pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Mr. Andrew R. Wheeler
Acting Administrator
U.S. Environmental Protection Agency
Air and Radiation Docket
Mail Code: 28221 T
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460

Attn: Docket No. EPA-HQ-OAR-2013-0495

RE: Review of Standards of Performance for Greenhouse Gas Emissions from New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units 83 FR 65424 (December 20, 2018).

Dear Acting Administrator Wheeler:

The Pennsylvania Department of Environmental Protection (DEP) submits the following comments in response to the notice of proposed rulemaking entitled *Review of Standards of Performance for Greenhouse Gas Emissions from New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units* published by the U.S. Environmental Protection Agency (EPA) on December 20, 2018. (83 FR 65424).

As part of its comments on the proposed rule, DEP incorporates by reference the contemporaneously filed comment letter submitted by the Attorney General of New York and numerous other states to EPA for Docket No. EPA-HQ-OAR-2013-0495.

EPA's Proposal

EPA is proposing amendments to the rulemaking titled *Standards of Performance for Greenhouse Gas Emissions from New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units (EGUs),* which EPA promulgated by notice dated October 23, 2015 (2015 Rule). 80 FR 64509. Specifically, EPA proposes to amend its previous determination that the best system of emission reduction (BSER) for newly constructed coal-fired steam generating units (EGUs) is partial carbon capture and storage (CCS). Instead, EPA proposes to find that the BSER for this source category is the most efficient demonstrated steam cycle (*e.g.*, supercritical steam conditions for large units and subcritical steam conditions for small units) in combination with the best operating practices.

Although not considering changing its legal interpretation, EPA is seeking comments on whether it is correct to interpret the ''endangerment finding'' as a finding that is only made once for each source category at the time EPA lists the source category or whether EPA must make a new

endangerment finding each time the Agency regulates an additional pollutant by an already-listed source category.

EPA proposes to revise the standard of performance for newly constructed steam generating units as separate standards of performance for large and small steam generating units that reflect the Agency's amended BSER determination. In addition, EPA proposes to revise the standard of performance for reconstructed steam generating units by establishing separate standards of performance for reconstructed large and small steam generating units, consistent with the proposed revised standards for newly constructed steam generating units.

EPA also proposes separate standards of performance for newly constructed and reconstructed coal refuse-fired EGUs. However, EPA is not proposing to amend and is not reopening the standards of performance for newly constructed or reconstructed stationary combustion turbines. EPA is also proposing other miscellaneous technical changes to the regulatory requirements.

General Comments on the Proposed Rule

While EPA proposes to weaken these standards, the impacts on climate continue to accumulate as detailed by the analysis and findings of the U.S. Global Change Research Program (USGCRP) contained in the Fourth National Climate Assessment[1] (Assessment) released by the Trump Administration on November 23, 2018; a confident, scientific assessment of the national and regional impacts of natural and human-induced climate change. The Assessment represents the work of over 300 government and non-government experts, led by experts within EPA, the U.S. Department of Transportation and eleven other federal agencies.[2]

The scientific evidence of climate change caused predominantly by the burning of fossil fuels has only grown since EPA promulgated the 2015 Rule. Among other things, the Assessment notes:

> • "Earth's climate is now changing faster than at any point in the history of modern civilization, primarily as a result of human activities."[3]
>
> • "The impacts of global climate change are already being felt in the United States and are projected to intensify in the future."[4]
>
> • "Climate change is transforming where and how we live and presents growing challenges to human health and quality of life, the economy, and the natural systems that support us."[5]

[1] USGCRP, 2018: Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA. doi: 10.7930/NCA4.2018, available at: https://nca2018.globalchange.gov/.

[2] The other 11 federal agencies are the U.S. Departments of Agriculture, Commerce, Defense, Energy, Health & Human Services, Interior, and State, as well as the U.S. Agency for International Development, NASA, the National Science Foundation, and the Smithsonian Institution.

[3] USGCRP, at 24.

[4] *Id.*

[5] *Id.* at 26.

• "Increased atmospheric carbon dioxide levels change ocean conditions through three main factors: warming seas, ocean acidification, and deoxygenation. These factors are transforming ocean ecosystems, and these transformations are already impacting the U.S. economy and coastal communities, cultures, and businesses."[6]

• "Climate-related changes in weather patterns and associated changes in air, water, food, and the environment are affecting the health and well-being of the American people, causing injuries, illnesses, and death."[7]

In addition to these global impacts, the Commonwealth of Pennsylvania faces several fundamental threats related to climate including: (1) sea level rise and its impact on communities and cities in the Delaware River Basin, including the city of Philadelphia; and (2) more frequent extreme weather events, including large storms, periods of drought, heat waves, heavier snowfalls, and an increase in overall precipitation variability. Based on studies commissioned by DEP, as part of its mandate under the Pennsylvania Climate Change Act, 71 P.S. §§ 1361.1 – 1361.8, Pennsylvania has undergone a long-term warming of more than 1°C over the past 110 years.[8]

The 2015 Pennsylvania Climate Impacts Assessment Update also finds that this warming trend will threaten Pennsylvania in other ways: agriculture will have to adapt to greater extremes in temperature and precipitation; forests will be subject to multiple stressors; suitable habitat for plant and wildlife species is expected to shift to higher latitudes and elevations; the public health of Pennsylvanians will be harmed due to worsening air quality causing increased respiratory and cardiac illness; West Nile disease will become more prevalent; climate change will have a severe, negative impact on winter recreation; and climate change poses a threat to the fauna of the tidal freshwater portion of the Delaware estuary in Pennsylvania.[9]

EPA's proposed revised standards are not supported by the administrative record or the Clean Air Act (CAA), 42 U.S.C.A. § 7401 *et seq.* EPA's legal obligation to regulate greenhouse gas (GHG) emissions from existing power plants was affirmed by the Supreme Court's 2007 decision in *Massachusetts v. Environmental Protection Agency*, 549 U.S. 497 (2007), and triggered by EPA's formal finding in 2009 that GHG emissions threaten public health and welfare. 74 FR 66496 (December 15, 2009). Consequently, as EPA moves to amend the 2015 Rule, it must promulgate standards that are more stringent than the current regulation to ensure that the new standards are technology-forcing and will protect public health and the environment. EPA must not abdicate its statutory obligations under the CAA.

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[6] *Id.* at 86.
[7] *Id.* at 102.
[8] *See* "Pennsylvania Climate Impacts Assessment Update," May 2015, available at http://www.elibrary.dep.state.pa.us/dsweb/Get/Document-108470/2700-BK-DEP4494.pdf. *See also* "Pennsylvania Climate Impacts Assessment Update," October 2013, available at http://www.elibrary.dep.state.pa.us/dsweb/Get/Document-97037/PA%20DEP%20Climate%20Impact%20Assessment%20Update.pdf; "Pennsylvania Climate Assessment," June 2009, available at http://www.elibrary.dep.state.pa.us/dsweb/Get/Document-75375/7000-BK-DEP4252.pdf.
[9] Pennsylvania Climate Impacts Assessment Update, at pp. 7-14.

Specific Comments on the Proposed Rule

Comment – Endangerment Finding

EPA is considering comments on whether it is correct to interpret the ''endangerment finding'' as a finding that is only made once for each source category at the time that the EPA lists the source category or whether EPA must make a new endangerment finding each time the Agency regulates an additional pollutant by an already-listed source category.

DEP's Comment: In the 2015 Rule, EPA promulgated standards for carbon dioxide (CO_2) emissions from sources in two source categories: fossil fuel-fired electric utility steam generating units and combustion turbines. EPA explained that the Agency interprets the CAA to require an endangerment finding to be made at the time EPA lists the source category and to broadly consider emissions from the source category, and not to consider emissions of any particular pollutant that may be made subject to a revised or newly issued standard for a source category that has already been listed. EPA further explained that CAA section 111(b) does not specify what pollutants EPA should regulate once it lists a source category, so that EPA may exercise its discretion to regulate particular pollutants as long as EPA provides a rational basis for doing so. DEP maintains that this is the correct legal interpretation and that EPA should continue to apply that interpretation to this proposed rule.

In the 2015 Rule, EPA described its rational basis for regulating CO_2 emissions from fossil fuel-fired EGUs, including that the CO_2 emissions from fossil fuel-fired EGUs are almost three times as much as the emissions from the next 10 source categories combined, and that the CO_2 emissions from even a single new coal-fired power plant may amount to millions of tons each year. EPA added that even if it were required to make an endangerment finding for those emissions in order to regulate them, the same facts that provided the rational basis would qualify as an endangerment finding. DEP maintains that is the correct rationale and that EPA should continue to apply that rationale to this proposed rule.

It is particularly troubling that EPA's request for comments on the correctness of its interpretations and determinations and whether there are alternative interpretations that may be permissible is buried in a footnote. EPA's current endangerment finding is the cornerstone to regulating this source category. EPA continues to have a rational basis for regulating this source category even if emissions from this category continue to decline and the likelihood of new sources being built from this category have diminished. The trend of lower CO_2 emissions from the power sector does not provide a rational basis for EPA to eliminate regulation of these sources. This trend also existed at the time EPA finalized the current rule, and no new evidence changes the rationale for EPA's current position. That is, CO_2 emissions from fossil fuel-fired EGUs are almost three times as much as the emissions from the next 10 source categories combined, and that the CO_2 emissions from even a single new coal-fired power plant may amount to millions of tons each year.

Furthermore, federal government policies aim to reverse the trend of plant closures and have encouraged the building of new plants. For example, on December 6, 2018, (the same day EPA signed this proposed rule) the U.S. Department of Energy (DOE) issued a request for proposal for "Coal-Based Power Plants of the Future Conceptual Designs." DOE's "Coal FIRST" (Flexible,

Innovative, Resilient, Small, Transformative) initiative will develop the coal plant of the future needed to provide secure, stable, and reliable power. CO_2 emissions from this source category are significant and are a major contributor to climate change. As a result, this source category must continue to be regulated as required under the 2015 Rule.

Comment – Proposed Revisions to the 2015 Rulemaking

For newly constructed fossil fuel-fired electric utility steam generating units that are either utility boilers or integrated gasification combined cycle (IGCC) units, EPA proposes to revise the BSER to be the most efficient demonstrated steam cycle (*i.e.*, supercritical steam conditions for large EGUs and best available subcritical steam conditions for small EGUs) in combination with the best operating practices, instead of partial CCS. (Comment C-1).

DEP's Comment: While New Source Performance Standards (NSPS) can serve as a baseline for best available control technology (BACT) standards, several BACT determinations clearly demonstrate that emissions lower than the currently proposed standards are achievable.[10] Under section 169(3) of the CAA, application of BACT may not result in emissions that exceed those allowed by the applicable NSPS. The purpose of BACT is to push individual sources to make deeper emission reductions than required for the category-wide performance standards. Thus, DEP recommends emission standards of 850 lbs CO_2/MWh (gross) or 900 lbs CO_2/MWh (net) on a 12-month annual average basis for natural gas combined cycle (NGCC) units.

It should be pointed out that EPA's own technical support document clearly shows that coal fired EGUs can achieve about 1,750 lbs CO_2/MWh which is lower than the proposed emission standard for such units, even without the use of CCS.

DEP appreciates that EPA recognized the uniqueness of waste coal-fired EGUs and is proposing a separate emission standard for this subcategory. DEP agrees with EPA's proposed emission standard for waste coal-fired sources of 2,200 lb CO_2/MWh (gross) and recommends adding another emission standard of 2,350 lb CO_2/MWh (net) to account for the service load to run auxiliary equipment at the site.

DEP disagrees with EPA regarding separate emission standards for smaller New and Reconstructed Steam Generating Units and IGCC Units, and Modified Steam Generating Units and IGCC Units, because supercritical efficiency units are found at heat input ratings below 2,000 MMBtu/hr. While EPA has not proposed any changes for turbines, DEP recommends removing the applicability requirement for turbines that allows a turbine burning less than 90 percent natural gas to escape applicability.

Comment – The 2015 Rulemaking, Reconsideration, and Litigation

With respect to affected steam generating units that undergo modifications that result in smaller increases in CO_2 emissions (specifically, steam generating units that conduct modifications resulting in an increase in hourly CO_2 emissions (mass per hour) of 10 percent or less ("small"

[10] Based on EPA's RBLC database.

modifications) compared to the source's highest hourly emission during the previous five years), EPA concluded it did not have sufficient information and did not finalize any standard of performance or other requirements. EPA continues to review whether it has sufficient information to establish appropriate standards for small modifications and is soliciting comment on options for determining appropriate standards in this action. (Comment C-2).

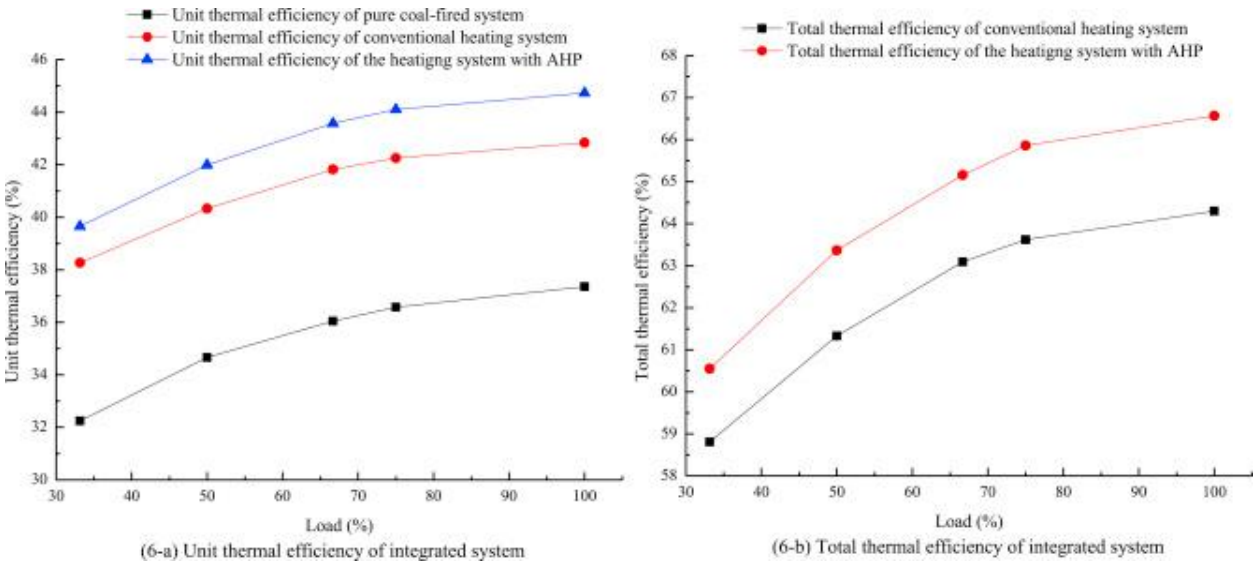
DEP's Comment: DEP agrees with the proposed approach of establishing a unit specific emission standard based on the best historic performance of the modified unit and that it should apply to all modifications irrespective of the amount of CO_2 increase. DEP disagrees with the proposal arbitrarily establishing an increment of additional CO_2 emissions of 10 percent without conducting an engineering analysis. The analysis should use the emission rate, averaging the best three consecutive years, as the floor for the numerical emission standard. This analysis should be performed by the owner or operator of the affected unit and approved by the state or local air pollution control agency following a process approved by EPA. DEP believes that this approach is also appropriate for existing units under Section 111(d) that do not meet the definitions of modified or reconstructed under this proposed rule.

Calculation methodologies for emission standards and compliance demonstration should be developed to cover dual fuel capability and co-firing fossil or non-fossil fuel in affected EGUs. DEP also recommends deleting the applicability requirement for turbines that allows a turbine burning less than 90 percent natural gas to escape applicability.

Comment – Low Duty Cycle Subcategory

EPA is soliciting comment on whether it would be appropriate to establish a subcategory for steam generating units during 12-month rolling average periods when the unit is not operated at high capacity factors (Comment C-32).

DEP's Comment: Graph 6-a, below, demonstrates that the thermal efficiency drops off by ~5 percent going from 100 percent load to 30 percent load. Going from 100 percent to 65 percent load, the efficiency has dropped by ~1 percent. Therefore, it is unreasonable to subcategorize and adjust the limits for coal-fired units.

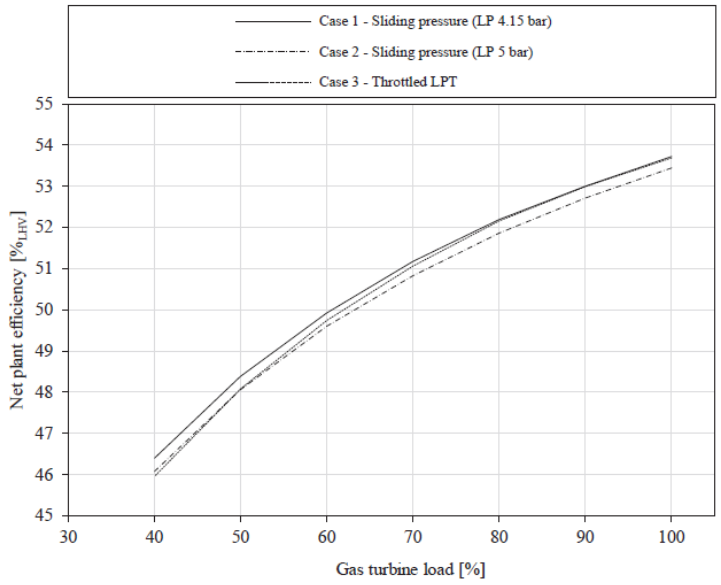


(6-a) Unit thermal efficiency of integrated system

(6-b) Total thermal efficiency of integrated system

https://www.sciencedirect.com/science/article/pii/S1743967114202959

The following graph for NGCC units, below, demonstrates that the net plant efficiency drops off ~7 percent going from 100 percent load to 40 percent load. Going from 100 percent to 65 percent load, efficiency drops by ~3 percent, making it unreasonable to subcategorize and adjust the limits for NGCC units.

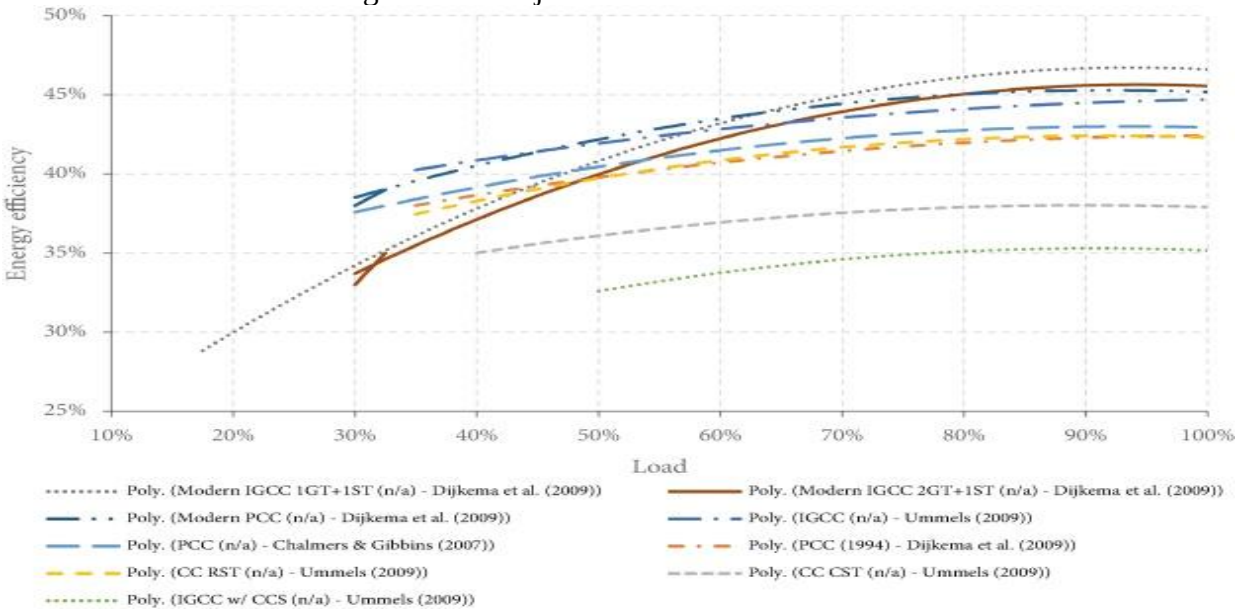


https://www.researchgate.net/figure/a-Net-plant-electric-efficiency-at-varying-load-NGCC-b-Net-plant-electric-efficiency_fig3_257712222

Comment – Low Duty Cycle Subcategory

EPA is soliciting comment on whether IGCC units should also have a low duty cycle subcategory or if a single standard should apply at all load levels (Comment C-39).

DEP's Comment: The following graph demonstrates that the thermal efficiency drops off by about 2 percent going from 100 percent load to 65 percent load for the four IGCC units. Therefore, it is unreasonable to subcategorize and adjust the limits for IGCC units.



https://www.sciencedirect.com/science/article/pii/S0360544217312628

Conclusion

For NGCC units, DEP recommends emission standards of 850 lbs CO_2/MWh (gross) or 900 lbs CO_2/MWh (net) on a 12-month annual average basis, regardless of size. For waste coal-fired EGUs, DEP agrees with EPA's proposed emission standard of 2,200 lb CO_2/MWh (gross) and recommends an additional emission standard of 2,350 lb CO_2/MWh (net).

For modified and reconstructed EGUs, DEP recommends a unit-specific emission standard determined by the unit's best historical annual CO_2 emission rate (from 2002 to the date of the modification) where the emission standard will be no more stringent than that for new sources. DEP disagrees with EPA regarding separate emission standards for smaller New and Reconstructed Steam Generating Units and IGCC Units, and Modified Steam Generating Units and IGCC Units, because supercritical efficiency units are found at heat input ratings below 2,000 MMBtu/hr. While EPA has not proposed any changes for turbines, DEP recommends deleting the applicability requirement for turbines that allows a turbine burning less than 90 percent natural gas to escape applicability.

Finally, EPA continues to have a rational basis to regulate this source category. CO_2 emissions from fossil fuel-fired EGUs are almost three times as much as the emissions from the next 10 source categories combined, and CO_2 emissions from even a single new coal-fired power plant may amount to millions of tons each year. If EPA finalizes its amendments to the 2015 Rule, the amended rule must promulgate standards that are more stringent than the current regulation to

ensure that the new standards are technology-forcing and will protect public health and the environment.

Thank you for your consideration in this matter. Should you have questions or need additional information, please contact George Hartenstein, Deputy Secretary for Waste, Air, Radiation and Remediation, by e-mail at ghartenste@pa.gov or by phone at 717.772.2725. You may also contact Krishnan Ramamurthy, Director of the Bureau of Air Quality, by e-mail at kramamurth@pa.gov or by phone at 717.787.9702.

Sincerely,

Patrick McDonnell
Secretary