Roadmap for Incorporating Energy Efficiency/Renewable Energy Policies and Programs into State and Tribal Implementation Plans

Appendix K: State, Tribal and Local Examples and Opportunities

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Contents

FIGURES

TABLES

SECTION K.1 – OVERVIEW

This appendix provides information on:

- States that addressed energy efficiency/renewable energy (EE/RE) policies and programs in their State Implementation Plans (SIPs) for the 1997 8-hour ozone National Ambient Air Quality Standards (NAAQS)
- States that are considering incorporating EE/RE programs and policies in their SIPs
- Emerging opportunities for incorporating EE/RE policies and programs in SIPs
- Tribal governments that have implemented EE/RE programs on tribal lands
- Other opportunities to reduce electricity consumption and nitrogen oxides (NO_x) emissions thru Renewable Energy Certificates credits and storm water mitigation requirements

Appendix D, among other things, provides key questions for government officials to consider when evaluating whether it makes sense for state, tribal or local agencies to account for the future impacts of EE/RE policies in a State Implementation Plan/Tribal Implementation (SIP/TIP).

SECTION K.2 – STATES THAT ADDRESSED ENERGY EFFICIENCY/RENEWABLE ENERGY POLICIES AND PROGRAMS IN THEIR STATE IMPLEMENTATION PLANS FOR THE 1997 OZONE 8-HOUR NATIONAL AMBIENT AIR QUALITY STANDARDS

Background

In the mid-2000s, some state air agencies began considering EE/RE policies and programs as part of their SIPs, which were due in 2007 for the 1997 8-hour ozone NAAQS. Several states took steps to factor their EE/RE policies and programs into their SIPs. These states established multi-stakeholder working groups to analyze the emissions benefits of EE/RE policies and programs, and to specify the policy mechanisms involved with this new approach. Key drivers for these efforts included impending regulatory deadlines and significant financial assistance provided under the Department of Energy's (DOE's) "Clean Energy/Air Quality Integration Initiative." The initiative was active from 2005-2007 and provided assistance to six jurisdictions, including the states of Illinois, Texas, Louisiana, New Jersey, and Connecticut, and the Metropolitan Washington Council of Governments (MWCOG).

Summary

State experience with incorporating EE/RE policies and programs in SIPs was initially limited. States found that analyzing the effects of EE/RE policies and programs on air quality was time and resource intensive, and that the potential emissions benefits of EE/RE policies and programs might not have justified the effort necessary to quantify that impact. Part of the reason this may have been the lack of detailed enough EPA guidance.

The EPA believes that accounting for the impacts of EE/RE policies and programs in SIPs/TIPs continues to be an important part of SIP/TIP attainment strategies. In response to the early concerns and experiences, EPA has produced this EE/RE SIP Roadmap Manual to provide the "how to" for incorporating EE/RE policies and programs in SIPs and to address any informational and resource barriers in the way of meeting that goal. The EPA also plans concerted outreach and technical assistance to help state, tribal and local agencies through the policy and analytical steps EPA recommends air agencies address as they consider accounting for and incorporating EE/RE policies and programs in SIPs and TIPs. Finally, along with the manual, EPA is providing online training on the electric energy sector and tools for quantifying the emissions benefits of EE/RE strategies.

In terms of policy outcomes, the following jurisdictions did incorporate EE/RE policies and programs in SIPs and were successful in including EE/RE policies and programs in their air quality plans:

1. Washington, DC Region (via the MWCOG) – voluntary control measures in 1 hour and 8 hour ozone SIPs
2. Texas – control measure in Dallas, TX 8-hour ozone SIP
3. Shreveport, Louisiana – voluntary control measure in 8 hour ozone early-action compact SIP revision
4. Connecticut – weight of evidence (WOE) in 8 hour ozone SIP

State Examples

This section highlights examples of states that have taken steps to include EE/RE policies and programs in their SIPs. In all cases, the states took the following general approach to quantifying the impacts of EE/RE policies and programs on air quality:

- Determining the amount, type, and location of electric generation that would be displaced by EE/RE measures being pursued in the jurisdiction
- Estimating the annual and summer ozone season NO_x emission rates from power plants serving the state/region
- Resolving policy barriers to incorporating reductions into state air quality plans

Energy Efficiency/Renewable Energy as a Control Measure

Texas: The Texas Commission on Environmental Quality sought credit for emissions reductions of 0.72 tons per day (tpd) of NO_x for energy-related measures in the 2005 Dallas-Fort Worth (DFW) five percent Increment of Progress (IOP) SIP revision. (DFW was nonattainment for the 1997 8-hour ozone NAAQS.) It did so by citing Senate Bill (SB) 5 (77th Legislature) and SB 7 (76th Legislature) requirements. The SB 5 and SB 7 directed municipalities in ozone nonattainment counties and in counties deemed near-nonattainment to reduce their electricity consumption by 5 percent per year. The EPA approved in the SIP NO_x emissions reductions of 0.72 tpd achieved by EE measures that occurred in the DFW nonattainment area. These reductions were achieved through reduced demand for fossil-fuel generation at power plants, as a result of EE measures implemented in new construction for single and multi-family

residences in 2003. These measures were reported to the Texas State Energy Conservation Office (SECO) under SB 5. The EPA approved the EE measures into the SIP on August 15, 2008 (73 FR 47835).

DFW, Texas SIP:
http://www.gpo.gov/fdsys/pkg/FR-2008-08-15/pdf/E8-18835.pdf

Energy Efficiency/Renewable Energy in a Voluntary Control Measure Bundle

Washington, DC Region: In 2004, Montgomery County, Maryland led a multi-county buying group to purchase wind power and undertook a first-of-its-kind analysis to estimate its effect on air quality. The reductions were ultimately included in the Maryland SIP, which was approved by EPA in 2005. Building on this success, Metropolitan Washington Council of Governments (MWCOG) developed a regional air quality plan for the 1997 8-hour ozone standard for the Washington, DC Region non-attainment area that also included EE/RE provisions. This 2007 MWCOG air quality plan increased municipal RE purchases fourfold from 2004 to 2009 – with commitments to purchase 123 million kilowatt-hours (kWhs) of RE certificates annually – and included the installation of LED traffic lights in place of conventional incandescent lights. The plan was adopted by Virginia, Maryland and the District of Columbia and the respective ozone SIPs were approved by the EPA regions in 2007.

*DC Region 8 hour ozone SIP, see p. 12*6:
http://www.mwcog.org/uploads/pub-documents/9FhcXg20070525084306.pdf (html page with above link: http://www.mwcog.org/environment/air/SIP/default.asp)

Shreveport, Louisiana: As part of its SIP revisions for the purpose of attaining and maintaining the 8-hour ozone standard, the Louisiana Department of Environmental Quality submitted an Early Action Compact SIP for the Shreveport area to EPA in 2004. The SIP included the emission reductions expected to be achieved from installation of energy conserving equipment in City buildings in Shreveport. The performance contract was estimated to have saved 9,121 megawatt-hours (mWhs) of electricity per year with NO_x emission reductions of 0.041 tons per ozone season-day. The city arrived at this figure after employing several different methods to determine the emissions avoided through its programs. The EPA Region 6 published approval of this SIP revision in August, 2005.

Shreveport Early Action Compact, see p. 3:
http://www.deq.louisiana.gov/portal/Portals/0/AirQualityAssessment/Planning/SIP/Progress%20Report%206-30-04.pdf (html page with above link: http://www.deq.louisiana.gov/portal/Default.aspx?tabid=2311)

States Using Energy Efficiency/Renewable Energy in a Weight of Evidence Finding

Connecticut: The Connecticut Department of Environmental Protection (DEP) – a member of the Ozone Transport Commission (OTC) – wanted to know if the EE programs managed by Connecticut Light and Power and the United Illuminating Company could reduce electricity consumption and NO_x emissions on "high electricity demand days." The DEP worked with other OTC states to analyze the mix of power plants used to meet peak demand and determined that many had the highest emission rates in the region. The OTC team also found that peak load

electricity demand on the hottest days was growing two to three times faster than base load demand. With this information, Connecticut DEP established a team of technical experts to analyze the effect that EE/RE projects – including high efficiency air conditioners, compact fluorescent lighting, combined heat and power (CHP) and solar photovoltaic energy – were having on NO_x emissions at critical/peak times. The results were included as WOE in the 8-hour ozone SIP and submitted to the EPA region in June 2007.

CT 1997 8 hour ozone SIP, see page 31:
http://www.ct.gov/dep/lib/dep/air/regulations/proposed_and_reports/section_8.pdf (html page with above link:
http://www.ct.gov/dep/cwp/view.asp?a=2684&q=385886&depNav_GID=1619)

Texas: In an effort to reduce air pollutant emissions associated with energy use, in 2001, the Texas State Legislature passed SB 5 to amend the Texas Health and Safety Code. The legislation required changes in energy use within the state to help the state comply with federal Clean Air Act (CAA) standards. It applied to all political subdivisions within counties recognized in Texas as nonattainment areas and "near" nonattainment areas.

In 2007, the Texas Legislature passed SB 12, which, among other things, extended the timeline set in SB 5 for emissions reductions. Where SB 5 required political subdivisions to reduce their electrical consumption by five percent for five years beginning January 1, 2002, the SB 12 legislation required that such entities establish a goal to make the five percent reductions each year for six years, effective September 1, 2007. SB 12 amended the Health and Safety Code Section 388.005, in part, by requiring affected political subdivisions to:

- Implement all cost-effective energy-efficiency measures
- Establish a goal to reduce electricity consumption by 5 percent each year for 6 years
- Report efforts and progress annually to the Texas SECO

In 2011, the Texas Legislature passed SB 898, extending the SB 5/SB 12 provisions for 10 additional years, through 2021. The current number of counties covered is 41 and includes institutes of higher education and state agency facilities, as well as political subdivisions.

Dallas/Ft. Worth, Texas SIP:
http://www.gpo.gov/fdsys/pkg/FR-2008-08-15/pdf/E8-18835.pdf

SECTION K.3: ENERGY EFFICIENCY/RENEWABLE ENERGY PROGRAM IMPLEMENTATION ON TRIBAL LANDS

The EPA provides capacity building support to tribal governments to implement the CAA in Indian country. Tribes have made tremendous progress over the last several years. Tribal

governments continue to develop and refine air quality management programs.[1] In addition, tribal governments have implemented EE/RE programs in Indian country and could explore the opportunity to capture the criteria air pollutant and air quality benefits of these policies and programs.

Department of Energy's Tribal Energy Program

Since 2002, DOE's Tribal Energy Program[2] has invested more than $30 million in 129 tribal energy projects across the country (2002-2010). These tribal projects reflect a diversity of technologies and geographic distributions that address the following areas:

- Planning and training
- Wind power
- Biomass
- EE of buildings
- Hydro power
- Geothermal
- Solar

EPA's Climate Showcase Communities Program

In 2009 and 2010, EPA awarded $20 million in competitive grants to help tribal and local governments establish and implement climate change initiatives. The overall goal of the Climate Showcase Communities program[3] is to create replicable models of cost-effective and persistent greenhouse gas (GHG) reductions that will catalyze broader local and tribal government actions to stabilize the climate and improve environmental, economic, health, and social conditions. While the focus is on reducing GHG emissions through innovative strategies, implementing EE/RE projects avoids or displaces fossil fuel-fired generation that could also result in reductions of criteria pollutants.

Forty-nine communities received grants under the program, including six tribal governments. The tribal funded projects that include EE/RE projects are listed in Table 1.[4]

[1] The 1990 CAA Amendments provide authority for Tribes to implement CAA programs and instructed EPA to adopt regulations so that eligible Tribes may manage their own EPA-approved air pollution control programs under the CAA. The 1998 Tribal Authority Rule (TAR) implements the provisions of section 301(d) of the CAA to authorize eligible Tribes to develop their own tribal programs. Under the TAR, a Tribe may be approved by EPA to be eligible to be treated in the same manner as a state for one or more CAA programs. Such a program may include, but is not limited to, a TIP. As the TAR makes clear, tribal governments are not required to submit a TIP, nor are they subject to deadlines mandated under the CAA. However, EPA must meet its obligations under the CAA.

[2] For more information, go to: http://apps1.eere.energy.gov/tribalenergy/.

[3] For more information, go to: http://www.epa.gov/statelocalclimate/local/showcase/.

[4] For more information, go to: http://www.epa.gov/statelocalclimate/local/showcase/index.html.

Table 1: Tribal Projects Funded by EPA's Climate Showcase Communities Program

Project Title	Govt. Name	State	Project Type
Santa Ynez Chumash Community Energy Project	Santa Ynez Band of Chumash Indians	CA	EE retrofits and installations
Healthy Energy Living Project	Choctaw Nation of Oklahoma	OK	Efficiency–commercial
COOL CAP	Confederated Tribes of Siletz Indians	OR	RE
Galena Greenhouse Project	Tanana Chiefs Conference	AK	CHP
Reduction of GHGs Through Innovative Climate Projects	Gila River Indian Community	AZ	RE and green building projects
Efficiency and GHG Reduction on the Northern Cheyenne Tribe Reservation	Northern Cheyenne Tribe	MT	Efficiency–public buildings

SECTION K.4: STATES THAT ARE CONSIDERING INCORPORATING ENERGY EFFICIENCY/RENEWABLE ENERGY PROGRAMS AND POLICIES IN THEIR STATE IMPLEMENTATION PLANS

States Considering Incorporating Energy Efficiency/Renewable Energy in State Implementation Plan Development

While there may be others, EPA is aware of at least three states that have explored opportunities for incorporating EE/RE into future ozone SIPs that are featured in this appendix:

- Connecticut
- Maryland
- New Mexico

States at the early stages of the SIP process will need to consider at least three activities that include:

- Initiating collaboration among key state entities responsible for air and energy decisions
- Understanding and identifying EE/RE policies and programs to be included in the SIP, as well as estimating the magnitude of potential air emissions benefits
- Understanding the pathways available under this manual for incorporating EE/RE programs and policies into SIPs

Connecticut

Connecticut's experience is used in this section to illustrate one state's approach to addressing these steps. Background information is provided in Attachment A on the state's EE/RE policies and programs. Other states can use this experience to inform their own efforts to incorporate EE/RE into SIPs.

Background

In 2010 the then Connecticut Department of Environmental Protection (CTDEP)[5] expressed an interest to EPA New England in exploring the use of emission reductions associated with the state's EE and RE programs in their air quality planning documents, such as the SIP for air quality, in the same manner as emission reductions from more traditional air pollution control regulations might be used. As noted earlier in this document, Connecticut cited emission reductions from these programs within its WOE submittal made within its attainment demonstration for EPA's 1997 8-hour ozone standard. Given the demonstrated ability of EE and RE programs towards meeting air quality goals, CTDEP intends to rely more heavily on the benefits of these programs in future attainment demonstrations, such that the impact from the state's EE/RE programs will be directly factored into the future year modeling effort.

Initiate Collaboration among Key State Entities Responsible for Air and Energy Decisions

To help ensure that the appropriate state entities are involved in joint air and energy decisions, Connecticut has taken concrete actions to foster collaboration across agencies. These partnerships assist in addressing the complex policy and analytic questions that cut across traditional agency responsibilities for improving air quality and expanding the use of EE/RE policies and programs. Examples of such questions include:

- How to identify the appropriate SIP pathway?
- What method to use to estimate the energy impacts from EE/RE?
- How to quantify the resulting air quality improvement?

Over the past several years, the CTDEP has established formal lines of communication with the Connecticut Department of Public Utility Control (CTDPUC). For example, the CTDEP is a member of the state's Energy Conservation Management Board (ECMB), the Clean Energy Fund, and the Connecticut Energy Advisory Board. These ties are important, because the CTDPUC is primarily responsible for oversight of Connecticut's EE and RE programs, including implementation, monitoring and enforcement. Each of these programs is discussed separately below. In addition, the state continues to engage with EPA on the key state-federal issues that will arise if Connecticut formally moves ahead to incorporate EE/RE into its SIP.

[5] The CTDEP was replaced in 2011 with the Connecticut Department of Energy and Environmental Protection (DEEP) that is charged with conserving, improving and protect the natural resources and the environment of the Connecticut as well as making cheaper, cleaner and more reliable energy available for the people and businesses of the state. DEEP was established with the consolidation of the CTDEP, the Department of Public Utility Control, and energy policy staff from other areas of state government. For more information, go to: http://www.ct.gov/dep/cwp/view.asp?a=2690&q=322476&depNav_GID=1511.

Understand and Identify Energy Efficiency/Renewable Energy Policies and Programs to be Included in the State Implementation Plan

Connecticut has several existing laws requiring electric utilities to meet minimum percentages of the state's energy needs with zero-emissions EE and RE. On the RE side, a "renewable portfolio standard" (RPS) policy requires that electricity distribution companies (Connecticut Light and Power Company and United Illuminating Company) obtain a minimum percentage of their retail load from RE; an EE target also applies. The policy became law in 2005 with a minimum requirement of 4.5 percent in that year, increasing to 27 percent of the state's retail electricity load by 2020. To ensure compliance, CTDPUC conducts compliance evaluations of the RPS each year through an administrative docket process. It imposes fines or other corrective actions if compliance is not shown.

On the efficiency side, Connecticut has over twenty years of experience with EE programs. There is an efficiency component to the RPS with set targets for Class III resources (4 percent of retail load) which includes the following efficiency measures – customer-sited CHP systems with an efficiency of 50 percent or greater, electricity savings from conservation and load management programs, and systems that recover waste heat or pressure from commercial and industrial processes. Most funding for EE comes from the Connecticut Energy Efficiency Fund (CEEF). This CEEF is capitalized by a surcharge of $0.003 per kWh (3 mills per kWh) on utility customers' electric bills. Each of the two utilities administers and implements efficiency programs with monies from its ratepayer fund, in accordance with a comprehensive plan approved by the CTDPUC. Additional sources of funding for the CEEF in 2009 included the Regional Greenhouse Gas Initiative (RGGI), the Forward Capacity Market (FCM), Class III Renewable Credits, and the American Recovery and Reinvestment Act (ARRA). To ensure that all of these program monies are spent in accordance with CT energy efficiency goals and that the savings impacts are "real," the CTDPUC conducts an annual review and evaluation of the EE programs implemented by the state's electricity suppliers.

Understand the Pathways Available Under this Manual for Incorporating Energy Efficiency/Renewable Energy Programs and Policies into State Implementation Plans

Connecticut's past experience using clean energy in an air-planning context (via its attainment demonstration for EPA's 1997 8-hour ozone standard) provides a head start in defining and addressing important analytic and policy challenges. To address current air quality challenges, CTDEP and its partners are now working to identify the state's options for:

- Including EE/RE policies and programs in future attainment demonstrations
- Factoring the impact of EE/RE programs directly into future year modeling efforts
- Adopting EE/RE in the SIP as a control measure.

As the state proceeds, examples of key issues that the Connecticut will need to address should it pursue the control strategy pathway are included in the EPA, Region 1 letter to the state (Attachment B). These issues include what energy-impacts data to use, how to gauge the impact that EE programs have during high electricity demand days (days typically correlated

with high ozone episodes), and how to calculate air quality impacts at the appropriate level of detail. This letter outlines the state's strategy moving forward and raises several outstanding questions for the state to answer. While uncertainties remain, Connecticut's letter can be used to inform the work of other states and jurisdictions interested in taking a similar approach.

Maryland

Background

Under 2008 revised ozone standard, parts of Maryland have been designated nonattainment,[6] which will pose challenges as the state seeks additional reductions in ozone precursors from different sectors, potentially including the electric sector. In addition, Maryland also recently adopted legislation that requires the state to develop a climate action plan to reduce GHG emissions 25 percent by the year 2020. Coordinated multi-pollutant planning and the implementation of synergistic strategies will be necessary to successfully meet these two challenges.

Understand and Identify Energy Efficiency/Renewable Energy Policies and Programs to be Included in the State Implementation Plan

Maryland currently has several pieces of legislation intended to provide a substantial start toward these goals (see Attachment B for a greater description):

- The Healthy Air Act which required coal-fired power plants in Maryland to reduce NO_x by 75 percent, sulfur dioxide (SO_2) by 85 percent, and mercury by 90 percent, and
- Participation in the RGGI to reduce CO_2 emissions.
- The EmPOWER Maryland Energy Efficiency Act of 2008 is designed to reduce per capita electricity use by Maryland consumers by 15 percent in 2015.
- The accelerated RPS standard 20 percent of electricity from renewable resources by 2022.

Understand the Pathways Available Under this Manual for Incorporating Energy Efficiency/Renewable Energy Programs and Policies into State Implementation Plans

Maryland anticipates that a WOE demonstration will be necessary to meet the 2008 8-hour ozone NAAQS in the next round of ozone SIPs to supplement conventional photochemical modeling. At this time, Maryland believes that emission reductions for EE may be a key element needed to show attainment.

To separate the emission reductions that should be attributed to EE policies/programs compared to programs that control emissions through specific emissions caps, Maryland has contracted with NESCAUM to run an integrated framework of models. The NE-MARKAL (New England MARKet ALlocation model), initiative, which began through a collaboration between NESCAUM and the EPA Office of Research and Development in 2003, has resulted in the development of a least-cost optimized linear programming model which is tailored specifically

[6] For more information, go to: http://www.epa.gov/ozonedesignations/2008standards/index.htm.

to the energy infrastructure of several Northeast states.[7] NE-MARKAL is a data-rich analytical framework for examining energy policy options and their resultant impact on energy services in the region. The model serves as the centerpiece of the integrated policy analysis framework developed at the Northeast States for Coordinated Air Use Management (NESCAUM) which aids in developing a comprehensive understanding of technology, economic, environmental and public health consequences of air quality protection initiatives.

Working with NESCAUM, Maryland has completed Phase I which has included:

- A Maryland specific calibration of the NE-MARKAL model
- An independent assessment for the impacts of RGGI and Maryland Clean Cars

This type of scenario analysis serves to identify the magnitude of climate, air quality and energy impacts relative to the other strategies under examination.

In Phase II, Maryland proposes to identify interactions between the strategies that may lead to climate, air quality and energy outcomes that differ from an analysis that examines only one strategy at a time.

New Mexico

Background

In 2010, the New Mexico Environment Department and the City of Albuquerque expressed an early interest in possibly incorporating New Mexico's EE/RE policies and programs into a potential, future SIP for a future revised ozone NAAQS. Currently, there are no ozone nonattainment areas in New Mexico and none are immediately anticipated. However, elevated ozone levels have been experienced in the state in the past.

The EPA held preliminary meetings with the state to help EPA and state air staff and managers both better understand and identify New Mexico's EE/RE policies and programs and estimate the magnitude of potential air emissions benefits from those policies and programs. The state and EPA also discussed the need for interaction between state air staff and state energy officials. The EPA has explored with the state the pathways available for incorporating EE/RE programs and policies and programs into SIPs.

Initiate Collaboration among Key State Entities Responsible for Air and Energy Decisions

New Mexico is a state with a very predominant urban area (Albuquerque-Bernalillo County), with which cooperation is very important, especially since, for New Mexico, the City of Albuquerque-Bernalillo County is responsible for its own SIP revision. The state and Albuquerque-Bernalillo may choose to act together in any ozone SIP technical analyses, so that the entire state can be analyzed as one for purposes of electric sector EE/RE policies and

[7] For more information, go to: http://www.nescaum.org/topics/ne-markal-model.

programs. With Albuquerque-Bernalillo constituting such a large percentage of the state's total population, this cooperative treatment might benefit both entities.

Understand and Identify Energy Efficiency/Renewable Energy Policies and Programs to be Included in State Implementation Plans

New Mexico has three primary EE/RE policies:

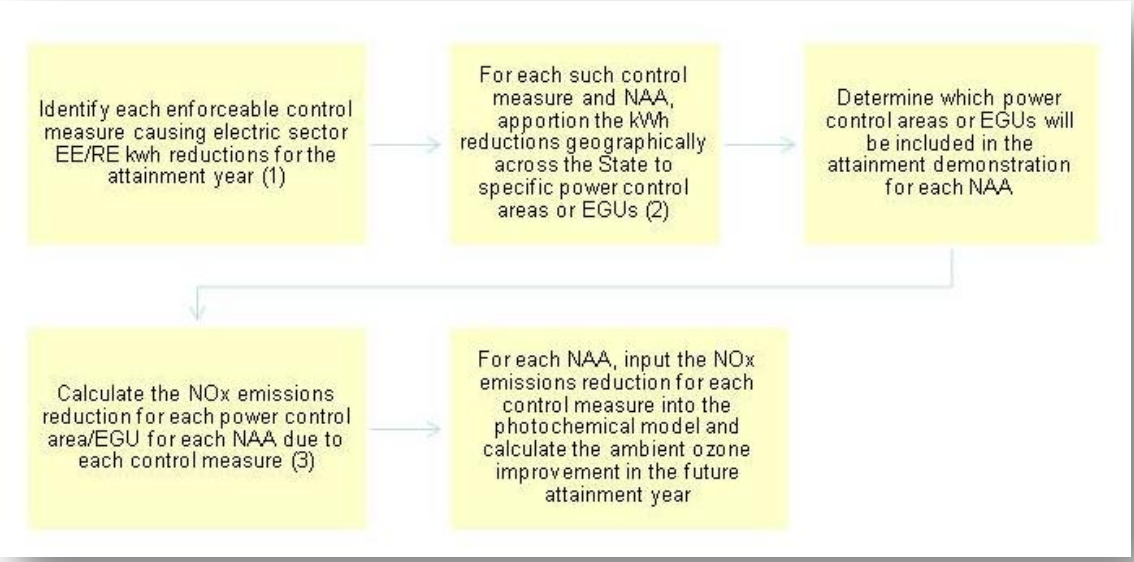
- The Renewable Energy Act requires investor-owned electric utilities to produce or buy increasing amounts of RE, which started at 5 percent in 2006, is 10 percent by 2011, and increases to 20 percent by 2020.
- The Efficient Use of Energy Act requires that public utilities, distribution cooperative utilities and municipal utilities include cost-effective EE and load management investments in their energy resource portfolios. In 2008, the statute was amended to include a State Energy Efficiency Resource Standard (EERS) in which public utilities must acquire all cost-effective and achievable EE and load management resources available in their service territories.
- The Energy Efficiency and Renewable Energy Bonding Act authorizes up to $20 million in bonds to finance EE and RE improvements in state government and school buildings.

Attachment C provides more detail on New Mexico's EE/RE policies.

Understand the Pathways Available Under this Manual For Incorporating Energy Efficiency/Renewable Energy Programs and Policies into State Implementation Plans

With respect to potential EE/RE SIP demonstrations for a state such as New Mexico, it is unclear what the state and Albuquerque would choose to do with regard to electric sector EE/RE policies and programs in any future, potential ozone SIP revision. Below are two control measure examples that could apply to a state like New Mexico. It should be noted that no New Mexico counties are currently designated ozone nonattainment, so these examples are provided for illustrative purposes only. The first example is a general control measure approach. Figure 1 conceptually illustrates the steps that would apply generically, while Table 2 provides an example for Albuquerque-Bernalillo.

Figure 1: Steps for New Mexico Analysis



The second example in Table 2 illustrates a more specific, hypothetical accounting of EE/RE NO_x reductions for Albuquerque-Bernalillo County alone. In this example, four separate EE/RE measures are quantified to determine their impacts on reducing NO_x emissions in the state and ultimately ambient ozone in the nonattainment area. Some of these measures are ones adopted by New Mexico and highlighted in Attachment C to this appendix. Not all of these NO_x emissions reductions would occur within Albuquerque-Bernalillo County. Also note in this example it is assumed that seven EGUs are impacted by these various measures, but NO_x emissions from only EGUs 1-5 are determined to impact ozone levels in Albuquerque-Bernalillo.

Table 2: Hypothetical Example for Albuquerque-Bernalillo County

EE/RE Measure[8]	Resulting Electricity Reductions	NO_x Reduction at PCA/EGU[9] (tons/ozone season day)
LED retrofits for traffic lights (in NAA)	1 million kWh	EGU 1: 0.1, EGU 2: 0.2, EGU 3: 0.05
State Renewable Energy Production Tax Credit (Corporate) (in NAA)	2 million kWh	EGU 1: 0.2, EGU 2: 0.05, EGU 3: 0.2, EGU 4: 0.3

[8] In concert with the State, EE/RE control measures can include not only those that actually occur in Albuquerque-Bernalillo but also those that occur in outlying areas but that cause a reduction in emissions from EGUs that impact Albuquerque-Bernalillo.

[9] In this example only EGUs 1-5 affect ozone concentrations in the Albuquerque-Bernalillo NAA. Therefore, emissions reductions from only EGUs 1-5 would be input into the photochemical model to assess the ambient ozone reductions due to the electric sector EE/RE measures.

EE/RE Measure[8]	Resulting Electricity Reductions	NO_x Reduction at PCA/EGU[9] (tons/ozone season day)
Sustainable Building Tax Credit (in NAA)	1 million kWh	EGU 2: 0.05, EGU 4: 0.25
State Renewable Energy Production Tax Credit (Corporate) in County A (outside NAA)	10 million kWh	EGU 4:2.0, EGU 5:1.0, EGU 6: 2.0, EGU 7:1.5

SECTION K.5: EMERGING OPPORTUNITIES FOR INCORPORATING ENERGY EFFICIENCY/RENEWABLE ENERGY POLICIES AND PROGRAMS IN STATE IMPLEMENTATION PLANS

Massachusetts

Massachusetts has several programs in the state that provide incentives for CHP and other technologies. Emissions benefits stemming from these policies could potentially be accounted for in future SIPs.

Massachusetts recently established several policies designed to promote CHP and other EE technologies. In 2008, Massachusetts passed the Green Communities Act[10] which outlined a collection of incentive programs. One of the programs called out in the Green Communities Act is an Alternative Energy Portfolio Standard (AEPS), which requires that 5 percent of the state's electric load come from "alternative energy" by 2020. The emissions benefits resulting from these policies could potentially be accounted for in SIPs.

This program functions through a certificate trading program similar to the state's RPS. CHP systems, flywheel storage, coal gasification, and efficient steam technologies qualify if the project began operation in 2008 or later. However, it is anticipated that CHP will represent a significant portion of this portfolio Eligible projects receive alternative energy certificates (AECs) which were valued around $18 per certificate in early 2011. Under the APS, CHP certificates are measured in megawatts based upon a performance-based formula that rewards efficient production of electricity and use of thermal energy. Compliance for the standard started in 2009, and during the first year of the program, CHP systems accounted for 99 percent of the compliance obligation. Funding for this program comes from the electric load serving entities who must comply with the standard by purchasing the AECs.

The Green Communities Act also directs Massachusetts utilities to purchase all energy efficiency that is cost effective, including CHP as an eligible efficiency measure for both gas and electric programs. Under this program, now offered exclusively through the electric utilities (because CHP results in reduced kWh and increased gas on-site), CHP systems that pass a cost-

[10] For more information, go to: http://www.mass.gov/?pageID=eoeeasubtopic&L=3&L0=Home&L1=Energy%2C+Utilities+%26+Clean+Technologies&L2=Green+Communities&sid=Eoeea.

effectiveness test are eligible for a payment. Eligible projects must be located in territories of the Investor Owned Utilities. The payment structure is as follows: $250/kW for feasibility study and an upfront rebate of up to $750/kW for installation. Funding for the EE/CHP program comes from the efficiency charge on customer bills.

SECTION K.6: OTHER OPPORTUNITIES TO REDUCE ELECTRICITY CONSUMPTION AND NO_X EMISSIONS

Renewable Energy Certificates

A renewable energy certificates or REC (pronounced: rĕk) represents the property rights to the environmental, social, and other non-power related qualities of renewable electricity generation. A REC, and its associated attributes and benefits, can be sold separately from the underlying physical electricity associated with a renewable-based generation source.

RECs provide buyers flexibility:

- In procuring green power across a diverse geographical area.
- In applying the renewable attributes to the electricity use at a facility of choice.

This flexibility allows organizations to support RE development and protect the environment when green power products are not locally available.

All grid-tied renewable-based electricity generators produce two distinct products:

- Physical electricity
- RECs

At the point of generation, both product components can be sold together or separately, as a bundled or unbundled product. In either case, the renewable generator feeds the physical electricity onto the electricity grid, where it mixes with electricity from other generation sources. Since electrons from all generation sources are indistinguishable, it is impossible to track the physical electrons from a specific point of generation to a specific point of use.

As renewable generators produce electricity, they create one REC for every 1,000 kWhs (or 1 mWh) of electricity placed on the grid. If the physical electricity and the associated RECs are sold to separate buyers, the electricity is no longer considered “renewable” or “green.” The REC product is what conveys the attributes and benefits of the renewable electricity, not the electricity itself.

RECs allow the end-user to exclusively claim or account for the associated attributes of renewable-based generation. The REC and the associated underlying physical electricity may take separate pathways to the point of end use. As renewable generators produce low-emission electricity, they also impact the need for fossil fuel-based generation sources to meet

consumer demand. The following are the inherent primary attributes that a REC can convey to an owner:

- Renewable fuel source
- Emissions of the renewable generation
- Geographic location of the generator
- Vintage of the generator
- Eligibility for certification or RPS

Here are the derived attributes that a REC can convey to an owner:

- Avoided emissions
- Eligibility for emission reduction credits or offsets
- Price stability

RECs and the attributes they represent are an ingredient of all green power products. REC providers—including utilities, REC marketers, and other third-party entities—may sell RECs alone or sell them bundled with electricity. As of 2007, more than 50 percent of utility customers have access to green power bundled products, whereas all customers have access to buying renewable energy certificates.[11]

Hypothetical Example of Baseline Emissions Reduction Credit from a Local Purchase of Renewable Energy Certificates

Many local communities purchase RECs to operate their municipal operations with "green power." In many instances, these communities are in or near existing EPA nonattainment areas and are purchasing a very significant quantity.[12]

RECs are an important additional incentive for RE facilities, often necessary to turn an uneconomical project into a viable one. For project developers, RECs represent an additional revenue source: a wind farm, for instance, will produce two saleable products—electrons and RECs. This added revenue helps developers recover costs, pay off debt, and reduce project risk. Increased demand for RECs will help developers to pay for new projects, which influences the mix of resources used to generate electricity. Purchasing RECs through long-term contracts is even more desirable for project developers because such contracts further reduce risk and uncertainty.

Generally speaking, new renewable electricity facilities deliver electricity that affects the order in which existing facilities generate electricity for the grid and the future plans for fossil-fueled generators. As a result of bringing new renewable electricity facilities online, the electricity sector emits fewer tons of emissions than it would have if these RE sources had not been

[11] For more information on green power suppliers, use EPA's Green Power Locator tool: http://www.epa.gov/greenpower/pubs/gplocator.htm.

[12] For more information, go to: http://www.epa.gov/greenpower/toplists/top20localgov.htm.

operating or built. Thus, any NO_x reductions from EGUs in or near these nonattainment areas due to REC purchases could potentially reduce the area's ambient air pollution and be incorporated in the SIP.

While there is potential for reductions and being able to incorporate those reductions in the SIP, it should be noted that, in some cases, there can be a fundamental complication in assessing whether such purchases actually reduce demand from EGUs in or near the nonattainment areas. Unlike direct powering of municipal operations with dedicated, on-site RE, RECs may be purchased by communities from RE facilities anywhere in the U.S. If a community is in a grid Independent System Operator (ISO) that has restrictions on power exchanges with other ISOs (an extreme example of which may be the ERCOT grid in Texas), then REC purchases outside the home grid ISOs may not result in power demand reductions at EGUs within those home grid ISOs. Similarly, even without such a formal restriction, if the purchasing city's Power Control Area (PCA) within its grid ISO does not historically conduct power transfers between itself and the PCA/ISO home where the RE is produced for the RECs, then it is unlikely the RECs purchase actually decreases energy demand (hence air emissions) from the EGUs near the city. Communities should check with their grid ISOs, PUCs, and/or State Energy Offices to determine if either a formal or operational restrictions like these may apply.

In attempting to determine the degree of benefit to the SIP, it is necessary to apportion the reductions in demand for fossil fuel fired power geographically due to REC purchases by EGU based on the emissions reduction technique you have employed. As cited in previous examples in this manual, the grid ISO may be able to assist the community in determining the proportional EGU contribution or other state agencies such as PUCs and Energy Offices may be able to help; EPA may also be able to suggest estimation techniques.

Another issue is, if a community wants baseline emissions reduction credit for its RECs purchase, many states may question the purchase's enforceability. After all, a community's purchase may be limited in duration and subject to reversal by a vote of the city council, for instance. If a state is uncomfortable and unwilling in guaranteeing reductions from such purchases itself, then either the community may be compelled to offer something enforceable as a back-up to the REC purchase or the state may refuse to consider the purchase in the SIP.

The following is a hypothetical scenario in which a community purchases RECs to earn SIP credit via the baseline emissions scenario:

> Tree City is a non-attainment area for ozone, with a required attainment date eight years from now. Sizable NO_x reductions will likely be needed for Tree City to attain the ozone NAAQS by the attainment date. It is estimated that mobile sources constitute approximately 2/3 of the NO_x inventory in Tree City's nonattainment area.
>
> As part of an overall sustainability initiative, Tree City's Council is considering signing a one-year contract to purchase RECs for wind power from a wind farm within its home grid ISO, in an adjoining PCA. The two PCAs conduct regular and frequent power

transfers. Tree City currently contracts with an investor-owned utility to purchase grid power it needs for City operations. The RECs purchase would amount to 50 percent of the annual kwh required by the City, or approximately 300 million kwh.

The City Council wants to condition continuing its RECs contract on the state agreeing to seek NO_x SIP credit for the purchase, which would benefit the Tree City nonattainment area as the state prepares and submits to EPA its ozone SIP revision.

Tree City's Environment Office staff work with the state DEQ, following these steps:

- Step 1: Identify the control measure:

  RECs purchase for 300 million kWh per year

- Step 2: Work with the home grid ISO, PUC, State Energy Office to determine if a RECs purchase may cause real energy demand reduction at ISO EGUs:

  Tree City and the state DEQ learn that the RECs would be purchased for power produced at a wind farm within the home grid ISO, approximately 200 miles from Tree City. The ISO confirms that such a purchase would have the effect of reducing energy demand on the grid and in Tree City's PCA.

- Step 3: Apportion the grid kWh purchased by Tree City by EGU:

  Tree City and the state DEQ glean historical dispatch modeling results from the home grid ISO. These results show that seven separate conventional (i.e., fossil-fired) EGUs in the ISO supply the Tree City with electrical power, in the following kwh proportion:

  Plant 1: 30 percent
  Plant 2: 20 percent
  Plant 3: 20 percent
  Plant 4: 10 percent
  Plant 5: 10 percent
  Plant 6: 5 percent
  Plant 7: 5 percent

- Step 4: Determine which EGUs will be included in the nonattainment analysis for Tree City:

  Distance and direction from Tree City may eliminate some of these EGUs from having any significant impact potential on the Tree City nonattainment area. In this case, the state DEQ decides that only Plants 1-4 will have any meaningful potential to impact Tree City; Plants 5-7 are located over 300 miles away and in a direction

where winds during the ozone season blow rarely and with a very low correlation to higher ozone days.

- Step 5: Quantify the current NO_x emissions from Tree City's purchase of 300 million kWh of grid power at the relevant EGUs:

  State DEQ supplies the average ozone season values of NO_x emissions from Plants 1-4 above (in lbs NO_x /mWh); these emissions rates and total emissions due to Tree City's energy demand are:

  Plant 1: 8.0 lb/MWh 360 tons NO_x
  (i.e., total emissions = 30 percent x 300 million kWh x 8.0 lb/MWh)

  Plant 2: 7.0 lb/MWh 210 tons NO_x
  (i.e., total emissions = 20 percent x 300 million kw kWh h x 7.0 lb/MWh)

  Plant 3: 7.0 lb/MWh 210 tons NO_x

  Plant 4: 6.0 lb/MWh 90 tons NO_x
  (i.e., total emissions = 10 percent x 300 million kWh x 6.0 lb/MWh)

- Step 6: Seek state concurrence as to whether these reductions would be significant at the projected attainment year

  Even though the state DEQ estimates NO_x emissions rates at Plants 1-4 will decrease to 50 percent of current values by the attainment date in eight years (hence the estimated NO_x reductions due to the RECs purchase would only be 50 percent of the estimated values above), the state DEQ agrees that the NO_x reductions at Plants 1-4 due to Tree City's proposed RECs purchase would still be significant at the projected attainment year. The state DEQ intends to perform ozone air modeling to determine the NO_x reductions needed overall for Tree City to attain the ozone NAAQS by the attainment date. This will include quantification of NO_x emissions reductions necessary at Plants 1-4. The NO_x reductions for the attainment year at each plant due to the RECs purchases will be subtracted from the required, total attainment year NO_x reductions at each of these four plants as determined by modeling. Thus, the RECs purchase will cause a reduction in the emissions baselines for Plants 1-4 at the attainment year (as well as in earlier years when the RECs purchase is in effect).

- Step 7: Determine whether the City and the state can agree upon an enforceable mechanism so that the RECs purchase can continue to be counted as a NO_x reduction measure in the SIP through and beyond the attainment date

Maintenance of ozone NAAQS attainment at Tree City requires a continuation of the magnitude of NO_x reductions that the RECs purchase creates. So, this is potentially a long-term commitment on the part of the Tree City.

Nevertheless, the state and the City reach a formal, enforceable agreement that binds the City to purchasing RECs through the attainment year. The City may elect to substitute another strategy that reduces an equivalent ambient ozone amount, but the ambient ozone impact of this other strategy must be confirmed via modeling by the state and approved by EPA in a separate SIP revision. Similarly, for maintenance purposes, the City may elect to substitute another strategy subject to the same conditions as above. Failure of the City to abide by this formal agreement with the state would result in a penalty payable by the City to the state which would be sufficient for the state to acquire the NO_x reductions by other means.

Emissions Reduction Credit from use of Green Infrastructure to Meet Storm Water Mitigation Requirements

EPA'S Storm Water Rules

The EPA's Office of Water (OW) is issuing new storm water mitigation regulations. Compliance measures for these new regulations are expected to rely heavily on best practices for "green infrastructure," a series of actions and technologies that encourage natural processes to accommodate and minimize storm water runoff (see examples below). These kinds of measures can directly result in reducing electricity consumption and NO_x emissions in the following ways:

- Reduce municipal electricity demand due to less frequent pumping, (easiest to quantify and attribute to NO_x emission reductions);
- Obviating construction of conventional, artificial storm water channeling, processing, and controlled discharge systems;
- Reduction in electricity demand for cooling in buildings near green infrastructure-implementation areas; and
- Reduction in photochemical generation potential due to cooling of urban core.

Green Infrastructure Measure Examples

- Increasing vegetated surfaces in developed areas
- Swales
- Water gardens
- Holding ponds
- Permeable pavements
- Green roofs

A recent report for the Philadelphia metropolitan area is an excellent resource that can help locals and states interested in pursuing NO_x SIP reductions in this way.[13]

[13] Stratus Consulting (2009).

Hypothetical Example: Tree City Nonattainment Area

The Tree City, a leader in sustainable practices and a current ozone nonattainment area with its attainment date in eight years, sees alignment among overall sustainability/livability measures it has adopted locally, mitigation actions to meet the ozone NAAQS, and actions that can aid the City in meeting EPA's new storm water regulations, expected in 2012. These actions include the following:

- Recently funded, livability initiatives to convert 50 percent of the public conventionally paved areas to vegetation; cool permeable pavements or trees within the next 25 years
- To further encourage NO_x emissions reductions from power plants, another program with the local investor-owned utility to incentivize strategic tree-planting around businesses and residences in order to reduce energy demand in the summer cooling season
- A recently passed City ordinance, requiring all commercial buildings and property within 10 years to establish green roofs and rainwater harvesting or storm water best management practices for intercepted precipitation.
- To comply with EPA's proposed storm water regulations, redesign of the City's conventional public storm water management infrastructure to create water gardens, swales, and holding ponds (to be effected within the next eight years and intended to result in minimal need to artificially manage storm water runoff)

The City and state DEQ staff estimate the following kWh reductions from the above measures:

- Items in (a), (b), and (c) will prompt a 50 percent reduction in City water pumping requirements, resulting in a savings of 250 million kWh annually within 25 years and 150 million kWh annually within eight years
- Within eight years, items in (a) and (b) will prompt a 150 million kWh reduction in energy demand in commercial buildings and residences from cooling requirements in the summer season; this reduction will amount to 250 million kWh within 25 years

In order to assess the extent to which the above measures can be incorporated into the future ozone SIP revision, Tree City staff work closely with the state DEQ in the following steps (see "Hypothetical example of baseline emissions reduction credit from a local purchase of Renewable Energy Certificates (RECs)," above, for more explanation):

- Step 1: Identify the control measures:
    - 150 million kWh reduction in energy demand due to cutback in need for city water pumping
    - 150 million kWh reduction in energy demand from summer season cooling requirements, due to green roofs, tree planting, enhanced vegetation, and cool permeable pavements
    - Total: 300 million kWh by the attainment date

- Step 2: Work with the home grid ISO, PUC, State Energy Office to determine if these measures will cause real energy demand reduction at ISO EGUs:

    - Yes, these are on-site reductions in Tree City directly traceable to reductions at EGUs in the home grid ISO.

- Step 3: Apportion the grid kWh purchased by Tree City by EGU (See "Hypothetical example of baseline emissions reduction credit from a local purchase of Renewable Energy Certificates (RECs)," Step 3)

    - Plant 1: 30 percent
    - Plant 2: 20 percent
    - Plant 3: 20 percent
    - Plant 4: 10 percent
    - Plant 5: 10 percent
    - Plant 6: 5 percent
    - Plant 7: 5 percent

- Step 4: Determine which EGUs will be included in the nonattainment analysis for Tree City (See "Hypothetical example of baseline emissions reduction credit from a local purchase of Renewable Energy Certificates (RECs)," Step 4):

    - According to the state DEQ, only Plants 1-4 significantly impact Tree City in the ozone season.

- Step 5: Quantify the current NO_x emissions from Tree City's purchase of 300 million kWh of grid power at the relevant EGUs (See "Hypothetical example of baseline emissions reduction credit from a local purchase of Renewable Energy Certificates (RECs)," Step 5):

    - Plant 1: 360 tons NO_x
    - Plant 2: 210 tons NO_x
    - Plant 3: 210 tons NO_x
    - Plant 4: 90 tons NO_x

- Step 6: Seek state concurrence as to whether these reductions would be significant at the projected attainment year? (See "Hypothetical example of baseline emissions reduction credit from a local purchase of Renewable Energy Certificates (RECs), " Step 6)

    Yes. Even though the state DEQ estimates NO_x emissions rates at Plants 1-4 will decrease to 50 percent of current values by the attainment date in eight years (hence the estimated NO_x reductions due to Tree City's storm water-livability initiatives would only be 50 percent of the estimated values above), the state DEQ agrees that the NO_x

reductions at Plants 1-4 due to these proposed actions would still be significant at the projected attainment year. The state DEQ intends to perform ozone air modeling to determine the NO_x reductions needed overall for Tree City to attain the ozone NAAQS by the attainment date. This will include quantification of NO_x emissions reductions necessary at Plants 1-4. The NO_x reductions for the attainment year at each plant due to these storm water-livability initiatives will be subtracted from the required, total attainment year NO_x reductions at each of these four plants as determined by modeling. Thus, the storm water-livability initiatives will cause a reduction in the emissions baselines for Plants 1-4 at the attainment year (and increasingly in subsequent years).

- Step 7: Determine whether the City and the state can agree upon an enforceable mechanism so that these reductions can continue to be counted as a NO_x reduction measure in the SIP through and beyond the attainment date

  The state may be satisfied with the enforceability of these City plans, given the financial and contractual commitments the City has made. However, the state may want to have a formal agreement with the City to the effect that failure of the City to abide by this formal agreement with the state would result in a penalty payable by the City to the state which would be sufficient for the state to acquire the NO_x reductions by other means. A similar provision could be included for maintenance of the NO_x emissions once the area has attained the ozone NAAQS. Because the NO_x reductions in this example are expected to increase after the attainment year, this should not be a major concern.

ATTACHMENT A: CONNECTICUT'S ENERGY EFFICIENCY/RENEWABLE ENERGY POLICIES AND PROGRAMS

Renewable Energy Policies and Programs

Connecticut's RPS began in 1998 as part of the electric deregulation initiative. It requires that electricity suppliers obtain a minimum percentage of their retail load from renewable sources. The minimum percent requirement was 4.5 percent in 2005, and it increases each year until 2020, at which point 27 percent of the state's retail electricity load must come from renewable energy sources. Of the total target, 4 percent must be meet by EE resources which includes CHP systems, conservation and load management programs, and waste heat recovery systems. CTDPUC evaluates each electricity supplier's compliance with the RPS requirement each year through an administrative docket process, and imposes fines or other corrective actions if compliance is not shown. To date, Connecticut's electricity suppliers have been able to meet their obligations every year but one, and the CTDPUC imposed substantial monetary fines for each MWh shortfall in meeting the required RPS. Under CT's RPS program, there is a requirement for a quarterly truing up and an annual report. The CTDPUC requires the electric distribution company (EDC) to look back to see if the RPS minimum percentage requirement was met. If it has not been met, then the CTDPUC requires the EDC to pay a fee or essentially a fine.

Utilizing RPS in air quality plans is complicated by the fact that electricity suppliers may demonstrate compliance with the RPS (for traditional renewable resources – Class I and Class II) through the purchase of RECs from out of state RE generators, whereas the federal CAA requires that reductions relied on for RFP or attainment must come from within the nonattainment area. Additionally, for Class III resources such as CHP, the emissions benefits need to be carefully assessed since there may be increased emissions on-site but decreased overall emissions in due to the displacement of grid-supplied power. Connecticut intends to work with the region's ISO, the ISO-New England, to analyze which electric generating units (EGUs) are likely to ramp down as more "must-take" RE resources are made available. A key aspect of this analysis will be predicting the location of future RE resources in New England, and identifying the fossil-fuel fired units that either shut-down or operate less due to the increased electricity produced from renewable resources.

Under CT's RPS program the renewable power generally can come from the New England or NY power pools, although the statutory region includes New England states, NY, PA, NJ, MD, DE. All of these states have RPS programs except VT.

Energy Efficiency Policies and Programs

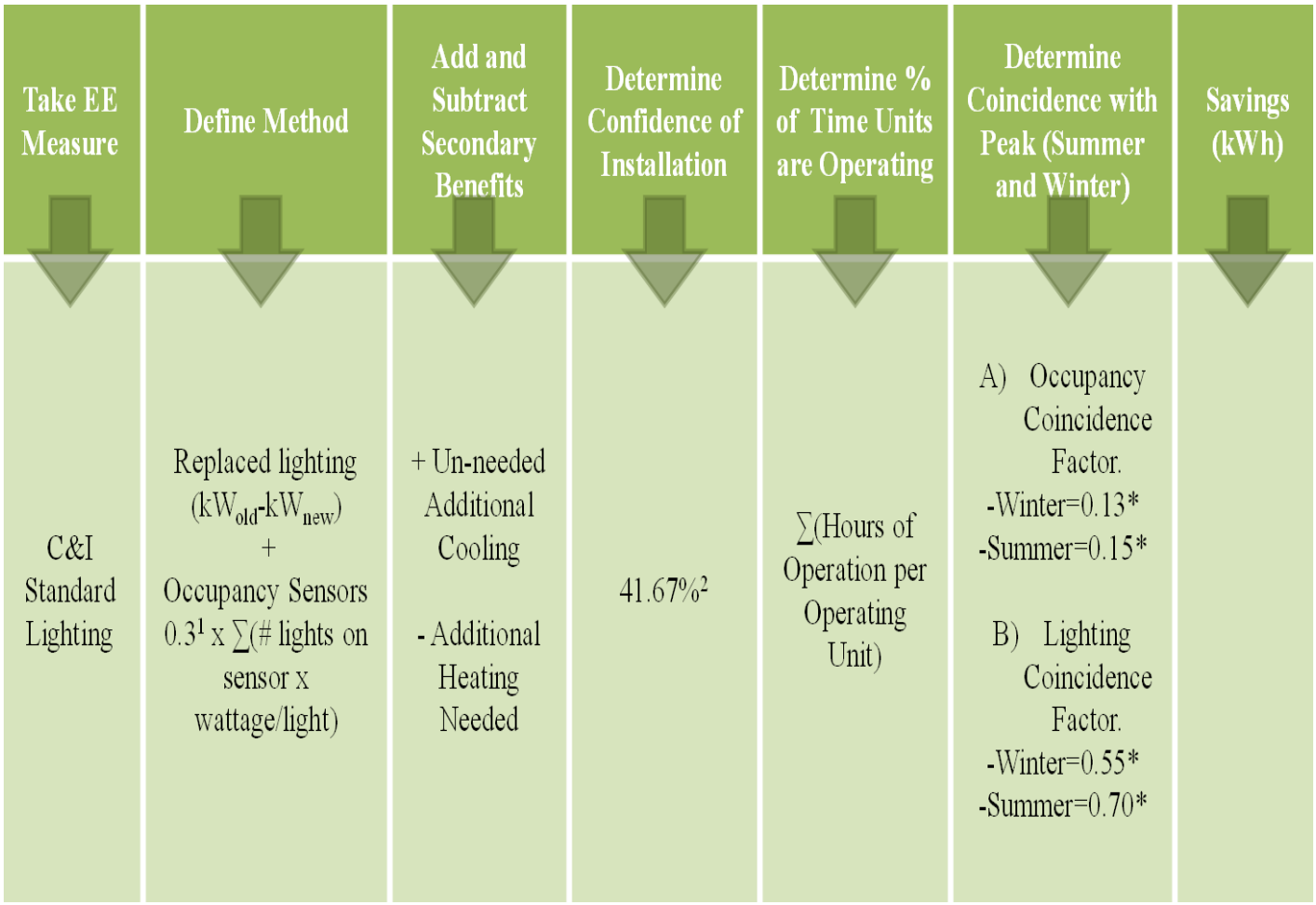
Connecticut has over twenty years of experience with EE programs. Even before the restructuring of the electric power industry that occurred in 1998, electric utilities in Fairfield County used EE programs to supplement energy generation and to help mitigate transmission constraints. These early successes were then developed into statewide programs when, in 1998, the state's legislature established the CEEF and created the ECMB. These programs are funded primarily by ratepayers but are supplemented with funds from other sources such as

proceeds from the auction of allowances in the RGGI program. The CEEF is funded by a surcharge of $0.003 per kWh (3 mills per kWh) on Connecticut Light and Power (CL&P) and United Illuminating (UI) customers' electric bills. Each of the two utilities administers and implements efficiency programs with monies from its ratepayer fund, in accordance with a comprehensive plan approved by the CTDPUC. The utilities develop their plans with advice and assistance from the state's ECMB. Additional sources of funding for the CEEF in 2009 included the RGGI, the FCM, Class III Renewable Credits, and the ARRA. Figure 2 provides an average program example of how Connecticut quantifies energy savings from energy efficiency.

As with the state's RPS program, the CTDPUC conducts an annual review and evaluation of the EE programs implemented by the state's electricity suppliers. Connecticut is evaluating whether some of these programs may be suitable for incorporating into its SIP. Connecticut is also reviewing options for quantifying the emission reduction impact from these measures. With regard to quantification, the state may use as a starting point the somewhat conservative estimate of energy savings bid into and accepted by the ISO-New England's FCM. Additionally, the state is exploring how to gauge the impact that its EE programs have during high electricity demand days, as these days typically correlate well with high ozone episodes.

Connecticut's original electric-industry restructuring legislation (Public Act 98-28) was enacted in April 1998 and created the CEEF. The mission of the CEEF is to advance the efficient use of energy, to reduce air pollution and negative environmental impacts, and to promote economic development and energy security.

Figure 2: How Connecticut Quantifies Energy Savings from Energy Efficiency, Average Program Example



[1] Von Neida, Bill et al (2000). pp. 433-459.
[2] Rundquistetal, R.A. (1993).
*Average winter coincidence factor of each factor calculated by the above.

Letter from EPA Region 1 to Connecticut

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 1
5 POST OFFICE SQUARE, SUITE 100
BOSTON, MA 02109-3912

September 30, 2010

Anne Gobin, Chief
Bureau of Air Management
Connecticut Dept. of Environmental Protection
79 Elm Street
Hartford, Connecticut 06106-5127

Dear Ms. Gobin:

As you know, on January 6, 2010 EPA proposed to tighten the national ambient air quality standard (NAAQS) for ground level ozone. This letter is intended to convey to you our preliminary suggestions for how Connecticut could pursue expanded emission reduction credit from your state's energy efficiency and renewable energy programs within the SIP Connecticut will need to develop to meet this forthcoming standard.

Members of our respective staffs have met a number of times over the past several months to discuss the various aspects of Connecticut's energy efficiency (EE) and renewable energy (RE) legislation, and the merits of incorporating these programs into your SIP. Through these discussions, it has become clear that establishing linkages between Connecticut's EE/RE programs and your state's more established criteria pollutant air quality management planning process is desirable, appropriate and technically feasible. Therefore, we are providing you with our preliminary recommendations for the technical support materials we think should be assembled to document emission reductions from the fossil fuel fired electrical generating units in Connecticut due to implementation of these programs. Although the focus of our discussions has been on NOx emission reductions from EGUs and ozone SIPs, we believe this methodology can be used to determine emission reductions from other pollutants for SIPs as well.

In addition to our collaborative effort with Connecticut, you should also be aware that a larger effort is underway within EPA nationally to provide clarifying guidance on the incorporation of EE/RE measures in SIPs. As that develops, we will provide additional feedback as necessary.

In 2004, EPA published the following two documents that contain guidance for states seeking to incorporate emission reductions from EE/RE programs into their SIPs:

- "Guidance on SIP Credits from Emission Reductions from Electric-Sector Energy Efficiency and Renewable Energy Measures," and
- "Incorporating Emerging and Voluntary Measures in a SIP."

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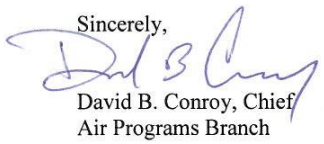
Pursuant to this guidance, energy efficiency and renewable energy programs were generally considered emerging measures. The guidance stated that, "Voluntary and emerging measures are limited to 6 percent of the total amount of emission reductions required for the rate-of-progress, reasonable further progress, attainment, or maintenance demonstration purposes." However, measures that can be shown to meet the federal Clean Air Act's requirements for approvable SIP measures are not subject to this limitation. Given Connecticut's considerable track record in implementing its legislatively mandated EE and RE programs, we believe that your state can pursue SIP credit from these programs as traditional measures such that they would not be subject to the 6 percent limitation. The Enclosure offers suggestions for how to document the emission reductions from these programs.

The incorporation of expanded emission reduction credit from Connecticut's energy efficiency and renewable energy programs represents a new and important aspect of your state's overall air quality management program, and we look forward to continuing to work with your staff to bring this to fruition. It is clear that the formal lines of communication that your agency has forged with your state's Department of Public Utility Control have been beneficial to Connecticut in this endeavor, and we encourage you to maintain this relationship in the future.

Please thank Rick Rodrigue, Paul Bodner, and Paul Farrell of you staff for the considerable amount of time, energy, and leadership that they are providing to meet this objective.

Sincerely,



David B. Conroy, Chief
Air Programs Branch

cc: Rick Rodrigue, CT-DEP
Paul Bodner, CT-DEP
Paul Farrell, CT-DEP

ENCLOSURE

Energy Efficiency (EE) and Renewable Energy (RE) in Connecticut's Ozone State Implementation Plan (SIP)

In order to meet federal Clean Air Act (CAA) requirements, emission control measures must be shown to be quantifiable, surplus, enforceable, and permanent. Each of these criteria are discussed below along with our suggestions for the information that Connecticut could gather to illustrate how its EE and RE programs meet these criteria.

Quantifiable: Pollution control measures submitted for inclusion within a SIP must be quantifiable and amenable to verification over time so that the level of emission reduction claimed can be tracked to see if it has actually been achieved.

Quantification of RE measures: Section 16-245(a) of the Connecticut General Statutes established a renewable portfolio standard mandate that requires electricity suppliers providing services to the state ensure that a portion of the electricity they make available is generated by renewable resources. The portion of electricity that must come from renewable resources is 14% for 2010, and this percent requirement increases each year through 2020. Connecticut's legislation also requires a quarterly truing up and an annual report that compels EGUs to confirm whether or not the RPS minimum percentage requirement was met.

The Connecticut Department of Public Utility Control (DPUC), in implementing this legislation, allows the renewable energy used to meet Connecticut's RPS requirements to come from within the state, within the ISO-New England control area, or from an adjacent power control area. This large geographic area from which Connecticut's electricity suppliers may seek renewable energy resources complicates the analysis of the NOx emissions that are avoided due to fossil fuel fired electrical generating units (EGUs) running less as renewable suppliers become available. However, we believe sufficient data exist that will allow Connecticut to gauge the impact of its RPS legislation on NOx emissions from the production of electricity in the area.

One method Connecticut could explore is analysis of the location and NOx emitting characteristics of the fossil fuel fired EGUs that have been able to reduce their output as renewable energy resources were made available on past days. The output based NOx emission rates for these units (e.g., units of lbs. NOx per megawatt-hour) can then be multiplied by the actual number of megawatt-hours of renewable electricity procured by the state's electricity suppliers. This method can provide an approximation of the NOx emissions avoided as a result of Connecticut's RPS program. Given the interconnectedness of the region's electricity grid, and the existence of RPS programs in neighboring states, it may be advantageous for Connecticut to approach ISO-New England, the regional transmission organization (RTO) that oversees operation of New England's electric power system, for assistance in performing this analysis.

A second quantification approach could entail review of dispatch modeling prepared by other entities such as ISO-New England, or if resources allow dispatch modeling tailored to this specific project, to provide an indication of how the dispatch of EGUs in the future will be affected by implementation of Connecticut's RPS program.

Quantification of EE measures: Over the past several years much work has been performed in the area of measurement and verification of the impact that energy efficiency programs have on electricity demand, and linkage of these savings to reductions in air pollutant emissions. For example, Connecticut's energy efficiency program requires documentation of estimated energy savings from the state's ratepayer funded EE program before and after energy efficiency programs are implemented.

More recently, ISO-New England took the significant step of allowing electricity savings from energy efficiency, distributed generation, load management, and load response to be bid into its forward capacity market (FCM). Market participants earn payments for the qualifying resources successfully bid into the market. The inclusion of energy efficiency in the FCM, which includes payments made by ISO-New England for the electricity savings represented by these measures, provides additional evidence that the calculated EE savings are real and also provides an additional accountability mechanism to ensure that they occur. We suggest that Connecticut DEP explore use of the amount of electricity savings bid in to the FCM by the state's electricity suppliers as a starting point in determining the amount of NOx emissions avoided from the state's EE programs. This could be supplemented with other readily available approximations of the electricity savings from energy efficiency measures such as those documented in the ISO-New England Regional System Plan, or in Connecticut's Integrated Resource Plan. As a side note, we also encourage Connecticut DEP to monitor the distributed generation resources in the state to ensure that these resources' participation in this market have a positive impact on air quality.

In addition to the above, an understanding of how the regional photochemical urban airshed modeling that will be used to support Connecticut's SIP treats state RPS standards is imperative to avoid double counting the impact of these measures on future year emissions from the EGU sector. EPA headquarters is currently looking into technical analyses it may be able to perform that will help shed light on this issue. EPA and CT-DEP should continue to work collaboratively on this effort as EPA's analysis is developed and refined.

Surplus: Emission reductions are considered surplus as long as they aren't otherwise used to meet attainment requirements in the SIP. Accordingly, Connecticut should ensure that it has a good understanding of the assumptions made in the electricity sector future year baseline modeling done to support its next ozone SIP. One manner of accounting for the NOx emission reductions from Connecticut's energy efficiency and renewable portfolio standards programs would be to ensure that the future baseline assumptions for the electricity sector in the state's modeled attainment demonstration accurately reflect the impact of the state's programs. Alternatively, Connecticut could

take steps to ensure that the future year baseline modeling does not incorporate the impact from its EE/RE programs, and then determine their impact separately akin to how traditional control measure reductions are determined.

EPA recently proposed a rule to address air pollution transported from one state to another in the Eastern U.S. The proposed rule includes annual and ozone season NOx budgets for Connecticut. If this rule is finalized as it was proposed, NOx emissions from EGUs in Connecticut will be subject to emissions caps and will be allocated allowances to use as a means of demonstrating compliance with their obligations under the rule developed to implement this program. Connecticut should ensure that emission reductions which accrue from the implementation of its energy efficiency programs do not simply result in the freeing up of allowances that EGUs in the state can use or sell to other entities in need of allowances to cover their air emitting activity. One method for accomplishing that would be for the state to set aside allowances for EE/RE and then retire them as these measures come to fruition, but there may be other viable approaches that address this concern.

Enforceable: Emission reductions used to meet SIP RFP or attainment needs must be enforceable against a source, and the state and EPA must have the ability to apply penalties if deemed appropriated. Additionally, citizens must have access to the emissions related information obtained from the sources, and must be able to file suits against the source for violations.

In Connecticut's case, the state's renewable portfolio standards and energy efficiency programs are mandatory programs created by specific state legislation that is primarily implemented by the state's Department of Public Utility Control (DPUC). As we have discussed over the past several months, submittal of these programs for incorporation into the Connecticut State Implementation plan (SIP) will enable these programs to also become federally enforceable. This federal enforceability is key to EPA being able to provide expanded SIP credit for these programs. In the coming months, we envision that Connecticut DEP and EPA staff will be able to work out the details of the specific legislation and/or rules that should be submitted to EPA, as well as the development of any formal agreements between CT-DEP and CT-DPUC regarding overview and enforcement of these programs.

Permanent: The emission reductions expected from the state's EE/RE programs should continue through the term for which the credit is granted unless replaced by another measure, or the state demonstrates through a SIP revision that the measure is no longer necessary. With regard to Connecticut's renewable portfolio standards program, given that the state has adopted legislation for this program and has an established track record of oversight and enforcement for it, we believe the "permanent" criterion could be addressed by the state committing in the SIP to continued implementation of the program.

With regard to Connecticut's energy efficiency programs, the permanence of some programs, such as purchase programs for energy efficient equipment and products, would need to be addressed in that there is no guarantee that the purchased equipment/products,

take steps to ensure that the future year baseline modeling does not incorporate the impact from its EE/RE programs, and then determine their impact separately akin to how traditional control measure reductions are determined.

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With regard to Connecticut's energy efficiency programs, the permanence of some programs, such as purchase programs for energy efficient equipment and products, would need to be addressed in that there is no guarantee that the purchased equipment/products,

would be replaced at the end of their useful lives with comparably efficient equipment. However, we believe the permanence of energy efficiency measures can be adequately demonstrated and will continue to work with staff from Connecticut DEP to address it. For example, from a broad perspective it seems reasonable to conclude that as technological innovations in this industry continue, future equipment replacements will likely take the form of comparable or improved equipment from an EE perspective. Additionally, Connecticut's ten plus years of experience with funding and implementation of its EE programs coupled with a SIP commitment to continue doing so should help address the permanence criterion.

ATTACHMENT B: MARYLAND'S ENERGY EFFICIENCY/RENEWABLE ENERGY POLICIES AND PROGRAMS

EmPower Maryland

EmPOWER Maryland, enacted in 2007, requires utilities and the Maryland Energy Administration (MEA) to reduce per capita peak demand and per capita electricity consumption in the state 15 percent by 2015. The utilities are in the process of implementing residential, commercial, and industrial sector programs to achieve the goal, and the MEA is implementing complementary programs, including:

- EmPOWER Maryland State Agency Loan Program (SALP): a loan program for state agencies to expand the use of energy performance contracts to make state buildings more efficient;
- EmPOWER Maryland Empowering Finance Initiative: a loan program targeted at helping residential consumers afford clean energy improvements
- EmPOWER Maryland Appliance and Lighting Rebate Programs: rebate programs to incentivize the purchase of energy efficient appliances and light bulbs
- EmPOWER Maryland Industrial and Commercial Programs: various programs targeting the industrial and commercial sector, including a loan program to help finance the cost of EE projects in commercial and industrial facilities and a program to provide Maryland industries access to informational resources, workshops, technical support and energy assessment opportunities
- EmPOWER Maryland Residential Initiatives: various programs, including a grant program in coordination with DHCD to conduct EE retrofits in apartment units to reduce energy bills for low and moderate income families

These EmPOWER Maryland programs incorporate several of the other policies recommended in the Maryland Climate Action Plan, including:

- RCI-2: Demand-Side Management Energy Efficiency Programs (captured by the utilities' peak demand programs)
- RCI-3: Low Cost Loans for Energy Efficiency (captured by EmPower Maryland SALP, EmPowering Finance and Industrial and Commercial Programs, described above)
- RCI-7: More Stringent Appliance/Equipment Efficiency Standards (captured by the EmPOWER Maryland Program Appliance and Lighting Rebate Programs, described above. MEA also continues to advocate for legislation for stronger standards.)
- RCI-11: Promotion and Incentives for Energy-Efficient Lighting (captured by the EmPOWER Maryland Program Appliance and Lighting Rebate Programs)

Renewable Portfolio Standards

The goal of Maryland's RPS is for the state to obtain 20 percent of its electricity from renewable resources by 2022, with intermediate targets of 7.5 percent by 2011 and 18 percent by 2020. To help Maryland reach these ambitious targets, MEA has focused on advocating for policies to promote RE and on running programs to stimulate the RE market.

This past year, MEA advocated for legislation, passed by the Maryland General Assembly, to amend the RPS to accelerate the solar RPS requirement in the near term (2011-2017), resulting in more incentives for solar development. MEA also advocated for legislation, passed by the Maryland General Assembly, to reauthorize the Maryland RE production tax credit, offering up to $2.5 million to eligible taxpayers for the production of renewable electricity.

Through its residential renewables grant program, MEA awarded hundreds of grants (ranging from $1,000-10,000) to homeowners and businesses to offset the cost of installing wind, geothermal and solar PV systems. Demand has increased from 200 systems a year to 200 systems a month, even with significantly reduced incentives.

MEA also developed and implemented Project Sunburst, a program offering rebates of up to $1,000 per KW of solar PV capacity installed on public buildings. The program will incentivize the building of about 10 MW of solar in Maryland over the next year, more than doubling current capacity in the state.

In addition, leading by example, MEA and DGS partnered with the University System to launch the Generating Clean Horizons Initiative, which resulted in Power Purchase Agreements with 3 new, utility scale renewable developments (65 MW of onshore wind and 17 MW of thin film solar).

To promote all different types of renewables, MEA has a program manager dedicated to biomass, biofuels and electric vehicles; a program manager dedicated to wind; and two program managers dedicated to solar. These program managers focus on providing support for the development and adoption of their respective technologies.

Finally, MEA administered the RE production tax credit. Over the past three years, more than $5 million in these credits have been claimed.

As demonstrated above, MEA's efforts to help the state reach the RPS goal incorporate several of the other policies recommended in the Maryland Climate Action Plan, including:

- ES-1: Promotion of Renewable Resources
- ES-2: Technology-focused Initiatives for Electricity Supply
- ES-5: Clean Distributed Generation

Regional Greenhouse Gas Initiative

The Regional Greenhouse Gas Initiative (RGGI) is a market-based CO_2 cap and trade program designed to reduce CO_2 emissions from fossil fuel-fired power plants. The program will be implemented by the participating states in January 2009. As there are no technological controls available to reduce CO_2 emissions, the program provides for the sale of a determined quantity of CO_2 allowances. Electric generators will be required to purchase one CO_2 allowance for every ton of CO_2 emitted. The proceeds will be used to fund EE programs, resulting in reduced CO_2

emissions achieved through reduced electrical demand. These regulations will apply to fossil fuel-fired generating units over 25 MWs.

Regional reduction targets have been agreed upon as a two-phase regional emissions cap:

- 2009 through 2015: Hold regional emissions constant at current levels (about 150 million tons CO_2), with a built-in review of the RGGI program no later than 2015.
- 2015 - 2020: Reduce emissions by 10 percent below current levels

Maryland Clean Car Program

The Maryland Clean Cars Program required adoption of the California clean car program for implementation beginning in Maryland in model year 2011. The implementing regulations were originally adopted in 2007 and updated in both 2009 and 2010. The following legislation passed in 2010 created incentives for the purchase of advanced technology vehicles that are required by the Clean Car Program:

- HB 469 (SB281) Motor Vehicle Excise Tax – Tax Credit for Electric Vehicles – provides credit against the motor vehicle excise tax for qualified vehicles.
- HB 674 (SB) High Occupancy Vehicle (HOV) Lanes – Use by Plug–In Vehicles – allows qualified vehicles access to HOV lanes without the required minimum occupancy.

The Maryland Clean Cars Act of 2007 required MDE to adopt regulations implementing the California Clean Car Program. Maryland's implementing regulations adopted, through incorporation by reference, the applicable California regulations. The California program is a dynamic, changing program in which many of the relevant California regulations are continuously updated. To retain the California program, Maryland must remain consistent with their regulations, hence when California updates its regulations; Maryland has to update their regulations. The Maryland regulations were updated in 2009 and 2010.

ATTACHMENT C: NEW MEXICO'S ENERGY EFFICIENCY/RENEWABLE ENERGY POLICIES AND PROGRAMS

New Mexico has three primary EE/RE policies. First, the state has a RPS. The original RPS law required investor-owned utilities (IOUs) to get 10 percent of their electricity retail sales by 2011 from renewable energy sources. Under the 2007 amendment, IOUs must have renewable energy sources providing 15 percent of their electricity retail sales by 2015 and then increase to 20 percent by 2020. Rural electric cooperatives must have RE for 5 percent of their electricity retail sales by 2015, increasing to 10 percent by 2020. Renewable energy can come from new hydropower facilities, fuel cells that are not fossil-fueled, and biomass, solar, wind, and geothermal resources.

Second, the state requires that IOUs must offer a voluntary RE program to their customers. In addition to and within the total portfolio percentage requirements, utilities must design their public utility procurement plans to achieve a fully diversified RE portfolio no later than January 1, 2011, as follows:

- No less than *20 percent Wind*
- No less than *20 percent Solar*
- No less than *10 percent Other technologies*
- No less than *1.5 percent Distributed Generation (2011-2014) and 3 percent Distributed Generation by 2015*.

Third, enacted in 2005, New Mexico's Efficient Use of Energy Act (Section 62-17-1 NMSA 1978) requires that public utilities, distribution cooperative utilities and municipal utilities include cost-effective EE and load management investments in their energy resource portfolios and that any regulatory disincentives that may exist to public utility investments in cost-effective EE and load management are eliminated.

In 2008, the statute was amended to include a State Energy Efficiency Resource Standard (EERS). Under this amendment public utilities providing electricity and natural gas service to New Mexico customers shall, subject to commission approval, acquire all cost-effective and achievable EE and load management resources available in their service territories. This requirement, however, for public utilities providing electricity service, shall not be less than savings of five percent of 2005 total retail kWh sales to New Mexico customers in calendar year 2014 and ten percent of 2005 total retail kWh sales to New Mexico customers in 2020 as a result of EE and load management programs implemented starting in 2007.

The Energy Efficiency and Renewable Energy Bonding Act (Sections 6-21D-1 through 6-21D-10 NMSA 1978) authorizes up to $20 million in bonds to finance EE and RE improvements in state government and school buildings. State agencies or school districts may request an energy assessment from the New Mexico Energy, Minerals and Natural Resources Department to identify specific energy saving measures. A wide range of measures are eligible for funding,

including CHP and waste heat recovery systems. Bonds are to be paid back by realized energy savings.

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