

# **IMPROVING AIR QUALITY THROUGH ENERGY EFFICIENCY AND CONSERVATION - THE POWER OF GOVERNMENT POLICY AND AN EDUCATED PUBLIC**



**New Jersey Clean Air Council  
2007 Annual Public Hearing**

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THROUGH ENERGY EFFICIENCY  
AND CONSERVATION - THE POWER  
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EDUCATED PUBLIC**

Public Hearing April 11, 2007

**Sub-Committee**

James Blando, Ph.D., Hearing Chair  
John Elston, Hearing Vice Chair

New Jersey Clean Air Council Public Hearing  
April 11, 2007  
Trenton, New Jersey

## Table of Contents

Scope .....	6
Recommendations .....	7
Supporting Innovative Government Actions for Reducing Greenhouse Gas Emissions.....	7
Using Energy Efficient Products .....	9
Practice Conservation .....	9
Create Economic Incentives .....	10
Seeking New Alternative Energy Sources .....	11
Optimizing Transportation Efficiencies .....	12
Developing Efficient Personal Choices through Education and Communication .....	13
Background .....	14
Testimony .....	19
Invited Speakers.....	19
Lisa P. Jackson.....	19
Michael Winka .....	20
Susan Vercheak.....	23
Anthony J. Broccoli, Ph.D.....	24
Kim Knowlton, Dr.P.H. ....	26
Lisa Jacobson .....	28
John Rhodes.....	31
Sue Gander .....	32
Paul Flanagan, Esq.....	34
Greg Dana .....	35
Paul H. Genoa .....	36
Frank Felder, Ph.D.....	38
William Walsh .....	42
Public Speakers .....	45
Latrell McLean .....	45

Susan Ruch .....	45
Joanna Underwood .....	46
Wilbur McNeil.....	48
Glossary of Acronyms .....	49
Clean Air Council Public Hearing History .....	51
References.....	53

New Jersey Clean Air Council Website  
[www.state.nj.us/dep/cleanair](http://www.state.nj.us/dep/cleanair)

## **New Jersey Clean Air Council Public Hearing**

**April 11, 2007**

**Trenton, New Jersey**

### **Scope**

Energy makes the world turn; energy production and use are critical to everyday activities. Each year human demand for energy increases. Many forms of energy production and use result in air pollution, which affects public health, welfare, and the environment. Energy efficiency refers to the practices and policies of energy production, use, and conservation aimed at decreasing the adverse environmental effects and amount of energy used in our society. If we are able to increase our energy efficiency through technology and conservation, we can improve our air quality by reducing greenhouse gases (GHG), particulates, and ozone. By using less energy, we can protect human health and our environment, use fewer natural resources, and save money.

Government policies can encourage energy efficiency and conservation. These policies require a holistic view that both balances society's needs and coordinates environmental, economic, energy and transportation policies. These policies will likely be complex and have pros and cons; it is unlikely that any policy can fully address all concerns simultaneously. Government, industry, academia, and the public need to be involved to develop, promote, and implement the policies.

On April 11, 2007 the New Jersey Clean Air Council (CAC) conducted a public hearing on Improving Air Quality through Energy Efficiency and Conservation: the Power of Government Policy and an Educated Public. The purpose of this hearing was to obtain testimony from the scientific and regulated communities and the public to provide recommendations to the CAC when it advises the Commissioner of the New Jersey Department of Environmental Protection (NJDEP) on improving air quality through energy efficiency and conservation. After considering the testimony given during the April 11, 2007 hearing, the CAC prepared this report to submit as an advisory document to the Commissioner of the NJDEP.

## **Recommendations**

### **Clean Air Council Public Hearing 2007**

There is a significant scientific consensus that emissions from energy production and use, especially fossil-fuel based sources, contribute to environmental degradation — such as global warming, photochemical smog, and toxic air pollution, which can seriously affect public health and welfare. The CAC believes these problems can be addressed, in part, by:

- Supporting innovative government actions
- Reducing greenhouse gas emissions
- Using energy efficient products
- Practicing conservation
- Creating economic incentives
- Seeking new alternate energy sources
- Optimizing transportation efficiencies
- Developing efficient personal choices through education and communication

### **Supporting Innovative Government Actions for Reducing Greenhouse Gas Emissions**

#### **1. Executive Order (EO) 54**

The CAC supports the goals and targets of EO 54, an executive order to reduce GHG emissions, and likewise supports legislation that is aligned with EO 54's objectives. Increasing energy efficiency is a crucial component to the success of this executive order. The CAC supports legislation aligned with EO 54. Such legislation is now under consideration at the state level.

#### **2. Energy Master Plan (EMP)**

The CAC supports updating the EMP and bringing stakeholders together to promote dialogue on energy issues. Energy efficiency and conservation should be a significant component of the EMP. The EMP should specifically address plans for increasing energy efficiency and conservation among the public, private, and residential sectors.

#### **3. Local Planning**

The CAC recommends that municipalities incorporate strategies for sustainable growth into their land use plans and development ordinances. Municipalities should be required to assess municipal operations to optimize opportunities for energy efficiency, conservation, and sustainability. Guidance is available from the US Environmental Protection Agency (USEPA) and the NJDEP. The USEPA Green Communities Program has a web-based tool kit and planning guide to help communities conduct needs assessments and access the tools and information needed to become sustainable. NJDEP pledged in its 2007 Priorities and Action Plan to maximize the use of its resources to provide incentives, coordination and technical expertise to encourage state, regional and

local planning entities to incorporate smart growth, green building design technologies, energy efficiency, and renewable energy into planning and individual project design. Municipalities should be required to improve energy efficiency, conservation, and sustainability when feasible.

#### 4. Regional Greenhouse Gas Initiative (RGGI)

The Council supports RGGI, which is a ten-state effort to cap and reduce carbon emissions from power plants. The Council also urges New Jersey to strongly encourage the Commonwealth of Pennsylvania to join in this effort. Energy efficiency should also be emphasized as a strategy for reducing emissions.

#### 5. Federal Actions

The Clean Air Council believes that the Federal Government must develop a comprehensive national energy program consistent with the goals of the Federal Clean Air Act. Only in this way can New Jersey's industries and power producers, which are subject to strict State environmental regulations, avoid economic disadvantage. The CAC supports other Northeast states in their recommendations for a national program controlling emissions from energy use and production, as well as enhancements in energy efficiency and conservation across all states to address climate change and other air quality problems.

#### 6. International Agreements

The Clean Air Council endorses the concepts of international agreements, such as the Kyoto Protocol, in addressing climate change and air quality. These agreements should include specific goals and targets and significant discussion about energy efficiency and conservation as effective ways to prevent air emissions before they are generated.

#### 7. Leadership

The CAC supports Senate Bill 2154 and other related bills that authorize the New Jersey Department of Community Affairs (NJDEA) to adopt standards that exceed the national model code in order to establish enhanced energy conservation construction requirements, the added cost of which may reasonably be expected to be recovered within seven years. All state agency local planning assistance efforts should be coordinated and should include guidance to municipalities on developing a community sustainability plan.

The State of New Jersey (including quasi-state agencies), county and local governments should lead by example and serve as sites to demonstrate technologies for enhancing energy efficiency and conservation. Government should engage in technology forcing activities that help to move new energy efficiency and conservation technologies to the market place.

The CAC believes New Jersey should take a leadership role in raising business and public awareness about the financial benefits as well as the air quality benefits from improvements in energy efficiency and conservation. This may include implementing voluntary and regulatory measures to improve energy efficiency, reduce emissions, and practice conservation.



The CAC supports funding of academic centers to conduct, support and evaluate technical and economic assessments of current pending energy issues.

### **Using Energy Efficient Products**

The CAC recommends the following:

8. Incorporate contract language requiring the use of energy conservation and use of energy efficient products into state contracts.
9. Require architects and developers to meet, at least, LEED standards and encourage further innovation in building design.
10. The CAC believes that significantly more funding must be provided to the New Jersey Board of Public Utilities (NJBP) energy efficiency programs to allow for more participants and to reduce the time for Return on Capital Investments. Currently, the capital costs can be significant and the time to recoup those costs is too long for some businesses and the public to fully engage in these programs.
11. The Federal Government should further toughen appliance efficiency standards and states and product retailers should encourage and provide incentives for the use of Energy Star rated products.
12. Robust measurement and verification plans in energy efficiency programs must be developed and maintained to assure the expected benefits are realized. In addition, third-party certification by rigorous scientific and engineering evaluations of new technologies can assure that these new technologies deliver the expected benefits.

### **Practice Conservation**

New Jersey should conserve energy resources by:

13. Promoting the use of compact fluorescent light bulbs because they use only 25 - 35 percent of the energy of incandescent light bulbs, while lasting ten times longer. However, effective waste management solutions for these mercury-containing products must be utilized as well as investments in newer lighting technologies that are even more efficient, such as LED lights.
14. Promoting the use of appliances with an Energy Star Label and extending this type of labeling beyond appliances would be effective as long as the labeling is verifiable, accurate, and simple for the consumer to understand.
15. The CAC supports continued education to encourage businesses and the public to turn down the thermostat 10 - 20 degrees during sleep or when the building is not

occupied during the heating season, and correspondingly to turn the thermostat up during the cooling season. Installing a programmable thermostat or one that can be centrally controlled is recommended. These managerial approaches can yield significant savings.

16. Other managerial approaches, such as central control of lighting and the ability to turn off lights and computers can be effective. In addition, business and homeowners must be educated about the need to turn off their computers when not in use rather than leaving the computer on because computers that are “hibernating” still use a significant amount of energy.
17. The Inspection & Maintenance program should educate the public during vehicle inspections about the need to, and benefits of, maintaining vehicles by replacing air filters and keeping tires inflated at their correct pressure. The cost saving in improved fuel efficiency should be emphasized.

### **Create Economic Incentives**

The CAC believes in providing additional financial incentives and support for business and homeowners to encourage energy efficiency, conservation, and alternative energy use.

Some possibilities include:

18. Conduct an inventory to determine which products as a whole consume the most energy. Remove or reduce taxes on those products, such as energy efficient computers if they meet stringent energy efficiency requirements.
19. Extending the length of payback time for investments in energy efficiency. The CAC recommends benefiting the customer by extending these timeframes and increasing contract flexibility for those government entities that install alternative energy sources, such as solar power.
20. Reducing costs of municipal permits required for installing solar and alternative energy systems.
21. Removing barriers. Provide protections for businesses and citizens so there are no hurdles in installing and using these systems. Create an atmosphere that makes it easy for citizens to do the right thing.
22. The CAC believes that energy efficiency and conservation should not be a disincentive to New Jersey's energy-producing organizations. These organizations must be encouraged to redefine and develop their business strategy to incorporate energy efficiency and conservation.
23. Lessen the restrictions on net metering rules (connecting to the Power Grid).

24. The lack of readily available PM-2.5 emission offsets may present an obstacle for licensing some new high efficiency power generation units, unless they are replacing other lower efficiency and higher emitting units at the same time. The CAC supports air pollution control policies and procedures that both protect and improve air quality, while enabling the construction of a cleaner, more efficient generation of power plants to replace those outdated electric units that still remain in service today.
25. Develop incentives for driving hybrid cars, carpooling, and ride-sharing programs. If possible, stagger work hours to avoid rush hour traffic jams and wasting gas. Encourage telecommuting, alternative workday programs, and businesses to provide commuter services.
26. Incentives must be provided through grants or other financing schemes, such as low interest loans, enabling easier investment in energy efficiency.
27. The CAC recognizes the importance of two significant issues, decoupling and cap-and-trade, whose resolution is important in facilitating energy efficiency practices. The CAC is not now prepared to make a specific recommendation on either of these matters, but urges NJBPU to include them in its EMP activities.

### **Seeking New Alternative Energy Sources**

The CAC recommends these activities:

28. Conduct additional evaluation of all types of energy efficiency. Examine and advocate alternative forms of energy including solar, wind, geothermal, and hydro.
29. Examine renewable portfolios and determine the costs, risks, limits, and benefits of each alternate source of energy. Diverse energy portfolios are needed by our state to maintain reliability and therefore the integration of older technologies and newer technologies must be thoughtfully constructed.
30. New Jersey should offer incentives for developing and implementing alternate energy technologies. Technology grants from the state or federal government, as well as recruiting New Jersey high tech companies that develop alternate and enhanced efficiency, may be effective at increasing the use and development of these technologies. The entire life cycle of new technologies must be understood so that we do not create waste management problems while solving air quality problems.
31. The solar energy industry should develop aesthetically pleasing solar panels so as not to discourage or forbid installation. If used as a standard, such technology could then provide a guarantee permit for its installation.
32. Conduct studies on the implications of the alternative sources to provide educated decision-making. These studies must consider environmental, economic and

transportation issues; examine how to meet the demand and the costs; enable citizens to compare and decide what is best for New Jersey; and incorporate a component for evaluating alternate energy programs. It is important to realize and avoid the potential for an increase in energy availability to simply increase energy use.

33. The CAC recognizes that nuclear energy is a large source of reliable electricity in the United States that does not contribute significantly to GHG emissions, particulate matter, or ozone at the point of electricity generation. However, one limitation for nuclear energy is the significant waste management issues associated with spent fuel rods and therefore the federal government and nuclear industry must develop an effective waste management plan. In addition, plant safety must constantly be assessed and upgraded to current standards, even for older nuclear power stations.

### **Optimizing Transportation Efficiencies**

Transportation continues to be the largest source of CO<sub>2</sub> emissions. Major improvements in automobiles, driving conservation, public transportation and fuels are needed.

34. The Council supports the legislative mandate to meet California CO<sub>2</sub> standards starting in the 2009 model-year vehicles. Other efforts will be needed to implement the mandate including public awareness campaigns. These vehicle standards should be uniform in all states so that variability does not reduce manufacturing efficiencies among the auto manufacturers.
35. The Council also recommends support for a short-rail transportation system from the ports to major distribution centers through the region, which would greatly reduce traffic and transportation energy use in the port areas of New Jersey.

The following recommendations are summarized from "Moving Transportation in the Right Direction", the 2003 New Jersey Clean Air Council Annual Public Hearing Report. It is the Council's tradition to include former recommendations where applicable.

The Council recommends:

36. Improving cooperative regional planning. Center-based land use patterns such as transit villages and revitalized cities can reduce automobile dependency and improve air quality.
37. Revitalize New Jersey's major cities. Initiatives are needed for improvement in air quality, tax incentives, development of brownfields, crime control, mass transit options, improved schools and housing options.
38. Increase funding for mass transit. Encourage funding intra-New Jersey projects connecting urban neighborhoods to significant destinations.

39. The Council is concerned that promoting growth in urban centers will, on the short term, exacerbate documented air quality issues in these areas. To net out the negative impacts of additional growth, significant efforts to change vehicular traffic flow through these areas are needed.
40. The Council urges consideration of air quality issues in any and all state initiatives.
41. The CAC recommends that New Jersey railroads examine the feasibility of enhancing the movement of passengers and freight with a goal of reducing truck and auto traffic.

### **Developing Efficient Personal Choices through Education and Communication**

The CAC recommends the following:

42. Educate people about the causes and effects of air pollution, such as climate change, and the decisions and actions they can take to reduce their personal impact.
43. Research and choose green energy choices.
44. Establish a fund to conduct public education. This could incorporate education about the need for energy conservation among all school ages, including elementary school, so that as children become adults they will appreciate the need to conserve energy because of the impact of energy use on our environment.
45. Conduct a communication campaign to provide education to citizens, businesses, and legislators about conservation and energy efficiency initiatives.
46. Produce and broadcast effective ads (similar to anti-smoking campaigns).
47. Explore the use of Supplemental Environmental Projects to develop education programs about energy efficiency, conservation, and climate change.
48. The State government should encourage New Jersey residents to reduce automobile vehicle miles traveled by carpooling, trip planning, and use of public transportation and similar efforts.

## **Background**

### **Energy Pollution, Efficiency and Conservation**

Energy is vital to life, as we know it. Each year our demand for energy increases to supply the needs and wants of a growing human population. However, all parts of the energy life cycle from exploration, extraction, refining, to energy production can cause harmful effects to human health, welfare, and the environment (Epstein and Selber 2002; Epstein and Mills 2005).

Energy production, especially combustion, generates air pollution that contributes to human health problems, environmental degradation, and climate change (Epstein and Rogers 2004; Romm and Ervin 1996). Major research supports the evidence of the connection between air pollution and human health. Six main air pollutants have been found to be related to illness and death: ozone, particulates, carbon monoxide (CO), sulfur dioxide (SO<sub>2</sub>), volatile organic compounds (VOCs), and oxides of nitrogen (NO<sub>x</sub>) (Romm and Ervin 1996). Fossil-fuel (gas, oil, coal, and natural gas) combustion emits these pollutants (Epstein and Selber 2002).

Emissions from vehicles that burn fossil fuels can create smog that exacerbates asthma. Small particles emitted from diesel exhaust can affect the airways in the lungs and contribute to respiratory illness. These particles may also intensify the effect of pollen and mold on the lungs, and some evidence supports their role in contributing to lung cancer risk (Epstein and Rogers 2004). Populations living in urban areas bear the brunt of concentrated air pollution. Urban populations living near truck and bus routes experience high rates of asthma (Epstein and Rogers 2004).

In addition to fossil-fuel combustion contributing to health problems, combustion also increases amounts of GHG emitted to the atmosphere, which cause climate change. The Greenhouse Effect refers to the ability of GHG gases in the Earth's atmosphere to trap the heat radiating from the Earth. During the past two decades there has been much discussion and concern about the increasing amount of GHG because of human activity, primarily fossil-fuel combustion (Epstein and Selber 2002). These increased GHG in the atmosphere are retaining the radiated heat and raising the temperature of the Earth, interfering with the planet's ecological systems and heat balance, and changing the climate (Epstein and Rogers 2004).

The main GHG resulting from anthropogenic activities is Carbon Dioxide (CO<sub>2</sub>). Coal combustion produces the most CO<sub>2</sub> per energy unit generated, followed by petroleum and natural gas (Epstein and Selber 2002). As we burn fossil fuel, large amounts of CO<sub>2</sub> are released to the air because large amounts of carbon are contained in the fuels. Fossil-fuel

combustion contributed to 98 percent of the total CO<sub>2</sub> emissions in the United States in 1998 (Epstein and Selber 2002).

In 2001, the Intergovernmental Panel on Climate Change ([www.ipcc.ch](http://www.ipcc.ch)), consisting of 49 international experts, met to review public health and economic topics related to air pollution. The panel stated that humans are mainly responsible for causing climate changes from deforestation and burning fossil fuels. Climate change can cause lung problems, increase heat-related illnesses and infectious diseases, change food production, and influence weather extremes (Epstein and Rogers 2004).

The production and use of energy has created complicated issues. Environmental, economic and energy issues all must be considered and coordinated when developing energy policies. There is no single perfect solution to these issues, but one of the most effective methods to reduce the air pollution impacts on human health and the environment from energy production and use is to effectively utilize energy efficiency and conservation practices. A study conducted by Pimental et al. (2004) found that using energy efficiency and conservation could save the nation approximately 33 percent of its current consumption of energy, over approximately 10 years. This study listed these sectors as being capable of making large energy savings: transportation, home heating and cooling, and food systems.

Energy efficient technologies can protect the environment and lower energy costs for consumers and businesses. These technologies are essential to sustainability, provide the opportunity to lessen or slow climate change, reduce the impact of air pollutants on human health, and save money, offering us a win-win situation (Romm and Ervin 1996).

Reducing CO<sub>2</sub> can provide us with co-benefits. Less air pollution will lead to less health issues. Bell et al. (2002) in The International Expert Workshop on the Analysis of the Economic and Public Health Impacts of Air Pollution explained that a main co-benefit connected with reducing GHG is the improvement in public health. Policies that reduce fossil-fuel combustion will reduce emission of CO<sub>2</sub>, other GHG, and other harmful air pollutants. There will be a reduction in air pollution that causes health issues such as, asthma, respiratory illnesses, premature deaths, and increased hospitalizations.

In this report the CAC developed several recommendations for increasing energy efficiency and conserving energy resources. These are detailed in the report.

It is important to make our citizens aware of the risks and opportunities related to energy use and conservation. It is also crucial to educate business, industry, government, academic, and public representatives so they can take necessary actions. Organizing on the various political levels, ranging from local to international can contribute to improving energy efficiency (Epstein and Rogers 2004). We need to make wise decisions about energy production and use. The decisions we choose today will greatly influence the environmental and health conditions in the years ahead (Romm and Ervin 1996).

## Energy Use in New Jersey

During 2003, the total amount of energy used equaled 2,578,340 billion British Thermal Units (BTU). The energy consisted of 299,832 thousand barrels of petroleum (this includes motor gasoline, distillate fuel, liquefied petroleum gases and jet fuel), 602,560 million cubic feet of natural gas, and 5,004 thousand short tons of coal.

In New Jersey, the transportation sector is the sector that consumes the most energy. Of all petroleum products, the most used in 2003 was gasoline at 103, 779 thousand barrels.

Other petroleum products were distillate fuel (40,318 thousand barrels), liquefied petroleum gases (3,045 thousand barrels), and jet fuel (25,038 thousand barrels).

The end-use energy sectors in 2003 consisted of residential (633,695 billion BTU), commercial (594,582 billion BTU), industrial (483,500 billion BTU) and transportation (866, 563 billion BTU).

There are ten electricity-producing power plants in New Jersey. Natural gas and coal supply most of New Jersey's power plants. The five plants powered by gas are Bergen Generating Station, Linden Cogen Plant, Public Service Electric and Gas (PSE&G) Linden Generating Station, AES Red Oak LLC, and PSE&G Essex Generating Station. Two plants are powered by coal: PSE&G Hudson Generating Station and PSE&G Mercer Generating Station.

Nuclear power is the energy source for the three remaining plants: PSEG Salem Generating Station, PSE&G Hope Creek Generating Station, and Oyster Creek. While Salem is one of the largest capacity power plants in the United States, Oyster Creek, in operation since 1969, is the oldest working nuclear power plant in the United States (U.S. Department of Energy Information Administration website). In 2003, nuclear electricity generated over 50 percent of the electricity for the state. The amount decreased to 48 percent in 2004 because of plants shutting down to conduct routine maintenance.

## Energy Statistics for New Jersey

<b>New Jersey Carbon Dioxide Emissions by Fuel 2003</b>	
<b>Fuel</b>	<b>Million Metric Tons</b>
Petroleum	80.7
Natural Gas	33.0
Coal	9.9
Total	123.7
Source: Energy Information Administration (EIA) website <a href="http://www.eia.doe.gov">www.eia.doe.gov</a>	



<b>New Jersey Carbon Dioxide Emissions by Sector 2003</b>	
<b>Sector</b>	<b>Million Metric Tons</b>
Transportation	61.4
Residential	18.3
Electric Power	18.0
Industrial	15.3
Commercial	10.5
Total	123.7
Source: EIA	

<b>New Jersey Emissions of Carbon Dioxide by Year</b>	
<b>Year</b>	<b>Million Metric Tons</b>
1990	113.9
1991	114.1
1992	121.0
1993	117.5
1994	127.2
1995	126.4
1996	122.4
1997	124.2
1998	119.5
1999	123.3
2000	123.3
2001	122.7
2002	122.7
2003	123.7
Source: EIA	

<b>New Jersey Emissions (estimated) from All Electric Power Plants, 2002</b>			
<b>Product</b>	<b>Thousand Short Tons</b>	<b>National Ranking</b>	<b>Annual Growth Rate (1993 - 2002)</b>
Sulfur Dioxide	49	36 <sup>th</sup>	-2.9 percent
Nitrogen Oxide	41	36 <sup>th</sup>	-1.9 percent
Carbon Dioxide	22,339	37 <sup>th</sup>	4.0 percent
Source: State Electricity Profiles, Energy Information Administration			

## **I. Alternate Energy in New Jersey**

### **A. Alternative fueled vehicles**

During 2003, as reported by the Energy Information Administration website, 6,569 alternative fueled vehicles were in use in New Jersey.

## **II. Renewable Energy in New Jersey**

Renewable energy technologies including wind, solar, hydro, geothermal and biomass are being used more in this state with a focus on reducing air emissions (NO<sub>x</sub>, CO, CO<sub>2</sub>, and VOCs). Reducing these pollutants will reduce air pollution and the associated effects.

### **A. Wind**

New Jersey has high wind power potential onshore and offshore along the Atlantic coast. Wind energy is a clean fuel source, and one of the lowest priced renewable energy technologies available. Wind is made by inconsistent heating of the air by the sun, uneven features on the Earth's surface, and the Earth's rotation. Local land characteristics, water bodies, weather, and plant coverage influence winds. Wind turbines catch the wind produce electricity. Concerns about wind energy include aesthetics, noise from the machinery blades and bird fatalities.

### **B. Solar**

#### **1. Photovoltaic**

Photovoltaic devices use semiconducting materials to change sunlight into electricity. Radiation from the sun varies with changing atmospheric conditions (clouds and dust) and the Earth's location to the Sun. Nearly all areas of the United States have solar energy potential.

#### **2. Thermal**

Solar thermal devices use direct heat from the sun, concentrating it to make heat at useful temperatures. Some of the uses are for heating swimming pools and making steam for electricity production.

### **C. Hydro**

HydroElectric utilities use water as their main source for renewable energy to make electric power. Hydroelectric plants are sited where suitable waterways are available; many of the best sites have already been developed. Generating electricity using water has several advantages: no water is lost in the process, water is an inexpensive power source; no fuel is combusted so there is little air pollution compared to fossil-fuel plants; and there is limited thermal pollution compared to nuclear plants. Using water for electricity generation can be problematic because damming rivers and streams can adversely affect local plant, fish, and animal habitats.

### **D. Geothermal**

Geothermal energy is in underground reservoirs of steam, hot water, hot dry rocks, and in some cases systems may simply capitalize on the warmer temperatures present several feet below the ground. Hot water or steam is taken from geothermal reservoirs in the Earth's crust. This material is supplied to steam turbines to drive generators to produce

electricity. Moderate-to-low temperature geothermal energy can be used for space heating in homes and captures heat through the slightly warmer temperatures that are often present several feet below the ground's surface. Geothermal heat pumps use lower temperature geothermal resources to heat and cool buildings.

#### **E. Biomass**

Biomass is an important source of energy; it provides the only renewable alternative for liquid fuel for transportation. The uses include ethanol, biodiesel and biomass power. (US Department of Energy, Energy Efficiency and Renewable Energy website)

## **Testimony**

### **Invited Speakers**

*Lisa P. Jackson*

**Commissioner**

**New Jersey Department of Environmental Protection**

The NJDEP has a special partnership with the NJBPU. The two departments have a good working relationship, which serves the State well. NJBPU has been on the cutting edge with renewable portfolio standards for our State, and a clean energy program that provides incentives and investments in clean and renewable energy.

There is a clear overlap between energy policy and the environment, including environmental threats of all kinds, not the least of which is GHG. Within the past few months there has been an emphasis on GHG. New Jersey has begun with a great foundation started by my predecessor, with both the California low-emission vehicle program becoming effective 2009 and the RGGI.

The DEP has penalty money and supplemental environmental project money available from Atlantic City Electric to assist in funding the next level of inquiry for the offshore wind project. This money will go towards a Request for Proposal that will study our ocean environment so we can understand our resources and make an informed decision about the siting of wind farms.

#### **GHG Inventory**

New Jersey is a leader in studying GHG. We had conducted a 1990 GHG inventory that is currently being refined for 2006. Progressive states are now discussing GHG inventory and are looking to New Jersey as an example. As we work with these other states, New Jersey will again be a leader in helping them to inventory and track emissions, so they can focus on their GHG reduction.

#### **RGGI**

RGGI is a modest attempt, by design, to decrease GHG. The idea was to implement and operate the cap-and-trade program for GHG emissions. I think there will be a national program that is more aggressive than RGGI. We need a national standard, but we need to

advocate for a standard that is built on state efforts (and does not undermine the states), as well as incorporate state and local knowledge.

#### EO 54

In February 2007, Governor Corzine initiated EO 54, which set goals of stabilization of GHG emissions at 1990 levels by 2020; and reduction of GHG emissions to 80% below 2006 levels by 2050. These aggressive goals were set for two reasons: 1) the science shows that to make a difference in emissions and in the level of CO<sub>2</sub>, drastic reductions need to be made in human-made carbon dioxide and other GHG by 2050; and 2) to obtain the changes needed, an aggressive future goal must be set to allow businesses the opportunity to adapt and understand how to operate in the regulatory environment. We will soon have GHG legislation in New Jersey that will change the Governor's EO goals into laws.

It is important for us to make changes in energy efficiency as well as our personal behavior.

All of these actions mean we are pointing this state and this country in the direction of reducing GHG.

#### *Michael Winka*

##### **Director, Office of Clean Energy New Jersey Board of Public Utilities**

Our mission today is no less than saving the world from ourselves. I am going to talk about the connection between economic development, environment, energy efficiency, and renewable energy.

New Jersey's Clean Energy Program is a statewide program administered by the NJBPU that promotes energy efficiency and renewable energy for all New Jersey ratepayers including residences, businesses, schools and municipalities. The Clean Energy Program provides incentives for investments in energy efficiency and renewable energy, resulting in \$492 million in energy efficiency investments. These investments reduce customers' energy bills, reduce pollution, reduce reliance on imported fuel and stimulate the local economy.

We have to make energy cleaner and we have to use it more efficiently if we are going to meet the goals that Governor Corzine has set.

These are some of the tools the NJBPU is using to reach the goals:

- EMP is a tool that considers transportation, heating, electricity, where we are today, what will happen over the next 20 years, what will happen if we do not take action.
- Clean Energy Program provides financing and funding to implement some of the items in the EMP.

- RGGI will develop a cap-and-trade program to help finance changes in energy efficiency and renewable energy.
- Energy Certificates Trading
- Outreach and Education
- Energy Stars
- Zero Energy Building
- United States Green Building Council
- LEED
- Solar Systems is a successful program. The program started with installing 6 systems in 2001 and has installed over 1,000 in 2006.

### **2001 - 2005 Energy Efficiency Programs for Residences**

- Renewable Energy Portfolio Standard - the supplier must have a certain amount of renewable energy in the portfolio that is being sold. To meet compliance, the NJBPU issues a certificate for the megawatt that is generated by the renewable energy system. The certificate can be sold on the market for the value of the "greenness". We have turned that attribute of that green electricity into a value.
- Home Energy Analysis - NJBPU sponsors a home audit system that certifies contractors by the Building Performance Institute to work with homeowners to identify sources of energy loss and recommend improvements. The NJBPU website offers advice on saving energy in the home and rebate information.
- Home Performance with Energy Star is concerned with existing buildings. NJBPU is developing financing systems through utilities to help finance upgrades in energy efficiency.
- Warm Advantage/Cool Advantage Program provides rebates and promotions for energy efficient heating, cooling, and central air conditioning in homes.
- Home Energy Star Program provides incentives for energy efficient construction. Developers can get rebates for building significantly above the current energy code.
- Comfort Partners Program is for low-income citizens. NJBPU will pay 100% of any cost-effective upgrade in a low-income home. The program averages about 6,000 customer upgrades per year. Customers save an average of 200 dollars on their energy bill.
- Smart Start Buildings Program provides technical assistance and incentives for new and retrofit efficiency upgrades for commercial office buildings, industrial facilities, schools, hospitals and government building owners. NJBPU has worked with over 2,000 businesses on an annual basis.

- Combined Heat and Power Incentive provides incentives up to 30% to purchase and install various types of small (up to 1 megawatt) combined heat and power operations.
- Up Front Incentive for Commercial Businesses programs works with the businesses to develop their design to raise the efficiency above grade. This program works in the design phase so changes can be made prior to the developing phase of the project.
- Custom Measure Program - if a prescriptive remedy does not fit the project, NJBPU works with the commercial customer in retrofitting their project or developing a new construction program.

**These are new NJBPU programs:**

- Energy Audit for Municipalities. NJBPU will pay 90% of the energy audit. The audit provides a report with suggestions for cost-effective measures and financing the measures.
- Zero Energy Building, on the commercial/industrial side, examines how to link energy efficiency and renewable incentives in congested areas.

We cannot just set a goal for energy efficiency hoping to meet the required percentage reductions in EO 54. We need to acquire a certain amount of energy efficiency and we want that to occur through utilities or suppliers.

NJBPU recommends the Council look in terms of overall energy goals of the program. If you are going to use energy efficiency as a resource, you need to express that. You need to say legislatively that we put a value on that resource and we want that resource to be acquired in New Jersey. When that is done, you can set up the training program and that energy efficiency portfolio standard.

With the energy efficiency programs NJBPU has in place, we are avoiding a little over 300,000 metric tons of CO<sub>2</sub> annually. To reach the Governor's goal, we need to increase this number by two orders of magnitude. Unfortunately, we will not meet the goal with our current programs. The cumulative avoided emissions over the 5-year time period on the life of those products, is a significant number, but that is still only 2% of that total CO<sub>2</sub> emissions that were emitted during that 5-year time period. To get to the goal, we need to do something drastically different to be able to reach the executive order's numbers. We are willing to work with NJDEP and the Council in helping to meet those goals.

The bottom line is we can get more energy efficiency by increasing the building codes and appliance standards, including combined heat and power, clean distributive generation or renewable energy into the energy mix. On the other hand, we can have

larger transmission lines in New Jersey, pay for out-of-state power plants, and send our energy dollars out of New Jersey to other states.

***Susan Vercheak***

**Deputy Attorney General**

**Chief, Public Utilities Section**

**Division of Law**

**New Jersey Department of Law and Public Safety**

I am here to speak about the overview between the energy master plan and the clean air concerns of the CAC. Governor Corzine has recognized the energy and environmental challenges facing the state. As a result, in October 2006, he announced the start of the process to update the EMP.

The goal of the EMP is to bring disparate pieces together, harmonize the competing interests, and develop a working and implemented master plan for New Jersey. The plan is examining a variety of components, including energy efficiency, and codes for appliances and buildings. The NJBPU and the Governor's Office of Economic Growth co-chair the proceedings. All of the agencies, while working together are also working with the public, regulated groups, unregulated groups, and business community. The intent is to make the process as transparent and collaborative as possible.

The plan uses a public and collaborative process. In January 2007, a series of public hearings and meeting with stakeholders were held throughout the state. Since then, there have been many working group meetings held by different agencies. For example, the NJBPU has five working groups studying various components of energy issues.

Various elements related to energy issues are being addressed: building more transmission, building more generation, not building more generation, and avoiding more generation with energy efficiency. Everything is being analyzed with an eye towards the actual cost and the fallout. Everyone in the state who is working on this is committed to the struggle of coordinating the plan and harmonizing our different perspectives to meet the goal.

The draft master plan should be ready by July 2007, followed by public hearings and completing the final plan in the fall.

I emphasize the importance of the clean air component within the EMP goals. The goals are developing and implementing a plan for affordable, reliable and environmentally sound energy in New Jersey.

The New Jersey Energy Master Plan website explains the goals, working groups, schedules, drafts, and the comments and reports which have been submitted. Comments can be submitted through this website.

*Anthony J. Broccoli, Ph.D.*

**Associate Professor**

**Department of Environmental Sciences**

**School of Environmental and Biological Sciences**

**Rutgers University**

I am speaking on this issue because I think that this is the number one environmental issue in the 21<sup>st</sup> century. The effects of increasing gases on our climate are so wide ranging that they will affect everyone. I think, in a coastal state like New Jersey, a state that is very dependent on water resources, both for public consumption and also for the success of our economy, the impacts of climate change will be felt and are probably already being felt.

Measurements show that from the Middle Ages up to the Revolutionary War the GHG content of the atmosphere was very stable at around 280 parts per million. Then we started to burn coal during the Industrial Revolution. After that we burned oil and natural gas, and the levels began to rise. Measurements show that during the time before the Industrial Revolution, the concentration of these gases, never rose much, and were about 280 or 285 parts per million.

At the same time temperatures have been rising. We've had enough thermometers measuring temperatures around the world to have good observations going back to about 125 years. During the period of 125 years, we've seen a rise in temperature, more gradual during the early part of the 20<sup>th</sup> century, some leveling off from the 1940s through the 1970s, in part because of increasing traditional pollutants (not CO<sub>2</sub>, but soot and other forms of industrial pollution).

From the 1970s to the present, there has been a rapid increase in temperatures. We are in territory that the Earth has not seen for at least 650,000 years.

The world's climate scientists have been asked to try to understand the relationship between the increases in GHG and the increase in temperature. We know from fundamental physics that carbon dioxide makes it more difficult for the Earth to emit infrared radiation to space; that is the mechanism that balances the heat that the Earth receives from the Sun. If we make it harder for the longer wavelengths of radiation to be emitted from the Earth into space, that is expected to warm the climate.

Our confidence and understanding of the issue has been growing because we have developed better models for simulating the climate system. It's also become more confident because we have had more data. There has been more time to see the continued increase in temperature consistent with what our models have predicted.

Changes in climate have a lot of potential impacts. A few of those impacts are particularly important to New Jersey, as a coastal state and heavily dependent on water



resources. A lot of property is near sea level. New Jersey's coastal tourism industry is a large part of New Jersey's economy. This real estate is at risk due to sea-level rise.

Global sea level, associated with climate, is rising for three reasons: 1) thermal expansion - warm water takes up more space than cold water; 2) melting of glaciers and ice caps (when ice located on land melts, it raises the ocean level; and 3) melting and calving of big ice sheets covering Greenland and Iceland.

What might happen to New Jersey? Based in part on a study conducted at Princeton University, there is a 50 percent probability of about six-tenths of a meter sea level rise. If that happened, some New Jersey land would be inundated, including part of the Delaware Bay coast and some of the back bays from Ocean, Atlantic and Cape May counties, and a small bit of coastal Raritan Bay.

Other potential effects brought about by climate change are floods and droughts. Paradoxically, global warming brings with it the prospect of both flood and droughts. To understand the reason, think about the hydrologic cycle, the process through which water cycles through our climate system. Water evaporates into the atmosphere, that water condenses in the form of clouds. If cloud droplets get large enough, they turn into precipitation that falls on the land in the form of rain. The rain runs off into rivers, streams, and groundwater, some of which we use for human consumption, the rest flows to the ocean.

If the precipitation is in the form of snow, the snow remains on the land, melts in the spring and fills reservoirs and streams. Climate change has the possibility of increasing both the rate of evaporation and rate of precipitation. Increased evaporation and precipitation may sound like a balance, but it is a global balance. On the local level, that may not always be the case because floods occur when there is a lot of precipitation in a short time period. More precipitation in that same short time period can result in more flooding.

Droughts occur when there is no rain for a long time period and evaporation takes moisture out of the ground. If evaporation is occurring more rapidly, that can lead to more frequent or severe droughts.

If this is the warming we have had so far during the course of the 20<sup>th</sup> century, we will definitely get additional warming, even if we were to stop emitting carbon dioxide today. The reason is that the current climate is not in equilibrium with the amount of GHG that are currently in the atmosphere. There will be a couple of tenths, perhaps as much as four-tenths of a degree of additional warming, even if we stopped emitting CO<sub>2</sub> today, but we are not going to stop emitting CO<sub>2</sub> today. And every molecule of CO<sub>2</sub> that we emit into the atmosphere from today on will have associated with it increased warming.

There are four areas to consider for managing climate change: leadership, mitigation, adaptation, and knowledge.

- Leadership: Raise public awareness of the challenges posed by climate change and the need for society to mitigate and adapt to what we can't avoid.
- Mitigation: Reduce emissions of carbon dioxide and other GHG.  
Develop other energy sources such as solar and wind  
Carbon capture and storage  
Conserve energy
- Adaptation: Increase the resilience of society to climate change.
- Knowledge: Develop a better understanding of the details of future climate change so we can make wise decisions about how to mitigate the effects of climate change and how to adapt to those effects. Enable people to understand what is happening and to understand the connection between the decisions that we make and what our climate future is going to be.

*Kim Knowlton, Dr.P.H.*

**Department of Environmental Health Sciences  
Mailman School of Public Health  
Columbia University**

I will begin by offering my support to the efforts of the New Jersey CAC to investigate the impacts of energy efficiency and conservation on air quality and, by extension, on human and environmental health, which are my areas of study.

As a health scientist, it is important to point out that those policies which support enhanced energy efficiency and conservation measures from fossil fuel combustion will also help control GHG emissions, which has been mentioned here today. These measures will not only help reduce New Jersey's contribution to global warming, but will also reduce fossil fuel combustion that has more direct impacts on the health of New Jersey residents.

My research team at Columbia University and Barnard College has been looking at health impacts that could result from global warming brought down to the local, regional level. Our study region includes the Great Metropolitan New York area, which includes northern and central New Jersey. Our work suggests that heat stress, air quality and pollen could all become more severe problems in this region if the climate continues to warm. These impacts are beginning to be seen now, but will really be felt by our children and grandchildren.

Reducing GHG emissions will also help improve local air quality today and will have more immediate health benefits.

Many sources of GHG, car and truck exhaust, emissions from generating electrical power and other industrial processes are also sources of air pollutants such as fine particulates and chemicals that combine to form lung-damaging ozone in New Jersey. Fuel efficiency

and conservation measures could have local health co-benefits for state residents both now and in the future.

Addressing climate change presents opportunities for positive action. Increasing emphasis and support for energy efficiency and conservation would provide incentive for local entrepreneurs to develop alternate energy technologies and systems.

It is important for New Jersey to be a leader in areas of such local, national and global importance. New Jersey can and should play a leadership role in this critically important issue, which will benefit the health and economic vitality of its residents.

Energy demands largely in this state are from fossil fuel sources. Fossil fuel sources provide most of the state's energy, so not only GHG emissions, but ozone precursors, particulate matter and emissions are some of the things that come from that type of energy that are cause for concern. Climate change largely vis-à-vis health effects is going to not always create brand new health issues, certainly infectious disease is possible and not withstanding, but mostly, it will tend to exacerbate already existing health concerns.

Already urban areas and the building materials within urban areas tend to trap, capture and then re-radiate in the evening hours, heat, preventing the local populations from enjoying the benefits of nighttime cooling.

From what we can see in climate change model projections, frequency and intensity of those kinds of events will tend to increase.

Some of the populations in New Jersey and the Metro area that tend to be most at risk for both heat stress and high ozone air episodes are people aged 65 and older, and people with preexisting cardiovascular or respiratory illnesses.

Ozone is not directly emitted from transportation sources, rather ozone precursors, including volatile organic compounds and nitrogen oxides, in the presence of sunlight and especially at higher temperatures combine to form ozone. Ground-level ozone is a powerful lung irritant, can cause lung damage, and diminish lung function in a wide variety of respiratory and cardiovascular effects. On hotter summer days, ozone production tends to increase.

Studies have been conducted on ground-level ozone. Michelle L. Bell at Yale and her colleagues developed a recent paper taking climate model projections from the 2050s under a relatively rapid GHG emissions scenarios, a set of assumptions, and compared ozone concentrations in mid-century to those of today. In cities in the eastern US there is a 68% increase in the number of eight-hour ozone exceedence days projected by mid-century under this relatively rapid growth of GHG emissions scenario.

I worked on a project Columbia, titled "The New York Climate and Health Project", with collaborators that included global and regional climate modelers, atmospheric chemists and land use modelers. Our study area included much of northern and central New

Jersey. We tried to down scale from the global models; we tried to take a specific local picture of how heat and ozone conditions might change by mid-century. In the projection by mid-century, the 2050s, summer heat-related mortality across the whole study area, the 31-county Metropolitan New York region could double and could triple by the 2080s. This is assuming a relatively high growth emissions scenario, not one of the more modest growth scenarios. Summer ozone-related mortality will increase not only within the urban core counties of New York City proper, but also into New Jersey, upstate New York and Connecticut counties.

We are looking at the question if increased carbon dioxide and increased temperature have been found in certain field studies to enhance pollen production in ragweed, which is one of the main pollen-bearing weed species; and causes allergies. If enhanced carbon dioxide concentrations and temperatures tend to increase pollen production, what impact might that have on health for local population in which asthma prevalence tends to be about twice the national average?

A paper by Baker and Brambeck indicates some of the relationships between pollen quantity production and carbon dioxide concentrations. We are wondering if this may be evidence of some local impact on local emissions. If, indeed, carbon dioxide emissions are prevalent and are sustaining higher level concentrations of CO<sub>2</sub> and if that has an impact on local plant species that bear pollen that affect allergies, this could be cause for concern for our local population.

***Lisa Jacobson***

**Executive Director**

**The Business Council for Sustainable Energy**

The Business Council for Sustainable Energy is a broad-based industry coalition representing the energy efficiency, natural gas, and renewable energy industries. We have a largely United States membership, including power developers, equipment manufacturers, independent generators, green power marketers, gas and electric utilities, as well as several of the primary trade associations in these sectors.

The Council's mission is to expand markets for clean energy products and services, and to support new vehicles to expand these markets through the integration of energy, air and climate change policy. We promote markets and clean energy technology solutions. We work across various local, state, regional, federal and international levels to shape the design of clean air programs and climate change markets. Our niche has been in incorporating a broad set of clean energy technologies into market-based programs.

The main area of focus are the value and benefits of integrating air quality and energy programs, the societal and economic efficiencies of market-based approaches and, specifically, how do you incorporate energy efficiency and clean generation into market-based programs. Our view is that energy efficiency is the quickest, cheapest, and

cleanest way to meet growth and energy demand and to reduce air quality and climate change emissions.

We need to integrate environmental and energy policies because there are multiple benefits and co-benefits of energy efficiency. Energy efficiency programs could save half of the typical costs of the new power sources and one-third of the costs of natural gas. This is significant because it is extremely expensive to site and build transmission lines. Any conversation with the electric and natural gas utilities on air quality and climate change will get into a discussion about price and costs. There is a large concern about increasing cost for natural gas. For every federal dollar spent on Energy Star, the return on these investments is significant and should not be lost. So the environmental benefits of energy efficiency should be recognized, rewarded and given incentives under air quality and energy efficiency programs.

There is a relationship between energy efficiency, air quality and climate change. One of the easiest options is to address emissions and supply and demand side efficiency options are still untapped. Many discussions we have on RGGI, for example, in the northeast or the Clean Air Interstate Rule, just by doing this alone, setting up a cap and then allowing trading, all of a sudden we are going to get benefits in deployment. Well, for energy efficiency, it has got some unique features and we need to look at those when designing such a program. It is crucial that the program design be set in a way that directly rewards energy efficiency. This can be done through set asides and offsets. There is this idea, and it certainly is the same with renewable energy, that if we do a market-based program for air quality or climate change, there is going to be a big increase in deployment of clean energy technologies. Again, renewables, efficiency, and other technologies have their own specific issues, but if they are not addressed directly in the program, the indirect benefits are not going to be that significant. Emissions programs clearly make energy efficiency more attractive. Any time we talk about energy efficiency, more consumers become aware of the opportunity that's presented to them. So public awareness is clearly going to happen. Over time, as deployment happens, we are hoping that costs go down. We certainly have seen that in market segments. Then there is the opportunity to create new financial vehicles. The tension on emissions issues can drive other policy changes. They can increase building code standards, create beyond code programs and address appliance standards, expand consumer rebates and bring up new ideas like energy efficiency resource standard.

Market-based approaches are not just cap-and-trade. They are things such as the renewable portfolio standard that allows for credit trading; things like the energy efficiency resource standard model. There are things that New Jersey is very experienced with, like their NOx trading program and some of the new initiatives that are underway like the RGGI. We believe it's important because the market-based incentives can lower the cost of compliance. When looking at climate change, there is a global potential pool of participants. When looking at air quality, there is more in a local context, but still giving people the option to go for the lowest-cost investment that that will achieve the desired results. We believe they also create over-performance incentives; that is what drives new technology. As I mentioned before, incorporating energy efficiency into

market-based programs has some challenges, but these challenges are not insurmountable. Programs such as RGGI have shown good directions on how to do it.

Supply-side efficiency can be addressed through emissions allocation policies. A cap-and-trade program will limit the number of emissions across a sector, for instance, just the power sector. Then emissions allowances will be distributed on a pro-rata basis or on a historic basis in terms of their emissions or on their generation output. If allowances are distributed based on their generation output, clear driver for energy efficiency can be built. And so utilities are able to make decisions in their planning process that will value energy efficiency because it will get wrapped into their annual emissions and they will need less allowances to generate the same amount of power. It gives an opportunity, again, to value megawatts or energy that is avoided. So again, this is a powerful sign along a large scale to the power sector. Sometimes, though, depending on how a program is structured, like, for example, under RGGI, they set a threshold of facilities that are covered at 25 megawatts. Some of the new clean power that is coming on line, while it's still vital is smaller than that, we need to develop tools to bring that power into the allocation process so they also receive those signals and the financial value of more efficient generation is rewarded. For example, set aside programs that might address small clean generators, maybe 20 megawatts, either combined heat and power or renewables.

Demand-side management has challenges, but these challenges are not insurmountable. We have to understand and look for ways to give those spending their sources the most direct incentive for energy efficiency. One way to do this is through either a set-aside policy or auction revenue under a cap and trade program.

We believe a federal approach is needed, but I would only want to say how important RGGI has been in terms of keeping this on the agenda and making the case that, states can come together and address these difficult and challenging issues, even if just for the power sector. It is not perfect by any means. There are things we would like to see improved or we would like to see a transition toward a federal program; but for now, we are very interested in the precedence that RGGI is setting. Our position does not change if you look at them at the state level or if you look at them at the global level. We think energy efficiency, in particular, needs to be directly incorporated into these market-based programs, not just we will hope that they get indirect benefits down the line, but we need them to lower the cost of compliance.

Do not overlook the importance of public awareness. We need a tremendous amount more to be done in terms of public awareness programs. We need to develop an information campaign to reach the people on television, on buses, through public service announcements to tell them that energy efficiency in a positive way. We should inform them about the benefits they're going to get for their household from energy efficiency and the return on energy efficiency investment and the short time period for payback and then creating the support on a governmental and private sector level to leverage that interest. Some environmental groups funded by the Energy Foundation have started

information campaigns. They are doing very compelling kind of threat-type ads related to climate change from a species basis or a human health basis.

*John Rhodes*

**Director, Energy Savings**

**New Jersey Department of Treasury**

I think you probably have a good sense about our energy problem. We can agree there are serious issues that will have an impact on our environment, economy, and national security.

I see the air quality connection, as it relates to energy, as divided into two pieces. The first piece has a direct and obvious impact, where most people readily acknowledge the connection between energy consumption and the environment and air quality. Motor vehicles are a good example; people can see and smell the exhaust and have an idea it is probably not good for the environment.

Electricity on the other hand is a bit more insidious where the ultimate end user is disconnected from the generation source and, also, from the pollution. It is easy for people to flick a light switch or plug something in without thinking too much about the impact it is having on the environment.

We can recognize what energy conservation and energy efficiency can deliver to us. It can reduce pollution and put a downward pressure on prices. It is all good but solving the problem is not all easy. We need to think about how we are going to make these changes happen. I want to give some examples of how we need to change our thinking, philosophies, and actions.

What is New Jersey doing? Governor Corzine has made it clear with his commitment with EO 11 and 54 to reduce energy consumption, increase efficiency and reduce emissions for all state facilities. I started in December and established the Office of Energy Savings within the Department of Treasury to help implement these directives.

The New Jersey State government consumes over 8 trillion BTU every year throughout all state departments and agencies. We process close to 30,000 invoices annually for energy. We need to evaluate those invoices and extract useful information to manage our use and costs.

Every employee is an energy consumer and needs to think about how they use electricity and operate equipment. State government has over 4,000 buildings, about 300 facilities (some are large campuses), over 12,000 vehicles, and 84 percent of our CO<sub>2</sub> emissions are related to facility energy consumption.

The management strategy we are using is based on Energy Star. The Governor took the first step - commitment. We are analyzing data to determine how we consume energy,

how it is used and misused, ranking the facilities, benchmarking the performance against facilities outside of the State, including the rest of the country, using programs like Energy Star and Portfolio Manager, and developing agency-specific plans. We need to monitor and improve performance, and reward accomplishment. However, there has to be measurable results with a credible and accurate measurement system.

This is a list of some of our initiatives:

1. Forming department energy teams including members of my staff and the large energy-using departments of the State (Human Services, Corrections and Treasury).
2. Reviewing the State vehicle fleet
3. Examining ways to automatically shutdown desktop computers when they are not in use.
4. Evaluating redundant office equipment - individual machines are being used for printing, faxing and copying. Today, one machine can do all of these tasks.
5. Encouraging duplex printing.
6. Analyzing the recycling program to improve the recycling rate for all agencies.
7. Proposing legislation to allow for performance contract performance. The State of New Jersey has procurement restrictions, which precludes the State from using performance contracting as a tool for financing energy efficiency projects.
8. Developing a website that provides energy and conservation information.
9. Developing a plan for early shutdown of lighting in State office buildings, beginning with Department of Labor. This is a no-cost initiative, no capital is involved, and energy consumption can be reduced by 3.5 million-kilowatt hours annually.
10. Raising awareness of employees about conservation practices.
11. Installing lighting retrofits.
12. Installing new, energy efficient chillers.
13. Installing solar power systems. A solar power system has been operating at Fort Dix since June 2005. Two other installations will soon be operating in state government facilities.

***Sue Gander***

**Program Manager**

**Clean Energy-Environment State Partnership Program**

**U.S. Environmental Protection Agency**

USEPA is a proud partner with NJDEP, NJBPU and several other New Jersey organizations and companies on a number of energy and air quality efforts. This includes New Jersey's membership in the USEPA Clean Energy-Environment State Partnership Program that I represent but, also, various Energy Star efforts, the National Action Plan on Energy Efficiency, our Leaders Program, and the Combined E Power Partnership Program.

Today, I would like to share with you how we are working to help advance energy efficiency through these programs and provide ideas to make the energy efficiency and air quality connection.



Energy efficiency can play a broad role in meeting environmental goals and energy system and economic goals. This is a critical time for energy efficiency; there is much momentum driven by a number of needs. There is no one silver bullet solution, but we think energy efficiency offers a lot of promise. Energy efficiency has been providing some benefits such as energy system benefits, environmental and economic benefits, and risk management benefits.

There is a tremendous amount of untapped energy efficiency. One of the benefits is the cost competitiveness of energy efficiency.

A lot of states look to New Jersey as an example. However, there is still more that New Jersey can do, so we should push to do more. We can do more if a number of barriers were removed. We have studied USEPA programs to see how to address those barriers and provide best practice examples of how to provide tools to help quantify and measure benefits and to sponsor collaboratives among the numerous players.

The most recent survey indicates that 65 percent of the public recognizes the Energy Star label or brand. We think this is tremendous. The flip side is that 35 percent need to know about Energy Star, so there is more work to be done.

Eighteen months ago we started, in partnership with the United States Department of Energy (USDOE), the National Action Plan for Energy Efficiency. The work is guided by a group of high level stakeholders. This group has released a report containing these recommendations:

1. Recognize energy efficiency as a high priority energy resource
2. Commit long-term to energy efficiency
3. Communicate the benefits
4. Provide timely and stable source of funding
5. Recommend where policies should be adjusted to align utility incentive to deliver energy efficiency and move from the disincentives where utilities would lose money if they were to invest in energy efficiency.

In response to the needs identified by the leadership group, we are developing a number of additional tools and reports, including one on measurement and verification, and gathering and streamlining the available information.

USEPA is working with some states to advance energy efficiency and other clean energy efforts through the Clean Energy Environment State Partnership Program. The focus of the partnership is to help each of the states identify the clean energy and energy efficient options that make sense in their states and spread the message through the rest of the country. We have developed a Clean Energy Environment Guide to Action, which provides 16 best practice areas.

USEPA was a part of an ongoing initiative with the Ozone Transport Commission (OTC). The OTC is examining high electricity demand days, the peak ozone periods on

hot summer days where there are exceedences in ozone levels. Energy efficiency along with a number of other measures has been recognized as an important part of the solution.

The bottom line is there are a multitude of reasons to pursue energy efficiency. It is important to look at removing barriers, as well as providing incentives. Robust measurement and verification plans are important. The closer we can get to treating energy efficiency as a resource, then the closer we can get to achieving the full potential for the benefit it provides.

***Paul Flanagan, Esq.***

**Litigation Manager**

**Division of Rate Counsel**

**New Jersey Department of the Public Advocate**

I am a litigation manager with the Division of Rate Counsel in the New Jersey Department of Public Advocate. Our charge is to represent ratepayers in matters before various regulatory entities, particularly, the NJBPU, although we do a lot of work at the FCC and the Federal Energy Regulatory Commission. We also work with the PJM and get involved with capacity issues. We are working on the EMP.

We have an energy conservation book available at our website [www.rpa.state.nj.us](http://www.rpa.state.nj.us). It provides a number of conservation tips for clients, ratepayers, and a do-it-yourself home energy audit.

We have said throughout the past year, with the high price of energy after Hurricane Katrina and other hurricanes and the increase of natural gas prices, which also affected electricity prices, that the single best thing consumers can do to lower their bills is to conserve energy.

We have supported those programs the NJBPU has implemented, working on the EMP with utilities and other working groups to try to reduce those peaks. The peak tends to be the worst for air quality, so to the extent we can reduce the peaking issues, it is beneficial for the citizens of the state.

We are concerned about our base load going out of State. This increases the peaking needs, which in turn is bad for the air. There are a number of existing and potential projects where the power from New Jersey is taken, particularly to New York. The problem for New Jersey is when the power is taken out, we need to get additional power from the west, usually from Pennsylvania, which has typically dirtier air and costs more for transmission and upgrades through the PJM.

We have been involved in the EMP, as representative of the New Jersey Public Advocate, on several working groups and participated in developing various reports.

Last week, I attended an energy conference of engineers. A representative from one of the municipalities said only six or seven municipalities have their own master plan for energy efficiency and energy.

With regard to Basic Generation Service Supply, we recommend the Council examine.

1. Currently, the energy for New Jersey is acquired over a three-year period. We believe a longer term would be beneficial because it could reduce costs.
2. Look at the possibility for a power authority, either to acquire plans or to acquire a portfolio of power.
3. Add benchmarks and milestones to make sure we are achieving our goals.
4. There are three key items that need review: cost, reliability, and efficiency. We want to make sure the risk and rewards benefits are available for the ratepayers.

We think overall reductions are helpful and if we can avoid either extending power plants or building new power plants, we think that is beneficial. Our underlying concern is for the ratepayers, who are paying an extraordinary amount of money. We have to make sure the programs in place are effective so the ratepayers receive what they pay for.

***Greg Dana***

**Vice President, Environmental Affairs  
Alliance of Automobile Manufacturers**

We have done a lot to improve efficiency over the years, but we do not get a lot of credit for it. Part of the problem has been the increasing number of vehicles in this country. The number of trucks sold has increased: in the 1970s trucks were 19 percent of the fleet, now they are 50 percent of the fleet. That shows the consumer preference. We cannot control consumer preference; we sell what they want to buy.

As noted in the above statistics, we are primarily selling trucks today. Consumers are choosing to buy sport utilities, pickups, midsize cars, and minivans. Light trucks are 50 percent of the vehicles sold in every state in the nation.

The automakers need to balance consumers' desire for power-generated or power-operated equipment in a vehicle. Air bags are an example of how rates for optional equipment have increased over time on various and sundry optional equipment. Air bags are now mandated 100 percent across the board. These add weight to the vehicle, so part of the balancing equation is how to add weight, improve efficiency and also meet emissions standards.

Vehicle miles traveled have grown about 2 percent per year. If cars are made to be more fuel efficient, people will drive more miles and travel further from their homes.

We have raised efficiency in cars and trucks by 2 percent per year since 1975.

In our manufacturing plants, we have committed to reduce GHG intensity by 2012. Assembly plants are incredibly efficient. That makes sense, because most of this costs

money and plants tend to elect not to spend money. The plant recycles everything they use.

The auto industry invests about 15 billion dollars per year in research and development to try to make products better, more efficient, and cleaner. There are about 200 models that get more than 30 miles per gallon when driven on the highway. Unfortunately, the sales of those vehicles are low. People buy the SUVs and the trucks.

Almost all models now have fuel-efficient technologies. We continue to push advanced technology vehicles. We expect to bring clean diesels back into the market place probably by the 2009 or 2010 model year. We have to meet a tough NOx emission standard to sell them.

Hybrid electric vehicles are available and we continue to work on internal combustion engines and fuel cells fueled by hydrogen.

The Energy Tax bill that Congress passed included incentives for people who bought hybrid vehicles and other advanced-technology vehicles. The incentives have been helpful, because the vehicles are premium priced. If the State of New Jersey wanted to do something to encourage purchases, other incentives could be added to these cars. We are suing the State of California for several reasons over the fuel economy standards they put in place. California estimates the standards put in place would be about \$1,064 per car. We think the number is closer to \$3,000. We are concerned, because unlike emissions, you cannot just put a catalyst on the car to control fuel economy. You can add technology, much of which we have already added to cars to today. We think we will need to make cars smaller and lighter to meet the standards in California. New Jersey has already adopted those standards, so you will probably get fewer models, and lighter cars and trucks than you have today.

We are willing to improve the efficiency of vehicles, but again, we would like a strong national program. We can not afford for each state to set separate standards.

Four of our member chief executive officers testified before the House Energy and Commerce Committee. They stated we would work with Congress on a cap-and-trade program for carbon control, support a strong national program and we support NHTSA handling it because of considerations of confidential business information.

***Paul H. Genoa***

**Director, Policy Development and Deputy Assistant to the President  
Nuclear Energy Institute**

I want to talk about how energy efficiency has led to significant clean air benefits in the United States today.

The Nuclear Energy Institute is the Washington-based policy organization for the nuclear industry. We represent about 270 corporations in twenty nations worldwide and uniquely, we do represent 100 percent of the nuclear power companies in the United

States. We speak for them on regulatory, generic regulatory issues, as well, but we also represent companies that are involved just purely in nuclear technology, research of medical applications and so forth.

What is energy efficiency? One measure of energy efficiency is getting more output from an existing asset. We have excelled in that in this country since 1990. We have 103 nuclear power plants in the United States. We only have about 10 percent of the installed capacity in the United States and yet for almost 20 years we've provided 20 percent of the nation's electricity. Therefore, we're getting a lot of energy out of those plants. Those plants are online continuously. On average in 1990, the 103 plants across the United States produced less than 70 percent capacity factor. In other words, they were operating less than 70 percent of the time they were able to.

There are a number of ways to obtain additional energy from these power plants: retooling (uprates), restarting, re-licensing, pre-licensing, and implementing a smart grid.

What does it mean in terms of air pollution? If you sum up that increase and you realize that because nuclear power doesn't emit GHG, it offsets electricity from a mixture of sources that do.

Another way to get energy efficiency is to get more energy out of those plants. Running the plants harder and longer can get more energy from the plants. Another way is to retool the plants in the routine maintenance to enhance the generators and other components and eke a bit more energy out of every plant. Those are called "uprates". Another way is to restart an asset that was once shut down, as in the Browns Ferry Unit 1. A study was conducted about the feasibility of building a new plant there. The results indicated that refurbishing the old plant and using all new components would be cheaper than building a new plant and with less risk. The refurbished plant will be on line next month, producing an extra 1200 megawatts of capacity, bringing the nuclear fleet up to 104 reactors, about 20 percent.

How else can the additional efficiency be extended or gained out of that investment in those plants? You can extend the life of these plants through maintenance, uprates and re-licensing. Currently, 48 of the 103 plants have already received license renewal to operate for an additional 20 years. Twenty-two plants have announced their intent, 25 plants intend to. Virtually all the plants will approach it and virtually all will receive it. In addition to the restart and the uprates, there are over 30 plants in pre-licensing right now. Virtually all of those, if they are built, will be built in the southeastern United States. Those will be evolutionary plants, upgrades of existing light-water reactors that are used in the United States and used mostly around the world. However, we are working today to develop prototypes for what we call the next generation nuclear plant, which will be a high-temperature gas reactor. It will be a small reactor. It is a process heat machine because it won't necessarily be there for electricity and it won't necessarily be electric utilities that want them. It will provide other opportunities beyond the traditional electric sector. This type of a high-temperature gas reactor can produce hydrogen through several different mechanisms more efficiently and with no CO<sub>2</sub> emissions. That would provide the future with an opportunity to refine petroleum

products, to develop hydrogen-4 fuel cells, distributed energy, and fuel-cell vehicles and so forth.

Energy efficiency can also be obtained by implementing a smart grid that allows electricity to be transmitted more efficiently and smarter so that appliances can turn on and off when they're needed.

There is concern about the waste fuel disposals. All the fuel that has ever been created in the United States is where it was, other than a few minor shipments between plants. Therefore, it is all at the plant within its fuel pool or it's within dry storage containers that have been licensed by the Nuclear Regulatory Commission (NRC). The NRC believes that those dry-storage facilities are safe for perhaps one hundred years so we have time to implement our long-term plan. There has never been any doubt about what the ultimate solution to used nuclear fuel is, it has always been an international consensus of scientific opinion that the geological repositories are the appropriate option. In the United States, we have a federal law that has required the development by the USDOE of a repository in Yucca Mountain, Nevada. That repository has been found suitable by the government and Congress has upheld that decision made by the President. It is a controversial issue, the State of Nevada objected, and it was overwritten by Congress, in 2002.

Currently, we are in what you call pre-licensing for the repository. Today there is renewed interest in looking at a new management option that would be in addition to the repository. That's the idea of recycling the energy value out of the fuel and, in doing so, reduce the toxicity and the volume of the remaining waste; that technology has been demonstrated at pilot programs at our national labs, but has never been demonstrated on a full-scale project. It also requires advance reactors to consume this waste material as a fuel and that, while that's promising and should be pursued and there is research and development money going forward, almost \$500 million this year to study that problem, it would not be available while we are alive. Maybe in 2050 that level of implementation will be available.

There is sufficient uranium around the world to support a revival until that time. In addition, the waste is stored where it is and can safely be stored for a long period of time, although there are some decommission projects where it clearly should be moved to a DOE federal facility.

***Frank Felder, Ph.D.***

**Director, Center for Energy, Economic & Environmental Policy  
Edward J. Bloustein School of Planning and Public Policy  
Rutgers, the State University of New Jersey**

The Center for Energy, Economics and Environmental Policy conducts a lot of state-sponsored research, but primarily for the NJBPU, and the NJDEP. We participate in evaluating the New Jersey Clean Energy Program. We do direct evaluation work for ourselves, but we also manage outside experts and consultants and advise that process.

We are doing the modeling and the data analysis for the New Jersey EMP. We also have created a New Jersey energy data center that goes hand-in-hand with the EMP so that we have the metrics in terms of energy distributed emissions, prices, uses; that way the public and experts can have a common consistent force of data so that they can do analyses and program evaluation. We also operate the New Jersey Hydrogen Learning Center. In addition, a few years ago we wrote a very good report on RGGI emission allowances.

The question is how do we decrease the emission of carbon, while increasing our economic growth? The good news is we can have both economic growth and address our GHG concern; in other words, meet the government's targets in 2020 and potentially in 2050, which are very ambitious. So there is no trade-off between GHG and economic prosperity; it is not one or the other.

Now, that doesn't mean it is an easy problem. It doesn't mean there are a lot of bad answers out there. That doesn't mean we don't have to think very hard in order to get to that path or continue on that path. Fundamentally, I believe strongly and our modeling suggests, both numerous other sources, and ours you can do both. This is a really complex problem. I want to provide somewhat of a simple, perhaps simplistic solution to it. If you want to increase economic growth, you reduce the cost of economic growth. If you want to decrease the use of carbon or the emission of carbon, you increase on the margin the cost of carbon. If you do those two things, then we can steer our economy, the state and national economy away from a carbon economy to a less carbon-intense economy. That's very easy for me to say, increase costs here, decrease costs there; obviously, there are political realities.

To recap:

1. We can have both economic prosperity and economic growth, environmental improvements. We can do both.
2. To do this, we need a broad-based response. But there is a major sector of the economy, industrial business, commercial sector of the economy that needs to be brought into that. We need to design policies with the proper incentives. It's just not enough to say we need energy efficiency. Energy efficiency designed wrong can actually make things not as good as you thought they were, but perhaps even worse. So it's not good enough to say energy efficiency is a resource. We need to have long-term solutions that monitor us. We have got to design it right. If we don't design it right we're just spinning our wheels and that won't get us to our two goals of economic growth and reduction of carbon.

If you reduce carbon, you solve a lot of other air emissions problems, as well and perhaps, potentially, some national security issues.

Energy, economic and environmental policy must be coordinated and connected. They have to be integrated and the incentives and the issues have to be thought out across all three sectors.

Finally, there are some real issues with energy efficiency. Energy efficiency is a great tool to achieve many of our means, but we need to do it properly.

Here are two examples to give a better appreciation of the need to design them properly.

Example 1: If you give someone a rebate to install a more efficient air conditioner, they will take that more efficient air conditioner. So instead of buying a new model, they buy the new energy efficiency model. What has happened, on the margin, once they now have this new air conditioner, the cost for them to cool their house is less. So they'll do several things, one is their energy bill has now gone down so they now have some extra income, they will spend that money and perhaps they spend it driving their car further, which may have more CO<sub>2</sub> emissions than the savings of energy efficiency in terms of the air conditioner.

Secondly, instead of keeping their house at 71 or 70 degrees, because it now costs less, they now can keep it one degree cooler than they otherwise would. So what's important, what the key idea is, it is important to raise the cost on the margin of emitting whatever emission you're trying to reduce, whether it's SO<sub>2</sub>, NO<sub>x</sub>, or CO<sub>2</sub>.

Example 2: RGGI caps the amount of emissions, but just for generation units, power plants over 25 megawatts. The cap raises the cost of emitting CO<sub>2</sub> because you need to buy an emission permit, which is a good thing, because on the margin, it directs economic activity away from carbon consumption, carbon emission, and directs it towards noncarbon or less carbon-emission items.

If the policies aren't designed right and people now connect a 5 kilowatt or small kilowatt Honda generator, that's emitting more CO<sub>2</sub> than if they would have bought it from the grid. You've now created a bigger problem.

Therefore, we need to think through these incentives, not only within the behavior of a particular person, but through that industry and then the connection to other energy sectors.

Is there is a solution to some of those pitfalls regarding the rebate issues with appliances? There are various solutions. For a rebate-type framework, you need to adjust this type of rebate, try to provide incentive, do measurement and verification. The energy efficiency portfolio standards solve the incentive problem because for every time a kilowatt-hour of electricity is used, you get so much energy efficiency.

This is the key, on the margin, it raises the cost of using electricity. So when I implement a more efficient air conditioner, I then turn around and spend it by keeping the lights on or don't worry about turning off the computers. I then have to go out and get the corresponding amount of energy efficiency for that increasing use, so that provides that incentive on the margin. The problem is if I then take that money that I save and say, I've saved \$300 a year on my electricity bill, I'm going to upgrade my Ford pickup truck to the super Ford pickup truck now I'm emitting it on the transportation side, which is why it's critical to be comprehensive over all the energy uses, otherwise the programs just won't be as effective as we anticipate.



We need to apply a rigorous economic analysis and understand people's incentive.

RGGI emission allowances should be allocated in part to generation companies based on their ongoing production; in other words, the more you produce, the more RGGI allowances you get. That's a frequent flier mileage program to produce CO<sub>2</sub>. You produce and you keep your coal plant running and you get more allowances. Allowances are the equivalent of dollar bills because you just sell them in the market or you take the economic value of it.

I'm not saying that's a good or bad idea, but unless you trace through those economic incentives, which we did in a small RGGI report, what seems to be a really good idea, we should give allowances to generation manufacturers because they'll go out and pursue energy efficiency. However, if you trace through economics, which requires a couple of hours, we have the "a-hah moment"; this is actually counterproductive, what we thought would result in A is resulting in Z.

There are other examples. Take the renewable portfolio standard, which requires a minimum amount of renewable energy, solar and other types, class 1, class 2. When you marry that with a cap-and-trade program for sulfur dioxide or for carbon dioxide, you can't add the benefits. You can't take CO<sub>2</sub> reductions from energy efficiency, plus the CO<sub>2</sub> reductions due to solar, wind, add them to RGGI, and get a cumulative effect. Why? By increasing energy efficiency or reducing energy demand, you free up allowances on the electricity side, which will then be sold to some other state in the region, to a coal plant or natural gas plant, who will then emit it. So you need to not only get the energy efficiency policies right, but implant them properly in the other policies that we have; otherwise, the benefits won't be as much as we would like.

We have got a lot of stuff to do if we're planning to meet these goals. Unless we align these policies up, the economic incentives and then between them, we will just be reducing the effectiveness of the outcome.

However, if we're going to substantially shift our economy away from carbon dioxide and reduce that anywhere near New Jersey's or other states' goals, we need to use price signals. Voluntary action is admirable and incredibly important. I'm not dismissing it at all, but it won't get us there. It won't get us anywhere near the goals that Governor Corzine has laid out. That being said, we can do it without bankrupting our economy and we can still grow our economy and achieve those GHG and other emission goals.

***William Walsh***

**Director of Corporate Issues**

**PSE&G**

I've heard a lot about master plans today. Electric and gas utilities have been very active participants in the master plan. The Governor has clearly set some very aggressive goals. They really represent a substantial challenge, but when you think of those in the context of climate issues, energy costs, the security and the reliability of energy supplies, I think we need to look at that now. Now, is the time to take that challenge. It will require a fundamental change in the way we look at our electric and gas utilities and the role that you all play going forward.

The electric and gas utility community has contributed something more than 20 ideas throughout the master plan process. They range from advanced metering infrastructure or metering your equipment, which can set the stage for measurements and verification, and to some of these other issues we need to have going forward, energy efficient management. A number of these strategies have some broad support within the electric and gas community, some don't. Some are one company coming up with an idea that other companies may not agree with initially. But, it represents a very broad spectrum for policy makers and those who will make recommendations to policy makers, like the Council. It gives you a sense of some of the new thinking that is out there. My company, PSE&G, is not new to this area. We were the first utility in the country to sign off to a voluntary agreement to reduce our GHG to 1990 levels by the year 2000. We accomplished that. We are currently taking that to the next step, which is to reduce the CO<sub>2</sub> emission rates by 18 percent by the year 2008 from 2000 levels. We are well on track to do that. We've been in support of national legislation that would reduce the electric power emission to 1990 levels. How much are we talking about when we say we want to reduce those levels, CO<sub>2</sub> and GHG to 1990 by the year 2020?

Assuming that the current amount of New Jersey's emissions are around 150 million metric tons, and on a business-as-usual course we would expect that to grow to somewhere around 180 million tons by the year 2020, that would be about a 25 percent reduction. A recent McKinsey & Associates study on global abatement suggests that to get a 25 percent reduction, the carbon cost will be between \$15 and \$30 a ton. Assuming we get there on a gradual course through 2020, the potential impact of the New Jersey economy will be somewhere between \$3 billion and \$6 billion. If New Jersey or even RGGI is going to undertake that program without having participation from other states, and countrywide, then it clearly will potentially have a significant negative impact on the New Jersey economy.

There are things that New Jersey's utilities can do right now to address this issue that won't put us at an economic disadvantage. I am referring to those 20-some ideas that the seven companies have put forth in the master plan process, the metering initiative, which really lets customers see pricing in a real-time situation, reduce their demand and better

control their energy uses and also provide information and education on how to do that. Incentives for energy efficiency programs, transportation and renewables,

We do have some concerns with RGGI, as currently designed. Specifically, if it goes forward as just a regional initiative and we don't have any national program, we're not convinced that we're going to see significant overall emissions because of "leakage"- the likelihood that power will be produced from states to the west of us in the PJM system and even states in the Midwest, which have a dirtier environmental profile than New Jersey's generation, is an issue that we need to address.

So somehow we need to come up with a way to deal with the leakage issue because that will clearly have an impact, not only on our economy, but also on our workforces where we have a competitive disadvantage. New Jersey's power sector, 23 million tons a year represents something like 15 percent of New Jersey's total CO<sub>2</sub> emissions. Nationally, the electric power sector is somewhere in the 40 percent range.

Energy and environment are inextricably linked. We need in New Jersey an integrated approach that is going to develop an infrastructure to enable energy efficiency, conservation, as the first choice for consumers, implement renewable supplies wherever they make sense and ensure a long-term, carbon-friendly central power station source of energy.

Where has PSE&G been on this? We have taken a leadership role in a number of areas, not only education of the public, as well as policy makers, and we've done an awful lot to reduce our own carbon intensity. Since 1990, we have spent through conversions, through natural gas combined cycle, improved nuclear capacity factor, technological upgrades, we've invested more than \$3 billion in our fossil fuel alone; that's since 1990 in New Jersey and elsewhere in the country.

The utilities are uniquely positioned to help invest in energy efficiency, land-side management opportunities, and renewables. Metering infrastructure gets to the measuring and verification issues. This summer will be the second summer we've run a pilot "my power connection", where thermostats are in households and linked directly to the air conditioning units. Depending on the price of electricity in any one hour, the air conditioning thermostat would be raised 5 degrees or 10 degrees or whatever the customer would preprogram. We have seen a number of folks see some interesting savings.

PSE&G signed onto RGGI in an effort to get some national movement. We do have concerns that if a single state or a region even, the RGGI region as comprised now, goes ahead and with the likelihood that we may have a national program in two to three years, we are concerned about what happens when that national program kicks in; will we be able to dovetail national programs into -- or will the New Jersey or RGGI program dovetail easily into a national program; that's really what we need in order to address the leakage issues and really make some significant dent into what is expected to be the increase in carbon.

Why that is important? The New Jersey contribution from electric power sectors is about 23 million tons of carbon. As of January of last year, there were 132 new coal plants on the books for construction in the country. Forty-seven of them are within the PJM power pool area. One of them was in the RGGI region.

The Power Information Administration suspects that by the year 2030, electricity produced from coal will increase by 1.3 billion-kilowatt hours, resulting in 1.1 billion tons, annually, of additional carbon. That's a level of carbon, if these 132 were built, that is 6 times the 2009 RGGI state budget. To say it another way, shut down every source in the RGGI region for six years in order to offset the contribution that's expected from these additional coal plants. The point is New Jersey can't do it alone. RGGI can't do it alone. We really need to get behind the national program so that all these sources will be treated equally.

How might the RGGI issue have significantly higher impacts to New Jersey? New York, a RGGI state, is its own separate power pool. The rest of the New England states are within their own New England power pool. So we have a situation where New Jersey has signed on to a program that impacts not all the generators in the power pool that we operate in and therein lies the issue and the concern. Even RGGI modeling by RGGI staff shows that the level of imports will likely rise, sometimes significantly in some of the models that they've done. This gets to the issue of leakage and how we can possibly deal with that.

We need to be assured that the leadership or the price paid for being the leader on prime issues, like New Jersey is, is not going to translate to some economic incentive for upland states and dirtier power that is going to penalize New Jersey's economy; thereby, possibly negatively impacting operating jobs at New Jersey's plants, generation plants, and also negating a number of construction jobs associated with whatever upgrades would be made at New Jersey facilities.

Are there any proposed solutions out for leakage under RGGI? I think there are a number of solutions. Certainly, we are very much aware of the issue and looking for ways to address it. I have heard ideas of an environmental portfolio standard like we have one for the renewable portfolio standards, where everybody would, essentially, if you're going to sell a kilowatt hour into the State of New Jersey, it has to have a certain profile, you can't exceed X pounds of CO<sub>2</sub> or something like that. I am told that there are ways around the interstate commerce clause issues with respect to that. That's one of a number of ideas that have to be vetted more with stakeholders so that we come up with a solution. I think the number one solution is a national program. If you impose whatever restrictions on everyone, every power generator, everybody knows what the rules of the game are. There is no uncertainty. Businesses will know the rules are not going to change. The businesses will know what they need to do in the next five years. They can now make an investment decision because they know that side of my equation won't change.

## Public Speakers

***Latrell McLean***

### **New Jersey Concerned Citizen**

I want to talk about three companies that constantly affect my life: the Exxon/Mobil plant in Paulsboro, the Sunoco plant on Route 295, and the CCMU (Camden County Municipal Utilities incinerator) plant in Camden. For years the CCMU plant in Camden has been emitting pollution into the air. I don't understand how they can continue to do so and receive only small fines. The same with the Exxon/Mobil company; last summer their debris spilled and came all the way to my house near Woodbury. Their material traveled a long way from Paulsboro to Woodbury.

Will the laws be changed regarding the way the plants react to polluting the air? It disturbs me that the companies caused so much pollution. It also disturbs me that the companies did not inform us about the fine they received and what material was in the pollution deposited on my property.

I would really like to know what spilled from the Exxon/Mobil plant. Is this public knowledge? Is there any public forum where we can attend and ask, "Hey, what actually spilled on my property; what did I inhale?" That is my concern.

I am wondering if they're going to change the law because this information should be available for everybody. We need to know how far the pollution can travel.

***Susan Ruch***

### **East Coast Energy Solutions Hightstown, New Jersey**

I learned that New Jersey has no ethanol plants and no E85 fuel made from corn or sugar to use as an alternative source to fuel our cars. We are one of just ten states in the United States that does not have an E85 dispensing pump to add alternative fuel into our flexible fuel vehicles.

Our dependence on foreign oil and burning fossil fuel is taking a toll on us. The harsh reality is that our dependence on oil is causing serious problems that directly impact our energy security, our national security, our economic security, as well as our environmental security. The life we know will drastically change if we do not start to produce renewable energy, specifically for our cars and trucks. We can offset a significant portion of demand for oil by giving American consumers a choice of automotive fuel.

I have been working with the State to determine how we can reduce our consumption of oil (which is petroleum). We can reduce our oil consumption and reduce our GHG production by using domestically produced fuel from our farmer's fields, whether it is

corn or sugar. Our weak response to energy issues is all the more frustrating, given that alternatives to oil do exist.

If we are going to clean up America's air, we need to start with America's biggest polluter, engine emissions. Now, we already have a renewable portfolio standard to reduce our energy usage of electricity by producing renewable energy from solar and wind power and that's terrific.

We need a renewable fuel standard like they have in other states. Transportation underlies our entire modern economy. The cost of oil affects our businesses, our customers, and consumers.

If every car in the country, converted to E85, we would be able to produce enough biofuel to fuel all of those vehicles. We would be able to grow enough corn to meet the demand for those bio fuels.

***Joanna Underwood***

**President**

**Energy Vision, New York**

I am the president of Energy Vision in New York. This organization was started this year to look at ways to end this country's addiction to oil and transportation.

I spent ten years as president of the Inform organization, working in New Jersey to shape and pass the pollution prevention law based on the research that Inform had conducted. The research was on chemical plants and showed that there was a solution in preventative action, which produced also, the 1990 pollution prevention law, which was the first prevention law in the country.

I am here to talk about another solution to the problem that Energy Vision is looking at and that is transportation. I'm going to talk about the aspect of transportation that generates the most of the health-threatening emissions from vehicles and is a very significant source in GHG production; that is, diesel vehicles, diesel buses and trucks and produce delivery vans. These types of vehicles have the most to do with diesel emissions in this state and the accompanying health impact. It is possible to address the problems in this sector right now.

I would like to present this information to you today: First, what are the fuel choices out there; and, where can they take us in addressing the vehicle emissions and GHG issues. Second, our study of probably the most significant polluting diesel sector in this state and most other states, that is, refuse and recycling trucks, which go up and down every residential street in every community and leave their pollution on every doorstep. They are more polluting and more numerous than transit buses. These trucks are more of a health threat than school buses or produce delivery vans.

There are two fuel sources that I think can take us into a remarkably clean future. Biomethane is a renewable, domestically produced fuel source. The methane that can be captured from landfills, from dairy operations, from agricultural operations, from sewerage plants is an enormous resource. It must be captured looking forward because it is a huge GHG source if it is not captured.

These methane sources need to be captured and, in fact there is an estimate by the USDOE that within the next decade, about 10 billion gallons of this fuel a year can be produced. This would reduce a methane problem and create a clean fuel.

Natural gas is the fuel that is domestically plentiful, and can take us not only to the cleanest vehicles today, but also on a path to hydrogen. It is available through pipeline systems all over this state. It can be used in commercial engines in every light- and heavy-duty engine that is made today, including refuse trucks. It is a fully commercial option and affordable with federal incentives. Once you have a refueling infrastructure, about which I have some recommendations for this state, you cannot only refuel these vehicles, but you can begin to move toward what will be a hydrogen future.

You can take advantage of natural gas combined with biomethane. You can then use the natural gas refueling stations to produce some of the natural gas hydrogen and use a combined high-thane fuel, which is four times cleaner than natural gas. You can then, ultimately, when hydrogen fuel vehicles are ready, use those refueling stations to power hydrogen vehicles.

Energy Vision is looking at the thousands of refuse and recycling trucks in this state located in every municipal area. They are the most concentrated source of pollution. Most of the trucks are very old. Once the trucks go on the road, they never have to change their pollution control practices again. First they are permitted and then they are used until they die. They are very heavy petroleum users, about 2.8 miles a gallon.

When our first report, Green and Garbage Trucks, came out, we found 750 natural gas trucks in the country in 2002. We conducted workshops in about five states at the request of several planning agencies. We wrote another report at the beginning of 2006. Our second survey found the number of trucks had doubled from 750 to 1500. The number of communities using them had doubled from 26 to 57. The trucks were performing well. They were not only massively reducing pollution, but they were reducing the noise in the communities they served, protecting the hearing and the health of the drivers and workers.

Twelve hundred of the trucks are on the West Coast, but the first fleet is on the East Coast, in Smithtown, New York. Smithtown now has 22 new natural gas trucks serving the community. They are being looked at by every community on Long Island and as far away as Quebec.

I suggest this is an opportunity waiting to fall in your lap in New Jersey. You can then look at transit buses and other vehicles.

What is needed in this state is a level of incentives that fully provides a level-playing field for communities that want to buy and use these trucks. There are private-sector companies that will come in and build your refueling structure for you right now.

***Wilbur McNeil***

**Weequahic Park Association**

I will submit my remarks. However, I'd like to present a little history on the Weequahic Park Association. We are a 15-year old grassroots association. We meet weekly and are located one mile west of Newark International Airport and the Port Authority of New York and New Jersey.

We have a serious environmental problem with particulates from the planes, ships, vehicles and Highway 27, Route 22, Route 1, and Route 9. We have been inundated. I have a chart showing that more people die from those particulates in that area over New Jersey than from homicides or auto accidents. I am sure there are no recent or current studies done around Newark Airport to let the community know what's killing them.

**Editor: Suzanne Shannon**



## Glossary of Acronyms

BTU	British Thermal Unit
CAC	Clean Air Council
CCMU	Camden County Municipal Utilities
CO	Carbon Monoxide
CO <sub>2</sub>	Carbon dioxide
EMP	Energy Master Plan
EO	Executive Order
GHG	Greenhouse gas
LEED	Leadership in Energy and Environmental Design - a green building rating system developed by the US Green Building Council.
NJBPU	New Jersey Board of Public Utilities
NJDCA	New Jersey Department of Community Affairs
NJDEP	New Jersey Department of Environmental Protection
NHTSA	National Highway Traffic Safety Administration
NO <sub>x</sub>	Oxides of Nitrogen
NRC	Nuclear Regulatory Commission
OTC	Ozone Transport Commission
PJM	Pennsylvania, Jersey, Maryland Power Pool - it is the electricity control area (the electric grid) for NJ, and all or parts of DE, IL, IN, KY, MC, MI, NC, OH, PA, TN, VA, WV and District of Columbia. PJM insures that there is enough power to meet expected customer electricity demand at all times plus an additional reserve margin above peak demand.
PM-2.5	Particulate Matter 2.5 microns in aerodynamic diameter or less.
PSE&G	Public Service Electric and Gas
RGGI	Regional Greenhouse Gas Initiative

SO <sub>2</sub>	Sulfur Dioxide
SUV	Sport Utility Vehicle
USDOE	United States Department of Energy
USEPA	United State Environmental Protection Agency
VOC	Volatile Organic Compounds

## Clean Air Council Public Hearing History

2006	Indoor Air Quality
2005	Air Pollution—Effects on Public Health, Health Care Costs, and Health Insurance Costs
2004	Fine Particulate Matter in the Atmosphere <ul style="list-style-type: none"><li>• Health Impacts in NJ</li><li>• Need for Control Measures</li></ul>
2003	Moving Transportation in the Right Direction
2002	Innovative Solutions for Clean Air
2001	Air Quality Needs Beyond 2000
2000	Air Toxics in New Jersey
1999	The Impact of Electric Utility Deregulation on New Jersey's Environment
1998	CLEAN AIR Complying with the Clean Air Act: Status, Problems, Impacts, and Strategies
1997	Particulate Matter: The proposed Standard and How it May Affect NJ
1996	Clearing the Air Communicating with the Public
1995	Strategies for Meeting Clean Air Goals
1994	Air Pollution in NJ: State Appropriations vs. Fees & Fines
1993	Enhanced Automobile Inspection and Maintenance Procedures
1992	Impact on the Public of the New Clean Air Act Requirements
1991	Air Pollution Emergencies
1990	Trucks, Buses, and Cars: Emissions and Inspections
1989	Risk Assessment - The Future of Environmental Quality
1988	The Waste Crisis, Disposal Without Air Pollution

1987	Ozone: New Jersey's Health Dilemma
1986	Indoor Air Pollution
1985	Fifteen Years of Air Pollution Control in NJ: Unanswered Questions
1984	The Effects of Resource Recovery on Air Quality
1983	The Effects of Acid Rain in NJ
1981	How Can NJ Stimulate Car and Van Pooling to Improve Air Quality
1980	(October) Ride Sharing, Car – and Van-Pooling
1979	What Are the Roles of Municipal, County, and Regional Agencies in the New Jersey Air Pollution Program?
1978	How Can NJ meet its Energy Needs While Attaining and Maintaining Air Quality Standards
1977	How Can NJ Grow While Attaining and Maintaining Air Quality Standards?
1976	Should NJ Change its Air Pollution Regulations?
1974	Photochemical Oxidants
1973	Clean Air and Transportation Alternatives to the Automobile and Will the Environmental Impact Statement Serve to Improve Air Quality in NJ?
1972	The Environmental Impact on Air Pollution: The Relationship between Air Quality, Public Health, and Economic Growth in NJ
1971	How Citizens of NJ Can Fight Air Pollution Most Effectively with Recommendations for Action
1970	Status of Air Pollution From Mobile Sources with Recommendations for Further Action
1969	Status of Air Pollution Control in NJ, with Recommendations for Further Actions

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