Protocol Recommendation

Inclusion of Energy Efficiency and Renewable Energy in State Implementation Plans for Air Quality and Climate Change

March 31, 2010

Prepared by:

Metropolitan Washington Council of Governments (MWCOG)
Department of Environmental Programs (DEP)

for:

U.S. Department of Energy,
Office of Weatherization and Intergovernmental Programs

Metropolitan Washington Air Quality Committee (MWAQC)

COG Climate, Energy, and Environment Policy Committee (CEEPC)

MWCOG Energy Advisory Committee (EAC)

MWCOG Intergovernmental Green Building Group (IGBG)

State and Local Energy Offices

Public Service Commission of Maryland, the District of Columbia, and the Commonwealth of Virginia

Project Financing Provided by the U.S. Department of Energy (DOE) through the Virginia Department of Mines, Minerals, and Energy (DMME)

Acknowledgements

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The project team greatly appreciates the input, feedback, and support received from the following individuals and organizations:
Tad Aburn, Brian Hug, and Diane Franks, Maryland Department of the Environment
Tom Ballou and Doris McLeod, Virginia Department of Environmental Quality
Cecily Beall and Jessica Daniels, District Department of the Environment
Najib Salehi, Loudoun County Energy Manager
John Morrill, Arlington County Energy Manager
Eric Coffman, Montgomery County Energy Manager
Chris Cripps, Valerie Broadwell, Julie Rosenberg, Art Diem, Niko Dietsch, U.S. EPA
Walt Aburn, Maryland Energy Administration
Calvin Timmerman and Crissy Godfrey, Maryland Public Service Commission
Rick Morgan, District Public Service Commission
Emil King and Teresa Lawrence, District Department of Environment, Energy Office
Al Christopher and Ken Jurman, Virginia Department of Mines Minerals and Energy
Howard Spinner, Virginia State Corporation Commission
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1. Background

Renewable energy and energy efficiency and conservation (EERE) are core components of regional strategies to reduce carbon emissions and improve air quality. EERE 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. To meet environmental sustainability goals, governments in the National Capital Region are leading by example to reduce energy consumption through installation of energy efficient equipment and to increase quantities of clean energy produced and purchased in the region. This document contains specific recommendations on approaches for inclusion of EERE programs in regional air quality and climate and energy sustainability plans. It is intended to be a living document that is modified over time to reflect best practices for inclusion of EERE in climate and air quality plans.

2. Summary of Recommendations

Energy efficiency and renewable energy programs should be included in regional air quality and climate/energy planning documents.

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.

This protocol is intended to be used to support inclusion of state and local EERE projects in air quality State Implementation Plans (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.

Energy efficiency and renewable energy programs should be included in SIPs as voluntary bundle items and for use in weight of evidence.

States wishing to include EERE measures in the SIP as a voluntary control measures with credit must establish Emission Allowance set aside authority and procedures.

Programs mandated under law may be included in the base case conditions supporting future emission projections and therefore will not qualify for emission reduction credit in SIPs.

The energy impact of voluntary initiatives can be tracked and emission benefits quantified using available emission calculators.

There are a range of possible emission rates that can be used to estimate the criteria pollutant and greenhouse gas emission benefit of programs. The regional emission calculator developed for this project contains options to allow the user to select the emission rate most applicable to the measure or program. Different energy measures can have different emission impacts depending on issues such temporal differences in load or generation. NEEP is conducting primary research focused on evaluating the load shapes of important end use equipment that can be integrated into the recommended regional emission calculator over time.

Reporting burdens on utilities, PSCs, and local energy managers should be minimized.

The need for rigorous evaluation, measurement, and verification (EM&V) varies depending on project/program sponsor, intended uses of impact data, and available resources. The Northeast Energy Efficiency Partnership's (NEEP) EM&V Forum is currently developing a set of standardized EM&V and reporting guidelines for program administrators in the mid-Atlantic and New England. These procedures, once finalized, should be integrated into this planning protocol.

Specific Steps for Inclusion of EERE in SIPs

- States and localities undertake projects, maintain records, make calculations, and report as appropriate.

- Use preferred impact evaluation methods, including gross and net energy calculations, establishing baseline (preferably 3 years) 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.

- Provide letter of commitment to air agency for the project.

- Submit request and required documentation to air agency for retirement of NOx Allowances.

- 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.

3. Approach Used for Research Project

Voluntary advisory workgroup formed. Members include local energy managers, state energy offices, state air agency officials, Public Service Commission staff, and utility staff for Dominion, Pepco, and Constellation.

Staff compilation and review of supportive policies, guidance, and technical resources.

Research on development of marginal emission factors based on a refined impact analysis of different EERE measures reflecting available load shape data. Development of a spreadsheet tool for conducting emission benefit calculations.

Meetings with technical experts supporting development of regional air quality and climate action plans.

Consideration of how relevant national protocols may address similar factors or needs.

Development of Criteria to Evaluate Options. Selected Criteria include:

Technical adequacy
Can be accomplished within existing resources
Is an approved option within the relevant regulatory context
Does not create problems for future planners and regulators

Briefings and solicitation of feedback with technical and policy committees:

- COG Energy Advisory Committee (EAC)
- COG Intergovernmental Green Building Group (IGBG)
- Metropolitan Washington Air Quality Committee (MWAQC)
- MWAQC Technical Advisory Committee (TAC)
- MWAQC Local Government Initiatives Subcommitteee
- Climate, Energy, and Environment Policy Committee (CEEPC)

4. Including EERE Programs in SIPs and Climate Plans

EERE in SIPs

Based on a review of EPA guidance, there are four basic options for inclusion of energy efficiency and renewable energy measures (programs/projects) in SIPs.

- Baseline Emission Projections Modification
- Mandatory Control Measure
- Voluntary Control Measure in the Voluntary Bundle
- Weight of Evidence

EERE Eligibility According to EPA Guidance

The following is eligible for inclusion in SIPs: "Electric-sector energy efficiency and renewable energy projects, initiatives or measures that will result in quantifiable reductions in emissions at existing fossil fuel-fired electric generating units and will improve air quality in a nonattainment area."

In September 2004, EPA issued its policy on "Incorporating Emerging and Voluntary Measures in a State Implementation Plan (SIP)."[1] 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.

Reflecting EERE in SIP Emission Baselines

EPA Guidance states that "if a State considers certain energy efficiency or renewable energy activities in developing its projected emissions baseline for the EGU sector, the resulting projected baseline emissions may be lower than a scenario without such activities. In this case, such activities are already accounted for, and "credited" in the SIP, as part of the projected baseline emissions. Consequently, to avoid double counting, additional SIP credit should not be granted for those activities already considered in a State's projection of future baseline emissions for EGUs."

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."[2] 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.

States Must Establish Mechanism to Retire NOx Allowances

According to EPA guidance: "one acceptable way of achieving additional emission reductions from energy efficiency and renewable energy measures in the presence of a cap and trade program is through the retirement of allowances commensurate to the emissions expected to be reduced by the energy efficiency measures. The retirement of allowances provides some level of assurance that the energy efficiency measures will achieve emission reductions that are surplus to the emissions reductions under the cap and trade program."

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

[1] See http://www.epa.gov/ttncaaa1/t1/memoranda/ereseerem_gd.pdf
[2] See http://www.epa.gov/ttn/caaa/t1/memoranda/10885guideibminsip.pdf

How to Determine the SIP Credits Associated with an EERE Project:

The procedure described in the guidance consists of four steps:

1. Estimate the energy savings compared to the baseline for EE projects, or estimate the amount of energy generation that will be displaced by the new generator for RE projects.

2. Convert the energy impact into an estimated emissions reduction. Refer to attached factsheet for detailed methodology.

3. Demonstrate and evaluate the impact on air quality in the non-attainment area. Air quality modeling should be used in case emission reductions occur outside the non-attainment area (electricity net importer or exporter areas).

4. Provide a mechanism to evaluate the effectiveness of the project. Specific monitoring, record keeping and reporting requirements are necessary to determine the actual amount of SIP credit generated. Among available protocols, the EPA National Action Plan for Energy Efficiency Impact Evaluation Guide, and the International Performance Measurements and Verification Protocol (IPMVP) are recommended.

Basic Approach Recommended by EPA Guidance: (a) develop a reasonable methodology to estimate emission or pollutant reductions impacting a nonattainment area, (b) run the measure for a specified period of time, (c) evaluate how well the measure worked in reducing the pollutant or emission levels, and (d) timely make up any shortfall between estimated and actual reductions.

State Responsible for Evaluation and True-Up
The State is responsible for assuring that the reductions credited to the SIP occur. As part of the process to gain approval of emissions reductions credit in a SIP attainment or ROP demonstration, the State would need to make an enforceable SIP commitment to monitor, assess and report on the emission reductions resulting from the measure and to remedy any shortfalls from forecasted emission reductions in a timely manner. In the circumstance where the actual emission reductions achieved is more than the amount projected, credit for the additional emission reductions may be taken.

Impact Evaluation and Reporting Method

The impact evaluation methods should be based on the U.S. EPA Impact Evaluation Guide[3]. 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[4] and state protocols. The NJ protocol[5] provides good source-by-source algorithms. The California Protocol contains an acceptable approach for evaluating market transformation programs.

EPA Limit on EERE Credits. The total of all voluntary measures (including voluntary energy efficiency and renewable energy measures) may not exceed 3 percent of the total reductions needed to meet any requirements for RFP/ROP, attainment or maintenance as described under the policy.

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 NOx 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 NOx 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.

[3] http://www.epa.gov/RDEE/documents/evaluation_guide.pdf
[4] http://www.evo-world.org/ or http://www.nrel.gov/docs/fy02osti/31505.pdf
[5] http://www.njcleanenergy.com/files/file/Protocols_REVISED_VERSION_1.pdf

Stipulated or Deemed Savings
In the near-term, analysis of actual project impacts utilizing utility bill or measured data is recommended. Deemed savings estimates being developed by the NEEP EM&V Forum, once finalized, should be incorporated into this protocol document for potential future use.

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. State air agencies often recommend a 50% discount 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.

EPA-recommended documentation:
- Basic information on project sponsor
- Description of project with implementation schedule and estimated lifetime
- Savings or generation with documentation
- Monitoring and verification method description
- Three seasons of baseline energy-use data, and verification of accuracy

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
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."[6] EPA also approved the wind purchase as the first-ever renewable energy measure to receive NOx emissions reduction credit in a State Implementation Plan.[7]

Udated 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.[8] The New Jersey work was conducted in cooperation with the U.S. Environmental Protection Agency and the National Renewable Energy Laboratory.

The RSG calculator was used to develop a COG dashboard calculator that can be used to translate energy impacts into air quality and greenhouse gas reduction benefits. Both the RSG Calculator and the COG dashboard will be made available on the COG website.

Roles/Responsibilities

U.S. Environmental Protection Agency (EPA)

- Region III Air Division. Review and approval of emission inventory and credits for mandatory and voluntary control measures.
- Office of Air Quality Planning and Standards (OAQPS). Guidance on acceptable methods for emission inventory development. Guidance on inclusion of EERE in SIPs. Providing appropriate emission growth factors through EGAS or other guidance.
- Office of Air and Radiation, Clean Air Markets Division (CAMD). Emission and emission rate information for electric power plants.
- Office of Air and Radiation, State and Local Climate and Energy Program. Technical support for development of innovative green power and energy efficiency programs.

U.S. Department of Energy (DOE)

- Supply and demand growth factors for electric utility sector through the Annual Energy Outlook (AEO). Information is used by EPA to develop emission growth factors.

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[6] See http://www.epa.gov/ttncaaa1/t1/memoranda/ereseerem_gd.pdf

[7] 70 Fed. Reg. 24988 (May 12, 2005).

[8] U.S Department of Energy, *Final Report on the Clean Energy/Air Quality Integration Initiative for the Mid-Atlantic Region*, August 2006. See http://apps1.eere.energy.gov/wip/air_quality_projects.cfm; 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.

Metropolitan Washington Air Quality Committee (MWAQC)

- Coordinate development of SIPs for metropolitan Washington, DC-MD-VA nonattainment area. Develop SIP emission inventories and develop recommended control strategy. Work with local governments to develop voluntary bundle programs for inclusion in the SIP.

Local Energy Managers

- Implement energy programs within their jurisdiction. Track energy impacts of portfolio of programs. Report energy impacts to MWAQC staff.

State Air Agencies

- Lead agency responsible for SIP development and implementation of control measures contained in the SIP. Responsible for promulgating regulations for retirement of NOx allowances associated with EERE set-aside requests.

State Public Service Commissions (PUC)

- Regulate the utilities in the region, including oversight of programs addressing energy efficiency and renewable energy. Require reporting of program costs and benefits.

State Energy Offices

- Implement statewide energy programs. Track energy impacts of portfolio of programs. Provide periodic reports on program impacts.

Utilities

- Implement approved energy programs. Track energy impacts of portfolio of programs. Provide periodic reports on program impacts.

PJM

- Manage the forward capacity market and the reliability pricing model.

NEEP EM&V Forum

- Manage multi-year project to develop a range of program support tools in the area of evaluation, measurement, and verification, and common reporting protocols.

EERE in Regional Climate and Energy Action Plans

Regional Climate and Energy Action Plans are voluntary initiatives designed to align program activities to achieve established greenhouse gas emission reduction targets.

In the case of the National Capital Region Climate Action Plan adopted in 2008, these targets encompass both short-term, medium-term and long-term goals:

- Return to the 2005 emission level by 2012 (10% under the 2012 baseline),
- Reduce emissions 20% below 2005 by 2020,
- Reduce emissions 80% below 2005 by 2050.

Emissions from energy use represent more than 65% of all greenhouse gas emissions in the Metropolitan Washington region. EERE measures thus represent the main resource to tap to achieve these goals.

Although the 2008 plan already includes an extensive list of recommendations spanning over all emissions sources (energy, land use and transportation, residential and commercial buildings, and others), recent efforts of COG's Climate, Energy, and Environment Policy Committee (CEEPC) focused on developing a detailed work plan to meet the 2012 target.

The following EERE programs and policies and associated performance measures are included in this 2012 Climate and Energy Action Plan document:

Green Building Policy	COG Green building policy adopted and implemented by 100% of member jurisdictions	2011
Municipal energy consumption	100% of jurisdictions reduce energy use by 10% below BAU	2012
Street lights	60% of jurisdictions implement a program to replace street lights with more efficient lights	2012
Building Benchmarking and Disclosure Requirements	80% of jurisdictions benchmark/ 60% disclose energy performance in govt buildings	2012
Outreach and Education Programs (Community Energy challenge programs, Green Business program)	35% of jurisdictions have community outreach and business certification programs	2011
Building Retrofits	35% of jurisdictions have energy loan programs + annual targets for number of residential units/ commercial retrofitted	2012 Annually, starting in 2011
Green Purchase Policy	60% of jurisdictions adopt green purchasing policies	2011
Clean Energy Purchase or Local Generation	100% of jurisdictions purchase or consume 10% RE 50% of consumers purchase a portion of their electricity from RE	2012 2012
Installation of Renewable Energy Systems On-Site	10,000 RE systems installed throughout the region	2012

A majority of these programs and policies are implemented at the local level and are under local governments' control. A regional progress tracking system must therefore be developed, in order to aggregate results at the regional level and produce annual progress reports. This will be done by the end of 2010, with the purpose of:

- Developing consistency in reporting procedures among COG's member jurisdictions, with the objective of aligning as much as possible regional and national reporting needs (related to ARRA funding for instance),
- Considering and organizing reporting both on policy adoption and program outcomes (in kWh), developing methods to roughly estimate the impacts of policy adoption on greenhouse gas emissions,
- Using standardized regional emission factors to assess the emissions impacts of policies and programs, with a "multi-pollutant" approach considering both greenhouse gas and criteria pollutant benefits.

For progress tracking at the "macro" level, this regional progress tracking system will also include:

- Regular updates of the regional GHG inventory, using a consistent method, to track progress toward GHG emissions targets.
- Use of regionally standardized/ harmonized methods to conduct local greenhouse gas inventories.

Because local and regional energy and climate plans are voluntary, EM&V procedures can be significantly simplified compared to what is required for air quality plans. As the region moves forward in developing greenhouse gas tracking and reporting, a balance will have to be found though between accuracy and flexibility.

5. Other Considerations

EECBG/ARRA Reporting Requirements - Interaction with Regional EERE Protocol

Since recipients of ARRA (and especially EECBG) funding are required to report a number of indicators to DOE, OMB on a regular basis and with a semi-standardized format only, the following items are recommended to be pursued in the Washington region:

- *Develop collaboration on reporting procedures among jurisdictions within the region and especially*:
    - set up common estimates to determine energy savings and costs savings associated with EERE measures and streamline reporting procedures
    - use MWCOG emission calculator to calculate avoided GHG/ criteria pollutants emissions, with a multi-pollutant approach.

- *Use the set of EECBG- funded projects in the next round of SIP* – these projects produce permanent benefits that will have been carefully monitored and documented since their inception when the next round of SIP will be discussed. They should therefore be included in the voluntary bundle.

- **Background information about ARRA/EECBG reporting requirements**

Under the EECBG program, grantees are required to report quarterly (monthly for recipients with allocation> $2 million) on:

- **Economic benefits** of ARRA funding (job creation and retention),
- **Standardized programmatic metrics**: for example, outlays, numbers of square footage retrofitted, number and capacity of renewable energy systems installed etc.
- **Performance indicators**: energy savings, energy cost savings, renewable energy generation, and total emissions reductions in CO2 eq, amount of criteria air pollutants reduced (tons)

DOE has developed a tool to help recipients estimate these metrics that can be accessed at: http://www.eecbg.energy.gov/Downloads/ARRA_Benefits_Reporting_Calculator.xls
However, in its reporting guidance, DOE gives an explicit preference to recipients using their own methodology for the determination and reporting of performance metrics.
Detailed reporting requirements can be accessed here:
http://www.eecbg.energy.gov/Downloads/EECBG_10-07A.pdf

Toward a Multi-Pollutant, Multi-Benefit Approach for EERE Measures

In addition to the environmental benefits of reducing greenhouse gas and criteria pollutants emissions, EERE measures have major co-benefits and contribute to avoid social and economic damages and costs[9]:

From a utility perspective:

- Grid benefits, peak demand reduction, avoided transmission losses, deferred new generation

From a community perspective:

- Energy system reliability, energy security,
- Reduced health problems,
- Job creation and economic development,

From a consumer perspective:

- Lower consumer energy bills.

As far as possible, we recommend to factor co-benefits of EERE measures into air quality and climate planning and policy design, acknowledging though that quantifying these co-benefits and assigning a monetary value for cost-efficiency analysis is not an easy task.

To that purpose, interesting research has been conducted recently at the federal level: an interagency working group[10] recently proposed various estimates for the economic cost of GHG emissions to be integrated in cost-benefits analysis (required for all regulatory actions).

[9] http://www.epa.gov/cleanenergy/documents/Business_case_for_EE_final.pdf

[10] http://www2.eere.energy.gov/buildings/appliance_standards/commercial/pdfs/sem_finalrule_appendix15a.pdf

The estimates ranged from approximately $5 to $35 per metric ton CO2 for the year 2010, and from approximately $10 to $50 per metric ton CO2 for the year 2030. These values are intended to represent the "social cost" of carbon emissions and include impacts on net agricultural productivity, human health, property damages from increased flood risk, etc.

A multi-pollutant approach integrating all criteria pollutants and climate benefits of EERE measures should also be adopted when possible, as a more effective and cost-effective way to address both issues.

According to a recent report by researchers from the University of Wisconsin[11], health only co-benefits of CO2 reduction strategies can be valued between $2 and $196 ($50 on average), due to increased life expectancy, decrease in illness rates and increase of . It is worth noting that these values are in the same range as the average cost of climate-change mitigation measures.

This means that in some cases, the cost of reducing greenhouse gas emissions is offset simply by the associated health benefits of reducing criteria pollutants emissions at the same time. Several organizations have officially adopted a position in favor of a multi-pollutant approach, and especially on the air quality side: NESCAUM, the Clean Air Association of the Northeast States, the Ozone Transportation Commission, and recently EPA's head of air programs Gina Mc Carthy.

6. Recommendations and Lessons Learned

There are a number of policy drivers increasing the number of energy efficiency and renewable energy programs in the region, including:

- Carbon Reduction Targets
- NAAQS Compliance
- Energy Savings Targets
- Renewable Electricity Targets
- Peak Demand Reduction Targets
- High Electricity Demand Day Initiatives

During the SIP inventory development process, take time to understand which efficiency or renewable programs may already be reflected in the baseline emission projections for ROP/Attainment Years[12]. Research methods and inputs for EGAS and IPM. Do not take steps to modify the baseline emission inventory projections at this time unless there are strong and documented reasons to believe that EERE will significantly alter IPM or EGAS growth assumptions.

[11] A summary of their main findings can be accessed at: http://environmentalresearchweb.org/cws/article/futures/41491

[12] Large-scale EERE programs are reflected in current SIPs because growth factors applied were from EGAS, which reflect estimates from DOE Annual Energy Outlook that include consideration of EERE, but only for programs in law/regulation at the time the growth factors were developed.

Establishing a new mandatory reporting relationship between the utilities, state air agencies, and the public service commissions is not recommended at this time.

Maryland should revise its regulations to make energy efficiency projects eligible for NOx Allowance set-asides. The District of Columbia should adopt a regulation enabling retirement of NOx Allowances for EERE.

Maintain and expand inclusion of local EERE projects in the voluntary bundle and weight of evidence.

Continue to foster common methodologies for tracking, estimating, and reporting impacts, including costs and benefits.

Develop analysis of the anticipated multipollutant benefits of the various state, regional, and local programs in Appendix A. Estimate the benefits of state-level EERE initiatives and include an assessment of the range of possible impact scenarios in the weight of evidence portion of the SIP.

Consider a request to the air quality attainment modeling groups to conduct a sensitivity run to demonstrate possible air quality benefit of EERE programs not captured in either the selected growth factors or the high electric demand day situations across mid-Atlantic. Generic results could be used in the weight of evidence section.

Foster relationship between COG, electric utilities, PJM, state weatherization programs, and state HPES programs to develop method and process to document progress in meeting energy efficiency and renewable energy targets and goals in the regional climate and energy action plan. Explore the possibility of an MOU between COG and utilities in the region to collect data on behalf of area jurisdictions.

Continue development of a regional process for data tracking and reporting, including use of on-line survey tool on COG's sharepoint server.

Evaluate the reporting requirements of the American Recovery and Reinvestment Act of 2009 and the Energy Efficiency and Conservation Block Grant programs and consider integrating reporting format and process with regional efforts.

EPA should consider providing additional guidance/data from eGrid about appropriate emission rates to use for benefit calculations (baseload, nonbaseload, time-matched marginal).

DOE and EPA should coordinate to ensure that recommended growth factors for the next round of SIPs include appropriate consideration of the underlying EERE programs in the region and enable states to clearly understand which programs are reflected in the growth factors for SIP emission inventory projections.

EPA should provide guidance regarding inclusion of episodic measures such as high electricity demand day initiatives in SIPs as control measures or weight of evidence.

EPA should consider providing additional guidance to its regional offices to promote supports approval of EERE measures for SIPs. Instead of emphasizing the permanence, surplus, and enforceability criteria for energy programs, EPA's policy should allow states to determine what criteria to use to link energy program impacts to the emission allowance program and require the permanence, surplus, and enforceability criteria only for the NOx Allowance retirement process.

States should consider use of PJM EE Capacity Market contract documentation to link energy efficiency projects to the NOx Allowance set aside system in the way that Renewable Energy Certificates (RECs) currently are used in the process.

Update the COG regional emission calculator as new eGrid data, loadshape data, or other factors become available.

Track developments from the NEEP EM&V Forum and incorporate new EE documentation and reporting strategies as they become available.

Investigate and evaluate potential to use data exchange network approach to streamline reporting and sharing of energy and emission impact data (see: http://www.exchangenetwork.net/exchanges/index.htm)

Research potential energy and environmental benefits of investments in smart grid technologies.

Consider incorporating EERE reporting components into state, local, and regional public education and outreach campaigns (e.g., Solar Mapping, Earthaid, Cool Capital Challenge).

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Appendix A. List of EERE Programs for Air Quality and Climate Planning (as of 2010)

Existing Government 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

State, Regional, and Local Energy Plans and Strategies
- COG's Climate and Energy Action Plan
- EmPower Maryland
- Virginia Energy Plan
- District Sustainable Energy Utility
- Green DC Agenda
- Arlington Fresh AIRE
- Alexandria EcoCity
- Loudoun Strategic Energy Plan
- Cool Counties

Clean Energy Mandates and Goals
- Renewable Portfolio Standards
- Renewable Energy Purchases

Efficiency Standards
- Energy Efficiency Resource Standards
- Appliance Efficiency Standards
- Purchase of Energy Star Appliances and Equipment
- Building Codes

Building Efficiency and Green Building Programs
- Energy Audit Programs
- Clean Energy Municipal Financing
- Home Energy Loan Programs
- Building Retrofits
- Energy Efficiency and Conservation Block Grants
- Federal Home Weatherization Program
- Home Performance with Energy Star Programs
- Energy Efficiency Outreach Programs
- Federal High Performance Building Program
- Building Benchmarking and Disclosure Requirements
- Energy Performance Contracts

Local Voluntary Clean Energy and Efficiency Programs

- Clean Currents
- Cool Capital Challenge
- Clean Air Partners Energy Star Pledge
- Neighborhood Energy Challenges

Appendix B. Documentation of Emission Allowance Set-aside Programs, Authority & Process

What is the purpose and interest of allowance retirement?

➔ *Ensure that EERE measures duly result in emissions reduction of a capped pollutant, in States with emissions trading programs (CAIR).*

If trading allowances are NOT retired from the market commensurate with the amount of emissions avoided by EERE measures, then EERE measures simply make it easier for emitters to respect their cap, but don't decrease total emissions since the number of allowances on the market remains unchanged.

How does it work?

States set aside allowances in a specific "account" from which allowances for EERE measures can be retired.

Once an entity purchasing renewable energy accumulates enough RECs, it may submit the RECs to the State Air Agency for allowance retirement. The RECs have to be converted in tons of avoided emissions, using a standardized emission factor.

	MD "Clean Energy Projects account"	VA "Renewable and Energy Efficiency Projects account"
1. Statutory and Regulatory Citations for Authority for Allowance Set Asides for Energy Efficiency and/or Renewables.	<u>Regulatory language</u> COMAR 26.11.28.05 section G. COMAR 26.11.28.06 section C. "By July 1 of each year, NOx allowances for renewable energy projects shall be transferred to a general account established by the EPA in the allowance tracking system for the owner or operator of the renewable energy project" "Allowances for a consumer of electric power shall be transferred to a retirement account established by the EPA in the allowance tracking system. Allowances (…) shall be considered only if the total electric power that the consumer purchased during the ozone season or calendar year is equivalent to the allocation of at least one allowance"	<u>Statutory language</u>: Section 10.1-1328.A.4 "The rules shall include a 5% set-aside of NOX allowances during the first five years of the program and 2% thereafter for new sources, including renewable and energy efficiency projects." <u>Regulatory language</u>: 9 VAC 5-140-1420 G - NOx annual 9 VAC 5-140-2420 G - NOx ozone season
2. Eligible Pollutants	NOx (ozone season and annual program)	NOx (ozone season and annual program)

3. Lead Agency	Duane King, Section Head – MDE-ARMA (410) 537-178 dking@mde.state.md.us	Tom Ballou and Kotur Narasimhan – VDEQ Thomas.ballou@deq.virginia.gov Kotur.narasimhan@deq.virginia.gov
4. Data Needs for Application to Retire Allowances	Renewable Energy Certificate of Transfer	EE projects must be located in Virginia. Must provide sufficient information and documentation as to the actual energy savings directly achieved by the project. RE projects should either be located in Virginia or must provide a demonstration of benefit to the Commonwealth. This can generally be done by showing that such a project is located in a common service or transmission area (zone) to any area in Virginia. Project must have been implemented or commenced commercial operation prior to the applicable control period.
5. Actual Application Form if any		http://www.deq.virginia.gov/air/planning/CAIR.html Annual application by April 1 for the ozone season and July 1 for the annual program.
6. Specific History of application and retirements	One application to date: 2006 – Montgomery County – Wind power purchase - 27 tons on NOx (MDE currently working on 07-08 purchase documentation)	One application to date - 3Degrees for annual and ozone season NOx

DC: There is currently no NOx Allowance set aside authority in the District of Columbia.

Appendix C: Additional Resources

Agencies and Committees

Metropolitan Washington Air Quality Committee (MWAQC)
http://www.mwcog.org/committee/committee/default.asp?COMMITTEE_ID=14

COG Climate, Energy and Environment Policy Committee (CEEPC)
http://www.mwcog.org/committee/committee/default.asp?COMMITTEE_ID=250
http://www.mwcog.org/store/item.asp?PUBLICATION_ID=334

Maryland Department of the Environment
http://www.mde.state.md.us/

Maryland Public Service Commission
http://webapp.psc.state.md.us/Intranet/home.cfm

Maryland Energy Administration
http://www.energy.state.md.us/

District Department of the Environment
http://ddoe.dc.gov/ddoe/site/default.asp

District Public Service Commission
http://www.dcpsc.org/

District Energy Office
http://ddoe.dc.gov/ddoe/site/default.asp

Virginia Department of Environmental Quality
http://www.deq.state.va.us/

Virginia Energy Office
http://www.dmme.virginia.gov/divisionenergy.shtml

Virginia State Corporation Commission
http://www.scc.virginia.gov/

State and Local Energy Plans and Strategies

COG's Climate and Energy Action Plan
http://www.mwcog.org/committee/committee/default.asp?COMMITTEE_ID=250
COG's November 2008 Climate Change report led to the formation of the Climate, Energy, and Environment Policy Committee (CEEPC). CEEPC has develop a climate and energy action work plan to guide local and regional efforts to ramp up EERE programs to meet carbon reduction targets for 2012 and 2020.

EmPower Maryland
http://www.energy.state.md.us/facts/empower/index.asp
Under this legislative initiative, the State of Maryland will reduce energy consumption by 15 percent by the year 2015, through (1) improving building operations, (2) energy performance contracting, (3) state agency loan programs, (4) energy efficient building requirements, (5) ENERGY STAR product purchasing, and (6) community energy loans.

Virginia Energy Plan
http://www.dmme.virginia.gov/DE/VAEnergyPlan/VEPBriefing.pdf
This 10-year energy plan sets four broad goals: (1) energy independence, with an emphasis on conservation and clean fuel technology, (2) expanding consumer education on conservation/energy-efficiency practices, (3) reducing GHG emissions by 30 percent by 2025, and (4) R&D and expansion in renewables, nuclear technology, and carbon capture and sequestration (CCS).

District Sustainable Energy Utility
http://www.imt.org/Capital/SEUFactSheet_623Draft.doc
The sustainable energy trust fund (SETF) was created by devoting (and increasing) utility taxes per kWh to finance sustainable energy provision. The 2008 Act also established a renewable energy standard of 20% for DC by 2020.

Green DC Agenda
http://rrc.dc.gov/green/cwp/view,a,1248,q,461471.asp
This mayoral initiative to make DC one of the most sustainable cities in the world has several areas of focus, including homes, schools, neighborhoods, parks, transit, job creation/the economy, city government operations, the Anacostia River, and climate change. Goals include developing a District GHG inventory and setting emission reduction targets.

Arlington Fresh AIRE
http://www.co.arlington.va.us/portals/topics/Climate.aspx
This county initiative set a target for reducing GHG emissions by 10% from 2000 to 2012. Building upon past reductions (2.6% from 2000-2005), new programs include (1) partnering with ENERGY STAR to reduce business emissions, (2) encouraging residential energy use reduction, (3) decreasing government emissions through retrofits, hybrid vehicles, and LED lights, and (4) increased recycling.

Alexandria Eco City
http://alexandriava.gov/Eco-City
In 2007, the City partnered with Virginia Tech to design a strategic, collaborative planning process to guide Alexandria towards sustainability. After creating an Eco-City Charter and Environmental Action Plan, Alexandria has also compiled an inventory of local sustainability programs and best practices.

Loudoun County Energy Strategy (CES)
http://www.loudoun.gov/Portals/0/docs/Energy/Energy%20Strategy.pdf

This initiative outlines a 30-year plan for energy use, distribution, and supply. Recommendations include efficient construction, renovation, and operations of homes/buildings, and incorporating clean and renewable energy generation. Loudoun County also established goals to be a regional, state, and national role model of energy management, and have one of the lowest county GHG emissions in the US.

Cool Counties
http://www.conservationleaders.org/cool.counties.htm
Formed in 2007, this initiative seeks to address climate change through (1) reducing county government GHG emissions, (2) reducing countywide GHG emissions 80% by 2050, (3) promoting climate adaptation, and (4) securing federal government support. Signatories include Fairfax County, Montgomery County, Arlington County, Prince George's County, and 38 others across the country.

Cool Capital Challenge
http://www.coolcapitalchallenge.org/
This consortium of businesses, government agencies, institutions, and individuals is an unprecedented initiative to reduce the Washington region's emissions by two billion pounds of CO_2. The Cool Capital campaign provides specific recommendations and seeks to coordinate local CO_2 reduction "contributions."

Renewable Portfolio Standards

District of Columbia
http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=DC04R&re=1&ee=1

Maryland
http://webapp.psc.state.md.us/intranet/ElectricInfo/home_new.cfm

Virginia
http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=VA10R&re=1&ee=1

Purchasing Renewable Energy
http://www.energysavers.gov/your_home/electricity/index.cfm/mytopic=10400
http://www.cleancurrents.com/
http://www.dom.com/dominion-virginia-power/customer-service/energy-conservation/green-power.jsp
http://www.communityenergyinc.com/wind-farms/wind-farms-summary/
http://www.carbonfund.org/site/business/alt/green_power

Protocol Documents

International:
NREL International Performance Measurement and Verification Protocol
http://www.evo-world.org/
http://mnv.lbl.gov/

http://www.nrel.gov/docs/fy02osti/31505.pdf
http://www.energyautomation.com/pdfs/ipmvp-vol2.pdf
http://www.mwcog.org/uploads/committee-documents/mF5fX1pe20071218103300.pdf

Federal:
M & V Guidelines: Department of Energy Measurement and Verification for Federal EERE Projects
http://mnv.lbl.gov/

EPA Model Energy Efficiency Program Impact Evaluation Guide
http://www.epa.gov/RDEE/documents/evaluation_guide.pdf

EPA: Energy Efficiency and Renewable Energy Set-Aside in the NOx Budget Trading Program
http://www.p2pays.org/ref/11/10064.pdf

State:
New Jersey Protocol
http://www.njcleanenergy.com/files/file/Protocols_REVISED_VERSION_1.pdf

California Protocol
http://www.calmac.org/events/EvaluatorsProtocols_Final_AdoptedviaRuling_06-19-2006.pdf

AEP (Arkansas) M&V, Energy Efficiency Standards
http://www.aepefficiency.com/arkansas/CI/downloads/index.htm

System-Wide Demand Reduction Program Implementation Plan (NY State Department of Public Service)
http://sites.energetics.com/MADRI/pdfs/Implementation_Plan_102805.pdf

Texas Measurement and Verification Guidelines
http://texinfo.library.unt.edu/texasregister/html/2005/jun-10/tables-and-graphics/200502121-2.pdf

Other organizations:
Local Government Operations Protocol (ICLEI)
http://www.theclimateregistry.org/downloads/2009/05/LGO_Protocol.pdf

Energy Efficiency in Buildings as an Air Quality Compliance Approach (Edward Vine, Ernest Orlando Lawrence Berkeley National Laboratory)
http://www.escholarship.org/uc/item/8r10s8z9?display=all

FEMP Standard Measurement & Verification Plan for Lighting Equipment Retrofit or Replacement Projects
http://mnv.lbl.gov/

Measurement & Verification Resources and Training Opportunities (FEMP)
http://mnv.lbl.gov/training

The Need for and Approaches to Developing Common Protocols to Measure, Verify and Report Energy Efficiency Savings in the Northeast (NEEP)
http://cleanefficientenergy.org/sites/default/files/NEEP_ProtocolsReport.pdf

Other Resources

EPA Guidance and Resources
http://www.epa.gov/ttncaaa1/t1/memoranda/ereseerem_gd.pdf
http://www.epa.gov/ttn/caaa/t1/memoranda/10885guideibminsip.pdf
http://www.epa.gov/RDEE/energy-programs/napee/resources/guides.html
http://www.epa.gov/RDEE/energy-programs/napee/resources/tools.html
http://www.epa.gov/RDEE/energy-programs/napee/resources/calculator.html

EPA Weight of Evidence Information
http://www.epa.gov/scram001/guidance_sip.htm
http://cleanairinfo.com/modelingworkshop/presentations/SA_WOE_Dolwick.pdf

Business Case for Energy Efficiency
http://www.epa.gov/cleanenergy/documents/Business_case_for_EE_final.pdf

DOE Air Quality Clean Energy Integration Report
http://apps1.eere.energy.gov/wip/pdfs/40477.pdf

NEEP EM&V Forum
http://neep.org/emv-forum/about-emv-forum

ICLEI
http://www.iclei.org/

The Climate Registry
http://www.theclimateregistry.org/resources/protocols/general-reporting-protocol/

DOE EECBG
http://www.eecbg.energy.gov/

ARRA
http://www.recovery.gov/Pages/home.aspx

Federal Home Weatherization Program: HOMESTAR
http://www.whitehouse.gov/the-press-office/fact-sheet-homestar-energy-efficiency-retrofit-program

Federal High Performance Building Program
http://femp.buildinggreen.com/

Network Data Exchanges (for Environmental Data)
http://www.exchangenetwork.net/exchanges/index.htm

EPA Central Data Exchange (CDX)
http://www.epa.gov/cdx/

ENERGY STAR Resources

ENERGY STAR Green Lights (LED, CFL)
http://www.energystar.gov/index.cfm?c=ssl_res.pt_ssl_program
http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=LB

ENERGY STAR High Efficiency Heating and Air Conditioning
http://www.energystar.gov/index.cfm?c=new_homes_features.hm_f_heating_and_cooling

Lighting Occupancy Sensors
http://www.energysavers.gov/your_home/lighting_daylighting/index.cfm/mytopic=12210
http://www.lrc.rpi.edu/resources/pdf/dorene1.pdf

ENERGY STAR Programmable Thermostats
http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=TH

ENERGY STAR Windows, Doors and Skylights
http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=WI

Insulation and Weatherization
http://apps1.eere.energy.gov/weatherization/wx_technologies.cfm

ENERGY STAR Appliances and Equipment: Standards and Purchasing
http://www.energystar.gov/index.cfm?c=products.pr_how_earn
http://www.energystar.gov/index.cfm?c=products.pr_find_es_products

Economic and Social Benefits of EERE Measures

The business case for energy-efficiency, National Plan for Energy efficiency – EPA
http://www.epa.gov/cleanenergy/documents/Business_case_for_EE_final.pdf

Implications of incorporating air-quality co-benefits into climate change policymaking - Nemet, Holloway and Meier – Environmental Research Letter 5 014007, Jan 2010 - http://www.iop.org/EJ/article/1748-9326/5/1/014007/erl10_1_014007.html

Social cost of Carbon for Regulatory Impact Analysis- Analysis under Executive Order 12866, Interagency Working Group on Social Cost of Carbon – March 2010
http://www2.eere.energy.gov/buildings/appliance_standards/commercial/pdfs/sem_finalrule_appendix15a.pdf

US DOE Job Calculator for the EECBG program -
http://www.eecbg.energy.gov/about/program_guidance.html

ACEEE Energy Stimulus Jobs Impact Calculator
http://www.eecbg.energy.gov/about/program_guidance.html