Comprehensive Comments on Energy Efficiency Issues in EPA's Proposed Clean Power Plan Rule Docket ID No. EPA-HQ-OAR-2013-0602

Southwest Energy Efficiency Project (SWEEP)
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BACKGROUND

The Southwest Energy Efficiency Project (SWEEP) is a non-profit organization that advances energy efficiency in Arizona, Colorado, Nevada, New Mexico, Utah and Wyoming. SWEEP has worked on building up energy efficiency policies and programs in these states for over 13 years. We work closely with nine investor-owned utilities and a number of publicly-owned utilities on the design, implementation and evaluation of all types of energy efficiency programs; we work with state policy makers and public utility commissions on utility energy efficiency policy; and we work with state energy offices and other state agencies on building energy codes, financial incentives, financing programs and other state programs to advance more efficient energy use. In short, we are "in the trenches" and we have a wealth of real world energy efficiency policy and program experience that informs the comments provided below.

SWEEP applauds the Environmental Protection Agency (EPA) for including energy efficiency programs and significant levels of energy savings in the determination of each state's emissions rate reduction goals. Furthermore, SWEEP appreciates that states are allowed to include a wide range of energy efficiency policies and programs in their emissions reduction implementation plans.

Including energy efficiency prominently, as the EPA has done, will enable states and utilities to meet the emissions reduction goals at least cost and potentially with net economic benefits for households, businesses and the economy as a whole. Indeed, the EPA estimates that electricity bills will be 8% lower by 2030 mainly as a result of energy efficiency improvements, while at the same time CO_2 emissions will decline 30% by 2030 from 2005 levels. In addition, the EPA estimates that the proposed rule will result in 78,000 additional jobs in the energy efficiency sector.

SWEEP's experience and ongoing analysis of potential energy savings indicates that the EPA's estimates are likely conservative. When looking at the potential benefits from best practice utility energy efficiency programs in Arizona, Colorado, Nevada, New Mexico, Utah and Wyoming during the 2010-2020 time period, we found that 2.0% annual energy savings are possible, 28,000 jobs could be created in the region, and households and businesses could obtain nearly $20 billion in net benefits (economic and public health).[1] This savings potential is from utility efficiency programs only; it does not include potential savings from building codes, state

[1] H. Geller et al. *The $20 Billion Bonanza: Best Practice Electric Utility Energy Efficiency Programs and Their Benefits for the Southwest.* Boulder, CO: Southwest Energy Efficiency Project. Oct. 2012. http://www.swenergy.org/programs/utilities/20BBonanza.htm

appliance and equipment efficiency standards, state financing or financial incentive programs, or other non-utility policies and programs.

In addition to the economic and public health benefits mentioned above, residential energy efficiency efforts can increase occupant comfort, improve health and safety factors, increase property values, and provide some financial relief to low and middle income households. Commercial and industrial programs can increase worker comfort and productivity, reduce waste in production processes, and lower environmental compliance costs. All of these efforts also conserve our water resources, something that is a significant and growing concern in the Southwest.

SWEEP is an active participant in discussions in the Southwest regarding the energy efficiency provisions in EPA's proposed Clean Power Plan rule. In addition, we will be assisting Southwest states and utilities as they prepare their state plans, in particular to help them incorporate strong, cost-effective energy efficiency policies and programs into their plans.

These comments were prepared under the leadership of Howard Geller, SWEEP's Executive Director. He was assisted by Ann Livingston, Program Manager for State and Local Engagement, Neil Kolwey, Industrial Program Director, Jim Meyers, Buildings Program Director and Will Toor, Transportation Program Director at SWEEP. Questions regarding the comments should be sent to Howard Geller at hgeller@swenergy.org or Ann Livingston at alivingston@swenergy.org. These comments represent the views of the staff of SWEEP and not those of individuals or organizations represented on SWEEP's Board of Directors. For more information on SWEEP, please visit www.swenergy.org.

CLEAN POWER PLAN COMMENTS AND RECOMMENDATIONS

While we applaud the EPA's proposal in general, we also believe that there are some areas that should be clarified or strengthened in order to best meet the goals of the Clean Power Plan at least cost as well as support state level goals, programs, and regulatory requirements. Our comments are presented below for the most part in the order that they are brought up in the Proposed Rules, with reference to the page numbers in the Federal Register notice published June 18, 2014.

1. General Approach (pp. 34855-58)

SWEEP supports the general approach of including energy efficiency in the best system of emissions reduction (BSER), and allowing flexibility in state compliance plans to include all types of end-use efficiency policies and programs (i.e., utility and non-utility programs). This approach is critical for cutting power plant CO_2 emissions at least cost.

SWEEP would like to note that there are other benefits of energy efficiency improvements not mentioned by EPA in the proposed rules including higher productivity in the workplace,

increased comfort, reduced water consumption, and risk reduction.[2] These benefits result from energy efficiency efforts regardless of whether or not the policies or programs are connected to utility efforts, but are often not accounted for in cost effectiveness analysis or evaluation of utility or non-utility efficiency policies or programs. Allowing states and utilities the flexibility to use a wide range of energy efficiency policies and programs to help meet their CO_2 emissions reduction targets from existing power plants will maximize both economic benefits and these other important non-energy benefits.

2. Building Block 4 Assumptions (pp. 34871-75)

In establishing CO_2 emissions rate targets state by state, the EPA has assumed that all electric utilities can ramp to 1.5% electricity savings per year from utility efficiency programs only, based on net savings (i.e., savings net of free ridership but including spillover effects). Savings start in 2017 at the level of savings that was achieved by electric utilities in each state in 2012 and savings increase from this starting point by 0.2% per year until reaching 1.5% per year. These are the key assumptions that determine the Building Block 4 values for each state that in turn influence the overall emissions rate targets for each state.

These are very conservative assumptions for a number of reasons and should be revised upwards by the EPA, as discussed below. First, numerous utilities and states are already surpassing the target of 1.5% savings per year from their energy efficiency programs. In 2013, utilities or third party administrators of ratepayer funded efficiency programs in six states (Arizona, Hawaii, Massachusetts, Michigan, Rhode Island and Vermont) met or surpassed the metric of 1.5% savings from electric utility ratepayer funded programs alone.[3] Utilities in the top performing states, Massachusetts and Rhode Island, achieved more than 2% savings per year. In addition, utilities in California have exceeded 1.5% savings per year in the past, and achieved 1.25% savings statewide in 2013 according to the American Council for an Energy-Efficient Economy (ACEEE). In the region SWEEP works in, four utilities—Arizona Public Service Company, Salt River Project, Tucson Electric Power, and the City of Fort Collins Utilities—surpassed 1.5% savings from efficiency programs implemented in 2013.

Secondly, the key Building Block 4 assumption of ramping up to 1.5% savings per year is overly conservative because this assumption is based on savings from utility programs (or utility ratepayer funded programs administered by third parties) only, even though the EPA is proposing that states can receive energy efficiency credits from both utility and non-utility programs. The EPA requested comments on the alternative of ramping up to 2% savings per year from a combination of utility and non-utility EE policies (p. 34875) along with a higher ramp rate. SWEEP supports this alternative, or possibly moving up to 2.2% savings per year, for the reasons explained below.

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[2] See Geller, et al., Note 1, pages 132-134. Also, see J. Lazar and K. Colburn. *Recognizing the Full Value of Energy Efficiency.* Montpelier, VT: Regulatory Assistance Project. Sept. 2013. www.raponline.org/document/download/id/6739

[3] A. Gilleo, et al., *The 2014 State Energy Efficiency Scorecard*. Washington, DC: American Council for an Energy-Efficient Economy. p. 33. http://www.aceee.org/research-report/u1408.

Non-utility policies and programs such as building codes, state tax credits and other financial incentives, state financing programs, state appliance efficiency standards, energy efficiency programs targeted to the public sector, and policies or programs to support adoption of Combined Heat and Power (CHP) systems offer significant incremental savings potential, in addition to the savings from utility programs. We discuss the savings potential from a number of these options below.

In general, SWEEP believes it is legal and appropriate to include non-utility policies and programs in both the Building Block 4 calculus and in the implementation phase because EPA has correctly defined the scope of the Rule to include actions that influence both electricity supply and electricity demand. These non-utility policies and programs influence electricity demand in a manner similar to utility policies and programs—through education, financial incentives, regulations, etc. In many cases, there is collaboration between utilities and state or local governments in the adoption and implementation of energy efficiency policies and programs. For example, many utilities provide training to support building code implementation and in some cases also support the adoption of state-of-the-art building energy codes. Also, many utilities provide rebates for projects implemented to help achieve public sector energy savings goals established at the state or local level. There is considerable interaction and overlap between utility and non-utility energy efficiency policies and programs—these are only a few examples.

Regarding building energy codes, SWEEP recommends that the EPA indicate that the 2009 International Energy Conservation Code (IECC) was the national baseline code as of 2014, and allow states to receive energy savings credits for new homes and commercial buildings built to meet a code that is more stringent than this baseline. The 2009 IECC was the code in effect in about 25 states as of mid-2014, with only a handful of states having already adopted the 2012 IECC.[4] Consistent with comments below, we recommend that energy savings credits should begin in 2020 for new buildings constructed starting in 2017 that meet an energy code that is more stringent than the 2009 IECC. The credits would be independent of date of adoption (i.e., states that adopted the 2012 or 2015 versions of the IECC prior to 2017 would not be penalized for doing so).

States that are home rule states adopt building codes at the local level. These states should also be allowed to receive energy savings credits, as long as the state includes a building energy codes initiative in its state Section 111(d) plan and tracks construction levels in local jurisdictions that have adopted these up-to-date codes. In addition, we recommend that the EPA allow states to receive energy savings credits for efforts that improve energy code enforcement and compliance rates, as measured through code compliance studies that are conducted in accordance with EPA-approved protocols on the topic.

SWEEP estimates that moving from the 2009 International Energy Conservation Code (IECC) to the 2015 IECC would save about 614 GWh per year in the region served by SWEEP (AZ, CO, NM, NV, UT and WY) during 2017-2025, given projected construction rates and energy savings potential state-by-state (see table below). This is equivalent to about 0.25% savings per year given projected electricity use in the region during this time period (which is approximately

[4] ibid. pp. 9-10. Also see *Residential State Energy Code Status* and *Commercial State Energy Code Status*. Building Code Assistance Project (BCAP). http://bcap-energy.org.

250,000 GWh per year). The 2009 IECC "baseline" is the building code now most prevalent in the region, although some jurisdictions recently adopted the 2012 IECC. Likewise, ACEEE estimates that adopting state-of-the-art building energy codes nationwide could provide incremental annual savings of 10,900 GWh per year in 2020 and 12,100 GWh per year in 2030.[5] This is equivalent to about 0.25% savings per year based on the most recent Energy Information Administration (EIA) forecast of future electricity consumption.

Estimated Electricity Savings in New Construction from Adoption of the 2015 IECC in Southwest States, Average Annual Savings during 2017-2025 (1)

State	New housing starts per year	Savings per new home (kWh per year)	Commercial new construction (Million square feet per year)	Comm. savings per unit of floor area (kWh per square foot)	Total savings (GWh per year)
Arizona	26,504	2,408	67.4	2.69	244.9
Colorado	28,930	1,174	29.0	3.28	129.2
Nevada	11,748	2,327	30.2	2.35	98.4
New Mexico	5,426	1,715	12.8	2.75	44.5
Utah	16,630	1,129	25.6	2.28	77.2
Wyoming	2,418	1,249	4.6	2.90	19.5
All	**91,656**	**1,890 (2)**	**169.6**	**2.72 (2)**	**613.8**

(1) Energy savings estimated based on a shift from the 2009 IECC to 2015 IECC.
(2) Weighted average
Source: Southwest Energy Efficiency Project.

States can adopt minimum efficiency standards on products not regulated by the federal government under the National Appliance Energy Conservation Act (NAECA) legislation. California and other states have adopted state efficiency standards in recent years on televisions, battery chargers, and other electronic products. According to the Appliance Standards Awareness Project (ASAP), twelve states currently have state appliance efficiency standards in effect.[6] ASAP suggests that there are ten products including battery chargers, commercial dishwashers, quartz halogen lamps and room air cleaners that are good candidates for state appliance standards at this time, and that adopting these standards would provide substantial net economic benefits for consumers and businesses.[7] Other products, including televisions, set-top boxes, and commercial and industrial fans and pumps, may be candidates for state appliance standards in the future as well.

ASAP has estimated the energy savings potential state-by-state in 2025 and 2035 assuming that state standards on ten products are adopted in 2017.[8] Colorado, for example, could achieve 350 GWh of electricity savings in 2025 from adopting the standards according to ASAP. Considering that electricity consumption in Colorado was 53,685 GWh in 2012 and that consumption is

[5] S. Hayes, et al. *Change is in the Air: How States Can Harness Energy Efficiency to Strengthen the Economy and Reduce Pollution*. Washington, DC: American Council for an Energy-Efficient Economy. p. 67. http://www.aceee.org/research-report/e1401.
[6] State Adoption of Energy Efficiency Standards. Boston, MA: Appliance Standards Awareness Project. http://www.appliance-standards.org/states.
[7] Personal communication with Marianne DiMascio, Appliance Standards Awareness Project, Boston, MA. Nov. 16, 2014.
[8] *State-Level Benefits from Potential State Appliance Standards*. Boston, MA: Appliance Standards Awareness Project. http://www.appliance-standards.org/map/benefits-from-state.

projected to reach about 61,000 GWh in 2025 given current estimates of load growth, the savings potential from state appliance efficiency standards is equal to about 0.6% of projected statewide electricity use in 2025. This is equivalent to saving about 0.07% of statewide electricity use per year on average during the 2017-2025 time period (i.e., saving 0.07% per year for 9 years results in about 0.6% savings in 2025).

Expanding the adoption of CHP systems through state incentive programs or other types of policies to stimulate greater CHP adoption is another opportunity for additional energy savings at the state level. Based on an analysis by ACEEE[9], we estimate that it would be feasible to expand CHP capacity by 1,500 MW per year nationwide during 2020-2030. Furthermore, doing so would provide net electricity savings of around 0.15% per year for the nation as a whole. This is a reasonable if not conservative assumption about incremental CHP potential. (See section 8 of these comments for further details regarding CHP potential including how we estimate the net energy savings.)

Increasing the adoption of efficiency measures in the public sector through setting energy savings goals, financing programs, use of performance contracting, and other mechanisms can provide additional energy savings including savings in public buildings, in street lighting and in water and wastewater treatment. Researchers from Lawrence Berkeley National Laboratory (LBNL) estimate that public sector efficiency projects implemented by energy service companies (ESCOs) during 2003-2012 yielded savings of about 15 TWh per year in 2012, adjusting to exclude projects that utilized incentives from utility energy efficiency programs.[10] This is equivalent to about 0.4% of national electricity consumption. According to LBNL, the annual incremental savings from public sector efficiency projects implemented by ESCOs without utilizing utility incentives during 2010-12 was about 1.0 TWh per year, which is equivalent to about 0.025% of national electricity use. However, this is a very conservative estimate of public sector energy efficiency potential because it does not include projects implemented directly by state or local governments without use of an ESCO or the performance contracting approach.

Las Vegas, NV is a leading city in the southwest region with respect to energy efficiency improvement. Las Vegas reduced its total electricity use in municipal buildings, street lighting and water/wastewater treatment and pumping by 34 GWh per year or 22% from action taken during 2010-14.[11] Among the actions taken, the city replaced about 80% of street lights with LED lights. Most of this work was done with internal financing such as use of revenues from sale of municipal general obligation bonds, not through use of ESCOs or performance contracting.

Peoria, AZ is another example of a local government that has achieved a significant reduction in its consumption of electricity in a short time period using only general fund dollars and revenues from sales of municipal bonds. In just a few years and only working on the first round of

[9] See Note 4, pp. 49-50.
[10] J.P. Carvalho, P.H. Larsen and C.A. Goldman. *Estimating customer electricity savings from projects installed by the U.S. ESCO industry*. Berkeley, CA: Lawrence Berkeley National Laboratory. Nov. 2014. http://emp.lbl.gov/publications/estimating-customer-electricity-savings-projects-installed-us-esco-industry
[11] Personal communication with Marco Vellota, City of Las Vegas Sustainability Office, April 8, 2014 and Nov. 17, 2014.

buildings in its portfolio, Peoria reduced the city's total annual electrical usage by 7.7%, saving almost 5.4 GWh per year. This was accomplished with work performed in 2009-2011—some buildings have already achieved over 20% savings. City officials view this as the beginning of an ongoing effort.[12]

In summary, the combination of building codes, state appliance efficiency standards, public sector efficiency programs and CHP support programs could yield total electricity savings of 0.5% per year or greater, in addition to savings from utility efficiency programs. And other types of non-utility policies and programs, such as home or commercial building retrofit ordinances, state financing programs (including PACE financing), and state financial incentive programs (including state tax credits) could provide even greater savings.

Additionally, SWEEP recommends providing energy savings credits, as well as developing the Building Block 4 assumptions, based on gross energy savings rather than net energy savings. As discussed below, this is justified on a number of counts including the fact that all energy savings generate CO_2 emissions reductions. Using gross savings rather than net savings will simplify savings analysis for both utility and non-utility programs, and remove the possibility of states or utilities claiming dubious "spillover effects". The difference between net and gross savings for electric utility efficiency programs as a whole is typically about 10-15%[13], so 1.5% net savings is equivalent to 1.65-1.7% gross savings. The combination of shifting to gross savings and accounting for savings potential from non-utility programs justifies moving to 2.2% savings per year as the key Building Block 4 assumption (this reflects an additional 0.5% per year for non-utility programs and 0.2% per year for moving from net to gross savings).

Regarding the ramp rate assumption, experience by many utilities justifies a ramp rate of 0.25% or 0.3% per year. The table below shows the savings achieved and ramp rate for the two major utilities in Arizona, Arizona Public Service Co. (APS) and Salt River Project (SRP), after both utilities began to ramp up their efficiency programs in response to policy mandates. Both utilities are now achieving in excess of 1.5% savings per year. For the period 2009-2013, APS increased savings about 0.25% per year on average while SRP increased savings about 0.30% per year on average.

Electricity Savings Achieved by Major Utilities in Arizona, 2009-2013

Utility	Electricity Savings (GWh/yr and % of sales)									
	2009		2010		2011		2012		2013	
Arizona Public Service Co.	209	0.74%	320	1.15%	397	1.41%	499	1.77%	486	1.72%
Salt River Project	284	1.09%	381	1.46%	390	1.46%	461	1.72%	626	2.32%

Source: Data collected from the utilities by the Southwest Energy Efficiency Project.

[12] City of Peoria, *Sustainability Action Plan*, 2012.

[13] In the Southwest region, Xcel Energy in Colorado reported a net-to-gross savings ratio of 0.86 for its portfolio of energy efficiency programs in 2013; Rocky Mountain Power in Utah reported a net-to-gross savings ratio of 0.88 for its portfolio of energy efficiency programs in 2013, and NV Energy in Nevada reported a net-to-gross savings ratio of 0.825 for its portfolio of energy efficiency programs in 2013. In addition, ACEEE assumes a net-to-gross savings ratio of 0.90 for comparing savings achievement across states that report savings different way (see Note 3, p. 33).

This rate of increase, 0.25-0.30% per year, has been achieved by other utilities as well during periods when there was a conscious effort to significantly increase energy savings. For example, ACEEE reports that utility program savings increased by at least 0.25% per year on average during 2010-2013 in Arizona, Rhode Island, Massachusetts, Michigan, and Pennsylvania (data for states as a whole).[14]

For the nation as a whole, electricity savings achieved by ratepayer-funded programs increased from 18.4 million MWh per year in 2010 to 24.4 million MWh per year in 2013, a 33% increase in three years.[15] Furthermore, studies indicate that electric utility energy efficiency programs are still growing at this time and will continue to grow in the near future. Growth in savings is occurring in both leading states such as Arizona, Massachusetts and Rhode Island and in previously lagging states such as Colorado, Michigan and Illinois. Furthermore, a recent ACEEE study found that estimates of energy efficiency savings potential had not changed noticeably over the past decade and that states and utilities are still finding a substantial amount of energy efficiency savings potential after more than ten years of aggressive energy efficiency efforts.[16]

Researchers from LBNL have projected that electric utility energy efficiency program spending nationwide will increase from $3.9 billion in 2010 to $6.5 billion in 2015 and then to $7.4 billion by 2020 (medium case scenario).[17] Increased funding will result in increased energy savings, including in the period 2012-2017. LBNL projects that electricity savings nationwide will increase from 18.4 million MWh per year from programs implemented in 2010 to 26.6 million MWh per year in 2015 and 28.6 million MWh per year in 2020 in a medium case scenario.[18] By 2017, many more utilities and states will be saving 1.5% or more per year given the growth in funding as well as energy savings goals or targets that call for this level of energy savings or greater.

Given these trends and projections, SWEEP recommends that the EPA modify the starting point for energy savings in 2017 in Building Block 4. Rather than assuming no growth in savings between 2012 and 2017 as was done in the Proposed Rule, SWEEP recommends that the EPA assume 7% annual growth in savings during 2012-2017, for each state. This is slightly less than the annual average growth in savings that LBNL is projecting will occur nationwide during 2010-2015, which is 7.6% per year. For example, if a state was achieving 0.5% annual savings from electric utility programs in 2012, we recommend that EPA assume it will achieve 0.7% annual savings from electric utility programs in 2017. In addition, we recommend that EPA use 2013 actual data rather than 2012 data in deriving the starting point in 2017 for each state, given

[14] See Gilleo et al., Note 3 and B. Foster et al., *The 2012 State Energy Efficiency Scorecard*. Washington, DC: American Council for an Energy-Efficient Economy. p. 31. http://www.aceee.org/research-report/e12c.
[15] See Gilleo et al., Note 3 and B. Foster et al., *The 2012 State Energy Efficiency Scorecard*. Washington, DC: American Council for an Energy-Efficient Economy. p. 31. http://www.aceee.org/research-report/e12c.
[16] M. Neubauer. *Cracking the TEAPOT: Technical, Economic, and Achievable Energy Efficiency Potential Studies*. Washington, DC: American Council for an Energy-Efficient Economy. Aug. 2014. http://www.aceee.org/research-report/u1407.
[17] G.L. Barbose, et al. *The Future of Utility Customer-Funded Energy Efficiency Programs in the United States: Projected Spending and Savings to 2025*. LBNL-5803E. Lawrence Berkeley National Laboratory, Berkeley, CA. Jan. 2013, http://emp.lbl.gov/sites/all/files/lbnl-5803e.pdf.
[18] The LBNL study previously cited included low, medium and high growth scenarios.

that 2013 data will be available—in other words, start with 2013 actual savings data and then escalate savings by 7% per year for the four years (2013-17).

The EPA has also invited comment on a less stringent alternative of 1.0% savings per year with a ramp rate of 0.15% per year (p. 34873; p. 34898). These values are much too conservative and do not reflect what well performing utilities and states are already achieving with respect to utility energy efficiency programs let alone what all utilities and states are capable of achieving. The EPA should adopt energy savings values in Building Block 4 that are higher, not lower, than those contained in the Proposed Rules.

3. Levelized Cost of Saved Energy (pp. 34874-75)

While it is not an input to the derivation of Building Block 4 energy efficiency values, the EPA has made assumptions about the average cost of electricity savings as part of its analysis of the cost for complying with the proposed CO_2 emissions reduction goals. In particular, the EPA has assumed a levelized cost of saved energy of $85-90 per MWh of savings in the 2020-2030 time period. We contend that this cost range is much too high and inconsistent with experience regarding the cost of saved energy from utility energy efficiency programs.

Both ACEEE and LBNL have studied the cost of saved energy from programs across the country as of 2009-2011 (LBNL) and 2009-2012 (ACEEE). LBNL reported an average levelized cost of $21 per MWh saved considering program administrator costs only (i.e., not including participant costs).[19] ACEEE reported an average levelized cost of $28 per MWh and a median cost of $26 per MWh, again only considering program costs.[20] Based on limited data from seven states, ACEEE reported an average total levelized cost (including utility and participant costs) of $54 per kWh saved.

LBNL recently examined the total cost of saved energy from 50 program administrators in 19 states and concluded that the total cost averaged $44 per MWh saved (based on gross savings) during 2009-2013.[21] Consistent with other studies, LBNL found that the total cost of saved energy is about twice the program administrator cost. In addition, the total cost was under $55 per MWh saved in two states (Minnesota and Washington) where utilities were able to save more than 1.5% per year. The total cost of saved energy represents all costs paid by society for electricity savings. However, it should be recognized that it is appropriate to use only the utility (also known as program administrator) costs for comparison to supply-side resource options.

Based on ACEEE's tracking of program administrator costs over time, there is no evidence that the average cost of saving energy was rising in the 2009-2012 time period. In addition, ACEEE

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[19] M.A. Billingsley et al. *The Program Administrator Cost of Saved Energy for Utility Customer-Funded Energy Efficiency Programs*. Lawrence Berkeley National Laboratory, Berkeley, CA. March, 2014. http://emp.lbl.gov/sites/all/files/lbnl-6595e.pdf.

[20] M. Molina. *The Best Value for America's Energy Dollar: A National Review of the Cost of Utility Energy Efficiency Programs.* Washington, DC: American Council for an Energy-Efficient Economy. http://www.aceee.org/research-report/u1402.

[21] C.A. Goldman, et al. *The Total Resource Cost of Saved Energy for Utility Customer-Funded Energy Efficiency Programs.* Berkeley, CA: Lawrence Berkeley National Laboratory. Presentation at the NARUC Annual Meeting. San Francisco, CA. Nov. 17, 2014.

found a weak correlation (r value of 0.27) between the cost of saved energy and the level of energy savings achievement. This suggests that average costs will not increase, or only increase slightly, for achieving savings of 1.5% per year or greater throughout the nation.

It is true that some of the lower cost, "low hanging fruit" such as compact fluorescent lamps (CFLs) will play a diminished role or possibly no role in future utility efficiency programs as their market penetration grows and/or the measures become mandated by federal efficiency standards. However, new technologies such as LED lamps, heat pump clothes dryers and Wifi-enabled smart thermostats have been commercialized in recent years and increase energy savings potential. Furthermore, the cost of these new technologies is declining over time as the technologies improve and economies of scale are realized. In addition, utilities find new ways of promoting the adoption of energy efficiency measures that increase the energy savings and cost effectiveness of their efficiency programs, such as using advanced building energy data analytics or moving from downstream to midstream or upstream incentives.

The experience of utilities in the Southwest confirms that the cost of saved energy can remain stable or even decline as utilities scale up energy savings. The table below shows the results achieved by Xcel Energy in Colorado during 2010-2013. Xcel Energy is responsible for about 57% of retail electricity sales in the state. The table shows that the cost per unit of energy savings remained nearly constant between 2010 and 2013, in spite of a significant growth in energy savings. Xcel's programs saved about 1.25% of electricity sales in 2013 on a net savings basis.

Xcel Energy – Colorado Electric Energy Efficiency Program Performance, 2010-2013

Parameter	2010	2011	2012	2013
Gross energy savings achieved (GWh/yr)	268.1	337.0	434.9	414.5
Net energy savings achieved (GWh/yr)	235.3	289.6	372.5	357.3
Gross energy savings as a fraction of retail electric sales	0.95%	1.19%	1.51%	1.44%
Net energy savings as a fraction of retail electric sales	0.83%	1.02%	1.29%	1.24%
Efficiency program expenditures (million $)	42.3	51.7	67.1	63.5
Utility cost per unit of net energy savings ($ per GWh/yr)	179,800	178,500	180,100	177,700
Benefit-cost Ratio (modified TRC test)	3.33	2.85	2.38	2.30
Net economic benefits for customers (million $)	209.8	178.3	169.6	160.5

Notes: Energy savings achievements are at the customer level. Net economic benefits take into account the shareholder incentive that Xcel Energy received based on the performance of its programs.
Sources: Demand-Side Management Annual Status Reports prepared by Xcel Energy for Public Service Company of Colorado.

Numerous studies show that achieving high levels of energy savings in the future will continue to be very cost effective, providing large net economic benefits for customers and businesses. For example, a study of Best Practice utility energy efficiency programs in the Southwest found that implementing such programs would yield electricity savings of about 2.0% per year at an

average cost of approximately $27 per MWh saved (utility cost only) and a total cost of about $55 per MWh saved.[22]

Based on these trends and studies, we recommend that the EPA assume total levelized costs on the order of $50-55 per MWh saved (based on gross savings) for future utility energy efficiency programs. But in conducting cost-benefit analysis for energy efficiency policies and programs, it is critical to recognize that energy efficiency programs and measures provide substantial non-energy benefits as well as direct energy system benefits of avoided fuel purchases and avoided capital investment in energy supply. These non-energy benefits include avoided pollutant emissions (and consequently improved public health), water savings, risk reduction, increased business productivity, and/or lower operation and maintenance costs, and improved comfort. For certain types of energy efficiency programs—such as new construction programs, home retrofit, and programs for low income households—the value of these non-energy benefits can be greater than the total energy benefits.[23] The EPA should value the full range non-energy benefits of energy efficiency measures and programs, including but not limited to environmental benefits, in its benefit-cost analysis of the proposed Clean Power Plan.

4. Municipal Utilities and Rural Cooperatives (p. 34884, 34887)

The EPA has requested comment on the issue of whether there are special issues for municipal utilities and rural electric cooperatives that merit modifications in EPA's Building Block 4 proposal. In response, we would like to point out that there are numerous examples of municipal utilities and rural electric cooperatives with outstanding energy efficiency programs that are achieving high levels of energy savings, and doing so cost effectively. In Colorado, for example, the City of Fort Collins Utilities (FCU) implements a comprehensive set of energy efficiency programs that in 2013 saved customers 32,700 MWh per year or 2.2% of their electricity total consumption, considering energy savings on a gross savings basis, and 27,700 MWh per year or 1.9% of consumption considering net energy savings.[24] FCU is a relatively small municipal utility serving about 67,000 customers. The Sacramento Municipal Utility District (SMUD) provides an example of a larger municipal utility that saved about 174,000 MWh per year or 1.4% of electricity sales in 2013 on a net savings basis. SMUD has a target of saving 1.52% per year on average during 2014-2023.[25]

In a number of states, municipal utilities or rural electric cooperatives (RECs) are served by wholesale power providers that assist in planning, funding and implementing energy efficiency programs. For example, this is the case with the Iowa Association of Electric Cooperatives which consists of 35 RECs in Iowa and Hoosier Energy which supplies power to 18 RECs in Indiana. In Iowa, rural electric cooperatives were planning to save 1.2% of electricity sales through

[22] See Note 1.
[23] T. Woolf, et al., *Energy Efficiency Cost Effectiveness Screening: How To Properly Account for "Other Program Impacts" and Environmental Compliance Costs*. Montpelier, VT: Regulatory Assistance Project. Sept. 2013. www.raponline.org/document/download/id/6149.
[24] *Energy Policy – 2013 Annual Update*. City of Fort Collins Utilities. Aug. 2014. http://www.swenergy.org/news/news/documents/file/FCU_Energy_Policy_2013_annual_update.pdf.
[25] *Energy Efficiency in California's Public Power Sector: A 2014 Status Report*. California Municipal Utilities Association. http://www.anaheim.net/utilities/adv_svc_prog/SB10372010.pdf

energy efficiency programs implemented in 2012[26] while most municipal utilities were planning to save 1.1% of sales.[27]

In other states such as Oregon and Minnesota, rural electric cooperatives implement very effective energy efficiency programs either on their own or through aggregators such as Great River Energy in Minnesota. Overall, municipal utilities and rural electric cooperatives in Minnesota saved 315,000 MWh per year or 1.4% of electricity sales through energy efficiency programs implemented in 2010.[28] For comparison, investor-owned utilities (IOUs) in Minnesota achieved 511,000 MWh per year of electricity savings through programs implemented in 2010, which was also 1.4% of electricity sales (savings on measured on a gross savings basis). On average, there was no difference in the level of savings in percentage terms between the larger IOUs and smaller municipal utilities and rural electric cooperatives.

Rural electric cooperatives and municipal utilities throughout the country can replicate what these leading utilities are achieving with respect to energy savings. Thus no adjustment in the proposed Building Block 4 targets is warranted to reflect a difference in energy savings potential between IOUs and municipal utilities or rural electric cooperatives. However, as many of these entities are not regulated in the same manner as the IOUs, EPA and states should give some consideration as to how these utilities will be treated in the state plans and implementation efforts. Due to the varying regulatory practices, municipal utilities and rural cooperatives may, in fact, have greater latitude in the types of programs they implement. In addition, it may be more appropriate to have an authority other than the state public utilities commission (PUC), such as the state energy office, certify that appropriate evaluation, measurement, and verification (EM&V) procedures were followed and that the energy efficiency credits resulting from efficiency programs implemented by municipal utilities or rural electric cooperatives are legitimate. At the same time, municipal utilities and rural electric cooperative should comply with the same EM&V requirements that IOUs are expected to follow in order to receive energy savings credits under the Clean Power Plan.

5. Computation of Energy Savings Credits (pp. 34895-97)

SWEEP supports the proposed approach of adding energy efficiency savings to the denominator if a state chooses to comply through the rate based approach. This approach is simpler and likely to be more accurate than estimating the CO_2 emissions reductions from energy efficiency policies and programs and subtracting this from the numerator, given the uncertainties regarding the actual time of energy savings and defining which specific power plants cut their generation as a result of end-use energy savings. Moreover, it is essential to provide such credits under a

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[26] K. Freischlag. Review of Leading Rural Electric Cooperative Energy Efficiency Programs. Boulder, CO: Southwest Energy Efficiency Project. June 2011. http://www.swenergy.org/data/sites/1/media/documents/publications/documents/Leading_Rural_Electric_Cooperative_Energy_Efficiency_Programs_06-2011.pdf.

[27] *Iowa's Municipal Electric and Gas Utilities Joint Report to the Iowa Utilities Board. 2010 Energy Efficiency Program Results and 2012-2013 Energy Efficiency Goals*. Iowa Association of Municipal Utilities. Dec. 30, 2012. http://archive.iamu.org/documents/EE/2012%20Municipal%20EE%20Report.pdf.

[28] Minnesota Conservation Improvement Program Energy and Carbon Dioxide Savings Report for 2010-11. Minnesota Department of Commerce, Division of Energy Resources. Oct. 1, 2013. http://archive.leg.state.mn.us/docs/2013/mandated/131112.pdf.

CO_2 emissions rate approach so that states are not discouraged and penalized for implementing energy efficiency initiatives that tend to reduce the operation of cleaner power plants.[29]

In applying energy savings credits to the denominator in the emissions rate calculation, end-use energy savings should be adjusted upwards to account for electricity losses in the transmission and distribution grid (i.e., to represent electricity savings at the point of generation). This should be allowed for electricity savings from both utility and non-utility energy efficiency programs. Furthermore, these T&D loss adjustments should be based on actual values for a utility or a state.

In the Notice of Data Availability (NODA) issued on October 27, EPA requested comments on the issue of whether some or all of the energy efficiency credits and renewable energy generation that states add to the denominator in their CO_2 emissions rate calculation would reduce fossil generation from existing power plants, and whether and how this should be incorporated into the numeric calculation of state emissions rate targets. SWEEP believes it is reasonable for the EPA to assume that a portion of the generation provided by incremental energy efficiency and renewable generation will be used in the future to displace new fossil generation (either from new or existing power plants) that would otherwise be necessary to serve population and economic growth (i.e., growth in the demand for energy services), and a portion will be used to displace historical generation from existing power plants. We suggest a methodology where it is first assumed that incremental energy efficiency and renewable generation offsets new fossil generation, with any remainder displacing historical generation from existing power plants. And regarding the latter, SWEEP supports the option presented in Section C(a) of the NODA where remaining energy efficiency and renewable generation replaces historical fossil generation on a pro rata basis. This is most consistent with what is likely to take place in the real world in our view where decisions about displaced generation are made for both economic and environmental reasons.

For the determination of energy savings credits, it is essential that the EPA define whether utilities and other energy efficiency program implementers are supposed to use gross energy savings or net energy savings in determining energy savings credits. Without such direction, there will be confusion about which type of savings to use among states and utilities and in all likelihood a lack of consistency among states. The EPA has proposed using net savings to calculate credit towards state emissions rate targets. Net savings include estimates of and adjustments for free riders and in some cases spillover effects; gross savings exclude these factors. Gross savings are simpler to calculate and are a more appropriate methodology for both setting state goals and determining credit towards the realization of those goals. SWEEP strongly recommends that the EPA base the computation and credit on gross energy savings rather than net energy savings for the following reasons:

- Actual CO_2 emissions reductions result from gross energy savings, not net savings. The attribution of savings is not relevant to the issue of providing fair credit to energy

[29] *Incentivizing and Providing Appropriate Credit for Energy Efficiency Improvement in Forthcoming CO2 Emissions Standards for Existing Power Plants*. A policy paper issued by the Regional Energy Efficiency Organizations. Nov. 2013. pp. 9-10. http://www.swenergy.org/data/sites/1/media/documents/publications/documents/Carbon_Emissions_Standards_&_Energy_Efficiency_-_November_2013.pdf.

efficiency measures for the role they play in reducing emissions, when the emissions rate approach is used. States and utilities will benefit from the CO_2 emissions reductions due to gross energy savings under a mass-based approach, and the same basis for savings should be used under a rate-based approach.

- Some utilities only calculate gross savings, and not net savings, at this time. This is particularly true for municipal utilities and rural electric cooperatives that are not subject to PUC regulation. In addition some IOUs report gross savings in response to energy savings standards or goals based on gross savings.
- Net–to-gross savings ratios are imprecise and not consistent from utility-to–utility. Furthermore, net-to-gross savings ratios are rarely estimated or applied to non-utility efficiency policies and programs including building energy codes, state appliance standards or public sector energy efficiency programs.
- Gross savings are easier to determine than net savings and will facilitate states implementing, and receiving credit for, a wide range of energy efficiency policies and programs. States will not have to deal with the challenging question of estimating net savings resulting from building codes, state financing or financial incentive programs, public sector energy efficiency programs, and the like—a question they have no experience or interest in addressing. Requiring states to estimate and report net savings from non-utility programs would increase EM&V costs and lead to greater uncertainty and inconsistency in savings claims and credits, compared to using gross savings.
- If states and utilities are provided energy savings credits based on net rather than gross savings, they have the opportunity to claim substantial "spillover effects" (i.e., energy savings stimulated by a policy or program outside of direct participation in the policy or program) that may be uncertain or of questionable validity. By definition spillover effects are excluded from the determination of gross energy savings.
- Many states define their energy efficiency standards or goals in terms of net savings. It will not be difficult for utilities or states to report gross energy savings to the EPA while at the same time determining net savings for the purpose of complying with state standards or goals. In general net savings are determined by first estimating gross savings for a program, and then applying a net-to-gross energy savings ratio to this value.

It should be acknowledged that there are a limited number of efficiency programs where commonplace savings evaluation techniques yield net rather than gross energy savings. In particular, this is the case for behavior change programs where savings from a treatment group is compared to savings from a control group. We recommend that the energy savings for programs where savings is evaluated in this manner be treated as gross savings for the purpose of calculating energy savings credits under the Clean Power Plan.

In calculating gross energy savings, the EPA should clarify that states and utilities are not allowed to count savings from and receive credits for efficiency measures installed outside of participation in those energy efficiency policies and programs included in state plans, except in the specific case of market transformation programs. Market transformation programs are by definition designed to have broad market impacts by increasing the availability of certain energy efficiency measures, educating consumers, influencing codes and standards, and other techniques

such as those practiced by the Northwest Energy Efficiency Alliance (NEEA).[30] The impacts of market transformation programs often extend in time beyond the program implementation period. The EPA should allow states to implement and receive energy savings credits for market transformation programs, and should issue a specific protocol for evaluating the energy savings impacts of such efforts. This protocol can and should be based on existing impact evaluation methodologies such as those used by NEEA.

If the EPA agrees to use gross savings, gross savings should be used consistently in the Building Block 4 input to the emissions rate reduction goals, state plans for achieving the Clean Power Plan targets, and the energy efficiency credits claimed during the implementation period. As noted above, utilizing gross savings will increase the credit utilities and states receive for Building Block 4 savings by 10-15% relative to utilizing net savings, In other words, 1.5% savings on a net savings basis is equivalent to about 1.65-1.7% savings on a gross savings basis. Thus, if the EPA accepts the recommendation to move from net energy savings to gross energy savings, it should modify its Building Block 4 calculation, using a ramp up to 1.7% savings per year for utility programs only and preferably a ramp up to 2.2% savings per year from the combination of utility and non-utility programs.

It is also important for utilities, other program implementers, and those conducting energy efficiency program evaluations to establish an accurate baseline to measure savings against. The EPA should ensure that states and utilities utilize best practices in determining baselines, and in this regard we recommend that the EPA endorse the guidance regarding selecting baselines in the SEE Action Network's Energy Efficiency Program Impact Evaluation Guide.[31] This Guide was developed by leading energy efficiency impact evaluation experts, is highly credible, and is widely used and referred to in the energy savings evaluation work. Providing guidance concerning baselines that differs from these well-established best practices would cause confusion for utilities and other non-utility program implementers, as well as those responsible for energy efficiency program evaluation.

6. Net importing States (p. 34896-97, 34922)

EPA is proposing an adjustment of electricity savings credits downwards in net electricity importing states because some of the CO_2 emissions reductions are likely to occur out of state. However, EPA is not proposing a comparable upwards adjustment in savings credits in net exporting states. The EPA has requested comments on this proposal.

SWEEP recommends that there be no adjustment as long as both the importing and exporting state select rate-based goals, meaning that the state where the electricity savings occurs should get full credit for the energy savings in that state. This convention should be used in both determining state goals and in compliance with goals under a rate-based approach. States that choose the emissions rate approach should get full credit for electricity savings occurring in the

[30] *NEEA's Definition of Market Transformation*. Portland, OR: Northwest Energy Efficiency Alliance. http://neea.org/docs/marketing-tookits/neea_definition_of_markettransformation.pdf?sfvrsn=0.
[31] *Energy Efficiency Program Impact Evaluation Guide*. SEEAction Network. Washington, DC. Dec. 2012. https://www4.eere.energy.gov/seeaction/publication/energy-efficiency-program-impact-evaluation-guide.

state, and should not be required to track savings back to actual power plants or determine CO_2 emissions reductions due to electricity savings.

We believe this is reasonable because while some emissions reduction might occur out of state, the average emissions rate of the exporting state does not necessarily decline due to energy efficiency improvements made within the importing state. The average emissions rate of the exporting state could go up or down, depending on whether the reduction in generation due to out-of-state energy savings occurs at power plants with above average or below average emission rates. In many cases, the average emissions rate of the exporting state will go up or at worst remain about the same because cleaner natural gas-fired power plants operate on the margin much of the time throughout the nation, while dirtier coal-fired power plants tend to be baseload power plants.[32] Thus, the state where the savings occurs should not be penalized (i.e., have its savings credits reduced) due to the fact that it is an electricity importing state.

Furthermore, reducing the savings asymmetrically as EPA proposes is not fair and would diminish the motivation to implement energy efficiency measures that, as EPA notes, is the most cost-effective compliance option. If the EPA rejects the proposal in the previous paragraph, we urge the EPA to allow the adjustment to be made symmetrically (i.e., the energy exporting state would receive any energy savings credits that the importing state loses).

There is a legitimate concern, however, if a state chooses a rate-based approach and gets full credit for energy savings achieved in the state, but then imports a significant amount of electricity from a state that chooses a mass-based approach. This in effect would double count the portion of the energy savings (and the emissions reductions resulting from the savings) that results in reduced generation out of state. It would be reasonable for the EPA to require an energy savings adjustment within the state where the savings occurs in this case. The EPA could set a threshold for applying an adjustment factor during the implementation phase (e.g., an adjustment is required if a state that chooses the rate-based approach imports more than 5% of its electricity from a state that chooses the mass-based approach in any particular year).

It should also be noted that this is not an issue if a state chooses the mass-based approach for compliance. In this case, emissions reductions will occur where they occur and compliance will be based on actual emissions, not on a computation of emissions. There are no energy efficiency credits if a state chooses mass-based compliance, and thus no adjustment for electricity import/export.

7. State Plans and Implementation Efforts (pp. 34901-09)

SWEEP supports the proposed portfolio approach where states have the ability to select, adopt, and enforce energy efficiency policies and programs, rather than the EPA enforcing them. This will create a better result for all types of energy efficiency policies and programs including building energy codes, utility energy savings requirements/goals, and other energy efficiency policies or programs included in the state plans.

[32] See Note 29.

Utilities are already implementing energy efficiency programs for their customers in a wide range of policy contexts—some states have adopted formal energy savings requirements (e.g., an energy efficiency resource standard or EERS), some have set energy savings goals, some allow energy efficiency program funding and savings levels to be driven by integrated resource plans (IRPs), and some simply undertake energy efficiency program review and approval on an annual, biennial, or triennial basis, without any formal energy savings standards or goals. All are valid approaches to utility energy efficiency policy and program implementation. The EPA should allow all approaches to be included in state plans and then be used during the implementation phase. Non-utility energy efficiency programs, including but not limited to building energy codes, state appliance efficiency standards, and public sector efficiency efforts also have a solid history in most states and provide a strong complement to utility programs.

As proposed, the Clean Power Plan allows both utility and non-utility programs to receive energy savings credits. However, some aspects of the proposal should be clarified in this regard including indicating which types of programs are eligible for inclusion in state plans and for energy efficiency credits, and which are not. SWEEP proposes the following:

- The EPA should allow states and utilities to receive savings credits for a wide variety of utility programs, including but not limited to measure-based incentives, behavior change programs, transmission and distribution system upgrades, financing programs, building code support programs, and incentives for combined heat and power (CHP).
- Non-utility policies and programs should be eligible for savings credits and may include building energy codes, energy retrofit ordinances, tax incentives, financing programs, public sector energy efficiency improvement policies or programs, programs to spur market transformation, state-based appliance efficiency standards, state policies or programs to foster adoption of CHP systems, and state programs to improve industrial or agricultural efficiency.
- Policies or programs adopted and/or implemented by local governments should be eligible for energy savings credits if they are included in state plans and the energy savings are properly measured and verified according to EPA-approved procedures and protocols. For example, some states such as Arizona and Colorado are home rule states where by state constitution certain policies such as building codes are adopted and enforced at the local level, not at the state level. In such cases, states should be allowed to aggregate savings across local jurisdictions, evaluate energy savings (if not done by local governments), and receive energy savings credits. Likewise, states should be able to receive energy savings credits for public building retrofit or other public sector efficiency programs approved and implemented at the local level, as long as these programs are part of state plans and the EM&V requirements and other rules established by the EPA are followed.
- Energy efficiency credits should only be claimed for energy savings resulting from policies and programs included in state compliance plans. Credits should not be provided to individual energy efficiency projects as this would be an administrative nightmare, it would be difficult to ensure that proper EM&V procedures are followed, and it would be difficult to avoid double counting of energy savings credits between policies and programs on the one hand and individual projects on the other.

Certain energy efficiency policies should not be eligible for energy efficiency credits under the Clean Power Plan or should only be eligible for partial credits. Most importantly, credit should not be given for energy savings that result from federal appliance and equipment efficiency standards or other federal mandates, for the reasons explained in Section 9 of our comments. Similarly, to the extent that state or local actions are funded entirely by the federal government (e.g., implementation of the federal Weatherization Assistance Program or energy efficiency projects implemented in federal facilities as part of the Federal Energy Management Program), we recommend that these actions not be eligible for inclusion in state plans or for energy savings credits under the Clean Power Plan. Although they are worthy efforts that are reducing CO_2 emissions, they are not occurring as a result of state or local initiatives. However, we recommend that programs that are jointly funded by states or utilities and the federal government should be eligible for energy savings credits for the portion of the programs that are not federally funded, with energy savings pro-rated on a funding share or some other appropriate basis.

In addition, SWEEP recommends that stand alone pricing-based policies such as inverted block rates or time-of-use rates not be allowed in state plans or be eligible for savings credits because the energy savings impacts of these policies are uncertain and inherently difficult to evaluate with accuracy. However, pricing policies that are implemented along with enabling technologies, such as time-of-use rates or prepay meters implemented in conjunction with in-home energy information displays, should be eligible for energy efficiency credits as long as appropriate EM&V procedures and protocols are followed.

While energy efficiency efforts are a tried and true least cost means to achieve Clean Power Plan goals, their inclusion in state plans should be facilitated and the EPA requirements clarified as explained below:

- The proposed portfolio approach is wise in that it allows efficiency measures to be considered "implementing measures" that are complementary to electric generating unit (EGU) emissions limits, but not directly enforceable, while allowing states to adopt and enforce the measures as appropriate (p. 34901-03). Utilities, states and state utility regulatory commissions are rightly concerned that EPA enforcement of specific energy efficiency policies and programs included in state Section 111(d) plans would limit ability to modify these policies and programs as conditions change and could result in enforcement actions if efficiency policies and programs are not as successful as initially hoped. This would discourage including energy efficiency initiatives in state Section 111(d) plans. The EPA should clarify that enforcement actions on individual energy efficiency policies and programs will not be taken and are not allowed as long as a state's emissions rate targets are being met.
- States should be allowed to modify the energy efficiency policies and programs contained in state plans during the implementation phase, without seeking or obtaining approval from the EPA. This helps to ensure that new technologies can be incorporated into energy efficiency programs as they become available, results from EM&V work can be acted upon, and otherwise supports best energy efficiency practices as they evolve over time. This flexibility would also allow states to make adjustments in order to make up for any emissions reduction shortfall if energy efficiency policies and programs are not as

effective as expected, and allows for other adjustments if energy efficiency policies and programs turn out to be more effective than expected in the initial state plans.

- States should be required to include provisions in their state plans to avoid double counting of energy savings among the various energy efficiency policies and programs included in the plans (e.g., for projects that participate in both utility and non-utility programs). States should be given the flexibility to determine which programs will receive the credits where there is overlap, and to indicate how double counting will be avoided.
- If states adopt mass-based targets, EM&V protocols do not need to be applied because no energy savings credits are issued and compliance is measured directly through statewide CO_2 emissions levels. (pp. 34902-03)

As noted above, SWEEP recommends that the EPA give states the flexibility to adopt and modify utility and non-utility energy efficiency policies and programs over time, including adopting new or strengthened policies. Energy efficiency policies and programs are rarely if ever adopted and left unchanged for 15 years, and the same will be the case during 2016-2030. Energy efficiency policies including building energy codes and utility energy efficiency goals or standards are typically reviewed and modified depending on energy savings potential and other factors at least once every five years if not more frequently. It is essential that the EPA allow for modifications in energy efficiency policies and programs over time if it wants to encourage states to take maximum advantage of energy efficiency as a compliance strategy. Furthermore, states should be allowed to modify their energy efficiency policies and programs, and thus their Clean Power Plan implementation plans, without formal approval of the EPA as long as they comply with rules regarding which types of programs are eligible for savings credits, follow EM&V guidance, and take steps to prevent double counting of energy savings.

A related issue is the fact that some state energy efficiency policies such as energy efficiency resource standards, appliance efficiency standards, building energy codes or financing initiatives require legislative approval in most states. The EPA should allow states to include such policies in their Section 111(d) implementation plans with the understanding that the policy will only go forward if legislative approval is obtained, and that a state will modify its plan and implement other measures in order meet the CO_2 emissions rate targets if this approval is not obtained. As long as a state is meeting its targets, the EPA should make it clear it will not micro-manage the details as to how it is being achieved.

8. Combined Heat and Power (CHP) (p. 34924; 34956-57)

CHP produces useful heat and power from a single fuel source, and also includes waste heat to power (WHP) projects. CHP is significantly more efficient than central power generation, and is a proven approach to lower pollutant emissions. CHP also helps manufacturers and other large facilities to become more competitive, and enhances electric system reliability. The Obama Administration recognizes these benefits and has established a national goal to encourage greater deployment of cost-effective CHP.

The Proposed Rule discusses how "affected" (generally larger than 25 MW) CHP facilities would be treated, and invites comments on its proposal to credit 75% of the thermal output from

these affected units. The Proposed Rule also mentions that smaller, unaffected CHP units could be a type of energy efficiency measure included in Building Block 4 (p. 34924), and invites comments on whether CHP should be allowed as a potential emission reduction option.

SWEEP supports EPA's proposal to allow credit for 75% of the useful thermal output of CHP systems that qualify as EGUs. For unaffected CHP units, SWEEP recommends that the EPA allow both CHP and WHP to be eligible compliance methods, WHP under Block 3 and CHP under Block 4 in states that choose the emissions rate approach. Natural gas-fired CHP is an end-use energy efficiency method with demonstrated benefits. There are accepted methods for calculating the net CO_2 emissions reductions from CHP systems[33] and 13 states currently permit electricity savings from CHP systems to contribute to achievement of energy efficiency resource standards in some manner.[34]

SWEEP recommends that a utility that provides CHP incentives or a state that has a CHP standard or incentive, financing or technical assistance program be eligible for energy efficiency credits, as long as the state includes the CHP policy or program in the state's Section 111(d) compliance plan. Credits should not be provided to individual CHP projects, but rather to a utility or state program. We further suggest that the credits could either be CO_2 emission reductions or electricity savings from a CHP system. Emissions reductions would be applied to the numerator in a state's emissions rate calculation; electricity savings would be added as a credit in the denominator (analogous to other energy efficiency credits as proposed by EPA).

SWEEP recommends that the EPA allow utilities and states to receive CHP credits based on the net CO_2 emissions reductions from a CHP system. As an alternative, states could calculate an equivalent amount of net electricity savings from CHP, again based on the CO_2 emission reductions. We provide detailed recommendations about how these calculations could be made in separate comments on CHP. In short, we suggest that 60-80% of the total electrical output of the CHP system would be counted as "net electricity savings", with the exact value based on the type and efficiency of the overall CHP system.

Regarding the savings potential from CHP systems that are not affected EGUs, ACEEE estimates that about 20 GW of new CHP capacity could be installed in the United States by 2030 if states were to adopt moderately supportive CHP policies spurred on in part by the Clean Power Plan.[35] ACEEE's analysis considers both technical potential and the likelihood of implementation based on energy prices, estimated payback periods, and other economic factors. We assume that this 20 GW of potential new CHP capacity by 2030 translates to 1.5 GW installed per year during 2020-2030, which in turn corresponds to about 6,300 GWh per year of net electricity savings from new CHP systems installed each year using the methodology described above. This level of net electricity savings from CHP systems is equivalent to about 0.15% of national electricity consumption projected in this time frame.

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[33] For example by using the EPA CHP Partnership's, "CHP Emissions Calculator," available at http://www.epa.gov/chp/basic/calculator.html.

[34] See Note 3, pp. 68-69.

[35] S. Hayes, et al. *Change is in the Air: How States Can Harness Energy Efficiency and to Strengthen the Economy and Reduce Pollution.* Washington, DC: ACEEE. April 2014. http://www.aceee.org/sites/default/files/publications/researchreports/e1401.pdf, p. 50.

9. Federal Appliance and Equipment Efficiency Standards

An important energy efficiency issue is whether or not states that choose the emissions rate approach receive energy savings credits for savings resulting from federal appliance and equipment efficiency standards. SWEEP recommends that the EPA not allow states to receive such credits. ACEEE and the Appliance Standards Awareness Project estimate that the federal energy efficiency standards adopted through 2011 saved about 278 TWh per year in 2010, 7.2% of national electricity use that year, and that the savings from these existing standards will increase to 682 TWh per year by 2025, 15.6% of projected national electricity use that year according to the EIA's most recent Annual Energy Outlook.[36] Furthermore, standards enacted since 2011, as well as those that will be set in the coming years, will add to the electricity savings that will be realized in the future.

Allowing states to receive credit for these savings will result in very large credits that would help states reach their CO_2 emissions rates targets without any action on the part of utilities or states. If states were allowed to receive such credits, the savings from federal appliance and equipment standards must be added to the Building Block 4 energy savings assumptions and thus to the CO_2 emissions rate targets. However, there is significant uncertainty about the level of energy savings from federal standards state by state; some standards yield differing amounts of unit savings in different states—for example, due to climatic differences. Also, the market penetration of some products varies considerably across states. These issues are not well studied. Furthermore, states have little or no experience estimating the energy savings occurring within their borders due to federal appliance and equipment efficiency standards. Rather than modifying the Building Block 4 assumptions significantly and allowing states to receive credits for energy savings resulting from the standards, and attempt to address all the uncertainties that doing this entails, it is far simpler and more accurate to leave the federal standards out of the Building Block 4 assumptions (as the EPA has done in the proposed rules) and likewise not allow states to receive energy savings credits for energy savings resulting from the federal standards.

The federal efficiency standards will reduce future electricity use in all states and thereby lower CO_2 emissions, helping those states that choose mass-based targets to meet their targets. However, the EPA has given states an option for determining mass-based goals that takes into account projected load growth out to 2030 in the "*Translation of the Clean Power Plan Emission Rate-Based CO2 Goals to Mass-Based Equivalents*" Technical Support Document issued in November. Load growth projections made by the EIA and used by the EPA do take into account federal appliance efficiency standards that have already been adopted. Load forecasts for 2030 have been reduced due to the effects of federal efficiency standards, leading to lower mass-based goals when the rate goal is multiplied by the projection of future electricity generation. So, in effect, federal appliance and equipment efficiency standards will help states meet mass-based goals that have been adjusted downwards to account for federal standards, assuming states select this option that includes projected load growth or some variation of it.

[36] A. Lowenberger, et al. *The Efficiency Boom? Cashing In on the Savings from Appliance Standards.* Washington, DC: ACEEE and Boston, MA: ASAP. March 2012.
http://www.aceee.org/sites/default/files/publications/researchreports/a123.pdf.

10. Reporting and Plan Revisions (pp. 34907-09)

SWEEP supports the EPA's proposal that a report and corrective measures would be required if actual emissions (or emissions rates) fall short of planned levels by more than 10 percent starting in 2022. Also, if a state fails to meet its goals, either in the interim period or final goal, SWEEP supports requiring additional actions and a modified compliance plan to make up for the emissions performance deficiency. Similarly, SWEEP supports the proposal that state plans include contingencies if the enforceable emissions limits on EGUs in and of themselves do not achieve the required emissions performance level (p. 34909). In addition, the EPA should consider requiring an additional compliance plan submittal in 2025 (p. 34905) to ensure states will meet the goals in 2030 as well as to establish initial plans for meeting goals beyond 2030.

11. Credits for Early Actions (pp. 34918-19)

The EPA has raised the issue of whether states should get energy savings credit for existing state policies and programs, or measures adopted in the 2014-2020 time period, for meeting the goals during 2020-2030. In general, states will benefit from "early actions" that reduce carbon emissions and emissions rates even if the policies take effect before 2020 in that they will help states move towards meeting their goals in the 2020-2030 time period. The earlier the actions occur, the greater the environmental and economic benefits. This is the case whether it's retirement of an older coal plant, adopting a higher renewables portfolio standard (RPS), or expansion of energy efficiency programs through an EERS or other policies.

The EPA has proposed (p. 34918) that existing energy efficiency policies and programs or new policies and programs started before 2020, and energy efficiency measures installed through them starting on the date of publication of the proposed rule, would be eligible to provide energy efficiency credits starting in 2020 during the compliance period. In other words, a utility with an EERS could receive energy efficiency credits starting in 2020 for measures installed through energy efficiency programs as of June, 2014, as long as the measures are still in use in 2020. However, there would be no credit for energy savings occurring before January 1, 2020 under the EPA's proposal. In addition, the EPA has requested comments on counting energy efficiency measures starting as of some later date, such as 2017 (which is the date when the Building Block 4 calculation begins), as well as the possibility of energy savings credits for energy savings occurring prior to 2020.

SWEEP recommends that states be allowed to start tracking energy efficiency measures installed in 2017 or later, not in 2014 as EPA has initially proposed for the following reasons:

- Counting energy savings from measures installed starting in 2017 towards each state's emissions rate goals is consistent with the Building Block 4 calculation used in establishing the emissions rate goals.
- Counting measures would start after publication of the final rule, EM&V requirements are defined, and state plans are prepared at least on a preliminary basis. Eligible measures should be those that are adopted as part of policies or programs included in state plans.

- By starting the counting of measures in 2017, states and utilities will have an incentive to ramp up energy efficiency policies and programs in the 2017-2019 time period, not just starting in 2020.
- States and utilities have already planned energy efficiency programs for 2015 and 2016 as a result of other state policies or goals such as EERS requirements, integrated resource planning requirements, or a goal to reduce energy waste and help consumers and businesses lower their energy bills when doing so is cost effective.[37] It is highly unlikely that these programs will be eliminated or cut back if the Clean Power Plan does not allow counting efficiency measures installed prior to 2017.

If measures from eligible state and utility policies and programs are tracked and counted starting in 2017, SWEEP recommends that energy savings credit from these measures begin in 2020 as the EPA has proposed. Most efficiency measures installed during 2017-19 are long-lived and will provide substantial energy savings in 2020 and thereafter, and thus will contribute energy savings credits during the compliance period (e.g., if a measure with a 12 year lifetime is installed through a utility program in 2018, the utility would be able to count the savings over 10 of the 12 years for purposes of Clean Power Plan compliance). States and utilities that want to realize substantial energy savings starting in 2020 will need to begin programs prior to 2020 given the time required to ramp up to high levels of program participation and energy savings. Thus, states and utilities will have an incentive to implement programs in the 2017-19 time period, even if there are no credits for energy savings prior to 2020. Moreover, starting energy savings credits sooner than 2020 would have the undesirable effect of reducing the overall CO_2 emissions reductions achieved by the Clean Power Plan, unless the CO_2 emissions rate reduction targets are strengthened; i.e., the emissions rate targets are lowered.

SWEEP supports counting energy savings measures beginning in 2017 from policies and programs included in state plans, whether the policies and programs began prior to 2017 or after 2017. This will avoid penalizing states that have already adopted EERS policies, state-of-the art building energy codes, state financing or financial incentive programs, etc., or plan to do so in the near future. Only measures implemented starting in 2017 would contribute energy savings credits starting in 2020, but in effect the policy or program stimulating the adoption of the measures could start at any time, again as long as the policy or program is included in a state plan for meeting the CO_2 emissions rate goals.

12. Evaluation, Measurement and Verification (pp. 34920-21)

SWEEP would like to comment on a number of issues related to energy efficiency evaluation, measurement and verification (EM&V). First, the Final Rule should confirm that EM&V of energy efficiency programs, and reporting of energy savings results, is only required in states that choose to comply through the CO_2 emission rate approach. This is necessary for determining

[37] In the Southwest region, for example, Xcel Energy in Colorado and Public Service Company of New Mexico have submitted 2015-16 energy efficiency program plans that are under review by their state regulators. Both plans call for increased funding and increased energy savings compared to prior energy efficiency plans. Other utilities such as NV Energy will expand their efficiency programs during 2015-16 under previously approved DSM program plans. No entity is suggesting throttling back utility energy efficiency programs unless utilities get credit for energy savings credits prior to 2020 under the Clean Power Plan Rule.

the energy savings credits that get added to the denominator in the determination of the CO_2 emissions rates for compliance purposes. In states that choose the mass-based approach, compliance is through measurement of the actual CO_2 emissions of affected EGUs. SWEEP supports the position that there should be no energy efficiency credits and thus no energy efficiency EM&V requirements or energy savings reporting whatsoever in states that choose the mass-based approach.

Second, EM&V requirements for Clean Power Plan energy efficiency credits should be limited to energy savings impacts (MWh saved per year) as this is the value that is factored into CO_2 emissions rates through the addition to the denominator. There should be no requirements for estimating time-differentiated energy savings or peak demand reductions, at least under the Clean Power Plan.

Third, for states that choose the emissions rate approach, we support the EPA providing guidance to states and utilities on appropriate EM&V protocols, as proposed in the Draft Rule. The EPA should identify and approve EM&V protocols such as the International Performance Measurement and Verification Protocol (IPMVP), the Department of Energy (DOE) Uniform Methods Project Protocols, SEE Action Network Evaluation guides and other protocols that were developed by EM&V experts and are generally accepted and widely used within the energy efficiency field. In addition, the EPA (preferably with the help of the DOE) should develop and approve additional EM&V protocols to fill gaps that exist, such as protocols for evaluating the energy savings from building energy codes, state financing programs, market transformation programs, and CHP support programs. These protocols are critical for ensuring that EM&V is high quality, accurate, and consistent across states. In addition, these protocols will clarify what procedures states and utilities (and their program evaluators) need to follow in order to claim energy efficiency credits in a manner that is acceptable to the EPA.

The EM&V protocols should be approved and the current gaps filled as soon as possible. But the full set of protocols do not need to be available at the time the Final Rule is issued, especially if counting of efficiency measures does not start until 2017 as SWEEP recommends. In addition, the EM&V protocols should be revised and updated periodically as experience is gained and EM&V practices evolve over time.

In addition, we provide the following recommendations regarding EM&V, based in large part on our knowledge of the EM&V practices routinely used by utilities in the southwest region:

- The EPA should require third party EM&V of the total first year energy savings (MWh saved per year) of every energy efficiency program that is claiming efficiency credits at least once every three years, using EPA-approved EM&V protocols for different types of programs. Many utilities perform third party EM&V more frequently. For example, NV Energy and utilities in New Mexico (PNM, Southwestern Public Service Company, and El Paso Electric) perform EM&V of all or most of their programs every year. By requiring that EM&V be done for all programs at least once every three years, the EPA will limit the burden and cost of EM&V for those states or utilities that want to limit the burden and cost.

- There should not be different EM&V requirements for those states or utilities that have limited experience with energy efficiency programs and those that have substantial experience. All are capable of hiring qualified EM&V experts to evaluate the energy savings of their efficiency programs, including new programs initiated in full or in part to assist states comply with their Clean Power Plan targets. A number of utilities in the southwest region including Public Service Company of New Mexico, Black Hills Energy in Colorado, NV Energy, Southwestern Public Service Company, and El Paso Electric Company began to implement energy efficiency programs for their customers at some point in the past 10 years and had no difficulty initiating third party EM&V of energy savings starting with the first year of their new efficiency programs. Fortunately, there are a host of companies that specialize in energy efficiency program EM&V. These companies will be able to support all states and all utilities in following the EM&V guidance and protocols established by the EPA under the Clean Power Plan.
- The same EM&V requirements should apply to both utility and non-utility policies/programs that a state is claiming energy efficiency credits for. There is much less experience with EM&V of non-utility programs compared to utility programs, but there are many competent EM&V experts and firms that can perform the EM&V of non-utility programs once EPA issues guidance and EM&V protocols for these programs. In addition, shifting from net savings to gross savings as suggested in a previous comment will facilitate the EM&V of savings from both utility and non-utility programs.
- There should not be multiple sets of EM&V protocols for the same type of programs and/or discounting of savings if utilities or states take an "easier approach." Allowing such discounting is much more complicated and subjective than having a single set of protocols, and is unnecessary. All states, utilities and other program implementers, whether in leading states such as Arizona and Massachusetts or lagging states such as North Dakota and Virginia, can hire EM&V experts capable of following the EM&V protocols approved by the EPA.
- In its general EM&V guidance, the EPA should provide guidance on statistical sampling in order to reduce potential sampling error bias in savings estimation and to help ensure that energy savings evaluation is consistent across utilities and states. In particular, we recommend that the EPA require 90/10 confidence interval/precision as part of EM&V for programs that are contributing 5% or more of the total energy savings of a particular utility, third party program administrator, or state in any one year, but allow 80/20 confidence interval/precision for programs contributing less than 5% of total savings. The 90/10 value is relatively common in EM&V studies especially for major energy efficiency programs. For example, NV Energy evaluates all of its energy efficiency programs using 90/10 confidence/precision and utilities in New Mexico do the same except for programs with very few participants. Allowing 80/20 confidence interval/precision for programs contributing less than 5% of total savings will hold down EM&V costs for those entities that want to do so, while not significantly affecting the accuracy of claimed energy savings credits.
- If EM&V is required only once every three years for every program, EM&V results may not be available when states file their annual compliance reports with the EPA. Thus the EPA should allow annual emissions rate reporting using ex-ante energy savings assumptions (also known as deemed savings values) if the savings values as determined by third party EM&V are not yet available. However, SWEEP recommends that the EPA

require retroactive adjustment of energy efficiency credits (either up or down) when the required EM&V is completed. This retroactive true-up will lead to more accurate savings values and thereby enhance the credibility of energy efficiency as a compliance strategy. At the same time it will not increase the EM&V burden or cost—the same EM&V studies are required whether or not there is retroactive true-up of savings values. It simply means that utilities and states must compile and report the savings true-ups to the EPA, which can be done as part of the normal annual reports that states submit to the EPA.

- The retroactive true-up will change a state's actual average CO_2 emissions rate from the initially reported value, but the change is not likely to be very large. And since compliance with at least the interim emissions rate goal is a 10-year average emissions rate over the 2020-29 period, minor true-ups of annual emissions rate values one or two years after initial annual reports are filed should not create a problem in terms of complying with the 10 year average targets. But if the final year emissions rate target in 2030 remains a single year target, trueing up the 2030 energy efficiency credits say in 2032 could conceivably shift a state from being in compliance to being out of compliance with the 2030 target. However, this outcome is highly unlikely. And even if it is the case, the state could be required to make up the difference in the post-2030 compliance period—assuming the Clean Power Plan and its requirements continue beyond 2030.

In the implementation phase, the EPA should allow states and utilities to conduct EM&V on their own without necessarily complete standardization across states, as long as the EM&V is consistent with approved protocols. In submitting reports, states should certify that appropriate EM&V protocols were followed for all claimed EE credits, with certification provided by a state PUC, energy office or other appropriate state entity.

For states that include both utility and non-utility EE policies and programs in their implementation plans, the EPA should require states to identify the procedures that will be used to avoid double counting of savings across policy or program types. For example, there will be a need to avoid double counting of savings from energy efficiency projects that participate in both a utility efficiency program and a state program such as a state financing or financial incentives program, or a program focused on energy savings in the public sector.

Based on experience in the Southwest region, the EM&V guidelines we recommend are feasible for both large and small utilities and for utilities both just starting to implement efficiency programs and those with long-established programs. In our region, some smaller utilities such as El Paso Electric Company in New Mexico (with annual energy efficiency expenditures of $3 million in 2013) carry out third party evaluation of the energy savings of all energy efficiency programs either annually or periodically. To facilitate EM&V for very small utilities such as small municipal utilities or rural electric cooperatives, we recommend that EPA allow EM&V to be carried out for multiple utilities jointly in collaboration with wholesale power providers or other entities such as a state association of municipal utilities or rural electric cooperatives.

13. Lifetime of Energy Efficiency Measures (GHG Abatement Measures TSD)

The Technical Support Document explains in detail the assumptions made by the EPA regarding the lifetime of energy efficiency measures, which in turn is used for determining the energy

efficiency component of the state CO_2 emissions rate targets as shown in Table 7 (p. 34873). The assumptions assume that energy savings start to decline immediately after installation of efficiency measures, and continue to decline in a linear manner due to efficiency measures "burning out" on a steady basis. Annual energy savings decline steadily over time but reach zero at some point, as shown on page 5-42 GHG Abatement Measures TSD.

In our view, these are not reasonable assumptions. In considering the assumptions about efficiency measure lifetimes, we recommend that the EPA recognize that many energy efficiency measures such as ENERGY STAR lighting measures are designed to last a minimum number of hours and while some products may fail early, the vast majority do not (i.e., there is a relatively narrow band of lifetimes around an average lifetime value, with a few outliers). For example, a study of the measure life and persistence of commercial lighting measures in the Northeast found the values shown in the table below.[38] The variation in lifetime is due in part to varying levels of usage (hours on per year) not just differing failure rates.

Effective Useful Lifetime of Lighting Efficiency Measures in Commercial Buildings in Efficiency Programs Implemented in Northeast States

	CFLs	CFL Fixtures	HID lights	LED Exit Signs	T8 Fixtures
Average Lifetime (yrs)	5.1	7.0	9.1	21.9	16.2
90% Confidence Interval	4.1-6.3	6.2-7.9	8.0-10.3	11.1-43.1	12.0-22.0

Source: See Note 38.

We recommend that the EPA use average lifetime values for different types of measures and programs in its Building Block 4 calculations, with savings remaining constant over the average lifetime rather than steadily declining from year one. In other words, all efficiency measures installed in year x providing y MWh of savings per year with a 12 year average lifetime would continue to provide that same level of savings for 12 years and then drop to zero savings. Likewise, the EPA should direct states and utilities to use the same methodology in their implementation plans and during the implementation period. This approach is more straightforward and consistent with how utilities and states typically treat measure lifetime and persistence of energy savings when considering savings from programs implemented and measures installed over a multi-year period, compared to the approach used by the EPA in the Proposed Rules.

In the Southwest region, Public Service Company of New Mexico (PNM) is required to meet energy efficiency standards based on cumulative energy savings (i.e., from energy programs implemented over a multi-year period). In particular, the utility is required to achieve 5% savings by 2014 and 8% savings by 2020 from programs implemented starting in 2007. In order to comply with these requirements, the utility conducts EM&V to estimate the first year savings as

[38] *C&I Lighting Measure Life and Persistence Project*. Final Report. Report prepared by KEMA, Inc. for the Regional Evaluation, Measurement and Verification Forum. Lexington, MA: Northeast Energy Efficiency Partnership. June 2011. http://www.neep.org/initiatives/emv-forum/forum-products#Measured Life Research.

well as the average measure lifetime for each program. The average lifetime is shown by program type in the table below.[39]

Energy Efficiency Program Average Lifetime Assumptions, Public Service Company of New Mexico Example

Program	Assumed Lifetime (yrs)
Home Energy Check-up	10.0
Low Income Home Energy Check-up	14.0
Residential Cooling	15.0
Refrigerator Recycling	5.0
Residential Lighting	10.0
Home Energy Reports	1.0
PNM Home Works	11.0
Easy Saving Kits	8.0
Multi-Family	10.0
Commercial Comprehensive	11.6

Source: *2014 Energy Efficiency and Load Management Program Plan*. Public Service Company of New Mexico.

These average lifetime values are used for determining future energy savings. For example, a program implemented in 2015 with a 10 year average lifetime is assumed to have the same first year energy savings during 2015-24, but then provide zero energy savings. This is the approach that we recommend the EPA follow in its Building Block 4 assumptions, and the approach that we recommend utilities and other program implementers take during the implementation period. To the best of our knowledge, this is the approach for energy savings lifetime most commonly used by utilities and other programs implementers throughout the country.

We also have comments on the average life of efficiency measures used by the EPA in its Building Block 4 assumptions, an issue discussed on page 5-36 of the GHG Abatement Measures TSD. The EPA notes that ACEEE has estimated an average measure lifetime of 10.6 years based on data from electric energy efficiency programs in twelve states, with an average measure life of 8.1 years for residential programs and 12.5 years for commercial/business programs. The data used by ACEEE are from energy efficiency programs implemented in 2009-2012. Based on this study, the EPA chose to use an average measure life of 10 years, which it notes is a conservative assumption.

We want to point out that residential efficiency programs in the 2009-2012 time period relied heavily on compact fluorescent lamps (CFLs), a measure with a relatively short life. However, energy efficiency programs are shifting away from CFLs and to LED lamps which have a much longer life compared to CFLs. LED lifetimes in residential applications are 20 years or longer. In the 2020-2030 time period, utilities and other program implementers are not likely to be promoting CFLs at all while LEDs are expected to contribute large amounts of energy savings in

[39] *2014 Energy Efficiency and Load Management Program Plan*. Public Service Company of New Mexico. Albuquerque, NM. Oct. 6, 2014. https://www.pnm.com/documents/396023/2036722/06_Direct+testimony+and+Exhibits+of+Steven+Bean.pdf/b283da01-0d21-4203-9312-deb6688a9f43.

all sectors.[40] Based on this consideration, we recommend that the EPA assume an average measure life of 12 years in its Building Block 4 energy efficiency assumptions. Further supporting the use of 12 year average lifetime is the fact that the recent study of total cost of saved energy from more than 100 program administrators in 34 states conducted by Lawrence Berkeley National Laboratory found an average program lifetime of 12.6 years.[41]

In the planning and implementation phases, we recommend that the EPA direct states, utilities and other program implementers to use average measure lifetimes that are appropriate for each individual energy efficiency program.

Another point that the EPA should consider is that many efficiency measures are replaced by other energy efficiency measures when they "burn out", not by inefficient measures. For example, a CFL that burns out in the next few years is going to be replaced by another CFL or an LED lamp in most cases, not by an incandescent or halogen lamp, whether or not there is an incentive program fostering the energy-efficient replacement. We are not recommending that an adjustment be made to the Building Block 4 energy savings methodology to account for this effect; we only point it out to note that it makes the methodology we suggest conservative.

14. Other Potential Emissions Reduction Measures (p. 34923)

The EPA has requested comment on other possible emissions reduction measures that states may include in their plans. First, we recommend that the EPA allow savings credits for energy efficiency improvements within utility T&D systems, including Conservation Voltage Reduction (CVR). CVR provides energy savings for end-use consumers as well as some reduction in distribution system losses. T&D efficiency measures including CVR implemented in 2017 or later should be eligible for the same energy savings credits as end-use efficiency measures, for states that choose to comply using the emissions rate approach. If a state chooses to comply through a mass-based approach, no energy efficiency credits are provided since efficiency measures directly reduce actual CO_2 emissions.

Plug-in electric vehicles (EVs) are another set of potential emissions reduction measures that EPA should address in the Section 111(d) Rule. EVs will increase electricity consumption and, thus, carbon emissions by utilities but in most states will reduce total carbon emissions on a net basis through reduced petroleum consumption.[42] Furthermore, the net reduction in carbon emissions due to EV adoption will increase over time as electricity generation is decarbonized. The Clean Power Plan should not penalize states or utilities as EVs are adopted or discourage states or utilities from promoting EVs.

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[40] *Energy Savings Potential of Solid-State Lighting in General Illumination Applications*. Report prepared by Navigant Consulting, Inc. for the U.S. Department of Energy, Jan. 2012. http://apps1.eere.energy.gov/buildings/publications/pdfs/ssl/ssl_energy-savings-report_jan-2012.pdf.

[41] Personal communication from Ian Hoffman, Lawrence Berkeley National Laboratory. Nov. 23, 2014.

[42] D. Anair and A. Mahmassani. *State of Charge: Electric Vehicles' Global Warming Emissions and Fuel-Cost Savings across the United States.* Cambridge, MA: Union of Concerned Scientists. June 2012. http://www.ucsusa.org/sites/default/files/legacy/assets/documents/clean_vehicles/electric-car-global-warming-emissions-report.pdf.

For states that choose the mass-based compliance option, the current Clean Power Plan proposal could act as a disincentive to electrifying transportation beyond the forecasted transportation electrification load used to establish the mass-based goal. The state would need to ensure any additional load is directly or indirectly offset by increased use of low carbon generation. We recommend that the EPA allow states to adjust their mass-based targets to remove this "EV penalty" (i.e., allow an upward adjustment of mass-based targets to accommodate future electricity use by EVs). At the same time, if the mass-based goal is adjusted upwards more than the amount due to the actual electricity use of EVs, then actual CO_2 emissions from power plants will be "too high" and the benefits of the Clean Power Plan would be weakened.

We propose an approach that both removes the disincentive to additional EVs and eliminates the ability to game the system by over-projecting EV load when setting mass-based targets. The adjusted mass-based emissions targets would first be calculated ignoring any electricity use by EVs, but the targets would then be adjusted after the fact based on the actual number of EVs operating in the state in any year. Under this proposal, the actual value of the target would not be known a priori. The final target would be calculated ex post facto when the actual number of operating EVs is known and their electricity use is estimated. If states elect the mass-based approach and want to take advantage of this adjustment, they would need to maintain data on the number and type of EVs operating in the state.

We are not proposing any adjustment for EVs in states that choose the emissions rate approach as it is unclear if states and utilities will be penalized or will benefit by the adoption of EVs, under the rate-based approach. This effect depends on whether the electricity generated to serve the vehicles comes from power plants with below average or above average emissions rates. In many states, incremental electricity load will be served by natural gas-fired power plants. Further details regarding our EV proposal are being submitted to the EPA in separate comments.