

MEMORANDUM

To: Energy Advisory Committee (EAC)
State Air Agency Renewable Energy and Energy Efficiency Coordinators

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Date: June 4, 2008

Subject: Energy Efficiency and Renewable Energy (EERE) Evaluation Protocol
Design Concept

Protocol Recommendation

Based on a review of existing protocols used throughout the United States and internationally to document the energy impacts from energy efficiency and renewable energy projects, we recommend the use of the EPA National Action Plan for Energy Efficiency Impact Evaluation Guide and the International Performance Measurement and Verification Protocol (IPMVP) as the basis of the metropolitan Washington EERE protocol.

Background

Energy Efficiency and Renewable Energy projects in the metropolitan Washington region have the capacity to reduce demand for electricity, create new sources of clean energy, and reduce overall emissions of criteria pollutant (precursors to ozone and fine particles) as well as greenhouse gases. The project team is developing a protocol that will assist state and local governments to take credit for these actions in SIPs and climate programs.

On April 8, staff recommended that the following EERE programs be considered for M&V protocol development:

- Existing-Building Retrofits for Efficiency Improvement
 - Green Lights (LED Lighting, CFL)
 - High Efficiency Heating
 - High Efficiency Air Conditioning
 - Occupancy Light Switches
 - Programmable Thermostats
 - Efficient Windows and Doors
 - Upgrade Insulation and Weatherization
- Appliance Efficiency Standards/Purchase of Energy Star Appliances and Equipment
- Renewable Portfolio Standards/Purchase of Renewable Energy

Based on a review of existing protocols for evaluating the energy and environmental benefits of EERE projects, we recommend the following protocol design concept.

Protocol Applicability

We propose that this protocol be used to support inclusion of state and local EERE projects in air quality SIPs, and to document the benefits of measures adopted to meet regional greenhouse gas emission reduction goals. It is not intended to be used by utilities or the state to satisfy PUC regulatory requirements associated with implementing EERE or demand response programs using public benefits charges, or for compliance with PJM requirements for participating in RPM or Future Capacity Markets, though could serve as a starting point for such needs.

Summary of Recommended Protocol Design Concept

- States and localities undertake projects, maintain records, make calculations, and report as specified herein.
- Use preferred impact evaluation methods, including gross and net energy calculations, establishing baseline and making adjustments. Use the EPA impact guide as acceptable approach.
- Savings estimates to be based on utility bills, with adjustments as specified. Use deemed savings and engineering analysis where possible to lower costs.
- Discount savings estimates if needed to account for uncertainty. Obtain state and EPA input on acceptable level of discount.
- As a component of the impact evaluation, use the International Performance Measures and Verification Protocol (IPMVP) as the preferred M&V method.
- Self-certify equipment was installed and operated as claimed in the impact evaluation. If project is eligible for reporting carbon reductions to the Climate Registry, use the Climate Registry General Reporting and Verification Protocols.
- Report to state air agencies annually through COG. State air agencies to report to EPA Region III every 3 years as a program evaluation report.

Impact Evaluation Methods

We propose that the impact evaluation method for the protocol be based on the recent EPA Impact Evaluation Guide. EPA provides methods for Gross and Net Energy Calculations and establishing Baseline. EPA also recommends appropriate M&V methods.

Where needed, the basic approach outlined in the EPA Impact Evaluation Guide could be supplemented with the IPMVP and state protocols. The NJ protocol provides good source-by-source algorithms. The California Protocol contains an acceptable approach for evaluating market transformation programs.

Baseline, Gross Energy, Adjustments, Net Energy Calculations

The EPA guide provides methods to document baseline and gross energy consumption, as well as adjustments and final net energy calculations.

Measurement and Verification (M&V) Methods

The IPMVP is recommended as the core M&V component of the protocol. The IPMVP is a flexible M&V guideline that offers varying levels of rigor and cost. It is the accepted industry standard used by energy service companies (ESCOs) for performance contracting projects, largely for government EE projects (e.g., municipal buildings, schools, etc.), and is referenced in EPA guidance documents as a protocol that can be, and has been, used by states to support their EE or renewable energy set-aside programs under the NO_x SIP Call (State Implementation Plan) program. While IPMVP was initially developed to support financial contract terms between ESCOs and their clients, it is increasingly being used or recommended in a number of states as the M&V guideline for EE savings to support system planning needs, portfolio standards and carbon reduction programs. (Northeast Energy Efficiency Partnership).

The United States Department of Energy's Federal Energy Management Program (FEMP) uses the IPMVP for energy retrofits in federal buildings, while the EPA references it in guidance related to the NO_x State Implementation Plan (SIP) Call program. At the state level, the IPMVP has also been adopted for use by California, Florida, Iowa, Texas, New York, and is recommended in Illinois.

The IPMVP allows its users to select from four measurement and verification approaches (Option A, B, C and D) in order to best match their specific project costs, savings requirements and particular EE measures or technologies.

Stipulated or Deemed Savings

Deemed savings estimates can and should be used in certain situations. Deemed savings estimates will be developed for the region using available information from the PJM, California, and NJ protocols, as applicable.

Metering Standards and Precision

The EPA Impact Evaluation Guide contains recommendations on appropriate sources and approaches to address metering standards and precision.

Discounting Savings

The EPA Impact Evaluation Guide contains recommendations on appropriate approaches to discounting savings estimates to account for uncertainty.

Third Party Verification

In most instances, self certification is sufficient. If reporting carbon reductions, follow the Climate Registry Reporting and Verification Protocols. For SIPs and COG regional climate programs, COG and the state air agencies can provide 3rd party verification, which is already occurring on an annual basis for all of the SIP voluntary bundle programs. Every 3 years an evaluation report is prepared and submitted to EPA.

Recordkeeping and Reporting

Record: date of installation, type of equipment, installation location, baseline energy use, post-installation energy use, changes in building occupancy or other factors affecting energy use.

Report: Project, date, baseline energy, scenario energy, gross energy savings, adjustments, net energy savings, anticipated measure life, M&V method, third party verifier (if applicable), project point of contact

Estimating Environmental Benefits

Under separate task, the project team will develop values/calculations to link energy reductions tracked by localities and COG with the associated environmental benefits.

In recent years, substantial progress has been made in the development of methodologies to quantify emission reduction benefits from energy efficiency and renewable energy (EERE) measures. Several methods have been used to calculate the benefits resulting from the displacement of fossil fuel generation in the dispatch order. The methodology outlined below was developed by Resource Systems Group, Inc. (RSG) in cooperation with Environmental Resources Trust (ERT).

The State of Maryland relied on an initial version of the RSG/ERT methodology in its regional wind purchase submission as part of the bundle of voluntary measures submitted to EPA in its 1-hour ozone SIP. This SIP control measure was subsequently cited with approval by the EPA in its August 2004 “Guidance on State Implementation Plan (SIP) Credits for Emission Reductions from Electric-sector Energy Efficiency and Renewable Energy Measures.”¹ EPA also approved the wind purchase as the first-ever renewable energy measure to receive NOx emissions reduction credit in a State Implementation Plan.²

Updated versions of the RSG methodology have been subsequently used in three separate projects to estimate the displacement of emissions at fossil-fueled power plants resulting from EERE measures in New Jersey, Connecticut, and Virginia. Most of this work has been supported by the U.S. Department of Energy.³ The New Jersey work was conducted in cooperation with the U.S. Environmental Protection Agency and the National Renewable Energy Laboratory.

¹ See <http://www.epa.gov/cleanenergy/stateandlocal/guidance.htm>

² 70 Fed. Reg. 24988 (May 12, 2005).

³ U.S. Department of Energy, *Final Report on the Clean Energy/Air Quality Integration Initiative for the Mid-Atlantic Region*, August 2006. See http://www.eere.energy.gov/wip/clean_energy_initiative.html; Resource Systems Group, *Estimation of Avoided Emission Rates for Nitrogen Oxide Resulting from Renewable Electric Power Generation in the New England, New York and PJM Interconnection Power Market Areas, 2006*, Prepared under grant funding from the U.S. Department of Energy and under subcontract to Environmental Resources Trust and Connecticut Smart Power; Resource Systems Group, *Avoided Emissions at Three Proposed Wind Power Projects in Virginia, 2006*, Prepared under grant funding from the U.S. DOE’s Clean Energy/Air Quality Integration Initiative.

Inclusion in SIP

In September 2004, EPA issued its policy on “Incorporating Emerging and Voluntary Measures in a State Implementation Plan (SIP).”⁴ This policy establishes criteria for EPA to approve credit under a SIP for emission reductions from voluntary and emerging measures. This policy permits states to develop and implement innovative programs that partner with local jurisdictions, businesses and private citizens to implement emission-reducing measures at the local level.

In August 2005, EPA issued a second guidance document to facilitate innovative control measures. This document was entitled “Guidance on Incorporating Bundled Measures in a State Implementation Plan.”⁵ The guidance supports the development of innovative measures by describing how States can develop individual voluntary and emerging measures and “bundle” them into a single SIP submission. The emissions reductions for each measure in the bundle are quantified but it is the performance of the entire bundle (the sum of the emission reductions from all the measures in the bundle) that is measured by EPA for SIP compliance purposes. The bundled measures policy takes into account the fact that some measures may perform less effectively than projected by allowing the State to average these measures with others that perform better than expected. Agencies must implement each voluntary control measure, and states must monitor each measure for effectiveness and report the findings to EPA. If the estimated reductions are not achieved, states commit to take corrective action by either making changes to the existing program or developing more effective control measures.

Each state needs to include provisions in their NO_x Ozone Season emissions trading program that will set aside a portion of the state’s ozone season NO_x allowance budget to support renewable energy and energy efficiency projects. Each state will assure that NO_x allowances are retired in an amount commensurate with the size of the EERE measures to ensure surplus emission reductions.

Software Tools

Utility Bill Recording. The team proposes that all jurisdictions adopt a common software to record and track data. There are several software packages available (e.g., Energy CAP) that can be used to track utility bills and make adjustments for weather.

Under a separate task, NO_x and CO₂ Emissions calculator will be developed.

⁴ See <http://www.epa.gov/cleanenergy/stateandlocal/guidance.htm>

⁵ Ibid.

Next Steps

Once the protocol design concept is approved by the state air agencies and key stakeholders from the Energy Advisory Committee (EAC), staff will draft the protocol document using the sources of information described herein.

The project team will also begin work on the NO_x and CO₂ emission calculator.