



Affordable Clean Energy (ACE) Rule

November 8, 2019
Stakeholder Meeting



Introductions

- Daniel Czecholinski, ADEQ Air Quality Director

ACE Rule Presentation

- Zachary Dorn, Environmental Science Specialist
- Hao Zhou, Environmental Engineer

Stakeholder Feedback

- Mike Sonenberg, Technical Analysis Unit Manager
 - Stakeholder Values
 - Future Stakeholder Engagement



Background and ACE Requirements

- Final rule completed three distinct rulemakings:
 - Repeal of the Clean Power Plan
 - Finalized the Affordable Clean Energy Rule (ACE)
 - 40 C.F.R. Part 60, Subpart UUUUa.
 - Finalized new regulations for state implementation of ACE and future emission guidelines under Clean Air Act (CAA) § 111(d).
- Proposed New Source Review provisions have not been finalized.
 - EPA has not announced a timeframe for these proposed changes to be finalized.

■ Clean Power Plan (CPP)

– Three Building Blocks

- 1) Improve heat rate at individual at affected coal-fired steam generating units;
- 2) Substituting increased generation from lower-emitting existing natural gas combined cycle units for decreased generation from higher-emitting affected steam generating units
- 3) Substituting increased generation from new zero-emitting renewable energy generating capacity for decreased generation from affected fossil fuel-fired generating units.

■ ACE

- One Building Block: Improve heat rate at individual at affected coal-fired steam generating units

ACE is smaller in scope than CPP

CPP

- Power plant efficiency & shifting generation
- Standards
 - Emission Rate or mass limits
 - Statewide goals
- Variety of compliance options
 - Inter- or intra-state trading
 - Energy efficiency
 - Biomass



ACE

- Power plant efficiency guidelines
- Standards
 - Emission Rate
- Unit Level Compliance

- Designated Facilities defined as “a steam generating unit that meets the relevant applicability conditions in section § 60.5775a, except as provided in § 60.5780a.” 40 C.F.R. § 60.5805a.
 - Steam generating unit means “any furnace, boiler, or other device used for combusting fuel and producing steam (nuclear steam generators are not included) plus any integrated equipment that provides electricity or useful thermal output to the affected facility or auxiliary equipment.”
 - 1) Serves a generator connected to a utility power distribution system with a nameplate capacity greater than 25 MW-net (*i.e.*, capable of selling greater than 25 MW of electricity).
 - (2) Has a base load rating (*i.e.*, design heat input capacity) greater than 260 GJ/hr (250 MMBtu/hr) heat input of fossil fuel (either alone or in combination with any other fuel).
 - (3) Is an electric utility steam generating unit that burns coal for more than 10.0 percent of the average annual heat input during the 3 previous calendar years.

- Units subject to NSPS, Subpart TTTT
- Units that are and have always been subject to a federally enforceable limit of net electric sales to 219,000 MW-hr or one-third of potential electric output capacity
- Municipal waste combustors subject to NSPS subpart Eb
- EGU subject to NSPS subpart CCCC (for Commercial and Industrial Solid Waste Incineration Units)
- Stationary combustion turbine that meets definition of combined cycle or combined heat and power turbine
- Integrated Gasification Combined Cycle (IGCC)
- Non-fossil unit
 - Capable of combusting 50% or more of non-fossil fuel and has always limited fossil fuels to 10% of annual capacity; or
 - Is subject to federally enforceable permit limiting fossil fuels to 10% or less of annual capacity factor.
- An EGU that serves a generator greater than 25 MW along with other units where the effective generation capacity is 25 MW or less

Designated Facilities in Arizona

Apache Generating Station

- Unit 3

Cholla Generating Station

- Unit 1
- Unit 3
- Unit 4

Coronado Generating Station

- Unit 1
- Unit 2

Springerville Generating Station

- Unit 1
- Unit 2
- Unit 3
- Unit 4

- CAA § 111(d)
- EPA determine Heat Rate Improvement is the BSER for existing coal-fired EGUs.
 - Unit level evaluation of the application of HRI and consideration of other factors.
- EPA proposed six candidate technologies states shall consider for Heat Rate Improvement:
 - Neural Network/Intelligent Sootblowers
 - Boiler Feed Pumps
 - Air Heater & Duct Leakage Controls
 - Variable Frequency Drives
 - Blade Path Upgrade (Steam Turbine)
 - Redesign/Replace Economizer
 - And Improved Operating and Maintenance (O&M) Practices

BSER Candidate Technologies

TABLE 1—SUMMARY OF MOST IMPACTFUL HRI MEASURES AND RANGE OF THEIR HRI POTENTIAL (%) BY EGU SIZE

| HRI Measure | <200 MW | | 200–500 MW | | >500 MW | |
|--|---|-----|------------|-----|---------|-----|
| | Min | Max | Min | Max | Min | Max |
| Neural Network/Intelligent Sootblowers ... | 0.5 | 1.4 | 0.3 | 1.0 | 0.3 | 0.9 |
| Boiler Feed Pumps | 0.2 | 0.5 | 0.2 | 0.5 | 0.2 | 0.5 |
| Air Heater & Duct Leakage Control | 0.1 | 0.4 | 0.1 | 0.4 | 0.1 | 0.4 |
| Variable Frequency Drives | 0.2 | 0.9 | 0.2 | 1.0 | 0.2 | 1.0 |
| Blade Path Upgrade (Steam Turbine) | 0.9 | 2.7 | 1.0 | 2.9 | 1.0 | 2.9 |
| Redesign/Replace Economizer | 0.5 | 0.9 | 0.5 | 1.0 | 0.5 | 1.0 |
| Improved Operating and Maintenance (O&M) Practices | Can range from 0 to >2.0% depending on the unit's historical O&M practices. | | | | | |

Table 1 Source: 84 Fed. Reg. 32,520, 32,537 (July 8, 2019).

TABLE 2—SUMMARY OF COST (\$2016/KW) OF HRI MEASURES

| HRI Measure | <200 MW | | 200–500 MW | | >500 MW | |
|--|----------------------|------|------------|------|---------|------|
| | Min | Max | Min | Max | Min | Max |
| Neural Network/Intelligent Sootblowers ... | 4.7 | 4.7 | 2.5 | 2.5 | 1.4 | 1.4 |
| Boiler Feed Pumps | 1.4 | 2.0 | 1.1 | 1.3 | 0.9 | 1.0 |
| Air Heater & Duct Leakage Control | 3.6 | 4.7 | 2.5 | 2.7 | 2.1 | 2.4 |
| Variable Frequency Drives | 9.1 | 11.9 | 7.2 | 9.4 | 6.6 | 7.9 |
| Blade Path Upgrade (Steam Turbine) | 11.2 | 66.9 | 8.9 | 44.6 | 6.2 | 31.0 |
| Redesign/Replace Economizer | 13.1 | 18.7 | 10.5 | 12.7 | 10.0 | 11.2 |
| Improved O&M Practices | Minimal capital cost | | | | | |

Table 2 Source: *Id.* at 32,542 (July 8, 2019).

Compliance techniques that do not qualify under ACE:

- Trading or averaging across designated facilities at a single plant.
- Trading or averaging between designated facilities at different plants.
- Biomass co-firing

- For each EGU, ADEQ must:
 - 1) evaluate the applicability of the 6 candidate technologies and best O&M practices;
 - 2) determine which candidate technologies or practices are appropriate; and
 - 3) establish CO₂ standards based on the emission reductions the selected technology or practice could achieve.
 - 4) describe the application of the BSER technology to each source in setting those standards;
 - 5) implementation and enforcement of those standards.
- Must also include
 - Monitoring, recordkeeping, and reporting requirements
 - Project future operating characteristics of each unit through 2035

- Feasibility of each technology/practice at each unit
- Recent independent installation of candidate technologies
- Interactions that reduce efficiency gains from the candidate technologies
- Variable emission performance
- Remaining useful life
- Unreasonable cost resulting from plant age, location, or design
- Potential rebound effect (84 Fed. Reg. 32,520, 32,542-43)



- Based on cumulative impact of all applicable HRI
- Unit specific and rate-based
- Adequate monitoring, recordkeeping, and reporting to ensure compliance
- Compliance within two years of state plan submission
 - Increments of progress if two years is not feasible and if approved by EPA



ADEQ Planning

| Event | Date | Comments |
|---|-------------------------|---|
| Election by designated facilities to conduct initial HRI analysis | February 15, 2020 | Let ADEQ know if facility will complete it's own analysis or done by ADEQ |
| Workgroup Meetings | After February 15, 2020 | For utilities completing their own HRI analysis, workgroup meetings to ensure consistent analyses |
| HRI Analysis Due | December 1, 2020 | |
| Rulemaking Process Begins | April 1, 2021 | For sources that want a rule |
| Permit Deadline | December 1, 2021 | For sources with a permit |
| Submittal of Plan to EPA | July 8, 2022 | Failure to submit a plan would require EPA to create a federal plan |
| Compliance with Plan Limits | July 8, 2024 | Longer compliance period is possible with EPA approval |

D.C. Circuit Court of Appeals Litigation

- Multiple Petitions for Review and Motions to Intervene have been filed in the D.C. Circuit Court of Appeals.
 - Currently pending before the Court:
 - EPA's Motion to expedite briefing schedule;
 - Petitioners' motions to hold case in abeyance pending action on proposed revisions to New Source Review and administrative reconsideration.
- On-going litigation could affect the planning process.
 - Stay tuned for future updates.

New Source Review

- EPA may finalize its proposed revisions to New Source Review.



Stakeholder Values and Feedback

Regional Haze Stakeholder Values and Design Principles

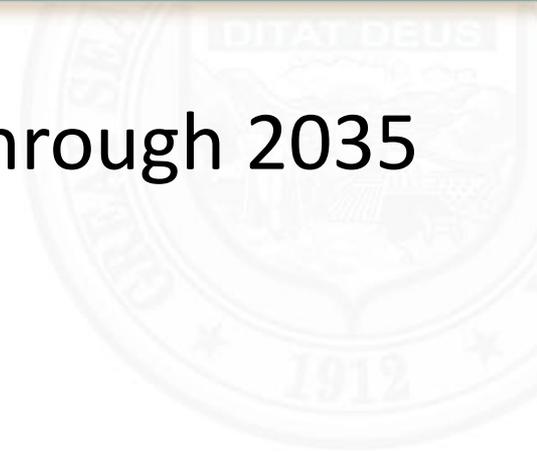
| Stakeholder Values | Design Principles |
|--|--|
| Reasonable progress toward visibility goals | Develop a control strategy that ensures continued progress towards State visibility goals. |
| EPA approval of SIP | Involve EPA early and often in development cycles for controls and SIP revision. |
| Produce accurate modeling | Perform model evaluation and calibration using the most recent, complete, and accurate datasets available. |
| Consider visibility improvement as focus of control analysis | When developing a control analysis methodology, evaluate visibility as a potential screening and/or reasonable progress consideration. |
| Follow the goals of the Regional Haze roadmap | Where reasonable, ensure the State process is in-line with EPA's recommendations. |
| Take credit for existing programs | Include existing controls and emission reduction programs in modeling and control analysis. |
| Affordability for industry and general public | Collect stakeholder feedback on and evaluate the cost of controls during the control analysis. Choose those controls that balance environmental benefit with cost. |
| Account for international transport | Evaluate available modeled international impacts and attempt to account for transport in visibility analysis. |
| Cost equity between sources | Stakeholders to lead conversations considering cost equity. |
| Reach out to sources for future emissions projections | Allow stakeholders ability to evaluate projected emissions and methodologies and provide feedback. |



- Net or Gross Generation?
- Averaging Time for Standards?
- Operating Scenarios?
- Degradation of HRI?
- Cumulative impacts?
- Recent, independent installation of a candidate technology?
- Monitoring and Recordkeeping Requirements?
- How to Evaluate Remaining Useful Life?
- Permit Attachment or Rule?



- Future Operating Characteristics through 2035
- Rebound Effect?



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