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JOINT ECONOMIC

United States Senate
WASHINGTON, DC 20510

November 20, 2014

The Honorable Gina McCarthy
Administrator
U.S. Environmental Protection Agency
EPA Docket Center (EPA/DC), Mailcode 28221T
Attention Docket ID No. OAR–2013-0602
1200 Pennsylvania Avenue NW
Washington, DC 20460

Dear Madam Administrator:

I am writing to provide comments on the Environmental Protection Agency's (EPA) proposed Clean Power Plan for existing power plants, "Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units; Proposed Rule," published in the Federal Register on June 18, 2014. I also wish to express my appreciation to you for convening the public hearing held in Pittsburgh on July 31. The hearing was important for my constituents to have adequate opportunity to comment on this rule and I believe my constituents have much to contribute in that regard.

I. Climate Change Driven by Carbon Pollution Poses a Serious Threat to Public Health, the Environment and the Nation's National Security

Carbon pollution poses a threat to public health and the environment. Climate change is already affecting much of the Nation, including Pennsylvania, and it is imperative for us to develop sensible policies to stave off more dramatic consequences over the next century. How the threat of climate change is addressed is important for a state like Pennsylvania during an economic recovery. Although addressing climate change represents a significant challenge for the Nation and the world, Pennsylvania has the necessary natural and intellectual resources to minimize and mitigate these impacts while moving us towards energy independence and creating jobs across the Commonwealth. Pennsylvania has established itself as an industry leader through the development of clean energy sources, the reduction of greenhouse gas emissions and the conservation of water and other natural resources. These efforts not only reduce our dependence on foreign oil and create jobs, but they also work to preserve the richness, beauty and diversity of the Commonwealth's natural environment.

The Nation stands at a critical crossroads. Looking in one direction is the "status quo" in which we ignore the scientific evidence about the need to reduce carbon pollution to address the real threat of climate change. The threat of climate change to national security is real enough that the military has assessed its readiness to protect us and keep the peace in the face of climate change. Additional national security implications arising from already unstable regions of the world include not having enough drinking water or water to grow food due to increased drought from

climate change. Scientists nearly unanimously predict that, by the end of the century, average temperatures will reach 4°C above pre-industrial levels. According to a November 2012 report for the World Bank by the Potsdam Institute for Climate Impact Research and Climate Analytics, "Turn Down the Heat: Why a 4°C Warmer World Must be Avoided," countries across the globe would likely see the inundation of coastal cities; increasing risks for food production potentially leading to higher malnutrition rates; many dry regions becoming dryer, wet regions wetter; unprecedented heat waves in many regions, especially in the tropics; substantially exacerbated water scarcity in many regions; increased frequency of high-intensity tropical cyclones; and irreversible loss of biodiversity, including coral reef systems. The report states:

> The effects of climate change on agricultural production may exacerbate under-nutrition and malnutrition in many regions—already major contributors to child mortality in developing countries. Whilst economic growth is projected to significantly reduce childhood stunting, climate change is projected to reverse these gains in a number of regions: substantial increases in stunting due to malnutrition are projected to occur with warming of 2°C to 2.5°C, especially in Sub-Saharan Africa and South Asia, and this is likely to get worse at 4°C. Despite significant efforts to improve health services (for example, improved medical care, vaccination development, surveillance programs), significant additional impacts on poverty levels and human health are expected. Changes in temperature, precipitation rates, and humidity influence vector-borne diseases (for example, malaria and dengue fever) as well as hantaviruses, leishmaniasis, Lyme disease, and schistosomiasis.

Climate change will also have an effect on public health here in the United States. According to a study published in the Journal of the American Medical Association on October 15, 2014[1], the health effects of climate change include:

- Heat-related disorders, including heat stress and economic consequences of reduced work capacity;
- Respiratory disorders, including those exacerbated by fine particulate pollutants, such as asthma and allergic diseases;
- Infectious diseases, including vector-borne diseases, such as Lyme disease, and water-borne diseases, such as childhood gastrointestinal diseases;
- Food production, including reduced crop yields and an increase in plant diseases;
- Mental health disorders such as post-traumatic stress disorder and depression that are associated with natural disasters.

The authors specifically state that for heat-related disorders, "High-risk groups include elderly persons, those living in poverty or social isolation, and those with underlying mental illness… Dementia is a risk for hospitalization and death during heat waves… Increased frequency of kidney stones (likely precipitated by dehydration) also occurs during heat waves." Climate change can also have an effect on people with allergies and asthma. According to the authors, "Climate change may exacerbate allergies by enhancing pollen production and other allergens from nature. Fifty-five percent of the U.S. population tests positive for allergens, and more than

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[1] Jonathan A. Patz, Howard Frumkin, Tracey Holloway, Daniel J. Vimont & Andrew Haines, *Climate Change: Challenges and Opportunities for Global Health*, 312 JAMA, 1565, 1567–1569 n.15 (2014).

34 million have asthma." The authors of the *JAMA* article also state that, "In the Great Lakes region of the United States, climate modeling projects a 50 percent to 120 percent increase in overflow events by 2100." The authors state that waterborne diseases would be expected to increase particularly because of wetter weather and a rise in flooding. For example, "Childhood gastrointestinal illnesses in the United States and India have been linked to heavy rainfall."

I strongly believe that we have a duty to preserve the environment not just so we can have clean air to breathe and clean water to drink, but because this world is in our care for our children and our children's children. As a person of faith, I believe we must act because of our sacred stewardship of this earth. If ever there was an issue that people of faith should support, it is this one that affects all life on our planet. As individuals, as a nation, and as a global community, we must face and conquer the problem of climate change. The evidence of human-caused climate change is overwhelming. Climate change exists and human activities are a major factor. The evidence – rising average temperatures, melting glaciers, shifts in migratory bird patterns – is telling us something. We are failing in our duties as stewards of God's creation.

As a Pennsylvanian, I bear in mind that over forty years ago, Pennsylvanians overwhelmingly ratified the Environmental Rights Amendment to the Commonwealth's constitution, sending a clear message about Pennsylvania's commitment to stewardship of the Commonwealth's 46,055 square miles. That amendment reads:

> The people have a right to clean air, pure water, and to the preservation of the natural, scenic, historic and esthetic values of the environment. Pennsylvania's public natural resources are the common property of all the people, including generations yet to come. As trustee of these resources, the Commonwealth shall conserve and maintain them for the benefit of all the people.

As a public official twice elected to represent Pennsylvania in the United States Senate, I have an obligation to give meaning to that Constitutional directive through my work in the Senate. An excerpt from the book, *Pennsylvania: A History of the Commonwealth*, is also quite meaningful for me when I reflect upon Pennsylvania's environmental history:[2]

> Much of that natural beauty remains in Pennsylvania. At the dawn of the twenty-first century, the state's landscape is still implausibly as it was when the first European colonists saw it in the seventeenth century. The vast majority of the state's inhabitants today live compacted in a dozen metropolitan areas. Outside those areas, the vast majority of the state resembles, more than almost any other eastern state, the way it was in the colonial era. The same mighty rivers still run. The same deep forests still stretch to the same endless mountains.

So for all these reasons, we must reject the status quo and look to the other direction, our clean energy future in which we rise to the challenge of climate change and regain control of our economy and our national security. This can be a future in which we revitalize our economy by increasing our efforts in the areas of energy efficiency and conservation, by developing and adopting new, cleaner ways of producing electricity, and by creating jobs for today and for future generations.

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[2] Randall M. Miller & William Pencak, eds., *Pennsylvania: A History of the Commonwealth*, 383-384 (2002).

II. EPA Has Put Forth a Regulatory Proposal to Reduce Carbon Pollution That Squarely Confronts the Serious Threats Posed by Climate Change, Implementation of Which Should Reflect Individual State Realities

A: The Comprehensive Nature of the EPA Plan is Critical to Effectively Addressing Climate Change

In order to address the aforementioned consequences of climate change, EPA has put forth a comprehensive regulatory proposal to reduce carbon pollution. EPA's proposal comprises the state-specific carbon pollution reduction goals, as well as procedures for the state planning process in order to achieve the expected goal. My comments will focus on EPA's goal-setting process. On the whole, I support EPA's comprehensive system of reducing carbon pollution with the structure of building blocks, including:

1. Efficiency improvements at coal-fired electric generating units (EGUs);
2. Dispatching natural gas-fired EGUs more often;
3. Increasing the use of renewable, and zero-carbon or low-carbon, energy; and
4. Increasing demand-side energy efficiency.

This comprehensive approach has several advantages towards achieving the end goal of carbon pollution reduction. For example, increasing energy efficiency is critical in holding electricity use constant over the life of the program. Increased efforts at implementing policies for energy efficiency consistently have been shown to lead to financial savings in the long run.[3] As the price of electricity produced from renewable energy declines, its adoption will also work to reduce the growth of carbon pollution in an increasingly cost-effective manner. This inclusive method is a necessary and effective step to address carbon pollution and its effect on climate change.

B: To Ensure That Implementation is Feasible, EPA Must Address the Relatively High Burdens the Proposal Imposes on Pennsylvania Relative to Other States

Pennsylvania, with its strong and diversified energy sector and its tradition of innovation in developing new energy sources, should be well situated to play its part in reducing carbon under EPA's comprehensive approach. At the same time, as a net-energy-producing-state on which neighboring states rely for their power needs, and a state whose economy is built on affordable electricity for manufacturing and other energy-intensive, trade-exposed industries, Pennsylvania faces constraints and challenges not confronted by most other states. Thus, while I generally support EPA's approach, I am concerned with several elements that would disproportionately and unfairly burden the Commonwealth of Pennsylvania. These specific concerns are presented in the sections that follow.

Pennsylvania has had a long history of developing its energy resources and using these resources to spur industrial growth and create jobs. Pennsylvania has a proud heritage as an industrial and

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[3] MEGAN A. BILLINGSLEY, IAN M. HOFFMAN, ELIZABETH STUART, STEVEN R. SCHILLER, CHARLES A. GOLDMAN & KRISTINA LACOMMARE, ERNEST ORLANDO LAWRENCE BERKELEY NATIONAL LABORATORY, "THE PROGRAM ADMINISTRATOR COST OF SAVED ENERGY FOR UTILITY CUSTOMER-FUNDED ENERGY EFFICIENCY PROGRAMS" (2014).

manufacturing state rich in natural resources such as coal, oil, and natural gas. Making use of our coal and natural resources, Pennsylvania emerged as the Nation's leading steel producer. While heavy industry like steel making has declined in our state and elsewhere, Pennsylvania still manufactures specialty metal products, transportation equipment, machinery, chemicals, and a wide variety of plastic, rubber, stone, clay, and glass products. More recently, technology has allowed access to the vast Marcellus Shale natural gas reserve that underlies a large portion of the Commonwealth. Taking advantage of the well-trained, dedicated and skilled workforce combined with the entrepreneurial spirit that has grown out of our industrial past and present, Pennsylvania has also fast become home for an increasing number of clean and renewable energy companies. According to the Bureau of Labor Statistics, the green goods and services sector employed 167,397 Pennsylvanians in 2011, an increase of four percent from 2010.[4]

The transition to clean energy must include a pathway for multiple forms of electricity generation including coal, nuclear energy and hydropower, as well as consider our manufacturing and industrial sectors. Pennsylvania ranks fourth in coal production and coal provides about 40 percent of its electricity. Moreover, the reliability and reasonable cost of coal-based electricity is critical to the energy-intensive industries in Pennsylvania (including steel, cement, pulp and paper, and glass) and to Pennsylvanians who must balance their household budgets. We need to keep coal in our energy mix, but in a manner that reduces pollution. Coal is an important domestic resource that we cannot simply ignore for the sake of expediency. I will continue to fight to ensure that clean coal and natural gas are included in a national strategy to reduce carbon emissions and that affordable electricity remains available. It is of great importance to me that American families are not left behind as the nation addresses the challenge of climate change.

III: EPA's Renewables Goal for Pennsylvania is Grossly Inflated, Was Developed Using a Flawed Methodology and Would Impose Substantial Costs on Pennsylvania Ratepayers Which Cannot be Mitigated Through Additional Emission Reductions from Other Sources

Introduction

Increased generation from renewables comprises the single largest component in EPA's development of Pennsylvania's overall carbon emission rate target. Specifically, under EPA's scenario, increased renewables would account for nearly 50 percent of the total carbon emission reductions needed to move Pennsylvania from its 2012 emissions rate to the 2030 target rate prescribed for it by EPA.[5]

This heavy reliance on increased renewables stands out as peculiar in light of Pennsylvania's limited potential—relative to other states—for expanding its renewables capacity. Under EPA's

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[4] News Release, U.S. Dep't of Labor Bureau of Labor Statistics, Employment in Green Goods and Services – 2011 at 15 (March 19, 2013), *available at* http://www.bls.gov/news.release/pdf/ggqcew.pdf

[5] EPA proposes that Pennsylvania reduce its carbon emission rate from 1,627 lbs/MWh in 2012, to 1,052 lbs/MWh in 2030, for a total reduction of 575 lbs/MWh. Of this total reduction, 278 lbs/MWh, or 48.3%, is attributable to increased renewables. U.S. Envtl. Prot. Agency, *Clean Power Plan State Goal Visualizer*, http://www2.epa.gov/sites/production/files/2014-09/cpp_state_goal_rate_calculation_viewer_-_final_3_0_0.xlsm, (last visited Nov. 11, 2014).

scenario, Pennsylvania would be required to increase its reliance on renewables eight-fold, which is greater than any state in the country outside of the East Central region.[6] Yet among all states, Pennsylvania ranks second to last in terms of technical potential for meeting the overall needs of its own energy sector through renewable generation.[7]

This sharp disparity between the inflated renewables target EPA used to establish Pennsylvania's emission rate goal, and the state's limited renewable energy potential relative to other states, is directly traceable to flaws in EPA's methodology for computing renewable energy targets. These flaws produce biases both across regions of the country, as well as within the East Central region to which Pennsylvania was assigned, all of which work to the detriment of Pennsylvania. One way to correct for some of these biases is discussed below.

Finally, EPA's flawed methodology, if left uncorrected, would impose significant costs on Pennsylvania ratepayers that cannot be mitigated through emission reductions from other building blocks.

A: EPA's Emissions Target for Pennsylvania Rests on the False Premise That the State Can Increase its Reliance on Renewables by a Factor Greater than Any State Outside the East Central Region, Notwithstanding EPA's Own Data Which Indicate Pennsylvania Lags Every State in the Country but One in Terms of Potential Renewables Relative to the Needs of its Own Energy Sector.

In order to meet EPA's renewable energy target, Pennsylvania would need to increase the amount of electricity it obtains from renewable sources by a multiple of eight times between 2012 and 2030. This multiple exceeds what EPA is expecting of any other state in the country outside the East Central region to which Pennsylvania was assigned for purposes of developing renewable energy targets.[8] Indeed, outside the East Central region only seven states would even be expected to increase renewables as a percentage of total generation by a factor as much as

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[6] Pennsylvania would be expected to increase its renewable generation level from 2% of total generation in 2012, to 16% of total generation in 2030, an eight-fold increase. See Table 6 in Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, 79 Fed. Reg. 117,34830, 117,34868 (proposed June 18, 2014) (to be codified at 40 C.F.R. pt. 60).

[7] Data on potential renewables were drawn from a report prepared by the National Renewable Energy Laboratory. Total potential renewables for each state were calculated as the sum of technical potential generation across all renewable categories reported by NREL. Each state's total potential renewable generation was then divided by its overall 2012 generation which provides a measure of its relative ability to meet future electricity needs through in-state renewables generation. By this measure, Pennsylvania ranks second to last among all states and the District of Columbia. Only Connecticut ranks lower. ANTHONY LOPEZ, ET AL., NATIONAL RENEWABLE ENERGY LABORATORY, U.S. RENEWABLE ENERGY TECHNICAL POTENTIALS: A GIS-BASED ANALYSIS TECHNICAL REPORT NREL/TP-6A20-51946 (2012) [Hereinafter RENEWABLE ENERGY POTENTIALS].

[8] Proposed Carbon Emission Guidelines, 79 Fed. Reg. at 117,34868. In addition to Pennsylvania, only MD, NJ, and OH, all assigned to the East Central region, would be required to increase renewables by a factor of eight or more.

four times.[9] Another fifteen states would only be expected to increase renewables as a percentage of generation by a factor of two times or less, or in some cases not at all.[10]

At the same time that Pennsylvania would be expected to increase its reliance on renewables at a rate greater than all states beyond the East Central region, it ranks close to the bottom among all states in terms of technical potential for meeting its overall energy needs through in-state renewable generation. Specifically, according to back-up data relied upon by EPA itself, Pennsylvania ranks fiftieth among the 50 states and the District of Columbia in terms of potential renewable generation relative to the historic needs of its overall energy sector.[11] Moreover, a broader comparison of these rankings against increases in renewables EPA is expecting from other states, reveals an upside-down and illogical pattern where states with greater potential renewables would generally be expected to grow their reliance on renewables less than states with more limited renewable potential. For example, all of the fifteen states noted above, which would be expected to grow renewables by only two times or less, rank among the top half of all states in terms of potential renewables relative to total historic generation.

Thus, there is a stark disconnect between Pennsylvania's limited potential—relative to other states—for expanding its renewable generation capacity, and the highly ambitious rate of increase in renewable energy—exceeding that of nearly every other state—which EPA assumed for Pennsylvania in developing the state's overall emission rate target. This incongruity calls into question the fairness and validity of EPA's methodology for integrating renewables into its overall target setting process and raises concerns that this methodology contains inherent biases that disproportionately burden Pennsylvania vis-à-vis other states. As explained below, close examination of EPA's methodology bears out these concerns.

B: EPA's Flawed Methodology for Developing Renewables Targets Imposes a Disproportionate Burden on Pennsylvania Relative to Other States with Much Greater Renewable Resources.

EPA purports to estimate each state's "potential renewables" available for inclusion in setting the state's overall emission rate target through a multi-step process that begins with assigning each state to one of eight regions.[12] Pennsylvania was assigned to the East Central region which also includes Delaware, District of Columbia, Maryland, New Jersey, Ohio, Virginia, and West Virginia.[13] EPA then calculates a "renewable generation target"[14] for each region, from which it derives an "annual growth factor"[15] that would allow the region as a whole to reach its renewable

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[9] *Id.* States include AL, CT, MA, NY, RI, SC, and TN.
[10] *Id.* States include AK, AZ, CA, HI, ID, IA, KS, ME, MN, MT, NM, ND, OK, OR, SD.
[11] RENEWABLE ENERGY POTENTIALS, *supra* note 7.
[12] U.S. ENVTL. PROT. AGENCY OFFICE OF AIR AND RADIATION, DOCKET ID NO. EPA-HQ-OAR-2013-0602, TECHNICAL SUPPORT DOCUMENT FOR CARBON POLLUTION GUIDELINES FOR EXISTING POWER PLANTS: EMISSION GUIDELINES FOR GREENHOUSE GAS EMISSIONS FROM EXISTING STATIONARY SOURCES: ELECTRIC UTILITY GENERATING UNITS GHG ABATEMENT MEASURES at 4-2 (2014) [hereinafter GHG ABATEMENT MEASURES TSD].
[13] *Id.* at 4-15.
[14] *Id.* at 4-12.
[15] *Id.* at 4-17.

target in 2029. This regional annual growth factor is then applied to individual states' historic 2012 renewable levels to calculate each state's interim and final renewable targets.[16]

As illustrated below, this methodology produces some highly anomalous results. In the first instance, these results appear to be driven by the disparate annual growth factors developed for each of the eight regions. In particular, the annual growth factor for the East Central region, at 17 percent, is the highest among all eight regions in the country.[17] As a consequence, several states in the East Central region—including Pennsylvania, Maryland, New Jersey, and Ohio—would need to grow their renewables by eight times or more to achieve their ultimate renewables targets. By contrast, the annual growth factor for the North Central region—an area awash in potential renewables that dwarf those available in the East Central region—is only six percent.[18] Consequently, no state in the North Central region would be required to grow its renewables at a rate remotely approaching rates applicable to any state in the East Central region. To the contrary, four states in the North Central region—Iowa, Minnesota, North Dakota, and South Dakota—would not need to grow their renewables at all; while the other states in the region—Indiana, Illinois, Michigan, and Missouri—would only need to increase their renewables at rates in the range of two to three times.[19]

Drilling down into how the regional annual growth factors were developed reveals why EPA's methodology produces such anomalous results. This development starts from the renewable generation targets EPA set for each region. These regional targets were calculated by taking an average of the goals set forth in Renewable Portfolio Standards (RPS) for those states in each region that have adopted RPSs.[20] Significantly, in calculating these targets EPA gave no consideration at all either to states' actual historic renewable generation levels or to states' estimated technical potential for future renewables generation.

EPA justifies its exclusive reliance on RPS standards asserting they reflect state level renewable requirements that have been implemented in 29 states plus Washington D.C. representing all regions of the country. EPA offers as further justification that RPSs have been developed and implemented with technical assistance from state-level regulatory agencies, and that they reflect expert assessments of renewable technical and economic potential.[21]

I do not dispute the relevance of RPSs as one possible proxy for estimating states' renewable potentials. Nor do I contend that RPSs should play no role at all in EPAs development of states' renewable targets. However, it is indisputable that EPA's sole reliance on state RPSs provides a measure of renewable potential that is at best indirect, incomplete, and needlessly imprecise. Moreover, as demonstrated below, EPA's computational technique for combining RPSs and plugging the gaps which are inherent in its methodology introduces biases both across regions and within the East Central region that work to the unfair detriment of Pennsylvania.

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[16] *Id.* at 4-19.
[17] *Id.* Table 4.5 at p. 4-18.
[18] *Id.*
[19] Table 6 in Proposed Carbon Emission Guidelines, 79 Fed. Reg. at 117,34868, *supra* note 6.
[20] GHG ABATEMENT MEASURES TSD, *supra* note 12, at 4-12.
[21] *Id.* at 4-2.

1: EPA's Flawed Methodology Produces Biases Between Regions of the Country that Work to the Detriment of Pennsylvania and Other States in the East Central Region.

The most obvious defect with relying exclusively on state RPSs is that 21 states—including many with very substantial renewables potential—have not established RPSs at all. For example, in the North Central region, neither Iowa, North Dakota, nor South Dakota have enacted RPSs.[22] Notably, however, all three of these states have historically produced large amounts of power from renewable sources. Indeed, Iowa and North Dakota—both states with economies and overall electricity generation that are a small fraction the size of Pennsylvania's—had higher renewables generation than Pennsylvania in 2012.[23] Moreover, all three of these states have technical potential renewables many times that of Pennsylvania; specifically 9 times greater for Iowa, 13 times greater for North Dakota, and 15 times greater for South Dakota.[24] Yet incredibly, EPA's proposed method for establishing regional renewable targets, regional annual growth factors, and ultimately individual states' renewable targets gives no recognition whatsoever to these states' tremendous estimated technical potential for future renewables.

Similarly, the South Central region has immense potential for the further development of renewable energy sources. Yet only one state in that region—Kansas—has an RPS that gets factored in to the computation of the region's renewable target.[25] Other states in the region include Texas which has potential renewables 71 times greater than Pennsylvania; Oklahoma, 16 times greater; Nebraska, 18 times greater; Louisiana, 6 times greater; and Arkansas, 5 times greater.[26] Because none of these five states have RPSs, their very considerable potential renewables do not get factored in to the region's renewable generation target or, in turn, in to the region's annual renewables growth factor. This leads to the peculiar and obviously biased result whereby the South Central region, with all of its highly abundant renewable resources, is assigned an annual renewables growth factor of only 8 percent, less than half the 17 percent growth factor for the East Central region which by comparison has relatively meager renewables potential.[27]

2: EPA's Flawed Methodology Produces Biases Within the East Central Region by Ignoring Pennsylvania's Role as the Region's Predominant Producer and Consumer of Electricity and Imposing on Pennsylvania the Policy Choices of Neighboring States with Very Dissimilar Economic and Energy Profiles.

In addition to producing inequities across regions, EPA's method of combining RPSs to derive individual states' renewables targets leads to unfairness and distortions within

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[22] *Id.* at 4-11, 4-15.
[23] *Id.* Table 4.9 at 4-29.
[24] RENEWABLE ENERGY POTENTIALS, *supra* note 7.
[25] GHG ABATEMENT MEASURES TSD, *supra* note 12 at 4-11, 4-15.
[26] RENEWABLE ENERGY POTENTIALS, *supra* note 7.
[27] GHG ABATEMENT MEASURES TSD, *supra* note 12, Table 4.5 at p. 4-18.

regions. EPA explains that it chose "RPS mandated quantities as the basis for deriving regional targets to be applied to states" because they provide "a reasonable benchmark of regionally cost-effective renewable generation which states could grow towards over time."[28] I agree that in principle this is an appropriate guiding objective. In practice, however, EPA's method of combining state-level RPS standards—which in some cases bear no relationship at all to a state's actual renewable generation—introduces gross distortions and comes nowhere close to producing a "reasonable benchmark of regionally cost-effective RE generation."

The flaw in EPA's methodology arises from its decision to compute regional generation targets by simply taking the arithmetic average of RPSs of those states in each region that have established RPSs. In so doing it gives no further consideration to the unique characteristics of each state that bear on the overall potential for cost-effective renewables generation in the region. Thus, for the East Central region EPA takes the sum of:

Delaware	19%
District of Columbia	20%
Maryland	18%
New Jersey	22%
Ohio	9%
Pennsylvania	8%[29]

EPA then divides this sum—96—by the number of states with RPSs—6—to come up with a regional renewables target of 16 percent (which translates to a regional growth factor of 17 percent).

The first problem with this approach is that it excludes Virginia and West Virginia—neither of which have adopted RPSs—from the calculation altogether. As a matter of consistency—and accepting EPA's premise that RPSs provide a reasonable benchmark of regionally cost-effective RE generation—it would be appropriate to include these two states in the computation to reflect that effectively both have RPSs of zero. Doing so would reduce the regional target from 16 percent to 12 percent.

A further serious problem with EPA's methodology is the equal weighting it gives to each state's RPS. While perhaps convenient, this shortcut obscures factors which are clearly relevant in assessing the overall renewables potential of the region. For example, Pennsylvania with its large energy intensive industrial base is by far the largest producer and consumer of energy in the East Central region. By contrast, Delaware—with a much smaller population and geographic area, and a smaller economy that is less heavily dependent on energy intensive industry—generates less than four percent as much

[28] *Id.* at 4-2.

[29] Pennsylvania's Alternative Energy Portfolio Standard is, in fact, 18 percent by 2021 (0.5 percent from solar, 7.5 percent from Tier I and 10 percent from Tier II). EPA excludes all of Tier II because Pennsylvania allows certain non-renewable energy sources to fulfill the tier's requirements. However, much of Tier II has been fulfilled by renewable sources that EPA has otherwise excluded, such as existing hydropower.

electricity as Pennsylvania.[30] Yet EPA's methodology gives equal weight to Delaware's significantly higher RPS in setting a regional renewables target applicable to Pennsylvania.

Washington D.C. presents an even more dramatic illustration of the arbitrariness and distorting effect of EPA's methodology. The District's total electric generation is on the order of rounding error—only .03 percent—compared with Pennsylvania; its economy does not depend at all on energy intensive industry; and it has no utility level renewable generation whatsoever.[31] Yet again EPA's methodology gives equal weight to the District's significantly higher RPS in establishing a regional renewables target applicable to Pennsylvania.

It is apparent, then, that giving equal weight to Delaware and D.C.—both of which have insignificant electricity generation relative to Pennsylvania—produces a skewed and inflated regional target rather than a "reasonable benchmark of regionally cost-effective renewable generation" which EPA professes to be seeking. It is also apparent that EPA's methodology gives short shrift to distinctive features of Pennsylvania's electricity market and has the effect of imposing on Pennsylvania the policy choices of neighboring states with wildly dissimilar economies and energy profiles.

3: Correcting for the Biases Created by EPA Within the East Central Region Produces a More Plausible and Equitable Renewables Target That Reflects Pennsylvania's Own Policy Choices and Gives Full Consideration to the Conditions of the State's Electricity Market.

If, however, EPA remains committed to relying on RPSs to establish regional renewables targets, a more plausible approach, which dramatically reduces the biases inherent in its equal weighting method, would be to weight each state's RPS to reflect its proportionate share of overall generation in the region. Using this more reasonable and equitable approach would further reduce the renewable target for the East Central region from 12 percent to less than 9 percent.[32] This 9 percent regional renewable target translates to a regional annual growth factor of 12 percent (versus 17 percent using equal weighting of state RPSs). Applying this more realistic regional growth factor would then require Pennsylvania to increase its reliance on renewables by 4.3 times (versus eight times under EPA's approach) to achieve its final renewables target.

Compared with what EPA is expecting from other states, a 4.3 times increase in renewables is certainly a more plausible and fair goal for Pennsylvania. The average

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[30] *Id.* Table 4-1 at 4-6, 4-7.

[31] *Id.*

[32] Calculated by dividing total East Central region 2012 generation in MWh by total 2020 effective renewable energy level in MWh from proposed renewable energy approach data file provided by EPA. U.S. Envtl. Prot. Agency, CALCULATIONS TO DERIVE STATE RENEWABLE ENERGY TARGETS, EPA (last visited Nov. 11, 2014), http://www2.epa.gov/sites/production/files/2014-06/20140602tsd-proposed-re-approach.xlsx

increase EPA is targeting across all states is 3.24 times.[33] Thus a 4.3 times increase would still place Pennsylvania in the top half among all states which, if anything, is still very ambitious considering that Pennsylvania ranks next to last among all states in terms of renewable energy potential relative to the needs of its own energy sector.

Similarly, taking Pennsylvania's own RPS as a guideline, a 4.3 times increase in renewables provides a more fair and realistic result. Including just those renewables recognized by EPA, Pennsylvania's renewable generation constituted two percent of its overall generation for the 2012 base year.[34] Increasing this percentage by 4.3 times would require Pennsylvania to expand its generation from renewables to 8.6 percent of total generation by 2029. While this is somewhat higher than Pennsylvania's eight percent Tier 1 RPS—particularly considering that EPA excludes certain types of renewables that factor into Pennsylvania's RPS—it is at least in the same ballpark as the renewables requirement that Pennsylvania has imposed on itself. In contrast, an eight times increase, which would result from the renewables target proposed by EPA, would require Pennsylvania to essentially double its RPS target.

Clearly then, a 4.3 times increase, which reflects Pennsylvania's status as the predominant electricity producer in the East Central region, comports more closely with EPA's central guiding principle for setting overall emission targets, by giving full consideration to the state's own "fuel mix, and its electricity market ..." thereby ensuring that "each state's goal reflects its unique conditions."[35] Moreover, development of this 4.3 times increase fits more closely with EPA's specific justification for relying on RPSs to calculate renewables targets, in that it tracks relevant state experience and "state level goals and requirements (which) have been developed and implemented with technical assistance from state-level agencies, and utility commissions such that they reflect expert assessments of renewable technical and economic potential."[36]

C: EPA's Inflated Renewables Target for Pennsylvania Will Impose Substantial Costs on the State's Ratepayers That Cannot Be Mitigated Through Additional Emission Reductions from Other Sources

As discussed below, substantial costs will be imposed on Pennsylvania ratepayers if EPA does not lower the state's renewable energy target. Moreover, to a significant extent, these costs would not be accompanied by any offsetting financial benefits that would accrue to Pennsylvania's economy. Nor, contrary to the suggestion of EPA, would Pennsylvania be able to readily mitigate or avoid these costs—if it could do so at all—by squeezing additional emission reductions from one or more of the other building blocks.

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[33] Calculation of average (mean) of increase in proposed final goal renewable energy targets in relation to 2012 renewable energy percentage by state from RENEWABLE ENERGY TARGETS *supra* note 31.
[34] Table 6 in Proposed Carbon Emission Guidelines, 79 Fed. Reg. at 117,34868, *supra* note 6.
[35] Proposed Carbon Emission Guidelines, 79 Fed. Reg. at 117,34833.
[36] GHG ABATEMENT MEASURES TSD, *supra* note 12 at 4-2.

1: EPA's Inflated Renewables Target Would Require Pennsylvania Ratepayers to Make Additional Transfer Payments to Out-of-State Generators Which Provide No Offsetting Benefits to Pennsylvania's Economy

Pennsylvania electricity suppliers currently meet their RPS requirements (or Alternative Energy Portfolio Standards (AEPS) as referred to under Pennsylvania law) in one of three ways. First, they can receive credits by generating electricity from their own renewable sources. Second, they can buy electricity from renewable sources where the cost of renewable credits is included or bundled into the price of the purchased electricity. And third, they can buy renewable credits separately from the purchase of electricity itself. This third category—so-called unbundled credits—accounts for the largest share of credits used by Pennsylvania electricity suppliers to meet their renewable requirements.[37] During Pennsylvania's most recent reporting period (June 1, 2012 to May 31, 2013) electricity suppliers in the state spent more than $50 million to acquire unbundled credits needed to fulfill their Tier 1 RPS (or AEPS) requirements.[38] Because these expenditures are separate from and in addition to the price paid for purchased electricity ultimately supplied to Pennsylvania consumers, and because they account for the lion's share of credits used by suppliers to satisfy their RPS requirements, this $50 million figure provides a fair—and if anything conservative—measure of the additional costs imposed on Pennsylvania ratepayers by the state's current Tier 1 RPS standard.

While a portion of this $50 million flows to Pennsylvania companies or individuals generating renewable energy that feeds into the grid in Pennsylvania, a significant portion flows to renewable generators in other states such as wind farms in Illinois and Indiana. Specifically, approximately 60 percent of unbundled credits were purchased from out-of-state generators during the most recent, 2013, reporting period. Payments to these out-of-state generators constitute a sheer transfer of wealth from Pennsylvania ratepayers to say Illinois wind farm operators who were already being fully compensated for the electricity they produced by purchasers in their own or neighboring states. Moreover, unlike with credits purchased from renewable generators in Pennsylvania, it cannot be asserted, that these additional costs are accompanied by benefits accruing to Pennsylvania's economy associated with jobs and income created by the operation of these wind farms. Rather, these expenditures represent a pure cost to Pennsylvania ratepayers, a pure subsidy to out-of-state wind farm operators, and provide no direct offsetting contribution to Pennsylvania's economy.

Pennsylvania's heavy dependence on out-of-state renewable credits simply to meet its current RPS standard also suggests just how difficult and costly it would be if Pennsylvania were forced to increase its reliance on renewables by a factor of eight times as prescribed by EPA in setting the state's overall emission rate target. Of course it is hardly surprising that Pennsylvania is currently acquiring 60 percent of its renewable credits from out-of-state given that it lags every state but one in terms of potential

[37] Pa. Pub. Util. Comm'n, *2013 Annual Report: Annual Energy Portfolio Standards Act of 2004*, Oct. 2014, at 3.
[38] *Id.*

renewables relative to its overall electricity needs. For the same reason it is improbable to suppose that Pennsylvania could reduce its reliance on out-of-state credits as it ramps up just to meet its own progressively increasing RPS requirements. And it is wholly implausible to suppose that Pennsylvania could reduce this reliance—and thereby reduce the transfer payments its ratepayers make to out-of-state wind farms—if it is required to meet the much higher renewables target envisioned for it by EPA. To the contrary, both evidence and common sense point in the opposite direction. Specifically, over the three most recent reporting periods, as Pennsylvania's Tier I AEPS requirements have progressively ratcheted upwards, so too the percentage of credits purchased from out of state generators has increased steadily from 47 percent in 2011, to 55 percent in 2012, and to 60 percent in 2013.[39]

2: Costs Imposed by EPA's Inflated Renewables Target Cannot be Mitigated by Obtaining Additional Emission Rate Reductions from Other Building Blocks

EPA describes this first phase of its regulatory process as setting "state-specific emission rate-based CO2 goals" that reflect "EPA's calculation of the emission limitation that each state can achieve through the application of 'best system of emission reduction (BSER).'" It goes on to explain that states would not be required to apply any particular measures under one or more of the four building blocks that constitute the BSER to the same extent EPA determines is achievable, but instead would have flexibility to select the measure or combination of measures it prefers to meet its overall emission reduction goal. Thus, as EPA explains, a state could choose to achieve more reductions from one measure and less from another.[40]

In theory then, at least according to EPA, this flexibility should enable Pennsylvania to design an implementation plan that depends less on emission reductions from increased renewables generation but relies more heavily on reductions from measures in other building blocks such as heat rate improvements from coal fired generating units. In actuality, however, there is no way Pennsylvania could come up with additional reductions from other building blocks sufficient to materially offset the inflated expectations from renewables built into its overall emission rate target by EPA. As a matter of simple arithmetic, because of the outsized role EPA assigned to renewables in developing Pennsylvania's overall emission rate target, even relatively significant further emission reductions from other building blocks would permit only marginal adjustments to Pennsylvania's renewables target. Moreover, as discussed below, it is highly doubtful that even modest—let alone substantial—additional reductions could be derived from other building blocks.

a) Coal Heat Rate Improvement

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[39] *See* Pa. Pub. Util. Comm'n, *2011 Annual Report: Annual Energy Portfolio Standards Act of 2004*, Oct. 2012, at 10; Pa. Pub. Util. Comm'n, *2012 Annual Report: Annual Energy Portfolio Standards Act of 2004*, Oct. 2013, at 12; Pa. Pub. Util. Comm'n, *2013 Annual Report: Annual Energy Portfolio Standards Act of 2004*, Oct. 2014, at 8.

[40] Proposed Carbon Emission Guidelines, 79 Fed. Reg. at 117,34835.

In constructing Pennsylvania's overall emission rate reduction target of 575 lbs/MWh, EPA included reductions of 77 lb/MWh from building block 1, coal heat rate improvement.[41] Thus under EPA's scenario, increased efficiency at existing coal fired power plants would account for 13 percent of the total carbon emission reductions needed to move Pennsylvania from its 2012 emissions rate to its 2030 target rate.[42]

In developing states' emission reduction targets from heat rate improvement, EPA started from the premise that coal fired power plants, or electric generating units (EGUs), "are generally less efficient at converting fuel into electricity than is technically and economically possible."[43] Based on this premise it reasoned that there is "potential for broadly applicable efficiency improvements ....(that) would result in corresponding reductions in greenhouse gas emissions."[44] It then identified a number of technologies to improve the efficiency of existing EGUs , reviewed previous studies on heat rate improvement, and reviewed the experience of a number of EGUs that made year-to-year improvements in lowering their heat rates.[45]

Based on these reviews, EPA concluded that a total six percent heat rate improvement could be achieved, four percent through the adoption of best practices in operating EGUs, and 2 percent through equipment upgrades.[46] EPA also assumed a six percent heat rate improvement would directly translate to a six percent reduction in the net carbon emission rate.[47] Based on this assumption and using Pennsylvania's 2012 historic coal generation and coal emission rate, EPA then calculated the state's targeted emission rate reduction from coal heat rate improvement to be 77 lb/MWh.

I have not undertaken my own analysis of the reasonableness of EPA's conclusion that a six percent heat rate improvement is technically and economically feasible. I am aware, however, that the operators of Pennsylvania's coal fired EGUs have serious doubts about their ability to meet this standard. I understand they believe they are operating presently at or near heat rates that are technically and economically achievable at current levels of dispatch. Thus they seriously question whether they would be able, even under current circumstances, to

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[41] Figures derived from *Clean Power Plan State Goal Visualizer*, *supra* note 5.

[42] Heat rate is a common way to measure the efficiency of coal fired power plants. It is defined as the amount of heat input required on average to generate 1KWh of electricity. As the efficiency of a plant is increased, less coal is burned per kilowatt-hour generated, resulting in a decrease in carbon emissions. Thus, lower heat rates are associated with greater efficiency and reduced carbon emissions. GHG ABATEMENT MEASURES TSD, *supra* note 12 at 2-3,2-15.

[43] GHG ABATEMENT MEASURES TSD, *supra* note 12 at 2-1.

[44] *Id.*

[45] *Id.* at 2-5 - 2-34.

[46] *Id.* at 2-34.

[47] U.S. ENVTL. PROT. AGENCY OFFICE OF AIR AND RADIATION, DOCKET ID NO. EPA-HQ-OAR-2013-0602, GOAL COMPUTATION TECHNICAL SUPPORT DOCUMENT at 9 (2014) [hereinafter GOAL COMPUTATION TSD].

achieve anything approaching the six percent heat rate improvement established as a benchmark by EPA.

Moreover, I understand the operators of these units believe that with the shift in generation away from coal and towards natural gas which EPA is calling for, their ability to sustain even current heat rate levels will be compromised. In particular they observe that their coal generating units will forced to operate, on average, at a lower percentage of capacity and will become subject to greater fluctuations in dispatch as they move from being base load units to load following units. As EPA itself has recognized, both of these factors tend to increase heat rate levels and thus reduce the efficiency of coal fired EGUs.[48]

While I am not in a position to fully evaluate these concerns, I expect they will be presented and fully developed in comments filed by the operators of Pennsylvania's coal fired EGUs, and I urge EPA to give thorough and fair consideration to these comments. I do note, however, that assuming these concerns are well-founded, the prospect for further emission reductions from coal heat rate improvement, sufficient to facilitate even a very modest reduction in Pennsylvania's renewables target, would be illusory. To the contrary, assuming these concerns are correct, necessary modifications to the coal heat rate building block would create pressure to further increase renewables as a source of emission reductions rather than offering relief from already inflated renewables expectations.

b) Natural Gas Redispatch

In constructing Pennsylvania's overall emission rate reduction goal, EPA included reductions of 70 lbs/MWh from building block 2, redispatch from coal-fired EGUs to natural gas-fired EGUs. Thus, under EPA's scenario, substituting generation from less carbon intensive natural gas EGUs for more carbon intensive coal EGUs would account for 12 percent of the total carbon emission reductions needed to move Pennsylvania from its 2012 emission rate to its 2030 target rate.[49]

EPA's formulation of emission rate reductions available from redispatch starts from the indisputable fact that natural gas-fired EGUs emit significantly less carbon per unit of electricity generated than do coal-fired EGUs. Specifically, EPA cites national average carbon emission rates for 2012 of 2,220 lbs/MWh for coal-fired units versus only 907 lbs/MWh for natural gas-fired units.[50]

From there, EPA examined the potential for redispatch through increasing generation from natural gas EGUs now operating and those currently under construction. It explained that while natural gas EGU's are technically

[48] GHG ABATEMENT MEASURES TSD, *supra* note 12 at 2-5,2-23.
[49] Figures derived from *Clean Power Plan State Goal Visualizer*, *supra* note 5.
[50] GHG ABATEMENT MEASURES TSD, *supra* note 12 at 3-5.

"available"—i.e. exclusive of scheduled and unplanned maintenance and unplanned outages—to generate electricity approximately 87 percent of the hours in a year, in fact they have been operating on average at a utilization rate or "capacity factor" of only 46 percent.[51] EPA also observed that 10 percent of existing natural gas units operate at a capacity factor of 70 percent or greater, much closer to the technical availability limit of 87 percent.[52] Based on this observation, EPA then concluded that a 70 percent capacity factor is a reasonable fleet-wide average that each state's natural gas units should be capable of achieving.[53]

Applying this standard to Pennsylvania, EPA increased the state's natural gas generation to a level commensurate with operating at 70 percent of capacity and decreased the state's coal generation by an equivalent amount. Making these adjustments and factoring in the emission rate advantage natural gas has over coal, EPA then calculated that under building block 2, Pennsylvania could reduce its carbon emission rate by 70 lbs/MWh.

I am aware that some have questioned the reasonableness of EPA's 70 percent capacity factor assumption. These observers, like EPA, begin by citing the figure of 10 percent of natural gas units that have operated at or above this level. However, taking a "glass half empty" perspective, they then focus on the 90 percent of units that historically have operated below this level and question whether a 70 percent fleet-wide average utilization rate—while technically feasible—is realistic based on the operational experience of the vast majority of existing units that have failed to meet this benchmark. At the same time, I am also aware that some operators of natural gas fired EGUs in Pennsylvania are confident of their ability to meet or even exceed a 70 percent capacity level.

I am not in a position to opine on whether a 70 percent fleet-wide capacity level is reasonable or achievable. Whether or not it is, however, I have serious doubts that attempting to increase this benchmark would provide Pennsylvania any meaningful relief from EPA's inflated renewables target. Granting EPA the benefit of the doubt—and then some—assume Pennsylvania were to adopt a 75 percent capacity factor. This would result in a significant relative increase in building block 2 emission reductions, from 70 lbs/MWh to 94 lbs/MWh.[54] Yet because of EPA's heavy reliance on renewables in constructing Pennsylvania's overall emission rate goal, this substantial proportionate increase in the state's building block 2 target would translate to only a nine percent downward

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[51] *Id.* at 3-5, 3-6.
[52] *Id.* at 3-9.
[53] *Id.*
[54] Using the state goal data computation spreadsheet provided by EPA shows that an expansion of the NGCC capacity factor from 70% to 75% for PA results in a reduction of the final emission rate from 1052 lbs/MWh to 1028 lbs/MWh (a reduction of 24 lbs/MWh), all else being equal for building blocks 1, 3, and 4. *Clean Power Plan State Goal Visualizer*, *supra* note 5.

adjustment in the state's inflated building block 3 renewables target. Moreover, even after this reduction Pennsylvania would be required to increase the percentage of electricity it derives from renewables by about seven-fold, which is still greater than any state in the country outside the East-Central region.[55]

Finally, even this very modest relief would be eroded because the further shift toward natural gas generation would be accompanied by a corresponding shift away from coal generation. As explained above this further decline in coal dispatch would decrease the efficiency (i.e. increase the heat rate) of the state's coal-fired fleet thus further limiting the potential for emission rate reductions from building block 1.

c) Energy Efficiency

In constructing Pennsylvania's overall emission rate reduction goal, EPA included reductions of 105 lb/MWh from building block 4, demand-side energy efficiency.[56] Thus, under EPA's scenario, reduced electricity generation, from the adoption of demand-side energy efficiency measures, would account for 18 percent of the total carbon emission reductions needed to move Pennsylvania from its 2012 emission rate to its 2030 target rate.

To calculate states' emission abatement targets from reduced electricity consumption, EPA first developed what it characterizes as "best practices," to provide an "estimate of the potential for states to implement policies that increase investment in cost-effective demand-side energy efficiency technologies and practices."[57] Based on its review of past performance across all states, and the requirements states have put in place for further savings to be achieved by 2020, EPA chose a best practices level of performance applicable to all states of 1.5 percent incremental savings as a percentage of retail sales.

Looking at these same factors, EPA then established a trajectory or "pace of improvement" necessary to move states from their historic levels of energy efficiency performance to the best practices level. This pace of improvement was set at 0.2 percent per year for all states.

Through a series of state-specific calculations, EPA then applied this "pace of improvement" to establish a level of cumulative savings as a percentage of retail sales for each state. For Pennsylvania, this cumulative savings level was set at 11.69 percent of baseline retail sales.

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[55] Further calculation from expansion of the NGCC capacity factor shows a corresponding reduction in the renewable generation goal for PA of only 2% (from 16% to 14%) in order to achieve EPA's PA emission rate goal of 1052 lbs/MWh. *Id.*

[56] Figures derived from *Clean Power Plan State Goal Visualizer*, *supra* note 5.

[57] GHG ABATEMENT MEASURES TSD, *supra* note 12 at 5-30.

These state specific levels of cumulative savings as a percentage of retail sales are significant for two reasons. First, they provide a relative measure of efforts states would need to make to achieve reductions in energy consumption necessary to meet the building block 4 targets EPA used in computing their respective emission rate goals. This allows for comparisons to be drawn among states with respect to the level of effort they would need to expend to meet their energy efficiency targets. Second, these state specific savings levels are what drive the computation of the building block 4 targets for each state. So, for example, following procedures described in its *Goal Computation TSD*, EPA derived Pennsylvania's building block 4 target emission reduction of 105 lb/MWh, from the 11.69 percent cumulative savings level it established for the state.[58]

Review of the cumulative savings levels EPA is expecting from other states reveals that Pennsylvania ranks toward the high-end in terms of efforts it would be expected to make to reduce its energy consumption.[59] Specifically, Pennsylvania's cumulative savings level places it ninth highest among the 50 states and the District of Columbia.[60] On its face, this relatively high ranking calls into question the fairness and feasibility of requiring Pennsylvania to rely even more heavily on energy efficiency measures to achieve further emission reductions.

Moreover, attempting to obtain additional emission reductions from building block 4, would impose demands on Pennsylvania that move it well out of the mainstream among other states in terms of energy efficiency expectations, while providing negligible relief from EPA's inflated renewables target for the state. For example, assume Pennsylvania were to adopt an implementation plan based on a cumulative savings level of 12.2 percent, versus 11.69 percent which EPA used to compute the state's overall emission rate goal. Pennsylvania would then rank first among all states and the District of Columbia in terms of cumulative savings as a percentage of retail sales.[61] Yet even though Pennsylvania would then exceed all states in terms of energy efficiency efforts, this increase would only provide additional emission reductions of 4 lb/MWh.[62] Assuming all of these reductions were used to offset Pennsylvania's renewables target, this would provide very scant relief, allowing for an adjustment from 278 lbs/MWh to 274 lbs/MWh or only 1.4 percent.

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[58] Figures derived from *Clean Power Plan State Goal Visualizer*, *supra* note 5.
[59] GHG ABATEMENT MEASURES TSD, *supra* note 12, Table 5-21 at 5-46.
[60] *Id.*
[61] *Id.*
[62] Computation based on methodology described in *Goal Computation TSD* using EPA's state goal data computation spreadsheet: http://www2.epa.gov/sites/production/files/2014-06/20140602tsd-state-goal-data-computation_1.xlsx. GOAL COMPUTATION TSD, *supra* note 47 at 18.

IV. EPA Should Create a Subcategory for Electric Generating Units That Use Coal Refuse Since They Cannot Switch Fuel and They Provide Other Environmental Benefits

As I stated earlier, Pennsylvanians have been mining coal for 200 years. Before modern coal mining laws and regulations were in place, coal that was undesirable because it was very low in heat content was haphazardly discarded all across Pennsylvania's landscape. The Pennsylvania Department of Environmental Protection has testified that it would cost billions of tax dollars and take over 500 years to clean up these coal refuse ("waste coal") piles. Waste coal power plants were created as a zero-cost way to rid Pennsylvania's landscape of these piles.

The Commonwealth of Pennsylvania has 13 waste coal-fired power plants in both the bituminous and anthracite coal regions. These plants use state-of-the-art circulating fluidized bed (CFB) technology to convert waste coal into energy. This has yielded significant environmental benefits for Pennsylvania by removing hundreds of millions of tons of coal refuse stockpiles. These legacy piles cause blight and pose a serious risk to the affected communities. Removal of the piles through the use of the coal refuse in these electric generating units has prevented acid mine drainage and allowed for the reclamation of thousands of acres of previously-damaged land and the restoration of hundreds of miles of polluted streams. This has saved between $100 and $200 million in potential cleanup costs for taxpayers.

Fuel switching is not an option for these plants. They cannot switch to higher-energy forms of coal or other fuels as this would defeat the purpose of these plants. If waste coal power plants did not exist to remove the legacy coal refuse piles, then greater potential exists for uncontrolled releases of carbon and other harmful air pollution from accidental burning of the piles, which is a frequent occurrence. The Commonwealth of Pennsylvania has spent millions of dollars fighting and extinguishing such fires that also create the risk of igniting fires in nearby coal seams, which poses an even greater danger and air pollution hazard.

I suggest that EPA create a subcategory for electric generating units that use coal refuse, and thus would not switch to fuel with a higher Btu rating, and recalculate a goal emission rate specific to these plants so they may continue to do the essential task of cleaning up coal refuse piles.

V. EPA Arbitrarily Excludes Certain Forms of Zero-Carbon or Low-Carbon Energy from Emission Rate Goal Achievement

EPA is excluding certain clean power sources like existing nuclear and hydropower from state achievement of the final emission rate in 2030 based on the rationale that it is seeking to encourage future behavior rather than recognize past behavior. However, given that EPA does recognize other existing forms of clean power such as wind and solar, the selective application of this rationale produces some highly arbitrary and unfair results. For example, as I noted earlier, four states in the North Central region—Iowa, Minnesota, North Dakota, and South Dakota—would not need to grow their renewables at all because they would be allowed to include their existing wind power resources in the computation of their final emission rate.

Because the majority of existing nuclear and hydropower would not be counted in a state's final emission rate calculation, this has the effect of encouraging generation from new natural gas plants to be substituted for generation from existing nuclear power or hydropower plants. Of course, in the real world, such substitutions would increase, rather than decrease, carbon emissions. However, given EPA's irrational decision to leave out existing nuclear and hydropower, such substitutions—or even the closure of all existing nuclear and hydropower plants—would have either no effect on the EPA-calculated carbon emission rate or could conceivably reduce it. If EPA's intent is to lower carbon intensity by reducing greenhouse gas emissions from existing fossil fuel-fired EGUs, then EPA must create a greater incentive for all zero-carbon and lower-carbon energy sources without arbitrarily excluding any of these sources. Likewise, EPA must not provide a contradictory incentive to increase carbon emissions in order to achieve a final calculated goal.

Nuclear power provided 35 percent of Pennsylvania's electricity in 2013, the second highest in the Nation.[63] By giving Pennsylvania credit for only 6 percent of nuclear power (at-risk nuclear), EPA is not providing an incentive for the other 94 percent to remain in operation. Nuclear power may be at greater risk of closure in Pennsylvania, where it provides a large proportion of zero-carbon energy, because of the Commonwealth's competitive (deregulated) electricity market. By not giving a larger credit to nuclear or other forms of existing zero-carbon energy such as hydropower, EPA has provided a disincentive for these generators to continue operation since states will receive only a small, or no, emission rate reduction if these sources remain in operation.

Further, biomass is an important resource in the Commonwealth. Pennsylvania in July 2014 ranked fifth in the Nation for the production of electricity from biomass in the electric power sector.[64] Biomass generally sequesters carbon before it is used in an energy facility, thus it could be considered a net-zero-carbon energy source. While EPA mentions in its proposal the use of biomass energy as one option the states can use to mitigate carbon pollution, EPA must better clarify how it intends to treat biomass energy in determining a state's emission rate. I ask EPA to give all due consideration to comments from my constituents regarding these issues.

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[63] U.S. Energy Info. Admin., State profile and energy estimates for Pennsylvania (March 24, 2014), http://www.eia.gov/state/?sid=PA.

[64] U.S. Energy Info. Admin., Electric Power Monthly with Data for July 2014 (September 2014), http://www.eia.gov/electricity/monthly/current_year/september2014.pdf.pdf/epm.pdf.

Conclusion
EPA should re-examine its formulation of targeted emission rate reductions under all four building blocks, particularly renewable energy, to ensure Pennsylvania is not disproportionately burdened in the National effort to reduce carbon pollution.

We have the obligation to take back control of our national security, our energy future, and our economy. I believe we must not pick winners and losers in the types of energy we pursue in our efforts to reduce pollution. Renewable energy, energy efficiency, clean coal, nuclear, and natural gas all have an important role to play in shifting to a lower carbon economy. But if our pursuit is properly planned, we can foster economic control and support our nation's communities in strategically shifting forward to a lower carbon economy.

Sincerely,

Bob Casey, Jr.

Robert P. Casey, Jr.
United States Senator