December 1, 2014

Environmental Protection Agency
EPA Docket Center (EPA/DC)
Mail code 28221T
Attn: Docket ID No. EPA–HQ–OAR–2013–0602
1200 Pennsylvania Avenue NW
Washington, DC 20460

RE: Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, Proposed Rule, 79 Fed. Reg. 34830 (June 18, 2014). Docket No. EPA-HQ-OAR-2013-0602

Public Citizen,[1] Consumer Action,[2] and Ohio Partners for Affordable Energy[3] submit these comments on the EPA's proposed *Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units*.[4]

We write to provide a consumer perspective on the Clean Power Plan. We strongly support the Plan and strongly urge the EPA to (1) require deeper emissions cuts as the climate science demonstrates are necessary; (2) treat energy efficiency and renewables as replacing fossil-fuel generation in the goal-setting equation; (3) use more efficiency and renewables and less if any natural gas or nuclear generation in calculating state targets; and (4) foster consumer oversight and participation in the implementation process.

Contents

[1] Public Citizen is a national consumer advocacy organization with over 350,000 members and supporters.

[2] Through multilingual financial education materials, community outreach, and issue-focused advocacy, Consumer Action empowers underrepresented consumers nationwide to assert their rights in the marketplace and financially prosper.

[3] Ohio Partners for Affordable Energy (OPAE) is a 501(c)(3) nonprofit membership organization created to advocate for affordable energy policies for moderate and low-income Ohioans. Sixty-four OPAE member agencies provide essential energy services, including bill payment assistance, weatherization and energy efficiency, and housing services to over 440,000 households statewide annually.

[4] 79 FED. REG. 34,830 (June 18, 2014).

Introduction

We write to provide a consumer-focused perspective on the EPA's Clean Power Plan, which aims to reduce carbon emissions from U.S. electricity generation 30 percent from 2005 levels by 2030. The Plan has four major building blocks: (1) improving the efficiency or "heat rate" of existing coal-fired generators; (2) switching from coal to natural gas generation; (3) maintaining a small about of nuclear generation that is likely to retire and adding a small amount of new nuclear generation, as well as adding renewable generation; and (4) adding additional capacity through demand-side energy efficiency measures. We strongly support the agency's effort to reduce greenhouse gas emissions, as mitigating climate change is critical to consumers. We also urge the agency to strengthen the proposed Clean Power Plan, make it more consumer friendly, and give states better guidance on how to comply with the Plan in the least-cost manner. The agency can achieve these goals by organizing the rule around a least-cost principle—reduce emissions incrementally, displacing the most carbon-intensive generation with the lowest-cost emission-reducing strategy—and requiring consumer participation and oversight in the rule's implementation.

A. We strongly support the Clean Power Plan.

We strongly support the Clean Power Plan because it will provide significant benefits to consumers. As the agency is well aware, climate change will inflict a vast range of harms on consumers, and particularly on vulnerable populations such as children, the elderly, and those with low incomes.[5] Heavier precipitation, the increased frequency and intensity of droughts, and other extreme weather events threaten property, infrastructure, water supplies and water quality, and agriculture.[6] Warmer temperatures will lead to increased pests and disease.[7] These are only the more modest and nearer-term consequences of climate change. Over a slightly longer time horizon, extending into the 2100s, more severe potential consequences include mass extinctions and other changes in

[5] *See, e.g.*, U.S. GLOBAL CHANGE RESEARCH PROGRAM, HIGHLIGHTS OF CLIMATE CHANGE IMPACTS IN THE UNITED STATES: THE THIRD NATIONAL CLIMATE ASSESSMENT 34, 39 (2014) (hereinafter "THIRD NATIONAL ASSESSMENT").

[6] *See, e.g.*, IPCC, CLIMATE CHANGE 2014 SYNTHESIS REPORT: SUMMARY FOR POLICYMAKERS 10-11 (2014) (hereinafter "IPCC SUMMARY"); U.S. GLOBAL CHANGE RESEARCH PROGRAM, HIGHLIGHTS OF CLIMATE CHANGE IMPACTS IN THE UNITED STATES: THE THIRD NATIONAL CLIMATE ASSESSMENT 34, 39 (2014); THIRD NATIONAL ASSESSMENT at 12-13, 38-45.

[7] *See, e.g.*, IPCC SUMMARY at 10-11; THIRD NATIONAL ASSESSMENT at 34, 36-37.

ecosystems that would have incalculably large, negative consequences for humans, including dramatically slower economic growth, increased poverty, food scarcity and food insecurity, mass displacement of people, and increases in government instability and violent conflict.[8]

Climate change is projected to cause tremendous harm as a matter of economic cost alone. A 2008 analysis estimating the U.S. costs of climate change from four factors, hurricane damage, real estate losses, energy-sector costs, and water costs, found costs ranging from $271 billion in 2025 to $1.9 trillion in 2100.[9] A 2014 analysis projects costs of $525 billion over the next 15 years just from damage to coastal property and infrastructure.[10] It also projects a 10 percent decline in crop yields in some Midwestern and Southern counties over the next 5 to 25 years, and up to $300 billion in costs over the same period for new electric generation to meet increased demand for cooling.[11] The same analysis found that, if emissions remain on their present course, $238 billion to $507 billion worth of coastal property will simply be below sea level by 2100,[12] and some Midwestern and Southern counties could experience 50 to 70 percent declines in crop yields.[13] The White House in 2014 released an analysis concluding that warming of 3°C compared to 2°C would create an additional drag of 0.9 percent on the global economy.[14] These types of economic costs are only a fraction of full risks that climate change poses, and they dwarf the costs of prevention. However, the costs of prevention rise 40 percent each decade.[15] We need strong, assertive responses immediately.

Because unchecked climate change would be devastating to U.S. consumers, the Clean Power Plan's contribution to mitigating the harms of climate change will benefit consumers tremendously. But the Plan offers significant other benefits as well. The EPA projects that the Plan will reduce consumer electricity bills 8.4 percent from business-as-usual rates by 2030[16] and create roughly 104,700 jobs in 2020 alone.[17] A reduction in electricity costs should reverberate positively throughout the economy, although the EPA does not attempt to quantify these benefits. The agency also notes that the rule will provide significant health benefits by reducing other harmful pollution from coal-fired power plants in addition to carbon emissions.[18] A recent analysis of a scenario akin to the Clean Power Plan found that its reductions in sulfur dioxide, nitrogen oxides, particulate matter, and mercury would prevent 3,500 premature deaths annually (nine each day),[19] 1,000 annual hospital admissions for heart and lung disease,[20] and 220 non-fatal heart attacks annually.[21] The rule would also provide several benefits that the researchers did not quantify, such as

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[8] IPCC SUMMARY at 10-11.

[9] FRANK ACKERMAN ET AL., THE COST OF CLIMATE CHANGE v (2008). The figures given are in 2006 dollars.

[10] RISKY BUSINESS, THE ECONOMIC RISKS OF CLIMATE CHANGE IN THE UNITED STATES 3 (2014)

[11] *Id*.

[12] *Id*. at 4.

[13] *Id*. at 5.

[14] EXECUTIVE OFFICE OF THE PRESIDENT, THE COST OF DELAYING ACTION TO STEM CLIMATE CHANGE 2 (2014).

[15] *Id*.

[16] EPA, REGULATORY IMPACT ANALYSIS FOR THE PROPOSED CARBON POLLUTION GUIDELINES FOR EXISTING POWER PLANTS AND EMISSION STANDARDS FOR MODIFIED AND RECONSTRUCTED POWER PLANTS Table 3-43 (2014) (hereinafter "RIA").

[17] 79 FED. REG. at 34,935.

[18] *See, e.g.*, *id*. at 34,839.

[19] JOEL SCHWARTZ ET AL., HEALTH CO-BENEFITS OF CARBON STANDARDS FOR EXISTING POWER PLANTS 3 (2014).

[20] *Id*.

[21] *Id*.

reducing asthma symptoms,[22] preventing unquantified damage to ecosystems and agriculture, and reducing the accumulation of toxic mercury in fish.[23] The agency quantifies and monetizes only a portion of Clean Power Plan's non-climate-related health benefits, but they are still massive. It finds values of $14 billion to $37 billion in 2020 and $23 billion to $58 billion in 2030.[24]

The rule also should promote a more rapid transition to renewable energy sources, which will offer consumers nationwide cheaper and more reliable electricity than that from fossils fuels and nuclear generation.

For all of these reasons, we strongly support the Clean Power Plan.

B. We urge the agency to strengthen the Plan.

The EPA should strengthen the Plan significantly to align it more closely with what the climate science suggests is necessary to minimize the risk of grave harm. The International Panel on Climate Change (IPCC) projects that to hold the concentration of atmospheric CO_2 in 2100 to 450 parts per million, which would "likely" prevent temperatures from rising more than 2°C above pre-industrial levels, we must reduce global greenhouse gas emissions by 40 to 70 percent from 2010 levels by 2050 and cut them to near or below zero by 2100.[25] To meet these global reduction levels, industrialized nations like the United States must make deeper cuts.

Even these reductions may be inadequate. The IPCC projects that they have only a 66 to 100 percent chance of preventing warming over 2°C,[26] and limiting warming to 2°C may still be insufficient to prevent severe harm.[27] Missing the 2°C target could be catastrophic, with the likelihood and intensity of harms increasing as temperatures rise further. A recent World Bank analysis concludes that we cannot be certain that humans can adapt to 4°C increase in temperatures.[28]

The proposal's 30 percent reduction in carbon emissions from 2005 levels by 2030 falls short of what is required to prevent 2°C of warming, much less to be confident that we will remain below that threshold with a margin of error. Fortunately, as the remainder of these comments discuss, greater reductions are feasible, at reasonable cost to electricity consumers.

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[22] *Id*.

[23] *Id*. at 1.

[24] RIA Table ES-6.

[25] IPCC, SUMMARY at 15; *id*. at Table SPM-1.

[26] IPCC, SUMMARY, at 3 n.1.

[27] *See, e.g.*, IPCC SUMMARY at SPM-10 ("The precise levels of climate change sufficient to trigger abrupt and irreversible change remain uncertain, but the risk associated with crossing such thresholds increases with rising temperature (medium confidence).").

[28] *See, e.g.*, WORLD BANK, TURN DOWN THE HEAT: WHY A 4°C WARMER WORLD MUST BE AVOIDED xviii (2012) ("[G]iven that uncertainty remains about the full nature and scale of impacts, there is also no certainty that adaptation to a 4°C world is possible.").

C. Summary of these comments: The EPA should make the Plan more favorable to consumers and guide states toward least-cost compliance strategies by employing a least-cost metric, as well as provide for consumer oversight and participation.

Although the EPA projects that the Clean Power Plan would lower consumer electricity bills by 8.4 percent by 2030 due to efficiency measures,[29] the Plan could be far more consumer-friendly. The Plan overstates the costs and understates the potential for energy efficiency, which is the least-cost, most effective, and most consumer-friendly strategy for curbing carbon emissions. It also overstates the costs and understates the potential for renewables, which soon will provide the cheapest and most reliable sources of electricity for consumers, and in some places already does. The Plan promotes increased electric generation from natural gas, even though the climate benefits of switching from coal to natural gas are uncertain due to methane emissions and, setting aside the methane issue, soon we must incur the expense of phasing out natural gas due to its carbon emissions. In addition, natural gas prices are projected to increase 23 percent by 2030, straining the budgets of low-income households, even without the EPA spurring additional demand for natural gas. The Plan also includes nuclear power, which carries exorbitant costs that consumers typically must subsidize through their utility bills.

Below, these comments describe how the agency can strengthen the rule and make it more consumer-friendly. They revolve around a simple principle: reduce greenhouse gas emissions incrementally by using the least-cost means to displace the most carbon-intensive generation. A rule organized in this manner would prioritize energy efficiency and renewables, include far less natural gas, if any, and likely omit nuclear generation entirely. It would be significantly stronger than the proposed Clean Power Plan, at a lower cost and with greater benefits for consumers. Efficiency is by far the lowest-cost and most effective way to reduce carbon emissions. As a general matter, renewable energy is already cost-competitive with existing generation in some regions and is rapidly becoming cost-competitive elsewhere. The remaining barrier to cost-competitiveness, where it remains an issue, is merely that new investments in renewables are competing with a generation infrastructure that has already been built and carries only operating costs. In a straight comparison of new investments, onshore wind and utility-scale solar generation projects are already cheaper than building coal, natural gas, or nuclear plants.[30] But as these comments elaborate below, when one considers cost-competitiveness *for purposes of reducing carbon emissions*, renewables are less expensive than switching to our existing fossil fuel infrastructure. Together, efficiency and renewables are the best means to respond to climate change effectively at the lowest cost to electricity consumers.

Even if the agency does not revise the proposed best system of emission reduction according to this principle of incremental lowest-cost carbon emission reduction, it should nonetheless outline potential compliance strategies that follow the principle to give states strong guidance on how they can comply with the rule at the least cost. At present, the proposal's analytic errors have the effect of working at cross purposes with least-cost compliance. Less sophisticated states may rely on the agency's analysis without conducting their own independent research, leading them to grossly overestimate the relative costs and underestimate the carbon-reducing potential of energy efficiency and renewables, and to do

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[30] *See* LAZARD'S LEVELIZED COST OF ENERGY—VERSION 8.0 2 (2014) (hereinafter "LAZARD'S 8.0").

the reverse for natural gas and nuclear generation. The end result would be state plans that appear to be low-cost and high-efficacy but in fact leave enormous carbon-reducing potential untapped and yield higher consumer electricity bills than necessary.

Finally, the agency should take steps to foster consumer oversight by making key information readily accessible on its website and should require states to provide consumer voice and oversight in the development and execution of implementation plans. States have broad flexibility to achieve the targets that the EPA sets, and consumers will benefit from sound policies and bear the brunt of poor policies. As a matter of fairness, they deserve a strong role in the formulation and execution of state plans. But consumer participation and oversight is valuable for another reason as well. There is substantial overlap between the policies that are best for reducing emissions and those that are best for consumers. Consumer participation will substantially increase the likelihood that states will adopt sound, least-cost plans that are likely to yield their projected carbon-reduction goals. In effect, consumer representation and oversight can be thought of as important features of an effective carbon-reduction strategy.

II. The goal-setting formula should treat energy efficiency and renewables as replacing fossil-fuels, beginning with the most carbon intensive generation.

The proposed goal-setting formula treats additional natural gas generation as replacing coal-fired generation, but treats energy efficiency and renewable energy as merely adding to the overall pool of electricity generation rather than displacing anything. The EPA requested comment on whether it should change how energy efficiency and renewables are counted in calculating state targets.[31] It should. Renewables and efficiency should be treated as replacing fossil-fuels, in the order of carbon-intensity.

This modification is one of the most important steps the agency should take before finalizing the rule. Treating efficiency and renewables as adding to the generation pool rather than displacing carbon-intensive fuels results in targets that are far too modest, vastly understating the potential of the two policies that should be the centerpieces of the rule. Reducing carbon emissions is the entire point of the rule; the most sensible model for calculating carbon-reduction goals, then, is to assume that states will use carbon-free sources of electricity to displace carbon-emitting sources. Indeed, failing to treat efficiency and renewables as replacing fossil fuels in most instances is at odds with the agency's own analysis of the merits of the two strategies for reducing emissions. The agency rightly includes renewable energy and efficiency in the Clean Power Plan precisely because they can displace electricity generation from fossil fuels.[32] Moreover, as the agency recognizes, that is typically what happens at present. Fossil-fuel generation is usually displaced first because it has higher variable costs than other forms of generation.[33]

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[32] *See* 79 FED. REG. at 34,858 ("Low-and zero-carbon generating capacity provides electricity that can be substituted for generation from more carbon-intensive EGUs."); *id.* ("Demand-side energy efficiency programs . . . support reduced generation from existing fossil fuel-fired EGUs by reducing the demand for that generation."); *id*. (describing the Plan's building blocks in relevant part as "3. Reducing emissions from affected EGUs in the amount that results from substituting generation at those EGUs with expanded low- or zero-carbon generation. 4. Reducing emissions from affected EGUs in the amount that results from the use of demand-side energy efficiency that reduces the amount of generation required.").

[33] 79 FED. REG. at 34,871.

This change in calculating state goals would significantly strengthen the Clean Power Plan. As proposed, the Plan would reduce cumulative U.S. emissions from 2012 to 2029 from 21.5 billion short tons to 18.2, a difference of 3.3. If the targets are calculated by assuming that efficiency and renewables will displace fossil fuels, beginning with the most carbon-intensive, the Plan would reduce cumulative CO_2 emissions by more than twice as much—by 7.2 billion short tons, to 14.3. Similarly, the proposal would reduce annual CO_2 emissions by 330 million short tons in 2029 compared to 2012 (from 2,153 to 1,823). The alternative formula would reduce annual emissions nearly three times as much, or 919 million short tons. The difference in annual emissions is a 15.3 percent reduction versus a 42.7 percent reduction.[34]

III. The agency should strengthen the Plan and make it more consumer-friendly by applying a least-cost principle. This approach would substantially boost the proposal's targets for energy efficiency and renewables, reduce reliance on natural gas and nuclear generation, lower costs, and offer much greater consumer benefit.

The EPA also requested comment on the stringency of the building blocks.[35] We urge the agency to strengthen its energy efficiency and renewables targets and diminish the rule's reliance on natural gas and nuclear generation. These changes flow from analyzing the rule according to the principle of replacing fossil-fuel generation incrementally with the lowest-cost reduction strategy, as well as from correcting errors in the EPA's analysis of the cost, availability, and effectiveness of the technologies that the rule employs.

A. The agency should strengthen the rule's energy efficiency targets and adopt more realistic estimates regarding the cost of saved energy.

The agency should strengthen the proposed energy efficiency targets to more realistic levels that would achieve much greater reductions in both carbon emissions and consumer costs. The agency rightly recognizes that energy efficiency is the least-cost, most effective means of reducing carbon emissions and that efficiency typically pays for itself.[36] For these reasons, energy efficiency should be a centerpiece of the Clean Power Plan (along with renewables, addressed in the next section of these comments). The agency's analysis overstates the cost of efficiency and understates its potential to reduce emissions. As a result, the agency's efficiency targets are far too low, failing to capture significant carbon reductions and cost savings for consumers.

The EPA has solicited comment on whether it should increase the annual incremental savings rate for energy efficiency to 2.0 percent and the pace of improvement to 0.25 percent to reflect additional savings from policies that the proposal does not include, such as building codes and appliance standards.[37] It should increase the rate to 2.0, as well as incorporate combined heat and power (CHP), equipment standards, and building codes.

A 2014 analysis by the American Council for an Energy Efficient Economy finds that combining these four efficiency measures—utility programs, CHP, building codes, and

[34] Calculations conducted with the M.J. Bradley & Associates' Clean Power Plan Evaluation Tool.
[35] 79 FED. REG. at 34,839.
[36] *See* EPA, GHG ABATEMENT MEASURES, at 5-26.
[37] 79 FED. REG. at 34,875.

equipment standards—at a 1.5 percent rate of annual improvement would reduce emissions by 26 percent from 2012 levels by 2030 through energy efficiency alone.[38] This amounts to 73 percent of the Clean Power Plan's *total* projected reduction, using all four building blocks, of 30 percent from 2005 levels by 2030.[39] Moreover, ACEEE explains that its analysis is conservative in several ways. Its CHP analysis omits some policies that could lead to greater reductions;[40] its analysis of equipment standards includes only five products;[41] and it analysis of building codes includes only new buildings, not existing buildings, and does not calculate savings from reduced natural gas consumption.[42] For these reasons, savings higher than 1.5 can be achieved cost-effectively.[43] In fact, five states have already set savings targets at 2 percent or greater.[44]

In addition to underestimating the full potential of efficiency, the EPA dramatically overstates the costs of utility energy efficiency programs, the only end-user efficiency measures it considers. The agency estimates that the levelized cost to program administrators and participants will be 8.5 cents per kWh saved in 2020 and 9.0 cents in 2030.[45] The best analyses suggest much lower numbers. A 2014 ACEEE study found an average of 5.4 cents across seven states for which it had adequate data,[46] and a more extensive analysis by Lawrence Berkeley National Laboratory (LBNL) found costs of just 4.4 cents.[47]

The EPA constructs its own estimates. It begins with studies of program-side costs that typically yield estimates ranging from 2 to 3 cents. Lazard's 2014 analysis yields 0 to 5 cents, the midpoint of which is 3.[48] The most comprehensive analysis that the EPA cites, by LBNL, found a cost of 2.1 cents.[49] A 2009 ACEEE study found average costs of 2.5 cents per kWh,[50] and a 2014 ACEEE analysis found an average of 2.8 cents.[51] The EPA appears to characterize these ACEEE findings as 2.75 and 2.3, respectively,[52] and adopts the former, setting a baseline program cost of 2.75 cents per kWh. It adopts this figure despite acknowledging that the "up-to-date, more comprehensive results" from ACEEE and LBNL indicate lower values. We have less data on participant costs, but EPA reasonably assumes

[38] ACEEE, CHANGE IS IN THE AIR, at iv-v.

[39] Emissions from the U.S. electric power sector were 2,445.7 teragrams (Tg) in 2005 and 2,064 Tg in 2012. *See* EPA, INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS AND SINKS 1990-2012 2-22 (2014). The EPA proposes a 30 percent reduction from 2005, which is 733.71 Tg, while ACEEE proposes a 26 percent reduction from 2012, which is 536.64 Tg. In absolute terms, ACEEE's proposed reduction (536.64 Tg) is 73.1 percent of the EPA's (733.71 Tg).

[40] ACEEE, CHANGE IS IN THE AIR, at 11.

[41] *Id*. at 12.

[42] *Id*. at 17.

[43] *Id*. at 5.

[44] *Id. at* 8.

[45] RIA at 3-18.

[46] ACEEE, THE BEST VALUE FOR AMERICA'S ENERGY DOLLAR: A NATIONAL REVIEW OF THE COST OF UTILITY ENERGY EFFICIENCY PROGRAMS 23 (2014).

[47] As of this writing, LBNL has made available a presentation of the analysis but not a report. The presentation is available at http://emp.lbl.gov/sites/all/files/TR%20CSE_NARUC_111714_Final%20Release.pdf

[48] LAZARD'S LEVELIZED COST OF ENERGY—VERSION 8.0 2 (2014) (finding a cost of $0 to $50 per MWh).

[49] LBNL, THE PROGRAM ADMINISTRATOR COST OF SAVED ENERGY FOR UTILITY CUSTOMER-FUNDED ENERGY EFFICIENCY PROGRAMS xi (2014).

[50] ACEEE, SAVING ENERGY COST-EFFECTIVELY: A NATIONAL REVIEW OF THE COST OF ENERGY SAVED THROUGH UTILITY-SECTOR ENERGY EFFICIENCY PROGRAMS 4 (2009).

[51] ACEEE, THE BEST VALUE FOR AMERICA'S ENERGY DOLLAR: A NATIONAL REVIEW OF THE COST OF UTILITY ENERGY EFFICIENCY PROGRAMS iv (2014).

[52] GHG ABATEMENT MEASURES at 5-50–5-51.

that total costs are split nearly evenly between administrators and participants.[53] Applying this metric to the 2.75-cent program costs that the agency adopts yields a total of 5.5 cents, not the 8.5- to 9.0-cents that the agency projects.

The agency arrives at its higher number by assuming that costs escalate dramatically as one increases the rate of efficiency savings. It projects that costs rise 20 percent as one increases the rate of efficiency savings from 0.5 percent to 1 percent and another 20 percent when one increases from 1.5 percent.[54] This assumption is unwarranted. It is mistakenly based on a single ACEEE study that in fact rejects the agency's interpretation. The ACEEE study states, "These findings *cast doubt* on the hypothesis that programs with higher electricity savings levels are associated with higher CSE [cost of saved energy] values."[55]

The same ACEEE study provides additional evidence that EPA's interpretation is flawed when viewed in light of EPA's data on states' 2012 rates of efficiency improvement. The ACEEE study found total costs of 5.4 cents per kWh among seven states for which it had adequate data. An analysis of EPA's data on these states 2012 rates of improvement shows that these states were achieving close to 1 percent improvement. The average rate among the seven states was 0.83 percent, and 97 percent if one excludes Hawaii, which was an extreme outlier at 0.04 percent.[56] Average total cost was 5.1 cents if Hawaii is excluded.

State	2012 Rate[57]	Program Cost[58]	Participant cost	Combined program and participant cost
Hawaii	0.04%	$0.033	$0.049	$0.076
Illinois	0.93%	$0.016	$0.018	$0.041
Iowa	1.05%	$0.019	$0.030	$0.049
New York	0.93%	$0.020	$0.053	$0.073
Pennsylvania	1.06%	$0.018	$0.029	$0.043
Rhode Island	0.78%	$0.045	$0.011	$0.056
Wisconsin	1.05%	$0.019	$0.022	$0.041
Average	0.83%	$0.024	$0.030	$0.054
Average without Hawaii	**0.97%**	**$0.023**	**$0.027**	**$0.051**

In other words, states already achieving 1 percent progress had total costs averaging 5.1 cents. But when analyzing a hypothetical state that happens to begin at a 0.5 percent rate of progress, EPA would begin with an admittedly conservative estimate of 5.5 cents, then project a 20 percent increase in costs as the state's rate of improvement increases to 1 percent, reaching a total of 6.6 cents. This figure is nearly 30 percent higher than the 5.1-cent cost for 1 percent growth reported in the very ACEEE study on which the EPA purports to rely when adjusting cost estimates upward. The adjustment is wholly unwarranted.

[53] EPA, GHG ABATEMENT MEASURES at 5-51–5-52.
[54] GHG ABATEMENT MEASURES at 5-35.
[55] ACEEE, BEST VALUE at 30 (emphasis added).
[56] ACEEE, BEST VALUE, at 23.
[57] For data on 2012 rates, see GHG ABATEMENT MEASURES at 5-17–5-19.
[58] For cost data in this and other columns, see ACEEE, BEST VALUE at 23.

Overall, EPA's total price tag of 8.5 to 9.0 cents is more than 60 percent higher than ACEEE's estimate of 5.4 cents and roughly double LBNL's estimate of 4.4. The agency fails to justify ignoring these analyses and generating its own estimate based on—in its own words—"notably conservative assumptions."[59] The effect is to artificially escalate the projected cost of efficiency measures by a wide margin, leading to significantly reduced emphasis on what should be a centerpiece of the Clean Power Plan.

Also, it is also noteworthy that among the seven states discussed above, costs tend to be lower in states with stronger rates of improvement and higher in states with weaker rates of improvement. In addition to the possibility that higher rates of improvement reduce costs because of economic factors like economies of scale, it is reasonable to hypothesize that both cost and rate of progress are influenced in part by a third factor: policy choice. There is wide variety among efficiency programs, and policy choices surely play an important role in determining what the programs achieve and at what cost.[60] The EPA should not be tethered to rigid quantitative analyses of past average costs and rates of improvement among energy efficiency programs, much less adopt conservative assumptions that depart from prior average performance to skew policymaking even further in the direction of higher cost and lower efficacy. The Clean Power Plan should influence policy choices in the right direction, toward best practices, not toward performance that is below average among all prior programs. The agency is not only justified in nudging policymakers and program administrators in the right direction; it is required to do so. Section 111(d) of the Clean Air Act is at least modestly technology-forcing, and perhaps strongly technology-forcing.[61]

B. The agency should strengthen the targets for renewable energy by using more realistic estimates of growth potential and cost of renewables.

The EPA should significantly increase its targets for renewable energy. A 2014 analysis by the Union of Concerned Scientists (UCS) found that states can increase their share of electricity generation from renewable energy sources by nearly double the EPA targets—23 percent rather than 12 percent.[62] The UCS analysis is based on reasonable, even modest assumptions, involving past growth in renewables and state-law renewable-energy targets. For states performing below the national average of 1 percent annual growth in renewables, UCS assumes the states can merely bring their growth up to average. It then projects that high-performing states can achieve growth of 1.5 percent, a figure consistent with the targets set by the laws of leading states. For each state, UCS then assumes that the state will meet the greater of UCS's projected growth rate or the state's legally required rate.[63]

The proposal also overestimates the cost of renewables by failing to account adequately for their steeply declining cost. A recent analysis commissioned by the Natural Resources Defense Council (NRDC) found that the EPA's cost estimates are 46 percent

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[59] 79 FED. REG. 34,874.

[60] Indeed the assumption that policy choices matter is often cited as the very purpose of studying efficiency programs. *See, e.g.*, LBNL, PROGRAM ADMINISTRATOR COST at 2.

[61] *See Essex Chemical Corp. v. Ruckelshaus*, 486 F.2d 427, 433-34 (D.C. Cir. 1973); *Sierra Club v. Costle,* 657 F.2d 298, 326 (D.C. Cir. 1981).

[62] UNION OF CONCERNED SCIENTISTS, STRENGTHENING THE EPA'S CLEAN POWER PLAN (2014).

[63] *Id*. at 4.

above *current* average costs,[64] much less future costs, which are expected to continue to plummet. Since just 2010, the cost of building utility-scale solar has fallen by roughly 50 percent and onshore wind by more than 20 percent.[65]

A modest correction of the agency's cost estimate for renewables would yield the result that they are less costly than Building Block 2 of the Plan, switching from coal to natural gas. The agency estimates that switching to combined-cycle natural gas (NGCC) generators by increasing their utilization to 70 percent would cost $30 per metric ton of CO_2 emissions reduced. It projects average NGCC utilization of 64 percent, which would cost roughly $21 per metric ton of CO_2.[66] By contrast, it projects renewable sources would cost between $10 and $40 per metric ton of CO_2, or an average of $25.[67] This cost figure is similar to that for natural gas switching. With even modest corrections, renewables would clearly be less expensive on average than natural gas.

C. The agency should account accurately for the efficacy and cost of switching from coal to natural gas, which will likely lead to curbing the Plan's reliance on natural gas dramatically.

The EPA should sharply reduce the Clean Power Plan's reliance on natural gas. There is little if any room for natural gas in a proposal that replaces fossil-fuel generation incrementally by using the emission-reduction strategies that come at lowest cost to consumers. The climate benefit of switching to natural gas is doubtful, and the cost is extraordinary because we must soon phase out natural gas, a factor that EPA fails to consider.

1. The proposal overstates the climate benefits of switching to natural gas.

First, because of methane emissions, the climate benefits of switching to natural gas are far from certain in the near term, over timelines during which it is critical that we reduce greenhouse gas emissions. Over 20 years, methane emissions are estimated to be 87 times more disruptive to the climate than carbon emissions;[68] over 100 years, they will be 36 times as disruptive. The EPA inexplicably uses the IPCC's 2007 estimate of 25[69] for 100-year impacts rather than its 2013 estimate of 36, which is based on an improved methodology.[70] The agency wholly fails to consider 20-year impacts, even though the next 20 years are critical to putting ourselves on the right path regarding climate change.[71] In addition to underestimating the impact of methane emissions, the agency underestimates the amount of methane released, largely because it relies heavily and without adequate justification on industry estimates. The EPA previously estimated methane leakage at 2.5 percent from conventional natural gas and 3.9 percent from gas extracted through hydraulic fracturing or "fracking." It recently reduced these estimates to 1.8 percent from all sources based on a non-peer-reviewed study by the American Petroleum Institute.[72]

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[64] *See* NRDC, ISSUE BRIEF, THE EPA'S CLEAN POWER PLAN COULD SAVE UP TO $9 BILLION IN 2030 1 (2014).
[65] *See id*. at 2.
[66] 79 FED. REG. at 34,865.
[67] *Id*. at 34,875.
[68] IPCC, CLIMATE CHANGE 2013: THE PHYSICAL SCIENCE BASIS 714 (2013) (hereinafter AR5 WGI).
[69] EPA, RIA at 3A-10.
[70] IPCC, AR5 WGI at 714.
[71] *See, e.g.*, IPCC, CLIMATE CHANGE 2014 SYNTHESIS REPORT 40 (2014).
[72] *See* TERRI SHIRES & MIRIAM LEV-ON, AMERICAN PETROLEUM INSTITUTE, CHARACTERIZING PIVOTAL SOURCES OF METHANE EMISSIONS FROM NATURAL GAS PRODUCTION (2012), http://www.api.org/~/media/Files/News/2012/12-October/API-ANGA-Survey-Report.pdf.

Independently produced, peer-reviewed estimates are commonly much higher. A recent meta-analysis of more than 200 studies found 3.6 to 7.1 percent leakage, with a midpoint of 5.4.[73] An even more recent study, based on satellite observations of two sites, estimated leakage of roughly 9 and 10 percent.[74] In short, there is strong reason to doubt that switching from coal to natural gas has any climate benefit on a 20- or even a 100-year time scale.[75]

2. The proposal understates the cost of switching to natural gas.

Setting aside the issue of methane emissions, burning natural gas also releases carbon. For that reason we must soon phase out electric generation from natural gas. Given this reality, the proposal significantly understates the cost of Building Block 2, switching from coal to natural gas. An accurate estimate of the cost of switching to natural gas over the next five to fifteen years must incorporate the estimated cost of switching *away* from natural gas soon thereafter. A starting point for estimating those costs is the price of switching to renewables, which offer the only feasible replacement for natural gas. In other words, the true cost of switching to natural gas now is the cost of that change *plus* the cost of replacing natural gas with renewables in a few years.

By EPA's own measure, the per-ton cost of switching to natural gas to reduce carbon is similar to that of energy efficiency ($21 versus $20 per metric ton of CO_2, respectively),[76] and barely less expensive than that for renewables ($25 per metric ton).[77] For all of the reasons discussed above, the agency's estimates for energy efficiency and renewables are far too high, and its estimate for natural gas far too low. Even modest corrections to EPA's estimates would show that both efficiency and renewables are cheaper carbon-reducers than natural gas.

Finally, switching to natural gas may burden consumers because the price of natural gas is expected to rise steeply—23 percent by 2030.[78] If the Clean Power Plan spurs additional demand for natural gas, it could increase prices further, deepening the strain on low-income households. By contrast, the cost of building renewable generation continues to plummet and, once built, renewable electricity has zero ongoing fuel costs.

D. The agency should account accurately for the cost and reliability of nuclear power, which likely means omitting it from the calculation of state goals.

1. The proposal dramatically understates the cost of nuclear generation.

The agency makes extraordinary errors in its analysis of the cost of nuclear generation. It is important to correct these errors, as nuclear power is exorbitantly expensive and requires large subsidies, with consumers stuck paying those subsidies through their electricity bills. The proposal expressly encourages states to preserve nuclear a set of nuclear generators that are likely to be taken offline because they are not cost-

[73] *See* A. R. Brandt et al., *Supplementary Material for Methane Leaks from North American Natural Gas Systems*, 343 SCIENCE 733, S29 (2014), http://www.sciencemag.org/content/343/6172/733/suppl/DC1

[74] *See* Oliver Schneising et al., *Remote Sensing of Fugitive Methane Emissions from Oil and Gas Production in North American Tight Geologic Formations*, 2 EARTH'S FUTURE 548 (2014).

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[76] 79 FED. REG. at 34,865 (natural gas); *id*. at 34,869 (efficiency).

[77] *Id*. at 34,875.

[78] *See* U.S. ENERGY INFORMATION ADMINISTRATION, ANNUAL ENERGY OUTLOOK Table 13 (2014).

effective.[79] The very reason these units are likely to be retired is that they would require large subsidies from ratepayers to maintain in operation. The agency states that "a host" of factors "have altered the outlook for the U.S. nuclear fleet in recent years."[80] But the common element among all of the factors is economic viability. They include "increasing fixed operation and maintenance costs, relatively low wholesale electricity prices, and additional capital investment associated with ensuring plant security and emergency preparedness."[81] Consumers should not be asked to pay the exorbitant cost of uneconomical nuclear power.

In addition, although the proposal includes five under-construction nuclear generating units, it completely omits the cost of completing those projects.[82] The agency appears to believe they are certain to be completed and the costs are already committed,[83] but neither is true. The first generation of nuclear power plants proved so costly to build that half of them were abandoned during construction, and the industry has not overcome the delays and cost overruns that plagued that first wave of reactors.[84] Between 2002 and 2008, for example, cost estimates for new nuclear plant construction rose from between $2 billion and $4 billion per unit to $6 billion to $9 billion per unit.[85] Substantial uncertainties remain regarding whether the current projects will be completed, and billions of dollars could be saved by halting them.

Additionally, the agency is not justified in arbitrarily omitting the costs of building these plants merely because their construction is based on existing state policy. The proposal relies on existing policies in myriad ways, and in no other instance does the agency omit the costs of a particular policy merely because it is in place already. In all cases, including the construction of new nuclear generating units, the relevant policymakers could change course, or they might decide to stay the course as part of a compliance plan for this rule.

The proposal also dismisses the costs from radioactive waste that would result from preserving or increasing the deployment of nuclear generation. Producing more radioactive waste creates significant additional costs from potential environmental contamination events and the ongoing difficulty of developing and managing interim and long-term waste storage. For example, the failure by the U.S. to site a permanent waste repository has resulted in nearly 80 lawsuits by utilities seeking to recover costs of waste storage. These settlements and judgments, which are paid from the taxpayer-funded Judgment Fund, have ballooned to $2 billion and could reach more than $20 billion if the Department of Energy begins accepting waste by 2020. If it does not, then the cost are projected to rise by hundreds of millions of dollars annually.[86]

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[79] 79 FED. REG. at 34,871.

[80] *Id*. at 34,871.

[81] *Id*.

[82] *Id*. at 34,870.

[83] *Id*. ("The EPA believes that since the decisions to construct these units were made prior to this proposal, it is reasonable to view the incremental cost associated with the CO_2 emission reductions available from completion of these units as zero for purposes of setting states' CO_2 reduction goals . . . .").

[84] Regarding delays and cost overruns in the construction of the Georgia and South Carolina projects, see SOUTHERN ALLIANCE FOR CLEAN ENERGY, GEORGIA PUBLIC SERVICE COMMISSIONERS FAIL TO PROTECT CONSUMERS (2014), http://www.cleanenergy.org/gapsc-fail-to-protect-consumers/.

[85] *See, e.g.*, UCS, NUCLEAR LOAN GUARANTEES: ANOTHER TAXPAYER BAILOUT AHEAD? 15-16 (2009).

[86] *See* BLUE RIBBON COMMISSION ON AMERICA'S NUCLEAR FUTURE, REPORT TO THE SECRETARY OF ENERGY 79 (2012).

The agency also ignores the potential economic and health costs from radiological accidents, which are massive. As of late 2012, Tokyo Electric Power Co. estimated that the cleanup from the Fukushima nuclear disaster in Japan might cost $137 billion.[87] Estimates of the total economic impact range from $250 billion to $500 billion.[88] The proposal also fails to consider the impact of nuclear generation's intensive water requirements on water resources.[89]

The agency's partial and inaccurate treatment of nuclear generation costs is deeply problematic because a full and accurate accounting of the costs would lead to vastly different conclusions about the propriety of including nuclear generation in the state targets, almost certainly leading to the omission of nuclear generation entirely. Subsidizing uneconomical nuclear generation burdens ratepayers with unnecessary costs and unwisely depresses the expansion of safer, cheaper, and more sustainable renewable resources.

2. Reliability and alternatives

In addition to problems with the agency's cost estimates, the proposal's inclusion of nuclear is flawed as a technical matter. First, the agency's attempt to preserve the "at-risk" nuclear generation may fail, and the under-construction projects may not be completed. The existence of these sources of nuclear generation is simply not reliable enough for the EPA to include them when calculating state targets.

Second, the agency is mistaken to assume that the alternative to nuclear power is fossil-fuel generation. For new construction, efficiency, onshore wind, and utility-scale solar are all cheaper than both nuclear and natural gas (as well as coal, for that matter):

Unsubsidized Levelized Cost ($/MWh)[90]	Low	Avg	High
Energy Efficiency	$0.00	$25.00	$50.00
Wind	$37.00	$59.00	$81.00
Utility Scale Solar	$72.00	$79.00	$86.00
NGCC	$61.00	$94.00	$127.00
Coal	$66.00	$108.50	$151.00
Nuclear	$92.00	$112.00	$132.00

In some cases, it may appear less expensive at present to replace nuclear generation with additional capacity from existing natural gas generators than to use renewables, but that is not the relevant metric. The agency's task is to curb greenhouse gas emissions, which means reshaping market rules where necessary, not simply codifying existing arrangements. Setting targets for the Clean Power Plan requires looking at the cost and feasibility *of*

[87] *See* Tsuyoshi Inajima & Yasumasa Song, *Fukushima $137 Billion Cost Has Tepco Seeking More Aid*, BLOOMBERG, Nov. 7, 2012, at http://www.bloomberg.com/news/2012-11-07/fukushima-137-billion-cost-has-tepco-seeking-more-aid.html.

[88] *See* STEVEN STARR, PHYSICIANS FOR SOCIAL RESPONSIBILITY, COSTS AND CONSEQUENCES OF THE FUKUSHIMA DAIICHI DISASTER (2012), http://www.psr.org/environment-and-health/environmental-health-policy-institute/responses/costs-and-consequences-of-fukushima.html.

[89] *See, e.g.*, UCS, NUCLEAR POWER AND WATER (2011).

[90] *See* LAZARD'S 8.0 at 2.

meeting the rule's purpose, reducing carbon emissions. As discussed above, efficiency and renewables are generally cheaper than natural gas for that purpose.

IV. The agency should foster consumer voice in the development, implementation, and oversight of state plans.

The EPA should also foster consumer voice in the 111(d) process. First, consumer voice is critical as a matter of fairness. Consumers will benefit immensely from sound climate policies, and they could be harmed by unsound policies. A process without adequate consumer voice risks the possibility that states will develop implementation plans that pass the costs of reducing carbon emissions to consumers while leaving too much of the economic benefit in the hands of electricity generators and utilities. Consumers deserve a voice in the process of reshaping the electricity infrastructure on which they rely and for which they pay.

Second, strong consumer participation and oversight is sound climate policy. As these comments demonstrate, there is substantial overlap between the best carbon-reducing policies and the most pro-consumer policies. Providing consumer representation in the process of crafting compliance plans makes it more likely that states will produce sound, reliable, and low-cost plans. In the implementation process, consumer oversight and participation will increase the likelihood that the plans come to fruition.

The EPA should take two sets of actions to foster consumer voice. First, the agency should advise states that it will scrutinize implementation plans more closely if they were developed without adequate consumer participation or they lack adequate provisions for consumer participation and oversight in the implementation process. The EPA should review state plans not just for consumer voice in general, but also to ensure that low-income consumers and other disadvantaged groups have adequate representation. In addition to providing public notice and the opportunity to comment on their proposed plans, states should hold regional public hearings, convene consumer advisory panels, and conduct other outreach to consumer advocates at earlier stages in the process of crafting their plans. A state plan should contain provisions for continuing input and oversight by consumer representatives, likely in the form of consumer decisionmaking or advisory panels involved in or overseeing the implementation of the plan's key elements. The agency should also take in account whether states provide intervenor funding in utility proceedings or other forms of funding for consumer representatives in relevant regulatory processes.

Finally, the EPA should directly foster consumer oversight by collecting and making available on its own website extensive information and data about state plans and ongoing state performance. This data should include costs and benefits of compliance, with a distributional analysis. The agency should make these data available in formats that are accessible both to sophisticated researchers and to ordinary members of the public. Consumers in a given state should be able to find out easily, for example, what goals their state has set regarding energy efficiency or renewables, at what cost and who pays the costs, as well as find information about their state's ongoing progress toward meeting its goals. They also should be able to compare their state's plans and performance to those of other states. To achieve these ends, the EPA should collect disparate information from various states and present it in a uniform manner to the extent possible.

Conclusion

For the foregoing reasons, we urge the agency to (1) require deeper emissions cuts as the climate science demonstrates are necessary; (2) treat energy efficiency and renewables as replacing fossil-fuel generation; (3) use more efficiency and renewables and less if any natural gas or nuclear generation in calculating state targets; and (4) foster consumer oversight and participation in the implementation process.

Thank you for considering these comments.

Sincerely,

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Director, National Priorities
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