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Using Energy Efficiency to Advance Air Quality Compliance

Nancy L. Seidman

Introduction

Air quality officials across the United States have a significant—and largely unused—tool for reducing harmful air pollution: energy efficiency (EE). EE offers high potential because it reduces multiple types of emissions, and generally does so at a cost savings.

During the spring and summer of 2017, RAP Senior Advisor Nancy Seidman interviewed officials to discern if and how air quality agencies are purposefully using EE as an air quality control strategy, and to identify new or updated ways that air regulators might employ EE in their work. Besides state and local officials, Ms. Seidman interviewed officials from the U.S. Environmental Protection Agency (EPA) and U.S. Department of Energy (DOE) and a number of non-governmental organizations.

In particular, Ms. Seidman solicited specific ideas from interviewees that could enable air regulators to become "champions" of energy efficiency within their agencies and localities. The seven strategies outlined below emerged from this research. They are illustrative of a mosaic of efforts that can move EE forward at the state and local levels.

Seven Potential Strategies for Air Regulators

- Generate New Source Review (NSR) Offsets: States and EPA could allow NSR offsets to be demonstrated and used through EE. A facility seeking to build or expand might identify another commercial or industrial facility in the non-attainment area (or an area upwind) where demonstrated reductions in NOx, fine particulate matter (PM2.5), or SO2 have occurred (or could occur) through EE initiatives. The offsets need to demonstrate permanent, surplus, enforceable, and quantifiable reductions.

- Use Energy Efficiency for Regional Haze Compliance: EPA could allow EE to satisfy progress requirements for the second regional haze planning period required under the Clean Air Act, in addition to other methods, such as add-on control equipment for nitrogen oxides (NOx), sulfur dioxide (SO2), and other emissions that impair visibility.
- Target Commercial & Industrial Programs: States could demonstrate the air quality benefits of EE in industrial and commercial sectors pertinent to their state. A demonstration in a relatively narrow portion of a given state's economy could prompt action in other parts of the state's economy, as well as gain buy-in from economic, energy, and environmental agencies.
- Train Permit Writer to Include EE Review/Upgrades: States (or other entities) could educate air quality permit writers about the possibilities of incorporating EE initiatives into facility permits. The objective would be to encourage permit writers to promote and, where appropriate, require the most efficient equipment possible, reducing demand—and emissions. For example, this effort could be teamed with generating NSR offsets.
- Promote Measuring EE Impacts as a "Mobile Source": Given the disparate nature of EE and changes in many small sources that accumulate to make a difference, EPA could view EE more as a "mobile source" measure, using modeling tools like those designed to quantify vehicle emissions, or area sources, instead of using modeling tools designed for stationary sources. EPA could update its existing tools so states can more easily quantify the results of EE measures for approval in a State Implementation Plan (SIP), using a model more like EPA's Motor Vehicle Emission Simulator (MOVES).
- Improve Other Modeling Tools to Include EE: RAP could assist the states and EPA involved in the Eastern Regional Technical Advisory Committee (ERTAC) to advance the committee's work, perhaps using EPA's Avoided Emissions and Generation Tool (AVERT) model to assess EE measures. Or, working with a firm such as Blumont Engineering Solutions and its "JuiceBox" model, RAP could identify and assist a state as a test case to pilot "E-Merge," an integrated energy and air quality planning process RAP has developed.
- Continue/Develop Ongoing Cross-Agency Conversations: RAP and others could promote peer-to-peer conversations across energy and environmental agencies within one state, or with an organization, such as the National Governors Association and its learning academies, involving one or more states. Alternatively, collaborative efforts between state air programs (and associated multi-jurisdictional organizations), along with the National Association of State Energy Officials (NASEO) and the National Association of Regulatory Utility Commissioners (NARUC), have proved fruitful over the years in developing relationships between agencies within and across states on issues such as EE. These efforts should continue.

RAP is interested in hearing from governments, organizations, and others interested in learning more about these ideas.

Contact: Nancy L. Seidman at nseidman@raponline.org

Strategy: New Source Review (NSR) Offsets

The Challenge

New Source Review (NSR) is a complicated permitting process for new sources of air pollution. In "nonattainment" areas (where one or more air pollutants do not meet health standards), any facility seeking to build or expand must offset new emissions of nonattainment pollutant(s) from the facility by at least a 1:1 ratio. New or expanding facilities in nonattainment areas find that obtaining offsets, particularly for NOx, can be difficult and costly.

The Opportunity

States and EPA could consider allowing the use of NSR offsets to be accomplished through energy efficiency (EE) measures. A facility seeking to build or expand would find another commercial or industrial facility in the non-attainment area where demonstrated reductions in nitrogen oxide (NOx), fine particulate matter (PM2.5), or sulfur dioxide (SO2) have occurred (or could occur) through EE initiatives (e.g., lighting upgrades from fluorescent to LEDs, or fan, motor, or pump replacements). Provided that those initiatives can be demonstrated to provide guaranteed and ongoing energy reductions (through EPA-approved calculations), the offsets could be used, either on site for that facility, or at another facility. If the facility needing offsets has on-site generation of electricity or steam, the demonstration is easier than if the EE offsets grid- based electricity. However, even the reduction in grid- based electricity should be eligible if the facility can demonstrate the that EE reductions are quantifiable, enforceable, surplus and permanent. For example, a facility would not go back and install old pumps once more efficient ones have been purchased and installed.

Example

North Carolina's air quality division led an EE project in 2014-2015 that demonstrates the strength of this idea. With $360,000 from EPA, air quality officials worked with contractors on 76 audits and implementation of EE measures demonstrating quantifiable emission reductions from commercial and industrial facilities in the state, primarily furniture manufacturers. North Carolina demonstrated how a small amount of funding can be leveraged for improvements at facilities, demonstrating the efficacy of EE, while helping train contractors, state officials, and industrial employees. This may be a good model for other states. Air quality improvements as a result of EE, like those seen as a result of this project, could accrue to a facility to be used as NSR offsets.

Next Step(s)

States or other entities could work with RAP or EPA to estimate the emission reduction potential for EE in their area for which NSR offsets could be used, and whether there are existing local EE programs that could be used for this purpose. Involving EPA Regional offices in next steps is also important.

Strategy: Regional Haze Compliance Demonstrations

The Challenge

The federal Clean Air Act (CAA) establishes a 2064 date for meeting visibility targets in areas that are designated Class 1 under the Regional Haze Program (e.g., national parks). Achieving this presupposes decreasing the amount of nitrogen oxides (NOx), sulfur dioxide (SO2), particulate matter (PM) and other air pollutants using traditional air pollution control equipment (i.e., add-on controls, facility shutdowns, or fuel switching).

The Grand Canyon on clear (above) and hazy days

The Opportunity

The Regional Haze requirements are like those for a state implementation plan, including developing compliance plans, and providing five-year progress reports and demonstrations to the public and EPA, like the Reasonable Further Progress requirements for nonattainment areas. States who are due to complete their second progress plan between their progress in 2018-2021 expect to have problems achieving and demonstrating the required progress increment. EPA could allow states to use energy efficiency (EE) to demonstrate the required progress increment instead of requiring additional add-on control equipment or other pollutant reduction measures.

Example

One option for incorporating EE would be to pursue a demonstration using the EPA's EE/renewable energy Roadmap and the "baseline pathway." States would demonstrate ongoing reduced demand for electricity using data and forecasts from independent system operators, rather than through specific EE program implementation. Using the Roadmap could demonstrate multi-pollutant benefits with reduced demand for electricity and demonstrate EPA's flexibility in meeting the required progress demonstration.

Next Step(s)

Work with EPA's Office of Air Quality Planning and Standards on their views of this idea and potential next steps. Seek a state(s) or multi-jurisdictional organization (e.g., the Ozone Transport Commission or the Western States Air Resources Council) interested in pursuing this idea with EPA.

Strategy: Energy Efficiency for Targeted Commercial and Industrial Programs

The Challenge

In some states, air quality staff need more knowledge of the benefits of energy efficiency in reducing multiple types of emissions, and doing so at a cost savings.

The Opportunity

States could demonstrate the air quality benefits of EE in pertinent commercial and industrial (C&I) sectors. Demonstration in a relatively narrow portion of a given state's economy could prompt action in other parts of the state's economy, as well as gain buy-in from economic, energy, and environmental agencies. Such an effort could show air quality agencies and industries what EE can accomplish, and how the state and business community could work together to improve bottom lines and air quality.

Specifically, officials could document through case studies (or "on the ground" efforts) from within a given state (or a neighboring state) how EE upgrades (e.g., pumps, fans, motors, lighting, boiler replacements, etc.) in a state's C&I sector(s) can provide economic opportunity for expansion, better financial returns for the facility, and air quality benefits. Those air quality improvements could accrue to the air quality agency for compliance and be used for an attainment demonstration, or to a facility for New Source Review offsets.

A state may have a preferred sector that they want to support using EE, or a sector may want to demonstrate to the state/local agency how it has improved (or can improve) its economic viability and lowered emissions through EE. For example, food preparation, agricultural activities, supermarkets or other prominent store chains, heavy industries such as automobile manufacturers, data servers, machined part manufacturers, etc. all provide significant opportunities for EE.

Example

North Carolina's EE work with its furniture industry demonstrated how a small amount of funding can be leveraged for improvements at facilities, demonstrating the efficacy of EE while helping train contractors, state officials, and industrial employees. This may be a good model for other states.

Next Step(s)

States or other entities could work with RAP or EPA to estimate the emission reduction potential for EE from a large industrial or commercial sector in their area, and explore whether there are existing EE programs to support that economic sector for this purpose. Also, EPA and DOE have relevant materials developed for many sectors that could be utilized.

Strategy: Writing Permits to Include Energy Efficiency Review/Upgrades, Training Permit Writers

The Challenge

Air quality officials, specifically air permit writers, in some cases do not have a deep understanding of the energy efficiency (EE) technologies that are most effective in industrial situations in achieving air quality improvements (e.g., upgrading boilers, fans, motors, pumps, compressors, lighting, etc.)

The Opportunity

States (or other entities) could educate air permit writers about the possibilities of incorporating EE initiatives into air permits. The objective would be to encourage permit writers to promote and, if appropriate, require the most efficient equipment possible, reducing demand, lowering emissions, and providing other environmental improvements (e.g., reduced water use) while saving facilities money.

Permit writers could be prepared to ask questions in pre-application meetings with facilities, helping to ensure that new facilities are incorporating new, energy efficient technologies for their boilers, pumps, fans, compressors, etc. This effort could be coupled with (or operate as part of) an agency's pollution prevention or small business ombudsman offices.

Permit writers who are educated about EE could, among other things, reduce the permitting burden on facilities by recommending efficiency measures which might change the applicable permitting category for the facility. For example, in many states boilers below a certain size threshold do not require a permit from the agency or can take advantage of a "permit by rule" option that comes with lower permit fees and oversight.

Next Step(s)

State officials and EE advocates, among others, can work together to target training to assist air quality permit writers on EE options and opportunities. As a technical advisor, RAP has provided training on EE benefits and initiatives for regulators in a variety of states.

Strategy: The Mobile Source Analogy

The Challenge

Promote EPA's development of additional tools to encourage states to incorporate energy efficiency into Clean Air Act state implementation plans (SIPs).

The Opportunity

Given the disparate nature of EE and changes in many small sources (individual households and businesses, etc.) that accumulate to make a large difference in emissions, EPA could view EE more as a "mobile source" measure, using modeling tools like those designed to quantify vehicle emissions, instead of using modeling tools designed for stationary sources. The agency could update its existing tools so states can more easily quantify the results of EE measures for approval in a SIP, using a model more like the EPA's MOVES. EPA may have tools from modeling area sources that might also be appropriate for EE.

Example

If a state pursues significant upgrades in lighting at commercial facilities (e.g., bakeries, grocery stores, big box stores), the changes can lead to sizable reductions in energy use across a wide geographic area. Those changes can be aggregated and modeled by assuming a consistent change from baseline energy use at similar facilities to a new permanent lower energy level with reduced electricity use and reduced emissions. This would be similar to EPA's area and mobile source inventory guidance, which allows a state to assume a per capita or per industry reduction in air emissions, then use an emission factor to estimate the reduction that can be assumed in the SIP.

Next Step(s)

Work with EPA to promote the mobile source analogy and planning its implementation in the electricity sector. EPA headquarters offices (transportation and air planning) have held conversations to educate those outside the transportation office about the MOVES model and how its methodology might work for EE. This could inform suggestions for revising existing models such as AVERT.

EPA could view this effort as a "streamlining" innovation that would provide states with additional options for achieving public health standards.

Strategy: New Modeling Tools for Energy Efficiency

The Challenge

EPA's current models could more successfully enable connections between air quality planning and program implementation, and energy efficiency (EE).

The Opportunity

RAP could assist the states and EPA involved in the Eastern Regional Technical Advisory Committee (ERTAC) to advance the committee's work, perhaps using EPA's AVERT model to assess and incorporate EE measures. Or, working with a firm such as Blumont Engineering Solutions and its "JuiceBox" model, RAP could identify and assist a state as a test case to pilot "E-Merge," an integrated energy and air quality planning process RAP has developed.

Example

The Ozone Transport Commission and its member states participate in ERTAC. They are interested in learning more about how EE could be used as a compliance option with an easier modeling tool than currently exists. EPA is interested in working with the ERTAC states to see whether AVERT could be modified to work with the ERTAC model as a "front end" mechanism for assessing the impact of EE on future power plant emissions.

Next Step(s)

Discuss next steps to incorporate EE into the ERTAC model with EPA and states. Pursue the use of JuiceBox with an interested state in the context of an E-Merge pilot project. Present a webinar for interested states on modeling options (as RAP did with the E-Merge concept earlier this year).

Strategy: Cross-Agency Conversations

The Challenge

Multi-agency (and cross agency) conversations within states or within power grids that began during the Clean Power Plan to coordinate on energy and air quality planning in the power sector had been helpful. Now that the impetus for those conversations is gone, the conversations have largely stopped.

The Opportunity

RAP and others could promote peer-to-peer conversations across energy and environmental agencies within one state, or with an organization, such as the National Governors Association and its learning academies, involving one or more states. Alternatively, collaborative efforts between state air programs (and associated multi-jurisdictional organizations), along with the National Association of State Energy Officials (NASEO) and the National Association of Regulatory Utility Commissioners (NARUC), have proved fruitful over the years in developing relationships between agencies within and across states on issues such as EE. Either model provides opportunities for proceeding, though the effort need not be focused solely on EE.

Example

NACAA and NASEO recently launched a web site to promote cross-agency communication on states' plans for using the funds from Volkswagen's settlement. Sharing of best practices and plans for use of these funds could promote long-term improvements in states' transportation and air quality goals. A similar effort focused on the connections between EE and air quality could promote states' advancement of these issues.

Next Step(s)

Follow up with NGA, NARUC, NASEO, and the air quality multi-jurisdictional groups periodically to encourage concerted efforts.

RAP is interested in hearing from governments, organizations, and others interested in learning more about the ideas outlined in this document.

Contact: Nancy L. Seidman at nseidman@raponline.org

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The Regulatory Assistance Project (RAP)®
Belgium · China · Germany · India · United States

50 State Street, Suite 3
Montpelier, Vermont 05602
USA

1 802-223-8199
info@raponline.org
raponline.org