

C O M M E N T

# Regulating Greenhouse Gas Emissions From Existing Sources: Section 111(d) and State Equivalency

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On December 23, 2010, the U.S. Environmental Protection Agency (EPA) entered into a settlement agreement requiring new source performance standards (NSPS) covering greenhouse gas (GHG) emissions from fossil fuel-fired electricity-generating units and petroleum refineries.<sup>1</sup> Together, these two categories of sources account for close to 40% of total U.S. GHG emissions.<sup>2</sup> Typically, an NSPS rulemaking process applies only to new sources or existing sources undergoing major modifications. In situations where a pollutant covered by an NSPS is not also regulated as a criteria pollutant under the national ambient air quality standards (NAAQS) program or as a hazardous air pollutant (HAP), however, the Clean Air Act (CAA)<sup>3</sup> also requires states to develop performance standards for existing sources, subject to EPA's guidance and approval. Because GHGs are not regulated as criteria pollutants or HAPs, the existing source performance standard requirements under §111(d) of the Act will apply to the current GHG NSPS rulemaking.

Regulating GHGs under §111(d) is significant, for a number of reasons. First, the language of §111(d) is broad, suggesting that EPA and states have discretion regarding its implementation. Second, the majority of NSPS regulations apply to pollutants also covered under §§108-110 (NAAQS) or §112 (HAPs) of the Act. As a result, there is little precedent to guide the Agency as it develops guid-

ance for the states. Third, unlike NSPSs, §111(d) does not require a uniform national standard, potentially allowing states to develop tailored plans for the existing sources within their borders. Fourth, there are significantly more existing power plants and refineries than there are new or modified sources within these categories. For example, in 2009, there were 594 existing coal-fired power plants in the United States,<sup>4</sup> but only 11 new coal-fired power plants became operational in 2010, and that reflected a 25-year high.<sup>5</sup>

Numerous states have one or more programs in place to limit GHG emissions, including renewable portfolio standards, energy-efficiency programs, and GHG markets. Some stakeholders, including state policymakers, electric utilities, and environmental groups, have suggested that the rules governing the existing source performance standards should allow states the flexibility to utilize existing GHG programs for compliance with the requirements.<sup>6</sup> If these programs do indeed achieve equivalent reductions in emissions, allowing states to submit existing programs as their §111(d) plan would avoid forcing covered entities to comply with multiple regulatory regimes with little to no additional environmental benefits. Allowing states to demonstrate the equivalency of existing programs could also help the Agency meet its stated goal of implementing standards that address the environmental harm in a cost-effective manner.<sup>7</sup> The impacts of climate change will

1. Boiler GHG Settlement, Dec. 23, 2010, available at <http://www.epa.gov/airquality/pdfs/boilerghgsettlement.pdf>. On the same day, EPA also entered into a settlement agreement to create NSPS for GHG emissions from petroleum refineries. See Refinery GHG Settlement, Dec. 23, 2101, available at <http://www.epa.gov/airquality/pdfs/refineryghgsettlement.pdf>. Under the original settlement agreements, EPA was to propose performance standards and emissions guidelines for power plants by July 26, 2011, and for refineries by December 15, 2011, with final standards and implementation guidelines issued by May 26, 2012, and November 15, 2012, respectively. The Agency did not meet the deadlines for the proposed rules and, as of the submission date for this Article, has not announced an updated time line.

2. U.S. EPA, *Addressing Greenhouse Gas Emissions*, <http://www.epa.gov/airquality/ghgsettlement.html>.

3. 42 U.S.C. §§7401-7671q, ELR STAT. CAA §§101-618.

4. U.S. Energy Info. Admin., *Count of Electric Power Industry Power Plants, by Sector, by Predominant Energy Source*, tbl. 5.1, EIA.gov, <http://www.eia.doe.gov/cneaf/electricity/epa/epat5p1.html> (last visited Jan. 26, 2012).

5. U.S. DEP'T OF ENERGY NAT'L ENERGY TECH. LAB., *TRACKING NEW COAL-FIRED POWER PLANTS* (2011), available at <http://www.netl.doe.gov/coal/refshelf/ncp.pdf>.

6. U.S. EPA, *LISTENING SESSIONS ON GREENHOUSE GAS STANDARDS FOR FOSSIL FUEL-FIRED POWER PLANTS AND PETROLEUM REFINERIES*, available at <http://www.epa.gov/airquality/listen.html>.

7. Press Release, EPA to Set Modest Pace for Greenhouse Gas Standards/ Agency Stresses Flexibility and Public Input in Developing Cost-Effective and Protective GHG Standards for Largest Emitters (Dec. 23, 2010),

differ across the country, as will the costs and opportunities for GHG emission reductions, justifying the possibility that different policy approaches could constitute the “best” system in different states. By allowing states to demonstrate that existing programs are equivalent to EPA’s rate-based standard, EPA could free states to act as laboratories for innovation, exploring different reduction strategies and potentially identifying more cost-effective strategies.<sup>8</sup> On December 9, 2011, the Nicholas Institute for Environmental Policy Solutions convened a broad range of stakeholders representing numerous viewpoints to explore issues surrounding §111(d), including options for states to demonstrate that existing GHG policies are equivalent to the §111(d) requirements. This Article builds upon the discussion during the December 9 workshop and considers some of the major challenges associated with categories of potentially “equivalent” state programs.

Although setting the standard and deciding what level of detail to include in the guidance to the states is an important part of the §111(d) rulemaking, the goal of this Article is not to predict how the Agency *will* act or to offer an opinion as to how the Agency *should* act. Rather, the goal is to examine the options available for states to demonstrate that existing GHG policies are equivalent to the §111(d) requirements, and the challenges that may face the states and the Agency regarding equivalency.

## I. Section 111(d) Overview

Section 111 of the CAA regulates sources of pollutants by setting standards of performance that reflect the emission reductions achievable through the application of “adequately demonstrated” cost-effective technology.<sup>9</sup> It is not necessary that a covered source adopt a specific technology, as long as it achieves the required emission limitation. Section 111 performance standards apply to categories of sources, e.g., coal-fired boilers or refineries, that the Administrator determines emit a regulated pollutant(s) at a level that will “cause, or contribute significantly to, air pollution which may reasonably be anticipated to endanger public health or welfare.”<sup>10</sup> Over 75 categories of sources currently meet these criteria.<sup>11</sup>

available at <http://yosemite.epa.gov/opa/admpress.nsf/d0cf6618525a9efb85257359003fb69d/d2f038e9daed78de8525780200568bec!OpenDocument>.

8. *New State Ice Co. v. Liebmann*, 285 U.S. 262, 311 (1932). (In his dissenting opinion, Justice Louis Brandeis said: “It is one of the happy incidents of the federal system that a single courageous state may, if its citizens choose, serve as a laboratory; and try novel social and economic experiments without risk to the rest of the country.”)
9. 42 U.S.C. §7411(a)(1).
10. 42 U.S.C. §7411(b)(1)(A).
11. U.S. EPA, *New Source Performance Standards and State Improvement Plans*, <http://www.epa.gov/compliance/monitoring/programs/caa/newsource.html> (citing 40 C.F.R. §60).

EPA typically promulgates standards of performance for new facilities and existing facilities that undergo major modifications within a source category. These NSPSs are governed by §111(b) of the Act. In limited instances, §111(d) also requires *existing* facilities within a category to comply with performance standards. Section 111(d) states that standards of performance must be established for:

any existing sources 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 7408(a) of this title or emitted from a source category which is regulated under section 7412 of this title but (ii) to which a standard of performance would apply if such existing source were a new source.<sup>12</sup>

In other words, performance standards are required for existing sources if two criteria are met: (1) a category of sources is determined to require NSPS; and (2) the regulated pollutant is neither a HAP nor a criteria pollutant regulated under §108 of the Act.

Section 111(d) grants a more significant role to the states in the development and implementation of standards of performance than does §111(b). Under §111(d), EPA establishes “emissions guidelines” for states to use in drafting a state plan that establishes “standards of performance” for existing sources, subject to Agency approval.<sup>13</sup> This cooperative federal-state process is “similar to that provided by section 110” of the Act, which outlines the NAAQS program.<sup>14</sup>

### A. Standards of Performance

Section 111 of the CAA defines standard of performance as

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 non-air quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated.<sup>15</sup>

The statute does not define the phrase “best system of emission reduction,” but the Agency typically sets NSPSs as a “numerical emissions limit, expressed as a performance level (i.e., a rate-based standard).”<sup>16</sup> The Agency has previously determined that averaging emissions across

12. 42 U.S.C. §7411(d).

13. 42 U.S.C. §7411(d)(1).

14. *Id.*

15. 42 U.S.C. §7411(a)(1) (emphasis added).

16. U.S. EPA, *BACKGROUND ON ESTABLISHING NEW SOURCE PERFORMANCE STANDARDS (NSPS) UNDER THE CLEAN AIR ACT*, available at <http://www.epa.gov/airquality/pdfs/111background.pdf>.

facilities or an emission trading system can also qualify as a “best system.”<sup>17</sup>

For new or modified sources (NSPS), the Administrator identifies the potential emission limits achievable from existing emission-reduction systems and assesses each limit based on costs and benefits to determine the best system of emission reduction.<sup>18</sup> The performance standard is then set to reflect the rate of emissions that would occur after the application of that technology. Once an NSPS is set for a category of sources, every new source or existing source undergoing major modifications that falls within that category must meet the performance standard.<sup>19</sup>

The Act requires a different process for developing existing source standards. Section 111(d) calls for the Administrator to specify a procedure for states to submit a plan to the Agency that establishes standards of performance for existing sources. EPA’s implementing regulations governing §111(d) rulemakings have interpreted the procedure to be a three-step process. First, EPA identifies potential emission limits achievable from existing emission-reduction systems for a category of sources. Next, EPA assesses each limit based on costs and benefits to determine “an *emission guideline* that reflects the best system of emission reduction.”<sup>20</sup> The Agency publishes that emission guideline as part of a broader guidance document. Finally, states submit to EPA their state plans incorporating the emission guideline as the performance standard and detail how the state will implement and enforce the standard.<sup>21</sup>

## B. State Plans

According to the regulations governing §111(d) rulemakings, EPA issues an emission guideline that sets a floor for the state standard.<sup>22</sup> Thus, it is EPA and not the states making the initial determination about the “degree of emissions limitation” that is achievable, though this is tempered by the fact that a state retains the authority to apply a more stringent standard if it wishes, or a less-stringent standard for specific facilities if it can justify the deviation.<sup>23</sup> Important for purposes of seeking equivalency, states have the discretion to determine the best way to achieve the emission limitation.

The Act provides that states shall submit plans following a procedure “similar to that provided by §110.”<sup>24</sup> Section 110 outlines the implementation process for the Act’s NAAQS, which regulate concentration of pollutants in the air, rather than the sources of pollution. Under §110,

EPA sets the standard (concentration of a given pollutant), and the states determine how to meet the standard. The approach in §110 utilizes a cooperative federalist model whereby EPA uses its expertise to determine *what* the NAAQS should be, and the states are delegated the authority to determine *how* the NAAQS will be achieved. States are charged with submitting a state implementation plan (SIP) to EPA, which is then approved or disapproved based on *whether* the plan will achieve the standard, and not the *means* of achieving the standard.<sup>25</sup> Section 110 is often cited for the flexible compliance mechanisms and experimentation it allows states.<sup>26</sup> For example, the section explicitly allows for the use of “economic incentives such as fees, marketable permits, and auctions of emissions rights.”<sup>27</sup> The opportunity to use these tools allows states to act as laboratories of innovation and to learn from one another’s successes and failures.

## C. Best System of Emission Reduction

Of the performance standards that have been established under §111(d) for existing sources, all but two are expressed as a rate-based standard that is met on a facility-by-facility basis. Two significant exceptions include the emission guidelines for Large Municipal Waste Combustors (LMWCs) and the Clean Air Mercury Rule (CAMR), which, though it was eventually struck down on grounds unrelated to the §111(d) interpretation, contained an emission guideline for mercury emitted by existing power plants.<sup>28</sup> EPA’s emission guidelines in these two cases include a rate-based standard, but also explicitly give states the option to adopt a plan allowing facilities to trade emissions.

Considering the cumulative emissions from a regulated category of sources when determining whether a state’s plan complies with an EPA §111(d) emission guideline would allow states the flexibility to select alternative means of compliance as the best system of emission reduction, provided the program does indeed achieve emission reductions equivalent to a facility-by-facility approach. Flexibility under §111(d), however, is largely untested in court. Petitioners in the CAMR litigation argued that emissions reductions sufficient to meet the emission guideline must occur continuously at every source in order to meet the

17. See Standards of Performance for New and Existing Stationary Sources: Electric Utility Steam Generating Units (Clean Air Mercury Rule), 70 Fed. Reg. 28606 (July 18, 2005); Emission Guidelines for Municipal Waste Combustor Metals, Acid Gases, Organics, and Nitrogen Oxides, 40 C.F.R. §60.33b(d).

18. 40 C.F.R. §60.22.

19. 42 U.S.C. §741(a)(1).

20. 40 C.F.R. §60.22(b)(5).

21. Regulating Greenhouse Gas Emissions Under the Clean Air Act (Advanced Notice of Proposed Rulemaking), 73 Fed. Reg. 44486 (July 30, 2008).

22. 40 C.F.R. §60.24(c)(3).

23. 40 C.F.R. §60.24(f).

24. 42 U.S.C. §7411(d).

25. *Union Electric Co. v. EPA*, 427 U.S. 246, 6 ELR 20570 (1976).

26. See, e.g., FRANZ LITZ ET AL., WORLD RESOURCES INSTITUTE, WHAT’S AHEAD FOR POWER PLANTS AND INDUSTRY? USING THE CLEAN AIR ACT TO REDUCE GHGs, BUILDING ON REGIONAL PROGRAMS (Feb. 2011) (“Title IV of the Clean Air Act and section 110(a)(2)(A) contain express provisions for flexible market-based mechanisms[.]”).

27. 42 U.S.C. §7410(a)(2)(A).

28. See Standards of Performance for New and Existing Stationary Sources: Electric Utility Steam Generating Units (Clean Air Mercury Rule), 70 Fed. Reg. 28606 (July 18, 2005); Emission Guidelines for Municipal Waste Combustor Metals, Acid Gases, Organics, and Nitrogen Oxides, 40 C.F.R. §60.33b(d).

statutory definition of standard of performance.<sup>29</sup> As stated above, the court did not reach this question.<sup>30</sup>

The forthcoming §111(d) GHG standards for power plants have renewed interest in this broader interpretation of “standard of performance” and “best system.” If EPA allows states to focus on the cumulative emissions reductions required by the emission guideline, then states can put forth existing GHG emission-reduction programs that achieve equivalent reductions as the best system of emission reduction.

## II. State Programs and Equivalence

There are numerous GHG emission-reduction programs currently in place at the state level. Some states have expressed interest in a flexible §111(d) program that allows existing state programs to qualify as the §111(d) program.<sup>31</sup>

EPA could define the parameters of acceptable existing programs in the rulemaking, including the acceptable time frame and design of such programs. The Agency could also choose to remain silent on the issue and make a determination on a case-by-case basis as states submit implementation plans.

### A. Existing State Programs

State programs addressing GHG emissions fall into five general categories: (1) renewable portfolio standards (RPSs) or end-use efficiency programs; (2) averaging the rate-based standard across the facility, source category, state, or region; (3) planned retirement of coal-fired power plants; (4) utility-only GHG markets; and (5) GHG markets that include source categories beyond the power sector. These options are not mutually exclusive and could operate together. For example, some states participate in a utility-only GHG market and also have an RPS. The following subsections describe each approach, including the challenges presented in the §111(d) context.

#### I. RPS/End-Use Energy Efficiency

Twenty-nine states and the District of Columbia currently have RPSs or energy-efficiency programs, and an additional eight states have voluntary goals. State programs differ widely on a number of variables that will influence the amount of GHG emission reductions that result. Similar to planned facility retirements and utility-only markets (described below), RPSs and efficiency programs may

result in an overall decrease in aggregate emissions from power plants, but they will not affect the emission *rate* for a facility. A typical rate-based standard applies whenever the plant is operating and does not take into account overall emissions.

With EPA’s current NSPS/§111(d) rulemaking applying to fossil fuel-fired power plants, both renewable electricity generation and energy-efficiency programs fall outside of the source categories. If reductions must occur within the regulated source category, it is not clear whether these activities can qualify as equivalent programs under §111(d). Demand-side energy-efficiency programs and renewable energy generation may fit within the §111 framework, however, because both reduce the utilization of power plants, which is a traditional compliance mechanism under §111. According to this reasoning, emission reductions *are* occurring within the source category, because of changes in generation at the power plant.

Including RPSs or end-use efficiency programs in state §111(d) plans would first require interpreting the phrase “best system of emission reduction” to permit covered entities to reduce their emissions by relying on actions outside the source categories. Next, the states would need to convert the baseline rate-based standard to a relevant metric, e.g., tons of GHGs, then compare the metric to the projected GHG reductions resulting from the RPS/end-use program using reliable modeling methods. Projecting emissions reductions is complicated by the fact that it is difficult to know whether an efficiency program is leading to reductions in energy demand or if, instead, demand has slowed due to economic or other factors. Likewise, it is difficult to know whether renewable generation is actually replacing existing generation, or if it is instead meeting new demand, in which case it would not be reducing emissions from existing facilities. Assuming this difficulty can be overcome and emission reductions can be accurately predicted, a “mass-based” standard could be established. The potential to use such a metric will be discussed in further detail below.

#### 2. Averaging the Emission-Rate Standard Across Sources

States applying the rate-based standard provided by EPA may wish to utilize averaging. Averaging would allow each source to comply if the average rate of emission across all sources were equivalent to the rate that would be achieved by a source-by-source requirement. Such a flexible approach may lower the cost of the program by creating improvements beyond the standard at sources where abatements are less expensive to make up for underperformance at other sources, thereby lowering the overall cost of emission reductions in the system. Averaging could also reduce the administrative burden on affected sources, and potentially state and EPA regulators, depending on the scale. For example, allowing companies to average across all of their individual units within a state (as opposed to compliance

29. Final Reply Brief of Environmental Petitioners 16, *New Jersey v. EPA*, 517 F.3d 574, 38 ELR 20046 (D.C. Cir. 2008) (No. 05-1097).

30. For a discussion of EPA’s response, see JONAS MONAST ET AL., DUKE UNIVERSITY NICHOLAS INSTITUTE FOR ENVIRONMENTAL POLICY SOLUTIONS, *AVOIDING THE GLORIOUS MESS: A SENSIBLE APPROACH TO CLIMATE CHANGE AND THE CLEAN AIR ACT* (Oct. 2010) (citing Final Brief of Respondent U.S. EPA in *New Jersey v. EPA*, 517 F.3d 574, 38 ELR 20046 (D.C. Cir. 2008)).

31. U.S. EPA, Listening Sessions on Greenhouse Gas Standards for Fossil Fuel-Fired Power Plants and Petroleum Refineries, *available at* <http://www.epa.gov/airquality/listen.html> (last visited Jan. 26, 2012).

on a unit-by-unit scale) could permit more streamlined reporting requirements.

EPA has allowed an averaging approach in meeting §111(d) standards in the past. States may allow limited averaging under EPA's §111(d) guidelines for nitrogen oxide (NO<sub>x</sub>) emissions from large municipal waste combustors.<sup>32</sup> The guidelines set a rate-based standard, limiting the NO<sub>x</sub> concentration level that may be emitted from municipal waste combustors, but allow for averaging of emissions from all designated facilities at a single plant.<sup>33</sup>

One issue that arises with an averaging approach is determining how broadly to apply the “bubble” under which averaging occurs—facilitywide, companywide, statewide, or across a region. Also, assuming EPA's NSPS rule covers more than one source category, i.e., coal-fired boilers and natural gas turbines, a state could conceivably propose averaging across all sources covered by the rule.

### 3. Planned Retirement of Coal-Fired Power Plants

In 2010, Colorado enacted the Clean Air, Clean Jobs Act. This law requires significant reductions in nitrous oxide (N<sub>2</sub>O) emissions “to meet reasonably foreseeable federal ‘Clean Air Act’ requirements to reduce emissions from coal-fired power plants.”<sup>34</sup> The law required the state's major electric utility to submit a plan to the Colorado Public Utility Commission outlining how it will retire or retrofit 900 megawatts (MW) of coal-fired generation and replace it with generation that achieves emission rates equivalent to or less than a combined-cycle natural gas-generating unit.<sup>35</sup> Although the remaining facilities may not meet EPA's rate based standard, Colorado could argue that it has achieved a greater level of emissions reductions through retirements than would have been achieved by applying the performance standard to all facilities.

Depending on the state plan, retirements may not present an issue under §111(d). If the state implements a source-specific emission-rate standard, the standard would apply to any new or existing plants making up for the lost generation. Addressing plant retirements with a plan that would be judged by the total mass of emissions can be more challenging. It may be necessary to account for retirements if EPA determines that the budgets must reflect the equivalent emission reductions as a rate-based standard over the lifetime of the program. A state could accomplish this either by periodically updating the emission budget or by including remaining useful life projections into the emission budget at the outset.

### 4. Utility-Only GHG Market

The Regional Greenhouse Gas Initiative (RGGI) is a utility-only market system designed to reduce cumulative carbon dioxide (CO<sub>2</sub>) emissions from power plants in participating states by 2018. Started in 2009, the program creates a regionwide cap on emissions from power plants, and allows covered entities to buy and sell allowances to comply with the emission cap. Nine states are currently participating in the RGGI.

The RGGI states developed a memorandum of understanding and a model rule to create the market system. Each state then implemented its own laws to enact the RGGI, and each state contracts with a third party—RGGI, Inc.—to conduct and monitor allowance auctions, and to manage the allowance tracking system.

Market-based systems present a number of issues in the §111(d) context:

- Assuming EPA issues a rate-based emission standard applicable to individual plants, the states would have to convert the standard to a relevant metric for assessing the state program's equivalence to the federal standard.
- Section 111(d), like the NSPS program, applies to specific source categories (in this instance, fossil fuel-fired power plants).<sup>36</sup> Under the RGGI, the emission reductions may occur through end-use energy-efficiency programs or through electricity generation from renewable resources—both outside of the defined §111(d) categories. While this may reduce plant operation (and therefore emissions), a typical rate-based standard applies whenever the plant is operating and does not take into account overall emissions.
- Multistate programs, such as the RGGI, where overall emissions in one state may increase even though cumulative, regionwide emissions may decline, may present monitoring and enforcement challenges for EPA.
- If the state aggregates the rate-based standard to create a statewide emission metric, it would likely be necessary to review the program periodically to ensure that the state plan remains at least as stringent as a baseline rate-based standard.
- Plant retirements under a traditional, plant-specific, rate-based emission standard do not affect other

32. See Emission Guidelines for Municipal Waste Combustor Metals, Acid Gases, Organics, and Nitrogen Oxides, 40 C.F.R. §60.33b(d).

33. 40 C.F.R. §60.32b (defining “designated facility” as a “municipal waste combustor unit with a combustion capacity greater than 250 tons per day of municipal solid waste for which construction was commenced on or before September 20, 1994”).

34. Clean Air, Clean Jobs Act, COLO. REV. STAT. ANN. §40-3.2-201-210 (West 2010).

35. *Id.*

36. The settlement agreement under which EPA is operating only requires it to issue standards of performance for “electricity steam generating units [EGUs] subject to 40 C.F.R. part 60, Subpart DA”—that is, steam EGUs with a heat input rate over 73 MW. The settlement has a narrow scope because the lawsuit from which it arose had a narrow scope: the plaintiffs in the case sued on a 2006 rule that only included standards for Subpart DA. Although the settlement agreement only compels standards of performance for steam EGUs, it does not prevent EPA from issuing standards for other source categories. See Boiler GHG Settlement, Dec. 21, 2010, available at <http://www.epa.gov/airquality/pdfs/boilerghgsettlement.pdf>.

facilities. In contrast, under a market system, a plant retirement may result in more allowances available to other facilities, thereby reducing compliance costs for the remaining covered entities. Depending on the type of facility retiring, there may be a significant reduction in GHG emissions in the short term. The prospect of excess allowances in the market, along with the expectation of lower allowance prices, may provide an incentive to retire older facilities. On the other hand, if the excess allowances were allowed to remain in circulation for the lifetime of the program, it may provide a disincentive for the remaining facilities to seek additional reductions.

- The RGGI program allows companies to purchase offsets (emission reductions occurring outside the covered sector) in limited circumstances. It is not clear that offsets are permissible under §111(d), as they do not reduce emissions from any regulated source category.<sup>37</sup>

## 5. Market System That Extends Beyond the Power Sector (e.g., California)

California is in the process of implementing a market system for GHGs that will cover multiple sectors of the economy, including the electric power sector. In contrast to the RGGI, which only covers the electric utility sector, the California system will cover utilities as well as major industrial facilities and refineries. Like the RGGI, demonstrating equivalency with the new GHG existing source performance standard would first require converting a rate-based emission standard into a mass-based emission metric.

In addition to the challenges regarding §111(d) and the RGGI described above, the California system presents additional issues to consider:

- Section 111 of the CAA (NSPS and existing source performance standards) applies to specific categories of sources. California's program may lead to emission reductions outside the NSPS/§111(d) category.
- In addition to domestic offsets, the California system will also allow international offsets. As stated above, it is not clear that any type of offset credit is permissible under the structure of §111.

## B. Demonstrating Equivalence and Ensuring Accountability

As discussed above, past EPA actions suggest that the “best system” need not be a static rate-based emission standard applied to individual units.<sup>38</sup> This interpretation leaves room for the states to demonstrate that their suite of relevant programs is acceptable under the statute if it is projected to achieve equal or greater aggregate emission reductions than required by EPA guidelines. States will benefit from this flexibility, even if the performance standard put forth by EPA is written as an emission rate that applies to individual facilities or units. EPA's §111(d)/§129 emission guidelines for municipal waste combustors, for example, allow for state plans to include emission limits in “alternative formats” to those put forth by the Agency, if the limits are “at least as protective” as those specified in the guidelines.<sup>39</sup>

Assuming that the Agency identifies a “rate-based” standard for new sources, i.e., an emissions/British thermal unit standard for all fossil fuel boilers, it would then apply the same rate-based approach to the existing fleet of sources through its guidelines, although it will likely adjust the standard to reflect the relative cost of abatement due to the age, size, and fuel type of existing sources.<sup>40</sup> A state could then produce a plan that simply applies the adjusted rate-based standards for existing sources to the state's fleet. Some states, however, have expressed a desire to pursue other GHG reduction strategies instead of a rate-based approach, believing that such policies will lead to a more efficient path of emission reductions, and hence constitute a better “system of emission reduction” under the statute.<sup>41</sup> Thus, to ensure that the experiments conducted in the state laboratories perform in a manner that is equivalent to EPA-determined rate-based standard, the Agency could provide a mechanism for converting the standard into a metric appropriate for evaluation.

A heterogeneous approach amongst the states is consistent with the U.S. Supreme Court's recent evaluation of the §111(d) program, which observed: “The Act envisions extensive cooperation between federal and state authorities, generally permitting each state to take the first cut at determining how best to achieve EPA emission standards within its domain.”<sup>42</sup>

37. See, e.g., Gregory Wannier et al., *Prevailing Academic View on Compliance Flexibility Under §111 of the CAA*, Resources for the Future Discussion Paper 11-29 (July 2011), available at <http://www.rff.org/Publications/Pages/PublicationDetails.aspx?PublicationID=21603>; Nathan Richardson, *Playing Without Aces: Offsets and the Limits of Flexibility Under Clean Air Act Climate Policy*, Resources for the Future Discussion Paper 11-49 (Dec. 2011), available at <http://www.rff.org/RFF/Documents/RFF-DP-11-49.pdf>.

38. See Standards of Performance for New and Existing Stationary Sources: Electric Utility Steam Generating Units (Clean Air Mercury Rule), 70 Fed. Reg. 28606 (July 18, 2005); Emission Guidelines for Municipal Waste Combustor Metals, Acid Gases, Organics, and Nitrogen Oxides, 40 C.F.R. §60.33b(d).

39. Municipal Waste Combustion: Summary of the Requirements for Section 111(d)/129 State Plans for Implementing the Municipal Waste Combustor Emission Guidelines (EPA-456R-96-003).

40. Because EPA has not indicated how it will define the performance standard for existing sources, this Article assumes, without taking a position, that the Agency's §111(d) guidance will include a rate-based standard.

41. U.S. EPA, Listening Sessions on Greenhouse Gas Standards for Fossil Fuel-Fired Power Plants and Petroleum Refineries, available at <http://www.epa.gov/airquality/listen.html>.

42. *Am. Elec. Power Co. v. Connecticut*, 131 S. Ct. 2539, 41 ELR 20210 (2011).

## I. Converting Rate-Based Standards to Metrics for State Programs

The first step in assessing a state program's equivalence to the requirements of §111(d) is developing criteria for the comparison. Such an assessment begins with the "emission guidelines" produced by EPA, creating binding requirements that states must address when developing plans to regulate existing sources of GHGs.<sup>43</sup> The guidelines must reflect the emission reduction available through the application of the best demonstrated technology (as determined by Agency in its §111(b) rulemaking for new sources), but the statute and regulations also recognize that existing sources may not be able to achieve the same level of emission control at reasonable cost as new sources.<sup>44</sup>

Programs to lower demand, programs to increase electricity generation from non- or low-emitting sources, programs to negotiate shutdowns of older plants, and state and regional GHG emission trading programs all work to reduce the cumulative emissions created by sources within the state, rather than the emission rate of individual sources. None of these programs guarantee actual rate improvements, but all are designed to ensure improvements in cumulative emissions at a lower overall cost than a rate-based program.

Thus, if the Agency decides to allow such cumulative emission-targeted programs to go forward, it would need to create a metric that measures the program based on the mass of GHGs emitted, rather than the emission rate. EPA has recent experience with this approach. To prevent allocation under the Cross-State Air Pollution Rule (CSAPR) from exceeding the terms of utility consent decrees that included maximum emission rates, the Agency converted the unit-level emission rates to a mass-based value.<sup>45</sup> The formula for a mass-based metric should sum the expected emissions from the affected sources within the state if they were to emit GHGs at the target rates. This calculation should consider the capacity factor for each plant in the state, as the percentage of time each plant is operating, and thereby emitting GHGs, dictates the expectations regarding the fleet's average rate or its cumulative emissions.

There are two general options for determining baseline operation for each facility: historical operation; and emission projection modeling. The states can look back to a five-year period preceding the rulemaking process to determine the historical baseline. The Agency has used this approach in other rules, such as the CSAPR.<sup>46</sup> In this instance, the state would evaluate the operating time for each plant

in its borders for the years 2006 to 2010. To control for abnormalities in the five-year period due to economic or natural fluctuations, the state would not use the data from each plant's highest year and lowest year of utilization. The average of the remaining three years will then become the expected operating time for that plant for the determination of an expected average rate or expected cumulative state emissions.

Under the emission-projection modeling approach, capacity-factor determinations would need to include the projected impacts of new and upcoming air quality regulations, such as the CSAPR, the Toxics Rule, and potentially coal ash and cooling tower regulations. These rules may have a significant impact on fossil fuel power generation independently of GHG regulation, and basing the mass-based metric upon continued operation of these facilities at current levels could project higher GHG emissions than would occur under rate-based standards.

Emission-projection modeling also accounts for future energy demand. Energy demand is inherently uncertain, however, and is affected by variables over which policymakers may have little or no control, including the strength of the economy, the price of natural resources, and the weather. Although emission-projection modeling attempts to account for these uncertainties when forecasting future emissions levels, with this approach, states will rely on emission levels that are based, at least in part, on unknowable future scenarios. Another concern is that emission-projection modeling proved to be problematic with the CSAPR. In that case, modeling updates, including lower natural gas prices and reduced demand, resulted in significantly lower NO<sub>x</sub> emission levels in the final rule than were anticipated in the proposed rule.<sup>47</sup>

## 2. Demonstrating Equivalency With the Rate-Based Standard

Once a state has determined an emission standard, it must then demonstrate how its programs would achieve the mass-based reductions deemed equivalent to the rate-based standard. The statute specifies that states, in developing implementation plans, follow a procedure similar to that used to establish SIPs for NAAQS under §110 of the Act.<sup>48</sup> The regulations pertaining to §110 allow for equivalency if "the resulting emission limit is quantifiable, enforceable, and based upon replicable procedures, is equivalent to the SIP limit"<sup>49</sup>

EPA's regulations governing the NAAQS SIP process require states to demonstrate the adequacy of their plans using modeling.<sup>50</sup> Using the emission-projection modeling approach described above, the state would determine the

43. Regulating Greenhouse Gas Emissions Under the Clean Air Act (Advanced Notice of Proposed Rulemaking). 73 Fed. Reg. 44487.

44. 40 C.F.R. §60.24.

45. U.S. EPA, Assessment of Impact of Consent Decree Annual Tonnage Limits on CSAPR Allocations, available at <http://www.epa.gov/airtransport/pdfs/ConsentDecreeTSD.pdf>.

46. 76 Fed. Reg. 48208 (Aug. 8, 2011). On December 30, 2011, the U.S. Court of Appeals for the District of Columbia (D.C.) Circuit granted a stay of the CSAPR pending completion of the court's review of the rule's validity. Though the Court did not explain its decision, petitioners' arguments against the legal validity of the CSAPR includes a claim that EPA impermissibly

bypassed state authorities by imposing federal implementation plans and challenges the accuracy of the state emission budgets.

47. U.S. EPA, Cross-State Air Pollution Rule: Frequently Asked Questions, <http://www.epa.gov/airtransport/faqs.html> (last visited Jan. 26, 2012).

48. 42 U.S.C. §7411(d)(1).

49. 57 Fed. Reg. 13567-68.

50. 40 C.F.R. §51, app. W.

quantity of emissions under the policy scenario depicted in its state plan, and would compare that to the emissions allowed by the standard to determine the adequacy of the policy scenario as an equivalent plan. EPA maintains a database of emissions-projection models, several of which can project future GHG emissions for the purpose of evaluating whether state programs achieve emission reductions equivalent to those that would occur under a facility-specific, rate-based standard.<sup>51</sup>

In the past, EPA has identified modeling software for the states to use in the §111(d) guidance documents to the states. For example, in the emission guidelines for municipal solid waste landfills, EPA specified that the states must estimate landfill emissions either using EPA's "Landfills Air Emissions Estimation Model" or using an alternative model if approved by EPA.<sup>52</sup> EPA could provide similar guidance for the GHG §111(d) Guidance, identifying models or other options for demonstrating prospectively that a state plan will achieve results equivalent to a rate-based standard. In the case of RPS and end-user efficiency programs, EPA could also provide guidance on how to account for out-of-sector reductions in meeting the mass-based goal.

### 3. Ensuring Accountability

The Agency's general §111(d) regulations require that each state plan include a compliance schedule for achieving the emission standard, as well as requirements for owners and operators to report emission information to the state, and for periodic inspection and testing of facilities.<sup>53</sup> The states must then submit annual reports to EPA that include information on achievement of the standard, enforcement actions initiated, and a list of facilities that have ceased operations.<sup>54</sup>

Section 111(d) requires that state plans provide for the enforcement of the standard<sup>55</sup> and further grants EPA the authority to enforce a state plan under §§113 and 114 of the Act.<sup>56</sup> Because §§113 and 114 address enforcement for both §§110 and 111 of the Act, regulations pertaining to §110 regarding the accountability and enforceability of equivalent programs are also instructive in understanding the requirements of §111(d) equivalent programs. As noted above, equivalent programs under §110 must be both "enforceable" and "accountable." The Agency explains both requirements:

Measures are enforceable when they . . . specify clear, unambiguous, and measurable requirements . . . [Accountability] means, for example, that source-specific limits

should be permanent and must reflect the assumptions used in the SIP demonstrations. It also means that the SIP must contain means to track emission changes at sources and provide for corrective action if emission reductions are not achieved according to the plan.<sup>57</sup>

If a state fails to submit a plan, or if the submitted plan is not satisfactory, EPA has the same authority to prescribe a federal implementation plan (FIP) as it does for the §110 NAAQS program.<sup>58</sup> Under the §110 FIP process, EPA may prescribe an FIP if it "disapproves a State implementation plan submission in whole or in part, unless the State corrects the deficiency, and the Administrator approves the plan or plan revision, before the Administrator promulgates such Federal implementation plan."<sup>59</sup> Furthermore, if EPA approves a state plan and the state subsequently fails to comply with the emission standard set forth in the state plan, EPA has the authority under §113 of the Act to take enforcement action.<sup>60</sup>

The NAAQS nonattainment plan provisions in §172 of the Act could provide a model for building in progress checks and contingency measures for novel approaches to emission reduction. Section 172(c)(2) requires plans to provide for "reasonable further progress" provisions requiring states to check in more frequently with the Agency to ensure progress toward the standard.<sup>61</sup> Section 172(c)(9) requires state plans to include backstop measures that will take effect automatically if the state fails to attain the standard.<sup>62</sup> Although §172 is not directly applicable to §111, it could provide a model for the Agency to help ensure the success of state programs, and to help states avoid being subject to an FIP.

If states opt for the rate-based standard provided by EPA, compliance and enforcement will be straightforward. States or EPA could initiate enforcement actions against facilities that do not meet the required standard, and EPA could initiate enforcement actions against states that do not comply with their state plan. As discussed below, if EPA approves an alternative state plan under §111(d), enforcement may become more complicated. For example, it is unclear how enforcement would occur in the case of interstate trading programs where each individual state has a requirement to the federal government under the statute or, in the case of RPS and end-user efficiency programs, where emission reductions may occur outside of the covered sector but the operations at the power plants remain unchanged.

### C. Interstate Cooperation

If EPA allows states to pursue alternative §111(d) programs, the Agency may face questions regarding interstate coop-

51. U.S. EPA Emissions Projection Modeling Clearinghouse, <http://www.epa.gov/ttnchie1/emch/projection/> (last visited Jan. 26, 2012).

52. U.S. EPA, Municipal Solid Waste Landfill New Source Performance Standards (NSPS) and Emission Guidelines (EG) Questions and Answers, *available at* <http://www.epa.gov/ttnatw01/landfill/landfq%26a.pdf>.

53. 40 C.F.R. §§60.24(d) & 60.25(b).

54. 40 C.F.R. §60.25(e) & (f).

55. 42 U.S.C. §7411(d)(1)(B).

56. 42 U.S.C. §7411(d)(2)(B).

57. 57 Fed. Reg. 13568.

58. 42 U.S.C. §7411(d)(2)(A).

59. 42 U.S.C. §7410(c)(1)(B).

60. 42 U.S.C. §7413.

61. 42 U.S.C. §7472(c)(2).

62. 42 U.S.C. §7472(c)(9).



eration. While interstate issues could theoretically apply to multiple options, including RPSs and averaging, they currently arise in the context of the RGGI carbon market. Nine states are currently participating in the RGGI system. California may also address GHG emissions with interstate cooperation through the Western Climate Initiative (WCI)—a coalition of states and Canadian provinces working collectively on climate policy. Three of the jurisdictions (California, British Columbia, and Quebec) plan to initiate a market system in 2013, and Manitoba and Ontario plan to join once the program begins.<sup>63</sup>

Interstate cooperation is not new under the CAA. For example, the NO<sub>x</sub> SIP Call, the CSAPR, the Clean Air Interstate Rule (the CSAPR's predecessor), and the CAMR all provide for some degree of interstate cooperation. Although a federal circuit court overturned the CAMR on grounds unrelated to the trading program, the rule included a §111(d) trading program, and thus presents a useful model. In that rule, EPA set the emission limit by identifying the covered sources within a state, determining the emission rate appropriate for each source, converting the emission rate to a mass-based limit (tons of mercury), and aggregating that limit statewide. The rule explicitly allowed interstate trading. EPA set the state budgets, designed a model rule that ensured "accurate, certain, and consistent quantification of emissions,"<sup>64</sup> and monitored compliance.

In contrast to the CAMR, EPA does not currently have a role in the existing RGGI program. The RGGI states agreed on the structure for the program, and each state adopted its own independent legislation to create the program, which allows for interstate cooperation. RGGI, Inc., oversees the auctions and overall system compliance with the cap, as well as the emission tracking system.

EPA will have to determine whether it must be directly involved in the operation of an interstate market and how to determine and monitor compliance. There are two general options available, assuming (a) the Agency determines that interstate cooperation is permissible under the Act, and (b) the Agency does not provide a model rule allowing for interstate cooperation:

1. Allow states to create their own agreements and governance structures, and submit the program to EPA as part of the state plan. This option would be similar to the RGGI process of creating a common memorandum of understanding, but with each state adopting its own implementing legislation.

2. Allow states to request that the Agency play a direct role in allowance allocation and monitoring, as it would have under the CAMR.

Under either approach, EPA would retain its ability to initiate enforcement actions against entities that do not comply pursuant to §113 of the CAA. Nonetheless, interstate trading may still present enforcement challenges. For example, noncompliance by an entity in one state may affect compliance in cooperating states. In such a circumstance, the Agency and the states would have to determine how to enforce noncompliance. EPA could address this concern by allowing compliance on a regional basis, rather than a state-by-state basis. The Ozone Transport Commission (OTC) could provide a model for this approach. The OTC is a regional entity that assists northeastern states in meeting NAAQS for ground-level ozone by reducing NO<sub>x</sub> emissions regionwide through a regional trading program.

#### D. Addressing Plant Retirements

Economic factors, new environmental regulations, and projections of sustained low natural gas prices will likely lead to the retirement of numerous coal-fired power plants in the coming years.<sup>65</sup> If retirements occur in a state that implements a traditional rate-based emission standard, any new plant or existing plant replacing retired generation would presumably comply with the NSPS for new sources.

Depending on the time line for implementing the §111(d) rules, some planned retirements of coal-fired power plants may occur after the rules go into effect. The CAA requires EPA to allow states to "take into consideration, among other factors, the remaining useful life of the existing source" when setting the performance standards. States seeking to implement a facility-specific performance standard can invoke the "remaining useful life" provision in its state plan to try to justify an exclusion or less stringent standard for a facility that will shut down soon after the rule goes into effect.<sup>66</sup> According to EPA's §111(d) implementing regulations:

Unless otherwise specified in the applicable subpart on a case-by-case basis for particular designated facilities or classes of facilities, States may provide for the application of less stringent emissions standards or longer compliance schedules . . . provided that the State demonstrates with respect to each such facility (or class of facilities):

- (1) Unreasonable cost of control resulting from plant age, location, location or basic process design;
- (2) Physical impossibility of installing necessary control equipment; or

63. International cooperation provides additional challenges under the CAA. It is not likely that emission reductions taking place in another country could count as the best system of emission reduction under the statutory language of the CAA. In addition, state regulators and EPA would have limited ability to directly monitor emissions and to pursue enforcement actions.

64. Standards of Performance for New and Existing Stationary Sources: Electric Utility Steam Generating Units (Clean Air Mercury Rule), 70 Fed. Reg. 28606 (July 18, 2005).

65. See, e.g., ICF International, *Potential Impacts of Environmental Regulation on the U.S. Generation Fleet*, Final Report, prepared for Edison Electric Institute, January 2011; North American Electric Reliability Corporation, *2010 Special Reliability Scenario Assessment: Resource Adequacy Impacts of Potential U.S. Environmental Regulations*, October 2010.

66. See 40 C.F.R. §60.24(f).

- (3) Other factors specific to the facility (or class of facilities) that make application of a less stringent standard or final compliance time significantly more reasonable.

If a natural gas facility replaces a coal facility, significant GHG reductions may result. Some states may wish to include emissions from plants that will soon retire when they develop their §111(d) plans. States using a mass-based emission-reduction program, for example, could incentivize (or not discourage) retiring older coal units by allowing companies to continue receiving allocations for a period of time after retirement. This approach could potentially ease compliance obligations for the remaining facilities, as the reduction in overall emissions would result in more allowances available to other covered entities. Another approach to incentive retirements in a mass-based state program could reduce allowances at a specified time based on projections about when a facility will reach its “remaining useful life.” Companies could continue operating the facilities, but there would be a smaller pool of allowances in the system, presumably driving up costs of compliance.

While the retirement may result in overall GHG reductions, which is the underlying goal of a GHG NSPS/§111(d) program, the emission budget (based on the conversion from the rate-based standard to the state- or regionwide emission limit) would be higher than a budget created by aggregating the emissions from the remaining sources. To ensure that the state program remains equivalent to EPA’s rate-based standard over the lifetime of the program, it will be necessary to account for plant retirements.

### *E. Revising the Standard*

Any state program that does not apply a plant-by-plant, rate-based standard will need to include a mechanism for ensuring that the program achieves the same level of emission reductions over time as those called for in EPA’s §111(d) guidance. Revising the state emission standards is not a cut-and-dried issue under §111(d), however. While §111(b) requires EPA to “review and, if appropriate, revise” the NSPS at least every eight years, §111(d) is silent regard-

ing whether EPA can require states to update their plans. EPA’s advanced notice of proposed rulemaking sought comment on “its authority and the advisability of such periodic updating with respect to” regulation of GHGs under §111(d).<sup>67</sup>

EPA could address this legal uncertainty by indicating that a state program must include a mechanism for reducing an emission cap to account for retirements in order to qualify as a “best system.” The state plan could create a schedule for reviewing the standard periodically (similar to the “at least every eight years” provision in §111(b)) and adjusting it to reflect technological advances and changes in the fleet. Such an approach would need to balance the goals of (a) ensuring the program achieves the appropriate level of emission reductions over time, and (b) providing sufficient regulatory certainty to allow cost-effective business planning.

### **III. Conclusion**

The regulation of existing sources of GHG emissions under §111(d) of the CAA will be the broadest application to date of this little-used section of the Act. Due to the limited precedent regarding §111(d) and the breadth of the statutory language, there are several potential regulatory approaches available to the Agency in setting the standard, and to the states in determining its implementation. One issue that has garnered much analysis in the academic and policy arena is the potential for states to demonstrate that existing GHG policies are equivalent to the §111(d) requirements. While many stakeholders agree that the rules governing the existing source performance standards *should* allow states the flexibility to utilize existing GHG programs for compliance with the requirements, there are differing opinions on how the Agency and the states should address the challenges presented by each category of existing state programs and the legality of each approach. In this Article we have examined the options available for meeting the challenges that may face the states and the Agency regarding equivalency. It will fall to the Agency to decide how to address these challenges.

67. Regulating Greenhouse Gas Emissions Under the Clean Air Act (Advanced Notice of Proposed Rulemaking), 73 Fed. Reg. 44489.