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Public Interest Comment¹ on

The Environmental Protection Agency's Proposed Rule:

Standards of Performance for Greenhouse Gas Emissions from New Stationary Sources:
Electric Utility Generating Units

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The George Washington University Regulatory Studies Center

Retrospective Review Comment Project

The George Washington University Regulatory Studies Center strives to improve regulatory policy through research, education, and outreach. As part of its mission, the Center conducts careful and independent analyses to assess rulemaking proposals from the perspective of the public interest. This comment on the Environmental Protection Agency's proposed rule setting standards of performance for certain greenhouse gas emissions does not represent the views of any particular affected party or special interest, but is designed to evaluate whether EPA's proposal incorporates plans for retrospective review, pursuant to Executive Order 13563.

¹ This comment reflects the views of the author, and does not represent an official position of the GW Regulatory Studies Center or the George Washington University. The Center's policy on research integrity is available at <http://research.columbian.gwu.edu/regulatorystudies/research/integrity>.

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Introduction

The proposed rule would establish new standards of performance for carbon dioxide (CO₂) emissions from coal- and natural gas-fired power plants, or electric generating units (EGUs). Pursuant to Section 111 of the Clean Air Act, EPA must establish federal standards of performance for new sources which, in the judgment of the Administrator, “cause, or contribute significantly to, air pollution which may reasonably be anticipated to endanger public health or welfare.” The standards should “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 Administrator determines has been adequately demonstrated.” EPA refers to this as the best system of emission reduction (BSER).

EPA is proposing different emissions performance standards for coal-fired EGUs and natural gas-fired EGUs. For coal-fired EGUs, EPA is proposing CO₂ emission limits of 1,100 lb/MWh, a standard that will not be achievable without partial use of carbon capture and storage (CCS). For natural gas-fired EGUs, EPA is proposing emission limits of 1,000 lb CO₂/MWh for larger units, and 1,100 lb CO₂/MWh for smaller units. There is no CCS requirement proposed for natural gas-fired EGUs; instead, EPA has determined that already-existing efficient natural gas combined cycle (NGCC) technology is the BSER for natural gas EGUs.

As a part of its ongoing Retrospective Review Comment Project, the Regulatory Studies Center examines significant proposed regulations to assess whether agencies propose retrospective review as a part of their regulations, and submits comments to provide suggestions on how best to incorporate plans for retrospective review into their proposals. This comment will not address questions about the legal or policy merits of EPA’s decision to set standards for CO₂ under Section 111 for coal and gas-fired EGUs, other than to examine the Agency’s use of retrospective review. To facilitate meaningful retrospective review after the promulgation of a final rule, multiple government guidelines instruct agencies to incorporate retrospective review plans into their proposals during the rulemaking process.

Incorporating Retrospective Review into NPRMs

Through a series of Executive Orders, President Obama has encouraged federal regulatory agencies to review existing regulations “that may be outmoded, ineffective, insufficient, or excessively burdensome, and to modify, streamline, expand, or repeal them in accordance with what has been learned.” On January 18, 2011, President Obama signed Executive Order 13563, Improving Regulation and Regulatory Review, which reaffirmed the regulatory principles and structures outlined in EO 12866. In addition to the regulatory philosophy laid out in EO 12866, EO 13563 instructs agencies to

consider how best to promote retrospective analysis of rules that may be outmoded, ineffective, insufficient, or excessively burdensome, and to modify, streamline, expand, or repeal them in accordance with what has been learned. Such retrospective analyses, including supporting data, should be released online whenever possible.³

This ex-post review makes it possible for the public—and for the agencies that regulate them—to measure whether a particular rule has had its intended effect. In his implementing memo on retrospective review, former Administrator of the Office of Information and Regulatory Affairs, Cass Sunstein, stated the importance of designing regulations to facilitate their evaluation:

With its emphasis on “periodic review of existing significant regulations,” Executive Order 13563 recognizes the importance of maintaining a consistent culture of retrospective review and analysis throughout the executive branch. To promote that culture, *future regulations should be designed and written in ways that facilitate evaluation of their consequences* and thus promote retrospective analyses and measurement of “actual results.” To the extent permitted by law, agencies should therefore give careful consideration to how best to promote empirical testing of the effects of rules both in advance and retrospectively.⁴ [Emphasis added]

This emphasis is repeated in Sunstein’s June 14, 2011 memo, “Final Plans for Retrospective Analysis of Existing Rules.” In its Draft 2013 Report to Congress on the Benefits and Costs of Federal Regulations, the Office of Management and Budget (OMB) states that such retrospective analysis can serve as an important corrective mechanism to the flaws of ex ante analyses. According to that report, the result of systematic retrospective review of regulations:

should be a greatly improved understanding of the accuracy of prospective analyses, as well as corrections to rules as a result of ex post evaluations. A large priority is the development of methods (perhaps including not merely before-and-after accounts but also randomized trials, to the extent feasible and consistent with law) to obtain a clear sense of the effects of rules. In addition, and importantly, *rules should be written and designed, in advance, so as to facilitate retrospective analysis of their effects.*

³ Exec. Order No. 13563, *Improving Regulation and Regulatory Review*, 76 FR 3821 (2011).

⁴ United States. Office of Management and Budget. Office of Information and Regulatory Affairs. *MEMORANDUM FOR THE HEADS OF EXECUTIVE DEPARTMENTS AND AGENCIES: Retrospective Analysis of Existing Significant Regulations*. By Cass Sunstein. April 25, 2011.

Retrospective Review Requirements

To evaluate whether EPA’s proposal was “designed and written in ways that facilitate evaluation of [its] consequences,” we measure it against five criteria:

- Did EPA clearly identify the problem that its proposed rule is intended to solve?
- Did EPA provide clear, measurable metrics that reviewers can use to evaluate whether the regulation achieves its policy goals?
- Did EPA commit to collecting information to assess whether its measurable metrics are being reached?
- Did EPA provide a clear timeframe for the accomplishment of its stated metrics and the collection of information to support its findings?
- Did EPA write its proposal to allow measurement of both outputs and outcomes to enable review of whether the standards directly result in the outcomes that the EPA intends?

Identifying the Problem

The first of the “Principles of Regulation” outlined by President Clinton in EO 12866 makes it clear that, as a first step, agencies must be able to identify the problem that justifies government action through regulation:

Each agency shall identify the problem that it intends to address (including, where applicable, the failures of private markets or public institutions that warrant new agency action) as well as assess the significance of that problem.

This step is crucial to the formulation of any policy. Without knowledge of the problem that the agency is trying to address, the public cannot assess whether the policy or regulation at hand has had the intended effect, which is key in retrospectively evaluating regulation. In the text of its proposed rule, EPA states the problem that its proposal is intended to address:

Greenhouse gas (GHG) pollution threatens the American public's health and welfare by contributing to long-lasting changes in our climate that can have a range of negative effects on human health and the environment.⁵

This problem necessitates regulation of EGUs because “Fossil fuel-fired electric utility generating units are by far the largest emitters of GHGs, primarily in the form of CO₂, among stationary sources in the U.S., and among fossil fuel-fired units, coal-fired units are by far the

⁵ 79 FR 1433

largest emitters.”⁶ Given this information, reducing GHG emissions from new EGUs should theoretically have a significant effect on domestic CO₂ emissions.

However, EPA does not expect that its rule will have any effect at all on CO₂ emissions. This is because EPA forecasts that no (or very few) new coal-fired EGUs will be built between now and 2020, and that new power generation will instead come from natural gas EGUs and renewable sources. In the text of its proposal, EPA states that it: “believes that electric power companies would choose to build new EGUs that comply with the regulatory requirements of this proposal even in its absence, because of existing and expected market conditions. In addition, the EPA does not project any new coal-fired EGUs without CCS to be built in the absence of this proposal.”⁷ In addition, new natural gas EGUs would have already used the required NGCC technology due to economic factors. As a result, “the EPA projects that this proposed rule will result in negligible CO₂ emission changes, quantified benefits, and costs by 2022.”⁸

As with any policy, success in this case will depend upon whether the identified problem is addressed—and, to some extent, solved—by implementation of the rule. Therefore, to build a successful plan for retrospective review into this rule, we must measure how effective this rule will be at reducing GHG pollution from EGUs, and how those reductions change human health and environmental outcomes. However, given EPA’s own prognosis, this rule has very little chance of actually accomplishing its stated goal. Given this constraint, it is fair to ask the agency why it is pursuing a rulemaking that it expects will not change CO₂ emissions.

Measurement Criteria

In order to measure the success of this rule following implementation, it is necessary for EPA to define what constitutes a “success.” Any stated metrics of success should be linked to the problems identified, to show that the standards that the agency is proposing are effectively reducing emissions of CO₂ from new coal-fired and natural gas-fired EGUs.

Although EPA does not explicitly say that it will use any metric or set of metrics to evaluate its rule, the agency does reference some anticipated outcomes of its proposal that could potentially be measured after its implementation. Therefore, the ability to measure these intended outcomes can help the agency and the public evaluate the rule’s success or failure. Below are some of the assumptions underlying EPA’s proposal and some of the stated outcomes. Measuring these ex post will help inform whether EPA’s analysis was accurate, and whether EPA’s standards were successful.

⁶ 79 FR 1441

⁷ 79 FR 1496

⁸ 79 FR 1433

Assumptions

EPA's analysis—and, in fact, EPA's rule itself—relies on a few key assumptions. Evaluating whether these assumptions are borne out in reality will indicate whether EPA's rule had the intended effect, and whether EPA's assumptions were correct.

EGU Projections

First, EPA assumes that, even in the absence of this rule, few, if any, solid fossil fuel-fired EGUs will be built in the foreseeable future. EPA further assumes that any future EGUs will be natural gas facilities incorporating NGCC technology, and would meet the proposed emissions standards regardless of EPA action.⁹ This assumption allows EPA to project that its standard will not result in any costs, because the rule does not actually change any action taken by EGUs.

However, this assumption poses some difficulty for evaluating the success of EPA's rule, and contradicts some of the outcomes that EPA states will result from its standards. For example, if this assumption is correct, then the rule will not result in any reduction in CO₂ emissions from coal-fired or natural gas-fired power plants. This is problematic because the entire reason this rule is being promulgated is to address these stationary source emissions, and if market factors are already addressing these emissions satisfactorily, there is no remaining problem for this standard to address.

Furthermore, the reason that EPA determined that partial CCS was BSER was that this system “ensures that any new fossil fuel-fired utility boiler or IGCC unit will achieve meaningful emission reductions in CO₂, and it will also encourage greater use, development, and refinement of CCS technologies.”¹⁰ EPA's analysis indicates that this rule not result in “meaningful” emission reductions, or even in any emission reductions at all. Additionally, the fact that EPA does not predict that any new coal-fired power plants will be built means that there will not be an opportunity for “greater use, development, and refinement of CCS technologies.” Any use and development of CCS technologies will only come from existing EGUs that are not regulated by this standard. On both counts, EPA's determination of BSER rings hollow due to the contradictions between these goals and EPA's cost estimates and EGU projections. Either the reasons why EPA determined partial CCS as BSER are false, and the regulation will not result in significant CO₂ reductions, or EPA's projections for coal-fired power plants are inaccurate, and the regulation will have substantial costs.

⁹ 79 FR 1433, 79 FR 1443, 79 FR 1480

¹⁰ 79 FR 1436

Projected Demand for Captured Carbon

In part, EPA justifies its determination of partial CCS as BSER with the assumption that the captured carbon can be sold for industry uses, particularly for enhanced oil recovery (EOR).¹¹ EOR is used by the oil and natural gas industries to increase production yields, such as through hydraulic fracturing, or fracking. For these reasons, EPA states that captured CO₂ will have marketable value,¹² and that revenue from sale of captured CO₂ would offset any implementing costs of EPA's proposed standards.¹³ To this effect, EPA states:

Moreover, the EPA wishes to encourage rather than discourage EOR using captured CO₂ since the practice makes CCS itself more economic and thus promotes use of the technology on which the proposed standard is based.¹⁴

Ironically, it is possible that demand for large amounts of captured CO₂ may not materialize because plans to extract oil and natural gas are impeded by future EPA regulations. As EPA promulgates new regulations related to the extraction of oil and natural gas using EOR, it should consider the cumulative effect on the incentives provided in this rulemaking. If EPA places additional restrictions on oil and gas production, CCS will become a less economic choice for producers, adding to the costs of this rule.

Stated Metrics

Below are some potential metrics that EPA identifies in its proposed rule which may enable measurement both of the rule's success, and the accuracy of EPA's ex ante analysis.

Outcomes

1. EPA projects that this proposed rule will result in negligible CO₂ emission changes, quantified benefits, and costs by 2022. (79 FR 1433)
2. EPA estimates that determination of partial CCS as BSER will not have adverse impacts on the power sector, national electricity prices, or the energy sector. (79 FR 1480)
3. EPA asserts that partial CCS will result in "meaningful emission reductions," that the technology is technically feasible, that it can be implemented at a reasonable cost, and that determination of CCS as BSER promotes deployment and further development of the technology. (79 FR 1469)

¹¹ 79 FR 1480

¹² 79 FR 1464

¹³ "The use of CO₂ for EOR can significantly lower the net cost of implementing CCS. The opportunity to sell the captured CO₂ for EOR, rather than paying directly for its long-term storage, improves the overall economics of the new generating unit." 79 FR 1474

¹⁴ 79 FR 1484

4. EPA believes that an emission limit based on partial CCS offers operators considerable operational flexibility, which minimizes the cost of CCS in new fossil fuel-fired projects. (79 FR 1470)
5. EPA asserts that this rulemaking reduces uncertainty, and will promote energy diversity. (79 FR 1496)
6. Additionally, EPA expects that the use of EOR from EGU captured carbon will lower production costs for domestic oil, which will promote energy independence. (79 FR 1480)

Costs

1. EPA believes this proposed rule will have no compliance costs, because electric power companies would be expected to build new EGUs that comply with the regulatory requirements of this proposal even in the absence of these standards. (79 FR 1496)
2. EPA projects that implementing partial CCS will result in a localized cost of electricity (LCOE) generation ranging from \$92/MWh to \$110/MWh. (79 FR 1436)
3. EPA expects that its definition of “steam electric generating unit” to include emissions from integrated equipment in the calculation of overall affected source greenhouse gas (GHG) emissions could lower generation costs, as well as lower the GHG emissions rate for an EGU. (79 FR 1460)
4. EPA expects that the transportation of captured carbon from EGUs to potential sequestration sites is technically feasible, and will not pose significant costs. (79 FR 1472)
5. EPA uses “next-of-a-kind” estimates to calculate costs for integrated gasification combined cycle (IGCC) facilities or any plant that includes CO₂ capture. These cost estimates represent a plant that is somewhere between “first-of-a-kind” (FOAK) and “nth-of-a-kind” (NOAK) plants, and do not include the unique cost premiums associated with FOAK plants (79 FR 1476). Because this technology is still not well-established, EPA should measure retrospectively whether implementation costs were closer to those of a “next-of-a-kind”, FOAK, or NOAK plant.
6. EPA estimates that the total additional cost of implementing partial capture CCS (without revenues from CO₂ sales for EOR) is about half the additional cost of coal-fired generation, compared to natural-gas fired generation. (79 FR 1478)
7. EPA projects that the costs of implementing partial capture CCS will decrease over time as the technology becomes more widely used. (79 FR 1479)

Implementation

1. EPA does not intend its rule to apply to small units that are designed to operate only during peak demand, and believes that the standards as written will not cause these units to be miscategorized as regulated EGUs. (79 FR 1445)

2. EPA estimates that EGU startup or shutdown periods will have only a minimal impact on the calculation of an EGU's total average emissions. (79 FR 1448)
3. The D.C. Circuit Court states that the purposes of the CAA section 111 include "not giv[ing] a competitive advantage to one State over another in attracting industry." (79 FR 1463)
4. EPA anticipates that opportunities to utilize CO₂-EOR operations for geologic storage will continue to increase. (79 FR 1474)

Paperwork

1. EPA estimates that the paperwork reporting burden for this rule will average \$15,570 and 396 labor hours per year, with 36 total respondents averaging 8 burden hours per response. (79 FR 1499)

The metrics in the second section, *Outcomes*, are the most clearly associated with the problem that EPA is attempting to solve in its rulemaking. However, the metrics in the first section, *Assumptions*, underpin the whether the anticipated outcomes will materialize. Therefore, whether the rule accomplishes the reductions in CO₂ emissions will depend on whether the agency's assumptions on projected EGU startups are correct. These sets of metrics are both crucial to evaluation of the success of EPA's proposal.

The remaining stated metrics pertaining to cost and to implementation are important to measure insofar as they inform EPA on the validity of its ex ante analysis, and can improve methodology for future analyses. For instance, if the actual costs of this rule vary significantly from the estimated costs, or if the energy landscape changes such that EOR does not create significant demand for captured CO₂, EPA can learn from these measurements and apply the new information to other relevant analyses for estimating outputs.

Information Collection

In order for retrospective review to be effective, EPA should identify how it will gather information to assess whether its stated metrics are being accomplished, and whether its assumptions proved to be accurate. Although EPA doesn't describe in its proposal how it might collect the relevant information to evaluate its rule, the information collected through the GHG Reporting Program can be used to measure some of the agency's anticipated outcomes.

In the text of its proposal, EPA references at least two ways in which the GHG Reporting Program provides information relevant to the evaluation of its rule:

1. Proposed amendments to the GHG Reporting Program provide a consistent method to track CO₂ capture and sequestration. (79 FR 1483)

2. Information collected under the GHG Reporting Program will provide a means for EPA and the public to evaluate the effectiveness of CCS, including improvements needed in monitoring technologies. (79 FR 1472)

Because it allows EPA to track changes in GHG emissions, this information is directly relevant to evaluation of the rule's success.

Timeframe

The text of the proposed rule does not include a timeframe for retrospective review. In its final rule, EPA should commit to measuring the above stated metrics and assumptions on a regular basis to provide timely feedback on the rule's outcomes, costs, implementation, and paperwork burdens.

Measure Linkages

As EPA commits to measuring the effects of its rule, it should also be aware of mediating factors that may have accomplished or undermined the stated metrics absent the rule. Determining linkages between the rule and the measured outcomes is necessary to ensure that the policy itself resulted in the desired outcomes, rather than other factors beyond the agency's control.

This is particularly relevant for this rulemaking because EPA is having some difficulty defining its baseline. EPA projects that its goal, to meaningfully reduce CO₂ emissions from new EGUs, is already being accomplished in the marketplace absent this regulation, and that no new coal-fired EGUs would be built. Therefore, any result of this rule should be measured against this baseline, and the rule is only a "success" based on these metrics if it causes emissions reductions above and beyond what is already anticipated to occur absent this rule.

Recommendations

It is worth noting in this section that a major flaw of EPA's proposal is that its outcomes and assumptions are both self-contradictory and unmeasurable, making it difficult for the agency and the public to be able to assess whether this policy will have the intended effect. The agency's baseline is designed such that there is no possible differentiation between outcomes that resulted from policy changes and outcomes that are unavoidable given the state of the energy market. As such, this rule cannot possibly be considered to be "designed and written in ways that facilitate evaluation of [its] consequences."

Nevertheless, each of the below recommendations addresses a specific stated metric listed previously in this comment, and is intended to simplify EPA's retrospective review of this rule to the extent possible.

Assumptions

- As with all regulatory impact analysis, the baseline assumption is critical, yet difficult to evaluate after-the-fact. In this case, EPA's assumptions pertaining to new coal-fired EGUs in particular drive the results. If these assumptions were accurate, then the rule will have no effect, and is a questionable use of agency resources. If the assumptions are inaccurate, then the rule will have substantial costs which were not accounted for in this rulemaking.
- When promulgating future rules for oil and gas extraction, EPA should evaluate the effect on EOR use and subsequent demand for captured CO₂. Changes in demand for captured CO₂ will affect whether the partial CCS technologies prescribed in this rule are actually economically viable for new coal-fired power plants, and whether any further implementation costs will be incurred.

Outcomes

- As noted above, EPA's primary stated outcomes are neither cohesive nor measurable, leaving the public and the agency few options for the retrospective review of this rule. EPA should very clearly define its baseline, and how the proposed policy outcomes differ from those already expected to be achieved absent policy intervention.
- EPA should measure whether its standard has any adverse impacts on the power sector, national electricity prices, or the energy sector.
- EPA should commit to working with EGU operators to gauge whether its standard does in fact provide operational flexibility and minimize costs.
- EPA should measure whether its rule does in fact help to promote the goals of energy diversity and energy independence.

Costs

- EPA should commit to measuring whether its standard has any implementation cost, and, if so, whether these costs follow the pattern of EPA's estimate for "next-of-a-kind" plant costs.
- EPA should evaluate whether the transportation of captured carbon poses unexpected costs for EGUs, and how this factor affects the rule's economic feasibility.
- EPA should track the implementation cost of partial capture CCS to gauge whether these costs decrease over time.

Implementation

- EPA should evaluate whether its definition of covered EGUs is sufficient to exclude small units designed to operate only during peak demand.

- EPA should assess whether its standards give a competitive advantage to one state over another in attracting industry.

Paperwork

- EPA should measure whether its paperwork reporting burden estimates were approximately correct.