Summary of Virginia offshore research activities and resources

A baseline synopsis to inform planning and coordination of research efforts, including research associated with DMME research lease applications 1 and 2; the DMME-BOEM ocean survey; and investment of $1 million in the DMME FY14 budget that is to be used “to leverage private and federal funding for increased data gathering to give Virginia an advantage over competing states in attracting the offshore wind industry to Virginia.”

Research and Resources Specific to Virginia WEA

Virginia Offshore Wind Technology Advancement Project (VOWTAP)
Research focus is on innovation and cost of energy reductions. Activities planned include:
- Floating LIDAR
- G&G study
- Metocean data collection

DMME-BOEM G&G study of Virginia WEA and vicinity
- A regional geologic desktop study
- A regional Geophysical Survey conducted along widely spaced ship track lines
- The preparation of a regional geologic and geophysical report that uses the findings from the regional desktop and collected survey data to describe the anticipated seafloor and subsurface conditions in the WEA and 238 research areas.

Possible Add-On opportunity to the DMME/BOEM OR VOWTAP G&G Study
- DMME geologist proposes using a “vessel of opportunity” to obtain bottom sediment grab samples and core samples or sample splits in the WEA and along cable routes for laboratory analysis of mineral content. This would help inform developers and provide valuable information to the DMME Division of Geology and Mineral Resources and BOEM. Since BOEM funds, on average, $30 million per year for scientific studies in the Gulf of Mexico, the Atlantic, the Pacific, and the Arctic, this also may be a way to leverage additional federal funds. Virginia offshore mineral study reports available at http://www.boem.gov/Non-Energy-Minerals/Marine-Mineral-Studies.aspx#Virginia.

NASA Langley Airborne LIDAR Wind Measurement Initiative
- Airborne Doppler LIDAR for three-dimensional (3-D) mapping of Virginia WEA. NASA-Langley researcher Grady Koch obtained internal funding to support Virginia WEA overflights in November 2012. Mr. Koch presented these results at the VOWDA Board meeting on January 17, 2013, which suggest that wind conditions are not necessarily homogeneous in and around the WEA. Both wind speed and wind direction can vary significantly across relatively short distances.
Another set of flights has been internally funded and is scheduled for June 2013. In addition, a one-year proposal has been submitted to the NASA Research Opportunities in Space and Earth Sciences (ROSES) program, in collaboration with Virginia Tech and WeatherFlow, for an expanded work to include:

- more flights spread over the course of a year,
- including overflight of the Chesapeake Light Tower as a “ground truth” observation point,
- the use of LIDAR 3-D maps to further validate the WeatherFlow forecast model

Research and Resources NOT Specific to Virginia WEA

Mid-Atlantic Baseline Studies Project - Biodiversity Research Institute (DOE Funded):

- Satellite tracking of Northern Gannets, Red-throated Loons, Surf Scoters, and Peregrine Falcons (four separate studies by species),
- Two years of boat surveys and high-definition aerial video surveys to obtain data on bird, sea turtle, and marine mammal distributions and densities, and to obtain environmental data,
- Comparison of boat and aerial data to validate accuracy of aerial surveys in WEAs,
- Nocturnal acoustic avian migration monitoring to better understand migration patterns,

HiDef Video Component of the BRI Study above:

- HiDef was selected by the U.S. Department of Energy to undertake an extended program of aerial surveys as part of the federal governments ‘smart from the start’ initiative. The contract award, worth $1.4 million will see HiDef conduct digital aerial several surveys over the lifecycle of the three year award with extensive coverage of areas under consideration for large scale offshore wind farms. HiDef pioneered the use of digital technologies within the environmental permitting space in the United Kingdom in collaboration with various government agencies. The company was the first to apply the technology with The Crown Estate and remain the only company in the world who offer a digital video platform.

- In addition to the BRI study, HiDef has a 12 month contract to conduct aerial surveys for the State of Maryland with their super HD digital video technology. HiDef will analyze sea bird and sea mammal species in state waters for proposed offshore wind projects.

- Additional information on HiDef available at: www.hidefsurveying.com/latest-news/hidef-selected-for-us-department-of-energy-contract.html

Virginia Coastal Zone Management (CZM) Research Initiatives

Whale Migration study off Virginia Coast for Use in Marine Spatial Planning
In an effort to better understand whale activity off Virginia’s coast, the Virginia CZM Program teamed with the Virginia Aquarium and through a national competition for NOAA funds secured a $180,000 grant to conduct whale aerial surveys beginning in October 2012. Spatial data on whales will be added to the MARCO Ocean Data Portal (see below).

Because whales may vary from year to year in terms of the places they use, Virginia CZM has requested from NOAA an additional $180,000 for continued whale aerial surveys that would continue through 2014. Notification on whether their request will be granted is imminent.

In addition to aerial surveys, the Virginia Aquarium, in partnership with Cornell University have used passive acoustic monitoring to gather six months of data in and around the Virginia WEA (June-November 2012) and have identified the spatial and temporal distribution of:

- Several species of Endangered Species Act (ESA) listed whales,
- Multiple fish species e.g. Atlantic croaker, cusk-eel, red and black drum,
- Commercial shipping and fishing vessels with correlating AIS database information.

Additional passive acoustic monitoring would be valuable in helping understand more comprehensively where and when whales are moving in and around the WEA. Passive acoustic monitoring buoys can be used to detect animal vocalizations continuously whereas aerial surveys can only be conducted intermittently and in excellent flying conditions. A project to integrate the Aquarium’s recent aerial data with Cornell’s acoustic data could be useful.

If CZM/Va. Aquarium can prove the validity of the acoustic data by “ground truthing” it with the more expensive to acquire aerial data, and perhaps deploy acoustic monitoring buoys in the WEA, this would add substantially to the knowledge base to ensure protection of endangered right whales and other marine mammals.

Coral survey off Virginia Coast

There exists a need to map coral locations on the OCS to inform all stakeholders, including wind power developers, recreational and commercial fishermen about the location of coral populations. This could inform decisions that might avoid actions that could redirect fishermen using bottom gear into areas with high concentrations of rare cold-water corals, which provide habitat for many fish species.

Fine-Scale Research and Data on Commercial Fishing in Virginia WEA

While Virginia CZM has collected information on recreational fishing in and around the WEA, program managers believe that it is important to better characterize commercial fishing activities in and around the WEA. Although NOAA collects data through a vessel
monitoring system and vessel trip reports, not all fisheries are included in these reports and commercial fishers often believe they are not accurate. A project to collect fine-scale information from commercial fishers could help develop greater trust and rapport with Virginia’s commercial fishers and the data could perhaps be used in fashioning a mutually acceptable plan for commercial fishing in and around the WEA. Through MARCO and the Virginia CZM Program, some work on this topic is scheduled for the upcoming fall/winter 2013/14. However there are minimal resources available from NOAA for this activity.

**Coast Guard Atlantic Coast Port Access Route Study (ACPARS)**

The Atlantic Coast Port Access Route Study Workgroup (WG), chartered in 2011, was given three objectives to complete within the limits of available resources: 1) Determine whether the Coast Guard should modify or create safety fairways, Traffic Separation Schemes or other routing measures; 2) Provide data, tools and/or methodology to assist in future determinations of waterways suitability for proposed projects; and 3) Develop AIS products and provide other support as necessary to assist Districts with all emerging coastal and offshore energy projects.

An Interim report on the ACPARS was published in the Federal Register. The WG determined, given the lack of complete AIS data and rudimentary analysis to date, that recommending even preliminary routing measures is not appropriate at this time. The WG has concluded that modeling and analysis is critical to determine if routing measures are appropriate and to evaluate the change in navigational safety risk resulting from different siting and routing scenarios.

A second interim report is in process and will be followed with modeling and analysis to identify risks associated with modifying traffic patterns and modifying or creating routing measures. BOEM, with technical advice from the Coast Guard, awarded a contract to Pacific Northwest National Labs to develop the modeling and analysis tool which should be available to begin the analysis this summer/fall.


**Other Initiatives, Data Resources, and potential Project Partners:**

RFP for 2014-2016 NOAA Sea Grant program for regional scale research proposals that address priorities of the state programs and the Mid-Atlantic region. Priority topic areas are:

- climate impacts and adaptation
- coupled social-ecological systems science that links social science and natural science research
- land-estuarine or land-sea interactions; or
- Cross-disciplinary, integrative research that analyzes and synthesizes existing data to address major, large-scale issues of relevance to coastal and marine communities. The RFP also seeks to bring together innovative research teams with high levels of integration, demonstration of synergistic benefits, and mechanisms for transferring knowledge to end-users.

**Funding Priorities:**
- Innovative teams and approaches
- Successful proposals will aim for integration/synergies:
  - Integration across disciplines, functions, and expertise
  - Demonstration of synergistic regional benefits
  - Mechanisms for transferring knowledge or findings

- **Virginia Sea Grant amounts total only $70,000 per year for two years.**
- Pre-proposals were due in April, and final Proposals due in July.
- This item is included here as a possible future partnering opportunity.

**DOE – BOEM RFI:** [Environmental Research and Observations at First Offshore Wind Facilities](#)

DOE and BOEM are requesting input through May 30 regarding a research campaign to inform our understanding of offshore wind energy development that could be conducted in the next two to five years during the construction and operation of the first generation of deployed facilities. They aim to quantify the impact-producing factors (i.e. the characteristics of a project that may cause an impact, such as the sound produced during construction) associated with a project and to evaluate the efficacy of monitoring technologies and techniques deployed at offshore wind farms selected at a future date. This RFI MAY lead to a future FOA.

**JMU/WeatherFlow wind speed modeling (pending continued funding??)**

- Online mapping application allows users to view current measured and modeled meteorological conditions along the coast and across the waters of Virginia.
- The intent of this portal is to make this region's wind conditions and related meteorological information publicly accessible. [http://vawinds.timmons.com](http://vawinds.timmons.com).
- This initiative was funded using federal ARRA funds. While there may not be continued funding potential, a positive consequence of that effort is that WeatherFlow was able to develop its offshore wind forecast model to the point that it was able to win an award from CIT’s second round Commonwealth Research Commercialization Fund solicitation for their project titled Development of an Operational Tuned Forecast System for Use in Offshore Wind Energy: [www.cit.org/service-lines/crcf-awards](http://www.cit.org/service-lines/crcf-awards)

**MARCO Renewable Energy Data Page:** [http://portal.midatlanticocean.org/learn/energy](http://portal.midatlanticocean.org/learn/energy)

- The MARCO Portal is an online resource that consolidates available data and enables state, federal and local users to visualize and analyze ocean resources and human use.
information such as fishing grounds, recreational areas, shipping lanes, habitat areas, and renewable energy sites, among others.

- The Portal serves as a platform to engage all stakeholders in ocean planning from the five-state Mid-Atlantic region—putting all of the essential data and state-of-the-art mapping and visualization technology into the hands of the agencies, industry, and community leaders engaged in ocean planning.

**Virginia Coastal Geospatial and Educational Mapping System (GEMS):**

http://www.coastalgems.org/

- Coastal GEMS is a gateway to Virginia’s coastal resource data and maps; coastal laws and policies, facts on coastal resource values, and direct links to collaborating agencies responsible for current data.
- A growing inventory of water and land based natural resources, conservation planning tools, and planning examples that can help us to protect Virginia’s coastal ecosystems.
- A tool to promote community involvement and environmental education.

**The Virginia Institute of Marine Sciences (VIMS):**

Has a legislative mandate to conduct research and provide sound scientific advice concerning issues surrounding use and conservation of marine resources. VIMS activities are not limited to state waters. Research at VIMS extends from the inland watersheds of Chesapeake Bay to the open ocean and from the tropics to the poles. This flexibility may present opportunities to partner on research activities in and around the Virginia WEA that can help inform wind power stakeholders. Click [here](http://www.coastalgems.org/) for VIMS legislative mandate: