

**A NEW ENERGY ECONOMY
FOR
HAMPTON ROADS**

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Executive Summary

Wind is the fastest growing energy source in the world, and Virginia is poised to capitalize on this trend by developing the first offshore wind facility in the United States. Such a facility would enable Virginia to meet 20% of its electricity demand with competitively priced energy while simultaneously spurring economic development and advancing our nation's energy security.

The Hampton Roads Area of Southeastern Virginia, encompassing Virginia Beach, Williamsburg, and several other cities and counties, is home to nearly 1.7 million people as well as one of the largest military complexes in the world. Hampton Roads is also adjacent to one of the strongest offshore wind resources in the United States. This wind resource is unique on the East Coast in that it harbors all four of the requisite factors for successful offshore wind development: (1) sufficiently shallow ocean depth, (2) strong, steady offshore winds, (3) a suitable onshore power substation in close proximity to load centers, and (4) a state that vigorously supports the wind industry for purposes of domestic energy security and economic growth. With these assets, the Virginia Coast is the most readily developable site for large-scale offshore wind on the Eastern seaboard.

The Virginia Coastal Energy Research Consortium (VCERC) was created by the Virginia legislature to research and develop the technologies and knowledge base necessary for large-scale renewable energy production in Virginia. This multidisciplinary collaboration among universities, state and local government, and industry has determined that offshore wind energy production is a viable solution to help meet the nation's growing energy needs. Indeed, with adequate support, Hampton Roads could generate up to 3,600 MW of installed capacity in Class 6 winds beyond the shore's visual horizon, providing a template for a national expansion of clean, reliable, and secure energy production.

VCERC's analysis and recommendations regarding the policy and financial support needed to advance the development of Hampton Roads' offshore wind potential is further discussed below. In sum, incentivizing wind development through (1) favorable policy at the federal and state levels, (2) access to existing and future Department of Energy (DOE) loan guarantees, and (3) funding of cutting-edge research and development, will position Virginia to become a global leader in marine renewable energy production and significantly advance the United States' clean energy goals.

Background

Currently, the four pillars of the Hampton Roads economy are:

1. National security and Department of Defense-related activities;
2. Ports, port-related activities, and municipal facilities;
3. Waterfront construction and ship fabrication, inspection, maintenance, and repair activities to support defense and port activities; and
4. Tourism (recreation and hospitality).

All four of these industries spring from the ideal geographic location of Hampton Roads. These geographic attributes now provide an opportunity to grow a fifth industry sector:

5. Energy

The Mid-Atlantic region has 70% of the United States' offshore wind energy potential in shallow waters. Because energy already plays a critical role in supporting the first four industries, developing a robust domestic energy industry in Hampton Roads will stimulate economic growth in its own right, and will benefit these existing industries.

More specifically:

1. The Department of Defense (DOD) is a major consumer of electricity and fuels and is under federal mandate to acquire 25% of its electricity from renewable energy sources by 2025, which exceeds the Renewable Portfolio Standards (RPS) established in many states and proposed national renewable electricity standard. More importantly, energy is the lifeblood of our country, and thus achieving energy security is paramount. Developing domestic energy sources in Virginia would drastically reduce our dependence on imported energy.
2. Ports, port-related activities, and municipal facilities (water purification and treatment) are energy intensive, and the commercial viability of these operations would be enhanced by developing domestic renewable energy supplies that are not subject to fossil-fuel price volatility.
3. Ship fabrication and repair activities are also heavy consumers of electricity. Northrop Grumman's shipyard in Newport News is Dominion Virginia Power's single largest customer. Having long-term energy price stability will ensure the long-term profitability of both large and small fabrication and repair yards.
4. Hotels and restaurants likewise would benefit from energy price stability, as well as local, reliable, and clean energy supplies.

Hampton Roads is ideally situated to make a substantial contribution to our nation's domestic energy supply and further expand our economy. The areas that offer the greatest potential for expanded employment and increased economic activity are:

1. Offshore wind power;
2. Offshore development of gas/oil reserves and onshore development of biofuels;
3. Manufacture of nuclear components; and
4. Enhanced energy-related R&D.

This paper focuses on offshore wind power, which has now been the subject of two years of state-funded research by the Virginia Coastal Energy Research Consortium (VCERC), which was created by the omnibus energy legislation that I introduced and which was ultimately passed in the 2006 legislative session of the Virginia General Assembly. This Consortium includes eight state universities, four state government departments, and four industry associations. VCERC serves as an interdisciplinary research and information resource for the state on coastal energy resources, including offshore winds and algae-derived biofuels.

Some of VCERC's key findings in the area of offshore wind are summarized below. Through the vision and cooperation of state leaders from our legislative and executive branches, VCERC's research has provided the framework to move from concept to reality by:

- (A) establishing the technical viability and economic competitiveness of offshore wind relative to fossil fuel generation;
- (B) estimating Virginia's realistic offshore wind energy potential, taking into account other ocean users such as commercial shipping and the Navy; and
- (C) assessing the infrastructure and workforce training requirements to implement a new Hampton Roads offshore wind industry.

State-funded VCERC research has enabled the Commonwealth of Virginia to take a critical first step by paving the way for commercial investment and execution in making Virginia a leader in marine renewable energy. Following a summary of VCERC research results below, the remainder of this paper focuses on critical recommendations for federal action to help Virginia leverage these assets and move forward with large-scale commercial offshore wind development.

VCERC Offshore Wind Research Findings

Offshore Resource Advantage - Some of the most reliable and constant winds that can be found anywhere in the world exist off the coast of Virginia. Winds are classified by a rating system of Class 1 (calm to mild wind) to Class 7 (the strongest). Virginia has vast offshore tracts in close proximity to our shoreline where Class 6 winds are abundant.

VCERC's results indicate that the cost of energy from a new offshore wind project of about 600 MW in rated capacity would be 3 to 4 cents per kilowatt-hour less than energy from a new coal-fired project of similar size, and ½ to 1 cent per kilowatt-hour less than from a new combined-cycle gas-fired project of similar size. This comparison is based on the average prices of coal and natural gas in 2008, and it is highly doubtful that the price of these fossil fuels will remain at 2008 levels during the 25- to 50-year service life of such power plants. Thus, the development of offshore wind provides a hedge against long-term fuel price increases and provides energy price stability, which is key to attracting and retaining all new industries and commercial enterprises in Virginia.

In the ocean area immediately off Virginia Beach, VCERC has identified over 3,600 MW of potential installed capacity in Class 6 wind resources located beyond the visual horizon more than 12 nautical miles offshore. This immediately developable potential occurs in water depths of 15 to 25 meters, suitable for proven monopile foundations, and will not interfere with any naval operations, commercial shipping, or dredge spoil disposal activities. Continuing consultation with other stakeholders will ensure that micro-siting of individual turbines will not interfere with commercial and recreational fishing concerns and will not adversely impact the coastal environment.

Onshore Infrastructure Advantage - Within the City of Virginia Beach, near the oceanfront south of Rudee Inlet, Camp Pendleton substation is capable of accepting offshore power and routing it to Fentress substation, which is the only existing high-voltage (500 kV or higher) substation located in close proximity to the coast between Staten Island, New York and Savannah, Georgia. To develop wind resources offshore to other states, such a facility might have to be built, adding significant additional cost to such a project. Since Virginia already has this substation, it starts with a significant competitive advantage over other regions.

Although Virginia is fortunate to have these two major advantages for potential offshore wind development, federal policy and funding incentives are needed to jumpstart the development of this tremendous resource.

Key Recommendations to Transform Virginia’s Offshore Wind Potential from Research to Commercial Development

Issue 1: Much of Virginia’s offshore wind potential overlaps Navy training areas.

Recommendation: A high-level meeting must occur between the DOD and the Department of the Interior (DOI) to develop a mechanism by which the Minerals Management Service (MMS) and Navy can work together to ensure that offshore commercial leasing activities are synergistic with defense activities.

As mentioned above, DOD has a mandate to obtain 25% of its electrical energy from renewable energy sources by 2025, and offshore wind could satisfy this requirement. VCERC’s lead industry partner, SAIC, has facilitated several mid-level meetings with both Fleet Forces Command and Naval Facilities Command, resulting in an excellent relationship at the operational level, identifying areas for offshore wind development that would not conflict with military training activities in the Virginia Capes Range Complex. VCERC recommends the intra-agency meeting to advance this discussion and formulate a cooperative plan for development of this resource.

Issue 2: The recent MMS offshore renewable energy rule sets forth an 18- to 24-month permitting process before leasing can occur, which means that loan guarantees and grant money authorized by the American Recovery and Reinvestment Act of 2009 (the “Stimulus Bill”) will likely not be available to spur Virginia’s offshore wind projects.

Recommendation: Congress must act to ensure that loan guarantees and R&D funds appropriated to stimulate the economy will be available for a long enough duration to facilitate the development of offshore wind projects and thereby significantly boost the United States economy and energy security into the future.

The Stimulus Bill authorized the appropriation of \$6 billion to guarantee up to \$60 billion of loans for renewable energy projects and contained significant new funding for clean energy research and development. The intent of the Stimulus Bill was to put Americans back to work. Yet unless these moneys are available for a longer period of time, they may not stimulate the development of offshore wind. Although VCERC results indicate that offshore wind costs are less than or equal to comparable new fossil fuel-fired generation, there are risks inherent in the development of any new energy resource, which could be reduced by the federal funding of meteorological, oceanographic, and seabed surveys, as well as extending loan guarantees to the first commercial offshore wind projects.

Issue 3: The vast majority of the renewable energy loan guarantees authorized by the Stimulus Bill will benefit land-based wind projects in the Midwest and utility scale solar projects in the Southwest, at the expense of Eastern coastal states. Furthermore, federal funding for the construction of high-voltage power lines for transmitting large quantities of wind power from the Great Plains and Upper Midwest to the Eastern Seaboard will disadvantage coastal states attempting to develop their offshore wind and other local renewable energy resources (see Appendix A for a letter from ten Governors, including Governor Kaine).

Recommendation: Legislation must be introduced to specifically guarantee up to \$10 billion of loans for commercial offshore wind development on the East Coast and to provide research and development funding specifically targeted at offshore wind. If transmission is to be addressed in federal energy legislation, Congress should focus its attention on regional solutions in existing competitive power markets. In particular, Mid-Atlantic offshore wind must have the opportunity to compete on an even playing field with remote, land-based wind in the Midwest, and not be disadvantaged by transmission subsidies.

Issue 4: The 25-year term of DOI leases is not long enough for a commercial offshore wind project to produce a viable return on investment.

Recommendation: DOI should provide for a 50-year lease term for offshore wind projects. In the interim, a pilot project of 30 lease blocks off the City of Virginia Beach could be leased to the Navy, the Commonwealth of Virginia, the City of Virginia Beach, or a partnership among these entities, for a total lease term of 50 years.¹

Leasing individual 25-year offshore wind projects will create a “boom and bust” effect in the local maritime economy. For example, there are three different companies that have initiated the development of lease prospects in federal waters off New Jersey (Bluewater Wind, Garden State Offshore Energy, and Fishermen’s Wind). These three developers will be competing for the same fabrication and installation services, probably causing a hiring surge. Once these projects are built, however, most of the newly-hired workers will have to be laid off. By contrast, a 50-year total lease period

¹ Most of these blocks lie within the Navy’s Virginia Capes Operating Area and thus the Navy must be engaged as a key stakeholder in the commercial development of offshore wind power within this important military training range.

would permit the staggered and incremental development of offshore wind projects, thereby creating career-length jobs and true learning curve cost reductions.

If the high-level meeting between DOD and DOI recommended under Issue 1 above cannot produce agreement on a way to move forward with transferring lease blocks in off the Virginia Coast for 50-year development terms, then Congress should act to amend the Energy Policy Act of 2005, enabling such long-term development to occur with multiple, serial projects to provide sustainable jobs and economic growth.

Issue 5: DOD has mandated that 25% of its energy requirements will be generated from renewable resources.

Recommendation: Congress should extend the contract term between DOD and renewable power providers beyond what is currently provided in the Federal Acquisition Regulations. An extension of such terms to 30-50 year power purchase agreements would enable renewable energy producers to obtain favorable project financing terms from investors and banks, as well as loan guarantees. In addition, extending the contract period would help DOD to meet its renewable energy mandate.

The Navy also has expressed an interest in offshore wind as a potential resource for meeting its DOD renewable energy goals. Developing just 20 of the 30 total offshore lease blocks, discussed above, at ~150 MW per block would yield 3,000 MW of total installed capacity, which could supply DOD installations throughout Virginia and the Mid-Atlantic.

Issue 6: Further research is needed to demonstrate that wind turbines do not interfere with radar.

Recommendation: DOE, Congress and the State of Virginia should fund research on the impact, if any, of offshore wind turbines on radar signatures. This can be done by compiling results from tests in Europe, particularly in the United Kingdom, which evaluated the effects of wind turbines on a wide variety of radar types, including long-range air traffic control, surface search, air-to-ground, and ship navigation, and determining their applicability to the specific types of radar operated on shore and from ships and planes in Hampton Roads.

Conclusion

Increasing our capacity to harness wind power will decrease our dependence on foreign sources of energy, increase our energy security, revitalize our economy, and mitigate global warming. By addressing the six issues described above, long-term commercial offshore wind development can become a reality off the coast of Virginia. The first turbines can be installed in 2014, and ultimately produce up to 3,600 MW of installed capacity in Class 6 resources located beyond the visual horizon. This would create thousands of new, career-length jobs, attracting the best and brightest to this new energy industry in the Hampton Roads region. The realization of such a long-term offshore wind enterprise would position Virginia to play a leading role in commercial offshore wind development, maximizing green jobs potential in this emerging industry, and provide energy price stability to support the other four major industries in Hampton Roads. At the national level, Hampton Roads would serve as a pilot project for offshore wind development that would help the United States capitalize upon a clean, cost-competitive, reliable, and secure method of domestic energy production.