Roadmap for Incorporating EE/RE Policies and Programs into SIPs/TIPs - Frequently Asked Questions

August 2013

EPA released the "Roadmap[1] for Incorporating Energy Efficiency and Renewable Energy Policies and Programs in SIPs/TIPs" in July 2012. The Roadmap's goal is to help states[2] estimate and account for emission reductions from EE and RE policies and programs in their Clean Air Act plans to improve air quality. As states begin to implement the Roadmap, their questions will be documented and distributed via these Frequently Asked Questions (FAQ).

1. **In general, how can states take credit for energy efficiency/renewable energy (EE/RE) policies and programs in State or Tribal Implementation Plans (SIPs)/(TIPs)[3]?**

   States need to analyze the impacts of the EE/RE policies and programs on electric generating unit (EGU[4]) emissions. If the analysis shows that EGU emissions are expected to decrease as a result of EE/RE policies and programs, then states may wish to incorporate the EE/RE policies and programs in a SIP through one of the following pathways:
   - Baseline emissions projection pathway;
   - Control strategy pathway;
   - Emerging/voluntary measures pathway; and
   - Weight of evidence determination pathway.

   States need to make sure that the policy and/or program is carried out as described in the SIP and the resulting emissions reductions are expected to benefit air quality in the nonattainment area.

   Unlike traditional control measures, which apply directly to an air pollution source and require the source to reduce its air emissions, SIP measures that involve EE/RE policies and programs instead reduce emissions from EGUs in general by lowering demand on the electric power grid and/or increasing the availability of electricity generated from lower-emitting non-EGU sources, such as renewable generation.

2. **In what SIPs can states take credit for EE/RE policies and programs?**

   Traditionally the EPA has allowed states to take credit for EE/RE policies and programs in SIPs associated with sections 110, 172, and 175A of the Clean Air Act. Several types of SIP requirements are eligible for credit:
   - Attainment demonstration SIPs for nonattainment areas;
   - Reasonable further progress (RFP) plans;

[1] "Roadmap for Incorporating Energy Efficiency and Renewable Energy Policies and Programs in SIPs/TIPs," http://www.epa.gov/airquality/eere/

[2] The use of the term "state" in these FAQs could also refer to Tribes and/or air quality management agencies within a state or states; it is used to indicate the entity that develops the SIP/TIP.

[3] The use of "SIPs" in these FAQs encompasses both SIPs and TIPs. Traditionally the EPA has applied EE/RE credit in SIPs associated with sections 110, 172, and 175A of the Clean Air Act.

[4] An EGU is the entity that supplies electricity to the electric system and can rely on a variety of fuels.

- Contingency measures for attainment plans;
- SIP measure substitution; and
- Maintenance plans.

Attainment demonstration SIPs for nonattainment areas: EE/RE policies and programs can help states meet attainment and maintenance SIP requirements for areas that are designated nonattainment, or have attained with an approved maintenance SIP, even when the emissions reductions resulting from EE/RE are projected to occur outside the boundaries of nonattainment areas. The states should demonstrate that resulting emissions reductions are expected to benefit air quality in the nonattainment area of interest.

RFP plans: EE/RE policies or programs can help meet RFP requirements, but there are geographic constraints. The U.S. Environmental Protection Agency (EPA) believes the Clean Air Act requires emissions reductions that apply to the RFP requirement to come from sources of emissions located within the boundaries of nonattainment areas.[5] Therefore, requests for credit need to include an analysis documenting that emissions will be reduced within the nonattainment area and need to satisfy any other RFP-specific requirements, as explained in the applicable EPA implementation rule for the pollutant in question.

As described in the "Roadmap for Incorporating Energy Efficiency/Renewable Energy Policies and Programs in SIPs/TIPs" ("Roadmap"), EPA has developed approaches to assist states with determining the location of emission reductions from EE/RE measures. States may use these methods, or other tools, to demonstrate that reductions will occur in the nonattainment area.

Contingency measures for attainment and RFP[6] plans: EE/RE policies and programs that meet the applicable requirements of section 172(c)(9) of the Clean Air Act (CAA) can also be used as contingency measures in cases where areas fail to attain, including projected emissions reductions from EGUs outside the nonattainment area.

SIP measure substitution: The CAA provides states with the option to substitute measures in a SIP with replacement measures, including replacing a non-EE/RE measure with an EE/RE measure; however, a substitution that seeks to replace an existing measure with an EE/RE measure should include an analysis comparing the magnitude and location of the emission reductions from the substituted measure to the existing measure. (For EPA to be able to approve a requested substitution, the requirements of CAA section 110(l) must be satisfied. Section 110(l) provides that a SIP revision, such as one seeking to substitute one control measure for another, cannot be approved if it will interfere with attainment, reasonable further progress, or any other applicable requirement of the CAA; therefore, the analysis is required.)

[5] "Reasonable Further Progress Requirements for the 1997 8-Hour Ozone National Ambient Air Quality Standard," 75 Federal Register 80420, December 22, 2010.

[6] As indicated above, for EE/RE policies and programs to count as contingency measures for RFP, their emission reductions must be located within the boundary of the nonattainment area.

Maintenance plans: Each state that submits a request for redesignation to attainment must submit a maintenance plan that provides for the maintenance of the National Ambient Air Quality Standards (NAAQS) for at least 10 years after the redesignation. The plan must contain measures necessary to ensure such maintenance, including contingency measures to promptly correct any violation of the NAAQS. EE/RE policies and programs that serve as measures to ensure maintenance and contingency measures are eligible for SIP credit, provided appropriate SIP requirements are addressed (e.g., permanent, enforceable, quantifiable, surplus).

3. What if a state does not meet its attainment SIP requirements? What does "federally enforceable" mean for EE/RE policies and programs incorporated in a SIP?

If a state does not carry out or falls short of carrying out a program, including an EE/RE policy or program, that is in the SIP, then consequences could range from the state revising its SIP voluntarily to EPA issuing a SIP call (CAA section 110) to address non-implementation or deficiencies.

To incorporate EE/RE policies and programs in a SIP, there are four pathways available to state, tribal and local agencies. The four pathways, baseline emissions projection, control strategy, emerging/voluntary measures, and weight of evidence, are described in EPA's Roadmap. One of these pathways -- the control strategy pathway -- carries federal enforceability.

Under the control strategy pathway, if a state submits a SIP that incorporates EE/RE programs, the programs also become federally enforceable. "Federally enforceable" means that EPA has the authority under the CAA to apply CAA-mandated penalties against the party responsible for noncompliance, and state-adopted EE/RE programs that are federally enforceable are on par with more traditional air pollution control programs for which states have sought SIP credit in the past. Depending on the EE/RE policy incorporated in the SIP as statute, regulation or commission order, the responsible party would not be the agency (typically the PUC) administering the policy. Instead, the responsible party may be the load serving entity delivering power to customers and who has been required to implement the EE/RE programs through, for example, a permit or the rate setting process.

Under the baseline emissions projection pathway, the EE/RE policies and programs must be "on the books[7]" to be included, but are not federally enforceable. However, if the SIP reductions are not realized by the timeframe outlined in the SIP, then the state is responsible for making up the emission reductions.

Under the emerging/voluntary measures pathway, an emerging measure is one that does not have as high a level of certainty as a traditional measure, but which is enforceable against the source, while a voluntary measure is not enforceable against an

[7] "On-the-books" means that the EE/RE policy or program must already be adopted in federal or state regulation, public utility commission (PUC) order, and/or local law.

individual source or implementing party. However, if the SIP reductions are not realized by the timeframe outlined in the SIP, then the state is responsible for making up the emission reductions.

Under the weight of evidence pathway, the measures included in the weight of evidence demonstration are not federally enforceable. Although no SIP credit is available, the state does benefit from any realized emissions reductions.

4. **Can statewide emission reductions as a result of statewide EE programs be credited to the SIP for a single non-attainment county or group of counties?**
Statewide emissions reductions as a result of statewide EE/RE policies and programs can receive credit in attainment demonstration SIPs and reasonable further progress (RFP) SIPs, but with the important geographic distinctions described in question #2.

An analysis should be done by the state to quantify the emission reduction benefits of state-wide EE policies and programs and assess whether the emission reductions will impact air quality in a nonattainment area or group of counties. There are several different methods for quantifying the emission benefits of state EE policies and programs and Appendix I of the Roadmap outlines four quantification approaches that can be used.

The first step in the analysis is to understand the available quantification methods and to select one that is most appropriate for the circumstances of the EE/RE policies and programs to be analyzed. Four emission quantification approaches provide estimates of EE/RE emission impacts:

1) eGRID emission rate approach (only assesses regional average of emissions);
2) Capacity factor approach;
3) Historical hourly emissions rate approach; and
4) Energy modeling approach.

The second step is calculating the amount of energy savings that EE/RE policies and programs would achieve in a base year and in a future year of interest (i.e., the future attainment year.) Selections for base year and future year will depend on the SIP (e.g., attainment demonstration SIP, RFP SIP), as well as the classification of the area (e.g. moderate, severe.)

- For EE, the information is normally needed in the form of annual megawatt hours (MWhs) saved by the policies and/or programs in the state. State PUCs and energy offices can usually provide this impact data, as well as details on how efficiency "evaluation, measurement, and verification" (EM&V) is conducted in the state. Knowing that EM&V is rigorous, credible, and transparent can help ensure that the EE "inputs" to avoided emissions calculations are acceptable to state air agencies.

- For RE, states need to collect the expected annual MWhs of the renewable energy generation over the period of interest.

The third step is translating the energy savings into emission impacts. The capacity factor approach, historical hourly emissions rate approach or energy modeling approach can be used for this purpose. States can then assess whether the estimated emission reductions will benefit the air quality in a nonattainment area or group of counties.

Statewide EE programs potentially can be credited in an attainment demonstration SIP, even if the emissions reductions from EE/RE are projected to occur *outside the nonattainment area* boundaries. However, statewide EE programs can be credited in an RFP SIP only for those emissions that are reduced from sources located *within the nonattainment area* (provided they meeting other RFP-specific requirements as well.)

5. Can the emission benefits of multiple, small EE/RE programs across a state be counted? If so, what is the best way?

Multiple measures with smaller air emissions benefits across a state, including building efficiency projects**,** can be bundled together. (See EPA's 2005 guidance[8] that encourages states to bundle multiple measures with smaller air emissions benefits for inclusion in a SIP.) Bundling together relatively small-scale or local SIP measures can be beneficial if individually these measures would be difficult or resource-intensive to quantify or verify in the SIP.

States should aggregate the benefits of the multiple projects. The emissions reductions for each measure in the bundle would be quantified and the total reductions would be summed together. By bundling multiple measures, however small, states can generate meaningful emission reductions. While some measures in a bundle might under-perform, others might over-perform, and by considering the total effect of the measures, there is greater likelihood that the desired air quality results will in fact be achieved. For SIP purposes, it is the performance of the entire bundle that is considered, not the effectiveness of any individual measure.

The EPA has learned from past experience that it is difficult for states to quantify the emission benefits of individual programs, such as building energy efficiency retrofit projects, which individually amount to a small emission reduction benefit. When done properly, bundling multiple energy-efficiency programs – as described in EPA's bundled measures guidance – can yield supportable emissions reduction estimates in a more efficient manner.

[8] "Guidance on Incorporating Bundled Measures in a State Implementation Plan," http://www.epa.gov/ttn/oarpg/t1/memoranda/10885guideibminsip.pdf, August 2005.

6. **One common energy efficiency program is to improve building efficiency by improving building operations. How is this factored into SIP protocols, especially in the context of the "enforceable, permanent and quantifiable" criteria?**

   EPA recommends that state air agencies work with their counterparts in Public Utility Commissions (PUCs) and State Energy Offices (SEOs) to identify the expected energy impacts over the SIP timeframe for the specific EE policies or programs of interest. State PUCs or SEOs normally conduct the evaluation, measurement, and verification (EM&V) which can provide the energy savings impacts.

   To evaluate EE in a SIP, state air agencies should address the aggregate impact(s) of overall EE programs and evaluate the individual impact of specific efficiency projects on particular buildings.

   EPA does not recommend that states incorporate EE from a single building into a SIP. Instead, states can consider incorporating statewide policies that encompass EE programs covering large numbers of building and facility EE upgrades (such as lighting and air conditioning upgrades), since the EM&V supporting statewide policies typically accounts for building-level operational differences across large portfolios of facilities.

   Again, state PUCs or SEOs can provide information on state-specific EM&V procedures, describe the specific methods used to evaluate building-level energy efficiency impacts, and offer suggestions for how state air agencies should interpret and apply the data. While it is not necessary for state air agencies to become experts in EM&V, it is useful to understand the sources of EE data, along with roles played by leading organizations, reporting schedules, overall level of rigor, and other basic information that will help create a successful linkage between air and energy policy. More information on EE EM&V can be found in the "Model EE Program Impact Evaluation Guide" at the National Action Plan for Energy Efficiency[9].

7. **My state incorporated state energy building codes into a SIP, but now these codes have improved. How should I handle this situation?**

   In general, states that are interested in accounting for building energy code improvements in their SIPs should make sure that the code for which they are seeking SIP credit represents an improvement over the code that is reflected in the SIP's baseline emissions inventory. In many cases for the EGU sector, the code that was modeled in the baseline emissions inventory can be found in the most recent Energy Information Administration's (EIA's) Annual Energy Outlook (AEO) (http://www.eia.gov/forecasts/aeo/).

   Also, states seeking SIP credit should investigate whether adequate mechanisms are in place to ensure that in-state builders comply with the building code. (More information

[9] National Action Plan for Energy Efficiency, http://www.epa.gov/cleanenergy/energy-programs/suca/resources.html

on code compliance is available at: http://www.energycodes.gov/compliance.) Because codes apply to new construction, states seeking SIP credit should have a forecast of new building construction and be able to document the incremental savings from the new code over the baseline code. Municipalities with codes more stringent than the state's base-level code may likewise be able to claim SIP credit, but should first determine whether EE savings from a geographically limited code upgrade achieves a level of impact worth pursuing.

Building energy codes save energy by requiring minimum efficiency levels for new homes and commercial buildings, and for major renovations. Codes are typically developed at the national level, adopted by states, and then enforced by local governments (though individual municipalities can voluntarily adopt codes that are more stringent than state requirements). Information about what code is in place in a given state is available through organizations such as the Building Codes Assistance Project.

8. My state incorporated an EE policy or program into a SIP, but the energy efficiency technology has changed.

Improvements in equipment technology affected by EE policies are normally accounted for by existing state evaluation, measurement & verification (EM&V) procedures and should not prompt the need for further state SIP-related action. Nonetheless, if EE technology changes do occur for an EE policy or program that is incorporated in the SIP, the state should consult its EPA Regional Office to determine whether any SIP-related action would be needed in response. It should also be noted that if the conditions expected to create the air quality improvement have changed in a way that negatively affects either the expected amount of emissions reduction or the ability or manner of enforcement, the change needs to be reflected in a SIP revision.

State efficiency programs and policies are designed to encourage the installation of energy-efficient technology in homes, buildings, and facilities. State Public Utility Commissions (PUCs) rely upon evaluation, measurement, and verification (EM&V) procedures conducted by independent third-parties to ensure that these technology improvements occur and that they perform as intended over time.

In contrast to some traditional emissions programs that require technology upgrades at a limited number of facilities or locations, energy efficiency programs and policies support the installation of thousands of pieces of equipment at hundreds of locations throughout a state (depending on the size and scale of the EE program). For this reason, it is not practical for PUCs or SEOs to directly verify the proper functioning of every piece of equipment installed under an efficiency program. Instead, efficiency evaluators have developed "sampling" protocols and other industry-standard techniques to provide PUCs with impact estimates that meet their requirements for precision and accuracy. PUCs then typically count the resulting equipment- or technology-level savings towards any applicable statewide policy targets (e.g., energy efficiency resource standards).

9. **If a SIP includes EE/RE policies and programs that reduce demand for electric power (and thus emissions), what would prevent an EGU from generating the original amount of power and selling the extra on the grid? If this does occur, what are the impacts?**

   The power grid is dynamic, with real-time balancing of supply and demand. The supply from fossil-fired EGUs can be reduced by energy-efficiency policies that lower customer-side electricity demand, and, likewise, the supply from fossil-fired EGUs can be reduced or "avoided" if the electricity is instead produced from renewable energy sources. Because we cannot precisely determine how a single EGU may be impacted by an EE/RE program or policy, there are surrogate approaches (such as the ones listed in Appendix I of the Roadmap) that can *estimate* which facilities, based on their cost and their dispatch order within a regional electricity market, would most likely be impacted by EE/RE.

   EPA's Roadmap guidance recommends states ensure that the EE/RE policy or program is carried out as described in the SIP, and, as mentioned previously, EPA guidance treats EE/RE policies and programs in a SIP differently than traditional emissions limitations on point sources. EPA does expect states to ensure that the EE/RE policies and programs incorporated in SIPs are fully implemented and yield the expected emissions reductions. For EE, states can use the EM&V procedures to ensure that technology improvements occur and perform as intended. For RE, states can verify renewable energy credits (RECs) or metered RE data for verification that the renewable energy generation was achieved. More information on energy efficiency accounting is available in the answers to subsequent questions.

   If the expected emissions reductions are not met, the state is responsible for the making up any emissions reductions shortfall. Like any SIP measure that underperforms, there is a statutory mechanism for correction. A state should consider a regulatory mechanism (i.e. a permit limitation on the affected EGUs) that requires a greater degree of certainty, or a contingency measure that could be implemented to make up the difference, or adjustments to the expected emissions reductions to be more conservative.

10. **Will EPA accept the use of my jurisdiction's energy model or emissions estimation tool for SIP purposes?**

    EPA understands that the viability of EE/RE as a SIP strategy requires the availability of accessible and credible analytic models and tools, including ones developed by EPA and state, tribal and local agencies. EPA is working to provide guidelines for states in selecting appropriate models and tools.

    The Roadmap (Appendix I) describes four emissions quantification approaches, plus example tools and/or models for each approach.

    One of the emissions quantification approaches is the historical hourly emissions rate approach. For this approach, EPA has developed the AVoided Emissions geneRation

Tool (AVERT) to estimate the emissions impacts of EE and RE policies and programs and will make this tool available to states.

Another of the emissions quantification approaches is the energy modeling approach. One energy model currently available is MARKet Allocation for the Northeast (NE-MARKAL), a least-cost energy optimization model that has been customized by the Northeast States for Coordinated Air Use Management (NESCAUM) in partnership with the EPA for use by 11 states in the northeastern U.S. The NE-MARKAL model generates outputs that can be used as inputs for other models, including air quality models.

As in any SIP exercise, the state should coordinate closely with its EPA Regional Office. The inputs to a chosen tool or model, and the policy scenarios modeled, can drive the results that feed other models, and it is imperative that the Regional Office also understand the rationale behind any decisions made in the model's assumptions and inputs.

11. What resources are available to help states forecast the energy impacts of EE/RE policies over the SIP compliance timeframe?

The EPA has developed and demonstrated an approach to account for the projected energy and emission impacts of EE/RE state-level policies that are not accounted for in Energy Information Administration's (EIA's) Annual Energy Outlook (AEO). This approach provides an opportunity for states to account for these impacts as they prepare SIPs to meet the NAAQS and for multi-pollutant strategies.

To estimate the projected energy impacts, EPA analyzed only EE/RE policies that are adopted in state law and codified in rule or order, but that are not reflected in the electricity demand projections of EIA's AEO 2010. Estimated impacts are provided for:

a. Energy Efficiency policies that reduce electricity demand in key end-use sectors through the use of more energy efficient equipment, technologies and practices.
b. Renewable Portfolio Standard policies that increase their requirements beyond what is assumed in AEO 2010.

The EPA then used these electric sector impacts to forecast regional emissions impacts for NO_x, sulfur dioxide, carbon dioxide in 2020. For more information, see http://www.epa.gov/statelocalclimate/state/statepolicies.html.

12. What is the basic approach to energy efficiency accounting for SIPs?

"Energy efficiency accounting" for SIPs refers to the retrospective evaluation, measurement, and verification (EM&V) of existing EE policies and programs, and to forecasts of their expected energy impacts. EM&V is the set of approaches – e.g., direct equipment metering, statistical analysis, and deemed savings values – that utility regulators and energy officials use to estimate their state's prior-year efficiency savings.

Over a SIP compliance period, air regulators can leverage these data to verify that EE policies/programs are achieving intended energy savings, and to inform emissions quantification. In contrast, forecasts of "on the books" EE program impacts are used to assess the magnitude of efficiency savings and associated emissions reductions expected over the forward-looking SIP compliance period. In this way, EM&V and EE forecasts can help air regulators confirm that EE policy/program impacts are accounted for in a manner that is credible, rigorous, and transparent.

13. Where can I find information to support energy efficiency accounting for SIPs?

Regardless of the Roadmap pathway selected, some level of EE accounting is necessary to support a SIP submittal. The good news is that this information is often available from Public Utility Commissions (PUCs) and State Energy Offices (SEOs). In addition, several national and regional organizations provide data, technical assistance, and guidance documents to support EE accounting. Examples include DOE's SEE Action EM&V Working Group (http://www1.eere.energy.gov/seeaction/evaluation.html) and the Northeast Energy Efficiency Partnership (NEEP) EM&V Forum (http://neep.org/emv-forum/). Both organizations have developed measurement standards to enhance the cross-state consistency of EM&V. NEEP recently finalized an EE reporting database for participating New England and Mid-Atlantic states (http://www.neep-reed.org/).

On the EE forecasting side, there are also multiple sources of state-by-state impact data. For example, EPA developed – and is currently updating – estimates of EE impacts from on-the-books policies (epa.gov/statelocalclimate/state/statepolicies.html), which states can leverage in their SIP/TIP submissions. The Lawrence Berkeley National Laboratory (LBNL) has released state savings estimates (eetd.lbl.gov/ea/emp/reports/40026.pdf) that air regulators may wish to examine. In addition, several Independent System Operators (ISOs) and other regional electric-reliability organizations have likewise developed state-level EE forecasts.

14. With whom should I work with to support energy efficiency accounting for SIPs?

Regardless of a state's experience with energy-efficiency programs and associated measurement techniques, EPA encourages state air regulators to work closely with PUCs, SEOs, and other energy experts to identify EE data sources and accounting issues.

States with active EE policies and programs in place may find that existing EE-accounting frameworks provide state air regulators with the desired level of rigor, credibility, and transparency for measuring EE savings.

On the other hand, states with less experience may wish to take advantage of the multiple EE accounting resources described previously. In all cases, however, state air regulators are encouraged to work with their energy-agency peers to document EE data sources and accounting approaches.