



THIRD MEETING OF THE GOVERNOR'S COMMISSION ON CLIMATE CHANGE

April 22, 2008

College of William and Mary, Tidewater Room, University Center
Williamsburg, Virginia

I. Call to Order

The Honorable L. Preston Bryant, Jr., Chairman, called the Third Meeting of the Governor's Commission on Climate Change to order at 10:00 a.m.

II. Attendance

The following Commission members were present: The Honorable L. Preston Bryant, Jr., The Honorable Patrick O. Gottschalk, Mr. Stephen A. Walz, Ms. LuAnn L. Bennett, The Honorable Donald S. Beyer, Jr., The Honorable Joseph F. Bouchard, The Honorable David L. Bulova, Mr. R. Daniel Carson, Jr., Christine Chmura, Ph.D., The Honorable John W. Daniel, II, The Honorable R. Creigh Deeds, The Honorable Paul Ferguson, Mr. Robert J. Fledderman, Mr. Stuart A. Freudberg, Mr. Felix Garcia, Mr. Dale A. Gardner, The Honorable John H. (Jack) Gibbons, Ms. Jodi Gidley, Mr. William S. Greenleaf, The Honorable Penelope A. Gross, Mr. David A. Heacock, Mr. Robert F. Hemphill, Jr., Ms. Ann F. Jennings, Mr. Michael L. Lipford, Roger Mann, Ph.D., The Honorable Robert E. Martínez, The Honorable Joe T. May, Mr. Tyrone W. Murray, Mr. R. Paul Orentas, The Honorable Kenneth R. Plum, Mr. Michael J. Quillen, The Honorable Ron Rordam, Mr. Harrison B. Rue, Dr. Jagadish Shukla, The Honorable Bruce Smart, Mr. William A. "Skip" Stiles, Dr. Lydia W. Thomas, Mr. Michael S. Townes, and The Honorable Frank W. Wagner.

Those not in attendance were: The Honorable Pierce R. Homer, The Reverend Richard Cizik, The Honorable Ralph S. Northam, and Mr. Oliver A. Pollard, III.

III. Opening Remarks

Chairman Bryant greeted the Commission members, the speakers, and the public.

IV. Approval of Meeting Minutes

The Chairman requested a motion to approve the minutes from the March 27, 2008, meeting. The motion was moved and seconded. The motion carried unanimously.

V. Presentation: Update on the GHG Reduction Goal

*Thomas R. Ballou, Department of Environmental Quality, and
Steve Walz, Senior Advisor to the Governor on Energy Policy.*

Mr. Ballou and Mr. Walz gave a joint presentation regarding the Greenhouse Gas Reduction Goal. The Virginia Energy Plan GHG Goal is a 30% reduction in 2025 Business-As-Usual Energy Use. This goal assumes that the long-term population growth remains steady, a continued improvement in energy efficiency/energy intensity, and the

same fuel mix, noting that each fuel type grows as total energy use grows. The projected emissions growth from 2002 to 2025 based on the DEQ Inventory would be 1.7% per year for the total inventory, 2.7% per year for transportation, and 1.3% per year for other energy sources. The latest comprehensive inventory should be used for the goal. CY 2000 was used to put reduction into historical context.

Dr. Shukla asked if it was within the purview of the Commission to state that a 30% reduction is too modest a goal. Secretary Bryant said that the charge of the Commission is to recommend strategies to meet the goal in Executive Order 59. However, he noted that it was also within the scope of the Commission work to suggest that the goal should go beyond 30%.

Mr. Ferguson asked that members be provided with a list of the targets that have been adopted by other states. Mr. Townes added that the U.S. Conference of Mayors has a set of goals that cities are adapting and asked that this also be provided to Commission members.

VI. Presentations: Voluntary actions undertaken by industry and incentives for such action

A. Climate Change: The Automotive Perspective

Michael J. Stanton, President & CEO, Association of International Automobile Manufacturers

Mr. Stanton said that there is a need to focus on climate change from the automotive perspective. He said that transportation accounts for 32% of manmade greenhouse gas emissions. About 20% relates directly to automobiles and trucks. He said that Miles Per Gallon (MPG) roughly equal CO₂ emissions. An increase in fuel efficiencies will equate to a decrease in carbon dioxide. A short-term approach would include reducing energy usage and the carbon footprint, while a long-term approach (looking towards the year 2050) would be to work towards a 60-80% GHG reduction and low carbon or no carbon energy.

Mr. Stanton noted that hybrid sales have increased from 9,000 in the year 2,000 to over 374,000 in the year 2007. More manufacturers are introducing hybrid models. He said that current oil usage is 85 million barrels a day and is projected to be 120 million per day by the year 2030. The automotive industry is supportive of government policies such as: purchase incentives, exemptions for HOV lane use, support for telecommuting, promoting rideshare programs, subsidies for mass transit, and fueling infrastructure.

Secretary Bryant asked Mr. Stanton to address the three primary motivators for manufactures to voluntarily reduce GHG. Mr. Stanton said those would be customer demand, value to the customer, and fuel efficiency and GHG reductions. He said that the customer bottom line would drive the companies.

Several Commission members expressed concerns about the automobile industry's marketing efforts that encourage consumers to buy bigger cars and drive more. Concern

was expressed that other countries have been able to achieve better gas mileage than that exhibited by the cars sold in the U.S. A need for the auto industry to coordinate with the utility companies on plug-in hybrids was noted.

B. Voluntary Actions Undertaken by Industry and Incentives for Such Action

Paul Loeffelman, Director, Environmental Public Policy, American Electric Power

Mr. Loeffelman addressed voluntary actions taken by American Electric Power, or Appalachian Power Company as the company is known in Virginia. He said that AEP is basically a coal burning utility. As the largest utility in the U.S., about 68% of the energy generated by the company is from coal burning facilities. AEP has two coal burning plants in Southwest Virginia; the remainder of AEP facilities in Virginia are hydroelectric. AEP's long-term CO₂ reduction commitment includes these existing programs: existing plant efficiency improvements, renewables such as wind and hydro, domestic offsets, international offsets, and participation in the Chicago Climate Exchange. Mr. Loeffelman also outlined a number of new program additions.

Mr. Loeffelman said that AEP is the first to announce plans to build two 600+ MW IGCC (Integrated Gasification Combined Cycle) commercial size facilities in the U.S. by the middle of the next decade. AEP will be the first to employ new generation ultra-supercritical call plant in the U.S.

Mr. Loeffelman said that reducing CO₂ emissions will be expensive and that it is important to understand the economic consequences of the choices. He said that it matters how CO₂ emissions are regulated and suggested that setting cap and trading allowances under the cap is most effective and economical method. He suggested that the economic impact of the Lieberman-Warner bill (S2191) presently being debated in Congress would result in a Gross Domestic Product loss of \$151 billion to \$210 billion in 2020 and \$631 billion to \$669 billion per year in 2030.

In response to a question about the extent to which AEP is focusing on energy conservation, Mr. Carson said that the company has invested a good bit of time showing how they will comply with the new standards and how they will meet the 10% energy savings goal and the 40% reduction for energy demand.

VII. Presentations: Industry experience with actions taken by other states and regions to address climate change

A. NAM: The Voice of Manufacturing

Keith McCoy, Vice President for Energy and Resources, National Association of Manufacturers

Mr. McCoy noted that manufacturers use about 30-35% of the energy in this country. He noted that concern regarding natural gas is from the cost standpoint. While coal remains

the largest source of electricity generation, natural gas is required for some manufacturing processes, including things such as the development of plastic bottles.

Mr. McCoy said practical strategies for reducing global GHG include: using cost/benefit analysis before adopting policies, reducing the cost of U.S. energy investment through tax code improvement and incentives for non profits, increasing research and development for new technologies to reduce energy intensity, capturing and storing carbon, developing new energy strategies, and promoting nuclear power for energy.

B. Dominion: Climate Change Perspective

Pamela Faggert, Chief Environmental Officer, Dominion

Ms. Faggert said that numerous pieces of proposed federal climate change legislation have been introduced, yet it is still not clear that any proposal will pass the current Congress. She said that Dominion supports federal legislation that: regulates greenhouse gas emissions economy-wide, establishes a cap and trade regulatory approach, sets a realistic baseline year and schedule of compliance, promotes technology development, and includes a safety valve to protect customers. She said the Dominion strategy is to meet the need with three major tools: conservation and efficiency, renewable generation, baseload and intermediate generation and other infrastructure improvements. Climate change is a global issue and requires a consistent national approach as well as international efforts. Regional and state efforts should work in tandem with a consistent national approach.

VIII. Presentation: Major Simulation of Sea Level Rise Impacts on Downtown Norfolk Virginia Modeling and Simulation Center

*Chris Mang, Joint Interagency Multi-National Concepts
Lockheed Martin Simulation, Training and Support*

Mr. Mang gave a presentation of technology using Light Detection and Ranging (LIDAR) and topographic maps that projected the impact of a rise in sea level. The maps showed areas in Hampton Roads and where the projected water level would be in such an event. This information was developed as part of a hurricane simulation. He said that the key to understanding the simulations was the input of correct data that includes the locations of buildings and roads as well as land elevation. He noted that there were more accurate models being developed by VIMS, ODU, and NOAA. This data is useful from the preparedness perspective.

Ms. Jennings asked if the only area available for this type of data was the Hampton Roads area or if it was also available for the Eastern Shore and Northern Neck. Mr. Mang said similar graphics could be developed for any area with the appropriate data input.

Mr. Stiles said that the LIDAR data is currently available only for Poquoson, Alexandria, and Virginia Beach. It would cost approximately \$5 million to map the entire state, as the cost is roughly \$100 per square mile. He said to put that cost in perspective, the City of Norfolk spent \$4.5 million razing houses following Hurricane Isabel.

IX. Presentations: Predicted Impacts of Climate Change on Coastal Virginia and the Chesapeake Bay**A. Physical, Geological and Biogeochemical Processes**

*James E. Bauer, Ph.D., Professor of Marine Science,
Virginia Institute of Marine Science*

Mr. Bauer said that the Initiative for Coastal Climate Change Research hopes to become leading advisory body on coastal change for state and mid-Atlantic region. Coastal Virginia is one of the most susceptible regions to climate change. The Atlantic Coast, including tidally influenced waters, is roughly 3,300 acres. Regions like the Chesapeake Bay not only have pressures with regard to a rise in sea level, but also pressures from the impact of climate change on land. He presented a summary of historical data on temperature and sea level as well as predictions for future impact of climate change on the Chesapeake Bay. He gave an overview of Hampton Roads inundation estimates under different sea level rise scenarios. He said that the ocean's uptake of excess CO₂ is leading to ocean acidification. Phytoplankton, which form the basis of the coastal food web, are being negatively impacted by ocean acidification, which will affect the rest of the food web.

B. Ecosystems and Living Resources

*J. Emmett Duffy, Ph.D., Loretta and Lewis Glucksman Professor of
Marine Science, Virginia Institute of Marine Science*

Dr. Duffy addressed the likely impacts on ecosystems and living resources. He noted that the average and the maximum annual temperatures of the Chesapeake Bay have increased by more than 1°C over the last four decades. The life cycles of animals and plants are closely tied to temperature. In aquatic systems, springtime is when the water column becomes stratified. Shortly after that, animals wake up and begin to feed. Over the course of the last 40 years, the date of springtime has increased by about three weeks which speeds up the life processes. Another consequence is change in distribution. There will likely be changes to the fish distribution in the Chesapeake Bay. Some of the more southerly species are likely to increase. Major changes have already been seen in waterfowl, partly due to the loss of suitable habitat in the form of underwater grasses. There also will be a decline in the foundation of species. Grassbeds which are very productive in terms of invertebrates and food are disappearing. These plants are important because they make and hold the land at the edge of the sea.

Dr. Duffy noted that biological changes are often non-linear. The threshold of responses may result in sudden "tipping points" between alternative states (*e.g.*, grass v. mud). Changes between states may be difficult to reverse, even when pressures (nutrient loading, fishing) are relaxed. Dr. Duffy said that dealing with continuing change will require explicitly incorporating adaptive management into policy – systematically analyzing and learning from successes and failures, and revising policy accordingly.

Dr. Thomas said that the changes noted are drastic, but they also are occurring at a much faster rate. She asked what would be a reasonable time and cost to address these issues. Dr. Duffy said that the reality is that if everything remained the same, the system was already in trouble.

Ms. Jennings asked if VIMS could address the likely cost to Virginia of the decline of the health of the Bay. Dr. Bauer said that VIMS is working towards having that data and will be releasing a series of white papers in the next few weeks. These will be available on the VIMS website.

X. Presentations: Predicted Climate Change Impacts to Agriculture, Forests and Wildlife Habitat

A. Impacts on Natural Systems

Herman H. Shugart, W.W. Corcoran Professor, Department of Environmental Sciences, University of Virginia

Mr. Shugart addressed the role of Virginia's terrestrial ecosystems in the context of the global carbon system and the possible effects of climate change on Virginia's terrestrial ecosystems. At this time, the natural ecosystems of Virginia are storing some carbon. It is likely that the soils of the Commonwealth also are doing the same. He said that the climate change projections for the Virginia region are not radically different from those in past evaluations over the past two decades. He noted that the IPCC report said, "It is very likely that hot extremes, heat waves and heavy precipitation events will continue to become more frequent." He showed graphics depicting the likely shift in forest distribution if these trends continue. The situation for forests and other natural systems under the climatic changes being predicted in the coming century implies great change. Some ecosystems are more vulnerable than others but none can be expected to be immune.

B. Impacts on Fisheries and Wildlife

Douglas B. Inkley, Ph.D., Senior Scientist, National Wildlife Federation

Dr. Inkley said that the National Wildlife Federation is looking at most of the work they do through the lens of climate change. He said that of the 127 national wildlife refuges in the Southeastern Region, 78% are projected to be no longer in the same biome by the end of the century. There is a projected gross species lost of breeding songbirds of 37%. He said that brook trout are a species that are temperature impaired if the water temperature reaches 70°. As the air temperatures rises, so will the stream temperatures. This will result in a brook trout habitat decline. By 2090, there could be a 40-100% loss of brook trout in Virginia. The total number of waterfowl in the area also is changing. As ponds and lakes to the north no longer freeze over for the winter, waterfowl are migrating shorter distances, if at all. A bird will fly south only far enough to find open water and food. He said that to help wildlife survive global warming, it is necessary to maintain healthy, connected, genetically diverse population; reduce non-climate stressors; control invasive species; restore natural habitats; and fund wildlife conservation.

XI. Presentation: Climate Change and Human Health

Kristie L. Ebi, Ph.D., M.P.H.; ESS, LLC

Dr. Ebi said that across the sectors, little has been done on health with regard to global warming. The level of federal funding is at a minimum on this issue. Health impacts depend on geographic factors, biological sensitivity, and socioeconomic factors that affect the ability to adapt or respond. Health impacts due to climate changes are occurring but are unevenly distributed. Impacts will increase with increasing climate change. She said that mitigation and adaptation are needed now. Since 1980, about 150,000 people globally die per year due to climate change. Changes in temperature have an impact on the infrastructure, and we are not prepared for them. Most impacts will be in low-income countries, but Katrina and the heat wave of 2003 made it clear that no one is prepared. The focus must be on how climate change can impact the ecosystem. A survey from the Environmental Defense Fund notes that most directors of public health believe that change will be a problem, but that they do not have the human and financial resources to address it. There is a need to identify and assess health risks and to monitor and evaluate the changes. Public health adaptation should include reducing exposures, preventing onset of adverse outcomes, and response and treatment.

XII. Roundtable Discussion

Secretary Bryant called for additional comments from Commission members.

- Dr. Rue said there is a need for bold and courageous innovation. He is concerned that industry expects to be regulated or coerced to take action. He said that it was time for the United States to lead in climate change. He said that he would like to see a presentation from the business sector from a more entrepreneurial perspective. Secretary Bryant said that there will be more of a focus in that regard at the next meeting to be held in May at George Mason University.
- Mr. Beyer said that further warming is a reality and that adaptation strategies should be studied by the Commission.
- Mr. Townes said that the industry issue could be characterized as jobs and development vs. addressing a problem that potentially threatens human existence. He said there needs to be a way to address both issues. He suggested that the Commonwealth's goal of a 30% GHG reduction by 2025 should be a minimum. He recommended that the Commission adopt a 2% per year reduction.
- Mr. Smart said that change will not kill industry, but the failure to respond to change would. He said that there are urgent needs for change and suggested that the Commission begin putting together a report.
- Mr. Fledderman said that it appears that adaptability needs to be part of the strategy in moving forward. This will take a lot of planning as well as monitoring and intervention at the state level. He said that from the manufacturing side, he believes the cost of the Lieberman-Warner bill will be much higher. He said that it is important not to put the economy at risk. Mr. Fledderman also stated that greenhouse gas emissions from the industrial sector have already been reduced to

- 1990 levels and that he would provide to the Commission a table showing this reduction (see attachment).
- Mr. Stiles said that there is a need to characterize and quantify net emissions of greenhouse gases, taking into account the carbon that is being stored in Virginia. He said speaking in terms of net emissions would allow agriculture and forestry to be involved.
 - Mr. Greenleaf requested that at future meetings the Commission be educated about utility regulations in the Commonwealth. He said it would be beneficial to know what is in place today in order to make recommendations.
 - Dr. Martínez said that in the areas of expertise, there has not been a lot of treatment with regard to global source issues. He said that he would like to be able to have that information without over burdening the Commission with presentations.
 - Mr. Quillen said that there is data available from the work of the advisory group that assisted in the development of the Virginia Energy Plan. He said that significant progress on energy conservation will require human behavioral changes.
 - Dr. Shukla said it was important not to move too fast. The Commission needs to ask some very important questions. He said that the industry presentations should not be the basis for a clear understanding of the cost and benefits. He suggested an independent review of this question.
 - Dr. Gibbons said that the perception that conservation requires a sacrifice needs to be addressed. He said the Commission should look at what can be done that is bottom line positive.
 - Dr. Thomas said that about 27 states have taken on this topic. There are good ideas in some of the plans that have been put forward. It would be to the advantage of the Commission to get a good sense of what other states are doing.
 - Mr. Bennett said that there is a need to hear from the building industry and asked that there be a presentation at a future meeting.
 - Ms. Jennings said that she would like to see the Commission distill the information and provide this in a condensed format to the General Assembly. She said that she anticipated that the Commission will develop recommendations but that perhaps it would be unfair to expect legislators to react in a very short period of time.
 - Mr. Lipford said that at the previous meeting there were presentations on the right placement of federal action vs. state action. vs. local action. He said that it would be advantageous to come to an agreement of what could be done without regret at the state level. He said that several organizations have invested tremendous resources in coastal habitats and that many of those are at risk.

XIII. Public Comment

At this point of the meeting, the Chairman opened the floor for public comment.

- Elizabeth Smith, Director of the Chesapeake Bay Observing Program said that in order to construct an accurate and reliable forecast, precise information about flood plain elevations is imperative. This can only be found from digital LIDAR.

She said that she strongly supported the acquisition of digital LIDAR for the Commonwealth.

- Robert O. Richardson, a local resident, said that his main concern was that he was only able to be at the meeting because it was held in Williamsburg. He asked for consideration to be given to streaming at least the audio from the meeting onto the Internet.
- James White, a resident of James City County, asked that the Commission keep balance in mind. He noted that the proposed plant in Wise County would provide about 1,000 construction jobs and almost 100 ongoing jobs. He said that it is important to consider health care, but it is also important to recognize that part of Virginia could do well with an infusion of jobs and tax revenue.
- Michael Casaretto said that he was pleased to see the government taking steps to address the greenhouse effect. He said this is a monumental challenge that requires pragmatism. There should be a balanced approach that maintains affordable energy. He said the state should not deny new coal fire plants with environmental controls while still allowing old plants without those controls to continue to operate.
- David Host from the T. Parker Host Shipping Company spoke in favor of the Dominion Hybrid Center in Wise County. He said that coal is the only source readily available for meeting the increased demand. Other energy sources cannot be constructed in time to meet energy demands in the near future.
- Charles Brinley said that he was speaking as an individual but has been associated with the coal business for forty years. He said that 50% of electricity is derived from coal and that coal is not dispensable. But he said that there is a need to significantly improve the way in which it is burned. He said there needs to be assistance to help plants make upgrades financially feasible.
- John Kwapisz from the Virginia Coalition for Common Sense on Climate Change said that the Commission should not rush to decisions until all the pieces of information are gathered. He provided several documents for the Commission's review. He said that most information presented had been based on UN reports, a great many of which are flawed.
- Ellis W. James, a resident of Norfolk, said that the Commission had heard excellent presentations and much of the information shows an intense climate change situation. He said that global warming is one piece of man's footprint. He said that fossil fuels are not the way of the future and suggested that major changes need to be made in habits and energy usage.
- Robin Church, a retired chemical engineer, said that the Commission has quite a challenge to bring the carbon emissions down to where they were in 2000, yet that is not a big enough challenge. She noted that the Kyoto Protocol called for the levels to be brought down to emissions in 1990.
- Randy Randol, a retired nuclear engineer, asked that the Commission not draft a report until all the data is received. He said that unless plants are built the right way they would not survive. He said that with regard to plug-in automobiles the question of impact on the exiting power plants needs to be addressed. He noted that natural gas prices would continue to rise.

- Diane Bell, an employee of Massey Energy Company, said that her company strongly supports the Virginia City Hybrid Center in Wise. She said that coal is important to economic and national security.
- Andon Zebal, a William and Mary student, said that one of the biggest changes the Commission could recommend is not allowing the plant to be built in Wise County. He said instead the funds should be invested in energy savings plans.
- Terrence Elkins said that in terms of transportation systems, gains in emissions all but cancel out the gains in efficiency achieved. He said that the increased transportation emissions are related to urban sprawl. He said that the approach to land use and development should be revised.
- James Douglas, a graduate student at VIMS, said that while the Commission had heard a lot of information about the costs of reducing greenhouse gas emissions that it was just as important to think of the cost of no action. He said that it is important to correlate the production of GHG and the total demand for energy with the total planet population. He said that it is important to address population growth.
- Hannah Weigard, a William and Mary student, asked the Commission to bear in mind the attitudes and interests of young people. Speaking on behalf of the Virginia Young Democrats and the William and Mary Chapter of Young Democrats she said that both groups passed resolutions against the use of coal. She said the groups would recommend a bolder emissions reduction goal to the Governor.
- Russell Burke, a graduate student at VIMS, said that with respect to nuclear power, the models predict only a 30-year extension of oil resources due to the limited reserve of yellow cake uranium. In addition, as noted by Mr. McCoy, the expertise in building and operating nuclear power plants is limited. He said the lack of attention to solar energy was disturbing.
- Joshua Relic, a student, said that ice core drillings in Antarctica have been able to correlate the level of oxygen isotopes with the average global temperature. He said that with regard to the Wise Power Plant that the citizens of Southwest Virginia recommend you not drink the water due to the amount of sulfur. He said the power plant could potentially produce pollution harmful to citizens. He also suggested additional investments in mass transit would be beneficial.
- Eileen Levandowski of the Hampton Roads Sierra Club said that programs and policies that will not only curb emissions but also will provide incentives are very important. She said the Commission should keep local government in mind as partners.
- Timmons Roberts, a William and Mary professor, thanked the Commission for making the opportunity to speak available to students. He said it was important to remember the seriousness of the risk. He said that while adaptation may cost billions of dollars it was wrong just to consider the current costs as the efforts will impact future generations.
- Maria Ivanova, a William and Mary professor, thanked the Commission for meeting on campus. She said that her main points were that change is necessary, change is possible, and that the agents of change, the Commission, were in the

room. She said decisions should be based on competitiveness, leadership, and what is the right thing to do.

XIV. Adjournment

Chairman Bryant thanked William and Mary for hosting the Commission. He reminded members and attendees to monitor the website for updates and additional information. He adjourned the meeting at 6:00 p.m.

Total Carbon Dioxide Emission

(Million Metric Tons of Carbon Dioxide)

	1990	2006	Difference
Residential	953.7	1253.8	+31.4%
Commercial	780.7	1050.6	+34.6%
Industrial	1683.6	1682.3	< 0%
Transportation	1566.8	1958.6	+25%
Electricity	1803.1	2375	+31.7%

Source: EIA