ORAL ARGUMENT SCHEDULED FOR APRIL 17, 2017

IN THE UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

No. 15-1381 (and consolidated cases)

STATE OF NORTH DAKOTA, *et al.*,
Petitioners,

v.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, *et al.*,
Respondents.

On Petition for Review of Final Agency Action of the
United States Environmental Protection Agency

FINAL BRIEF OF THE INSTITUTE FOR POLICY INTEGRITY AT NEW YORK UNIVERSITY SCHOOL OF LAW AS *AMICUS CURIAE* IN SUPPORT OF RESPONDENTS

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December 21, 2016

CERTIFICATE AS TO PARTIES, RULINGS, AND RELATED CASES

Except for the following, all parties, intervenors, and *amici* appearing in this court are listed in the Brief for State Petitioners:

Amicus Curiae for Respondent: Institute for Policy Integrity at New York University Law School; Technology Innovation Experts: Nicholas Ashford, M. Granger Morgan, Edward S. Rubin, and Margaret Taylor; and

Movant-Amicus Curiae for Respondent: Carbon Capture and Storage Scientists: Roger Aines, Sally Benson, S. Julio Friedmann, Jon Gibbins, Raghubir Gupta, Howard Herzog, Susan Hovorka, Meagan Mauter, Ah-Hyung (Alissa) Park, Gary Rochelle, and Jennifer Wilcox; and Saskatchewan Power Corportation.

References to the rulings under review and related cases appear in Respondents' brief.

STATEMENT REGARDING SEPARATE BRIEFING, AUTHORSHIP, AND MONETARY CONTRIBUTIONS

A single *amicus curiae* brief is not practicable in this case because the Institute for Policy Integrity, *amici* Technology Innovation Experts, and movant-*amici* Carbon Capture and Storage Scientists and Saskatchewan Power Corporation offer wholly distinctive perspectives on the issues involved. *See* D.C. Cir. R. 29(d).

Under Federal Rule of Appellate Procedure 29(a)(4)(e), the Institute for Policy Integrity states that no party's counsel authored this brief in whole or in part, and no party or party's counsel contributed money intended to fund the preparation or submission of this brief. No person—other than the amicus curiae, its members, or its counsel—contributed money intended to fund the preparation or submission of this brief.

RULE 26.1 DISCLOSURE STATEMENT

The Institute for Policy Integrity ("Policy Integrity") is a nonpartisan, not-for-profit organization at New York University School of Law. Policy Integrity is dedicated to improving the quality of government decisionmaking through advocacy and scholarship in the fields of administrative law, economics, and public policy. Policy Integrity has no parent companies. No publicly held entity owns an interest of more than ten percent in Policy Integrity. Policy Integrity does not have any members who have issued shares or debt securities to the public.

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* Indicates sources on which brief chiefly relies

GLOSSARY OF ACRONYMS AND ABBREVIATIONS

Pursuant to Circuit Rule 28(a)(3), the following is a glossary of acronyms and abbreviations used in this brief:

Circular A-4:	Office of Mgmt. & Budget, Executive Office of the President, OMB Circular A-4, Regulatory Analysis (2003)
EIA:	Energy Information Administration
EPA:	Environmental Protection Agency
Policy Integrity:	Institute for Policy Integrity
Regulatory Impact Analysis:	EPA, Regulatory Impact Analysis for the Final Standards of Performance for Greenhouse Gas Emissions from New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units (2015)
Rule:	Standards of Performance for Greenhouse Gas Emissions from New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units, 80 Fed. Reg. 64,510 (Oct. 23, 2015)

STATUTES AND REGULATIONS

All applicable statutes and regulations are included in the Statutory Addendum to the Brief for Respondents.

INTEREST OF AMICUS CURIAE

Pursuant to this Court's November 8, 2016 order (Doc. 1645138), the Institute for Policy Integrity at New York University School of Law[1] ("Policy Integrity") files this *amicus curiae* brief in support of Respondents, the Environmental Protection Agency ("EPA") and Gina McCarthy, Administrator.

Policy Integrity is a nonpartisan think tank dedicated to improving government decisionmaking through advocacy and scholarship in administrative law, economics, and public policy, focusing on environmental issues. Policy Integrity is a collaborative effort of faculty at New York University School of Law; a full-time staff of attorneys, economists, and policy experts; law students; and a Board of Advisors comprised of leaders in public policy, law, and government.

Policy Integrity has produced scholarship on and has expertise in the regulation of greenhouse gases and other pollutants under the

[1] This brief does not purport to represent the views of New York University School of Law, if any.

Clean Air Act, regulatory impact analysis, and rulemaking under the Administrative Procedure Act. Our director, Richard L. Revesz, has published more than 50 articles and books on environmental and administrative law, including pieces discussing the policy underpinnings of regulating externalities under the Clean Air Act. Policy Integrity has previously filed *amicus curiae* briefs in a number of significant cases in this Court and the Supreme Court involving EPA's authority to regulate pollutants under the Clean Air Act, including the case challenging EPA's Clean Power Plan rule, which limits carbon dioxide emissions from existing power plants.

Policy Integrity has a significant interest in the outcome of the legal issues presented in this case. An area of special concern for Policy Integrity is the proper use of cost-benefit analysis in the promulgation of federal environmental regulations. Policy Integrity has specific expertise in the estimation of regulatory costs and benefits and in the application of economic analysis to administrative decisionmaking. In addition, Policy Integrity filed formal comments on the Rule at issue in this case.

SUMMARY OF ARGUMENT

EPA's standards for carbon dioxide emissions from new, modified, and reconstructed power plants serve an important risk-management function and provide net benefits to society. *See* Standards of Performance for Greenhouse Gas Emissions from New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units, 80 Fed. Reg. 64,510 (Oct. 23, 2015) [hereinafter "Rule"].

State Petitioners argue that the Rule will have no benefits and substantial costs. *See* State Pet'rs' Br. at 11. They also assert that the Rule's alleged lack of benefits renders it "superfluous" and therefore "unlawful." State Pet'rs' Br. at 32. And Non-State Petitioners argue that EPA's cost assessment is inaccurate because the agency failed to consider the possibility that some future power plants will be built to burn coal rather than natural gas. *See* Non-State Pet'rs' Br. at 38. But both sets of Petitioners misread the administrative record.

In its Regulatory Impact Analysis supporting the Rule, EPA analyzed the benefits and costs of the Rule under a range of future scenarios. *See* EPA, Regulatory Impact Analysis for the Final Standards of Performance for Greenhouse Gas Emissions from New, Modified, and

Reconstructed Stationary Sources: Electric Utility Generating Units chs. 4-5 (2015) [hereinafter "Regulatory Impact Analysis"].[2] EPA found that under existing and anticipated market conditions, even in the absence of this Rule, no new coal-fired power plants will be built without carbon capture and storage technology in the foreseeable future; in other words, new power plants will be in compliance with the Rule's requirements regardless of whether the Rule is in place. *See, e.g.*, *id.* at ES-3, 4-1 to 4-2. Thus, in the most likely future scenarios, the Rule has negligible benefits and costs. But EPA also considered less likely future scenarios, in which new conventional coal-fired power plants could become economically viable in the absence of the Rule. EPA concluded that the Rule will have net benefits in most of those scenarios as well, with net costs possible only in extremely unlikely scenarios. *See id.* at ES-5, 5-14 to 5-16.

Additionally, while EPA identified no market conditions under which building a coal plant that complied with the Rule would be a more cost-effective means of generating electricity than building a compliant gas plant, EPA recognized that some developers might

[2] Available at https://www.epa.gov/sites/production/files/2015-08/documents/cps-ria.pdf.

nevertheless prefer to build a coal plant for reasons other than cost competitiveness. Thus, EPA also evaluated costs and benefits that would occur if a developer chose to construct a new coal-fired power plant with partial carbon capture and storage technology, and it found that the benefits of such a project could outweigh its costs under a range of assumptions. *See id.* at ES-5, 5-16 to 5-23.

Contrary to Petitioners' contention, the fact that the Rule might, under existing and anticipated market conditions, generate negligible benefits does not render it unlawful. EPA has identified multiple scenarios in which the Rule would generate substantial net benefits, and it is common practice across many agencies for regulations to address unlikely or unexpected scenarios. As a result, the Rule is neither arbitrary nor capricious. Instead, it is a reasonable risk-management tool that is necessary to protect the nation from the danger of climate change.

ARGUMENT

To satisfy its statutory obligation under Section 111 to "tak[e] into account . . . cost" when determining the "best system of emission reduction," *see* 42 U.S.C. § 7411(a)(1), EPA considered costs of its chosen system "both at the individual plant level—using two different well-accepted metrics for comparing the costs of new plants—and across the industry," EPA's Br. at 66, 66-76; Rule, 80 Fed. Reg. at 64,559-64. As EPA explains in its brief, Section 111 does not require EPA to conduct a cost-benefit analysis. *See* EPA's Br. at 75-76. Nonetheless, in order to comply with Executive Order 12,866, *see* 58 Fed. Reg. 51,735 (Oct. 4, 1993),[3] EPA prepared a Regulatory Impact Analysis, in which it conducted a cost-benefit analysis of the Rule, *see* EPA's Br. at 77. Policy Integrity, as *amicus curiae*, uses this analysis to rebut several of Petitioners' arguments and underscore the Rule's reasonableness.

[3] Available at https://www.whitehouse.gov/sites/default/files/omb/inforeg/eo12866/eo12866_10041993.pdf.

I. THE RECORD DEMONSTRATES THAT EPA THOROUGHLY ANALYZED THE RULE'S COSTS AND BENEFITS UNDER A RANGE OF MARKET CONDITIONS AND THAT THE RULE'S BENEFITS WILL ALMOST CERTAINLY EQUAL OR OUTWEIGH ITS COSTS

Contrary to Petitioners' assertions that EPA inadequately considered the Rule's costs and benefits, *see, e.g.*, State Pet'rs' Br. at 11, 32; Non-State Pet'rs' Br. at 38, EPA analyzed the Rule's costs and benefits under a full range of potential market conditions. EPA's analysis demonstrates that the Rule's benefits will almost certainly equal or outweigh its costs. *See, e.g.*, Regulatory Impact Analysis at ES-5. As with most EPA regulations, the potential benefits of the Rule are improvements in public health and welfare associated with reduced air pollution, while the potential costs are primarily compliance costs (capital and operational) incurred by the regulated plants. *See id.* at chs. 3, 5.

A. EPA Measured the Rule's Costs and Benefits Against Baseline Scenarios that Reflected a Range of Potential Market Conditions

Cost-benefit analysis assesses the array of costs and benefits in a world with a given rule as compared to a "baseline" world without that rule. Thus, the first step in conducting cost-benefit analysis is

determining an appropriate baseline. Establishing the baseline is no easy task; it requires not only assessing the relevant factors that exist today but also estimating how those factors may change in the coming decades in the absence of regulatory intervention. The Office of Management and Budget's guidance document on analyzing the impact of federal regulations, Circular A-4, explains that "[t]he choice of an appropriate baseline may require consideration of . . . evolution of the market, changes in external factors affecting expected benefits and costs, changes in regulations promulgated by the agency or other government entities, and the degree of compliance by regulated entities with other regulations." Office of Mgmt. & Budget, Executive Office of the President, OMB Circular A-4, Regulatory Analysis, at 15 (2003) [hereinafter "Circular A-4"].[4] The expected costs and benefits of the rule must then be compared to the baseline. *See id.*

In this rulemaking, EPA considered the Rule's expected costs and benefits under a range of alternative baseline scenarios. First, EPA considered the Rule's impacts relative to a "base case" scenario of the

[4] Available at https://www.whitehouse.gov/sites/default/files/omb/assets/regulatory_matters_pdf/a-4.pdf.

most likely future market and regulatory conditions. *See* Regulatory Impact Analysis at 4-7. Next, it "closely examined modeling results from a number of alternative baseline scenarios" from the U.S. Energy Information Administration ("EIA"), the federal agency tasked with collecting, analyzing, and disseminating energy information. *Id.* at 4-3. These alternative baseline scenarios reflected a wide range of likely market and regulatory conditions. *See, e.g.*, *id.* at 4-1 to 4-2, 4-8 to 4-9. Finally, EPA illustrated the Rule's impacts relative to unlikely baseline scenarios that reflected unexpected and even unprecedented market conditions. *See id.* at 5-13 to 5-16. This approach is consistent with Circular A-4, which encourages agencies to "consider measuring benefits and costs against alternative baselines," Circular A-4 at 15, and to conduct sensitivity analyses "to reveal whether, and to what extent, the results of the [principal] analysis are sensitive to plausible changes in the main assumptions and numeric inputs," *id.* at 3.

EPA's robust procedure for measuring the Rule's impacts under a range of plausible baseline conditions renders Petitioners' reliance on this Court's holding in *American Equity Investment Life Insurance Co.* misplaced. *See* State Pet'rs' Br. at 31-32 (citing *Am. Equity Inv. Life Ins.*

Co. v. Sec. Exch. Comm'n, 613 F.3d 166, 177–78 (D.C. Cir. 2009)). In that case, the Securities and Exchange Commission attempted to satisfy its statutory obligation to assess the effect of its rule on competition by asserting, without analysis, that its rule's disclosure requirements would increase competition by increasing price transparency and information disclosure. *See Am. Equity*, 613 F.3d at 178. But the agency did not "assess the baseline level of price transparency and information disclosure" and "did not make any finding on the existing level of competition." *Id.* In other words, it failed to establish a baseline projection against which its rule's benefits to competition could be meaningfully assessed. *See id.*

In contrast, for the Rule at issue in this case, EPA employed a series of transparent baselines corresponding to different assumptions about future market conditions. *See, e.g.*, Regulatory Impact Analysis at 4-7 to 4-9. The model EPA used for its "base case" calculations incorporated "the latest available electricity demand forecasts, as well as expected costs and availability of new and existing generating resources, fuels, and emissions control technologies." *Id.* at 4-7. EPA also analyzed the Rule's impacts under thirty-one scenarios developed

by EIA for its Annual Energy Outlook 2014, *see id.* at 4-13, including EIA's reference scenario as well as alternative scenarios which "separately examine higher economic growth, lower coal prices, no risk premium for greenhouse gas emissions liability from conventional coal, and lower oil and natural gas resources," *id.* at 4-9. Finally, in a separate analysis, EPA considered the Rule's impacts under a range of possible future natural gas prices.[5] *See id.* at 5-11 to 5-16. In particular, for each range of natural gas prices, EPA provided an illustrative example of the Rule's incremental impacts relative to the baseline. *See, e.g.*, *id.* at 5-15. Thus, unlike the Security and Exchange Commission's conclusory assertion that its rule would further competition, EPA's finding that the Rule will, under the most likely market conditions, have a negligible impact and, under less likely conditions, reduce carbon dioxide emissions and generate net benefits is grounded in thorough analysis.[6]

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[5] In the next section, we explain the impact of natural gas prices on the desirability of constructing coal-fired power plants.

[6] Moreover, the Securities Act language on which this Court based its ruling in *American Equity* is inapplicable to EPA. *See* 613 F.3d at 177-78 (interpreting the Securities and Exchange Commission's obligations under 15 U.S.C. § 77b(b)).

B. The Record Suggests that, When Uncertainty Regarding Market Conditions Is Taken into Account, the Rule Has Expected Net Benefits

State Petitioners argue that the Rule violates the Clean Air Act because it will have no benefits *and* substantial costs. *See, e.g.*, State Pet'rs' Br. at 11 ("It violates the [Clean Air Act] for EPA to adopt a costly Rule while conceding that the Rule is unlikely to result in any discernible benefit."). But, as EPA explains in its Regulatory Impact Analysis, if future market conditions are such that the Rule imposes substantial costs, the Rule will also generate substantial benefits that, under all but the most unlikely scenarios, outweigh those costs.[7] *See* Regulatory Impact Analysis at 5-13 to 5-16. Conversely, if conditions are such that the Rule generates negligible benefits, it will also impose negligible costs. *See, e.g.*, *id.* at 4-1 to 4-2. There is no plausible scenario in which the Rule results in substantial costs but negligible benefits.

Similarly, Non-State Petitioners' assertion that EPA failed to consider a "full range of variability" in assessing the Rule's cost is baseless. *See* Non-State Pet'rs' Br. at 38. In fact, EPA gave thorough

[7] Notably, scenarios in which net costs are possible are considerably less likely than scenarios in which only net benefits are possible. *See* Regulatory Impact Analysis at 5-13 to 5-16.

consideration to the Rule's effects over a comprehensive range of possible market conditions and scenarios. *See* Regulatory Impact Analysis at 4-1 to 5-25.

The reality is that, with or without the Rule, a developer interested in constructing a coal-fired power plant would have to contend with unfavorable market conditions that make coal economically unprofitable relative to natural gas. *See, e.g.*, Rule, 80 Fed. Reg. at 64,525. Most prominent among these market conditions is the low price of natural gas, driven in part by substantial increases in gas production from extensive shale resources across the United States. *See id.*; *see also* Regulatory Impact Analysis at 4-14 to 4-16. Looking ahead, shale gas production is expected to increase, *see* Regulatory Impact Analysis at 4-15, and natural gas prices are expected to be "considerably lower than observed prices over the past decade," *id.* at 4-14. As long as natural gas prices remain below $11 per million British Thermal Units, coal will simply not be competitive with natural gas for a representative new plant. *See id.* at 4-29. For context, a natural gas price of $10 per million British Thermal Units would be "higher than any national average annual natural gas price faced by the electric

power sector since at least 1996, when the EIA historic data series begins."[8] *Id.* at 5-15.

Nonetheless, EPA analyzed the Rule's impacts under a range of possible natural gas prices. The table below summarizes EPA's findings. These findings are discussed in more detail in Sections I.B.1 to I.B.2.

EPA's Representative Projections of the Rule's Effects Over a Range of Possible Natural Gas Prices

Scenario Probability	**Natural Gas Price***	**Compliance Assumption**	**Representative Range of Net Benefits****
Most likely: expected range of natural gas prices	Any price below $11	Developer constructs natural gas combined cycle plant even in the absence of the Rule	**negligible**
Unlikely: unexpectedly high natural gas prices	*e.g.*, $12	The Rule leads developer to construct natural gas combined cycle plant rather than coal-fired plant	**+$2.2 to +$73**
Extremely unlikely: unprecedented natural gas prices	*e.g.*, $14	The Rule leads developer to construct natural gas combined cycle plant rather than coal-fired plant	**-$11 to +$60**

* Natural gas price is measured per million British Thermal Units.
** Net benefits are measured per megawatt-hour of electricity generation.

[8] In a sensitivity analysis in which natural gas resources were assumed to be low, resulting in a higher natural gas price, the highest natural gas price EIA projected for the years 2020 to 2049 was $8.45 per million British Thermal Units. *See* Regulatory Impact Analysis at 4-30 tbl.4-6.

1. In the Most Likely Scenarios, EPA's Analysis Demonstrates that the Rule Will Have Negligible Costs and Negligible Monetized Benefits

EPA finds that, regardless of whether the Rule is in effect, no new coal plants without carbon capture and storage technology will be constructed. *See* Regulatory Impact Analysis at 4-8 to 4-10. The finding holds true not only for the expected (most likely, or "base case") scenario, but also for a wide range of relatively likely alternative scenarios. *See id.* at 4-13 to 4-14. As EPA explains in its brief, its finding holds even after considering "the possibility of higher economic growth . . . lower coal prices based on lower wages, lower manufacturing and transport costs, and greater mining productivity . . . and 50 percent lower oil and natural gas resources." EPA's Br. at 73-74; *see* Regulatory Impact Analysis at 4-9, 4-13 to 4-14. Furthermore, EPA's conclusion is consistent with the EIA's comprehensive analysis of trends in the energy sector and with publicly available long-term resource plans from a range of utilities. *See* Rule, 80 Fed. Reg. at 64,515, 64,526, 64,558–59.

Because EPA anticipates that new power plants will meet the Rule's standards regardless of the Rule's existence, it also anticipates that the Rule will impose no additional compliance obligations beyond

the baseline. *See, e.g.*, Regulatory Impact Analysis at 4-1 to 4-2. Therefore, under the most likely scenarios, the Rule will result in negligible costs and negligible monetized benefits. For this reason, EPA emphasizes that "[t]he conclusions presented in Chapter 4 [of the Regulatory Impact Analysis]—that costs of the rule are likely to be negligible—represent the best approximation of the overall cost to society." *Id.* at 5-23.

2. In Less Likely Scenarios, EPA's Analysis Demonstrates that the Rule Is Expected to Generate Net Benefits, with Net Costs Possible Only in Extremely Unlikely Scenarios

EPA also considered less likely future scenarios, in which new, conventional coal-fired power plants might become economically viable in the absence of the Rule. *See* Regulatory Impact Analysis at 5-14 to 5-16. EPA concluded that the Rule will generate net benefits in most of these scenarios, with net costs possible only in extremely unlikely scenarios in which natural gas prices are "unprecedented." *See id.* at 5-15 to 5-16.

First, EPA considered "unlikely" scenarios with "unexpectedly high" natural gas prices ($11 per million British Thermal Units and somewhat higher). *See id.* at 5-14 to 5-15. Under these conditions, in the

absence of the Rule, a developer might choose to build and operate a conventional coal-fired plant, because the developer's cost of constructing and operating a natural gas power plant might exceed his cost of constructing and operating a conventional coal-fired power plant. With the Rule in place, however, the developer's lowest-cost option would be to build and operate a natural gas plant. In these scenarios, EPA found that the health and welfare benefits of building a natural gas plant instead of a coal plant—benefits including reductions of both carbon dioxide emissions and other pollutants such as particulate matter—"will outweigh" the increase in costs to the developer, resulting in net benefits to society. *See id.* at 5-15.

Next, EPA conducted further analyses to determine if the Rule could have net costs to society under any scenario, and it found that net costs are possible only under "unprecedented" natural gas prices. *See id.* at 5-15 to 5-16. Even in these extremely unlikely scenarios, net costs are *possible*, not certain; net benefits are possible as well. *See id.* For example, if natural gas prices reach $14 per million British Thermal Units—more than triple the average price for 2014, *see id.* at 4-15—EPA estimates an impact that ranges from a net social cost of $11 per

megawatt-hour of electricity generated to a net social benefit of $60 per megawatt hour relative to the coal-fired power plant, *see id.* at 5-16.

Finally, EPA noted that there are unquantified health and welfare benefits associated both with carbon dioxide reductions and with accompanying reductions of conventional pollutants that the agency did not include in these estimates. *See id.* at 5-14 n.12. For carbon dioxide, these unquantified benefits include physical, ecological, and economic benefits of climate change mitigation that are not captured in the estimates that EPA used to monetize the benefits of reducing carbon emissions. *See id.* For conventional pollutants, these unquantified benefits include, among other things, reduced incidence of morbidity from exposure to nitrogen dioxide and sulfur dioxide and reduced environmental damage from acid deposition. *See id.*; *see also* EPA, Regulatory Impact Analysis for the Final Revisions to the National Ambient Air Quality Standards for Particulate Matter at 5-4 to 5-6 tbl.5-2, 6-4 to 6-5 tbl.6-2 (2012) (providing a long list of unquantified health and welfare benefits).[9] The existence of these unquantified benefits, which would further offset costs, provides additional support

[9] Available at https://www3.epa.gov/ttnecas1/regdata/RIAs/finalria.pdf.

for EPA's assessment that the chances of the Rule having net social costs are "exceedingly low." Regulatory Impact Analysis at 5-16.

3. When All Scenarios Are Considered Together, EPA's Analysis Strongly Suggests that the Rule Has Expected Net Benefits

As discussed in the previous sections, the Rule's expected costs and benefits depend on market conditions that are uncertain. In such cases, it is often useful to calculate an expected value, or a weighted average in which the net benefits of each possible future scenario are multiplied by that scenario's likelihood of occurring and then summed. *See* E.J. Mishan & Euston Quah, Cost-Benefit Analysis 221–223 (5th ed. 2007). In fact, this Court has endorsed agency assessments that considered jointly the likelihood and magnitude of possible impacts. *See Carolina Envtl. Study Grp. v. United States*, 510 F.2d 796, 799 (D.C. Cir. 1975) (concluding that the Atomic Energy Commission's decision "to consider the probabilities as well as the consequences of certain occurrences" under the National Environmental Policy Act was "entirely proper, and necessary").

Here, EPA's qualitative evaluation of the relative likelihood of future scenarios and the magnitude of corresponding net benefits

indicates that scenarios with negligible benefits and negligible costs generated by the Rule are highly likely, scenarios with net monetized benefits are less likely, and scenarios with possible net costs (as well as possible net monetized benefits) are extremely unlikely. *See, e.g.*, Regulatory Impact Analysis at ES-5, 5-14 to 5-16. On balance, this record suggests that the Rule very likely has a positive expected net benefit to society.

II. EPA'S COST-BENEFIT ANALYSIS ACCOUNTS FOR THE POSSIBILITY OF NEW COAL UNITS

Petitioners claim that EPA's cost-benefit analysis failed to consider "the possibility of construction of steam generating [coal] units." Non-State Pet'rs' Br. at 38. This is flatly untrue. Although EPA identified no market conditions under which a newly constructed coal plant that met the Rule's emission standards could generate electricity more cheaply than a newly constructed gas plant, the agency recognized that factors other than cost competitiveness, such as concerns about fuel diversity, might lead a developer to prefer to build a new coal plant anyway. *See* Regulatory Impact Analysis at 5-16 to 5-17; *see also* Rule, 80 Fed. Reg. at 64,559. Accordingly, EPA performed an additional, illustrative analysis of "the impacts that might occur if an investor,

which otherwise wanted to construct a new non-compliant coal unit, chose to instead construct a new compliant coal-fired unit." Regulatory Impact Analysis at 5-17.

In particular, EPA found that the pollution-reduction benefits of equipping a coal plant with partial carbon capture and storage technology could outweigh the costs of installing and operating the technology by up to almost $8 per megawatt-hour of electricity generated, assuming that some of the carbon captured by the plant could be sold for use in enhanced oil recovery efforts. *See* Regulatory Impact Analysis at 5-21 tbl.5-5. Even if none of the captured carbon were sold, EPA found that a compliant plant still had the potential to generate net benefits.[10] *See id.* Finally, as in the analyses discussed earlier in this brief, EPA emphasized that its calculations understated the pollution-reduction benefits of using partial carbon capture and

[10] EPA did not consider the potential for enhanced oil recovery revenue when evaluating the reasonableness of costs as part of its determination of the "best system of emission reduction" under Section 111. *See* Regulatory Impact Analysis at 5-17 n.19. Even so, it noted that "new units that capture [carbon] will likely be built in areas where there are opportunities to sell that captured [carbon] for some useful purpose," which suggests that a net benefits calculation based on an assumption of no enhanced oil recovery may be unduly conservative. Rule, 80 Fed. Reg. at 64,564.

storage technology because many benefits could not be quantified. *See* Regulatory Impact Analysis at 5-20.

Ultimately, EPA cautioned that its "detailed behavioral models of the electricity sector . . . show that [the decision to build a compliant coal plant instead of a compliant gas plant] does not hold across the economy." *Id.* at 5-23. In other words, developers who chose to build compliant coal plants in lieu of cheaper generating options would be outliers. Nevertheless, by conducting its illustrative analysis, EPA adequately accounted for the possibility that *some* new coal units would be constructed, and it found that equipping such units with partial carbon capture and storage technology in order to meet the Rule's emission standards could offer net benefits to society.

III. MANY REGULATIONS, LIKE THE RULE, ADDRESS UNLIKELY BUT PLAUSIBLE SCENARIOS THAT WOULD PRODUCE UNDESIRABLE CONSEQUENCES

State Petitioners describe the Rule as "superfluous" and argue that "EPA cannot impose a nationwide emission standard . . . if it does not believe that the Rule is likely to actually result in reduced levels of pollution." State Pet'rs' Br. at 32. Their assertion is based on EPA's conclusion that, in the mostly likely scenario, the Rule will have a

negligible impact because developers would choose to construct power plants that comply with the Rule even in the absence of the Rule. But Petitioners overlook the unlikely but plausible scenarios that EPA identified in which the Rule would generate substantial emission reductions relative to the baseline.

In light of these alternative scenarios, the Rule serves an important risk-management function, as do a large number of prior regulations from EPA and other agencies that similarly address unexpected but harmful future events. For example, many regulations aim to ensure a certain level of health and safety by codifying an industry "best practice" that is already widely adopted. Others manage risks that cannot be easily quantified but nonetheless warrant regulatory action to protect the public. Like the Rule, both of these types of regulation will have negligible benefits in scenarios in which the feared risks fail to materialize in the future, but both are necessary to manage risk in the face of uncertainty.

A. Many Regulations Codify Industry Best Practices and Have Benefits Only if Unlikely Scenarios Occur

Some regulations formalize industry best practices that many industry participants already observe. These regulations may appear to

have little social benefit because the benefits of such practices are already reflected in the baseline. However, these regulations are important risk-management tools. They hedge against unlikely but plausible future scenarios in which some industry participants might otherwise deviate from current best practices. These rules are analogous to the current Rule, which sets emission standards that industry participants are expected to comply with even in the absence of the Rule, under the most likely market conditions.

For example, the Federal Aviation Administration under the Bush Administration issued a final rule updating its regulations of amateur rocket activities in 2008. *See* 73 Fed. Reg. 73,768 (Dec. 4, 2008). The notice of proposed rulemaking explained that the Federal Aviation Administration historically relied on "voluntary self-regulation" (along with "state and local regulation" and the agency's "own analysis") to oversee amateur rocket launching, but the increasing power of model rockets and the activity's increasing popularity meant that "the once remote possibility of an accident or incident resulting from amateur rocket activities has become more likely." 72 Fed. Reg. 32,816, 32,817 (proposed June 14, 2007). The agency's final rule aimed "to preserve the

level of safety associated with amateur rocketry" and to "reflect current industry practice." 73 Fed. Reg. at 73,768. Therefore many of the agency's requirements, such as standards for distance between the launch site and spectators, reflected norms that amateur rocket enthusiasts already followed. The agency nevertheless maintained that "it is important to codify the best practices to ensure they are preserved." 72 Fed. Reg. at 32,822.

In addition, EPA codified current industry practices in a recent rule that prohibits oil and gas extractors that use hydraulic fracturing from sending their wastewater to municipal sewage treatment plants. *See* 81 Fed. Reg. 41,845 (June 28, 2016). EPA noted that no such extractors were currently sending their wastewater to municipal sewage treatment plants, and therefore "the final rule is not projected to affect current industry practice or to result in incremental compliance costs or monetized benefits." *Id.* at 41,848. However, EPA pointed out that the rule served "as a backstop measure because onshore unconventional oil and gas extraction facilities have discharged to [municipal sewage treatment plants] in the past and because the potential remains that some facilities may consider discharging to

[municipal sewage treatment plants] in the future." *Id.* In other words, even though the rule would have benefits only in unlikely scenarios, it was justified to avoid costs that would result from a deviation from the status quo.

In fact, the U.S. Court of Appeals for the Fifth Circuit has already upheld an EPA rule of this type. *See Texas Oil & Gas Ass'n v. EPA*, 161 F.3d 923 (5th Cir. 1998). EPA had promulgated a zero discharge limit on drilling wastes for all coastal oil and gas facilities except those located in one region in Alaska. *See* 61 Fed. Reg. 66,086 (Dec. 16, 1996). According to EPA, "[o]perators would not incur any costs under [the rule] because the requirements reflect current practice." *Id.* at 66,095; *see also Texas Oil & Gas Ass'n*, 161 F.3d at 932 (acknowledging EPA's finding that the rule would have no economic effect because it "reflected current industry practice"). Far from finding that the rule's codification of existing practices rendered it unlawful, the court approvingly cited the "near-perfect uniformity of industry practice in this area" as a reason to uphold the rule against petitioners' claim that EPA's selection of the standard was arbitrary and capricious. *See Texas Oil & Gas Ass'n*, 161 F.3d at 937.

Numerous other rules codify industry best practices in similar ways and discuss the value and importance of preserving such practices. *See*, *e.g.*, 79 Fed. Reg. 33,864, 33,865 (June 13, 2014) (Coast Guard "codifying the established industry practice" of using two tugboats to guide double-hulled oil tankers through Prince William Sound); 59 Fed. Reg. 22,100, 22,100 (Apr. 28, 1994) (Federal Aviation Administration codifying standards for jacking and tying down airplanes that are "consistent with current industry practice"); 48 Fed. Reg. 52,692, 52,692 (Nov. 22, 1983) (Food and Drug Administration stating that "the final rule only formalizes existing industry-wide practices"). By promulgating such regulations, a regulatory agency ensures a minimum level of health and safety in the face of unpredictable and fast-changing economic or regulatory circumstances.

B. Many Regulations Address Low-Probability Events

As discussed earlier, under the most likely market conditions, the Rule is expected to generate negligible costs and benefits because developers would not find it economically advantageous to construct conventional coal-fired power plants even in the absence of the Rule. But if gas prices rose to $11 per million British Thermal Units or more,

coal-fired generation would become competitive and carbon dioxide emissions from new power plants would be significantly higher in a world without the Rule than in one with the Rule. Although EPA determined that such scenarios were unlikely, it also demonstrated that, in most of those scenarios, the Rule would generate net benefits to society. The fact that the scenarios are less likely does not mean that the scenarios are unimportant or should be ignored.

For example, in 2003, the Department of Transportation's Research and Special Programs Administration issued a final rule requiring shippers of hazardous waste to develop security plans in order to address the threat of terrorist attacks on hazardous waste shipments. *See* 68 Fed. Reg. 14,510 (Mar. 25, 2003). The agency noted that it could estimate the compliance costs for the rule, but it could not provide any estimate of the benefits from the reduced threat of terrorist attacks against shipments of hazardous materials. *Id.* at 14,518. Nonetheless, the agency concluded that, in its judgment, the costs of the Rule are "more than offset by the potential benefits if there is a finite chance that these measures might avert a successful attack." *Id.* at 14,519. The potentially small magnitude of this finite chance did not deter the

agency from regulating. *See also* 81 Fed. Reg. 11,364, 11,394 (Mar. 3, 2016) (Transportation Security Administration regulating to reduce the likelihood of a successful terrorist attack, a "[l]ow probability, high consequence event[]");[11] 76 Fed. Reg. 51,848 (Aug. 18, 2011) (Transportation Security Administration regulating the screening of cargo for passenger airplanes).[12]

More recently, the Food and Drug Administration issued a separate rule aimed at preventing intentional adulteration of food. *See* 81 Fed. Reg. 34,166 (May 27, 2016). The agency found it "prudent" to regulate even though "the likelihood of an incident is low" because "a successful intentional adulteration of food" would "cause wide scale public health harm" absent mitigation strategies. *Id.* at 34,174.

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[11] This rule has a challenge pending in this Court, Case No. 16-1135. In that challenge, the petitioners take issue with the agency's cost-benefit analysis—for example, its failure to consider ancillary costs of the rule such as increases in driving-related deaths and its failure to account for privacy interests and the potential for harassment—but they do not challenge the agency's ability to regulate low-probability risks if properly analyzed. *See* Case No. 16-1135 (petitioners' briefs).

[12] Coincidentally, these examples focus on the risk of a terrorist attack under various circumstances. They are not, however, meant to suggest that the risk of market conditions favorable to coal-fired generation is similar to the risk of a terrorist attack. Instead, they simply highlight the fact that EPA is not the only agency to confront low-probability or difficult-to-quantify risks.

Some outcomes, despite being unlikely, may be sufficiently harmful that regulation is justified. Given this fact, agencies need the flexibility to use their expert judgment to address such risks through rulemakings. Agencies should not have to wait until risks are imminent before they can commence the lengthy process of promulgating net beneficial regulations to avoid or mitigate potential harms.

CONCLUSION

For the foregoing reasons, the petitions should be denied and the Rule should be upheld.

DATED: December 21, 2016

Respectfully submitted,

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CERTIFICATE OF COMPLIANCE WITH WORD LIMITATION

Counsel hereby certifies that, in accordance with Federal Rule of Appellate Procedure 32(a)(7)(C), the foregoing Brief of the Institute for Policy Integrity at New York University School of Law as *Amicus Curiae* In Support of Respondent contains 5759 words, as counted by counsel's word processing system, and this complies with the applicable word limit established by the Court.

DATED: December 21, 2016

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ADDENDUM

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Excerpt from E.J. Mishan & Euston Quah, Cost-Benefit Analysis (5th ed. 2007).	ADD-1

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Cost–Benefit Analysis
5th edition

E.J. Mishan and Euston Quah

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41 Simple probability in decision making

1 The techniques illustrated in game theory are based on the assumption that there is no knowledge at all available that could throw any light on the likelihood of each of the alternative events, b_1, b_2, b_3, occurring over the period in question. In the complete absence of such knowledge, we can no more suppose that b_1 is as likely to occur as b_2 than we can suppose that b_1 is more (or less) likely to occur. We can say no more of the events in question than that each is possible. Once a suspicion about the greater likelihood of one or more of the possible events occurring begins to form, the simple game-theory method may require modification. In general, the more information about likelihoods we can obtain, the more agreement about the best decision we can hope to secure. If, from years of keeping records about floods, we could attach probabilities to each of two possible outcomes b_1 and b_2 in Table 38.1, our procedure would be to include those probabilities as weights in working out a solution.

2 Suppose that event b_1 (flood) can be expected with a probability of p_1, say 3/5, and event b_2 (no flood) therefore with a probability p_2 of $(1 - p_1)$, or 2/5, we make our calculations in a way illustrated by Table 41.1.

If option a_1 is chosen, each of the outcomes, 130,000 and 400,000, corresponding to the possible events, b_1 and b_2 respectively, is multiplied by the probability of the occurrence of the event, 3/5 and 2/5. The weighted average, or mathematical expectation, of the gains from choosing a_1 is entered in the third column, as also is the weighted average of gains from choosing a_2 and a_3. The largest weighted average is obviously 238,000, arising from the choice of option a_1, which can be regarded in the circumstances as the proper decision.

Table 41.1

	$b_1 (p_1 = 3/5)$	$b_2 (p_2 = 2/5)$	*Weighted average*	*Largest weighted average*
a_1	130,000 × 3/5	400,000× 2/5	238,000	238,000
a_2	140,000× 3/5	260,000 × 2/5	188,000	
a_3	80,000 × 3/5	90,000 × 2/5	84,000	

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Now if this figure of 238,000 could be regarded as the anticipated value of net revenue from choosing a_1, in the sense that there is a stronger likelihood of a net revenue of 238,000 occurring when a_1 is chosen than of any other single value, we might have less hesitation in opting for a_1 rather than a_2 or a_3. But this figure of 238,000 for a_1 can be regarded as the expected value only in the conventional statistical sense; that is to say, if it were possible to repeat this experiment year after year for, say, the next 100 years or so, then – provided that the relevant climatic conditions remain unaltered – the *average* net revenue from choosing a_1, taken over the 100 years, would be close to 238,000. For roughly 3/5 of the century, or for roughly 60 out of the 100 years, event b_1 would occur, and for the remaining years event b_2 would occur.

It is clear, then, that if we are thinking in terms of many years ahead, on the one hand, we can (if relevant conditions are not expected to change very much) expect to come close to the (undiscounted) average of 238,000 by repeatedly opting for a_1. If, on the other hand, we are interested in the outcome next year alone, we obviously cannot expect a net revenue of 238,000 from choosing a_1. For in one year, only one event will occur. If b_1 occurs, the net revenue will be 130,000. If, instead, b_2 occurs, the net revenue will be 400,000. All we can say is that, on the basis of past evidence, there is more chance of b_1 occurring than b_2. And the higher the probability of b_1's occurring, the more we are disposed to expect it and to have our decision governed by the thought of its occurrence.

If, to take more extreme probabilities, we discovered from the records that floods occur, on the average, in nine years out of ten, we should be justified in expecting a flood next year, and in being surprised if it did not occur. The net revenue we can most reasonably expect if we choose a_1 is therefore 130,000. By the same logic, the net revenue we should be inclined to expect by choosing option a_2 is 140,000. This being so, we might conclude that the rational thing is to choose a_2. But once we have probabilities attached to the various events it would not be very sensible to focus our expectations on the event with the highest probability and ignore the possibility of the other events occurring. Thus, whether the probability of event b_1 occurring is 3/5 or 9/10, the decision maker is not completely indifferent to the outcome arising from event b_2 – unless that outcome is the same, say 200,000, whatever option is chosen. The greater the gain in choosing a_1 (given that b_2 occurs) compared with that in choosing a_2, the more weight he will give to the a_1 option. To illustrate with extreme figures, if choice of a_1 would entail an outcome of 1,000,000 if event b_2 occurred whereas the choice of a_2 entailed an outcome of zero for the same event, the nine chances out of ten that b_1 would occur – conferring an additional 10,000 if a_2 were chosen rather than a_1 – would hardly be likely to prevail against the thought that if, despite its slim chance, b_2 did occur a net gain of 1,000,000 would be collected.

3 We may conclude tentatively that dependable probabilities will be taken into account by the decision maker in such cases; moreover, that the use of these probabilities as weights in the method indicated above (by reference to Table 41.1),

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would be acceptable to many as a rough general rule. By choosing an option on the basis of a weighted average of events, rather than on the basis of a single most likely event, we are in effect refusing to neglect the possible impact of the less likely event(s) on our decision, and doing so in a systematic and conventional manner.

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CERTIFICATE OF SERVICE

I hereby certify that on December 21, 2016, I filed the foregoing Final Brief of the Institute for Policy Integrity at New York University School of Law as Amicus Curiae In Support of Respondents through the Court's CM/ECF system, which will send a notice of filing to all registered CM/ECF users. I also caused the foregoing to be served via Federal Express on counsel for the following parties at the following addresses:

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