pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

October 31, 2018

Mr. Andrew R. Wheeler
Acting Administrator
U.S. Environmental Protection Agency
Air and Radiation Docket
1200 Pennsylvania Ave, N.W.
Washington, DC 20460

Attn: Docket No. EPA–HQ–OAR–2017–0355

Re: Emission Guidelines for Greenhouse Gas Emissions from Existing Electric Utility Generating Units; Revisions to Emission Guideline Implementing Regulations; Revisions to New Source Review Program. 83 FR 44746 (August 31, 2018)

Dear Acting Administrator Wheeler:

The Pennsylvania Department of Environmental Protection (PADEP or Department) appreciates the opportunity to provide comments in response to the notice of proposed rulemaking entitled *Emission Guidelines for Greenhouse Gas Emissions from Existing Electric Utility Generating Units; Revisions to Emission Guideline Implementing Regulations; Revisions to New Source Review Program* (the Affordable Clean Energy (ACE) Rule) published by the U.S. Environmental Protection Agency (EPA) on August 31, 2018 (83 FR 44746).

As part of its comments on the ACE rule, PADEP incorporates by reference the contemporaneously filed comment letter, including attachments, submitted jointly by the Attorneys General of New York, California, Pennsylvania and numerous other states, along with the City of Philadelphia and others, to EPA on the Proposed Rule, for Docket No. EPA–HQ–OAR–2017–0355.

EPA's Proposal

EPA is proposing the ACE rule as a replacement to the Clean Power Plan (CPP) (promulgated on October 23, 2015, 80 FR 64662), which sets greenhouse gas (GHG) emission guidelines for existing electric utility generating units (EGUs). In the ACE, EPA is proposing to replace the CPP with revised emissions guidelines that inform the development, submittal, and implementation of state plans to reduce GHG emissions from affected EGUs. In the proposed emissions guidelines, consistent with the interpretation described in the proposed repeal of the CPP, the EPA is proposing to determine that heat rate improvement (HRI) measures are the best system of emission reduction (BSER) for existing coal-fired EGUs. Second, EPA is proposing new regulations that provide direction to both EPA and the states on the implementation of emission guidelines. The new proposed implementing regulations would apply to this action and any future emission guidelines issued under section 111(d) of the Clean Air Act (CAA). Third, the Agency is proposing revisions to the New Source Review

(NSR) program designed to prevent NSR from being a barrier to the implementation of HRI projects at affected EGUs.

General Comments on ACE

EPA's legal obligation to regulate GHG emissions from existing power plants was affirmed by the Supreme Court's 2007 decision in *Massachusetts v. Environmental Protection Agency*[1] and triggered by EPA's formal finding in 2009 that GHG emissions threaten public health and welfare. Consequently, as EPA moves to repeal the CPP, the carbon dioxide (CO_2) emissions standard for existing power plants, it is obligated to propose a meaningful replacement standard to limit GHG emissions.

The CPP, finalized in 2015, establishes state-based CO_2 emissions goals for affected fossil fuel-fired power plants and requires states to ensure that the power plants in their jurisdictions—either individually, together, or in combination with other states—achieve the state goal. The CPP incorporates flexible compliance options that allow emission reductions to be achieved from carbon intensity reductions at individual plants—otherwise known as heat rate improvements at the source—or from the substitution of generation towards less carbon-intensive and zero-carbon energy sources. Averaging across units and trading among units within or across states is also allowed. Given this flexible structure, the CPP can be termed a "beyond-the-source" standard. At the time it was finalized, it was estimated that the CPP would decrease CO_2 emissions by 415 million tons, or 19 percent, below a business-as-usual base case level by 2030, or 30 percent below 2005 levels.

In response to the Trump Administration's Executive Order on Energy Independence, EPA in 2017 released its proposed repeal of the CPP. The proposed replacement rule, ACE, employs a narrow "at-the-source" regulation, commonly referred to as "inside the fence line," which defines the legally relevant BSER as opportunities to improve heat rates at individual coal plants. Estimated emissions are 920 million short tons, or 63 percent higher than the beyond-the-source scenario.[2] ACE is not a meaningful replacement for the CPP; therefore, it must be withdrawn.

Specific Comments on ACE

C-1. Industry Trends. The need for energy is one of the primary drivers of GHG emissions, and Pennsylvania is the third largest emitter of CO_2 in the country. Nevertheless, Pennsylvania has made significant strides in the past few years to reduce GHG emissions. For instance, the 2014 CO_2 emissions from existing Pennsylvania electric generating facilities, intended to be regulated under the CPP, were 106,967,641 tons. In 2015, CO_2 emissions decreased to 96,266,428 tons, and in 2016 decreased again to 87,613,794 tons. Accounting for emissions from new EGU sources, the 2016 total for CO_2 emissions was 89,467,892 tons. Thus, Pennsylvania has already exceeded its 2030 CPP goal of 89,822,308 tons through a combination of market-driven techniques like fuel switching and renewable energy standards while maintaining its status as a

[1] *Massachusetts v. Environmental Protection Agency*, 549 U.S. 497 (2007).
[2] *See, Carbon Standards Examined: A Comparison of At-the-Source and Beyond-the-Source Power Plant Carbon Standards:* Keyes, *et al.*, Resources for the Future (RFF WP 18-20), August 2018.

net energy exporter. In Pennsylvania, implementation of the CPP would have proven to be a cost-effective way to continue to reduce carbon pollution without sacrificing electric grid reliability. Therefore, EPA should retain and implement the CPP to continue the industry trend and combat climate change.

C-2, C-40. Legal Authority for Determination of the BSER. The Supreme Court has previously recognized that Congress drafted the CAA to provide the flexibility necessary to address new and evolving problems, and that EPA is at the front line in determining when and how, consistent with statutory guidance, to address those problems. As the Supreme Court recognized in *Massachusetts*, the CAA– and its definition of "air pollutant" – "unquestionably" and "unambiguous[ly]" encompassed GHGs, and specifically addressed threats to climate.[3] Even if in 1970 Congress "might not have appreciated the possibility that burning fossil fuels could lead to global warming," it made the conscious choice to draft parts of the CAA in broad language – language that "confer[red] the flexibility necessary to forestall ... obsolescence."[4] Congress understood that "without regulatory flexibility, changing circumstances and scientific developments would soon render the [CAA] obsolete."[5]

Fossil fuel-fired power plants are by far the highest-emitting stationary sources of CO_2, generating approximately 37 percent of all domestic man-made CO_2 emissions – almost three times as much as the next 10 stationary source categories combined.[6] As a result, EPA realized that no serious effort to address the monumental problem of climate change could succeed without meaningfully limiting the CO_2 emissions from these plants.

EPA's authority and responsibility under Section 111(d) to control CO_2 emissions from fossil fuel-fired power plants was central to the Supreme Court's holding in *American Electric Power v. Connecticut*,[7] *(AEP)* that "the [CAA] and the EPA actions it authorizes displace any federal common-law right to seek abatement of [CO_2] emissions from fossil-fuel fired power plants."[8] The court specifically examined Section 111 and concluded that provision provides a means for EPA to set limitations on power-plant CO_2 emissions that would abate their contribution to climate change.[9] Thus, EPA properly exercised its Section 111(d) authority by promulgating the CPP to limit CO_2 emissions from these plants.

In determining the guidelines to apply to CO_2 emissions from existing power plants, under Section 111(d), EPA was required to select the "best system of emission reduction" (BSER) that is "adequately demonstrated" to achieve pollution reductions.[10] To satisfy this statutory obligation, EPA appropriately considered "strategies, technologies and approaches already in widespread use by power companies and states" to address the unique qualities of carbon-dioxide pollution and the interconnected electricity grid.[11] EPA's careful consideration of

[3] *Massachusetts*, 549 U.S. at 528-29, 532, 506.
[4] *Id.* at 532.
[5] *Id.*
[6] 80 Fed. Reg at 64,696-99.
[7] 564 U.S. 410 (2011)
[8] 564 U.S. at 424.
[9] *Id.*
[10] 42 U.S.C. § 741l(a)(l).
[11] 80 Fed. Reg. at 64,664, 64,689; *see also id.* at 64,667, 64,725, 64,744.

existing practices and emission-reduction strategies highlights the reasonableness of the CPP.

EPA reasonably concluded that the three Building Blocks provided in the CPP collectively constitute the "best" system of emission reduction, applying the relevant considerations (including the degree of reductions achieved, costs, energy requirements, and non-air quality health and environmental impacts).[12] The selected set of measures presents the most cost-effective available system for sources to meaningfully limit their CO_2 emissions.[13]

While the CPP guidelines included generation-shifting measures, they follow the industry trend toward greater use of renewable energy and gas-fired generation, and decreased use of coal-fired generation. This trend is largely due to falling prices and increased efficiency of renewables and gas, as well as the aging of existing coal-fired plants.[14] Notably, renewable energy was already increasing prior to the CPP promulgation; by 2013, renewable energy had increased five-fold in just 15 years.[15] And while EPA projected that the CPP would reduce some coal-fired generation by the time it is fully implemented in 2030, the amount of that reduction is projected to be less than, and to occur more gradually than, the reduction that already occurred from 2005 to 2014.[16]

The language under Section 111(d) identifying the "best system of emission reduction" as the central determination in the standard-setting process establishes that a broad scope of potential pollution-curbing measures can serve as the basis for the guidelines. This broad statutory language shows that Congress was directing EPA to consider a wide range of measures to reduce emissions from sources.[17] In the case of power plants, those measures can include on-site, technology-based control measures, but they should also include measures through which power plants reduce emissions by replacing higher-emitting generation with lower-emitting generation.[18]

The language of section 111(a)(l) is also clear that after determining the BSER, EPA is authorized under the CAA and the implementing regulations, as an integral component to setting emission guidelines, to determine the resulting emission limitation from the BSER. Specifically, the definition of a "standard of performance" under section 111(a)(l) is "a standard for emissions... which reflects the degree of emission limitation achievable through the application of the [BSER]."

Following the determination of the BSER, section 111(a)(l) authorizes EPA to determine "the degree of emission limitation achievable" from the BSER. This is precisely what EPA did under the CPP when it established emission performance rates based on the BSER and then translated these rates into equivalent State-specific emission goals for 2030. EPA's emission guidelines set forth these performance levels, along with other requirements, as the minimum requirements for states to meet in order to have an approvable state plan. If a state failed to submit an approvable

[12] 80 Fed. Reg. at 64,744-51; *see also id.* at 64,801-02, 64,810-11 (cost considerations); id. at 64,670-71, 64,693-94, 64,800, 64,874-81 (energy considerations); *id.* at 64,746, 64,748 (non-air quality health and environmental impacts).
[13] 80 Fed. Reg. at 64,751.
[14] *Id.* at 64,678, 64,694-95, 64,795, 64,803-04.
[15] *Id.* at 64,695.
[16] *Id.* at 64,785.
[17] 80 Fed. Reg. at 64,762.
[18] *Id.*

plan, then EPA would implement a federal plan imposing emission standards for the affected EGUs in that state.

Section 111(d) should be interpreted in light of the purpose and letter of the CAA, which is to regulate all air pollutants that have the potential to damage public health and welfare, including CO_2. EPA's interpretation under the CPP that a "best system of emission reduction" includes cost-effective generation-shifting for this industry is eminently reasonable. EPA's legal interpretation under the CPP best fulfills the purpose of Section 111 to protect public health and welfare through cost-effective measures that sources can implement.

C-3 - 4. Affected Sources. If EPA continues with implementing the ACE, EPA should maintain the definition of affected sources found in 40 CFR Part 60 Subpart TTTT. This means that existing stationary combustion turbines (natural gas combined cycle (NGCC) and simple cycle (GT) turbines) and existing integrated gasification combined cycle (IGCC) turbines that meet the applicability criteria would also be included in state plans. While EPA does not identify HRI for these sources, minimum standards of performance could be established.

C-5 - 9, C-13 - 18, and C-22 - 26. Potential HRI Measures and Their Relationship to State Plan Development. PADEP disagrees with an "inside the fence line" approach to reduce CO_2 emissions from EGUs. EPA's own analyses indicate that even with the most optimistic assumptions, energy efficiency improvements above 6% are not possible for the existing coal-fired fleet. Implementing "inside the fence line" measures will increase the costs of reducing CO_2 emissions and will significantly reduce the achievable benefits. The best way to cost-effectively lower carbon emissions is to implement an outside-the-fence line approach such as the CPP and/or significantly increase the amount of electricity generation from zero-carbon emitting or carbon-neutral sources such as hydroelectric, wind, solar, and nuclear.

Under the ACE Rule, EPA is interpreting section 111(d) to mean that BSER measures must be applicable inside the fence line of a facility.[19] PADEP disagrees with EPA's interpretation on this issue. BSER can support outside-the-fence line measures like those identified under the CPP. In fact, the CPP approach is supported in multiple Supreme Court decisions upholding EPA's authority to regulate CO_2 emissions under the CAA.[20] In *AEP*, the court expressly held that section 111(d) of the CAA "speaks directly" to limits on CO_2 emissions from existing power plants. Consequently, the CPP is a legitimate exercise of the legislative mandate under the CAA to promote public health and welfare by addressing CO_2 emissions from existing power plants.

If EPA's new interpretation of section 111(d) is applied, it should be applied in a similar manner as with other pollutants, i.e., determined on a plant-specific basis using the following steps:

1. Each operator of an affected power plant would have to evaluate the improvement suggestions by EPA and conduct a technical feasibility analysis. Operators could also propose alternate improvement suggestions for consideration as long as equivalency is demonstrated or in the case that EPA does not propose improvement suggestions.

[19] 80 FR 64662 (October 23, 2015).
[20] *See, Massachusetts and AEP*.

2. Any measures technically feasible for the plant should be reviewed to determine cost-effectiveness.
3. Any cost-effective measures should be implemented, similar to a Best Available Control Technology analysis.
4. Similar to 40 CFR Part 60 Subpart TTTT (see Tables 1 and 2), an affected EGU which requires modification would be required to meet a unit-specific emission limit determined by the unit's best historical (since 2002) annual CO_2 emission rate or a minimum standard of performance based on the EGU's base load (heat input) rating.

PADEP cautions EPA not to approve State plans that could simply shift emissions to states with weaker standards, negating the benefit of any reductions achieved in states with more stringent standards. PADEP is responsible for protecting the health of its citizens and increased emissions in neighboring states would impede our ability to do so.

The role of federal regulation under the CAA is to create a minimum level of environmental protection and provide states with the flexibility to be more protective. Many states have developed, or may wish to develop, ambitious GHG reduction programs regulating emissions from fossil fuel-fired EGUs that would be covered by a rule under section 111(d). EPA should ensure that any rule under section 111(d) does not impede the goals or implementation of those programs and that it maintains the cooperative federalism structure of the CAA.

Method 1 from section 2.5.3.1 of the Technical Support Document (TSD) for the CPP suggests that an HRI of about 6% can be achieved. However, EPA must investigate why plants in the past had a better heat rate than at present, before determining if replicating past performance is technically and economically feasible. Under Method 3 of the TSD, the approach to see if plants can lower heat rate is good in theory. However, EPA should investigate to determine why plants do not currently operate this way and to see if lowering heat rate through best practices is practical and cost-effective. In addition, Method 3 only proves that a plant can operate for a year with reduced variability. EPA needs to show that the plant can both operate with reduced heat rate variability and do so at the low end of the plant's heat rate range.

Net heat rate should be used to compare the performance of different plants as it measures the fuel input against the electricity delivered by the plant to the grid. In addition, the use of net heat rate encourages energy efficiency measures at the plant, because lowering plant energy usage lowers the net heat rate while having no effect on gross heat rate.

PADEP suggested in its comments on the Advance Notice of Proposed Rulemaking (ANPR) that EPA recommend measures for BSER and allow states to determine BSER on a plant-by-plant basis. EPA should recommend additional measures which would be BSER for coal-fired EGUs, as well as measures which would be BSER for NGCC, GT, and IGCC. However, a minimum standard of performance based on the EGU's base load (heat input) rating should be determined in case the plant-by-plant BSER determination is incapable of finding any emission reductions. If the affected EGU's emissions are below the minimum standard of performance, no further action would be needed; however, should the EGU's emissions exceed the minimum standard of performance, additional emission reduction measures would be needed to meet the

minimum standard of performance. The minimum standard of performance would also prevent states from submitting plans that are too lax and ensure that GHG emissions are being adequately reduced.

PADEP believes that EPA should suggest additional systems which may be the BSER for some EGUs, IGCC, and stationary combustion turbines. This will assist the states in independently determining which technologies are appropriate for each plant. Even so, such an approach is likely to be burdensome for states; PADEP's burden would be considerable as there are currently 27 power facilities with 49 total EGUs: 27 coal-fired, 9 coal refuse-fired, 4 residual oil-fired, and 9 natural gas-fired, in Pennsylvania, 18 power facilities with 49 NGCC; and 15 power facilities with 41 simple cycle turbines, 15 diesel-fired and 26 GT. PADEP would need to determine BSER for each plant. In addition, PADEP would need to establish a heat rate limit subcategorization of the emission requirements, which would likely result in the loss of most emission improvement opportunities.

Both the degradation of heat rate and the changes in operations can be evaluated using a case-by-case approach. Heat rate degradation can be determined based on historical data from the plant and other similar plants. To help alleviate the anticipated burden, PADEP advises EPA to compile data from several plants and make it available to the states. Ideally, this data would include heat rates at various coal-fired power plants before and after improvements or cleanings. Variable load requirements should be based on the historical data of the plant or, if unavailable, similar plants. PADEP would again advise EPA to survey several plants to estimate the effect variable load has on the heat rate, if not undertaken already, and to make the data available to the states.

PADEP recommends that EPA establish a minimum standard of performance, similar to those for modified sources in 40 CFR Part 60 Subpart TTTT. By doing so, EPA would allow for the maximum CO_2 emissions reductions achievable based on a plant-by-plant analysis with a maximum output-based standard that would act as a floor. Because of the complexity of establishing unit-specific standards of performance, a uniform compliance schedule of 36 months in length is appropriate.

PADEP believes that a rate-based CO_2 limit should not be imposed across all states, and still disagrees with the inside-the-fence line approach due to the extremely limited opportunity for improvements. However, should the inside-the-fence line approach be adopted, PADEP believes that mass-based limits should be allowed in order to provide flexibility to the states. In addition, mass- and rate-based systems should be allowed to trade. Below is an example of emissions trading between two hypothetical states. In the example, State 1 has a rate-based limit and State 2 has a mass-based limit.

- State 1 (rate-based) buying credits from State 2 (mass-based)
- State 1 currently emits at a rate of 1,580 lb/MWhr and generates 30,000 GWhr
- State 1 has a compliance limit of 1,500 lb/MWhr
- State 2 emits 24,400 thousand tons and is allowed to emit 26,000 thousand tons
- State 1 must trade with State 2 to achieve compliance, and State 2 has 1,600 thousand tons of CO_2 to trade

- To trade, convert State 1's emissions to mass as follows:
  1,580 lb/MWhr * 30,000,000 MWhr *1 ton/2,000 lb = 23,700,000 tons
- State 1 is only allowed to emit 1,500 lb/MWhr so:
  1,500 lb/MWhr * 30,000,000 MWhr * 1 ton/2,000 lb = 22,500,000 tons
- State 1 needs (23,700-22,500) thousand tons = 1,200 thousand tons from State 2

C-12, C-18, C-20 - 21. Other Considered Systems of GHG Emission Reductions. Outside the fence line measures are needed to meaningfully reduce emissions. If a plant implements successful carbon capture and sequestration (CCS) in the future, then they should be allowed to participate in trading programs to encourage the development of CCS. In addition to regular monitoring for CO_2, the plant should be required to monitor the flow rate of CO_2 to the underground reservoir. In addition, the ambient air above the reservoir should be monitored for CO_2 concentrations before and after activation of the plant to ensure that the reservoir is not leaking. Co-firing methods should also be included in the list of BSER candidate technologies for states to evaluate, especially natural gas co-firing.

State Plan Development

C-28 - 39. Averaging and Trading. EPA should provide for the use of averaging and trading in State plans, as long as the state establishes that it is equivalent to the minimum standards of performance. Facility-wide averaging should be acceptable. However, it should be done in a way that the minimum standards of performance are met by each type of affected facility. For example, if one of three coal-fired EGUs is modified to run exclusively on natural gas, the facility-wide average emissions rate could be taken and compared to the coal-fired EGU standards of performance. However, if the facility consists of a coal-fired EGU and an NGCC, the averaging should take into account the more stringent standard of performance of the NGCC. This could be done by averaging the standards of performance and comparing it to the facility average, or awarding a deduction to the coal-fired EGU's emissions based on the amount by which the NGCC goes beyond meeting the minimum standard of performance.

Averaging affected EGUs with non-affected EGUs within a facility should be acceptable, and should not be limited to non-emitting capacity as long as all CO_2 emissions and all generation are considered.

The Department disagrees that there are both legal and practical concerns that would preclude averaging and trading between existing sources more broadly than averaging across a facility. As discussed in the section on legal authority for determination of the BSER (C-2, C-40) above, the Department believes that there is ample legal authority to allow for the inclusion of averaging and trading between existing sources in state plans. Many states may wish to establish trading plans, renewable portfolio standards, or other instruments to average across the electricity sector in general. The key is having enforceable requirements on all of the participants, whether emitting or non-emitting, and minimum performance standards.

To prevent averaging and trading from rendering standards of performance superfluous, it would be incumbent on the states to show how the averaging or trading program accounted for the remaining useful life of an affected source. Having a well-designed averaging and trading

program does not negate the standards of performance, nor does allowing an averaging and trading program as a means of compliance negate the consideration of the remaining useful life for affected sources in this or in other industries.

PADEP disagrees that the development and implementation of a State plan that includes averaging and trading would be overly complex. States can demonstrate to EPA that the proposed plan has sound Evaluation Monitoring &Verification (EM&V) provisions to ensure compliance with the standards. This can include requiring all mass-based allocations to be based on the difference between a source's actual performance and minimum standard of performance for each type of affected facility; rewarding non-emitting sources with MWh credits which could be used by emitting facilities; awarding mass-based allocations on the minimum standard of performance for the source's facility type; and not allowing banking of allocations or limiting the durability of the allocations so they could not be used too far into the future.

PADEP does not believe that averaging across multiple sources would undermine the BSER determination as illustrated by the example below:

- If the sources to be averaged are all of the same type (i.e., all coal-fired EGUs), averaging should be as simple as adding CO_2 emissions from all the sources and dividing by the electricity generation of all the sources.
- If the sources to be averaged are of different types (i.e., coincidentally located coal-fired EGU and NGCC) averaging could be accomplished in one of two ways:
  - Average the minimum standards of performance to determine the average standard of performance and compare that to the combined CO_2 emissions divided by the combined electricity generation; or
  - Compare each unit to the appropriate standard of performance (SOP), noting the difference between the actual emission rate and the standard of performance. Sum each difference, and if the total is zero or less, the facility average is in compliance.
  - For example, if the SOP is 1,000 lb/MWh for NGCC and 1,800 lb/MWh for coal units and the actual performance is 750 lb/MWh for NGCC and 2,050 lb/MWh for coal, the facility is in compliance:
    (750 - 1,000) lb/MWh + (2,050 - 1,800) lb/MWh = (-250 + 250) lb/MWh = 0 lb/MWh
  - If the actual performance is 750 lb/MWh for NGCC and 2,250 lb/MWh for coal, the facility is not in compliance:
    (750 - 1,000) lb/MWh + (2,250 - 1,800) lb/MWh = (-250 + 450) lb/MWh = 200 lb/MWh

Real data on emissions, as reported to CAMD, and real data on electricity generation, as reported to the U.S. Energy Information Administration (EIA), should be used when calculating compliance of all affected sources involved in the trading program. Mass-based limits should also be allowed in order to provide flexibility to the states.

Trading and averaging has been shown to reduce emissions (see SO_2 trading program and ERC for NO_X and VOC). PADEP believes that if trading is included as part of a state's plan, banking compliance instruments should be allowed. However, to minimize the impact of banked compliance instruments, there should be a limit to the durability of the banking of

allocations so that they cannot be used too far into the future.

C-41. Flexibility for State Plan Development. PADEP believes that averaging, trading, and bubbling should be afforded as flexibilities available under state plans to achieve compliance. The innovative techniques under "bubbling" compliance has the potential to have widespread effects as the innovative techniques could be implemented at other facilities. However, at no time should these flexibilities allow for facilities to exceed the minimum standards of performance.

C-43. Averaging Times for Affected EGUs. PADEP believes that a 12-month rolling average is appropriate for demonstrating compliance. The Department has used this averaging technique to demonstrate compliance in the past with great success. It minimizes the effect of short-term exceedances while ensuring that the long-term limits are not exceeded. The rolling nature of the average, as opposed to an annual (calendar year) average, prevents a long period of high emissions as the emissions in a given month cannot greatly exceed the emissions of the month dropping from the average.

C-44 - 45. Electronic Submittal of State Plans. PADEP believes that electronic submittals of State plans on an EPA-provided platform would be appropriate and less burdensome to the states. However, it should be an option, not a requirement.

C-46. State Plan Requirements. The component requirements of the State plan submittal are comprehensive. PADEP will be required to submit a detailed engineering analysis including an applicability evaluation of each HRI for each affected unit and how remaining useful life and other factors are to be considered. The documentation needed to substantiate the applied unit-specific standard of performance will be extensive.

To meet some other requirements of the proposed 40 CFR Part 60 Subpart Ba, complex forecasting using the Integrated Planning Model or another energy model would be required. Otherwise, a gross overestimation and/or simplification would result based on maximum run times (either 100% or a plant-specific capacity factor).

The vagary of detail to still meet other requirements of the proposed Subpart Ba leaves much to be desired. For example, no details are given as to what must be provided in the documentation on the state's legal authority to implement the State's plan or in the fiscal analysis to show how the state agency can afford to enforce the standards of performance which are required to be submitted with the state plan to obtain EPA's approval. State agencies are also required to hold hearings and document the proceedings for submittal as part of the State plan, on top of the engineering analysis, documentation on legal authority, and fiscal analysis, as part of EPA's approval process.

C-42, C-47 - 56. Update to the Implementing Regulation for State Plans. PADEP agrees with EPA's approach that the new implementing regulations will be applicable only to emission guidelines and associated plans developed after promulgation of this regulation, including the emission guideline being proposed as part of this action for GHGs and existing affected EGUs. PADEP agrees with EPA's proposal regarding applying the changes to timing requirements to

both emission guidelines published after the new implementing regulations are finalized, and to all ongoing emission guidelines already published under section 111(d). On the individual requirements of the implementing regulation:

- PADEP agrees with the changes to the definition of "emission guideline."
- PADEP believes that extending the timing of submission of state plans from 9 months to 3 years from the publication of the notice of availability of a final emission guideline is reasonable.
- PADEP agrees with the updated timing requirements for EPA action on State submittals and promulgation of federal plans.
- PADEP agrees with the updated timing requirements for increments of progress when included in a State plan.
- PA DEP agrees with the criteria and a process for determining completeness of State plan submissions similar to CAA section 110(k)(1) and (2).
- PADEP agrees with replacing the term "emission standard" with "standard of performance."
- PADEP agrees with allowing states to use the internet to notify the public of the proposed plan or revision and the date, time, and place of public hearings.
- PADEP believes that the distinction between public health-based and welfare-based pollutants in an emission guideline should not be removed.
- PADEP also disagrees that the variance provision should be updated to be consistent with CAA section 111(d)(1)(B).

C-57 - 58. Variance Provision. PADEP believes that the unreasonable cost of control resulting from plant age, location, or basic process design; the physical impossibility of installing necessary control equipment; or other facility-specific factors may make application of a less stringent standard or final compliance time reasonable. In these cases, it would benefit the state and the environment if the other options afforded to affected sources in the CPP were to be implemented.

Introduction to New Source Review (NSR)

In the proposed rule, EPA has proposed that, for EGUs, an increase in hourly emissions of a regulated NSR pollutant is needed for a modification to be subject to either Nonattainment New Source Review (NNSR) or Prevention of Significant Deterioration (PSD) permitting requirements. PADEP opposes this change to the NNSR and PSD regulations because any significant increase in a regulated NSR should undergo NSR permitting.

General Comments

C-59. Considering NSR Compliance Cost in BSER. It is not appropriate to consider costs incurred for PSD or NNSR when evaluating BSER. These permitting costs are not considered for other programs, such as case-by-case Reasonably Available Control Technology (RACT). Application preparation costs and permitting fees should not be considered when evaluating BSER as this has the potential to increase costs of technically feasible control measures, and making them economically infeasible. Permitting fees are required to fund state agencies for the

costs of the Title V program and are unrelated to BSER.

C-65. Concern Over Potential Emission Increases. As an example of how the options provided in the proposed ACE Rule would affect NNSR and PSD, PADEP ran a scenario using NO_X emissions from Unit 1 at the Keystone Power Plant. Unit 1 is a coal-fired EGU with a rated capacity of 8,717 MMBtu/hr.

Under Option 1, using the one-year period of May 10, 2014 through May 9, 2015, the baseline hourly NO_X emissions would be 3,474 lb/hr. Under Option 2, using the five-year period of 2013 – 2017, the baseline hourly NO_X emissions would be 3,723 lb/hr. Over the period of 2013 – 2017, the maximum NO_X emission rate was 0.574 lb/MMBtu. At maximum achieved heat input capacity over that timeframe (9,404 MMBtu/hr), the achievable NO_X emission under Option 3 is 5,398 lb/hr.

The baseline actual NO_X emissions of this unit, when taken over the same baseline period of 2013 – 2017, are 9,195 tons per year (TPY). If the hourly emission screening test was allowed for NSR, the unit could have the following actual NOx emissions above the baseline actual emissions (BAE) without undergoing NSR permitting:

	Total NOx Emissions (TPY)	NOx Emissions Increase (TPY)
Option 1:	15,216	6,021
Option 2:	16,308	7,113
Option 3:	23,643	14,448

Net NO_X increases of this magnitude should not be allowed without NSR permitting (including Lowest Achievable Emission Rate (LAER), offsets, and alternatives analysis for NNSR and Best Available Control Technology (BACT) and ambient impact modeling for PSD) being applied to the project. The potential for a slight increase in energy efficiency or small decrease in CO_2 emission rate does not justify such unrestrained increases in other criteria pollutants.

It should be noted that the virgin coal-fired EGUs remaining in Pennsylvania already have the top-level pollution control technology installed or are co-fired on natural gas. Should these EGUs undergo energy efficiency projects and be required to undergo NSR for various pollutants, the EGUs would likely not be required to have new control technology installed. The only costs the owner and operators would incur would be for the NSR analysis itself and for offsets, if required. PADEP is not aware of any energy efficiency project that was ruled out due to cost for control of air contaminants if the sources are already controlled to the maximum or near-maximum extent. It is not an undue burden on the owner and operators to undergo NSR permitting analysis in order to show that the EGUs are, in fact, controlled to the maximum extent. In some cases, the NSR permitting would be preferred in order to mandate the use of these existing pollution controls. In the instance that EPA were to keep an hourly emissions test for NSR applicability, the Department recommends using Option 1, the statistical analysis method.

C-61- 68. Hourly Emissions Test for NSR and Minimizing the Impact of NSR on Implementing State Plans. Pennsylvania commented on the Advance Notice of Proposed Rulemaking

("ANPRM")[21] published on December 28, 2017 that NSR regulations could be amended to redefine a "major modification" for an EGU in terms of lb/MWh (net). This approach would have the advantage of tying NSR permitting directly to energy efficiency. PADEP would further recommend that the standard be taken on a 12-consecutive-month basis instead of the hourly basis as proposed by EPA.

As stated in the section on concerns over potential emission increases (C-65) above, PADEP opposes the proposed NSR hourly emissions test. While the Department strongly recommends against the NSR hourly emissions test, the problems with the proposed regulation would be restricted if the hourly emission test were only applicable to affected EGUs under the proposed rule and other limited categories of sources.

In the example of Keystone Unit 1 above, there is a vast difference between actual and achievable NO_X emissions. EPA's assertion that they are equivalent is not valid in Pennsylvania as coal-fired EGUs are no longer the steady baseline units they once were. From 2007 to 2017, overall capacity factor on a heat input basis at seven coal-fired EGUs has dropped from 76% to 45%. Five of these coal-fired EGUs are currently operating at capacity factors of less than 40%.

The Keystone Unit 1 example also shows that maximum achievable hourly emissions and maximum achieved hourly emissions are not equivalent. For the example, the maximum achievable NO_X is approximately 45% higher than the maximum achieved NO_X.

In the past, EPA rules have sometimes required sources to make modifications or to add control equipment. These modifications were made under plan approvals in Pennsylvania. This rule should not differ.

C-69. UARG vs EPA and the Definition of Modification. EPA is also taking comment on other ways to minimize or eliminate any adverse impact that NSR may have on implementing section 111(d) plans for EGUs. EPA asks whether it has more flexibility with regard to its interpretation of the definition of modification in the context of the PSD program than the D.C. Circuit has previously recognized.

The NSR process requires industry to undergo pre-construction review for environmental controls if they propose either building new facilities or any modifications to existing facilities that would create a "significant increase" of a regulated pollutant. If a source makes modifications to comply with the Emission Guidelines (e.g., HRI projects), it could potentially trigger major NSR requirements. However, *URAG v. EPA*[22] does not provide EPA the cover it seeks to turn the NSR program on its head. EPA does not have this flexibility because it would produce an absurd result, which would lead to increased pollution and not less. EPA lacks the authority to exempt projects that would result in annual emission increases from NSR permitting and pollution control requirements. Seeking this type of exemption is a tacit admission that an inside-the-fence-only approach increases emissions and does not decrease emissions.

[21] 82 FR 61507.
[22] 134 S.Ct. 2427 (2014).

C-70. Flexibility of Adopting the Proposed NSR Rule Changes. Pennsylvania incorporates the Federal PSD requirements into its own regulations by reference. Therefore, Pennsylvania will not have the flexibility to exclude the hourly emissions test. For the NNSR program, PADEP would need to decide if the NNSR regulations in Title 25, *Pennsylvania Code* would need to be revised to include an hourly emissions test.

C-71. Separating the NSR Revisions from the ACE Rule and Updated State Plan Regulations. PADEP believes that the ACE Rule, proposed update to the state plan regulations, and the proposed revisions to the NSR revisions are severable. EPA should identify whether the proposed rules or revisions are severable in their own formal rulemaking, as the State plan regulation update and the NSR revisions have major implications outside of the ACE Rule.

NSR Conclusion

EPA's proposed changes to the NSR applicability test will result in no energy efficiency projects at EGUs being subject to NSR requirements regardless of actual emission increases. Should a significant increase in emissions occur, it should go through the NSR permitting process. Any NSR applicability test for short-term emission increases should take efficiency into account, such as the PADEP-recommended lb/MWh emission standard.

Comments on the Regulatory Impact Analysis

C-73. Regulatory Impact Analysis (RIA). The ACE rule does not go far enough to limit the dangerous climate effects of CO_2 and other GHG emissions. Compared to the CPP, the ACE rule, by EPA's own analysis, causes plants to incur most of the economic costs of the CPP while leaving most of the benefits, in both GHG and other pollutants, unrealized. In addition, the justification for the ACE rule intentionally minimized the dangers associated with climate change, which by the EPA's own analysis range from minimal to catastrophic for the planet. The justification for the ACE rule also only discusses the U.S. benefits, and not the global benefits from reduced CO_2 emissions. Overall, it is clear, that the CPP was a far better rule due to its far greater benefits for little additional cost.

Table 6-12 of the ACE rule RIA (also Table 18 of the proposed rule) clearly shows that the CPP has economic benefits over the ACE rule under all three scenarios studied, at all times shown, and at both a 7% and 3% discount rate. The net benefits of the CPP over the ACE rule range from $12.8 to $76.3 billion depending on the assumptions used. In addition, the CPP would have prevented the emission of pollutants which were not quantified in the RIA for the ACE rule. This includes lower emissions of mercury, HCl, SO_2, NO_2, and visibility effects. If these effects were quantified, it would show even greater benefit from the CPP over the ACE rule.

The RIA for the ACE rule understates the damage CO_2 will cause to the earth's climate, and damage from fossil fuel emission in general, in several ways. Broadly, these include discounting future damage from CO_2 at too high a rate, ignoring the global damage from US CO_2 emissions, and ignoring damage from several pollutant categories and the effects of these pollutants, even when the pollutants themselves are included in the analysis.

The RIA Discounts Long-Term CO_2 Damage Using Short-Term Capital Market Rates

The ACE RIA contains the following about discounting the future damage from CO_2 emissions: "Regarding discount rates, Circular A-4 states that regulatory analyses "should provide estimates of net benefits using both 3 percent and 7 percent." The 7 percent rate is intended to represent the average before-tax rate of return to private capital in the U.S. economy. The 3 percent rate is intended to reflect the rate at which society discounts future consumption, which is particularly relevant if a regulation is expected to affect private consumption directly. EPA follows this guidance below by presenting estimates based on both 3 and 7 percent discount rates in the main analysis."

This is a clear misrepresentation of the instructions the A-4 circular provides for discounting intergenerational effects such as climate change. The A-4 circular references research from the 1990s that suggests intergenerational discount rates from 1% to 3% are most appropriate and should be used to model the long-term impact of CO_2 emissions. According to the A-4 circular, the reasons for this lower intergenerational rate are as follows:

- Society should not favor the welfare of current generations over future generations since future citizens are not a party to decisions being made today.
- Under long time horizons, there is no private investment benchmark for determining what the discount rate should be.

The RIA Uses Domestic Climate Costs instead of World Climate Costs

Unlike NO_X or SO_X, CO_2 will spread throughout the earth's atmosphere regardless of where it is initially emitted. This means that CO_2 emitted in the U.S. will cause damage to the entire planet while CO_2 emitted in foreign countries will also damage the entire planet including the U.S. The U.S. needs to lead by example by taking a global view of the damage done by climate change. Failure to take a global view of climate change will encourage foreign nations to do the same, which will result in other nations pricing the negative effects of their CO_2 emissions too low.

In addition, ignoring world costs is contradictory to the intent of the CAA. The purpose of the CAA is to prevent an owner or company from freely polluting the air without properly pricing that into his/her decision-making process. The failure of the RIA to properly price carbon has a large impact on this cost analysis. This is shown by the fact that that social cost of 1 ton of carbon in 2025 is $1 using a 7% discount rate if only effects to the US economy are considered, while the cost is $77 using a 2.5% discount rate and if the global cost of carbon is considered.

The RIA Ignores the Benefits from the Reduction in Emissions of Many Pollutants

The RIA for the ACE rule ignores the health benefits from the reduction in emissions from SO_2, NO_2, mercury, and HCl. In addition, some of the effects of ozone and PM are also not quantified. In the ACE rule RIA, EPA states they are unable to quantify the benefits of reduced NO_X and SO_X. This may be done using the same methodology DEP and EPA use when

evaluating the cost of control through BAT and BACT. BAT and BACT assume approximately $5,000 per ton of NO_X or SO_X reduced as economically feasible; this implies that each ton of NO_X or SO_X not emitted is equivalent to approximately $5,000 in benefits. In the year 2035, the CPP results in total power sector emissions of 821,000 short tons of SO_X and 740,000 short tons of NO_X while the ACE rule results in emissions of 856,000 short tons of SO_X and 777,000 short tons of NO_X (both are averages of the three ACE rule scenarios). This gives the CPP a $175-million advantage based on SO_X emissions and a $185-million advantage in NO_X emissions for a total of a $360-million advantage in favor of the CPP in the year 2035. This approach also ignores the extra benefit associated with removal of NO_X and SO_X from nonattainment areas subject to LAER.

The RIA Ignores PM Effects When the Concentration of PM Falls Below the NAAQS

It is not reasonable to ignore $PM_{2.5}$ benefits after ambient levels fall below the NAAQS. Per page 4-20 of the RIA, "The PM ISA, which was twice reviewed by the Clean Air Scientific Advisory Committee of EPA's Science Advisory Board (SAB-CASAC) (EPA-SAB 2008a, 2009), concluded that there is a causal relationship between mortality and both long-term and short-term exposure to $PM_{2.5}$ based on the entire body of scientific evidence. The PM ISA also concluded that the scientific literature supports the use of a no-threshold log-linear model to portray the PM-mortality concentration-response relationship while recognizing potential uncertainty about the exact shape of the concentration-response function. The PM ISA, which informed the setting of the 2012 PM NAAQS, reviewed available studies that examined the potential for a population-level threshold to exist in the concentration-response relationship. Based on such studies, the ISA concluded that the evidence supports the use of a "no-threshold" model and that "little evidence was observed to suggest that a threshold exists" (U.S. EPA 2009) (pp. 2-25 to 2-26). Consistent with this evidence, the Agency historically has estimated health impacts above and below the prevailing NAAQS."

Therefore, it is inappropriate to apply zero human-health effect $PM_{2.5}$ concentrations that are below the NAAQS. The RIA also states the following on pages 4-21 and 4-22 of the RIA: "In general, we are more confident in the size of the risks we estimate from simulated $PM_{2.5}$ concentrations that coincide with the bulk of the observed PM concentrations in the epidemiological studies that are used to estimate the benefits. Likewise, we are less confident in the risk we estimate from simulated $PM_{2.5}$ concentrations that fall below the bulk of the observed data in these studies. To give insight to the level of uncertainty in the estimated forgone $PM_{2.5}$ mortality benefits at lower ambient levels, we report the PM benefits according to alternative concentration cut-points. Below we further describe our rationale for selecting these cut-points and report a suite of sensitivity analyses."

Addressing uncertainty necessitates showing a worst-case scenario, and this worst-case scenario should be a part of the RIA and shown alongside the best-case scenario. Showing a worst-case scenario is further reinforced by the fact that many of the known costs of $PM_{2.5}$ and other pollutants were not quantified, which likely makes it more realistic than the best-case scenario.

Conclusion on the RIA

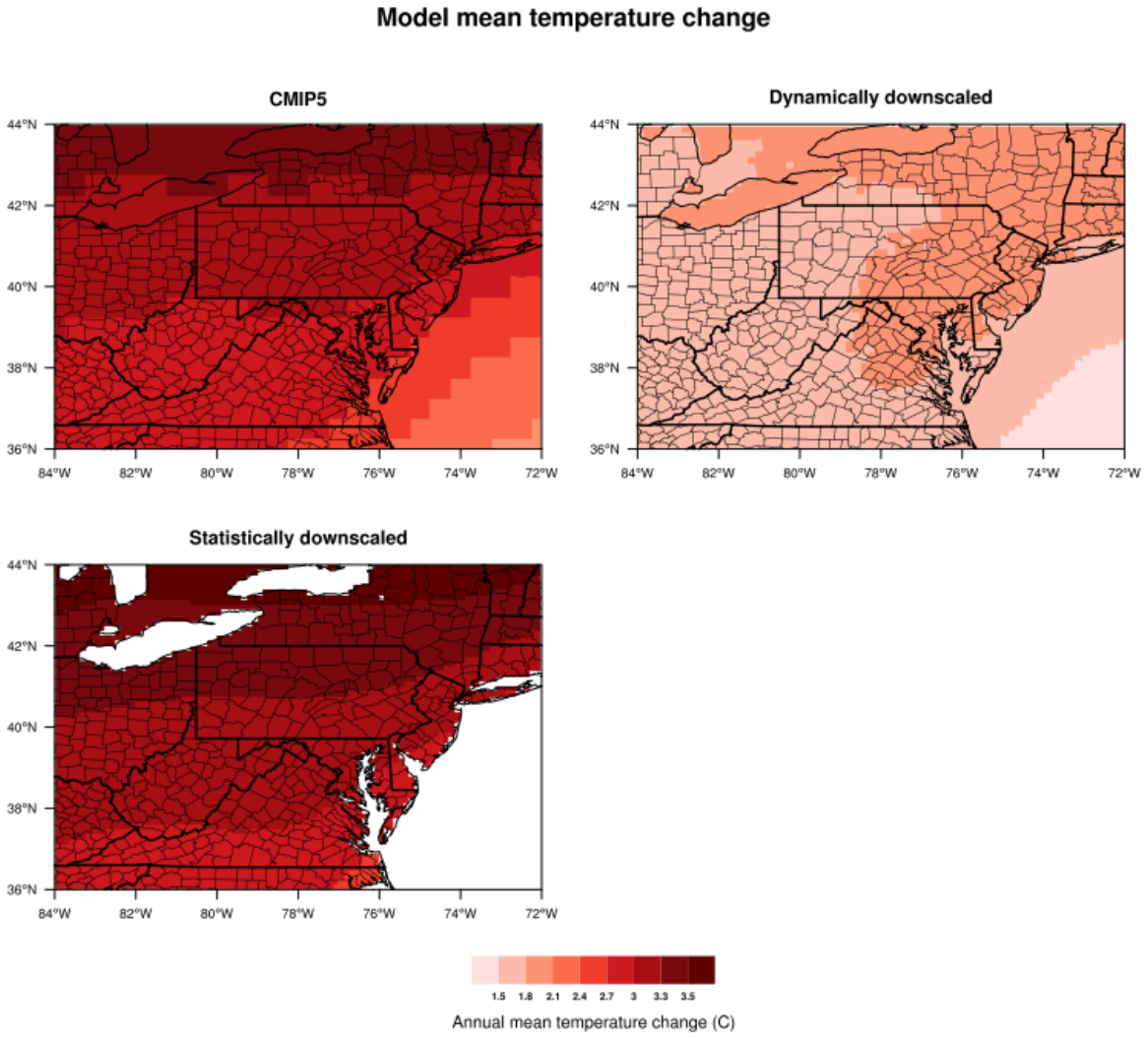
Overall, the RIA shows that the CPP had clear economic advantages over the ACE rule. This occurred despite EPA ignoring or incorrectly analyzing the benefits of the CPP as mentioned above.

Climate Change Impacts in Pennsylvania

Like every state in the country, Pennsylvania has already begun to experience adverse impacts from climate change, such as flooding, heat waves, and drought. Based on the overwhelming scientific evidence, those harms are likely to increase in number and severity unless aggressive steps are taken to reduce emissions of carbon dioxide and other greenhouse gases.

The Commonwealth of Pennsylvania faces two fundamental threats related to climate: (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 PADEP, 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.[23] The models used in the 2015 Climate Impacts Assessment Update suggest this warming is a result of anthropogenic influence, and that this trend is accelerating. Projections in the 2015 Update show that by the middle of the 21st century, Pennsylvania will be about 3°C warmer than it was at the end of the 20th century.

[23] *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.



Modeling charts from the 2015 Update show that in both the CMIP5 and statistically downscaled CMIP5 datasets, mid-century temperatures in the Philadelphia region are projected to be similar to historical temperatures in the Richmond, VA area. Similarly, Pittsburgh's temperatures are projected to resemble the historically observed temperatures in the Baltimore-Washington area. The mean warming across the state simulated by these models is generally 3.0-3.5 °C (5.4-6.3°F). The CMIP5 model mean change is 3.0-3.3 °C (5.4-6.0 °F) across nearly the entire state. The statistically downscaled CMIP5 model mean change is 3.3-3.5 °C (5.9-6.3°F) in the northern half of the state and 3.0-3.3 °C (5.4-6.0°F) in the southern half. Finally, the dynamically downscaled dataset model mean change is only 1.5-1.8 °C (2.7-3.2°F) across the western half of the state and 1.8-2.1 °C (3.2-3.8 °F) across the eastern half. The reduced warming is likely at least partially because these models rely on a different emissions scenario, in which the buildup of greenhouse gases in the atmosphere occurs at a slower rate than in the than in the scenarios that the CMIP5 models use.

The 2015 Climate Impacts Assessment Update also finds that this warming trend will threaten Pennsylvania in other ways:

- Pennsylvania agriculture will have to adapt to greater extremes in temperature and precipitation.[24] Pennsylvania dairy production is likely to be negatively affected by climate change due to losses in milk yields caused by heat stress, additional energy and capital expenditures to mitigate heat stress, and lower levels of forage quality.

- Pennsylvania's forests will be subject to multiple stressors.[25] The warming climate will cause tree species inhabiting decreasingly suitable habitat to become stressed. Mortality rates are likely to increase and regeneration success is expected to decline for these tree species, resulting in declining importance of those species in the state.

- Suitable habitat for plant and wildlife species is expected to shift to higher latitudes and elevations.[26] This will reduce the amount of suitable habitat in Pennsylvania for species that are at the southern extent of their range in Pennsylvania or that are found primarily at high latitudes; the amount of habitat in the state that is suitable for species that are at the northern extent of their range in Pennsylvania will increase. The Canada lynx, which is already rare in Pennsylvania, will likely be extirpated from the state.

- The public health of Pennsylvanians is threatened because climate change will worsen air quality relative to what it would otherwise be, causing increased respiratory and cardiac illness.[27] The linkage between climate change and air quality is most strongly established for ground-level ozone creation during summer, but there is some evidence that higher temperatures and higher precipitation will result in increased allergen (pollen and mold) levels as well.

- West Nile disease is endemic in Pennsylvania.[28] It is currently most prevalent in Southeastern and Central parts of the state, and less prevalent in the Laurel Highlands and the Allegheny Plateau. However, climate change is expected to increase the prevalence of West Nile disease in the higher-elevation areas, due to higher temperatures. In addition to its range, the duration of the transmission season for West Nile disease is sensitive to climate. Warmer temperatures result in a longer transmission season, and therefore greater infection risk.

- Climate change will have a severe, negative impact on winter recreation in Pennsylvania.[29] Downhill ski and snowboard resorts are not expected to remain economically viable past mid-century. Snow cover to support cross country skiing and snowmobiling has been declining in Pennsylvania, and is expected to further decline by

[24] 2015 Climate Impacts Assessment Update, *supra*, at 63.
[25] *Id*. at 114.
[26] *Id*.
[27] *Id*. at 321.
[28] *Id*. at 135.
[29] *Id*. at 141.

20-60%, with greater percentage decreases in southeastern Pennsylvania, and smaller decreases in northern Pennsylvania.

- Climate change poses a threat to the fauna of the tidal freshwater portion of the Delaware estuary in Pennsylvania.[30] One reason is that increased water temperatures with climate change decrease the solubility of oxygen in water and will increase respiration rates, both of which will result in declines in dissolved oxygen concentration. Thus, climate change will worsen the currently substandard water quality in the tidal freshwater region of the Delaware Estuary.

- The freshwater tidal wetlands along Pennsylvania's southeastern coast are a rare, diverse, and ecologically important resource.[31] Climate change poses a threat to these wetlands because of salinity intrusion and sea-level rise. Sea-level rise, however, has the potential to drown wetlands if their accretion rates are less than rates of sea-level rise.

Pennsylvania's Efforts to Address Power Plant Carbon Pollution

Pennsylvania has continued to bear the impacts of climate change caused by manmade emissions of greenhouse gases, while developing several initiatives to reduce emissions from the largest stationary sources of those emissions. Even as a net energy exporter, Pennsylvania has shown that generation shifting and energy efficiency/demand response programs are cost-effective tools to substantially reduce carbon pollution from the power sector while maintaining reliability and incentivizing economic growth.

Pennsylvania's energy efficiency law, 66 Pa.C.S.A. § 2806.2 *et seq.*, which requires the state's major electric distributing companies to meet savings targets established by the Public Utility Commission, conserved 1,337,127 MWh/year total (equivalent to the energy it takes to power 99,229 homes for a full year) and is estimated to save Pennsylvanian ratepayers over $95 million on their electricity bills annually.[32]

The state's renewable energy portfolio standard, 73 P.S. §§ 1648.1- 1648.8, which requires that 18% of electric power come from clean energy sources like wind and solar by 2021, has helped to grow the clean energy industry, while providing clean energy options to Pennsylvania businesses and homeowners. More than 1,300 megawatts of wind power at over 25 wind farms and nearly 240 MW of solar – which combined is enough energy to power the equivalent of 330,000 homes – has been installed to date and has brought over $2.8 billion in capital investment into the state.

"Finding Pennsylvania's Solar Future" is a 2017-2019 statewide planning project being led by the PADEP Energy Programs Office to equip Pennsylvania to produce more solar energy. The stakeholder effort modeled and developed 15 strategies to increase in-state solar generation to 10

[30] *Id*. at 152.
[31] *Id*.
[32] *See* "The Benefits of Pennsylvania's Act 129 Energy Efficiency Programs and the Potential Losses of Allowing Users to Opt Out," available at https://alliance4industrialefficiency.org/wp-content/uploads/2017/06/PA-Act-129-Report_AIE_FINAL_6.26.2017.pdf.

percent of Pennsylvania's energy portfolio by 2030. Pennsylvania's Solar Future Plan concludes that this goal is technically and economically achievable. For example, in the United States alone, the price of solar power has decreased by 66 percent from 2010.

As of 2018, Pennsylvania ranks 11th among all 50 states and D.C. in clean energy jobs. The energy efficiency sector is the largest part of Pennsylvania's clean energy industry. 65,289 workers are employed in improving the efficiency of commercial and residential facilities, developing better energy storage options, and building "smart grid" innovations in the state. Pennsylvania's renewable energy companies provide support for 8,714 workers. Of the 8,714, the largest group (4,777) works in solar, followed by wind power (2,677). Pennsylvania's clean energy industry also includes 6,749 individuals who work for employers focused on clean vehicles and 1,410 workers focused on alternative fuels.[33]

Conclusion

PADEP does not endorse an "inside-the-fence line" approach to control CO_2 emissions. This approach will do little to address climate change and will cost more per unit of CO_2 removed by needlessly restricting methods of eliminating emissions. The CPP meets EPA's legal obligation to reduce GHGs and employs cost-effective emission reduction strategies. In addition, the Department disagrees with EPA's proposal to revise the NSR program. This proposal is not supported by law and risks increased emissions of criteria pollutants that will damage human health and the environment.

Thank you for your consideration in this matter.

Sincerely,

Patrick McDonnell
Secretary

[33] *See* "Clean Jobs in Pennsylvania," available at https://www.e2.org/wp-content/uploads/2018/06/Clean-Jobs-Pennsylvania-2018.pdf.