

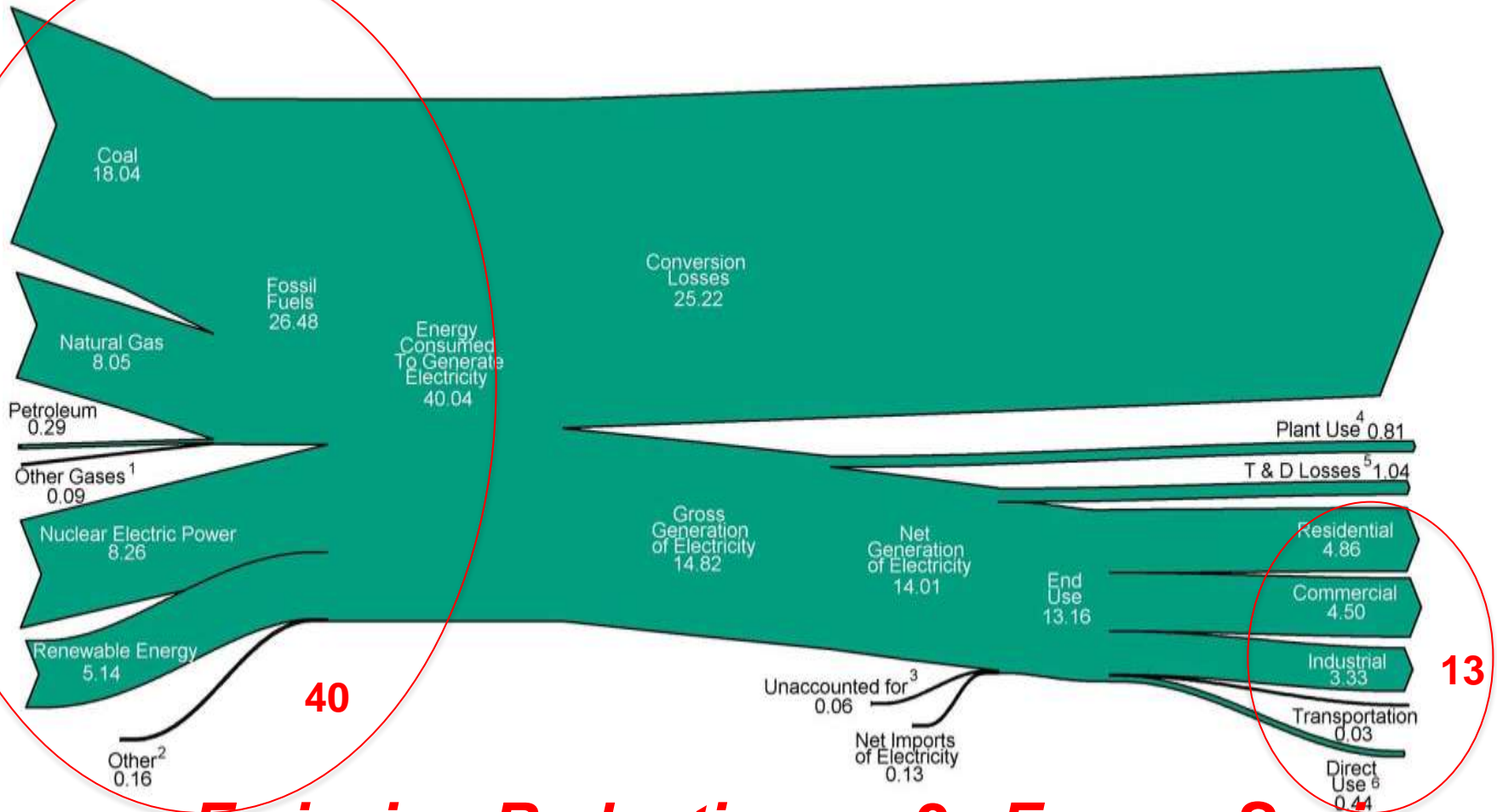
Capturing the Emissions Reduction Benefits of Energy Efficiency

NASEO-ASRETTI Energy Outlook Conference
February 6, 2013 – Washington, DC

Presented by Ken Colburn

Figure 8.0 Electricity Flow, 2011
(Quadrillion Btu)

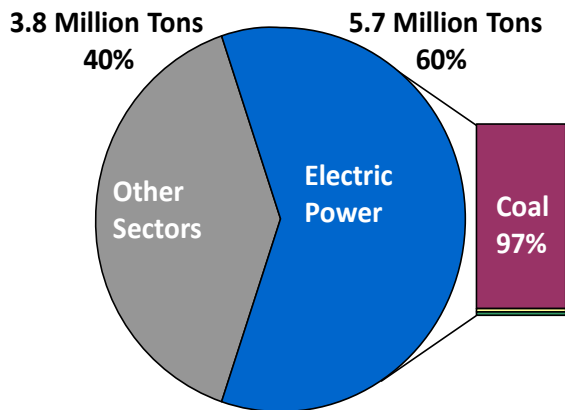
**U.S. Energy Information Administration
Annual Energy Review 2011**



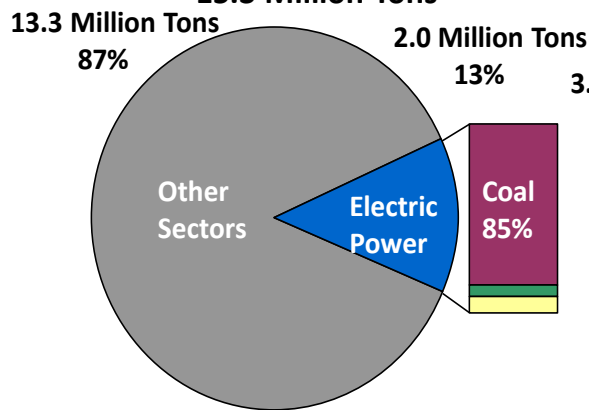
Emission Reductions = 3x Energy Savings

Power Sector: A Major Share of US Air Emissions

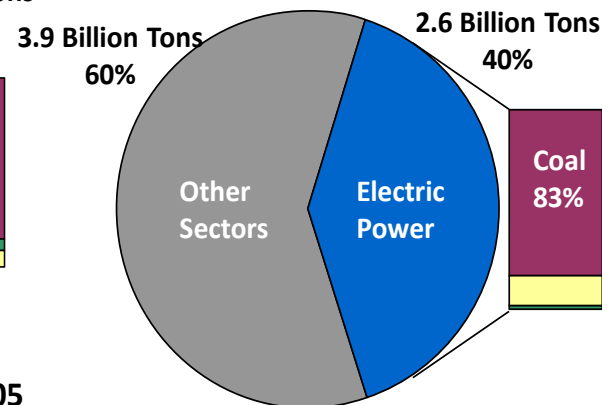
Sulfur Dioxide (SO₂), 2009
9.5 Million Tons



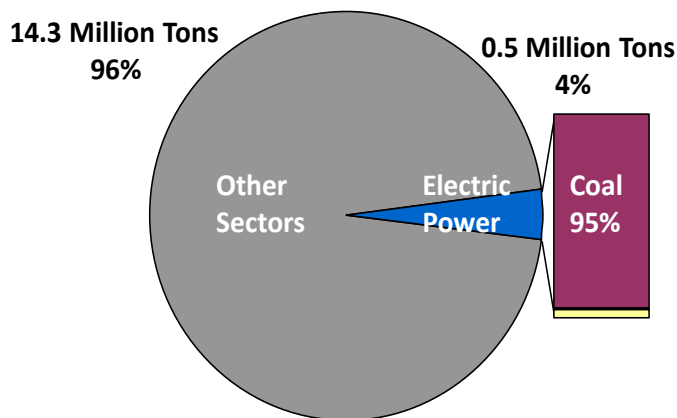
Nitrogen Oxides (NO_x), 2009
15.3 Million Tons



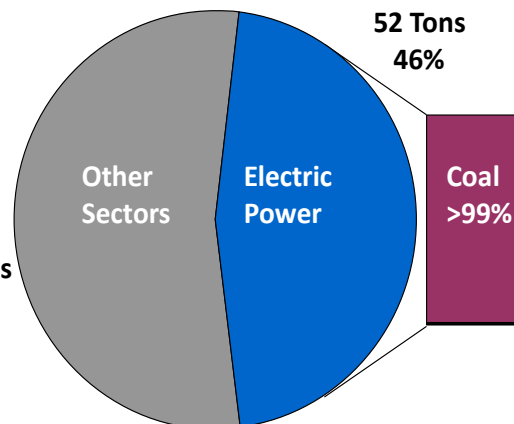
Carbon Dioxide (CO₂), 2008
6.5 Billion Tons



Particulate Matter (PM₁₀), 2005
14.8 Million Tons



Mercury (Hg), 2005
114 Tons



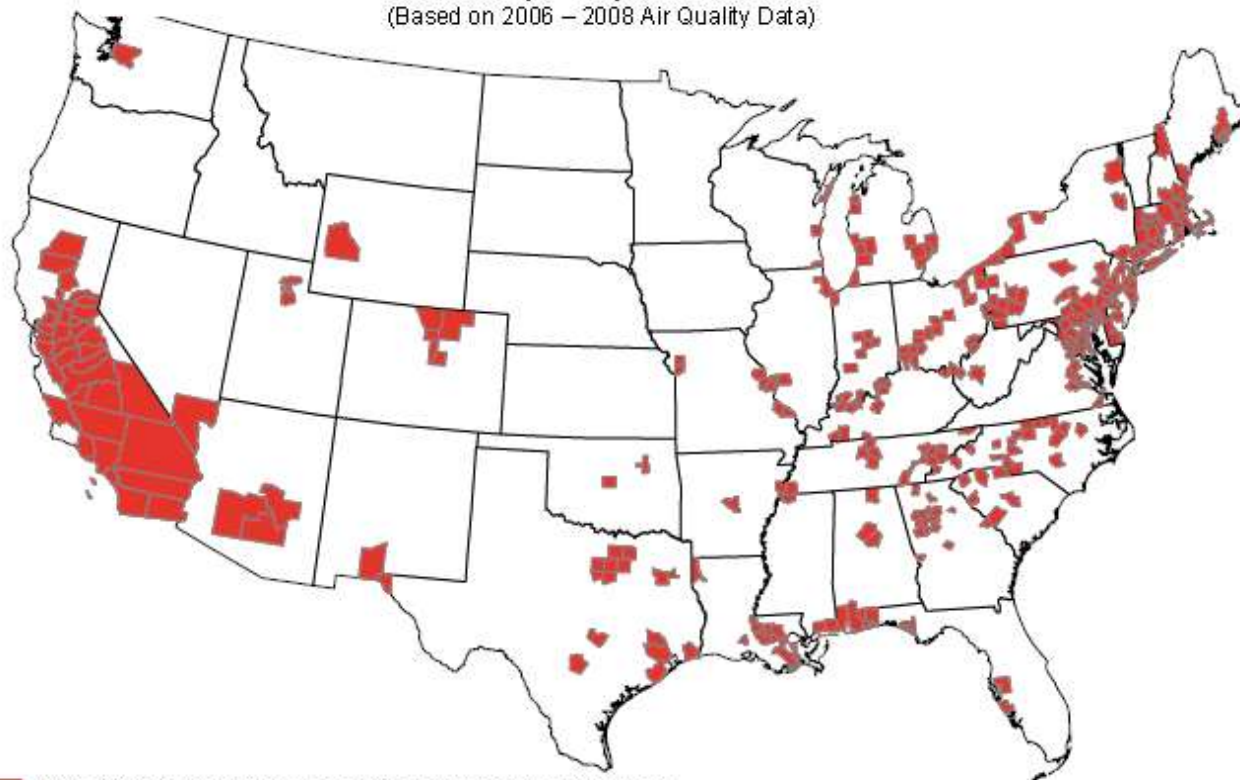
Coal-fired power plants: vast majority of power sector air emissions

Sources: SO₂ and NO_x - NEI Trends Data and NEI 2005 Version 2 (2009) and CAMD Data & Maps (2010); PM₁₀ - NEI Trends Data (2009); Hg - NEI 2005 Version 2 (2009); CO₂ - Inventory of U.S. GHG Emissions and Sinks: 1990-2008 (2010) and 1990-2007; "Other" sources include transportation, other mobile sources, and industrial sources

2008 Ozone NAAQS

Counties With Monitors Violating the March 2008 Ground-Level Ozone Standards
0.075 parts per million

(Based on 2006 – 2008 Air Quality Data)



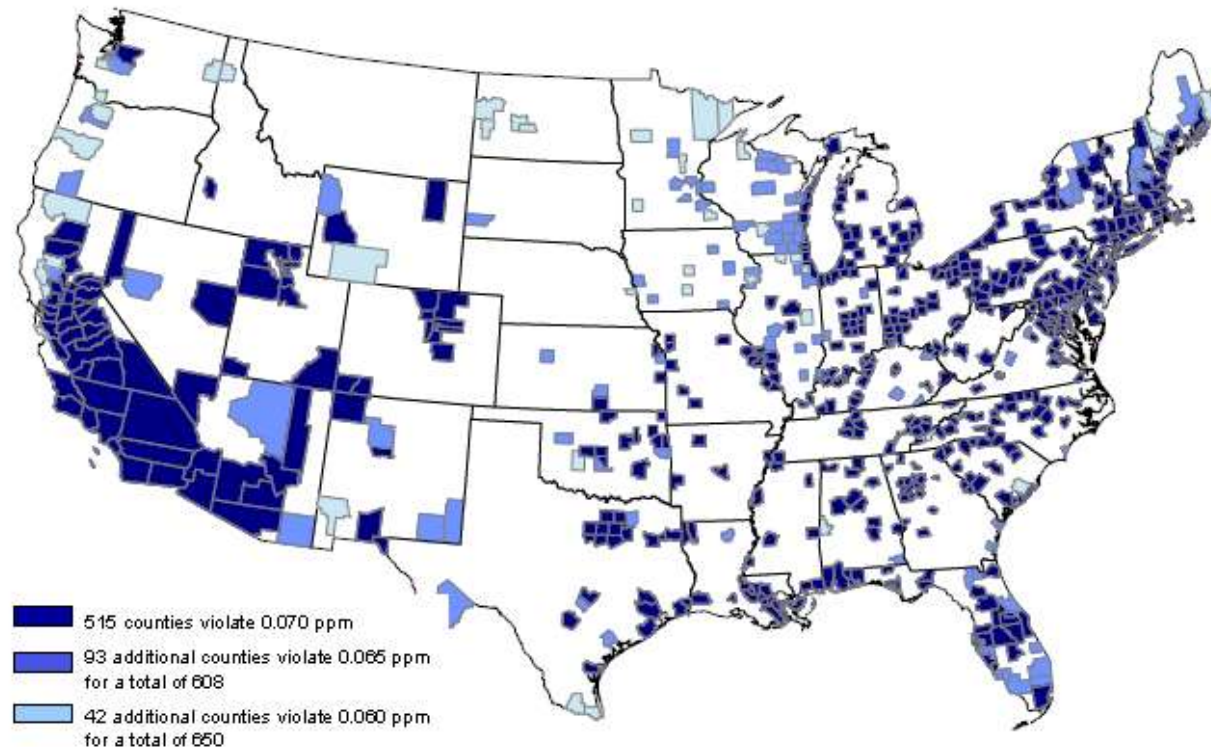
322 of 675¹ monitored counties violate the standard

What if the Ozone NAAQS is Tightened?

Counties With Monitors Violating Primary 8-hour Ground-level Ozone Standards 0.060 - 0.070 parts per million

(Based on 2006 – 2008 Air Quality Data)

EPA will not designate areas as nonattainment on these data, but likely on 2008 – 2010 data which are expected to show improved air quality.



Notes:

1. No monitored counties outside the continental U.S. violate.
2. EPA is proposing to determine compliance with a revised primary ozone standard by rounding the 3-year average to three decimal places.

Consequences of Nonattainment



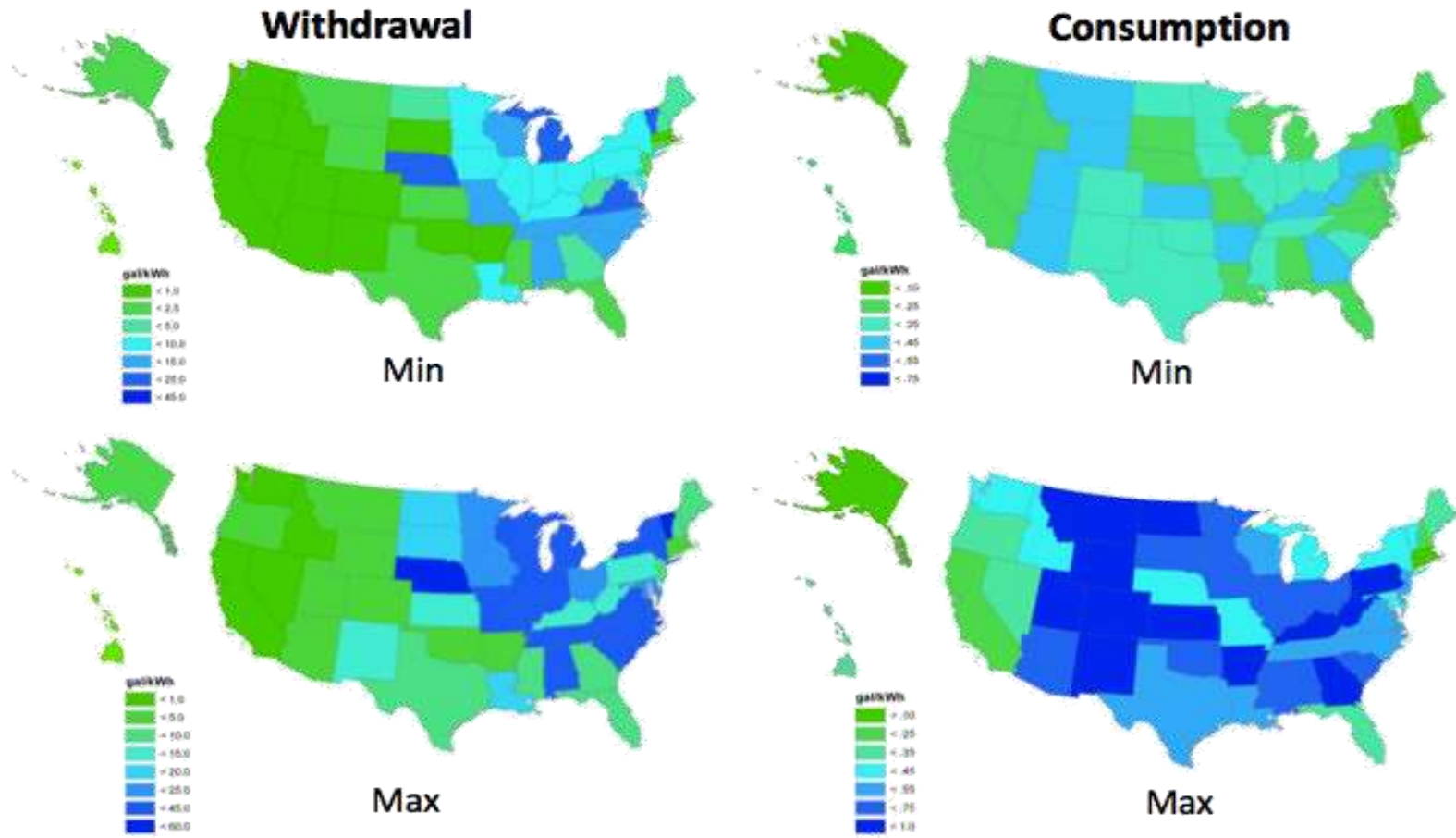
A non-attainment designation under the Clean Air Act carries serious repercussions including the loss of federal highway funding and the loss of economic development opportunities.

- **Loss of Federal Highway and Transit Funding**
One year from the date of a non-attainment designation, federally funded highway and transit projects will not be allowed to proceed unless the state demonstrates there will be no increase in emissions associated with the projects.
- **Boutique Fuels**
Non-attainment areas are subjected to the Clean Air Act's reformulated gasoline program, which significantly raises the price of motor vehicle fuels for consumers.
- **Enhanced Regulatory Oversight**
Once an area is designated as being in non-attainment, EPA has the authority to intervene and revise permitting decisions throughout the state.
- **Restrictive Permitting Requirements**
New and upgraded facilities in, or near, non-attainment areas are required to install the most effective emissions reduction controls without consideration of cost. Operators of existing facilities may also be required to install more restrictive control technologies than are otherwise required for similar units in areas that are in attainment.
- **Mandatory Emissions Offsetting**
Prior to permitting the construction of new facilities, a state must offset any emissions increases by achieving reductions at existing facilities.
- **Loss of Economic Development Opportunities**
The added regulatory and paperwork burdens, as well as expenses associated with constructing new facilities, or expanding existing ones, limit the amount of economic investment in non-attainment communities.

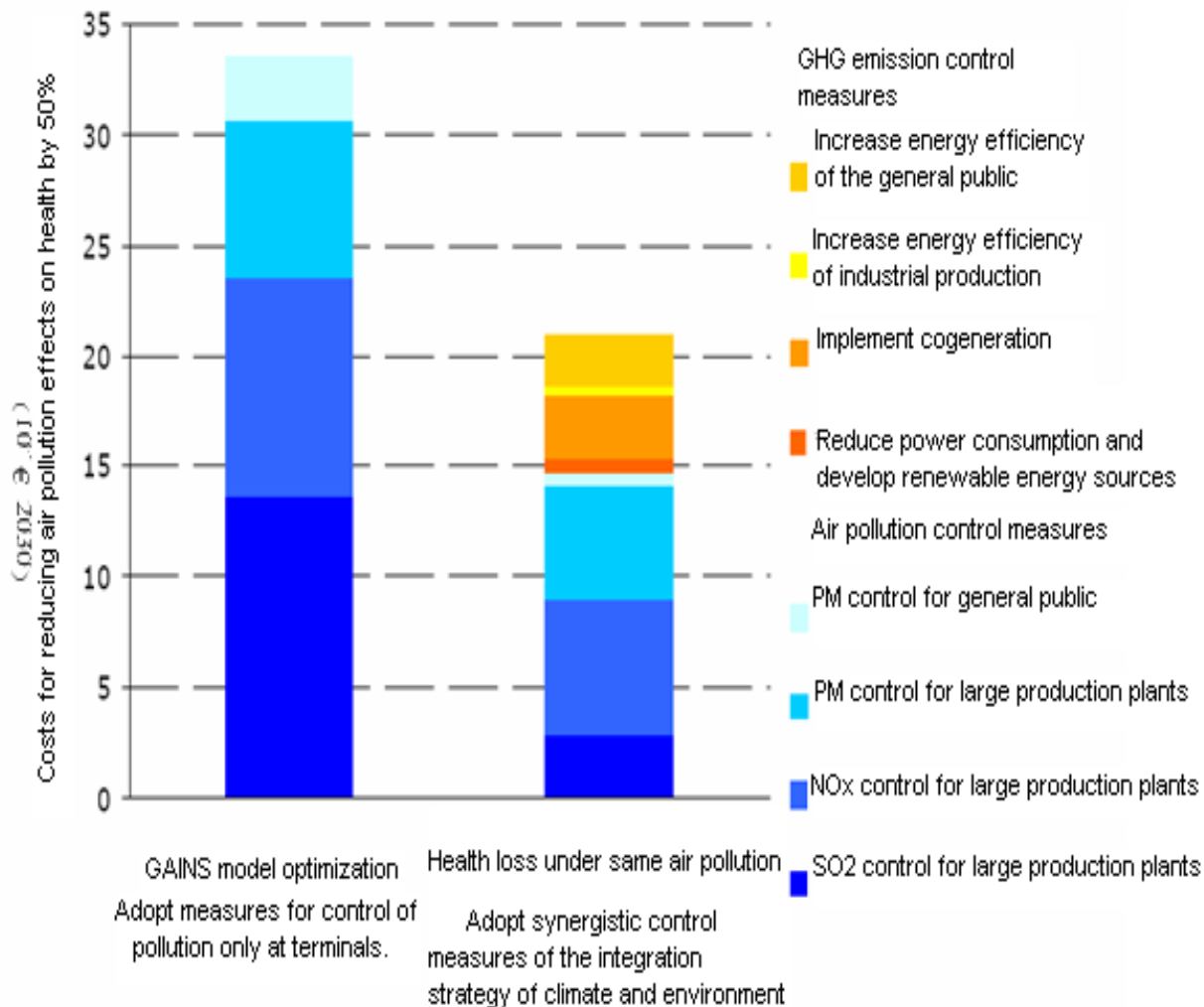
US Water Consumption for Power Generation

Figure 1: Freshwater intensity of power

(2008 data; calculated from EW3 database using minimum and maximum NREL values)

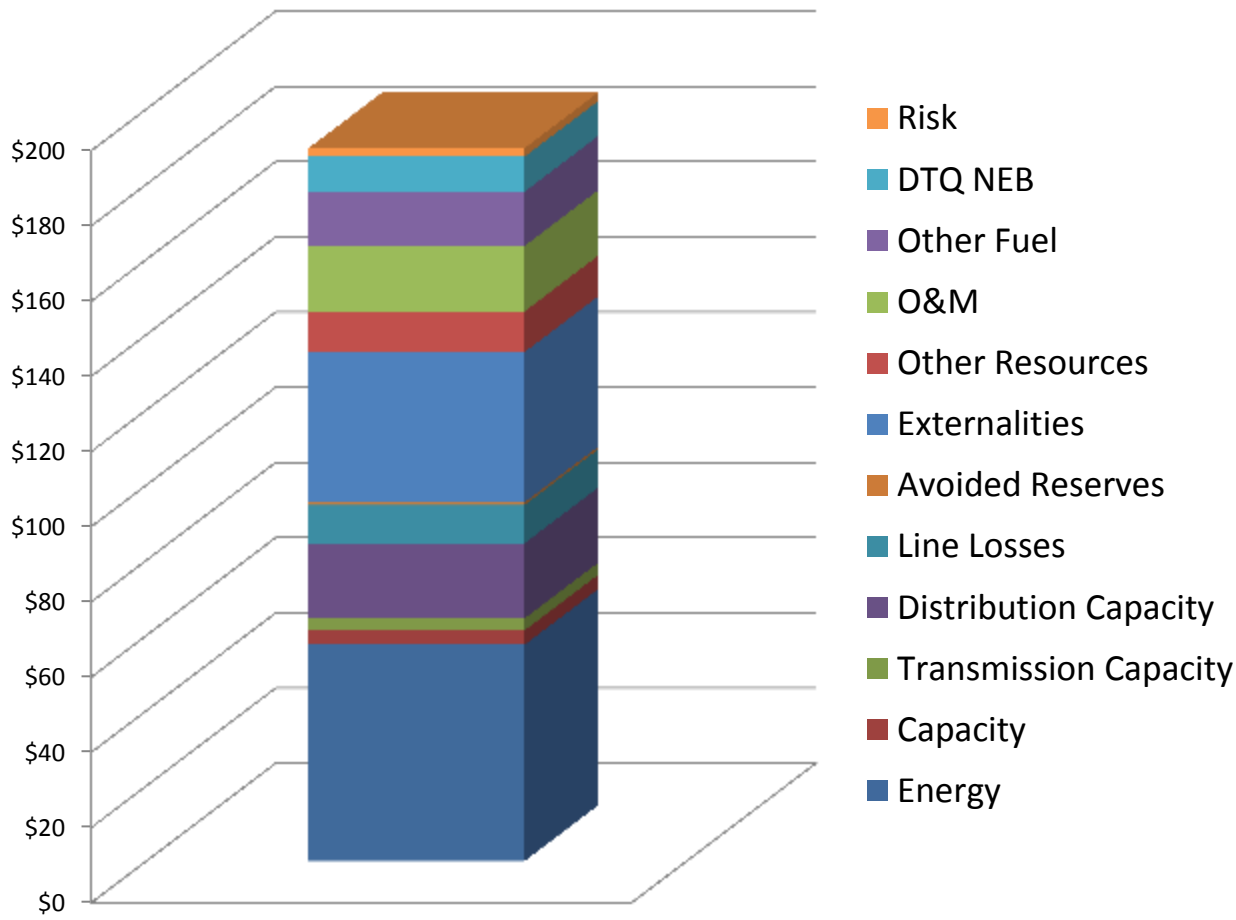


Synergistic Effects of Multi-pollutant Planning Have Economic Benefits



Multiple Benefits of EE

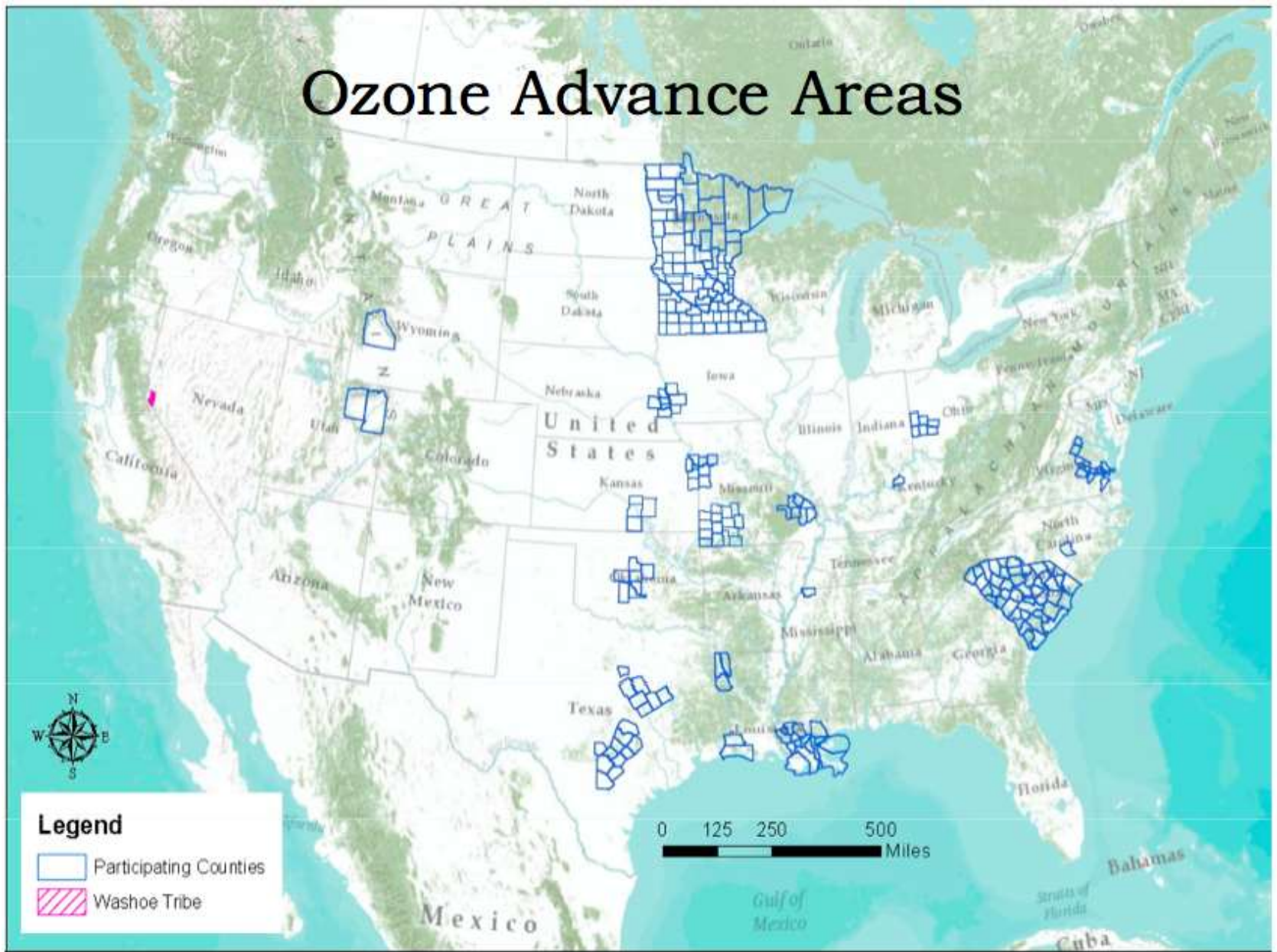
**Vermont Energy Efficiency Savings Value
Updated Externality and NEB Values**



Most analyses of EE are incomplete:

- **Some look only at avoided energy costs.**
- **Many include production capacity costs, but not transmission or distribution capacity or line losses.**
- **Few include other resource savings (water, gas, oil).**
- **Very few try to quantify non-energy benefits.**

Ozone Advance Areas



EPA EE/RE Roadmap “Paths”

	Baseline Pathway	Control Technology Pathway	Emerging/Voluntary Measures Pathway	Weight-Of-Evidence Pathway
Types of Projects	For “on the book” policies; Best on a state-wide or regional basis	For “on the way” policies	For locally-based activities; Can be bundled	Any
SIP Credit Limit	None	None	6% of total required emission reductions	No credit taken but do get emissions benefits
Enforcement	State enforceable but not Federally enforceable	Federally enforceable against the responsible party	Not enforceable against the responsible party	None
What happens if SIP reductions do not Materialize?	CAA SIP Call; Air agency required to make up for the emissions shortfall	Responsible party required to comply	State responsible for reductions	-
Level of Documentation Required	Significant analysis to show reductions are in place for planning period, quantify impacts, and ensure no double counting	Significant analysis to show reductions are permanent, enforceable, quantifiable and surplus	Moderate	Can range depending on level of analysis

Quantifying EE Emission Reductions

EPA: “*EE Data for Air Quality Regulators*”

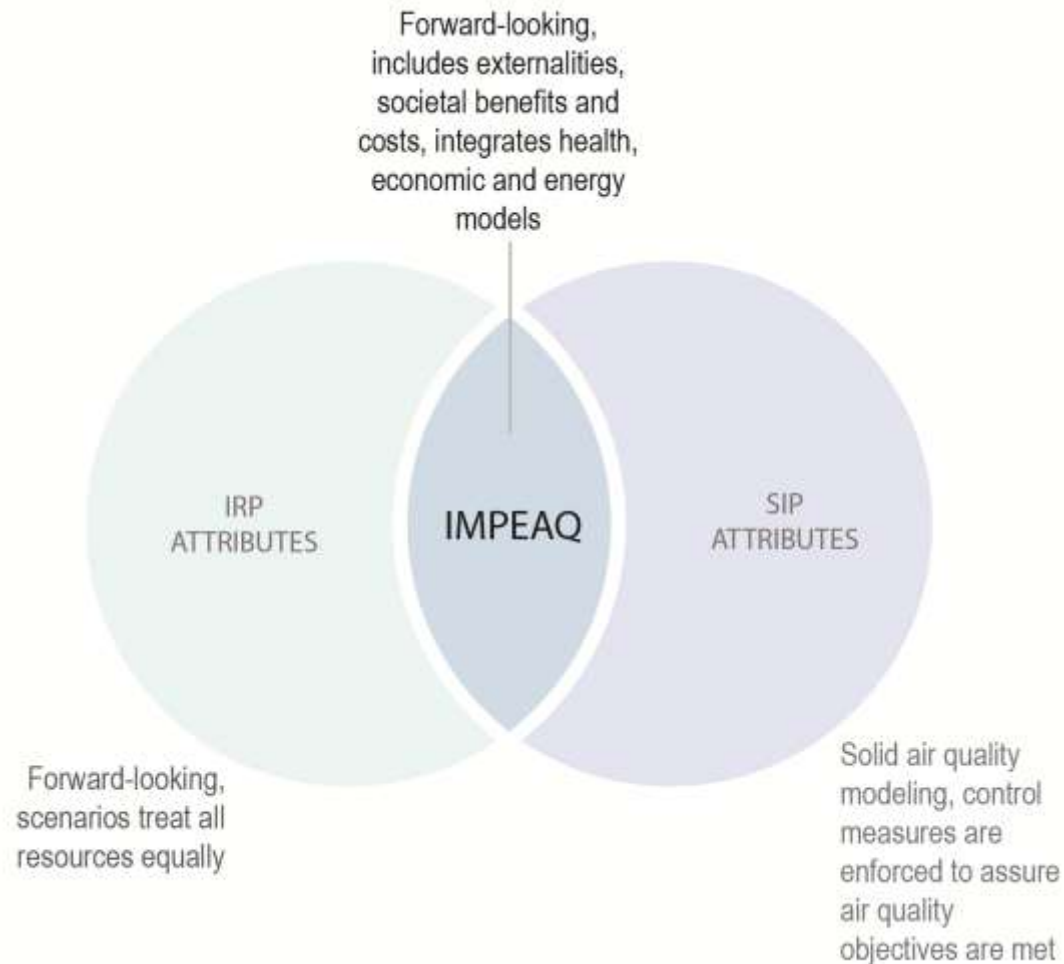
Steps for quantifying EE impacts for air pollution regulatory purposes:

1. Develop a **baseline** forecast of energy consumption and associated emissions.
2. Determine which EE policies and programs are already **embedded** in the baseline energy forecast, if any, and which are incremental to the forecast, if any.
3. Quantify the expected **energy savings** from incremental EE.
4. Quantify the expected **avoided emissions** from incremental EE.

Challenges with Using EE as an Air Quality Strategy

- Quantification easier said than done:
 - Usual EM&V issues, plus...
 - What part of the load curve was affected by the EE measure?
 - *When* matters: On-peak/Off? Marginal unit backed off?
 - *Where* matters: EE measures don't necessarily reduce power plant emissions in the same area
- Still pretty much “uncharted waters”...

Integrated, Multi-pollutant Planning for Energy and Air Quality (IMPEAQ)



Bottom Line:

- Many air regulators don't know what they don't know on energy, and many don't know where to start...
 - They need your help; work with them.
- Because of win-win potential re savings and emissions, air regulators could become CEOs' biggest advocates.
- YOU should be the next state to engage.

About RAP

The Regulatory Assistance Project (RAP) is a global, non-profit team of experts that focuses on the long-term economic and environmental sustainability of the power and natural gas sectors. RAP has deep expertise in regulatory and market policies that:

- Promote economic efficiency
- Protect the environment
- Ensure system reliability
- Allocate system benefits fairly among all consumers

Learn more about RAP at www.raonline.org

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Other Electricity Sector Environmental Regulations

- Mercury and Air Toxics Standard
- NSPS for GHG Emissions
- PM_{2.5} NAAQS Revisions
- Coal Combustion Residuals (Ash) Rule
- SO₂ NAAQS Revisions
- Effluent Limitation Guidelines
- 316(b) Cooling Water Rule