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

EPA National Webinar

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State and Local Climate and Energy Program

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U.S. EPA

State and Local Climate and Energy Program

EPA

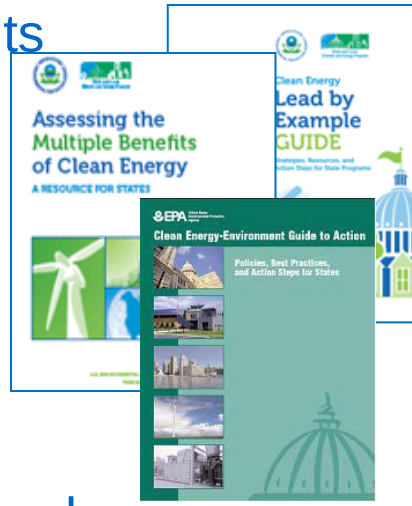
Today's Presentation

- Overview of EPA's State Climate and Energy Program
- Resources to help include impacts of EE/RE in air quality planning
  - Four emission quantification approaches
  - New Draft EE/RE Emissions Calculators
    - Power Plant Emissions Calculator
    - Hourly Marginal Emissions Tool
- Energy policy and measurement resources
  - Projected energy savings of EE policies and programs

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

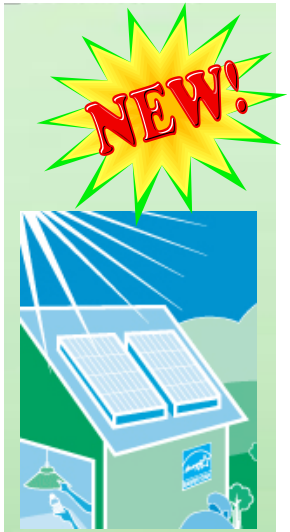
http://epa.gov/statelocalclimate/

Four Emission Quantification Approaches

Appendix I of the Roadmap describes four approaches to quantify emission benefits of EE/RE policies and programs

Approach	Available Tools	Electric Generating Unit (EGU) Data
eGrid subregion non-baseload approach	Power Plant Profiler and Portfolio Manager	EPA's eGRID
Capacity factor approach	P-PEC	EPA's eGRID
Reported Hourly emissions approach	Hourly Marginal Emissions Tool	EPA's Air Market's Program Data
Energy modeling approach	IPM, MARKAL, Ventyx	Varies

Methods range from basic to sophisticated



Draft Power Plant Emissions Calculator Overview

Background:

- P-PEC uses the capacity factor emission quantification approach
- Simplified tool that locates emission reductions using eGRID information
  - Emission factors, power plant info and capacity factors all come from eGRID

Purpose:

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

Audience:

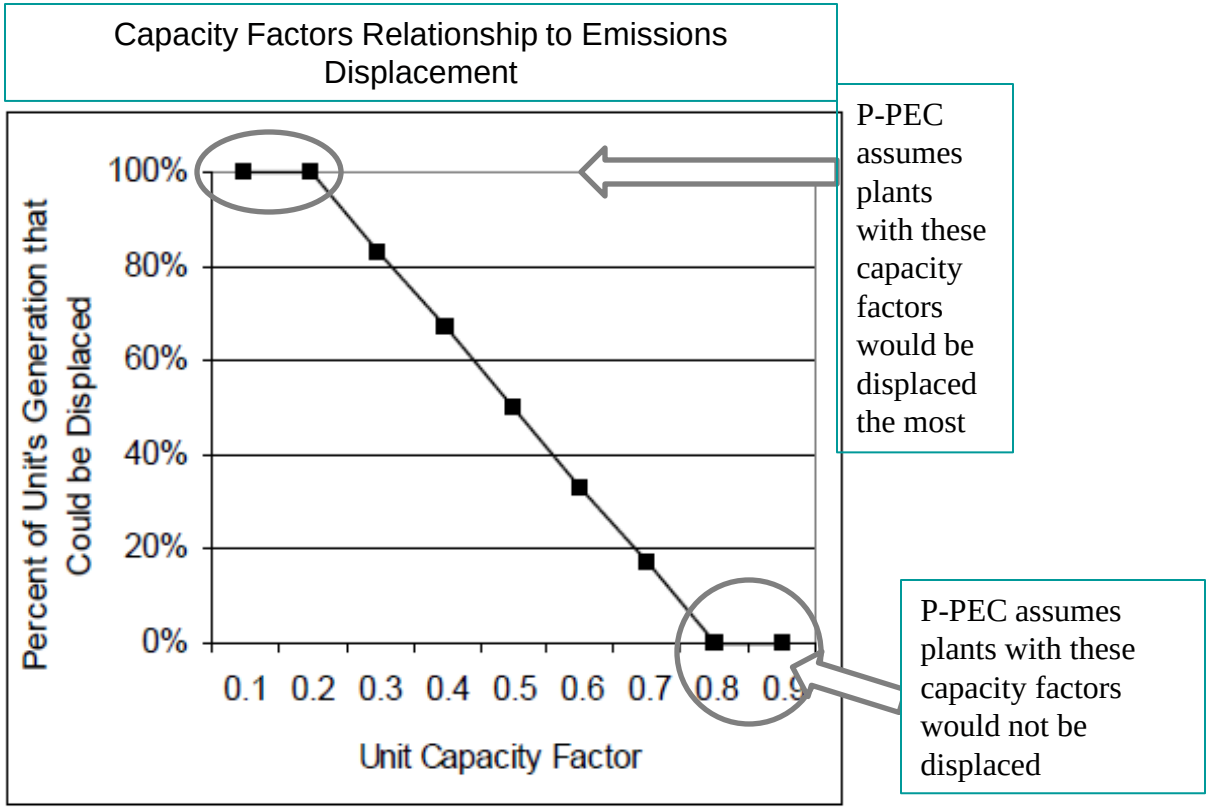
- State and local air agencies
- Energy planners interested in emission impacts

When to use tool:

- Quickly estimate magnitude of emission reductions for each power plant within an eGRID subregion
- Understand potential emission reductions within a county or nonattainment area.

Draft Power Plant Emissions Calculator Assumptions

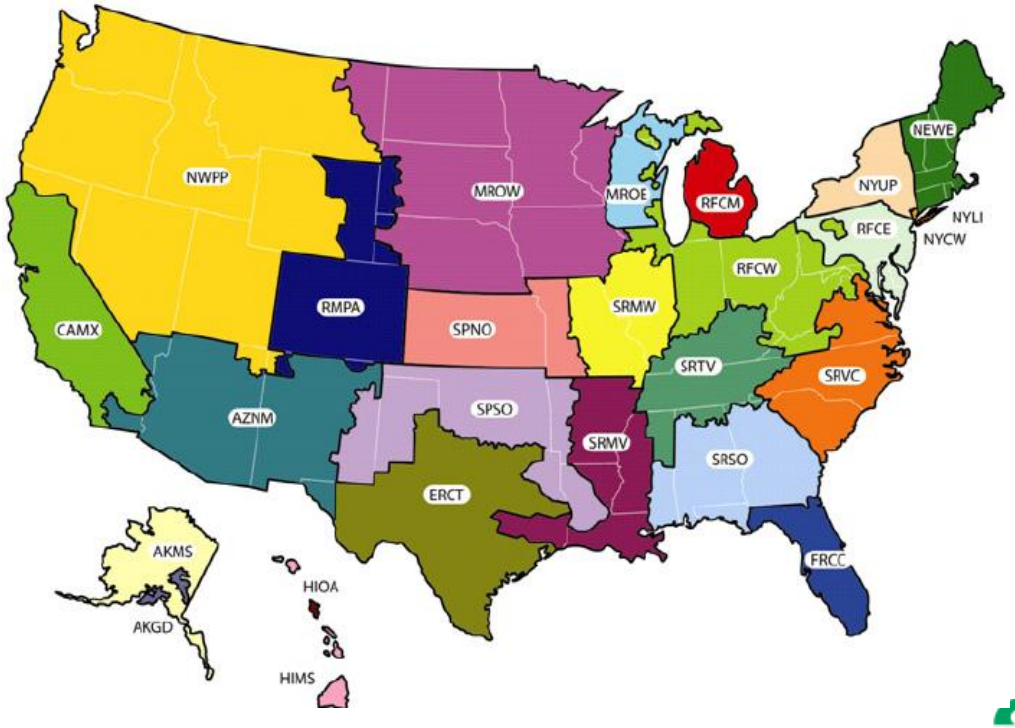
Capacity Factor Rule of Thumb



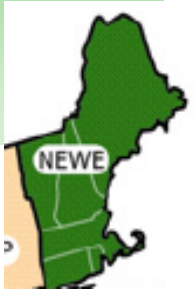
Draft Power Plant Emissions Calculator Assumptions

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

eGRID Subregions



Draft Power Plant Emissions Calculator Demonstration



Step 1: Identify EE policy or program and estimate energy savings

- Energy Efficiency Resource Standards (EERS) and rate-payer funded programs in New England
  - Estimated energy savings in 2010: 1,238 GWhs
    - Connecticut – 360 GWhs
    - Massachusetts – 624 GWhs
    - New Hampshire – 44 GWhs
    - Rhode Island – 89 GWhs
    - Vermont – 121 GWhs

- Energy savings estimates are from EPA's analysis of existing state EE policies not explicitly reflected in AEO 2010
  - For more information visit: http://epa.gov/statelocalclimate/state/statepolicies.html

Draft Power Plant Emissions Calculator Demo

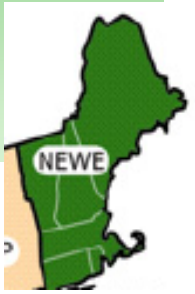
Step 2: Locate the eGRID subregion in which the EE policy/program was implemented.

- If an eGRID subregion splits a state, find out which utilities are implementing the program and match up their service territory with an eGRID subregion.
  - Go to complete summary tab in P-PEC for match up

Step 3: Convert GWhs to MWhs (1GWh = 1,000 MWhs) and enter energy savings in P-PEC

- **Example energy savings in 2010: 1,238,000 MWhs**

Power Plant Emissions Calculator Results for New England Region

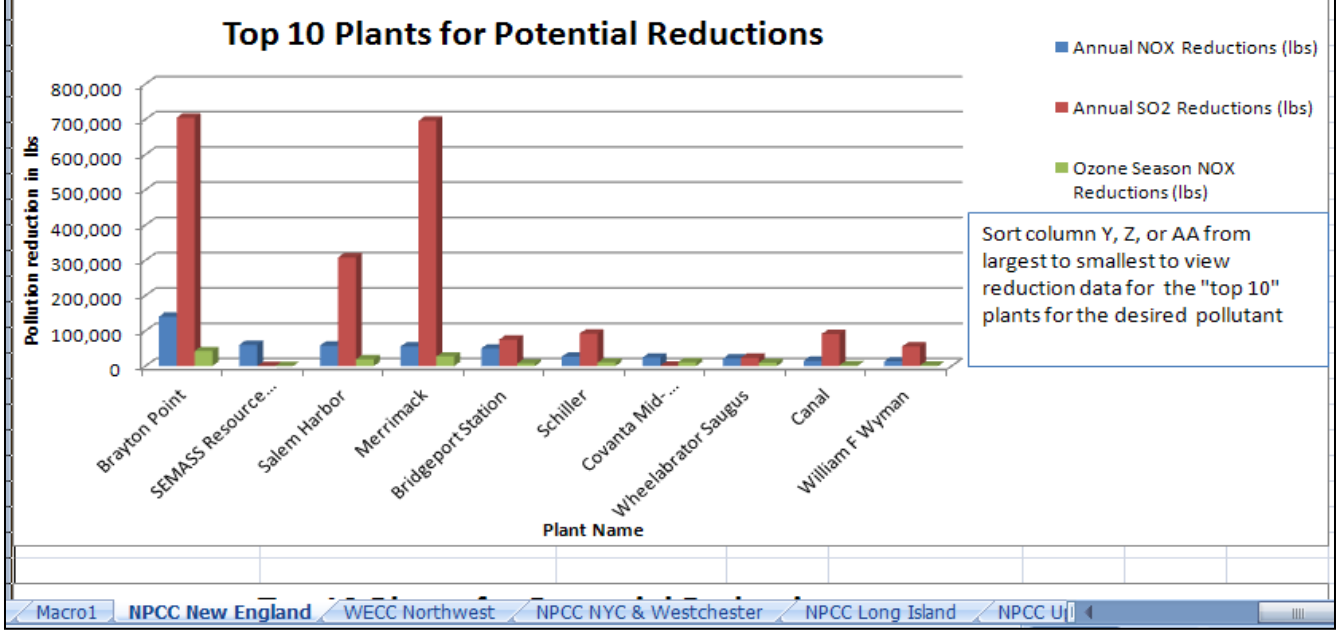


Step 4: Refer to eGRID region worksheet tab in P-PEC for results

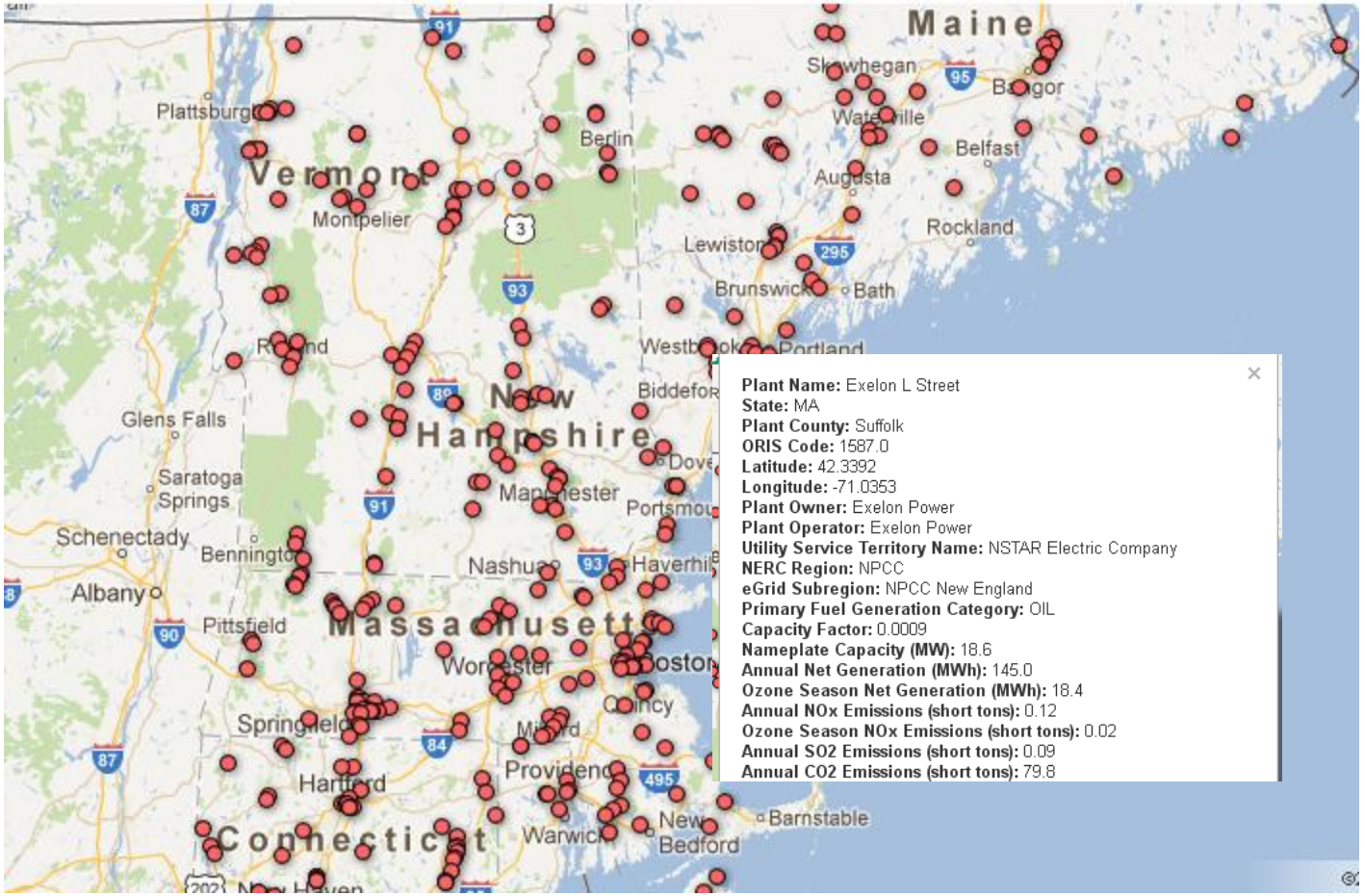
Pollutant	Total Emission Reduction	% Reduction Based on 2010 Emissions
NOX (lbs)	748,703	1.17%
SO2 (lbs)	2,443,035	1.42%
CO2 (short tons)	662,626	1.49%
Ozone Season NOX (lbs)	231,740	1.17%

Map of All NPCC New England Power Plants

NPCC New England



Google Map with all Plants in NEWE eGRID Region



Draft Power Plant Emissions Calculator Process and Outreach

Status:

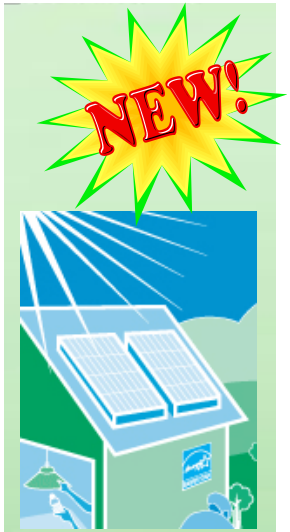
- Draft version released on July 3, 2012
- Peer review underway this summer
- Plan to release official tool late 2012

Outreach:

- Webinars:
  - July 2012: NACAA and NESCAUM
  - Aug 27th: national webinar w/ OAQPS
  - Sept: training for EPA regions
  - Recorded training will be available online

Future plans:

- Revise tool based on peer review findings
- Support and maintain tool with most recent eGRID information



Hourly Marginal Emissions Tool
(under development)

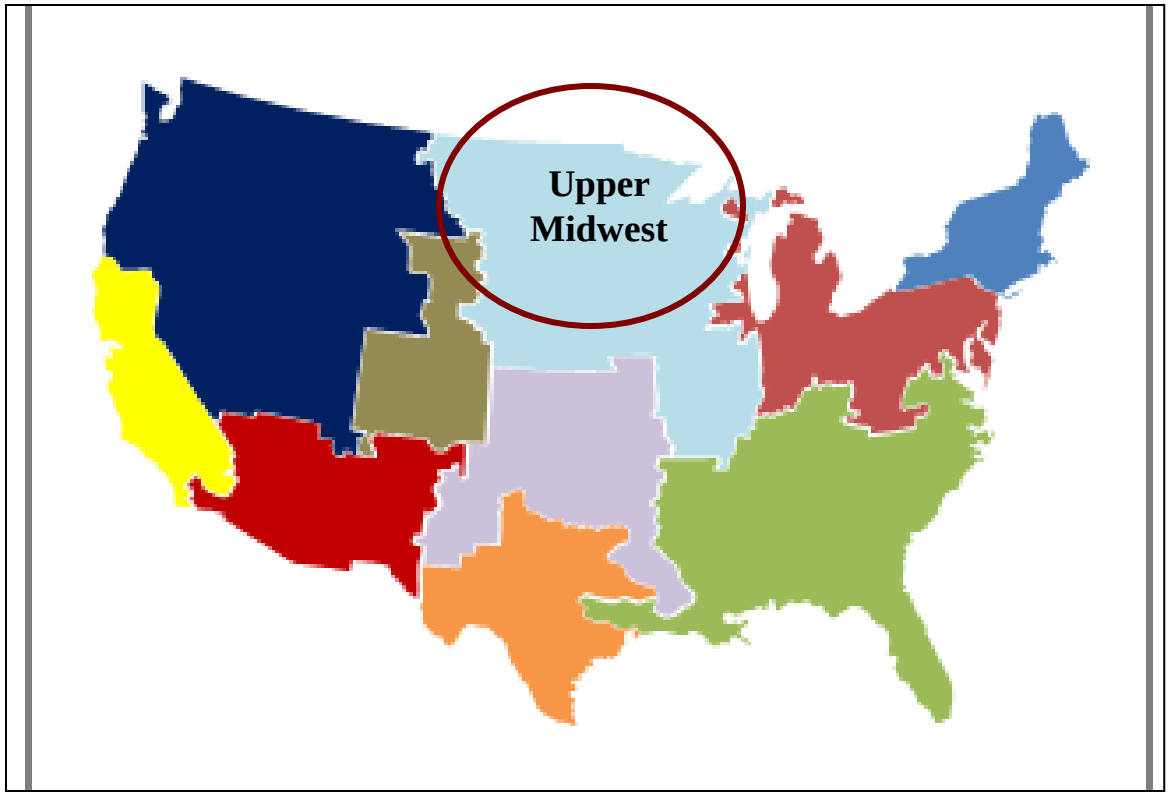
Overview:

- The tool is a statistical dispatch simulator that predicts the hourly changes in generation and air emissions at electric generating units (EGUs) resulting from EE/RE policies and programs.
- State and local governments can:
  - Identify hourly changes “on the margin” compared to baseline
  - Understand emission reductions during peak demand periods (e.g., High Electric Demand Days)
  - Compare emission impacts of different EE/RE programs (e.g., wind v. solar generation)
- Tool uses reported Acid Rain Program unit level data from EPA Air Market’s Program Data for a specified year (units greater than 25 MWs)
  - Exploring future year projection capabilities

Hourly Marginal Emissions Tool Example –Upper Midwest

Step 1.

Select Region for Analysis



Upper Midwest includes: IA, IL, MN, MO, MT, ND, NE, SD, WI

Hourly Marginal Emissions Tool Example –Upper Midwest

Step 2. Estimate Energy Savings for States within the Region

State's Energy Efficiency Resource Standards (EERS) and rate-payer funded programs

- Estimated energy savings in 2012: 8,127 GWhs
  - IA: 1,332 GWhs
  - IL: 2,757 GWhs
  - MN: 2,947 GWhs
  - MT: 113 GWhs
  - WI: 978 GWhs

- Energy savings estimates are from EPA's analysis of existing state EE policies not explicitly reflected in AEO 2010
- For more information visit: http://epa.gov/statelocalclimate/state/statepolicies.html

Hourly Marginal Emissions Tool Example –Upper Midwest

Step 3. Enter EE/RE Information

Select Type of RE/EE profile

Reduce load by annual n MWh

n MWh: 8,127,000 MWhs

Load is reduced by 8,127,000 MWhs throughout the year

Note: Within the context of this page, "MW" represent the energy reduced in one hour, while "MWh" represent the total energy reduced over two or more hours.

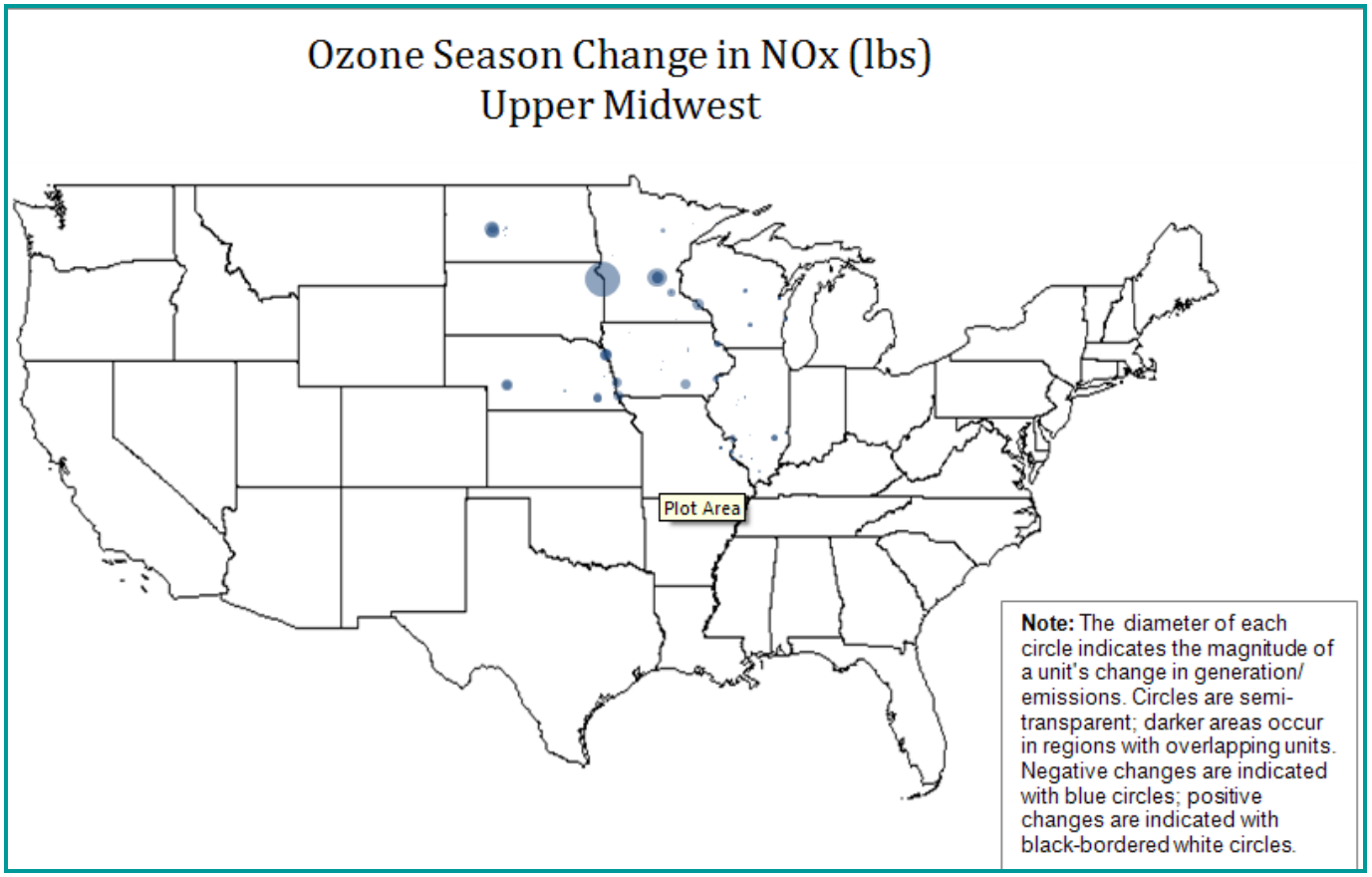
Note: If changes are made to the EE profile, return to Step 6 to refresh the values for displaced generation and emissions.

Click here to go back to Step 6.

Hour	User Input (Hourly MW)	Final
1		-141.324
2		-141.324
3		-141.324
4		-141.324
5		-141.324
6		-141.324
7		-141.324
8		-141.324
9		-141.324
10		-141.324
11		-141.324
12		-141.324
13		-141.324
14		-141.324
15		-141.324
16		-141.324
17		-141.324
18		-141.324
19		-141.324
20		-141.324
21		-141.324
22		-141.324
23		-141.324
24		-141.324
25		-141.324
26		-141.324
27		-141.324
28		-141.324

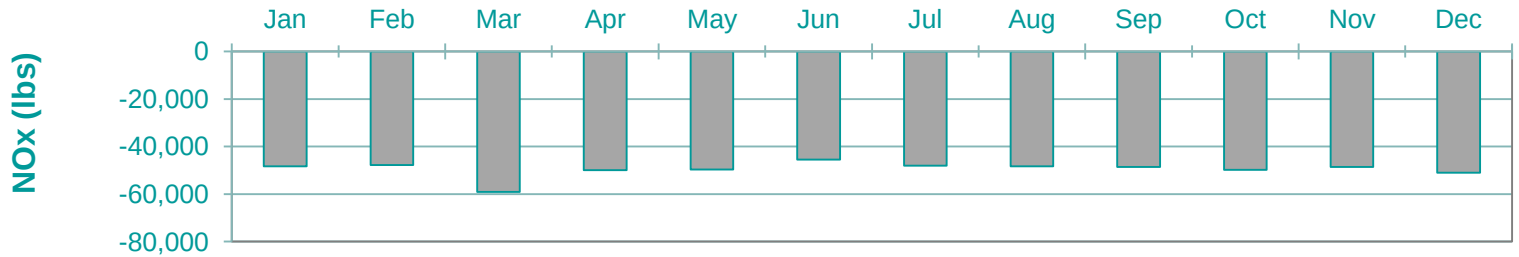
Hourly Marginal Emission Tool

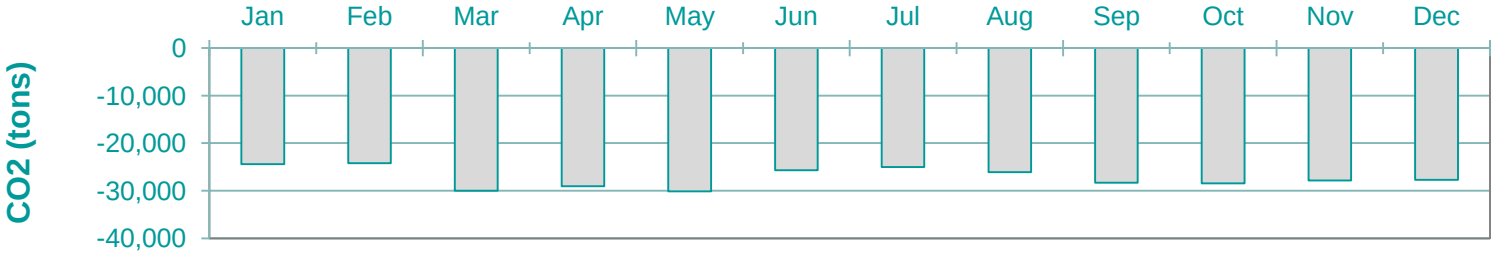
Map of change in emissions

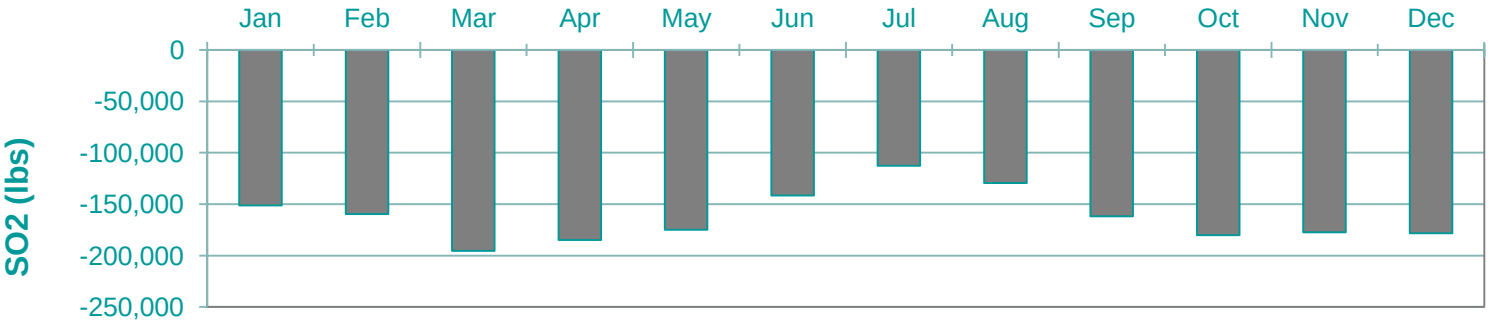


Annual Emission Reductions in Upper Midwest
NOx reductions: 7,200 tons
CO2 reductions : 7,600,000 tons
SO2 reductions : 17,800 tons

Hourly Marginal Emission Tool Monthly Charts - Wisconsin







Hourly Marginal Emissions Tool Process and Outreach

Status:

- Draft tool under development
- Peer review scheduled for fall 2012
- Plan to release official tool winter early 2013

Outreach:

- Provide webinars and trainings early 2013
  - EPA Regions
  - State air agencies
  - State energy regulators

Future plans:

- Revise tool based on peer review findings
- Support and maintain tool with most recent data or projections

Energy Savings of Existing State EE Policies & Programs

- EPA estimated the energy savings of existing State EE policies through 2020
- Intended to help states capture emission reductions of EE policies in SIP baseline emission projections
- Policies include:
  - Energy Efficiency Resource Standards (EERS)
  - EE programs financed by Public Benefits Funds
  - EE programs financed by the Regional Greenhouse Gas Initiative (RGGI)
- EE policy impacts (MWh) reduce demand ~ 3% in 2020
- For more information
  - Energy savings estimates: http://epa.gov/statelocalclimate/state/statepolicies.html
  - Methods & approach: Appendix J of the Roadmap Manual

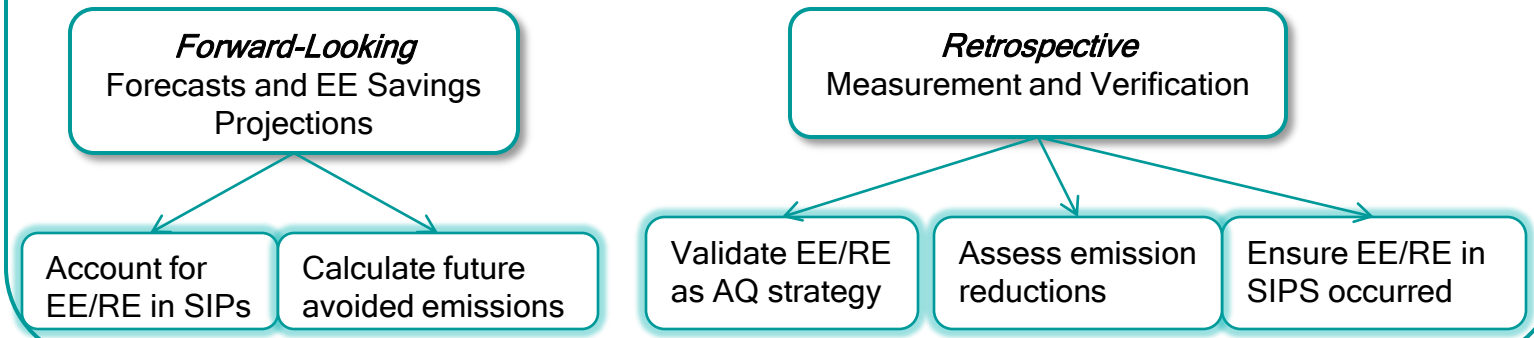
Opportunity & Issues for Air Regulators

- Roadmap and complementary tools can help air planners incorporate EE/RE in air quality plans
  - Understand if the magnitude of impact is worth air planners' time
- Working with States to bolster successful examples
  - Quantification and each SIP pathway
- Helping state and locals get started

Taking Steps to Help Clarify EE/RE Data Needs

- Provide basic information to help air regulators
  - Answer key questions
  - Understand EE/RE policies and programs
  - Confirm that EE/RE impacts are real
- Help air regulators consult existing sources of EE/RE data, resources, and expertise

EE/RE Data from State Energy Offices and Public Utility Commissions:



Questions?

Emission Quantification and EE/RE Policies/Programs

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EE/RE Roadmap Manual

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Roadmap Manual Website:

http://www.epa.gov/airquality/eere/index.html