ORAL ARGUMENT SCHEDULED FOR JUNE 2, 2016

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

No. 15-1363 (and consolidated cases)

STATE OF WEST VIRGINIA, *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

Richard L. Revesz
Denise A. Grab
Jack Lienke
Jason A. Schwartz
INSTITUTE FOR POLICY INTEGRITY
139 MacDougal Street, Room 319
New York, NY 10012
(212) 992-8932
richard.revesz@nyu.edu
Counsel for Amicus Curiae
Institute for Policy Integrity

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CERTIFICATE AS TO PARTIES, RULINGS, AND RELATED CASES

All parties, intervenors, and *amici* appearing in this case are listed in the brief for Respondents, except for the following movant *amicus curiae* in support of Respondents: (a) Union of Concerned Scientists; (b) Grid Experts: Benjamin F. Hobbs, Brendan Kirby, Kenneth J. Lutz, James D. McCalley, and Brian Parsons; and (c) Current Members of Congress and Bipartisan Former Members of Congress: Rep. Frank Pallone, Jr., Rep. Jared Huffman, Rep. Nancy Pelosi, Rep. Steny H. Hoyer, Rep. James E. Clyburn, Rep. Xavier Becerra, Rep. Joseph Crowley, Rep. John Conyers, Jr., Rep. Elijah E. Cummings, Rep. Peter A. DeFazio, Rep. Eliot L. Engel, Rep. Raúl M. Grijalva, Rep. Eddie Bernice Johnson, Rep. Sander Levin, Rep. John Lewis, Rep. Nita M. Lowey, Rep. Jim McDermott, Rep. Richard E. Neal, Rep. David Price, Rep. Charles B. Rangel, Rep. Bobby L. Rush, Rep. José E. Serrano, Rep. Louise M. Slaughter, Rep. Alma S. Adams, Rep. Pete Aguilar, Rep. Karen Bass, Rep. Ami Bera, Rep. Donald S. Beyer, Jr., Rep. Earl Blumenauer, Rep. Suzanne Bonamici, Rep. Brendan F. Boyle, Rep. Robert A. Brady, Rep. Corrine Brown, Rep. Julia Brownley, Rep. Cheri Bustos, Rep. G.K. Butterfield, Rep. Lois Capps, Rep. Tony

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Moran (ret.), Rep. Henry Waxman (ret.), and Sen. & Rep. Timothy E. Wirth.

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

STATEMENT REGARDING SEPARATE BRIEFING, AUTHORSHIP, AND MONETARY CONTRIBUTIONS

Pursuant to this Court's Order of January 28, 2016 (Doc. 1595922), and for the reasons discussed in the January 27, 2016 Unopposed Joint Motion of Amici (Doc. 1595470) as to why a single joint brief is not practicable in this case, the Institute for Policy Integrity files this separate amicus brief in compliance with the word limits set forth in Fed. R. App. P. 29(d). *See* D.C. Circuit Rule 29(d).

Under Federal Rule of Appellate Procedure 29(c), 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 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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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:

Comment Responses:	EPA, Responses to Public Comments on the EPA's Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units (2015)
EPA:	Environmental Protection Agency
GAO:	Government Accountability Office, formerly General Accounting Office
Mercury Rule:	Clean Air Mercury Rule, 70 Fed. Reg. 15,994 (Mar. 29, 2005) & 70 Fed. Reg. 28,606 (May 18, 2005)
Policy Integrity:	Institute for Policy Integrity
RIA:	EPA, Regulatory Impact Analysis for the Clean Power Plan Final Rule (2015)
Transport Rule:	Cross-State Air Pollution Rule, 76 Fed. Reg. 48,208 (Aug. 8, 2011)

INTEREST OF AMICUS CURIAE

Pursuant to this Court's December 18, 2015 order (Doc. 1589385), the Institute for Policy Integrity at New York University School of Law[1] ("Policy Integrity") files this *amicus* brief in support of Respondents.

Policy Integrity is a nonprofit think tank dedicated to improving government decisionmaking through advocacy and scholarship in administrative law, economics, and policy, focusing on environmental issues. Policy Integrity has produced scholarship on the legality, economics, and design of Clean Air Act regulation and has filed *amicus* briefs in this Court and the Supreme Court regarding the Environmental Protection Agency's ("EPA") Clean Air Act authority.

Policy Integrity commented on the proposed Clean Power Plan, supporting EPA's flexible approach to reducing carbon pollution. Policy Integrity's director testified at March 22, 2015 and October 22, 2015 congressional hearings discussing the Clean Power Plan's legality, and our staff have authored scholarship regarding the rule.[2] This brief

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

[2] Richard L. Revesz & Jack Lienke, *Struggling for Air: Power Plants and the "War on Coal"* (2016); Richard L. Revesz, Denise A. Grab, and

builds upon that work, arguing that regulatory history and economic analysis support EPA's authority to promulgate the Clean Power Plan.

SUMMARY OF ARGUMENT

Petitioners argue that the Clean Power Plan represents an "enormous and transformative expansion" of EPA's regulatory authority, Pet'rs Core Issues Br. 34 (quoting *Util. Air Regulatory Grp. v. EPA*, 134 S.Ct. 2427, 2444 (2014)), because the rule's emission guidelines are (1) not based solely on reduction techniques that individual sources can implement independently, (2) assume "generation shifting" from high-emitting to low- and non-emitting electricity generators, and (3) assume that owners and operators can undertake or invest in off-site actions to reduce pollution from regulated sources. But there are, in fact, regulatory precedents for each of these aspects of the Clean Power Plan. Legislative history further supports EPA's embrace of flexible reduction techniques, revealing that Congress intended EPA to have broad discretion when determining a "best system of emission reduction" for existing sources under §111, 42 U.S.C. §7411.

Jack Lienke, *Familiar Territory: A Survey of Legal Precedents for the Clean Power Plan*, 46 Envtl. L. Rep. 10190 (2016).

Petitioners also argue that EPA's "longstanding reading" of the Clean Air Act precludes regulating power plants' greenhouse gas emissions under §111(d), because power plants are regulated for hazardous pollutants under §112, 42 U.S.C. §7412. Pet'rs Core Issues Br. 61. In fact, during the twenty-five years since the 1990 Clean Air Act Amendments enacted §111(d)'s current language, Republican and Democratic administrations have consistently interpreted EPA's §111(d) authority to extend to particular pollutants that escape regulation under other Clean Air Act provisions. This consistent interpretation supports the Clean Power Plan's regulation of greenhouse gases from existing power plants.

Finally, Petitioners allege that EPA "diminishes" the statutorily required consideration of costs by "inflating" the rule's benefits. *Id.* at 69. This attack is meritless, since EPA fully assessed both costs and benefits, following best economic practices. To measure the rule's substantial climate benefits, EPA properly applied the global Social Cost of Carbon, a rigorous, consensus-based, transparent metric used across the federal government. EPA also properly considered the rule's significant health co-benefits, consistent with standard analytical

practices. After carefully weighing the rule's full costs—including indirect costs—EPA concluded that the rule's benefits vastly outweigh its costs.

ARGUMENT

I. EPA HAS, FOR DECADES AND UNDER ADMINISTRATIONS OF BOTH PARTIES, LOOKED BEYOND INDIVIDUAL SOURCES' FENCELINES WHEN SETTING EMISSION LIMITS UNDER THE CLEAN AIR ACT

Petitioners argue that the Clean Power Plan is unprecedented in multiple respects and, consequently, represents an "'enormous and transformative expansion' of [EPA]'s power." Pet'rs Core Issues Br. 34 (quoting *Util. Air Regulatory Grp.*, 134 S. Ct. at 2444). In reality, the rule relies on familiar, flexible reduction techniques that EPA has used for several decades and under administrations of both parties. Courts have repeatedly upheld these techniques as reasonable exercises of EPA's discretion.

Most broadly, Petitioners claim that, before this rulemaking, EPA "has consistently promulgated emission limitations achievable only by improved performance of *the individual facilities* in a regulated source category." *Id.* at 34 (emphasis in original). This is untrue. Several

previous EPA regulations—under §111 and other Clean Air Act provisions—featured emission limits that regulated sources could achieve *collectively*, through emission trading or averaging. In some rules, the use of trading and/or averaging enabled EPA to set tighter limits than it otherwise would have. In other words, trading and averaging were not merely offered as compliance mechanisms, but affected the rules' stringency.

Petitioners also assert that the Clean Power Plan's consideration of "generation shifting" from high-polluting to low- or non-polluting electricity generators is "unambiguously foreclosed by…nearly a half century of consistent administrative practice." *Id*. at 42. This, too, is incorrect. In previous power sector regulations, EPA has explicitly considered the potential for generation shifting when setting emission limits.

Finally, Petitioners suggest that EPA has never before based emission limits on actions that regulated sources' owners and operators can take only "beyond the source itself." *Id*. at 43. But from the Clean Air Act's earliest days, §111 rules have recognized owners and

operators' ability to reduce pollution by undertaking or investing in off-site activities.

A. Prior Section 111(d) Rules Have Looked to Flexible Reduction Techniques Like Emission Trading and Averaging when Determining the Stringency of Emission Limits

Petitioners insist that emission guidelines under §111(d) must be based on technological or operational changes that each regulated source can implement independently. *Id*. at 48. But EPA has twice before set §111(d) emission limits based on reductions that sources can achieve collectively, through emission trading and/or averaging. In one rule, EPA explicitly relied on averaging to justify more stringent standards than it would have set if sources had to achieve all reductions independently.

1. Clean Air Mercury Rule

Under the George W. Bush Administration, EPA issued the Clean Air Mercury Rule ("Mercury Rule"), which set statewide targets for coal-fired generating units' mercury emissions and allowed intersource and interstate trading of emission allowances. 70 Fed. Reg. 28,606, 28,606, 28,632 (May 18, 2005). Notably, the Mercury Rule explicitly factored emission trading into its "best system of emission reduction." *Id.* at

28,617 ("EPA has determined that a cap-and-trade program based on control technology available in the relevant timeframe is the best system for reducing [mercury] emissions from existing coal-fired Utility Units."). In other words, EPA took the availability of trading into account when determining the appropriate stringency of the rule's emission budgets.

In promulgating the Mercury Rule, EPA also explained why trading was a permissible component of state plans under §111(d), noting that "'standard of performance' is not explicitly defined to include or exclude an emissions cap and allowance trading program" and that no other part of §111(d) "indicate[s] that the term 'standard of performance' may not be defined to include a cap-and-trade program." *Id.* at 28,616-17. Accordingly, EPA amended the §111 implementing regulations to provide that states' "[e]mission standards shall either be based on an allowance system or prescribe allowable rates of emissions except when it is clearly impracticable." *Id.* at 28,649.

Though the D.C. Circuit ultimately vacated the Mercury Rule, the reversal was on grounds unrelated to trading or the rule's stringency. *New Jersey v. EPA*, 517 F.3d 574, 577-78 (D.C. Cir. 2008). Under the

current version of §111's implementing regulations, standards may still be based on allowance systems. 40 C.F.R. §60.24(b)(1).

2. Emission Guidelines for Large Municipal Waste Combustors

The Mercury Rule was not the first §111(d) regulation to incorporate flexible reduction mechanisms. Under the Clinton Administration in 1995, EPA issued joint §111(d)/§129 guidelines for municipal waste combustors that allowed the combustors to average the nitrogen oxides emission rates of multiple units within a single large plant and to trade emission credits with other plants. 60 Fed. Reg. 65,387, 65,402 (Dec. 19, 1995).[3] Further, plants that took advantage of emission averaging were subject to tighter emission guidelines than those that did not. *Id.* EPA thus explicitly recognized that the flexibility provided by averaging justified more stringent emission limits.

[3] Section 129, added to the Clean Air Act in 1990, instructed EPA to establish performance standards for both new and existing solid waste incineration units under §111. 42 U.S.C. §7429. Like §111, §129 does not include any language explicitly authorizing or prohibiting trading or averaging.

B. Emission Trading and Averaging Have Also Affected Regulatory Stringency Under Other Clean Air Act Provisions

EPA has also incorporated emission trading and averaging into several rules under Clean Air Act provisions other than §111. In at least two of these rules, EPA explicitly found that trading enabled greater emission reductions than a technology-based standard that individual sources had to achieve independently.

1. Trading Under the Good Neighbor Provision

EPA incorporated emission trading into three rules issued under §110(a)(2)(D), commonly known as the Good Neighbor Provision, which prohibits "any source" in an upwind state from emitting pollution that "contribute[s] significantly" to downwind states' failure to meet national ambient air quality standards. 42 U.S.C. §7410(a)(2)(D)(i)(I). In the 1998 NO_x SIP Call, promulgated during the Clinton Administration; the 2005 Clean Air Interstate Rule, promulgated during the George W. Bush Administration; and the 2011 Cross-State Air Pollution Rule ("Transport Rule"), promulgated during the Obama Administration, EPA established statewide emission budgets for the power sector and crafted trading mechanisms that states could opt into as a flexible, cost-

effective means of meeting their budgets. *See* 63 Fed. Reg. 57,356, 57,358-59 (Oct. 27, 1998); 70 Fed. Reg. 25,162, 25,162, 25,229 (May 12, 2005); 76 Fed. Reg. 48,208, 48,210-11 (Aug. 8, 2011).

In designing the Transport Rule, EPA considered a "direct control" approach that would have set emission limits on individual sources without allowing trading, but ultimately concluded "that the direct control alternative would result in fewer emission reductions and higher costs compared to [a trading-based approach]." 76 Fed. Reg. at 48,272-73. Thus, the use of trading enabled EPA to issue a more stringent (and cost-effective) rule.

Though the Transport Rule was issued under §110, it is a particularly instructive precedent for the Clean Power Plan, because §111(d) directs EPA to follow "a procedure similar to that provided by [§110]" when working with states to set standards for existing sources. 42 U.S.C. §7411(d)(1). In upholding the Transport Rule in 2014, the Supreme Court found that "EPA's cost-effective allocation of emission reductions among upwind States…[was] a permissible, workable, and equitable interpretation of the Good Neighbor Provision." *EPA v. EME*

Homer City Generation, L.P., 134 S.Ct. 1584, 1610 (2014). The same is true of EPA's flexible design for the Clean Power Plan.

2. Regional Haze Trading Program

EPA also used emission trading to address regional haze under §169A of the Clean Air Act, 42 U.S.C. §7491. In 2012, EPA approved a trading program proposed by a group of western states and municipalities to address their collective contributions to haze in the Colorado Plateau. 77 Fed. Reg. 73,926, 73,927 (Dec. 12, 2012); 77 Fed. Reg. 74,355, 74,357 (Dec. 14, 2012); 77 Fed. Reg. 70,693, 70,694-95 (Nov. 27, 2012); 77 Fed. Reg. 71,119, 71,121 (Nov. 29, 2012). As a prerequisite to approving the program, EPA required the states to show that trading would achieve *greater* overall reductions than the installation of "best available retrofit technology" at individual sources. *WildEarth Guardians v. EPA*, 770 F.3d 919, 923 (10th Cir. 2014). Once again, the flexibility provided by trading enabled EPA to set a more stringent reduction target than it otherwise would have. The Tenth Circuit upheld the regional haze trading program in 2014. *Id.*

3. Trading and Averaging Under Mobile Source Provisions

EPA has also, for decades, looked beyond individual sources' independent reduction capabilities when regulating vehicles and fuels under Title II of the Clean Air Act. For example, under the Reagan Administration in 1982, EPA promulgated a §211 standard for the lead content of gasoline that some refineries could satisfy only by obtaining blending components or "lead credits" from other refineries. *Small Refiner Lead Phase-Down Task Force v. EPA*, 705 F.2d 506, 534-36 (D.C. Cir. 1983) (upholding this aggregate approach to lead reduction and finding that "[a]lthough lead-credit trading was a new idea, EPA had sufficient reason to believe that a market for lead credits would develop" given nature of refining industry and agency's experience with similar programs).

Since the 1980s, EPA has taken a similarly flexible approach to motor vehicles standards under §202, 42 U.S.C. §7521(a)(1). Rather than requiring each new vehicle to achieve the same degree of emission control, EPA sets standards that a manufacturer's fleet can meet on average. *See, e.g.*, 50 Fed. Reg. 10,606, 10,607-08 (Mar. 15, 1985). As in previous examples, the flexibility provided by averaging has directly

affected the stringency of vehicle rules. *See id.* at 10,634-45 (noting a risk of widespread noncompliance if the agency set a standard of similar stringency without allowing averaging).[4]

The D.C. Circuit upheld this fleet-wide approach to §202, finding that, absent "any clear congressional prohibition of averaging," EPA's effort to "allow manufacturers more flexibility in cost allocation while ensuring that a manufacturer's overall fleet still meets the emissions reduction standards makes sense." *Natural Res. Def. Council v. Thomas*, 805 F.2d 410, 425 (D.C. Cir. 1986).

Section 111 similarly contains no "clear congressional prohibition" on trading or averaging. Thus, the Clean Power Plan's reliance on flexible reduction techniques merits the same deference that EPA received in the motor vehicles context.

C. Prior EPA Rules—Under Section 111 and Other Clean Air Act Provisions—Have Based Emission Limits on "Generation Shifting"

In setting the Clean Power Plan's emission guidelines, EPA found that the "best system of emission reduction" for carbon dioxide from

[4] In more recent rules, EPA has gone beyond averaging and allowed inter-manufacturer emission trading. *See, e.g.,* 77 Fed. Reg. 62,624, 62,629 (Oct. 15, 2012).

electric generating units involved substituting generation at higher-polluting electricity sources with increased generation at lower-polluting sources. 80 Fed. Reg. 64,662, 64,707 (Oct. 23, 2015). Petitioners argue that emission limits based on such "generation shifting" are "unambiguously foreclosed by…nearly a half century of consist ent administrative practice." Pet'rs Core Issues Br. 42. In fact, both the Mercury Rule (promulgated under §111(d)) and the Transport Rule (promulgated under the Good Neighbor Provision) took the possibility of increased dispatch of lower-emitting sources and decreased dispatch of higher-emitting sources into account when setting emission limits for the power sector. *See* 70 Fed. Reg. at 28,619 (projecting emission reductions from "dispatch changes"); 76 Fed. Reg. at 48,252 (projecting reductions from "increased dispatch of lower-emitting generation").

Other Clean Air Act regulations have been expected to result in generation shifting, even if their emission limits were not set based on that expectation. For example, the 2011 Mercury and Air Toxics Standards were set by reference to reductions that oil- and coal-fired generating units could achieve using on-site controls, but EPA

nevertheless projected that the rule would cause a 1.3% decrease in coal-fired generation and a 3.1% increase in gas-fired generation between 2009 and 2015. EPA, Regulatory Impact Analysis for the Final Mercury and Air Toxics Standards 3-16 tbl.3-6 (2011).[5] Similarly, national ambient air quality standards are set solely by reference to pollutants' health impacts, but EPA has long recognized that they encourage states to increase use of cleaner electricity sources. *See, e.g.*, Press Release, EPA, EPA Sets National Air Quality Standards (Apr. 30, 1971) (quoting Administrator Ruckelshaus as saying that "meeting the [ambient standard for particulates] in the time allowed by the law in [seven major] cities will require increasing our total national use of natural gas by about 15 percent");[6] EPA, Legal Memorandum Accompanying Clean Power Plan for Certain Issues 93-94 (2015) (noting that multiple states have included renewable energy

[5] *Available at* https://www3.epa.gov/ttnecas1/regdata/RIAs/matsriafinal.pdf.
[6] *Available at* https://www.epa.gov/aboutepa/epa-sets-national-air-quality-standards.

installations in their state implementation plans for ambient standards).[7]

Thus, contrary to Petitioners' claims, there is ample precedent for the Clean Power Plan's expectation that regulated facilities can reduce emissions by shifting some generation to lower-emitting electricity sources.

D. Prior EPA Rules Have Assumed Off-Site Action and Investment by Owners and Operators of Regulated Sources

Petitioners also argue that §111 emission limits must "apply to sources, not owners and operators of sources" and thus should not be set based on an assumption that owners and operators can take "actions beyond the source itself." Pet'rs Core Issues Br. 43. But from the Clean Air Act's earliest days, EPA has issued rules under §111 that harness the ability of sources' owners and operators to undertake or invest in off-site activities that reduce pollution.

Indeed, the very first set of §111 standards for *new* sources that EPA ever issued, under the Nixon Administration in 1971, assumed that the "best system of emission reduction" for sulfur dioxide from

[7] *Available at* https://www.epa.gov/sites/production/files/2015-11/documents/cpp-legal-memo.pdf.

electric generating units included precombustion cleaning of coal to reduce its sulfur content, an action that source owners and operators typically paid third parties to perform off-site. *See* EPA, *Background Information for Proposed New-Source Performance Standards: Steam Generators, Incinerators, Portland Cement Plants, Nitric Acid Plants, Sulfuric Acid Plants* 7 (1971) (noting "desirability of setting sulfur dioxide standards that would allow… fuel cleaning"); 80 Fed. Reg. at 64,765 n.499 (explaining that coal cleaning is generally performed by third parties). Congress later ratified the use of coal cleaning in the Clean Air Act Amendments of 1977. *Id.* at 64,765.

Perhaps the closest analogue to the actions expected of owners and operators under the Clean Power Plan were those expected under the Mercury Rule, which, as discussed above, explicitly incorporated emission trading into its definition of the "best system of emission reduction." *Supra* at 6-8. To buy or sell emission allowances from or to other sources, owners and operators would have had to take actions—and, in some cases, make investments—outside of their own facilities. *See, e.g.,* 40 C.F.R. §96.6(c)(1) (NO_x SIP Call regulation providing that owners and operators must hold allowances for their units); 40 C.F.R.

§96.60 (explaining responsibilities of owners and operators' representatives with respect to allowance transfers).

Like these earlier rules, the Clean Power Plan simply recognizes that, as a practical matter, §111 emission limits apply to owners and operators of sources and can reasonably encompass off-site pollution-reducing actions undertaken or funded by those owners and operators.

II. LEGISLATIVE HISTORY SUPPORTS THE CLEAN POWER PLAN'S RELIANCE ON BEYOND-THE-FENCELINE REDUCTION TECHNIQUES

Incorporating reduction techniques like emission trading and averaging (and related generation shifting) into the Clean Power Plan is not merely consistent with past EPA rulemakings; it is also supported by legislative history. Section 111 requires that standards of performance for existing sources reflect the "best system of emission reduction" for the relevant pollutant and source category. 42 U.S.C. §7411(a)(1). Section 111 does not define "best system of emission reduction," but Congressional materials from the time of its initial enactment suggest that legislators intended the phrase to encompass more than just technological or operational changes at individual sources. While the version of the Clean Air Act originally passed by the

House took a purely technological approach to stationary source regulation, 80 Fed. Reg. at 64,764 (citing H.R. 17,255, 91st Cong. §5 (1970)), the Senate's bill contemplated a variety of reduction techniques, providing for standards that reflected "the greatest degree of emission control…achievable through application of the latest available control technology, processes, operating methods, *or other alternatives*." *Id.* (quoting S. Rep. No. 91–1196, at 15–16 (1970)). The final conference bill reflected the Senate's broader approach. *Id.* (citing Senate exhibit summarizing conference agreement).

Congress amended §111 in 1977, requiring that standards for new sources reflect the "best *technological* system of continuous emission reduction," but maintaining greater flexibility for EPA with regard to existing source standards, which could be based on the "best system of continuous emission reduction." *Id.* at 64,764-65 (emphasis added). Thus, for existing sources, legislators recognized that the best system was "not necessarily technological." *See id.* at 76,765 (quoting H.R. Rep. No. 95–294 (1977)).

Finally, in 1990, Congress revised §111 once again, returning to a broad "best system of emission reduction" formulation for both new and

existing sources, without any requirement that the system be "technological" or "continuous." *Id.*

Taken together, this history suggests that §111's framers intended to grant EPA wide latitude in determining a best system of emission reduction, particularly with respect to existing sources.

III. SINCE THE 1990 CLEAN AIR ACT AMENDMENTS AND THROUGH ADMINISTRATIONS OF BOTH PARTIES, EPA HAS REPEATEDLY INTERPRETED THE SCOPE OF ITS SECTION 111(d) AUTHORITY TO FOCUS ON POLLUTANTS, RATHER THAN SOURCE CATEGORIES

During the twenty-five years since the 1990 Clean Air Act Amendments enacted the current version of §111(d), Republican and Democratic administrations have consistently interpreted EPA's §111(d) authority to cover pollutants that escape regulation under other Clean Air Act provisions. This consistent interpretation supports the Clean Power Plan's regulation of greenhouse gases from existing power plants. Surprisingly, Petitioners and their amici argue the exact opposite: that EPA's "longstanding reading" of the statute precludes regulating power plants' greenhouse gas emissions under §111(d), because power plants are regulated for hazardous pollutants under §112. Pet'rs Core Issues Br. 61, 64-65, 67-68; Coal Intervenors' Br. 6-8;

Congress Members' Amicus Br. 6-7. Those briefs mischaracterize EPA's statutory interpretations.

Petitioners cite three sets of rulemakings following the 1990 Amendments, where EPA noted that a reading of the House Amendment could lead to the conclusion that EPA might be restricted from regulating the same source category under both §111(d) and §112. *See* Pet'rs Core Issues Br. 62-63 & n.31 (citing proceedings on landfill gases, mercury emissions, and the proposed Clean Power Plan). However, each time EPA conducted this statutory analysis—in these and other rulemakings—it ultimately determined that the section's scope depended on the particular pollutants being regulated, not on the source category in question. *See* EPA Br. 96-98. EPA's reasoning varied slightly in each rulemaking: at times, EPA attempted to harmonize the House Amendment with the Senate Amendment;[8] elsewhere, EPA interpreted the House Amendment alone. But in each case, EPA concluded that the scope of §111(d) relative to §112 must be determined with respect to particular pollutants, not entire source categories.

[8] The House and Senate originated different versions of the provision in the 1990 Amendments; the Senate Amendment supports an interpretation that permits the Clean Power Plan. *See* EPA Br. 77-78, 87-93.

A. The George W. Bush Administration's Advanced Notice of Proposed Rulemaking for Greenhouse Gases Supports a Pollutant-Focused Reading of Section 111(d)'s Scope, Which Is Consistent with the Clean Power Plan's Interpretation of Statutory Authority

Under the George W. Bush administration, EPA invoked a pollutant-specific interpretation of §111(d)'s scope, specifically with respect to greenhouse gases, which is consistent with EPA's interpretation in the Clean Power Plan. In its 2008 advanced notice of proposed rulemaking, EPA considered regulating greenhouse gases under §111(d) and noted, "where a source category is being regulated under [§]112, a [§]111(d) standard of performance cannot be established to address any [hazardous pollutant] listed under 112(b) that may be emitted from that particular source category." 73 Fed. Reg. 44,354, 44,417-18 (July 30, 2008).[9] EPA further explained that §111(d) "provides a 'regulatory safety net' for *pollutants* not otherwise subject to major regulatory programs under the [Clean Air Act]." *Id.* at 44,418

[9] In its 2008 advanced notice of proposed rulemaking, EPA asked for comment on which Clean Air Act provisions were best suited for greenhouse gas regulations. Several current Petitioners then commented that §111(d)'s flexible regulatory framework made it a better candidate for greenhouse gas regulation than less flexible provisions like §112. *E.g.*, New Jersey Dep't of Envt'l Protection, Comment on Advanced Notice of Proposed Rulemaking 3-4, EPA-HQ-OAR-2008-0318-2031 (Nov. 25, 2008).

(emphasis added). This pollutant-focused interpretation of the interplay between §111(d) and §112 would allow EPA to promulgate the Clean Power Plan, because—although power plants are regulated under §112 for hazardous pollutants—their greenhouse gas emissions are not covered by the §112 rule.

Likewise, the proposed and final versions of the Clean Power Plan adopt a pollutant-specific interpretation of §111(d)'s scope. EPA's precise statutory interpretation evolved in response to comments between the rule's proposed and final versions, but EPA always interpreted the scope to depend on which pollutants—not just which source categories—are being regulated. In the proposed rule's legal memorandum, EPA indicated that a reasonable interpretation of §111(d)'s scope is that "[w]here a source category is regulated under [§]112, a [§]111(d) standard of performance cannot be established to address any [hazardous pollutant] listed under [§]112(b) that may be emitted from that particular source category." EPA, Legal Memorandum for Proposed Carbon Pollution Emission Guidelines for

Existing Electric Utility Generating Units 26 (2014).[10] In the final rule, EPA determined that the "best, and sole reasonable, interpretation" of the House amendment is that "it excludes the regulation of [hazardous pollutants] under…[§]112 if the source category at issue is regulated under…[§]112, but does not exclude the regulation of other pollutants, regardless of whether that source category is subject to…[§]112 standards." 80 Fed. Reg. at 64,714.

EPA's pollutant-focused interpretation of its §111(d) authority in the Clean Power Plan is consistent with the agency's earlier interpretation of that authority for greenhouse gases under the George W. Bush administration.

B. In Regulating Landfill Gases Under Both Bush Administrations and the Clinton Administration, EPA Adopted a Pollutant-Focused Interpretation of Section 111(d)'s Scope that Would Allow the Clean Power Plan

Just six months after passage of the 1990 Clean Air Act Amendments, EPA under President George H.W. Bush indicated that the scope of its §111(d) authority turned on particular pollutants, not just source categories. In a May 1991 proposal of emissions guidelines

[10] *Available at* http://www2.epa.gov/sites/production/files/2014-06/documents/20140602-legal-memorandum.pdf.

for municipal solid waste landfills, EPA indicated that it must issue §111(d) standards for "designated pollutant[s]." 56 Fed. Reg. 24,468, 24,469 (proposed May 30, 1991). EPA defined a "designated pollutant" as "one that may cause or contribute to endangerment of public health or welfare but is not 'hazardous' within the meaning of [§]112 of the [Clean Air Act] and is not controlled under [§]108 through [§]110 of the [Clean Air Act]." *Id.* Though this proposed rulemaking never discussed the language of the 1990 Amendments directly, *see id.* at 24,474, this framing shows that EPA determined that the scope of its §111(d) authority relates to whether the particular pollutants at issue have been deemed "hazardous" under §112.

In its ongoing work on these landfill regulations, the Clinton EPA more directly addressed §111(d)'s scope. Petitioners cite a 1995 EPA report on the development of the municipal landfill regulations, which they argue supports their view that §111(d) cannot cover source categories regulated under §112. *See* Pet'rs Core Issues Br. 67 (citing EPA, *Air Emissions from Municipal Solid Waste Landfills—Background Information for Final Standards and Guidelines*, Pub. No. EPA-453/R-94-021, at 1-6 (1995) [hereinafter 1995 Report]).

However, contrary to Petitioners' argument, this 1995 report actually supports a pollutant-focused view of §111(d)'s scope—one consistent with the Clean Power Plan. When the 1995 report was written, municipal solid waste landfills had been listed as a source category under §112, and regulations of their hazardous emissions were clearly on the way, even though §112 emissions standards had not yet been promulgated.[11] 1995 Report at 1-5 (citing 57 Fed. Reg. 31,576 (July 16, 1992)). EPA did rely in part on the fact that landfills had not yet been regulated under §112 to support its position that regulation under §111(d) was appropriate. However, EPA also explained that regulation of landfill gas under §111(d) is appropriate because "some components of landfill gas are not hazardous air pollutants listed under [§]112(b) and thus will not be regulated under a [§]112(d) emission standard." *Id.* at 1-6 to 1-7. With this statement, EPA indicated that the non-hazardous pollutants in landfill gas would not count as "regulated" for the purposes of §111(d), even when §112 standards are promulgated—a pollutant-focused reading of §111(d)'s scope that would allow promulgation of the Clean Power Plan.

[11] These Section 112 emission standards for landfills would later be promulgated in 2003. 68 Fed. Reg. 2227 (Jan. 16, 2003).

In its final §111(d) emissions guidelines for landfill gases, EPA declined to formally articulate §111(d)'s scope, though the agency indicated that it was considering issuing hazardous air pollutant standards for landfills in the future. 61 Fed. Reg. 9905, 9906 (Mar. 12, 1996) ("[M]ercury might be emitted from landfills. The EPA is still looking at the possibility and will take action as appropriate in the future under [§112]."). And, indeed, when EPA did propose hazardous air pollutant standards under §112 for landfills in the Clinton administration's final months, the proposed rule explicitly indicated that the §111(d) emissions guidelines would continue to apply. 65 Fed. Reg. 66,672, 66,674-75 (Nov. 7, 2000).

Under the George W. Bush administration, EPA finalized the §112 standards for landfills and indicated that the §111(d) emission guidelines would continue operating. 68 Fed. Reg. 2227, 2229 (Jan. 16, 2003) ("[Qualifying sources] would continue to be subject to the EG [§111(d) emission guidelines]…as applicable, plus additional requirements imposed [under § 112].").

Petitioners suggest that the order of regulation matters—that simultaneous regulation of a source category under §111(d) and §112 is

permitted as long as the §111(d) regulation comes first. *See* Pet'rs Core Issues Br. 67-68. However, this reading of the statute calls into question Petitioners' argument that in the 1990 Amendments, Congress "limited the reach of [§]111(d) for the purpose of prohibiting double regulation of sources also regulated under [§]112." *Id.* at 9. Petitioners fail to explain why "double regulation" is problematic only if §111(d) rules come first. *See* EPA Br. 84, 86-87; NGO Br. 22; State Intervenors' Br. 31.

Moreover, under both the George W. Bush and Obama administrations, EPA has repeatedly reviewed and approved state plans for landfill gas under §111(d), after the §112 standard was promulgated. *See, e.g.*, 68 Fed. Reg. 74,868, 74,868 (Dec. 29, 2003) (approving Pennsylvania's §111(d) plan for existing municipal solid waste landfills, even though §112 standards already applied to municipal solid waste landfills); 79 Fed. Reg. 21,146 (Apr. 15, 2014) (same for Missouri's plan).[12] Under §111(d)'s terms, the same conditions

[12] Under the Clinton and George W. Bush administrations, states similarly submitted—and EPA similarly approved—state §111(d) plans addressing total reduced sulfur at Kraft pulp and paper mills, which were already regulated under §112 for other pollutants. *See e.g.*, 64 Fed. Reg. 59,718 (Nov. 3, 1999) (approving Maryland's §111(d) plan for total reduced sulfur emissions from existing Kraft pulp mills, even though §112 standards already applied to Kraft pulp mills, 63 Fed. Reg. 18,504

apply both when "[t]he Administrator shall prescribe regulations" and when "each State shall submit to the Administrator a plan." *See* 42 U.S.C. § 7411(d). The fact that states continue submitting—and EPA continues approving—state plans under §111(d) for sources already regulated for different pollutants under §112 confirms a pollutant-focused reading of the statute's scope. Otherwise, EPA could not approve state plans under §111(d) after the promulgation of §112 regulations affecting the same source. In contrast, under the pollutant-focused interpretation, EPA would be allowed to promulgate the Clean Power Plan.

C. In its Clean Air Mercury Rule, EPA Under President George W. Bush Ultimately Adopted a Pollutant-Focused View of Section 111(d)'s Scope

In its 2005 Mercury Rule, the George W. Bush administration attempted to remove power plants from coverage under §112 and instead regulate their mercury emissions under §111(d). 70 Fed. Reg. 15,994, 16,031-32 (Mar. 29, 2005). Petitioners argue that the Mercury Rule supports their position because EPA "sought first to delist power plants entirely under [§]112 before regulating those plants under

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(Apr. 15, 1998)); 68 Fed. Reg. 23,209 (May 1, 2003) (same for Maine's plan); 72 Fed. Reg. 59,017 (Oct. 18, 2007) (same for Virginia's plan).

[§]111(d).” Pet’rs Core Issues Br. 67-68. However, EPA removed power plants from §112 coverage in the Mercury Rule only because it wanted to regulate the same source category for the *same pollutant*—mercury—unlike here, where carbon pollution is not covered by §112.[13]

Counter to Petitioners’ assertions, EPA’s interpretation of its §111(d) authority in the Mercury Rule actually supports its ability to promulgate the Clean Power Plan. In particular, EPA interpreted the relationship between §111(d) and §112 to depend on whether the particular air pollutants that EPA seeks to address under §111(d) are regulated under §112. 70 Fed. Reg. at 16,031-32 (“Where a source category is being regulated under [§]112, a [§]111(d) standard of performance cannot be established to address any [hazardous pollutant] listed under [§]112(b) that may be emitted from that particular source category.”).

[13] Petitioners are similarly disingenuous when they indicate that the D.C. Circuit vacated the Mercury Rule “based on the Section 112 Exclusion.” Pet’rs Core Issues Br. 68 n.33. The Court vacated the rule because EPA had not properly delisted power plants under §112. *New Jersey v. EPA*, 517 F.3d 574 (D.C. Cir. 2008). The Court never addressed the issue of whether the same source could be regulated for different pollutants under both §111(d) and §112.

In reaching its conclusion on how to interpret §111(d), EPA noted that, "EPA has historically regulated non-[hazardous pollutants] under [§]111(d), even where those non-[hazardous pollutants] were emitted from a source category actually regulated under [§]112." 70 Fed. Reg. at 16,032. Ultimately, through the Mercury Rule, EPA revised the definition of "designated pollutants" (i.e., those pollutants subject to §111(d)), confirming that §111(d) can regulate pollutants emitted by source categories covered under §112 so long as those particular pollutants are not also regulated under §112. 70 Fed. Reg. 28,606, 28,649 (May 18, 2005). Applying that definition today, EPA would be authorized to regulate greenhouse gases from existing power plants.

From shortly after passage of the 1990 Clean Air Act Amendments, through over two decades of administrations of both parties, EPA has consistently interpreted §111(d)'s scope to depend on whether particular pollutants, rather than entire source categories, are regulated under other sections of the Act. In light of EPA's consistent, reasonable interpretation of the scope of its §111(d) authority, this Court should find that EPA is permitted to regulate greenhouse gases from power plants under §111(d).

IV. ATTACKS ON EPA'S COST-BENEFIT ANALYSIS ARE MERITLESS

Petitioners allege that EPA "diminishes" the statutorily required consideration of costs by "inflating" the rule's benefits. Pet'rs Record-Based Br. 69. This attack is meritless, since EPA fully assessed both costs and benefits, following best economic practices. To measure the rule's substantial climate benefits, EPA properly applied the global Social Cost of Carbon, a rigorous, consensus-based, transparent metric used across the federal government. EPA also properly considered the rule's significant health co-benefits, consistent with standard analytical practices. After carefully weighing the rule's full costs—including indirect costs—EPA concluded that the rule's benefits vastly outweigh its costs.

Petitioners' attacks on the Social Cost of Carbon fail. Petitioners cite one coal lease where the Interior Department declined to use the metric, ostensibly as evidence that agencies disfavor the Social Cost of Carbon. *Id.* at 69-70. Yet Interior has repeatedly used the Social Cost of Carbon in decisionmaking. *E.g.*, Office of Surface Mining, *Record of Decision: Four Corners Power Plant & Navajo Mine Energy Project* 22-

23 (2015);[14] Bureau of Land Mgmt., *Environmental Assessment: Little Willow Creek Protective Oil & Gas Leasing* 81-82 (2015);[15] 80 Fed. Reg. 44,436, 44,581 (July 27, 2015). EPA and the Departments of Energy and Transportation have collectively applied the metric in over 30 proposed rulemakings subject to public comment. *See* Gov't Accountability Office, GAO-14-663, *Development of Social Cost of Carbon Estimates* tbl.3 (2014).[16]

Petitioners next put words ("outdated, inaccurate, and uncertain") in the mouth of the National Academies of Sciences. Pet'rs Record-Based Br. 70. Yet in their recent report reviewing the Social Cost of Carbon, the Academies say nothing of the sort. Rather, their report "does not recommend changing" the methodology in the "near-term"; they recommend future improvements, but never discourage use of current Social Cost of Carbon estimates. Nat'l Acad. Sci., *Assessment of Approaches to Updating the Social Cost of Carbon* 1 (2016). Some

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[14] *Available at* http://www.wrcc.osmre.gov/initiatives/fourCorners/documents/ROD/RecordofDecisionFCPP.pdf.

[15] *Available at* https://eplanning.blm.gov/epl-front-office/projects/nepa/39064/55133/59825/DOI-BLM-ID-B010-2014-0036-EA_UPDATED_02272015.pdf

[16] *Available at* http://www.gao.gov/assets/670/665016.pdf.

uncertainty is inevitable in assessing climate benefits, but the Government Accountability Office's investigation found that the Social Cost of Carbon discloses relevant uncertainties and draws from the best data and models available. GAO-14-663, *supra*, at 12-20. If anything, current uncertainties strongly suggest the Social Cost of Carbon undervalues the benefits of climate regulation. *See* Peter Howard, *Omitted Damages: What's Missing from the Social Cost of Carbon* (2014).[17]

Petitioners also badly misread economist Robert Pindyck's critiques. Pet'rs Record-Based Br. 70. Pindyck's central criticism is that the Social Cost of Carbon omits catastrophic risks and thus *underestimates* the benefits of climate action. Robert S. Pindyck, *Climate Change Policy: What Do the Models Tell Us?* 51 J. Econ. Lit. 860, 869-70 (2013).[18] Despite his critiques, Pindyck endorses "tak[ing] the [current Social Cost of Carbon] number as a rough and politically acceptable starting point." *Id.* at 870. Many scholars share this view.

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[17] *Available at* http://costofcarbon.org/files/Omitted_Damages_Whats_Missing_From_the_Social_Cost_of_Carbon.pdf.

[18] *Available at* http://web.mit.edu/rpindyck/www/Papers/PindyckClimateModelsJELSept2013.pdf.

E.g., Richard L. Revesz et al., *Improve Economic Models of Climate Change*, 508 Nature 173, 174 (2014) ("[T]he current estimate for the social cost of carbon is useful for policy-making, notwithstanding the significant uncertainties.") (co-authors include Kenneth Arrow).[19]

Petitioners wrongly presume that the Clean Air Act "forecloses" consideration of global effects. Pet'rs Record-Based Br. 70. Section 111 charges EPA with protecting "welfare," 42 U.S.C. §7411(b)(1)(A), which the statute defines to include "effects on…climate." 42 U.S.C. §7602(h). When interpreting §202 of the Act—which similarly references "welfare"—the Supreme Court found "there is nothing counterintuitive to the notion that EPA can curtail the emission of substances that are putting the *global* climate out of kilter." *Massachusetts v. EPA*, 549 U.S. 497, 531 (2007) (emphasis added). When industry challenged another EPA climate program by arguing that the Clean Air Act "was concerned about local, not global effects," this Court had "little trouble disposing of Industry Petitioners' argument that the [Clean Air Act's prevention of significant deterioration] program is specifically focused solely on localized air pollution," finding instead that the statute was "meant to

[19] *Available at* http://www.nature.com/news/global-warming-improve-economic-models-of-climate-change-1.14991.

address a much broader range of harms," including "precisely the types of harms caused by greenhouse gases." *Coalition for Responsible Regulation v. EPA*, 684 F.3d 102, 138 (D.C. Cir. 2012), *aff'd in part Util. Air Regulatory Grp. v. EPA*, 134 S.Ct. 2427 (2014). Furthermore, foreign climate damages inexorably "spillover" to affect U.S. welfare, through "national security, international trade, public health, and humanitarian concerns." EPA, Regulatory Impact Analysis for the Clean Power Plan Final Rule ("RIA"), at 4-5 (2015).[20]

Petitioners claim EPA "overstates emissions reductions by ignoring" that industry "will inevitably" respond to energy price increases by shifting production—and associated emissions—abroad. Pet'rs Record-Based Br. 71. First, EPA "does not see evidence" of likely "emissions leakage" due to "the relatively modest changes in electricity prices." EPA, Responses to Public Comments on the EPA's *Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units* ("Comment Responses"), ch. 8, pt.2, p.77 (2015). Nevertheless, EPA qualitatively assesses how rising electricity prices may lead to substitution of goods. While some substitutes could

[20] *Available at* https://www.epa.gov/sites/production/files/2015-08/documents/cpp-final-rule-ria.pdf.

be imports from countries with higher emissions per production-unit, resulting in foreign emissions increases, other substitutes would be to alternate domestic goods or even to imports from countries with less-intensive emissions. RIA at 5-5–5-6. Moreover, U.S. regulation could motivate foreign countries to adopt their own climate policies, mitigating the risk of leakage. *Id.* Given this uncertainty, EPA could only assess leakage qualitatively, in accordance with recommendations by the Office of Management and Budget. Office of Mgmt. & Budget, *Circular A-4* at 27 (2003) (concluding some substitution effects are "very difficult to quantify").[21] To the extent there is unquantified leakage cost, note that the rule also generates many unquantified benefits. RIA at 4-46–4-56 (listing qualitative benefits from hazardous pollutant reductions and visibility improvements).

Petitioners claim EPA ignored "30,000 premature deaths associated with the loss of disposable income." Pet'rs Record-Based Br. 71. This type of claim commits a "health-wealth" fallacy. Richard L. Revesz & Michael Livermore, *Retaking Rationality* 67 (2008).

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

Petitioners cite to industry comments, which assume that the rule imposes improbably large consumer costs and that one premature death results for every $12 million income loss. Oil & Gas Indus. Orgs. & Participants, Comments on Proposed Rule 19-20, EPA-HQ-OAR-2013-0602-25423 (Dec. 1, 2014). EPA rebuts the first assumption, explaining "electricity prices are anticipated to increase by less than one percent by 2030 on a nationwide average basis, while actual electricity bills may fall for consumers who invest in energy efficient technologies." Comment Responses, ch. 8, pt.1, p.343. The second assumption derives from the work of, among others, Ralph Keeney. Oil & Gas Comments, *supra*, at n.53. In 1992, the GAO (then called the General Accounting Office) described Keeney's approach as based on "controversial" theories and "incomplete" models. Gen. Accounting Office, *Risk-Risk Analysis* 1 (1992).[22] GAO explained an *association* exists between increased wealth and improved health, but "evidence is lacking" for causal relationships: poor health may cause lower income, or a third factor, like education, may drive both health and wealth. *Id.* at 6. Even the correlation "exists only for small segments of the population." *Id. See also* Revesz &

[22] *Available at* http://www.gao.gov/assets/220/216346.pdf.

Livermore, *Retaking Rationality, supra* at 67-76 (debunking the health-wealth fallacy).

Finally, Petitioners' amici wrongly belittle the rule's significant health co-benefits from ancillary reductions of particulates, calling co-benefits "a well-worn accounting trick" and arguing that particulates are already controlled under other statutory authorities. State & Local Assoc. Amicus Br. 25-27; *accord.* Nevada Amicus Br. 27. But those prior regulations did not eliminate all health risks from particulate exposure, and additional emissions reductions beyond existing regulations will generate additional health benefits. *See* Comment Responses, ch. 8, pt.2, pp.101-102; *see also* Michael Livermore & Richard L. Revesz, *Rethinking Health-Based Environmental Standards*, 89 N.Y.U. L. Rev. 1184, 1225-26 (2014) (explaining adverse health effects occur at any particulate exposure level).[23] And EPA factored those regulations into the baseline for this Rule's regulatory analysis. RIA at 1-5 ("Base Case v.5.15 includes...[all] other state and Federal...air-related limitations.").

[23] *Available at* http://www.nyulawreview.org/issues/volume-89-number-4/rethinking-health-based-environmental-standards.

CONCLUSION

The petitions for review should be denied.

DATED: April 1, 2016

Respectfully submitted,

_/s/ Richard L. Revesz_____
Richard L. Revesz
Denise A. Grab
Jack Lienke
Jason A. Schwartz
INSTITUTE FOR POLICY INTEGRITY
139 MacDougal Street, Room 319
New York, NY 10012
(212) 992-8932
richard.revesz@nyu.edu
Counsel for Amicus Curiae
Institute for Policy Integrity

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 6986 words, as counted by counsel's word processing system, and this complies with the applicable word limit established by the Court.

DATED: April 1, 2016

_/s/ Richard L. Revesz_____
Richard L. Revesz
Denise A. Grab
Jack Lienke
Jason A. Schwartz
INSTITUTE FOR POLICY INTEGRITY
139 MacDougal Street, Room 319
New York, NY 10012
(212) 992-8932
richard.revesz@nyu.edu
Counsel for Amicus Curiae
Institute for Policy Integrity

ADDENDUM OF STATUTES AND REGULATIONS

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Except for those listed above, all applicable statutes and regulations are contained in the Statutory Addendum to the Brief for Respondents.

authority's title V operating permits regulations for final action on a permit application) prior to the later of May 1, 2003 or the date on which the unit is to first resume operation.

(ii) A unit exempt under this section and located at a source that is required, or but for this exemption would be required, to have a non-title V permit shall not resume operation unless the NO_X authorized account representative of the source submits a complete NO_X Budget permit application under §96.22 for the unit not less than 18 months (or such lesser time provided under the permitting authority's non-title V permits regulations for final action on a permit application) prior to the later of May 1, 2003 or the date on which the unit is to first resume operation.

(3) The owners and operators and, to the extent applicable, the NO_X authorized account representative of a unit exempt under this section shall comply with the requirements of the NO_X Budget Trading Program concerning all periods for which the exemption is not in effect, even if such requirements arise, or must be complied with, after the exemption takes effect.

(4) A unit that is exempt under this section is not eligible to be a NO_X Budget opt-in source under subpart I of this part.

(5) For a period of 5 years from the date the records are created, the owners and operators of a unit exempt under this section shall retain at the source that includes the unit, records demonstrating that the unit is permanently retired. The 5-year period for keeping records may be extended for cause, at any time prior to the end of the period, in writing by the permitting authority or the Administrator. The owners and operators bear the burden of proof that the unit is permanently retired.

(6) *Loss of exemption.* (i) On the earlier of the following dates, a unit exempt under paragraph (b) of this section shall lose its exemption:

(A) The date on which the NO_X authorized account representative submits a NO_X Budget permit application under paragraph (c)(2) of this section; or

(B) The date on which the NO_X authorized account representative is required under paragraph (c)(2) of this section to submit a NO_X Budget permit application.

(ii) For the purpose of applying monitoring requirements under subpart H of this part, a unit that loses its exemption under this section shall be treated as a unit that commences operation or commercial operation on the first date on which the unit resumes operation.

§96.6 Standard requirements.

(a) *Permit Requirements.* (1) The NO_X authorized account representative of each NO_X Budget source required to have a federally enforceable permit and each NO_X Budget unit required to have a federally enforceable permit at the source shall:

(i) Submit to the permitting authority a complete NO_X Budget permit application under §96.22 in accordance with the deadlines specified in §96.21(b) and (c);

(ii) Submit in a timely manner any supplemental information that the permitting authority determines is necessary in order to review a NO_X Budget permit application and issue or deny a NO_X Budget permit.

(2) The owners and operators of each NO_X Budget source required to have a federally enforceable permit and each NO_X Budget unit required to have a federally enforceable permit at the source shall have a NO_X Budget permit issued by the permitting authority and operate the unit in compliance with such NO_X Budget permit.

(3) The owners and operators of a NO_X Budget source that is not otherwise required to have a federally enforceable permit are not required to submit a NO_X Budget permit application, and to have a NO_X Budget permit, under subpart C of this part for such NO_X Budget source.

(b) *Monitoring requirements.* (1) The owners and operators and, to the extent applicable, the NO_X authorized account representative of each NO_X Budget source and each NO_X Budget unit at the source shall comply with the monitoring requirements of subpart H of this part.

(2) The emissions measurements recorded and reported in accordance with

subpart H of this part shall be used to determine compliance by the unit with the NO_X Budget emissions limitation under paragraph (c) of this section.

(c) *Nitrogen oxides requirements.* (1) The owners and operators of each NO_X Budget source and each NO_X Budget unit at the source shall hold NO_X allowances available for compliance deductions under §96.54, as of the NO_X allowance transfer deadline, in the unit's compliance account and the source's overdraft account in an amount not less than the total NO_X emissions for the control period from the unit, as determined in accordance with subpart H of this part, plus any amount necessary to account for actual utilization under §96.42(e) for the control period.

(2) Each ton of nitrogen oxides emitted in excess of the NO_X Budget emissions limitation shall constitute a separate violation of this part, the CAA, and applicable State law.

(3) A NO_X Budget unit shall be subject to the requirements under paragraph (c)(1) of this section starting on the later of May 1, 2003 or the date on which the unit commences operation.

(4) NO_X allowances shall be held in, deducted from, or transferred among NO_X Allowance Tracking System accounts in accordance with subparts E, F, G, and I of this part.

(5) A NO_X allowance shall not be deducted, in order to comply with the requirements under paragraph (c)(1) of this section, for a control period in a year prior to the year for which the NO_X allowance was allocated.

(6) A NO_X allowance allocated by the permitting authority or the Administrator under the NO_X Budget Trading Program is a limited authorization to emit one ton of nitrogen oxides in accordance with the NO_X Budget Trading Program. No provision of the NO_X Budget Trading Program, the NO_X Budget permit application, the NO_X Budget permit, or an exemption under §96.5 and no provision of law shall be construed to limit the authority of the United States or the State to terminate or limit such authorization.

(7) A NO_X allowance allocated by the permitting authority or the Administrator under the NO_X Budget Trading Program does not constitute a property right.

(8) Upon recordation by the Administrator under subpart F, G, or I of this part, every allocation, transfer, or deduction of a NO_X allowance to or from a NO_X Budget unit's compliance account or the overdraft account of the source where the unit is located is deemed to amend automatically, and become a part of, any NO_X Budget permit of the NO_X Budget unit by operation of law without any further review.

(d) *Excess emissions requirements.* (1) The owners and operators of a NO_X Budget unit that has excess emissions in any control period shall:

(i) Surrender the NO_X allowances required for deduction under §96.54(d)(1); and

(ii) Pay any fine, penalty, or assessment or comply with any other remedy imposed under §96.54(d)(3).

(e) *Recordkeeping and Reporting requirements.* (1) Unless otherwise provided, the owners and operators of the NO_X Budget source and each NO_X Budget unit at the source shall keep on site at the source each of the following documents for a period of 5 years from the date the document is created. This period may be extended for cause, at any time prior to the end of 5 years, in writing by the permitting authority or the Administrator.

(i) The account certificate of representation for the NO_X authorized account representative for the source and each NO_X Budget unit at the source and all documents that demonstrate the truth of the statements in the account certificate of representation, in accordance with §96.13; provided that the certificate and documents shall be retained on site at the source beyond such 5-year period until such documents are superseded because of the submission of a new account certificate of representation changing the NO_X authorized account representative.

(ii) All emissions monitoring information, in accordance with subpart H of this part; provided that to the extent that subpart H of this part provides for a 3-year period for recordkeeping, the 3-year period shall apply.

(iii) Copies of all reports, compliance certifications, and other submissions and all records made or required under the NO_X Budget Trading Program.

(iv) Copies of all documents used to complete a NO_X Budget permit application and any other submission under the NO_X Budget Trading Program or to demonstrate compliance with the requirements of the NO_X Budget Trading Program.

(2) The NO_X authorized account representative of a NO_X Budget source and each NO_X Budget unit at the source shall submit the reports and compliance certifications required under the NO_X Budget Trading Program, including those under subparts D, H, or I of this part.

(f) *Liability*. (1) Any person who knowingly violates any requirement or prohibition of the NO_X Budget Trading Program, a NO_X Budget permit, or an exemption under §96.5 shall be subject to enforcement pursuant to applicable State or Federal law.

(2) Any person who knowingly makes a false material statement in any record, submission, or report under the NO_X Budget Trading Program shall be subject to criminal enforcement pursuant to the applicable State or Federal law.

(3) No permit revision shall excuse any violation of the requirements of the NO_X Budget Trading Program that occurs prior to the date that the revision takes effect.

(4) Each NO_X Budget source and each NO_X Budget unit shall meet the requirements of the NO_X Budget Trading Program.

(5) Any provision of the NO_X Budget Trading Program that applies to a NO_X Budget source (including a provision applicable to the NO_X authorized account representative of a NO_X Budget source) shall also apply to the owners and operators of such source and of the NO_X Budget units at the source.

(6) Any provision of the NO_X Budget Trading Program that applies to a NO_X Budget unit (including a provision applicable to the NO_X authorized account representative of a NO_X budget unit) shall also apply to the owners and operators of such unit. Except with regard to the requirements applicable to units with a common stack under subpart H of this part, the owners and operators and the NO_X authorized account representative of one NO_X Budget unit shall not be liable for any violation by any other NO_X Budget unit of which they are not owners or operators or the NO_X authorized account representative and that is located at a source of which they are not owners or operators or the NO_X authorized account representative.

(g) *Effect on other authorities*. No provision of the NO_X Budget Trading Program, a NO_X Budget permit application, a NO_X Budget permit, or an exemption under §96.5 shall be construed as exempting or excluding the owners and operators and, to the extent applicable, the NO_X authorized account representative of a NO_X Budget source or NO_X Budget unit from compliance with any other provision of the applicable, approved State implementation plan, a federally enforceable permit, or the CAA.

§ 96.7 Computation of time.

(a) Unless otherwise stated, any time period scheduled, under the NO_X Budget Trading Program, to begin on the occurrence of an act or event shall begin on the day the act or event occurs.

(b) Unless otherwise stated, any time period scheduled, under the NO_X Budget Trading Program, to begin before the occurrence of an act or event shall be computed so that the period ends the day before the act or event occurs.

(c) Unless otherwise stated, if the final day of any time period, under the NO_X Budget Trading Program, falls on a weekend or a State or Federal holiday, the time period shall be extended to the next business day.

Subpart B—NO_X Authorized Account Representative for NO_X Budget Sources

§ 96.10 Authorization and responsibilities of the NO_X authorized account representative.

(a) Except as provided under §96.11, each NO_X Budget source, including all NO_X Budget units at the source, shall have one and only one NO_X authorized account representative, with regard to all matters under the NO_X Budget Trading Program concerning the source or any NO_X Budget unit at the source.

account to one or more other NO_X Allowance Tracking System accounts.

(b) If a general account shows no activity for a period of a year or more and does not contain any NO_X allowances, the Administrator may notify the NO_X authorized account representative for the account that the account will be closed and deleted from the NO_X Allowance Tracking System following 20 business days after the notice is sent. The account will be closed after the 20-day period unless before the end of the 20-day period the Administrator receives a correctly submitted transfer of NO_X allowances into the account under § 96.60 or a statement submitted by the NO_X authorized account representative demonstrating to the satisfaction of the Administrator good cause as to why the account should not be closed.

Subpart G—NO_X Allowance Transfers

§ 96.60 Submission of NO_X allowance transfers.

The NO_X authorized account representatives seeking recordation of a NO_X allowance transfer shall submit the transfer to the Administrator. To be considered correctly submitted, the NO_X allowance transfer shall include the following elements in a format specified by the Administrator:

(a) The numbers identifying both the transferor and transferee accounts;

(b) A specification by serial number of each NO_X allowance to be transferred; and

(c) The printed name and signature of the NO_X authorized account representative of the transferor account and the date signed.

§ 96.61 EPA recordation.

(a) Within 5 business days of receiving a NO_X allowance transfer, except as provided in paragraph (b) of this section, the Administrator will record a NO_X allowance transfer by moving each NO_X allowance from the transferor account to the transferee account as specified by the request, provided that:

(1) The transfer is correctly submitted under § 96.60;

(2) The transferor account includes each NO_X allowance identified by serial number in the transfer; and

(3) The transfer meets all other requirements of this part.

(b) A NO_X allowance transfer that is submitted for recordation following the NO_X allowance transfer deadline and that includes any NO_X allowances allocated for a control period prior to or the same as the control period to which the NO_X allowance transfer deadline applies will not be recorded until after completion of the process of recordation of NO_X allowance allocations in § 96.53(b).

(c) Where a NO_X allowance transfer submitted for recordation fails to meet the requirements of paragraph (a) of this section, the Administrator will not record such transfer.

§ 96.62 Notification.

(a) *Notification of recordation.* Within 5 business days of recordation of a NO_X allowance transfer under § 96.61, the Administrator will notify each party to the transfer. Notice will be given to the NO_X authorized account representatives of both the transferror and transferee accounts.

(b) *Notification of non-recordation.* Within 10 business days of receipt of a NO_X allowance transfer that fails to meet the requirements of § 96.61(a), the Administrator will notify the NO_X authorized account representatives of both accounts subject to the transfer of:

(1) A decision not to record the transfer, and (2) The reasons for such nonrecordation.

(c) Nothing in this section shall preclude the submission of a NO_X allowance transfer for recordation following notification of non-recordation.

Subpart H—Monitoring and Reporting

§ 96.70 General requirements.

The owners and operators, and to the extent applicable, the NO_X authorized account representative of a NO_X Budget unit, shall comply with the monitoring and reporting requirements as provided in this subpart and in subpart

ADDENDUM OF OTHER MATERIALS

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BACKGROUND INFORMATION FOR PROPOSED NEW-SOURCE PERFORMANCE STANDARDS:

Steam Generators

Incinerators

Portland Cement Plants

Nitric Acid Plants

Sulfuric Acid Plants

ENVIRONMENTAL PROTECTION AGENCY
Office of Air Programs
Research Triangle Park, North Carolina
August 1971

pounds per million Btu. Only a few states and local jurisdictions restrict NO_x emissions. Limits range from 0.15 to 0.60 pound per million Btu heat input for gaseous fuels, and from 0.13 to 0.60 pound per million Btu for liquid fuels. These regulations have only recently been promulgated, and there has been little experience with their enforcement. The performance standards for gaseous and liquid fuels are slightly higher than the minimum levels for local agencies. Regulations for oxides of nitrogen produced by solid-fuel combustion have not as yet been adopted by states or local jurisdictions.

In developing performance standards for steam generators, consideration was given to the availability and cost of fuels and control techniques and to effects on the economics of producing electric power. The major considerations were:

The necessity of making use of all the principal fossil fuels - coal, oil, and natural gas. The cleanest fuels are in limited supply. It is estimated that the use of coal will increase at a much greater rate over the next 30 years than will that of residual oil and natural gas.

The desirability of setting standards that would allow the use of combination control systems to collect both particulates and sulfur dioxide. It does not appear that the particulate/SO_2 systems under study are capable of collecting nitrogen oxides.

The desirability of setting sulfur dioxide standards that would allow the use of low-sulfur fuels as well as fuel cleaning, stack-gas cleaning, and equipment modifications.

The fact that most low-sulfur fuel oil or crude oil will have to be imported from Alaska or from foreign countries. Substantial quantities of desulfurized fuel oil will be available from Caribbean facilities, several of which will go on-stream in 1971 and 1972.

The fact that naturally occurring low-sulfur coal is restricted for the most part to the Rocky Mountain area, so that shipping costs to eastern and midwestern power stations can be appreciable. Coal-cleaning techniques can be used to remove substantial portions of sulfur and ash from some coals, but the processes are highly dependent on the make-up of the coal.

The fact that stack-gas desulfurization processes have only recently been developed to the point at which they can be applied to steam generators. The first new steam generators to be affected by the standards will be put into operation in 1975 and 1976. In many cases owners and operators can delay decisions on air pollution control equipment for a year or longer after the steam generator has been designed. At that time there should be a greater number of options for sulfur dioxide control schemes from which to choose.

JUSTIFICATION OF PROPOSED STANDARDS

The proposed performance standards are based on inspections and tests of prototype and full-scale control systems, on consultations with state and local officials and operators and designers of steam generators and control systems, on EPA surveys of available combustion fuels, and on review of the literature. Essentially all of the technology applicable to the subject was developed in the United States.

EPA's Responses to Public Comments on the EPA's *Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units*

August 2015

Comments, letters, and transcripts of the public hearings are also available electronically through *http://www.regulations.gov* by searching Docket ID EPA-HQ-OAR-2013-0602

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Commenters stated that investment in renewable generation and energy efficiency can drive job creation. The commenters stated that the fuel savings of renewable resources and energy efficiency improvements will lower utility bills for families and businesses and those savings will be spent on other goods and services, stimulating local economies, as states with strong energy efficiency programs are already experiencing.

Commenters stated that energy efficiency and conservation are the fastest, cheapest, cleanest, and most reliable forms of energy resources. The commenters also stated that the job creation benefits of energy efficiency are significant; not only does energy efficiency create jobs doing the work of upgrading our infrastructure, the investments open up private capital to be reinvested in the economy, which has a multiplier effect on jobs.

Commenters stated that a popular measure is to estimate jobs per dollar invested. The commenters stated that in the electricity space, a comparative analysis of efficiency compared to generation found that efficiency created twice as many jobs per dollar spent on nuclear power and 50% more jobs than coal and gas generation, and these large increases in economic activity lead to increases in employment. The commenters stated that the effect is magnified by the fact that the non-energy sectors of the economy are substantially more labor intensive than energy production, and the energy sector is less than half as labor intensive as the rest of the economy. The commenters puts forward that this effect is compounded where energy is imported (as in the U.S. transportation sector), and as consumers substitute away from energy, the goods and services they purchase stimulate economic and disproportionately large job growth. The commenters remarked that these efforts to model the economic impact of energy efficiency have proliferated with different models being applied to different geographic units, including states and nations. The commenters stated that the results differ across studies because the models are different, the impact varies according to the size of the geographic unit studied and because the assumptions about the level and cost of energy savings differ. The commenters noted that these differences are not an indication that the approach is wrong; on the contrary, all of the analyses conclude that there will be increases in economic activity and employment, and given that there are different regions and different policies being evaluated, we should expect different results. The commenters stated that, taken together, the overestimation of costs and underestimation of benefits lead to a substantial and systematic underestimation of the net benefits of efficiency gains, and because the impact of the efficiency improvements depends on (a) the size of the improvement and (b) the type of consumer durable being studied, (c) the sector in which it occurs and (d) the region being analyzed, one cannot offer a single, simple estimate. The commenters stated that the exact calculation of costs and benefits is likely to underestimate the benefit/cost ratio by a factor of at least two because of the failure to reflect the macroeconomic benefits and cost reducing trends, both of which are positive externalities of the adoption of performance standards.

Response 13: Several commenters state that the benefits of the Clean Power Plan are overstated due to EPA's failure to consider the negative health impacts associated with higher energy costs and unemployment. A number of other commenters conclude the benefits of the CPP are understated by EPA for a variety of reasons including:1) high costs associated with climate damages, 2) economic growth and jobs created with renewable and energy efficient technologies, 3) increased revenues from economic growth for governments and school systems including rural communities from renewable and energy efficient technologies, 4) water savings associated

with less carbon intensive power generating technologies, 5) enhanced national security from greater geopolitical stability by addressing climate change, and 6) greater productivity of labor due to increases in the intellectual capacity of the US workforce.

The benefits, costs and economic impacts of the final CPP are estimated in the Regulatory Impact Analysis (RIA) included in the docket. In the RIA, EPA finds that the benefits of the CPP far outweigh the costs of the CPP. While these estimates are illustrative of the benefits and costs that may result from implementation of the CPP, the EPA believes these estimates are reasonable estimates of the benefit and costs of the action. States will make the final determination through their state plans as to how the sources will need to comply with the CPP. Thus, the final benefits and costs of the guidelines may differ from those reported to the extent that state plans differ from EPA's implementation assumptions in the RIA. The EPA discusses the climate and human health benefits of the CPP in Chapter 4 of the RIA, the estimated costs and potential changes in price of energy (e.g., electricity prices) are reported in Chapter 3, and employment impacts are presented in Chapter 6. As discussed in Chapter 3 of the RIA, electricity prices are anticipated to increase by less than one percent by 2030 on a nationwide average basis, while actual electricity bills may fall for consumers who invest in energy efficient technologies. Regional differences in projected electricity price changes are likely to occur as reflected in chapter 3 of the RIA. In chapter 6, EPA discusses possible job impacts of the CPP and concludes that certain jobs may be lost in specific sectors such as coal mining, but job gains are likely in the energy efficiency sector. Thus the impacts on electricity prices and employment estimated by EPA do not match those assumed by the commenters that underlie their comment regarding negative health impacts. Further states will be able to address the economic interests of their utilities and ratepayers by using the flexibilities in the final CPP to design their state implementation plans.

Regarding those commenters who believe EPA underestimated the benefits of the Clean Power Plan, EPA notes that Chapter 4 of the RIA presents the climate benefit estimates and a full discussion of the limitations in the SC-CO2 analysis, e.g., the incomplete way that integrated assessment models capture catastrophic and non-catastrophic impacts. See also Section 8.7.2, Comment 1, in the Response to Comments for EPA's response to comments regarding omitted impacts from the integrated assessment models. EPA also reports job growth estimates relating to renewable energy and energy efficiency. The EPA does not directly analyze possible changes in the general economic activity in the nation in the RIA. However, the EPA does discuss potential impacts on secondary markets such as energy-intensive manufacturing in Chapter 5 of the RIA. In EPA's continuing effort to advance the evaluation of costs, benefits, and economic impacts associated with environmental regulation, EPA has formed a panel of experts as part of its Science Advisory Board SAB to advise the Agency on the technical merits and challenges of using economy-wide economic models to evaluate the impacts of regulations that would provide estimates of change in general economic activity. The SAB panel of experts will consider a variety of issues related to the use of economy-wide modeling. Answers from the panel of experts will help EPA assess economy-wide economic impacts in the future.

The EPA recognizes that less carbon intensive electric generation is generally less water intensive, but water usage was not directly analyzed in the RIA and actual changes in water usage will be dependent upon actual implementation of the CPP. (Please see http://www.epa.gov/cleanenergy/energy-and-you/affect/water-resource.html for more details on water usage associated with different types of energy generation.) The EPA agrees that climate

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estimates. In response to these comments and consistent with the 2010 commitment to periodically revise the SC-CO2 estimates, in 2013 the IWG released an update to the SC-CO2 estimates that maintained the same methodology underpinning the previous estimates, but applied the most current versions of the three IAMs. The science underlying the assessment and valuation of climate change impacts is constantly evolving. Since the publication of the initial SC-CO_2 estimates in 2010, the representation of the science and economic consequences of climate change in the three IAMs has improved. The 2013 SC-CO_2 technical update allowed the SC-CO_2 estimates to reflect these improvements. Some of the model revisions tended to increase the value of SC-CO_2 while others tended decreased it. The updated values reflected the net effect of all of those changes. None of interagency working group's 2010 modeling decisions were revisited as a part of the 2013 update. The 2013 update used the same approach and assumptions as the 2010 analysis, but with the latest version of each of the three models available. In addition, the TSDs fully discuss the sensitivities of the SC-CO_2 and how the interagency working group explored those sensitivities. See also 8.7.2, comment 4 for discussion about treatment of uncertainty.

EPA strongly disagrees with the comment that climate change is an artifact of modeling, Global Circulation Models have no connection to the real world, and SCC is therefore a model of models. See 8.7.2, comment 1, for detailed response to comments criticizing the IAMs and section 8.7.1, comment 6 for response to comments arguing that climate is too complex for computer models or EPA to be able to predict the impact of GHG mitigation.

Regarding the comments about quantification versus monetization of the climate benefits and the comment that the Agency has not provided a single quantifiable climate benefit of the proposed rule, EPA disagrees and notes that it has in fact provided the estimated value of climate benefits. The climate benefits estimates have been calculated using the estimated values of marginal climate impacts, known as the social cost of carbon (SC-CO2), presented in the Technical Support Document: Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis under Executive Order 12866. The SC-CO2 is a metric that estimates the monetary value of impacts associated with marginal changes in CO2 emissions in a given year. It includes a wide range of anticipated climate impacts, such as net changes in agricultural productivity and human health, property damage from increased flood risk, and changes in energy system costs, such as reduced costs for heating and increased costs for air conditioning. It is typically used to assess the avoided damages as a result of regulatory actions (i.e., benefits of rulemakings that have an incremental impact on cumulative global CO2 emissions). In order to calculate the dollar value for emission reductions, the SC-CO2 estimate for each emissions year is applied to changes in CO2 emissions for that year, and then discounted back to the analysis year using the same discount rate used to estimate the SC-CO2. While the impacts of CO2 emissions changes, such as sea level rise, are estimated within each integrated assessment model as part of the calculation of the SC-CO2, it is the resulting monetized damages that are relevant for conducting the benefit-cost analysis. As such, it is the SC-CO2 estimates that are used in the RIA to estimate the welfare effects of quantified changes in CO2 emissions.

Regarding the comments on leakage, specifically that multiplying the SC-CO_2 values by estimated CO2 reductions within the power sector only is problematic because the SC-CO_2 should only be applied to estimated net changes in global CO2 emissions, EPA notes that it has

applied the SC-CO2 estimates to the best available estimate of the net emissions impact and includes emissions from the new fossil fuel sources subject to the final 111(b) standard (see RIA Chapter 3 and the final rule for 111(b)). As discussed in RIA Chapter 5, EPA has not quantified the emissions leakage, if any, that may result from secondary market impacts. The final 111(d) emission guidelines cover existing fossil fuel-fired EGUs, and the EPA does not see evidence that notable changes would result from secondary markets, including industry, given the relatively modest changes in electricity prices; see also the RTC, Section 8.6, comment 18. EPA recognizes that this is an important issue for analysts to consider in determining the net CO2 reductions to be valued in an RIA but notes that it does not affect the calculation of the SC-CO_2 itself, which is an estimate of the marginal benefit of a net one-ton reduction in CO2 emissions. The SC-CO_2 estimates are multiplied by estimates of net GHG emissions changes to calculate the value of benefits associated with a policy action in a given year. It is in the estimation of net GHG emissions, and not the SC-CO_2, that any leakage should be accounted for.

Regarding the comment about inconsistencies in the scenarios underlying the rulemaking's base case (AEO) and the SCC estimates (EMF-22), and specifically the recommendation to use the same scenarios in the calculation of the SC-CO_2, EPA has determined that updating the scenarios underlying the SC-CO_2 estimates requires additional research. The selection and harmonization of scenario variables among the IAMs used to estimate the SC-CO_2 involved extensive discussion and analysis by EPA and other members of the IWG. Given the time and resources required to run the IAMs in addition to the difficulty in incorporating new scenarios to the IAMs, it is not feasible to change the scenarios and re-estimate the SC-CO_2 for every rulemaking at every agency. The EMF-22 scenarios were peer-reviewed, and publicly available, they had the key advantage that GDP, population, and emissions trajectories are internally consistent for each model and scenario evaluated. As noted in the 2010 TSD, the scenarios used "span a wide range, from the more optimistic (e.g. abundant low-cost, low-carbon energy) to more pessimistic (e.g. constraints on the availability of nuclear and renewables)." EPA will continue to follow and evaluate the latest science on socioeconomic-emissions scenarios and along with all the members of the IWG, is seeking external expert advice on the technical merits and challenges of potential approaches to update these scenarios in future revisions to the SC-CO_2 estimates. See the OMB Response to Comments document on SC-CO2 for a full discussion about the EMF-22 scenarios and consideration of potential inconsistencies between the scenarios and IAMs.[28]

Regarding the recommendation for USG guidance on the application of the SC-CO_2, specifically guidance that would clarify the TSD's recommendation to use all four SC-CO2 estimates in rulemaking analyses, EPA first notes that it has followed the current guidance to consider all four values in regulatory impact analysis. EPA agrees that consistent and appropriate application of the SC-CO2 estimates is important. EPA will inform OMB of this comment requesting additional guidance of the application of the SC-CO2 to regulatory impact analysis.

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[28] See the OMB Response to Comments, pgs 17-20, at https://www.whitehouse.gov/sites/default/files/omb/inforeg/scc-response-to-comments-final-july-2015.pdf

$PM_{2.5}$ and ozone, to let a climate-related regulation take credit for those reductions is a recipe for unnecessary regulations that result in economically inefficient management of the public health.

Commenters stated the benefits that EPA asserts are produced at ambient air concentrations that are lower than the NAAQS, even though EPA set the NAAQS at a level it deemed requisite to protect the public health with an adequate margin of safety and without considering compliance costs.

Commenters stated that EPA relies on a series of conjectures that infer rises in ozone and $PM_{2.5}$ concentrations, as a result of increased heat waves and drought. However, ozone and $PM_{2.5}$ are criteria pollutants regulated through the establishment of NAAQS under CAA Section 110. The commenters said that these health-based standards must, by law, adequately protect human health, including that of sensitive populations; therefore, it is inappropriate for EPA to consider further reductions in criteria pollutants as a justification for additional GHG regulation in this situation. The commenters said that EPA has not identified any GHG as a criteria pollutant nor has the agency established a related primary NAAQS which is associated with human health. The commenters said that EPA has failed to make a direct correlation to specific concentrations of GHG, including CO_2, that would directly affect ground-level ozone or $PM_{2.5}$ concentrations and that otherwise, EPA would be compelled to consider these substances as pollutant precursors and regulate them under a NAAQS.

Commenters stated that NOx and SO_2 are currently regulated by the EPA. The commenters said that as of October 2012, no area of the country has been found to be out of compliance for NOx and that since 1980, SO_2 concentrations have decreased by 71%. The commenters questioned why is the EPA touting any increased air quality benefits now, when these gases are already being adequately regulated.

Commenters stated that the methodology EPA uses to calculate benefits, particularly from $PM_{2.5}$ reductions, is fundamentally flawed. The commenters said that EPA uses a no-threshold linear-regression-to-zero model design; which counts the benefits of even the smallest reduction in $PM_{2.5}$. The commenters said that this contradicts all standard procedures for health analysis, by not establishing a threshold-cut off to determine benefits of reductions.

Response 3: The proposed rule is not based on the estimates of air quality co-benefits provided in the RIA. The benefit-cost analysis included in the RIA accompanying the proposed rule was conducted in compliance with Executive Order 12866, which requires a cost-benefit analysis for major regulations with an expected impact of greater than $100 million annually. Consistent with OMB (OMB, 2003) and EPA guidance (U.S. EPA, 2010a), when conducting a cost-benefit analysis to meet the requirements of EO 12866, the EPA estimates all of the anticipated costs and benefits associated with a regulatory action to the extent feasible, including benefits anticipated to occur from reducing air pollution to below the NAAQS levels. As EPA has consistently stated, the NAAQS are not risk free, and as a result, consistent with scientific evidence and CASAC review, EPA includes benefits of reductions in air pollution at levels below the NAAQS and in areas that attain the NAAQS, even if there is potentially reduced confidence in the specific magnitude or those benefits. The most recent Integrated Science Assessments (ISA) for ozone and $PM_{2.5}$ indicate that the science supports use of log-linear no-threshold concentration-response functions for both ozone and $PM_{2.5}$ (U.S. EPA, 2009, 2013).

Our use of no-threshold models directly follows this science. The EPA disagrees with commenters who suggest it is inappropriate to use no-threshold models, and disagree that these models are not reliable. The EPA also disagrees with the commenters who suggested use of a Hormesis based model. The scientific literature for $PM_{2.5}$ does not support this type of model, and the literature cited by the commenters is not directly relevant to air pollution exposures or $PM_{2.5}$ and ozone specifically.

The EPA believes that the best estimate of benefits includes benefits both above and below the levels of the NAAQS and maintains it is not double-counting benefits simply because the magnitude of the health benefits that occur at lower concentrations are more uncertain.

The EPA's standard practice for its rules is to estimate, to the extent data and time allow, all benefits of the emissions reductions achieved by a rule *beyond control requirements for other rules, i.e., establish a baseline*. While it can be difficult to account for concurrent rulemakings in a baseline, the EPA clearly identifies what is and what is not in the baseline for each analysis. If this proposed rule was duplicative of other rules, then there would be no additional costs or benefits attributable to this proposed rule. Prior to estimating the health benefits of this proposed rule (and any other rule), we simulated what $PM_{2.5}$ concentrations would be in the future to account for the air quality benefits that would occur due to other regulations (e.g., MATS) or economic factors in this baseline. Any emissions changes expected as a result of this proposed rule are additional emissions reductions beyond the other regulations included in the baseline (e.g., MATS). Therefore, the benefits from particle reductions are not double-counted – they are real health benefits from emissions reductions anticipated to be achieved by this proposed rule.

Further, the $PM_{2.5}$ and ozone health co-benefits expected from this proposed rule are not double-counted with benefits estimated in the NAAQS RIAs. NAAQS RIAs illustrate, but do not predict, the emissions reductions strategies that States may choose to enact when implementing a revised NAAQS. Subsequent Federal and State implementation rules will be reflected in future baselines for PM and ozone NAAQS reviews. Also, because it is not possible to accurately account for rules that have not yet been promulgated, RIAs prepared for a future rulemaking will likely include any additional rulemakings in the baseline. For example, the baseline in this RIA reflects many recently promulgated rulemakings, including MATS, CSAPR, and CCR.

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Assessment of Approaches to Updating the Social Cost of Carbon: Phase 1 Report on a Near-Term Update

Committee on Assessing Approaches to Updating the Social Cost of Carbon

Board on Environmental Change and Society

Division of Behavioral and Social Sciences and Education

The National Academies of
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Executive Summary

The social cost of carbon (SCC) for a given year is an estimate, in dollars, of the present discounted value of the damage caused by a 1-metric ton increase in carbon dioxide (CO_2) emissions into the atmosphere in that year or, equivalently, the benefits of reducing CO_2 emissions by the same amount in that year. The SCC is intended to provide a comprehensive measure of the monetized value of the net damages from global climate change that results from an additional unit of CO_2, including, but not limited to, changes in net agricultural productivity, energy use, human health effects, and property damages from increased flood risk. Federal agencies use the SCC to value the CO_2 emissions impacts of various regulations, including emission and fuel economy standards for vehicles; emission standards for industrial manufacturing, power plants, and solid waste incineration; and appliance energy efficiency standards.

The Interagency Working Group on the Social Cost of Carbon (IWG) developed a methodology for estimating the SCC and applied that methodology to produce estimates that government agencies use in regulatory impact analyses under Executive Order 12866. The IWG requested this Academies interim report to determine if a near-term update to the SCC is warranted, with specific questions pertaining to the representation of the equilibrium response of the climate system in the integrated assessment models used by the SCC modeling structure, as well as the presentation of uncertainty of the SCC estimates. This interim report is the first of two reports requested by the IWG: the second (Phase 2) report will examine potential approaches for a more comprehensive update to the SCC estimates.

The committee concludes that there would not be sufficient benefit of modifying the estimates to merit a near-term update that would be based on revising a specific parameter in the existing framework used by the IWG to reflect the most recent scientific consensus on how global mean temperature is, in equilibrium, affected by CO_2 emissions. Furthermore, the committee does not recommend changing the distributional form used to capture uncertainty in the equilibrium CO_2 emissions-temperature relationship. Rather than simply updating the distribution used for equilibrium climate sensitivity—the link that translates CO_2 emissions to global temperature change—in the current framework, the IWG could undertake efforts toward the adoption or development of a common representation of the relationship between CO_2 emissions and global mean surface temperature change, its uncertainty, and its profile over time. The committee outlines specific diagnostic criteria that can be used to assess whether such a module is consistent with the best available science.

Further, the committee recommends that the IWG provide guidance in their technical support documents about how SCC uncertainty should be represented and discussed in individual regulatory impact analyses that use the SCC. The committee recommends that each update of the SCC include a section in the technical support document that discusses the various types of uncertainty in the overall SCC estimation approach, addresses how different models used in SCC estimation capture uncertainty, and discusses uncertainty that is not captured in the estimates. In addition, the committee notes that it is important to separate the effects of the discount rate on the SCC from the effects of other sources of variability. Finally, the committee recommends that

the IWG provide symmetric treatment of both low and high values from the frequency distribution of SCC estimates conditional on each discount rate.

The committee also reminds readers that it will be exploring these and other broader issues further in Phase 2 of this study; the committee may offer further discussion of these issues in its Phase 2 report including the modeling of the climate system and the representation of uncertainty in the estimation of the SCC.

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
PO Box 402
Trenton, NJ 08625-0402
TEL. # (609) 292-2885
FAX # (609) 292-7695

JON S. CORZINE
Governor

MARK N. MAURIELLO
Acting Commissioner

November 25, 2008

DEC 01 2008

Air and Radiation Docket and Information Center
Environmental Protection Agency
Mailcode: 2822T
1200 Pennsylvania Ave., NW
Washington, DC 20460

Docket ID No. EPA-HQ-OAR-2008-0318

Thank you for the opportunity to comment on the Advanced Notice of Proposed Rulemaking (ANPR) entitled "Regulating Greenhouse Gas Emissions under the Clean Air Act." In addition to this letter, New Jersey is submitting technical comments on the ANPR under signature of our State's Division of Air Quality Director.

The federal government must move quickly and decisively to join the states, which are already implementing a wide range of programs to regulate greenhouse gases (GHGs). While we appreciate the effort USEPA staff put into the CAA analysis and technical support documentation included in the ANPR, we are concerned the ANPR inaccurately fails to see value in using the CAA as a tool to begin to take the immediate actions needed to reduce GHG emissions and their impacts. While we agree that strong, comprehensive federal climate legislation is ultimately needed to address climate change, the CAA can provide an important bridge to this federal climate legislation and a critical long-term complement to such legislation. While not a perfect or complete solution to address all aspects of climate change, the CAA works on many levels to allow for actions that will complement federal legislation. Beyond the adoption of this new federal legislation, the CAA will continue to allow for the critical coordination between criteria pollutant and GHG controls.

The USEPA is legally obligated to regulate GHG emissions from motor vehicles once the USEPA determines that greenhouse gases cause or contribute to air pollution, which may reasonably be anticipated to endanger public health or welfare. We believe that the ANPR needlessly goes beyond the central issue of the U.S. Supreme Court decision in Massachusetts v. EPA, where the Court specifically ruled that the USEPA could avoid taking further action under the CAA "only if it determines that greenhouse gases do not contribute to climate change or if it provides some reasonable explanation as to why it

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cannot or will not exercise its discretion to determine whether they do." As the Supreme Court made clear, USEPA must issue this determination based solely on science and the law. Current science makes clear that GHGs cause or contribute to air pollution, which may reasonably be anticipated to endanger public health or welfare. There is broad scientific consensus that human-caused GHG emissions are impacting the Earth's climate, and that increasing atmospheric GHG concentrations will result in very significant adverse global, regional, and local environmental impacts.[1] States in the Northeastern United States are especially vulnerable to the impacts of global warming, with potentially devastating ecological, economic and public health impacts to New Jersey.[2] Not only does climate change threaten New Jersey's shoreline and ecology, but also the socioeconomic impacts of global warming stand to be profound and costly. Therefore, aggressive and immediate action at all levels of government is needed to stabilize, and then reduce, atmospheric GHG concentrations in order to avoid the most serious climate change impacts.

The USEPA requests comment on whether well-designed legislation for establishing a broad GHG regulatory framework has the potential for achieving greater environmental results at lower cost for many sectors of the economy, with less concern about emissions leakage and more effective, clearer incentives for development of technology, than a control program based on the CAA alone. Rather than presenting it as a choice between new legislation and regulation, an effective national climate change policy should incorporate legislation, including cap and trade legislation for certain sectors, as well as regulatory initiatives based on the CAA authority. New Jersey, as well as its neighboring states, has demonstrated the viability of combining targeted regulatory programs with cap and trade systems[3] and has proven that through this approach we can make significant progress in mitigating air pollution.

While there are challenges associated with regulating GHGs under the CAA, many of the issues raised by the USEPA in the ANPR are outside the scope of the Supreme Court's opinion and resolving them should not delay the issuance of an endangerment determination and the promulgation of motor vehicle GHG standards.
We believe that the USEPA can make this positive endangerment determination under § 202(a)(1) of the CAA without necessarily triggering many of the other provisions of the CAA discussed in the ANPR, and that, even if certain provisions of the CAA may apply, the USEPA and the states have significant flexibility under the CAA to implement the requirements using reasonable approaches.

Critical Immediate Federal Actions:

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[1] Intergovernmental Panel on Climate Change, Climate Change 2007: Synthesis Report, Summary for Policymakers, Fourth Assessment Report, November 2007.
[2] Frumhoff, P.C., J.J. McCarthy, J.M. Melillo, S.C. Moser, and D.J. Wuebbles. 2007. Confronting Climate Change in the U.S. Northeast: Science, Impacts, and Solutions. Synthesis report of the Northeast Climate Impacts Assessment (NECIA). Cambridge, MA: Union of Concerned Scientists (UCS).
[3] For example, the Regional Greenhouse Gas Initiative.

Most states, including New Jersey, have formulated plans and are undertaking action on global warming due to the urgency of the issue and lack of national leadership to date. However, it is clear that in order to truly stem the tide on global warming, and alleviate the more serious consequences of inaction, federal coordination and action is necessary. In some cases, these federal actions are needed before the states can take action (e.g., approval of California's waiver to regulate GHGs from motor vehicles). In other cases, national requirements would be far more effective in addressing the problem without creating state-to-state or regional conflicts (e.g., national fuel regulations). New Jersey, in cooperation with the other northeastern and mid-Atlantic states, has continued to encourage the federal government on issues related to global warming. In addition, New Jersey and other states have identified several specific actions that the new federal administration should take expeditiously in order to establish a federal agenda and plan for dealing with climate change. Specifically, New Jersey asks that the USEPA:

1. Issue an "endangerment" determination that greenhouse gases from motor vehicles cause, or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare, see 42 U.S.C. § 7521(a)(1), which will allow state and federal action to address GHGs under the Clean Air Act.

2. Rescind its decision to deny California's waiver request to implement the GHG-portion of its Low Emission Vehicle Program, allowing California and the sixteen states that have adopted California's LEV program (including New Jersey) to move forward with implementation of their vehicle GHG standards.

3. Propose standards to address transportation-related GHG emissions, including:
   - New national vehicle emissions standards equivalent to those approved under the California waiver, using its authority to set federal standards under Section 202 of the Clean Air Act; and
   - A national low carbon fuel standard using its authority under Section 211 of the Clean Air Act.

4. Create a national program to deal with GHG emissions from power plants and other necessary stationary sources.

5. Address non-CO_2 GHGs used in refrigeration through substitution, as well as through leak detection and repair requirements similar to those federal rules initially proposed by the USEPA on June 11, 1998, (63 Fed. Reg. 32044).

Addressing the Unique Challenges of Regulating GHGs under the CAA:
Much of the important information and analysis the USEPA provided in the ANPR is undermined by its conclusion that the CAA is an inappropriate instrument for addressing climate change. According to the USEPA, the most significant hurdles that would have to be overcome are the need to establish a national ambient air quality standard (NAAQS) and the implications of new source review (NSR) provisions for regulating GHGs. We urge the USEPA to establish GHG New Source Performance Standards (NSPS) for

stationary sources under Section 111 of the CAA. We believe regulating GHG emissions using NSPS has the most value of any of the approaches discussed in the ANPR. The NSPS path offers the USEPA substantial flexibility to regulate new and modified, as well as existing, stationary sources. With regards to NAAQS, we disagree that the issuance of an endangerment finding necessitates the establishment of a NAAQS and, in the event it is determined by the courts that the USEPA must establish a GHG NAAQS, we believe that there is flexibility inherent in the CAA which could be applied to the NAAQS provisions that would make it workable. Similarly, we believe that USEPA has sufficient flexibility under the CAA pertaining to NSR to avoid what might otherwise be construed as an unworkable requirement to individually permit thousands of small sources. New Jersey has significant experience using several of the streamlined permitting approaches discussed in the ANPR, such as general permits.

Economic Benefits of a National GHG Reduction Strategy:
The economic benefits of undertaking early actions to address climate change are noteworthy. Studies show that industrialized countries could achieve major reductions in carbon emissions and save money -- even before considering the benefits of avoided damages from climate change. Programs that promote energy efficiency reduce energy bills, which frees up resources for reinvestment in the economy. Similarly, programs that stimulate renewable energy installations create high-paying renewable energy sector jobs. With appropriate policies, such as an allowance auction system, and improved energy efficiency, economic gains can offset the costs of carbon pricing. Taken together, these and other policies that reduce the consumption of petroleum products can reduce the outflow of U.S. dollars to petroleum producing countries of the world. The sooner the transition is begun, the greater the benefits to our economy and environment.

Also on the horizon is the potential advantage from research and development of clean energy power generation and alternatives to global warming halogenated substances. States can gain a considerable technological head start in these critical areas with their well-established university and industry research and development infrastructure. Positive results will have implications on state economic output, income and employment.

Conclusion:
Numerous states, including New Jersey, have already taken bold action through legislation, regulations and program implementation to combat the threats posed by climate change. These actions were taken with the confidence that well designed climate change policy will also provide a host of associated societal benefits ranging from economic development, to energy security, to consumer protection. Climate change strategies are broadly seen in our state as engines of economic growth and stability. The opportunities associated with a low carbon future are spurring the kind of creative competition that drives the American economy. There are tremendous potential consumer savings afforded by more efficient vehicle and appliance technologies that are emerging as a consequence of state climate action. These savings will become more critical over time as fossil fuel costs increase.

We disagree with the USEPA Administrator's conclusion that the CAA is an inappropriate instrument for regulating greenhouse gases. Not only *must* the USEPA take action under the CAA if the USEPA makes a positive endangerment determination, pursuant to the Supreme Court's direction, but also for the reasons articulated above, we believe the Act is particularly well suited for this purpose. The flexibility provided under the CAA will certainly be needed to adapt it for the purpose of GHG mitigation. Our experience of working within the construct of this legislation over the past 35 years provides confidence that the CAA can serve as a needed bridge to federal climate legislation and an effective long-term complement to cap and trade legislation.

Sincerely,

Mark N. Mauriello
Acting Commissioner

Oil and Gas Industry Organizations and Participants - II

Submit:

Comments on
Proposed Rule: Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, 79 Fed. Reg. 34,829 (June 18, 2014)

Submitted Electronically to:
U.S. Environmental Protection Agency

Air Docket:
EPA-HQ-OAR-2013-0602

December 1, 2014

C. The Lack of Impact on Global Warming

EPA relies on a fundamentally flawed estimate of SCC to capture the benefits of CO_2 emissions reductions. The SCC assumes a variety of adverse effects due to increased global temperature and is specifically based on an estimate of climate sensitivity that is in error. In its most recent report, the Intergovernmental Panel on Climate Change admitted it could not estimate climate sensitivity with any accuracy and then decreased the range of its estimates to levels well below the estimate used by EPA. Further, more recent peer reviewed studies have calculated the climate sensitivity to be from 0.8 to 1.2, values that would reduce SCC to less than $10 at a 5% discount rate and dramatically reduce the estimates of benefit.

Even assuming a high climate sensitivity, using MAGICC, a climate change calculator developed in part with EPA support, climate scientists estimate the global temperature change from the Clean Power Plan's CO_2 reductions will reduce global temperatures by less than two one-hundredths of a degree Celsius by the year 2100. The exact number is 0.018°C.[47]

D. Health "Co-Benefits" are Non-Existent

Reductions in premature fatalities attributed to coincidental reductions in ozone and fine particulate ($PM_{2.5}$) pollution account for more than 90% of the estimated $23 billion to $59 billion in health benefits in 2030 (RIA ES-22). The bases for these estimates are fatally in error.

EPA claims that $PM_{2.5}$ pollution currently kills thousands of Americans annually, deaths that would be avoided by the proposed rule, but these estimates are based on cherry-picked studies and extrapolation of health effects below the lowest $PM_{2.5}$ concentrations associated with mortality in epidemiological studies.[48] Such claims also conflict with toxicological studies,[49] which indicate that current $PM_{2.5}$ concentrations in U.S. cities are too low to cause significant disease or death.[50]

The rule's purported health benefits for ozone reduction are even less plausible, since asthma prevalence – especially childhood asthma rates — increased since 1980[51] while, according to EPA,

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[47] *See*, Attachment B, Lewis, M. "How Can EPA's 'Clean Power Plan' Deliver $Billions in Climate Benefits If It Has No Detectable Impact on Global Temperatures, Sea-Level Rise, or Other Climate Indicators?" available at: http://www.globalwarming.org/2014/06/12/how-can-epas-clean-power-plan-deliver-billions-in-climate-benefits-if-it-has-no-detectable-impact-on-global-temperatures-sea-level-rise-or-other-climate-indicators/

[48] *See* Attachment C, Goodman, J. "EPA's Assessment of Health Benefits Associated with PM2.5 Reductions for the Final Mercury and Air Toxics Standards" available at file:///D:/1%20E&E%20Legal/111d%20Project/111d%20comments/HHRG-112-IF03-WState-JGoodman-20120208.pdf.

[49] *See* Attachment D, Schwartz, J. "Where the Bodies are Buried", available at http://johnlocke.org/site-docs/research/schwartz-tva.pdf.

[50] *See* Attachment E, Green, L.C. & Armstrong, S.R. "Particulate matter in ambient air and mortality: toxicologic perspectives" Regul Toxicol Pharmacol. 2003 Dec;38(3):326-35, abstract available at http://www.ncbi.nlm.nih.gov/pubmed/14623483.

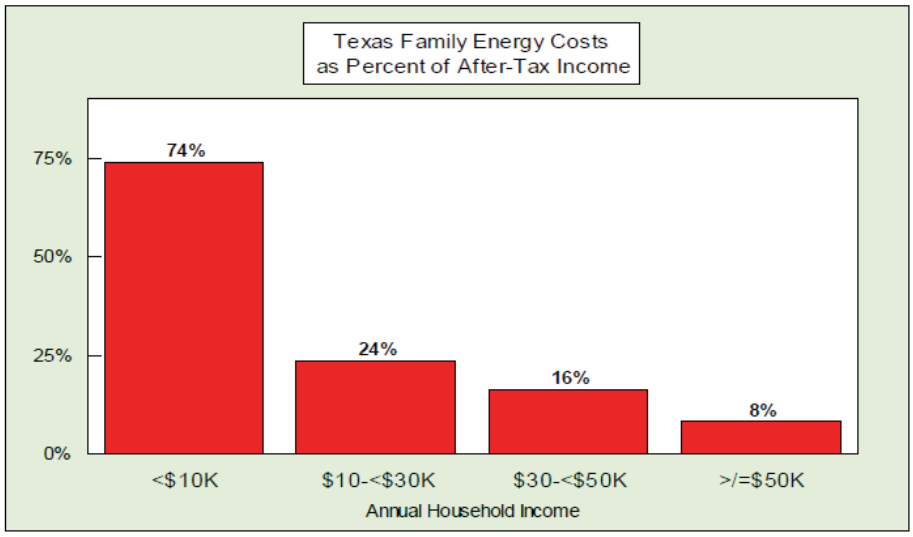
[51] *See* Attachment F, Akinbami, L.J., et al, "Asthma Prevalence, Health Care Use, and Mortality: United States, 2005–2009" National Health Statistics Reports No. 32, available at http://www.cdc.gov/nchs/data/nhsr/nhsr032.pdf.

ozone concentrations declined by 25%.[52] The link between asthma and ozone is simply not credible based on this single fact, a fact EPA does not and cannot dispute and has never been able to explain away.

Nor did EPA assess the number of premature deaths the rule will cause through loss of disposable income to Americans. Texans are at particular risk.

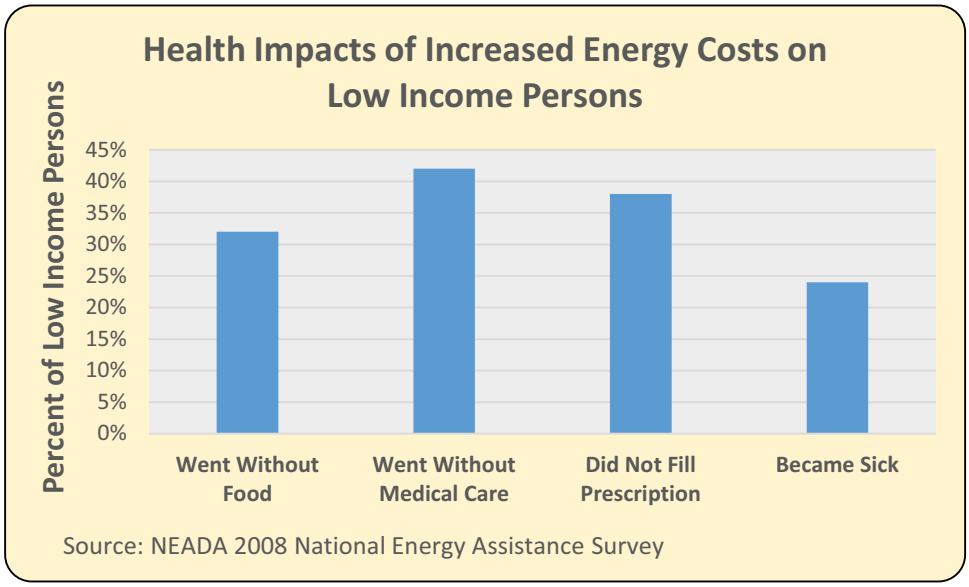
Some 49% of Texas's families have gross annual incomes of $50,000 or less, with an average after-tax income of $23,756, or less than $2,000 per month. About 700,000 families in Texas live well below the federal poverty line, earning less than $10,000 per year, and are being squeezed hardest by energy cost increases. Many of these families receive state and other energy assistance to help reduce energy costs. Yet for most lower-income families and for the 25% of Texas households receiving Social Security, energy costs are competing with other basic necessities for the family budget.

As shown in the table, 700,000 families spend nearly three-quarters of their income on energy. A 15% increase due to the proposed rule will place them in dire straits.



[52] *See* Attachment G, EPA, "National Trends in Ozone Levels" available at http://www.epa.gov/airtrends/ozone.html.

The implications of cost increases on the poor are known. Faced with increased energy costs, low income persons go without food, medical care and prescription drugs. They become sick more often than those who can absorb the increases in energy bills.



EPA has examined this "health-wealth" relationship.

Lutter and Morrall explain that

> [r]egulations to promote health and safety that are exceptionally costly relative to the expected health benefits may actually worsen health and safety, since compliance reduces other spending, including private spending on health and safety. Past studies relating income and mortality give estimates of the income loss that induces one death--a value that we call willingness-to-spend (WTS)--to be around $9 to $12 million ($US 1990).[53]

[53] Lutter, R. and Morrall, J.F., "Health-Health Analysis: A New Way to Evaluate Health and Safety Regulation", Journal of Risk and Uncertainty Vol. 8-1 pp. 43-66 (1994). There is an extensive academic literature regarding the effect of loss of wealth on health. *See*, *e.g.*, Ralph L. Keeney, "Mortality Risks Induced by Economic Expenditures", *Risk Analysis* 10(1), 147-159 (1990); Krister Hjalte et al. (2003). "Health–health analysis—an alternative method for economic appraisal of health policy and safety regulation: Some empirical Swedish estimates," *Accident Analysis & Prevention* 35(1), 37-46; W. Kip Viscusi "Risk-Risk Analysis," *Journal of Risk and Uncertainty* 8(1), 5-17 (1994); Viscusi and Richard J. Zeckhauser, "The Fatality and Injury Costs of Expenditures", *Journal of Risk and Uncertainty* 8(1), 19-41 (1994); U.S.EPA, Economic Analysis and Innovations Division, "On the relevance of risk-risk analysis to policy evaluation," August 16, 1995, http://yosemite.epa.gov/ee/epa/eerm.nsf/vwAN/EE-0311-1.pdf/$file/EE-0311-1.pdf (accessed January 23, 2011); Arnold, F.S. (1995), Economic Analysis of Environmental Policy and Regulation, (John Wiley and Sons, Inc.: New York); Chapman, K.S., and G. Harihan (1994) "Controlling for Causality in the Link from Income to Mortality", Journal of Risk and Uncertainty, 8(1), 85-93; Graham, J., B. Hung-Chang, and J.S. Evans (1992) "Poorer Is Riskier",

The U.S. Environmental Protection Agency has applied this principle to economic analyses, stating: "people's wealth and health status, as measured by mortality, morbidity, and other metrics, are positively correlated. Hence, those who bear a regulation's compliance costs may also suffer a decline in their health status, and if the costs are large enough, these increased risks might be greater than the direct risk-reduction benefits of the regulation."[54] This, of course, is exactly what the NEADA 2008 National Energy Assistance Survey found – that increased energy costs results in more sickness.

EPA failed to estimate the number of premature deaths associated with the loss of disposable income due to its proposal. EPA should have updated and used the U.S. Office of Management and Budget (OMB) federal estimate of one premature death for every $12 million ($US 2010) in reduction of disposable income.[55] In addition to OMB, the EPA, the Food and Drug Administration (FDA), and the Occupational Safety and Health Administration (OSHA) use this methodology to understand the degree to which their regulations induce premature death amongst those who bear the costs of federal mandates.[56]

One measure of the loss of disposable income is the increase in consumer costs which EPA estimates at $360 Billion. This loss of disposable income would cause 30,000 premature deaths. This adverse impact swamps the purported benefits of reducing particulate matter associated with the rule.

EPA's failure to fully examine the adverse effects on human health associated with the proposed rule requires EPA to withdraw the rule and more properly analyze the actual harm its proposal will cause.

Risk Analysis, 12(3), 333-337; Keeney, R.L. (1994) "Mortality Risks Induced by the Costs of Regulations", Journal of Risk and Uncertainty, 8(1), 95-110; Lave, L.B. (1981). The Strategy of Social Regulation: Decision Frameworks for Policy, (The Brookings Institution: Washington, DC); Peltzman, S. (1975) "The Effects of Automobile Safety Regulation", Journal of Political Economy, 83(4), 677-725; Portney, P.R., and R.N. Stavins (1994) "Regulatory Review of Environmental Policy: The Potential Role for Health-Health Analysis", Journal of Risk and Uncertainty, 8(1), 111-122; Smith, V.K., D.E. Epp, and K.A. Schwabe (1994) "Cross-Country Analyses Don't Estimate Health-Health Responses", Journal of Risk and Uncertainty, 8(1), 67-84; Wildavsky, A. (1980). "Richer is Safer", The Public Interest, 60, 23-39.

[54] U.S.EPA, Economic Analysis and Innovations Division, "On the relevance of risk-risk analysis to policy evaluation," August 16, 1995, http://yosemite.epa.gov/ee/epa/eerm.nsf/vwAN/EE-0311-1.pdf/$file/EE-0311-1.pdf (accessed January 23, 2011).

[55] The dollar value of expenditures that induce one premature death was inflated to 2010 dollars using the Bureau of Labor Statistics CPI Inflation Calculator.

[56] *See* notes 53 & 54, *supra* and associated text.

RICHARD L. REVESZ
MICHAEL A. LIVERMORE

Retaking Rationality

How Cost-Benefit Analysis Can Better Protect the Environment and Our Health

OXFORD
UNIVERSITY PRESS
2008

Fallacy 2: Wealth Equals Health

Every college student who studies statistics is told that correlation is not causation. In other words, just because Y and Z correlate with each other, we cannot assume that Y causes Z or that Z causes Y. Both are possibilities, but it is also possible that the correlation is random, or that some third agent, X, is causing both Y and Z. For instance, the weather correlates with the seasons, but no one would say that the weather causes the seasons.

The rookie error of confusing correlation with causation is the root of the second fallacy of cost-benefit analysis: Wealth equals health. This fallacy is the basis for the so-called health-wealth tradeoff. Proponents of health-wealth tradeoff analysis observe that there is a correlation between more wealth and more health. Wealthy people do in fact live longer. But then these proponents assume that correlation is causation, asserting that more wealth causes more health. Under this pseudo logic, they assert that because any regulation will impose costs on people, thereby decreasing their wealth, such regulations will also create the countervailing risk of diminishing people's health. In other words, health regulations should be abolished because they kill people.

A statistics teacher would give that reasoning an *F* and move on. Unfortunately, that is impossible here, and the health-wealth argument has gained significant traction. It has been heard in the halls of the White House and in the chambers of the U.S. Supreme Court. If anything, its popularity continues to grow.

In the early 1990s, the Occupational Safety and Health Administration (OSHA) proposed the Air Contaminants Standard in the Construction, Maritime, Agriculture, and General Industries. The proposed rule set the permissible level of exposure for six hundred chemicals in the agricultural sector, set several new general contaminant levels, and lowered the permissible levels of exposure to these chemicals in the construction and maritime industries.

OMB tried to use health-wealth tradeoff analysis to kill it. In a letter dated March 10, 1992, James McRae, acting administrator of the Office of Information and Regulatory Affairs (OIRA), wrote to Nancy Risque-Rohrbach at the Department of Labor, stating that he had "suspend[ed] review of the draft proposed rule"—effectively sending OSHA back to the drawing table.[198] Arguing that "richer workers on average buy more leisure time, more nutritious food, more preventive health care, and smoke and drink less than poorer workers," MacRae maintained that the rule to reduce workplace contaminants might have the perverse effect of increasing worker risk. MacRae reasoned, "If government regulations force firms out of business or into overseas production, employment of American workers will be reduced, making workers less healthy by reducing their incomes." He estimated that "the $163 million annual cost of the [proposed] rule would result in approximately 22 additional deaths per year." Based on these estimations, he suggested that the rule might result in a "net increase of about eight to fourteen fatalities per year."

The reaction from Congress was negative and swift. An outraged Senator Edward M. Kennedy deplored OMB's use of "Alice in Wonderland economics."[199] Two negative stories about the OMB action written in the *Washington Post* and the *New York Times* were read on the Senate floor.[200] Senator John Glenn, then chairman of the Government Affairs Committee, called for an investigation of OMB's reasoning by the General Accounting Office (GAO).[201] The GAO investigation found that OIRA had improperly relied on health-wealth tradeoff analysis as a means of circumventing the statutory ban on carrying out cost-benefit analysis, that the agency did not use the methodology correctly, and that the methodology was, in the words of Senator Glenn, "a pipe dream."[202]

OMB backed down from its position that time.[203] Nonetheless, it has never disavowed health-wealth tradeoff analysis. Because most of OMB's review of agency decisionmaking occurs through informal processes, it is difficult to know how much health-wealth thinking continues to exert an antiregulatory influence. We do know that health-wealth tradeoff analysis has not disappeared from the public debate.

IS WEALTH HEALTH?

Proponents of health-wealth tradeoff analysis begin with the premise that wealthier people and societies are also healthier.[204] They argue that because environmental, health and safety regulations impose large economic costs on society, they have negative health consequences.[205] In the words of Professor Viscusi, "[R]egulatory expenditures represent opportunity costs to society

that divert resources from other uses. These funds could have provided for greater healthcare, food, housing, and other goods and services that promote individual longevity."[206] This negative effect must be weighed against the benefits of reducing target risks.

Supporters of the idea of health-wealth tradeoffs rely on a few empirical studies. One of the more influential, entitled *Mortality Risks Induced by Economic Expenditures*, by Professor Ralph L. Keeney,[207] used data from a 1973 study by Evelyn Kitagawa and Philip Hauser, which showed a correlation between income and health. Keeney employed a relatively straightforward mathematical model to determine how general social costs imposed on the population as a whole might be translated into increased risks to health. From that analysis, he gave several estimates for how much social cost will result in one "induced fatality," the most cited of which was $7.25 million in 1980 dollars.[208] Converted to 2006 dollars, this amount is equivalent to $17.7 million.[209] Thus, the argument goes, a regulation that costs more than $17.7 million to save a life kills more people than it saves.

Another influential study was conducted by Randall Lutter, John Morrall, and W. Kip Viscusi, entitled *The Cost-Per-Life-Saved Cutoff for Safety-Enhancing Regulations*.[210] It used a mathematical model that took into account a broader set of variables than Keeney's, notably the correlations between income and various health-related individual choices like drinking, smoking, and exercise. The study estimated that regulatory expenditures of over $15 million per human life saved ($18.15 million in 2006 dollars) will have net counterproductive effects.[211] Other prominent academics like Cass Sunstein have also embraced the idea of health-wealth tradeoffs.[212]

HEALTH-WEALTH TRADEOFFS AND REGULATION

Health-wealth tradeoffs have several antiregulatory uses. The first, and the use that its proponents most favor, is as a substitute for cost-benefit analysis when such analysis is statutorily prohibited. Certain environmental, health and safety statutes, as interpreted by the courts, prohibit agencies from taking costs into account when setting certain standards. For example, as already noted, in *American Trucking*, the Supreme Court interpreted the Clean Air Act as prohibiting the Environmental Protection Agency (EPA) from considering costs when setting ambient air quality standards. Health-wealth tradeoffs, however, offer the potential to reinterpret all costs in terms of health risks, allowing (or forcing) the EPA to circumvent the statutory prohibition.

Second, health-wealth tradeoffs can be used to set an upper bound on the value of a statistical life.[213] A variety of tools have been used to measure

the value of risk reduction to Americans, including statistical analysis of the wages paid for risky jobs and surveys. Those tools have generated a set of estimations of the value of a statistical life. The current value used by the EPA, based on the midpoint of a number of studies, is $6.3 million dollars per statistical life (year 2000 dollars). Advocates of the health-wealth tradeoff argue that a number derived from health-wealth analysis should trump any higher number derived from a different analysis because the use of the higher value will result in death. Health-wealth analysis then acts as an antiregulatory "emergency switch" that activates if people are willing to pay "too much" to reduce risk.

Finally, the health-wealth tradeoff allows proponents of deregulation to seize the rhetorical high ground by framing arguments about regulatory costs in terms of health risks. John Graham coined the inflammatory phrase *statistical murder*[214] to characterize regulations that impose large economic costs. Instead of arguing that society is unwilling to pay a certain amount of money to reduce health risks, advocates of deregulation have attempted to recast the debate as one of competing health claims, rather than as the true choice—economic costs versus health and safety risks. Even television pundits have gotten into this act. For example, John Stossel, coanchor of ABC's *20/20* and a strong opponent of governmental intervention in the marketplace, has used a health-wealth tradeoff argument in broad attacks against regulation, stating, "Wealthier is healthier, and regulations make the country poorer. Maybe the motto of OSHA should be: 'To save four, kill ten.'"[215]

HEALTH-WEALTH IN ACTION

The idea of health-wealth tradeoffs has been influential well beyond its academic origins and has been used by courts, OMB, and Congress to overturn regulation, circumvent statutory prohibitions against taking costs into account, and recast regulatory costs in terms of health risks.

In *Lockout/Tagout*,[216] plaintiffs challenged an OSHA rule designed to reduce instances in which industrial equipment can "suddenly move and cut or crush or otherwise injure a worker."[217] In a concurring opinion to the judgment remanding the rule to OSHA for further consideration, Judge Williams rejected the union's contention that less stringent regulation was necessarily adverse to worker safety, saying:

> More regulation means some combination of reduced value of firms, higher product prices, fewer jobs in the regulated industry, and lower cash wages. All the latter three stretch workers' budgets tighter (as

does the first to the extent that the firms' stock is held in workers' pension trusts). And larger incomes enable people to lead safer lives.[218]

This opinion was cited in the MacRae letter discussed above.

Other distinguished judges, including Frank Easterbrook[219] and Richard Posner,[220] have supported the concept of health-wealth tradeoffs. Most importantly, Justice Breyer embraced health-wealth analysis in his concurring opinion in *American Trucking*. In that case, industry groups opposed to new clean air standards challenged the constitutionality of the Clean Air Act, and argued that the EPA had to consider costs when setting ambient air quality standards. The majority rejected both of those challenges, holding that the Clean Air Act prohibited the consideration of costs in this context. In his concurrence, Justice Breyer used the logic of health-wealth tradeoff to argue that since excessively expensive regulation not only violates canons of cost-benefit analysis but also reduces overall health, such regulation therefore violates the statutory requirement to promote public health. He stated, "Nor need regulation lead to deindustrialization. Preindustrial society was not a very healthy society; hence a standard demanding the return of the Stone Age would not prove 'requisite to protect the public health.'"[221]

We have already seen the use of health-wealth tradeoff in the OMB letter that temporarily shut down OSHA workplace contaminant regulations. John Graham's reference to statistical murder was quoted by Congressman John Mica of Florida in support of a regulatory reform bill that was viewed by many as deeply antiregulatory.[222] The idea that regulations, by lowering economic productivity, can result in increased mortality has found its way deep within the antiregulatory Washington, D.C., culture, and has even influenced more progressive actors like Justice Breyer.

CAUSATION: THE QUESTIONABLE ASSUMPTION

So, we must all retake Statistics 101: Correlation is not causation. The data used by Keeney showed a *correlation* between income and health. Correlation is a statistics term used when two variables tend to vary together. In the Kitagawa and Hauser study, on which Keeney relied, the healthier people tended to be wealthier people (and vice versa). As discussed earlier, a correlation between two variables does not tell us anything about causation.

It might be that increased wealth leads to increased health. This might happen if greater wealth tends to *cause* people to act more carefully, or spend more money on effective health care. Alternatively, it might also be that increased health leads to increased wealth. Healthier people can work more hours, can be more

effective at their jobs, and have higher productivity than less healthy people. Finally, some other factor, which leads to both increased health and increased wealth, might explain the data. For example, education increases earning power; it might also lead to the abandonment of risky behavior such as smoking.

Keeney is quite explicit about his causal assumptions. Even though he acknowledges that Kitigawa and Hauser "suggest that it may be poor health that leads both to less income and greater mortality,"[223] he "assume[s] that the relationship between higher incomes and lower mortality risks is induced, meaning that higher incomes will lead to lower mortality risks."[224] In Keeney's work, this relationship is just an assumption, not a conclusion. When Keeney's work becomes incorporated into the public policy debate, however, this nuance gets lost.

The Lutter study makes the same assumption. In that study, the authors review a set of other studies showing that income *correlates* with risky behavior like smoking. The authors then proceed as though this data showed that low-income *causes* risky behavior. This study has exactly the same problem as Keeney's—it assumes, but does not defend, a causal relationship between wealth and risky behavior; nothing more than a correlation has been shown. Although it is *possible* that low income causes risky behavior, it is also possible that risky behavior causes low income, or that a third factor—like education—explains both income and health. We just don't know.

Recent research has used sophisticated estimation techniques and more robust data to understand the causal relationship between health and wealth.[225] James P. Smith, a senior economist at RAND, published a major study in 2005 entitled *Unraveling the SES-Health Connection*. (SES stands for socioeconomic status.)[226] Smith wrestled with the issue that is merely an assumption in prior studies, ultimately casting serious doubt on their conclusions.

First, Smith asked the *reverse causation* question—whether reduced health leads to reduced wealth. The hypothesis is intuitive. Sick people work less, incur more health-related expenses, and may save less. Using survey data from the Health and Retirement Study (of households with at least one person aged 51 to 61) Smith found significant effects on income that were attributable to health shocks. He was able to make this causal claim because he based it on data collected over time, not just once. Smith estimated the average aggregate wealth impact from a major health shock (cancer, heart disease, and lung disease) to be almost $50,000 over time. He then tested his findings against a larger portion of the life cycle using data from the Panel Study of Income Dynamics (PSID), a large data set covering over thirty years and 35,000 individuals. He again found that health shocks predict wealth effects; the strongest effect is for the age group 50 to 60, perhaps because this

group is close to retirement, but the effect remains important for other age groups as well. So, at least in part, the causal link between health and wealth means that health problems can reduce wealth.

Second, Smith sought to decouple several features of socioeconomic status, which is based on a number of related aspects, including financial elements such as income and wealth, and nonfinancial factors such as education. Because the elements of socioeconomic status correlate with each other, they also correlate with health. This means that the health-wealth effect could also be called the health-education effect, because an analysis that plots health and wealth will look similar to one that plots health and education. Health-education effects do not translate into an argument against regulation, however, and so they have not been as prominent in the public policy debate. Still, there is no obvious reason to assume that income or wealth, rather than education, is driving the correlation.

Smith investigated this question and found interesting results. Most notably, once wealth, income, and education are disentangled, neither wealth nor income is a particularly powerful predictor of health.[227] This bears repeating: Smith disproved the fundamental assumption underlying health-wealth analysis. The reason that both income and wealth seem to have a relationship with health is that education has a significant relationship to health—the more educated you are, the healthier you tend to be. As Smith says, "additional schooling is strongly and statistically significantly predictive" of better health.[228] He offered several theories to explain this, but acknowledged that more work needs to be done to understand the health-education relationship. He also undertook an investigation of the relationship between health, education, and income by looking at the group of individuals with the lowest education levels. Within that group, the relationship between income and health disappears for all but the poorest respondents. Smith provided a tentative explanation: Respondents in the lowest income bracket tend not to be working and individuals in poor health also tend not to be working.

Smith's study is not the last word on the subject. But it does show that the assumption that wealth causes health is debatable, and that any policy that just assumes such causation is irresponsible. Because current health-wealth analysis makes that assumption, it is ready for the recycling bin.

WOULD LESS REGULATION BE THE RIGHT ANSWER?

Let's now assume the Smith study turned out to be wrong. Let's also assume that proponents of the idea of health-wealth tradeoff could produce valid

studies showing a causal relationship between income, or wealth, and health. Even then, it is not clear that less regulation would be the appropriate solution to health-wealth tradeoffs.

Imagine lower income did cause worse health. We would expect that if such a relationship existed, there would be a diminishing marginal effect of income on health—that is, the more money you had, the less the loss of a few dollars would affect your health. If Bill Gates lost $1,000, or even $10 million, it is unlikely that his health would be affected at all (he might not even blink). If, however, a person living at the poverty line, without access to health insurance, were to suffer a $1,000 loss of income, we would expect a significant effect. Thus, the health-wealth effect is both a matter of regulatory costs, and a matter of how, and by whom, those costs are borne.

Keeney understood this important feature of health-wealth tradeoffs. In his model, the risk-reduction benefit of an additional dollar of income quickly diminishes to zero with increasing income. He predicts health-wealth effects mostly at the bottom end of the income scale. In his model, those that make over $68,000 in family income (year 2006 dollars)[229] see *no* additional health benefit from *any* amount of additional income. Keeney creates different models depending on how regulatory costs are distributed throughout society, arriving at different predictions about the health-wealth tradeoff depending on who bears regulatory costs.

Thus, if a health-wealth tradeoff existed, there would be two general solutions. The one advocated by the deregulatory crowd is to reduce regulation. The other is to change the distribution of regulatory costs. The deregulatory solution has been well vetted. The distribution arguments, however, have gotten very little airtime even though there is no reason to focus on the regulatory rather than the redistributive side of the question.

If the health-wealth effect exists, it would primarily affect people on the lower end of the income scale. Agencies could therefore revise regulations so that regulatory costs were not borne by that group. The regulations would have various effects on the economy, all of which are considered costs. Job losses are a possibility, as are decreased land values and higher prices for consumer goods; plants and technologies may be rendered obsolete. These costs affect different populations differently—increases in the costs of luxury goods, job losses in a profession, or reductions in shareholder value are unlikely to affect the poorest Americans much. Job losses for less-skilled labor or price increases for basic necessities such as electricity or heating oil, however, would impact the poor significantly. Agencies could take these considerations into account when designing regulations in order to minimize the health-wealth impact of regulations.

Alternatively, it is possible to compensate low-income Americans who bear regulatory costs. Job retraining programs, transitional health insurance, relocation subsidies, tax incentives for economic development—all could be used to soften the blow of regulatory costs on low-income people. Transfer payments are also a mechanism to compensate for regulatory costs. All of these, by providing increased economic opportunity or resources, would reduce or eliminate any health-wealth effect from a regulation.

Unfortunately, the distribution side of the equation has been largely ignored. Individuals and interest groups who oppose regulation tend to also dislike redistribution. When antiregulatory groups seized on the issue of health-wealth tradeoffs, they also quickly seized on "less regulation" as the answer. Instead, they could have asked how to minimize the impact of regulation on the poor. While commentators were calling for less regulation, more economically efficient solutions lay on the ground, waiting to be picked up.

HEALTH AND ECONOMIC PRODUCTIVITY

This chapter has debunked the health-wealth myth. First, the core assumption underlying the health-wealth tradeoff—declines in wealth cause health problems—is not justified. Alternative explanations for the health-wealth correlation are not only plausible, but are supported by solid empirical analysis. Second, even if the causal relationship existed, the redistribution of regulatory costs (or compensation for regulatory losses) would be at least as plausible a solution to the problem as deregulation. If the proponents of the health-wealth tradeoff really believed their own arguments, they would be calling for a large-scale redistribution of society's resources from the rich to the poor. No one has heard this from them recently.

The question now is whether the idea of health-wealth tradeoffs has a useful place in the regulatory debate. Treated properly, it does. Once we drop the unhelpful and incorrect notion that there is a simple and straightforward causal relationship between wealth and health, we can look at the health-wealth data with fresh eyes and find an additional justification for health and safety regulation, rather than an argument against it.

Environmental, health and safety regulation is designed to increase health. By reducing exposure to toxic chemicals, preventing workplaces accidents, and reducing highway fatalities, regulations make Americans healthier and safer. If, as seems likely, health shocks reduce economic productivity, then environmental, health and safety regulation can be expected to increase economic productivity. This boost is an ancillary regulatory benefit, which should be included in determining the value of a regulation.

The idea that health problems lead to losses in productivity is not new. Early estimations of the value of a statistical life saved relied heavily on this idea, going so far as to equate lost productivity with the value of a statistical life, a position not advocated here. However, losses in economic activity due to poor health and mortality that can be reduced through regulation are an important reason for regulatory interventions. Gains in economic productivity can be expected to offset some of the economic costs that regulations impose.

To a certain extent, current cost-benefit analysis takes into account the economic productivity gains resulting from health and safety regulation. Some regulations reduce the number of "workdays" lost due to illness, a reduction that has sometimes been taken into account by cost-benefit analyses.[230] In addition, the willingness to pay to avoid risk—the standard value that is given to risk-reducing regulation—likely includes some of the lost productivity that would result from a health or safety emergency. In order to eliminate such a risk, a person should be willing to pay at least as much as the value of the lost productivity anticipated from a risk. In addition to anticipated health care costs and the value of being healthy and safe, lost productivity can be expected to be a component of an individual's willingness to pay to reduce risk.

The health-productivity link shows that placing health benefits on one side of the ledger and economic costs on the other leads to a misperception about the project of cost-benefit analysis. The idea is not that society is buying better health and paying for it with lost economic productivity. Rather, the purpose of cost-benefit analysis is to identify regulations that increase aggregate wealth. An important component of increasing wealth is increasing economic productivity, something that efficient regulations, by improving health, can at least sometimes be expected to do. Health-wealth tradeoffs, then, turn out not to be arguments against regulation. Rather, the concept is a reminder that regulations can have a positive effect on economic activity by making people healthier and safer, and therefore more productive.

CERTIFICATE OF SERVICE

I hereby certify that on April 1, 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:

William F. Cooper
State of Hawaii
Department of the Attorney General
425 Queen Street
Honolulu, HI 96813

Jacob Larson
Environmental Law Division
321 E. 13th Street, Room 18
Des Moines, IA 50319

Thiruvendran Vignarajah
Office of the Attorney General
State of Maryland
200 St. Paul Place
20th Floor
Baltimore, MD 21202-2021

///

Kelvin Allen Brooks
Office of the Attorney General
State of New Hampshire
33 Capitol Street
Concord, NH 03301-6397

Tannis Fox
Office of the Attorney General
408 Galisteo Street
Villagra Building
Santa Fe, NM 87501

Carrie Noteboom
New York City Law Department
100 Church Street
New York, NY 10007

David Finley Crabtree
Deseret Power
10714 South Jordan Gateway
South Jordan, UT 84092

Patrick Burchette
Holland & Knight LLP
800 17th Street, NW
Suite 1100
Washington, DC 20006-6801

DATED: April 1, 2016

_/s/ Richard L. Revesz_____
Richard L. Revesz
Counsel for Amicus Curiae
Institute for Policy Integrity