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Attn: Docket ID No. EPA-HQ-OAR-2013-0602

Dear Administrator McCarthy:

The Southern Environmental Law Center, Appalachian Voices, and the Virginia Conservation Network (collectively, "Conservation Groups") appreciate the opportunity to provide comments to the Environmental Protection Agency ("EPA") on the proposed Carbon Pollution Emission Guidelines for Existing Stationary Sources—Electric Utility Generating Units ("Clean Power Plan" or "CPP") at 79 Fed. Reg. 34830 *et seq.* (June 18, 2014).[1] We strongly support the CPP's purpose of achieving significant carbon reductions from the power sector in a cost-effective manner. The nation's existing fossil fuel-fired power plants constitute the largest single source of carbon emissions in the country. No meaningful effort to address the severe human and environmental effects of climate change can occur without limiting such emissions. We agree with EPA that the most cost-effective approach must reflect an understanding that power generating sources are part of an electrical system, interconnected through the electric grid.

The Southern Environmental Law Center ("SELC") is a non-profit, regional environmental organization dedicated to the protection of natural resources throughout the Southeast. Through utility regulatory proceedings, stakeholder processes, and legal and administrative matters under the Clean Air Act, SELC works extensively on issues concerning energy resources and their impact on the people, culture, environment, and economy in six Southeastern states – Virginia, North Carolina, South Carolina, Georgia, Alabama, and Tennessee. Since 2005, SELC has participated in 26 proceedings before the Virginia State Corporation Commission ("SCC"), which oversees Virginia's two largest investor-owned utilities, Dominion Virginia Power ("Dominion") and Appalachian Power Company ("Appalachian Power"). These proceedings have included integrated resource plan ("IRP") dockets, rate cases, demand-side management ("DSM") program approvals, DSM cost-recovery, certificates of public convenience and necessity, solar program approvals, and transmission infrastructure approval dockets. We also have extensive experience working on matters falling

[1] These comments also address information provided in the October 28, 2014 Notice of Data Availability and the additional information on a mass-based conversion provided on November 6, 2014. *See* Clean Power Plan Proposed Rule Notice of Data Availability – Oct. 28, 2014, 79 Fed. Reg. 64,543; Clean Power Plan Proposed Rule Notice: Additional Information Regarding the Translation of Emission Rate-Based CO2 Goals to Mass-Based Equivalents – Nov. 6, 2014, 79 Fed. Reg. 67,406.

within the authority of the Virginia Department of Environmental Quality ("DEQ"), as the state implementing agency for the Clean Air Act, including Title V and Prevention of Significant Deterioration ("PSD") permits. We also regularly engage in state lawmaking and policy venues on energy issues. In particular, SELC was asked to present at a joint hearing of the Virginia House and Senate Commerce and Labor committees on the Clean Power Plan and we are serving on the Governor's Climate Change and Resiliency Commission.

Appalachian Voices is an award-winning, nonprofit organization bringing people together to protect the communities and natural resources of the Appalachian region by promoting a shift from harmful, polluting energy practices, including mountaintop removal coal mining, to a cleaner, more just and sustainable energy future. With offices in Boone, N.C., Charlottesville, Va., Knoxville, Tenn., and Washington, D.C., Appalachian Voices works at the local, state and federal level, focusing on grassroots organizing and policy reform.

The Virginia Conservation Network ("VCN") is a network of more than 150 organizations committed to protecting Virginia's natural resources. We work to serve and strengthen our member organizations and we advocate for shared environmental priorities, our common agenda.

These comments draw on the Conservation Groups' extensive in-state experience, and focus specifically on the Commonwealth of Virginia.[2] We agree with EPA that power companies and state decision-makers have already undertaken or set in motion measures impacting various parts of the electrical system that will reduce emissions of carbon pollution from fossil fuel-fired power plants. In Part I of the comments, we summarize how EPA calculated Virginia's emission reduction target. In Part II, we discuss how the state-specific target proposed for Virginia is readily achievable. Collectively, as a result of decisions made long before the proposal was issued, Virginia is nearly 80 percent of the way toward achieving its target. The remaining 20 percent could be cost-effectively achieved through modest investments in energy efficiency and renewable energy resources. In Part III, we summarize an analysis performed by ICF International, which demonstrates that the cost of compliance to Virginia would actually be a net negative number (i.e., the cost of implementing the Clean Power Plan would be lower than the cost of Virginia's business-as-usual scenario) in nearly all years through 2030. In Part IV, we comment on certain aspects of the proposal regarding renewable energy, energy efficiency, and nuclear resources.[3] Finally, in Part V we discuss why implementing the proposal is necessary to

[2] In addition to these comments, SELC is filing sets of comments on impacts of the proposal in Alabama, Georgia, North Carolina, South Carolina, and Tennessee, as well as a separate set of comments on the treatment of biomass under the proposal.

[3] In large part, our comments address issues in the context of the proposed rate targets for Virginia and other states, without noting how state mass targets may affect those issues. However, as a general matter, we note that the Clean Air Act requires that any state plan be at least as stringent as the emission rate achieved by applying the Best System of Emission Reduction (BSER). *See* 42 U.S.C. § 7411(c); *see also* 79 Fed. Reg. at 34,900 (in adopting a state plan, a state must "establish an emission standard or set of emission standards, and, perhaps other measures, along with implementing and enforcing measures, that will achieve a level of emission performance that is equal to or better than the level specified in the state plan."); *Id.* at 34,917 ("[N]o 'backsliding' on overall plan emission performance through a plan modification would be allowed"). Therefore, if a state adopts a mass-cap compliance strategy in place of a rate-based target, EPA should ensure that the mass-cap achieves carbon emissions reductions at least as stringent as what the Clean Power Plan would require of that state under a rate-based target.

begin reigning in carbon emissions and addressing some of the most serious impacts of climate change here in the Commonwealth.

I. Summary of Virginia's Emission Rate Target

The emission reduction targets outlined in the Clean Power Plan are based on EPA's determination of the best system of emission reduction ("BSER") in the form of four building blocks that have been adequately demonstrated at a reasonable cost. The Conservation Groups support EPA's finalization of a 2030 target for Virginia that is at least as stringent as the proposed target – particularly because Virginia's *actual* starting point (i.e. one that accounts for decisions already made) is much lower than what EPA assumes. The following summarizes EPA's target-setting for Virginia.

In a spreadsheet entitled "EPA's Calculation of Virginia's Target" (Attachment 1), we re-create the state target EPA computed for Virginia using the four BSER building blocks. For Virginia, the baseline carbon emissions rate for fossil-fuel generation in 2012 was 1,438 lbs/MWh. Applying each of the four building blocks to Virginia's 2012 baseline resulted in an emissions rate goal of 810 lbs/MWh in 2030, with an interim goal of 884 lbs/MWh average for years 2020–2029.

A. Building Block 1: Making Existing Coal Plants More Efficient.

Under building block 1, EPA assumed that a combination of best operating practices and equipment upgrades could result, on average, in a 6 percent heat rate improvement at all existing coal-fired power plants. EPA's 6 percent heat rate assumption is based on an evaluation of potential efficiency improvements attributed to operation and maintenance practices and equipment upgrades. In its emission rate calculation, EPA assumed that the 6 percent heat rate improvement at coal-fired electric generating units ("EGUs") will directly translate to a 6 percent reduction in the carbon emission rate of those EGUs. Applying this assumption to Virginia's coal fleet results in a decrease from the starting 2012 baseline rate of 1,438 lbs /MWh to 1,389 lbs/MWh, a reduction of 49 lbs/MWh.[4]

B. Building Block 2: Redispatching to Underutilized Natural Gas Capacity.

Under building block 2, EPA assumed that emissions could be reduced by substituting generation from the most carbon-intensive EGUs with generation from lower-polluting existing and under construction NGCC EGUs. EPA calculated this building block assumption in two separate steps.

i. Re-dispatch of existing NGCC units.

In Step 1, EPA evaluated the redispatch of *existing* NGCC EGUs and assumed that such EGUs would operate at a 70 percent capacity factor. In 2012, existing NGCC EGUs in Virginia were operating at an average capacity factor of 60 percent. EPA applied this 70 percent capacity factor assumption to increase the level of generation from Virginia's existing NGCC EGUs. The

[4] *See* Attachment 1, line 3.

increase in NGCC generation was then subtracted from the 2012 coal and steam generation proportionally to represent the replacement of higher carbon-intensive resources with lower carbon NGCC generation. Applying this assumption to Virginia's existing NGCC fleet results in a decrease from 1,389 lbs/MWh to 1,273 lbs/MWh, a reduction of 116 lbs/MWh.[5]

ii. *Re-dispatch of under construction NGCC units.*

In Step 2, EPA evaluated the redispatch of *under construction NGCC capacity*. "Under construction" was defined as any NGCC capacity that came online in 2013 or that was under construction, site prep, or testing by January 8, 2014. For Virginia, EPA identified 1,928 MW of "under construction" NGCC capacity. While the "under construction" units were assumed to operate at a 70 percent capacity factor, EPA conservatively assumed that 55 percent would be unavailable for redispatch to replace generation from existing higher carbon-intensive EGUs. Therefore, only 15 percent of Virginia's "under construction" capacity was assumed to displace existing coal and steam generation. Applying this assumption to Virginia's under construction NGCC fleet results in a decrease from 1,273 lbs/MWh to 1,135 lbs/MWh, a reduction of 138 lbs/MWh.[6]

C. Building Block 3: Expanding Nuclear and Renewable Energy Generation.

Under building block 3, EPA assumed that emissions could be reduced by substituting generation from affected EGUs with expanded renewable and nuclear generation. Again, EPA applied this building block in two steps.

i. Expanding existing and under-construction nuclear.

In Step 1, EPA assumes that 6 percent of "at-risk" existing nuclear capacity would be retained and that all nuclear units currently under construction would be completed. In Virginia, EPA assumed that no new nuclear units were under construction, so EPA only applied the 6 percent retention assumption. EPA first assumed that all "at-risk" units would operate at a 90 percent capacity factor, and then it assumed that 6 percent of this "at-risk" generation would be retained. This calculation resulted in retention of 187 MW of nuclear generation in Virginia. Applying this assumption to Virginia's existing nuclear fleet results in a decrease from 1,135 lbs/MWh to 1,097 lbs/MWh, a reduction of 38 lbs/MWh.[7]

ii. Expanding renewable energy resources.

In Step 2, EPA assumed that states would increase renewable generating capacity over time through state-level renewable generation targets. EPA averaged renewable generation portfolio standards that have been established by states in the same region to quantify renewable energy potential in states that do not have a renewable portfolio standard ("RPS"). For Virginia, EPA calculated a 16 percent renewable energy target by 2030 based on RPS targets of other states within the PJM territory. This translates to roughly 11 million MWh of generation from

[5] *See* Attachment 1 at line 4.
[6] *See id*. at line 5.
[7] *See id*. at line 6.

renewable resources. Applying this assumption results in a decrease from 1,097 lbs/MWh to 894 lbs/MWh, a reduction of 204 lbs/MWh.[8]

D. Building Block 4: Increasing Demand-Side Energy Efficiency.

Under building block 4, EPA assumed that carbon emissions could be reduced by offsetting generation from affected EGUs through the use of demand-side energy efficiency. EPA assumed that all states can reach annual incremental efficiency savings of 1.5 percent of sales by 2030. EPA assumed that savings levels from energy efficiency investments would begin to increase after 2017, which is the year after state plans are expected to be submitted. The incremental savings levels in 2017 were based on the state's 2012 level of performance. EPA then assumed an increase in incremental savings of 0.2 percent each year, starting from the baseline 2017 levels, until such levels reach 1.5 percent. When incremental savings levels reached 1.5 percent, EPA held those levels constant through 2030. For Virginia, EPA started with 0.03 percent incremental savings in 2017 and increased this level by 0.2 percent annually until reaching 1.5 percent in 2025.

EPA also assumed that states that are net importers of electricity will receive credit for only a portion of their energy efficiency investments. As a net electricity importing state, Virginia receives credit for 58 percent (its share of in-state generation) of its energy efficiency investments. Therefore, EPA reduced the level of energy efficiency credited in Virginia reflect this assumption, resulting in 6,269,112 MWh of avoided generation by 2030. Applying this assumption results in a decrease from 894 lbs/MWh to the final 2030 target of 810 lbs/MWh, a reduction of 84 lbs/MWh.[9]

E. General Comments on EPA's Building Blocks.

We offer the following additional observations regarding EPA's building block assumptions, which are integral to the comments that follow. First, while EPA relied upon the above methodology to set Virginia's 2030 target, there is nothing requiring Virginia to follow the same path for compliance. As EPA emphasizes in the proposal, states may elect to pursue some building blocks more extensively and others less extensively than EPA assumes, and may even choose other measures, so long as they meet the overall target reduction.[10] States retain the flexibility to determine the compliance path that makes the most sense under their unique facts and circumstances.

Second, while EPA considers the displacement of coal and steam generation by re-dispatched NGCC generation in building block 2, EPA does not take into account the displacement of NGCC and other fossil generation by new renewables and energy efficiency per Building Blocks 3 and 4. In practice, these measures, which have zero fuel costs, would indeed displace fossil generation, which does have fuel costs. EPA has requested comment on this issue in its recent Notice of Data Availability ("NODA") released on October 27, 2014.[11]

[8] *See* Attachment 1 at line 7.
[9] *See id*. at line 8.
[10] 79 Fed. Reg. at 34,897.
[11] 79 Fed. Reg. 64,543.

In fact, because of the displacing effects of renewables and energy efficiency on fossil units, exact reliance on the four building blocks as used by EPA in the target setting would result in *over-compliance* – i.e., Virginia would achieve a target rate lower than its 2030 goal. This is an important reason to view application of the building blocks for target-setting as distinct from their use for compliance. It also shows that Virginia's route to compliance is less burdensome than a narrow focus on the target-setting would indicate. Virginia's pursuit of measures under building blocks 3 and 4 will result in substantial carbon reductions, especially if those measures are allowed to displace fossil generation on a pro-rata basis.

II. Virginia's Target is Readily Achievable Based on Plans Virginia's Utilities Already Have in Place and Modest Investments in Underutilized Clean Energy.

In evaluating the achievability of the state's final target, it is important to note that there are a number of steps that Virginia's two largest investor-owned utilities ("IOUs"), Dominion Virginia Power ("Dominion") and Appalachian Power Company ("Appalachian Power"), are already planning to take that will reduce Virginia's carbon emissions rate below the 2012 baseline level. In a spreadsheet entitled "SELC's Calculation of Virginia's Achievability" (Attachment 2), we applied some of these existing plans to Virginia's 2012 baseline emissions rate to demonstrate that Virginia can get 80 percent of the way to its target with existing plans and resources. Subsection A describes how the calculations were applied to reach the 80 percent figure. Subsection B describes how the remaining 20 percent of the target can be met by reaching just a fraction of Virginia's existing legislative goals on renewable energy and energy efficiency.

A. Plans and Resources that Virginia's Utilities Already Have in Place Take Virginia Almost 80 Percent of the Way to Its Target.

EPA's target-setting did not take into account many of the carbon-reducing measures that Virginia had begun pursuing prior to the proposal. When those measures – which include coal unit retirements and conversions, the construction of new natural gas units, and new investments in renewable generation and energy efficiency – are taken into account, Virginia will achieve almost 80 percent of its reduction target merely by staying the course.

i. Utility Plans to Retire Existing Coal-Fired Generation

In identifying plans and resources that the utilities already have in place, we did not assume that Virginia's utilities are already planning to achieve a 6 percent heat rate improvement at existing coal plants. While this assumption may be achievable, we instead evaluated the decisions that Dominion and Appalachian Power have already made to retire a number of its oldest, dirtiest and least economic coal-burning units. The units for which retirement decisions have already been made include:

- Chesapeake Units 1, 2, 3, 4[12]

[12] *See* Virginia State Corporation Commission, In re: Virginia Elec. & Power Co.'s Integrated Resource Plan filing pursuant to Va. Code § 56-597 *et seq*., "Dominion Virginia Power's and Dominion North Carolina Power's Report of Its Integrated Resource Plan," PUE-2011-00092, at 23 (Sept. 1, 2011) (hereinafter "Dominion 2011 IRP"); *see also* Virginia State Corporation Commission, In re: Virginia Elec. & Power Co.'s Integrated Resource Plan filing

- Yorktown Units 1 and 2[13]
- Clinch River Unit 3[14]
- Glen Lyn Units 5 and 6[15]

The electric generation and carbon emission levels from these four coal-fired EGUs were included in Virginia's baseline 2012 carbon emissions rate. However, EPA did not include the planned retirement of these EGUs when calculating Virginia's emission reduction target. Combined, these units represented 2,391,610 megawatt hours ("MWh") of generation in 2012, including 16 percent of the carbon emissions and 17 percent of the electric generation in Virginia's coal-fired EGU fleet.

Applying these retirements to Virginia's 2012 baseline emission rate results in a decrease from 1,438 lbs/MWh to 1,383 lbs/MWh, a reduction of 55 lbs/MWh.[16]

	State Emissions Rate	**Rate Reduction**
Virginia's 2012 Baseline (Fossil)	1,438	
Retire Chesapeake, Yorktown, Glen Lyn, Clinch River	**1,383**	**55**

It should be noted that this reduction is larger than the emissions rate reduction for EPA's building block 1 (6 percent heat rate improvement at existing coal-fired EGUs), which reflected a reduction of 49 lbs/MWh. Thus, simply continuing on course with the plan to retire these units would reduce Virginia's 2012 emissions rate by *more* than EPA's application of building block 1. This demonstrates that the assumed reductions from Virginia's coal-fired EGUs are achievable.

ii. Utility Plans to Re-Dispatch to Existing Underutilized NGCCs

Under building block 2, EPA evaluated the re-dispatch of existing natural gas EGUs and assumed that such EGUs would operate at a 70 percent capacity factor. This 70 percent assumption reflects plans that Virginia's utilities already have in place. For example, excluding the units for which generation contracts with Dominion will expire in the next few years (Hopewell and Doswell), the average capacity factor for existing natural gas EGUs in Virginia

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pursuant to Va. Code § 56-597 *et seq*., "Dominion Virginia Power's and Dominion North Carolina Power's 2013 Report of Its Integrated Resource Plan," PUE-2013-00088, at 32 (Aug. 30, 2013) (hereinafter "Dominion 2013 IRP").

[13] *See id*.

[14] *See* Virginia State Corporation Commission, In re: Appalachian Power Company's Integrated Resource Plan filing pursuant to Va. Code § 56-597 *et seq*., "Integrated Resource Planning Report to the Commonwealth of Virginia State Corporation Commission," PUE-2011-00100, at 80 (Sept. 1, 2011) (hereinafter "Appalachian Power 2011 IRP"); *see also* Virginia State Corporation Commission, In re: Appalachian Power Company's Integrated Resource Plan filing pursuant to Va. Code § 56-597 *et seq*., "Integrated Resource Planning Report to the Commonwealth of Virginia State Corporation Commission," PUE-2013-00097, at 53 (Aug. 30, 2013) (hereinafter "Appalachian Power 2013 IRP").

[15] *See id*.

[16] *See* Attachment 2 at line 3.

was already 71.6 percent in 2012. This information was supplied in Dominion's 2013 Integrated Resource Plan and is represented in Figure 1, below.[17]

Figure 1: VA 2012 NGCC Capacity

Virginia's NGCC Units	2012 Net Capacity Factor
Bear Garden	78.2
Bellmeade Power Station	52
Chesterfield 7 CC	85.8
Chesterfield 8 CC	73.8
Gordonsville 1 CC	69.5
Gordonsville 2 CC	65.2
Possum Point	79.5
Tenaska Virginia Generating Station	68.8
Average Capacity Factor (excluding Doswell and Hopewell)	71.6

In addition, EPA assumed that a state's generation can only be re-dispatched to this 70 percent level if there is enough historical fossil generation to be displaced. In 2012, existing natural gas EGUs in Virginia were operating at an average capacity factor of 60 percent. Thus, Virginia would require an increase of 6.2 million MWh to achieve a 70 percent capacity factor. Since Virginia's 2012 coal and steam generation was 14.8 million MWh, there is already sufficient generation to allow for re-dispatch of the state's natural gas EGUs up to the 70 percent assumption.

The 70 percent natural gas capacity assumption is also reasonable in light of existing pipeline capacity. According to the EIA, the total capacity of the gas pipelines delivering into Virginia is 8,011 MMcf per day, which includes 1,800 MMcf per day of pipeline capacity entering Virginia from the Cove Point LNG terminal.[18] The 70 percent capacity assumption would increase the level of total gas delivered to customers during the peak month from 1,485 MMcf per day to 1,583 MMcf per day. Even subtracting the 1,800 MMcf per day of gas inflow capacity from the LNG terminal and the 2,175 MMcf per day that flows out of Virginia to other markets,[19] the average daily amount of pipeline capacity available to supply Virginia markets would still be more than two and a half times the peak month gas use (~4,000 MMcf per day of capacity vs. ~1,600 MMcf per day of consumption). Thus, existing pipeline capacity should be able to accommodate the additional capacity at existing natural gas EGUs.

[17] *See* Dominion 2013 IRP at Appendix 3D.
[18] Energy Information Administration ("EIA"), "U.S. State-to-State Capacity," *available at* http://www.eia.gov/naturalgas/data.cfm.
[19] *See* EIA, "International & Interstate Movements of Natural Gas by State," *available at* http://www.eia.gov/naturalgas/data.cfm.

In addition, Synapse Energy Economics analyzed the 2012 U.S. electric dispatch system and evaluated the available, unused natural gas generation that could feasibly displace coal-fired generation on a region-by-region basis.[20] Parts of Virginia are in three different sub-regions: SRVC, SRTV, and RFCW. The Synapse analysis indicated that each of these three regions could exceed EPA's natural gas re-dispatch target of 70 percent and could, under the assumptions modeled, reach an 80 percent capacity factor.

As such, based on utility plans and the reasonableness of the assumption as applied to Virginia, we included the 70 percent assumption in our calculations. As with EPA's calculation, the increased capacity from existing NGCC units were assumed to operate at the average historical emissions rate of 903 lbs/MWh. Applying this assumption results in a decrease from 1,383 lbs/MWh to 1,245 lbs/MWh, a reduction of 138 lbs/MWh.[21]

	State Emissions Rate	**Rate Reduction**
Virginia's 2012 Baseline (Fossil)	1,438	
Retire Chesapeake, Yorktown, Glen Lyn, Clinch River	1,383	55
Increase existing NG to 70% capacity factor	**1,245**	**138**

iii. Utility Plans to Convert Existing Coal-Fired Generation to NGCC Units

Beyond the re-dispatch to existing NGCC units, our calculation also incorporates utility plans to fuel-switch from coal to natural gas at existing coal-fired EGUs. Such conversions are underway at two EGUs in Virginia: Dominion has completed the conversion of Bremo Bluff Units 3 and 4 (227 MW) from coal to natural gas,[22] and Appalachian Power anticipates that the conversion of Clinch River Units 3 and 4 (484 MW) from coal to natural gas will be complete in late 2015 and early 2016, respectively.[23] For these EGUs, the full coal-fired generation at these units is displaced by natural gas generation. Our calculations assume that the units would produce the same level of generation once the units are converted as they produced in 2012 when the units burned coal. In addition, our calculations assume that the units would operate at the average historical emissions rate of 903 lbs/MWh.[24]

[20] Knight, P., B. Biewald, J. Daniel, Synapse Energy Economics, "Displacing Coal: An Analysis of Natural Gas Potential in the 2012 Electric System Dispatch," (2013), *available at* http://www.synapse-energy.com/Downloads/SynapseReport.2013-09.EF.Displacing-Coal.13-020.pdf.
[21] *See* Attachment 2 at line 4.
[22] *See* Virginia State Corporation Commission, In re: Virginia Elec. & Power Co.'s Integrated Resource Plan filing pursuant to Va. Code § 56-597 *et seq*., "Dominion Virginia Power's and Dominion North Carolina Power's Report of Its Integrated Resource Plan," PUE-2014-00087, at 26 (Aug. 29, 2014) (hereinafter "Dominion 2014 IRP").
[23] *See* Appalachian Power 2013 IRP at 5.
[24] We recognize that units that fuel-switch from coal to gas will likely not be as efficient as new NGCC units and will likely operate at a higher lbs/MWh emission rate. However, we utilized the same average NGCC emission rate of 903 lbs/MWh for all NGCC units in our calculations (existing, fuel-switch, and under-construction). Because we applied the same rate to the new NGCC capacity from Warren County and Brunswick (which will almost certainly have a lower rate), we assumed that the average emission rate would not change significantly after adding in the converted units (which may have a higher rate, but represent just 711 MW of capacity) and the new units (which may have a lower rate, but represent 2687 MW of capacity). Since we did not have the actual emissions data for these units that are fuel-switching, this was our simplified assumption.

Applying this fuel-switch assumption results in a reduction from 1,245 lbs/MWh to 1,211 lbs/MWh, a decrease of 34 lbs/MWh.[25]

	State Emissions Rate	Rate Reduction
Virginia's 2012 Baseline (Fossil)	1,438	
Retire Chesapeake, Yorktown, Glen Lyn, Clinch River	1,383	55
Increase existing NG to 70% capacity factor	1,245	138
Fuel switch from coal to NG at Bremo Bluff and Clinch River	**1,211**	**34**

iv. Utility Plans Regarding Under-Construction NGCC Units

Under building block 2, EPA assumed that new NGCC units that were under construction as of January 8, 2014 accounted for 1,928 MW of capacity in Virginia. However, the total level of new NGCC capacity expected to come online in the next few years is significantly higher than EPA assumed. Dominion anticipates that the Warren County Power Station (1,329 MW) will be operational by 2015 and that the Brunswick County Power Station (1,358 MW) will be operational in 2016.[26] These two new NGCC EGUs represent 2,687 MW of new natural gas capacity, which is nearly 40 percent higher than EPA's under construction assumption. Our calculations assumed that the units would operate at the average historical NGCC emission rate of 903 lbs/MWh.[27]

Applying the under-construction generation using EPA's methodology, which assumes that the units will increase operation from an average of a 55 percent capacity factor to a 70 percent capacity factor and that 15 percent of the capacity displaces coal-fired generation, results in a reduction from 1,211 lbs/MWh to 1,031 lbs/MWh, a decrease of 180 lbs/MWh.[28]

	State Emissions Rate	Rate Reduction
Virginia's 2012 Baseline (Fossil)	1,438	
Retire Chesapeake, Yorktown, Glen Lyn, Clinch River	1,383	55
Increase existing NG to 70% capacity factor	1,245	138
Fuel switch from coal to NG at Bremo Bluff and Clinch River	1,211	34
Add in under construction Warren County and Brunswick CCs	**1,031**	**180**

[25] *See* Attachment 2 at line 5.
[26] *See* Dominion 2014 IRP at xiv.
[27] *See* Footnote 24 above.
[28] *See* Attachment 2 at line 6.

v. Utility Plans Regarding Existing Nuclear Resources

Under building block 3, EPA applied the assumption that 6 percent of "at-risk" nuclear capacity would be retained and the units would operate at a 90 percent capacity factor. This resulted in the retention of 187 MW of nuclear generation in Virginia. The four nuclear units in Virginia, which are all owned by Dominion, are expected to continue operating at above a 90 percent capacity factor through 2030.[29] Further, the licenses on these four nuclear units are not set to expire before 2030 (Surry 1 in 2032, Surry 2 in 2033, North Anna 1 in 2038, and North Anna 2 in 2040).[30] As such, Dominion already has plans to retain this 6 percent of nuclear generation.

Applying the 6 percent assumption to Virginia's existing nuclear fleet in the same manner that EPA applied the assumption in its formula results in a reduction from 1,031 lbs/MWh to 998 lbs/MWh, a decrease of 33 lbs/MWh.[31]

	State Emissions Rate	**Rate Reduction**
Virginia's 2012 Baseline (Fossil)	1,438	
Retire Chesapeake, Yorktown, Glen Lyn, Clinch River	1,383	55
Increase existing NG to 70% capacity factor	1,245	138
Fuel switch from coal to NG at Bremo Bluff and Clinch River	1,211	34
Add in under construction Warren County and Brunswick CCs	1,031	180
Retain 6% "at risk" nuclear	**998**	**33**

vi. Utility Plans Regarding Renewable Energy Resources

EPA applied renewable portfolio standards ("RPS") that have been established by states in the same region to quantify renewable energy potential in states that do not have an RPS. Because Virginia does not have a mandatory RPS, the target is calculated assuming the state will meet the East Central region's renewable energy goal of 16 percent by 2030. However, this target is not far from Virginia's voluntary RPS goal of procuring 15 percent of the power sold in Virginia from eligible renewable energy sources by 2025.[32]

In 2012, Virginia's existing renewable generation made up 3 percent of generation, equivalent to 2.4 million MWh. This level does not reflect the plans of both Dominion and Appalachian Power to add higher, though still quite modest, levels of renewable generation to their energy portfolios. For example, Dominion received approval from the State Corporation Commission to construct and operate 30 MW of distributed solar resources[33] and to purchase 3

[29] *See* Dominion 2014 IRP at Appendix 3D.
[30] *See id*. at 13.
[31] *See* Attachment 2 at line 7.
[32] Va. Code § 56-585.2.
[33] *See* Virginia State Corporation Commission, "For approval of a Community Solar Power Program and for certification of proposed distributed solar generation facilities," Case No. PUE-2011-00117; *see also* Dominion 2013 IRP.

MW of distributed solar from its customers.[34] We referenced filings from Dominion's 2013 IRP that assume that the 30MW solar resources would operate at a 15 percent capacity factor and the 3 MW solar resources would operate at a 13.9 percent capacity factor.[35] In addition, Dominion received a grant from the Department of Energy to develop two offshore wind test turbines that will produce a total of 12 MW of generation. [36] We also referenced filings in the Dominion 2013 IRP docket that assume that this resource would operate at a 40 percent capacity factor.[37]

Applying the existing level of generation that EPA assumed in the 2012 baseline as well as the solar and offshore wind resources that are under development results in a reduction from 998 lbs/MWh to 952 lbs/MWh, a decrease of 46 lbs/MWh. [38]

	State Emissions Rate	**Rate Reduction**
Virginia's 2012 Baseline (Fossil)	1,438	
Retire Chesapeake, Yorktown, Glen Lyn, Clinch River	1,383	55
Increase existing NG to 70% capacity factor	1,245	138
Fuel switch from coal to NG at Bremo Bluff and Clinch River	1,211	34
Add in under construction Warren County and Brunswick CCs	1,031	180
Retain 6% "at risk" nuclear	998	33
Add existing renewables	**952**	**46**

vii. Utility Plans Regarding Demand-Side Energy Efficiency

The two largest IOUs in Virginia either have utility-sponsored demand-side management ("DSM") programs in place or have plans to implement such programs over the next few years. For example, Dominion already has three rounds of energy efficiency programs that have been approved by the State Corporation Commission and that are currently in place. The energy efficiency savings levels for these programs equate to roughly 799,367 MWh over the next fifteen years. While Appalachian Power has recently applied for approval of a total of eight new DSM programs, the Commission has just recently approved two of them, and the remaining six are pending review by the Commission.

Therefore, adding just the additional savings from Dominion's approved energy efficiency programs to EPA's baseline 2012 level of energy efficiency, while also factoring in the fact that only 58 percent of the energy efficiency is counted because Virginia is a net

[34] *See* Virginia State Corporation Commission, "For approval of a special tariff to facilitate customer-owned distributed solar generation," Case No. PUE-2012-00064; *see also* Dominion 2013 IRP.
[35] *In re: Virginia Electric and Power Company's Integrated Resource Plan filing pursuant to § 56-597 et seq. of the Code of Virginia*, Case No. PUE-2013-00088, Rebuttal Testimony of J. Scott Gaskill at 17 (April 4, 2014).
[36] Dominion 2013 IRP at xiv.
[37] Dominion 2013 IRP at Appendix 5A (unredacted) (June 13, 2014).
[38] *See* Attachment 2 at line 8.

importing state, results in a reduction from 952 lbs/MWh to 943 MWh, a decrease of 9 lbs/MWh.[39]

	State Emissions Rate	Rate Reduction
Virginia's 2012 Baseline (Fossil)	1,438	
Retire Chesapeake, Yorktown, Glen Lyn, Clinch River	1,383	55
Increase existing NG to 70% capacity factor	1,245	138
Fuel switch from coal to NG at Bremo Bluff and Clinch River	1,211	34
Add in under construction Warren County and Brunswick CCs	1,031	180
Retain 6% "at risk" nuclear	998	33
Add existing renewables	952	46
Add existing EE	**943**	**9**

As discussed in Part IV below, EPA should modify its assumption for net importing states so that such states receive full credit for the efficiency programs that they implement. This is especially important because the principal argument in favor of employing higher levels of efficiency centers on the benefit of avoiding supply-side generation. If Virginia were to receive credit for the full 100 percent of its energy efficiency, the reduction would increase from 9 lbs/MWh to 14 lbs/MWh.

viii. Summary

In total, when the above planned retirements, conversions and resource additions are factored in, Virginia's emission rate drops to 943 lbs/MWh, an almost 80 percent reduction from the 2012 baseline. This aligns closely with projections by the Staff of the State Corporation Commission, which has estimated Virginia is roughly 73 percent of the way to its carbon reduction target. Moreover, this demonstrates that Virginia will be substantially on the way toward achieving its target before the compliance period even begins.

B. Virginia Can Reach the Remaining 20 Percent of its Target by Achieving Just a Fraction of Existing State Renewable Energy and Energy Efficiency Goals.

Our analysis shows that Virginia can achieve its remaining reductions through a combination of renewable resource additions and increased energy efficiency investments. Renewable energy and energy efficiency have been adequately demonstrated in Virginia to be a cost-effective and clean way to meet our energy needs. Our state is already beginning to make investments in these clean energy technologies, and we can do much more.[40]

For example, Virginia would only need to achieve a fraction of the renewable and energy efficiency goals that are already set forth in the Virginia Code and the Virginia Acts of Assembly

[39] *See* Attachment 2 at line 9.
[40] *See* Part IV, Subsections A and B.

to reach our carbon reduction target. Virginia's General Assembly enacted a voluntary Renewable Energy Portfolio Standard goal in 2007, which now states that electric utilities would procure 15 percent of electric sales from renewable resources.[41] As discussed in more detail in Part IV below, this voluntary goal is readily achievable. In addition, the Virginia General Assembly established a goal of reducing electricity consumption by 10 percent by 2022.[42] The Virginia State Corporation Commission has found that this energy efficiency goal is reasonable and achievable.[43] If Virginia were to achieve just 50 percent of both of these voluntary goals, it would reach the 810 lbs/MWh emissions rate.

Further, if EPA modified its methodology in line with the recommendation provided in its October 28, 2014 NODA by assuming that the level of incremental renewable energy and energy efficiency resources would reduce proportionally the level of existing coal and gas fired generation, Virginia would only need to achieve 37 percent of both goals.[44] This represents roughly half of the renewable energy and energy efficiency levels that EPA assumed in building blocks 3 and 4.[45]

	State Emissions Rate	**Rate Reduction**
Virginia's 2012 Baseline (Fossil)	1,438	
Retire Chesapeake, Yorktown, Glen Lyn, Clinch River	1,383	55
Increase existing NG to 70% capacity factor	1,245	138
Fuel switch from coal to NG at Bremo Bluff and Clinch River	1,211	34
Add in under construction Warren County and Brunswick CCs	1,031	180
Retain 6% "at risk" nuclear	998	33
Add existing renewables	952	46
Add existing EE	944	9
Add incremental renewables (37% of 15% goal displaces fossil)	**868**	**75**
Add incremental EE (37% of 10% goal displaces fossil)	**810**	**58**

Finally, if Virginia were to get credit for 100 percent of its energy efficiency investments – rather than 58 percent – it would only need to achieve 31 percent of the renewable energy and energy efficiency goals.

[41] Va. Code § 56-585.2.
[42] Third Enactment Clause of Chapter 933 of the 2007 Virginia Acts of Assembly
[43] *See* Commonwealth of Virginia State Corporation Commission, *Report: Study to Determine Achievable and Cost-effective Demand-side Management Portfolios Administered by Generating Electric Utilities in the Commonwealth* at i (Nov. 15, 2009).
[44] *See* Attachment 2 at lines 10-11.
[45] The renewable energy investments under our calculations total 6,319,996 MWh versus EPA's assumed level of 11,192,0008. The energy efficiency investments under our calculations total 3,038,072 MWh versus EPA's assumed level of 6,269,112 MWh. *Compare* Attachment 1 at lines 7-8 to Attachment 2 at lines 10-11.

III. Analysis of the Costs and Benefits of the Proposal to Virginia Reveals that the Benefits of the Proposal Significantly Outweigh Any Costs.

SELC contracted with ICF Resources, L.L.C. ("ICF") to provide analytic support to illustrate and quantify some of the potential impacts of the CPP proposal in Virginia. ICF relied on the proposal itself and the technical supporting documents published by EPA to evaluate the following impacts: compliance costs, carbon reduction benefits, ancillary emission reduction benefits, rate and bill impacts, and economic and employment impacts. The analysis reveals that the benefits to Virginia under both a State Level compliance approach and a Regional Level compliance approach significantly outweigh any costs. Further, in the majority of the years, the compliance costs associated with the CPP will be negative. A summary of the key findings follows. The full report is included as Attachment 3.

A. Compliance Costs

The proposal defines compliance costs as the difference between total system costs in a modeling run with the CPP (a policy case scenario) and a modeling run without it (a base case scenario). Table 1 below shows total compliance costs inclusive of wholesale market costs (system costs taken from IPM) and EE costs for both of the compliance options that EPA evaluated: State Level and Regional Level.[46] Relative to the Base Case, the fuel costs decline in both the State Level and Regional Level runs due to less overall generation as a result of the assumed energy efficiency investments. The values are negative in the majority of years. This implies that the cost of the assumed energy efficiency investments is lower than the fuel, variable O&M, fixed O&M, and capital cost under the base case scenario due to the need for less generation.

Table 1: Virginia Compliance Costs Associated with CPP

(in Millions of 2011$)	2020	2025	2030
Total Compliance Costs (Option 1--State Level)	**(502)**	**(712)**	**300**
Total System Costs (Option 1--Regional Level)	**(785)**	**(922)**	**(105)**

B. Carbon Reduction Benefits

EPA determined the carbon reduction benefits of the CPP by using its Social Cost of Carbon (SCC), which measures these benefits on a global, rather than state-specific scale. ICF produced the Virginia-specific carbon reductions that would be achieved from the two compliance options. We applied EPA's SCC assumptions to the Virginia-specific carbon reductions to calculate the carbon reduction benefits of the proposal, as shown in Table 2 below.[47]

[46] *See* Attachment 3 at pages 5-6.
[47] *See id*. at page 7.

Table 2: Carbon Reduction Benefit Associated with CPP

(in Millions of 2011$)	2020	2025	2030
Carbon Reduction Benefits (Option 1 – State Level)	**465**	**779**	**562**
Carbon Reduction Benefits (Option 1 – Regional Level)	**583**	**890**	**779**

C. Ancillary Emission Reduction Benefits

EPA quantified ancillary emission reduction benefits of the CPP associated with reduced $PM_{2.5}$ and ozone. For $PM_{2.5}$, EPA calculated health co-benefits of reducing one ton of $PM_{2.5}$, or one of its precursors (NO_x and SO_2). Similarly, EPA calculated health co-benefits of reducing one ton of the ozone precursor, NO_x, in order to estimate ozone co-benefits. EPA measured the benefits of such emission reductions on a regional, rather than state-specific scale. Table 3 below shows the benefit-per-ton estimates for the East region.[48]

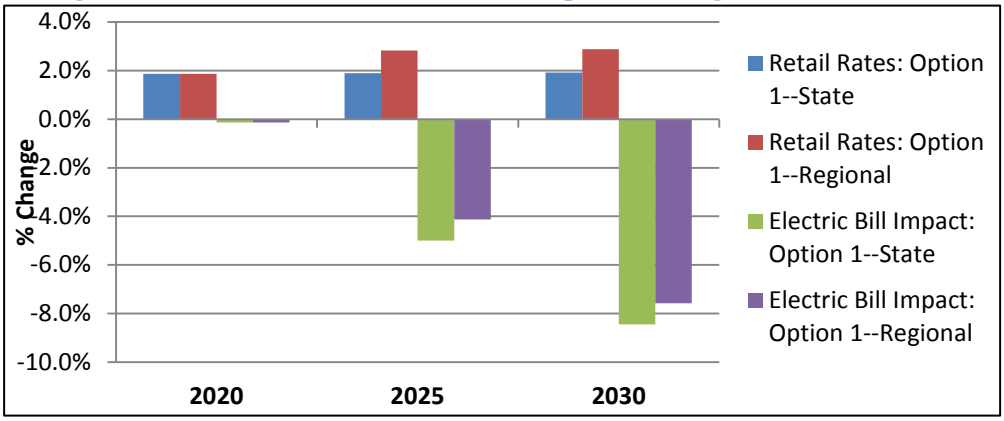
Table 3: Ancillary Emission Reduction Benefit Associated with CPP

(in Millions of 2011$)	2020		2025		2030	
	Min	**Max**	**Min**	**Max**	**Min**	**Max**
Total Emissions Reduction Benefits (Option 1 – State Level)	**17,390**	**40,100**	**23,630**	**54,400**	**26,670**	**62,000**
Total Emissions Reduction Benefits (Option 1 – Regional Level Level)	**16,350**	**37,100**	**22,630**	**52,800**	**25,710**	**58,800**

D. Rate and Bill Impacts

EPA provided impacts on retail rates at the sub-RTO region level. ICF assumed that rate impacts experienced in Virginia will be the same as at the regional level. ICF also evaluated the bill impacts resulting from lower household electric consumption due to energy efficiency programs. Figure 1 below demonstrates the results of this analysis: while retail rates will increase slightly, the lower household consumption counters that effect on the overall household bill and results in as much as an 8 percent reduction in the average household bill.[49]

Figure 1: Retail Rate and Electric Bill Impacts in Virginia Due to the CPP



[48] *See* Attachment 3 at page 11.
[49] *See id.* at page 16.

E. Employment Impacts

EPA's approach for determining employment impacts looked primarily at "first-order" jobs associated with the power sector, such as jobs for construction and maintenance of new units and jobs for heat-rate improvement upgrades. The only "second-order" job impacts that EPA evaluated are jobs in the coal mining and gas extraction sectors. EPA did not calculate "second-order" jobs associated with higher levels of renewable resources, so the figures represented in Tables 4 and 5 below summarizing EPA's job impact numbers are conservative estimates of the true job creation benefits of the proposal.[50]

Table 4: Construction-Related Job Impacts in Virginia Due to the CPP

	Option 1--State			Option 1--Regional		
	2017-2020	2021-2025	2026-2030	2017-2020	2021-2025	2026-2030
Total Construction-related (One-time) Changes	**(668)**	**(1,133)**	**(64)**	**(985)**	**(1,114)**	**(310)**

Table 5: O&M and Extraction Job Impacts in Virginia Due to the CPP

	Option 1--State			Option 1--Regional		
	2020	2025	2030	2020	2025	2030
Total Supply-Side (Recurring) Changes	**(1,239)**	**(1,851)**	**(681)**	**(1,709)**	**(1,907)**	**(1,004)**

EPA also estimated jobs created in the EE sector by assuming a standard factor that translates dollars expended in EE implementation to jobs created in this field. Table 6 below lists jobs created due to EE.[51]

Table 6: Energy Efficiency Jobs Created in Virginia Due to the CPP

	Both Option 1--State and Option 1--Regional		
	2020	2025	2030
Additional Jobs per Additional MM$ on EE	265	1,657	2,998

Overall, the ICF report demonstrates that the Clean Power Plan proposal will overwhelmingly benefit the Commonwealth. The proposal will result in net negative costs over nearly all years of the compliance period and will produce significant public health and economic benefits.

IV. Recommended Modifications to Building Block Assumptions

As the above discussion illustrates, EPA's emission rate target for Virginia is reasonable as proposed. Nevertheless, the Conservation Groups recommend several modifications to EPA's assumptions that will help maximize the role that cost-effective investments in renewable generation and energy efficiency can play in both Virginia's target-setting and its state compliance plan.

[50] *See* Attachment 3 at page 18.
[51] *See id*. at page 20.

A. EPA's Renewable Energy Assumptions in Building Block 3 Should be Modified

EPA supplied two approaches to the BSER building block assumptions for renewable resources. As conceptual approaches, we find both the proposed approach, which is based on state renewable portfolio standards, and the alternative approach, which is based on individual state renewable energy technical and economic potential, supportable. However, both approaches warrant some modification. Virginia's renewable energy potential is significantly higher than EPA assumed in its proposal, under either approach. A more robust approach has been offered by the Union of Concerned Scientists, which provides a third alternative and one that we support.[52]

Virginia has abundant renewable energy resources at its disposal to meet its incremental renewable targets. Its technical potential for utility scale solar alone is 1,090 gigawatts (GW) – over 25 times greater than current state generation.[53] The Department of Energy's SunShot Initiative assumes declining solar PV prices will result in Virginia having a cumulative installed solar PV capacity of 8.7 GW by 2030.[54] And Virginia's in-state potential is not limited to solar. The recent technological advances and cost declines affecting wind generation have led to vastly improved estimates of in-state wind potential across the South, including Virginia. Virginia is also home to the first offshore wind lease area in the Mid-Atlantic, which, if fully developed, could generate up to 2,000 MW and power over 500,000 homes.[55]

To reflect Virginia's true renewable energy potential, EPA should: (i) update renewable energy costs to ensure costs reflect up to date information; (ii) ensure that the growth rate of renewables deployment is at least as aggressive as historical rates; (iii) assume full compliance with current RPS requirements that are set by state law; (iv) account for actual and expected renewables growth between 2013 and 2017; (v) update its formula to correctly account for emissions reductions from renewable energy; and (vi) clarify that out of state RECs can be used towards compliance to ensure the most cost effective use of renewable energy.

i. EPA should use up-to-date renewable energy costs

EPA relies on outdated assumptions about the costs of renewable energy. The dramatic decreases in cost of renewable energy technologies mean that Virginia's renewables target can be met cost effectively. The price of wind and solar have dropped precipitously in recent years, fueling tremendous growth in these technologies.[56] The cost decreases have been so substantial

[52] Union of Concerned Scientists ("UCS"), *Strengthening the EPA's Clean Power Plan, available at* http://www.ucsusa.org/sites/default/files/attach/2014/10/Strengthening-the-EPA-Clean-Power-Plan.pdf, last accessed November 22, 2014.
[53] Lopez, A. et al, *U.S. Renewable Energy Technical Potentials: A GIS-Based Analysis*, National Renewable Energy Laboratory, (2012) a*vailable at* http://www.nrel.gov/docs/fy12osti/51946.pdf.
[54] U.S. Dep't of Energy, *SunShot Vision Study*. at 257 (Feb. 2012) *available at* http://www.eere.energy.gov/solar/sunshot/vision-study.html, last accessed November 22, 2014.
[55] Dominion Virginia Power, *Wind Generation, available at* https://www.dom.com/corporate/what-we-do/electricity/generation/wind, last accessed November 30, 2014.
[56] *Id*. at 6.

that both technologies are now out-performing fossil generation in many areas of the country.[57] According to an Energy Department report released in October 2014, rooftop solar system prices dropped 12-15 percent in 2013, and are projected to drop from 3-12 percent this year.[58] Similarly, utility scale PV systems dropped under $2 per watt in 2013 and are projected to reach $1.80/watt in 2014 - 59 percent of what models had predicted in 2010.[59]

Similar to solar, since 2009, the national average cost of wind power has dropped more than 60 percent, making it competitive with new fossil fuel plants in many regions.[60] Wind energy pricing has now reached an all-time low, according to a recent report from the Lawrence Berkeley National Laboratory.[61] As a result, utilities are increasingly selecting wind as the lowest-cost option.[62] While EPA projects capital costs of $2.26 per watt in 2016 to $2.04 per watt in 2030,[63] the U.S. Department of Energy (DOE) has determined that wind projects installed in 2013 were already much cheaper than these projections, with pricing in the $900 to $1300 per kW range.[64]

These lower renewable energy prices are now being seen across the South. As a result of these dramatic cost declines, solar power can help decrease costs for utilities, providing ratepayer benefits in terms of lower electricity bills. Utility-scale solar has reached lows of under 5 cents/kWh.[65] In Georgia, Georgia Power Company is currently seeking approval for 515 MW of new utility-scale solar generation at an average price of less than 6.5 cents per kWh.[66] Georgia Power has stated that these contracts are priced below the utility's projected avoided costs, and

[57] Diane Cardwell, *Solar and Wind Energy Start to Win on Price vs. Conventional Fuels*, The New York Times (Nov. 23, 2014).
[58] Ling, Katherine, *Rooftop costs plunge, on track for Obama's goal – DOE*, E&E News, (Oct. 20, 2014).
[59] *Id*.
[60] *See* Wiser, R., and M. Bolinger, *2013 wind technologies market report*, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, (2014) *available at* http://emp.lbl.gov/sites/all/files/2013_Wind_Technologies_Market_Report_Final3.pdf , last accessed November 22, 2014.
[61] Allan Chen, *New Study Finds Price of Wind Energy in U.S. at an All-Time Low; Competitiveness has Improved*, (Apr. 14, 2014) *available at* http://phys.org/news/2014-08-price-energy-all-time-competitiveness.html, last accessed on November 21, 2014.
[62] *Id*.
[63] EPA, Power Sector Modeling Platform v.5.13, Chapter 4: Generating Resources, Table 4-16, Performance and Unit Cost Assumptions for Potential (New) Renewable and Non-Conventional Technology Capacity in EPA Base Case v.5.13, *available at* http://www.epa.gov/powersectormodeling/BaseCasev513.html, last accessed November 22, 2014.
[64] U.S. Dept. of Energy, *Wind Technologies Market Report 2013*, *available at* http://emp.lbl.gov/sites/all/files/2013_Wind_Technologies_Market_Report_Final3.pdf, last accessed November 22, 2014.
[65] Eric Wesoff, *Cheapest Solar Ever? Austin Energy Buys PV from SunEdison at Five Cents Per Kilowatt-Hour*, Greentech Media (March 10, 2014), *available at* http://www.greentechmedia.com/articles/read/Cheapest-Solar-Ever-Austin-Energy-Buys-PV-From-SunEdison-at-5-Cents-Per-Ki, last accessed November 25, 2014.
[66] Lacey, Stephen, *Georgia is the latest state to procure dirt-cheap solar power*, (Oct. 15, 2014) *available at* http://www.greentechmedia.com/articles/read/how-cheaply-can-georgia-power-buy-solar-for-6.5-cents, last accessed November 23, 2014.

that these solar power agreements provide "overwhelming benefit" to customers in the form of projected energy savings.[67]

Similar to solar, declines in wind power costs are already resulting in wind projects that are lowering electricity prices for customers in the South. Alabama Power has entered two agreements to import cost-effective wind generation from the Midwest, along with associated renewable energy credits (RECs), from Oklahoma and Kansas.[68] The projects total 404 MW.[69] Alabama Power has touted the purchases as "helping to displace higher-cost energy [they] would otherwise produce using other resources."[70] The utility has also promoted the deals as helping to diversify its fuel mix while providing a hedge against the fuel cost increases inherent in fossil fuel generation.[71] In approving the wind deals, the Alabama PSC noted that the delivered price of energy would be below the Company's avoided costs, "with the resulting energy savings flowing directly to the Company's customers."[72]

These cost declines are not reflected in EPA's IPM model. For wind, EPA projects capital costs of $2.26 per watt in 2016 to $2.04 per watt in 2030.[73] However, the U.S. Department of Energy ("DOE") has determined that wind projects installed in 2013 are already much cheaper than these projections, with pricing in the $0.90 to $1.30 per watt range.[74]

For solar, EPA's IPM modeling assumes solar PV installed costs of $3,098/kW.[75] This model adopts costs from the EIA's Annual Energy Outlook 2013. New industry data demonstrate that these cost assumptions are significantly out of date. Natural Resources Defense Council compiled more recent solar cost information, which assessed the cost of solar PV as $1,770/kW.[76] These cost estimates are based on data from the Department of Energy, Bloomberg

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[67] Georgia Power Company, *Application for Certification of 2015 and 2016 ASI Prime PPAs and Request for Approval of 2015 ASI PPAs*, Georgia Public Service Commission Docket No. 38877, Direct Testimony at 12 (Oct. 21, 2014).
[68] *See* Alabama Power, *Chisholm View, Buffalo Dunes projects provide cost-effective power*, *available at* http://www.alabamapower.com/environment/news/chisholm-view-project-provides-low-cost-power.asp, last accessed November 21, 2014.
[69] *Id.*
[70] *See id.*
[71] *See* Thomas Spencer, *Alabama Power Purchases Electricity Generated by Wind in Oklahoma, Kansas,* AL.com, (Sept. 30, 2012) *available at* http://blog.al.com/spotnews/2012/09/alabama_power_purchases_electr.html, last accessed November 21, 2014.
[72] *See* Ala. Pub. Serv. Comm'n, Docket No. 31653, Order (Sept. 9, 2011) (Chisholm View); *see also* Ala. Pub. Serv. Comm'n, Docket No. 31859, Order (Sept. 17, 2012) (Buffalo Dunes).
[73] EPA Power Sector Modeling Platform v.5.13, Chapter 4: Generating Resources, Table 4-16, Performance and Unit Cost Assumptions for Potential (New) Renewable and Non-Conventional Technology Capacity in EPA Base Case v.5.13, *available at* http://www.epa.gov/powersectormodeling/BaseCasev513.html, last accessed November 22, 2014.
[74] Department of Energy, *Wind Technologies Market Report 2013*, *available at* http://emp.lbl.gov/sites/all/files/2013_Wind_Technologies_Market_Report_Final3.pdf, last accessed November 22, 2014.
[75] Natural Resources Defense Council, *Issue Brief: The EPA's Clean Power Plan Could Save Up to $9 Billion in 2030*, (Nov. 2014), *available at* http://www.nrdc.org/air/pollution-standards/files/clean-power-plan-energy-savings-IB.pdf, last accessed November 25, 2014.
[76] *Id.*

New Energy Finance and SEIA.[77] Updating these assumptions would lower the levelized cost of solar energy from $224/MWh to $153/MWh.[78]

The solar and wind cost declines projected by market experts are the product of rapid technological advances, so it is understandable that the proposal does not adequately capture them. However, EPA should ensure that the final rule does include updated cost projections. In addition, EPA should use those updated projections to more accurately quantify the amount of renewable energy that can be deployed at reasonable cost in Virginia.

ii. EPA should ensure renewables deployment rate is consistent with historical rates

Section 111(d) of the Clean Air Act requires EPA to establish a standard of performance for covered sources based on a best system of emissions reduction.[79] When determining the "best system," EPA must consider the cost of achieving emission reductions, as well as health, environmental and energy requirements.[80] As noted previously, EPA's proposed approach for determining the emissions reduction potential of renewable energy relies on regional targets. For the East Central region, EPA has established a regional target of 16 percent. EPA then calculated an annual growth rate that is needed to achieve the regional target, using state renewable generation levels in 2012 as the baseline. States are assumed to start, in 2017, at levels they achieved in 2012 and to cease adding renewable generation when they reach the regional cap. We agree with UCS that this "average system" approach fails to represent the "best system of emission reduction" that the Clean Air Act requires.[81] Among other things, it fails to account for demonstrated growth in states over the last several years, producing overly conservative targets that are already being exceeded by several states.[82]

We urge EPA to assume a rate of renewable energy deployment that is more consistent with recent historical rates of deployment. Specifically, we encourage EPA to adopt UCS' Demonstrated Growth approach, which calculates a national average renewable energy benchmark growth rate of 1 percent of annual electricity sales based on actual state data from 2009 to 2013 from EIA.[83] For states below the benchmark, EPA should assume they can gradually ramp up to 1 percent by 2020 and continue at that level through 2030, similar to the approach that EPA takes for the energy efficiency building block. For the leading 15 states, EPA should assume that they can continue at their 5-year average rate up to 1.5 percent per year.[84] This approach will produce targets more in step with recent trends, more accurately reflecting the

[77] Natural Resources Defense Council, *Issue Brief: The EPA's Clean Power Plan Could Save Up to $9 Billion in 2030* (Nov. 2014), at Note 7, *available at* http://www.nrdc.org/air/pollution-standards/files/clean-power-plan-energy-savings-IB.pdf, last accessed November 25, 2014.
[78] *Id.* at Note 3.
[79] 42 U.S.C. 7411(d)(1)(A); 42 U.S.C. 7411(a)(1).
[80] *Id*.
[81] Union of Concerned Scientists, *Strengthening the EPA's Clean Power Plan*, at 3, *available at* http://www.ucsusa.org/sites/default/files/attach/2014/10/Strengthening-the-EPA-Clean-Power-Plan.pdf, last accessed November 22, 2014.
[82] *Id.*
[83] *Id*.
[84] *Id*.

role that renewable generation can play in reducing carbon emissions. This will ensure that renewable energy targets truly reflect the "best" system of emission reduction, based on real world information.

iii. EPA should assume full compliance with current RPS requirements set by state law

Under EPA's proposed approach, 17 of the 29 states with RPS obligations under state law have lower targets under the EPA approach than what is required to meet their existing state laws.[85] This outcome cannot reflect the "best" system of emission reduction. EPA should assume that these states will achieve the greater of their EPA target or the level of renewables needed to comply with their state RPS obligations.[86] That way, EPA targets will serve as a floor rather than a ceiling, and existing state law obligations will be reflected in those states' "best" system of emission reduction.

iv. EPA should account for actual and expected renewable energy growth in Virginia between 2013 and 2017

EPA starts with each state's 2012 renewable energy generation, and then assumes that states will not begin ramping up renewable energy from 2012 levels until 2017. This approach fails to capture any of the recent or expected growth in renewable energy in Virginia between 2012 and 2017, ignoring the significant investments that are already underway.

Even in the past year, our state's renewable energy generation has increased from 2,358 GWh to 2,845 GWh.[87] These increases are expected to continue due to ongoing declines in the cost of renewable technologies that afford utilities the opportunity to lower costs for ratepayers through investments in wind and solar. We urge EPA to update its projected renewable generation levels for Virginia both in advance of finalizing the proposed rule and again in 2017 to ensure that targets reflect real world conditions.

If EPA were to adopt these recommendations – increasing renewable energy growth rate benchmarks to reflect national best practices, assuming full compliance with state RPS policies and accounting for renewable energy growth from 2013-2017 – the Union of Concerned Scientists found that national average electricity prices would be a maximum of 0.3 percent higher per year than business as usual through 2030.[88] This means that a typical household would only see a maximum increase of 18 cents on their monthly electricity bill.[89] For Virginia,

[85] Clemmer, S., *EPA clean power plan underestimates power of renewable energy to reduce carbon emissions*, Union of Concerned Scientists (Oct. 2014) *available at* http://blog.ucsusa.org/epa-clean-power-plan-underestimates-power-of-renewable-energy-to-reduce-carbon-emissions-682, last accessed November 23, 2014.
[86] Union of Concerned Scientists, *Strengthening the EPA's Clean Power Plan* (Oct. 2014) *available at* http://www.ucsusa.org/sites/default/files/attach/2014/10/Strengthening-the-EPA-Clean-Power-Plan.pdf, last accessed November 23, 2014.
[87] UCS Spreadsheet entitled "UCS Demonstrated RE Growth (State Level)" is included as Attachment 4.
[88] Union of Concerned Scientists, *Strengthening the EPA's Clean Power Plan* (Oct. 2014) *available at* http://www.ucsusa.org/sites/default/files/attach/2014/10/Strengthening-the-EPA-Clean-Power-Plan.pdf, last accessed November 23, 2014.
[89] *Id.*

this would increase the renewable energy target in 2020 from EPA's proposed 4,459 GWh to 5,932 GWh; in 2030, Virginia's target would increase to 18,707 GWh compared to EPA's proposed target of 11,192 GWh.[90] This analysis confirms that much more aggressive renewable energy targets are achievable and cost effective.

v. EPA should update its goal-setting formula to correctly account for emissions reductions from renewable energy

In EPA's October 27, 2014 NODA, it explained that the formula in its proposed rule did not correctly incorporate the emission reduction benefits of renewable energy and energy efficiency resources. In the proposal, such resources were simply factored into the denominator when calculating the lbs/MWh emissions rate goals, but EPA did not back out equivalent fossil-fired generation.

This approach is inconsistent with the way in which EPA discussed the renewable energy and energy efficiency BSER assumptions in the proposal itself. For example, the proposed rule states that Building Block 3 represents: "[r]educing emissions from affected EGUs in the amount that results from *substituting generation* at those EGUs with expanded low-or zero-carbon generation" and building block 4 represents: "[r]educing emissions from affected EGUs in the amount that results from the use of demand-side energy efficiency that reduces the *amount of generation required*."[91] Despite these statements, EPA's calculations did not substitute generation or reduce generation from fossil-fired resources in the amount associated with new renewable energy resources. As such, EPA should revise its formula for setting the state targets and adopt the corrected approach proposed in the NODA[92] to ensure that incremental renewable resources do in fact reduce the equivalent level of fossil-fired generation.[93]

vi. EPA should allow out-of-state RECs to count towards compliance

States that choose to rely on renewable energy to meet carbon reduction targets will need to account for that renewable energy in order to demonstrate compliance. EPA is proposing that a state could take into account all of the CO2 emissions reductions from renewable energy implemented by the state, whether they occur in the state or in other states.[94] This would acknowledge the existence of renewable energy credits (RECs) that allow for interstate trading of renewable energy attributes. This approach would also be consistent with existing state RPS policies, which often allow for the use of renewable energy located in another state to be used to comply with that state's RPS, so long as RECs are exchanged.

Renewable energy has been tracked and traded in the United States for nearly 20 years, resulting in integrated electronic tracking systems and standardized approaches to trading and

[90] *See* Attachment 4.
[91] 79 Fed. Reg. at 34,836 (emphasis added).
[92] Between the two proposed formulas for backing out historical fossil generation, we favor substitution on a pro rata basis across generation types.
[93] We take the same position in regards to energy efficiency. See Part IV.B.
[94] 79 Fed. Reg. at 34,922.

establishing ownership.[95] The currency for these trading systems is the Renewable Energy Certificate (REC), which represents the "renewableness" of a MWh of energy.[96] The precise content of a REC depends on state law, but typically include the legal right to claim delivery and usage of renewable energy.[97] The consistent feature of REC trading is that each REC should only be used (or "retired") once.

Currently, Virginia operates within the PJM-GATS trading system.[98] This database could be used to track renewable energy that is generated in-state and used by load-serving entities in that state for compliance, as well as renewable energy generated in one state and transferred to a load-serving entity located in another state. The goal of such a tracking system should be to give states confidence that investments in renewable energy are adequately quantified, non-duplicative, and verifiable.

Using regional REC markets is consistent with EPA's approach of determining state renewables targets based on the regional availability of renewable power resources. Allowing states to comply with targets using out-of-state purchases of renewable energy will greatly increase the cost effectiveness of renewables and capture regional efficiencies. Importantly, EPA should ensure that compliance credit goes to the states where the purchasers of RECs and energy reside, regardless of where the renewable energy was physically generated.

We support the flexibility that EPA has given states to comply in the proposed rule. States can ensure compliance with targets by requiring action by load-serving entities to purchase renewable energy and setting in place backstop measures that are applied directly to regulated sources in the case of a shortfall. Renewable energy should not be limited to utility scale projects, but should also allow for credit from commercial and residential distributed solar systems.

B. EPA's Energy Efficiency Assumptions in Building Block 4 Should be Modified

For all states, including Virginia, EPA has concluded that implementation of energy efficiency measures is achievable at reasonable costs. We strongly agree. Energy efficiency is recognized as the most widely available and the lowest-cost options for reducing carbon emissions.[99] For example, EPA's Regulatory Impact Analysis for the Clean Power Plan cites two studies finding that demand-side efficiency improvements can be realized at less cost than the

[95] Quarrier, R. and D. Farnsworth, *Tracking renewable energy for the U.S. EPA's clean power plan: Guidelines for states to use existing REC tracking systems to comply with 111(d)*, (2014) *available at* http://www.resource-solutions.org/pub_pdfs/Tracking%20Renewable%20Energy.pdf, last accessed November 23, 2014.
[96] *Id*. at 4.
[97] *Id*.
[98] *Id*. at 5.
[99] Molina, M., *The Best Value for America's Dollar: A National Review of the Cost of Utility Energy Efficiency Programs*, American Council for an Energy-Efficient Economy ("ACEEE"), (Mar. 2014) *available at* aceee.org/research-report/u1402; Hayes, S. and Herndon, G., *Trailblazing Without the Smog: Incorporating Energy Efficiency into Greenhouse Gas Limits for Existing Power Plants*, ACEEE, (Oct. 2013) *available at* www.aceee.org/research-report/e13i.

savings from avoided power generation.[100] The ICF analysis described above in Part III reveals that compliance options that prioritize energy efficiency programs may actually result in customer bill reductions. In addition to allowing the State to meet Clean Power Plan targets in a cost-effective way, an increase in energy efficiency measures could create 5,600 new jobs for Virginians over the next five years alone.[101]

However, we believe that EPA's assumptions for this building block undersell the resource in Virginia. To reflect Virginia's true energy efficiency potential, EPA should: (i) ensure that energy efficiency potential assumptions are reflective of true potential; (ii) update energy efficiency cost assumptions to reflect current information; (iii) update the emissions rate formula to correctly account for emissions reductions from energy efficiency; (iv) incorporate the full value of energy efficiency programs as a compliance mechanism; and (v) clarify that gross savings are the appropriate metric for compliance purposes.

i. EPA's energy efficiency potential assumptions underrepresent the full potential in the Commonwealth

Under the Clean Power Plan, Virginia is expected to have the ability to achieve annual incremental energy efficiency savings of 1.5 percent by 2025, and to hold that rate through 2030. The result would be a cumulative savings of 9 percent, or 6 million MWh, by 2030.[102] However, these expectations are modest in comparison to actual policies that are in effect in the Commonwealth.

In 2007, Virginia adopted a modest voluntary goal of reducing electric energy consumption by 10 percent of 2006 sales by 2022, which is a reduction of 11,836 GWh. The State Corporation Commission conducted an evidentiary hearing where it determined that the 10 percent goal is realistic and achievable, and Dominion has called this goal "realistically accomplishable."[103] The Staff of the State Corporation Commission further stated:

> "The Staff believes that the 10% goal . . . can be achieved even using a relatively conservative test for 'cost-effectiveness.' … This conclusion is supported by the observation that Virginia's electricity rates have been relatively low for decades and that, as a result, it is reasonable to assume that conservation opportunities developed in higher electric cost jurisdictions could be adopted in Virginia at a lower cost than that of new supply from the electric power system. For the same reasons, Staff agrees with the

[100] U.S. EPA, Regulatory Impact Analysis for the Proposed Carbon Pollution Guidelines for Existing Power Plants and Emission Standards for Modified and Reconstructed Power Plants 2-14 (June 2014) ("RIA"), *available at* www.epa.gov/ttn/ecas/regdata/RIAs/111dproposalRIAfinal0602.pdf.

[101] Natural Resources Def. Council, *Carbon Pollution Standards Fact Sheet: Virginia*, (May 2014) *available at* http://www.nrdc.org/air/pollution-standards/files/cps-state-benefits-VA.pdf.

[102] 79 Fed. Reg. at 34,874.

[103] Virginia State Corporation Commission, *Report: Study to Determine Achievable and Cost-effective Demand-side Management Portfolios Administered by Generating Electric Utilities in the Commonwealth* (Nov. 15, 2009).

findings of the Virginia Energy Plan and other studies that generally conclude that there is much cost-effective conservation ready for harvest."[104]

Yet EPA's energy efficiency assumptions for Virginia would reach just 3,395 GWh of energy savings in 2022, less than one third of the modest 10 percent goal. This indicates that EPA's savings targets are under-representative of Virginia's true energy efficiency potential.

Further, the level of DSM that Dominion and Appalachian Power projected in their respective Integrated Resource Plans filed with the State Corporation Commission in 2013 would produce higher levels of cumulative savings through 2022 than were included in EPA's assumptions. The figure below demonstrates that EPA vastly underestimated the level of energy efficiency savings that Virginia could achieve in the early years of the planning period.

Year	CPP Target	Dominion Projections	APCo Projections	Utility Total (GWh)
2014	0	557	146	703
2015	0	797	220	1,017
2016	0	1,234	286	1,520
2017	30	1,835	345	2,180
2018	286	2,373	415	2,788
2019	761	2,846	629	3,475
2020	1,445	3,034	909	3,943
2021	2,327	3,041	1,154	4,195
2022	**3,395**	3,080	1,209	**4,289**

In addition to Virginia's own policy goals and plans, independent analysis reveals that Virginia could achieve significantly higher cumulate energy savings than included in EPA's analysis. Earlier this year, the American Council for an Energy Efficient Economy (ACEEE) determined that Virginia could reduce electricity consumption by 23 percent below 2012 levels by 2030 by implementing four common efficiency practices.[105] These four practices – implementing an annual energy efficiency savings target of 1.5 percent, enacting national model building codes, constructing combined heat and power systems, and adopting efficiency standards for products and equipment – are well within the Commonwealth's reach.

Moreover, recent savings and new targets in other states demonstrate the increasing achievability of energy efficiency. Eleven states achieved energy savings of over 1 percent of retail sales in 2012.[106] National investments in utility energy efficiency programs have grown at

[104] Virginia State Corporation Commission, *In re the Matter of Energy Program Goals*, Case No. PUE-2007-00049, Staff's Report to the State Corporation Commission in Preparation for the Commission's Report to the Governor and the General Assembly, at 61 (Nov. 16, 2007).
[105] Hayes, S. et al, American Council for an Energy Efficiency Economy, "Change is in the Air: How State Can Harness Energy Efficiency to Strengthen the Economy and Reduce Pollution," April 2014.
[106] *Id.* at 5-17–5-19.

a rapid pace—increasing from $1.6 billion in 2006 to $5.9 billion in 2011[107]—and are projected to continue to increase to between $8.1 billion and $12.2 billion over the next decade, with the most significant increases occurring in regions with lower levels of historical program spending.[108]

Given these trends, and the comparatively low levels of energy efficiency currently being realized in Virginia, the potential to ramp up energy savings across the Commonwealth is enormous,[109] and Virginia's utilities can and should achieve much higher levels of energy savings going forward.

ii. EPA should use up-to-date cost information for efficiency programs

Energy efficiency is the lowest-cost resource option for reducing carbon emissions.[110] However, EPA's estimates of energy efficiency costs, which reflect a very low cost compared to supply-side resources, are likely too high.[111] EPA estimates the levelized cost of energy efficiency savings at 8.3 to 9 cents/kWh.[112] Yet EPA directly acknowledged that it "has taken a conservative approach (i.e., leading to higher estimates to costs) to the development of the EE state goals as well as to other factors that affect the EE cost estimates…"[113]

In practice, energy efficiency costs are one-third to one-fourth of the cost that EPA assumed. For example, the Lawrence Berkeley National Laboratory found that the average levelized cost of energy saved from efficiency programs is 2.1 cents/kWh at a 6 percent discount rate.[114] ACEEE also performed a study of the cost of efficiency programs and found that, on average, the levelized cost is roughly 2.8 cents/kWh under a 5 percent discount rate and 2.5 cents/kWh under a 3 percent discount rate.[115]

Cost assumptions that reflect the true cost of energy efficiency programs are vital if states are to realize the full benefits of these resources. As a result, EPA's cost assumptions should include the more realistic assessments that are being seen in the marketplace.

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[107] EPA, Technical Support Document: GHG Abatement Measures, Docket ID No. EPA-HW-OAR-2013-602, at pages t 5-2, 5-14–5-15, 5-19 (hereinafter "GHG Abatement TSD").

[108] *Id*.

[109] GHG Abatement TSD at 5-19.

[110] Molina, M., *The Best Value for America's Dollar: A National Review of the Cost of Utility Energy Efficiency Programs*, ACEEE, (Mar. 2014) *available at* aceee.org/research-report/u1402; Hayes, S. and Herndon, G., *Trailblazing Without the Smog: Incorporating Energy Efficiency into Greenhouse Gas Limits for Existing Power Plants*, ACEEE, (Oct. 2013) *available at* www.aceee.org/research-report/e13i.

[111] *See* Molina at 34–37; Megan A. Billingsley, et al., *The Program Administrator Cost of Saved Energy for Utility Customer-Funded Energy Efficiency Programs*, Lawrence Berkeley National Laboratory, at 52–57 (Mar. 2014), *available at* http://emp.lbl.gov/sites/all/files/lbnl-6595e.pdf.

[112] GHG Abatement TSD 5-60.

[113] *Id*. at 5-52.

[114] *See* Megan A. Billingsley *et al*., Lawrence Berkeley National Laboratory, *The Program Administrator Cost of Energy Saved for Utility Customer-Funded Energy Efficiency Programs* (Mar. 2014), at xi.

[115] *See* Molina at 20.

iii. EPA should revise its goal-setting formula to correctly account for emissions reductions from energy efficiency resources

As described in more detail in Subsection A, EPA failed to properly account for energy efficiency and renewable energy resources in the goal-setting formula. Rather than backing out the equivalent level of existing fossil-fired generation that these resources would displace, EPA simply added the MWh of generation or energy savings from these resources into the denominator of the lbs/MWh emissions rate. EPA should adopt the methodology in line with the information released in its NODA to fully capture the emissions-reduction benefits of these resources.

iv. EPA should revise its goal-setting formula for states that are net-importers of electricity

In its target setting formula, EPA assumed that states that are net importers of electricity should receive credit for only a portion of their energy efficiency investments. The portion is represented as the share of in-state generation that is not imported. As a net electricity importing state, Virginia receives credit for 58 percent of its energy efficiency investments, which represents its share of in-state generation in 2012. The problem with this assumption is that it discounts the value of energy efficiency programs as a compliance mechanism.

EPA should revise its formula so that the full level of energy efficiency resources that a state invests in will be counted as a compliance mechanism. This revision will be especially vital if EPA adopts the approach set forth in its NODA and adjusts its emission rate formula to reflect the fact that renewable energy and energy efficiency resources are deferring fossil-fired generation. Such an adjustment will be required so that the target-setting calculation adequately represents the underlying assumption that such resources displace existing fossil-fired generation. It is important that net-importing states like Virginia receive full credit for investments in energy efficiency, especially where such investments reduce generation from fossil-fired resources. Without such an assumption, a significant amount of energy efficiency will not be credited as a compliance option, even if the practical effect of such programs is that they are displacing in-state generation.

v. EPA should recognize gross savings as an appropriate metric for state compliance plans.

In the proposal, EPA states that it calculated state energy efficiency goals based on net savings.[116] As EPA states:

> "This incremental savings rate and all others discussed in this subsection represent net, rather than gross, energy savings. Gross savings are the changes in energy use (MWh) that result directly from actions taken by program participants, regardless of why they participated in the program. Net savings refer to the changes in energy use that are directly attributable to a particular energy

[116] 79 Fed. Reg. at 34,872.

> efficiency program after accounting for free-ridership, spillover and other factors."[117]

EPA did not specifically seek comment on this issue, and the Conservation Groups do not disagree with EPA's use of net savings for purposes of target-setting. Compliance, however, is another issue. In its State Considerations Technical Support Document, EPA states that a consideration for energy efficiency programs in state compliance plans "is whether reporting of energy savings should be specified on either gross or net basis, or both, to promote consistency in measuring the impact of energy efficiency measures across state plans."[118]

Net savings establish whether a utility expenditure caused a consumer to adopt an energy efficiency technology or measure. As such, they are a useful metric for determining whether a utility should receive a performance incentive or lost revenue adjustment for its program. But this is a separate issue from whether a utility program has the effect of reducing carbon emissions for a state carbon reduction goal. From that standpoint, any measure that actually reduces emissions by reducing the need for generation should count for compliance, regardless of whether the measure was installed by a free rider, or resulted from spillover or other factors. Accordingly, we believe that gross savings are the appropriate metric for compliance purposes, and EPA should so clarify in the final rule.

C. EPA's Assumptions Regarding New Nuclear Generation Should be Clarified

As EPA correctly notes, while nuclear generation has carbon-reduction benefits, building new nuclear generation costs far more than other types of generation both in terms of dollars and time.[119] While EPA did include nuclear that was already under construction in three states (Tennessee, Georgia, and South Carolina) when setting the emission reduction target in those states,[120] it did not include any under-construction nuclear in establishing Virginia's emission reduction target. EPA should clarify that any state choosing to include construction of new nuclear projects in its state compliance plan should reasonably demonstrate the extent to which such nuclear generation would displace existing fossil-fired generation.

V. Importance of the Clean Power Plan to Address the Significant Costs and Risks from Climate Change that Impact All Virginians.

For Virginia to avoid the spiraling consequences of climate change, carbon emissions must be reduced significantly. The Supreme Court has confirmed EPA's authority to regulate carbon emissions from EGUs under the Clean Air Act.[121] Setting reasonable safeguards for carbon pollution, including through the regulation of carbon emissions from existing EGUs

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[117] 79 Fed. Reg. at 34,872.
[118] EPA, Technical Support Document: State Plan Considerations, Docket ID No. EPA-HW-OAR-2013-602, at 53.
[119] 70 Fed. Reg. at 34,870.
[120] *See* Comments filed by SELC on the Clean Power Plan regarding Georgia, Tennessee, and South Carolina (providing specific recommendations regarding the treatment of under-construction nuclear).
[121] *Massachusetts v. Envtl. Prot. Agency*, 549 U.S. 497 (2007); *American Electric Power v. Connecticut*, 131 S.Ct. 2527 (2001).

under the Clean Power Plan, is essential in beginning to address the risks that all Virginians face from climate change.

The serious threats that Virginia faces on account of sea level rise and associated storm surges are only expected to grow as climate change continues.[122] The level of development across Virginia's coastline and its low-lying nature make the area particularly susceptible to such threats.[123] For example, the Hampton Roads area has the highest levels of sea level rise along the East Coast and is second only to New Orleans in its vulnerability to sea level rise impacts.[124] Rising sea levels could force the relocation of military installations that drive the Hampton Roads economy.[125] Rising sea levels have already forced the Navy to implement a $60 million replacement of 14 piers in Norfolk, to protect the Navy's ship repair facilities.[126]

Since 1880, the average global sea level has risen eight inches, but in Virginia Beach, sea level has risen by a remarkable 30 inches.[127] The Norfolk Virginia Beach Metropolitan Area ranks 10th in the world in value of assets exposed to an increase in flooding from rising sea levels,[128] which is likely to accelerate over the coming decades due to climate change.[129] Climate change-related forces are expected to destroy 79 percent of Virginia's beaches as well as large portions of undeveloped dry land and marshes in the lower tidewater region of Virginia Beach and Norfolk.[130]

Rising sea levels and increased storm surges attributed to climate change have caused increasingly severe and widespread property damage nationally. In 2012 alone, insured losses in the U.S. totaled $58 billion.[131] The effects of climate change have been felt strongly in Virginia, particularly in the Virginia Beach/Norfolk/Hampton Roads region. As severe weather has intensified and become more frequent over the past couple of decades, most property and casualty insurers have stopped writing policies for mid-Atlantic coastal businesses and primary

[122] *Id.*

[123] Robert Repetto, *Economic and Environmental Impacts of Climate Change in Virginia*, at 2, *available at* http://www.demos.org/sites/default/files/publications/VA_ClimateChangeInTheStates_Demos.pdf.

[124] Forbes Tompkins and Christina Deconcini, S*ea-Level Rise and its Impact on Virginia*, at 1, (June 2014) *available at* http://www.wri.org/sites/default/files/WRI_FactSheet_Virginia_Final.pdf ("WRI Fact Sheet").

[125] *Id.*

[126] Earthwise, *Capitalizing on Climate Solutions*, (Summer 2013) *available at* http://www.ucsusa.org/assets/documents/earthwise/earthwise-summer-2013.pdf.

[127] Nancy Cole, *Rising Tide*, (Fall 2013) *available at* http://www.ucsusa.org/publications/catalyst/fa13-rising-tide-catalyst-fall.html.

[128] Repetto at 2.

[129] National Climate Assessment (citing Strauss, B. H., R. Ziemlinski, J. L. Weiss, and J. T. Overpeck, *2012: Tidally adjusted estimates of topographic vulnerability to sea level rise and flooding for the contiguous United States. Environmental Research Letters*, at 7).

[130] Repetto at 2.

[131] *See* U.S. Government Accountability Office, *Climate Change: Energy Infrastructure Risks and Adaptation Efforts*, at 3, (Jan. 2014) *available at* www.gao.gov/products/GAO-14-74 ("GAO Infrastructure Report").

residences.[132] This has meant that, for example, less than 25 percent of residences in Hampton Roads have flood insurance.[133]

Climate change is also expected to increase the frequency and severity of extreme weather events.[134] Hurricane Isabel provides a recent example of the devastation caused by extreme weather. Hurricane Isabel caused approximately $5 billion in total damages, and approximately $925 million in Virginia alone.[135] Risk assessment firm First American estimates that if a Category 1 storm hit Virginia Beach, it would cause over $7.4 billion in damages.[136] The firm estimates that a Category 5 storm would cost over $39 billion.[137]

Rising temperatures caused by climate change will have a dramatic effect on human health both nationally and in Virginia. Higher summer and fall temperatures will negatively affect air quality by, among other things, increasing the presence of pollen and other allergens in the air.[138] Higher temperatures will also increase smog, which causes and exacerbates a wide array of respiratory conditions, such as bronchitis and asthma.[139] Furthermore, three of the four leading causes of death in Virginia—heart attack, stroke, and chronic respiratory illnesses—are exacerbated by heat.[140] Climate change also will threaten Virginians' health by facilitating the spread of certain infectious diseases. For example, Lyme disease—an occasionally fatal disease with symptoms that can persist for months or years[141]—is currently confined to just one region of Virginia, but is expected to spread across the state as temperatures rise and allow ticks, the main carrier of the disease, to propagate.[142] The health hazards exacerbated by climate change will disproportionately impact young children and the elderly. Elderly citizens are at higher risk of heart disease and stroke, and children are particularly susceptible to the respiratory impacts of

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[132] Repetto at 2.

[133] *Id*.

[134] Intergovernmental Panel on Climate Change, *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation: Summary for Policymakers*, at 5, (2012) *available at* https://www.ipcc.ch/pdf/special-reports/srex/SREX_FD_SPM_final.pdf.

[135] Nat'l Oceanic and Atmospheric Admin., *Service Assessment: Hurricane Isabel*, at 2, (May 2004), *available at* http://www.nws.noaa.gov/os/assessments/pdfs/isabel.pdf.

[136] First American, *2010 First American Storm Surge Report*, at 30, (2010) *available at* http://images.bimedia.net/documents/2010SurgeReport_FA.pdf ("First Am. Report"). Another risk assessment firm, CoreLogic, estimates that the total damage caused by storm surges to Virginia Beach, assuming 100 percent destruction of residential properties, would be approximately $87 billion. *See* CoreLogic, *2014 CoreLogic Storm Surge Report*, at 12, (July 2014) *available at* http://www.corelogic.com/research/storm-surge/corelogic-2014-storm-surge-report.pdf.

[137] First Am. Report at 30.

[138] Repetto at 7.

[139] U.S. EPA, *Climate Change and Air Quality*, (2010) *available at* http://www.epa.gov/airtrends/2010/report/climatechange.pdf.

[140] M. Martiello and M.V. Giacchi, *Review Article: High temperatures and health outcomes: A review of the literature*, Scandinavian Journal of Public Health, (Dec. 2010), Vol. 38 No. 8 826-837.

[141] Repetto at 7.

[142] John S. Brownstein, T.R. Holford, and D. Fish, *Effect of Climate Change on Lyme Disease Risk in North America Ecohealth*, at 38-46, (March 2005) *available at* http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2582486/.

heat waves, as their lungs are still developing and they have greater exposure than adults because they breathe at a higher rate and often play outdoors.

VI. Conclusion

The Conservation Groups strongly support the Clean Power Plan's goal of achieving significant carbon reductions from the power sector. Virginia's proposed emissions rate target is readily achievable; indeed, Virginia could reach nearly 80 percent of the target with plans and resources that are already in place. Further, compliance with the Clean Power Plan's carbon reduction goals will overwhelmingly benefit the Commonwealth, resulting in significant health benefits and net reductions in electric bills throughout the state.

Although EPA's emission rate target for Virginia is reasonable as proposed, it appears to underestimate the true potential for both renewable energy and energy efficiency in the Commonwealth. Accordingly, we urge EPA to revisit the assumptions used in calculating Building Blocks 3 and 4 in order to fully capture all achievable, cost-effective emissions reductions.

The Commonwealth of Virginia is already feeling the effects of climate change, and these impacts will only worsen with time. To mitigate these impacts, we must significantly reduce carbon emissions. The Clean Power Plan is an essential step in addressing the risks of climate change. We support the EPA's approach to carbon reductions, and urge the EPA to finalize a robust, achievable rule.

Respectfully submitted,

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