This post is the first in a mini-series exploring likely legal challenges to EPA's New Source Performance Standard (NSPS) for power-plant greenhouse gas emissions under Clean Air Act § 111(b), and how those challenges might affect the Clean Power Plan.

I will leave detailed exploration of the Clean Power Plan for later posts, but suffice it to say here that I consider the final rule in general to be a legally defensible tool to achieve meaningful climate action.

There are certainly important, unresolved statutory interpretation questions that are not sure-wins for EPA. As Ann Carlson and I argue in a recent Harvard Environmental Law Review essay, we expect the U.S. Supreme Court's analysis of the Clean Power Plan to come down, at heart, to how the Court views EPA's interpretation of the text in broader context. In other words, in designing its program for state-based control of greenhouse gas emissions from existing power plants, is EPA interpreting Clean Air Act § 111(d) "sensibly" by issuing a rule that takes into account cost-effectiveness, historical state action, and the complexity of the problem, thus warranting the leeway that *EPA v. EME Homer City Generation* accorded EPA? Or is the agency engaged in an "enormous and transformative" power grab as in *Utility Air Regulatory Group v. EPA*, imposing on power plants and states a rule that extends far beyond the bounds of what the statute intends? It is impossible to predict what five justices will think, but the former story seems to better fit the Clean Power Plan. At the end of the day, it will likely come down to which story Justice Kennedy finds more compelling.

Dan Farber and Kate Konschnik have also discussed the so-called Clean Air Act "glitch" or "drafting error"—an apparent unreconciled conflict in the Senate and House versions of the 1990 Clean Air Act Amendments. Opponents argue the glitch bars EPA from regulating power plants under §111(d). Like Dan and Kate, I do not think Congress intended to strip

EPA of its regulatory authority, and generally view opponents' arguments here as stretched.

Additionally, some have raised constitutional objections to the Clean Power Plan—but these more-bark-than-bite arguments seem far less persuasive than the statutory claims.

All in all, it seems the Clean Power Plan has, at the very least, a solid fighting chance of surviving judicial review.

There is another potential legal threat to the Clean Power Plan, however—one that could derail the rule before a court even has a chance to review it.

The Clean Air Act requires a performance standard for *new* sources to be in place before EPA enacts a standard for *existing* sources (CAA § 111(d)(1)(A)(ii)). EPA released a final New Source Performance Standard (NSPS) for greenhouse gas emissions from new and modified fossil-fuel-fired power plants at the same time as it released the Clean Power Plan. In the clamor to explore the content of the Clean Power Plan, commentators have devoted little focus to the final NSPS. But if a court were to strike down the standard for new plants, the Clean Power Plan could be rendered invalid. Even though this invalidation would only be temporary (pending EPA's adoption of a new NSPS), a delay could significantly disrupt the Clean Power Plan compliance timeline and state targets. Meanwhile, in the absence of federal regulation, many existing power plants would continue to emit greenhouse gases into the atmosphere, hampering achievement of the Obama Administration's international emission-reduction commitments. NSPS legal vulnerabilities are thus, to some extent, also threats to the Clean Power Plan.

What is the NSPS for Greenhouse Gases?

Clean Air Act § 111 requires EPA to establish greenhouse gas emission standards for fossil-fuel-fired power plants. These performance standards must "reflect[] the degree of emission limitation achievable through the application of the **best system of emission reduction** which (taking into account the cost of achieving such reduction and any nonair quality health and environmental impact and energy requirements) the [EPA] Administrator determines has been adequately demonstrated" (§111(a)(1)). This standard is otherwise known as **"BSER."** Sources do not necessarily need to adopt the BSER, but they must meet the associated performance standard. Performance standards allow sources flexibility to pursue cost-effective compliance options, and encourage investment in technological research and development.

Section 111 holds new sources to more stringent pollution-control standards than existing

sources, reflecting Congress' recognition that new construction is the ideal time to implement pollution-control systems. Installing pollution-control devices in new construction is generally less costly than retrofitting existing plants, and costs can be amortized over the life of the plant. Additionally, because the new plant will be in operation for a long time, the Clean Air Act recognizes the importance of controlling emissions from the outset.

EPA released its NSPS rule for greenhouse gas emissions from new and modified power plants at the same time as the Clean Power Plan, which regulates greenhouse gas emissions from existing power plants. The new source rule contains the following standards for new power plants:

- For new steam generating units (e.g., **coal or pet coke power plants**), EPA determined the BSER to be an **efficient new supercritical pulverized coal (SCPC) utility boiler with partial carbon capture and sequestration (CCS) technology**, resulting in a performance standard of **1400 lbs CO_2/MWh**.
- For new baseload stationary combustion turbines (e.g., **natural-gas power plants**), EPA determined the BSER to be an **efficient natural gas combined-cycle (NGCC) plant**, resulting in a performance standard of **1000-1030 lbs CO_2/MWh**.

The Controversy over CCS

The most controversial aspect of the NSPS is EPA's inclusion of carbon capture and sequestration (CCS) in its BSER determination for new coal plants. CCS technologies absorb CO_2 from all or a portion of the fuel or exhaust gas of a power plant. The CO_2 is then compressed and transported via pipeline to deep underground rock formations for permanent storage.

Litigation over CCS will focus on EPA's interpretation of the statutory text. To qualify as the BSER, a system of emission reduction must be the "**best**" of all "**adequately demonstrated**" systems. Opponents argue that CCS cannot be part of the BSER for new coal plants because it is too novel, complicated, and expensive to implement, and there are few examples of utility-scale plants employing the technology. Prior to the release of the final rule, there was broad speculation that EPA would remove CCS from the final NSPS and name ultra-supercritical technology the BSER for coal-fired power plants. Given that very few new coal-fired power plants are planned even in the absence of the rule, many guessed that EPA would settle for a more conservative NSPS in order to better protect the Clean Power Plan.

Instead, EPA's final NSPS rule vigorously defends the inclusion of CCS in the BSER

determination, analogizes the standard to historical NSPSs that imposed significant costs on coal-fired power plants, and emphasizes the considerable discretion that §111 offers EPA. EPA has also suggested that standards for modified sources, which are included in the NSPS, would be sufficient to serve as a basis for the Clean Power Plan even if a court were to strike down standards for new sources.

President Obama, it seems, considers CCS for all future coal-fired power plants to be an important piece of his climate legacy. While the Clean Power Plan will play a critical role in reducing U.S. emissions over the next several decades, standards that apply to new power plants could arguably be more influential in the long run. And even if few new coal plants are built in the United States, expressing confidence in CCS may be essential to persuade high-emitting developing countries to adopt the technology. In particular, it would be difficult for the United States to continue its campaign to persuade China to cut emissions aggressively without putting our money where our mouth is on CCS here at home. The United States and China have executed several recent agreements related to CCS and announced collaborative CCS projects. If the NSPS indirectly helps to control emissions from China's coal-fired power plants, or contributes to technological developments that have global applicability, it could indeed have massive climate impacts, regardless of the future of coal in the United States.

The NSPS should be published in the Federal Register sometime in October, at which point opponents will have 60 days to file challenges in the D.C. Circuit Court of Appeals. Challenges will argue that EPA's rule is "arbitrary, capricious, an abuse of discretion or otherwise not in accordance with applicable law" (5 U.S.C. § 706(2)(A)). Will EPA's defenses be enough to convince the D.C. Circuit—and likely the U.S. Supreme Court, on appeal—that CCS is in keeping with Congress' intent that §111(b) force technological development? Or will opponents succeed in persuading courts that the NSPS imposes unreasonable burdens on a sector that has long played a key role in powering the U.S. economy? **In this series of posts, I explore some of the likely potential challenges to the NSPS, beginning here with the question of whether CCS is "adequately demonstrated."**

Is CCS an "Adequately Demonstrated" System?

The D.C. Circuit has stated that an "adequately demonstrated" system of emission reduction is "one which has been shown to be reasonably reliable, reasonably efficient, and which can reasonably be expected to serve the interests of pollution control without becoming exorbitantly costly" (*Essex Chem. Corp. v. Ruckelshaus*, 486 F.2d 427, 433 (D.C. Cir. 1973), *cert. denied*, 416 U.S. 969 (1974)). An adequately demonstrated system need not "be in actual routine use somewhere" (*Portland Cement Ass'n* v. *Ruckelshaus,* 486 F.2d 375, 391

(D.C. Cir. 1973)). Instead, an NSPS can be designed to push industry to invest in technological advances, "so long as there is substantial evidence that such improvements are feasible" (*Sierra Club v. Costle*, 657 F.2d 298, 364 (1981)). Notably, EPA receives deference from reviewing courts in its interpretation of the Clean Air Act and in its technical judgements.

EPA argues that the technical feasibility of CCS technology is demonstrated by the fact that it "is in use or under construction in various industrial sectors, including the power generation sector" (NSPS pp. 16-17). EPA's most powerful example is the Boundary Dam Unit #3 in Saskatchewan, Canada—the world's first commercial-scale power plant with full CCS. The Boundary Dam Unit transports captured CO_2 by pipeline to nearby oil fields, where it is used for enhanced oil recovery. Commenters have argued that the Boundary Dam Unit is small—110 MW, less than a quarter of the size of a typical U.S. coal plant—and does not demonstrate that CCS could be scaled up at larger facilities. In response, EPA contends that a similarly sized CCS system could treat a portion (rather than all) of the exhaust at a larger power plant and still meet the NSPS (pp. 204-05). Notably, despite its small size, the Boundary Dam Unit was expensive and supported by subsidies from the Canadian and Saskatchewan governments, as well as the sale of captured carbon.

Kemper County Coal Gasification Plant, by XTUV0010

While there is no fully operational, large-scale utility power plant with CCS in the United States, EPA does reference a large-scale utility CCS project that is under development and partially operational: Southern Company's facility in Kemper County, Mississippi. Some have suggested, though, that as an IGCC plant, the Kemper plant is not representative of a

typical coal-fired boiler and therefore not a good basis for a BSER determination. (IGCC plants with CCS capture carbon pre-combustion, in the process of transforming coal into synthetic gas and refining it, while conventional boilers with CCS capture carbon post-combustion, at the smokestack.) Development of the Kemper plant has also been beset with delays and cost overages. At a total price-tag of over $5.5 billion, the Kemper facility is now one of the most expensive power plants ever built.

EPA also cites several U.S. commercial facilities that have been capturing carbon for over a decade, including two industrial coal plants that sell CO_2 to the food and beverage industry, one that uses captured CO_2 to produce soda ash, and a synfuels plant that sends captured CO_2 to nearby oil fields for enhanced oil recovery. None of these facilities is a utility power plant, however. EPA references several CCS pilot projects at U.S. utility power plants, as well as CCS-equipped power plants that are currently under development in other countries (pp. 212-19, 225-30). EPA also lists examples of geologic sequestration of carbon. Additionally, EPA cites academic literature and statements from industry to support its conclusion that CCS is a demonstrated technology (pp. 231-39; *see Essex Chem. Corp*, 486 F.2d at 440). Still, other than the small Boundary Dam Unit, EPA has no examples it can cite to demonstrate all of the components of a CCS system currently working together at a utility-scale power plant. And apart from projects that the U.S. Government itself helped fund (including the Kemper plant), EPA can cite to no U.S. example of a utility power plant with all the components of CCS.

The Potential Problem of Facilities that Received Government Funding

The Energy Policy Act of 2005 ("**EPAct05**") complicates matters further. EPAct05 authorizes the U.S. Department of Energy (DOE) to provide grants, loan guarantees, and tax credits to incentivize CCS technology development. EPAct05 § 402(i) states that:

> No technology, or level of emission reduction, **solely by reason of the use of the technology, or the achievement of the emission reduction**, by 1 or more facilities receiving assistance under this act, **shall be considered to be adequately demonstrated** for purposes of [Section 111].

EPAct05 also added §48A(g) to the Internal Revenue Code, which similarly limits facilities receiving tax credits from serving as the basis for an EPA determination that a system is "adequately demonstrated."

Some opponents have argued that these provisions bar EPA from considering *any* DOE-supported facilities when determining the BSER, including the Kemper facility. Apparently, EPA was unaware of these limitations prior to issuing its proposal; but in the final rule, EPA states that it interprets the provisions to bar EPA only "from relying ***solely*** on the experience of facilities that received DOE assistance, but not to preclude the EPA from relying on the experience of such facilities in conjunction with other information" (pp. 163, 199), in keeping with the intent of the EPAct05 to further deployment of CCS. Notably, however, EPA is not the main implementing agency of EPAct05 or the Internal Revenue Code, and its interpretation therefore may not be due judicial deference. EDF argues that even a plain reading of the EPAct05 statutory text confirms EPA's interpretation, though, emphasizing "EPAct's carefully circumscribed purpose of preventing one or more subsidized projects, in isolation, from being used as the full proof that a technology has been adequately demonstrated."

> Given that EPA's determination that CCS is adequately demonstrated does not rest primarily (much less wholly) upon the plants receiving support [from DOE], that determination is legally sound.

Excluding facilities that received DOE funding, EPA's list of CCS examples would be lighter. The academic literature is robust, and is supported by statements from CCS technology vendors about the availability of the technology for utility power plants. EPA's examples of industrial and international facilities with CCS also help to show that the technology exists and has worked cost-effectively for years outside of the utility sector. And the range of utility CCS projects under development around the world suggests that CCS is indeed the new state-of-the-art pollution-control technology for coal-fired power plants. Together with the Boundary Dam Unit example, and perhaps also DOE-funded projects, will this evidence be enough to persuade the courts?

Looking Ahead to Judicial Review

Overall, opponent Heritage Foundation argues, "[n]o credible basis exists to state that CCS is adequately demonstrated today since no large-scale power plant in the United States has CCS." Similarly, the CCS Alliance's comments on the proposed rule emphasize that "there [is] not a single power generating facility operating today anywhere in the world capturing and sending carbon for storage on the scale envisioned by the EPA . . . ."

In response, environmental advocates have dismissed industry criticisms as tired and

exaggerated. From the Clean Air Task Force:

> [W]e've long heard claims from the coal industry and some power companies that CCS isn't technologically ready or economically feasible . . . . But today, those claims just are not true. For decades, carbon capture systems have been used at large industrial plants to capture CO_2 that would otherwise be released to the atmosphere. Moreover, also for decades, millions of tons of CO_2 have been injected and stored at depleted oil fields to help produce more oil . . . . And integrated systems of capture and sequestration have been operating here and around the world for almost twenty years.

It does seem like the coal industry predicts gloom and doom every time it faces a new pollution-control requirement. EDF points out that when EPA released its 1971 NSPS for sulfur dioxide emissions from coal-fired power plants, which relied on flue gas desulfurization (FGD) "scrubber" technologies as the BSER, there was only one FGD vendor and only three operational units with scrubbers. Coal proponents raised similar arguments that FGD technologies were not "adequately demonstrated;" but ultimately, implementation was easier and cheaper than anticipated, and the standard dramatically reduced conventional air pollutants. Historical experience with this and other types of controls suggests that technology-based performance standards work effectively where an emerging pollution-control system is available, but not yet widespread, like CCS.

Furthermore, the §111 text supports EPA. Under a traditional *Chevron* analysis, the reviewing court is directed to look to the statutory text for the plain meaning of terms. If Congress' intent is not clear from the plain language, the court must then defer to the expert agency's reasonable interpretation of the statute. Prior caselaw and legislative history suggest that the language of §111 is quite lenient in terms of what constitutes "adequate[]" evidence that a technology is "demonstrated." As the D.C. Circuit has confirmed, the BSER need not be in routine use, so long as it is feasible that the technology will be available in the near future. That the BSER must simply be technically feasible is a rather low bar. Arguably, even just one operational plant is more than sufficient to satisfy this legal standard. But even if the plain text is not clear, a court should defer to EPA's interpretation of §111's BSER standard. Section 111 is meant to be technology-forcing, and therefore seems like a perfectly reasonable tool to encourage development of CCS.

Recent history suggests, however, that courts' application of *Chevron* is not always predictable where greenhouse gases are involved. EPA's BSER determination would

certainly be stronger if the agency could identify more examples of operational CCS at utility power plants—and in particular, given uncertainty over the interpretation of EPAct05, CCS projects that were not supported by federal funding. Given the lack of such examples in the record, opponents may be able persuade a reviewing court that EPA is overreaching. Notably, although the Supreme Court has confirmed that greenhouse gases are a "pollutant" under the Clean Air Act just like conventional air pollutants, the D.C. Circuit today may read the Clean Air Act differently in the context of climate change than it did in the context of the smog problem in the 1970s. Climate change is more nebulous, not localized. A gut-level weighing of the costs and benefits of CCS might lead a court to conclude that it would be unreasonable to impose a hefty standard on the coal industry (and electricity consumers) on the basis of so few utility CCS examples.

Given the importance of this case, it seems probable that the U.S. Supreme Court will render the final opinion. While it is impossible to predict how the Court would rule, I argue that **CCS is largely analogous to the BSERs underpinning past power-plant NSPSs, and in keeping with Congress' intent to encourage the development of pollution-control technology for new sources**. Facilities have been using the various components of CCS for decades, and some coal-fired power plants in the United States have cost-effectively installed and operated carbon-capture systems even without government assistance. The evidence EPA provides in the final rule seems to satisfy the §111 standard.

As always, comments from the LegalPlanet audience are welcome, especially from those with more technical expertise and familiarity with CCS. Are you convinced that CCS is adequately demonstrated? How is EPA likely to fare?

Stay tuned for the next post in this series, which will explore the question of whether CCS is the "best" system of emission reduction, considering costs.