Hg-Controls_CAELP_20210819.pdf

Analysis of utility industry's efforts to comply with MATS

- New technology developed
- Lowered costs since 2011
- More widespread implementation of technologies that may have been available in 2011 but were not widely deployed, and the resulting improvements in emissions performance
- Developments in best practices that may have occurred since 2011

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Consulting to the Air Pollution Control Industry

Analysis of PM and Hg Emissions and Controls from Coal-Fired Power Plants

C-21-CAELP

to:

Center for Applied Environmental Law and Policy (CAELP)

August 19, 2021

Mercury and Air Toxics Standard (MATS) established:

Mercury (Hg)

Non-Hg

- Filterable PM limit as a surrogate for complying with non-Hg metals

Acid gases

Compliance procedures

- Monitoring
- Reporting

Conclusions about complying with HAPs emissions limit

Filterable PM compliance overwhelmingly preferred by utilities.

Significant improvement in PM controls means actual emissions far lower than emissions limit (0.3 lb/mmbtu)

- Wider deployment of available PM control device improvements
- Improved practices.
- Technology improvements.

Industry found low-cost ways to achieve lower PM emissions that were not anticipated in 2011 or considered in EPA's 2011 assessment.

Electrostatic Precipitators

- Correction of operational issues, increases in treatment time
- High Frequency transformer rectifiers
- Replacing or repairing internals
- Adding fields or other approaches to increase treatment time
- Fabric filters installed downstream of an ESP

Fabric filters

- Correction of operational issues (leakage in baghouse casing and ductwork)
- Improved maintenance and better management of baghouse cleaning
- Bag and/or compartment leakage detectors
- Improved fabrics less prone to failure and clean more easily
- Bag replacement

Particulate Matter
Continuous Emissions
Monitors are now
commonly used.

Was considered “new” or “emerging” in 2011.

MATs required PM CEM or quarterly testing.

Most chose CEM.

Real-time monitoring allows facility operators to quickly identify and address potential problems

Cost ~\$250,000 to install.

Conclusions about Mercury Control

Hg Methods include scrubbers, baghouses, ESPs, ACI

All methods experienced large advances as MATS “focused attention of owners and technology suppliers on the goal of capturing Hg efficiently and at the lowest possible cost”.

ACI is a “dial-up” technology. Lower emissions achieved with increased carbon injection rates

A large reduction
in Hg emissions
resulted from:

Wider deployment of ACI, PM and SO₂ controls to
reduce emissions

Advances in Hg Controls:

- More advanced activated carbons that required lower treatment rates or were much more effective in situations that had previously been difficult
- Chemicals and other technology advances developed since 2011 to improve Hg oxidation and capture in PM or SO₂ control equipment
- Improvements in Hg monitoring that facilitated improved monitoring and use of controls, including the ability to correctly identify and correct potential problems

Development of “best practices”

- Limited experience prior to 2011 meant that “best practices” had not been developed

Activated carbon
is developed
specifically for Hg
capture in flue
gas

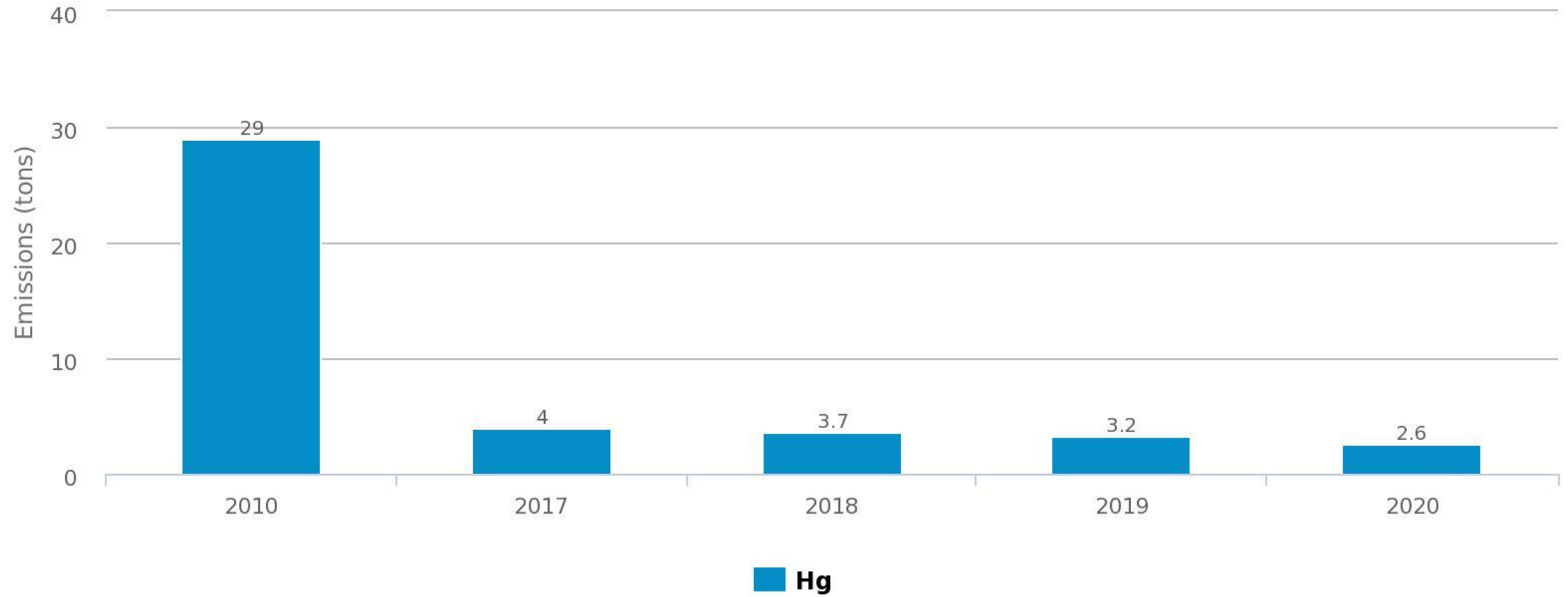
First generation carbons originally used for other purposes, but then repurposed for Hg capture.

Second generation carbons had some modifications—adding halogens or minimizing impacts to fly ash reuse in concrete.

Third generation developed post-2011.

- Specifically designed for difficult applications
- Lower injection rates
- Avoid impacts on flyash reuse

Mercury Emissions from MATS Sources, 2010-2020



tons