

MEMORANDUM

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

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Subject: Database of Energy Efficiency Projects and Estimated NO_x and CO₂
Emission Reduction Benefits for the National Capital Region

Background

Energy Efficiency projects in the metropolitan Washington region have the capacity to reduce demand for electricity and reduce overall emissions of criteria pollutants (precursors to ozone and fine particles) as well as greenhouse gases. The project team developed a protocol that will assist state and local governments to take credit for these actions in State Implementation Plans (SIPs) and climate programs. A previous memorandum addressed measurement, verification, and reporting for energy efficiency projects. This memorandum provides the results of efforts to link estimated energy reductions from actual and prospective projects to anticipated reductions in emissions of NO_x and CO₂.

Environmental Benefits of Energy Efficiency Projects

The project team developed values/calculations to link energy reductions tracked by localities and COG to their 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 NO_x emissions reduction credit in a State Implementation Plan.²

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

² 70 Fed. Reg. 24988 (May 12, 2005).

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 Both the New Jersey and Connecticut work was conducted in cooperation with the U.S. Environmental Protection Agency and the National Renewable Energy Laboratory (NREL).

The updated RSG methodology using time-matched marginal emission rates was used to estimate the environmental benefits of a database of energy efficiency programs in the metropolitan Washington region. Additional details on the RSG methodology will be provided separately.

Database of Energy Efficiency Projects

COG staff developed a database of energy efficiency projects in the metropolitan Washington region. All energy efficiency programs and projects tracked by COG staff to date are included in the database. Sources of information include reports provided by local energy managers as well as utility energy efficiency program plans posted on the Maryland Public Service Commission (PSC) website for the EmPOWER Maryland program (Case Numbers 9153 through 9157). The database includes projects implemented since 2002 as well as prospective project savings through 2011.

Attachment 1 provides the database of energy efficiency projects in the National Capital Region. Reports were readily available from Arlington and Montgomery Counties and the Maryland PSC, which provides energy savings to be realized statewide. As shown there are 85 projects included in the database generating an estimated energy reduction of 689,020 MWH. Projects types include lighting, HVAC, building energy management systems, low income assistance, heat pumps, water heaters, and Home Performance with ENERGY STAR.

Efforts are underway to collect additional program data to expand the database. Jurisdictions that may have program data to report include the District of Columbia, Dominion Power/State Corporation Commission (SCC) in Virginia, as well as Fairfax, Loudoun, and Prince William Counties.

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.

Results: Reductions in Emissions of NOx and CO₂

The estimated environmental benefits for the 85 projects contained in the database are shown in Table 1.

Table 1. Estimated Environmental Benefits of Energy Efficiency Projects in the National Capital Region

Total NOx (tpd)	Total NOx (tons per year)	Total Annual CO₂ (MT/year)
1.8904	1,046.77	591,778.17

Next Steps

Next steps include:

- Share and discuss results with the local energy managers, state energy officials, and state air agency representatives.
- Collect additional energy efficiency project data to improve the coverage of the database. Focus on collecting data from Fairfax, Prince William, and Loudoun Counties as well as Dominion Power in Virginia. Consider whether energy efficiency projects in the private sector should be added, including actions by the Energy Efficiency Partnership of Greater Washington, area universities, transit agencies, water and wastewater utilities, and the airports authority.
- Review project types included in the database and decide whether the RSG calculator should be updated to reflect additional project types. Currently the RSG calculator provides emission factors for lighting, HVAC, and LED traffic signals. Others project types to consider include geothermal heat pumps, energy management systems, and hot water heaters.
- Develop method to scale statewide benefits to the Washington, DC-MD-VA 8-hour ozone nonattainment area.
- Vet straw proposal with EPA and state air agency SIP planning staff to decide whether energy efficiency programs should be reflected in SIP baselines or as voluntary control measures. New attainment SIPs to address the 2008 8-hour ozone NAAQS are due in 2013. Inventory development efforts will occur between 2009-2012.
- Develop similar database for renewable energy programs in the National Capital Region.
- Evaluate cost effectiveness of energy efficiency and renewable energy programs in the region.