Air Quality
ENVIRONMENTAL QUALITY

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January 21, 2016

U.S. Environmental Protection Agency
EPA Docket Center EPA/DC
EPA WJC West Building
Room 3334
1301 Constitution Ave. NW
Washington, D.C. 20460

Attention: Docket ID No. EPA-HQ-OAR-2015-0199

Subject: Comments on Proposed Rulemaking – Federal Plan Requirements for Greenhouse Gas Emissions from Electric Generating Units and Model Trading Rules

Dear Sir/Madam:

The North Carolina Department of Environmental Quality (NCDEQ) is providing comments on the proposed rule "Federal Plan Requirements for Greenhouse Gas Emissions from Electric Utility Generating Units Constructed on or Before January 8, 2014; Model Trading Rules; Amendments to Framework Regulations" published in the *Federal Register* on October 23, 2015 (80 *FR* 64966). Unfortunately, EPA's proposed Federal Plan and Model Rules to reduce carbon dioxide emissions from both power plants and beyond power plants is based on legally and technically flawed emissions guidelines established in the final Clean Power Plan (CPP) under Clean Air Act (CAA) §111(d) (80 *FR* 64662). Moreover, these federal actions serve to frustrate and interfere with North Carolina's commitment to clean our energy sector while maintaining reliable and affordable energy to our citizens.

In a January 27, 2014 letter to EPA Administrator Gina McCarthy, NCDEQ outlined various legal concerns in a Principles Document attached to the letter. The letter and principles document are also attached to these comments in Appendix A so that they will be part of the official record.

Notwithstanding the importance of each issue outlined in the Principles Document which questions EPA's legal authority to establish emission guidelines under §111(d), NCDEQ affirms that EPA can only establish a unit-specific guideline that describes what control technologies have been demonstrated. NCDEQ agrees with the Sierra Club when it argued in *Asarco v. EPA* (1978) that §111 of the CAA cannot be applied to a combination of facilities within a plant site or the plant site as a whole. It certainly cannot be expanded to include facilities outside the plant site, or to source categories outside the proposed §111(d) source category. The plain language of the Act as well as legal precedent precludes EPA and States from implementation of building blocks 2 and 3 – both designed to require emission reductions outside of the affected emissions unit.

Additionally, EPA's interpretation of § 111(d) is contrary to the text of the statute which clearly states that "[t]he Administrator shall…establish a procedure…under which each state shall submit to the Administrator a plan which establishes standards of performance for any existing source for any air pollutant." The text is clear that Congress intended for states to establish standards of performance under § 111(d), and for EPA to establish a procedure for states' submission of plans to implement the standard. However, in its Final Rule, EPA established both a procedure and binding emission targets that apply to beyond the affected sources, making the Federal Plan proposal inconsistent with the delegation of authority provided for in § 111(d).

Both of these interpretations bring into question the legality of the Federal Plan requirements, including the associated mass-based and rate-based targets and trading mechanisms which predominantly rely on measures taken outside the fence-line of an affected unit and EPA established binding emission targets.

The NCDEQ believes the emissions guidelines should simply apply to each affected unit taking into account the statutory factors such as technical feasibility, cost of achieving reductions, and the remaining useful life of the unit to determine what the best system of emission reduction should be.

With that being said, and in no way prejudicing the legal arguments outlined above and in the Principles Document, NCDEQ is commenting on the proposed rule in its totality.

Leakage to New Sources

The EPA is seeking comment on the proposed treatment of leakage under both rate-based and mass-based federal plan approach and model rules. The NCDEQ believes EPA has ignored the clear intent of Congress by setting a performance rate for existing plants that is more stringent than the performance rate for new power plants (under Section § 111(b)). § 111(d) expressly instructed states and EPA to consider "the remaining useful life" of existing sources which conveys Congress's intent for existing sources to be given less stringent standards than new sources and within a class of existing sources, older sources can have less stringent standards than more recent sources. In its final § 111(d) rulemaking, EPA inverted both of these inferences by creating performance standards for existing sources that are more stringent than the standards for new sources. In addition, EPA applies a single performance standard to all existing sources, which demonstrates a disregard for the fact that older sources have a different "remaining useful life" than newer ones. As a result of this erroneous interpretation, EPA is concerned about emissions leakage to new sources due to its less stringent standard. Even if allowed under § 111, NCDEQ believes that a single standard should apply at a given time. If new sources are built, those sources are subject to the § 111(b) standard, and therefore have no role in § 111(d) guidelines for existing sources. Therefore, leakage should not be an issue. The NCDEQ believes that mandatory requirement of output-based set-aside and renewable energy set-aside in the Federal Plan to address leakage are unnecessary while creating a burdensome compliance process.

Reconstruction or Modification of an Affected Source

The EPA is seeking comment on a revision to its interpretation in the CPP proposal regarding whether a reconstruction or modification of an existing affected source subject to § 111(b) moves the source out of a § 111(d) program. The NCDEQ believes that the structural program established under § 111 has been effective and working since the 1977 amendments to the CAA. Thus, NCDEQ agrees with EPA's reinterpretation in the proposed Federal Plan and Model Rules "that when an existing source modifies or reconstructs in such a way that it meets the definition of a new source, for purposes of a particular NSPS and emission guideline, it becomes a new source under the statute and is no longer subject to the CAA section § 111(d) program."

Output-Based Set-Aside

1. The EPA proposes to calculate an NGCC unit's capacity factor based on the previous compliance period's net generation and the net summer capacity of the unit. The EPA also requests comment on whether the "maximum load value," which is a parameter that EGUs report to the EPA in their monitoring plans, is a reasonable proxy for EGU-level net summer capacity for these calculations. The NCDEQ recommends using the net summer capacity of the unit, as reported to the Energy Information Administration, to calculate the capacity factor of NGCC units rather than maximum load value reported to EPA in monitoring plans. The reasons are to maintain consistency with the final CPP and other federal reporting programs.

2. The EPA is also proposing to determine the size of the output-based set-aside one time, before the start of the program. To determine the size of the set-aside, EPA assumes that an existing NGCC would be incentivized by increasing its utilization from 50 to 60 percent capacity factor. The EPA would calculate the size as 10 percent of the 2012 NGCC capacity in the state multiplied by the hours in a year multiplied by 1,030 lbs/MWh-net. The set-asides would apply to every compliance period except for the first compliance period for which there would be no output-based set aside.

Based on capacity data contained in EPA's IPM v5.15 Base Case and EIA net generation data for 2013 and 2014, we have determined that each of North Carolina's NGCC units (representing 92% of state-wide NGCC capacity) already operates at high capacity factors (66% to 81%). Although not expected in North Carolina, limiting existing sources to obtain set-aside allowances only for generation between capacity factors of 50% to 60% could potentially dis-incentivize the sources from operating at higher capacity levels. Under the EPA's proposed method, if a source wants to operate at a 75% capacity factor (the target under the final CPP), then the source will need to purchase allowances to operate above 60%. Although we acknowledge that such cost impact may be low compared to the construction and operation of new NGCC units, the additional cost of acquiring allowances has the potential to force a source to limit operation below 60% capacity, and the remaining demand for generation could be made up by new units. This in turn, would result in leakage as defined by EPA. In summary, NCDEQ does not believe that output-based set-asides are necessary.

Compliance Timelines

1. The NCDEQ agrees with EPA's proposal to evaluate compliance after each multi-year interim compliance period. The NCDEQ does not want EPA to implement intervening compliance requirements as those in the RGGI or CARB programs.

2. In § 62.16231 and § 62.16431, EPA requires eligible renewable energy (RE) and demand-side energy efficiency (EE) projects to have commenced construction or implementation after September 6, 2018 for those states that the agency is implementing the Federal Plan under a mass-based or rate-based approach. However, if a state chooses to adopt model rules or rely on its own strategy to comply with the CPP, EPA allows RE projects or EE measures installed or implemented after January 1, 2013 as eligible resources. North Carolina and other states have invested billions of dollars in RE and EE projects which are ignored in EPA's differing compliance timelines. The EPA has provided no justification for this disparity. The NCDEQ believes that it is unfair that alternative resources in place before 2018 will not be recognized by EPA for compliance credits in the Federal Plan.

3. EPA's proposed plan to incentivize RE and EE by awarding early action allowances for generation and savings achieved in 2020 and 2021 could negatively impact investments made before 2018, as power plants may only want to purchase RE that provides credit for both the federal and state programs, thus delaying emission reductions. The NCDEQ believes that EPA's arbitrary cutoff date penalizes early action states by disqualifying RE facilities that predate 2018 to earn extra federal credits available in 2020 and 2021.

Allowance Allocation Methodology

1. The NCDEQ supports EPA's proposal to support a state's ability to develop its own allocation methodology under a State Plan as well as a Federal Plan.

2. EPA is proposing to distribute allocations to affected units based on historic generation (2010-2012). The NCDEQ recommends EPA use emissions, not generation to distribute mass-based allocations. This approach allows allocations to go directly to the boiler affected, eliminates confusion, and avoids allocations for retired units going to other resources.

3. For reconstructed or modified sources that move to 111(b) and no longer need the allowances, the NCDEQ believes that their allocations should be distributed to remaining affected units.

4. The NCDEQ does not support EPA's alternative allocation methodology. Specifically, distribution to load-servicing entities should be left up to the states to decide. Also, there is no compelling reason to expand the program size from affected units to all generating units. Such expansion will complicate program management, and lead to increased expenses for the utilities and increased rates for their customers.

Reliability Set-Aside

The EPA explains that "the very nature of the Federal Plan, in which affected EGUs can obtain allowances or credits if needed, supports reliability." Therefore, EPA is not proposing to include an allowance set-aside, or similar mechanism in a rate-based approach, to address reliability issues in the Federal Plan; however, EPA is requesting comment on including such a set-aside in the context of a mass-based approach. Specifically, EPA is requesting comment on the creation of an allowance set-aside for the purpose of making allowances available in emergency circumstances in which an affected EGU was compelled to provide reliability-critical generation and demonstrated that a supply of allowances needed to offset its emissions was not available. The NCDEQ supports the development of a mechanism to assist facilities in the event of an unforeseen, emergency reliability event. An example of such an event is the curtailment of natural gas on the East Coast during the winter of 2014. However, NCDEQ does not support re-allocating a portion of an EGU's allowance budget to create this reliability set-aside. Rather, we support the creation of additional reserve allowances in a state's budget to support reliability events. Additional reserve allowances are needed for three reasons. First, it is difficult to quantify the number of allowances required to support a reliability set-aside since these events, by their very nature, are unforeseen and may extend for long time periods or over large regions. Second, it leaves affected EGUs in a difficult position to make long term plans regarding the availability of allowances and their corresponding price if allowances are withheld for 2-year compliance periods then distributed among sources at the end of the compliance period if not needed. Lastly, the state mass allocations may be extremely difficult to meet for many states, and removing allowances from a state's budget for this reliability set-aside makes the targets even lower.

For rate-based plans, we support the development of a reliability safety crediting mechanism. Rate-based units may need to increase generation and or fuel switch during such events to support electricity generation needs. As a result, these units may require additional ERCs due to unforeseen events to meet their targets. Only allowing a set-aside for mass allowances and not ERCs may unduly penalize states utilizing a rate-based plan. Therefore, we recommend EPA provide rate-based credits from an emergency reserve pool to support affected EGUs after an unforeseen reliability event.

The NCDEQ does not support using banked ERCs or set-asides from the CEIP plan in emergency reliability episodes since these allowances and credits are part of the states' budgets. In addition, it is unknown if the quantity of allowances or ERCs banked as a result of the CEIP would be sufficient to ensure units are not penalized for operating during an emergency reliability event.

Updated List of North Carolina's Affected Units

The final CPP specifies criteria for applicability determination of an affected unit:

- § 60.5845(b)(1) - serves a generator connected to a 25 MW-net or greater nameplate capacity utility power distribution system.
- § 60.5845(b)(2) - contain a base load rating greater than 250 MMBtu/hr heat input of fossil fuel (alone or mixed with any fuel).

- § 60.5850(c) - excludes non-fossil fuel-fired units historically utilizing 10 percent or less of their annual capacity factor, or are subject to federally enforced permits limiting fossil fuel consumption to 10 percent or less of their annual capacity factor.

The NCDEQ requests EPA remove two facilities from its list of affected units for North Carolina. Each of these facilities do not satisfy the eligibility criteria specified in the final CPP. First, steam generating units at Elizabethtown Energy (ORIS code 10380) and Lumberton Energy (ORIS code 10382) are designed to operate below 250 MMBtu/hr heat input threshold, and do not satisfy § 60.5845(b)(2). The design heat input level for each unit at Elizabethtown Energy and Lumberton Energy is 215 MMBtu/hr and 180 MMBtu/hr, respectively. Second, Lumberton Energy recently obtained a revised operating permit to burn non-CISWI subject wood and poultry litter but not fossil fuels in its steam generating boilers. Based on this permit revision, Lumberton facility meets § 60.5850(c) exclusion criteria. In conclusion, EPA's carbon pollution standards should not apply to Elizabethtown Energy and Lumberton Energy.

Procedural Changes to Completeness Determination

The completeness criteria in the proposed §60.27(g)(3) contains some technical requirements that are similar to those codified in 40 CFR part 51, Appendix V for state plans submitted under CAA §110 and §111. In practice, states have significant understanding and experience with Plan submittals under §110 and §111. It is a concern that introducing new language that is both different from well-known requirements and that appears to mesh a technical review with a determination of Plan completeness could have unforeseen consequences. We suggest that the proposed language of §60.27(g)(3)(iv), §60.27(g)(3)(v) and §60.27(g)(3)(vi) be written similarly to that already contained in Part 51, Appendix V 2.2(g).

Evaluation, Measurements and Verification (EM&V) Requirements

For all of the measures described in the preamble to generate ERCs, EPA requests comment on how EM&V methods can be implemented for these measures across applicable jurisdictions in the timeframe provided in a way that is rigorous, straightforward, widely demonstrated, and in accordance with the EM&V requirements in the Federal Plan proposal, Model Rule preamble, and the final CPP.

Since 2008, North Carolina has implemented a Renewable Energy and Energy Efficiency Portfolio Standard to reduce electricity generation from fossil-fuel power plants under Session Law 2007-397. Under this program, both RE and EE programs are issued certificates equivalent to 1 MWh of renewable generation or avoided generation. The RECs and EECs are maintained in North Carolina's Renewable Energy Certificate Tracking System ("NC-RETS"). NC-RETS is integrated with all other renewable energy certificate tracking systems in the United States to allow for the import and export of RECs to and from North Carolina.

The North Carolina Utilities Commission (NCUC) requires EM&V for EE and demand side management (DSM) measures used to comply with the North Carolina REPS under rule NCUC R8-68 established on February 29, 2008 via an order on Docket E-100 Sub 113. This

rule requires the utilities to develop and report EM&V for each program under REPS using industry-accepted methods. In addition, it allows the use of a third party to develop EM&V results.

The NCDEQ recommends that EPA allow states with an existing program to certify and track RE generation and EE avoided generation with sufficient EM&V requirements to use those existing systems without modification, regardless if the state is issued a Federal Plan under §111d. Eligible resources should not be required to report under both an existing state-mandated tracking and EM&V program as well as a federally-mandated tracking and EM&V program implemented under a Federal Plan. Requiring sources to report under both systems is too burdensome.

Biomass

The EPA is requesting comment on the treatment options for biomass if biomass is included as an eligible measure. The NCDEQ recommends that EPA provide states with a pre-approved list of qualified biomass fuels, including waste-derived feedstocks, industrial byproduct feedstocks, and other feedstocks from sustainably managed forest lands. The NCDEQ agrees with EPA's approach to amend the pre-approved qualified biomass feedstocks as the agency completes its next round of biogenic CO2 assessment. We believe national guidance related to this topic is needed to ensure all states apply the same methodology regarding the treatment and accounting of biogenic CO2 in their state plans. The NCDEQ also requests that EPA maintain consistency between the Federal Plan and the model trading rules by including biomass as an eligible resource in rate-based and mass-based state plans, federal plans and model trading rules. Regarding the level of detail provided by EPA in the model rule for monitoring and reporting biogenic CO2 emissions from the use of qualified biomass, the NCDEQ requests EPA provide simple and clear procedures, while avoiding burdensome EM&V requirements.

Thank you again for the opportunity to comment on this proposed rule. I trust that the comments will be considered as EPA prepares the final rule. If you have any questions regarding our comments, please contact me at (919) 707-8430 or sheila.holman@ncdenr.gov.

Sincerely,

Michael A. Abraczinskas for S.H.

Sheila C. Holman, Director
Division of Air Quality, NCDEQ

SCH/ssm

Attachment

cc: Donald Van Der Vaart, NCDEQ
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North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor

John E. Skvarla, III
Secretary

January 27, 2014

Ms. Gina McCarthy
USEPA Headquarters
Ariel Rios Building
1200 Pennsylvania Avenue N.W.
Mail Code: 6101A
Washington D.C. 20460

Dear Administrator McCarthy:

North Carolina is submitting the attached document entitled "North Carolina §111(d) Principles" to help inform the discussion surrounding the development of an upcoming proposed rule for regulating greenhouse gasses from existing electric generating units.

To the extent that EPA decides to establish emission guidelines, adherence with these principles will ensure that states will be able to implement those guidelines in a manner consistent with the Clean Air Act (CAA) §111(d).

I am sure that your Agency agrees that cooperative federalism lies at the heart of the CAA§111(d) process and therefore it is critical that any emission guideline proposed by EPA should respect that principle. States and local air agencies have the primary responsibility for regulating sources in their jurisdictions and the CAA affords them wide discretion. Moreover, when establishing emission standards, states, unlike EPA, have unique site-specific knowledge that allows the states to design more effective emission standards.

If you have any questions about the principles outlined in this draft please feel free to contact Dr. Donald van der Vaart, Ph.D., P.E., J.D. at Donald.vandervaart@ncdenr.gov or at 919-707-8475.

Sincerely,

John E. Skvarla, III
Secretary

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NORTH CAROLINA §111(D) PRINCIPLES

North Carolina Department of Environment & Natural Resources

Preface

The federal Environmental Protection Agency ("EPA"), in response to the President's June 2013 memorandum "Power Sector Carbon Pollution Standards," is developing greenhouse gas ("GHG") emission standards for fossil fuel-fired electric generating units ("EGUs").[1] Specifically, the EPA is developing Clean Air Act ("CAA") §111 emission standards for new EGUs and emission guidelines for existing units. EPA has requested that States, such as North Carolina, provide information to the EPA to assist it in developing the CAA §111(d) federal emission guidelines for existing emission units. North Carolina has provided comments to the EPA and, in addition to those comments, has developed this guidance document outlining principles that it believes are important in the development and implementation of any program designed to impose CAA §111 greenhouse gas emission standards on existing fossil fuel-fired electric generating units.

North Carolina, like many States, has a long and successful history of protecting its environment and natural resources while at the same time providing for economic development. Adherence to the principles in this document will help ensure continued success.

[1] Presidential Memorandum, Power Sector Carbon Pollution Standards (June 25, 2013), available at http://www.whitehouse.gov/the-press-office/2013/2013/06/25/presidential-memorandum-power-sector-carbon-pollution-standards.

Introduction

This document will address several important principles associated with EPA's decision to regulate GHGs from existing fossil fuel-fired electric generating units and how this decision impacts North Carolina. The principles covered include:

- **Legal Constraints** – CAA §111(d) is a unique statutory provision with limited applicability. This paper will summarize several of these limitations and will discuss whether and to what extent EPA is authorized under §111(d) to regulate GHGs from existing fossil fuel-fired electric generating units.
- **The Starting Point** – In cases where §111(d) *is* authorized, its implementation is constrained by statutory boundaries and the application of sound technical and engineering principles. As discussed herein, any resulting GHG reduction achieved are at the unit level and is driven by these principles. An emission guideline developed under §111(d) cannot be the result of any preconceived emission reduction goal.
- **Engineering Function** – At its heart the proper implementation of CAA §111(d) is an engineering function. This paper will include a brief discussion of several GHG emission reduction strategies. One or more of these strategies, when applied at the required unit-specific level, can form the basis for an achievable §111(d) emission standard.

As important as the above issues are, there are some issues that this paper will not address. First, this paper will not discuss the scientific uncertainty the impact of anthropogenic greenhouse gas emissions have on climate. It will not address the accuracy or inaccuracy of the IPCC models relied upon by EPA or the divergence between the models' predictions and actual temperatures over the past 15 years. These issues are critical to any decision on whether, in the absence of Congressional authorization, EPA should regulate greenhouse gas emissions from stationary sources.

Legal Issues

EPA's decision to regulate GHGs from existing stationary sources using Clean Air Act §111(d) is a landmark policy decision and has therefore engendered considerable discussion among States, sources, and environmental groups. There are several important legal issues that have been raised that need to be addressed within the context of developing a §111(d) State plan.

Clean Air Act §111(d) Statute

For reference purposes, the following are excerpts from the CAA §111.

(d) Standards of performance for existing sources; remaining useful life of source

> *(1) The Administrator shall prescribe regulations which shall establish a procedure similar to that provided by section 7410 [CAA §110] of this title under which each State shall submit to the Administrator a plan which*
>
> > *(A) establishes standards of performance for any existing source for any* ***air pollutant***
> >
> > > *(i) for which air quality criteria have not been issued or which is not included* ***on a list published under section 108(a)*** *or* ***[emitted from a source category which is regulated under section 112*** *{or}* ***112(b)]*** *but (ii) to which a standard of performance under this section would apply if such existing source were a new source, and (B) provides for the implementation and enforcement of such standards of performance. Regulations of the Administrator under this paragraph shall permit the State in applying a standard of performance to any particular source under a plan submitted under this paragraph to take into consideration, among other factors, the remaining useful life of the existing source to which such standard applies, but (ii) to which a standard of performance under this section would apply if such existing source were a new source, and*
> >
> > *(B) provides for the implementation and enforcement of such standards of performance. Regulations of the Administrator under this paragraph shall permit the State in applying a standard of performance to any particular source under a plan submitted under this paragraph to take into consideration, among other factors, the remaining useful life of the existing source to which such standard applies.*

42 U.S.C. 7411 (CAA §111) http://www.epw.senate.gov/envlaws/cleanair.pdf , (emphasis added).[2]

The CAA defines "standard of performance" under §111 as,

[2] The language quoted here is from the Statutes at Large which control over the language set forth in the U. S. Code (which is different). *See* William J. Haun, *The Clean Air Act as an Obstacle to the Environmental Protection Agency's Anticipated Attempt to Regulate Greenhouse Gas Emissions from Existing Power Plants*, THE FEDERALIST SOCIETY (March 2013).

(1) The term "standard of performance" means a standard for emissions of air pollutants which reflects the degree of emission limitation achievable through the application of the best system of emission reduction which (taking into account the cost of achieving such reduction and any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated.

42 U.S.C. §7411 (CAA §111), Retrieved from http://www.law.cornell.edu/uscode/text/42/7411.

Prohibition for Pollutants Listed under CAA §108

CAA §111(d) prohibits regulating pollutants listed under §108. A pollutant must be listed under §108 when three criteria are satisfied.[3]

- First, CAA §108(a)(1)(A) requires an endangerment finding. EPA has already made an endangerment finding under CAA § 202.[4]
- Second, CAA §108(a)(1)(B) requires a finding that greenhouse gases in the ambient air result from numerous or diverse mobile or stationary sources. EPA has already made this finding.[5]
- Third, CAA §108(a)(1)(B) provides that EPA must plan to issue air quality criteria. Legal precedent has established that once the first two provisions under §108(a)(1) are met the third provision is constructively satisfied.[6]

While North Carolina takes no position on whether EPA should establish a NAAQS for greenhouse gas emissions, North Carolina is concerned that a CAA §111(d) action is prohibited because GHGs have constructively been listed under CAA §108.[7] It would appear, at least facially, as a result of the EPA's CAA §202 rulemaking, that all of the conditions precedent to list greenhouse gases under CAA §108 have already been met. Indeed, some have argued that the EPA may already be under a pre-existing, non-discretionary duty to issue criteria and simultaneously propose a National Ambient Air Quality Standard for greenhouse gases.[8]

[3] 42 U.S.C. §7408(a)(1); CAA §108(a)(1).
[4] 74 Fed. Reg. 66496 (December 15, 2009).
[5] *Id.*
[6] *NRDC v. Train*, 545 F.2d 320 (2nd Cir. 1976).
[7] In commenting on the EPA's Advance Notice of Proposed Rulemaking ("ANPR") California's Attorney General (Brown) and Connecticut's Attorney General (Blumenthal) stated "In other words, Section 108(a)(1)(C) does not provide EPA with discretion to decide whether it is appropriate to apply the NAAQS structure to a global air pollution problem like GHGs." ANPR EPA-HQ-OAR-2008-0318 (comments dated November 26, 2008).
[8] See http://www.biologicaldiversity.org/programs/climate_law_institute/global_warming_litigation/clean_air_act/pdfs/Petition_GHG_pollution_cap_12-2-2009.pdf

Source Category Prohibition

The second express statutory limitation under §111(d) provides that EPA is prohibited from regulating a "source category" under §111(d) if that same source category is already regulated under CAA section 112. On February 16, 2012 the EPA issued a §112 regulation for fossil fuel-fired EGUs thus foreclosing regulation under §111(d).[9] While there are many areas of disagreement between many of the stakeholders, this is one area where there is almost universal agreement. North Carolina agrees with the interpretation of §111 advanced by 14 States and five major environmental groups that opposed EPA's attempt to regulated mercury as part of the Clean Air Mercury Rule ("CAMR").[10]

- 14 CAMR State Petitioners: New Jersey, California, Connecticut, Delaware, Illinois, Maine, Massachusetts, Minnesota, New Hampshire, New Mexico, New York, Rhode Island, Vermont, and Wisconsin.
- 5 CAMR Environmental Petitioners: Natural Resources Defense Council, WaterKeeper Alliance, Chesapeake Bay Foundation, Earthjustice, Clean Air Task Force.

> *The text of §111(d) makes clear that EPA may not set standards for a pollutant that is "emitted from a source category which is regulated under Section 112"* - *CAMR Environmental Petitioners Brief (2007)*

In 2007 the 14 CAMR State Petitioners and the five (5) CAMR Environmental Petitioners submitted briefs to the D.C. Circuit Court arguing that, as a matter of law, EPA is prohibited from using §111(d) to set standards for a pollutant that is emitted from a source category regulated under §112.[11]

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[9] 77 Fed. Reg. 9304 (February 16, 2012) "National Emission Standards for Hazardous Air Pollutants From Coal and Oil-Fired Electric Utility Steam Generating Units and Standards of Performance for Fossil-Fuel-Fired Electric Utility, Industrial-Commercial-Institutional, and Small Industrial-Commercial-Institutional Steam Generating Units."

[10] In addition to the 14 CAMR State Petitioner listed below, Attorneys General of seventeen (17) States sent a "white paper" to EPA expressing concern about EPA's "recent unwillingness to appropriately defer to State authority under the Clean Air Act." The white paper set forth the States' position on §111(d) and included was a reference to the "source category" prohibition. *See* Perspective of 18 States on Greenhouse Gas Emission Performance Standards for Existing Sources under § 111(d) of the Clean Air Act, submitted to EPA under cover letter dated September 11, 2013 by the State of Nebraska Office of the Attorney General ("Nebraska") (Nebraska, Oklahoma, Alaska, Florida, Kansas, Montana, Michigan, Alabama, Arizona, Georgia, Kentucky, North Dakota, Ohio, South Dakota, Wisconsin, South Carolina, and West Virginia.)

> "Thus, the text of §111(d)(1)(A) makes clear that EPA may not set standards for a pollutant that is 'emitted from a source category which is regulated under section 112' or included on the §112(b) list of hazardous air pollutants."

Proof Opening Brief of CAMR Environmental Petitioners (NRDC, et. al.), p. 20.

> "Subsection (d) of Section 111 provides authority for regulation of existing sources, but it explicitly limited to those air pollutants that are not 'emitted from a source category which is regulated under section 7412 of this title.'"

Opening Brief of CAMR State Petitioner's (New Jersey, et. al.,) p. 27.

At the time the CAMR rule was promulgated the EPA advanced a theory that there was ambiguity in §111(d) with respect to whether the prohibition was pollutant or source category specific.[12] Both the CAMR State government and Environmental Petitioners rejected this theory.

The CAMR Petitioning States stated that ambiguity between the amendment versions cannot be relied upon to avoid the plain meaning of the statute. [13] Likewise, the CAMR Environmental Petitioners described the suggestion that there might be ambiguity as something the EPA "manufacture[d]" in an "attempt[ ] to exploit a non-substantive difference between the two amendments to §111." Proof Opening Brief of CAMR Environmental Petitioners (NRDC, et. al.), p. 21.

North Carolina agrees with the position taken in 2007 by the CAMR State Petitioners and Environmental Petitioners that §111(d) contains no such ambiguity. In fact, the provisions of §111(d) make sense given Congress' decision to shift the focus of the §112 program as part of the 1990 CAA Amendments. Prior to 1990, §112 was a pollutant-specific program. In 1990 the structure of §112 was changed from a program that regulated *pollutants* to one that regulates *source categories*. To prevent overlap with the newly structured 112 program §111(d) was revised to exclude not only §112 pollutants (i.e. hazardous air

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[11] Challenge to the EPA Clean Air Mercury Rule (CAMR), State of New Jersey v. EPA (No. 05-1162); "Proof Opening Brief of Environmental Petitioners" dated January 12, 2007; http://www.catf.us/resources/filings/UHAPR/20070112-Environmental Petitioners Opening Brief 05-1162.pdf; "Opening Brief of Government Petitioners" dated January 11, 2007); http://www.nj.gov/oag/newsreleases07/Mercury.PDF. *But See* footnote 13.

[12] *See* 70 Fed. Reg. 15994 at 16030 (March 29, 2005).

[13] On December 16, 2013 nine of the fourteen of the CAMR Petitioning States submitted comments to the EPA that appears to have reversed the position they had argued to the D.C. Cir. in 2007 when litigating the CAMR rulemaking. *See* http://www.ag.ny.gov/pdfs/Final-111d-white-paper-121613-with-signatures.pdf. It appears that these States now argue that the ambiguity in §111(d) can be relied upon. Moreover, these States reversed their 2007 statutory interpretation that EPA is prohibited from using §111(d) to regulate pollutants emitted from source categories regulated under §112. No legal explanation for these reversals was included in the white paper other than to note that CAMR regulated mercury and EPA now proposes to regulate GHGs.

pollutant ("HAPs"), but also §112 regulated source categories. The two exclusions complement each other.

Finally, some have suggested that a footnote in the 2011 Supreme Court decision *AEP v Connecticut* supports an interpretation that §111(d) requires the regulation of carbon dioxide emissions from fossil fuel-fired electric generating units. This is not the case. In paraphrasing the CAA, the Court actually misstated the statutory prohibition under §111(d).

> 7 There is an exception: EPA may not employ *§ 7411(d)* if existing stationary sources of the pollutant in question are regulated under the national ambient air quality standard program, *§§ 7408-7410*, or the "hazardous air pollutants" program, *§ 7412*. See *§ 7411(d)(1)*.

American Electric Power Co. v. Connecticut, 131 S.Ct. 2527, 2537 (2011). This paraphrasing is confusing at best because it refers to *sources* regulated under §§108 and 111. Of course, CAA §108 directs the regulation of pollutants (so-called criteria pollutants) while, since 1990 CAA §112 regulates "source categories." The footnote is difficult to reconcile with the CAA but it clearly does not stand for the proposition that §111(d)'s prohibition is limited to *pollutants* regulated under §112. Moreover, *AEP v Connecticut* was decided prior to the promulgation of the EGU MACT under §112. An argument could be made that EGUs were not regulated under §112 at the time of the decision.

What is clear is that unless EPA decides to withdraw its §112 regulation governing fossil fuel-fired EGUs, §111(d) prohibits the Agency from regulating fossil fuel-fired EGUs under §111. If EPA nevertheless moves forward with emission guidelines, States put themselves at risk by preparing a rule in response to the EPA guideline that is facially inconsistent with the CAA.[14] The uncertainty resulting from such an approach suggests that EPA should, at a minimum, make State plan submittal deadlines contingent on conclusion of legal challenges to a §111(d) emission guideline rule. (*See* "Legal Trigger Approach" discussed below).

[14] This is a particularly difficult legal issue in States that have statutory prohibitions against adopting regulations more stringent that federal law.

Unit-Specific Requirement Under §111(d)

In cases where the EPA does have the authority to establish emission guidelines under §111(d), that authority is limited. The EPA is not authorized to impose emissions standards on existing sources. Rather, EPA can only establish a unit-specific guideline that describes what control technologies have been adequately demonstrated. The CAA and implementing regulations at 40 CFR Part 60, Subpart B require §111(d) standards to apply on a unit specific basis rather than include activities beyond the unit itself (i.e."outside the fence" approach).

North Carolina again finds almost universal agreement with environmental groups, trade organizations, and a number of States that CAA §111 prohibits "outside the fence" approaches to establishing emission guidelines under §111(d). This issue was raised in the EPA's CAMR rule, and in 2007 the CAMR Environmental Petitioners took the position that §111(d) had to be applied at each emissions unit.

> "[T]he statute mandates that each State plan apply the best system of emission reduction 'to <u>any</u> source' – on a source specific basis – and that each source subject to this standard demonstrate "continuous emission reduction[s]'."

Proof Opening Brief of CAMR Environmental Petitioners (NRDC, et. al.) pgs. 25-26 (emphasis in original).

> "That is, each State plan must reduce emissions from any and all existing sources covered by its plan."

Id. at 27.

When discussing the possibility of allowing trading whereby decreases in mercury at one facility could be relied upon to satisfy another facility's reduction obligation, the CAMR Environmental Petitioner's noted,

> "EPA's convoluted interpretation of §§111(a) and (d)(1) leads to a topsy-turvy outcome where 'reduction' can actually mean 'increase.'"

Id. at 28.

CAMR Environmental Group's reading of the unit-specific applicability of §111(d) was not without precedent. In its 2007 brief to the D.C. Cir in the CAMR litigation, the CAMR Environmental Petitioners argued that §111 prohibits trading.

> "This Court has previously rebuffed EPA's efforts to authorize pollution trading under §111. In *ASARCO, Inc., v. EPA*, 578 F.2d 319 (D.C. Cir. 1978), the Court rejected even a limited emission trading scheme, whereby existing plants could avoid §111 standards when making changes so long as offsetting emission reductions could be identified elsewhere at the same plant site."

Id. Moreover, in 1990, well after the 1978 ASARCO decision, Congress amended the CAA and included very specific trading provisions. However, Congress amended §111 to include the "source category" prohibition discussed above, but did not provide for any trading mechanism. *See also, Clean Air Council v. Sunoco, Inc.*, 2003 U.S. Dist. LEXIS 5346 (D. Del. April 2, 2003) ("The NSPS program does not regulate entire plant sites, such as petroleum refineries. Instead, it regulates individual pieces of equipment and process units ("affected facilities") within a plant.")

In addition to the purely legal prohibition on "outside-the-fence" approaches under §111(d) there are practical consequences of an expanded interpretation of §111(d).[15] Those advocating an expansive reading of §111(d) rely on the use of the word "system" in the statutory definition of emission standard. The word "system" is also used to define the CAA's Best Available Control Technology ("BACT") emission standard under the Prevention of Significant Deterioration ("PSD") permitting program. Despite 30 years of BACT implementation with the potential for additional cost-effective emission reductions, to date the EPA has never allowed the BACT requirement to be satisfied by a system-based outside-the-fence emission reduction.[16] Similarly, with an expanded interpretation of "system," new units under section 111(b) might also be allowed to satisfy their reduction requirements for both GHGs and traditional pollutants by reducing emissions within the "system." This would mean that an entirely new fossil fuel-fired EGU could be built and operating without state-of-the-art controls as long as an existing unit within the "system" makes reductions equivalent to those that would have been achieved at the new unit. A shutdown of a single older coal-fired unit might provide enough emission reductions within the "system" to allow one or more new coal-fired units to construct and operate without installing unit-specific, state-of-the-art controls. North Carolina does not believe this system-based approach is consistent with the purpose of either the PSD or the NSPS programs of the CAA.

CAA §111 prohibits "outside the fence" approaches to establishing emission guidelines

[15] *See* van der Vaart & Evans, *GHG Regulation, The Siren Song of Cap-and-Trade*, ABA Trends, May/June 2012, Vol. 43, No. 5.

[16] The term "best available control technology" means an emission limitation based on the maximum degree of reduction of each pollutant subject to regulation under this Act emitted from or which results from any major emitting facility, which the permitting authority, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such facility through application of production processes and available methods, **systems,** and techniques, including fuel cleaning, clean fuels, or treatment or innovative fuel combustion techniques for control of each such pollutant." 42 U.S.C §7465; CAA §165 (emphasis added).

Adequately Demonstrated and DOE Funding

On November 14, 2013 Acting Assistant Administrator Janet McCabe testified in front of the U.S. House of Representatives Committee on Energy and Commerce and confirmed that the EPA was using information from four government funded projects as the basis for meeting the CAA §111 requirement that Carbon Capture and Sequestration ("CCS") technologies could be adequately demonstrated. On November 15, the House Committee on Energy and Commerce sent a letter to the EPA Administrator 2013 stating:

> The Energy Policy Act of 2005 specifically prohibits EPA from considering technology used at a facility receiving assistance under the Department of Energy's CCPI, or at a facility that is receiving an advanced coal project tax credit, from being "adequately demonstrated" for the purpose of Section 111 of the CAA.

Letter to EPA Administrator McCarthy from U.S. House of Representatives Committee on Energy and Commerce, November 15, 2013.[17] Given that three of the four projects the EPA are relying on to support CCS as being "adequately demonstrated" received funding from the Energy Policy Act, the Committee requested the Agency withdraw the proposed rule. To date the EPA has not responded to this letter.[18]

Notwithstanding the legal question raised by the Committee's letter, none of the four projects cited by the EPA is actually operational. North Carolina is not aware of any fossil fuel-fired EGU that is currently operating with CCS and consequently, North Carolina does not believe that CCS is "adequately demonstrated" for the purposes of 111(d).[19] In addition to the fact that there is not a single fossil fuel-fired utility plant operating with CCS, EPA has acknowledged geologic sequestration is not available at some existing emission units. Even if a State is blessed with the requisite geologic formations, facilities would be required to build miles of pipelines simply to reach the formation. EPA's proposed approach would pit the reliability of North Carolina's, and possibly this nation's, electricity supply against the

[17] http://energycommerce.house.gov/sites/republicans.energycommerce.house.gov/files/letters/20131115EPA.pdf.
[18] On December 5, 2013 the Environmental Defense Fund provided an alternative interpretation of the Energy Policy Act of 2005 that would allow to EPA to rely on projects that receive federal funding provided at least one source that has adequately demonstrated use of CCS did not receive federal funding. *See* http://blogs.edf.org/climate411/files/2013/12/Response-to-House-Committee-Letter-on-EPAct.pdf. It is unclear whether the EPA agrees with this interpretation.
[19] It is interesting to note that in 1996 the EPA proposed a definition of the term "demonstrated in practice" to include any technology that meets the following criteria: (1) it has been installed and operating continually for at least 6 months on an emissions unit(s) which has been operating at least at 50 percent of design capacity during that period of time; and (2) its performance has been verified during that 6-month period with a performance test or performance data while operating under a load that coincides with either the operation of the emissions units served by the control technology at their PTE, or 90 percent of the control technology's design specifications. *See* 61 Fed. Reg. 38249 at 38275.

considerable uncertainty of environmental permitting of pipelines sufficient to reach geologic structures superimposed on the unproven technology of CCS. North Carolina believes sound science, rather than speculation, should be relied upon to develop §111(d) emission guidelines and plans.

Timing – A "Legal Trigger Approach"

Given the almost certain litigation associated with a §111(d) emission guideline, States such as North Carolina are at risk if they move forward with developing and enacting State §111(d) plans prior to the resolution of litigation. For the reasons described in more detail below, North Carolina recommends that EPA amend submittal deadlines contained in the Subpart B regulations - the §111(d) procedures regulations. EPA should require each State to submit a §111(d) plan within three years following the expiration of the legal litigation process – a "legal trigger approach."[20] Employing a legal trigger approach would ensure that States and sources do not expend their limited resources attempting to satisfy another EPA rule that ultimately is vacated or remanded.

A "legal trigger approach" will ensure States do not expend their limited resources attempting to satisfy another EPA rule that is ultimately vacated or remanded

The risk associated with taking action before the conclusion of the legal process is best demonstrated by the recent EPA rulemakings to address alleged interstate transport - the Clean Air Interstate Rule ("CAIR") and the Cross State Air Pollution Rule ("CSAPR"). The federalist structure of the CAA establishes a procedure whereby the EPA first promulgates a rule setting forth requirements designed to address some aspect of the CAA (*e.g.*, interstate air pollution). States are given the opportunity to adopt regulations, based in large part on the federal rulemaking, that satisfy the federal requirement (as interpreted by EPA's rule). The State submits their rule to the EPA for approval into the State Implementation Plan (SIP). The EPA review process takes anywhere from a few months to many years during which time the States are implementing and enforcing their State rule.[21] When the EPA ultimately approves the State rule into the SIP, the rule becomes federally enforceable through the CAA. The difficulty comes when the federal rule that required the State to take action is remanded and/or vacated. If, at the time of the vacatur, a State is enforcing a State rule that is based on an illegal EPA rulemaking, the State must begin the process of repealing the State rule. Meanwhile, the EPA must revise the original federal rule to correct the legal deficiency that caused the rule to be vacated. When EPA promulgates a revised rule the process starts all

[20] EPA can either amend the Subpart B rules or provide a different deadline in the applicable subpart. *See* 40 CFR 60.23(a) and 60.27(a).

[21] *See Tex. v. United States EPA*, 690 F.3d 670, 673-674 (5th Cir. 2012) ("Sixteen years tardy, the Environmental Protection Agency (EPA) disapproved a revision to Texas's plan for implementing the requirements of the Clean Air Act.").

over again. There is significant harm associated with the State and sources located in the State having expended resources to develop, implement, and comply with a rule that fails to comply with the Clean Air Act.

This is not an abstract academic problem.[22] In the case of CAIR and CSAPR, the EPA promulgated CAIR in 2005 and States responded by adopting rules requiring sources to install hundreds of millions of dollars of air pollution control. In 2008, in the midst of State efforts to implement CAIR, the D.C. Court initially vacated then remanded CAIR. States and sources were left in the lurch. In 2010 the EPA attempted to correct the legal deficiency of the CAIR rule by promulgating an entirely new rule – CSAPR. States were then sent chasing the requirement of this rule only to have the court vacate CSAPR because of EPA's illegal interpretation of the CAA again.

The EPA can avoid all of these wasted resources by simply including a timing provision in the §111(d) guideline that requires State plans to be submitted after the conclusion of any legal challenge to the rule. Once the judicial review process has run its course, States can safely move forward developing plans that satisfy CAA §111(d).[23]

[22] An informal study of all litigation involving EPA at the appellate level in 2012 found that the courts found against EPA in more than 50% of the cases.

[23] Some might argue that implementing a "legal trigger approach" will delay GHG reductions. To the extent that implementation of §111(d) does result in GHG reductions that would not otherwise occur, the additional time may allow the EPA to consider the recent divergence observed between the climate change models and actual measurements. See *A Sensitive Matter*, (20132, March 30) The Economist. Retrieved from http://www.economist.com/news/science-and-technology/21574461-climate-may-be-heating-up-less-response-greenhouse-gas-emissions.

Starting Point for §111(d)

A considerable number of articles and proposals surrounding CAA §111(d) have been circulated in the past year. Many of these publications make the mistake of assuming that §111(d), if it could be legally implemented, can be applied to achieve some predetermined reduction in GHGs and, in some cases, that the level can be changed over time. For example, several widespread white papers begin their analysis assuming §111(d) must achieve a 17 percent reduction in GHGs by 2020.[24] This predefined goal appears to have been sourced from the President's GHG reduction commitment made at the 2009 Copenhagen Climate Summit to reduce GHG by 17 percent by 2020 and reiterated in the 2013 Climate Action Plan.[25]

Of course, implementation of §111(d) can only yield the reductions in GHG emissions that the law allows. It cannot yield a predetermined level of reduction, and the level of reductions allowed may well be considerably less than the President's goal. The incongruence of the President's goal and a reduction consistent with §111(d) is simply due to there not being adequately demonstrated add-on control technologies to reduce GHG emissions from fossil fuel-fired EGUs. It is the universal recognition of this fact that has led those who seek to use §111(d) to meet the President's goal to create expansive interpretations of §111(d) including "outside-the-fence" approaches in place of the source specific requirement of the law. Again, the legal failing of this approach was forcefully and correctly opposed by NRDC and associated plaintiff States in the CAMR litigation as quoted above.

§111(d) is a scientific – not political - endeavor

North Carolina believes that §111(d) is a scientific – not political – endeavor. As such, §111(d) emission standards developed by States cannot be designed to achieve any preconceived emission reduction. Rather, §111(d) emission standards must be established after careful scientific application of engineering principles on a unit-by-unit basis.

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[24] *See* Kentucky Greenhouse Gas Policy Implications for Kentucky under Section 111(d) of the Clean Air Act ("Kentucky Kentucky's framework contains the following provisions:...Establish the following baseline CO2 reduction targets for 2020 (17 percent reduction)...) Retrieved from http://eec.ky.gov/Documents/GHG%20Policy%20Report%20with%20Gina%20McCarthy%20letter.pdf

[25] *See* http://www.nrdc.org/international/copenhagenaccords/; http://www.whitehouse.gov/sites/default/files/image/president27sclimateactionplan.pdf

Potential CO_2 Control Options for Existing Fossil fuel-fired Electric Generating Units

As was previously discussed, the proper implementation of CAA section §111(d) is an engineering function. One or more of the CO_2 emission reduction strategies discussed below, when applied to a particular unit, can form the basis for achievable §111(d) emission guidelines.

There are several options that existing fossil fuel-fired EGUs might consider for reducing CO_2 emissions besides the addition of CCS technologies that have not, to date, been adequately demonstrated on these units. These options are aimed at increasing the efficiency of fuel combustion in the boiler and ancillary equipment supporting the boiler, such as air and water handling systems, and steam handling systems and electric generating turbines, among others. There are several important issues to note:

- Most of these options have been "adequately demonstrated" but are highly unit-specific and therefore their "achievability" and whether they can form the basis of a §111(d) emission standard must be made on a case-by-case basis. This unit specific analysis is the reason Congress limited the federal EPA's role and emphasized the States' flexibility.

EGU efficiency is a highly unit-specific and therefore "achievability" and whether a particular technique can form the basis of a §111(d) emission standard must be made on a case-by-case basis

- While several of these options can be implemented on a single unit, their respective efficiency gains are not additive. Because of the complex nature of these various options it is recommended that work practices, as opposed to numerical limitation (input or output), should be the form of any §111(d) emission standard.
- EPA acknowledged in its 2010 report on Available an Emerging Technologies that determining unit-specific efficiency is dependent on a number of factors including, but not limited to, EGU thermodynamic cycle, coal rank and quality, plant size, pollution system, operating and maintenance practices, cooling system, geographic location, load generation characteristics, equipment manufacturer, and plant components.[26] It is not feasible for EPA to establish any

[26] Available and Emerging Technologies for Reducing Greenhouse Gas Emissions from Coal-Fired Electric Generating Units, EPA Sector Policies and Programs Division, OAQPS, October 2010. http://www.epa.gov/nsr/ghgdocs/electricgeneration.pdf

assumed numeric efficiency to any existing unit, much less a numerical standard for the approximately 1,200 coal-fired EGUs in the country. For this reason alone it is impractical for EPA to attempt design a "target rate" to all units with the goal of establishing tradable emission credits.

- As a result of the EPA's interpretation of the New Source Review (NSR) regulations, many of these proposed changes could be considered to be "physical change[s]" or a "change in the method of operation" and trigger NSR review. As a result, many of these projects might actually achieve less than, and in some cases an increase in GHG emissions. For example, adding heat recovery to an existing EGU is considered by EPA to be a physical change; if the NSR review is triggered it could result in the requirement to install add-on controls to satisfy BACT for a traditional pollutant like SO_2 such as Flue Gas Desulfurization (FGD). While BACT for CO_2 might require a combination of work practices that could reduce CO_2 by 0.3 and 1.5 percent, the addition of an FGD unit could increase CO_2 by 3-6 percent. The project, designed to reduce CO_2, would actually increase CO_2.

The EPA prepared a comprehensive review of existing options for improving energy efficiency of existing EGUs.[27] A summary of those options is provided below.

Flue Gas Heat Recovery - Air preheaters, which essentially consist of various types of heat exchangers, allow the boiler combustion air to be elevated from the ambient air temperature, thus creating efficiencies in that the combustion air is not using fuel for heating the air in the boiler fire box.

Combustion Instrumentation Upgrades - Improving instrumentation and controls, including continuous combustion and steam quality monitors, to provide feedback to boiler operators allowing them to optimize boiler performance in real time. The EPA estimates efficiency increases in the range of 0.15 to 0.84 percent.

Sootblower Optimization – Sootblowing is a necessary boiler cleaning procedure that is designed to maintain or improve the unit's heat rate. Soot blowers intermittently inject high velocity jets of steam or air to clean coal ash deposits from boiler tube surfaces in order to maintain adequate heat transfer. Proper control of the timing and intensity of individual soot blowers is important to maintain steam temperature and boiler efficiency. The identified technologies include intelligent or neural network soot

[27] *Id.*

blowing (i.e., soot blowing in response to real time conditions in the boiler). The EPA estimates efficiency increases in the 0.1 to 0.65 percent range.

Steam Turbine Design – Advances in steam turbine blade design and materials can increase efficiency and output. As noted above, the EPA considers changes in non-pollutant emitting steam turbines, particularly changes designed to increase efficiency and decrease fuel usage on a per MW basis, to be a physical changes or a change in the method of operation that can trigger NSR review. Assuming that any NSR requirements do not offset any possible gains in CO_2 reduction, EPA estimates that steam turbine design changes to existing units could yield between a 0.84 and 2.6 percent efficiency increase.

Cooling System Heat Loss Recovery – In a typical coal-fired EGU system relatively warm water exiting the steam condenser prior to recirculation to a cooling tower or discharge has energy value. That energy value can be partially recovered by replacing cooler tower heat transfer surfaces and tuning the cooling tower and condenser. The EPA estimates efficiency gains of between 0.2 to 1 percent.

Improvements to Existing Add-on Controls for Traditional Pollutants – Additional air pollution control devices designed to control traditional pollutants result in increased CO_2 emissions. All FGD processes require varying amounts of electric power to operate, which contributes to the overall parasitic load of the unit. The FGD parasitic load requirements are typically between one-two percent of the gross output of the facility. In addition, some FGD processes use carbon-containing reagents (e.g., carbonates) that form CO_2 as a byproduct of the chemical reactions of the reagent with SO_2. For a typical unit, the CO_2 that is chemically created in a scrubber adds an additional one percent to the overall GHG emissions, but it can be as high as three percent for facilities burning high sulfur coals.[28] It is unfortunate that when the EPA establishes an emission standard under NSPS it is prohibited from considering the impact of increased CO_2 emissions resulting from installation of control systems. Nevertheless, there are methods that can reduce parasitic load on EGUs by improving environmental control system design and operation. Specific improvements can be made to wet flue gas desulfurization units (FGDs) and electrostatic precipitators (ESPs) to reduce the parasitic load. FGD systems can be made more efficient by reducing pressure drop across them including making air flow more uniform as well as providing an alternative to the high pressure drop associated with venturi throats common to many wet scrubber systems. Eliminating or reducing reagent flow during periods of low SO_2 emissions can save electricity.

[28] Available and Emerging Technologies for Reducing Greenhouse Gas Emissions from Coal-Fired Electric Generating Units, EPA Sector Policies and Programs Division, OAQPS, October 2010. http://www.epa.gov/nsr/ghgdocs/electricgeneration.pdf

Cumulatively these FGD improvements can add up to overall efficiency increases of up to 0.5 percent at a cost of $3M for a 500 Megawatt plant.[29] These values mean a cost of approximately $0.6 per kW. These improvements can be variably site specific depending on the existing FGD system design.

ESPs are another opportunity to reduce parasitic load on the EGU. Optimizing the ESP for plant and flue gas conditions can reduce sparking, which is a source of unnecessary high power drain in those systems. Additionally, using state of the art energy management systems to control ESP operations can reduce energy consumption of these control devices. Some of these changes, however, may require changes to overall plant control systems.

[29] *Id.* p. 3-9