OPPORTUNITY LOST

HOW ROLLING BACK THE CLEAN POWER PLAN HURTS AMERICA'S ECONOMY

Good for the Economy.
Good for the Environment.

Summary

The Trump Administration's effort to unwind the Clean Power Plan (CPP) represents a failure to capitalize on the economic and environmental benefits of clean energy.

Analysis shows that the CPP could create up to **560,000 jobs** and add $52 billion to the gross domestic product (GDP) in 2030. From states with relatively small populations like Maine and Montana to highly populated states like Florida, the CPP could have substantial employment and economic benefits — benefits that would disappear with the Trump Administration's repeal of the policy.

Additionally, rolling back the CPP will likely reduce investments in energy efficiency programs, resulting in the loss of further economic benefits from lower electricity bills and increased efficiency investments in our homes, offices, schools and other buildings. Analysis shows that incremental energy efficiency savings through the CPP could reduce annual average household electricity bills by 7 percent in 2030 compared to a case without the CPP.

Policymakers should oppose any efforts to weaken or rescind the CPP because doing so would reduce the employment and economic opportunities that come with it. Policymakers should also pursue other smart clean energy policies that support greater efficiency, renewable energy, electric vehicles, and grid modernization efforts, which would further grow our nation's economy while accelerating the urgently needed transition to a low-carbon future.

Introduction

Many businesses now recognize not only the risk of climate change, but the economic potential of climate action.[1] The clean energy economy is already a major economic catalyst and job creator, with the wind and solar industries representing the fastest-growing sectors in America. Additionally, increased investments in clean and efficient energy and appliances have the potential to support hundreds of thousands of new jobs in the coming years.

Clean energy is also a smart, low-cost source of power for businesses of all sizes. As companies including Google, Amazon, Apple, and Microsoft noted in their joint brief [2] in support of the Clean Power Plan, "renewable energy makes good business sense…[with] low and stable costs [that] permit energy consumers to hedge fuel price volatility and future increases in electricity rates and… can foster resilience." In fact, renewable energy and energy efficiency are now often the cheapest sources of new power even without considering renewable tax credits.[3] American companies are now some of the biggest consumers of renewable energy — overtaking electric utilities to become the largest direct purchasers of new wind power in 2015.

American companies know that increasing the use of renewable energy and energy efficiency is good for the environment and good for the economy. That is why hundreds of companies, dozens of cities and a growing list of states have said they will continue to abide by the goals of the Paris climate agreement and support smart policies that encourage economic growth, like the Clean Power Plan.[4] As these companies have made clear, "failure to build a low-carbon economy puts American prosperity at risk. But the right action now will create jobs and boost US competitiveness."

Power plants are some of the largest sources of dangerous carbon pollution in the country, with the electricity sector contributing around one-third of the nation's total CO_2 emissions.[5] To address the significant carbon footprint of the U.S. electric sector, the EPA finalized the Clean Power Plan in 2015, setting the nation's first-ever federally imposed limits on climate-changing emissions from power plants.

The CPP sets flexible, achievable emissions limits on coal- and natural gas-fired power plants, providing a reasonable framework for power companies and states to cut carbon pollution through several possible measures — including improvements at fossil plants, as well as by increasing investments in renewable energy and energy efficiency.[6] CPP limits begin in 2022, with states having to gradually reduce emissions until the final CPP targets go into effect in 2030. Nationwide, the CPP is projected to reduce annual emissions by 32 percent below 2005 levels by 2030.[7]

The power sector is well-positioned to meet the goals of the CPP at modest cost.[8] By encouraging clean energy investments in the sector, the goals of the CPP are consistent with current trends toward low- and zero-emitting energy and new services and technology choices for customers. The U.S. power sector has already reduced its carbon emissions by 25 percent since 2005. In 2016, carbon emissions from power plants reached the lowest levels since 1988, proving that a low-carbon electric grid can also be low-cost, reliable, and resilient.[9] Policies like the CPP help ensure that reductions in carbon pollution continue over the long term by encouraging increased investments in energy efficiency and renewable energy. In addition to the economic benefits described in this analysis, these investments help reduce electricity bills at homes, offices and schools while simultaneously delivering substantial climate and public health benefits.[10]

Methodology Overview

The discussion below details new analysis that forecasts the significant economic benefits driven by the CPP, as well as related investments in energy efficiency programs and services. The analysis used models of the U.S. electric power sector and the U.S. economy to calculate how carbon policy (i.e., the Clean Power Plan) and related investments in energy efficiency would impact jobs and gross domestic product (GDP). The models and calculations were applied at the national level as well as to select states.

This analysis was conducted in two steps.[11] First, power sector impacts were modeled using the Integrated Planning Model (IPM®). Second, these power sector impacts were run through the Regional Economic Model, Inc. (REMI) to determine employment and economic impacts. See the accompanying appendix for a full discussion of the methodologies used for the analysis.[12]

A range of scenarios were modeled, including different designs for CPP implementation and varying levels of investment in energy efficiency. The analysis also assessed options for states to recycle the proceeds of allowance sales for the benefit of their residents. While all scenarios to meet the CPP achieved employment and economic gains compared to a case without the CPP, the economic and employment gains do vary substantially between the cases depending on policy design and assumptions on energy efficiency.

This report focuses on three CPP scenarios: two "mass-based" approaches and one "rate-based" approach (see **Table 1**). Under a "mass-based" approach, there is an absolute tonnage limit on how much carbon pollution can be emitted from power plants in each state, with both existing and future power plants covered under this tonnage limit. Under a "rate-based" approach, there is no absolute tonnage limit on carbon pollution. Instead, power plants can only emit a certain number of pounds of pollution per unit of energy (MWh) they produce. Therefore, there is no cap on carbon pollution, since total pollution can increase if total energy demand also increases.

In all three scenarios, states were assumed to adopt the same policy design (e.g. all "rate" or "mass") and to participate in a national trading scheme, except for the nine Northeastern states already participating in the Regional Greenhouse Gas Initiative (RGGI), a regional carbon market, and California, which has a state carbon market. The scenarios vary the investments in energy efficiency programs. In the table below, 1 percent and 2 percent energy efficiency (EE) refer to the annual electricity saved as a percent of retail sales through incremental electric energy efficiency investments. These scenarios were compared to a business-as-usual (BAU) case that included annual electricity savings consistent with historical (2013) savings levels, but excluded the CPP.

Table 1. Clean Power Plan Scenarios Evaluated

Scenario ID	CPP Scenario Description
1	Mass-Based, Existing + New Limits, 2% Energy Efficiency (EE)
2	Mass-Based, Existing + New Limits, 1% Energy Efficiency (EE)
3	Rate-Based, 1% Energy Efficiency

Without the CPP, the U.S. Stands to Lose Major Employment and Economic Opportunities

Repealing the CPP would eliminate a significant opportunity to create hundreds of thousands of additional jobs and billions of dollars in additional economic value.

As shown in **Table 2**, at the very least, the CPP would create a minimum of 75,200 jobs and add nearly $14.9 billion to the economy in 2030. At the high end, a well-designed, mass-based approach could deliver an additional 560,000 jobs and $52.1 billion to the economy in 2030.

Table 2. U.S. Total Employment and GDP Gains Under CPP Without Revenue Recycling: Average Annual Impact (2016–2030) and in 2030

Scenario ID	CPP Policy Design	Energy Efficiency	Net Employment Gains (FTE jobs)		GDP Value Added (2012$)	
		(% of Annual Sales)	Average Annual Impact (2016–2030)	In 2030	Average Annual Impact (2016–2030)	In 2030
1	Mass	2%	206,600	560,100	$18.6 Billion	$52.1 Billion
2	Mass	1%	75,400	176,200	$5.7 Billion	$14.9 Billion
3	Rate	1%	88,800	212,000	$7.0 Billion	$16.7 Billion

I. Economic Impacts of CPP Rate-Based Approach

The rate-based compliance approach is projected to reduce carbon emissions in line with the mass-based approaches. However, this emissions outcome is not fixed. Unlike the prescribed pollution limits under the mass-based approaches described below, emissions outcomes under a rate-based approach may vary if economic conditions, including natural gas fuel prices, fluctuate or differ from our assumptions. Projections for total employment and value added in the economy are highly dependent on the way investments in the power sector shift. Growth in jobs supporting the clean energy and energy efficiency sectors tend to more than fully offset negative employment impacts in the fossil sector.

II. Economic Impacts of CPP Mass-Based Approach

Total employment gains in the CPP mass-based policy scenarios are projected to range from 176,000 to 560,000 jobs in 2030. Under an approach where states achieve 2 percent annual energy savings, the nation could see a net GDP gain of $52 billion in 2030. The less ambitious energy efficiency case leads to an increase of $15 billion to national GDP in 2030. For comparison, Colorado's coal and gas extraction industries delivered $14.4 billion in value added in 2016.[13]

Table 3 breaks down the employment and economic gains of 2 percent EE for a number of states.

III. Additional Economic Opportunities of Carbon Policies

The modeling above assumes that there is no program in place to collect the revenues from carbon allowances and return or reinvest it for customers benefit. Well-designed mass-based programs should include arrangements to maximize the value of a stream of revenues from the sale of allowances under the program.

Table 3. State Economic and Employment Impacts of CPP Case with 2% Energy Efficiency (in 2030)

State	Net Employment Gains (FTE Jobs)	GDP Value Added (2012$)
	In 2030	In 2030
Pennsylvania	19,500	$1.75 Billion
Virginia	20,300	$1.8 Billion
Ohio	20,700	$2.1 Billion
Michigan	14,300	$1.3 Billion
Missouri	13,400	$1.1 Billion
Illinois	19,400	$2.0 Billion
Iowa	5,700	$0.5 Billion
Minnesota	11,000	$1.1 Billion
Montana	1,700	$0.1 Billion
Colorado	5,700	$0.4 Billion
Nevada	4,400	$0.3 Billion
Florida	44,900	$3.7 Billion
New Hampshire	3,300	$0.3 Billion
Maine	2,600	$0.2 Billion
Georgia	28,900	$2.8 Billion
Rest of U.S.	344,600	$32.5 Billion
Total U.S.	**560,100**	**$52.1 Billion**

One way states could use this revenue is to offer worker retraining programs that help disadvantaged workers and communities take advantage of clean energy employment and economic opportunities. These programs could be designed to fit the specific needs of communities, target industries (e.g., sustainable building construction, advanced manufacturing, wind and solar technicians), and target populations (e.g., veterans, unemployed/dislocated adults, youths, workers with limited English). The U.S. Department of Labor has found that unemployed workers who take advantage of these retraining programs tend to find employment faster, are more likely to retain work, and see an average salary bump of $2,500 more per quarter than those without retraining.[14] For example, a Colorado program to retrain unemployed and dislocated workers to be wind technicians helped 77 percent of those who completed the training find employment in the wind industry, with 90 percent retaining their jobs in the following year.[15] A Tennessee program focused on solar energy and carbon fiber industries helped over 80 percent of finishers find jobs in those industries, with 95 percent retaining employment over the next year.[16]

Experience in RGGI has also demonstrated that carbon revenue recycling programs can bring significant benefits to consumers and the broader economy.[17] In the RGGI program, allowances are auctioned and proceeds go back to the states. The states have in turn invested billions of dollars back into their economies, such as by increasing funding for energy efficiency programs, building community-based renewable power projects, helping low-income customers pay their electricity bills, educating consumers, and offering training for clean energy jobs. The Analysis Group, a consulting group that conducts triennial reviews of the economic and employment impacts of the RGGI program, found that these programs have added $3 billion (2015$) in economic activity to the nine-state region over the first six years.[18] This economic boost to the region's economy spurred the creation of 5,000 full-time jobs on average.[19]

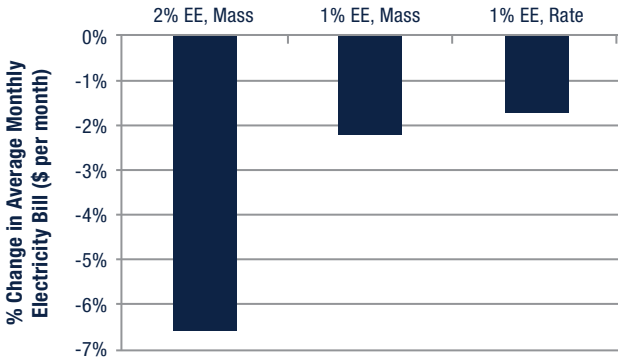
Backtracking on the CPP Results in Higher Electricity Bills for Households

Cost-effective investments in energy efficiency programs and clean energy technologies can lead to lower electricity bills, benefiting electric customers all over the nation. For instance, these bill savings mean households spend a smaller share of disposable income on energy purchases and can spend these dollars on consumer goods and services — many produced throughout the economy. Lower electric bills for commercial and industrial customers should provide a competitive edge in the global marketplace through lower costs of doing business.[20] The CPP mass- and rate-based scenarios studied here are projected to save the average household between 2 and 7 percent on annual electricity bills in 2030, compared to the reference case without the CPP.

As illustrated in **Figure 1**, maximizing investments in incremental energy efficiency as part of CPP compliance leads to the greatest average customer bill savings (2 percent EE). In this case, customers save approximately 6.6 percent on electricity bills compared to a Reference Case without the CPP, in which states continue to implement EE at their historical (2013) levels. If states only achieve modest electricity savings, consumers are projected to save approximately 1.7 percent to 2.2 percent on electricity bills (1% EE Rate and 1% EE Mass, respectively).

The CPP is designed to incentivize investments in energy efficiency and other clean energy solutions, helping keep electricity costs low.

Figure 1. The CPP Can Save the Average Household Money on Monthly Electricity Bills



Repealing the CPP Undercuts Opportunity for American Prosperity and Leadership

Smart clean energy and carbon policies can drive significant job and economic growth. If the Trump Administration repeals or weakens the CPP, it will result in the loss of significant economic benefits and eliminate a key opportunity for America to be a global leader in clean energy and innovation.

The Clean Power Plan is more than an economic opportunity; it can spur investments in energy efficiency that keep power affordable for electricity customers and will help protect the public and businesses[21] from the worst impacts of climate change.[22] Policymakers at all levels of government should work to preserve the tremendous economic growth opportunities of smart carbon policies and support efforts like the Clean Power Plan and other policies that support the burgeoning clean energy sector.

Footnotes

[1] Gordon, Kate. Risky Business: The Economic Risks of Climate Change in the United States: A Climate Risk Assessment for the United States. Eds. Matt Lewis, and Jamesine Rogers. riskybusiness.org, 2014

[2] Brief of Amici Curiae Amazon.Com, Inc., Apple Inc., Google Inc., And Microsoft Corp. In Support of Respondents. USCA Case No. 15-1363 (and consolidated cases). Filed April 1, 2016. Available at https://www.edf.org/sites/default/files/content/2016.04.01_major_tech_companies_amicus_brief_for_epa.pdf

[3] Lazard, "Levelized Cost of Energy Analysis — Version 10.0", November 2016. Available at https://www.lazard.com/perspective/levelized-cost-of-energy-analysis-100/

[4] The statement and signatories are available at http://www.lowcarbonusa.org/

[5] U.S. Energy Information Administration (EIA), *Monthly Energy Review,* Section 12 https://www.eia.gov/totalenergy/data/monthly/pdf/sec12_9.pdf

[6] Under the CPP, states have an array of options to set enforceable limits on power plant carbon pollution. First, states can choose to adopt and enforce the two national emission performance rates for coal generators and gas generators respectively that EPA established in constructing the standards. As a second option, the CPP establishes state-specific emission rate limits by combining the national emission rate limits for coal and gas plants, weighted to reflect the mix of electricity generated from the two types of plants in each state. Third, the CPP establishes equivalent mass-based limits for each state, and allows states to choose between two versions. A state can choose to include both existing and new fossil plants under the emission limits, requiring both to hold allowances for each ton of emissions. Alternatively, a state can include only existing plants, in which case the state must take further action to account for pollution increases from "emissions leakage" — shifting generation to plants that are outside the mass-based emission limit.

[7] U.S. Environmental Protection Agency, "Clean Power Plan: By The Numbers", Fact Sheet, August 2015

[8] A June 2016 analysis conducted by M.J. Bradley & Associates along with a group of stakeholders ("the stakeholder analysis") found that the Clean Power Plan's pollution reductions are achievable at low cost across a wide range of scenarios. As a result of the renewable energy tax credit extensions and continued low natural gas prices, the electricity sector is expected to be better prepared to meet the CPP targets than originally projected when the rule was finalized. As one example, in the stakeholder analysis, the price of allowances under a national trading scenario is projected to be about one-third the price forecasted in an earlier version of the analysis published in January 2016, dropping from just under $20 per ton to $6 per ton. Cost-effective resources and compliance flexibility are available in all states to mitigate costs and can minimize impacts for industry and electricity customers.

[9] U.S. Energy Information Administration (EIA), *Monthly Energy Review,* Section 12, https://www.eia.gov/totalenergy/data/monthly/pdf/sec12_9.pdf

[10] NRDC, "Keeping Electricity Bills Low as The Power Sector Curbs Carbon Pollution", Fact Sheet, March 2017, available at https://www.nrdc.org/sites/default/files/keeping-electricity-bills-low-power-sector-curbs-carbon-pollution-ib.pdf

[11] ICF performed this analysis for the Natural Resources Defense Council. The inputs into the economy-wide modeling were based on NRDC assumptions as well as previously developed power sector modeling. The previously developed power sector analysis is described in: M.J. Bradley & Associates, *EPA's Clean Power Plan: Summary of IPM Modeling Results With ITC/PTC Extension* (2016). http://www.mjbradley.com/sites/default/files/MJBA_CPP_IPM_Report_III_2016-06-01_final_0.pdf

[12] The full methodology s available at https://www.nrdc.org/sites/default/files/renewable-energy-tax-credits-economic-impact-methodology-appendix.pdf

[13] U.S. Bureau of Economic Activity, "GDP By Industry", Available at https://www.bea.gov/iTable/index_industry_gdpIndy.cfm

[14] The latest performance reports on the Workforce Investment Act are available on the DOL website at https://www.doleta.gov/reports/

[15] This was funded through a Community Based Job Training Grant to the Roane State Community College. More information available at https://www.doleta.gov/BRG/Grants/pdf/CBJT_FACT_SHEET.pdf

[16] This was funded through a Community Based Job Training Grant to the Northeastern Junior College. More information available at https://www.doleta.gov/BRG/Grants/pdf/CBJT_FACT_SHEET.pdf

[17] Hibbard, Paul J., et al. "The economic impacts of the Regional Greenhouse Gas Initiative on nine Northeast and Mid-Atlantic states." Analysis Group: Boston, MA (2015). Available at https://www.c2es.org/docUploads/rggi-mou.pdf

[18] Hibbard, Paul J., et al. "The economic impacts of the Regional Greenhouse Gas Initiative on nine Northeast and Mid-Atlantic states." Analysis Group: Boston, MA (2015)

[19] 30,000 job-years over 6 years. Id.

[20] Granade, Hannah Choi, et al. "Unlocking energy efficiency in the US economy." (2009); Bouton, Shannon, et al. "Energy efficiency: A compelling global resource." McKinsey Sustainability & Resource Productivity (2010)

[21] Gordon, Kate. Risky Business: The Economic Risks of Climate Change in the United States: A Climate Risk Assessment for the United States. Eds. Matt Lewis, and Jamesine Rogers. riskybusiness.org, 2014

[22] Yeh, Starla. "Top Scientists Validate Approach to Climate Policy-Making", January 17, 2017. Available at https://www.nrdc.org/experts/starla-yeh/top-scientists-validate-approach-climate-policy-making

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Environmental Entrepreneurs (E2) is a national, nonpartisan group of business leaders, investors, and professionals from every sector of the economy. We advocate for smart policies that are good for the economy and good for the environment.

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