



Recognizing State and Local Action: Resources for Incorporating EE/RE in Air Quality Plans

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**State and Local Climate and Energy
Program**



**State and Local
Climate and Energy Program**



Today's Presentation



- Overview of EPA's State Climate and Energy program
- New resources to help states quantify emission reductions of EE/RE policies and programs
 - ◆ Energy savings of EE policies and programs
 - ◆ Power Plant Emissions Calculator
 - ◆ Hourly Marginal Emissions Tool
- Future Efforts
 - ◆ Case studies
 - ◆ Exploring energy data needs for air regulators

U.S. EPA's State and Local Climate & Energy Program

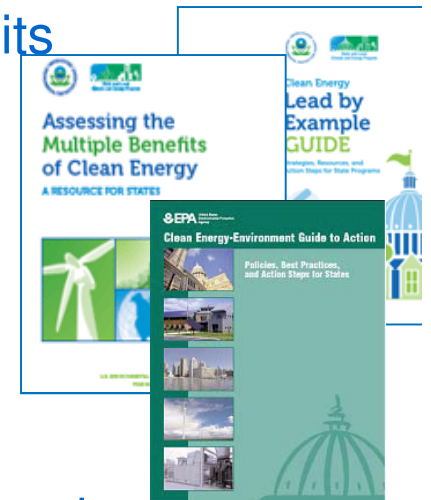


We provide tools, resources and case studies:

- ◆ EE/RE policy best practices and action steps
- ◆ Measuring energy impacts of EE/RE policies as well as emissions, climate, and economic co-benefits
- ◆ State-to-state peer exchanges
- ◆ Direct assistance through training

EPA is taking steps to help

- Including EE/RE in the compliance toolbox for air regulators
- Developing emission quantification resources and analyses that link energy & clean air goals
- Advancing a training/outreach program to further cross-agency collaboration, understanding and action



Resources to help states quantify impacts of EE/RE policies and programs



- Projected energy savings of existing state EE policies and programs 2010-2020

- Two *new* draft emission quantification tools
 - ◆ Power Plant Emissions Calculator (P-PEC)
 - ☞ Draft released with Roadmap
 - ☞ Formal peer review starting this summer
 - ☞ Official tool scheduled for release late fall

 - ◆ Hourly Marginal Emissions Tool
 - ☞ Under development
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Energy savings of existing state EE policies & programs



- EPA estimated the energy savings of existing State EE Policies
 - ◆ To help states capture emission reductions of EE policies in SIP baseline emission projections
- EPA analyzed the following EE Policies and Programs
 - ◆ Energy Efficiency Resource Standards (EERS)
 - ◆ EE programs financed by Public Benefits Funds
 - ◆ EE programs financed by the Regional Greenhouse Gas Initiative (RGGI)
- These policies are expected to reduce demand by:
 - ◆ 1.7% in 2015 and ~3% by 2020
- For more information
 - Energy Savings Estimates: <http://epa.gov/statelocalclimate/state/statepolicies.html>
 - The methodology: Appendix J of the Roadmap Manual.



NEW!



Draft Power Plant Emissions Calculator Background and Purpose

Purpose:

- Estimate which power plant could potentially reduce emissions from historical/reported :
 - ◆ EE policies and programs
 - ◆ Solar policies, programs, projects

Audience:

- ◆ State air agencies
- ◆ Local air agencies
- ◆ Energy planners interested in emission impacts

When to use tool:

- ◆ Quickly estimate potential emissions reduction for power plants within an eGRID subregion
- ◆ Understand potential emissions reduction within a county or nonattainment area.

Draft Power Plant Emissions Calculator Underpinnings

Data comes from eGRID (most recent year is 2009)

■ Power Plant Information in P-PEC

- ◆ Owner/operator, eGRID subregion, service territory, fuel type, etc.

- ◆ Emission factors

- Annual NO_x , SO_2 , CO_2 , and ozone season NO_x

- ◆ Capacity factors

- ☞ Ratio between- what was produced and the maximum capacity

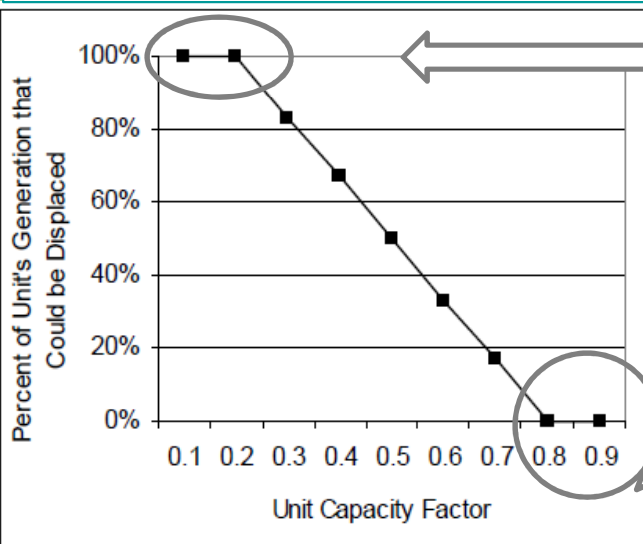
- Plants with ≥ 0.8 capacity factors would generally be nuclear or large coal plants
- Plants with ≤ 0.2 capacity factors would generally be combustion turbines, or peaking units



Draft Power Plant Emissions Calculator Assumptions

Capacity Factor Rule of Thumb

Capacity Factors Relationship to Emissions Displacement

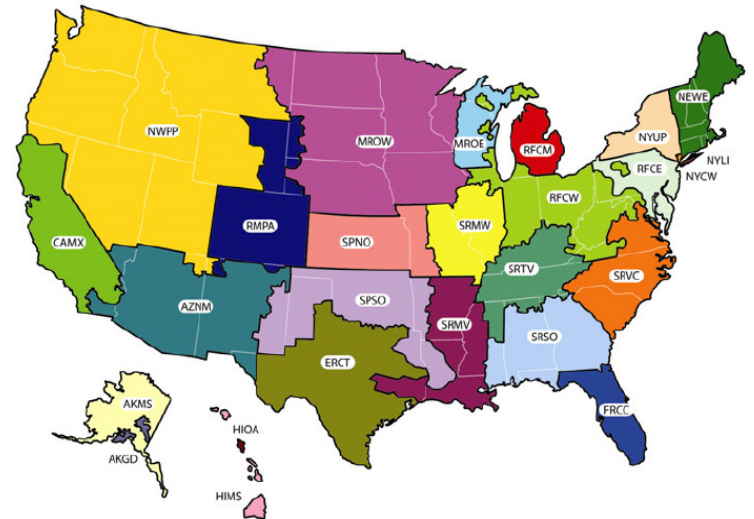


P-PEC assumes plants with these capacity factors would be displaced the most

P-PEC assumes plants with these capacity factors would not be displaced

EE/solar program impacts the set of power plants within one eGRID subregion

eGRID Subregions



Steps for Draft Power Plant Emissions Calculator



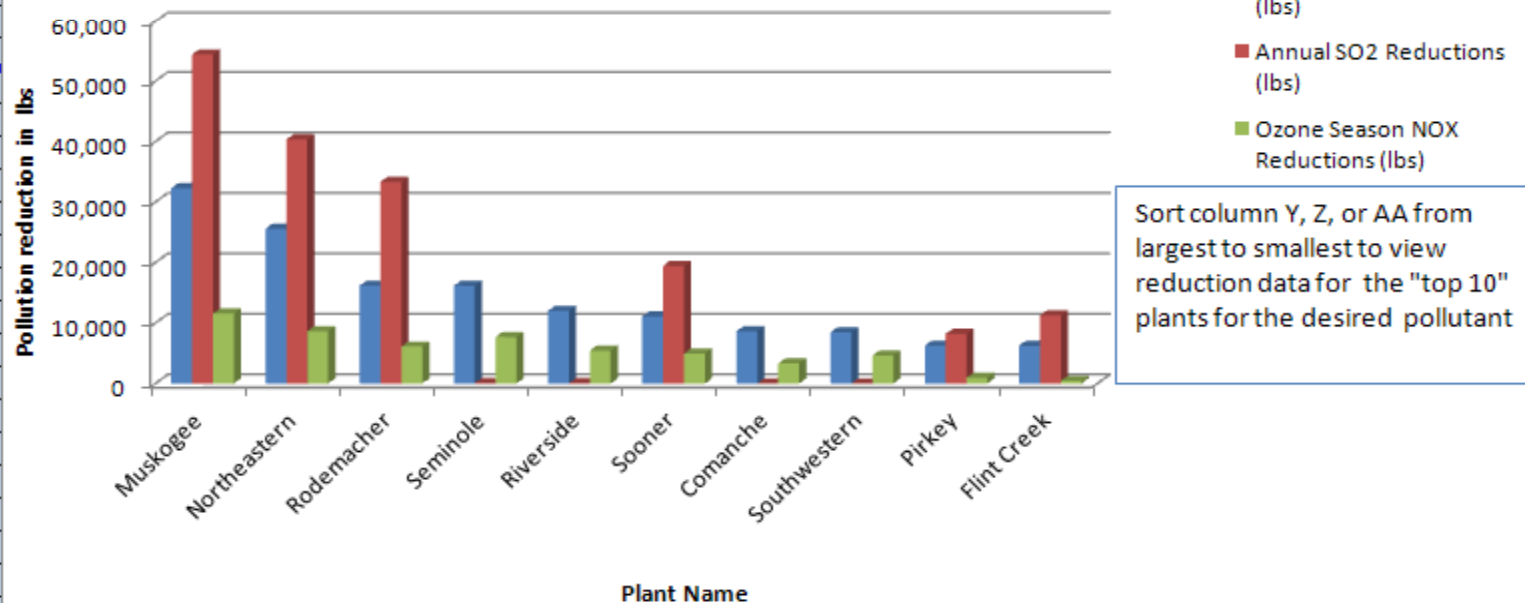
- Step 1: Locate which eGRID subregion the EE or Solar policy/program was implemented
- Step 2: Enter the Energy Impact (in MWhs) in the cell that corresponds to your eGRID subregion.
- Step 3: View potential emission reductions under the appropriate eGRID subregion worksheet

NOx, SO₂ Results in SPSO eGRID Subregion



Pollutant	Total Emission Reduction	% Reduction Based on 2010 Emissions
NOX (lbs)	226,377	0.08%
SO2 (lbs)	242,604	0.06%
CO2 (tons)	90,201	0.08%
Ozone Season NOX (lbs)	92,345	0.08%

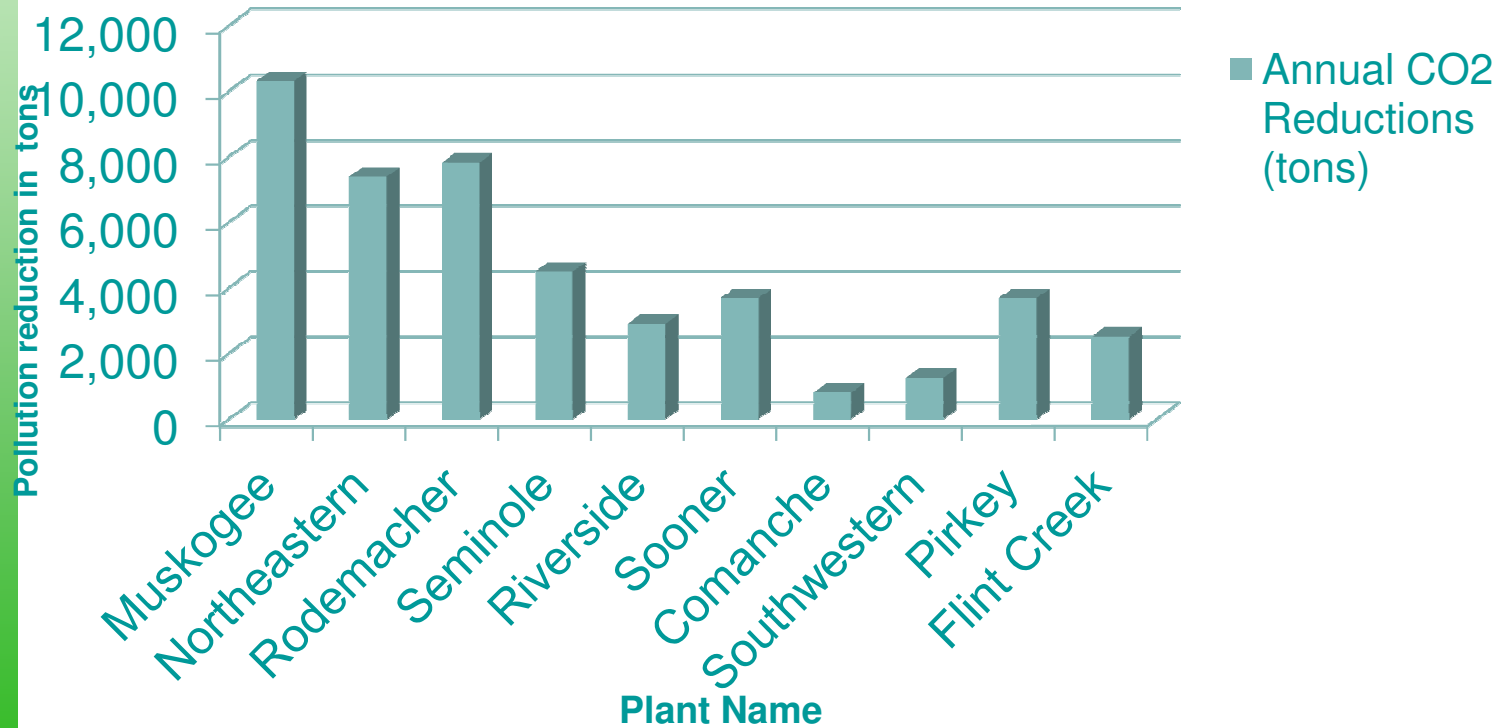
Top 10 Plants for Potential Reductions



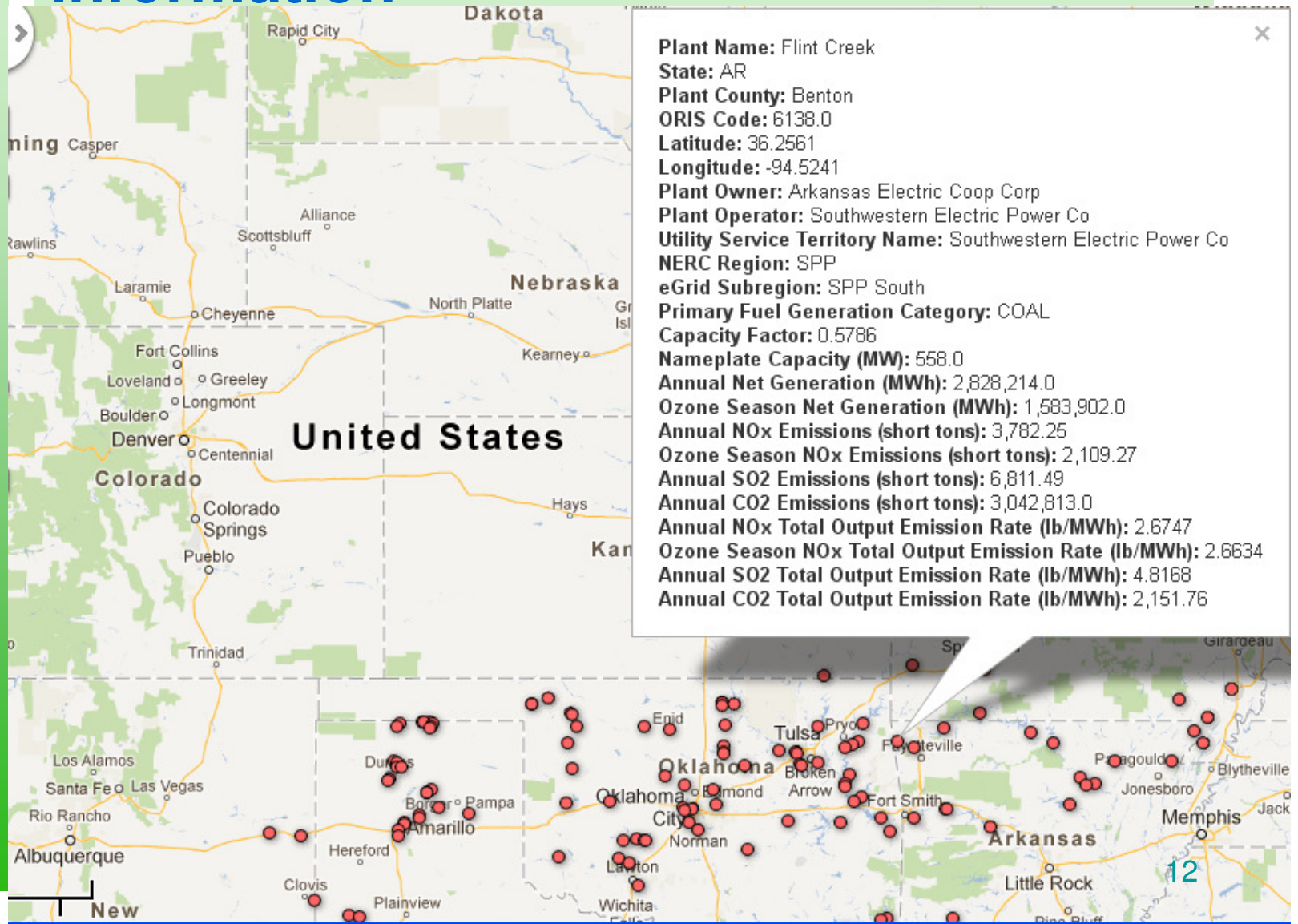
CO₂ Results from eGRID Subregion SPSO



Top 10 Plants for Potential Reductions



Google Map with Plant Location and Information





NEW!

Draft Hourly Marginal Emissions Tool

Purpose:

- ◆ This tool will help determine the marginal hourly emissions reductions of EE/RE policies and programs in a current, historical year or future year.

Audience:

- ◆ State air agencies
- ◆ Local air agencies (with expertise)
- ◆ Energy planners who are interested in emission impacts

When to use tool:

- ◆ Compare emission reductions of different EE/RE policies
- ◆ Understand emission reductions during peak demand periods
- ◆ Analyze air quality impacts of CE policies or programs (unit outputs will be compatible with air quality modeling)

Hourly Marginal Emission Tool Overview



Underlying data and assumptions:

- Hourly monitored generation and emissions data reported to U.S. EPA for national regulatory programs (e.g., Acid Rain)
- Statistical model based on historical dispatch behavior

Inputs:

- Use default hourly profiles for a specific EE program, or portfolio of programs
 - ◆ Or, use custom hourly load profile information
- Solar or Wind capacity

Outputs:

- Hourly emission reductions compatible with air quality models

Preview of Hourly Marginal Emissions Tool

1. Select Region for Analysis



2. Enter EE/RE Information

Select Type of RE/EE profile

- Reduce load by constant n MW
- User Input
- Reduce load by n %
- Reduce load by annual n MWh
- Reduce load by constant n MW
- Renewables

n MW:

2000

Load is reduced by 2000 MW in every hour.

Hour	User Input (Hourly MW)	Final
1		-2000.000
2		-2000.000
3		-2000.000
4		-2000.000
5		-2000.000
6		-2000.000
7		-2000.000
8		-2000.000
9		-2000.000
10		-2000.000
11		-2000.000
12		-2000.000
13		-2000.000
14		-2000.000
15		-2000.000
16		-2000.000
17		-2000.000
18		-2000.000

Hourly Marginal Emission Tool

Sample Views

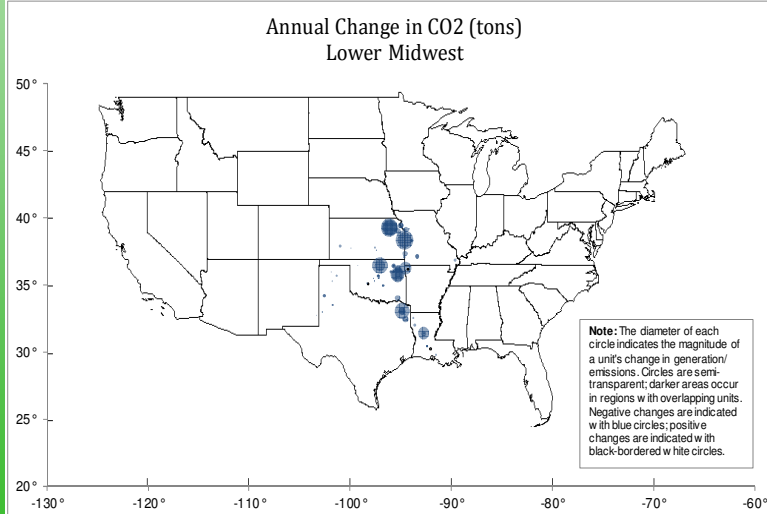


Map showing the magnitude of change in generation/ emissions.

Monthly Data for Region, State or County

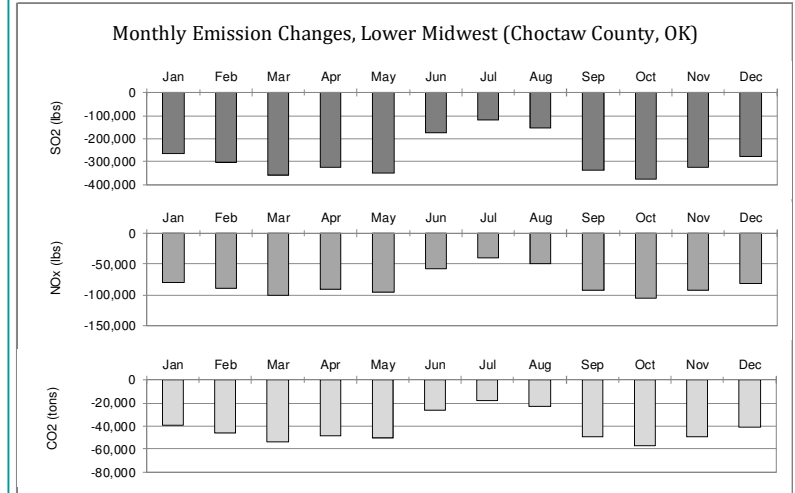


Select variable to display: Refresh map with selected variable.



Select level of Aggregation:
 Select State:
 Select County:

Refresh bar charts with geography selected at left



Feedback on *Draft* Emission Quantification Tools



■ EPA Peer review process

◆ Power Plant Emissions Calculator (P-PEC)

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■ State Environment Departments

□ Air staff can test functionality and air quality modeling usability

- Send comments on P-PEC to Robyn DeYoung by August 30, 2012
- Tool can be found at:

<http://www.epa.gov/airquality/eere/quantify.html>

Future Efforts



Case Studies focused on:

- ◆ Emission quantification
- ◆ States piloting SIP pathways
 - ☞ NY (control strategy),
 - ☞ MA (baseline) and
 - ☞ MD (weight of evidence)



Exploring energy data needs for air regulators:

- We are helping states air regulators:
 - ◆ Understand basic issues with EE data and Evaluation Measurement & Verification (EM&V)
 - ◆ Clarify the appropriate type of energy information to use in avoided-emissions calculations
 - ◆ Identify data sources, appropriate methods, and state examples
- We will be following up with states and their associations (NACAA, NASEO, NARUC) about opportunities for convening air regulators



Questions?



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