Building Momentum for Integrated Multipollutant Planning

Northeast States' Perspective

by Leah Weiss, Michelle Manion, Gary Kleiman, and Christopher James

Beginning in 1970, states accepted delegation from the U.S. Environmental Protection Agency (EPA) to implement and enforce the requirements of the federal Clean Air Act (CAA). Over the years, states have developed and refined techniques to assess and respond to air quality problems. States are laboratories of policy innovation. They can often act more quickly than the federal government, individually or in concert with other states. Historically, state-led efforts have helped shape new or tighten existing federal programs and approaches. Increasingly, however, states are facing a more complex set of challenges. These include new findings in science supporting more stringent health-based standards; newly defined pollution problems, including pollutant interactions and localized impacts; industrial sectors that are highly regulated; an increasingly aware and concerned public; and dwindling resources.

Traditionally, governments have responded to air quality problems on a pollutant-by-pollutant basis. However, recent challenges in addressing ground-level ozone (O_3) nonattainment and global climate change have been catalysts for the Northeast states to recognize the limits of the existing air quality management framework and the importance of moving to a more holistic, multipollutant approach. These issues cut across sectors as well as agency jurisdictions.

Leah Weiss is senior policy advisor, Michelle Manion is climate and energy program manager, and Gary Kleiman is science and technology program manager, all with the Northeast States for Coordinated Air Use Management (NESCAUM), Boston, MA. Christopher James is manager of climate and energy programs with the Connecticut Department of Environmental Protection, Hartford, CT. E-mail: lweiss@nescaum.org.

Integrated multipollutant planning has the potential to be a more efficient and economical way to address today's environmental and public health issues.

Integrated multipollutant planning has the potential to be a more efficient and economical way to address today's environmental and public health issues. Multipollutant planning can help identify the trade-offs

BALANCING MULTIPOLLUTANT TRADE-OFFS: BIOFUELS

Because of their potential to reduce greenhouse gas (GHG) emissions while increasing U.S. energy and economic security, biofuels, such as ethanol and biodiesel, are garnering interest from both political leaders and investors. Biodiesel, made from vegetable and waste oils, provides considerable opportunities as a climate change strategy, but raises some concerns from a criteria pollutant perspective. Using typical biodiesel blends for transportation fuel could reduce carbon emissions at the tailpipe, but may increase emissions of nitrogen oxides (NO_x). In the Northeast, even small increases in NO_x emissions could adversely affect states' efforts to meet the O_3 standard. Considering recent research, a key component of an effective biofuels strategy for the Northeast could be to blend biodiesel with home heating oil. Doing so could reduce carbon dioxide (CO_2) emissions by 2 million t/yr or more in the Northeast without increasing NO_x emissions.

of implementing one strategy over another, help set priorities and appropriate planning horizons, allow for more informed decision-making, and ultimately provide more regulatory certainty. (Balancing the sometimes-competing emission reduction trade-offs appears even more pronounced for climate change. See sidebar above.) Multipollutant planning can also help identify unintended consequences of various control approaches and select the best mix of policies and controls, given the mandate to protect public health and the environment. Moving to this approach requires changing the way agencies currently problem-solve and interact with one another, and takes considerable time, effort, and support.

INTEGRATED MULTIPOLLUTANT PLANNING

In the Northeast, states have taken vital steps toward integrated multipollutant planning by establishing cross-jurisdictional connections, considering creative alternatives to traditional problem-solving and regulation, and creating measurement and analysis tools. Starting in the late 1980s, states in the NESCAUM region[1] began integrating toxics benefits into O_3 programs (e.g., Stage I and II vapor recovery for gasoline) and ozone benefits into toxics programs (e.g., leak detection and repair for chemical plants). The region's need to reduce O_3, particulate matter (PM), and regional haze, coupled with concern over mercury contamination in fish and slow forest recovery from acid deposition, led to a series of regional multipollutant programs for stationary sources[2] and multipollutant assessments of control programs[3] during the period 1997–2006. By 2004, four Northeast states had adopted two- and four-pollutant power plant programs.[4]

Establishing Connections

A critical step in state multipollutant planning is to establish cross-jurisdictional connections. With the advent of the Ozone Transport Commission's NO_x Budget Program and EPA's NO_x SIP Call,[5] the Northeast states became proactive in incorporating energy efficiency incentives into their air quality programs. They established more formal connections between agencies, hosting cross-training workshops with air and energy staff, testing innovations through pilot programs,[6] developing metrics and tools linking air and energy goals,[7] and quantifying energy efficiency for state implementation plans (SIPs).[8-10] These efforts have provided valuable insights and experience toward successful multiple pollutant integration.

The connections forged between high-level air quality and energy officials in developing output-based standards and energy set-asides for the SIP Call required collaboration among policy-makers with sometimes disparate or competing interests and priorities that has continued with the Regional Greenhouse Gas Initiative (RGGI).[11] A critical element for the success of future efforts will be aligning the interests of environmental, energy, and other state agencies to the greatest extent possible. With RGGI, for example, air quality and energy policy-makers are working toward an agreed-upon objective of reducing CO_2 emissions in a cost-effective manner that will not compromise energy system reliability.

Thinking Beyond Traditional Regulation

States must continue to consider creative alternatives to traditional problem-solving and regulatory approaches in multipollutant planning. For example, the push in the 1990s toward market-based solutions to air quality problems, including the acid rain and NO_x cap-and-trade programs, was successful in reducing regional criteria pollutant emissions in the Northeast. Today, states must achieve additional reductions of criteria pollutants and address localized impacts of pollutants such as mercury.

Given that easily available emissions reductions from the typically regulated sources are decreasing and their costs per ton are increasing, states now seek solutions beyond traditional constructs. For example, the Northeast states are considering the innovative use of demand-side initiatives, including energy efficiency, to address growing NO_x emissions that coincide with days of high electricity demand. Electric power plants and generators that are used to meet this demand are among the highest emitting power plants in the region during the periods that the region experiences unhealthy air quality.[12] A peak-day power generator strategy, coupled with a strong consumer education/energy conservation component, could yield significant and cost-effective emissions reductions.

States are also developing cross-media programs. In Massachusetts, for example, efforts to promote biomass using renewable portfolio standards have required cooperation among solid waste and energy staff, and work on mercury mitigation has involved air, solid waste, and water staff. Meanwhile, under New Jersey's mercury rule, if an electric generating unit simultaneously controls PM, NO_x, and sulfur dioxide (SO_2) emissions to retrofit Best Available Control Technology (BACT) requirements, it is allowed additional time to phase in the required mercury controls.

Creating Metrics and Analytic Tools

States have been working to establish sufficient tools and analytic capacity to implement regional multipollutant programs. For example, the Northeast states, in collaboration with other states across the nation, are developing The Climate Registry, which will provide a standardized accounting tool that measures GHG emissions, baselines, and emissions reductions in a consistent, transparent, and verifiable manner. The registry is based on a software platform (the Emissions Allowance Tracking System, or EATS) originally developed by EPA to support emissions reporting and allowance tracking under the NO_x Budget and other programs. In the future, these systems could be seamlessly merged into a common clearinghouse for criteria and GHG pollutants.

States must continue to look beyond basic CAA requirements to ensure tools are developed that support state-based multipollutant programs. Regional-scale tools with regionally appropriate data are needed to provide the requisite level of specificity. Integrated environmental assessments can help evaluate benefits and trade-offs of moving beyond single-pollutant approaches. Modeling frameworks for conducting integrated environmental analyses are plentiful at the national and international levels of government,[13] but at the state and regional levels they are rare, requiring extensive regional detail to examine shifts in technologies, specific air quality, environmental, public health endpoints, and economic impacts of policy initiatives.

Through NESCAUM, the Northeast states have developed a suite of integrated regional modeling tools, including a technology-rich energy model to simulate least-cost policy approaches to achieving pollution reductions. The Northeast Market Allocation (NE-MARKAL) Model covers nine states and characterizes electricity generation, transportation, and the industrial, residential, and commercial building sectors over a 30-year time horizon. NE-MARKAL is a flexible framework that adapts to simulate a range of policy constraints and can accommodate the technological evolution needed to satisfy all energy demands. It provides a full accounting of emissions generated by a technology mix and its cost implications. The emissions information generated is critical for creating future emissions projections for regional air quality models.

NESCAUM plans to develop links to EPA's national MARKAL Model, so that projections over the eastern United States could be generated with enhanced regional detail in the Northeast. Other EPA-developed tools, such as the Benefits Mapping and Analysis Program (BenMAP) or the Co-Benefits Risk Assessment Model (Cobra), provide health benefits assessment capability for understanding potential impacts and economic burden of air quality-related morbidity and mortality. Cost information can be fed into a 12-state Regional Economic Models Inc. (REMI) Model to provide information on jobs, household spending, and gross state product. Economic analysis of this kind is crucial to inform decision-makers and stakeholders. Taken together, this suite of tools affords states the opportunity to examine the potential costs and benefits of multipollutant programs from the perspective of the economy, environment, and public health and welfare simultaneously.

> **A critical step in state multipollutant planning is to establish cross-jurisdictional connections.**

CHALLENGES

Despite some progress on sector-specific multipollutant approaches, challenges continue to hamper even incremental progress.

Structural and Institutional Challenges

Decades of stove-piped federal and state statutes have created institutional and structural obstacles to more integrated approaches. The statutes require agencies to develop plans solely aligned along specified air quality objectives. Tracking SIP progress typically relies on prescribed metrics that may not reflect cross-media or cross-program impacts. Funding is often focused on or earmarked to media- and issue-specific progress, so that multipollutant environmental objectives cannot be easily met.

Most state and federal agencies are organized along media functions. This can discourage broader, multimedia thinking and impede new approaches to problem-solving. For example, in many state agencies, pollution prevention offices are often located outside of traditional core programs and their missions and objectives are often seen as secondary. Staff training is typically single-media and functionally narrow, thus regulatory programs are developed with little consideration of multimedia impacts and benefits.

Years of success with traditional measurement techniques also make it difficult for agency staff to shift to more integrated thinking. It is challenging for staff to recognize that continuing on the single-pollutant path will eventually result in incremental progress at higher cost. Integrated planning efforts need to be supported institutionally, and not rely on any particular champion to ensure their viability.

States are not yet able to consistently produce results that clearly show that an integrated approach can work and will yield better, long-term results. Part of this is driven by the relatively short deadlines driven by the CAA. Superimposed upon the necessary statutory deadlines, regular feedback loops and enhanced assessment milestones could better serve the multipollutant planning process.

Technical Challenges

Traditional measurement techniques have worked well for directly assessing emissions reductions (e.g., continuous emissions monitors). However, for the types of policies now being considered or implemented by agencies, these traditional tools may be imprecise or inappropriate. Measuring indirect reductions through energy efficiency or the efficacy of a strategy to reduce fleet vehicle miles traveled tests the limits of existing tools used by state agencies. Developing and applying new tools is important because the states' ability to claim environmental benefit requires precision, certainty, and the ability to be replicated.

FOCUS ON THE FUTURE

Over time, these challenges can be addressed. In the meantime, below are some suggestions for maintaining the momentum.

1. Establish Frameworks for Evaluating Trade-Offs and Priorities. Agreeing to top priorities across agencies, programs, and pollutants will be a significant challenge in the years to come, but a necessary step toward integrated multipollutant planning. This will require gubernatorial leadership and incentives to promote interagency cooperation; aligning offices in agencies to encourage cross-program communications; and establishing a framework for integrated multipollutant air quality management to ensure that air agencies address clean air goals, while maintaining electric system reliability, and that energy agencies receive appropriate incentives to help meet air quality goals by engaging in air quality planning and completing projects within specified timeframes.

2. Develop Metrics for Long-Term Environmental, Economic, and Energy Goals. States currently target pollution mitigation plans to achieve certain threshold ambient pollutant concentrations. However, to address acid deposition, for example, meeting a numeric concentration target may not indicate whether a sensitive ecosystem is achieving recovery at the desired rate; the buffering capacity of an acid-sensitive watershed may be a better environmental indicator. Energy efficiency is another example. Applying the same analysis to energy efficiency as that for power generation fails to capture the cumulative benefits of energy efficiency and underestimates the risks from fossil-fuel generation.

3. Train Staff to Work in a Multipollutant Environment. Currently, few agency personnel are given interdisciplinary training. Ideas to foster such training include multi-year state training programs that allow staff to work in different programs and workshops and classes for permitting and planning staff in areas such as combined heat and power and emissions measurement and verification. Training must be expanded to provide agency staff with appropriate tools to assess the measures needed to attain the PM and O_3 standards, evaluate their co-benefits—not only for other pollutants such as GHGs, but also for public health, safety, insurance, and financial considerations—and assess the degree to which those measures are successful after they are implemented.

4. Ensure Transparent Processes for Developing Input Data and Assumptions. As more integrated models are being used, it is critical that processes be established to develop the appropriate input data. Agreement by states, federal officials, and other stakeholders on input data and assumptions can serve as a foundation for agreement on future technology approaches and programs. Engaging all stakeholders on data inputs and assumptions would shift policy discussion toward fundamental uncertainties that drive model results, and away from the "dueling outputs" dynamic that exists today.

5. Secure Funding for Multipollutant Efforts. Agencies are constrained by single-pollutant funding streams. One way to change this would be to use revenues from auctioning GHG and other pollution credits (i.e., encouraging a shift from allocating NO_x and SO_2 credits to generators) for research and development and subsidizing energy efficiency programs. For example, the solar technology market, which provides effective multipollutant benefits, needs to be transformed to be competitive.

6. Launch Pilot Programs. The federal government must play a significant role in enabling these efforts to occur and helping to build capacity at the state and local levels. Federal funding of state pilot projects, as well as technical support, would greatly assist in this effort. Pilot programs help define the scope of what is technically and economically achievable. Results can then be applied to broaden and deepen the penetration of successful pilots, and lessons learned can guide future program design. Pilots can hasten development of new and improved tools and metrics for integrated multipollutant planning.

SUMMARY

Great progress has been made in meeting federal and state air quality and public health objectives over the past 30 years. However, with this improvement has also come knowledge that present and future risks require sustained commitment for several generations to achieve our environmental and public health goals, provide affordable and secure energy supplies, and promote local and regional economic development. The longstanding role of states as incubators of ideas, and testing their potential efficacy through local pilots and measures, can once again help provide the basis for a national model where the benefits of a broader application of these ideas can be fully realized and appreciated. Such efforts can result in programs that are cost-effective, provide energy security, and reduce criteria pollutants and GHG emissions. **em**

REFERENCES

1. The Northeast States for Coordinated Air Use Management (NESCAUM) is the association of the air pollution control agencies in Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont. It was established in 1967 to provide a forum for coordinating state air quality protection programs in the Northeast region. See www.nescaum.org.
2. *Multi-Pollutant Approaches in Certain OTR States.* Prepared by Synapse Energy Economics for the Ozone Transport Region, Washington, DC, June 25, 2002; available at www.otcair.org.
3. *Identification and Evaluation of Candidate Control Measures; Draft Technical Support Document.* Prepared by MACTEC Federal Programs Inc. for the Ozone Transport Commission, October 2, 2006; available at www.otcair.org.
4. States with multipollutant programs as of 2004 included Connecticut, Massachusetts, New Hampshire, and New York.
5. Findings of Significant Contribution and Rulemaking for Certain States in the Ozone Transport Assessment Group Region for Purposes of Reducing Regional Transport of Ozone, Final Rule; *Fed. Regist.* **1998**, *63*, 57355 (40 CFR Parts 51, 72, 75, and 96).
6. *A Profile of the Electric System, Air Quality Issues, and the Economic Situation in Southwestern Connecticut.* Prepared by Center for Climate Solutions for the Ozone Transport Commission and the U.S. Department of Energy, Washington, DC, June 2002; available at www.otcair.org.
7. For example, several Northeast states adopted output-based methodologies for allocating allowances in cap-and-trade programs as an energy-efficiency incentive.
8. *Predicting Avoided Emissions from Policies that Encourage Energy Efficiency and Clean Power.* Prepared by Synapse Energy Economics for the Ozone Transport Commission, Washington, DC, June 24, 2002; available at www.otcair.org.
9. *The OTC Emission Reduction Workbook, Version 2.1.* Prepared by Synapse Energy Economics for the Ozone Transport Commission, Washington, DC, November 12, 2002; available at www.otcair.org.
10. Memorandum to the Regional Air Division Directors from Brian McLean and Steve Page, U.S. Environmental Protection Agency. Re: Guidance on SIP Credits for Emission Reductions from Electric-Sector Energy Efficiency and Renewable Energy Measures, August 5, 2004; available at www.epa.gov/ttncaaa1/t1/memoranda/ereseerem_gd.pdf.
11. The Regional Greenhouse Gas Initiative (RGGI) is an initiative of Northeast states that caps CO_2 emissions from the largest power plants in the participating states. Connecticut, Delaware, Maine, Massachusetts. New Hampshire, New Jersey, New York, and Vermont are currently participating. Maryland is legislatively required to become a full participant by June 30, 2007. The District of Columbia, Pennsylvania, Rhode Island, and the eastern Canadian provinces are observers. See www.rggi.org.
12. *High Electric Demand Day and Air Quality in the Northeast.* Prepared by Northeast States for Coordinated Air Use Management (NESCAUM), Boston, MA, June 5, 2006; available at www.nescaum.org.
13. Examples of such models include: (a) *Climate Change 2001: Synthesis Report*; Watson, R.T. and the Core Writing Team, Eds.; A Contribution of Working Groups I, II, and III to the Third Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press: Cambridge, UK, and New York, NY, 2001; available at www.ipcc.ch. (b) Prinn, R.; Jacoby, H.; Sokolov, A.; Wang, C.; Xiao, X.; Yang, Z.; Eckhaus, R.; Stone, P.; Ellerman, D.; Melillo, J.; Fitzmaurice, J.; Kicklighter, D.; Holian G.; Liu Y. Integrated Global System Model for Climate Policy Assessment: Feedbacks and Sensitivity Studies; *Climatic Change* **1998**, *41*(3/4), 496-546; available at web.mit.edu/globalchange/www/if.html. (c) Klaassen, G.; Amann, M.; Berglund, C.; Cofala, J.; Höglund-Isaksson, L.; Heyes, C.; Mechler, R.; Tohka, A.; Schöpp, W.; Winiwarter, W.; *The Extension of the RAINS Model to Greenhouse Gases. An interim report describing the state of work as of April 2004*; IIASA IR 04-015; International Institute for Applied Systems Analysis, Laxenburg, Austria, 2004; available at www.iiasa.ac.at/rains/reports.html.