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

Dear Administrator McCarthy:

The Southern Environmental Law Center ("SELC") is pleased to submit the following comments regarding the Environmental Protection Agency's ("EPA") 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 those 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.

SELC is a non-profit, regional environmental organization dedicated to the protection of natural resources throughout the Southeast. Through utility regulatory proceedings and stakeholder processes, as well as 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 – Tennessee, Virginia, North Carolina, South Carolina, Georgia, and Alabama. These comments focus specifically on Tennessee.[2]

SELC has extensive experience with the electric utility sector in Tennessee. SELC has participated in a number of stakeholder proceedings involving the Tennessee Valley Authority ("TVA"), the utility that generates electricity for the vast majority of the state. These proceedings have included integrated resource planning and renewable energy resource decisions

[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.

[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 Virginia, as well as a separate set of comments on the treatment of biomass under the proposal.

and valuation. We have also been involved in related stakeholder processes, such as the Southeast Regional Transmission Planning ("SERTP") process.[3]

Based on this in-state experience, we believe Tennessee is well positioned to meet or exceed the emission reduction target set by EPA. As EPA notes at the proposal's outset, the Clean Power Plan "would continue progress already underway to reduce carbon emissions from existing fossil fuel-fired power plants."[4] Indeed, Tennessee has already made significant progress toward lowering its carbon emissions from the power sector, primarily by decreasing its reliance on coal and increasing its reliance on lower-emitting natural gas. As we will discuss more fully below, as a result of decisions made long before the proposal was issued, Tennessee is nearly 88 percent of the way toward achieving its carbon emission reduction rate. The remaining 12 percent could be cost-effectively achieved through modest investments in energy efficiency and renewable energy resources.

In Part I of these comments, we summarize how EPA calculated Tennessee's emission reduction target. In Part II, we discuss how the state-specific target proposed for Tennessee is readily achievable. Finally, in Part III, we comment on certain aspects of the proposal regarding renewable energy, energy efficiency, and nuclear resources.[5]

I. Summary of Tennessee'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. SELC urges EPA to finalize a 2030 target for Tennessee that is at least as stringent as the proposed target – particularly because Tennessee's *actual* emission rate (i.e., one that accounts for decisions already made) is much lower than what EPA assumes. The following summarizes EPA's target-setting for Tennessee.

In a spreadsheet entitled "EPA's Calculation of Tennessee's Target" (Attachment 1), we re-create the state target EPA computed for Tennessee using the four BSER building blocks. For Tennessee, the baseline carbon emissions rate for fossil-fuel generation in 2012 was 2,015 lbs/MWh. Applying each of the four building blocks to this 2012 baseline rate resulted in an emissions rate goal of 1,163 lbs/MWh in 2030, with an interim goal of 1,254 lbs/MWh average for years 2020–2029.

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[3] *See* Southeastern Regional Transmission Planning, *available at* http://www.southeasternrtp.com/.

[4] 79 Fed. Reg. at 34830.

[5] In large part, our comments address issues in the context of the proposed rate targets for Tennessee 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.

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 Tennessee's coal fleet results in a decrease from the starting 2012 baseline rate of 2,015 lbs/MWh to 1,902 lbs/MWh, a reduction of 113 lbs/MWh.[6]

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 Tennessee were operating at an average capacity factor of approximately 45 percent. EPA applied the 70 percent capacity factor assumption to increase the level of generation from Tennessee's existing NGCC EGUs. The increase in NGCC generation was then subtracted from the 2012 coal and other fossil steam generation proportionally to represent the replacement of higher carbon-intensive resources with lower carbon NGCC generation. Applying this assumption to Tennessee's existing NGCC fleet results in a decrease from 1,902 lbs/MWh to 1,798 lbs/MWh, a reduction of 104 lbs/MWh.[7]

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 Tennessee, EPA did not identify any NGCC units as under construction, and thus did not apply any additional reductions to the state emissions rate.[8]

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[6] *See* Attachment 1, line 3.
[7] *See id*. at line 4.
[8] *See id*. at line 5.

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 assumed that 6 percent of "at-risk" existing nuclear capacity would be retained and that all nuclear units currently under construction would be completed. 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. EPA also assumed that the nuclear unit currently under construction at the Watts Bar facility would be completed and factored generation from that unit into the emission rate calculation. EPA assumed that the unit would operate at a 90 percent capacity factor, and added that generation into the denominator of the emission rate calculation. Applying these assumptions results in a decrease from 1,798 lbs/MWh to 1,433 lbs/MWh, a reduction of 365 lbs/MWh.[9]

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. EPA's decision to adopt a regional approach based on existing legal obligations of neighboring states is designed to ensure that the renewables target reflects regional availability of renewable energy resources.

For Tennessee, EPA calculated a 10 percent renewable energy target by 2030 based on RPS targets of other states in the Southeast region. For the Southeast region, this 10 percent goal is based on RPS requirements enacted by the state of North Carolina. North Carolina's RPS has been in effect since 2007 and requires all investor-owned utilities in the state to supply 12.5 percent of 2020 retail electricity sales from eligible energy resources by 2021. Applying this 10 percent renewable energy assumption results in a decrease from 1,433 lbs/MWh to 1,322 lbs/MWh, a reduction of 111 lbs/MWh.[10]

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

[9] *See* Attachment 1 at line 6.
[10] *See id*. at line 7.

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. Under EPA's assumptions, Tennessee is expected to achieve annual incremental savings of 1.5 percent by 2023, and cumulative savings of 10.79 percent by 2030.

However, EPA 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, Tennessee receives credit for 72 percent (of the share of total electricity sales produced by in-state generation) of its energy efficiency investments. Therefore, EPA reduced the level of energy efficiency credited in Tennessee reflect this assumption, resulting in 4,305,814 MWh of avoided generation by 2030. Applying this assumption results in a decrease from 1,322 lbs/MWh to the final 2030 target of 1,163 lbs/MWh, a reduction of 159 lbs/MWh.[11]

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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 Tennessee's 2030 target, there is nothing requiring Tennessee 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.[12] 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 28, 2014.[13]

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., Tennessee 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 Tennessee's route to compliance is less burdensome than a narrow focus on the target-setting would indicate. Tennessee'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.

[11] *See* Attachment 1 at line 8.
[12] 79 Fed. Reg. at 34,897.
[13] 79 Fed. Reg. 64,543.

II. Tennessee's Target is Readily Achievable Based on Plans the Tennessee Valley Authority Already Has in Place and Tennessee Can Achieve the Remaining Reductions With Modest Levels of Renewable Energy and Energy Efficiency.

In evaluating the achievability of the state's final target, it is important to note that there are a number of steps that TVA, which owns over 90 percent of the generation resources in the state and serves almost all of the state's 95 counties,[14] is already planning to take that will reduce Tennessee's carbon emissions rate below the 2012 baseline level. In a spreadsheet entitled "SELC's Calculation of Tennessee's Achievability" (Attachment 2), we applied some of these existing plans to Tennessee's 2012 baseline emissions rate to demonstrate that Tennessee can get 88 percent of the way to its target with existing plans and resources. Subsection A describes how the calculations were applied to reach the 88 percent figure. Subsection B describes how the remaining 12 percent of the target can be met by reaching just a fraction of EPA's renewable energy and energy efficiency assumptions for Tennessee.

A. Plans that TVA Already Has in Place Will Allow Tennessee to Achieve 88 Percent of the State's Target.

EPA's target-setting did not take into account many of the carbon-reducing measures that Tennessee 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, Tennessee will achieve 88 percent of its reduction target merely by staying the course. While the assumptions that we made in performing these calculations were simplified in comparison to the level of detail needed to determine actual compliance, these calculations nevertheless reflect the achievability of Tennessee's target.

i. Utility Plans to Retire Existing Coal-Fired Generation.

Under building block 1, EPA assumed a 6 percent heat rate improvement. In our analysis of existing plans, we did not assume that Tennessee'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 TVA has already made to retire a number of its oldest, dirtiest and least economic coal-burning units.[15] The units for which retirement decisions have already been made include:

- Johnsonville
- John Sevier
- Allen

[14] Energy Information Administration ("EIA"), *Tennessee State Energy Profile, available at* http://www.eia.gov/state/print.cfm?sid=TN.

[15] These retirement decisions are principally due to the terms of a Federal Facilities Compliance Agreement that TVA entered into with EPA to resolve long-running legal challenges and disputes about how the Clean Air Act applies to maintenance and equipment replacement at 11 of TVA's coal-fired plants in Alabama, Kentucky, and Tennessee. *See* EPA, *Tennessee Valley Authority Clean Air Act Settlement, available at* http://www2.epa.gov/enforcement/tennessee-valley-authority-clean-air-act-settlement.

EPA included the electric generation and carbon emission levels from these three coal-fired EGUs in Tennessee's baseline 2012 carbon emissions rate. However, EPA did not include the planned retirements of these EGUs when calculating Tennessee's emission reduction target.

Applying the retirement assumption to Tennessee's 2012 baseline emission rate by subtracting out the 2012 level of coal-fired generation from these units results in an emission rate reduction from 2,015 lbs/MWh to 1,963 lbs/MWh, a decrease of 52 lbs/MWh.[16]

	State Emissions Rate	**Rate Reduction**
Tennessee's 2012 Baseline (Fossil)	2,015	
Retire Johnsonville, John Sevier, Allen	**1,963**	**52**

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. In 2012, Tennessee's average NGCC capacity factor – a measure of those plants' actual output relative to their potential output – was 45 percent. To achieve a 70 percent capacity factor across its existing NGCC fleet, Tennessee would need to increase its gas generation by 3,297,176 MWh. While TVA is not specifically planning to increase the capacity of these units to 70 percent, the discussion that follows indicates that this assumption is achievable with existing resources and without significant capital investment. On this basis, we included the assumption in our calculations.

First, 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. Since Tennessee's 2012 coal and steam generation was 34.4 million MWh, there is sufficient generation to allow for re-dispatch of the state's NGCCs up to the 70 percent maximum. In contrast, states that are historically less dependent on coal do not have this opportunity – even if California re-dispatched all of its historical coal and steam generation to NGCCs, it would still only achieve a 49 percent NGCC capacity factor—an increase of just 4 percentage points.

Second, the 70 percent natural gas capacity assumption is reasonable in light of existing pipeline capacity. According to the U.S. Energy Information Administration ("EIA"), the total capacity of the gas pipelines delivering into Tennessee is 14,685 MMcf per day.[17] The 70 percent capacity assumption would increase the level of total gas delivered to customers during the peak month from 1,046 MMcf per day to 1,156 MMcf per day. After subtracting the 5,460 MMcf per day that flows out of Tennessee to other markets,[18] the average daily amount of

[16] *See* Attachment 2 at line 3.
[17] EIA, *U.S. State-to-State Capacity, available at* http://www.eia.gov/naturalgas/data.cfm.
[18] EIA, *International & Interstate Movements of Natural Gas by State, available at* http://www.eia.gov/naturalgas/data.cfm.

pipeline capacity available to supply Tennessee markets would still be more than eight times the peak month gas use (~9,000 MMcf per day of capacity vs. ~1,100 MMcf per day of consumption). Thus, existing pipeline capacity should be able to accommodate the additional capacity at existing natural gas EGUs.

Finally, 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.[19] Tennessee is in the SERC Tennessee Valley subregion. The Synapse analysis indicated that this region could exceed EPA's natural gas re-dispatch target of 70 percent and, under the assumptions modeled, reach an 80 percent capacity factor.

As such, based on the reasonableness of the assumption as applied to Tennessee, 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 813 lbs/MWh. Applying the assumption in the same manner as EPA's calculation results in a decrease from 1,963 lbs/MWh to 1,822 lbs/MWh, a reduction of 141 lbs/MWh.[20]

	State Emissions Rate	**Rate Reduction**
Tennessee's 2012 Baseline (Fossil)	2,015	
Retire Johnsonville, John Sevier, Allen	1,963	52
Increase existing NG to 70% capacity factor	**1,822**	**141**

iii. Utility Plans to Construct New NGCC Units.

Under Building Block 2, EPA also assumed that new NGCC units that were under construction as of January 8, 2014 are "existing" units for purposes of the proposal. However, in Tennessee, EPA assumed that no NGCC capacity was under construction. Since that time, TVA has announced plans to build a 1,000 MW NGCC unit to replace the retiring Allen coal-fired power plant.[21] EPA accounted for under-construction NGCC capacity by assuming that the unit operates at a 70 percent capacity factor, with 15 percent of the capacity displacing coal-fired generation and 55 percent included as "Other" generation. Our calculations assumed that the units would operate at the average historical emissions rate of 813 lbs/MWh. Applying this assumption to the Allen NGCC proposal would further decrease Tennessee's emission rate from 1,822 lbs/MWh to 1,645 lbs/MWh, a reduction of 177 lbs/MWh.[22]

[19] Knight, P., B. Biewald, J. Daniel, *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.
[20] *See* Attachment 2 at line 4.
[21] TVA, *TVA Board Approves Natural Gas Plant in Memphis* (Aug. 21, 2014), *available at* http://www.tva.gov/news/releases/julsep14/allen-board_approval.html, last accessed November 30, 2014.
[22] *See* Attachment 2 at line 5.

	State Emissions Rate	Rate Reduction
Tennessee's 2012 Baseline (Fossil)	2,015	
Retire Johnsonville, John Sevier, Allen	1,963	52
Increase existing NG to 70% capacity factor	1,822	141
Add under construction NGCC at Allen	**1,645**	**177**

iv. Utility Plans Regarding Existing Nuclear Resources.

EPA's "at risk" analysis is not directly tied to the amount of nuclear generation actually at risk of retirement in any given state. Instead, EPA has identified 6 percent as the approximate nationwide amount of nuclear generation that was at risk of retirement in 2012, based on recent projections by the U.S. Energy Information Administration. In Tennessee, EPA assumed that 1,571,000 MWh of nuclear generation is at risk. We assumed that TVA is planning to continue operating its nuclear units at full capacity through 2030, so we included the reduction in our calculations. Applying this assumption results in a reduction from 1,645 lbs/MWh to 1,580 lbs/MWh, a decrease of 65 lbs/MWh.[23]

	State Emissions Rate	Rate Reduction
Tennessee's 2012 Baseline (Fossil)	2,015	
Retire Johnsonville, John Sevier, Allen	1,963	52
Increase existing NG to 70% capacity factor	1,822	141
Add under construction NGCC at Allen	1,645	177
Retain 6% "at risk" nuclear	**1,580**	**65**

v. Utility Plans Regarding Under Construction Nuclear Resources.

EPA also assumed that the generation from the nuclear unit currently under construction at the Watts Bar facility would be factored into the emission rate calculation. EPA assumed that the unit would operate at a 90 percent capacity factor, and added that generation into the denominator of the emission rate calculation. As discussed in more detail in Part II below, there may be better alternatives for the treatment of under construction nuclear in the target-setting computation. However, if EPA were to retain its proposed methodology for under construction nuclear, applying the generation from that unit using EPA's formula would result in a reduction from 1,577 lbs/MWh to 1,293 lbs/MWh, a decrease of 287 lbs/MWh.[24]

[23] *See* Attachment 2 at line 6.
[24] *See id*. at line 7.

	State Emissions Rate	Rate Reduction
Tennessee's 2012 Baseline (Fossil)	2,015	
Retire Johnsonville, John Sevier, Allen	1,963	52
Increase existing NG to 70% capacity factor	1,822	141
Add under construction NGCC at Allen	1,645	177
Retain 6% "at risk" nuclear	1,580	65
Add under construction nuclear at Watts Bar	**1,293**	**287**

vi. Utility Plans Regarding Renewable Energy Resources.

In 2012, Tennessee's existing non-hydro power renewable generation constituted 1 percent of all generation, equivalent to 836,458 MWh. This existing generation together with the expected growth in renewables under Building Block 3b accounts for 4 million MWh of zero-emission generation. Due to Tennessee's low starting point in 2017, when the regional annual growth factor of 13 percent is applied, Tennessee does not reach the regional 10 percent target, but rather only achieves 6 percent renewable generation by 2030.

However, Tennessee has made significant new investments in renewable energy since 2012, the year EPA chose as a baseline year for compliance purposes. These additions will help propel Tennessee toward meeting EPA's proposed target. In 2013, TVA invested in 120 MW of new solar capacity.[25] In 2014, TVA made a similar investment of 126 MW, consisting of 10 MW for smaller-scale, rooftop solar under its Green Power Providers program; 16 MW for mid-size projects under the Solar Solutions Initiative; and 100 MW under the utility scale-size Renewable Standard Offer.[26] TVA has announced its 2015 solar programs, which total 130 MW – 10 MW Green Power Providers,[27] 20 MW Solar Solutions Initiative,[28] and 100 MW Renewable Standard Offer.[29] According to Patty West, Director of TVA's Renewable Energy Programs, "These programs balance low-cost and cleaner energy resulting in a renewable portfolio that is good for all 9 million consumers in the Valley."[30]

TVA has also been very bullish on wind power. TVA is currently sixth in the nation among all utilities in terms of wind power capacity.[31] The utility currently contracts for over

[25] Personal communication between SELC and TVA during the 2014 TVA Renewable Energy Stakeholder Group.
[26] TVA, *TVA Moves to Increase Solar Energy Capacity, Expand Renewable Programs* (Dec. 4, 2013), *available at* http://www.tva.com/news/releases/octdec13/solar.html, last accessed November 24, 2014.
[27] TVA, *2014 Green Power Providers Program*, *available at* http://www.tva.com/greenpowerswitch/providers/, last accessed November 24, 2014.
[28] TVA, *Solar Solutions Initiative*, *available at* http://www.tva.com/renewablestandardoffer/ssi.htm, last accessed November 24, 2014.
[29] TVA, *Renewable Standard Offer*, *available at* http://www.tva.com/renewablestandardoffer/, last accessed November 24, 2014.
[30] TVA, *TVA Moves to Increase Solar Energy Capacity*, Expand Renewable Programs (Dec. 4, 2013), *available at* http://www.tva.com/news/releases/octdec13/solar.html, last accessed November 24, 2014.
[31] American Wind Energy Association ("AWEA"), *State Wind Energy Statistics: Tennessee* (Apr. 10, 2014), *available at* http://www.awea.org/Resources/state.aspx?ItemNumber=5184, last accessed November 24, 2014.

1,500 MW of wind from wind farms in the Midwest.[32] This wind power avoids 818,000 metric tons of carbon dioxide a year, the equivalent of taking 144,000 cars off the road.[33] These 1,542 MW of wind power are comprised of nine power purchase agreements from wind farms in Iowa, Kansas, Illinois, the majority of which are the result of a TVA request for proposals in December 2008.[34] At the time these PPAs were announced in December 2012, Ms. West stated, "We're confident that wind power will continue to demonstrate its value, effectiveness and potential in the years to come."[35] In terms of in-state wind capacity, TVA has 29 MW installed.[36] 27 MW are being procured through a contract with Invenergy to purchase power from the Buffalo Mountain wind farm near Oak Ridge, Tennessee.[37]

Taking into account the 376 MW of solar capacity and 27 MW of land-based wind capacity that has or will be added since 2012, Tennessee's emission rate decreases from 1,293 lbs/MWh to 1,271 lbs/MWh, a reduction of 22 lbs/MWh.[38]

	State Emissions Rate	**Rate Reduction**
Tennessee's 2012 Baseline (Fossil)	2,015	
Retire Johnsonville, John Sevier, Allen	1,963	52
Increase existing NG to 70% capacity factor	1,822	141
Add under construction NGCC at Allen	1,645	177
Retain 6% "at risk" nuclear	1,580	65
Add under construction nuclear at Watts Bar	1,293	287
Add existing renewables (2012 level + 376 MW solar + 27 MW wind)	**1,271**	**22**

vii. Utility Plans Regarding Energy Efficiency Resources.

Under EPA's assumptions, Tennessee is expected to achieve annual incremental savings of 1.5 percent by 2023, and cumulative savings of 10.79 percent by 2030. However, EPA 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, Tennessee receives credit for 72 percent (its share of in-state generation) of its energy efficiency investments.

[32] American Wind Energy Association ("AWEA"), *State Wind Energy Statistics: Tennessee* (Apr. 10, 2014), *available at* http://www.awea.org/Resources/state.aspx?ItemNumber=5184, last accessed November 24, 2014.
[33] *Id*. (using EPA's Avert model).
[34] TVA, *TVA Energy Purchases from Wind Farms*, *available at* http://www.tva.com/power/wind_purchases.htm, last accessed November 24, 2014.
[35] TVA, *TVA Shows Wind Power Leadership in 2012* (Dec. 12, 2012), *available at* http://www.tva.com/news/releases/octdec12/wind.html, last accessed November 29, 2014.
[36] AWEA, *State Wind Energy Statistics: Tennessee* (Apr. 10, 2014), *available at* http://www.awea.org/Resources/state.aspx?ItemNumber=5184, last accessed November 24, 2014.
[37] TVA, *TVA Energy Purchases from Wind Farms*, *available at* http://www.tva.com/power/wind_purchases.htm, last accessed November 24, 2014.
[38] *See* Attachment 2 at line 8 (assuming an 18 percent capacity factor for the solar resources and a 30 percent capacity factor for the wind resources).

Therefore, EPA reduced the level of avoided generation to reflect this assumption, resulting in a decrease from 5,980,298 MWh to 4,305,814 MWh. As discussed in Part II below, modifications to this assumption should be made so that importing states receive full credit for the efficiency programs that they implement. This is especially important because the principal arguments in favor of employing higher levels of efficiency center around the benefits of avoiding supply-side generation.

Applying the energy efficiency savings levels that Tennessee has already received through 2012 results in an emissions rate decrease from 1,271 lbs/MWh to 1,262 lbs/MWh, a reduction of 9 lbs/MWh.[39]

	State Emissions Rate	**Rate Reduction**
Tennessee's 2012 Baseline (Fossil)	2,015	
Retire Johnsonville, John Sevier, Allen	1,963	52
Increase existing NG to 70% capacity factor	1,822	141
Add under construction NGCC at Allen	1,645	177
Retain 6% "at risk" nuclear	1,580	65
Add under construction nuclear at Watts Bar	1,293	287
Add existing renewables (2012 level + 376 MW solar + 27 MW wind)	1,271	22
Add existing energy efficiency	**1,262**	**9**

viii. Summary.

In total, under this analysis, when the above planned retirements, conversions and resource additions are factored in, Tennessee's emission rate drops from 2,015 lbs/MWh to 1,262 lbs/MWh and reaching over 88 percent of Tennessee's carbon reduction target. As such, Tennessee is already substantially on the way toward achieving its target before the compliance period even begins.

B. The Remainder of Tennessee's Target Can be Easily and Cost-Effectively Achieved.

Tennessee can reach the remaining 12 percent of the state target by achieving just a fraction of the level of renewable energy and energy efficiency additions that EPA assumed in building blocks 3 and 4. If Tennessee were to achieve just 45 percent of the level of renewable energy and energy efficiency generation that EPA assumed in calculating building blocks 3 and 4, it would reach its compliance target rate of 1,163 lbs/MWh.

Further, if EPA were to adopt the recommendation provided in Part II below that assumes that the level of new, incremental renewable energy and energy efficiency resources would

[39] *See* Attachment 2 at line 9.

reduce proportionally the level of existing coal and gas fired generation, Tennessee would need to achieve just 29 percent of EPA's assumptions.[40]

	State Emissions Rate	Rate Reduction
Tennessee's 2012 Baseline (Fossil)	2,015	
Retire Johnsonville, John Sevier, Allen	1,963	52
Increase existing NG to 70% capacity factor	1,822	141
Add under construction NGCC at Allen	1,645	177
Retain 6% "at risk" nuclear	1,580	65
Add under construction nuclear at Watts Bar	1,293	287
Add existing renewables	1,271	22
Add existing energy efficiency	1,262	9
Add incremental renewables to displace fossil (29% of building block 3)	**1,239**	**23**
Add incremental energy efficiency to displace fossil (29% of building block 4)	**1,163**	**76**

If Tennessee were to get credit for 100 percent of its incremental energy efficiency investments – rather than 72 percent – it would only need to achieve roughly 23 percent of EPA's renewable energy and energy efficiency assumptions.

III. Comments on the Building Block Assumptions.

As the above discussion illustrates, EPA's emission rate target for Tennessee is reasonable as proposed. Nevertheless, SELC recommends several modifications to EPA's assumptions that will help maximize the role that renewable generation and energy efficiency can play in both Tennessee's target-setting and its state compliance plan. Our state is already beginning to make investments in these clean energy technologies, and we can do much more. The following comments address EPA's nuclear, renewable energy, and energy efficiency assumptions in Building Blocks 3 and 4.

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. Tennessee's renewable energy potential is significantly higher than EPA assumed in its proposal, under either approach. A more robust approach has

[40] *See* Attachment 2 at lines 10-11.

been offered by the Union of Concerned Scientists ("UCS"), which provides a third alternative, and one that we support.

Tennessee has abundant renewable energy resources at its disposal to meet these incremental renewable targets. Its utility scale solar potential alone is over 1200 gigawatts (GW).[41] DOE's SunShot Initiative assumes declining solar PV prices will result in Tennessee having a cumulative installed solar PV capacity of 3.9 GW by 2030.[42] Tennessee'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 Southeast, including Tennessee. Increased hub heights and other technological advances have helped increase Tennessee's onshore wind potential to over 25,000 MW.[43]

Several of the issues UCS identifies are evident in EPA's treatment of Tennessee's renewables potential: EPA fails to account for both (1) the continued growth and falling costs of renewables projected by market experts and (2) the renewable energy deployment rates that states are already achieving.[44] SELC agrees with UCS that EPA should revise and update several of its underlying assumptions. To reflect Tennessee'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) account for actual and expected renewables growth between 2013 and 2017; (iv) update its formula to correctly account for emissions reductions from renewable energy; and (v) clarify that out of state RECs can be used towards compliance to ensure the most cost effective use of renewable energy. Doing so will show that Tennessee can reach a much higher renewable energy target – around 13 percent of 2030 electricity sales – at a reasonable cost.[45]

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 Tennessee'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.[46] The cost decreases have been so substantial that both technologies are now out-performing fossil generation in many areas of the country.[47] According to an Energy Department report released in October 2014, rooftop solar system prices

[41] Lopez, A. et al, *U.S. Renewable Energy Technical Potentials: A GIS-Based Analysis* (2012), National Renewable Energy Laboratory, a*vailable at* http://www.nrel.gov/docs/fy12osti/51946.pdf.
[42] U.S. Dep't of Energy, *SunShot Vision Study* (Feb. 2012), at 257, *available at* http://www.eere.energy.gov/solar/sunshot/vision-study.html, last accessed November 22, 2014.
[43] *See* National Renewable Energy Laboratory ("NREL"), *New National Wind Potential Estimates for Modern and Near-Term Future Turbine Technologies* (2014), *available at* http://www.nrel.gov/docs/fy14osti/62318.pdf, last accessed November 28, 2014.
[44] 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.
[45] UCS Spreadsheet, attached as Attachment 3 (showing that under its approach Tennessee would achieve by 2030 a total of 15,299 GWh of renewable generation versus EPA's assumed 4,306).
[46] UCS, *Strengthening the EPA's Clean Power Plan*, at 6.
[47] Diane Cardwell, *Solar and Wind Energy Start to Win on Price vs. Conventional Fuels* (Nov. 23, 2014), The New York Times.

dropped 12-15 percent in 2013, and are projected to drop from 3-12 percent this year.[48] 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.[49]

Similarly, 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.[50] Wind energy pricing has now reached an all-time low, according to a recent report from the Lawrence Berkeley National Laboratory.[51] As a result, utilities are increasingly selecting wind as the lowest-cost option.[52] While EPA projects capital costs of $2.26 per watt in 2016 to $2.04 per watt in 2030,[53] 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.[54]

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.[55] 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.[56] Georgia Power has stated that these contracts are priced below the utility's projected avoided costs, and that these solar power agreements provide "overwhelming benefit" to customers in the form of projected energy savings.[57]

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

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[48] Ling, Katherine, *Rooftop costs plunge, on track for Obama's goal – DOE* (Oct. 20, 2014), E&E News..
[49] *Id*.
[50] *See* Wiser, R., and M. Bolinger, *2013 Wind Technologies Market Report* (2014), U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, *available at* http://emp.lbl.gov/sites/all/files/2013_Wind_Technologies_Market_Report_Final3.pdf , last accessed November 22, 2014.
[51] 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.
[52] *Id*.
[53] 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.
[54] 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.
[55] Eric Wesoff, *Cheapest Solar Ever? Austin Energy Buys PV from SunEdison at Five Cents Per Kilowatt-Hour* (March 10, 2014), Greentech Media, *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.
[56] Lacey, Stephen. *Georgia is the latest state to procure dirt-cheap solar power* (Oct. 15, 2014), Greentech Media, *available at* http://www.greentechmedia.com/articles/read/how-cheaply-can-georgia-power-buy-solar-for-6.5-cents; last accessed November 23, 2014.
[57] Georgia Power Company, Application for Certification of 2015 and 2016 ASI Prime PPAs and Request for Approval of 2015 ASI PPAs, Oct. 21, 2014, Georgia Public Service Commission Docket No. 38877, Direct Testimony at 12.

agreements to import cost-effective wind generation from the Midwest, along with associated renewable energy credits (RECs), from Oklahoma and Kansas.[58] The projects total 404 MW.[59] Alabama Power has touted the purchases as "helping to displace higher-cost energy [they] would otherwise produce using other resources."[60] 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.[61] 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."[62]

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.[63] 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.[64]

For solar, EPA's IPM modeling assumes solar PV installed costs of $3,098/kW.[65] 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.[66] These cost estimates are based on data from the Department of Energy, Bloomberg New Energy Finance and SEIA.[67] Updating these assumptions would lower the levelized cost of solar energy from $224/MWh to $153/MWh.[68]

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

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[58] *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.
[59] *Id*.
[60] *Id*.
[61] *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.
[62] *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).
[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] *See* Wiser, R., and M. Bolinger, *2013 Wind Technologies Market Report* (2014), U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, *available at* http://emp.lbl.gov/sites/all/files/2013_Wind_Technologies_Market_Report_Final3.pdf , last accessed November 22, 2014.

[65] 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.
[66] *Id*.
[67] *Id*. at Note 7.
[68] *Id*. at Note 3.

addition, EPA should use those updated projections to more accurately quantify the amount of renewable energy that can be deployed at reasonable cost in Tennessee.

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

As noted previously, EPA's proposed approach for determining the emissions reduction potential of renewable energy relies on regional targets. For the Southeast, EPA has established a regional target of 10 percent based upon the renewable portfolio standard (RPS) of North Carolina. 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.[69] 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.[70]

We urge EPA to assume a rate of renewable energy deployment that is more consistent with recent historical rates of deployment. 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. 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.[71] This approach will produce targets more in step with recent trends, more accurately reflecting the role that renewable generation can play in reducing carbon emissions.

iii. EPA should account for actual and expected renewables growth between 2013 and 2017.

EPA's approach assumes that in 2017 Tennessee will be where it was in 2012, when non-hydro renewable generation was just 1 percent of total generation.[72] But Tennessee's renewable investments have increased substantially since 2012, and with continuing cost declines, it is reasonable to expect further such investments before 2017. By failing to capture any of the recent or expected growth in renewable energy in Tennessee between 2012 and 2017, EPA's approach ignores the significant investments that are already underway.

Since just 2012, TVA's renewable energy generation has increased by at least 376 MW. These increases are expected to continue due to ongoing declines in the price of renewable

[69] Union of Concerned Scientists, *Strengthening the EPA's Clean Power Plan* (Oct. 2014), 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.
[70] *Id*.
[71] *Id*.
[72] GHG Abatement TSD at 4-6, Table 4-1.

technologies and future commitments that are expected under TVA's 2015 integrated resource planning process, which is currently underway. We urge EPA to update its projected renewable generation targets for Tennessee both in the final rule and again in 2017. Tennessee's renewables target should be based on its actual renewable generation levels in 2017 as well as its abundant potential for future growth.

If EPA adopts these recommendations – improving cost assumptions, increasing renewable energy growth rate benchmarks to reflect national best practices 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.[73] This means that a typical household would only see a maximum increase of 18 cents on their monthly electricity bill.[74] For Tennessee, this would increase the renewable energy target in 2020 from EPA's proposed 1,385 GWh to 3,821 GWh; in 2030, Tennessee's target would increase to 15,299 GWh compared to EPA's proposed target of 4,306 GWh.[75] This analysis confirms that much more aggressive renewable energy targets are achievable and cost effective.

iv. EPA should update its formula to correctly account for emissions reductions from renewable energy.

On October 27, 2014, EPA released a Notice of Data Availability ("NODA") explaining 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*."[76] 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 and energy efficiency resources. As such, EPA should revise its formula for setting the state targets and adopt the corrected approach proposed in the NODA[77] to ensure that incremental renewable resources do in fact reduce the equivalent level of fossil-fired generation.[78]

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[73] 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.
[74] *Id*.
[75] *See* Attachment 3.
[76] 79 Fed. Reg. at 34,836 (emphasis added).
[77] Between the two proposed formulas for backing out historical fossil generation, we favor substitution on a pro rata basis across generation types.
[78] We take the same position in regards to energy efficiency. *See* Part III.C.iii below.

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

Tennessee's least-cost approach to renewables development is likely to include additional purchases of wind energy, and associated RECs, from wind farms in the Midwest. For that reason, we urge EPA to make clear in the final rule that bundled REC purchases from other states may count for compliance. This approach would 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 establishing ownership.[79] The currency for these trading systems is the Renewable Energy Certificate (REC), which represents the "renewableness" of a MWh of energy.[80] The precise content of a REC depends on state law, but typically it includes the legal right to claim delivery and usage of renewable energy.[81] The consistent feature of REC trading is that each REC should only be used (or "retired") once.

Currently, a voluntary market exists in states that do not have RPS obligations. For much of the Southeast except North Carolina, the North American Renewables Registry is the REC tracking system. North Carolina operates its own REC trading system, known as NC-RETS; Virginia operates within the PJM-GATS trading system.[82] SELC encourages EPA to support development of a regional trading system for the Southeastern states that will allow for tracking of renewable energy generated in the region for purposes of compliance with the Clean Power Plan. 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 out-of-state and transferred to a load-serving entity within the state. The goal of such a tracking system should be to give states confidence that investments in renewable energy will be credited toward compliance.

The use of 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 using out-of-state purchases of renewable energy will greatly increase the cost-effectiveness of renewable resources by capturing regional efficiencies. But for this to work effectively, 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.

SELC supports the flexibility that EPA has given states to comply with the proposed rule. States can ensure compliance with targets by requiring load-serving entities to purchase renewable energy and by establishing backstop measures that apply to regulated sources in the

[79] 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.
[80] *Id*. at 4.
[81] *Id*.
[82] *Id*. at 5.

event of a shortfall. Renewable energy credits should not be limited to utility scale projects, but should also be allowed to come from commercial and residential distributed solar systems.

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

For all states, including Tennessee, EPA has concluded that implementation of energy efficiency measures is achievable at reasonable costs. Tennessee is expected to achieve annual incremental energy efficiency savings of 1.5 percent by 2023, and cumulative savings of 10.79 percent by 2030.[83] Energy efficiency is recognized as the most widely available and the lowest-cost resource for reducing carbon emissions.[84] 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 savings from avoided power generation.[85] In addition to allowing the State to meet Clean Power Plan targets in a cost-effective way, more than 40,000 direct, indirect, and induced jobs could be created from robust investments in energy efficiency building retrofits and other clean energy efforts.[86]

To reflect Tennessee'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 Tennessee.

EPA's assumptions that Tennessee will reach 1.5 percent annual incremental savings by 2023 through a 0.2 percent annual ramp rate are modest in comparison to actual policies that are in effect in the state. In 2007, the Tennessee legislature voted on a joint resolution calling for the TVA to "make large-scale efforts to pursue energy efficient means of producing power and to consider such energy efficiency means when addressing growing demand for electricity in the Tennessee River Valley."[87] The resolution noted, "large scale energy conservation efforts can

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[83] 79 Fed. Reg. at 34,874.

[84] Molina, M., *The Best Value for America's Dollar: A National Review of the Cost of Utility Energy Efficiency Programs* (Mar. 2014), American Council for an Energy-Efficient Economy, *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* (Oct. 2013), American Council for an Energy-Efficient Economy, *available at* www.aceee.org/research-report/e13i.

[85] 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.

[86] Tennessee Department of Labor and Workforce Development, Employment Security Division, Labor Market Information Section, *Growing Green: The Potential for Green Job Growth in Tennessee* (Nov. 2008), *available at* http://www.state.tn.us/labor-wfd/Publications/EmploymentSecurity/GrowingGreenInTN2008.pdf.

[87] Tennessee House Joint Resolution No. 472.

cost half the amount of a new plant" and "energy conservation can easily meet and exceed the growing demand for electricity."[88]

In addition, TVA has also begun to expand its commitment to energy efficiency. In 2010, TVA's Board of Directors adopted its "Vision 2020" to "become a leading provider of low-cost, cleaner energy by 2020," and set three specific goals for fulfilling that vision: 1) lead the nation in improved air quality, 2) lead the nation in increased nuclear production, and 3) lead the Southeast in increased energy efficiency.[89] On March 2, 2011, TVA issued its final Integrated Resource Plan ("IRP"), entitled "TVA's Environmental and Energy Future," and an associated Environmental Impact Statement analyzing potential environmental impacts of the plan's proposed resources strategies.[90] On April 14, 2011, the TVA Board of Directors accepted the Integrated Resource Plan and authorized President and CEO Tom Kilgore to use its Recommended Planning Direction as a guide in energy resource planning and selection. The approved Recommended Planning Direction would expand the contribution of energy efficiency and demand side management by 3,600 to 5,100 MW by 2020. This is over ten times the level that EPA assumed in its application of building block 4 in Tennessee.

Further, in 2011, Senator Barbara Boxer (D-CA), Chairman of the Senate Committee on Environment and Public Works, requested that the GAO examine: 1) TVA's plan to meet future electricity demand, and how its plans and forecasts compared to other utilities; 2) TVA's efforts to use energy efficiency to meet electricity demand; and 3) TVA's financial condition and the impact of that condition on TVA's ability to meet its operational and financial goals. In response, the GAO reviewed forecasts underlying TVA's 2010 Integrated Resource Plan, characterized TVA's electricity generation portfolio, and analyzed aspects of TVA's assumptions related to capital costs of electricity generation alternatives, fuel costs, emission-related costs, and costs of energy efficiency programs. On October 31, 2011, the GAO issued its report, "Tennessee Valley Authority: Full Consideration of Energy Efficiency and Better Capital Expenditures Planning Are Needed."[91] With respect to energy efficiency, the GAO report concluded that "TVA's planning process may be ignoring opportunities to pursue a more cost-effective path that could make greater use of energy efficiency. . . . By not fully exploring and identifying energy efficiency resources [in its 2010 Integrated Resource Planning process], TVA cannot be certain that its plans to meet future demand, largely by building new generating capacity, are the most cost effective."[92]

The GAO report recommended that TVA use the information from its then-pending energy efficiency potential study "to better ensure that TVA's future resource planning process reflects the most cost-effective mix of resources."[93] The report from the energy efficiency potential study commissioned by TVA was released in 2011 and updated in 2012. The 2011 study revealed that TVA's achievable high potential in 2020 would result in over 15,000 GWh of

[88] Tennessee House Joint Resolution No. 472.
[89] TVA, *Mission and Vision*, http://www.tva.com/abouttva/vision.htm.
[90] TVA, *Final Integrated Resource Plan, available at* http://www.tva.com/environment/reports/irp/archive/index.htm.
[91] U.S. Government Accountability Office, *Report to the Chairman, Committee on Environment and Public Works, U.S. Senate* (Oct. 31, 2011), GAO-12-107, at 2, *available at* http://www.gao.gov/assets/590/586006.pdf.
[92] *Id.* at 43-44.
[93] *Id.* at 45.

savings, or 9.8 percent savings over baseline.[94] The 2012 analysis included updated projections reflecting a lower cost of natural gas and as a result decreased this projection to just over 13,000 GWh of savings, or 8.6 percent savings over baseline.[95] However, EPA's energy efficiency assumptions under the proposal would result in only 2,294 GWh of savings through 2020, significantly lower than both the 2011 and 2012 efficiency potential study results.

Other independent analysis reveals that Tennessee 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 Tennessee could reduce electricity consumption by 26 percent below 2012 levels by 2030 by implementing four common efficiency practices.[96] 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 Tennessee'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.[97] National investments in utility energy efficiency programs have grown at a rapid pace—increasing from $1.6 billion in 2006 to $5.9 billion in 2011[98]—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.[99]

Given these trends, and the comparatively low levels of energy efficiency currently being realized in Tennessee, the potential to ramp up energy savings across the State is enormous,[100] and TVA can and should achieve much higher levels of energy savings going forward.

ii. EPA should update its energy efficiency cost assumptions to reflect up-to-date costs of efficiency programs.

Energy efficiency is widely recognized as the lowest-cost option for reducing carbon emissions.[101] However, EPA's estimates of energy efficiency costs, which reflect a very low cost

[94] TVA, *Tennessee Valley Authority Potential Study* (Dec. 21, 2011), Report Number 1260.
[95] TVA, *Tennessee Valley Authority Energy Efficiency Potential Study, 2012 Update*, Report Number 1360.2.
[96] Hayes, S. et al, *Change is in the Air: How States Can Harness Energy Efficiency to Strengthen the Economy and Reduce Pollution* (Apr. 2014) American Council for an Energy Efficiency Economy,.
[97] *Id*. at 5-17–5-19.

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

[99] *Id*.

[100] GHG Abatement TSD at 5-19.

[101] 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.

compared to supply-side resources, are likely too high.[102] EPA estimates the levelized cost of energy efficiency savings at 8.3 to 9 cents/kWh.[103] 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…"[104]

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.[105] 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.[106]

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.

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

As described in more detail in Part III, Subsection A above, 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 generation from these resources into the denominator of the lbs/MWh emissions rate. EPA should adopt the methodology set forth in the 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 goal-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, Tennessee receives credit for 72 percent of its energy efficiency investments, which represents its share of in-state generation in 2012. However, this assumption 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 will be especially vital if EPA

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

[103] EPA, "GHG Abatement Measures," Technical Support Document at page 5-60, *available at* http://www2.epa.gov/sites/production/files/2014-06/documents/20140602tsd-ghg-abatement-measures.pdf.

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

[105] *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.

[106] *See* Molina at 20.

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. For states like Tennessee that are net importers, it is important that they get full credit for their 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.[107] 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 efficiency program after accounting for free-ridership, spillover and other factors."[108]

EPA did not specifically seek comment on this issue, and SELC does not disagree with EPA's use of net savings for purpose 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."[109]

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.

[107] 79 Fed. Reg. at 34,872.
[108] *Id.*
[109] EPA, Technical Support Document: State Plan Considerations, Docket ID No. EPA-HW-OAR-2013-602, at 53.

C. EPA's Assumptions for Under Construction Nuclear in Building Block 3 Should be Modified.

i. The CPP's Approach to Nuclear Power.

The CPP recognizes nuclear generation as a method for reducing greenhouse gas emissions, characterizing it as carbon-free generation with high construction costs and relatively low variable operating cost.[110] Thus, EPA reasons that states can reduce their greenhouse gas emissions by increasing nuclear generation to displace fossil fuel-fired generation.[111]

A brief summary of how EPA treats nuclear is below. We note that its treatment differs in some respects from that of other resources, both traditional fossil-fuel sources and from renewable generation. As a general matter, we believe that such disparate treatment is allowable, and even may be compelled by the material differences in the nature of the resources. For instance, unlike nuclear, under-construction fossil-fuel fired sources fall under Clean Air Act Section 111(d) in their own right, since they directly contribute to carbon emissions, and can follow load.

Even between zero-emitting resources like nuclear and renewables, differing treatment can be traced to inherent differences that bear consideration under a scheme like the CPP with its system-wide approach. For instance, nuclear units differ from renewables due to the tremendous scale on which nuclear resources are deployed, their massive up-front costs (often in the billions of dollars), federal permitting oversight, and their extensive lead times (usually taking years, or even decades, to complete). Moreover, assessing renewable energy's potential to reduce carbon emissions in a given state depends much more on that state's particular technologic, geologic, geographic, and economic condition than it depends on the resource's construction status. In contrast, the degree to which a state can fairly be expected to utilize nuclear generation to reduce its emissions depends far more on the construction status of projects to tap into the resource. Lastly, the Clean Air Act itself envisions taking into account factors other than strictly carbon impacts when establishing BSER.[112] For nuclear, these factors would include environmental and human health risks associated with potential accidents and radioactive waste storage.

a. <u>New Generation</u>

As EPA correctly notes, while nuclear generation has GHG-reduction benefits, building new nuclear generation costs far more than other types of generation both in terms of dollars and time.[113] EPA therefore concludes that *requiring* states to construct new nuclear generating units would not constitute BSER.[114] However, EPA does propose to give existing nuclear and nuclear projects already under construction a role in setting BSER.

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[110] *Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units*, 79 Fed. Reg. 34,830, 34,870 (June 18, 2014) (to be codified at 40 C.F.R. pt. 60).
[111] *Id.*
[112] 42 U.S.C. 7411(a) (BSER must take into account "the cost of achieving such reduction and any nonair quality health an environmental impact and energy requirements")
[113] 79 Fed. Reg. at 34,870.
[114] *Id.* at 34,923.

b. Existing Generation

For existing nuclear generation, EPA finds that states could reasonably and cost-effectively take steps to prevent cuts in their existing nuclear fleets. Such steps would contribute to the CPP's goals because lost nuclear generation requires replacement generation from some source, likely a fossil-fired plant. As EPA notes, between 2012 and June 2014, utilities either closed or announced closure plans for six nuclear EGUs at five plants across the country.[115] EPA notes that the EIA forecasts an additional 5.6 GW of capacity cuts in the U.S. nuclear fleet.[116] That forecast is used as a proxy to determine that 6 percent of the U.S. nuclear fleet is at risk of retirement due to (1) increased fixed operation and maintenance costs, (2) relatively low wholesale electricity prices, and (3) additional capital investment associated with ensuring plant security and emergency preparedness.[117]

EPA posits that, under a CPP-compliance approach, utilities and states can prevent that 6 percent loss without incurring unreasonable costs, and that preserving the 6 percent "at risk" nuclear generation could avoid 200 to 300 million metric tons of carbon emissions over a ten-year phase in period, at a cost of $12 to $17 per metric ton.[118] EPA accordingly concludes that each state could take steps to "retain" the existing "at risk" nuclear generation and incorporates this retention into its BSER target-setting calculus. Notably, this 6 percent retention calculus reduces a state's target emissions rate even if a particular state has no existing nuclear generation at risk.

On the whole, while factoring "at risk" nuclear generation into a state's target serves to reduce that state's target, most states need not take any actual steps (or expend any additional dollars) to incorporate this "at risk" generation when calculating their emissions rates in a proposed compliance plan. Essentially, the "at risk" nuclear provision becomes a "one in, one out" book exercise with no real-world burdens placed on the states.[119]

c. Under-Construction Generation

While EPA concludes that the CPP should not include entirely new nuclear construction as BSER, EPA does note that three states (South Carolina, Georgia, and Tennessee) currently have nuclear projects under construction. While docket proceedings continue, the proposed projects in both South Carolina and Georgia have received their Certificates of Public Convenience and Necessity.[120] The new unit in Tennessee is nearly complete.[121] As a result,

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[115] 79 Fed. Reg. at 34,923.
[116] *Id.* at 34,871.
[117] *Id.*
[118] *Id.*
[119] If a state actually does have "at risk" nuclear generation, that state would incur real-world costs in either preserving that capacity or making up for the lost nuclear generation in some other manner.
[120] Order No. 2009-104(A), *In Re: Combined Application of South Carolina Electric and Gas Company for a Certificate of Environmental Compatibility and Public Convenience and Necessity and for a Base Load Review Order for the Construction and Operation of a Nuclear Facility in Jenkinsville, South Carolina*, No. 2008-196-E (March 2, 2009); Amended Certification Order, *Georgia Power's Application for the Certification of Units 3 and 4 at Plant Vogtle and Updated Integrated Resource Plan*, No. 27800 (March 30, 2009).
[121] Press Release: *Watts Bar Unit 2 Over 90 Percent Complete, Key Milestones Ahead, August 12, 2014.* Available at http://www.tva.com/news/releases/julsep14/wb2.html, last visited December 1, 2014.

EPA concludes that those states could expect these new under-construction nuclear units to reduce GHG emissions at no additional compliance cost.[122] In other words, these units' multi-billion dollar price tag would be ignored when considering relative CPP compliance costs, on the theory that the states were going to build the units regardless of whether the CPP goes into effect.

Adding these under-construction units' generation into the target-setting formula substantially changes the result. For example, the CPP currently sets Tennessee's target emissions rate at 1,163 lbs/MWh, down from a starting point of 2,015 lbs/MWh. If EPA did not include under-construction nuclear generation in Tennessee's target but left all other Building Blocks the same, the CPP would set Tennessee's target at 1,352 lbs/MWh.

As with "at risk" nuclear, EPA's proposal factors the under-construction generation into the denominator when setting South Carolina, Georgia, and Tennessee's target emissions rate. The CPP then proposes to allow those states to count 100 percent of the generation from these units when calculating the state emissions rates in a compliance plan. Again, on paper, under construction nuclear amounts to little more than a "one in, one out" book exercise since that generation reduces the states' emissions rates in target setting but then also reduces the rate in calculating a compliance plan.

ii. Alternatives to the CPP's Treatment of Under-Construction Nuclear.

a. Possible Alternative Treatments If EPA Determines That Under-Construction Nuclear is BSER.

EPA's proposed target-setting calculus assumes Tennessee will complete Watts Bar Unit 2, while the CPP further assumes that Tennessee can, and will, include the same amount of megawatt hours of generation from these units in demonstrating compliance with the proposed 1,163 lbs/MWh target. Conceivably, that cost overruns and delays could so adversely impact the economics that TVA would decide to abandon or further prolong completion of the unit.[123] If Tennessee abandoned the project, the proposed target would require the state to make up the additional rate reduction in some other fashion, a challenging proposition given that the unit would supply approximately 1,100 MW of capacity. If Tennessee cannot complete the entire nuclear unit, it cannot produce *any* electricity from that unit. Unlike other zero-emitting resources, like renewable energy and energy efficiency, which are typically deployed in much smaller portions, new nuclear is a bulky, "all or nothing" resource. In essence, EPA's approach presents a considerable deterrent to states *not* completing these units and effectively encourages their completion by assuming they provide compliance "for free" compared to other compliance measures.

No new nuclear units have come online in the United States in nearly twenty years, largely due to cost overruns, controversy, and delays. These issues continue to threaten the current under-construction nuclear projects, and, to varying extents, a certain possibility exists

[122] 79 Fed. Reg. at 34,870.

[123] Lucas Vance, *Nuclear Reactors Facing Construction Delay*, Herald Independent, August 15, 2014. Available at http://heraldindependent.com/news/home_top-news/50284189/Nuclear-reactors-facing-construction-delay, last visited December 1, 2014.

that South Carolina, Georgia, or Tennessee may still cancel its project. Such a decision would drastically change that state's expected energy mix and its ability to meet EPA's target emissions rate. As such, we ask EPA to clarify whether and how it could revise a state's target to reflect that new reality, should it occur. We additionally request EPA to consider whether, due to the fact that new nuclear units are massive, incredibly expensive, "all or nothing" undertakings with significant and continued risks, EPA could make the state target effectively contingent on the state maintaining its current course of action of allowing completion of the units despite the delays and escalating costs.[124] In Tennessee's case, that would mean that if the state abandons Watts Bar Unit 2, the emissions target would revert to 1,352 lbs/MWh instead of 1,163 lbs/MWh.

Additionally, if EPA continues to treat under-construction nuclear generation as part of BSER, it might adjust the way it does so. We ask EPA to consider whether to treat the resource like under-construction natural gas, focusing on the extent to which the under-construction nuclear units will displace existing fossil-fuel fired sources. For under-construction natural gas, EPA assumes that those units will operate at 55 percent capacity factor under a "business as usual" approach to meet demand growth. EPA then assumes that utility operators could actually increase dispatch of those new natural gas units from 55 percent capacity factor to 70 percent capacity factor by applying Block 2. According to EPA, then, states could use the increased 15 percent capacity factor to displace existing fossil-fueled generation. This assumption lowers the state's emissions rate target. Constructing the new natural gas units and operating them above 55 percent capacity factor would be a means of compliance.

EPA should consider whether it could make a similar calculation for under-construction nuclear units. However, we do not believe that the exact approach EPA took for under-construction natural gas applies to under-construction nuclear. Both types of generation likely will meet some demand growth and offset some portion of existing fossil-fueled generation. But the CPP appropriately views under-construction nuclear differently than it views under-construction natural gas because operators can scale natural gas dispatch depending upon load, whereas nuclear operators lack that flexibility. Therefore, while EPA would review data from South Carolina, Georgia, and Tennessee to estimate what percentage of the under-construction nuclear generation could reasonably be said to be available to displace existing fossil-fuel generation and what percentage to meet demand growth, it would have to find a different, reasonable basis for the displacement-to-demand-growth ratio.[125]

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[124] EPA has anticipated elsewhere in the CPP that state-specific factors might necessitate revising a state's targets. 79 Fed. Reg. at 34,898. *See also* 79 Fed Reg. at 34,895 (Noting the severability of the building blocks as they apply to a state and associated adjustment of the state goal) and 79 Fed. Reg. at 34,904 (Referring to the on-going relationship between EPA and states to continue to work on implementation). However, we note that EPA appropriately includes in the proposal an antibacksliding provision, which we strongly endorse. 79 Fed. Reg. at 34,917.

[125] EPA could, for instance, look at considering the expected demand growth when the projects were first proposed, or in the case of Watts Bar Unit 2, re-started, and compare that number with a more current demand growth forecast. Since nuclear is less easily dispatched, any generation from an under-construction nuclear unit that does not meet demand growth will offset existing fossil-fueled generation. If a state now forecasts smaller demand growth than it originally expected, that difference could serve as an estimate of fossil-fueled displacement. Both historic and current regional or sub-regional demand growth projection might also be relevant.

In this process, when calculating those states' emissions targets, EPA would factor in that percentage of under-construction nuclear expected to actually displace existing fossil-fueled generation. Total generation in megawatt hours would remain constant[126], but the replacement of fossil-fueled generation with zero-carbon generation would reduce the total pounds of CO2 emitted. In other words, assuming the same amount of energy is produced, more of it would come from zero-carbon sources, such that the state's total target emissions rate would go down. This process would lower the state's target emissions rate by the amount that EPA estimated under-construction nuclear would actually displace existing fossil. EPA would then allow states that complete their under-construction nuclear units to add the same amount of that nuclear generation to the denominator when demonstrating compliance.[127] That is, since EPA will use that displacement estimate in setting the target, those states could use the same displacement percentage when demonstrating compliance.

b. Possible Alternative Treatment If EPA Determines Under-Construction Nuclear Is Not BSER.

Some parties in South Carolina, Georgia, and Tennessee have objected to EPA's inclusion of under-construction nuclear generation in setting their target emissions levels, but seek to count 100 percent of their under-construction nuclear generation in demonstrating compliance. EPA should understand that this approach could provide excessive credit for under-construction nuclear projects beyond their ability to displace existing fossil generation.

Calculating a CO2 emissions rate (lbs/MWh) requires estimating both the total pounds of CO2 emitted and the total megawatt hours of generation. Although presented as a rate of CO2 emissions, EPA's proposal includes generation from certain sources that have no CO2 emissions. As a result, the CPP's "target" CO2 emissions rates are not just the in-state average of CO2-emitting sources. The targets are actually the average of CO2-emitting sources and a select few zero-carbon sources that qualify as BSER. Mathematically, anything that increases the total generation (*i.e.*, the denominator) lowers the emissions rate. This is especially true when zero-carbon generation is added to the denominator, because such an addition adds no new pounds of CO2 to the numerator. How EPA, or a state, includes zero-carbon emitting sources radically changes the calculated result.

Including 100 percent of under-construction nuclear generation in compliance denominators would give the appearance of dramatically lower emissions rates, even if the under-construction nuclear does not displace or reduce actual CO2 emissions from existing fossil-fueled units. One possible solution to this dilemma is to recognize that under-construction nuclear units *will* reduce a state's emissions rate to the extent the under construction nuclear units actually displace existing fossil sources, as discussed above. Under this approach, EPA would remove under-construction nuclear generation from the target setting and also not add that generation into their compliance formulas. If and when those units come online, and to the extent they actually displace existing fossil units, those states' actual CO2 emissions rates will

[126] The estimated generation from existing fossil-fuel generation would decrease, but the state's total generation would increase by an equivalent amount due to the added under-construction nuclear generation calculated to meet existing demand.
[127] This is analogous to how EPA currently allows states to use "at risk" nuclear in demonstrating compliance.

reflect that displacement because their total fossil-fueled generation in MWh will decrease (by way of reduced or shut down fossil-fired plants), which will in turn lower the total pounds of CO2 emitted. Thus, EPA need not factor in the under-construction nuclear units' megawatt hours of generation in either the target-setting or the compliance phases because the CPP already allows credit for under-construction nuclear to the extent that it has a real-world impact on the state's emission rate.[128]

IV. Conclusion

SELC strongly supports the Clean Power Plan's goal of achieving significant carbon reductions from the power sector. Tennessee's proposed emission rate target is readily achievable; indeed, Tennessee could reach over 88 percent of the target with plans and resources that are already in place. Although this target is reasonable as proposed, it appears to underestimate the true potential for both renewable energy and energy efficiency in the state. 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.

Tennessee 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,

Frank Rambo
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Southern Environmental Law Center

[128] Unless South Carolina, Georgia, or Tennessee experience such growth that their under-construction nuclear projects only meet demand growth, their projects will have real-world impacts on the amount of CO2 emitted by 111(d) units each of those states. The Clean Air Act requires that any state plan be at least as stringent as the emission rate achieved by applying BSER. If a state adopts a mass-cap compliance strategy in place of a rate-based target, EPA should ensure that the mass-cap achieves GHG emissions reductions at least as stringent as what CPP would require of that state under a rate-based target.