MEASUREMENTS OF OFFSHORE WIND RESOURCE OVER MARYLAND FOR
STRATEGIC PLANNING AND DEVELOPMENT OF OFFSHORE WIND ENERGY
PROJECTS

Farrah Daham¹, Graham Antoszewski¹, Daniel Wesloh¹, Scott Rabenhorst¹, Alexandra St. Pe², 
Ruben Delgado³

¹ Physics Department, University of Maryland, Baltimore County,
1000 Hilltop Circle, Baltimore, MD 21250
² Geography and Environmental Systems Department,
University of Maryland Baltimore County, 1000 Hilltop Circle, Baltimore, MD 21250
³ Joint Center for Earth Systems Technology, University of Maryland Baltimore County,
1000 Hilltop Circle, Baltimore, MD 21250

Offshore wind energy promises to be a significant domestic renewable energy source for
costal electricity loads. A database that includes offshore wind resource characteristics such as
wind speed, water depth, and distance from shore needs to be generated to properly determine
the economics and societal benefit of offshore wind resources to the State of Maryland. To
address the need for offshore wind measurements aloft at turbine-rotor heights (100 m), aerosol
and wind lidar instruments were able to provide nearly continuous observations in the lower
troposphere. In particular, these lidar systems were able to measure profiles of key variables in
the Marine Boundary Layer (MBL), such as particle backscatter and wind, with suitable
accuracy and resolution. Offshore lidar measurements were conducted during the Maryland
Energy Administration (MEA) geophysical survey (July-August 2013) aboard the Scarlet
Isabella over the specified Maryland Wind Energy Area (MWEA), 10-25 miles offshore from
Ocean City, MD. Characterization of the MD offshore wind resource was determined with
Doppler wind lidar measurements (40-220 m) to provide high quality measurements of wind
and turbulence profiles above the air-ocean interface. Overall, the wind energy calculated from
measured wind speeds suggests significant potential for offshore power generation in the
MWEA, with an estimated power output calculated at the turbine-rotor height to be 150.2 W/
m², a promising value in assessing the relationship between offshore energy production and the
expected coastal electricity requirement of Maryland. Thus, the practical usefulness of offshore
wind turbines for alternative energy purposes can be concluded while also decreasing
uncertainty and risk regarding potential future wind turbine projects by verifying the estimated
wind speeds of Numerical Weather Prediction (NWP) models.

The Maryland Energy Administration (Contract U00P3400325), Maryland Department of the
Environment (Contract U00P7201032), and NOAA-CREST/CCNY Foundation CREST Grant
(Contract NA11SEC481004) have provided funding support for this research project.

UMBC reserves the right to edit all text to preserve the integrity and conformity of the
conference publication.

Poster 63