

Testimony of Ian Bowles
Secretary of Energy and Environmental Affairs
Commonwealth of Massachusetts
Select Committee on Energy Independence and Global Warming
U.S. House of Representatives
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APPENDIX

This appendix contains information Massachusetts would like to convey to the Select Committee regarding cap-and-trade programs for CO₂ and other important factors to consider in designing climate change programs. We first lay out some principles we feel should be contained in federal legislation. Then we address the questions posed by the committee and finally offer comments in some additional areas of concern.

Principles for Federal Legislation

Send clear market signals

Reducing greenhouse gas emissions will require the turnover of trillions of dollars of capital stock in power plants, transportation, building and industrial facilities. Done properly, a federal mandate can and should be a driver of economic opportunity for low carbon technologies. Effective investment of private capital requires long-term clarity. We urge the Congress to set long-term, technology neutral emissions requirements and let the markets work to find the least-cost solutions to reducing greenhouse gas emissions.

Reduce emissions 80% by 2050.

There is scientific consensus that worldwide greenhouse gas emissions must be reduced by 80% by 2050 in order to avoid the most dangerous effects of global climate change. We believe that any legislation should provide a mechanism to meet this target for all U.S. emissions. The legislation should also establish interim targets that can be revised as science may dictate.

Provide firm emissions caps to drive technology investments.

Provided with proper economic signals, the marketplace will react with technological solutions in areas such as carbon control and sequestration, energy efficiency, and renewable energy. For investors to commit capital to the clean energy technologies necessary to achieve the dramatic reductions in greenhouse gases that sound science is telling us are needed, we believe that the price signals of any carbon control market system should be firm. The use of verifiable offset markets should be the mechanism of choice to alleviate greater-than-anticipated economic impacts, but price-driven safety valve mechanisms may have benefits as well. As long as triggers are set high enough, safety valves can balance the need for market certainty (both for generators and clean technology development) and the need for mitigation of unforeseen economic shocks. However, such mechanisms should be used sparingly and only in ways that do not functionally undermine the emissions cap.

Support early acting states or corporations.

Massachusetts and several other states have been, and continue to be, leaders in reducing GHG emissions. We believe a federal greenhouse gas program must acknowledge and reward states or corporations that have taken early action on greenhouse gas reductions, and not penalize them for doing so. In practice, this will mean apportioning emissions reduction requirements and financial incentives based on commonly used factors such as population, gross state product and emission reduction performance, rather than just on historical emissions levels. Federal legislation should incorporate provisions that will smooth the transition from regional programs to a federal program.

Reserve the rights of states to implement more stringent regulations.

States are valuable laboratories for innovation, and their creativity and entrepreneurial efforts are necessary if we are to meet the climate challenge. States should be allowed and encouraged to implement more stringent greenhouse gas emission reductions should they so choose. Many of our best federal environmental laws and improvements to those laws have been due to successful innovation at the state level. Federal legislation should not preempt states from being the incubators of innovative technologies and policies that may help us as a nation meet the climate change challenge faster and in ways that we cannot now envision.

Auction allowances.

Auctioning allowances is an important opportunity to reduce costs, promote competition and maximize the development an effective carbon market. The European experience and the conclusion of many states, like MA, participating in RGGI is that most or all allowances should be auctioned. Auctions prevent windfall profits and create a level playing field for all generators. They also create funds to rebate consumers and accelerate the transition to clean energy alternatives. Importantly, we expect that electric consumers will see little difference in rates whether allowances are auctioned or given free to generators. Finally, auctioning allowances is consistent with other federal and state policies in which goods owned by the public at large are allocated in a fair, market-based approach that reaps value for the public. Broadband, FCC airwaves and timber are such examples.

Invest in energy efficiency and renewable energy.

Energy efficiency, renewable energy and clean energy technology innovation will represent the cornerstones of a carbon constrained energy sector economy. Energy efficiency represents the lowest cost option available today for reducing greenhouse gases. Energy efficiency yields emission and cost reduction benefits all the way up the supply chain, and reduces the need for costly infrastructure. Renewable energy and energy efficiency products represent potential job expansion and economic opportunity as the world moves toward sustainable technologies, and reduces our dependency on foreign fuel supplies. We believe energy efficiency and renewable energy should be promoted through the auctioning of allowances that would otherwise go to the electric generation sector, and directing the proceeds into these areas.

Answers to Questions Posed by the Select Committee

Q1 Why has Massachusetts opted to allocate allowances under RGGI primarily through auctions, as opposed to distributing them for free to incumbent polluters?

After careful examination, the Commonwealth plans to auction nearly 100% of RGGI allowances, and use the proceeds to benefit ratepayers and best meet our environmental objectives. By investing auction proceeds in energy efficiency, we can maximize the opportunity to reduce greenhouse gas emissions, save money for consumers, and grow our clean energy economy. By contrast, direct or free allocation creates a manifest risk of windfall profits for power generators, coming at the expense of business and residential customers.

This decision was informed by quantitative analysis of market dynamics, related review of theoretical literature on emissions markets, and extensive historical experience of federal and state market-based environmental programs.

Allowances in the federal acid rain program were allocated freely to generators on the basis of historical emissions. Massachusetts has rejected this approach in subsequent programs because (1) allowances are allocated to facilities even after they have shut down, and are not available for new facilities; and, (2) we now realize that generators add the value of these allowances to their cost of production, raising prices for end users, even when they get allowances for free.

To avoid allocating to shutdown facilities and accommodate new generators, and support efficient generators, Massachusetts has recently employed “updating, output-based” allocations to distribute NO_x allowances. In an updating, output-based system, allowances are allocated each year to generators based on electrical output, and these allocations are updated regularly based on recent generation data. This system has the important advantage of directing financial benefits toward efficient generators. But it does not solve the problem that generators are able to charge consumers for the value of allowances they have received free of cost.

Massachusetts has also used “set-aside accounts” to direct allowance value toward preferred energy solutions such as energy efficiency and renewable energy. Allowances allocated through set-aside accounts can be sold to emitters. Such sales have double benefits: the cost of buying allowances deters pollution and the profit from selling allowances rewards preferred solutions.

Updating, output-based allocations and set-aside accounts therefore represent initial attempts to direct allowance value toward preferred outcomes, but they retain some disadvantages that are inherent in direct allocations. Auctions represent further progress toward the goal of capturing allowance value for public use, and they avoid significant disadvantages of direct allocations.

It is also important to understand that auctions are not a new, untested idea. The federal Acid Rain Program has utilized auctions to distribute a small fraction of allowances. Small-scale auctions of greenhouse gas allowances in Europe have been so successful, compared with direct allocations, that European countries plan to greatly expand the use of auctions in the future.

We conclude our discussion of auctions by presenting five significant reasons that we plan to auction our share of RGGI allowances:

1. In a deregulated energy market, auctions will not result in larger electricity price impacts than direct allocations. Generators benefit from direct allocations because they are able to include the value of allocated allowances in the prices that they charge to electricity customers. Under auctions, rates still rise by the value of the allowances, but the government can spend the revenue in a way that benefits electricity customers or promotes other societal benefit. In the European Union (EU) and the federal acid rain program, allowances were freely allocated to generators and resulted in windfall profits for those generators.
2. The proceeds from auctions can be used to drive down the direct costs of the program for electricity customers. Our experience with revenue collected through system benefit charges on electricity bills shows that money spent on energy efficiency provides disproportionate savings and can be very effective at improving the overall efficiency of the electricity grid. Modeling done during the Regional Greenhouse Gas Initiative planning process has shown that spending auction revenue on further efficiency will significantly mitigate rate impacts that could otherwise result from the program. (See Q3 below for a more detailed discussion.)
3. Auctions create a level playing field for all fossil-fired generators, whether they are large, small, new, existing and using any fossil fuel. Any direct allocation scheme requires the government to choose which generators should benefit from receiving freely allocated allowances, and which ones should lose. Generators, not regulators, are best able to decide how many allowances they need to meet market conditions. Auctions promote competition and provide a market-based mechanism that allows generators to decide how many allowances they need to continue generating, and plan purchases accordingly.
4. Auctions have proven to be a useful way to capture the value of public goods for the highest public use. Recent auctions of rights to utilize broadcasting frequencies represent an important example. Massachusetts intends to use revenue from allowance auctions to advance program-specific goals such as energy efficiency. Additional priorities may include demand response, incentives for clean energy technology, and direct ratepayer mitigation.
5. Auctions provide regulators, the public, and market participants with important information about allowance prices. This information is absolutely critical to any effort to evaluate the success of the program from a cost-benefit perspective.

While our consideration of allowance auctions has thus far been largely limited to the electric power sector, we suspect that our conclusions are broadly applicable, and we urge the Committee to consider auctioning allowances across all sectors of the economy.

Q2 How much auction revenue does Massachusetts expect to generate through RGGI allowance auctions, and what does it plan to do with these revenues?

This depends on the price of allowances. Under RGGI, MA is allocated approximately 26.7 million short tons per year, therefore:

At \$1 / allowance MA revenue = \$27 million

At \$5 / allowance MA revenue = \$130 million

At \$10 /allowance MA revenue = \$270 million

For perspective, our current energy efficiency programs, which are funded through a 0.025 cent per kWh charge on all ratepayers, bring in \$125M that is invested in award-winning energy efficiency programs that save three-to-four dollars for every dollar invested. This system benefit charge procures only a small amount of the energy efficiency that can be economically implemented across the MA economy. At \$5/ton, the additional revenue from the RGGI CO₂ allowance auctions could double our energy efficiency investments and enable Massachusetts to capture even more of the economical energy efficiency measures available in our economy.

Modeling of the RGGI program to project changes in the region's electric generation fuel mix and costs was performed with ICF's Integrated Planning Model (IPM). Under the reference case of the RGGI policy, CO₂ allowance prices were projected to rise from \$2/ton at the start of the program in 2009 to \$3/ton in 2015, and to \$5.50/ton in 2024.

If allowance prices under a federal program closely track RGGI allowance prices, then auction revenue for the power sector alone (approximately 2.5 billion short tons initially) would be as follows:

At \$1 / allowance US revenue = \$2.5 billion

At \$5 / allowance US revenue = \$12 billion

At \$10 /allowance US revenue = \$25 billion

If allowances accounting for all US emissions were auctioned (approximately 8 billion short tons initially), and allowances prices under a federal program closely track RGGI allowance prices, then auction revenue would be as follows:

At \$1 / allowance US revenue = \$8 billion

At \$5 / allowance US revenue = \$40 billion

At \$10 /allowance US revenue = \$80 billion

Investing these funds strategically in energy efficiency would make the country more energy independent, lower bills across the economy, and help build a world-leading clean energy economy.

Q3 To what degree can investment of auction revenues in efficiency or other policies reduce the overall cost of the RGGI program?

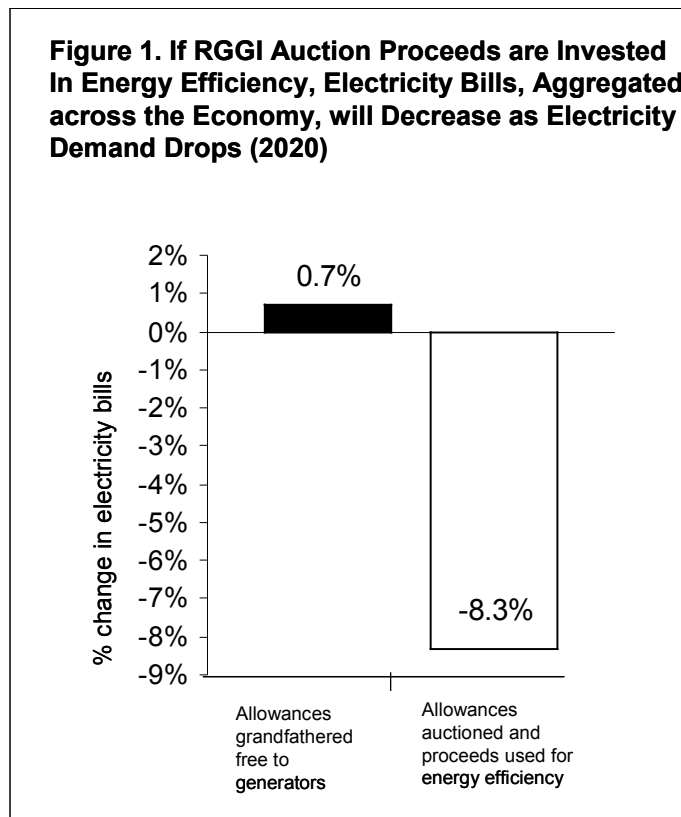
Under the cap-and-trade program, generators will have incentives to increase the efficiency of their own generation units and to consider fuel-switching options. However, widespread market mechanisms for generation owners to invest in end-use energy efficiency are unlikely, especially under a restructured electricity sector.

With significant cost-effective end-use energy efficiency opportunities still untapped, facilitating investment in energy efficiency provides the least cost strategy to meet the carbon cap, reduce pressure on CO₂ allowance prices, and reduce electricity spending, while supporting a growing economy.

The modeling of the RGGI program with the IPM model specifically constructed an energy efficiency module to analyze this opportunity and the impact of expanding the states' energy efficiency programs through re-investment of auction revenues. Results of the modeling showed that a regional doubling of energy efficiency expenditures can reduce by approximately one-half the region's load growth and reduce the wholesale electric price impact of the RGGI program, while simultaneously reducing imports to the region (or leakage). If electricity bills are aggregated across commercial, industrial and residential sectors, spending auction proceeds on energy efficiency would result in small short-term costs (a total of less than 1% bill impacts in the first three to four years) but long-term savings (starting in year four or five and totaling over 5% average annual savings). This is due to the large amount of cost-effective energy efficiency investments available in our state – and across the country.

Additional modeling, translating the changes in wholesale electric prices predicted by the IPM model to end-use retail prices to consumers, revealed that the doubling of energy efficiency spending reduced the cost increase due to the RGGI program from \$2.90 per year to \$0.77 per year for a typical household in 2015. Further analysis showed that if the reduction in energy usage by the average household were also taken into account, the increased efficiency expenditure would result in a net savings to the household of \$35 per year in 2015, compared with the RGGI program without the additional energy efficiency program. Analogous retail price savings and bill reductions were shown for the commercial and industrial sectors

This price mitigation is illustrated in Figure 1. The black bar on the left represents the percent increase in costs for consumers with RGGI if allowances are either given for free to generators or



if auction proceeds are not used for demand reduction (for example, as straight rebates). The white bar shows that, by auctioning allowances and investing proceeds in energy efficiency,

electricity bill increases would not only be mitigated, but could actually result in savings - consumers would save over 8% on their bills.

Energy efficiency programs reduce bills two ways. First, consumers who get efficiency upgrades in lighting, air conditioning, production equipment and appliances that use less electricity save the most, as their usage decreases. They save on bills directly because they are using less electricity. But all customers could save in the form of lower rates. Total electricity system energy costs decrease (benefiting all end users of the electric grid) because energy efficiency reduce the peak-hour demand, which is when the price of electricity is at its highest (up to \$1000/MWh on the hottest day of the year). Energy efficiency pushes dispatch down the bid stack, lowering the clearing price for electricity in that hour.

Massachusetts will also use its auction revenue to further expand its demand response programs, which target reductions in peak loads that occur over a relatively few summer and winter hours. These programs will reduce pressure for new generation capacity investment and very high peak demand charges to end-use customers, and help to mitigate fuel (natural gas) peak supply constraints to the region. These programs are also of great importance to assure the regional reliability of our electric grid and reduce the probability of outages, which result in large costs to customers.

While energy efficiency and demand response will be the primary focus for investment of the auction revenues by Massachusetts, the state will also consider support of renewable energy development (as might be necessary to supplement on-going renewable programs), carbon emissions abatement technologies, and other strategic energy goals, such as plug-in hybrid technology, fuel cells and other efforts that are outside the electricity sector.

A national program will similarly need to consider that energy efficiency provides the most cost-effective short-term means of reducing CO₂ emissions from the electric sector and reducing compliance costs. Despite cost-effective efficiency measures being widely available in the market, only broad ratepayer funded programs have shown the full effectiveness of these measures by end users. CO₂ auction revenues from a national program can provide needed revenue for widespread promotion of energy efficiency and should be distributed through and administered by the states.

Q4 What lessons does Massachusetts’s analysis and experience provide, with respect to allowance allocation and revenue recycling, for the design of a federal greenhouse gas cap-and-trade system?

Massachusetts’s analysis shows that capping greenhouse gas emissions is sound economic policy and will provide opportunities to grow a new clean energy economy by reducing uncertainty and stimulating development of new profitable economic sectors. Our analysis also shows that auctioning allowances is a crucial component of transforming the economy, as auctions provide the most technology-neutral, market-driven mechanism for distributing allowances at the same time that they generate revenue that can be used to support public energy and environmental policies. These policies can drive down the program’s cost to the public (e.g., through energy efficiency). Importantly, we expect that consumers will see no difference in rates whether power sector allowances are auctioned or freely given to generators. In addition, through its

efforts with the participating states to launch the RGGI system, Massachusetts has learned a number of specific lessons about cap-and-trade design and implementation that are worthy of federal consideration:

Retain a hard cap, but be adaptive and flexible.

As RGGI is a first-in-the-nation program, the states thought it was important to build into the program various cost control measures. Measures adopted by RGGI states provide temporal flexibility to stabilize the market by softening allowance price spikes that would otherwise result from extreme meteorological events (an unusually hot summer or cold winter), clean unit outages, and fuel price spikes. It is worth noting that the price impacts of the first two categories (meteorological events and clean unit outages) would be significantly smaller in a national program than in a regional program.

Multiple-year compliance period

RGGI employs a three-year compliance period, which can be extended to four years in the event that certain price triggers are met. Since the issue with climate change is cumulative load, and not annual emissions, long compliance periods were employed to provide regulated facilities more flexibility to adjust to variations in meteorology, fuel price spikes, clean unit outages, etc. A longer compliance period may also lead to administrative savings for the regulated facilities and the states implementing the program. It is not yet clear whether or not a multiple-year compliance period would be appropriate outside of the electric generating sector, as programs for other sectors are likely to be more experimental in nature, and may benefit from a more frequent program evaluation (i.e., a one-year compliance period).

Unlimited banking

Our approach also provides for unlimited banking of allowances, which gives facilities the ability to carry over unused allowances into future compliance periods. This allows facilities to create a “rainy day” fund that can be used to cover higher than expected emissions in future years. Banking should provide lower allowance prices and allowance price stability while providing an incentive to be frugal with current year allowances in order to hedge against uncertainty in future years’ emissions. Banking is permitted under all existing federal cap-and-trade programs, including: the Federal Acid Rain Program, the NO_x SIP Call, and the Clean Air Interstate Rule (CAIR).

Borrowing

RGGI does not provide for borrowing of allowances. Borrowing is using allowances allocated for future years in the current year. While banking encourages early action, borrowing actively discourages it, by allowing regulated entities to put off making necessary changes. This reduces the transformative impact of the program, and ultimately jeopardizes the long-term goal of emissions reduction as allowance debts accrue. Furthermore, borrowing allowances from future years also carries a risk of default, which, if it were to occur, would undermine the environmental benefits of the program if the source in default fails to surrender allowances equal to its emissions.

Use of Emissions Offsets

Offsets, if limited and subject to uniform and rigorous verification, can be an effective mechanism to reduce program costs by providing regulated entities additional compliance

flexibility. However, overly generous offset provisions can undermine the environmental and market goals of a cap and trade system. Careful attention should be paid to the quantity of offsets allowed and the regions from which they can come. Allowing the use of large quantities of offsets could send the wrong market signal for timely investment in new energy and technology alternatives. In addition, international offset provisions should be limited to ensure that much of the economic and environmental co-benefits of the program occur in the United States. Finally, we believe that careful attention should be paid to developing rigorous verification protocols to ensure that real reductions occur and that the offset program does not reward projects that would have occurred without the program.

Auction Mechanics

As we have made the case for auctions throughout this document, we would like to add several observations about auction mechanics we have learned preparing for our auctions, which will commence this year. These recommendations have grown out of our work with other RGGI states and a high caliber auction team based at the University of Virginia,¹ and we look forward to learning more as auctions get under way.

Frequency

We expect to hold four quarterly auctions of current and future-year allowances. Quarterly auctions seem to sufficiently balance the need for market liquidity and the cost of administering auctions. Forward auctions also enhance market liquidity and provide some indication of future allowance prices, which is necessary to facilitate planning and investment decisions by owners of affected RGGI facilities. Frequent and forward auctions help deter attempts to hoard allowances or collude in auctions. Because the total number of allowances available in each auction is relatively small, it is less profitable for firms to exercise market power. Also, frequent, smaller auctions allow regulators and other bidders to respond to market outcomes.

Participation

We expect to allow any qualified buyer to participate in the auctions. Open auctions should enhance competition by increasing the number of participants, which should limit opportunities for collusion. However, we believe that there is value to reserving the option to restrict auction participation in the future if malfeasance is observed.

Reserve Price

Allow for a reserve price if market data suggests it is warranted to ensure the integrity of the allowance markets. Massachusetts is currently exploring a number of options of how to address unsold allowances, and will share the outcomes of this research with this committee.

Market Monitoring

We believe that it is important to actively monitor the market to ensure that participants are not behaving in a manner that would compromise the functionality of the market. We are actively researching this matter in conjunction with the RGGI states.

¹ Charles Holt & William Shobe from the University of Virginia, Dallas Burtraw & Karen Palmer from Resources for the Future, and Jacob Goeree from the California Institute of Technology. Their final report can be found at: http://rggi.org/docs/rggi_auction_final.pdf

Additional Implementation Issues with a Federal Program

Use and Distribution of Federal Auction Proceeds

We believe that most auction revenue should flow to states for use in energy programs that will reduce greenhouse gases. States have a unique capacity to implement a portfolio of policies and measures that improve electric end-use energy efficiency and reduce electricity demand in ways that reflect local conditions. This model allows states to act as laboratories of innovation, facilitating the development of a new clean energy economy in the United States. States have consistently demonstrated this ability to tailor programs to meet their needs while achieving federal goals. In fact, most federal air programs over the last 20 years have provided states with flexibility regarding implementation (e.g., NO_x cap-and-trade). We believe that devoting proceeds to carefully tailored energy programs on the state level has the potential to magnify the transformative nature of the cap-and-trade program, particularly in early years.

Determining how to distribute auction proceeds between states (or allowances in the event that not 100% of allowances are auctioned) is a challenging issue that involves competing economic and political interests. Massachusetts strongly encourages Congress to avoid allocation schemes based solely on historic emissions, and instead consider utilizing other metrics, such as population, gross state product, or stringency and success of emission reduction programs. Such metrics could be used alone, or in combination. States like Massachusetts that obtain electricity from less greenhouse gas-intensive generating sources already pay a premium for that electricity, and are fully deserving of auction proceeds to help reduce energy consumption. Basing the distribution of proceeds on energy consumption or production has the potential to limit the success of the program by rewarding consumers and producers in high-emitting states where the price of electricity is currently low at the expense of states that conserve energy.

GHG Reduction Measures in Massachusetts

For additional background for the Committee, we have summarized the steps Governor Patrick has undertaken to curb Greenhouse Gas emissions and grow our clean energy economy.

- Combined Energy and Environmental Affairs into one Secretariat – Massachusetts is the first state to integrate energy and environment agencies and regulation.
- Brought GHG emissions into the core of our state environmental review process. This policy has already led to the first real estate development project with a legally binding cap on GHG emissions – Harvard University’s new Allston campus.
- Initiated a far-reaching rate decoupling proceeding. Rate decoupling, done properly, will provide the incentives to make large-scale efficiency a reality.
- Worked closely with the Legislature on comprehensive energy legislation which will unleash energy efficiency, our cheapest source of power, provide long term certainty for renewable energy development, establish a new super energy-efficient building code and create large tax incentives for advanced biofuels.
- In addition, major new renewable energy initiatives are moving forward, including 3 new biomass power plants, the Cape Wind project and a new aggressive solar rebate program.
- Also, we continue to advocate for the federal government to give Massachusetts and 18 other states the right to adopt California’s GHG reduction regulations for vehicles.

- We have also launched a project to develop a Climate Roadmap by this spring. The product of this analytic exercise will not be a glossy document but a continuously updated workbook of policies and initiatives, with rigorous calculations that show how far those actions take us toward meaningful GHG reductions.
- We are taking these steps in the context of Governor Patrick's commitment to make clean energy development a central part of our state's economic strategy. With a wealth of resources in our educated workforce, one of the global centers of venture capital, world-renowned institutions of higher education, and long tradition of entrepreneurship, we expect a clean energy future to be a prosperous future for Massachusetts, as it should be for the United States as a whole.

Conclusion

Since the early 1990s, Congress, successive Administrations and many states have implemented a variety of market-based approaches to environmental protection. This is an American innovation and experience shows market-based approaches encourage technology innovation and spur economic growth. We look forward to working with the Congress to assist in developing a national system for curbing carbon emissions, while also allowing the states to experiment with ways to take climate change policies further.