



Case Study: Energy Efficiency and Clean Energy in SIPs

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Session Purpose

- Discuss incorporation of reductions from clean energy measures into SIPs
- Time is right for a host of reasons:
 - Tightened NAAQS highlight need for more emission reductions
 - State renewable portfolio standard programs (RPS) expanding over next decade
 - State expenditures on energy efficiency (EE) programs are also expanding
 - \$16.8B of ARRA funding going to EE/RE



Background: Incorporation of EE into SIPs

- Three options:
 - SIP control measure
 - Weight of evidence (WOE)
 - Analyses (and measures) may be used in a demonstration to show that attainment is likely despite inconclusive modeled results
 - Future emissions baseline
 - Incorporation of EE/RE emission reductions in projected, future SIP emissions baseline



Background: Incorporation of EE into SIPs

- To be approved as a SIP measure providing emission reductions, needs to be:
 - Quantifiable, surplus, enforceable, and permanent
- EPA Guidance:
 - SIP credits for EE/RE (2004)
 - Voluntary and emerging measures (2004)



Background: EE/RE in States

- 29 states and DC have Renewable Portfolio Standards (RPS) policies in place
 - Five other states have nonbinding renewable energy goals
- Majority of states have energy efficiency programs
 - Variable but some combination of financial incentives and rules, regulations, and policies



EE/RE Project with State of Connecticut

- In 2009 OAQPS and Region 1 began scoping out what it would take to bring CT's RPS program into its SIP
- After beginning discussions with CT, the effort was expanded to include their RE and EE programs
- First, some background on their EE/RE programs...



Connecticut's RPS Program

- CT's RPS program requires a minimum percentage of their retail load be from renewable energy sources
- Program started in 2005 and reaches maximum in 2020
 - ➔ ■ 2005 4.5% of electricity from renewables
 - ➔ ■ 2020 27% of electricity from renewables
- Requirement for quarterly truing up and an annual report
 - Must look back to see if the percentages were met
 - If not met, electricity suppliers must then pay a fee



Connecticut's EE Program

- CT's EE program is mandatory under state statute
- State PUC is required to assess a charge to ratepayers to implement the EE fund for conservation and load management
- The fund pays for a whole range of EE measures and provides roughly \$90M/year
 - State receives additional money from Regional Greenhouse Gas Initiative, the Forward Capacity Market and Renewable Energy Credits
- CT's is in the top four for per capita EE expenditures
- PUC annually evaluates the effectiveness of EE programs

Connecticut's Energy Efficiency Program, begun in 1998, appears to be having an impact

	1999 Electricity Consumption	2008 Electricity Consumption	Growth in Electricity Consumption, 1999 to 2008	For every 1% increase in population Electricity consumption increased:
CT	29,800 GWhs	30,900 GWhs	+ 4% (population increased 7%)	0.57%
U.S.	3,310,000 GWhs	3,730,000 GWhs	+ 13% (population increased 12%)	1.08%

In 1998, CT's legislature established the Energy Conservation Management Board, and the CT Energy Efficiency Fund

Data from EIA's State Energy Data System and U.S. Census Bureau



Approaches Discussed for Calculating Credit for Connecticut's RPS Program

■ Approach 1:

- Calculation of estimated emission reductions from the CT's RPS program in 2005 and 2016
 - Multiplied MWhrs of renewables by NOx emission rate for fossil fired EGUs
 - Provides two examples using different NOx rates for each
 - Assumes CT's fossil fuel fired EGUs will emit less
 - Assumes some clean energy options emit NOx
 - Translated into "daily" basis for SIPs

■ Approach 2:

- Use electrical supply dispatch modeling
 - Evaluate various scenarios reflecting different levels of success implementing EE and RE programs
 - This would be best done across a large geographic area

Approach 1: Method for Calculating Credit for Connecticut's RPS Program

Calculation Method	2005 {4.5% renewables} NOx Emissions Reductions	2016 {21% renewables} NOx Emissions Reductions
Example 1: ISO New England, Annual marginal rate for CT for 2005 (0.72 lbs/MW hr)	Range: 185 to 354 tons/year {0.5 to 1.0 tons/day}	Range: 1,782 to 2,228 tons/year {5.1 to 6.3 tons/day}
Example 2: Actual NOx rate from CT EGUs, CAMD, 2005 average (0.93 lbs/MW hr)	Range: 239 to 458 tons/year {0.7 to 1.3 tons/day}	Range: 2,302 to 2,878 tons/year {6.5 to 8.2 tons/day}

Lower bound of range = high quality renewables

Upper bound of range = high quality renewables plus 50% of lower quality renewables.



Approach 2: Dispatch Modeling

- States within the OTR are engaged in modeling that CT will use in its attainment demonstration
 - The Ozone Transport Commission oversees the modeling
- This modeling will include an estimate of future year NOx emissions from EGUs
- Open questions:
 - Will this prediction account for the large increase in renewables CT's legislation requires?
 - Will this prediction account for a strong, well funded EE program in CT?



Current Discussions with Connecticut

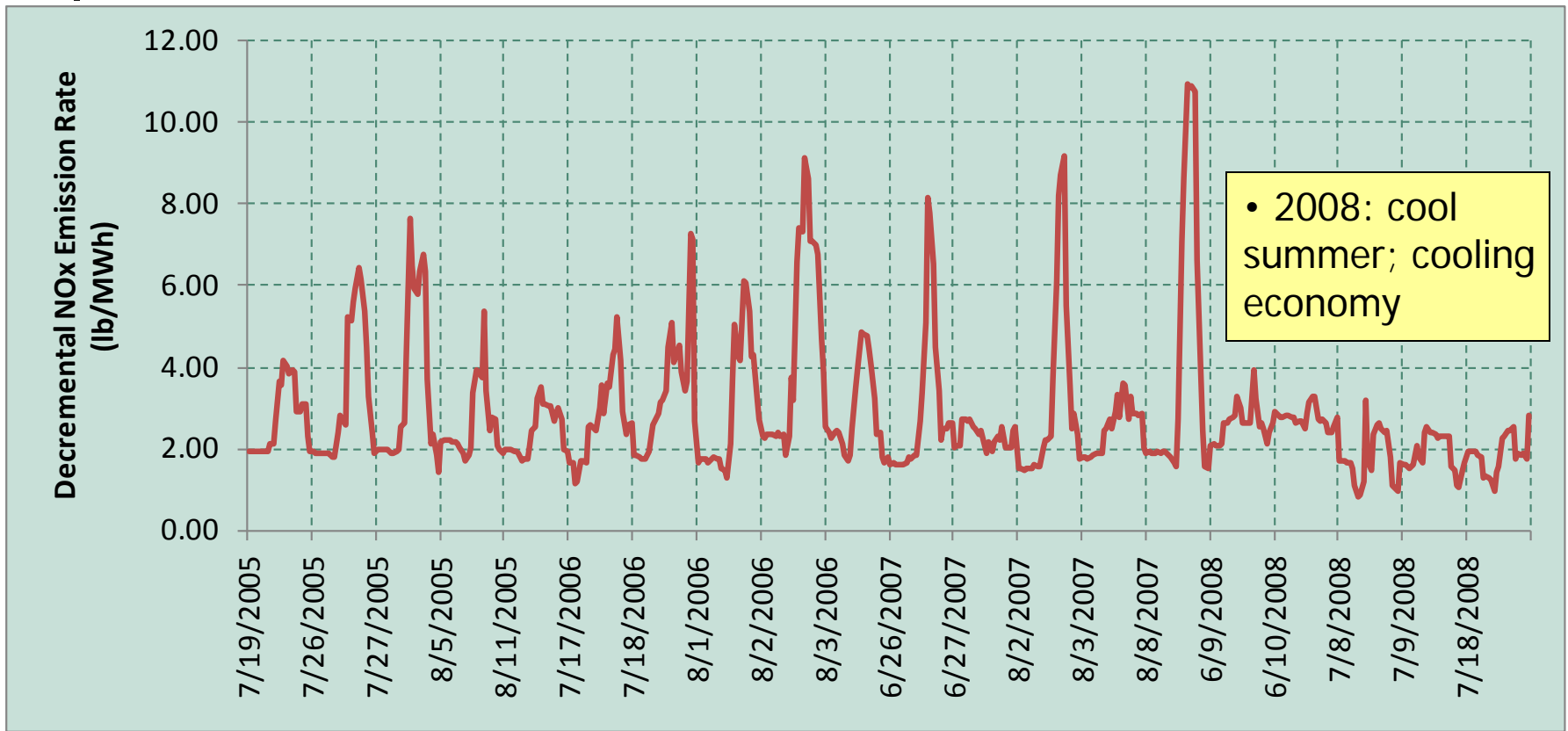
- We are developing a rough outline of what CT would need to include in their SIP for EE/RE programs
- CT will need to fill in the details
- CT will also need to work with OTC to figure out what impact the EE and RPS programs will have on future year EGU emissions
- For EE, Connecticut is likely to rely on reductions bid into ISO New England's forward capacity market



Connecticut's Initial Estimates of EE Emissions Reductions

- CT estimates about 60 MW of peak load reductions occur annually due to existing EE programs
 - These reductions are cumulative, and assumed to last for ten years
 - CT believes it can boost this to 160 MW/year if additional funding is provided
 - By 2013, CT-DEP believes EE programs can yield 10 tpd in NO_x reductions
 - Reductions on peak days are substantial because the last EGUs called up are usually high emitting units
 - EE measures can mean dirty units won't need to run

Average NOx Emission Rate for the Last 500MW Called up on Peak Days in New England



Source: ISO-New England



Agency Efforts Underway

- OAQPS is developing a workbook to apply the 2004 EE/RE guidance to a few example state programs to demonstrate how it works and to show documentation to consider
 - It will include CT's EE/RE programs
- OAR is undertaking a larger effort to lay out a roadmap for states and regions to incorporate EE/RE measures into a SIP



Questions We Are Considering

- What is the best way to invigorate efforts to take advantage in SIPs of EE/RE-generated emission reductions?
- What are the biggest obstacles?
- What are things EPA could do to help states, tribes and local agencies account for EE/RE measures in SIPs?
- What states would serve as the best examples to feature in a workbook?
- What issues concerning the application of EPA's EE/RE guidance should the workbook address?