

RGGI Program Review: A Model to Reduce Regulatory Uncertainty in Carbon Planning

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RAP is an independent, non-partisan, non-governmental organization dedicated to accelerating the transition to a clean, reliable, and efficient energy future. We help energy and air quality regulators and NGOs navigate the complexities of power sector policy, regulation, and markets and develop innovative and practical solutions designed to meet local conditions. Our team focuses on the world's four largest power markets: China, Europe, India, and the United States.



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Acronyms

CEMS	Continuous emissions monitoring system
CO ₂	Carbon dioxide
EGU	Electric generation unit
EPA	US Environmental Protection Agency
GHG	Greenhouse gas
ISOs	Independent system operators
MOU	Memorandum of understanding
MW	Megawatt
NO _x	Nitrogen oxide
NRDC	Natural Resources Defense Council
NDRC	China's National Development and Reform Commission
NY DEC	New York State Department of Environmental Conservation
RGGI	Regional Greenhouse Gas Initiative
RGGI COATS	RGGI CO ₂ Allowance Tracking System
SO ₂	Sulfur dioxide
UNFCCC	United Nations Framework Convention on Climate Change

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Preface

The Regulatory Assistance Project both develops innovative and practical policy and market solutions designed to meet local needs, and shares regulatory and policy lessons learned across the globe. Our work is designed to provide power sector decision-makers access to a constantly expanding set of adaptable policy tools and solutions.

Here, in “RGGI Program Review: A Model to Reduce Uncertainty in Carbon Planning,” we examine the program review mechanism of the Regional Greenhouse Gas Initiative (RGGI). Experience with RGGI illustrates the importance of including a comprehensive review mechanism that assesses a program’s operations to ensure its economic, environmental, and equitable performance. We believe that other regions could benefit from lessons learned by RGGI states and stakeholders.

Today, in seven pilot programs, China is testing a variety of approaches for regulating carbon emissions, with the aim of designing and implementing a national program in 2017. In light of these pilots and the national policy objective, and in the spirit of sharing “what works,” we offer this paper in the hope that it may provide useful insights for Chinese policymakers as they develop a program that best meets China’s needs.

Frederick Weston
Principal and China Programs Director

Introduction: The Relevance of RGGI to China

In a 2014 US-China Joint Presidential Statement on Climate Change, President Xi Jinping announced China's intent to establish a national carbon emissions trading system in 2017, covering the iron and steel, electric power, chemicals, building materials, paper, non-ferrous metals and other key industrial sectors.¹

The national program will build upon China's seven carbon-trading pilots, launched in 2012.² These pilot programs were established by China's National Development and Reform Commission (NDRC) in the "Notice of the General Office of the NDRC on the Pilot Trading of Carbon Emission Rights," issued in 2011. Four municipalities, two provinces, and one special economic zone were selected for the pilot programs, resulting in pilot programs in Beijing, Chongqing, Guangdong, Hubei, Shanghai, Shenzhen, and Tianjin.³

As China's decision-makers proceed with their review of the various cap-and-trade models piloted around the country, and develop solutions based on their own conditions, drawing from the lessons learned in other countries could prove invaluable. One such program is the Regional Greenhouse Gas Initiative (RGGI), a cooperative effort among nine states in the northeastern United States.⁴ The focus of this paper is on a particular element of RGGI known as **program review**—the formal means by which the states review and, if necessary, amend the program.

Experience with RGGI illustrates the importance of including a comprehensive review mechanism that assesses the program's effectiveness to ensure its economic, environmental, and equitable performance, and the authors believe that countries forging similar energy and environmental policies can benefit from lessons learned by the RGGI states and stakeholders.

In particular, an appreciation of how a formal review process accommodates some of the uncertainty inherent in developing and improving a regulatory program can have an important and beneficial effect on the program's overall design. This report looks first at RGGI's essential features, then at the manner in which the program review is conducted and the issues it addresses, and finally at the major lessons that program designers elsewhere can consider as they design and implement similar programs.

¹ See: http://news.xinhuanet.com/politics/2015-09/26/c_1116685873.htm and <https://www.whitehouse.gov/the-press-office/2015/09/25/us-china-joint-presidential-statement-climate-change>. In its 12th Five-Year Plan, covering 2011-2015, China established plans to develop pilot carbon programs. Also see: U.N. Framework Convention on Climate Change. (2015). Adoption of the Paris Agreement. Retrieved from <http://unfccc.int/resource/docs/2015/cop21/eng/l09.pdf>

² Upon establishing a national carbon market, China will surpass the European Union emissions trading system (ETS) to become the biggest carbon market in the world. See Ringius, L. (2016). *Environomist China Carbon Market Research Report 2016* [Preface]. International Finance Corporation. Retrieved from http://carbon-pulse.com/wp-content/uploads/2016/02/2016-Environomist-China-Carbon-Market-Research-Report_En_20160217_CW.pdf

³ Parenteau, P. & Cao, M. (2016, March). Carbon Trading in China: Progress and Challenges. *Environmental Law Reporter* 46, 10194. Retrieved from <http://www-assets.vermontlaw.edu/Assets/elc/Parenteau.March2016.pdf>. The pilot programs apply in different economic and industrial contexts and each possess different design features.

⁴ The Regional Greenhouse Gas Initiative (RGGI, pronounced "Reggie") is the first mandatory market-based program in the United States to reduce CO₂ emissions.

Part 1: Background and Design

Starting in 2009, RGGI originated from an agreement to develop a carbon cap-and-trade program to reduce power sector carbon dioxide (CO₂) emissions in the Northeast and Mid-Atlantic regions of the United States.⁵

In 2003, Governor George Pataki of New York sent a letter to the governors of other Northeast and Mid-Atlantic states suggesting a regional strategy to lead the nation in combating global climate change.⁶ In 2005 December, seven states—Connecticut, Delaware, Maine, New Hampshire, New Jersey, New York, and Vermont—signed a Memorandum of Understanding (MOU) to develop such a program. Two years after that three additional states, Maryland, Massachusetts, and Rhode Island, also formally joined the regional program.

The MOU reflects those states' agreement to adopt basic design elements of a cap-and-trade program and to jointly develop a "model rule" that would serve as a prototype for the development of their respective state regulations necessary to implement the program.⁷ In the MOU, the states also agreed to undertake a "comprehensive review of all components of the Program," including but not limited to program success, impacts, additional emissions reductions, imports and emissions leakage and the effectiveness of the use of offsets.⁸ RGGI later characterized what has become known as a "program review" as "a rigorous and comprehensive evaluation, supported by an extensive regional stakeholder process that engaged the regulated community, environmental nonprofits, consumer and industry advocates, and other interested stakeholders."⁹

RGGI, which went into effect in 2009, conducted its first program review in 2012–2013; a second review is currently underway and is expected to be completed before the end of 2016.¹⁰

The purpose of this paper is to examine RGGI's program review mechanism. Experience with RGGI has illustrated the importance of including a comprehensive review mechanism that assesses the program's functionality to ensure its economic, environmental, and equitable performance, and other jurisdictions can benefit from lessons learned by RGGI states and stakeholders. For jurisdictions that are designing plans to reduce greenhouse gas (GHG) emissions, an appreciation of the benefits and challenges associated with a built-in review process could afford them an opportunity to accommodate some of the uncertainty inherent in regulatory systems and to make valuable adjustments to those plans when necessary.

⁵ Regional Greenhouse Gas Initiative. (2005). Memorandum of Understanding. Retrieved from http://rggi.org/docs/mou_final_12_20_05.pdf

⁶ New York State Department of Environmental Conservation (DEC). (2006, August 15). DEC Announces Final Model Rule to Help States Implement RGGI (Press release). Retrieved from <http://www.dec.ny.gov/press/12440.html>

⁷ RGGI MOU, 2005, Section (3) (A).

⁸ RGGI MOU, 2005, Section (6) (D).

⁹ See RGGI. *2012 Program Review*. Retrieved from <http://www.rrgi.org/design/program-review>; and RGGI. (2012). *Final Program Review Materials: Summary of Recommendations to Accompany Model Rule Amendments*. Retrieved from http://www.rrgi.org/docs/ProgramReview/FinalProgramReviewMaterials/Recommendations_Summary.pdf

¹⁰ See: RGGI, *2012 Program Review*; and RGGI. *2016 Program Review*. Retrieved from <http://www.rrgi.org/design/2016-program-review>

To this end, we set out to understand how to design such a process, the resulting major benefits and challenges of the program review, and important lessons associated with designing such a process. As discussed further below, the RGGI program has benefitted from transparency, receiving regular feedback from participants, and being able to make needed program adjustments in a publicly accessible way. The authors consulted with more than a dozen individuals, including current and former RGGI regulators, stakeholders, and others, to solicit their insights into the benefits and challenges associated with RGGI's program review.¹¹ While anecdotal in nature, these interviews were crucial to the understanding of the program review presented in this paper.

Part I of this paper, "Background and Design," reviews the major features of RGGI's cap-and-trade program design. Part II, "Program Review," considers the manner in which the program review is conducted and the major issues addressed in the 2012-13 review. Part III, "Observations," articulates the major lessons that program designers can consider in their design of regulatory programs, in particular cap-and-trade programs, to reduce GHG emissions.

Developing RGGI

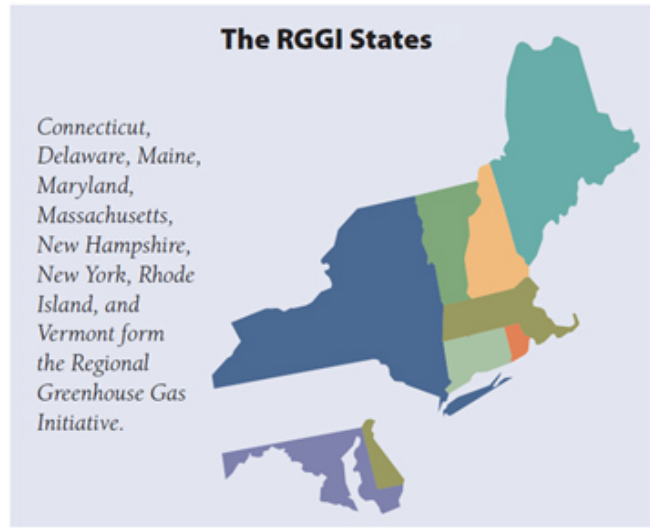
When state regulatory staff (RGGI staff)¹² first met in 2003 to develop the outlines of a program that would be memorialized in an MOU in 2005, they were conscious of not only being from different states, but also different regulatory agencies with different priorities and mandates.¹³ Recognizing that development of a regional carbon trading program would be both an environmental and energy challenge, each state sent a representative air regulator as well as a staff person from the state's energy regulatory body, typically a public utility commission.

¹¹ Dale Bryk, Natural Resources Defense Council; Director Philip Cherry and Valerie Gray, Delaware Department of Natural Resources and Environmental Control; Derek Furstenwerth, Calpine; Marissa Gillet, Maryland Public Service Commission; Brian Jones, M.J. Bradley; William Lamkin, Massachusetts Department of Environmental Protection; Professor Leigh Raymond, Purdue University; Franz Litz, Principal, Litz Energy Strategies; Peter Shattuck and Jordan Stutt, Acadia Center; Deputy Commissioner Jared Snyder and Lois New, New York Department of Environmental Conservation; and Chris Wentlent, Constellation and Exelon Company. The authors would like to thank these people for sharing their expertise and insights.

¹² RGGI's program review was conducted by a group of state regulators formally designated in 2009 as the "RGGI Program Committee." For purposes of this paper, however, state regulatory staff will be simply referred to as "staff" or "RGGI staff."

¹³ RGGI. (2003, September 29). *Goals, Proposed Tasks, and Short-Term Action Items*. Retrieved from <http://www.rggi.org/docs/actionplanfinal.pdf>

Figure 1



Source: Regional Investment of RGGI CO₂ Allowance Proceeds, 2014

Many of these regulators had worked together on regional issues in the past. The air regulators had worked on joint responses to various Midwest air pollution challenges, and had coordinated on market-based pollution programs related to emissions of sulfur dioxide (SO₂) and nitrogen oxides (NO_x). Energy regulators had a history of cooperation on the development of regional wholesale electricity markets. New England's energy and environmental regulators, and that region's grid operator, also had collaborated on the drafting of a model rule for distributed generation, to ensure that the region's environmental and reliability standards continued to be satisfied during periods of peak electricity demand. However, this was the first time that both environmental and energy regulators had engaged on an effort together at such a scale. Earlier efforts to develop consistent procedures for distributed generation (small-scale generators) and on procedures for when such units would be dispatched laid an effective groundwork for this more extensive RGGI effort. These early efforts helped to reveal constraints that can be imposed on the energy and environmental disciplines, and areas of opportunity, where value to the respective programs could be added through cooperation and understanding. These regulators understood that electricity generation is a significant environmental issue and that environmental compliance can have profound effects on the energy sector.

The RGGI staff agreed that their planning goal was to develop:

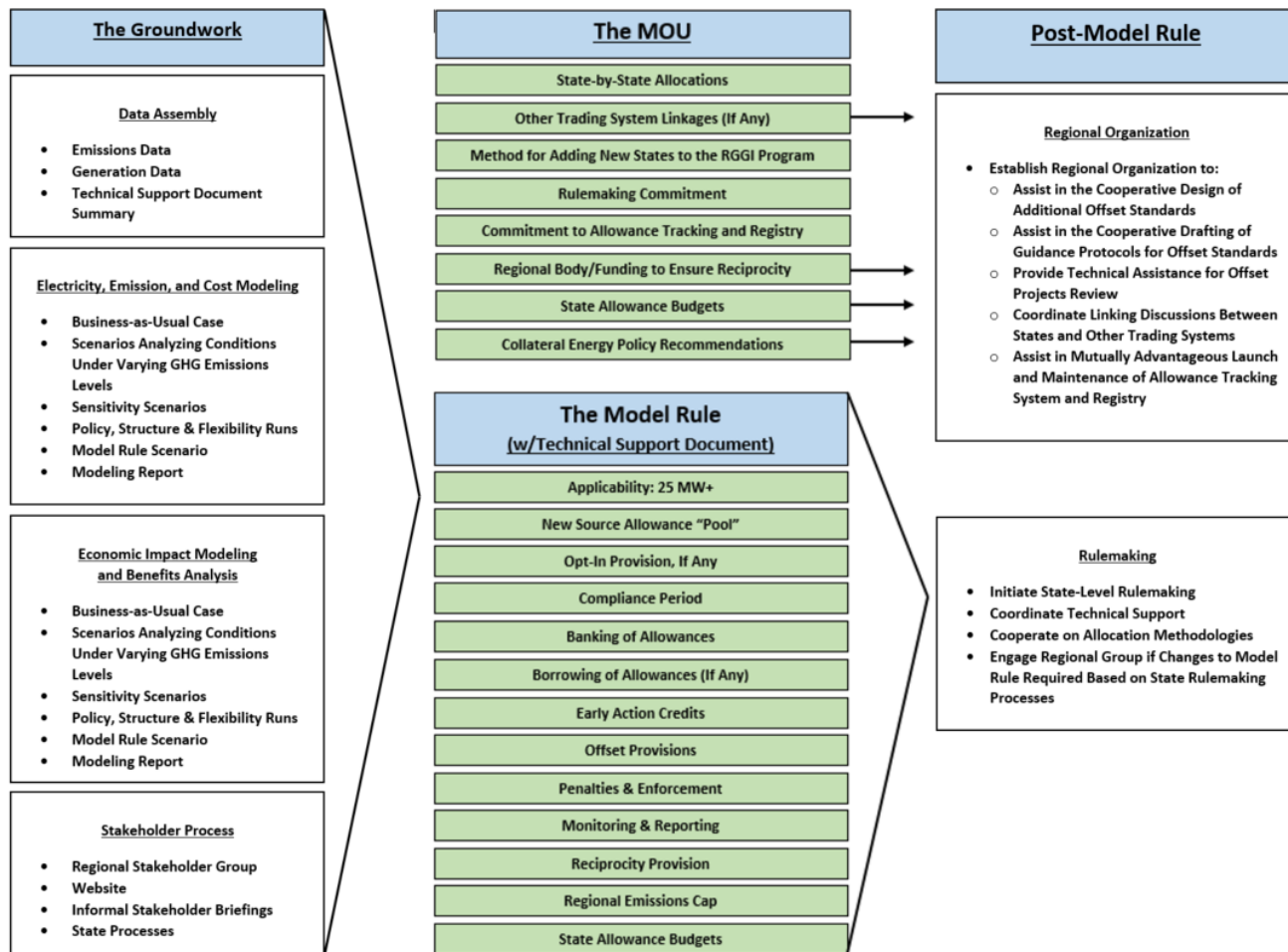
A program to reduce carbon dioxide emissions from power plants in the participating states, while maintaining energy affordability and reliability and accommodating, to the extent feasible, the diversity in policies and programs in individual states.¹⁴

They developed a flow chart (see Figure 2) to describe the process and illustrate their plans to others.

¹⁴ Ibid.

Figure 2

RGGI Planning Chart



Source: RGGI

During these early planning years, the RGGI staff recognized the need for education on various aspects of a GHG emissions reduction program, diverse stakeholder involvement, and a transparent process. As a result, staff arranged numerous stakeholder meetings and topical workshops, which together formed the initial model for what would later become program reviews. These stakeholder meetings and topical workshops provided a method of:

1. Informing the public and stakeholders about their “deliberations, and draft and final work products;”
2. Providing staff with early input on their ideas and draft work;
3. Maintaining a dialogue with stakeholders; and
4. Establishing a means for the public and stakeholders to submit formal comments to the RGGI staff at key decision points in the RGGI process.¹⁵

¹⁵ See, e.g., RGGI. (2004, January 18). *Draft Outline of Stakeholder Process*. Retrieved from <http://rggi.org/docs/stakeholderprocess.pdf>

As they engaged on these topics and improved their understanding of appropriate program design options, the RGGI staff also relied on a large group of experts from the energy and environmental fields known as the Resource Panel.¹⁶ In addition to consulting with the RGGI staff, the Resource Panel helped organize a number of topical workshops to educate staff and stakeholders about program design options and issues. For example, between 2004 and 2006, RGGI conducted the following workshops:

- “Electricity Markets, Reliability, and Program Design;”
- “Allowance Allocations;”
- “Offsets;”
- “Implementing the Minimum 25% Public Benefit Allocation;”¹⁷ and
- “Electric Imports and ‘Emissions Leakage’.”¹⁸

Experts from many disciplines and backgrounds—academia, think tanks, power companies, and environmental and energy NGOs—all supported the RGGI staff members in their effort to better understand the many questions they faced in designing and starting a power sector cap-and-trade program.¹⁹ Expert disciplines included economics, engineering, finance, electric power markets, and environmental and energy law and regulation.

How RGGI Works

In order to appreciate the value of RGGI’s program review mechanism, it is necessary to first understand the basic elements of the RGGI program. The following section discusses the program’s central features.

The Structure

While RGGI is generally considered a single program, strictly speaking, it is a collection of individual state programs that have undertaken measures to ensure their operation across the nine-state region (i.e., RGGI is a collection of nine linked state programs). This arrangement allows the states to preserve their legal sovereignty while at the same time coordinating administrative functions across the entire region.

As already noted, the MOU entered into by the RGGI states provided for the development of a “model rule” to serve as a blueprint for individual state regulations. Relying on the model rule, each of the RGGI states developed their respective regulations and regulatory programs that correspond in large part to

¹⁶ The Resource Panel members consisted of electricity grid planners, energy and environmental NGOs, and think tanks, including: the Regulatory Assistance Project (RAP); Natsource; Northeast States Coordinated Air Use Management (NESCAUM); PJM Interconnection; World Resources Institute; Pew Center; ISO-NE; NY ISO; and Resources for the Future (RFF). “A broad range of organizations participated as stakeholders in the development of RGGI. In addition, a number of organizations acted as Resource Panel members, helping the participating states to develop their approaches to a regional cap-and-trade system.” See: http://www.rggi.org/docs/Stakeholder_Resource_Organizations.pdf

¹⁷ RGGI. (2006, July 20). Workshop to Support the Regional Greenhouse Gas Initiative on the Topic: Implementing the Minimum 25% Public Benefit Allocation [Agenda]. Retrieved from http://www.rggi.org/docs/rggi_agenda_7_20_06.pdf

¹⁸ Workshop on Electric Imports and “Emission Leakage” In Support of the Regional Greenhouse Gas Initiative. See also, more generally, http://www.rggi.org/design/history/topical_workshops

¹⁹ See, e.g., presentations on auctions: general principles and procedures, Charles Holt, University of Virginia; spectrum auctions, Evan Kwerel, US Federal Communications Commission; Republic of Ireland’s auction, Ken Macken, Ireland EPA, State of Virginia’s NOx auction, Bill Shobe, University of Virginia.

each other. Where differences exist between state programs, these chiefly relate to how allowance auction revenues are to be used and administered. Various aspects of the program are explored in further detail below.

While each state operates under its own regulatory authority, all the RGGI states share a common administrative organization, “RGGI Inc.,” whose Board of Directors is comprised of two representatives – an environmental regulator and an energy regulator – from each RGGI state.

RGGI, Inc. has no regulatory or enforcement authority; the states retain these authorities. Instead, RGGI, Inc. provides administrative and technical services to support states in the operation of their respective programs. These functions include the development and maintenance of systems to report data from emissions sources subject to RGGI, and auction and tracking of CO₂ allowances. RGGI Inc. is responsible for monitoring the CO₂ allowance auction and market. It also provides technical assistance to participating states in reviewing applications for emissions offset projects and evaluating proposed changes to the States' RGGI programs.

It should also be noted that the MOU contains provisions for additional states to join²⁰ and for states to leave RGGI.²¹

Applicability

RGGI applies to fossil fuel-fired electric generation units (EGUs) serving a generator of 25 megawatts (MW) or larger, an approach that was largely predicated on the availability of data under existing federal regulations.²² Generators of that size were selected because RGGI staff determined that units of that size were responsible for approximately 95 percent of the electric generation sector’s CO₂ emissions in the participating states. The initiative also defined the term “fossil fuel-fired” depending on a unit’s in-service date.²³

In order to establish a region-wide list of affected sources, RGGI states conducted an inventory of all electricity generating units, and compiled or calculated recent historical CO₂ emissions from those units, relying on established data sources.²⁴ To fill in gaps in the inventory, the states revised the lists to add missing and remove exempt or duplicate units, used additional unit-level state data (where available),

²⁰ See MOU Section 5(A), “New Signatory States,” http://rggi.org/docs/mou_final_12_20_05.pdf.

²¹ Ibid. MOU Section 5(B), “Withdrawal of a Signatory State,” provides that states can withdraw from RGGI upon providing a 30-day notice. Remaining states agree to undertake measures to adjust allowance usage to account for the reduction in generation units that are subject to the program. The MOU also provides for RGGI Inc. by-laws to articulate any further requirements.

²² The emissions monitoring rules for Clean Air Act’s Title IV Acid Rain Program are found in federal regulations at 40 C.F.R. Part 75, and those generators subject to the Acid Rain program correspond largely but not entirely to the 25 MW and larger category of resources currently covered by RGGI. For example, there are some exceptions to this statement; in the State of Massachusetts, there are some RGGI units that are not subject to Title IV. See also notes 42-44 and accompanying text below.

²³ If a unit commenced service on or after January 2005, it would be considered fossil fuel-fired provided that fossil fuel comprised more than five percent of its total annual heat input. If a unit commenced service on or before January 2005, it would be considered fossil fuel-fired provided that fossil fuel comprised more than 50 percent of its total annual heat input.

²⁴ These sources included the US Energy Information Administration (EIA) Form EIA-767 data: Annual Steam-Electric Plant Operation and Design Data (<http://www.eia.gov/electricity/data/eia767>); the EPA’s Air Markets Program Data (<http://ampd.epa.gov/ampd>); the EPA’s Emissions & Generation Resource Integrated Database (<http://www.epa.gov/cleanenergy/energy-resources/egrid>); and state emissions inventories and fuel consumption data where available.

incorporated stakeholder feedback, and obtained generation data from wholesale market independent system operators (ISOs).

Compliance Periods and Cap Level

The RGGI states implemented a three-year compliance period, rather than the one-year period used by other control programs in the United States. This decision was made in part because of concern over possible allowance price volatility and the conclusion that compliance could be ensured even over a longer period. RGGI's first three-year compliance period started on January 1, 2009.

The RGGI MOU established a stable cap for the ten states' electric sector CO₂ emissions of approximately 188 million short tons (170 million metric tons) per year from 2009 through 2014. The cap was to decline at a rate of 2.5 percent per year for four years from 2015 through 2018. This approach results in a 2018 annual emission budget that is ten percent lower than the initial 2009 annual emission budget.²⁵

At the end of the first compliance period in 2011, the state of New Jersey withdrew from RGGI.²⁶ As further discussed in Section II, based on decisions informed by the program review, the nine remaining RGGI states reset the cap through a consensus process, lowering it to 91 million short tons (83 million metric tons) of CO₂ per year (to reflect actual emissions) while extending the 2.5 percent per year declining trajectory from 2015 through 2020 (from a 2018 end date).²⁷

Cost Containment

Market-based emission reduction mechanisms such as cap-and-trade provide the opportunity to meet environmental goals at lower cost than might otherwise occur under a more prescriptive approach. Market-based approaches provide compliance flexibility and incentivize the lowest-cost abatement opportunities across the entire market. This has been borne out in practice across multiple jurisdictions, including the RGGI states. However, due to a perception that even a flexible market-based regulatory program could experience price volatility and result in the imposition of unwanted costs, RGGI originally adopted several explicit cost containment mechanisms that were later eliminated in favor of a simpler approach.²⁸

RGGI established two mechanisms that could, under certain circumstances, temporarily (a) extend program compliance periods, and (b) expand the ability to use offsets for compliances to mitigate

²⁵ RGGI's initial regional cap was 188 million short tons of CO₂ per year, which staff indicated was approximately four percent above annual average regional emissions during the period of 2000 through 2004.

²⁶ The annual RGGI cap, including New Jersey (NJ), was initially set at 188.1 million tons from 2009-2014. NJ accounted for 22.9 million of that 188.1 cap, bringing the regional cap down to 165.2 when NJ departed after 2011. The new cap (beginning in 2014) was set based on actual emissions, so it is difficult to know precisely where the cap would have been set had NJ stayed in RGGI. Without NJ, the cap reduced from 165.2 to 91.0 million short tons, a reduction of 45%.

²⁷ See RGGI, *2012 Program Review*.

²⁸ RGGI adopted several mechanisms to address the possible increase in allowance prices. As discussed in the following sections, RGGI would later reject these mechanisms and settle upon a simpler approach. RGGI also adopted a "reserve price" in its auctions to ensure that allowance prices would not drop below a minimum price. The reserve price was set administratively and rose slightly with inflation. For further discussion, see Shobe, W. (2010, November). *Reserve Price Analysis Task: Performed for RGGI Inc. on behalf of the Participating States*. Center for Economic & Policy Studies, University of Virginia. Retrieved from https://www.rggi.org/docs/Reserve_Price_Analysis_Report.pdf

allowance prices. The “Compliance Period Safety Valve” was designed to further extend RGGI’s three-year compliance period under certain conditions.²⁹ RGGI developed additional compliance flexibility by allowing the use of offsets which, as explained below, are emissions reductions outside of the capped electric sector. While the RGGI limits the source and amount of offsets available for compliance purposes, it developed another cost containment mechanism that could expand both the allowable geographic scope and the amounts of offsets under certain circumstances.³⁰

Use of Offsets

RGGI allows limited use of CO₂ offset allowances, which are defined as an offset allowance representing a “project-based greenhouse gas emission reduction outside of the capped electric power generation sector.”³¹ RGGI developed offset protocols primarily as a cost-containment mechanism. The ability to increase the number of available allowances through limited development of offset projects was considered a way to mitigate potential allowance price increases. Use of offset allowances for compliance by a unit is limited to an amount equal to three percent of a unit’s reported CO₂ emissions during the compliance period.

RGGI states specified five eligible offset project categories:

- Landfill methane capture and destruction;
- Reduction in emissions of sulfur hexafluoride in the electric power sector;
- Sequestration of carbon attributable to US forest projects, including reforestation, improved forest management, and avoided conversion;³²
- Reduction or avoidance of CO₂ emissions from natural gas, oil, or propane end-use combustion attributable to end-use energy efficiency in the building sector; and
- Avoided methane emissions from agricultural manure management operations.³³

The RGGI states chose to adopt these specific offset categories—what RGGI called a “standards-based approach”—rather than allowing for the submission of offset applications on a case-by-case basis. RGGI states reasoned that this would help all parties understand requirements and thereby provide greater

²⁹ RGGI MOU, Section (2) (E), Compliance Period Safety Valve. This mechanism would extend the compliance period by as much as three additional one-year periods if, after the market-settling period (i.e., first 14 months of the three-year compliance period), program allowance prices exceeded the safety valve threshold for an established price point (\$10 per allowance) for an extended period (12-month rolling average).

³⁰ RGGI MOU, Section (F) (3), Offset Expansion Safety Valve. The mechanism that would expand the use of offsets was designed in a similar manner to the compliance period safety valve. If, after the market settling period (i.e., first 14 months of the compliance period), the average regional spot price for CO₂ were to equal or exceed \$7 for an extended period (12-month rolling average), referred to as an “offset trigger event,” offsets could be used from anywhere in North America and could cover up to five percent of an entity’s reported emissions. Furthermore, if the trigger occurs twice in two consecutive 12-month periods, the geographic availability of offsets would be expanded further and could include units from international trading programs. The amount of offsets that an entity could use would also be expanded beyond five percent for the first three years of a compliance period up to an amount equal to 20 percent of an entity’s reported emissions if the compliance period was extended beyond three years.

³¹ For more on the RGGI approach to CO₂ offsets, see: <http://www.rggi.org/market/offsets>

³² The states of Connecticut and New York also allow for offsets associated with “afforestation,” i.e., establishing forest in an area where there was none previously.

³³ See: <http://www.rggi.org/market/offsets>

certainty to developers. They concluded that it would also reduce both the administrative burden on RGGI states and developer transaction costs. They also established these requirements to ensure that authorized offset allowances would represent CO₂-equivalent emissions reductions or carbon sequestration that is “real, additional, verifiable, enforceable, and permanent.”³⁴

Allowance Distribution

The RGGI cap covers aggregated electric sector emissions from all of the participating states, and each allowance permits a regulated source to emit one short ton of CO₂. The emission cap is comprised, in total, of the sum of individual state emission budgets, which were agreed upon among the states based on proportional historical CO₂ emissions.³⁵

The auctions are conducted in accordance with the authority of each state offering CO₂ allowances for sale in that auction, and each state retains its authority to make regulatory determinations related to the conduct of the auction.³⁶ Auction proceeds are then returned to the states based on the proportion of the allowances they contributed to the auction.³⁷

The RGGI states distribute approximately 90 percent of CO₂ allowances through a regional allowance auction held quarterly.³⁸ They follow a single-round, uniform-price, sealed-bid auction format. This is an approach in which participants submit confidential bids for the amount of allowances they wish to purchase. Bidders receive the quantity of allowances specified in their winning bids at a uniform clearing price (i.e., all auction participants with a winning bid pay the same price for the allowances).

When electric generators bid the prices they are willing to accept for each MWh of electricity they produce, they will include the value of the allowances, whether given for free or purchased, in the cost of their electricity. Therefore, a free allocation of allowances can result in windfall profits—a transfer of wealth from electricity ratepayers to electricity producers who received the allowances at no cost.³⁹ In cases where the marginal price of electricity is established by a generator that has added this allowance value to its bid, all generators receive the added value of the allowance that was freely allocated.⁴⁰ In circumstances where this results in cost recovery exceeding compliance costs for individual units, this

³⁴ See: <https://www.rggi.org/market/offsets>

³⁵ For an illustration of this, see: National Association of Clean Air Agencies (NACAA). *Implementing EPA’s Clean Power Plan: A Menu of Options*. Chapter 24, Figure 24-5, p. 24-0. Retrieved from http://www.4cleanair.org/NACAA_Menu_of_Options

³⁶ For further information on RGGI auction processes and results, see: http://www.rggi.org/market/co2_auctions

³⁷ For example, between 2008 September and 2013 December, the RGGI states held 22 auctions in which they sold current and future control period allowances. First control period (2009 January 1 to 2011 December 31) allowances sold at a weighted average price of \$2.31, with prices ranging from \$1.86 to \$3.51. Second control period (2012 January 1 to 2014 December 31) allowance prices ranged from \$1.86 to \$3.21 and sold at a weighted average price of \$2.52. Through 2012, RGGI raised just under \$1 billion for the participating states. RGGI. (2012). *Regional Investment of RGGI CO₂ Allowance Proceeds*, p. 6. For an illustration of this, see NACAA, Chapter 24, Table 24-1, p. 24-9.

³⁸ See RGGI. Fact Sheet: RGGI CO₂ Allowance Auctions. Retrieved from https://www.rggi.org/docs/RGGI_Auctions_in_Brief.pdf

³⁹ More information about ISOs is available at: <http://www.isorto.org/about/default>

⁴⁰ In a competitive wholesale power market such as those in the RGGI region, the bid submitted by the most expensive generator that dispatches to meet system load will set the market-clearing price. All generators receive this market-clearing price, even if their generation costs are significantly lower than the marginal unit.

produces a windfall profit, i.e., a transfer of wealth from electricity customers to electricity producers who received the allowances at no cost.⁴¹

The RGGI states recognized that giving away allowances to generators or utilities provides a potential windfall benefit to the recipients.⁴² Allowances have value, and providing them to those entities at no cost transfers that value for free. This is true of both utilities in restructured organized markets and vertically integrated markets.⁴³

In its 2011 study, *The Economic Impacts of the Regional Greenhouse Gas Initiative*, the Analysis Group observed that:

Auctioning allowances and distributing allowance proceeds to states in this way had an important impact on program outcomes since it meant, in effect, that the public benefitted by transferring the value of allowances to market at market prices (rather than for free, as was done in the SO₂ and NO_x allowance programs).⁴⁴

Allowance Tracking

The RGGI CO₂ Allowance Tracking System (RGGI COATS) is an electronic platform that records and tracks CO₂ allowances and other program data for each RGGI state. Specifically, the system enables regulators to view program and market data reports regarding:

- CO₂ allowance transactions (identifying the date, price, and type of transaction);
- COATS accounts (listing accounts registered);
- COATS account representatives (showing individual contact details for all accounts);

⁴¹ See Littell, D. & Farnsworth, D. (2016, April). *Carbon Markets 101: "How-To" Considerations for Regulatory Practitioners*. Montpelier, VT: Regulatory Assistance Project. Retrieved from <http://www.raonline.org/wp-content/uploads/2016/05/rap-littell-farnsworth-carbonmarketsprimer-2016-april-5.pdf>⁴² For a more extensive treatment of carbon pricing effects in organized wholesale markets, see: Subcommittee on Energy and Environment, U.S. House Energy and Commerce Committee, (2009, March 12) (Testimony of Sonny Popowski, Consumer Advocate of Pennsylvania); see also: Cowart, R. (2008). Carbon Caps and Efficiency Resources, *Vermont Law Review*, (33), 201-223.

⁴² For a more extensive treatment of carbon pricing effects in organized wholesale markets, see: Subcommittee on Energy and Environment, U.S. House Energy and Commerce Committee, (2009, March 12) (Testimony of Sonny Popowski, Consumer Advocate of Pennsylvania); see also: Cowart, R. (2008). Carbon Caps and Efficiency Resources, *Vermont Law Review*, (33), 201-223.

⁴³ For an academic demonstration of windfall profits in a free allocation system, see Carmona, R., Fehr, M., Hinz, J., & Porchet, A. *Market Design for Emission Trading Schemes*. By way of example, the European Union Emissions Trading System (ETS) illustrated this in its first compliance period when allowances were given for free to utilities in the United Kingdom and Germany, and those utilities included their value in recoverable expenses nonetheless. So European ratepayers paid for the value of allowances that were given to utilities even though the utilities received the allowances for free. Also see: German Federal Ministry for the Environment. (2014, October 15). European Emissions Trading Scheme: The German Experience [Presentation], slide 10. Retrieved from https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/3420149/0633975ADD717B9CE053C92FA8C06338.PDF; Baldwin, R., Cave, M., & Lodge, M. (2012). *Understanding Regulation: Theory, Strategy, and Practice*. Oxford, United Kingdom: Oxford University Press, p. 203; and Sijm, J., Neuhoff, K., & Chen, Y. (2006, May). *CO₂ Cost Pass Through and Windfall Profits in the Power Sector* [Working paper]. Cambridge, England: Electricity Policy Research Group. Retrieved from <http://www.eprg.group.cam.ac.uk/wp-content/uploads/2008/11/eprg0617.pdf>; FERN. *Case Study 3: Carbon trading in practice — the EU Emissions Trading Scheme*. Retrieved from <http://www.fern.org/es/node/5201>.

⁴⁴ Hibbard, P., Tierney, S., Okie, A., & Darling, P. (2011, November). *The Economic Impacts of the Regional Greenhouse Gas Initiative on Ten Northeast and Mid-Atlantic States*. Analysis Group, p. 31. Retrieved from http://www.analysisgroup.com/uploadedFiles/Publishing/Articles/Economic_Impact_RGGI_Report.pdf

- RGGI sources (listing each regulated power plant and its location);
- Owners/operators of RGGI sources (showing the corporate affiliation of owners and operators for each regulated power plant);
- Special approvals (detailing allowance allocations made by states);
- Offset project applications and approvals; and
- CO₂ emissions from RGGI sources (showing emissions for each regulated power plant and summary CO₂ emissions for the nine-state region).⁴⁵

The data are not only critical for program administration, but for market monitoring and reporting as well. Public reporting based on RGGI COATS also provides open access, enabling viewing and downloading of data related to CO₂ allowance market activity.

Emission Monitoring and Reporting

The RGGI states have based their emissions monitoring and reporting requirements on existing requirements that have already been established under other air quality programs.⁴⁶ The Clean Air Act's Title IV Acid Rain Program established pursuant to the Clean Air Act Amendments of 1990 requires coal-fired EGUs to install and operate continuous emissions monitoring systems (CEMS).⁴⁷ The EPA has also developed monitoring, recordkeeping and reporting requirements for CEMS and these rules are found in federal regulations at 40 C.F.R. Part 75.⁴⁸ The data produced pursuant to these regulations are often referred to as "Part 75 data."

The universe of Title IV generators corresponds largely but not entirely to the 25 MW and larger category of resources currently covered by RGGI. RGGI uses these Part 75 data to populate CO₂ emission information contained in the RGGI COATS. According to RGGI, "regulated power plants are required to report data necessary to quantify CO₂ emissions to RGGI participating states," and:

CO₂ emissions data from each regulated power plant is recorded in the EPA Clean Air Markets Division database in accordance with state CO₂ Budget Trading Program regulations and U.S. EPA regulations at 40 CFR Part 75 and transferred to RGGI COATS.⁴⁹

Compliance and Enforcement

Unlike command-and-control programs in which individual emitters have to demonstrate compliance with a specified emissions limitation for each pollutant, under a cap-and-trade program, compliance is determined differently. It is structured to ensure that emitters have the requisite allowances at the end of the compliance period. EGUs in the RGGI states must surrender allowances equal to their reported emissions during a compliance period.

⁴⁵ See RGGI CO₂ Allowance Tracking System Data. Retrieved from <http://www.rggi.org/market/tracking/public-reporting>

⁴⁶ The Clean Air Act Amendments of 1990 set a goal of reducing annual SO₂ emissions by ten million tons below 1980 levels, requiring a two-phase tightening of the restrictions placed on fossil fuel-fired power plants.

⁴⁷ The Act requires the EPA to specify the requirements for such equipment and to specify any alternative monitoring system that is demonstrated as providing information with the same precision, reliability, accessibility, and timeliness as CEMS.

⁴⁸ There are also provisions for "initial equipment certification procedures, periodic quality assurance and quality control procedures, recordkeeping and reporting, and procedures for filling in missing data periods." Refer to the EPA Continuous Emissions Monitoring Fact Sheet at: <http://www.epa.gov/airmarkets/emissions/continuous-factsheet.html>.

⁴⁹ For RGGI COATS public data, see: <https://www.rggi.org/market/tracking/public-reporting>

The RGGI states have also established compliance and enforcement rules, and related provisions, for other aspects of the program including emissions reporting, allowance tracking, allowance retirement, and auction participation. Furthermore, no RGGI provisions excuse EGUs from compliance with any otherwise applicable provisions of state and federal laws or regulations.

The RGGI program uses an independent market monitor to assess allowance auction performance, and to watch for market manipulation, thereby protecting and fostering competition, which in turn increases the confidence of the states, participants, and the public in the allowance market.⁵⁰ RGGI contracts with an independent firm for independent monitoring of the competitive performance and efficiency of the RGGI allowance market. The market monitor:

- Identifies attempts to exercise market power, collude, or otherwise manipulate prices in the auction and/or the secondary market;
- Assesses whether the auctions are administered in accordance with the noticed auction rules and procedures; and
- Makes recommendations regarding proposed market rule changes to improve the economic efficiency of the market for RGGI allowances.⁵¹

Before the states approve auction results, the market monitor reviews each auction and issues a report containing its assessment. The market monitor's report is included with the public release of auction results. The market monitor also issues quarterly and annual reports on the secondary market, i.e., market activity occurring beyond the RGGI auction.

Use of Allowance Proceeds

In initial discussions leading up to the adoption of the 2005 MOU, the RGGI states agreed that each would have full discretion in its use of allowance auction proceeds. On the basis of subsequent discussions, however, each state agreed to allocate a quarter of its allowance revenues for "consumer benefit" or "strategic energy" purposes defined in the MOU as:

The use of allowances to promote energy efficiency, to directly mitigate electricity ratepayer impacts, to promote renewable or non-carbon emitting energy technologies, and to stimulate or reward investment in the development of innovative carbon emissions abatement technologies.⁵²

Investment in end-use energy efficiency was viewed as a critical complementary policy to keep consumer impacts manageable. See Figure 3, below. Energy efficiency's demand reduction and related allowance price suppression effects were also considered an important key to reducing potential emissions leakage in areas bordering the RGGI region.

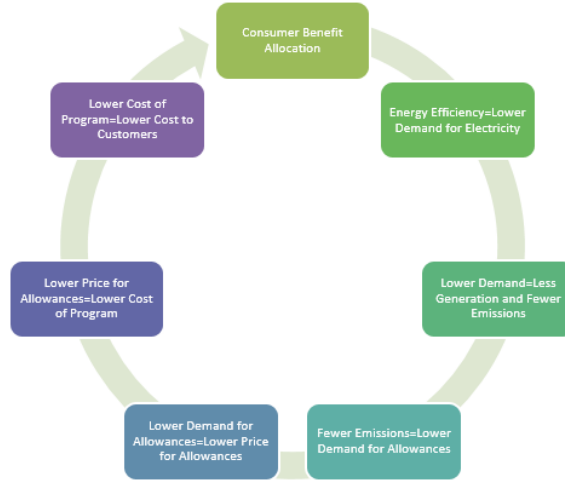
⁵⁰ For RGGI market monitor reports, see: http://www.rggi.org/market/market_monitor

⁵¹ Ibid.

⁵² RGGI MOU, Section (2)(G)(1).

Figure 3

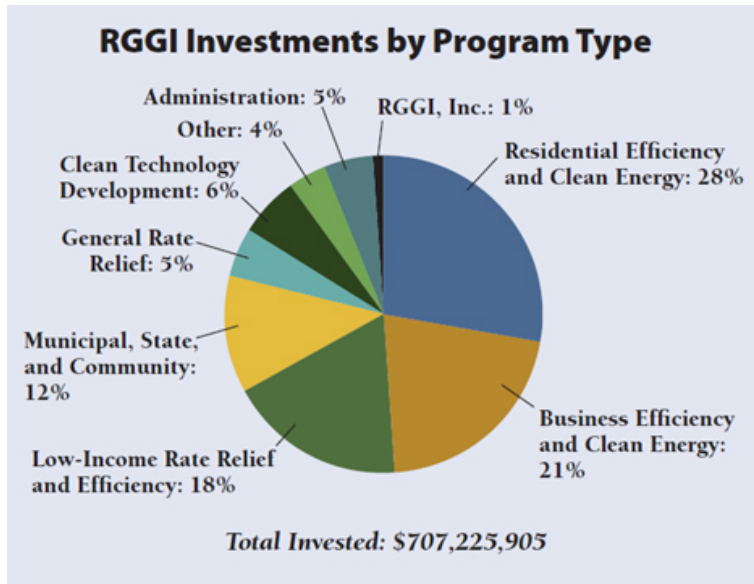
Effect of RGGI Consumer Benefit Allocation on Direct Program Costs



Source: Farnsworth, D’Antonio, & Pike-Biegunska, Climate Policy and Affordability: Advocacy Opportunities in the Northeast. *Regulatory Assistance Project, 2009*

In practice, the RGGI states have gone beyond investment levels specified in their agreement to allocate 25 percent for consumer benefit and strategic investment, and have invested significant amounts of their auction revenues in clean energy programs. During its first three-year compliance period (2009-2012), when the RGGI states raised more than \$984.7 million in auction proceeds, they invested \$707.2 million in state clean energy programs, as shown in Figure 4. During the second three-year compliance period (2012-2014), the RGGI states raised \$1.0 billion in allowance proceeds then reinvested that back into their economies.

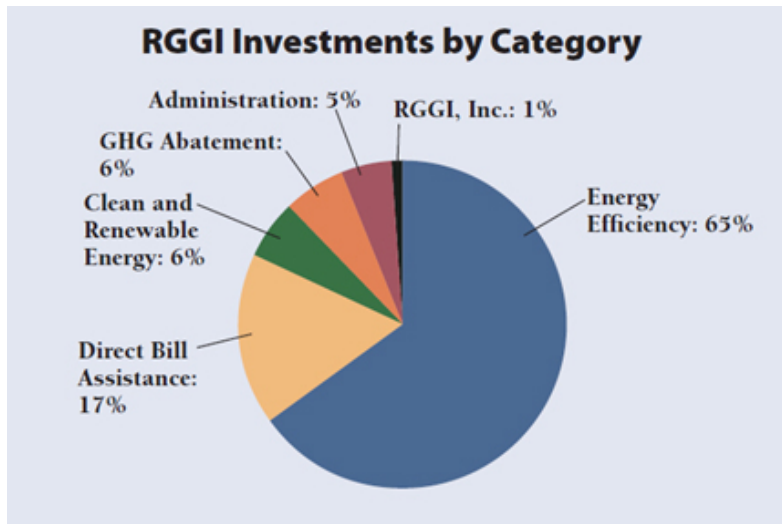
Figure 4



Source: Regional Investment of RGGI CO₂ Allowance Proceeds, 2014

RGGI reports that “more than 73 percent of 2012 RGGI investments, and approximately 65 percent of cumulative RGGI investments to date, fund energy efficiency programs in the region.” More than six percent of RGGI investment in 2012, and six percent of overall investment to date, funds clean and renewable energy programs, including grants and low-interest loans.⁵³ Figure 5 shows the portion of total RGGI auction proceeds directed toward different categories of investment.

Figure 5



Source: Regional Investment of RGGI CO₂ Allowance Proceeds, 2014

⁵³ Ibid.

Costs and Cost-Effectiveness

RGGI 's cap-and-trade program has proven to be cost-effective for decreasing carbon emissions. Like other cap-and-trade programs, it allows regulated entities to weigh all available options and choose the least-cost means of compliance. It also allows differential costs of emissions reduction between two regulated entities to be exploited to the benefit of both parties through their ability to trade allowances.

One aspect of the RGGI program approach that is not always sufficiently acknowledged is that, in addition to funding clean energy resources like energy efficiency and renewable energy, the program achieves GHG reductions separate from and in addition to the reductions in the capped sector by reinvesting some of the auction revenues in other sectors. For example, some of the energy efficiency investments that states have made with RGGI auction proceeds have been targeted to reduce the consumption of oil, propane, and natural gas for heating buildings. This reduces GHG emissions outside of the electricity sector without in any way relaxing the cap.

In 2011, the Analysis Group produced a study that assessed the economic impacts of RGGI's first three years (2009-2011) and found that power plant owners and other auction participants spent \$912 million to purchase CO₂ allowances in the first three years of RGGI, but the reinvestment of these revenues by states added \$1.6 billion in *net* economic value to the region.⁵⁴

Power plant owners spent \$912 million to purchase CO₂ allowances in the first three years of RGGI, but the reinvestment of these revenues by states added \$1.6 billion in net economic value to the region.

Analysis Group study

⁵⁴ Hibbard, P., Tierney, S., Okie, A., & Darling, P. (2011, November). *The Economic Impacts of the Regional Greenhouse Gas Initiative on Ten Northeast and Mid-Atlantic States*. Analysis Group, p. 31, footnote 32. Retrieved from http://www.analysisgroup.com/uploadedFiles/Publishing/Articles/Economic_Impact_RGGI_Report.pdf

Part II: Program Review

The RGGI program review, called for in the 2005 MOU, is an evaluation of the entire program by representatives from the RGGI state environmental and energy regulatory agencies, with the help of stakeholders, and the public, and has produced significant improvements to the program's design and effectiveness.

The discussion in this section looks briefly at the mandate, the process, and results of the 2013 program review. We then focus on the engagement itself and its benefits, which include:

1. Transparency;
2. Multi-perspective feedback;
3. A means of testing models for program improvement; and
4. A significant degree of stakeholder buy-in to program modifications.

The Mandate

As the RGGI states deliberated over how to design an electric sector carbon program, they were keenly aware that this had not been done before and that—due to the inherent complexity of developing a new market for CO₂ emissions linked to a market for electricity—they would need to proceed with caution and deliberation. They would also need to be certain that their program was producing the results that the RGGI states were seeking. These concerns prompted the decision to agree to revisit the program goals, design elements, and effectiveness after the completion of the first three-year compliance period (2009-2011). In the 2005 MOU, the RGGI states memorialized their agreement to conduct a review in 2012 of all components of the program, and to determine whether program changes were warranted. Components that the states initially agreed to consider included:

1. Program Success: whether the program has been successful in meeting its goals.
2. Program Impacts: the impacts to price and electricity system reliability.
3. Additional Reductions: whether additional reductions should be implemented.
4. Imports and Emissions Leakage: the effectiveness of any measures put in place to control emissions leakage.
5. Offsets: the effectiveness of the offsets component, with attention to price, availability, and environmental integrity.⁵⁵

In addition to the original agreement to assess basic program administration to see if there were areas for improvement, the actual circumstances in which RGGI found itself at the end of its first compliance period dictated the specific focus that the review would take. The program had excess supply of allowances by comparison to the region's actual emission levels. There was also the concern that, if the emissions cap were adjusted downward to reflect actual emissions, the cost control measures that were in place would not be effective in controlling costs.

⁵⁵ RGGI MOU, Section (2) (F) (6) (D) (1-5).

The Process

In practice, RGGI's first program review was not only comprehensive and in-depth, but commenced soon after the program's January 2009 launch. Starting in September 2010, RGGI's first program review was a series of more than a dozen workshops, webinars, and learning sessions. In addition, it included series of comment periods and opportunities to file responses to comments. This public process provided a venue for utilities; representatives of the academic, healthcare, and investment communities; and advocates from consumer and environmental organizations to engage on topics related to program design, operation, and effectiveness.

The RGGI states initially issued a public announcement about the program review describing preparations⁵⁶ that individual states had been making and also setting out a preliminary schedule for regular meetings, special workshops and webinars.⁵⁷ Over the ensuing months, RGGI states took both written and oral comments from dozens of stakeholders.⁵⁸ The RGGI website contained large amounts of information, including draft plans, proposals and comments from interested parties, all of which were readily available to the public.

During this period, the RGGI states organized and advertised these regularly scheduled public events. In order to increase the opportunity for stakeholder engagement and the submission of comments from interested parties, RGGI states also issued press releases on the various activities and topics being considered, and provided links where commenters could file their reactions to proposals.⁵⁹ This kept stakeholders and the public apprised of both the work underway, and the schedule for its completion. In meetings and later in written form, the RGGI staff reviewed public comments that had been solicited, explaining how and where staff would incorporate suggestions and, where necessary, why they chose not to.

As illustrated below, program review involved a significant amount of work for the RGGI staff and commissioners.⁶⁰ This involved both organizational work and frequent presentations on substantive topics. The RGGI staff took stock of current and past emissions inventory as reported in the RGGI COATS emission tracking system. The emissions inventory, trends and market price data formed some of the

⁵⁶ Preparations included, for example, efforts to gather analytical material on topics that states considered addressing in the program review, such as the CO₂ allowance budget and flexibility mechanisms. Staff also drew upon learning sessions with experts and stakeholders on key program design elements, such as flexibility mechanisms, electricity sector markets. See: https://www.rggi.org/docs/ProgramReview/Program_Review_Schedule_Dec-Feb.pdf

⁵⁷ RGGI's initial schedule looked out only over several months but articulated the states' plans for outreach. For example, in the first month this included a stakeholder webinar to solicit feedback on possible modeling potential scenarios, continued review of stakeholder comments, and macroeconomic and customer bill analyses. The following month included a stakeholder webinar to review the Model Rule with proposed 2014 CO₂ allowance budget and program review changes, and also state-specific public processes, and legislative and/or rule-making processes, with potential refinements to the RGGI program, as necessary and appropriate, becoming effective during the second control period. See: https://www.rggi.org/docs/ProgramReview/Program_Review_Schedule_Dec-Feb.pdf

⁵⁸ RGGI. (2016). Program Review Stakeholder Comments. Retrieved from <https://www.rggi.org/design/2016-program-review/stakeholder-comments-2016>

⁵⁹ RGGI. (2013, February 7). *RGGI States Propose Lowering Regional CO₂ Emissions Cap 45%, Implementing a More Flexible Cost-Control Mechanism*. Retrieved from https://www.rggi.org/docs/PressReleases/PR130207_ModelRule.pdf

⁶⁰ See, e.g., Program Review Status and Stakeholder Meeting Overview [Presentation by William Lamkin, Massachusetts Department of Environmental Protection] and Update on REMI Macroeconomic Analysis of IPM Scenarios [Presentation by RGGI staff]. Sessions at stakeholder meeting, November 20, 2012. Agenda retrieved from http://www.rggi.org/docs/ProgramReview/November20/12_11_20_Meeting%20Agenda%20and%20Logistics.pdf

raw data upon which the energy system modelling occurred. Implementation of other federal EPA air pollution programs including the Cross-State Air Pollution Rule (CSAPR) and the Mercury and Air Toxics Rules (MATS) were factored into the modelling. Implementation of the CSAPR and MATS rules impacted emitting unit's costs structure and thus impacted levels of retirements going forward.

The RGGI states also relied on a panel of experts, and conducted a number of learning sessions, webinars, and workshops to address relevant issues facing the program and stakeholders.⁶¹ For example, on October 11, 2011, RGGI hosted a "Learning Session on Electricity Markets and Electricity Imports" with presentations from the California Public Utilities Commission, Columbia Law School Center for Climate Change Law, Goldman Sachs, NY ISO, and RAP.

The RGGI states also engaged consultants such as Northeast States for Coordinated Air Use Management (NESCAUM), ICF International, and the Economic Development Research Group to conduct modeling to evaluate different revised emission cap scenarios and to gauge, among other things, the potential cost effects of those approaches. RGGI also solicited and reviewed an extensive number of comments from stakeholders over the program review period.⁶²

The appropriate level of effort associated with the program review was a topic raised in our interview with one state environmental agency director. He noted that, for RGGI's initial review and even the current review, a three-year period seems like an appropriate amount of time to conduct this work. For example, in 2013, there was a need to adjust the cap level to better reflect actual emissions, and today, with the EPA's Clean Power Plan in the near future, the states need to be as prepared as possible to make the transition from a state to a federal program. However, he said, "In the future, because this takes a lot of time and money, maybe a five-year review period would be more suitable."⁶³

Technical Analysis

As noted above, in order to determine possible energy, environmental and economic effects of the RGGI program, and any possible adjustments that might be considered during the review, the RGGI states engaged consultants to evaluate these affects using well-tested models. The energy model characterized the RGGI region's electricity generating system and the emissions associated with these generators. (See Figure 2).

RGGI states developed and discussed various assumptions about parameters such as future costs of fuels and their trajectories, electricity and population growth, and likely additional environmental control programs like CSAPR and MATS that might also be implemented concurrently with RGGI.

The energy model results also reported possible emissions effects that might occur outside the RGGI region. For example, generation outside the RGGI region would not be subject to a carbon price, and might enjoy a slight price advantage compared to those generators inside RGGI that are subject to RGGI requirements to purchase allowances to cover their carbon dioxide emissions. The results of the energy system model were then used as inputs to the macro-economic model to determine RGGI program effects on the region's employment, and shifts that could occur both in and outside the RGGI region.

⁶¹ Including ISO-NE; Natsource; Northeast States Coordinated Air Use Management (NESCAUM); NYISO; PJM Interconnection; the Pew Center; the Regulatory Assistance Project (RAP); Resources for the Future (RFF), and World Resources Institute (WRI).

⁶² RGGI. Stakeholder Comments. Retrieved from http://www.rggi.org/design/program-review/stakeholder_comments

⁶³ Interview with Philip Cherry, Director, Delaware Division of Energy and Climate, February 12, 2016.

In reviewing the record of RGGI’s extensive engagement with stakeholders during the first compliance period, it is clear that the program review served a number of valuable functions and that RGGI benefitted from the periodic review. In reflecting on the value of the program review process, one state air regulator observed that, in 2005, no US jurisdiction had regulated carbon across an entire sector of the economy as the RGGI states were proposing to do, and that the RGGI proposal carried with it a certain amount of uncertainty:

This program was cutting edge, but the architects had the foresight to recognize that this [RGGI’s design] could play out differently than they thought it might, and so they built into the program a way to make corrections if necessary.⁶⁴

“The architects had the foresight to recognize that this [RGGI’s design] could play out differently than they thought it might, and so they built into the program a way to make corrections if necessary.”

Who would have known in 2005 that in five years there would be a nationwide recession, or that fracking technology would change the market for natural gas so significantly, pushing coal out of the market for electricity generation—both factors that, with others, significantly affected regional emissions?⁶⁵

The Results

In 2013, on the basis of nearly three years of inquiry and engagement, the RGGI states proposed to “revise the regional cap and establish a Cost Containment Reserve.”⁶⁶ RGGI’s program review reinforced the knowledge that the program had excess supply of allowances by comparison to the region’s actual emission levels, and that if the emissions cap were adjusted to reflect those emissions, the cost control measures that were in place would be ineffective in controlling costs.⁶⁷

In response, the RGGI states revised the regional cap, lowering it by 45 percent to conform with their measure of then-current regional emissions levels.⁶⁸ It was set at 91 million short tons (83 million metric tons) of CO₂ in 2014, with an agreement that each RGGI state’s budget would decline 2.5 percent per year from 2015 through 2020.⁶⁹ RGGI staff also identified a large number of allowances sold at auction and held by compliance entities and investors. These allowances became referred to as the “private bank” of allowances because there were existing allowances held in private hands beyond those needed for current compliance. Given the number of allowances in circulation in the “private bank” the staff estimated the cap reductions even at 45 percent would not actually reduce emissions without further adjustments to compensate for the large “private bank” of allowances in circulation. To address this issue, the staff recommended and the commissioners agreed to make further reductions in allowances offered for auction each year.

⁶⁴ Interview with William Lamkin, Environmental Engineer, Climate Strategies Group, Massachusetts Department of Environmental Protection, December 16, 2015.

⁶⁵ Ibid.

⁶⁶ RGGI. (2012). *Final Program Review Materials: Summary of Recommendations to Accompany Model Rule Amendments*.

⁶⁷ Ibid.

⁶⁸ In addition to lowering the cap, the RGGI states agreed to address the bank of unused allowances held by market participants with two interim adjustments for banked allowances from the two compliance periods.

⁶⁹ RGGI. (2012). *Final Program Review Materials: Summary of Recommendations to Accompany Model Rule Amendments*.

These “interim adjustments” further reduced the number of allowances in circulation by reducing those offered for auction. So, for example, in 2015 when the RGGI adjusted cap had been lowered to 88.7 million short tons, the actual amount of allowances auctioned was adjusted downward to 66.8 million short tons meaning an amount below the cap was made available for sale. This interim adjustment mechanism is adjusted each year from 2015 to 2020 as the cap decreases to effectively reduce the private bank of emissions with interim adjustments ending in 2020.⁷⁰

In order to address concerns that the existing cost containment mechanisms would not be up to the task of responding to possible price increases that could stem from lowering the cap, the RGGI states adopted a Cost Containment Reserve that would make available five million allowances in 2014, and ten million allowances per year each year thereafter, in cases where allowance prices exceed price thresholds, as illustrated:

- \$4 in 2014,
- \$6 in 2015,
- \$8 in 2016, and
- \$10 in 2017.⁷¹

In each year after 2017, the cost containment reserve trigger price increases by 2.5%. Allowances released by this mechanism are in addition to those under the established emission cap, functionally expanding the emission cap if established price triggers are met.

Transparency

Arguably, in its simplest form, RGGI’s program review is a monitoring and adjustment process that provides a vehicle for program administrators and stakeholders to assess how a program is working and consider revisions if warranted. However, on the basis of anecdotal evidence, to characterize the program review as in this narrow manner would be an incomplete characterization. According to an academic expert:

If you are going to implement a policy with economy-wide implications, one that is going to affect energy prices in the face of a pressing global problem, you want to be ambitious, but you also want to give yourself every opportunity to experiment and then to learn from those experiments. So RGGI’s program review is one important way to allow for that experimentation and the ability to adjust periodically based on what you have learned.⁷²

The manner in which the RGGI staff conducted the review has produced additional benefits to the program. This process, according to exchanges with stakeholders and certain RGGI staff and commissioners, has created transparency. This has provided an avenue for valuable feedback to RGGI states from affected utilities and NGOs. This, in turn, has afforded RGGI states various opportunities to

⁷⁰ D. Littell, RAP, Aligning RGGI with Reliability and the Clean Power Plan, Presentation at the U.S./Canada Cross-Border Summit, Building Capacity in the Face of Mounting Environmental Constraints, March 24, 2016, Boston, Massachusetts, slide 7.

⁷¹ Summary of RGGI Model Rule Changes, https://www.rggi.org/docs/ProgramReview/FinalProgramReviewMaterials/Model_Rule_Summary.pdf.

⁷² Interview with Professor Leigh Raymond, Director of the Purdue University Center for the Environment, February 8, 2016.

experiment with improvements to the program. Many have observed that the program review has also helped develop understanding and acceptance of proposed changes by affected parties and the public.

An industry stakeholder who was active in the initial RGGI program design meetings, the 2013 program review, and is now active in the 2016 review sums up his impression of program review:

The structure of program review is a strength. There is an overall structure of engaging stakeholders, conducting analytics, sharing and developing recommendations for going forward with changes to the RGGI program. It is familiar to existing stakeholders and easy for newcomers to understand.

It is great that RGGI was able to develop a regional market that has been adjusted over many years, but there is an appreciation of not wanting policy changes to shock the market or make changes that are antagonistic to the market.⁷³

This sentiment is typical of the participants in RGGI's program review, whether from industry, government, or non-governmental organizations (NGO). This open process is both familiar to stakeholders, but also easy for newcomers, as noted above. It also provides a structure for making incremental adjustments to the program with an appreciation from the regulated community for avoiding shocks to the market.

One RGGI state staffer echoed this point: "The RGGI program is built on stakeholder input, strong analytics, and expert advice."⁷⁴ Among the top strengths identified by RGGI state staff is the ability to move in small steps to improve upon the program, and provide the transparency and input for the RGGI states' to improve the program.⁷⁵

Feedback

Stakeholder feedback provided in the program review was instrumental in RGGI staff decisions regarding changes to the program. While data demonstrated that RGGI had a non-binding cap (in other words, a cap far exceeding actual emissions) and needed to be adjusted to better correspond to current regional emissions and energy-demand forecasts, in the absence of a mechanism to mitigate the potential for allowance price shocks, there would not likely have been consensus among states for implementing a more binding cap. Stakeholder feedback recognized this challenge and offered solutions, favoring the adoption of a Cost Containment Reserve.⁷⁶

“RGGI has done an excellent job managing transparency, not just by providing a clear CO2 price signal that shows in the market, but also market monitoring reports, annual reports, getting the auction results out in a timely manner ... if you want to engage, there's more than an opportunity to do so.”

⁷³ Interview with Brian Jones, senior vice president, M.J. Bradley & Associates, February 8, 2016.

⁷⁴ Interview with Lois New, director, New York Department of Environmental Conservation (DEC) Office of Climate Policy, January 4, 2016.

⁷⁵ Interviews with Marissa Gillet, senior adviser to the Maryland Public Service Commission chairman, December 22, 2015, and Lois New, NY DEC, January 4, 2016.

⁷⁶ See, e.g., comments of the American Lung Association, January 13, 2013, retrieved from http://www.rggi.org/docs/ProgramReview/StakeholderComments/January/American_Lung_Association_of_the_Northeast.pdf; comments of M.J. Bradley & Associates, January 28, 2013, retrieved from

Staff working on RGGI, agree that new cost containment mechanisms were added in response to stakeholder feedback.⁷⁷ In reflecting on the value of feedback in this context, one industry stakeholder said that program review provides RGGI the chance to “retune, based on circumstances.” Others described it as affording an opportunity to “ground truth” and secure “quality assurance.” In describing the willingness of stakeholders to provide feedback, other staff observed that “folks are not shy.”⁷⁸

One member of an environmental NGO, noted that the opportunity to provide feedback encourages “deal making” because different interest groups are in the room at the same time and reacting to each other. He added that it also requires stakeholders to justify their positions in public.⁷⁹ Another NGO member also describes the stakeholder engagement and resulting feedback as a valuable opportunity to engage with all participants:

What is really happening [are] multi-layered negotiation[s] among stakeholders, between stakeholders and officials, and... among the officials themselves, both on behalf of the group of states and sometimes just for themselves. This was responsible for development of the infrastructure of the program that RGGI invented, including the auctioning of allowances and recognition of the value of investing revenues to reduce the cost of emission reductions by increasing energy efficiency and to speed the transition to a low-carbon economy by supporting renewables.⁸⁰

Program review is valuable because the public and market participants aren't surprised by the ideas if and when they eventually end up as proposed state rules.

Public engagement affords the observant participant the opportunity to gauge the prospects for certain ideas and the likelihood of their adoption. This feedback occurs quickly and, in the long run, may save time and help all participants, regardless of their initial positions, to focus on solutions that appear more likely to move ahead. Additionally, it is worth noting that, as observed by state staff, program review provides participants an opportunity to get clarification on “the thinking of state agency leadership.”⁸¹ In other words, in this informal setting, stakeholders are able to see how the regulators themselves are thinking about a challenge and with this opportunity, stakeholders can endeavor to be more responsive in their engagement.

Value of Stakeholder Engagement and Support

RGGI has a history of recognizing the value of participation and acceptance among stakeholders. This was a point made several years ago by a former state commissioner who observed that “the strong involvement of stakeholders—particularly the regulated industry—in the design and implementation of

http://www.rggi.org/docs/ProgramReview/StakeholderComments/January/MJ_Bradley_and_Associates.pdf; and comments of National Grid, January 23, 2013, retrieved from

http://www.rggi.org/docs/ProgramReview/StakeholderComments/January/National_Grid.pdf

⁷⁷ Interviews with Nicole Singh, RGGI Inc. executive director, December 30, 2015; and Marissa Gillet.

⁷⁸ Interview with William Lamkin.

⁷⁹ Ibid.

⁸⁰ Interview with Dale Bryk, Natural Resources Defense Council, director of programs, Jan. 14, 2016.

⁸¹ Interview with Lois New.

the program was critical to maintaining and sustaining support from Republicans and Democrats.”⁸² This view is consistent with an observation by a RGGI state staff person:

“Any regulatory process that is amended should be transparent to stakeholder input. It is a matter of trust in the integrity of the program. When you do things behind closed doors people don’t trust you anymore and they fill in the blanks.”

According to one power company executive, buy-in is one of the major values he associates with the program review. He emphasized that, in the RGGI program review process “people are acknowledged,” and this creates a collegial atmosphere and helps stakeholders find common ground.⁸³

Other interviewees agree. An NGO member noted that, “If stakeholders don’t understand what you are doing, and feel as though they weren’t heard, then there will be more tension. But if they feel like they were heard, even if the program doesn’t do exactly what they asked, the process works better.”⁸⁴

Another advocate noted that it is an opportunity for the RGGI states to coordinate in public, and helps them create a sense of accountability when they consider changes to the program.⁸⁵ Another industry stakeholder indicated that the states working together publicly sends a strong and positive message.

One former state staffer noted:

One of the interesting things about watching RGGI over the years, and this is partly due to program review, is that attitudes have changed and this process seems to have built what I’d call “a constituency.” At the first meetings, other than [environmental advocates], no one was [excited] about RGGI. They weren’t nasty, but by the time the program review was nearly completed, RGGI seems to have built this constituency.

It makes sense that, before the program starts there will be fears of the unknown; but once the program is running, you have the luxury of saying, “the sky didn’t fall; this has been working.” People gain the confidence to tinker some more and try new things like a Cost Containment Reserve. Maybe this would have happened anyway, but as a program benefits folks—or even just accommodates them in a respectful way—they become a ready group to continue the program and improve it.⁸⁶

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⁸² Silverman, G. (2013, September 20). RGGI Holds Bipartisan Support in Northeast As Climate Change Issues Debated Nationally. *Environment Reporter*. Retrieved from <http://www.bna.com/rggi-holds-bipartisan-n17179877193/>

⁸³ Interview with Derek Furstenwerth, senior director of environmental services, Calpine, January 6, 2016.

⁸⁴ Interview with Dale Bryk.

⁸⁵ Interview with Peter Shattuck, Acadia Center, February 3, 2016.

⁸⁶ Interview with Franz Litz, principal, Litz Energy Strategies, February 8, 2016.

Testing for Program Improvements

The program review represents an interesting balance: on the one hand, by supporting the process, the RGGI states get to publicly engage on the value and suitability of making certain changes to the program; on the other hand, it is an opportunity to make program adjustments without having to redesign the entire program. This provides an opportunity for program improvements to be considered before being formally proposed, and this opportunity for gradualism and incrementalism is a value that economic regulators strive to provide in rate cases and other regulated market contexts to minimize shock to the market.⁸⁷

An advocate noted that, while this gives the RGGI states the opportunity to suggest new ideas like the Cost Containment Reserve, it is valuable because the public and market participants aren't surprised by the ideas if and when they eventually end up as proposed state rules. During a workshop, staff will have described them, and perhaps a specialist may provide further information on how the new idea has worked elsewhere.

An industry executive noted that industry support was predictable:

Offset provisions for cost containment came from outside. Industry wanted them there even though this was a big lift for the states to take on to develop the learning curve and protocols. Multi-year compliance periods and banking came from industry. They were natural follow-ons to implementation of the NO_x SIP [State Implementation Plan] Call⁸⁸ that made banking familiar and appreciation of the flexibility banking provides to companies.⁸⁹

According to one state commissioner, the program review:

... provides the opportunity to see what's been working, and it can show where maybe something hasn't worked the way we had anticipated, and where some changes could be required. It recognizes that we have the ability to learn from what we are doing and improve the program over time based on what we've learned.⁹⁰

Lowering the emissions cap was one of the ideas raised by the program review. However, stakeholder willingness to lower the cap depended on the acceptability of a cost containment mechanism to stakeholders.

Program review
“recognizes that we have the ability to learn from what we are doing and improve the program over time based on what we've learned.”

⁸⁷ Interview with Marissa Gillet.

⁸⁸ The NO_x SIP Call Rule (63 FR 57356, October 27, 1998 and 69 FR 21604, April 21, 2004), a market-based program, addressed the interstate transport of ozone, and required twenty-one States and the District of Columbia to eliminate those amounts of NO_x emissions that contribute significantly to downwind nonattainment of the 1-hour ozone standard. “Q&As for Phase II of the NO_x SIP Call,” <https://www3.epa.gov/ttn/caaa/t1/reports/23814qnaasfin.pdf>.

⁸⁹ Interview with Brian Jones.

⁹⁰ Interview with Jared Snyder, NY DEC, assistant commissioner for air resources, climate change, and energy, January 15, 2016.

Part III: Observations

Policies can be improved by mechanisms that allow for adjustments to be made while the policies are already underway. This can be done without either having to stop a program or make such abrupt changes that could result in unnecessary economic disruptions to stakeholders or the governmental programs funded and associated with the state RGGI programs.

Building a review process into a complex energy and environmental program like RGGI allows for the opportunity to experiment, to learn from successes and challenges, and then, where necessary to periodically make program modifications openly and deliberately. Not only has RGGI's comprehensive program review process demonstrated its capacity to address complex and interrelated issues like the level of the cap and cost containment, it also has shown that the program itself operates as planned or better, and needs marginal modifications and improvements even given dramatic energy sector transitions in U.S. markets and governmental programs influences end-use energy such as energy efficiency and renewable mandates.

As the Chinese government moves toward a national cap-and-trade program in 2017, decision-makers should consider including a similar mechanism in it. Chinese (and U.S.) regulators can draw some of the following lessons from program review.

Over the last several years, China's process of ETS pilots has provided extensive lessons on program design and market operations that will inform the development of China's national program. This effort has been an extensive and worthwhile undertaking. The observations that are set out here are intended to supplement China's current efforts.

The Value in Recognizing and Addressing Uncertainty

All policymakers and energy sector entities face some amount of uncertainty and the possibility that factors beyond their control could affect the outcome of a new regulatory program. However, policymakers can adopt methods, such as engaging in a program review, that increase the likelihood of positive outcomes for their programs over a range of possible future market scenarios.

Program review affords decision makers and stakeholders with a public process and timetable that allows them to vet and even test the possible effects of potential program changes. Program review allows for ideas to be presented, discussed, and analyzed before they are adopted, and lead time to participants and decision makers to be sure that decisions are vetted by a broad group of stakeholders. Program review also provides market certainty that there will not be immediate changes impacting private investor expectations without a period of vetting and discussion with government policy makers and other energy sector stakeholders.

RGGI states work with stakeholders to address changing circumstances in the region – for example, shifting emissions levels or the potential effects of newly-adopted state renewables and energy efficiency policies. Likewise, China's regulators can also incorporate an open and collaborative process whereby they engage with other experts and stakeholders according to an established schedule, to accommodate changes that affect their national ETS. As emphasized by RGGI Inc.'s former Executive

Director, program review is a “structured, periodic process to change the program while allowing for change that is not disruptive to participants.”⁹¹

Program Review: Beyond Mere Monitoring?

Because the initial RGGI program design was new and untested, the RGGI states chose to conduct a rigorous analysis of the program and to sponsor extensive stakeholder engagement, including a process for engaging regulators, stakeholders, and other experts in a comprehensive review. This level of scrutiny and review, especially during the program’s early implementation years, provided the program significant risk mitigation.

As China’s regulators proceed with the development of a national ETS, they may find this RGGI experience valuable. A formal program review would allow the Chinese government to gauge the degree to which their energy and environmental policies and other relevant circumstances complement the goals of a national ETS program.

Likewise, the degree to which RGGI states engaged with stakeholders during program review is credited with creating a positive and collegial atmosphere that is respectful of differing views. It also produced transparency and led to valuable feedback that in turn led to program improvements and broader participant buy-in. The review is credited not only with highlighting challenges associated with adjusting RGGI emissions cap, but also with revealing the need for some kind of cost-containment mechanism and creating the circumstances that made possible the consensus among states to adjust the cap level. The RGGI experience suggests that the odds of a regulatory program’s success are improved, when those entities subject to the program are able to participate in the program design and its review and amendment.

Educating Affected Parties

A CO₂ emissions control program for the power sector and other sectors of the economy is by definition going to be far-reaching and will profoundly affect local economies, and a broad range of stakeholders. During RGGI’s early planning years, the RGGI staff engaged subject-matter experts and arranged numerous topical workshops to educate themselves and others about various aspects of the developing program and its potential effects. For example, air regulators needed to better understand how electricity was bought and sold. Energy regulators needed a better sense of the technology choices available for air quality compliance. Arguably, providing such cross-disciplinary education can limit the potential for unintended impacts in the design and operation of the emission trading program.

RGGI’s initial educational efforts formed the framework for later program review, engagement, and education, as embodied in RGGI’s “Draft Outline of Stakeholder Process:”

1. Inform the public and stakeholders about their deliberations, and draft and final work products;
2. Provide themselves with early input on their ideas and draft work;
3. Maintain a dialogue with stakeholders; and
4. Establish a means for the public and stakeholders to submit formal comments to the RGGI staff at key decision points in the RGGI process.

⁹¹ Interview with Nicole Singh.

As China's decision-makers consider how best to engage with the public, both learning from them and educating them, RGGI's initial education framework provides a valuable model for regulators to consider and use as a starting point. This approach would support better understanding, and help avoid any unwanted surprises.

Scope of Review

The RGGI states agreed, in the 2005 MOU, to conduct a review in 2012 of all components of the program, including but not limited to:

1. Program success;
2. Program impacts;
3. Additional emissions reductions;
4. Imports and "emissions leakage;" and
5. Offsets.

While the scope of the program review established in the MOU was ambitious, the RGGI states added more, reviewing the basic program administration to look for opportunities to improve the effectiveness and efficiency of the program. As described earlier in the paper, they first focused broadly across the entire program, but – based on public input and their own analyses – ultimately concentrated on several major issues: (a) adjusting the program's emissions cap and (b) adopting a more effective mechanism for cost containment. Starting broadly allowed the states to raise a number of issues that initially appeared significant, but which the states ultimately concluded did not need to be addressed.

Program review also afforded stakeholders significant opportunities to engage decision makers on the technical content underlying many of the issues under consideration. This included modeling assumptions associated with emissions and program impacts. Program review not only allowed the public to work with decision makers in an open manner, it provided notice of and justification for changes that the RGGI states were planning to make, and better prepared the public for program modifications that were likely to be adopted.

China's decision-makers reticent about a program review that focuses broadly on all program elements should remember that the government can take comment, prioritize, and manage the dialogue with stakeholders in a public and transparent manner to identify the issues in their programs in need of being addressed. In other words, a review that starts broadly doesn't need to stay that way.

A program review allows decision makers the opportunity to determine the degree to which complementary energy and environmental policies affect a national ETS. It also allows regulators to reach and test tentative conclusions before final decisions get made.

Level of Effort

RGGI's first program review was a labor-intensive engagement extending over 2 ½ years, involving a broad group of participants. As noted in the scope of review section above, there is no magic formula for the right amount of time to conduct a review. While the general assessment is that the effort was a success, it may be that, in other contexts, a shorter amount of time for the inquiry or more limited level of effort would produce equally acceptable results.

Conclusions

Experience with RGGI's program review mechanism illustrates the importance of including a comprehensive and formal review mechanism to assess program functionality and ensure a program's economic, environmental, and equitable performance. Carbon management in the electric sector, and across the economy, is a long-term undertaking. It can be expected to require adjustments. The adoption by an ETS of an open and collaborative planning framework with various stakeholders can help in the program's initial design and in its ability to accommodate and react to changing circumstances.

Regulators engaged around the world in the development of market-based programs can benefit from this model. For regions that are designing plans to reduce carbon emissions, an appreciation of the benefits and challenges associated with a formal review process can help them to accommodate some of the uncertainty inherent in the development of these relatively new regulatory systems, make valuable adjustments in a predictable and transparent way, and better ensure the effectiveness of their program.