

# Compete: Energy

Regional Energy Summit Series

## Eastern Energy Summit Energy Efficiency and the Regional Greenhouse Gas Initiative

April 15, 2009



**Compete.**

Council on  
Competitiveness

Energy Security, Innovation & Sustainability Initiative

In 2007, the Council on Competitiveness launched the Energy Security, Innovation & Sustainability (ESIS) Initiative to explore the linkages between the United States' need for greater energy security, the global imperative for environmental sustainability and U.S. economic competitiveness at the enterprise and national levels. Through a series of Progressive Dialogues, the ESIS Initiative brought together high-level experts from industry, labor, academia and the policy community to form conclusions and ideas on how to create the enabling conditions that will stimulate and accelerate private sector innovation and investment in sustainable energy solutions. Leveraging the insights generated at the dialogues and the wisdom of the ESIS Initiative Steering Committee, the Council crafted *Prioritize: A 100-Day Energy Action Plan for the 44th President of the United States*. *Prioritize* was released at the National Press Club on September 9, 2008, and has since had a significant impact in shaping U.S. energy policy and priorities.

In an effort to broaden understanding of the drivers for innovation and investment in sustainable energy solutions in specific areas, the Council is holding a series of four regionally-based energy summits around the United States during the first half of 2009. The Eastern Energy Summit was the second of this series.

The following are the highlights and key points captured at the Summit, which was held on April 15, 2009, in New Brunswick, N.J., at Rutgers, The State University of New Jersey.

The Council would like to express its gratitude to Ralph Izzo, chairman, president and CEO of Public Service Enterprise Group Incorporated (PSEG), and Richard McCormick, president of the Rutgers, the State University of New Jersey (Rutgers) for co-sponsoring the Eastern Energy Summit; Shirley Ann Jackson, president of Rensselaer Polytechnic Institute, vice chairman of the Council and co-chair of the Council's ESIS Initiative, for her leadership and vision in conceptualizing the Regional Energy Summit Series; Thomas Moran, director of public policy at PSEG; Dunbar Birnie III, professor of Ceramic Engineering at Rutgers; Philip Furmanski, executive vice president for academic affairs at Rutgers; Scott Weiner, director of the Center for Energy, Environmental and Economic Policy at Rutgers; and the PSEG and Rutgers teams for their strong support in planning and executing this event. The Council would also like to thank Governor Jon Corzine and Representative Rush Holt for their wisdom that set the tone of this Summit and for their support of the National Energy Summit & International Dialogue in September 2009.

**Compete: Energy  
Regional Energy Summit Series**

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## Energy Security, Innovation & Sustainability Initiative Regional Energy Summit Series



**February 13, 2009**  
**Houston, TX**

Clarence P. Cazalot Jr., president and CEO of Marathon Oil Corporation, hosted a regional summit on the path to achieving sustainable energy supplies and the impact of the economic stimulus package on U.S. energy security. This meeting was held in concert with *CERAWeek 2009*, the annual conference that brings executives from around the world together to discuss global energy issues.



**April 15, 2009**  
**New Brunswick, NJ**

Ralph Izzo, chairman, president and CEO of Public Service Enterprise Group; and Richard L. McCormick, president of Rutgers, The State University of New Jersey, co-hosted a regional summit on ways to promote energy efficiency in the utility industry and lessons for the nation that can be learned from the rollout of the Regional Greenhouse Gas Initiative (RGGI).



**May 13–14, 2009**  
**Chicago, IL**

James Owens, chairman and CEO of Caterpillar Inc.; Robert Zimmer, president of The University of Chicago; and Eric Isaacs, director of Argonne National Laboratory, co-hosted a regional summit focused on using the Midwest's unique energy resources and infrastructure to reduce greenhouse gas emissions and improve our nation's energy security.

# Compete: Energy

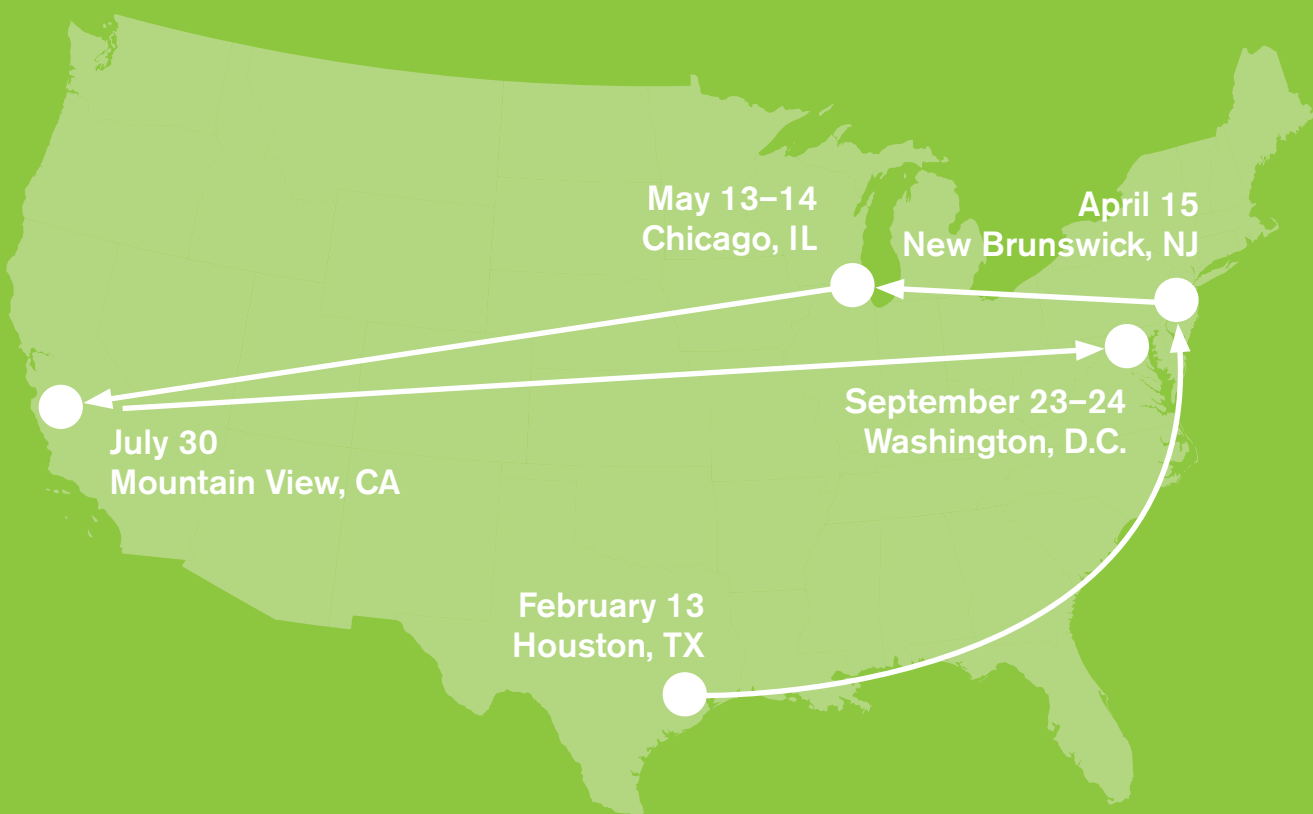
## The National Energy Summit & International Dialogue

**July 30, 2009**  
**Mountain View, CA**

S. Pete Worden, director of NASA Ames Research Center; Mark Yudof, president of the University of California; George Miller, director of Lawrence Livermore National Laboratory; Paul Alivisatos, interim director of Lawrence Berkeley National Laboratory; and Thomas Baruch, founder and managing director of CMEA Capital; co-hosted a regional summit on lessons that can be learned from the successes of California and other western states as front-runners in the development and deployment of sustainable energy technologies.

**September 23–24, 2009**  
**Washington, D.C.**

The Council will convene its top experts in the energy field and representatives from countries around the world to address the interconnected challenges of energy security, innovation and sustainability. The Council's agenda for change will be rooted in a new relationship between the public and private sectors to deal with a defining challenge of the millennium.



# Eastern Energy Summit Participants List

## CO-HOSTS

**Clarence P. Cazalot Jr.**  
President and Chief Executive Officer  
Marathon Oil Corporation

**Ralph Izzo**  
President, Chairman and Chief Executive Officer  
Public Service Enterprise Group

**Richard L. McCormick**  
President  
Rutgers, The State University of New Jersey

**Deborah Wince-Smith**  
President  
Council on Competitiveness

## PARTICIPANTS

**W. Terry Boston**  
President and Chief Executive Officer  
RJM Intercourse

**Assemblyman Upendra J. Chivukula**  
17th District, New Jersey

**Sue Coakley**  
Executive Director  
Northeast Energy Efficiency Partnerships, Inc.

**Governor Jon Corzine**  
State of New Jersey

**Wyatt Earp**  
President  
Monmouth and Ocean Counties Central  
Labor Council

**Jeanne Fox**  
President  
State of New Jersey Board of Public Utilities

**Caren Franzini**  
Chief Executive Officer  
New Jersey Economic Development Authority

**Alice P. Gast**  
President  
Lehigh University

**Congressman Rush Holt**  
U.S. House of Representatives

**Shirley Ann Jackson**  
President  
Rensselaer Polytechnic Institute

**Assemblyman John F. McKeon**  
27th District of New Jersey

**Dominic Pileggi**  
President and Chief Executive Officer  
Thomas & Betts Corporation

**Rafe Pomerance**  
President  
Clean Air—Cool Planet

**Jared Snyder**  
Assistant Commissioner for Air Resources, Climate  
Change and Energy  
New York State Department of Environmental  
Conservation

# Executive Summary

## **The Northern United States is aggressively seeking a lead in boosting energy efficiency and reducing carbon emissions.**

More than a dozen policy makers, energy experts and corporate leaders met in New Brunswick, N.J., on April 15, 2009, for the second in a series of four regionally-based energy summits being held by the Council on Competitiveness under the auspices of the Energy Security, Innovation & Sustainability (ESIS) Initiative. The Eastern Energy Summit was co-hosted by Public Service Enterprise Group and Rutgers, The State University of New Jersey. Participants discussed initiatives aimed at boosting energy efficiency and reducing greenhouse gas (GHG) emissions, the progress of those initiatives and challenges and plans for the future.

A major focus of the Summit was the Regional Greenhouse Gas Initiative (RGGI), which is the first mandatory cap-and-trade program for carbon dioxide (CO<sub>2</sub>) in the Western Hemisphere. Ten states in the Northeast and Mid-Atlantic regions, which collectively represent the eighth largest CO<sub>2</sub>-emitting region in the world, are involved in RGGI. The program has created a market-driven auction system for electricity generators that allows the sale, purchase and trade of CO<sub>2</sub> allowances. This critical step of setting a price on carbon can eventually result in a market-driven reduction in carbon emissions. Though still in its infancy, RGGI is being viewed as a model for other regional and national approaches to reduce GHG emissions.



*Richard L. McCormick, Rutgers, The State University of New Jersey; Shirley Ann Jackson, Rensselaer Polytechnic Institute; Governor Jon Corzine, The State of New Jersey; Deborah Wince-Smith, Council on Competitiveness; and Ralph Izzo, Public Service Enterprise Group.*

As the Summit was hosted in New Jersey, the state served as a reference for energy and climate initiatives in the region. In October 2008, New Jersey Governor Jon Corzine issued an Energy Master Plan, which is driving dozens of initiatives in the state. The plan calls for a 20 percent reduction in the state's energy use by 2020, a 30 percent increase in the use of alternative energy and a reduction of about 25 percent of GHG emissions, also by 2020.

The plan—combined with funding opportunities created by revenue raised by RGGI, federal stimulus funding and private investors—is transforming the state's energy landscape. New Jersey's approach is to create a market for green technologies, then

provide funding and incentives to help keep manufacturing and jobs in the state. Summit participants described programs and private sector projects designed to reduce the need for fossil-fuel driven technologies, ranging from utility poles powered by attached solar panels and “smart” grid devices to supporting the use of hybrid electric vehicles.

There was overall agreement that energy efficiency requires not only the application of available technologies but also greater public awareness and understanding of the issues surrounding energy and its use. Many felt that if consumers better understood the true cost of energy and the value of energy savings, they would alter their behavior to save energy.

Participants also agreed that energy education is critical and should not be limited to science and engineering subject matter. For example, social science curriculums should explore energy. Learning should begin in kindergarten and persist throughout high school, but it should not end in the classroom. Businesses can also learn how to use energy more efficiently in their operations.

Utilities can also play a major part in energy conservation. They are closest to the consumers and can provide ways to make homes and buildings more efficient, but incentives are needed for them to support alternative energy sources.

While all agreed that the states have an active role to play in increasing energy efficiency, all felt that there is a need for a national energy policy. In addition to federal standards, more research and development (R&D) can create transformational technologies with a clear path to market. The Advanced Research Projects Agency for Energy (ARPA-E)—a new organization within the U.S. Department of Energy that is modeled after DARPA, the defense agency responsible for the Internet and stealth defense—was cited as an exciting opportunity to bring forth game-changing energy solutions.

However, all agreed there is a fine line between quality regulation and red tape. While standardization and improved building codes are beneficial, they should be developed and applied in a manner that does not become a burden for business.

# Eastern Energy Summit Highlights

## Governor Jon Corzine on New Jersey's Energy Master Plan

As the Summit was hosted in New Jersey, the state served as a reference for energy and climate initiatives in the region. Governor Jon Corzine discussed how the State of New Jersey's approach to "push back" GHG emissions in a cost effective way was the creation of an Energy Master Plan. Released in October 2008, the plan calls for a 20 percent reduction in the state's energy use by 2020, a 30 percent increase in the use of alternative energy and a reduction of about 25 percent of GHG emissions, also by 2020.

He noted that the Regional Greenhouse Gas Initiative (RGGI) contributes to the plan. RGGI recognizes that carbon can be reduced over a period of time, that carbon has a cost and that the dollars that are produced in that system can be reinvested in energy efficiency and infrastructure. But Corzine pointed out that in a state with high energy costs, getting the price range of allowances to function properly is very important. Businesses' locations, methods of operating and investment decisions are influenced by these prices.

He described solar farms cropping up throughout New Jersey, including ones installed by Merck & Co., Inc. and Rutgers, The State University of New Jersey. The state now generates 85 kilowatts of solar energy, up from 10 kilowatts when Corzine



*New Jersey Governor Jon Corzine.*

took office. According to Corzine, New Jersey is installing more solar panels than any other state besides California.

In addition, New Jersey is harvesting wind power off the coast that should generate 3,000 megawatts of electricity each year by 2020.

"Alternative energy efforts, which include cogeneration, geothermal and a whole series of items in the Energy Master Plan, are designed to recognize that there is an economic opportunity at the same time that we need to provide for energy security, independence and sustainability," he said.

Corzine noted that many companies are moving forward in boosting their energy efficiency, according to construction plans filed in the state. However, the ultimate success in energy efficiency lies in the 3.6 million houses in New Jersey. Many feel that building codes must be updated to address energy efficiency.

It is understood that innovation and regulation can cost ratepayers, but efforts are underway with the state public advocate to set utility rates in a way that does not drive business away but can support a broad-scale energy efficiency program.

“New Jersey and other states have taken very aggressive stands,” he concluded. “We’ve had great cooperation from our private sector partners. Our legislature has also taken aggressive steps in working with public buildings, whether it’s on cogeneration or funding clean energy programs. Our energy economy can be the basis for a very prosperous America, and certainly a prosperous New Jersey, in the years to come.”

### **The Regional Greenhouse Gas Initiative: Cap-and-Trade in Action**

The Regional Greenhouse Gas Initiative (RGGI) is the first mandatory, market-based CO<sub>2</sub> emissions reduction program in the Western Hemisphere. Designed to limit GHG emissions, RGGI was started in 2008 and is now made up of ten Northeast and Mid-Atlantic states, which collectively represent the eighth largest GHG-emitting region in the world.

RGGI’s multi-state CO<sub>2</sub> emissions budget, or cap, will decrease gradually until it is ten percent lower than it was at the start. Electric power generators hold allowances covering their CO<sub>2</sub> emissions and participate in a market-based emissions auction and trading system where they can buy, sell and trade allowances. RGGI just held its fourth auction in mid-2009.

Proceeds from the auctions support low-carbon-intensity solutions, including energy efficiency and clean renewable energy, such as solar and wind power.

## Panel I: The Regional Greenhouse Gas Initiative—A Path to a National Program

### Key Takeaways

- Reinvesting proceeds of carbon management can reduce the cost of the program.
- The price of carbon must go up enough to affect behavioral change and ultimately reduce emissions.
- Energy efficiency can prevent carbon “leakage.”<sup>1</sup>
- Volatility can be managed through longer compliance periods and a reserve price for allowances. Another approach is a “price collar.”<sup>2</sup>
- States must maintain the ability to innovate.
- Funding, coupled with regulatory and statutory requirements, can foster new industries.
- Research and development is critical for new, zero carbon technology to meet emission reduction goals and for the United States to compete internationally.
- Infrastructure is needed to support a diverse portfolio of energy sources. Transmission of electricity is crucial in the solution equation.

<sup>1</sup> Carbon leakage occurs when there is an increase in carbon dioxide emissions in one region as a result of an emissions reduction by another region with a strict climate policy. If policies in one region add a premium to certain fuels or commodities, then the demand may decline and their price may fall. Regions that do not place a premium on those items may then take up the demand and use the same supply, negating any benefit.

<sup>2</sup> A price collar is also known as a symmetrical safety valve. It creates both ceilings and floors for carbon prices so costs are contained and incentives are not lost.

### **RGGI: Goals and Progress**

What can decision makers learn from RGGI? Is it meeting its goals? What kind of progress has it made, and what are the lessons learned that can help the federal government as it explores emission options? According to Jared Snyder, assistant commissioner for air resources, climate change and energy, New York State Department of Environmental Conservation, RGGI has broken ground in important areas.

According to Snyder, the program is successful in showing that the cap-and-trade concept can set a target goal on reducing carbon emissions and a price on carbon using free-market principles while addressing price volatility. The idea is to get businesses to start to consider what effect their emissions have and to incorporate those considerations in their planning. A stable price signal on carbon promotes cleaner energy. Instead of absorbing the cost of carbon emissions, businesses can see benefit in dollars and cents by reducing their GHG emissions.

RGGI uses an allowance auction to create the primary market and set a price for carbon. According to Snyder, it is an efficient method of allocating allowances. Electric generators who need an allowance can get it, for a price. Revenues from the auctions are reinvested in clean energy programs, and so far, New York has raised approximately \$40 million in energy efficiency programs, which can reduce the cost of the program.

### *RGGI Approaches to Manage Energy Price Volatility*

One important aspect RGGI tackled in its design was price volatility. Learning lessons from the early days of volatility in the European cap-and-trade program, RGGI set a three-year compliance period to accommodate wild market swings due to short-term events. For example, a very hot summer results in higher demand for air conditioning. Emission levels rise, and so can the total cost of allowances. By creating a longer-period of compliance, the cost averages out over time. Another approach is allowing unused allowances to be “banked.” In addition, there is a “reserve” price for allowances. If they fall below the reserve, they are not auctioned and are reserved until demand grows and the price rises.

Rafe Pomerance, president of Clean Air—Cool Planet, added that an emissions cap without a price ceiling creates volatility. He recommends the government establish a price collar, so that when prices reach designated high or low points, allowances are added or restricted to stabilize the price. Pomerance noted that a price ceiling will dampen the competitive impact of the emissions cap, while steep price reductions that would shock the economy can be mitigated by the floor amount.

According to Snyder, the first three auctions were extremely successful, and there has been robust demand for the allowances and their prices have been relatively consistent. In each auction, allowances have ranged from \$3.00 to \$3.50 a ton, higher than the reserve prices. This demonstrates that allowance prices are not being propped up artificially.

### *Carbon Management Presents Pricing and Leakage Challenges*

Two challenges relating to cap-and-trade are pricing and “leakage” (i.e. lower cost and higher-carbon generators flooding the higher-cost market). RGGI estimates that about one quarter of energy in the system is due to leakage. And while the RGGI has been successful in setting a price for carbon in its auctions, most agree that a higher price, as much as \$50 per ton, is needed to cause behavioral change and ultimately reduce carbon emissions.

Jeanne Fox, president of the States of New Jersey Board of Public Utilities commented that an effective way to eliminate leakage is through energy efficiency. Reducing the demand for power through efficiency measures is one important way to lower the level of leakage. Renewable portfolio standards, which require the production of energy from renewable energy sources, vary from state to state but are complementary to more energy conservation and less leakage, all of which strengthen a cap-and-trade system.

The proper architecture of a national cap-and-trade system is critical, said Pomerance. He called for a workable, equitable, allowance allocation plan as an essential part of the system.

### *RGGI Design Underscores States Ability to Innovate*

RGGI creates a model for federal action as support for auctioning allowances seems to be growing. Synder noted that when Congressional representatives started talking about legislating cap-and-trade



*Jeanne Fox, New Jersey Board of Public Utilities.*

programs a few years ago, no one was talking about auctioning 100 percent of the allowances. Now the president is calling for full auctioning of allowances.<sup>3</sup>

RGGI also demonstrates the importance of states maintaining their ability to innovate. Synder commented that RGGI is a premier example of what happens when states are allowed to create new programs.

<sup>3</sup> On June 26, 2009, the House of Representatives passed the American Clean Energy and Security Act, which includes a nationwide cap-and-trade program designed to reduce greenhouse gas emissions by 17 percent by 2020. Other provisions include new renewable requirements for utilities, studies and incentives regarding new carbon capture and sequestration technologies, energy efficiency incentives for homes and buildings and grants for green jobs, among other things.

## Investing in Energy Infrastructure

# Carbon Price Needed

The nation faces three daunting problems: energy security, climate change and an economic downturn. And the common solution to all is investment in sustainable energy infrastructure.

Recent data shows that it is unlikely for consumers to turn around the economic downturn through consumption alone. Economic recovery should instead be more investment driven. In the case of federal investment, the borrowing should reward future generations who will have to pay off that debt through projects that leave the environment every bit as productive and capable of supporting the vast variety of ecosystems that we have today. With this perspective, climate change becomes a natural investment opportunity.

What activities need to take place to invest in a green and sustainable future? The best way to get the marketplace to work and apply the creativity that will be needed is by setting a price for carbon. A price on CO<sub>2</sub> emissions would result in substantially higher energy prices, particularly in coal-intensive parts of the country. However, we should not run away from the fact that sending a carbon price signal is a policymaker's way of saying we need to raise the cost of fossil fuel-based electricity. Whether cap-and-trade or a carbon tax, it is about time that those of us in the policy debate make clear that high carbon prices will affect behavior around energy use in the future and ultimately reduce GHG emissions.



*Ralph Izzo, Public Service Enterprise Group.*

In order to keep customers' electric bills from rising dramatically, the nation will need to continue to drive energy efficiency measures. Higher electricity prices through a carbon price signal would direct consumer behavior toward more efficient usage. If command and control approaches to increasing energy efficiency, such as prohibiting the use of incandescent light bulbs, are not politically acceptable, another approach is to allow utility companies that have the expertise to make investments on behalf of consumers. At PSEG, we have employees with that expertise; who know what investments need to be made. We have a great brand. We have a relationship with our customers, and we have patient capital that

we can deploy to help bring about energy efficiency in ways that are far more significant than we have seen in the previous decades.

In addition to reflecting the price of carbon in our energy prices, setting efficiency standards and driving utilities to invest in consumers' efficiency, the United States also needs to invest in renewable energy. Renewable energy responds to policy and health challenges relating to CO<sub>2</sub>, NO<sub>x</sub> and CO<sub>2</sub>. Investment in renewables will also help stimulate the economy and expand the green workforce. Given the supply chain involved in renewable energy development, there are significant opportunities in the sector, but at a cost.

In the push to expand the nation's renewable energy capacity, the United States should be mindful of the costs and trade-offs involved in expanding the transmission infrastructure to transport renewable energy to distant load areas. One needs to consider both the costs of producing electricity as well as the costs of transporting the electricity to end users in order to make the most economically- and environmentally-efficient decision. When the true costs of transmission are accounted for, renewables located closer to customer demand may in fact be more cost effective and environmentally sustainable.

Regardless of the options—energy efficiency, renewables, a higher carbon price—solving our challenges will require a tremendous effort. To put

this in perspective, even if electricity consumption remains flat for 40 years, and fossil fuels are not used, and the use of anything that requires an electric outlet is outlawed, the United States would still not be on course to make the 80 percent reduction in carbon by 2050. Reaching that goal will take solutions on the scale of the complete electrification of our transportation system and the complete de-carbonization of our methods of producing electricity in the next 40 years.

So as we stand here at 2009, thinking 41 years ahead, I hope no one in this room believes we have the luxury of time to achieve the kind of change I just described. The time is now.

**Ralph Izzo**

Public Service Enterprise Group (PSEG)

### **Generating Funds to Invest in Green Technology**

So far, the RGGI auctions have generated \$40 million in revenues earmarked for energy efficiency programs. Another approach to fund technology that reduces CO<sub>2</sub> emissions is through the New Jersey Economic Development Authority (NJEDA), the state's financing agency for businesses and non-profits, in partnership with the Board of Public Utilities.

NJEDA manages 60 percent of the state's revenues from RGGI. It provides grants and low- or no-interest loans for companies that meet a menu of criteria to support the state's Energy Master Plan's goals. This could include commercial, institutional or industrial projects with the combination of heat and power, modern electric generation facilities, innovative carbon emission technology and significant carbon emission reduction avoidance technologies.

To ensure private buy-in on the loan applicants, a portion of non-public funding is required. Caren Franzini, CEO of NJEDA, stated that private equity and financing confirm to a state that a project is a good investment.

She noted that the state is creating its own demand for such technologies through its Energy Master Plan and is also striving to serve as a "go to" state when it comes to green technology. For that reason, it created the Edison Clean Energy Manufacturing Fund, a \$60 million fund dedicated to developing clean technology industries in New Jersey. The funding is in two parts, totaling \$3.3 million for any one project. Of that,

"Using its Energy Master Plan, New Jersey is creating a market for more clean energy technology—and is seeking to keep that expertise and manufacturing in state by helping to finance companies that produce 'green' products and services."

**Caren Franzini**

New Jersey Economic Development Authority

\$300,000 can be used for pre-development costs to site and design a facility. The project can then be eligible for a \$3 million zero-interest, ten-year loan to support facility improvements, equipment, purchases or facility construction. One third of the loan can even be in the form of a no-interest grant awarded for the facility's energy performance and the ability of the project to attract outside funding.

### **Beyond RGGI: A Call for Transformational Technologies**

According to Pomerance, what is needed to take on GHG emissions is transformational research and development that will lead to increased availability of zero-carbon technologies while driving down the cost of low-carbon energy production.

“We have a huge untapped potential to innovate and bring about transformational technologies if the scientific and engineering components in our universities are supported,” he said, lauding the creation of the Advanced Research Project Agency for Energy, which is similar to the Department of Defense’s DARPA initiative that helped introduce such innovations as the Internet and unmanned surveillance aircraft.

Factoring in international issues cannot be ignored. Pomerance pointed out that other countries, most notably India and China, are striving to reach consumption levels like that in the United States and are increasing their emissions dramatically. For that reason, R&D on zero-carbon solutions is even more critical. The United States needs to design and develop new technologies in order to compete internationally, against all the other countries that are advancing in this new long-term market.

Meanwhile, negotiations are underway in preparation for the United Nations Framework Convention on Climate Change in Copenhagen. At hand are amendments to the Kyoto Protocol, which set binding targets for industrialized nations to reduce GHG emissions. It is critical that China and India be at the table, Pomerance said.

### *Transmission is Critical*

Participants agreed that while alternative energies, including wind power and plug-in hybrid electric vehicles, are part of the solution, transmission



*W. Terry Boston, PJM Interconnection.*

is critical. Connecting energy sources to energy demand requires infrastructure. However, building electricity transmission has dropped 50 percent in the past decade.

W. Terry Boston, president and CEO of PJM Interconnection, pointed out that in addition to a diverse energy portfolio, the United States needs a robust and flexible grid to move power. While much needed focus and investment is being placed on making the grid smart, he noted that it is more expensive to make the grid robust.”<sup>4</sup>

<sup>4</sup> The Obama Administration included funding to build a new “smart grid” in its economic stimulus package, approved earlier this year.

## Energy Challenges Present Great Opportunities

We are in a triple bind; a convergence of global developments. There is a critical need for national and global energy security, but alarm over our planet's climate change complicates taking that from Point A to Point B. This now is further complicated by a global economic crisis.

These challenges are our major drivers of a global energy system restructuring. We have the opportunity to develop new energy markets, new trading schemes, new alignments and new technologies. There are extraordinary opportunities in spite of economic stress.

Now is the time to build collaboration between the varied public and private sectors to step forward together to find genuine and permanent solutions that make sense for private enterprises and create new jobs that draw on the capabilities of our great research universities. Learning from initiatives in the states that are designed to create a new energy future at the state level, and ultimately at the national level, is a key strategy we all must embrace.

**Shirley Ann Jackson**

Rensselaer Polytechnic Institute





*Alice P. Gast, Lehigh University, and Dominic Pileggi, Thomas & Betts Corporation.*

### **A Broad Spectrum of Education Needed to Support Energy System Transformation**

New technology is critical in combating GHG emissions, but perhaps more important is the energy workforce of tomorrow.

Alice P. Gast, president of Lehigh University, reported that students are demanding a non-traditional approach to study energy, the environment and infrastructure. They seek a holistic approach that brings science, engineering and social sciences together so they can look at the entire cost benefit analysis of energy issues.

Lehigh University is creating the Science and Technology for Energy, Policy and Society building to bring together disparate groups and to think about new technologies and approaches that can emerge



*Richard L. McCormick, Rutgers, The State University of New Jersey.*

and be adapted by society either through policy, regulations or the economic realities and viability of new technologies.

Richard L. McCormick, president of Rutgers, said that, as a state university, Rutgers has a responsibility to partner with the state and the nation to advance both the technology and the public policies needed to help the state meet its ambitious Energy Master Plan targets. He reported that faculties, students and staff are actively engaged in the laboratories, classrooms and field to combat global warming and explore alternative energy solutions. Every aspect—from purchasing green products for schools to building the largest campus-based solar farm—demonstrates a growing commitment to find solutions.

## Panel II: Unleashing the Potential for Energy Efficiency

### Key Takeaways

- Energy efficiency goes hand-in-hand with cap-and-trade. Strong policies are needed at state and federal levels to complement efforts.
- A range of policies, codes, standards, ratings and performance requirements are needed to improve the energy performance of homes and buildings.
- Utilities must play a major role in energy efficiency, but they need incentives.
- Broad-based energy education is needed so the public can better understand the cost of energy use.
- Plug-in hybrid electric vehicles (PHEV) are part of the solution, but investments in infrastructure, such as the smart grid, are necessary.
- Regulatory requirements, and the bureaucracy they entail, cost a significant amount in terms of time, human resources and money.
- Energy efficiency has market value that should be quantified.
- State regulatory approaches can serve as models for national standards.

“Efficiency is the future. It is the thing that’s going to allow the United States to afford the other clean energy, renewable and smart grid technologies that we need. The more we invest in efficiency, the more we’ll be able to devote to other carbon-lowering measures. It will take a whole range of policies, codes, standards, energy building ratings and performance requirements to improve the energy efficiency of our homes, buildings and factories.”

**Sue Coakley**

Northeast Energy Efficiency Partnerships, Inc.



**Energy Efficiency and the RGGI Synergy**

Energy efficiency goes hand in hand with RGGI. Policies to deliver meaningful, end-use energy efficiency measures are effective in reducing total electricity usage by households so as to overcome price increase impacts caused by RGGI.

RGGI requires that revenues from the sale of emission allowance allocations go to carbon reduction and energy conservation initiatives. Participants outlined a number of initiatives and approaches, from the mundane, such as installing attic insulation, to the revolutionary, such as plug-in sites for electric cars.

Commented Sue Coakley, executive director of the Northeast Energy Efficiency Partnerships, Inc., it will take a whole range of policies, codes, standards, energy building ratings and performance requirements to improve the energy efficiency and performance of homes and buildings.

Many agreed that utilities are the key to reaching consumers, including helping them make their homes and businesses more efficient. “Utilities in New Jersey need to play a major role. They have information about their customers and they want them to be able to afford their energy bills. Ramping up energy efficiency as a resource is critical,” Coakley said.



“There are enormous opportunities for making energy generation and consumption more sustainable and improving efficiency. ... We’re going to have to look at food and agriculture, not just for the generation of biofuels, but to understand carbon sequestration in soils and all of the other energy or energetic aspects of agriculture. We’ve got to look at transportation and work schedules, and we’ve got to look at construction and manufacturing. There are going to be dramatic changes in our lives and our behavior comparable to the changes brought about by the internal combustion engine in the early 20th century.”

**Congressman Rush Holt**  
**U.S. House of Representatives**

Finding incentives for utilities to act is important, participants agreed. In the majority of states, profitability is related directly to how much electricity or gas a utility sells. Rather, conservation and approaches to support alternative energies should be rewarded.

Another systemic change needed relates to building codes. Older codes do not support efforts to reduce GHG emissions. Updating building codes should strengthen energy efficiency. Several participants, including Assemblyman Upendra J. Chivukula of the 17th District of New Jersey, noted that a great deal of heating and cooling is wasted in many buildings. Using new material, such as volcanic ash insulation, and using geothermal energy in heating and cooling are available options to boost energy efficiency. Existing building codes encourage outdated construction approaches and do not favor efficiency enforcement.

### **Plug-In Hybrid Vehicles Key Solution but Need Infrastructure**

Currently there is room for 25 million plug-in hybrid vehicles in the mid-Atlantic region, without new generation capacity, if there was the ability to control when they are charged. Without that control, if 25 million PHEV owners plugged in their hybrids to charge at the same time, the electric system could collapse. A solution is a “smart” electric grid that can direct power to where it is needed from its closest source and “smooth” peak periods of electricity use, via two-way communication systems.



*Dominic Pileggi, Thomas & Betts Corporation.*

According to Boston—head of the PJM Interconnection which manages the high voltage electric grid and the wholesale electricity market that serves 13 states and the District of Columbia—electric hybrid vehicles will have one of the largest impacts on increasing energy security and reducing CO<sub>2</sub> emissions. To get sufficient market penetration requires investment in infrastructure.

Corzine noted that there are great opportunities to revolutionize transportation in New Jersey—via electric vehicles and charging stations along the New Jersey Turnpike, Garden State Parkway and Atlantic City Expressway.

Chivukula recommended a national master plan to use electrified transportation systems, such as the railroad, to transport more goods.

### **Regulatory Rehaul Can Add Value to Energy Efficiency**

Regulatory requirements, and the bureaucracy they entail, cost a significant amount in terms of time, human resources and money. As a public company and a manufacturer, Thomas & Betts would like to see less red tape from the government, particularly as it relates to its customers, who are having problems with issues like right-of-way regulations for transmission lines and other permits. Dominic Pileggi, president and CEO of Thomas & Betts Corporation, encouraged government research and development grants and tax credits as a way to subsidize industry to address those issues and recommended that standards and codes be harmonized not just nationally, but internationally.

Coakley agreed, noting that there is a need for a major program and supportive regulatory environment to reach goals such as those set by the New Jersey Energy Master Plan. She believes that the United States needs a regulatory environment that makes energy efficiency as attractive an investment as any other investment that a utility might make on behalf of their customers.

She also called for a New Jersey Energy Efficiency Utility, similar to programs in other states that work with customers by providing services, incentives and assistance in financing to help companies become more energy efficient. She also suggested a regulation that houses and buildings be given an energy rating before being sold, so that the buyer can understand what its performance may be like.

“Utility companies have credibility and are accountable to the public. They should lead efforts to help consumers be more energy efficient.”

**Wyatt Earp**

Monmouth and Ocean Counties Central Labor Council



This will create market value for energy efficiency. Some argue that a national policy is needed—that a quilt of different regulations and requirements state-by-state will ultimately be detrimental. Some also view states like New Jersey as the bellwether for future national policy. For example, state appliance efficiency standards required in the Northeast region have become federal standards.

### **Energy Education Needed Early On and Throughout Life**

Participants in the first panel, which discussed RGGI, embraced the concept of holistic education that links social science, economics and science in reshaping university curriculums. The second panel, which focused on energy efficiency, also agreed that much

needs to be done in energy education early on and throughout life. There was also agreement that the public needs to be educated in understanding the cost of energy use and approaches to conservation. Education starting as young as kindergarten and continuing throughout high school to address energy usage was encouraged. Another concept was better transparency so all users could better understand their energy usage and how much it is costing them.

Additionally, there is opportunity through vocational training and retraining blue collar workers for green jobs, such as building and installing solar panels, doing energy audits and weatherizing homes. Boston noted that, in his opinion, attic insulation is the most cost-effective method to reduce carbon emissions and can lead to hundreds of jobs.



Assemblyman John F. McKeon (D), 27th District, New Jersey; Shirley Ann Jackson Rensselaer Polytechnic Institute; and Deborah Wince-Smith, Council on Competitiveness.



Ralph Izzo, Public Service Enterprise Group.



Richard L. McCormick, Rutgers, The State University of New Jersey, and Shirley Ann Jackson, Rensselaer Polytechnic Institute.



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*Shirley Ann Jackson, Rensselaer Polytechnic Institute; Richard L. McCormick, Rutgers, The State University of New Jersey; New Jersey Governor Jon Corzine; and Deborah Wince-Smith, Council on Competitiveness.*



*Dominic Pileggi, Thomas & Betts Corporation; Alice P. Gast, Lehigh University; Assemblyman Upendra J. Chivukula, 17th District, New Jersey; and Sue Coakley, Northeast Energy Efficiency Partnerships.*



*Shirley Ann Jackson, Rensselaer Polytechnic Institute, and Susan McGinnis, CleanSkies.tv.*

## About the Council on Competitiveness

### WHO WE ARE

The Council's mission is to set an action agenda to drive U.S. competitiveness, productivity and leadership in world markets to raise the standard of living of all Americans.

The Council on Competitiveness is the only group of corporate CEOs, university presidents and labor leaders committed to ensuring the future prosperity of all Americans and enhanced U.S. competitiveness in the global economy through the creation of high-value economic activity in the United States.

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### HOW WE OPERATE

The key to U.S. prosperity in a global economy is to develop the most innovative workforce, educational system and businesses that will maintain the United States' position as the global economic leader.

The Council achieves its mission by:

- Identifying and understanding emerging challenges to competitiveness
- Generating new policy ideas and concepts to shape the competitiveness debate
- Forging public and private partnerships to drive consensus
- Galvanizing stakeholders to translate policy into action and change

### FOR MORE INFORMATION

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The Council on Competitiveness launched the Energy Security, Innovation & Sustainability (ESIS) Initiative in July 2007 with the firm belief that the crucial role of the private sector demand in driving the way America produces and uses energy has gone largely unrecognized in prior policy initiatives. The ESIS Initiative, which was called for in the Council's 2004 seminal report *Innovate America*, is led by a CEO-level steering committee comprised of approximately 40 chief executives from U.S. industry, academia, government laboratories and organized labor. The distinguished steering committee is led by James W. Owens, chairman and CEO of Caterpillar Inc.; Shirley Ann Jackson, president of Rensselaer Polytechnic Institute; and D. Michael Langford, national president of the Utility Workers Union of America, AFL-CIO. The goal of the Initiative is to enhance U.S. competitiveness and energy security by developing a public-private action agenda to drive private sector demand for sustainable energy solutions and create new markets, industries and jobs. It is underwritten by the U.S. Department of Energy and has benefited from the guidance of more than 200 executive-level energy experts.

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