

Governor's Commission on Climate Change

Proposed Findings – Discussion Document

Draft, October 17, 2008

NOTE: This document has been edited to reflect the Commission's discussion on September 10th. Items that have not yet been reviewed by the Commission are highlighted in yellow.

The Commission is mindful of Governor Kaine's charge to us, and we accept his views on certain foundational issues as our starting point. As Governor Kaine stated, the fact global climate change is happening and is largely human-caused is now widely accepted.*

We have used the IPCC's 4th Assessment Report as our reference point on the science of climate change. Governor Kaine also told us that because Climate Change is a global problem, a national solution is needed in order for significant reductions in GHG emissions to be achieved. However, because the effects of climate change on Virginia will be profound, we cannot wait for the federal government to act. We believe that the actions taken by U.S. states can have a significant effect on global GHG levels. The importance of the role of states in addressing climate change is illustrated by the World Resources Institute analysis that the emissions of Virginia, North Carolina and South Carolina are equivalent to those of South Korea or, perhaps more striking, the emissions from 10 Midwestern states are equivalent to those of India.

According to the IPCC, current climate models predict that global mean warming at the end of the 21st century (2090 - 2099) will range from 1.1°C to 6.4°C for various models and various scenarios, and the best estimate for one of the moderate emission scenarios (the so-called A1B scenario) is global warming of 2.8°C. Scientists from George Mason University, VA and Center for Ocean-Land-Atmosphere Studies, Maryland have examined the original IPCC data for the moderate A1B scenario for 15 global models and calculated the twenty-first century warming for Virginia and the adjoining areas (36.5°N-42°N; 73°W-84°W). It is found that the average warming for Virginia and the adjoining areas is 3.1°C and the increase in precipitation is 11%. The average warming for the bottom five, the middle five and the top five models is 2.2°C, 3.0°C and 4.2°C respectively. The warming will be higher for high emission scenarios. It is also found that the average increases in annual mean precipitation for Virginia and the adjoining areas for the bottom, the middle, and the top five models are: 2%, 8% and 24% respectively. (Shukla)

* While we have acknowledged these points as being beyond debate in our deliberations, we have allowed those with a different viewpoint to make their views known to the Commission during public comment periods at our meetings.

In pursuing actions to combat climate change, Virginia is not acting in a vacuum. Indeed, we join 37 other states in preparing a climate change action plan. Based upon these concepts, what we have learned from the experts who have made presentations before the Commission, from our discussions, and from the many external documents we have shared with one another and posted on the Commission's website, we now make the following findings:

Effects on the Built Environment and Insurance

- Sea level rise is a major concern for Coastal Virginia, particularly the highly populated Hampton Roads region. The Chesapeake Bay Program's Scientific and Technical Advisory Committee projects that sea levels in the Chesapeake Bay region will be 0.7-1.6m (2.3-5.2 feet) higher by 2100. Specific impacts will vary by location, depending on changes in land elevation.
- Based on an analysis by RMS (a catastrophe modeling company) [that has been reviewed and approved by OECD](#), Virginia Beach-Norfolk Metropolitan Statistical Area is the 10th largest coastal city in the world in terms of assets exposed to increased flooding from sea level rise.
- Modeling and simulation tools are already being used to improve our understanding of how sea level rise and storm surge may affect certain areas of coastal Virginia. However, the fact that LIDAR (Light Detection and Ranging) elevational data does not exist for most of Coastal Virginia is a major obstacle to the ability to plan effectively for these changes.
- Climate change should be viewed as a threat to national security. Its impacts are likely to exacerbate instability and conflict in many areas around the world. In Virginia, there are several major military installations located in low-lying areas that will be affected by sea level rise and storm surge.
- The continued affordability and availability of insurance for Virginia's landowners is a concern as our climate changes. These effects are already being felt in Coastal Virginia. The frequency and severity of storms in the future are expected to exceed those of the past, and the insurance industry may not have the ability to handle several concurrent events. It is also important to make sure that federal flood insurance programs are not encouraging development in sensitive coastal areas.

Effects on Natural Systems

- Climate change will have a significant impact on Virginia's ecosystems. At varying rates, vegetation ranges are moving from current locations to higher altitudes and latitudes. The effect of this will be that suitable habitat for some species will decline, other species will become extirpated, and others species will become extinct. Climate change will also exacerbate threats already faced by Virginia ecosystems, such as invasive species and pollution.

- The effects of climate change on many of Virginia ecosystem and species will be better understood as more research becomes available. Research and conservation efforts will need to be increasingly focused on managing resources to maintain healthy, connected and genetically diverse ecosystems, and plant, wildlife, and fisheries populations.
- Some of the Chesapeake Bay’s “foundation species,” such as blue crabs, eelgrass and oysters, could decline or disappear as salinity and temperatures continue to increase and weather patterns continue to fluctuate widely from year to year. Foundation species support many other species, so these impacts would be felt throughout the ecosystem.
- Oxygen levels in the Chesapeake Bay are expected to decrease due to increasing temperatures and increasing storm runoff, which will have a negative impact on species like striped bass, blue crabs and oysters. Acidification of the Bay and Atlantic Ocean is also a concern as waters absorb more CO₂.
- Coastal wetlands, a critical habitat for many of the Chesapeake Bay’s plants and animals, are being lost as sea levels rise, and freshwater coastal wetlands are similarly threatened by saltwater intrusion.
- Virginia’s agriculture and forestry industries, as well as commercial and sport fishing industries and park land, will be impacted by climate change. More research to determine specific effects is needed, because the lack of specific information on the impacts hinders Virginia’s ability to adapt and prepare for these changes.
- Virginia’s forestlands sequester approximately 23 million metric tons of carbon dioxide per year. Unless current land conversion trends are reversed, however, this number will decline every year, as Virginia loses on average 27,000 acres of forestland annually to development.

Effects on Human Health

- Climate change is likely to have wide-ranging and mostly adverse impacts on human health. Climate change can affect the health of Virginians directly and indirectly. Extreme weather events (e.g., floods, droughts, hurricanes or windstorms, wildfires and heat waves) can directly affect health through injuries, drownings, or mental health problems. These extreme weather events could lead to compromised water and food supplies, resulting in increases in waterborne and food-borne illnesses. Climate change will lead to the alteration or disruption of natural systems, making it possible for vector-borne diseases (i.e., arthropod-borne diseases such as West Nile virus, malaria, dengue, Lyme disease) to spread or emerge in areas where they had been previously limited or non-existent. These alterations or disruptions could result in the disappearance of some vector-borne diseases by making the environment less hospitable to the vector or pathogen.

Climate change is also expected to increase the incidence of diseases associated with air pollutants and aeroallergens and exacerbate other respiratory and cardiovascular conditions. (Virginia Department of Health)

- Disease surveillance systems are capable of tracking and identifying changes in diseases and illness that might be associated with climate change; however, with the exception of heat-related deaths, establishing causality between these illnesses or deaths and climate change effects will not be possible. (VDH)
- The Emergency Preparedness and Response Program for Virginia is available to address and/or mitigate the impacts of extreme weather events on human health. (VDH)
- Certain groups of people are recognized as being more vulnerable to the health impacts of climate change. These vulnerable populations include the following: children and the elderly, people of low socioeconomic status, members of racial and ethnic minorities, people living in coastal areas and flood plains, and people with pre-existing health conditions and disabilities. (VDH)
- Climate change has potential impacts on human health and quality of life, including but not limited to more frequent or intense hurricanes, vector or water-borne diseases, heat wave and therefore can present a challenge to our collective efforts—both public and private—to keep ourselves and future generations healthy, safe and secure.

General Principles Regarding Strategies

- The Governor's Executive Order 59 (2007) gives a greenhouse gas emission target of 30% below the business as usual. This is equivalent to zero percent reduction in emissions with respect to the 2000 level. This target not only falls far short of IPCC recommendations, it also makes Virginia the only major state which has no plans to reduce emissions from the 2000 level. (Shukla)
- Actions to combat climate change should be chosen in a manner cognizant of their costs with reference to benefits which are measurable and meaningful. Costly recommendations with benefits that cannot be achieved within a Virginia context or which cannot accurately be measured should not be pursued.
- It is not possible to effectively address impacts of climate change without significant public and private investment. Either new funding sources, redirection of existing resources, or both, will be required.
- Strategies that are focused on increasing the capacity of natural carbon sinks are among the more cost-effective ways to abate climate change. Some strategies,

such as conserving land and planting trees and other vegetation also produces a plethora of co-benefits like improving air and water quality, providing habitat for wildlife, assisting in stormwater management, minimizing impacts of sea level rise, producing food and fiber, reducing heat in urban areas, and providing recreational opportunities.

- The three largest sources of GHG emissions in Virginia are electricity generation, transportation, and non-utility uses of fuel in industrial, commercial and residential facilities. Emissions from all of these sources must be addressed in order for our climate-change mitigation efforts to be successful and fair.
- The nation's movement toward a GHG emission-constrained economy represents an opportunity for Virginia researchers, inventors, and investors to accelerate and deploy technologies in the areas of energy efficiency, indigenous renewable and low-emission energy as well as carbon capture and storage.
- Fossil fuels are a significant part of Virginia's current fuel mix. Carbon capture and storage technology offers the potential to reduce GHG emissions while continuing to produce energy from fossil fuels, but this technology is still in development and is not expected to be commercially available within the next ten years.
- As stated in the Virginia Energy Plan, energy efficiency and conservation provide the least costly and most readily deployable energy resource options available to Virginia. It is essential to identify and remove fiscal, regulatory and other barriers to investments in energy efficiency and conservation. Many of the technologies needed to reduce emissions are already available and are becoming more affordable every day.
- According to the US Energy Information Administration, annual per capita energy consumption in Virginia (345 million BTU) far exceeds European countries like the United Kingdom (165 million BTU), Germany (176 million BTU), France (182 million BTU) and Italy (138 million BTU). In California, annual per capita energy consumption is 232 million BTU.
- As stated in the Virginia Energy Plan, demand for electricity is expected to increase by nearly 2 percent per year, which would equal a __% increase by 2025. The plan further states that efficiency and conservation efforts should be accelerated, and that in addition to those efforts, new electricity generation capacity will be needed. How Virginia supplies this electricity will have a bearing on the Commonwealth's GHG emissions. Additional supplies of other energy sources will also be needed to meet growing demand due to population growth.
- While recently-enacted federal fuel efficiency standards will reduce the level of GHGs that would otherwise be emitted by automobiles, if there is a significant increase in vehicle miles traveled, that would mean that transportation emissions

would still grow over time. Regardless, near-term improvements in fuel efficiency, increased fuel costs and concomitant changes in driver behavior can significantly reduce emissions generated from VMT.

- Areas with compact development patterns and readily available transit services have lower vehicle miles traveled per capita than areas with sprawling development and limited transit, while conserving more fields, forests and farmlands. Indeed, areas of compact development generally have lower per-capita energy consumption overall.
- Local governments are the Commonwealth's critical partners in both reducing the level of GHGs and mitigating the impacts of climate change. Localities have authority over land use, zoning, and development decisions, the maintenance and operation of local infrastructure and vehicle fleets, and the enforcement of building codes. The response to climate change will be most effective if mechanisms are in place to properly coordinate between state and local levels of government.
- Virginia does not currently have an institutional infrastructure to monitor impacts of climate change on Virginia, the effects of efforts to reduce GHG emissions, or to make Virginia-specific predictions of the future climate and its impacts.
- Climate change is a global problem that requires a global solution. That global solution is only achievable if the U.S. demonstrates a commitment to reducing emissions and exerts sustained public policy, political, diplomatic, business and technological leadership.
- The Commission anticipates that Congress will enact an economy-wide cap-and-trade program in the next four years. The development of new technology will be accelerated by the market demand created by a cap on GHG emissions.