

FACTS VIRGINIA

A M E R I C A N S E C U R I T Y P R O J E C T

Pay Now, Pay Later: Virginia

Rising sea levels and increasingly frequent flooding have long been a disruptive, costly reality along the Virginian coast. Already, adaptation measures have reached \$1.25 million in just one coastal Norfolk neighborhood.¹

Severe storms, strengthened by climate change,² will likely have an increasingly significant effect on half of the state's land area,³ affecting properties valued at a combined \$129.7 billion as well as 1.5 million Virginians.⁴

Virginia's green job industry is steadily growing, but has much room to expand and much to gain. Investing in nuclear energy, for example, has paid off for the state; the industry currently employs 4,200 people.⁵

According to a new study, a failure to mitigate the effects of climate change could begin to cause serious gross domestic product and job losses within the next several decades. Between 2010 and 2050, it could cost Virginia \$45.4 billion in GDP and over 314,000 jobs.*

**GDP numbers are based on a 0% discount rate. Job losses are measured in labor years, or entire years of fulltime employment. Backus, George et al., "Assessing the Near-Term Risk of Climate Uncertainty: Interdependencies among the U.S. States," Sandia Report (Sandia National Laboratories, May 2010), 141. https://cfwebprod.sandia.gov/cfdocs/CCIM/docs/Climate_Risk_Assessment.pdf (accessed March 23, 2011).*

Admittedly, the effects of climate change, a complex and intricate phenomenon, are difficult to predict with precision. Informed scientific and economic projections, as we have used in our research, however, allow us to see that Virginia faces

significant losses in industries crucial to its economy if no action is taken.

Moreover, data shows Virginians are in a position to benefit from the research, development, and use of renewable energy technologies. Virginia currently

imports more energy than it produces, yet it is home to a wealth of bioenergy, wind and solar resources, which could both compensate and save Virginians money.⁶ Should we fail to take action, Virginia has much to lose.

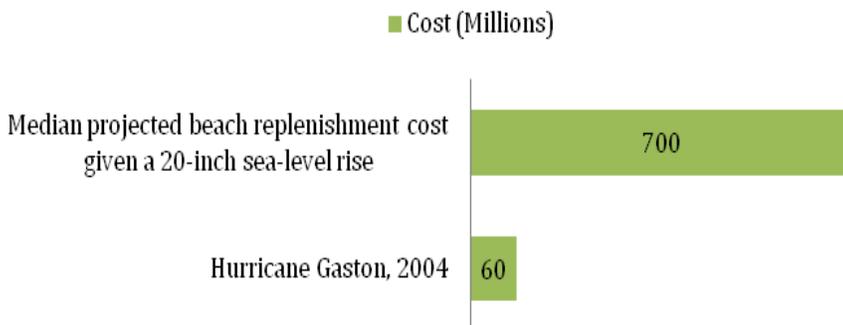
Pay Later: The Cost of Inaction

Virginia is the proud home of the Blue Ridge Mountains and a beautiful Atlantic shoreline, both of which draw thousands of tourists each year. But if the effects of climate change continue unabated, tourism, recreation, and agriculture will be severely affected. Climate change threatens the Commonwealth's economic security.

Severe Storms, Flooding and Costs to the Coast

In June 2009, Wetlands Watch Executive Director William A. Stiles reported that a two-foot rise in sea level along Virginia's coast would have a deleterious impact on the state's wetlands and dunes.⁷ Under a high sea-level rise scenario this could happen as early as 2050. A "hot spot" for rising sea levels, Virginian waters could rise 20-30 centimeters (8-12 inches) under even a low-rise scenario during this time period, or 30-40

Virginian Economic Cost Comparison



Sources: National Wildlife Federation; EDF, Virginia Tropical Storms and Hurricanes

centimeters (12-16 inches) given a mid-level rise in waters.⁸

Climate change is likely to bring stronger hurricanes⁹ to Virginia's coast, potentially affecting half the Commonwealth.¹⁰ An increase in such events—**today, there are twice as many Category 4 and 5 hurricanes worldwide as there were roughly 35 years ago**¹¹—will cost the state an immense amount of money. In 2004, Hurricane Gaston, a Category 1 hurricane originating over the Carolinas as a tropical storm, cost Virginia \$60 million.¹² Hurricane Isabel, the most damaging hurricane of the last 50 years, cost the state \$925 million.¹³

Percent of Virginia Labor Force Projected to be Directly Affected



Source: Bureau of Economic Analysis¹⁴

The threat posed by storm surges and flooding along the 3,315 miles of Virginian tidal shoreline will likely intensify.¹⁵ Popular tourist destinations and residential areas—Virginia Beach, Newport News, and Matthews to name a few—are projected to be significantly impacted.¹⁶ **The Environmental Protection Agency estimates Virginia's beach sand replenishment costs at \$200 million to \$1.2 billion under a 20-inch rise scenario by the end of the century.**¹⁷ This could be highly detrimental to the Virginian economy. In 2008, Virginia Beach brought in \$1.2 billion (6% of Virginia's total domestic travelers' expenditures), supporting 11,900 jobs

in tourist-related industries and \$209.4 million in aggregate income—as well as \$48.7 million for the state and nearly \$47.2 million in local government revenue.¹⁸

Coastal real estate is also threatened. Mid-Atlantic insurance companies have realized the potential for serious losses. **As of June 2009, 55% of the mid-Atlantic insurance market refused to insure businesses and primary residences in the coastal region.** Many industry members believe it will soon become too costly to cover many of these potentially high-risk properties. Some have begun to refuse coverage for vacation homes.¹⁹ One-fifth of the population, 1.5 million people, lives along Virginia's coast.²⁰

Norfolk Woes

Given coastal Virginia's economic dependence on U.S. military bases, climate change poses an even greater threat. Norfolk, home to the world's largest navy base, is a low-lying city situated on the banks of the Chesapeake Bay.²¹ Rising sea levels, which have increased by over a foot since 1930,²² have already begun to affect U.S. Navy operations. Flooding caused by storms and abnormally high tides have covered power lines, caused electricity outages on the base, and halted services to ships. Multi-million dollar adaptation projects are already underway,²³ but a changing climate threatens to interrupt naval readiness.²⁴ Encroaching waters also threaten nearby Langley Air Force Base.²⁵ Hampton Roads is home to the base, and half of its economy is tied to defense spending.²⁶

Looking to make cuts, the federal government could choose to close bases particularly threatened by

climate change.²⁷ In Norfolk, the relocation of one aircraft carrier group to Florida or the Pacific would cost the local economy \$900 million annually.²⁸

A Sportsman's Nightmare

A point of pride to the Commonwealth, the **commercial and the saltwater sport fishing industries generate \$130 million and \$1.2 billion, respectively, each year.** Climate change, however, is likely to significantly harm the ecosystems of the Chesapeake Bay—and the economic benefits it provides the state, not to mention the livelihood of small rural communities.²⁹ Warming and rising waters jeopardize the oyster fisheries³⁰ and the hard shell clam industry as well. If sea levels continue to increase, the roughly \$50 million hard shell clam industry may be permanently destroyed.³¹

The threat posed by storm surges and flooding along the 3,315 miles of Virginian tidal shoreline will likely intensify. Popular tourist destinations and residential areas—Virginia Beach, Newport News, and Matthews to name a few—are projected to be significantly impacted.

The hunting, fishing, and wildlife viewing industries are also likely to suffer. Warmer waters in the Appalachian region could cause trout levels to fall by as much as 61%.³² Within the next 30-80 years, Shenandoah Park's red spruce could lose ground to southern pine forests. Likely to suffer

would be the wildlife-related industries, which, in 2006, generated \$2.1 billion and created nearly 50,000 jobs. Unfortunately, it will be the 3.6 million hunters, anglers, and wildlife viewers who feel the brunt of these changes.³³

Pay Now: Benefits to Taking Action

Virginia has much to gain from renewable energy. In 2007, Virginia set a voluntary renewable standard that encourages utilities to generate 12% (of 2007 base sales) of their energy from renewable sources by 2022.³⁴ Virginia's energy consumption currently exceeds its energy generation, but the state can compensate for this imbalance by developing its renewable energy sector. For example, Virginia currently utilizes only 40% of its offshore wind potential, and 14-20% of its solar power potential, its two most promising renewable energy sources.³⁵ **If the Commonwealth invested \$2.7 billion in the green sector, it could generate nearly 56,500 jobs.**³⁶

Embracing biofuel and landfill gas are two promising options. Virginia has an abundance of the required resources for biomass combustion in particular, including mill and crop residues.³⁷ Each year, 8.7 million tons of biomass—1,700 MW of electricity—are produced and available for energy use.³⁸ Only 2.5% of electricity in Virginia is currently produced from biomass.³⁹

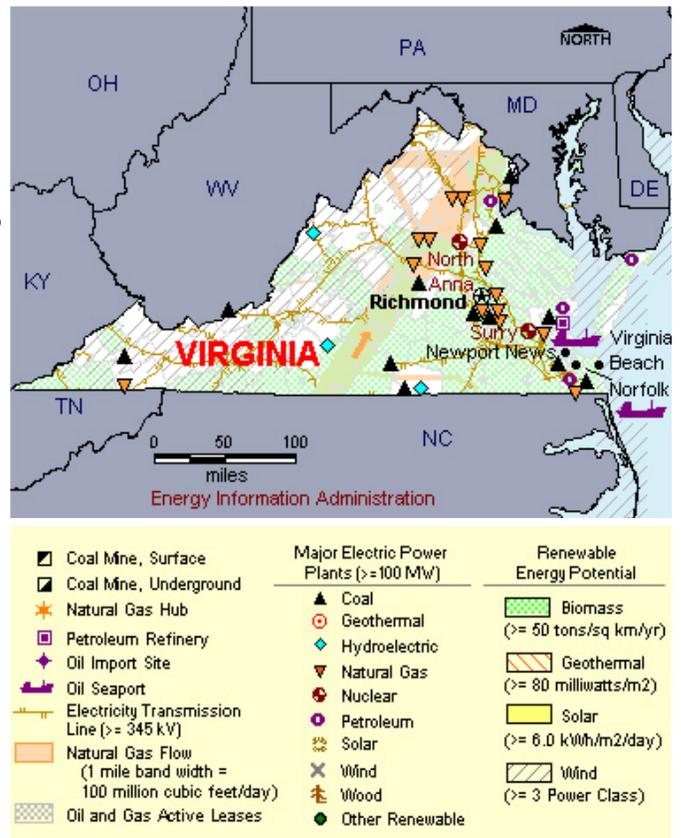
Currently, Virginia is operating at 90% capacity in its use of landfill gas for energy generation.⁴⁰ As trash in landfills breaks down, methane and carbon dioxide are released. Rather than simply burning this gas as many landfills do, some are starting to trap the methane and convert it into useable energy.⁴¹ Virginia has many of these gas sites, several of which are very productive. **The two generators at the Rappahannock regional landfill produce 2.14 MW of electricity—more than enough energy to power 1,300 homes each day.**⁴² Converting waste to energy also reduces greenhouse gas emissions.⁴³

For Virginia, addressing climate change is not about altruism, but rather about protecting the Commonwealth's economy and traditions while seizing the opportunity to create thousands of new jobs.

Conclusion

Virginia must consider action on climate change not just in terms of cost, but in terms of opportunities. If we give Virginia's population, businesses, and investors clear and consistent signals by properly offering initiatives and cultivating demand, investment and innovation in renewable technologies will follow.

Virginians will have to pay for the effects of climate change. The only remaining question is whether they will pay now, or pay later and run the risk of paying significantly more.



(Endnotes)

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