COLUMBIA LAW SCHOOL

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December 1, 2014

The Honorable Regina A. McCarthy, Administrator
U.S. Environmental Protection Agency
William Jefferson Clinton Building
1200 Pennsylvania Avenue, N.W.
Mail Code 1101A
Washington, DC 20460

Re: Comments in Docket ID No. EPA-HQ-OAR-2013-0602

Dear Administrator McCarthy,

The Sabin Center for Climate Change Law (SCCCL) supports the Environmental Protection Agency (EPA)'s determination that end-use energy efficiency constitutes a key component of the best system for reducing carbon pollution from existing power plants. End-use energy efficiency programs have been adequately demonstrated as cost-effective mechanisms for achieving substantial reductions in emissions of carbon dioxide (CO_2) and other air pollutants from this source category.[1] Thus, EPA has reasonably concluded that: (i) states may include such programs as part of a proposed system for reducing carbon pollution from existing power plants under §111(d) of the Clean Air Act, and (ii) EPA must account for achievable emission reductions from such programs when setting the stringency of its emission guidelines for existing power plants.

Because the proposed Clean Power Plan includes end-use energy efficiency programs as components of the "best system of emissions reduction" (BSER) to be implemented and enforced under §111(d), it provides significant flexibility for state regulators to select an optimal portfolio of pollution reduction strategies that includes a combination of on-site and off-site control measures. It is important for EPA to preserve this flexibility while also providing sufficient guidance to state regulators on how they can account for emissions reductions from energy efficiency measures in their initial §111(d) plans and subsequent compliance demonstrations. These comments highlight some of the key questions that EPA should address when issuing the final rule and any accompanying guidance, as well as recommendations on how

[1] *See* Kate Konschnik & Ari Peskoe, *Efficiency Rules: The Case for End-Use Energy Efficiency Programs in the Section 111(d)Rule for Existing Power Plants*, HARVARD ENVIRONMENTAL POLICY INITIATIVE, at 7 (2014).

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EPA can develop a flexible regulatory framework that will allow states to experiment with a variety of different approaches for reducing emissions through energy efficiency.

We appreciate your consideration of these comments and look forward to the promulgation of the final rule to regulate CO_2 emissions from existing power plants.

Sincerely,

Michael Gerrard
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Director, Sabin Center for Climate Change Law
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I. Background

End-use energy efficiency programs can deliver low-cost reductions in carbon pollution from the power sector[2] as well as a variety of economic, social and environmental co-benefits.[3] In a recent study, the Natural Resources Defense Council (NRDC) found that the deployment of energy efficiency programs could significantly reduce the cost of meeting CO_2 emissions standards for existing power plants.[4] According to NRDC's analysis, states could use a combination of energy efficiency programs and other control measures to reduce nationwide CO_2 emissions from the power sector by approximately 26% over 2005 levels in 2020 and 34% in 2025 without imposing unmanageable costs on regulated power plants. In addition, NRDC found that the direct economic savings from widespread efficiency improvements would offset the costs of implementing these measures by 2030, and the value of societal benefits generated from such improvements could reach $60 billion in 2020, as much as 15x the cost of compliance. NRDC's analysis also indicated that the inclusion of energy efficiency measures in a §111(d) program would reduce wholesale electricity prices by approximately 4% as compared with a reference case. Meanwhile, energy efficiency improvements in households and businesses would reduce electricity consumption, lowering electricity bills and emissions at the same time.[5] Recognizing these and other benefits, clean air agencies, regulatory utility commissions and state energy officials across the nation have expressed support for the inclusion of energy efficiency programs among the mechanisms that state regulators can use to reduce carbon pollution from existing power plants under §111(d).[6]

EPA has reasonably concluded that energy efficiency programs may constitute part of the BSER established by a state to reduce carbon pollution from existing power plants in accordance

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[2] The American Council for an Energy-Efficient Economy (ACEEE) estimates that the average cost of energy savings is $0.025 / kWh, significantly lower than the cost of additional generation ($0.07-0.15 / kWh). *See* Seth Nowak et al., *Leaders of the Pack: ACEEE's Third National Review of Exemplary Energy Efficiency Programs*, ACEEE Report No. U132 (June 2013). The potential for EE to reduce energy demand and avoid CO_2 emissions has been confirmed by many studies. *See, e.g.*, Hannah Choi Granade et al., *Unlocking Energy Efficiency in the U.S. Economy*, MCKINSEY & COMPANY (2009). AMERICA'S ENERGY FUTURE PANEL ON ENERGY EFFICIENCY TECHNOLOGIES, REAL PROSPECTS FOR ENERGY EFFICIENCY IN THE UNITED STATES (2010).

[3] For example, Deutsche Bank and Rockefeller Foundation estimate that there is $279 billion in potential investment to increase efficiency in existing buildings in the U.S., which could in turn save $100 billion in energy costs per year and mitigate more than 600 metric tons of CO2 per year. ROCKEFELLER FOUNDATION & DEUTSCHE BANK GROUP CLIMATE CHANGE ADVISORS, UNITED STATES BUILDING ENERGY EFFICIENCY RETROFITS: MARKET SIZING AND FINANCIAL MODELS (March 2012). In a similar study, the Rhodium Group concluded that there is potential for $189 billion in net savings in the year 2030 from a doubling of energy efficiency in buildings and industry resulting in a reduction of 786 million tons of CO_2 emissions. TREVOR HOUSER, RHODIUM GROUP, AMERICAN ENERGY PRODUCTIVITY: THE ECONOMIC, ENVIRONMENTAL, AND SECURITY BENEFITS OF UNLOCKING ENERGY EFFICIENCY (Feb. 2013).

[4] DANIEL A. LASHOF ET AL., NATURAL RESOURCES DEFENSE COUNCIL, CLOSING THE POWER PLANT CARBON POLLUTION LOOPHOLE: SMART WAYS THE CLEAN AIR ACT CAN CLEAN UP AMERICA'S BIGGEST CLIMATE POLLUTERS (March 2013).

[5] *Id.*

[6] *See, e.g.*, National Association of Clean Air Agencies (NACAA), National Association of Regulatory Utility Commissions (NARUC), and National Association of State Energy Officials (NASEO), *Principles for Including Energy Efficiency in 111(d) of the Clean Air Act*, submitted to EPA Administrator Gina McCarthy on May 12, 2014.

with §111(d). Accordingly, EPA has proposed that states may include energy efficiency programs as compliance measures when submitting state plans and verifying actual emissions reductions. To qualify for credit under the proposed rule, the emissions reductions from these programs must be "quantifiable, non-duplicative, permanent, verifiable and enforceable."[7] These terms are defined as follows:

- *Quantifiable* – The standard "can be reliably measured, in a manner that can be replicated."[8]
- *Verifiable* – "[A]dequate monitoring, recordkeeping and reporting requirements are in place to enable the state and the Administrator to independently evaluate, measures, and verify compliance with the emissions standard."[9]
- *Non-Duplicative* – The standard "is not already incorporated as an emissions standard in another state plan unless incorporated in multi-state plan."[10]
- *Permanent* – The standard "must be met for each compliance period, or unless it is replaced by another emission standard in an approved plan revision, or the state demonstrates in an approved plan revision that the emission reductions from the standard are no longer necessary for the state to meet its state level of performance."[11]
- *Enforceable* – The standard is: (1) "a technically accurate limitation or requirement" with a specified time period, (2) "compliance requirements are clearly defined," (3) the "affected entities responsible for compliance and liable for violations can be identified," (4) "each compliance activity or measure is enforceable as a practical matter;" and (5) EPA and the state maintain the ability to enforce violations and secure appropriate corrective actions pursuant to CAA §113.[12]

EPA has also proposed that a state plans that depend on end-use energy efficiency measures as compliance mechanisms must include an evaluation, measurement, and verification (EM&V) plan that explains how the effect of these measures will be determined in the course of plan implementation.[13]

EPA intends to develop guidance on the inclusion of energy efficiency measures as enforceable standards and what constitute acceptable EM&V protocols.[14] The agency's stated goal in developing such guidance is "to assure that it is consistent with industry-standard EM&V approaches for both RE and demand-side EE measures and programs, leverages the EM&V

[7] 79 Fed. Reg. 34,953.
[8] *Id.*
[9] *Id.*
[10] *Id.*
[11] *Id.*
[12] *Id.* at 34,953-54.
[13] This plan "will specify the analytic methods, assumptions, and data sources that the state will employ during the state plan performance periods to determine the energy savings and energy generation related to RE and demand-side EE measures," and would "be subject to EPA approval as part of a state plan." 79 Fed. Reg. 34,920
[14] 79 Fed. Reg. 34,920.

resources and infrastructure already in place in many states, and strikes a reasonable balance between EM&V costs, rigor, and the value of resulting information, while considering the specific use of such information in assessing avoided CO2 emissions from affected EGUs."[15]

In order to facilitate the utilization of energy efficiency programs under §111(d), EPA's guidance should provide a clear roadmap for the inclusion of energy efficiency measures in §111(d) plans and the requirements for monitoring, quantifying and verifying emissions reductions from those measures. The following comments highlight some of the key questions that should be addressed in the final rule or accompanying guidance, as well as recommendations on how EPA can develop a flexible regulatory framework that will allow states and affected Electric Generating Units (EGUs) to experiment with a variety of different approaches for reducing emissions through energy efficiency. These comments are organized around the following critical issues:

1. *Quantification and Verification of Emissions Reductions from Energy Efficiency*

    - What are the respective roles of EPA and the states in determining the scope of efficiency measures that may be included for credit in a §111(d) plan or compliance demonstration?
    - How should EPA and the states account for uncertainty with respect to quantification and verification of emissions reductions from emerging or voluntary measures?
    - What are the minimum requirements for quantifying and verifying emissions reductions, and how can EPA promote consistency in these practices?
    - How might EM&V protocols and other requirements differ for states adopting a mass-based target as opposed to a rate-based target?

2. *Enforceability of Energy Efficiency Measures*

    - How can states incorporate energy efficiency measures into their §111(d) implementation plans without imposing a federally enforceable obligation on the entities implementing those measures?
    - Will EPA allow states to include "voluntary" measures in their §111(d) plans, and if so, will there be any restrictions on the amount of credit allocated for such measures or additional EM&V requirements?

[15] *Id.* at 34,921.

II. Quantification and Verification of Emissions Reductions from Energy Efficiency Programs

1. Defining the Scope of Qualifying Energy Efficiency Measures and Programs: Respective Roles of EPA and the States

In the preamble to the proposed rule, EPA has solicited comment on: (i) whether the final rule or accompanying guidance should restrict the scope of energy efficiency measures that a state may include for credit in a §111(d) implementation plan or compliance demonstration; (ii) whether the agency should publish a list of presumptively qualifying demand-side energy efficiency projects for which quantification and verification of results are relatively straightforward; and (iii) what criteria the agency should use to evaluate energy efficiency measures and accompanying EM&V protocols when quantification and verification are more complicated, leading to greater uncertainty about the prospective and actual emissions reductions that can be traced to those measures.[16]

We submit the following recommendations for how EPA can promote flexibility in state implementation of §111(d) while also providing a clear pathway for state compliance with federal emission guidelines:

- EPA should avoid imposing any categorical restrictions on the types of energy efficiency measures that can be included in a state plan or compliance demonstration, provided that states submit a supporting EM&V plan that is rigorous, complete and consistent with EPA's guidance.
- EPA should publish a list of presumptively qualifying energy efficiency measures and EM&V protocols that states could include in their §111(d) plans.
- States should be allowed to propose alternative measures and EM&V protocols in their state plans, but these alternative approaches should be subject to a more detailed federal review process. EPA could also introduce additional safeguards to address the uncertainty associated with quantifying and verifying emissions reductions from emerging or voluntary measures.

Each of these recommendations is discussed in further detail below.

a. EPA Should Not Impose Categorical Restrictions on the Energy Efficiency Programs that May be Included in a §111(d) Plan or Compliance Demonstration

EPA has stated that "the agency does not intend to limit the types of… demand-side EE measures and programs that can be included in a state plan, provided that supporting EM&V is

[16] 79 Fed. Reg. 34,921 (June 19, 2014).

rigorous, complete, and consistent with the EPA's guidance."[17] However, EPA has also requested comment on whether the agency should take a different approach, and in particular, whether its guidance "should limit consideration to certain well-established programs" such as those described in Section V.A.4.2.1 of the State Plan Considerations Technical Support Document (TSD).[18] EPA notes that there is "a substantial base of experience" for the EM&V of many utility-driven efficiency programs. In contrast, EPA notes that some measures, "such as those that seek to alter consumer and building occupant behavior," may pose quantification challenges, while other measures, "such as state energy-efficient appliance standards and building codes, have not typically been subject to similar evaluation of energy savings results."[19]

EPA has identified the following examples of energy efficiency programs with "well established," "moderately well-established," and "less well-established" EM&V procedures.[20]

Well established	• Direct install incentive programs for building equipment (retrofits and new construction), including lighting; heating, ventilation, and air conditioning (HVAC); refrigeration; and motors • Consumer-direct and midstream rebates for ENERGY STAR-certified lighting, appliances (including residential refrigerator recycling), and HVAC equipment • Building commissioning and retro-commissioning • Incentives for certified energy-efficient residential new construction, such as ENERGY STAR Homes • Combined heat and power (CHP) installations/retrofits • Electrical distribution system and transmission system upgrades
Moderately well established	• Building energy codes (requirements and incentive programs for new construction, remodels) • State government building/operations programs (procurement, design standards, etc.) • Product-specific upstream market transformation programs directed at manufacturers • Industrial energy efficiency new construction or retrofits
Less well established	• General education programs for consumers, contractors, distributers, suppliers • Targeted training programs • Building labeling and disclosure programs • Targeted consumer behavior programs

[17] 79 Fed. Reg. 34921.
[18] 79 Fed. Reg. 34,921.
[19] *Id.*
[20] EPA, *Technical Support Document (TSD): State Plan Considerations* at 49 (2014).

To preserve flexibility for states as they implement the §111(d) guidelines, EPA should not impose categorical restrictions on the types of efficiency measures and accompanying EM&V protocols that states may include for credit in their §111(d) plans and subsequent compliance demonstrations. Some of the "less well established" measures identified by EPA could provide a cost-effective pathway for achieving significant emissions reductions from the power sector. For example, there are a variety of recent studies showing that behavioral approaches can result in significant, persistent, and measureable reductions in resource consumption.[21]

To fully capture the vast array of energy efficiency opportunities, we recommend that the final rule and any accompanying guidance should allow states to experiment with a variety of approaches, subject to EPA oversight. Through an ongoing process of implementation and review, state and federal agencies can improve the methodologies used to predict and verify emissions reductions from measures that are not included among the "well established" programs identified by EPA.

b. EPA Should Establish a List of Presumptively Qualifying Efficiency Programs and EM&V Protocols that States May Use as Models

EPA has asked whether its guidance should identify the types of efficiency measures and programs "for which evaluation of results is relatively straightforward and which are appropriate for inclusion in a state plan," and potentially allow for "streamlined review of EM&V protocols" for such measures, "provided that such protocols are applied in accordance with industry best

[21] We have attached several recent studies and articles on the utility and impacts of behavioral efficiency approaches to ensure that these reports are included in the final administrative record. These include: AK WOLFE ET AL., U.S. DEPT. OF ENERGY (DOE), BEHAVIORAL CHANGE AND BUILDING PERFORMANCE: STRATEGIES FOR SIGNIFICANT, PERSISTENT AND MEASURABLE INSTITUTIONAL CHANGE (2014) (documenting validated strategies that have been shown to encourage new use behaviors that can result in significant, persistent, and measureable reductions in resource consumption. From the peer-reviewed literature, the paper identifies relevant strategies for Federal facilities and commercial buildings that focus on the individual, groups of individuals (e.g., work groups), and institutions — their policies, requirements, and culture. The paper documents methods with evidence of success in changing use behaviors and enabling occupants to effectively interact with new technologies/designs); U.S. GENERAL SERVICE ADMINISTRATION (GSA), STRATEGIES TO ACHIEVE NET ZERO ENERGY: THE FORT CARSON ENERGY RESEARCH PROJECT (Sept. 2014) (This research tested the potential of the Army's Building Energy Monitor (BEM) program to motivate building occupants to employ energy-saving behaviors. Based on surveys and interviews with occupants, the research team designed a three-month intervention at five buildings to test a model of change that integrates policy ("Rules"), identification of people in specific roles as linchpins ("Roles"), and a variety of behavior change methods ("Tools"). Research findings included: (1) Occupants increased energy-saving behaviors as part of the intervention, leading to energy reductions of 2% or more in one building. Success rates varied across the five buildings. (2) Having an engaged BEM, with reinforcement from leadership, helped drive behavior change. (3) Occupant behavior can be influenced as part of a well-structured effort that includes considering the institutional context, targeting specific and relevant behaviors, providing social reinforcement, measuring results, and incorporating feedback); Ashlie Ossege, Michael Ozog & Patricia Thompson, *Comparison Reports: Analytical Insights and Utility Business Case (*2011); Trip Shealy & Elke U. Weber, *Opinion: We Can Build A Better Climate Solution Today*, THE DAILY CLIMATE (Nov. 12, 2014); Ruth Greenspan Bell & Elke U. Weber, *Opinion: We're Leaving Too Many Energy Dollars Behind Us, On the Ground*, THE DAILY CLIMATE (May 19, 2014).

practices."[22] This appears to be the best way to provide a roadmap for states to incorporate energy efficiency into their §111(d) plans without restricting the possible portfolio of efficiency measures that could qualify for credit.

Specifically, EPA could identify a list of presumptively qualifying energy efficiency measures, accompanied by model EM&V protocols. To identify such measures and accompanying EM&V protocols, EPA can build on guidance it has developed in the context of implementation plans prepared under §110, such as the agency's "Roadmap for Incorporating Energy Efficiency / Renewable Energy Policies and Programs into State and Tribal Implementation Plans" (EE/RE Roadmap).[23] It can also build on the broad experience of state and local governments implementing energy efficient programs,[24] and the evaluation guidance that has been prepared by both governmental and non-governmental sources.[25] These guides "provide context, planning guidance, and discussion of issues that determine the most appropriate evaluation objectives and best practices for different efficiency portfolios."[26]

This list would establish compliance pathways for states that have less experience with energy efficiency programs by providing a "menu" of acceptable approaches. Meanwhile, states would also be free to experiment with other approaches, so long as they can demonstrate that the accompanying EM&V plan is rigorous, complete and consistent with EPA guidelines. And the list could be updated over time to reflect new knowledge and improve consistency across states.

Many organizations and stakeholders support this approach. [27] It is also consistent with EPA's prior approach to crediting energy efficiency measures in the Title IV Acid Rain Program.

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[22] *Id.*

[23] EPA, ROADMAP FOR INCORPORATING ENERGY EFFICIENCY / RENEWABLE ENERGY POLICIES AND PROGRAMS INTO STATE AND TRIBAL IMPLEMENTATION PLANS (2012).

[24] *See, e.g.*, COMMENTS OF THE ATTORNEYS GENERAL OF NEW YORK, CALIFORNIA, MASSACHUSETTS, DELAWARE, NEW MEXICO, OREGON, WASHINGTON, CONNECTICUT, MAINE, MARYLAND, RHODE ISLAND, VERMONT, DISTRICT OF COLUMBIA ON THE DESIGN OF A PROGRAM TO REDUCE CARBON POLLUTION FROM EXISTING PLANTS 8-9 (2014) (discussing the variety of efficiency measures adopted by states, including efficiency standards for consumer products and commercial and industrial equipment, residential and commercial building codes, and incentives for consumers to adopt more efficient technologies, and investment in energy efficiency project); ACEEE, http://www.aceee.org/sector/state-policy (database containing information on a wide array of energy efficiency policies and programs implemented by states).

[25] *E.g.*, STATE AND LOCAL ENERGY EFFICIENCY ACTION NETWORK, ENERGY EFFICIENCY PROGRAM IMPACT EVALUATION GUIDE (2012); EFFICIENCY VALUATION ORGANIZATION, INTERNATIONAL PERFORMANCE MEASUREMENT AND VERIFICATION PROTOCOL (2012); ASHRAE GUIDELINE 14-2002 MEASUREMENT OF ENERGY AND DEMAND SAVINGS, DEPARTMENT OF ENERGY (DOE) SUPERIOR ENERGY PERFORMANCE MEASUREMENT AND VERIFICATION PROTOCOL FOR INDUSTRY (2012); DOE, Uniform Methods Project, http://energy.gov/eere/about-us/initiatives-and-projects/uniform-methods-project-determining-energy-efficiency-progr-0 (last visited Nov. 20, 2014).

[26] RGGI, REPORT ON EMISSION REDUCTION EFFORTS OF THE STATES PARTICIPATING IN THE REGIONAL GREENHOUSE GAS INITIATIVE AND RECOMMENDATIONS FOR GUIDELINES UNDER SECTION 111(D) OF THE CLEAN AIR ACT 14 (2014).

[27] *See, e.g.*, Honeywell, Ingersoll Rand, Johnson Controls, Schneider Electric, Siemens and United Technologies, *Crediting CO2 Emissions Reductions Achieved through End-User Energy Efficiency under Section 111(d): A Workable Framework is Needed to Tap the Potential of Private Sector Efficiency Investments* (report submitted to U.S. EPA by companies listed on December 2nd, 2013) at 2; Sara Hayes and Garrett Herndon, *Trailblazing Without*

In that program, EPA set aside a certain number of emissions allowances for the implementation of efficiency measures, provided a list of qualifying demand-side efficiency measures, but also permitted states to propose other measures in accordance with specific criteria.

c. EPA Should Establish Detailed Criteria for Federal Approval of Alternative Efficiency Measures and EM&V Protocols

States should be allowed to propose alternative measures and EM&V protocols in their state plans, but these alternative approaches should be subject to a more detailed federal review process. As part of this review process, EPA should specify detailed criteria that will be used to assess any measures or EM&V protocols that are not included on that list, to confirm that such measures will result in quantifiable, verifiable, non-duplicative, permanent, and enforceable emissions reductions. The criteria specified by EPA could include additional safeguards to address the uncertainty associated with quantifying and verifying emissions reductions from emerging or voluntary measures, such as programs to change building occupant behavior or programs that incentivize private sector investment in energy efficiency. For example, EPA could require a more detailed EM&V plan for those measures, impose a quantitative cap on the credit that may be acquired for such measures, or establish discount rates that should be applied to emission reduction estimates from such measures.

EPA can build upon its existing guidance for the inclusion of energy efficiency programs in state implementation plans (SIPs) submitted under §110 of the CAA. The most recent guidance document, the EE/RE Roadmap, specifies four "pathways" for incorporating energy efficiency and renewable energy policies and programs into SIPs prepared under §110:[28]

(1) Baseline emissions projections pathway: The state can include policies and programs that are "on the books" in a baseline projection so that they can incorporate the impact of those policies and programs on future emissions without rendering these measures federally enforceable.

(2) Control strategy pathway: If a state is contemplating adopting a new measure, it may include this as a "control strategy" in the SIP. These are the pollution reduction measures for which the state is seeking to obtain credit, and as such, they must be quantifiable, surplus, permanent and enforceable as both a legal and practical matter. They also become federally enforceable upon approval of the SIP.

(3) Emerging / voluntary measures pathway: A state may propose to receive some credit for voluntary measures (not enforceable against a particular source or implementing party) and emerging measures (for which it is difficult to quantify

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the Smog: Incorporating Energy Efficiency into Greenhouse Gas Limits for Existing Power Plants, ACEEE Report No. E13I (August 2013) at 13-14.

[28] EPA, ROADMAP FOR INCORPORATING ENERGY EFFICIENCY / RENEWABLE ENERGY POLICIES AND PROGRAMS INTO STATE AND TRIBAL IMPLEMENTATION PLANS (2012).

emission impacts) in its SIP. These measures can be "bundled" in the SIP submission. EPA has indicated that it will approve up to 6% of SIP credit for such measures, or more if a convincing case is made. But to receive credit, these measures must also be permanent, quantifiable, surplus and enforceable. This pathway provides some flexibility on the enforceability criterion for voluntary measures provided that the state, tribal or local agency ensures that the emission reductions credited in the SIP or TIP occur.

(4) Weight of Evidence (WOE) determination: This is a supplemental analysis to a attainment demonstration that may be used when an area is not predicted to attain an air quality standard based on air quality modeling. There is no limit on the amount of SIP credit that may be acquired through a WOE determination, but there are relatively narrow circumstances in which this mechanism can be used.

EPA could adopt similar guidelines for the inclusion of efficiency measures in §111(d) plans, allowing states to implement a portfolio of traditional control strategies, voluntary or emerging measures, and measures justifying a WOE determination. This guidance could be informed by previous experience with state implementation of energy efficiency measures under §110 of the CAA (see Table 1).

Table 1: Past Experience with Energy Efficiency Measures in SIPS

Location	Description of Control Measure(s)	Compliance Pathway
Washington, DC	In 2011, EPA approved a plan to reduce ozone pollution in the District of Columbia (DC) which included most reductions in NOx emissions from: (i) installation of efficient traffic lights, and (ii) building efficiency programs. To confirm the impacts of the programs, local governments agreed to review the program at least once every 3 years, and correct any deficiencies with 1 year (or 2 years if rulemaking was required).	Weight of the Evidence
Louisiana	In 2005, EPA approved a plan to attain the 8-hour ozone standard in Shreveport, LA through the installation of energy efficiency retrofits in 33 municipal buildings in the Shreveport area. This measure was incorporated into the SIP as a voluntary measure in an Early Action Compact (EAC) involving EPA, state and local regulators. The program was implemented through an Energy Savings Performance Contract (ESPC) with Johnson Controls to install the energy efficiency improvements in the municipal buildings. The City of Shreveport was responsible for implementation and any shortfall remedy, but the ESPC also provided a mechanism for holding Johnson Controls accountable for emissions reductions. Johnson Controls guaranteed an amount of energy savings, and the State relied on that guarantee. The state also relied on a third party, the National Renewable Energy Lab (NREL), to quantify the	Voluntary

	projected emissions reductions from the retrofits.	
Connecticut	Connecticut has received credit for avoided NOx emissions from a variety of different efficiency measures, utilizing the WOE approach. "Because the weight-of-evidence approach does not attribute specific quantities of emissions reductions to the efficiency measures included, Connecticut's DEP did not focus on quantification of emissions reductions."[29] However, Connecticut did provide a conservative estimate of emissions reductions in response to a proposed disapproval of the SIP.[30] Some of the specific EE measures included in the SIP were:[31] • Mandatory periodic assessment and reporting of energy efficiency and other clean energy resources available to meet capacity requirements by Connecticut' two major load serving entities—United Illuminating and Connecticut Light and Power • A requirement that energy capacity needs must first be met through all available energy efficiency and demand-side resources that are cost-effective, reliable and feasible • Mandatory assessment of how best to eliminate or stabilize growth in electric demand • Mandatory incorporation of the impact of current and projected environmental standards, including the ozone standard • All state building projects over $5 million must meet LEED Silver standards or better • The creation of a home heating oil conservation and efficiency program, and • The adoption of appliance efficiency standards	Weight of Evidence
Texas	In 2005, EPA approved an ozone SIP for the Dallas-Fort Worth area that included emissions reductions from energy efficiency measures as enforceable pollution control measures. To claim these credits, Texas relied upon Senate Bill 5 and Senate Bill 7, which mandated the statewide adoption of more energy efficient building codes and authorized local governments to inspect new buildings and enforce the codes.	Control Measure

[29] Sara Hayes & Rachel Young, *Energy Efficiency: The Slip Switch to a New Track Toward Compliance With Federal Air Regulations*, ACEEE Report No. E122 at 15 (Jan. 2012).

[30] July 32, 2009 Letter from Amey Marella, Acting Commission, Connecticut Department of Environmental Protection to Ira Leighton, Acting Regional Administrator, Environmental Protection Agency (July 31, 2009).

[31] Hayes & Young (2012) at 16 (citing Connecticut Department of Environmental Protection, Attachment D Revision to Connecticut's State Implementation Plan 8-Hour Ozone Attainment Demonstration: Technical Support Document (2008)).

d. EPA's guidance should promote consistency in the quantification and verification of impacts from energy efficiency measures, while allowing EM&V procedures to evolve as states gain additional experience with these procedures.

In the preamble to the proposed rule, EPA notes that after several decades of state and utility experience with demand-side energy efficiency programs, there is a "well-defined and generally accepted set of industry practices" for monitoring, evaluating and quantifying the impacts of such programs.[32] However, EPA also finds that "many states with energy efficiency programs use different input values and assumptions in applying these practices" and "[t]his can result in significant differences in claimed energy savings values for similar energy efficiency measures between states and utilities, even where the same measure type is installed under otherwise identical circumstances."[33] Thus, one key goal of EPA's guidance should be to facilitate some consistency or uniformity in the quantification of energy savings or emissions reductions from similar measures.[34]

At the same time, EPA's guidance should allow for the ongoing evolution of quantification and verification practices to reflect the experience gained by states while implementing the §111(d) rule. Hibbard & Okie (2014) have outlined one possible framework that EPA could use to support the evolution of EM&V practices and standards over time.[35] Specifically, the authors recommend that EPA should conduct a national EM&V coordination effort that will provide a forum for the transfer of information on different approaches and identification of best practices.[36] They also recommend that EPA could provide a clearinghouse for "deemed savings" values for specific efficiency measures.[37]

[32] 74 Fed. Reg. 34,920. For additional information on state EM&V approaches, see Paul J. Hibbard & Andrea Okie, Analysis Group, *Crediting Greenhouse Gas Emission Reductions from Energy Efficiency Investments* (March 2014) at 2 (describing state experience with EM&V of efficiency measures and identifying efforts to develop consensus on best practices and standardized protocols); AMERICAN COUNCIL FOR AN ENERGY EFFICIENT ECONOMY (ACEEE), 2013 STATE ENERGY EFFICIENCY SCORECARD (Nov. 2013); Mike Messenger et al., *Review of Evaluation, Measurement and Verification Approaches Used to Estimate the Load Impacts and Effectiveness of Energy Efficiency Programs* (Lawrence Berkeley National Laboratory, Apr. 2010); Martin Kushler et al., *A National Survey of State Policies and Practices for the Evaluation of Ratepayer-Funded Energy Efficiency Programs* (ACEEE, Feb. 2012).

[33] *Id.*

[34] Southwest Energy Efficiency Project (SWEEP), Northeast Energy Efficiency Partnerships (NEEP), Midwest Energy Efficiency Alliance (MEEA), Southeast Energy Efficiency Alliance (SEEA), South-Central Partnership for Energy Efficiency as a Resource (SPEER), *Incentivizing and Providing Appropriate Credit for Energy Efficiency Improvement in Forthcoming CO2 Emissions Standards for Existing Power Plants*, Policy Paper Issued by the Regional Energy Efficiency Organizations (November 2013) at 8 ("Transparent and consistent reporting of EM&V methods and results could also contribute to a clearer understanding of the contribution and cost-effectiveness of efficiency to reduce system-level CO2 emissions across the country").

[35] Hibbard & Okie (2014) at 22.

[36] *Id.*

[37] *Id.* at 9.

2. Clarifying EM&V Protocols and Other Requirements For States Adopting Rate- and Mass-Based Targets

EPA's proposed emission guidelines are expressed as an average CO2 emission rate (lbs / MWh) for affected EGUs within the state. The proposed rule allows states to either adopt the rate-based target or convert it to a mass-based performance target of equivalent stringency.

States that adopt rate-based targets will need to manually adjust their emissions rate calculations to account for energy savings or emissions reductions from qualifying energy efficiency measures. This is because efficiency gains reduce both emissions and generation at affected EGUs, and thus the value of such gains is not automatically reflected in an emissions rate calculation. To the contrary, increasing energy efficiency may actually increase the average emission rate if they reduce the operation of cleaner-than-average plants, such as natural gas-fired plants.[38] Thus, absent some mechanism for assigning value to energy savings from efficiency programs, a rate-based target may create a perverse incentive for states and affected EGUs to avoid undertaking energy efficiency measures.

In contrast, states that adopt a mass-based target will automatically receive credit for any energy efficiency measures that reduce emissions at affected EGUs during the compliance period. This is because "[a]nything a state, utility, local authority or other entity does to increase the efficiency of electricity use will reduce electricity consumption (relative to consumption without the energy efficiency initiative) and therefore reduce power plant operation and emissions (as long as fossil fuel-based plants operate on the margin at least part of the time)."[39] The only energy efficiency measures that would not contribute towards achievement of a mass-based target would be the measures that are included in the baseline projections of electricity generation used by the state to calculate the mass-based target. Thus, under the proposed rule, it may be possible for a state with a mass-based target to receive credit for efficiency measures that would not be creditable for a state that has adopted a rate-based target (e.g., voluntary conservation measures undertaken by individuals).

Several commentators have suggested that the EM&V requirements for states adopting mass-based targets should differ from the requirements for state adopting rate-based targets. For example, the Natural Resources Defense Council (NRDC) has proposed a framework for converting energy efficiency savings into CO2 credits that can requires rigorous EM&V, reporting and accounting of the efficiency savings to provide adequate certainty and precision needed to create the credits. [40] However, NRDC notes that an energy efficiency credit system would be unnecessary and may lead to double-counting of emissions reductions in states that adopt a mass-based target.[41]

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[38] SWEEP et al. (2013) at 9.
[39] *Id.* at 5.
[40] Lashof et al. (2013) at 16.
[41] Lashof et al. (2013) at 15.

The final rule or accompanying guidance should specify whether there will be different EM&V requirements for states depending on the type of target they adopt. Ideally, EPA's guidance should provide a clear compliance pathway for states adopting either a rate- or mass-based target—e.g., by describing state plan approaches, efficiency measures, and EM&V protocols that would be suitable for each approach. Some of the specific considerations that EPA should address when developing this guidance are detailed below.

EPA's guidance should also address whether any trading of efficiency credits will be permitted between states that adopt different types of targets. Absent sufficient oversight, trading between such states could result in double-counting of emissions reductions. To address this problem, EPA could prohibit trading of energy efficiency credits between states with mass- and rate-based targets unless state regulators can demonstrate that there are adequate safeguards in place to prevent double-counting of emissions reductions.

Finally, if EPA restricts the types of efficiency measures that are eligible for credit towards compliance with a rate-based target, this may cause a discrepancy in how energy efficiency is treated under the two different approaches. To reduce the potential discrepancy in how energy efficiency would be credited under the two approaches, EPA could: (1) promulgate detailed guidance for incorporating energy efficiency measures that would not qualify for credit under a rate-based approach into baseline emissions projections in the determination of a mass-based target; (2) allow for the revision of projections and mass-based targets to reflect new information during the implementation period; and/or (3) allow states to receive credit for the broadest possible range of energy efficiency measures, thus reducing the sorts of measures that might receive passive credit in a mass-based state but no credit in a rate-based state.

a. Rate-Based Approach to Quantifying and Crediting Emissions Reductions from Energy Efficiency Measures

EPA has suggested that efficiency gains could be assigned value in the context of a rate-based target through an administrative adjustment to the calculation of the average CO_2 emission rate of affected units, or a tradable credit scheme applied to an EGU's reported CO_2 emissions.[42] The proposed rule does not specify whether efficiency measures should be credited by adding the energy savings to the denominator to reflect avoided MWh or subtracting emissions reductions from the numerator. EPA could promote uniformity in this context by encouraging or requiring states to adopt a standard approach for assigning value to energy savings.

Several stakeholders have submitted detailed proposals for crediting energy efficiency improvements towards compliance with a rate-based target. For example, NRDC has proposed that CO2 credits could be generated from qualifying state and local regulator-approved energy efficiency programs or from improved building or appliance efficiency standards adopted at the

[42] 79 Fed. Reg. 34,919.

state level.[43] Under the NRDC proposal, CO2 emissions credits would be issued by the state air regulator after verification of energy savings. These credits would reflect "additional" energy savings as compared with a baseline period. The state air regulator could then auction or distribute the emissions credits to affected EGUs. Hibbard & Okie (2014) recommend a similar framework for crediting emissions reductions from energy efficiency measures under a rate-based approach.[44]

These proposals provide a pathway for crediting energy efficiency while ensuring that the emissions reductions from those measures are real and verifiable. However, they also reflect some of the drawbacks of the rate-based approach. For example, these proposals only allow credits for a limited set of energy efficiency efforts, not the full range of measures that may be undertaken by states, utilities, local authorities and other entities to increase energy efficiency. The proposals do not provide a clear pathway for crediting reductions from pricing policies, tax credits or education efforts that reduce electricity consumption.[45]

In addition, the proposals require rigorous EM&V procedures to confirm the actual emissions reductions that can be attributed to specific emission measures. These procedures may "increase the complexity and cost of efficiency as a compliance strategy relative to the mass-based emission reduction approach," and as a result, "states would likely narrow the range of efficiency programs and policies offered for efficiency credits."[46]

Finally, these proposals require an ex-post evaluation of emissions reductions generated from particular energy efficiency measures in order to determine the value of the emissions credit generated from those measures. This creates uncertainty as to the emissions reduction value of any efficiency project, which may deter investment in such projects.[47]

The proposed rule addresses each of these concerns by allowing states to adopt a mass-based target in lieu of a rate-based target. However, as noted above, the rule does not clearly specify whether states adopting rate- and mass-based targets will be subject different EM&V requirements. EPA should clarify the respective requirements for states with rate- and mass-based targets and provide examples of acceptable EM&V protocols in both contexts. This information will help states decide whether to convert their rate-based target to a mass-based target, and design an appropriate plan for EM&V of emissions reductions from energy efficiency measures.

[43] Lashof et al. (2013).
[44] Hibbard & Okie (2014).
[45] SWEEP et al. (2013) at 10.
[46] *Id.* at 11.
[47] Honeywell et al. (2013) at 20 ("While efficiency providers and end users have some level of control over the amount of energy saved in any particular time period, they do not have similar control over or foreknowledge of the dispatch of the grid. It will therefore be difficult to make investment decisions if the number of credits awarded for a project is unknown until after dispatch decisions are made. This will further reduce the incentive for energy efficiency.").

b. Mass-Based Approach to Quantifying and Crediting Emissions Reductions from Energy Efficiency Measures

EPA could require less rigorous EM&V procedures for energy efficiency measures in states adopting mass-based targets since emissions reductions from those measures are automatically reflected in the aggregate emissions from affected EGUs. This could reduce the overall costs of implementing these efficiency measures. As noted in a report from five regional energy efficiency organizations:

> The mass-based emissions reduction approach gives accurate and appropriate credit to all of these potential policies or programs in that each would directly reduce carbon dioxide emissions and help the state comply with its requirements. The amount of emissions reduction from each and every energy efficiency policy is uncertain… and does not need to be accurately known. If the policy or program is effective it will reduce emissions to some degree and there will be the right amount of credit; i.e., the amount of reduction actually occurring over time. Conversely if the policy or program is ineffective, there will be little or no emissions reductions. There is no need to evaluate the effectiveness of each policy and program in reducing CO2 emissions, monitor how the reductions change over time, and then provide "credit" for the estimated reductions. If declining mass-based emissions requirements are adopted to limit CO2 emissions from power plants, no additional emissions reduction credits for energy efficiency efforts are needed or appropriate. In fact, providing additional credits would be "double counting" of emissions reductions that are already captured through the direct reduction.[48]

However, states adopting mass-based targets would nonetheless need sufficient procedures in place to: (i) quantify the prospective emission reductions from any energy efficiency measures included as compliance mechanisms in a §111(d) plan; and (ii) determine which energy efficiency measures should be reflected in the baseline scenario for emissions growth that is used to calculate the mass-based target. EPA should provide clear guidance on the minimum requirements for these procedures. Some states may also want to conduct EM&V of efficiency measures in order to assess the efficacy of these programs and improve future projections. EPA could provide guidance, technical assistance or incentives to facilitate this review process.

In addition, states will need to adopt more detailed EM&V procedures if they are attempting to assign credit for emissions reductions from a specific energy efficiency measure to a specific entity under the mass-based approach. EPA should develop guidance which ensures that the allocation of such credits does not result in double-counting of emissions reductions.

States adopting mass-based targets will likely implement these targets through a cap-and-trade system for affected EGUs. Thus, EPA should build upon past experience with federal and state cap-and-trade programs to develop guidance on how states can integrate energy efficiency

[48] SWEEP et al. (2013) at 6.

measures into their §111(d) plans. Table 2 lists some relevant federal and state programs and their treatment of energy efficiency measures.

Table 2: Treatment of Energy Efficiency in Existing Cap and Trade Programs

Cap and Trade Program	Treatment of Energy Efficiency
Title VI Acid Rain Program	The cap and trade program established under Title VI included a "conservation and renewable Energy Reserve" (CRER) of 300,000 allowances that were set aside for utilities that implemented efficiency or renewable energy measures.[49] EPA provided a list of qualifying demand-side efficiency measures implemented in the residence or facility of a utility customer.[50] Measures not included in the list could qualify if they met specified criteria. In 2012, EPA reported that it had issued only 16% of the allowances set aside for energy efficiency. This can be explained by several factors: (i) the requirements for applying for, qualifying for, and verifying CRER allowances were relatively detailed; (ii) limits were placed on the utilities that were allowed to request CRER allowances; and (iii) the cost of allowances was much lower than forecast. As a result, facilities found it simpler and cheaper to purchase normal allowances rather than demonstrating that they were eligible for CRER allowances.[51]
Nitrous Oxide (NOx) SIP Call	The NOx SIP Call established multi-state cap and trade program to reduce NOx emissions from large fossil fuel-fired boilers, combustion turbines, and combined cycle systems.[52] In EPA's guidance on the Model Rule, the agency outlined a set-aside mechanism for states to award allowances for emissions reductions achieved through end-use efficiency measures.[53] EPA recommended list of technologies that could potentially qualify for set-aside allowances, but states retained discretion to make final determinations about qualifying actions.[54] . EPA guidance recommended that efficiency projects should receive set-aside allowances for at least three years and that verification of energy savings from projects should occur annually.[55]
Regional Greenhouse Gas Initiative (RGGI)	RGGI included detailed guidance on how EE projects could be used to earn offsets, but the offset market never became active due to the low cost of allowances. Instead, the participating states have used the funds generated from the sale of allowances to fund the implementation of complementary energy efficiency programs.

[49] 42 U.S.C. § 7651C.
[50] *See* 40 C.F.R. Part 73, Subpart F, Appendix A(1)
[51] Hayes & Young (2012) at 6, Dan York, *Energy Efficiency and Emissions Trading: Experience from the Clean Air Act Amendments of 1990 for Using Energy Efficiency to Meet Air Pollution Regulations* (ACEEE 2003).
[52] NOx SIP Call Model Rule (1998).
[53] EPA, Guidance on State Implementation Plan (SIP) Credits for Emission Reductions from Electric-Sector Energy Efficiency and Renewable Energy Measures (2004).
[54] EPA, Guidance on Establishing an Energy Efficiency and Renewable Energy (EE/RE) Set-Aside in the NOx Budget Trading Program (1999).
[55] Hayes & Young (2012) at 6.

III. Enforceability of Energy Efficiency Measures

1. EPA should provide additional guidance on how states can include energy efficiency measures in their plans without such measures becoming federally enforceable

Some states are concerned about including energy efficiency programs and measures in their §111(d) plans as compliance measures, due to the prospect of having these programs and measures become federally enforceable. EPA has proposed that a state could avoid this problem by adopting "complementary" RE and EE programs that would not be federally enforceable components of the plan, but could nonetheless be used to facilitate achievement of the required emission performance levels by affected EGUs. In the rule, EPA suggests that the inclusion of "complementary" and non-enforceable measures may be more appropriate for a state adopting a mass-based target, because there is no need for rigorous quantification, monitoring and verification protocols in this context.

States adopting "complementary" energy efficiency measures or programs would still need to demonstrate that the aggregate impact of other measures in their plans will be sufficient to achieve the emissions reductions required by EPA's emission guideline. One way to achieve this would be to allocate all of the responsibility for emissions reductions to affected EGUs and specify the means through which the EGUs can receive credit for emissions reductions from "complementary" state programs, in addition to their own investments in energy efficiency. This framework would most likely resemble a cap-and-trade system like the Regional Greenhouse Gas Initiative (RGGI) where states adopt a mass-based target and allocate emissions credits between units. As noted by RGGI state representatives, it may be easier for states to demonstrate compliance with §111(d) through such a system:

> [Cap and trade] provides a simple transparent, verifiable compliance system. It can be difficult to document and verify the emissions reductions attributable to programs that support renewable energy and energy efficiency. Under RGGI, the emissions are limited by the allowances that are distributed, providing certainty that the projected emission reductions will be achieved, including reductions attributable to energy efficiency and renewable energy.[56]

In addition, even though the required emissions reductions may be achieved on a statewide or regional basis, the point of compliance is with the source. Verification and enforcement are "simple and routine" in this context:

> [A]t the end of each compliance period, the amount of allowances in each source's compliance account must be adequate to cover that source's emissions. The measurement of CO2 emissions at sources covered by the cap is easily accomplished utilizing existing emissions monitoring equipment and protocols already in place at these source, and covered sources report CO2 emissions in accordance with 40 CFR Part 75. If a source

[56] RGGI, REPORT ON EMISSION REDUCTION EFFORTS OF THE STATES PARTICIPATING IN THE REGIONAL GREENHOUSE GAS INITIATIVE AND RECOMMENDATIONS FOR GUIDELINES UNDER SECTION 111(D) OF THE CLEAN AIR ACT 5 (2014).

does not have adequate allowances to cover its emissions, enforcement can be taken directly against the source.[57]

Thus, the adoption of a mass-based target accompanied by a cap-and-trade system may be the best approach for incorporating energy efficiency into §111(d) compliance without demonstrating that each energy efficiency measure meets the requirements specified above and subsequently rendering those measures federally enforceable through inclusion in a state plan.

Alternatively, states could avoid federal enforcement of a particular energy efficiency measure by include a panoply of compliance measures in their state plans, the aggregate impact of which exceeds the required emissions reductions. By starting with over-compliance, the state could later drop one or more measures from its plan without causing a compliance or enforcement problem.

Another approach that EPA should consider is to allow states to include "voluntary" measures in their §111(d) plans that are not enforceable against the implementing entity but can nonetheless be used to receive some credit towards compliance with the emissions guidelines. As noted in Part II, EPA has authorized states to receive some credit for voluntary measures in the SIPs prepared under §110 of the CAA. These measures can be "bundled" in the SIP submission. EPA has indicated that it will approve up to 6% of SIP credit for such measures, or more if a convincing case is made.[58] The state is ultimately responsible for ensuring that emissions reductions are achieved from voluntary measures.

If EPA does approve the inclusion of voluntary measures for credit in §111(d) plans, EPA can introduce additional mechanisms to ensure that emissions targets will be met in the event that the voluntary measure does not result in the anticipated emissions reductions. One option, highlighted in the SIP example above, would be to limit the amount of credit that states could earn for such measures. Another option would be to apply a discount rate to the projected emissions reductions from these measures to account for uncertainty.

EPA should also require state plans to include contingencies in the event that energy efficiency initiatives are less effective than predicted. Some commentators have recommended that state plans should include contingencies regardless of whether they depend on voluntary measures, given the uncertainties associated with the implementation of even well-established and mandatory energy efficiency programs.[59] In the proposed rule, states are required to have a process for biennial reporting and implementing corrective actions. Specifically, each state plan must include an automatic fall back plan (be "self-correcting") or identify corrective measures to employ if milestones are not met. EPA has issued similar requirements for program evaluation

[57] *Id*. at 8.
[58] *Id*. at 32.
[59] SWEEP et al. (2013) at 8.

procedures and reconciliation procedures in the event that control measures specified in SIPs do not deliver the anticipated results.[60]

With these options in mind, EPA should provide more guidance on exactly how states can include energy efficiency programs and measures in their §111(d) plans without making these federally enforceable. For example, EPA should address whether the approach of including "complementary" measures in a §111(d) plan would be appropriate for a state adopting a rate-based target, or if this approach is only available to states adopting a mass-based target. EPA should also clarify the requirements for plan revision and enforcement in the event that a state submits an initial plan demonstrating over-compliance (e.g., under what conditions does the state need to submit a revised plan). Finally, EPA should consider allowing states to include "voluntary" energy efficiency measures for credit in their §111(d) plans.

[60] EPA, Improving Air Quality with Economic Incentive Programs, EPA-452/R-01-001 (2001); EPA, Guidance on SIP Credits for Emission Reductions from Energy Efficiency and Renewable Energy Measures (2004), EPA, Incorporating Voluntary and Emerging Measures (2004); EPA, Incorporating Bundled Measures in a SIP (2005).