February 21, 2018

Improving Air Quality with Energy Efficiency

MARAMA Permitting Workshop

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Energy Efficiency = Pollution Prevention
Multiple Benefits of Energy Efficiency
Energy Efficiency - Cost and Impact

Source: Nadel, ACEEE for Restructuring Roundtable, 10/6/17
The United States has the potential to cost-effectively reduce its electricity use by 741,000 GWh*.

Saving 741,000 GWh is equivalent to the electricity used across all the highlighted states over a full year!†

It's equal to reducing the nation's electricity needs by about 16% in 2035.

Every state could save with energy efficiency, ranging from 12%–21% savings per state.

Energy efficiency is a low-cost option, averaging only 4.6¢ per kWh‡.

†2015 data; from U.S. Energy Information Administration, "Retail Sales of Electricity by State by Sector by Provider (EIA-861),” Detailed State Data, 2016.
What’s 1,000 GWh?

1,000

= 750-1000 tons

= 100,000 homes

Six 690 MW natural gas combined cycle power plants

Source: RAP Shenot, MassDEP Footprint permit
Air Quality Benefits of DOE’s Potential Study - NO$_x$

- 39,000 Tons NO$_x$
- 7,400 Tons NO$_x$
- 48,000 Tons NO$_x$
What’s 1,000,000 tons of CO$_2$?

1,700 GWh  =  1,000,000 tons  =  136,000 homes

35% of a 690 MW natural gas combined cycle power plants

Source: EPA GHG calculator, MassDEP Footprint permit
Air Quality Benefits of DOE’s Potential Study – CO\textsubscript{2}

8.4 Million Tons CO\textsubscript{2}

5.2 Million Tons CO\textsubscript{2}

73 Million Tons CO\textsubscript{2}
Energy Efficiency = Pollution Prevention
Linking Air Quality and Energy Efficiency

- Why do we care about energy?
- What’s energy efficiency got to do with it?
- How can the two be linked?
Energy Efficiency’s Value can be Modeled
Energy Efficiency Improves Air Quality

- NSR offsets
- Regional haze compliance demonstrations
- EGU emissions forecasting
- Other strategies – e.g., Ozone Advance
Energy Efficiency Benefits Facilities

- Saving facilities money during permitting
- Training for permit writers considering energy efficiency
- Focused commercial and industrial energy efficiency efforts, tailored to a state’s economy
Massachusetts Manufacturer Energy End Use

Source: National Grid MA EE Potential Study October 2015, pages 57 and 58
Permitting Steps - Opportunities

- Pre-application meeting
- Environmental Impact Statement
- Application questions
- Consultant training
- BACT, RACT, MACT determinations
- Draft permit
- Public hearing
- Final permit with conditions
Boilers
Efficiency as a Boiler Control Technology

- Install efficient designs and burners
- Install air preheaters and economizers
- Optimize with tuning, instrumentation and controls
- Insulate
- Reduce air infiltration and leakage
- Return hot condensates to boiler
Data Centers
Data Center Efficiency

- Maximize efficiency of building envelope, climate controls, lighting, and servers
- Reduce use of emergency backup generation
- Use efficient, properly sized IC engines
- Recover waste heat
Permitting Options

- Output-based standards
- Heat rate limits
- Energy audits
- Operational conditions
Resources

- Using Energy Efficiency to Advance Air Quality Compliance
- The Next Quantum Leap in Efficiency - 30 Percent Electric Savings in Ten Years
- Quantifying the Air Quality Impacts of Energy Efficiency Policies and Programs
- EPA boiler energy assessment requirements
Conclusions

Energy Efficiency:

- Reduces air pollution
- Can supplement regulations
- Can reduce permitting requirements
- Saves money for citizens and businesses
- Has a bright future!
About RAP

The Regulatory Assistance Project (RAP)® is an independent, non-partisan, non-governmental organization dedicated to accelerating the transition to a clean, reliable, and efficient energy future.

Learn more about our work at raponline.org