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Playing without Aces: Offsets and the Limits of Flexibility under Clean Air Act Climate Policy

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RESOURCES FOR THE FUTURE

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Abstract

The U.S. Environmental Protection Agency (EPA) continues to move ahead with regulation of greenhouse gas emissions under the Clean Air Act (CAA). Previous work has indicated that basic forms of compliance flexibility—trading—appear to be legally permissible under the relevant part (Section 111) of the CAA. This paper takes a close look at more expansive and ambitious types of flexibility: trading between different kinds of sources, biomass co-firing, and, above all, offsets. It concludes that most types of such extended flexibility are either legally incompatible with the CAA, or so legally problematic that EPA is unlikely to adopt them. This has important implications for both the costs of CAA climate policy and the level of environmental benefits that are achievable. It also creates tension between CAA climate policy and state-level policies, such as California's, that aim to include various forms of extended flexibility.

Key Words: Clean Air Act, offsets, carbon, GHGs, greenhouse gases, flexibility, §111, §111(d), CAA, biomass co-firing, AB32

Contents

Playing without Aces: Offsets and the Limits of Flexibility under Clean Air Act Climate Policy

Nathan Richardson*

1. Introduction

Since the Supreme Court's 2008 *Massachusetts v. U.S. Environmental Protection Agency*[1] *(EPA)* decision and the 2009–2010 failure of cap and trade in Congress, EPA—under the authority of the Clean Air Act (CAA)[2]—has become the sole venue for federal climate policy. But that authority is limited: EPA's freedom to design and implement climate policy is constrained by the scope of its powers under the CAA. Although critics' claims that regulating greenhouse gases (GHGs) under the CAA will be a "train wreck" are overblown,[3] CAA climate policy does require compromises. But which ones? This paper tries to answer a key part of that question. Specifically, can EPA allow emissions trading, offsets, and other flexibility mechanisms for the power plants, refineries, and other existing "stationary sources" whose carbon emissions it will soon regulate under the CAA?

EPA's climate policy program under the CAA will soon reach the end of its beginning as the agency proposes the first regulations limiting GHG emissions from the biggest class of emitters: existing fossil fuel power plants. Limits for other sectors will follow. These regulations

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[1] 549 U.S. 497, 528–29 (2007).

[2] 42 U.S.C. 7401.

[3] See New York Times, *More hot air from the White House* (Apr. 22, 2008) (available at http://www.nytimes.com/2008/04/22/opinion/22iht-edwarming.1.12230349.html) (quoting Bush administration press secretary referring to GHG regulation under the CAA as a "regulatory train wreck"); see also American Legislative Exchange Council, *EPA's Regulatory Train Wreck: Strategies for State Legislators* (2011) (available at http://www.alec.org/publications/epas-regulatory-train-wreck-2/) (characterizing a suite of recent and near-future EPA regulations, including those on GHGs). For a brief counterargument to the "train wreck" position, see Nathan Richardson, Arthur Fraas, and Dallas Burtraw, *The Return of an Old and Battle-Tested Friend, the Clean Air Act*, 176 Resources 25 (Fall 2010) (available at http://www.rff.org/RFF/Documents/RFF-Resources-176_CleanAirAct.pdf) (arguing that CAA regulation of GHGs can be effective, at least over the short term).

will come via a rarely used and relatively poorly understood part of the CAA: performance standards under §111(d).

Can these performance standards be flexible, allowing emitters to trade, or does the CAA require EPA to issue rigid, one-size-fits-all standards? To put it differently, does §111(d) give EPA the authority to implement a modern, market-based policy for GHGs? The answer is critically important for both the costs and the environmental benefits of the program.[4] In the most basic sense, the answer appears to be yes. Independent legal observers and EPA have both concluded[5] that §111 does allow EPA to give emitters "compliance flexibility," up to and possibly including the authority to impose a cap-and-trade system across the entire regulated sector.

But this is only part of the answer. There is more to flexibility than the ability to trade with other similar emitters, power plant to power plant. Most comprehensive climate polices, both actual and proposed, allow trading with other kinds of emitters, maybe even those in other jurisdictions. They also allow regulated emitters to buy offsets from those that are not covered, or from projects that cut atmospheric carbon in other ways, such as by preserving or planting forests. These forms of flexibility matter: expanding emissions markets by adding dissimilar

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[4] See generally Dallas Burtraw, Anthony Paul, and Matt Woerman, *Retail Electricity Price Savings from Compliance Flexibility in GHG Standards for Stationary Sources*, Resources for the Future discussion paper 11-30 (Jul. 2011) (available at http://www.rff.org/Publications/Pages/PublicationDetails.aspx?PublicationID=21606) (analyzing cost impact of flexibility in implementation of CAA performance standards and finding that one option, a tradable performance standard, reduces overall costs by two-thirds by 2020).

[5] See Gregory Wannier et al., *Prevailing Academic View on Compliance Flexibility under §111 of the CAA*, Resources for the Future Discussion Paper 11-29 (Jul. 2011) (available at http://www.rff.org/Publications/Pages/PublicationDetails.aspx?PublicationID=21603) (open letter to EPA from a collection of legal scholars identifying areas of consensus—and lack thereof—regarding the legality of different policy options under §111(d), and specifically concluding that basic compliance flexibility is probably permissible). EPA has made similar arguments in 2005 and 2008. See EPA, *Clean Air Mercury Rule* (CAMR), 70 Federal Register 28606, 28606, 28616 (2008) (establishing nationwide cap-and-trade program for mercury emissions under §111). See also EPA, *Advance Notice of Proposed Rulemaking: Regulating Greenhouse Gas Emissions under the Clean Air Act* (ANPRM), 73 Federal Register 44354, 44490 (Jul. 30, 2008) (noting that "As EPA has interpreted the NSPS [new source performance standards] requirements in the past with respect to certain air pollutants, we believe that the NSPS program could use emissions trading, including cap-and-trade programs and rate-based regulations that allow emissions trading, to achieve GHG emission reductions.")

emitters increases the opportunities for low-cost emissions cuts, and offsets may be the cheapest carbon-cutting opportunity of all.[6]

This paper attempts to determine whether EPA can take advantage of any of these "extended flexibility" opportunities under §111. For some, the answer appears to be yes: EPA probably can, for example, allow trading between different kinds of emitters ("source categories"). But for most types of extended flexibility, unfortunately, significant legal barriers exist. For international forest offsets, probably the most cost-effective option, these barriers appear insurmountable.

The sections that follow first discuss the basics of EPA's CAA regulations for GHGs (Section 2), then define and discuss the different types of flexibility available under climate policy (Section 3). Section 4 forms the core of the paper, analyzing the legal compatibility of CAA/§111 regulation with these flexibility mechanisms. Section 5 then discusses implications for states, some of which have independent climate policies. Conclusions are presented in Section 6.

2. EPA's Climate Regulations

Before discussing the scope of flexibility under EPA's coming §111 regulations, it's important to at least briefly describe where the agency is, how it got there, and the legal foundations of its program. In short, as of late 2011, EPA is well on its way to implementing a broad set of policies aimed at reducing U.S. GHG emissions with its authority under the existing CAA.

2.1 The Clean Air Act and Carbon

Two events led to EPA's predominant role in national climate policy. In 2007, the Supreme Court ruled in *Massachusetts v. EPA*,[7] concluding that carbon is a pollutant subject to regulation under the CAA. In 2009, it appeared possible that Congress would pass legislation

[6] The potential economic value of carbon offsets has been comprehensively analyzed. The most recent discussion is in analyses by the U.S. Energy Information Administration (EIA) and EPA of comprehensive congressional proposals for regulating GHGs with a cap-and-trade system in 2009. EIA's analysis found that the marginal cost of emissions reduction if a large number of offsets are available and allowed into the program would be around $20, or around $50 if no international offsets are included.

[7] 549 U.S. 497, 528–29 (2007).

creating a new national climate policy, most likely in the form of economywide cap and trade—but these efforts ultimately failed in the Senate. These two developments have together left the regulatory burden squarely on EPA's shoulders.

Under the Bush administration after *Massachusetts*, the agency investigated pathways for GHG regulation, issuing a lengthy public analysis,[8] but did not move to actually regulate any GHG emissions source. Under the Obama administration, EPA has moved relatively aggressively to use its CAA authority. The agency has made a formal endangerment finding for GHGs (enabling their regulation under the CAA),[9] strengthened regulation of tailpipe emissions from vehicles,[10] and included GHGs in the permitting process for large new or modified emitters.[11]

2.2 The Knowable Pathway

Until recently, EPA's plan for regulating GHG emissions from existing stationary sources—the power plants and industrial facilities responsible for the majority of U.S. emissions—was completely unknown. In December 2010, EPA revealed its general plan: in a settlement agreement with states and environmental groups that had sued the agency shortly after *Massachusetts*, the agency announced that it would use a specific tool under the CAA—performance standards under §111—to limit stationary-source emissions.[12] Still, much remains unclear. Given the magnitude of the emissions at stake, EPA's program for these sources will probably be the most important part of its GHG regulatory program.

As noted above, EPA's choice of regulatory program for new and existing stationary sources appears to be performance standards. Under §111 of the CAA, the agency first defines

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[8] See generally EPA, ANPRM (cited in note 5).

[9] See EPA, *Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the Clean Air Act*, 74 Federal Register 66496 (2009).

[10] See EPA, *Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards; Final Rule*, 75 Federal Register 25324 (2009).

[11] See EPA, *Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule*, 75 Federal Register 31514 (2010).

[12] See EPA, *Boiler GHG Settlement* (Dec. 21, 2010) (available at http://www.epa.gov/airquality/pdfs/boilerghgsettlement.pdf); see also EPA, *Refinery GHG Settlement* (Dec. 21, 2010) (available at http://www.epa.gov/airquality/pdfs/refineryghgsettlement.pdf).

categories of similar emitting sources ("source categories").[13] For new sources under §111(b), the agency sets a performance standard based on the "best system of emission reduction".[14] These new sources are then required to meet the level of emissions (or some other measure, such as efficiency) set by the standard,[15] though they are not required to use any specific technology to do so.[16]

The process for existing sources under §111(d) is similar, but for these sources EPA only sets guidelines, whereas states are charged with setting and implementing the standards—subject to EPA review.[17] In practice, the process is likely to be collaborative, with EPA possibly issuing a model rule that states may adopt. Traditionally, the §111(b) new source performance standards (NSPS) process has been technology-driven and has applied uniformly to all new sources within each category, without much flexibility.[18] The §111(d) existing source performance standards (ESPS), however, have rarely been used at all.[19]

EPA's general plan is clear: once implemented, these standards that EPA committed to proposing and finalizing in the settlement agreement will cover the two largest categories of stationary emitters—fossil-fuel power plants and petroleum refineries,[20] which together make up around 40 percent of U.S. emissions.[21] But the specifics of these performance standards remain

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[13] CAA §111(b).

[14] CAA §111(a)(1).

[15] CAA §111(b)(4).

[16] CAA §111(b)(5).

[17] CAA §111(d)(1).

[18] See Dallas Burtraw, Art Fraas, and Nathan Richardson, *Greenhouse Gas Regulation under the Clean Air Act: A Guide for Economists*, 5 Review of Energy Economics and Policy 293, 297 (2011).

[19] For a deeper discussion of the §111(d) pathway, see Nathan Richardson, Art Fraas, and Dallas Burtraw, *Greenhouse Gas Regulation under the Clean Air Act: Structure, Effects, and Implications of a Knowable Pathway*, 41 Environmental Law Reporter 10098 at 10104–10106 (2011); see also Wannier et al., *Prevailing Academic View* (cited in note 5).

[20] See EPA, *Boiler GHG Settlement* and *Refinery GHG Settlement* (both cited in note 12).

[21] See Juliet Eilperin, *EPA announces plans to regulate power plant, oil refinery emissions*, Washington Post (Dec. 23, 2010) (available at http://voices.washingtonpost.com/post-carbon/2010/12/epa_announces_plans_to_regulat.html) (noting that "Power plants account for more than 2.3 billion tons of carbon dioxide emissions each year, more than any other industry. Oil refineries rank as the nation's second-largest source, with emissions equivalent to more than 200 million tons of carbon dioxide a year" and that the two sectors combined account for almost 40 percent of U.S. emissions).

unknown. The first proposed rule, covering electric generating units (EGUs), was set to be released in September 2011, but has been delayed indefinitely.[22] As of this writing, almost nothing is known about it outside of EPA.

3. What Flexibility Means

Much remains unclear about these performance standards. Some of the questions are procedural: Will other categories of sources eventually be covered? How much latitude will EPA give to states in implementing ESPS? And some are substantive: How stringent will the performance standards be?

3.1 Flexibility, Benefits, and Costs

But possibly more important even than stringency is flexibility: How much compliance flexibility can or will be granted to emitters that must comply with the standards? In other words, is trading allowed, and if so, with whom? Because carbon is a global pollutant, in principle it does not matter where emissions cuts come from: reducing smokestack emissions from a U.S. coal plant, a similar plant abroad, or avoiding deforestation in the Amazon.[23]

These extended flexibility tools are usually viewed as cost-containment mechanisms. Offsets, especially those available from international forest-related projects, appear to be among the lowest-costs opportunities for GHG reduction. [24] But they might also be classed as environmental tools. Because §111 requires EPA to consider costs in setting performance standards,[25] reducing costs and achieving environmental goals are two sides of the same coin. Achieving similar environmental benefits for a lower cost is beneficial in its own right and may increase political flexibility for the agency. But reducing costs may also enable the agency to justify more aggressive environmental goals. Some tools may also have environmental side benefits: forest offsets could help stop biodiversity loss, or reductions in carbon emissions from sources outside the §111 standards could lead to reductions in other pollutants emitted from

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[22] See John M. Broder, *Greenhouse gas rule delayed*, New York Times (Sep. 15, 2011) (available at http://green.blogs.nytimes.com/2011/09/15/greenhouse-gas-rule-delayed/).

[23] Actions with the same CO_2-equivalency are indistinguishable from a climate perspective, but not necessarily for other purposes. Actions have other costs and benefits not related to climate that should be weighed as well.

[24] See note 6 and accompanying text.

[25] CAA §111(a)(1).

those sources (though reducing emissions at covered sources might also have co-benefits that would be sacrificed if reductions happen elsewhere instead).[26]

For these reasons, and despite the focus on cost-reduction effects in this paper, it is important to understand these tools in environmental as well as economic terms. And, of course, the entire point of having a regulatory program for GHG emissions is to promote environmental goals.

Some previous work has looked at flexibility under §111 in a general sense; that is, whether §111 is compatible with relatively simple trading between emitters in the same source category subject to the same performance standards. EPA and most observers appear to feel that the statute does permit this.[27] Scholars have applied relatively little analysis to extended flexibility—assuming that at least some flexibility is available under §111, how much? Can EPA allow emitters to trade with other sectors, buy offsets, or receive credit for other carbon-cutting actions?

In short, extended flexibility matters, but a lack of legal analysis makes it unclear whether and to what extent these tools are compatible with climate policy under the CAA, and specifically with §111 performance standards. This paper is an attempt to fill this gap.

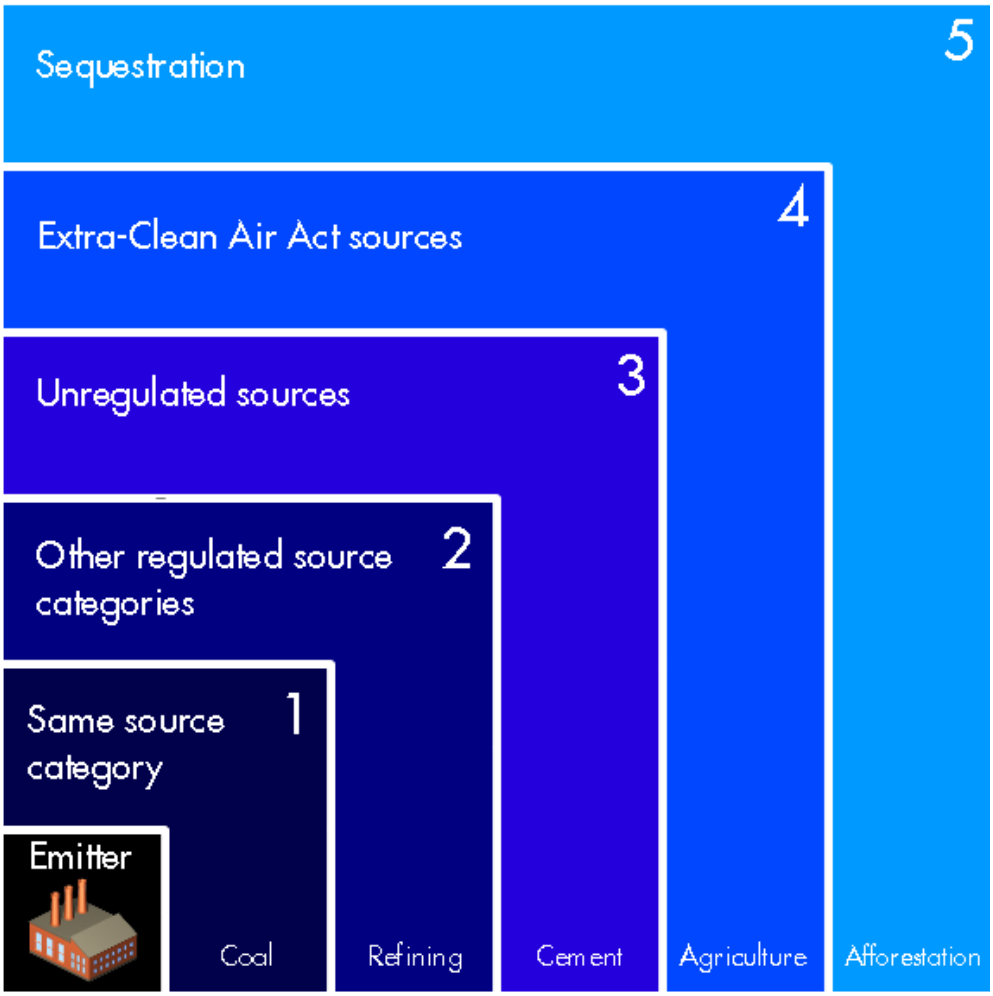
3.2 Types of Flexibility

Flexibility can come in many forms, and because the legal analysis differs significantly among the various forms, it's helpful to be clear. *Offsets* in particular is a broad term that can refer to many different types of activity, from paying a nearby cement plant to reduce its emissions to buying credits for avoided deforestation in faraway tropical regions. Instead of basing analysis on such ambiguous terms, it's more useful to concretely describe different types of flexibility. For the purposes of this paper, I discuss five different types of flexibility, as shown in Figure 1.

[26] It is also true that some tools could result in environmental harms. Some claim that the use of biomass for energy could increase the demand for forest products, with negative consequences for biodiversity, for example. This, along with skepticism about the carbon benefits of offsets or biomass, is the source of opposition to these tools in some circles, discussed in more detail below.

[27] See note 5 and accompanying text.

Figure 1. Types of Flexibility, with Examples



An emitter subject to §111 performance standards (or any emissions restriction) can either reduce its own emissions to comply or trade with others that make an equivalent contribution—if the regulator allows. These five types of flexibility categorize the different groups with which an emitter could, in principle, be allowed to trade. From Type 1 through Type 5, the source of emissions credits the regulated emitter is allowed to use becomes more distant conceptually (and often geographically). But the types are divided not by geography, but by the law of §111. Each successive type of flexibility is affected by additional legal barriers, as discussed in the following sections. These legal barriers are not necessarily interdependent, but generally speaking, if one class of flexibility is incompatible with the statute, more "distant" types will probably also be unavailable.

To help explain the different types of flexibility, let's consider a hypothetical coal-fired power plant subject to EPA performance standards. It must reduce its emissions, improve its efficiency, or whatever is required by the performance standard—or (if an emissions trading program is in effect), it may be able to purchase some form of credits created when someone else takes some kind of GHG-cutting action.

3.2.1 Type 1

Recall that NSPS and ESPS are set for defined source categories. If any compliance flexibility at all is available, sources will be able to trade with others in the same source category. Our coal plant could, for example, buy credits from a similar plant that improved its efficiency or reduced its emissions more than required by the performance standard. This is Type 1 flexibility.

3.2.2 Type 2

Another possibility is that sources could be permitted to obtain credits from emitters in other source categories that have their own performance standards. For example, our coal plant could buy credits from an oil refinery (for which standards are also scheduled to be issued by the end of 2012). This trading with other sources covered under §111, but in different source categories, is Type 2 flexibility.

3.2.3 Type 3

Emissions reductions could also occur at stationary sources that are not currently subject to any §111 performance standard, and these reductions could be another source of credits for regulated emitters. Our coal plant could, for example, buy credits from a cement plant that reduces its emissions. Trading with stationary sources that do not yet have §111 GHG performance standards is Type 3 flexibility.

3.2.4 Type 4

CAA §111 applies only to domestic stationary sources. But emissions reductions are equally valid whether they come from such sources, from sectors outside the reach of §111, such as vehicles or agriculture, or from stationary sources abroad. Our coal plant could, for example, buy credits from a farm that reduces its methane emissions, or from a similar coal plant in another country. Such trading with extra–CAA (or at least extra–§111) sources is Type 4 flexibility. This is a broad category, and analysis is somewhat different for sources that fall outside §111's definition of "stationary" and for those sources that do fit the definition but are outside its domestic jurisdiction. For this reason, I analyze the two separately.

3.2.5 Type 5

The ultimate goal of climate policy is to reduce atmospheric concentrations of GHGs and, thereby, reduce the likelihood of dangerous climate change. Reducing emissions at a source subject to §111 standards, or at any of the other sources discussed in Type 1–4 flexibility, achieves this goal directly. When emissions from any source decrease, the rate at which atmospheric carbon is increasing goes down, all other things being equal. But this is not the only way to reduce GHG concentrations in the atmosphere. It is also possible to remove, or sequester, carbon that is already there.[28] Though technological sequestration projects have been suggested, the primary tool currently available is trees: forest carbon sequestration. Carbon sequestration and emissions reduction are geophysically interchangeable. This means that a climate policy can, in principle, treat the two as equivalent by allowing emitters to purchase credits generated by sequestration actions taken elsewhere. To give an example, our coal plant could obtain credits from projects that plant trees (in California or possibly in Brazil). Such trading with "sources" that do not reduce *emissions*, but rather atmospheric carbon *concentrations*, is Type 5 flexibility.

3.3 Analyzing Flexibility Types

Using these defined types of flexibility is, I hope, clearer than using existing terms—above all, the term "offsets", which can refer to flexibility Type 3, 4, or 5 or to a combination of these types. The question of whether offsets are compatible with §111 performance standards has an ambiguous answer because it depends on which type of flexibility one means. The umbrella term "offsets" works for other purposes because the three types are geophysically interchangeable and come from a broad group of sources—those not subject to emissions limitations under the primary program. But the differences between the three types do matter in the legal analysis.

4. Extended Flexibility under §111 of the Clean Air Act

This section presents that legal analysis, attempting to assess the compatibility of each type of flexibility with EPA regulation via §111 performance standards. The analysis focuses almost exclusively on flexibility options for existing, rather than new, sources. This is partly

[28] Note that this is different from the sequestration required by carbon capture and storage (CCS) projects. CCS captures carbon at the smokestack, thereby limiting or eliminating a source's emissions. Forest carbon sequestration, or sequestration geoengineering, removes GHGs from the ambient atmosphere.

because of legal and practical complications with trading that includes new sources,[29] but also because the emissions of existing sources are far greater than those of new sources, at least over a reasonable time horizon. This means that any market for emissions allowances will be much larger for existing sources, and that a combined new/existing market will probably be dominated by existing sources.

As noted above, some existing scholarship has analyzed basic—that is, Type 1—flexibility under §111. Another small body of work has examined Type 2 flexibility. For this reason, I discuss Types 1 and 2 relatively briefly, with references to this existing work.

4.1 Type 1 Flexibility: Other Sources in the Same Category

Regulation under §111 is driven by source categories. EPA is charged with defining a list of categories of stationary sources that "cause[] or contribute[] significantly to" air pollution that endangers public health or welfare, and with revising that list as necessary.[30] For each category, the agency must issue performance standards; it does so first for new sources,[31] then, if a pollutant is not regulated under other major stationary-source CAA programs, EPA issues guidelines on which states will base similar standards for existing sources.[32] Source categories and subcategories defined by the agency are differentiated mostly by economic sector and by technology. For example, the categories for which EPA has agreed to issue GHG performance standards are those for "electric utility steam generating units"[33] (primarily coal plants) and a set of six subcategories covering different classes of petroleum refineries.[34]

Type 1 flexibility refers to the ability of sources regulated under §111 performance standards to trade within these categories. Must every coal plant reduce its emissions (or improve its efficiency) as required by the standard, or can these plants trade with each other, with the underperforming plants buying allowances from those that exceed the standard?

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[29] See Wannier et al., *Prevailing Academic View* at 5–6 (cited in note 5).

[30] CAA §111(b)(1)(A).

[31] CAA §111(b)(1)(B).

[32] CAA §111(d).

[33] See EPA, *Boiler GHG Settlement* (cited in note 12) (referencing 40 C.F.R. part 60, subpart Da).

[34] See EPA, *Refinery GHG Settlement* (cited in note 12) (referencing 40 C.F.R. part 60, subparts J, Ja, Db, Dc, GGG, and QQQ).

Both EPA itself and most scholars who have examined this question appear to have concluded that at least some such Type 1 flexibility is available.[35] In fact, this generally has been what observers mean when they claim that §111 allows for flexibility.

4.1.1 Flexibility: The "Best System"?

The most frequently cited grounding for Type 1 flexibility in §111 is in the statute's definition of performance standards in §111(a)(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 . . .) the Administrator determines has been adequately demonstrated.

The argument in favor of Type 1 flexibility is that this definition gives EPA discretion to determine the "best system" for reducing emissions, considering cost, from a source category. The agency could therefore conclude that allowing sources flexibility to trade within that category is the "best system" or at least the best possible approximation of it, given the structure of §111.[36]

There is some precedent for this approach, most notably under the 2005 Clean Air Mercury Rule (CAMR), in which EPA adopted a cap-and-trade system for mercury pollution from coal plants.[37] There, the agency similarly relied on the §111(a)(1) definition of "standard of performance":

> The term ''standard of performance'' is not explicitly defined to include or exclude an emissions cap and allowance trading program. In the final rule, EPA interprets the term ''standard of performance,'' as applied to existing sources, to include a cap-and-trade program. This interpretation is supported by a careful reading of the section 111(a) definition of the term, quoted above: A requirement for a cap and- trade program (i) constitutes a ''standard for emissions

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[35] See Wannier et al., *Prevailing Academic View* at 4–5 (cited in note 5) (citing academic and EPA authorities). But see Lisa Heinzerling, *Testimony before the Subcommittee on Energy and Air Quality of the Committee on Energy and Commerce, U.S. House of Representatives* at 11–14 (Apr. 10, 2008) (available at http://democrats.energycommerce.house.gov/images/stories/Documents/Hearings/PDF/110-eaq-hrg.041008.Heinzerling-Testimony.pdf) (arguing that, among other reasons, the technological focus of §111 implies that a trading system is incompatible with its design).

[36] See Wannier et al., *Prevailing Academic View* at 4–5 (cited in note 5).

[37] CAMR at 28606 (cited in note 5).

> of air pollutants'' (i.e., a rule for air emissions), (ii) ''which reflects the degree of emission limitation achievable'' (i.e., which requires an amount of emissions reductions that can be achieved), (iii) ''through application of (a) * * * system of emission reduction'' (i.e., in this case, a cap-and trade program that caps allowances at a level lower than current emissions). Nor do any other provisions of section 111(d) indicate that the term ''standard of performance'' may not be defined to include a cap-and-trade program.[38]

The agency further argued that a separate definition of "standard of performance" in §302(l) does not conflict with this interpretation.

The agency's rationale applies with equal force whether it chooses to implement cap and trade itself or some other, less ambitious emissions trading program, such as a tradable performance standard.[39] Almost any such program could be characterized as a "system of emission reduction," leaving EPA only to nonarbitrarily determine that it is the "best" such system or at least "reflects" the emissions reductions possible under the best system.

Though the CAMR interpretation of §111 and its scope for flexibility was questioned by some parties at the time,[40] it was not tested legally because the rule was rejected by courts on unrelated grounds.[41] EPA reiterated the plausibility of this approach in the GHG context in 2008.[42] This area of law remains unsettled, but many observers believe that some form of trading is legally permissible via the "best system" language.[43]

4.1.2 Counterarguments to Type 1 Flexibility as the "Best System"

One counterargument to flexibility under §111 is grounded in a 1978 D.C. Circuit decision, *Asarco v. EPA.*[44] The holding in this case prevents EPA from using a "bubbling" approach in CAA performance standards—that is, EPA is not allowed to redefine "facilities" for

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[38] Id. at 28616 (cited in note 5).

[39] For a discussion of a tradable performance standard, see Richardson et al., *Knowable Pathway* at 10114–10115 (cited in note 17); see also Burtraw et al., *Retail Electricity Price Savings* at 3–5 (cited in note 4).

[40] See, e.g., Heinzerling, *Testimony* (cited in note 35).

[41] See *New Jersey v. EPA*, 517 F.3d 574 (DC Cir. 2008) (vacating the CAMR rule on the grounds that EPA had improperly delisted mercury from §112 of the CAA).

[42] See EPA, ANPRM (cited in note 5).

[43] See Wannier et al., *Prevailing Academic View* at 4–5 (cited in note 5).

[44] 578 F.2d 319 (DC Cir., 1978).

regulatory purposes to include multiple physical facilities, thereby allowing averaging of emissions across those physical installations. Superficially, this might appear to rule out flexibility across sources within a category (Type 1) as well. The set of source across which trading is permitted could be characterized as simply a very large bubble, since although the set as a whole would meet the prescribed standard, no individual facility would necessarily do so. If this characterization is correct, *Asarco* could rule out Type 1 flexibility.

This appears unlikely, however, for two reasons. First, Type 1 flexibility would be built into EPA's §111 GHG program from its outset, unlike bubbling in the rulemaking the *Asarco* court considered. In other words, if EPA includes trading, not by altering its working definition of what a facility is, but by finding that trading is *itself* the "best system of emission reduction," *Asarco* and its limitations would not apply. It is true that both moves involve somewhat creative interpretation of CAA language, but "best system of emission reduction" is arguably more ambiguous than "facility"—and therefore it is much harder for a judge to find that it has a plain meaning that courts are qualified to identify. In legal terms, this probably gets the agency beyond step one of *Chevron* analysis[45] and, if so, greatly increases the chances that its interpretation will survive challenge.

Chevron itself provides a second reason why *Asarco* might not apply—as *Asarco* was decided well before *Chevron*, the agency might now be entitled to greater discretion to interpret the language of the CAA where, as here, it appears to be ambiguous. If this is correct, not only Type 1 flexibility but also the bubbling practice at issue in *Asarco* might be permissible.

Another counterargument to Type 1 flexibility is that including it misinterprets the "best system" language in §111(a). This language, the counterargument goes, guides EPA in determining a performance standard's stringency, but does not necessarily allow the agency to adopt that system via §111 regulation. In other words, standards are intended to "reflect" the "best system," not *be* the best system. Another related counterargument is that compliance flexibility stretches the meaning of "system" to the breaking point in what has traditionally been a technology-focused process.[46]

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[45] In *Chevron*, the Supreme Court held that agency interpretations of ambiguous statutory language prevail unless they are not "reasonable" or "permissible." The question of ambiguity is step one, and that of reasonableness of interpretation is step two.

[46] This is similar to the argument advanced by Professor Heinzerling in her 2008 testimony (cited in note 35).

Assuming that these counterarguments do not prevail and that Type 1 flexibility is possible, EPA and the states (charged with setting ESPS under §111(d)) can include it in their performance standards.

4.1.3 States' Independent Powers

A separate route that would allow Type 1 flexibility for existing sources under §111(d) is based on the role of states—states may be able to include Type 1 flexibility under §111(d) standards for existing sources even if EPA itself cannot. This argument is grounded in the procedure for §111(d) regulation. Recall that under §111(d), EPA sets national guidelines, which states then implement via

> . . . a procedure similar to that provided by section 110 under which each State shall submit to the Administrator a plan which (A) establishes standards of performance . . . and (B) provides for the implementation and enforcement of such standards of performance.[47]

The reference in the first sentence is to the state implementation plan (SIP) process under §110 of the CAA.[48] This is part of the National Ambient Air Quality Standards (NAAQS) program, in which EPA similarly sets standards that states implement and enforce. The SIP process is extensively detailed in §110 and is quite flexible. Notably, state SIPs can include "economic incentives such as fees, marketable permits, and auctions of emissions rights."[49] Although offsets are not explicitly mentioned, it can be argued that this grant, particularly the "economic incentives" language, is sufficiently broad to include Type 1 flexibility. Further, the argument goes, if offsets are in principle permissible under §110 SIPs, then states can also implement them under the "similar" §111(d) procedure. Though admittedly complex, this argument is appealing and has a firmer grounding in the statute than many of the other pro-offset arguments.

However, the substantive flexibility granted to states under §110 may not be fully incorporated into §111(d). Section 111(d)'s reference to §110 does not permit either states or EPA, in its approval process, to ignore the requirements of §111 itself. The language quoted above from §111(d) indicates that, whatever the §110-like "procedure" for EPA–state

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[47] CAA §111(d).

[48] CAA §110(a).

[49] CAA §111(a)(2)(A).

cooperation, the submitted plan must establish, implement, and enforce "standards of performance." This puts us back where we started: the definition of "standards of performance" in §111(a), including the "best system" language.

Put differently, the reference in §111(d) to a process similar to that for the NAAQS SIPs is purely procedural, not substantive. The substantive limits of §111(d) regulations are determined not by §110, but by §111, and whatever flexibility exists must be found there. As noted above, §111(a) defines "standards of performance" as based on the "best system of emission reduction." Any type of flexibility under §111 performance standards must fit within this definition, regardless of what §110 has to say about flexibility under the NAAQS. The argument in favor of offsets based on the states' role therefore collapses into the argument discussed in the previous section—whether "best system" itself can be interpreted to include offsets. If this interpretation of §111(d) and its reference to §110 is correct, that reference either grants no substantive flexibility, or any flexibility granted is superfluous.

4.1.4 The Scope of Type 1 Flexibility

Even if an argument for Type 1 flexibility based on §111(d)'s analogy to §110 is relatively weak, the primary argument that the "best system" language in §111(a) allows Type 1 flexibility remains strong. It is this argument that both EPA and most scholars have relied on in concluding that Type 1 flexibility is permissible.

How far could EPA and the states go with Type 1 flexibility? In principle, it might be able to create a source category–wide cap-and-trade program, as it attempted in the 2005 CAMR,[50] but this appears highly unlikely for GHGs, largely for political reasons.[51] More modest market-based mechanisms, such as a tradable performance standard based on efficiency improvements, have been suggested.[52]

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[50] See EPA, CAMR (cited in note 5).

[51] See Gabriel Nelson, *EPA promises to avoid cap, but some utilities want trade*, E&E News (Feb. 4, 2011) (available at http://www.eenews.net/public/eenewspm/2011/02/04/2) (quoting EPA assistant administrator Gina McCarthy as disavowing cap and trade as an option the agency is considering under the CAA)

[52] See Richardson et al., *Knowable Pathway* at 10114–10115 (cited in note 19); see also Burtraw et al., *A Guide for Economists* at 293, 304–308 (cited in note 18); see also Burtraw et al., *Retail Electricity Price Savings* at 3–5 (cited in note 4).

4.2 Type 2 Flexibility: Other Regulated Source Categories

Even CAMR, the high point of ambition for flexibility under §111 to date, did not extend that flexibility beyond a single source category. For GHGs, EPA will eventually need to issue standards for a wide variety of categories, from coal plants and petroleum refineries (for which it has already announced plans) to cement plants, steel mills, and other heavy industrial facilities.

The agency could not approximate an economywide carbon policy by regulating all U.S. GHG emissions under §111 because some types of GHG sources—such as vehicles and most agricultural operations—do not fit the statute's definition of "stationary source" (for more on the implications of this for flexibility, see Section 4.4). Nevertheless, expanding flexibility across source category boundaries would make trading markets more effective. If the most cost-effective emissions reductions among sources regulated under §111 come from one source category, regulation that allows sources outside that category to trade with sources inside it will be cheaper for the same level of overall emissions.

Observers have considered whether EPA has authority under §111 to allow trading across source categories—Type 2 flexibility.[53] Their tentative conclusion is that it does appear to be possible to allow such flexibility, for at least two reasons. First, there is no statutory preclusion, presumably because the drafters of §111 did not explicitly consider any form of flexibility. But neither is there any clear statutory authority.[54]

Second, the agency's categorization powers may allow it to achieve the practical equivalent of Type 2 flexibility. As noted above, the agency has the authority to revise source categories and create subcategories as it sees fit—it may "distinguish among classes, types, and sizes within categories."[55] This probably allows EPA to expand existing categories, and possibly to create new "supercategories" encompassing multiple existing categories and relegating those existing categories to subcategory status. If the agency can do this, it would further appear to be able to define performance standards specific to each subcategory, but allow flexibility across the

[53] See Wannier et al., *Prevailing Academic View* at 8 (cited in note 5).

[54] Id.

[55] CAA §111(b)(2).

entire supercategory.[56] This flexibility would technically be Type 1, but in practice would be equivalent to Type 2.

There is no precedent for such a recategorization, and much less for the Type 2 flexibility it may enable. Nevertheless, this route appears legally plausible, and no conflict with any provision of §111 is apparent.[57]

4.3 Type 3 Flexibility: Unregulated Source Categories

If EPA can allow regulated sources to trade within their own categories (Type 1) and possibly with other categories (Type 2), what about emissions sources that are not regulated under §111 standards at all? Some of these sources might not have §111 GHG standards because EPA has not yet issued them but could issue such standards in the future. Trading with these kinds of sources is Type 3 flexibility and is discussed in this section. Other sources might not have standards because they are outside the reach of §111 entirely. Trading with these sources is Type 4 flexibility and is analyzed in the next section.

Type 3 flexibility is the first type of flexibility considered here that could be described as a form of offset. If sources inside the §111 regulatory program are permitted to trade with GHG sources (even temporarily) outside of it, they are offsetting their emissions via cuts in unregulated emissions elsewhere.

At first impression, it might appear that Type 3 flexibility is a narrow category with limited practical importance. If source categories that do not currently have §111 standards account for a large volume of GHG emissions, EPA could simply issue standards for them. And if those sources have relatively low-cost opportunities to reduce those emissions, making them

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[56] A related question is whether the agency can create and/or revise source categories for GHG purposes while leaving them intact for purposes of regulating other pollutants under existing performance standards. The answer appears to be yes. The agency currently uses a long list of source categories at 40 C.F.R. part 60 that are not mutually exclusive—in other words, overlap between categories is tolerated, and therefore new GHG-specific categories, supercategories, and subcategories do not appear problematic. In addition, nothing in §111 restricts EPA's authority to define and redefine source categories as it sees fit, or implies that the same categories must be used for all pollutants.

[57] Just because intercategory trading is apparently legal does not mean that it is simple. Trading across different sectors subject to regulations of differing stringency and design could prove administratively complex and/or susceptible to manipulation, especially if EPA eschews quantity-based standards (tons of GHGs emitted) in favor of standards based on efficiency improvements or other measures.

viable sources of credits, issuing standards makes those credits available as Type 2, rather than Type 3, flexibility.

But the standard-setting process takes time, particularly for existing sources under §111(d), which requires every state to issue its own standards. Standards are issued for different source categories at different times, according to a schedule of regular reviews.[58] Each standard is subject to notice-and-comment rulemaking and, possibly, to litigation. Flexibility that includes sources in different stages of this process may therefore be important.

The discussions of Type 1 and Type 2 flexibility in the previous sections have shown two general tools for incorporating flexibility: for Type 2, EPA's powers over source category definitions, and for Type 1, the "best system of emission reduction" language in the statute's definition of performance standards themselves. Both tools may be useful in reaching for Type 3 flexibility.

4.3.1 Converting Type 3 into Type 2 Flexibility

As noted above, once EPA issues performance standards for a source category, potential trading with sources in that category becomes Type 2, rather than Type 3, flexibility. Because Type 2 flexibility appears compatible with §111, doing this would effectively make Type 3 flexibility compatible as well. But, as noted above, EPA and the states cannot quickly issue and implement substantive standards for all source categories that emit GHGs. If there were a way to shorten this process, however, EPA might be able to at least temporarily achieve Type 3 flexibility in practice.

One option for doing so would be for the agency to issue "paper" performance standards for categories that it believes would be useful sources of cost-effective emissions cuts. These standards could be minimally stringent, such that any reductions in emissions achieved by sources in the category could be immediately converted into credits for use by sources that are the primary target of §111 regulation (presumably the energy and refining sectors). Over time, EPA could then issue revised, more stringent standards for those categories with paper standards, as it completes its technical analysis and regulatory process.

[58] Every eight years, as prescribed by CAA §111(b)(1)(B); states may also petition for interim revisions for a variety of reasons; see CAA §111(g).

For example, if EPA issues standards requiring emissions reductions from fossil power plants, but wants to allow those plants to obtain credits from reductions made at cement plants, it could issue a paper or pro forma performance standard for cement plants, under which virtually any emissions reductions would be available for trading. More stringent standards for cement plants would then follow in the future.

But this process works only if EPA can issue minimally stringent performance standards more quickly than it can issue fully formed standards. It does not appear that the agency can do so. Even though technical analysis would be simpler, the agency would still have to follow notice-and-comment procedures, including mandatory periods for public comment and Office of Management and Budget review. Paper standards would also be vulnerable to litigation. Environmental groups would almost certainly sue, claiming that EPA's decision to issue lax standards for a given source category violates its obligations under §111 because such standards arbitrarily would not reflect the "best system of emission reduction" for that category. Large parts of the rulemaking process are also duplicated under this scheme; EPA would probably be better off using its limited resources to develop better and more legally defensible standards for sectors it believes can achieve low-cost GHG reductions rather than rushing to include those categories via regulatory sleight-of-hand.

4.3.2 Pure Type 3 Flexibility

If converting Type 3 into Type 2 flexibility is not legally permissible, or at least not practical, could EPA allow Type 3 flexibility directly? It appears possible, albeit unlikely. The reasons are complex, and analyzing Type 3 flexibility forms the heart of this paper.

4.3.2.1 §111 Does Not Rule Type 3 Flexibility Out—or In

The first and simplest argument in favor of Type 3 flexibility is that the CAA in general, and §111 in particular, do not expressly forbid it; in fact they give EPA a lot of flexibility in program design. As noted, §111 does not mention any form of compliance flexibility, much less specifics about whether sources can trade with emitters not subject to their own performance standards. EPA may therefore be relatively free to interpret the statute in favor of such flexibility, with substantial deference from federal courts under *Chevron*.[59] Recall that under *Chevron* discretion, unless EPA's interpretation is contradicted by the plain language of the

[59] 467 U.S. 837 at 842–43 (1984).

statute (step one) or, much less likely, is deemed unreasonable (step two), that interpretation prevails.[60]

But congressional failure to explicitly exclude something from its grant of authority is not, alone, enough to reach the deference available in *Chevron* step two. Agencies cannot create powers out of whole cloth, but rather must ground them in the statute. When they do so, that interpretation is (if challenged) subject to scrutiny by courts. In other words, pointing to the fact that Congress has not forbidden EPA to consider offsets under §111 is a necessary first step, but it is far from enough. It does not indicate the statutory source of EPA's authority to use offsets, much less whether interpretation of that source to allow offsets is valid.

4.3.2.2 Parallels Elsewhere in the Clean Air Act

A second argument in favor of Type 3 flexibility is that Congress' inclusion of something similar to Type 3 flexibility elsewhere in the CAA shows that offsets are broadly compatible with the statute and that Congress was aware of their advantages, particularly when regulation threatens to impose large costs.

Offsets are not unknown in CAA regulation, having been formally included since the 1977 amendments to the statute—albeit in limited fashion. These well-established CAA offsets, or "emissions reduction credits" (ERCs) in CAA jargon, are part of the §110 NAAQS program and work as follows.

For a permit to be issued for construction of a new emitting facility where pollution levels exceed the NAAQS, the firm seeking the permit must do two things. First, it must install tight emissions controls (to result in the lowest achievable emissions rate, or LAER). [61] Second, it must offset the residual emissions from the project. This is done via ERCs. Firms that verifiably reduce emissions obtain these credits, which can be sold to firms seeking permits for new projects (or used for the reducing firms' own projects). The ERC program is specified in section §173 of the statute itself[62]—it is not based on EPA interpretation of general pollution-control powers under the CAA.

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[60] Id.

[61] CAA §173(c).

[62] Id.

The ERC program has been widely used, but its impact is narrow. It is relevant only in areas that are in "nonattainment" for (that is, failing to meet) the NAAQS. Even in those areas, offsets are not used as a general emissions-control policy tool, but only when preconstruction permits are needed. And even then the ERC offsets required for the permit must be created within the same nonattainment area.[63] ERC offsets are best viewed as a safety valve that prevents strict regulations on nonattainment areas from completely shutting down economic growth rather than a general tool for reducing compliance costs. In fact they do little to reduce costs because facilities still must comply with the underlying emissions regulations—the LAER. In reality, they are more like a very limited and idiosyncratic Type 2 flexibility than they are like Type 3 flexibility.

The presence of the ERC program in the CAA has conflicting implications for the use of offsets under other CAA programs, including those for GHGs. ERCs themselves are not a useful option for potential GHG offsets under the CAA because it is unlikely that that NAAQS will be set for GHGs—EPA has chosen to use §111, not section §110, as its primary vehicle for stationary-source GHG regulation.[64]

Even if they are a poor analogy for hypothetical Type 3 flexibility under §111, ERCs at least superficially indicate that offsets are not in principle incompatible with the CAA. One might try to take this further and interpret ERCs as evidence that Type 3 flexibility under §111 is specifically compatible. But §111 contains no parallel to the ERC language in §110. Congress demonstrated with the ERC program that it was aware of the benefits of offsetting emissions and was capable of crafting language that would specifically include them in EPA's authority. Congress' failure to do so elsewhere in the Act, notably under the performance standard provisions in §111, could therefore be interpreted to indicate that it did not intend to grant such authority anywhere else. This leads to a contrary interpretation of ERCs—their presence in §110 but not §111 seems to imply that Congress *did not* intend for EPA to have the authority to implement anything similar for performance standards.

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[63] Id.; offsets can also come from an upwind area—that is, another nonattainment area—if emissions from that other area affect compliance in the area where the permit is being sought.

[64] Robin Bravender, *EPA chief signals opposition to Clean Air Act curbs on GHGs*, E&E News (Dec. 8, 2009) (available at http://www.eenews.net/public/Greenwire/2009/12/08/4) (quoting EPA Administrator Lisa Jackson: "I have never believed and this agency has never believed that setting a national ambient air quality standard for greenhouse gases was advisable").

This *expressio unius* argument should not be taken too far. The CAA is a flexible statute, with many different programs aimed at different pollutants from different sources. EPA has a long history of interpreting these programs relatively independently, strengthened by *Chevron* deference, and an *expressio unius* argument that depends on Congressional consistency throughout the statute is therefore not very strong. It is difficult to argue that the scope of authority delegated to EPA should be exactly the same for each CAA program, despite their wide variation in aims and structure.

Nevertheless, an *expressio unius* argument based on ERCs probably is a strong counter to the argument that the presence of offsets elsewhere in the statute makes them *compatible* with §111. In short, ERCs do not seem to provide clear evidence either way on offsets under §111.

4.3.2.3 The "Best System" and Type 3 Flexibility

A third argument for Type 3 flexibility is that if EPA can include Type 1 (and possibly Type 2) flexibility as part of the "best system of emission reduction," that language similarly supports the inclusion of Type 3. EPA can, the argument goes, characterize its chosen form of trading *plus offsetting Type 3 flexibility* as the "best system," and be done with the issue—or at least get over the *Chevron* step one bar. This might be correct, and is probably the strongest legal argument for Type 3 flexibility under §111.

But including both Type 1 and Type 3 via the "best system" language places a heavy burden on that part of the statute—with implications for both the courts' view of EPA's interpretation and the agency's own tolerance for such ambitious maneuvers. It is certainly not possible to rule out such a move for Type 3 flexibility while still accepting it as a legally plausible justification for Type 1, but including both based on the same statutory language would be a particularly bold strategy. The agency is likely (though not certain) to consider Type 1 flexibility to be a higher priority than Type 3. Its interpretation of the "best system" language will therefore already be doing heavy lifting, and it may not bear—or EPA may fear that it will not bear—the further strain of including offsets. Identifying the "best system" as Type 1 and Type 3 flexibility—trading *and* offsets—asks a lot of EPA general counsel and ultimately, given the inevitable lawsuit, of courts.[65] Nevertheless, this is at best informed speculation. The only legal judgments that matter are those of the agency (determining the initial scope of the program) and of the courts (determining its final legal status).

[65] This is especially true if EPA seeks to include *international* offsets. See Section 4.4.1 below.

Even if EPA does adopt Type 3 flexibility via the "best system" language, a court could find grounds to reject it without threatening Type 1 flexibility. Type 3 flexibility, by definition, requires EPA to consider emissions and/or carbon impact from sources that are not directly regulated by performance standards. *Asarco*, discussed in Section 4.1 above, can be viewed as restricting the ability of the agency to redefine the limits of the "fence" within which emissions/standards compliance can be averaged or traded. Identifying Type 1 flexibility as part of the "best system" allows EPA to move the fence despite *Asarco*, but it does nothing to permit inclusion of "outside-the-fence" facilities/resources, as required by Type 3 flexibility.

No CAA performance standard and, to my knowledge, no CAA program of any type has allowed offsetting from such outside-the-fence sources. No language within the statute readily supports such a move (though it is not directly contradicted either). Whatever ambiguities exist, §111 is focused on the regulation of defined source categories. Source categories are, in many ways, the defining feature of §111 regulation. Type 3 flexibility would ignore the "fences" implicit in a source category approach, without even the veneer of compatibility provided by using EPA's recategorization powers, as suggested above for Type 2 flexibility. A court might therefore conclude that Type 3 flexibility is incompatible with the general source category–driven structure of §111, even if it accepts an EPA claim that such flexibility is a reflection of the "best system".

4.3.2.4 Type 3 Flexibility and States' Independent Powers

Another argument is that states' powers under §111(d) may allow them to provide existing sources with Type 3 flexibility, even if EPA could not. This argument is largely identical to that discussed in Section 4.1.2 for Type 1 flexibility, and suffers from the same flaws. Above all, §111(d)'s reference to §110 appears to be purely procedural, and does not grant the authority to use substantive tools that are outside the §111(a) definition of performance standards.

However, even if states' §110 powers are fully incorporated by the §111(d) "procedure similar" reference, they still might not include Type 3 flexibility. As mentioned above, the NAAQS program already includes offsets: ERCs (albeit indirectly, via preconstruction permitting in nonattainment areas). Although the *expressio unius* argument based on ERCs is relatively weak when applied to the CAA as a whole, it is somewhat stronger when its scope is limited to the NAAQS program. ERCs would lose much of their significance if states could allow emitters to broadly offset their emissions. On the other hand, Congress might have been sufficiently concerned about costs in the specific situation covered by ERCs (new sources in

high-pollution areas) to carve out an offset provision, while still intending to allow states discretion over whether to use them more generally.

4.3.3 The Case for Type 3 Flexibility

It is difficult to draw a definitive conclusion about the compatibility of Type 3 flexibility with §111 performance standards. The statute does not clearly rule them in or out. Arguments based on parallels to NAAQS ERCs and those based on states' powers under §111(d) and §110 do not offer much support and are in tension with each other. But the core argument—analogous to that for Type 1 flexibility, that the offsets made available by Type 3 are part of the "best system"—is at least superficially strong. Nevertheless, the tension between the source category–based design of §111 and Type 3 flexibility may be hard for a court to ignore. Type 3 flexibility by definition breaks through, not only the barriers between source categories, but also those between sources inside and those outside of §111 entirely. This has no apparent precedent under any §111 regulation or indeed any CAA program.

4.4 Type 4 Flexibility: Extra–Clean Air Act Sources

The above discussion of Type 3 flexibility relates only to emissions from sources that could, at least in principle, be subject to their own §111 performance standards. But many sources of GHG emissions are entirely outside the reach of §111. Trading with these sources is Type 4 flexibility. Some sources are located outside the geographic—and apparently jurisdictional—reach of the CAA. Others are difficult or impossible to classify into source categories at all, regardless of their location.

4.4.1 International Sources

International sources appear to be outside the reach of §111 regulation. Courts interpret statutes not to have extraterritorial application unless there is evidence of congressional intent to the contrary.[66] No such evidence exists in §111, and there is little elsewhere in the CAA to indicate such an intent. Even §115 of the statute, which deals specifically with emissions that have international health or welfare impacts, limits regulatory authority to domestic pollutants—

[66] See *Morrison v. Nat'l Austl. Bank Ltd*., 130 S. Ct. 2869, 2873 (citing *U.S. Equal Employment Opportunity Commission v. Arabian American Oil Co*., 499 U.S. 244, 248) ("It is a "longstanding principle of American law that legislation of Congress, unless a contrary intent appears, is meant to apply only within the territorial jurisdiction of the United States. When a statute gives no clear indication of an extraterritorial application, it has none").

though it does require that other countries give the United States reciprocal rights.[67] §115 is the international emissions counterpart to the §110 NAAQS program,[68] but §111 performance standards have no such counterpart.

International sources certainly could not be subject to direct emissions limitations under §111—even if the section had extraterritorial reach, it contains no provisions for enforcement. Whether these sources can benefit from §111 regulation as suppliers of credits to those sources that are subject to performance standards is more ambiguous. But in practice it would be difficult, and perhaps impossible, for EPA to monitor and enforce the emissions reductions behind such credits. Cooperation with foreign governments would be necessary, and EPA has no legal authority to negotiate such agreements and no experience in this area—though executive agreements by the president or, in principle, negotiated and ratified treaties might supply this authority.

Whatever EPA's limitations, at least one state has moved ahead with plans to include international sources in its independent program. California has signed memoranda of understanding with states in Mexico and Brazil that may eventually lead to forest offsets from those areas entering the California program.[69] Whether this policy will survive legal challenge is unclear.[70] States may generally have greater practical capability to incorporate international sources in their programs—either in their independent programs or in those required under §111(d)—though they also face additional legal barriers. The states' role in §111(d) regulation is discussed in more depth in Section 5 below.

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[67] See CAA §115(a).

[68] See CAA §115(b) (identifying §110 SIPs as the vehicle for implementation of emissions reduction required under §115).

[69] See *Memorandum of Understanding on Environmental Cooperation between the State of Acre of the Federative Republic of Brazil, the State of Chiapas of the United Mexican States, and the State of California of the United States of America* (Nov. 16, 2010) (available at http://www.socioambiental.org/banco_imagens/pdfs/Memorando_Acre_Chiapas_California_REDD_Nov_2010.pdf) ; see also Margot Roosevelt, *Chiapas to California: preserving forests for dollars?*, Los Angeles Times (Dec. 9, 2010) (available at http://latimesblogs.latimes.com/greenspace/2010/12/cancun-climate-forests-carbon-trading-california-chiapas.html).

[70] See Daniel F. Morris, Nathan Richardson, and Anne Riddle, *Importing Climate Mitigation: The Potential and Challenges of International Forest Offsets in California Climate Policy*, Resources for the Future Issue Brief 11-12 at 8–12 (Sep. 2011) (available at http://www.rff.org/Publications/Pages/PublicationDetails.aspx?PublicationID=21658).

4.4.2 Nonstationary Sources

Even domestically, §111 only applies to stationary sources—its title is "[s]tandards of performance for new stationary sources,"[71] and the source categories on which §111 regulation is based can only encompass stationary sources.[72] As defined by §111(a)(3), a stationary source is "any building, structure, facility, or installation which emits or may emit any air pollutant".[73]

But many sources of GHG emissions do not fit this definition, including vehicles, many aspects of agricultural operations, and, most importantly, forests. Forests certainly are not "buildings" or "facilities" and it seems bizarre to call them "structures" or "installations" in anything but the most abstract sense. In my opinion, the definition clearly refers to the built environment. If this is correct, it means that credits or offsets generated by avoided-deforestation projects, whether domestic or international, are outside the scope of §111.

4.4.3 Barriers to Type 4 Flexibility

In short, Type 4 flexibility requires regulators (EPA or states) to argue that §111 allows trading not only with things that are not currently regulated (Type 3 flexibility) but with things that could never be regulated under §111 and are excluded from its scope. This makes it even more difficult than for Type 3 flexibility for regulators to argue that these GHG sources can be part of the "best system of emission reduction" and exacerbates tension with the source category–driven character of §111 regulation and the "fence" it creates.

Congress certainly never intended §111 performance standards to include vehicle emissions, as mobile sources are dealt with elsewhere, under Title II of the statute. Congressional intent with respect to other classes of "nonstationary" sources is less clear, but the inclusion of such sources has no precedent under any CAA Title I program.

A counterargument is that Type 4 flexibility does not require regulators to "include" such extra–§111 sources: it need not impose any substantive emissions limitations on these sources, group them into any source category, or otherwise make them a formal subject of §111 regulation. All that is necessary is that they be considered a mechanism for reducing emissions from sources that are regulated under §111—these regulated sources remain the point of

[71] See CAA §111.

[72] See CAA §111(b) (stating that the EPA Administrator must publish "a list of categories of stationary sources").

[73] See CAA §111(a)(3).

regulatory compliance, and it is they that must be within the geographic scope of the CAA's application and they that must fit within the §111(a)(3) definition of "stationary source."

Even if this argument is accepted, however, Type 4 flexibility has no grounding in the statute outside of the "best system" language, remains in tension with the source category design of performance standards, and creates significant practical problems of monitoring and enforcement, particularly for EPA.

4.5 Type 5 Flexibility: Sequestration

Even if EPA were to successfully argue that Type 3 and possibly Type 4 flexibility is part of the "best system," and that move survived legal challenge, it still might not allow credits generated by *sequestration* of GHGs—Type 5 flexibility—to be incorporated into performance standards.

The reason is that sequestration, by definition, does not reduce emissions. Sequestration offsets are generated when nonemitting entities (usually landowners) make moves that reduce *concentrations* but not *emissions* of a pollutant. Landowners who plant trees or otherwise change land-use practices to increase the potential for sequestration are potential sources of sequestration offsets (more specifically, *afforestation* offsets); correspondingly, policies that allow the use of such offsets give landowners the incentive to take such action.[74] But these actions do not reduce emissions. In fact, they *increase* emissions when emissions restrictions are in place if emitting sources opt to purchase the resulting offsets instead of cutting their own emissions. [75]

[74] This example illustrates the effects of afforestation offsets. Offsets created by avoided deforestation—that is, projects that prevent the destruction of forests (and the resulting emissions) that would have otherwise occurred—are harder to classify. Avoiding deforestation does reduce emissions because at least some portion of the carbon locked into the forest's biomass would otherwise be emitted when the trees burn or decompose. But it also has a sequestration component, to the extent that forests that survive as a result of the avoided-deforestation project continue to sequester atmospheric carbon. In other words, afforestation offsets are an example of Type 5 flexibility, but avoided-deforestation offsets are partly Type 4 and partly Type 5. The distinction is unlikely to matter, however. First, the distinction matters only if one of the two types is legal under §111 but the other is not, and it appears that neither Type 4 nor Type 5 flexibility is legally permissible. Second, even if Type 4 flexibility is permissible but Type 5 is not, EPA could simply characterize avoided-deforestation offsets as Type 4 by avoiding the emissions/sequestration issue entirely.

[75] Note that this does not mean that sequestration offsets are ineffectual in terms of their climate impacts. Instead, it means that they affect atmospheric carbon via a mechanism other than the direct reduction of anthropogenic emissions. The difference is immaterial from a geophysical perspective but relevant from a legal one.

For purposes of CAA regulation, the distinction matters. Because sequestration offsets do not reduce emissions, it is hard to see how they can be considered part of the "best system of emission reduction." The plain language of §111(a) appears to require actual, concrete emissions reductions, not reductions in atmospheric concentrations. It is entirely plausible that such an argument will be made by environmental groups in litigation against any CAA program that includes forest offsets.[76] The plain language of the statute makes it relatively easy for judges to accept the argument and find that an EPA that permits the use of sequestration offsets exceeded its discretion.

This is an unfortunate limitation of §111 and an illustration of the fact that it, along with much of the rest of the CAA, was designed for control of pollution problems fundamentally different from GHGs. Contrary to the toxic, local, or at most regional pollution problems covered by the CAA in the past, the globally mixed, stock pollutant nature of GHGs makes worldwide ambient concentrations more important than current emissions or short-term concentrations. The CAA is not incapable of dealing with such a pollutant, but it has limitations—of which its apparent inability to deal with sequestration is one example.

Offset proponents might argue that differentiating between sequestration and emissions-reducing offsets is splitting hairs. The intent of Congress in crafting §111, they might argue, was to give EPA the tools to address threats to public health from emitting source categories, not to rigidly focus on reducing smokestack emissions. Congress, they might further argue, did not and could not have anticipated the intricacies of all pollutants that might be regulated under the CAA and, in particular, the peculiar characteristics of global (as opposed to local) pollution problems like GHGs.

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[76] See, e.g., Clean Air Task Force, *Statement of Ann Brewster Weeks on EPA Deferral of CO_2 Emissions from Bioenergy and Other Biogenic Sources from Clean Air Act Permitting Requirements* (Mar. 9, 2011) (available at http://www.catf.us/newsroom/releases/2011/20110309-CATF_Statement_on_EPA_Biomass_announcement.pdf) (claiming, in reference to EPA decision to treat biomass emissions as carbon neutral for CAA permitting purposes, that "there is nothing in the Clean Air Act that supports either a categorical offramp from permitting or a categorical BACT [best available control technology] determination for biomass fuels. Treating a ton of carbon pollution emissions generated by burning trees differently than a ton of carbon pollution emissions generated by burning any other fuel, either on a temporary basis or permanently, is just not justified in the law.") Weeks is Senior Counsel and attorney of record for the Conservation Law Foundation, one of a group of environmental plaintiffs suing EPA in *Center for Biological Div et al. v. EPA et al.*, case no. 11-1101 (DC Cir. 2011) regarding the agency's 2011 decision to delay a decision on the treatment of biomass emissions in the permitting process for three years (effectively treating biomass as carbon neutral during that period).

But this contradicts the plain language of the statute. Congress could have given EPA the authority to require or permit actions other than emissions reduction to mitigate identified harms from air pollutants, but did not do so, at least not in §111. Even despite this conflict with the plain language of the statute, a court might still be willing to liberally interpret the §111(a) definition were it not for the fact that many environmental groups dispute the utility of offsets in countering climate change. These groups will argue, with some justification, that smokestack emissions reductions are a more effective and measurable policy tool for reducing the impact of GHGs than are most forms of offsets. This, they might generalize, is the reason for (or at least a reason for not deviating from) Congress' focus on emissions reductions—only such reductions can guarantee environmental benefits. Both sides in this debate make good points, but only one has the statutory text on its side.

Another counterargument is that carbon sequestration could be considered a form of "negative emissions." This makes sense from a certain perspective because sources regulated under §111 performance standards that might buy credits generated by sequestration projects would do so as a means to reduce their net emissions. Regulated facilities have "positive emissions" from their operations, and Type 5 flexibility—sequestration offsets—provide the negative counterpart. This is conceptually valid but semantically ambitious, akin to a football announcer commenting that a player "gained negative yardage" or EPA suggesting that regulation does not have costs but "negative benefits." It is hard to predict how a court would view this interpretation, but relying on it seems very risky.

Assuming one believes that offsets are a useful policy tool, a focus on emissions over concentrations is a disadvantage for CAA performance standards relative to the NAAQS program, which does focus on atmospheric concentrations of the pollutants it regulates (and gives states broad latitude to regulate with the aim of meeting concentration targets). But performance standards have many other practical advantages over the NAAQS, and the mainstream view held by the agency, industry, and most major environmental groups appears to be that a NAAQS for GHGs is the wrong approach, both politically and practically.[77]

If Type 5 flexibility—sequestration offsets—is incompatible with §111 performance standards, major sources of offsets, such as afforestation of previously deforested land or other

[77] See Nathan Richardson, *Greenhouse Gas Regulation under the Clean Air Act: Does* Chevron v. NRDC *Set the EPA Free?*, 29 Stanford Environmental Law Journal 283, 294–99 (2010); see also Richardson et al., *Knowable Pathway* at 10101–10103 (cited in note 19).

land-use changes, or even future carbon-sequestering geoengineering projects will be unavailable. If this is correct, it implicitly forces CAA climate policy to accept the forest status quo *and* to forgo any incentives to remedy future deforestation. In practice, this would substantially reduce the volume of offsets available.

4.6 Biomass—Another Option?

Although allowing power plants to burn biomass for electricity generation is a flexibility mechanism, it does not readily fit into the framework described in Section 3.2 above. This option might be more important than some of the analyzed types of flexibility, however. Legal analysis of the scope for including such biomass co-firing within §111 performance standards is also quite similar in many ways to that for compliance flexibility with other sources described in the preceding sections. Briefly discussing biomass therefore is not only useful in its own right, but sheds additional light on interpretation of §111.

Biomass co-firing has been cited by EPA as a plausible short-term emissions-reducing option,[78] and its cost savings appear to be substantial.[79] Biomass is also controversial, however, with critics claiming that it would do little if anything to reduce net emissions.[80] In any case, can EPA legally treat biomass as an emissions reduction strategy?

It is important, first, to draw a distinction between facilities that exclusively burn biomass, and biomass co-firing at fossil fuel power plants. No legal barrier prevents EPA from

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[78] See EPA, *Technical Support Document for the Advanced Notice of Proposed Rulemaking for Greenhouse Gases; Stationary Sources, Section VII*, EPA docket number EPA-HQ-OAR-2008-0318-0081 (2008) (stating that "In addition to heat rate improvements, biomass co-firing can substitute for some of the coal in most types of existing and future coal-fired boilers, resulting in proportionately lower GHG emissions. . . As a pragmatic order-of-magnitude estimate, biomass co-firing might eventually substitute for 2 percent to 5 percent of coal used in the current coal fleet").

[79] Burtraw, Dallas, Matt Woerman, and Anthony Paul, *Retail Electricity Price Savings from Compliance Flexibility in GHG Standards for Stationary Sources*, Energy Policy (forthcoming 2012).

[80] See, e.g., Center for Biological Diversity, press release, *Lawsuit Challenges Clean Air Act Exemption for Biomass Burners* (Aug. 15, 2011) (available at http://www.biologicaldiversity.org/news/press_releases/2011/biomass-08-15-2011.html) (stating that "Recent scientific information indicates that burning biomass—trees, for example—can actually increase global warming pollution, even compared to fossil fuels. According to scientists, nearly all biomass fuels cause at least temporary near-term increases in atmospheric CO_2 concentrations, significant amounts of which will persist in the atmosphere and cause climate damage for a century or more. This near-term increase directly undermines efforts to reduce carbon dioxide emissions over the next several years, an effort that is essential to avoid the very worst damage due to climate change").

setting separate §111 performance standards for dedicated biomass facilities; these could be regulated under their own source category, distinct from fossil fuel plants.

Biomass facilities do have significant smokestack GHG emissions, but there is no apparent reason why EPA cannot consider the net lifecycle emissions of biomass if it so chooses. EPA need not treat emissions of a pollutant from different source categories equally (it is, for example, required to consider costs independently for each category).[81] This does not of course mean that EPA decisions on stringency for biomass-only facilities are easy: as noted, the lifecycle emissions of biomass are a subject of controversy. But that is a technical and policy problem, not a legal one.

The scope for allowing differential treatment of biomass co-firing under §111 performance standards is more complex, however. Like the types of flexibility discussed above, biomass co-firing does not reduce emissions at the regulated facility. In fact, it probably would *increase* emissions because biomass fuels are generally less efficient than fossil fuels (i.e., more must be burned to achieve the same energy output, resulting in greater GHG emissions). Regrowth would then result in resequestration of at least some of these carbon emissions (how much is the subject of controversy).

But, just as with Type 5 flexibility, this resequestration is indirect and affects atmospheric carbon concentrations, not smokestack emissions. As discussed above with reference to offsets, §111 explicitly targets emissions reductions from facilities in regulated source categories, in contrast to other sections of the CAA such as the §110 NAAQS that target concentrations of pollutants in the atmosphere. Characterizing biomass co-firing as emissions reduction (momentarily setting aside the lack of certainty over lifecycle carbon effects) is at worst simply incompatible with the language of §111 and at best requires an ambitious redefinition of the term *emissions*. As noted above, opponents of biomass combustion as part of carbon policy have taken legal positions along these lines in response to other EPA biomass regulation.[82]

It is possible, however, that EPA might be able to avoid some of the problems associated with differential treatment of biomass co-firing by using its powers to define source categories, just as it may be able to do for Type 2 flexibility. For example, EPA could create new source categories for power plants that use biomass for a given percentage of their fuel inputs, then

[81] See CAA §111(a)(1).

[82] See note 80 and accompanying text.

issue performance standards for those categories that, as discussed above for biomass-only source categories, treat emissions more favorably than those from purely fossil power plants. [83] This move allows the agency to convert co-firing, analogous to Type 5 flexibility, into Type 2 flexibility. Although promising, a similar move is not available for other sources of Type 5 flexibility because they are not emitters and cannot be placed into a source category.

Although somewhat inelegant, such categorization would allow the agency to avoid the strongest arguments available in a challenge to rules that treat biomass emissions differently—though at the cost of additional administratively complex rulemakings. EPA has so far shown no evidence that it intends to subdivide the fossil electricity source category for which it will soon propose performance standards. Until and unless it does so, it may be legally impossible for the agency to credit biomass co-firing. Fine subcategorization, whether to shoehorn differential crediting of biomass co-firing or for other reasons, may also decrease the cost-effectiveness of regulation, undercutting the rationale for flexibility.[84]

In short, differential treatment of biomass emissions under §111 regulation may prove problematic for EPA. Although the agency appears free to treat emissions from biomass-only facilities as it wishes, favorable treatment for biomass co-firing at fossil EGUs may be legally difficult because it does not result in smokestack emissions reductions. EPA's categorization powers may provide a workaround, though stretched agency resources might make the option unattractive.

Though seemingly a small issue, biomass co-firing has additional importance because many analyses of potential EPA carbon regulation have assumed that it would be an available tool,[85] and have predicted substantial associated cost savings.[86] If it is not available, estimates of the emissions reductions available to EPA will have to be revised down, perhaps significantly.

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[83] As noted above for Type 2 flexibility generally, this would probably complicate the design of a trading system.

[84] Burtraw et al., *Retail Electricity Price Savings* (cited in note 79).

[85] See, e.g., Richardson et al., *Knowable Pathway* at 10112 (cited in note 19); Burtraw et al., *Retail Electricity Price Savings* at 17 (cited in note 4).

[86] Burtraw et al., *Retail Electricity Price Savings* (cited in note 79).

4.7 Summary

The arguments for and against each type of flexibility (and biomass co-firing) presented in the above sections are admittedly complex. Table 1 below collects the most important arguments for easier consideration.

Table 1. Key Arguments and Counterarguments for Flexibility under §111

Type of flexibility	Arguments for	Arguments against	Compatible with §111?
Type 1: same source category	• Part of "best system of emission reduction" • State powers through §111(d); §110 analogy (existing sources only)	• "Best system" refers to level of stringency, not design of standards • Technology focus of §111 design incompatible with trading §110 defines • §111(d) procedure, not substance	Probably
Type 2: other regulated categories	• Agency ability to redefine source categories makes Type 2 equivalent to Type 1	• No precedent for "supercategories"	Probably
Type 3: unregulated categories	• Agency could issue "paper" standards, converting into Type 2 • ERCs under §110 provide parallel • Part of "best system"	• Paper standards do not save time, likely to result in litigation • §110 ERCs create negative inference • Arguably incompatible with source category-based design of §111	Probably not
Type 4: extra–CAA sources	• Extra–CAA sources not subject to regulation, just sources of credits, so limitations of statute's reach not important	• No indication that §111 is extraterritorial • Sources outside §111 definition create further incompatibility with source category design • No EPA international monitoring or enforcement authority	Probably not
Type 5: sequestration offsets	• Sequestration is "negative emissions"	• Sequestration does not reduce emissions, so cannot be part of "best system of emission reduction"	Probably not
Biomass co-firing	• Agency can create narrow source categories for different levels of co-firing	• Biomass does not reduce emissions, so cannot be part of "best system of emission reduction"	Probably

5. The Role of States

The previous sections have discussed possible legal limitations to the flexibility available to EPA under §111. But §111(d) ESPS, probably the most important and wide-reaching part of GHG regulations under the CAA, is federalist at heart—the states, not EPA, play the largest role. It is therefore important to look at what effect these legal limitations will have on states—both on their implementation of §111(d) performance standards and on their independent climate policies. Although states have great freedom to implement climate policies in principle, this section illustrates how that freedom is restricted in practice if CAA §111 performance standards are imposed, particularly if those standards exclude the extended flexibility mechanisms discussed above.

Comparing federal and state climate policies is necessarily an apples-to-oranges comparison. Although the above discussion of federal policy focuses on the limitations presented by the CAA, the following discussion treats states as free actors, legally bound only by the Constitution. This ignores the fact that state policy depends on state legislative action, just as the limits of federal policy would change if Congress amended the CAA or passed new climate legislation.

Despite this contradiction, there are some good reasons for treating states this way. First and most obviously, some states have more political flexibility or willingness to act on climate change than Congress currently does, as a matter of political reality. Moreover, some state legislatures already have acted to create state-level climate policy, most notably California in the form of its Assembly Bill (A.B.) 32 law. Finally, and more practically, analyzing the limits of state environmental regulators' ability to enact climate policies would require a detailed analysis of each state's environmental statutes, something clearly beyond the scope of this paper.

5.1 Environmental Federalism and States' Freedom To Act

States are generally able to enact their own climate policies, including emissions-trading or tax policies. Indeed many states already have done so. Ten states have joined together in the Regional Greenhouse Gas Initiative (RGGI), an interstate trading program for GHG emissions from the electricity sector.[87] California has enacted a comprehensive GHG regulatory policy

[87] See RGGI, http://www.rggi.org/rggi; state participants are Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont.

under A.B. 32 that will include a cap-and-trade system.[88] California is also part of the Western Climate Initiative (WCI) along with other states and Canadian provinces, though no other U.S. WCI states have been as aggressive as California.[89]

5.2 Constitutional Issues with State Programs

Some have raised constitutional concerns about these policies. One argument is that they violate the Dormant Commerce Clause by discriminating against out-of-state businesses (such as coal EGUs).[90] Reports in late 2010 claimed that some states outside of RGGI and WCI would file suits against California on dormant commerce clause grounds, but to date no such suits appear to have been filed.[91]

Another argument is that RGGI and other interstate GHG policies violate the Compact Clause, which forbids states to enter into an "Agreement or Compact with another State, or with a foreign Power" without congressional consent.[92] Congress has given no specific consent for RGGI or WCI and, the argument goes, these are "compacts" of the type forbidden by the Constitution. Such a challenge does not appear to have been made against either group to date,

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[88] See California Air Resources Board (CARB), *A.B. 32 Climate Change Scoping Plan Document* (2009) (available at http://www.arb.ca.gov/cc/scopingplan/document/scopingplandocument.htm).

[89] See Margot Roosevelt, *California, New Mexico and 3 Canadian provinces outline regional cap-and-trade program*, Los Angeles Times (Jul. 28, 2010) (available at http://articles.latimes.com/2010/jul/28/local/la-me-climate-pact-20100728); see also WCI, *Design for the WCI Regional Program* (2010) (available at http://www.westernclimateinitiative.org/the-wci-cap-and-trade-program/program-design).

[90] See, e.g., Robert Stavins, *A.B. 32, RGGI, and Climate Change: The National Context of State Policies for a Global Commons Problem* (Oct. 1, 2010) (available at http://www.robertstavinsblog.org/2010/10/01/ab-32-rggi-and-climate-change-the-national-context-of-state-policies-for-a-global-commons-problem/) (noting that "In brief, in the absence of meaningful Federal action, sub-national climate policies could well become the core of national action. Problems will no doubt arise, including legal obstacles such as possible Federal preemption or litigation associated with the so-called Dormant Commerce Clause").

[91] See Mark Schapiro, *Four states prepare legal assault on California's climate law*, California Watch (Sep. 10, 2009) (available at http://californiawatch.org/dailyreport/four-states-prepare-legal-assault-californias-climate-law-4564) (stating that "The attorneys general of Alabama, Nebraska, Texas and North Dakota have been devising a legal strategy to challenge the California act, signed by Gov. Arnold Schwarzenegger in 2006, on the grounds that it interferes with the right to freely conduct interstate commerce").

[92] U.S. Const. art. I, § 10 cl. 3.

however, and some scholars have concluded that such a challenge would be likely to fail.[93] The Compact Clause may nevertheless create problems if states attempt to include international offsets in their programs or link with trading markets in other countries (as California plans to do with its Canadian WCI partners),[94] however. These constitutional issues remain unresolved but are largely outside the scope of this paper.

Neither of these constitutional issues appears likely to derail state-level climate policies generally. But that does not necessarily resolve the narrower questions of whether and how such policies might include offsets or the other flexibility mechanisms discussed above.

5.3 Leakage

If EPA adopts even basic (Type 1) flexibility in its §111 GHG performance standards, an immediate tension with state programs that more aggressively reduce GHG emissions is created: leakage. Because the stricter state programs do not result in increased stringency of the national program, those state programs may not reduce emissions, but rather simply export them to other states. Emitters that comply with strict state programs will overcomply with the federal standards, and therefore will have allowances or credits that can be traded to out-of-state emitters. The buyers of these credits can then emit the same amount of GHGs that the state sought to eliminate. And because GHGs are global pollutants, the state policy would see no environmental benefit.

Can this problem be avoided? Maybe. It helps that states control the implementation of §111(d) standards. A state with a more stringent program could opt out of any flexibility component of those standards suggested by EPA, or at least out of any interstate trading. It might also be able to design its §111(d) program so as to allow only emissions reductions beyond those

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[93] See, e.g., Michael S. Smith, *Murky Precedent Meets Hazy Air: The Compact Clause and the Regional Greenhouse Gas Initiative*, 34 Boston College Environmental Affairs Law Review 387, 415 (2007) ("In its current iteration, it is likely that RGGI will not require congressional consent . . ."); see also Dan Farber, *Climate Change, Federalism, and the Constitution*, 50 Arizona Law Review 879, 908 (2008) ("Thus, although the states may be limited in their ability to form multi-state regulatory authorities without congressional approval, policy coordination between states does not seem to pose the same kind of challenge to national authority. Thus, if a number of states coordinate on the adoption of similar climate change regulations and allow trading between their emission sources, the Compact Clause should not be implicated, provided that regulatory authority and enforcement powers continue to be held by the states themselves rather than by some interstate agency. For this reason, the RGGI trading system between the Northeast states does not appear to pose a problem under the Compact Clause").

[94] See Margot Roosevelt, *California, New Mexico and 3 Canadian provinces* (cited in note 89).

required by both federal *and* state regulation to generate tradable credits. Other technical fixes are undoubtedly available.

5.4 Extended Flexibility at the State Level

Because state legislatures (and, via powers delegated from those legislatures, state environmental regulators) control the design of state-level climate polices, those policies can in principle include almost any particular tool. A state could in principle enact a cap-and-trade system (as California and RGGI have), a renewable portfolio standard (as many states have done), a carbon tax, or other mechanisms.

This includes many types of extended flexibility as well. Nothing prevents California from, for example, allowing land-use change of some type in the state to generate offsets for use in the A.B. 32 cap-and-trade program. Assuming that interstate trading programs like RGGI are generally legal, offsets from other participating states could similarly be included—from the perspective of each regulating state, this is a form of Type 4 flexibility because the out-of-state sources are outside the reach of state regulators. A program could, in principle, also include out-of-state offsets even if those states are not full members of the interstate program—states that enter into agreements to set a baseline and supply credits need not also agree to reduce overall state emissions.

But legal problems with extended flexibility may arise in two scenarios. First, international offsets may present constitutional problems that could limit or prevent their adoption. And second, the limitations on extended flexibility under the CAA discussed above could cause compatibility issues with state-level programs, perhaps even causing states not to include them. I have at least briefly analyzed the constitutional issue elsewhere, [95] (and I hope that other scholars, including true experts in constitutional law, will do so in greater depth). Therefore, I discuss only the CAA compatibility here.

Even if states face no constitutional restrictions on their ability to incorporate extended flexibility, they could, ironically, be discouraged from doing so by the presence of the parallel EPA program. If EPA cannot include certain types of flexibility in its program, or simply

[95] See Morris et al., *Importing Climate Mitigation* at 12 (cited in note 70); see also Molly K. Macauley and Nathan Richardson, *Seeing the Forests and the Trees: Technological and Regulatory Impediments for Global Carbon Monitoring*, Berkeley Technology Law Journal (forthcoming 2011).

chooses not to, it may become incompatible with state programs that do include those types. If emitters in, say, California, use international avoided-deforestation offset purchases (Type 4 flexibility) to comply with emissions cuts required by the state, they would be out of compliance with a federal standard that required emissions cuts at the facility or source category (Type 1) level. This is true even if state requirements are stricter than federal requirements in terms of emissions. In this scenario, credits obtained through types of flexibility excluded under federal regulation would be useful only for the additional emissions reductions states impose beyond EPA requirements. This increases the cost of state programs without any emissions benefit.

This simple scenario hides much legal complexity. ESPS regulation under §111(d) is primarily a state activity; EPA simply sets initial guidelines and reviews state plans, intervening only if states fail to act. But states do not have complete discretion in writing their §111(d) plans. As discussed above, states must set standards of performance within the definition of the CAA, which limits their ability to incorporate extended flexibility just as it does for EPA. Section 111(d) does not limit states' ability to regulate emissions more stringently, but this does not grant states the ability to use tools other than "standards of performance" for the emissions cuts or efficiency improvements required under the CAA. This is in contrast to state plans under the CAA NAAQS program, which do grant such broad flexibility so long as environmental targets are met.[96]

It is possible that EPA could take more creative approaches to §111(d) regulation, such as setting state-level budgets rather than facility-level targets. But even if doing so is permissible under §111, it is unclear whether such approaches would permit any of the types of flexibility (3, 4, or 5) that may not be compatible with §111.

EPA's position on compatibility between its planned §111(d) standards and state-level climate programs is unclear. One senior figure at the agency has indicated that EPA will seek compatibility, stating that "[t]here is a very live possibility in upcoming guidelines and state implementation of those guidelines [that §111(d) standards] would be compatible with existing state programs."[97] But others at EPA have expressed skepticism over whether compatibility is

[96] See CAA §110(a)(2)(A).

[97] Dawn Reeves, *EPA Hints At Granting State GHG Programs "Equivalency" under NSPS*, Inside EPA, April 7, 2011, (available at http://insideepa.com/201104072360309/EPA-Daily-News/Daily-News/epa-hints-at-granting-state-ghg-programs-equivalency-under-nsps/menu-id-95.html) (quoting EPA senior air counsel Joe Goffman).

possible, particularly with state programs that include trading and offsets.[98] EPA officials have also stated that they do not intend to implement cap and trade via §111,[99] and though it is unclear exactly what regulatory approaches this would include and exclude, linking §111(d) regulation to state programs that explicitly use cap and trade might violate the principle.

It is important to stress that none of these potential incompatibilities limits states' freedom to develop their own climate policies, including the freedom to determine what level of flexibility is available and whether extended flexibility is included. But compliance with §111(d) is not optional, and states are bound by its limitations. For categories of sources regulated under CAA performance standards, states therefore face a choice: impose dual, overlapping requirements, or tailor their programs to comply with the limits of §111(d), at least for that portion of emissions reduction required by the federal guidelines.

If states with their own climate programs are unable to use extended flexibility for compliance with §111(d) EPA regulation, these states' program choices will narrow, and other states may be less likely to join existing interstate climate agreements. States with existing programs will probably be less likely to include offsets in their programs because they would be useful only for emissions restrictions beyond federal requirements. The administrative, enforcement, and compliance costs of an offset program might not be justifiable under these conditions, leading states to abandon offsets entirely. As a result, costs would increase (assuming offsets are the cheapest option available to emitters for meeting state requirements). This has obvious effects on the regulating states, but also makes other states less likely to join interstate programs. Federal climate regulation might also rob efforts to implement climate policy at the state level of much of their momentum.[100]

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[98] Id., noting that "EPA air chief Gina McCarthy at the listening sessions has openly grappled with how the agency could incorporate flexibilities offered under the state programs, such as allowance purchases and offsets, into the federal rule."

[99] Id., noting that "McCarthy has also been adamant that EPA would not seek to establish a broad cap-and-trade program under the NSPS rules, particularly given the current political climate against a carbon cap on Capitol Hill."

[100] Conceivably, §111(d) could also promote stronger climate policies in those states that do not already have them because it will force all states to have the administrative structure of a climate policy in place, reducing start-up costs for the program.

6. Conclusions and Implications

6.1 Legal Limits, Political Pressure, and EPA

At least in the short term, EPA action under the CAA appears to be the only game in town for federal climate policy. In practice, this means an old statute will be used for a new, possibly uniquely challenging policy problem. This is not a disaster. Evidence suggests that, given smart choices, EPA can implement a fairly effective and cost-effective set of short- to medium-term policies. But there are limitations. Cost-effective climate policy almost certainly involves an economywide carbon price and incorporates offsets—in particular, those generated by forest management in tropical countries. The CAA pathway appears incompatible with both.

The inclusion of extended flexibility, including some forms of offsets, in the most important part of the EPA/CAA climate program—§111 performance standards—cannot be ruled out. But including them requires ambitious interpretation of statutory language, and even that is not enough to allow the use of the most attractive categories of offsets: forests. Although EPA may be able to implement carbon-cutting policies that, politically, the current Congress cannot, the agency is legally constrained by the scope of authority granted by earlier Congresses, as embodied in the CAA. In other words, EPA's powers are limited. In congressional discussions of climate bills, politics made it necessary to deviate from blackboard ideals of cost-effective policies. The CAA will require EPA to deviate from those idealized policies too.

Even if they are not legally conclusive, the strength of arguments against Types 3, 4, and 5 flexibility makes it much less likely that EPA will take the practical risk of including offsets. Though the agency has made some bold interpretive moves in the recent past, most notably in CAMR, courts have not generally been receptive.[101] The agency may therefore have lost some of its appetite for ambitious interpretation of the CAA, particularly in the context of its already controversial GHG regulatory programs.

Moreover, institutional politics may constrain the agency in practice as much as or more than the CAA itself does. Many in Congress, particularly but not exclusively Republicans, are strongly opposed to the agency's GHG regulatory programs, and have sought legislation

[101] See generally *New Jersey v. EPA*, 517 F.3d 574 (DC Cir. 2008) (rejecting EPA's CAMR mercury cap-and-trade program); see also *North Carolina v. EPA*, 531 F.3d 896,908 (DC Cir. 2008) (per curiam) (remanding EPA's Clean Air Interstate Rule limiting sulfur dioxide and nitrogen oxide emissions).

delaying or removing EPA authority over GHGs.[102] They have also sought to cut agency funding.[103] In this environment, EPA is much less likely to be bold than it would be in quieter times or for less headline-grabbing pollutants, particularly with respect to tools like offsets that do not have strong support from many environmentalists.

For offsets, reduced EPA funding has direct implications. Offset programs are likely to be administratively complex and labor intensive for the agency, especially relative to more traditional performance standard approaches under §111. Although some of this workload could in principle be shifted to states under §111(d), much could not—especially insofar as international offsets are concerned. And budgetary situations in the states are hardly more favorable.

Put differently, it is not clear that offsets have a constituency pressing EPA to include them, so why would EPA expend its limited political capital and agency resources to implement them, given the apparent legal barriers and administrative costs?

The role of political pressure in the design of EPA's GHG programs is somewhat ironic; offsets and emissions trading are cost-control and efficiency mechanisms. Without them, EPA regulation is likely to be more costly, less environmentally valuable, or both. Although it grabs headlines to accuse EPA of attempting to implement cap and trade through the back door, such attacks make trading less likely, not caps. The same may be true for offsets.

6.2 Flexibility and Stringency

If extended flexibility options like offsets are not available, the implications affect not only the costs of EPA-driven climate policy, but also the level of stringency—that is, the level of environmental benefits—that the agency can legally and politically justify. The issues of stringency and flexibility are linked. The more stringent EPA's CAA climate policy is, the more important extended flexibility becomes. If CAA regulation requires only minimal reductions in GHG emissions, many sources will be able to meet the standards at reasonable cost either alone

[102] See Lynne Peeples, *TRAIN Act to limit clean air protection passes the House*, Huffington Post, Sep. 23, 2011 (available at http://www.huffingtonpost.com/2011/09/23/train-act-clean-air-protection-house_n_978502.html).

[103] See David Rogers, *EPA funding cuts outlined by GOP*, Politico, Jul. 6, 2011 (available at http://www.politico.com/news/stories/0711/58409.html).

or via Type 1 flexibility (trading with sources in the same sector). Evidence suggests that significant opportunities for improving efficiency are available at coal plants, for example.[104]

It is possible that these and other relatively easily identifiable and low-cost opportunities for domestic emissions reduction could be targeted by performance standards. But if these opportunities are not available, or if EPA fails to identify them, then the costs of climate policy will increase or ambitions for GHG reductions will have to moderate. The more stringent EPA's emissions reduction targets and the longer the CAA remains the only federal climate policy, the more quickly these opportunities will be exhausted. In the meantime, other countries may adopt policies that incorporate offsets. It is possible that by the time the United States adopts a climate policy not grounded in a 1970s statute, other countries may have already taken advantage of the most cost-effective carbon-reducing opportunities.[105]

The relationship between stringency and flexibility goes in both directions. Because EPA must take cost into consideration when setting performance standards under §111, and because higher-cost regulation will increase political pressure on the agency, the environmental goals reachable under §111 are constrained. If extended flexibility is unavailable, then standards cannot be as stringent. Although the agency's ability to consider costs is generally a good thing, in this case it combines with §111's apparent limitations on available tools to undermine EPA's ability to achieve meaningful emissions reductions under the CAA.

Not everyone agrees that this tradeoff exists. The analysis in this paper has generally assumed that the effect of extended flexibility tools like offsets on carbon concentrations is equivalent to the smokestack emissions cuts they replace. But some view the environmental gains of offsets and/or other options such as biomass co-firing as illusory.[106] These observers may cheer rather than lament a policy pathway in which these tools are difficult or impossible to

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[104] See Burtraw et al., *Guide for Economists* at 299–301 (cited in note 18); Burtraw et al., *Retail Electricity Price Savings* at 2 (cited in note 4); see also generally Sargent & Lundy, LLC, *Coal-Fired Power Plant Heat Rate Reductions*, Final Report (for EPA) (2009) (available at http://www.epa.gov/airmarkt/resource/docs/coalfired.pdf).

[105] On the other hand, it might be better to wait. In principle, technological change could make carbon-reducing opportunities cheaper, not more expensive, over time. Even if other countries were to, for example, take advantage of the most cost-effective forest offsets, future energy technologies might make all offsets less attractive, or sequestration geoengineering could even become available at low cost. Predicting these changes is impossible, but offsets, particularly forest offsets, are the most cost-effective large-scale emissions reductions currently available.

[106] See, e.g., EJ Matters, *The California Environmental Justice Movement's Declaration on Use of Carbon Trading Schemes To Address Climate Change* (available at http://www.ejmatters.org/declaration.html) (stating opposition of environmental justice groups to both cap and trade and carbon offsets).

implement. As lawsuits by California environmental justice groups over that state's decision to implement a cap-and-trade system illustrate,[107] it may be these groups, rather than industry, that are most likely to challenge EPA regulations that include alternative tools.

It is important to understand and verify the actual impact of offsets or biomass combustion on carbon concentrations and adjust policy accordingly. Nevertheless, a policy pathway that leaves one or more of these tools off the table entirely before they can be studied in practice is at least less than ideal, and may be substantially more costly. To the extent that this is true of an EPA- and state-led policy path, it is another in a list of disadvantages of that path relative to a legislative path.[108]

6.3 States

Can the states provide a way out of this dilemma? To date, they have been the leaders in U.S. climate policy, and that may not change even after EPA implements CAA performance standards for major sectors of the economy. States retain the freedom to pursue their own climate policies, using whatever tools they determine are most effective, including statewide cap-and-trade programs (like California) and, potential constitutional issues aside, international forest offsets.

But this theoretical freedom is tempered in practice by interactions with EPA's program. Because states must comply with EPA's guidelines and with the limits of §111 in doing so, tools that are unavailable to EPA are similarly unavailable to states for the emissions reductions in-state sources must make to comply with §111 standards. Because of this, states may decide that administratively costly offset programs are not worth pursuing, and this will increase the costs (and possibly the stringency) of these states' programs. States without climate policies may also be less likely to adopt them.

6.4 Implications of Limited Flexibility

The apparent inability of the CAA pathway to incorporate cost-effective extended flexibility tools does not mean that the pathway is a mistake. It is, first of all, required by law.

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[107] See *Associated Irritated Residents v. CARB*, case no. CPF-09-509562 (Cal. Super. Ct. San Francisco 2011).

[108] This is not to suggest that the legislative path is ideal either. As the Waxman–Markey bill illustrates, real-world federal carbon legislation is likely to be far from blackboard ideals and full of carve-outs, exceptions, and other features that limit its cost-effectiveness.

Moreover, the CAA still appears capable, in the hands of a bold, smart EPA, of achieving meaningful carbon reductions at modest cost over the short term.[109] And the short term matters because no federal-level alternative is likely to arise for some time. It is further likely that any new legislative policy that does eventually emerge will be far from ideal (perhaps just as far as the CAA appears to be) as a result of political compromise. Nevertheless, §111 performance standards that cannot include extended flexibility, particularly international forest offsets, appear to leave some of the best climate policy tools on the table.

Can this problem be solved? In principle, yes. A minimally invasive solution would be for Congress to amend the CAA to explicitly allow extended flexibility (with appropriate verification requirements) in §111 performance standards. But this would be politically difficult. Congress has almost no track record of such moderate changes to big environmental statutes. The last significant changes to the CAA, in 1990, required years of debate and major political compromise and resulted in the addition of multiple new Titles to the Act.[110] Essentially, Congress passed major new environmental legislation that was labeled as a set of amendments to an existing statute. The current makeup and level of debate in Congress makes it unlikely that this would happen today. And even if Congress is capable of passing major environmental legislation, it would be better off passing dedicated climate legislation, not tweaking the existing CAA to make it better fit the GHG problem. As noted at the outset, this, too, seems unlikely.

6.5 Further Research

It is worth stressing again that the availability of extended flexibility under CAA GHG regulation is seriously underexplored. This paper, I hope, has begun to address that gap, but it remains wide open. Substantial ambiguity remains over core questions, such as EPA's ability to use its categorization powers to achieve Type 2 flexibility, and, more deeply, over the meaning and implications of the "best system" language itself, upon which most arguments in favor of

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[109] See Richardson et al., *Knowable Pathway* at 10115–10116 (cited in note 19); see also Richardson et al., *The Return of an Old and Battle-Tested Friend* (cited in note 3).

[110] See EPA, *The Clean Air Act Amendments of 1990: Overview* (available at http://www.epa.gov/air/caa/overview.txt) ("By large votes, both the House of Representatives (401-21) and the Senate (89-11) passed Clean Air bills that contained the major components of the President's proposals. Both bills also added provisions requiring the phaseout of ozone-depleting chemicals, roughly according to the schedule outlined in international negotiations (Revised Montreal Protocol). The Senate and House bills also added specific research and development provisions, as well as detailed programs to address accidental releases of toxic air pollutants").

flexibility depend. In addition, legal scholars with expertise beyond environmental and administrative law have opportunities to make valuable contributions. For example, the constitutionality of state moves to include international offsets in their programs is unclear. International and constitutional law scholars will also be needed to better determine whether the CAA is compatible with international offsets.

Although it is likely that the courts and/or Congress will make the final decision on many of the issues discussed in this paper, ample room remains for further work to better understand the law as it stands. That work will be valuable, both to EPA and the states as they plan their regulatory programs under §111, and to industry as it attempts to predict what those programs will require.