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# *A Critical Review of the Benefits and Costs of EPA Regulations on the U.S. Economy*

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# Abstract

In 2010 and 2011, the Environmental Protection Agency (EPA) proposed sweeping new regulations of air emissions, water use and the disposal of combustion residuals from burning coal. The EPA has concluded that the benefits of these emerging regulations would far outweigh their costs. However, industry experts and many scientists and economists have concluded that some of the EPA's proposed standards would be impossible to meet with current technology and that most of the estimated health and economic benefits are highly uncertain if not illusory. Despite this disagreement, there is consensus among officials from the EPA, academia and the industry that the short-term costs of complying with only a few of these emerging regulations would be in the hundreds of billions of dollars. Such a tax on U.S. manufacturers and other producers, particularly when the economy is struggling to gain forward momentum, would be negligent, if not reckless. This report assesses the EPA's assumptions and conclusions present in its cost-benefit analyses for six of its proposed regulations. It confirms the results of other independent assessments that the impact of these emerging regulations on the U.S. economy—particularly on the U.S. manufacturing sector—would be far more severe than EPA estimates. In particular, the report concludes that the cumulative impact of the EPA's proposed regulations could cost, by conservative estimates, roughly $100 billion annually and more than 2 million jobs. In a worst-case scenario, the regulations could mean the loss of $630 billion, 4.2 percent of GDP and more than 9 million jobs.

The upfront costs for U.S. manufacturing from just three of the EPA's proposed rules could amount to 2.9 percent of the value of the manufacturing sector's output. Estimated impacts on manufacturing in selected states are much higher. The heavy cost of these rules conflicts with the Obama Administration's pledges to strengthen the nation's economy and double exports by 2014. This report also exposes flawed assumptions and analytical shortcomings inherent in the EPA's assessments.

# Executive Summary

In 2010 and 2011, the Environmental Protection Agency (EPA) proposed sweeping new regulations of air emissions, water use and the disposal of combustion residuals from burning coal. The EPA has concluded that the benefits of these emerging regulations would far outweigh their costs. But while there is broad consensus that the short-run costs (three to five years) of only three of the dozens of proposed rules would be in the hundreds of billions of dollars, there is widespread skepticism about the validity of the EPA's estimated benefits, which have been criticized as uncertain, unrealistic and speculative in nature. The EPA's benefit estimates have also been criticized because they often assume compliance with technologically infeasible requirements and may assign the same claimed benefit to more than one regulation.

According to the EPA's own assessments, the likely annualized compliance cost with the six proposed regulations evaluated in this report would be between $36 billion and $111 billion per year. For three of those six rules, the EPA provided estimates of the upfront capital expenditures needed for the industry to be compliant—a more relevant measure of short-term costs—and aggregated those costs at $63.1 billion. That significant expense falls short of the $142 billion estimate provided by the industry.

One immediate and incontrovertible impact of these new regulations would be an increase in electricity prices. Residential consumers would be affected directly, but electricity is also an intermediate good for business. It is consumed at the commercial and industrial levels in the course of producing and providing goods and services. As consumers of more than 28 percent of electricity production, manufacturers in the United States would see production costs rise. The cumulative impact of the proposed regulations will increase the price of electricity 6.6 percent annually. That would lead to higher prices of manufactured goods and services, resulting in lost sales at home and abroad, which, subsequently, would encourage layoffs and discourage new hiring and investment, render exports less competitive and ultimately suppress U.S. GDP.

Specifically, the survey conducted for this report shows that the cumulative impact of the EPA's proposed regulations could, in a worst-case scenario, cut annual U.S. output by as much as $630 billion and 4.2 percent of GDP. The EPA contends these regulations will create 48,230 jobs for one-time construction of compliance technology in the few years after implementation. However, the long-term impact of the regulations is far more damaging—with a range of 49,000 jobs (EPA estimates) and 9.748 million jobs (industry estimates) lost. The burden these proposed regulations will create on the economy is enormous. Moreover, manufacturing-heavy states, such as Indiana, Michigan, Missouri, Pennsylvania, Ohio and Wisconsin, will pay disproportionately more in compliance costs and initial capital expenditures than other states as a result of these regulations.

This report assesses the EPA's assumptions and conclusions present in its cost-benefit analyses for six key regulations[2] and aims to show why almost every third-party economic study claims that the impact on these emerging regulations on the U.S. economy—particularly on the U.S. manufacturing sector—would be far more severe than the EPA estimates. This report exposes some of the flawed assumptions and analytical shortcomings inherent in the EPA's assessments and ultimately raises serious questions about the quality and rigor of its estimates.

[2] These six regulations are (1) National Emission Standards for Hazardous Air Pollutants from Coal- and Oil-Fired Electric Utility Steam-Generating Units and Standards of Performance for Fossil Fuel–Fired Electric Utility, Industrial/Commercial/Institutional and Small Industrial/Commercial/Institutional Steam-Generating Units ("Utility MACT"); (2) National Emission Standards for Hazardous Air Pollutants for Industrial/Commercial/Institutional Boilers and Process Heaters ("Boiler MACT"); (3) Proposed Regulation on Disposal of Coal Combustion Residuals (CCR) from Electric Utilities ("CCR"); (4) the Cross-State Air Pollution Rule ("CSAPR"); (5) Proposed Cooling Water Intake Structures Regulations Under Section 316(b) of the Clean Water Act ("Cooling Water Intake Structures"); and (6) Proposed Revisions to the 2008 National Ambient Air Quality Standards (NAAQS) for Ground-Level Ozone ("Ozone NAAQS"). Although the U.S. Court of Appeals for the District of Columbia overturned the CSAPR in August 2012 and the Obama Administration withdrew the 2008 Ozone NAAQS rule in July 2011, the EPA is expected to propose a new Ozone NAAQS rule in December 2013 and is widely assumed to re-propose the CSAPR in 2013 or 2014.

# Introduction

In 2010 and 2011, the Environmental Protection Agency (EPA) proposed sweeping new regulations to protect aquatic life, govern disposal of combustion residuals produced from burning coal and reduce emissions of mercury, carbon monoxide, lead, nitrogen dioxide, ozone, sulfur dioxide and other hazardous air particles. The EPA has concluded that the benefits of these emerging regulations would far outweigh their costs. Although the EPA is at various stages in the process from consideration to implementation of dozens of new mandates, this report discusses six emerging regulations that primarily target the behavior of U.S. electricity producers and directly impact the U.S. manufacturing sector.[3]

According to the EPA's own assessments, the likely annualized compliance cost with these six regulations would be between $36 billion and $111 billion per year.[4] But instead of considering the amortized compliance costs over a period of 30 to 50 years (as that range of figures does), a more complete assessment of the true costs confronting electric utilities would consider the upfront capital expenditures needed in the short run—from three to five years—to comply with the regulations. The EPA provided such estimates for only three of the six rules.[5] For those three rules, the EPA estimated the aggregate upfront capital expenditures to be $63.1 billion and the annualized compliance cost to be $13 billion. According to industry sources, the upfront capital cost projection for the same three rules amounts to $142 billion (125 percent higher than the EPA's estimate), and the annualized compliance cost is $22.2 billion (70 percent higher than the EPA's estimate).

The difference between industry and EPA cost estimates, however, appears relatively small compared to the disagreements over the EPA's proposed benefit estimates. The EPA's estimated monetized benefits of the six regulations, which are derived primarily from the projected lifetime economic contributions of people who would have died prematurely or would have been in poorer health if not for the regulations, range from $182 billion to $531 billion. These estimates, however, are highly disputed by the industry and others who question the validity of the core assumptions and methodologies employed by the EPA.

This report assesses the EPA's assumptions and conclusions present in its cost-benefit analyses for these six key regulations and concurs with several other third-party economic studies in finding that the impact of these emerging regulations on the U.S. economy—particularly on the U.S. manufacturing sector—would be far more severe than EPA estimates. This report also exposes some of the flawed assumptions and analytical shortcomings inherent in the EPA's assessments.

One immediate and incontrovertible impact of these new regulations would be an increase in electricity prices. Utilities would incur costs of up to $142 billion in the short run to comply with

[3] Utility MACT, Boiler MACT, CCR, CSAPR, Cooling Water Intake Structures and Ozone NAAQS.
[4] Most of the variability and the upside in that cost range are attributable to the EPA's estimation of the annualized compliance cost with the Ozone NAAQS rule, which is projected to fall between $19 billion and $90 billion per year.
[5] Utility MACT, Boiler MACT and CCR.

only three of the dozens of EPA rules and would likely pass most of these costs through to their customers in the form of higher prices. Residential consumers would be affected directly, but electricity is also an intermediate good for business. It is consumed at the commercial and industrial levels in the course of producing and providing goods and services. As consumers of more than 28 percent of electricity production, manufacturers in the United States would see production costs rise. That would lead to higher prices of manufactured goods and services, resulting in lost sales at home and abroad, which, subsequently, would encourage layoffs and discourage new hiring and investment, render exports less competitive and ultimately suppress U.S. GDP.[6]

Given the significance and impact of the potential costs, it would be prudent for policymakers and the public to take a serious look at the assumptions and analyses supporting the EPA's assessments and compare those to recent industry studies. In light of the precarious state of the U.S. economy and national goals for U.S. businesses to invest, hire and double the value of export sales by the end of 2014, burdening the economy with costly regulations in pursuit of highly uncertain benefits would further discourage economic growth with little or no potential public health gain.

[6] Regulations targeted at end-user behavior—though still potentially costly—tend to carry fewer indirect costs than regulations aimed at entities further upstream in the supply chain.

# Economic Considerations in Environmental Regulation

Clean air and clean water are public goods. Producing electricity from fossil fuels is an activity that generates negative externalities, including higher concentrations of mercury, carbon dioxide and other particulate matter in air and water. In fact, many human activities, as well as naturally occurring phenomena, produce these kinds of emissions. When negative externalities are the byproduct of economic activity, then it is reasonable for the government to attempt to reduce them through rules that privatize their costs or, barring such alternatives, to control them through regulation. As a general matter, there is not much serious dissent from that premise. Ensuring the highest-quality air and water that is both technologically and economically feasible is a legitimate objective of public policy.

Since the creation of the EPA in 1970, air and water quality in the United States has improved dramatically. Reductions in all six National Ambient Air Quality pollutants (carbon monoxide, ozone, lead, nitrogen dioxide, fine particulates and sulfur dioxide) targeted under the Clean Air Act since 1980 have been significant across the country. Specifically from 1990 to 2008: eight-hour ozone concentrations improved by 14 percent; annual fine particulate matter (PM2.5) concentrations (since 2000) improved by 19 percent; coarse particulate matter (PM10) improved by 31 percent; $NO_2$ improved by 35 percent; eight-hour CO improved by 68 percent; and annual $SO_2$ improved by 59 percent.[7] According to the EPA, emissions of toxic air pollutants also declined about 40 percent nationwide between 1990 and 2005. While some of that improvement can be credited to the EPA's regulatory mandates, significant improvement is also attributable to the result of market forces that have led to innovation, globalization and changes in production techniques and consumer demand.

After more than 40 years of improvement in air and water quality, further progress is still possible. But how much more? What would be the benefits? And at what cost? Economics is about making the best use of scarce resources, and public policy formulation must heed its implications: policy decisions may produce economic benefits, but they also impose costs. Economics also teaches the theory of diminishing marginal returns, which holds that even though an additional unit of input may generate more output, there is a point beyond which the addition to total output from each new increment of input begins to decline. These economic concepts are relevant to the public's understanding of the implications of these emerging EPA regulations.

When societies first begin to implement pollution abatement measures, the scope for quality improvement is much greater than it is when societies are already meeting high standards. The marginal benefit of the first unit of abatement effort is much greater (and the marginal cost much lower) when air quality is lower. Accordingly, the cost of achieving a one unit improvement in the quality of air in the United States today is much greater than the cost in China, for example, where more basic abatement techniques can be deployed to achieve relatively large benefits. In 1970, when the EPA began to regulate activities that were presumed to have adverse impacts on environmental quality, there was plenty of scope for air and water quality improvement. For

[7] U.S. Environmental Protection Agency. February 2010. "Our Nation's Air—Status and Trends Through 2008."

every dollar of abatement effort, relatively large public health (and related economic) benefits were realized. Low-hanging fruit was plentiful in the early days of pollution abatement.

However, today, after the most obvious and affordable abatement measures have already been adopted and the associated benefits have been reaped, the marginal cost of the next increment of improvement is higher, and the marginal benefit from that effort is lower. After working down the continuum of abatement efforts toward the limits of technological feasibility, the marginal cost of the next increment of abatement becomes even higher and the marginal benefit even lower. In other words, the relationship between abatement measures and its benefits is not linear, nor is the relationship between abatement and costs. The assumption of linear relationships between these variables is among the many flaws evident in the EPA's cost-benefit analyses.

Regulators have a moral obligation to understand these trade-offs, to share that understanding with the public and to avoid policies where the expected costs exceed the expected benefits. President Obama has decreed that U.S. regulation must maximize net benefits—the difference between total benefits and total costs. According to Executive Order 12866, which is "supplemental to and reaffirm[ed]" by the more recent Executive Order 13563, regulating agencies "must, among other things…select, in choosing among alternative regulatory approaches, those approaches that **maximize net benefits** (emphasis added)."[8] Net benefits are maximized at the level of abatement where the marginal benefit equals the marginal cost. In other words, the optimal amount of regulation is the amount that maximizes net benefits, and that happens at the point of regulation (or the level of abatement effort) where the marginal benefit of an additional unit of regulation equals its marginal cost. Maximizing total benefits and maximizing net benefits imply very different amounts of regulation.

As the President's Council of Economic Advisers stated in a recent report, entitled "Smarter Regulations Through Retrospective Review," "A regulation that is expected to eliminate 90 percent of certain harmful emissions at a cost of $100 million per year may well generate higher net benefits than one that eliminates 98 percent of those emissions at a cost of $1 billion per year."[9]

[8] President Barack Obama. January 18, 2011. "Improving Regulation and Regulatory Review." Executive Order 13563.
[9] Executive Office of the President. May 10, 2012. "Smarter Regulations Through Retrospective Review." Council of Economic Advisers. p. 3.

Figure 1. Total Benefit and Total Cost and Net Benefit Curves

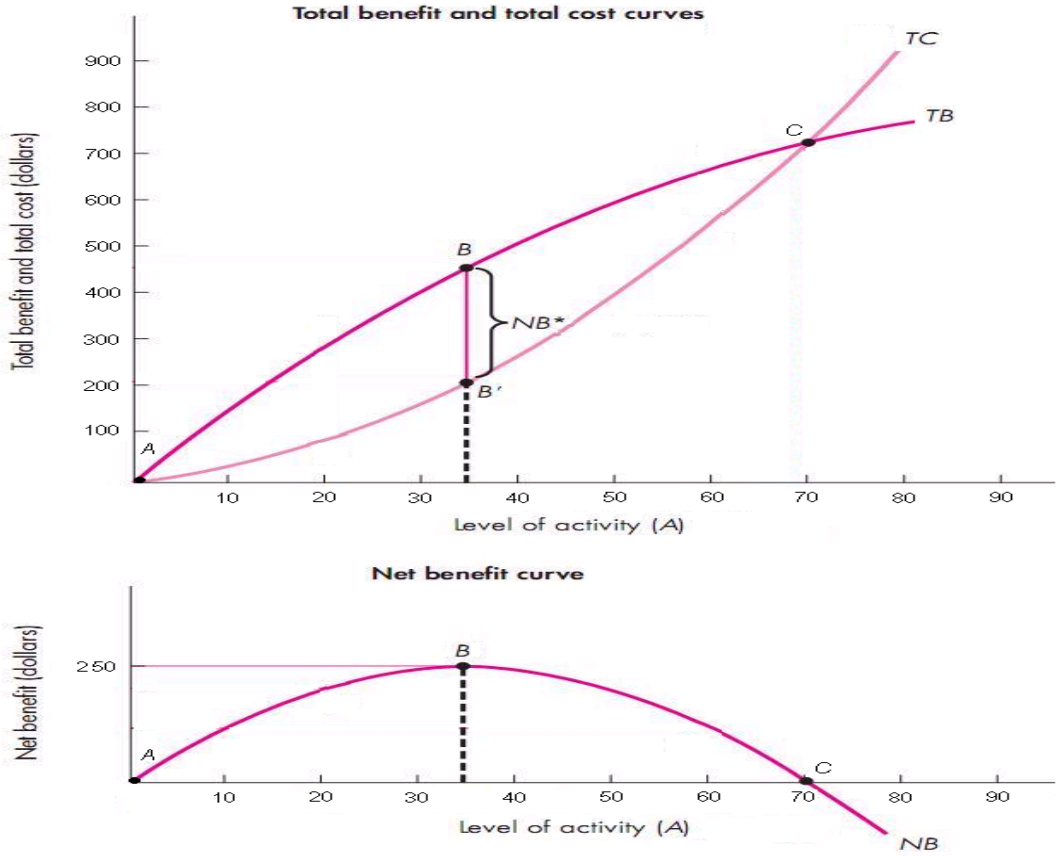


Figure 1 shows the net benefits are maximized at 35 units of regulation, where the difference between the total benefit curve and the total cost curve is maximized. The net benefit of regulation increases with more regulation, up to the point of optimal regulation. After that, the marginal cost of an additional increment of regulation rises, the marginal benefit declines, and the net benefit to society shrinks. Rather than aim for the optimal regulation level, the EPA seems more concerned with getting to the equivalent of point C on the chart. It seeks to maximize the total benefit of regulation without giving much consideration to the net benefit to society, which declines with too much regulation.

But if the regulations under consideration take effect, the EPA will have gone well to the right of point C, where the total cost exceeds the total benefit, and society suffers a net social loss.

# Official Skepticism of Regulatory Impact Analyses

In the words of a former chief economist at the Council of Economic Advisers, "The single greatest problem with the current system is that most regulations are subject to a cost-benefit analysis only in advance of their implementation. That is the point when the least is known, and any analysis must rest on many unverifiable and potentially controversial assumptions."[10] The Council of Economic Advisers' concern is given context by the EPA's own stated bias to err on the side of regulating. In describing its Utility MACT rule in the *Federal Register* in 2011, the EPA wrote: "We may determine it is necessary to regulate under section 112 even if we are uncertain whether [the rule] will address the identified hazards. We believe it is reasonable to err on the side of regulation of such highly toxic pollutants in the face of uncertainty."[11]

In January 2011, President Obama issued Executive Order 13563, entitled "Improving Regulation and Regulatory Review." Among the Executive Order's "General Principles of Regulation" is the requirement that regulators "must identify and use the best, most innovative and least burdensome tools for achieving regulatory ends."[12] Furthermore, President Obama acknowledged that regulations can be costly, counterproductive and superfluous when he issued requirements that his agencies formulate plans for undertaking systematic, retrospective reviews of their rules and regulations with an eye toward making them less imposing on society:

> Sec. 6. Retrospective Analyses of Existing Rules. (a) To facilitate the periodic review of existing significant regulations, agencies shall consider how best to promote retrospective analysis for rules that may be outmoded, ineffective, insufficient or excessively burdensome, and to modify, streamline, expand or repeal them in accordance with what has been learned…[13]

Implicit in the President's words and made explicit by the words of the Council of Economic Advisers and the research of the Office of Management and Budget (OMB) is the concern that regulators do not always get it right. Retrospective analyses, to confirm or reject assumptions made prospectively, are important tools to improve the efficacy and reduce the burdens of regulation.

In a 2005 study, entitled *Validating Regulatory Analysis*, the OMB presented results comparing the projected benefits and regulations costs with the actual benefits and costs measured after promulgation and implementation and found that projections "tend to overestimate both benefits and costs, but they have a significantly greater tendency to overestimate benefits than costs."[14]

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[10] Executive Office of the President. May 10, 2012. "Smarter Regulations Through Retrospective Review." Council of Economic Advisers. p. 3.
[11] Environmental Protection Agency. May 2011. *Federal Register.* Volume 76.
[12] President Barack Obama. January 18, 2011. "Improving Regulation and Regulatory Review." Executive Order 13563.
[13] Ibid.
[14] Office of Management and Budget. December 16, 2005. "Validating Regulatory Analysis: 2005 Report to Congress on the Costs and Benefits of Federal Regulations and Unfunded Mandates on State, Local, and Tribal Entities."

According to the data compiled in Table 3-2 of that report, the benefits projected by regulators in their regulatory impact analyses were overestimated 40 percent of the time; the costs were underestimated 26 percent of the time; and the cost-benefit ratio was overestimated 47 percent of the time.[15] The lack of precision in prospective regulatory assessments is a serious cause for concern. According to a recent study from the Small Business Administration, total U.S. regulatory costs amount to about $1.75 trillion per year—a figure that exceeds the total value added of the entire U.S. manufacturing sector in 2011.[16]

These general concerns about the accuracy of regulatory projections also apply to the EPA's emerging regulations. These regulations do not provide evidence of the President's concern over the potential impact of regulations on economic growth, U.S. exports or job creation. The EPA's regulatory impact analysis for each regulation under consideration confirms significant costs (that may still be underestimated) and highly uncertain benefits. Consequently, the net benefits—the key to identifying optimal policy—are unknown and are more likely to be negative, with costs far exceeding any potential benefits.

[15] Ibid. p. 47.
[16] Crain, Nicole V. and W. Mark Crain. September 2010. "The Impact of Regulatory Costs on Small Firms." Small Business Administration Office of Advocacy. 2012 Economic Report from the President.

# The EPA's Underestimation of Costs

According to the EPA's own assessments, the likely annualized compliance cost of the six proposed regulations could be as high as $111 billion and the upfront capital expenditures well in excess of that. For the three rules that the EPA provided estimates of the upfront capital costs, the aggregate capital expenditures were $63.1 billion, nearly five times greater than the annualized cost of those three rules. Applying this same ratio to all six rules suggests that the upfront capital costs for the six rules is in excess of half a trillion dollars.

Yet, despite the magnitude of this likely estimate, the EPA includes cost projections for each of the six component regulations that are significantly lower than those estimated by the industry (Table 1). The current status and affected industries of these rules are extracted from the EPA's website. The EPA's estimated annualized costs and capital expenditures are collected from various regulatory impact analysis reports. The industry cost estimates come from different sources, and therefore, do not necessarily add up in several instances.

Table 1. Summary of Status of EPA Rules and Impacts on the U.S. Markets

| Rule | Current Status and Affected Industries | EPA: Estimated Annualized Costs and Capital Expenditures | Industry: Estimated Annualized Costs and Capital Expenditures |
|---|---|---|---|
| Utility MACT | Final rule. Expected to be complied by 2015/2016. The rule affects coal- and oil-fired electric power plants across all states. Compliance costs affect electricity consumers in all manufacturing sectors and commercial and residential segments in all states. The EPA is currently reconsidering the limits for new units only. | $9.6 billion annualized costs per year by 2016; $35 billion upfront capital spending. | $11.9 billion annualized costs per year by 2015; $84 billion–$130 billion capital spending for Utility MACT and CAIR combined. |
| CSAPR/Clean Air Interstate Rule (CAIR) | Final rule. The U.S. Court of Appeals overturned the CSAPR on August 21, 2012. The EPA is currently appealing the decision. Compliance costs affect electricity consumers in all manufacturing sectors and commercial and residential segments in 28 eastern states. | $3.6 billion annualized costs per year in 2015 for CAIR; no estimate on capital spending. | $14 billion–$18 billion annualized costs per year by 2020 for combined CSAPR and various rules; no estimate on capital spending. |
| Boiler MACT | Final rule pending proposed reconsideration. Delay of effective date. The U.S. District Court for the D.C. Circuit vacated the EPA's notice. Compliance costs affect mainly manufacturing sectors. | $1.9 billion annualized costs for major sources per year in 2013; $5.1 billion capital spending. | $2.7 billion annualized costs per year in 2013; $14.3 billion upfront capital spending. |
| CCR | Proposed rule. Expected to be final in July 2013, compliance by 2015. The EPA is proposing national rules to manage coal ash from coal-fired power plants. Compliance costs affect electricity consumers in all manufacturing sectors and commercial and residential segments in all states. | $1.5 billion annualized costs per year; $23 billion upfront capital spending. | $7.6 billion annualized costs per year; $33.4 billion upfront capital spending. |

| | | | |
|---|---|---|---|
| Cooling Water Intake Structures | Expected final rule in 2013. Compliance costs affect electricity consumers in all manufacturing sectors and commercial and residential segments in all states. | $0.3 billion–$4.6 billion annualized costs per year; no estimate on capital spending. | $8 billion annualized costs per year; $149 billion upfront capital spending. |
| Ozone NAAQS | Proposed rule. Effective date is unknown. The EPA rule affects emissions from cars, power plants, industrial facilities, electric utilities and other sources. Compliance costs affect users in all sectors in all states. | $19 billion–$90 billion annualized costs per year by 2020. | $1 trillion annualized costs per year. |

Whereas the EPA estimates $63.1 billion in upfront capital expenditures to comply with the Utility MACT, Boiler MACT and CCR rules, the industry estimates those compliance expenditures to be nearly $142 billion—125 percent higher. For the six rules aggregated, the difference in annualized costs between the EPA's and the industry's estimates is greater, primarily due to the vast discrepancy in the ozone compliance cost projection. If the cost estimates for the Ozone NAAQS rule are excluded from the comparison (since the estimates are disproportionately large), the difference between the EPA and industry estimates narrow. Aggregating the annualized costs of the other five rules in this report yields an EPA estimate of $21.2 billion per year compared to an industry estimate of more than $33 billion per year.[17]

Several factors account for the differences between the industry's and the EPA's estimates. For instance, compared to industry estimates, the EPA (1) includes more aggressive assumptions about the capacity of the industry to comply; (2) underestimates the true likely impact of the financial burden on the industry by assuming long-term amortization of capital requirements; (3) excludes real compliance costs attributed to compliance with other rules when those rules remain in doubt or under legal risk; and (4) fails to account for the costs of its regulations on the broader economy.

***Aggressive Assumptions About the Capacity to Comply.*** The direct compliance cost is likely to be more expensive than the EPA's estimates suggest. For starters, the EPA's estimates of the amount and cost of retrofit equipment needed to comply with the Utility MACT, Boiler MACT and CCR rules differ—sometimes significantly—from the industry's estimates. In the case of CCR, the EPA estimates that nearly $23 billion in capital costs for "wet conversion" will be necessary, while industry experts estimate a minimum of $33 billion. The EPA projects that compliance would occur in a short period, while industry experts expect the conversion process to take decades to complete because of the limited manufacturing capacity to produce key conversion equipment. Experts claim that there are only a few domestic companies that manufacture the equipment necessary to convert wet ash–handling systems to dry systems.

There is also likely to be a surge in demand for control technologies, equipment and skilled workers that will inevitably increase input prices and the compliance costs well above the EPA's estimates, which are based on current prices in the pollution abatement industry. Where the technology does exist, the EPA underestimates the costs of retrofitting; where the technology does not exist, the EPA underestimates the amount of electric-generating capacity that will need to be converted to natural gas or some other fuel source, or retired completely from the energy grid. These unexpected conversion and retirement costs do not factor into the EPA's estimates.

[17] Industry estimates for CSAPR annualized costs are not available. We use the EPA's estimated annualized costs for CSAPR for this aggregate figure.

For example, the pollution abatement industry stands to benefit considerably from rigorous environmental rules, unless utilities forego retrofitting and are forced to shut down entirely. That is a very real concern of manufacturers of emissions control equipment. According to recent testimony from one such company requesting that the EPA reconsider its Utility MACT mandates, "The current state-of-the-art CEMS [continuous emissions monitoring systems] technologies available and referenced in the [EPA's Utility MACT] rule are not capable of measuring emissions levels needed to comply with the new limits."[18] According to industry experts, Utility MACT's mercury limit is at a level one-third of the detection level of current monitoring technology. For acid gases, the emissions limit is almost 20 times below the detection limit.[19]

In February 2011, the EPA estimated that compliance with its Boiler MACT regulation would require initial capital expenditures of $5.1 billion—more than $4.8 billion of which would be for upgrades to 1,727 existing major source solid and liquid fuel boilers. But the Council of Industrial Boiler Owners (CIBO) estimated the capital expenditure to be nearly triple the EPA's estimate, at about $14.3 billion for 1,752 major source solid and liquid fuel boilers. The difference between the estimates is foremost attributable to differences in assumptions about the cost of the technology necessary to achieve regulatory compliance.

The EPA relies heavily on technological innovation in curbing future emissions and ensuring compliance with the potential ozone standard. What's not covered or clear from the EPA is whether technology will progress to meet these standards, on what schedule it will be developed and at what cost to our economy. Research from NERA Economic Consulting shows that when factoring "known" and "unknown" technologies into the estimation, costs vary greatly.

According to NERA's analysis, emission reductions for "known" controls to reach attainment of 60 parts per billion (ppb) averaged 31,340 tons per state, while "unknown" controls averaged 82,200 tons per state. Moreover, reaching attainment of 60 ppb would require emission reductions averaging 113,540 tons or 40.6 percent per state from projected 2020 baseline conditions. Cost estimates for attainment in the analysis of 10 states would cost a total of $186.6 billion in 2020 with an aggregate of $1.4 trillion from 2020 to 2030.

***Amortization Masks the True Costs.*** For all of its cost estimates, the EPA amortizes capital expenditures over a long period—between 30 and 50 years. Since the EPA's projected benefits are unlikely to be manifest until many years after cost outlays are incurred, amortization provides the artifice that the necessary expenditures will be of limited impact to utilities. But annual amortization fails to account for the full financial burden that will be imposed within a short time period. Given the very large upfront capital costs and the uncertainty surrounding potential financing options, it is especially important to present the costs on an "as-incurred" basis. If the utilities cannot secure adequate amounts of financing at reasonable interest rates, they would have to shut down. As put by NERA's Anne Smith:

[18] The Babcock & Wilcox Company. April 2012. "Request for Partial Reconsideration of EPA's National Emissions Standards for Hazardous Air Pollutants from Coal- and Oil-Fired Electric Utility Steam Generating Units."
[19] Lewis, Jr., Marlo, William Yeatman and David Bier. June 2012. "All Pain and No Gain: The Illusory Benefits of the Utility MACT." *Issue Analysis,* No. 5. Competitive Enterprise Institute.

> I find that to finance the costs to fully comply with the MATS rule that are, when stated in annualized form, in the range of $10 billion per year by 2015, the U.S. electricity sector will have to raise about $84 billion (2010$) of additional capital between 2012 and 2015. This is a 30 percent increase over the capital spending projected within the U.S. electricity sector through 2015 under baseline spending (i.e., including CAIR). This is a large increment for businesses in a single sector to absorb, and might create financing challenges that would drive up the cost of capital to these companies—a potential cost escalation that is not incorporated into either the EPA's or my analyses.

The annualized costs presented in the EPA's regulatory impact analyses downplay these upfront capital requirements by amortizing the estimated costs over many years. The EPA's presentation of costs underemphasizes the actual adverse impact that will be felt by the industry (and the broader economy) because it assumes a smooth adjustment period where financing needs are met without disruption.

But the willingness of banks and other sources of capital to finance massive new projects that have rigid, perhaps unachievable, compliance objectives could be less certain than the EPA assumes—particularly for utilities that are perceived to be a long way from compliance. A more accurate assessment of the industry costs requires an evaluation of the upfront capital expenditures that will be necessary to meet compliance within the statutory period.

***Compliance Costs Assumed Away.*** In its regulatory impact analysis, the EPA does not always account for the compliance costs with a particular rule that it deems attributable to compliance with another rule, even if that rule is still under review or subject to litigation. In light of court stays and other implementation delays, those are improper assumptions to make. They lead systemically to underestimated cost estimates. Cumulative cost assessments better reflect the true costs of multiple regulations.

For example, in its Utility MACT regulatory impact analysis, the EPA acknowledged that certain costs that would otherwise be attributed to compliance with Utility MACT were excluded because they were assumed to be incurred in complying with the CSAPR, which was recently overturned by the U.S. Court of Appeals for the District of Columbia. In letters to EPA Administrator Lisa Jackson on January 24, 2012, and then again on June 8, 2012, House Energy and Commerce Committee Chairman Fred Upton (R-MI) requested a cost estimate for Utility MACT in light of the fact that CSAPR had been stayed by the court. The EPA has not yet provided the answer.

***Cumulative, Macroeconomic Costs Are Not Fully Considered.*** The EPA's cost assessments fail to take into consideration the likely macroeconomic impacts of its proposed regulations. Given that the annual costs of complying with the Ozone NAAQS rule are projected to be between $19 billion and $1 trillion, the macroeconomic impact (which is not estimated) could be significant and should be estimated. For example, the Manufacturers Alliance for Productivity and Innovation (MAPI), which estimates that the annual attainment cost to be more than $1.01 trillion in 2020, projects a reduction in GDP of $676.8 billion in 2020 and a loss of 7.3 million jobs.

NERA, in a September 2011 paper, estimated that the confluence of four EPA regulations on the electricity-generating industry (Utility MACT, CSAPR, CCR and Cooling Water Intake Structures) could cause an average annual net job loss of 183,000 and reduce average annual disposable income by $34 billion between 2012 and 2020.[20] Those figures do not factor into the EPA's assessment. In a June 2011 paper, NERA estimated that retail electric rates could increase by 12–24 percent, and the economy would suffer job losses of 180,000 per year from 2013 to 2020 as a result of Utility MACT.[21] But according to the EPA, it "has not quantified the rule's effects on all labor in other sectors not regulated by the [mercury standard].[22] Yet, with the final Utility MACT rule in place, there is evidence that electric rates will in fact go up. For instance, on November 13, 2012, Southern Company reported that EPA regulations could trigger a 20 percent increase in electricity rates for customers in the Southeast and that the utility could be forced to pay up to $18 billion to install new technology on its coal fleet to comply with the suite of new EPA rules. On August 16, 2012, the Government Accountability Office estimated that four of the six regulations analyzed in this report—Utility MACT, CSAPR, Cooling Water Intake Structures and CCR—would likely increase electricity prices in some regions such as the South and Midwest, where older plants are more likely to be retired than retrofitted.

The North American Electric Reliability Corporation estimated that Utility MACT could force the early retirement of 15 gigawatts (GW) of generating capacity.[23] The Federal Energy Regulatory Commission (FERC) projects that 81 GW of capacity—almost eight times the EPA's estimate—are likely to be retired. The effects of these dynamics on employment and wages are crucial cost considerations systematically neglected by the EPA. Given the Agency's focus on improved morbidity and mortality rates as transmitters of the benefits of its regulations, the EPA should consider the adverse impact of unemployment and reduced wages on those health outcomes as costs.

[20] NERA Economic Consulting. September 2011. "Potential Impacts of EPA Air, Coal Combustion Residuals and Cooling Water Regulation."
[21] NERA Economic Consulting. June 2011. "Economic Impacts of EPA's Transport Rule and the Utility MACT Rule."
[22] Environmental Protection Agency. March 2011. "Regulatory Impact Analysis of the Proposed Toxics Rule: Final Report."
[23] North American Electric Reliability Corporation. 2011. "2011 Special Reliability Scenario Assessment."

# Estimated Costs of Certain Major EPA Regulations by State

Under the most conservative cost estimates—those proffered by the EPA—the electric power industry will be required to spend more than $13 billion per year for operating and maintenance expenditures just to comply with the Utility MACT, Boiler MACT and the CCR regulations. For the same three rules, the industry estimates those costs to be more than $22 billion a year—70 percent higher than the EPA's estimate.

Table 2 provides a range of the annualized costs for a year estimated by the EPA and the industry for Utility MACT, Boiler MACT and CCR by state. The EPA figures include annual operating and maintenance costs, as well as amortized capital expenditures. The EPA amortizes the initial capital expenditure over 30 years and at a 6.15 percent discount rate for Utility MACT and Boiler MACT, and 50 years at a 7 percent discount rate for CCR. We obtained the aggregate figures from the latest EPA regulatory impact analysis reports. We disaggregated the EPA's $9.6 billion annualized costs in 2015 for Utility MACT across states based on the capacity at the 577 coal- and oil-fired power plants that are most likely to be affected. For Boiler MACT, we disaggregated the EPA's $1.9 billion annualized costs in 2013 based on the capacity of major source boilers that are most likely affected by the rule. We used the EPA's methodology to allocate costs across states by disaggregating the EPA's $1.474 billion in annualized costs of CCR compliance based on the 2005 CCR generation by coal-fired electric utility plants (tons per year).

Industry experts estimate that the annualized cost of Utility MACT is 23.6 percent higher than the EPA's figure. We apply the 23.6 percent difference across states to estimate the annualized cost of Utility MACT per year by state. For Boiler MACT, one source of the difference between the EPA's and the industry's annualized cost estimates is the capital expenditure component. For example, the CIBO estimates that capital expenditures for 1,752 major source boilers are three times higher than the EPA's estimate. Since the EPA estimates the amortization of capital expenditures to be approximately $0.4 billion (of $1.9 total annualized cost in 2015 just for major source boilers), we added an additional $0.8 billion to EPA estimates to capture the difference in capital expenditures, which makes the industry's total annualized cost estimate approximately $2.7 billion.[24] The EPA estimated the cost of complying with its CCR regulation under Subtitle C of the Resource Conservation and Recovery Act (RCRA)—which would classify coal ash as a hazardous material—to be $1.474 billion per year over a 50-year period (2012–2061). The industry cost estimates are much higher. For example, the Electric Power Research Institute estimated the costs are $7.62 billion per year.[25]

[24] Council of Industrial Boiler Owners. August 2010. "The Economic Impact of Proposed EPA Boiler/Process Heater MACT Rule on Industrial, Commercial, and Institutional Boiler and Process Heater Operators."
[25] Electric Power Research Institute. 2010. "Cost Analysis of Proposed National Regulation of Coal Combustion Residuals from the Electric Generating Industry."

Table 2. Estimated Annualized Costs per Year of EPA Regulations by State

| | Utility MACT | | Boiler MACT | | CCR | |
|---|---|---|---|---|---|---|
| | EPA ($2007 Millions; 2015) | Industry ($2007 Millions; 2015) | EPA ($2008 Millions; 2013) | Industry ($2008 Millions; 2013) | EPA ($2009 Millions; per Year) | Industry ($2009 Millions; per Year) |
| Alabama | 295.1 | 364.7 | 65.9 | 93.7 | 33.5 | 173.2 |
| Alaska | - | - | 19.3 | 27.4 | 0.5 | 2.5 |
| Arizona | 191.8 | 237.0 | 2.9 | 4.1 | 34.8 | 179.9 |
| Arkansas | 110.3 | 136.3 | 30.6 | 43.5 | 7.8 | 40.2 |
| California | 129.7 | 160.3 | 9.2 | 13.0 | 1.7 | 8.6 |
| Colorado | 130.5 | 161.3 | 9.7 | 13.8 | 17.8 | 92.0 |
| Connecticut | 64.1 | 79.2 | 14.5 | 20.6 | 1.8 | 9.3 |
| Delaware | 31.1 | 38.4 | 2.4 | 3.4 | 2.6 | 13.6 |
| District of Columbia | 12.0 | 14.8 | - | - | - | - |
| Florida | 659.9 | 815.7 | 29.9 | 42.5 | 64.0 | 330.9 |
| Georgia | 316.3 | 390.9 | 52.8 | 75.1 | 63.4 | 328.0 |
| Hawaii | - | - | 21.4 | 30.4 | 0.6 | 3.2 |
| Idaho | - | - | 10.6 | 15.0 | - | - |
| Illinois | 394.8 | 487.9 | 77.5 | 110.1 | 40.3 | 208.1 |
| Indiana | 448.3 | 554.1 | 105.5 | 150.0 | 91.8 | 474.8 |
| Iowa | 141.7 | 175.1 | 63.7 | 90.5 | 11.9 | 61.3 |
| Kansas | 157.9 | 195.2 | 9.5 | 13.5 | 15.6 | 80.7 |
| Kentucky | 371.2 | 458.9 | 23.3 | 33.1 | 96.0 | 496.3 |
| Louisiana | 259.8 | 321.1 | 33.4 | 47.4 | 16.9 | 87.1 |
| Maine | 20.5 | 25.3 | 36.2 | 51.4 | 0.5 | 2.6 |
| Maryland | 172.6 | 213.4 | 26.0 | 37.0 | 20.2 | 104.3 |
| Massachusetts | 126.5 | 156.3 | 19.9 | 28.3 | 3.8 | 19.6 |
| Michigan | 325.8 | 402.6 | 106.4 | 151.3 | 24.7 | 127.9 |
| Minnesota | 118.2 | 146.1 | 74.1 | 105.3 | 15.9 | 82.3 |
| Mississippi | 143.1 | 176.9 | 21.9 | 31.2 | 12.8 | 66.3 |
| Missouri | 262.9 | 324.9 | 45.3 | 64.4 | 28.0 | 144.6 |
| Montana | 54.4 | 67.3 | 4.3 | 6.1 | 19.1 | 98.8 |
| Nebraska | 96.3 | 119.1 | 7.9 | 11.3 | 6.4 | 33.2 |
| Nevada | 58.0 | 71.6 | - | - | 4.1 | 21.1 |
| New Hampshire | 22.1 | 27.3 | - | - | 1.8 | 9.5 |
| New Jersey | 74.9 | 92.6 | 15.6 | 22.2 | 7.7 | 39.7 |
| New Mexico | 91.3 | 112.8 | - | - | 41.6 | 215.0 |
| New York | 332.5 | 411.0 | 74.4 | 105.8 | 15.4 | 79.9 |
| North Carolina | 302.6 | 374.0 | 129.2 | 183.5 | 57.5 | 297.0 |
| North Dakota | 91.5 | 113.1 | 13.7 | 19.4 | 31.7 | 163.9 |
| Ohio | 478.2 | 591.1 | 116.0 | 164.8 | 108.9 | 562.8 |
| Oklahoma | 237.7 | 293.8 | 14.1 | 20.0 | 15.6 | 80.4 |
| Oregon | 12.7 | 15.7 | 20.2 | 28.7 | 1.0 | 5.4 |
| Pennsylvania | 467.4 | 577.7 | 99.9 | 141.9 | 160.3 | 828.9 |
| Rhode Island | - | - | 2.6 | 3.7 | - | - |
| South Carolina | 191.3 | 236.4 | 94.9 | 134.8 | 22.7 | 117.6 |
| South Dakota | 10.2 | 12.7 | - | - | 1.1 | 5.6 |
| Tennessee | 229.5 | 283.7 | 61.7 | 87.7 | 33.8 | 174.8 |
| Texas | 957.9 | 1,183.9 | 17.6 | 25.0 | 137.4 | 710.5 |
| Utah | 106.4 | 131.5 | - | - | 27.0 | 139.3 |
| Vermont | - | - | - | - | - | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| Virginia | 198.8 | 245.7 | 79.7 | 113.2 | 24.9 | 128.9 |
| Washington | 36.1 | 44.6 | 16.0 | 22.7 | 14.7 | 75.8 |
| West Virginia | 332.5 | 411.0 | 64.0 | 90.9 | 96.4 | 498.2 |
| Wisconsin | 196.8 | 243.2 | 75.8 | 107.7 | 14.7 | 76.2 |
| Wyoming | 136.9 | 169.2 | 20.6 | 29.3 | 23.2 | 120.1 |
| **TOTAL** | **9,600.0** | **11,865.6** | **1,900.0** | **2,700.0** | **1,474.0** | **7,620.0** |

With respect to upfront capital expenditures, the EPA estimates that the industry will be required to spend at least $63 billion during the adjustment period just to comply with the Utility MACT, Boiler MACT and CCR rules. For these same three rules, the industry estimates that it will need $142 billion in upfront capital. While the EPA estimated the capital costs would be around $5.1 billion for Boiler MACT, the industry estimates that it would need three times that amount. Similarly, based on industry estimates, the EPA overestimated technology and product availability, as well as underestimated the costs of the initial capital expenditures to comply with the CCR rule. The industry estimates the initial capital expenditures would be at least $33.4 billion, depending on the technology that is available, and could take more than 10 years to comply. The EPA estimates $35 billion in upfront capital expenditures for Utility MACT, while the industry estimates that Utility MACT and CSAPR/CAIR, combined, would need $130 billion in upfront capital expenditures.[26, 27]

Table 3 allocates the EPA's and the industry's estimates of capital expenditures to the states using the same methodologies described above.

Table 3. Estimated Capital Expenditures Needed to Comply with EPA Rules by State ($ Millions)

| | Utility MACT | | Boiler MACT | | CCR | |
|---|---|---|---|---|---|---|
| | EPA | Industry | EPA | Industry | EPA | Industry |
| Alabama | 1,075.7 | 2,904.7 | 177.0 | 496.4 | 522.5 | 759.3 |
| Alaska | - | - | 51.7 | 144.9 | 7.5 | 10.9 |
| Arizona | 699.2 | 1,888.0 | 7.7 | 21.5 | 542.7 | 788.6 |
| Arkansas | 402.1 | 1,085.7 | 82.1 | 230.2 | 121.1 | 176.0 |
| California | 472.8 | 1,276.6 | 24.6 | 69.0 | 26.0 | 37.8 |
| Colorado | 475.9 | 1,285.0 | 26.1 | 73.3 | 277.4 | 403.2 |
| Connecticut | 233.6 | 630.8 | 38.9 | 109.2 | 28.0 | 40.7 |
| Delaware | 113.4 | 306.1 | 6.5 | 18.3 | 40.9 | 59.4 |
| District of Columbia | 43.6 | 117.7 | - | - | - | - |
| Florida | 2,406.0 | 6,496.8 | 80.3 | 225.1 | 998.2 | 1,450.5 |
| Georgia | 1,153.1 | 3,113.6 | 141.8 | 397.7 | 989.3 | 1,437.6 |

[26] Industry experts typically estimate combined compliance costs and upfront capital expenditures for Utility MACT and other rules such as CSAPR/CAIR, CCR and Cooling Water Intake Structures. For example, The Brattle Group estimates Utility MACT and CSAPR would require $130 billion capital expenditures. The ratio of Utility MACT and CSAPR/CAIR annualized compliance costs is 0.727. We apply 0.727 to $130 billion to estimate the upfront capital expenditure for Utility MACT ($94.5 billion).

[27] Environmental Protection Agency. April 2010. "Regulatory Impact Analysis for EPA's Proposed RCRA Regulation of Coal Combustion Residues (CCR) Generated by the Electric Utility Industry"; EOP Group. 2009. "Cost Estimates for the Mandatory Closure of Surface Impoundments Used for the Management of Coal Combustion Byproducts at Coal-Fired Electric Utilities."

| | | | | | | |
|---|---|---|---|---|---|---|
| Hawaii | - | - | 57.4 | 160.9 | 9.6 | 13.9 |
| Idaho | - | - | 28.4 | 79.5 | - | - |
| Illinois | 1,439.2 | 3,886.4 | 208.0 | 583.4 | 627.8 | 912.2 |
| Indiana | 1,634.4 | 4,413.4 | 283.3 | 794.5 | 1,432.2 | 2,081.2 |
| Iowa | 516.6 | 1,395.0 | 170.9 | 479.2 | 185.0 | 268.8 |
| Kansas | 575.7 | 1,554.5 | 25.5 | 71.7 | 243.4 | 353.6 |
| Kentucky | 1,353.5 | 3,654.8 | 62.5 | 175.3 | 1,497.1 | 2,175.5 |
| Louisiana | 947.3 | 2,558.0 | 89.6 | 251.3 | 262.8 | 382.0 |
| Maine | 74.8 | 201.9 | 97.1 | 272.2 | 7.8 | 11.4 |
| Maryland | 629.3 | 1,699.4 | 69.9 | 195.9 | 314.6 | 457.2 |
| Massachusetts | 461.1 | 1,245.2 | 53.5 | 150.0 | 59.1 | 85.9 |
| Michigan | 1,187.6 | 3,207.0 | 285.7 | 801.3 | 385.7 | 560.5 |
| Minnesota | 431.0 | 1,163.8 | 198.9 | 557.9 | 248.4 | 360.9 |
| Mississippi | 521.8 | 1,409.1 | 58.9 | 165.1 | 200.1 | 290.8 |
| Missouri | 958.4 | 2,587.9 | 121.6 | 341.0 | 436.2 | 633.8 |
| Montana | 198.4 | 535.8 | 11.5 | 32.2 | 298.0 | 433.0 |
| Nebraska | 351.3 | 948.5 | 21.3 | 59.8 | 100.0 | 145.3 |
| Nevada | 211.3 | 570.7 | - | - | 63.7 | 92.6 |
| New Hampshire | 80.5 | 217.3 | - | - | 28.8 | 41.8 |
| New Jersey | 273.0 | 737.2 | 42.0 | 117.8 | 119.7 | 173.9 |
| New Mexico | 332.9 | 898.8 | - | - | 648.4 | 942.2 |
| New York | 1,212.4 | 3,273.8 | 199.8 | 560.4 | 240.9 | 350.0 |
| North Carolina | 1,103.1 | 2,978.8 | 346.7 | 972.3 | 896.0 | 1,302.0 |
| North Dakota | 333.7 | 901.0 | 36.7 | 103.0 | 494.5 | 718.6 |
| Ohio | 1,743.6 | 4,708.1 | 311.3 | 873.0 | 1,697.6 | 2,466.9 |
| Oklahoma | 866.6 | 2,340.0 | 37.9 | 106.2 | 242.7 | 352.6 |
| Oregon | 46.4 | 125.2 | 54.2 | 152.1 | 16.3 | 23.6 |
| Pennsylvania | 1,704.1 | 4,601.5 | 268.1 | 751.8 | 2,500.1 | 3,633.1 |
| Rhode Island | - | - | 6.9 | 19.4 | - | - |
| South Carolina | 697.4 | 1,883.3 | 254.7 | 714.3 | 354.6 | 515.3 |
| South Dakota | 37.3 | 100.8 | - | - | 16.9 | 24.5 |
| Tennessee | 836.8 | 2,259.6 | 165.7 | 464.7 | 527.4 | 766.4 |
| Texas | 3,492.3 | 9,430.2 | 47.2 | 132.3 | 2,143.0 | 3,114.1 |
| Utah | 387.9 | 1,047.4 | - | - | 420.3 | 610.8 |
| Vermont | - | - | - | - | - | - |
| Virginia | 724.8 | 1,957.1 | 213.9 | 599.8 | 388.8 | 565.0 |
| Washington | 131.7 | 355.5 | 42.9 | 120.2 | 228.7 | 332.4 |
| West Virginia | 1,212.3 | 3,273.5 | 171.7 | 481.6 | 1,502.6 | 2,183.6 |
| Wisconsin | 717.3 | 1,937.0 | 203.3 | 570.3 | 229.9 | 334.1 |
| Wyoming | 499.1 | 1,347.7 | 55.3 | 155.0 | 362.1 | 526.2 |
| **TOTAL** | **35,000.0** | **94,510.0** | **5,100.0** | **14,303.1** | **22,984.0** | **33,400.0** |

# Impact on U.S. Manufacturing

In Table 4, we allocate the $22.1 billion of the industry-estimated annualized compliance costs per year and the $141.8 billion of industry-estimated upfront capital expenditures needed to comply with the Utility MACT, Boiler MACT and CCR rules to all 50 states.[28] We allocate portions of those costs to the manufacturing sector.

Given that the utility industry is still largely regulated, it is reasonable to expect that most of the projected costs will be passed through to end-users. Virtually all costs of the Boiler MACT rule for major sources will be borne by industrial facilities. Utility MACT and CCR rules affect power plants that provide electricity to industrial, commercial and residential users. We calculate the share of electricity consumption by industrial sector to estimate the burden of annualized compliance costs and capital expenditures to manufacturing industries. We used the electricity consumption data published by the U.S. Energy Information Administration to estimate the shares of industrial consumption by state.[29]

Table 4. Cumulative Effects of EPA Rules (Utility MACT, Boiler MACT and CCR) on Manufacturing Sector by State

| | Annualized Compliance Costs per Year | | | Upfront Capital Expenditures | | |
|---|---|---|---|---|---|---|
| | All Sectors ($ Millions) | Manu-facturing Sector ($ Millions) | Manu-facturing Costs as % of Manu-facturing Output | All Sectors ($ Millions) | Manu-facturing Sector ($ Millions) | Manu-facturing Costs as % of Manu-facturing Output |
| Alabama | 631.6 | 298.9 | 1.2% | 4,160.4 | 1,894.3 | 7.3% |
| Alaska | 29.9 | 28.0 | 1.3% | 155.8 | 147.3 | 7.0% |
| Arizona | 421.0 | 78.6 | 0.4% | 2,698.1 | 499.7 | 2.3% |
| Arkansas | 220.0 | 114.1 | 0.7% | 1,491.9 | 735.2 | 4.8% |
| California | 181.9 | 44.9 | 0.0% | 1,383.4 | 317.1 | 0.1% |
| Colorado | 267.1 | 92.2 | 0.4% | 1,761.5 | 595.9 | 2.9% |
| Connecticut | 109.1 | 33.6 | 0.1% | 780.7 | 208.2 | 0.8% |
| Delaware | 55.4 | 16.6 | 0.4% | 383.8 | 110.9 | 2.5% |
| District of Columbia | 14.8 | 0.3 | 0.1% | 117.7 | 2.4 | 0.9% |
| Florida | 1,189.1 | 133.0 | 0.3% | 8,172.4 | 852.1 | 2.2% |
| Georgia | 794.0 | 260.4 | 0.6% | 4,948.9 | 1,570.8 | 3.3% |
| Hawaii | 33.6 | 31.6 | 2.3% | 174.8 | 166.0 | 12.1% |
| Idaho | 15.0 | 15.0 | 0.2% | 79.5 | 79.5 | 1.0% |
| Illinois | 806.1 | 341.0 | 0.4% | 5,382.0 | 2,175.4 | 2.5% |
| Indiana | 1,178.9 | 647.5 | 0.9% | 7,289.1 | 3,934.8 | 5.3% |
| Iowa | 326.9 | 199.7 | 0.7% | 2,143.0 | 1,247.9 | 4.5% |
| Kansas | 289.4 | 94.9 | 0.5% | 1,979.8 | 634.5 | 3.4% |
| Kentucky | 988.3 | 505.9 | 1.9% | 6,005.6 | 3,061.3 | 11.3% |

[28] CSAPR/CAIR was excluded from the allocation because the rule applies to only 28 eastern states and therefore would not be compatible when compared across all 50 states.
[29] U.S. Energy Information Administration, available at http://www.eia.gov/.

| | | | | | | |
|---|---|---|---|---|---|---|
| Louisiana | 455.6 | 198.8 | 0.3% | 3,191.3 | 1,341.6 | 2.1% |
| Maine | 79.3 | 59.5 | 1.0% | 485.5 | 334.0 | 5.7% |
| Maryland | 354.7 | 65.4 | 0.3% | 2,352.5 | 388.8 | 2.0% |
| Massachusetts | 204.2 | 86.0 | 0.2% | 1,481.1 | 587.0 | 1.4% |
| Michigan | 681.8 | 322.4 | 0.5% | 4,568.8 | 2,016.4 | 3.3% |
| Minnesota | 333.7 | 187.2 | 0.5% | 2,082.6 | 1,104.8 | 2.8% |
| Mississippi | 274.4 | 118.3 | 0.8% | 1,865.0 | 773.9 | 5.1% |
| Missouri | 533.9 | 172.9 | 0.5% | 3,562.7 | 1,085.6 | 3.4% |
| Montana | 172.2 | 56.3 | 2.5% | 1,001.0 | 324.8 | 14.2% |
| Nebraska | 163.6 | 65.4 | 0.6% | 1,153.6 | 448.1 | 4.0% |
| Nevada | 92.7 | 39.7 | 0.8% | 663.3 | 284.1 | 5.4% |
| New Hampshire | 36.8 | 7.0 | 0.1% | 259.1 | 49.2 | 0.6% |
| New Jersey | 154.5 | 37.8 | 0.1% | 1,028.9 | 225.5 | 0.6% |
| New Mexico | 327.8 | 107.9 | 1.8% | 1,841.0 | 606.2 | 10.3% |
| New York | 596.7 | 154.7 | 0.2% | 4,184.2 | 921.6 | 1.4% |
| North Carolina | 854.5 | 347.0 | 0.4% | 5,253.1 | 2,015.6 | 2.3% |
| North Dakota | 296.4 | 113.0 | 4.0% | 1,722.6 | 650.4 | 23.2% |
| Ohio | 1,318.7 | 593.7 | 0.7% | 8,048.0 | 3,540.1 | 4.4% |
| Oklahoma | 394.2 | 124.6 | 0.7% | 2,798.8 | 859.1 | 4.6% |
| Oregon | 49.8 | 34.3 | 0.1% | 300.9 | 191.5 | 0.3% |
| Pennsylvania | 1,548.5 | 651.6 | 0.9% | 8,986.4 | 3,735.7 | 5.3% |
| Rhode Island | 3.7 | 3.7 | 0.1% | 19.4 | 19.4 | 0.5% |
| South Carolina | 488.8 | 270.5 | 1.0% | 3,112.9 | 1,633.8 | 6.2% |
| South Dakota | 18.3 | 4.2 | 0.1% | 125.3 | 28.9 | 0.8% |
| Tennessee | 546.2 | 235.1 | 0.6% | 3,490.7 | 1,437.8 | 3.5% |
| Texas | 1,919.4 | 569.8 | 0.3% | 12,676.6 | 3,739.9 | 1.9% |
| Utah | 270.8 | 99.4 | 0.6% | 1,658.2 | 608.7 | 3.5% |
| Vermont | - | 0.0 | 0.0% | - | 0.0 | 0.0% |
| Virginia | 487.8 | 179.2 | 0.5% | 3,121.9 | 1,043.9 | 2.7% |
| Washington | 143.1 | 59.7 | 0.1% | 808.1 | 331.4 | 0.8% |
| West Virginia | 1,000.1 | 473.2 | 7.8% | 5,938.7 | 2,776.2 | 45.6% |
| Wisconsin | 427.1 | 224.8 | 0.4% | 2,841.4 | 1,403.2 | 2.8% |
| Wyoming | 318.6 | 205.9 | 8.0% | 2,028.9 | 1,299.1 | 50.2% |
| **TOTAL** | **22,100.0** | **8,805.5** | **0.5%** | **141,760.9** | **54,039.6** | **2.9%** |

We estimate that the manufacturing sector accounts for $8.8 billion and nearly 40 percent of total annualized compliance costs per year for Utility MACT, Boiler MACT and CCR. We also estimate that the manufacturing sector will account for $54 billion of the $141.8 billion upfront capital expenditures to comply with the three rules. This is a significant burden for the manufacturing sector, particularly given the fragile state of the U.S. economy. The sum of $54 billion amounts to 2.9 percent of the value of the manufacturing sector's output.[30] Even if the upfront capital expenditures are amortized over decades, the annualized compliance costs are approximately 0.5 percent of the output of the manufacturing sector per year. Manufacturing states in the Midwest, Northeast, South and Appalachia are blindsided by the aggressive compliance measures enveloped in the EPA's regulations. In states such as Wyoming (50.2 percent), West Virginia (45.6 percent) and North Dakota (23.2 percent), the financial burden would be particularly acute.

The EPA's aggressive approach to regulation is inconsistent with President Obama's commitment to regulatory reform, as spelled out in Executive Order 13563. EPA regulations are also inconsistent with Executive Order 13564, establishing the President's Council on Jobs and

[30] Bureau of Economic Analysis.

Competitiveness on January 31, 2011. According to the President, the Council was established "in order to continue to strengthen the nation's economy and ensure the competitiveness of the United States and to create jobs, opportunity and prosperity for the American people…"[31] President Obama has also committed his Administration to facilitating the goal of seeing U.S. exports reach $3.14 trillion by the end of 2014—an objective that will require a healthy, competitive manufacturing sector that is unencumbered by regulatory costs that do not affect foreign competitors.

It is difficult to reconcile the Obama Administration's exhortations of the U.S. manufacturing sector to invest and hire with the EPA's active regulatory agenda. On the one hand, the Administration is asking manufacturers to spur meaningful economic growth, to double exports by 2015 and to outcompete foreign rivals, and is considering measures to retain and attract investment in U.S. production. Yet, the Administration is prepared to push those goals further out of reach by saddling manufacturers with enormous regulatory burdens in the name of trying to achieve marginal—possibly imperceptible—improvements in air quality. The indifference to the likely costs of these mandates is troubling.

[31] President Barack Obama. January 31, 2011. "The President's Council on Jobs and Competitiveness." Executive Order 13564.

# Uncertain Public Health Benefits

The EPA's estimates of the benefits associated with its proposed rules are highly uncertain. Concerns about the EPA's reported benefits fall into three categories: (1) imperceptible small primary benefits for some rules; (2) inflated and unrealistic estimates of co-benefits; and (3) the employment of highly questionable assumptions.

***Imperceptible Small Primary Benefits for Some Rules.*** While the Utility MACT and Boiler MACT regulations are designed to reduce certain specific pollutants, EPA benefit estimates are driven by co-benefits that result from reductions in other pollutants not directly regulated under the proposed rules. For example, the main purpose of the Utility MACT rule is to reduce mercury emissions from coal-fired power plants.[32]

In its final rule in February 2012, the EPA estimated the annual benefits from Utility MACT's mercury reductions to be in the range of $500,000 to $6 million, less than a fraction of 1 percent of the estimated total benefits of between $33 billion and $90 billion per year.[33] Virtually none of the benefits from Utility MACT are attributable to mercury reductions. Moreover, the EPA could not quantify any benefits from reductions in the other hazardous air pollutants (HAPs) and acid gases. In fact, more than 97 percent of all of the estimated EPA benefits from Utility MACT are attributable to the co-benefits associated with reductions in PM2.5, which is a pollutant directly regulated under other rules.

Similarly, the large portion of the estimated benefits of the Boiler MACT rule also come through the co-benefits of reducing PM2.5. For the CCR rule, less than 1 percent of the estimated benefits are attributed to health improvement.

The EPA's benefit estimates also suffer from other weaknesses. For instance, the EPA estimates that the benefit of avoiding future CCR impoundment structural failures and related cleanup costs range between $1.7 billion to $16.7 billion in additional benefits, even though the EPA itself asserts that it has very limited data on which to base its estimates of the likelihood and costs of future releases. The EPA's benefits estimates, which range to more than 10 times the baseline benefit, affirm concerns over the often speculative nature of the EPA's key assumptions. Proponents of the rule have even argued that the EPA overestimated the annual lifecycle benefits of recycling ash and flue gas desulfurization by more than $21 billion.

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[32] One of the premises for the EPA's "appropriate and necessary" finding was that annual mercury emissions had increased from 46 tons in 1990 to 60 tons in 2010. (Environmental Protection Agency. December 20, 2000. *Federal Register*. Vol. 65, No. 245. p. 79,828.) In fact, mercury emissions had declined to 29 tons in 2011. (Environmental Protection Agency. December 2011. "Revised Technical Support Document: National Scale Assessment of Mercury Risk to Populations with High Consumption of Self-Caught Freshwater Fish, in Support of the Appropriate and Necessary Finding for Coal- and Oil-Fired Electric Generating Units." p. 7.)

[33] Lewis, Jr., Marlo, William Yeatman and David Bier. June 2012. "All Pain and No Gain: The Illusory Benefits of the Utility MACT." *Issue Analysis*, No. 5.

***Inflated and Unrealistic Estimates of Co-Benefits.*** The EPA's estimated benefits are not statistically significant. The ranges of the estimated benefits are widely distributed, and therefore, the midpoints used by the EPA are meaningless. The source of the monetized co-benefits for all of the reviewed EPA regulations is a single study on adult premature deaths, which are projected out from two medical studies with limited data samples. The first set of estimates relies on findings from Pope et al. in 2002.[34] The study relies on data from the 1980s, but fine particulate air pollution, as emphasized in the study, has since declined in the United States. To use older data to extrapolate future impacts, one must assume that there is a linear relationship between pollution abatement and health outcomes.[35] The second set of estimates relies on findings from Laden et al. in 2006. The results of this study embellish the findings of the Pope study.[36]

As shown in both the Pope and Laden research, the range of estimates of premature deaths prevented is very wide. Thus, the range of the EPA's benefits estimates, which are based on those findings, is also very wide. To provide a benefit number, the EPA selects midpoints of a vast range of estimates. In the case of a narrower range between the upper and lower bound, it is more acceptable to use a middle point, but when the range is wide, the midpoint cannot be assumed to represent a valid estimate of the true average with a high degree of statistical significance.

To estimate the benefits of the Utility MACT and Boiler MACT rules, the EPA selected (1) 6,800 deaths in a range between 1,900 and 17,000 and (2) 17,000 deaths in a range between 8,100 and 27,000 from the Pope and Laden data. In other words, the number of adult premature deaths used in the EPA cost-benefit analysis can be anywhere between 1,900 and 27,000 cases. The difference between the lower and upper values is 25,100 and is 3.7 times larger than the value of one of the midpoints that the EPA uses, which strongly suggests statistical insignificance.

After estimating the number of adult premature deaths prevented, the EPA quantified the monetary values of those foregone deaths. Since the number of foregone deaths is statistically insignificant, the monetary values associated with those foregone deaths are consequently speculative. The range of the EPA's total monetized benefits widened to between $4.2 billion and $410 billion, which reflects a high degree of uncertainty about the estimates. Because the economic benefits of a foregone death are realized over a long period of time, obtaining the present value of a 30-year income stream requires assumptions, even speculation, about a number of factors, including the proper discount rate to use.

The EPA selected two different discount rates to calculate the present values of the monetized benefits and then selected two midpoints for each discount rate: benefits of $53 billion, $59 billion, $130 billion and $140 billion. But each of these values fall within a very wide range of

[34] Pope, Arden C., Richard T. Burnett, Michael J. Thun, Eugenia E. Calle, Daniel Krewski, Kazuhiko Ito and George D. Thurston. 2002. "Lung Cancer, Cardiopulmonary Mortality, and Long-term Exposure to Fine Particulate Air Pollution." American Medical Association.

[35] Anenberg, Susan C. et al. June 2012. "Global Air Quality and Health Co-benefits of Mitigating Near-Term Climate Change through Methane and Black Carbon Emission Controls." *Environmental Health Perspectives*, 120(6): 831-9.

[36] Laden, Francine, Joel Schwartz, Frank E. Speizer and Douglas W. Dockery. 2006. "Reduction in Fine Particulate Air Pollution and Mortality—Extended Follow-up of the Harvard Six Cities Study." *American Journal of Respiratory and Critical Care Medicine.*

$4.2 billion and $410 billion, which means that they are very likely to be statistically insignificant. The EPA's benefits estimates are unreliable and vulnerable from a statistical standpoint.[37]

***The Employment of Highly Questionable Assumptions.*** The benefits estimated to be associated with the prevention of premature adult deaths and improved health are attributed to multiple rules in the EPA's assessment. But if a premature death is foregone because of the environmental benefits of one regulation, how can it again be saved by the environmental benefits of another? The EPA monetizes the co-benefits associated with 11,000 fewer premature deaths, 4,700 fewer heart attacks, 130,000 fewer asthma attacks and 540,000 fewer missed workdays to be between $33 billion and $90 billion, even though PM2.5 is already regulated, and the cited benefits already realized.

As put by NERA's Anne Smith, "Once one strips away the non-credible and inappropriate façade of coincidental co-benefits from reducing an already-regulated non-HAP pollutant, the MATS rule is left with almost nothing to justify its costs."

The "direct" benefits that the EPA attributes to the regulations are minimal. In fact, some 80 to 90 percent of the EPA's projected monetized benefits are attributable to secondary effects, or "co-benefits," that are not the intended purpose of the proposed regulation. Most of these co-benefits take the form of health spillover effects estimated from findings in two medical research papers of questionable statistical rigor and dubious applicability to the regulations under consideration.

[37] Brookings Institution. Summer 1997. "EPA's Proposed Air Quality Standards: Clean Air Sense."

# The Economic Impacts of EPA Regulations on the U.S. Economy

Implementing the proposed EPA regulations will raise utility prices and negatively affect employment over the years. Consequently, U.S. domestic output, measured by GDP, will be affected negatively. Although the EPA and industry experts agree on the overall economic effects, EPA estimates are substantially lower than industry forecasts (Table 5). The EPA estimates that implementing the six rules would have a minimal negative impact on domestic outputs. In fact, the EPA expects the negative impact of the CCR rule on U.S. GDP to be too small to warrant an economic impact assessment in its regulatory impact analysis. The EPA expects the other five rules would reduce the U.S. GDP approximately 0.1 percent per year. Industry experts, however, estimate these six regulations would reduce U.S. GDP by 4.2 percent per year and 0.6 percent per year without the Ozone NAAQS rule.

In addition to expecting only a small macroeconomic impact, the EPA is uncertain about the net employment impacts as a result of the six regulations. Excluding the CCR and Ozone NAAQS rules, the EPA expects the four other rules (Utility MACT, Boiler MACT, CSAPR and Cooling Water Intake Structures) would create 48,230 jobs for one-time construction of compliance technology in the first few years following the implementation of the rules. But the EPA then speculates that these rules could either create 30,500 jobs or cut 49,000 jobs permanently. In contrast, industry experts expect the Ozone NAAQS rule alone would cut 7.3 million jobs, and five other rules would shed approximately another 2.4 million jobs.

Both the EPA and industry experts concluded that these regulations would significantly impact U.S. electricity prices. Retail electricity prices are estimated to increase by around 6.5–6.6 percent per year, ranging from 13.6 percent per year in Kentucky and Tennessee and 0.1 percent per year in the Northwest.

Table 5. Economic Impacts of the Six EPA Regulations on the U.S. Economy

| | EPA | Industry |
|---|---|---|
| GDP | All sectors: -0.1% per year | All sectors: -0.6% per year without the Ozone NAAQS rule and -4.2% per year with the Ozone NAAQS rule |
| Employment | Short term: +48,230 jobs<br>Long term: -49,000 to +30,500 jobs | Long term: -9.748 million jobs |
| Retail Electricity Prices | National average: +6.6% per year | National average: +6.5% per year, ranging between +13.6% per year in Kentucky and Tennessee and +0.1% in the Northwest |

# Conclusion

The costs of the EPA's emerging regulations will impose a significant burden on electricity producers, industrial users, downstream consumers and the U.S. economy as a whole. Yet, most of the estimated benefits are uncertain and highly questionable. When considering these uncertainties, it is very likely that the regulations examined will produce negative net benefits to society.

Because of the significance of the estimated costs and the potential impact on the economy and U.S. employment, further analysis of the validity of EPA assumptions and overall conclusions is warranted, especially given recent industry estimates of likely costs.

# Appendix I. The Economic Impacts of EPA Regulations on the U.S. Economy, by Rule

| Proposed Rule | EPA Regulatory Impact Analyses | Industry-Supported Economic Impact Analyses |
|---|---|---|
| Utility MACT | **Employment:** The EPA projects the rule would create 46,000 jobs for one-time construction of compliance technology in 2015. Over the long term between 2015 and 2030, the EPA projects a range of 9,000 jobs gained to between 17,000 and 30,000 jobs lost.[38]<br><br>**Prices:** The rule would raise national energy prices by 0.8%, retail electricity prices by 3.1% and manufacturing sector prices by 0.1% in 2015.[39]<br><br>**GDP:** The EPA expects the rule will have minimal negative impacts on the U.S. economy. The rule would reduce U.S. energy production by 0.12%, non-manufacturing sectors by 0.012% and manufacturing sectors by between 0.04% (primary metals) and 0.01% (transportation equipment).[40] | **Employment:** NERA estimates 183,000 job losses per year and a total of 1.65 million job losses from 2012 to 2020, resulting from a combination of four proposed rules (Utility MACT, CSAPR, CCR and Cooling Water Intake Structures).[41]<br><br>**Prices:** NERA estimates that four rules (Utility MACT, CSAPR, CCR and Cooling Water Intake Structures) would raise retail electricity prices on average 6.5% per year during the period 2012–2020, ranging from 13.6% per year in Kentucky and Tennessee to 0.1% in the Northwest.[42]<br><br>**GDP:** NERA estimates that the cumulative impact of four proposed rules (Utility MACT, CSAPR, CCR and Cooling Water Intake Structures) would cost $29 billion and 0.2% of GDP per year from 2012 to 2020.[43] |

[38] Environmental Protection Agency. March 2011. "Regulatory Impact Analysis of the Proposed Toxics Rule: Final Report"; Environmental Protection Agency. December 2011. "Regulatory Impact Analysis for the Final Mercury and Air Toxics Standards."
[39] Ibid.
[40] Ibid.
[41] NERA Economic Consulting. September 2011. "Potential Impacts of EPA Air, Coal Combustion Residuals, and Cooling Water Regulations."
[42] Ibid.
[43] Ibid.

| | | |
|---|---|---|
| Boiler MACT | **Employment:** The rule would cause employment changes between -3,100 to +6,500 employees, with a central estimate of +1,700 employees for the major source National Emissions Standards for Hazardous Air Pollutants (NESHAP). The EPA also estimates employment changes between -1,000 to +2,000 employees, with a central estimate of +500 employees for the area source NESHAP.[44]<br><br>**Prices:** The EPA's economic model suggests that average industrial energy prices would rise by 0.01% annually under the proposed major and area source NESHAP.<br><br>**GDP:** The EPA estimates that the rule will reduce domestic production by 0.01% per year. | **Employment:** IHS Global Insight estimates the proposed rule could reduce from 337,702 to 798,250 direct jobs across all sectors.[45]<br><br>**Prices:** Not available.<br><br>**GDP:** IHS Global Insight estimates the proposed rules would cost a total of $63.3 billion and 0.4% of GDP to implement the rules. |
| CCR | **Employment, GDP:** The EPA expects that the proposed CCR rule would cost the U.S. GDP insignificantly, and therefore, the EPA did not complete an economic impact analysis.[46]<br><br>**Prices:** The EPA estimates the rule would raise electricity prices from 0.172% to 0.795% annually per kilowatt hour for consumers, depending on the regulatory option to be implemented. | **Employment:** Veritas Consulting found that the EPA's two proposed regulatory options under RCRA (Subtitle C and Subtitle D) would shed between 183,900 and 316,000 jobs and between 39,000 and 64,700 jobs, respectively.[47]<br><br>NERA estimates 183,000 job losses per year and a total of 1.65 million job losses from 2012 to 2020, resulting from a combination of four proposed rules (Utility MACT, CSAPR, CCR and Cooling Water Intake Structures).[48]<br><br>**Prices:** NERA estimates that four rules (Utility MACT, CSAPR, CCR and Cooling Water Intake Structures) would raise retail electricity prices on average 6.5% per year during 2012–2020, ranging from 13.6% per year in Kentucky and Tennessee to 0.1% in the Northwest.[49] |

[44] Environmental Protection Agency. February 2011. "Regulatory Impact Analysis: National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers and Process Heaters."
[45] Council of Industrial Boiler Owners. August 2010. "The Economic Impact of Proposed EPA Boiler/Process Heater MACT Rule on Industrial, Commercial, and Institutional Boiler and Process Heater Operators."
[46] Environmental Protection Agency. 2010. "Regulatory Impact Analysis for EPA's Proposed RCRA Regulation of Coal Combustion Residues (CCR) Generated by the Electric Utility Industry."
[47] Veritas Consulting. June 2011. "An Economic Assessment of Net Employment Impacts from Regulating Coal Combustion Residuals." Prepared for the Utility Solid Waste Activities Group.
[48] NERA Economic Consulting. September 2011. "Potential Impacts of EPA Air, Coal Combustion Residuals, and Cooling Water Regulations."
[49] Ibid.

| | | |
|---|---|---|
| | | **GDP:** NERA estimates that the cumulative impact of four proposed rules (Utility MACT, CSAPR, CCR and Cooling Water Intake Structures) would cost $29 billion and 0.2% of U.S. GDP per year from 2012 to 2020.[50] |
| Cooling Water Intake Structures | **Employment:** The EPA estimates the rule would either cut 14,000 jobs or produce 10,000 jobs per year depending on the regulatory option.[51]<br><br>**Prices:** The EPA estimates industrial utility prices would rise from 0.19% to 2.43% per year and residential utility prices from 0.11% to 1.4% per year.<br><br>**GDP:** The EPA estimates that the economic impacts range from $260 million and $6.2 billion per year from 2012 to 2056, depending on modeling assumptions and regulatory option. | **Employment:** NERA estimates 183,000 job losses per year and a total of 1.65 million job losses from 2012 to 2020, resulting from a combination of four proposed rules (Utility MACT, CSAPR, CCR and Cooling Water Intake Structures).[52]<br><br>**Prices:** NERA estimates that four rules (Utility MACT, CSAPR, CCR and Cooling Water Intake Structures) would raise retail electricity prices on average 6.5% per year during 2012–2020, ranging from 13.6% per year in Kentucky and Tennessee to 0.1% in the Northwest.[53]<br><br>**GDP:** NERA estimates that the cumulative impact of four proposed rules (Utility MACT, CSAPR, CCR and Cooling Water Intake Structures) would cost U.S. GDP $29 billion per year from 2012 to 2020.[54] |
| Ozone NAAQS | **Employment:** The EPA does not conduct an economic assessment for the rule on employment.[55]<br><br>**Prices:** Not available for both known and unknown technological controls. | **Employment:** MAPI projects a total cost of 7.3 million jobs across all states.[56]<br><br>**Prices:** Not available.<br><br>**GDP:** MAPI's research estimates the U.S. economy to be reduced by $677.8 billion and 3.6% of GDP in 2020. |

[50] Ibid.
[51] Environmental Protection Agency. 2011. "Economic and Benefits Analysis for Proposed Section 316(b) Existing Facilities Rule."
[52] NERA Economic Consulting. September 2011. "Potential Impacts of EPA Air, Coal Combustion Residuals, and Cooling Water Regulations."
[53] Ibid.
[54] Ibid.
[55] Under the Clean Air Act, the EPA is prohibited from taking macroeconomic impacts into account in setting a new NAAQS standard. The EPA only considers air pollution's effect on public health and is prohibited from considering economic factors when setting a new standard.
[56] Manufacturers Alliance for Productivity and Innovation. September 2010. "Economic Implications of EPA's Proposed Ozone Standard."

| | | |
|---|---|---|
| | **GDP:** The EPA projects the impacts on the U.S. economy to be minimal; the GDP would be reduced by less than 0.02% in 2020—the equivalent of $3.6 billion (2006). | |
| CSAPR | **Employment:** The EPA estimates that the rule would create 2,230 jobs in the short term by 2014. In the long term, the EPA estimates between 1,000 jobs lost to 3,000 jobs gained per year.[57]<br><br>**Prices:** Retail electricity prices are projected to increase nationally by an average of 1.3% in 2012 and 0.8% in 2014 with the final transport rule.<br><br>**GDP:** The EPA estimates that the proposed rule will decrease GDP by 0.01% ($1.6 billion) in 2014. | **Employment:** NERA estimates 183,000 job losses per year and a total of 1.65 million job losses from 2012 to 2020, resulting from a combination of four proposed rules (Utility MACT, CSAPR, CCR and Cooling Water Intake Structures).[58]<br><br>**Prices:** NERA estimates that four rules (Utility MACT, CSAPR, CCR and Cooling Water Intake Structures) would raise retail electricity prices on average 6.5% per year during 2012–2020, ranging from 13.6% per year in Kentucky and Tennessee to 0.1% in the Northwest.[59]<br><br>**GDP:** NERA estimates that the cumulative impact of four proposed rules (Utility MACT, CSAPR, CCR and Cooling Water Intake Structures) would cost $29 billion in U.S. GDP per year from 2012 to 2020.[60] |

[57] Environmental Protection Agency. 2011. "Regulatory Impact Analysis for the Federal Implementation Plans to Reduce Interstate Transport of Fine Particulate Matter and Ozone in 27 States: Correction of SIP Approvals for 22 States."
[58] NERA Economic Consulting. September 2011. "Potential Impacts of EPA Air, Coal Combustion Residuals, and Cooling Water Regulations."
[59] Ibid.
[60] Ibid.

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