

MARYLAND HIGHER EDUCATION COMMISSION

MARYLAND ENERGY ADMINISTRATION



Maryland Offshore Wind Energy Research Challenge Grant Program

Request for Application

Due Date:

Original application due date of April 15, 2013 4 p.m.

EXTENDED to MAY 13, 2013 4 pm

Deliver to:

Melinda Vann
Maryland Higher Education Commission
6 N. Liberty Street, 10th Floor
Baltimore, MD 21201
mvann@mhec.state.md.us

**FY 2013 Maryland Offshore Wind Energy Research Challenge Grant Program
Summary Timetable**

**awarding timeline amended May 8, 2013, updated date in red*

February 1, 2013	Request for Application (RFA) Release
February 28, 2013	Technical Assistance Meeting – to support application development <i>Location:</i> Maryland Association of Community Colleges, 60 West Street, Suite 200, Annapolis, MD 21401 <i>Directions:</i> http://www.mdacc.org/contact.html <i>Time:</i> 1:30 p.m. – 4:30 p.m. <i>RSVP</i> by February 26, 2013 to jharris@mhec.state.md.us
APRIL 17, 2013	<i>Informational Session - featuring Mr. Dirk Scheelje, Chief of Staff of the Ministry of Science and Education of the German State of Schleswig-Holstein. Schleswig-Holstein has a bi-lateral memorandum of understanding with Maryland for collaboration to foster improved clean energy and an improved environment.</i> <i>Location:</i> Maryland Energy Administration, 60 West Street, Suite 300, Annapolis, MD. <i>Time:</i> 12:00 - 2:30 p.m. <i>Lunch provided with the kind generosity of the Heinrich Böll Foundation</i> <i>RSVP</i> by April 15, 2012 to jharris@mhec.state.md.us
MAY 13, 2013 (extended from April 15, 2013)	Application Due, 4 p.m. to MHEC
JUNE 19, 2013	Awards Announced Grant project begins
JULY 22, 2013 (approximate)	First payment issued (50% of award)

FEBRUARY 28, 2014

Interim Narrative and Fiscal Report #1 Due
(progress over first eight months of grant),
Second grant payment (25%) issued pending
report approval

OCTOBER 31, 2014

Interim Narrative and Fiscal Report #2 Due
(progress over first 16 months of the grants),
third and final grant payment issued pending
report approval

JUNE 30, 2015

Grant ends
No new activities or expenditures after this
date are supported by the grant

SEPTEMBER 30, 2015

Final Narrative and Fiscal Report Due
All unexpended funds must be returned

Maryland Offshore Wind Energy Research Challenge



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Maryland Offshore Wind Energy Research Challenge

BACKGROUND INFORMATION

Maryland's higher education institutions are uniquely situated to aid the State and the nation in advancing the understanding of economical and environmentally sound deployment of offshore wind energy. Maryland higher education institutions are invited to submit an application for a one-time research grant to support the deployment of the offshore wind energy industry in the State.

Governor Martin O'Malley is working to position Maryland as an industry leader in renewable energies such as offshore wind. He worked to ensure that the merger of Exelon and Constellation Energy provided commensurate public benefits to Maryland. Among the commitments resulting from that process, a one-time research funding opportunity is made available to Maryland's public two- and four-year higher education institutions for research related to the deployment of offshore wind energy in Maryland. This grant program, administered by the Maryland Higher Education Commission and guided by the technical expertise of the Maryland Energy Administration, aims to harness the vision, expertise and ambition of Maryland's higher education research community by supporting efforts to establish new or enhance existing expertise and capacity in offshore wind energy research, technology development, and deployment. Applicants are encouraged to propose research projects and topics that will be perpetuated and secure a reputation within a niche field of expertise, using additional funding sources beyond the activities of this specific grant funding.

The Challenge

While early offshore wind development efforts are gaining momentum, the first offshore wind turbine has yet to be deployed in North American waters. By contrast, Europe and parts of Asia are already enjoying the economic benefits of massive expansion of the offshore sector, benefitting from over 20 years of experience.

The U.S. Department of Energy (DOE) set a goal that 20% of our nation's energy consumption would derive from wind by the year 2030, as well as a strategy to achieve it (<http://www.nrel.gov/docs/fy08osti/41869.pdf>). States have been quick to move on land-based wind energy initiatives. However, offshore deployment has not kept pace with the goals set forth by the DOE. Technological, logistical, fiscal, and political challenges have been encountered. Continuing uncertainty surrounding the federal budget and thus federal incentives for renewables has encouraged state level policymakers to develop innovative policy approaches to support the development of the renewable energy industry. Maryland, like other states, views offshore wind energy as a positive economic development opportunity associated with supply chain and infrastructure investment, and job creation.

The offshore wind energy sector, in all its phases from research to manufacturing to deployment and operations offers tremendous job creation opportunities for states that

move forward aggressively. This economic activity can have a profound multiplier effect that can benefit other sectors and enhance Maryland's tax revenues. However, to ensure the long-term sustainability of this workforce, Maryland must achieve a first-mover advantage by making strategic early investments in the most economically beneficial sectors of the supply chain. For this reason, many of the states along the eastern seaboard are competing to attract original equipment manufacturers (OEM) of the major components such as the wind turbines, blades, nacelles and towers which in turn will stimulate manufacturing of secondary and tertiary supply chain components.

An offshore wind industry requires significant upfront investment at all stages of development, including geophysical and geotechnical surveys, turbine array planning, foundation and turbine design, commissioning and deployment of installation vessels, development of port infrastructure and superstructure to accommodate heavy loads, or establishment of turbine manufacturing capacity. However, this investment can have a lasting impact on the geographic distribution of economic benefits. States that secure a U.S. turbine manufacturing facility will most likely supply wind farms across a broad region of the U.S. Key turbine component fabrication and assembly are also important drivers of local economic benefit as their workforce requirements can be considerable.

Maryland has many resources it can apply to capture offshore wind economic development benefits. These include a progressive renewable portfolio standard which requires that 20% of the electricity sales originate from a renewable source by the year 2022. Waters in the Atlantic off of Maryland's coast are home to outstanding wind resources and a gently sloping Outer Continental Shelf. Further, the State enjoys a highly proficient work force with skills in many of the relevant technologies, developed from working with many industry sectors including Defense.

Maryland's higher education institutions have an opportunity to move into this promising industry and advance their own research and workforce development programs while adding value to Maryland's offshore wind energy deployment efforts. This proposal is designed to provide financial support to Maryland higher education institutions that seek to play an important role in Maryland's emergence within the U.S. offshore wind energy industry.

GRANT APPLICATION OVERVIEW

Purpose: This grant program specifically supports research projects to address significant issues informing the implementation of offshore wind energy as a means of creating a sustainable clean energy source for the State of Maryland. Applicants will propose projects that specifically support Maryland's offshore wind energy development, complement existing research knowledge and industry expertise, and are not duplicative of currently known research findings.

Eligibility: All Maryland two- and four-year public higher education institutions; consortia of one or more Maryland public higher education institutions; and/or consortia of one or more Maryland public higher education institutions and public higher education institutions from other states, provided that a Maryland institution is the lead institution/principal investigator are eligible to apply.

Award: Awards range from \$250,000 up to \$1,000,000. Three or more awards are anticipated.

Grant Period: **JUNE 19, 2013 – JUNE 30, 2015 (24 MONTHS)**

Priority Funding: Applicants building on existing research and/or who are linking proposed research with other external funding sources for sustained effort will receive priority funding.

Cost Sharing: While no matching institutional contributions are required, applicants offering matching funds will be considered for priority funding.

Research Topics: A diverse array of research areas and thematic projects are suitable for this grant program. Fundable topics, based on the federal Department of Energy (DOE) framework, as well as, additional promising topics are highlighted below. Refer to Appendix 1 for a summary of grant awardees and brief project abstracts of projects using the DOE frameworks/topics listed here.

The DOE research framework for considering projects or research topics includes the seven categories. For a general overview of federally funded offshore wind energy projects see http://apps1.eere.energy.gov/news/news_detail.cfm/news_id=17722

Actual award recipients and funded project summaries are located at: <http://energy.gov/articles/41-offshore-wind-power-rd-projects-receive-energy-department-funding-0>. Fundable topics using the DOE Framework include:

1. Modeling and Analysis Design Tools to Assess Offshore Wind Turbine Technologies including Market Analysis and Barrier Removal
2. Innovative Offshore Wind Plant System Design Studies including Environmental Risk Reduction
3. Manufacturing and Supply Chain Development

4. Transmission Planning and Interconnection Studies
5. Optimized Infrastructure and Operations
6. Resource Characterization and Design Conditions
7. Impact on Electronic Equipment for Marine Environment

Other fundable promising topics include:

8. Developing secondary and tertiary components suppliers for OEMs
9. Optimizing Deployment Facilities and Processes

Refer to Appendix 1 for examples of projects for each of these topic areas.

Application Due Date Extended to May 13, 2013 by 4:00 PM

Deliver one hard copy with original signatures, four hard copies AND one electronic copy (word or PDF) to:

Melinda Vann
mvann@mhec.state.md.us
Maryland Higher Education Commission
Attention: Melinda Vann
6 N. Liberty Street, 10th Floor
Baltimore, MD 21201

APPLICATION FORMAT

General Format Requirements

1. Typed in 12-point Arial, Times New Roman, or a similar font type and size (single-spaced okay); 9- or 10-point font may be used for tables or formulas as long as the type is legible.
2. 8-1/2 by 11-inch pages and one-inch margins.
3. The proposal narrative must not exceed 15 pages. Narrative pages must be numbered. The page limit includes only elements of the proposal narrative, not the cover sheet, abstract, budget, budget narrative, curriculum vitae, resumes, or appendices.
4. All parts of the application must be submitted together, using appropriate forms from Appendix 2. The RFA and application forms are also posted to <http://www.mhec.state.md.us/Grants/index.asp>
5. The original signed copy of the application and four copies must be submitted to Melinda Vann, Maryland Higher Education Commission, 6 N. Liberty Street, Baltimore, MD 21201 by the stated deadline. Electronic copy (PDF or doc) shall be sent to mvann@mhec.state.md.us.

The grant application must include the following components, though no points are awarded for these.

- Application Cover Sheet
- Project Abstract - one page or less single spaced describing the project. Include the project objective (research question/problem to investigate), methodologies, and projected outcomes. The abstract should be suitable for editing for possible press release or publication to MHEC, MEA or other websites.

PROPOSAL NARRATIVE (85 total points, three sections)

The following outline should guide the application narrative describing the project. This outline will also guide the review panel in considering funding for your application. Individual sections do not have point divisions other than what is indicated below. Be sure to label the narrative sections with the headings as indicated below.

Research Question(s) or Problem(s) to be Addressed (25 points)

- Describe the general topic area that that principal investigator plans to address. Explain why this topic was chosen (e.g. the intellectual merit and practical application of the proposed activity). Summarize current related research

findings including citations that support the proposed area of investigation. References should be included in the application appendix.

- Identify the specific research question(s) or problems the project is designed to address; its uniqueness as well as context with other related research, and discuss how the project will address those issues.
- Discuss the broader implications of the research for the implementation of offshore wind energy production off Maryland's coast.

Project Personnel and Institutional Resources (15 points)

This section describes the qualifications and expertise of the principal investigator, key project personnel; and the institutional resources that will support the proposed project. A brief discussion of the principal investigator's research, publication, and project management experience should be included. Identify additional key personnel, their respective roles and responsibilities, and their expertise/qualifications as it relates to the project. Include curriculum vitae or resumes for the principal investigator and all key personnel in an appendix. Include a brief discussion of key personnel's related research and publications that demonstrate their qualifications. Discuss how institutional resources will be attained and managed to support the research team's work. This section should also provide a clear organization structure for managing the project, and demonstrate that the principal investigator and other key staff have sufficient time to conduct the work within the grant period. If funds are requested for personnel, linkages between the narrative and the budget should be evident.

Technical Approach and Operation Plan (45 points)

This section describes the activities that will be conducted to address the research questions or problems identified. The project technical approach and operation plan must contain sufficient detail to show project development, the timeline of events, major milestones, data collection, data management, and the analysis methodology. The principal investigator should indicate what, if any institutional approvals will be secured in compliance with institution specific research requirements (e.g. institutional review boards, scientific review committee).

The Technical Approach and Operation Plan must:

- describe the techniques, procedures, and methodologies to be used;
- describe data collection, data management, and data analysis plans
- describe anticipated results or outcomes
- provide a detailed plan that describes each activity, how it relates to the project, where and how each activity will be implemented and the key personnel responsible for each activity;
- map activities and expected deliverables with clear linkages to the budget;
- provide detailed information about what will be taking place during each activity (when will it take place, how long will it last, etc.);
- establish milestones/benchmarks and a timeline of all project activities;
- discuss the means by which project progress and efficacy will be measured and how often project effectiveness will be examined; and
- discuss how project findings will be shared (e.g. publication, conference presentation).

BUDGET AND BUDGET NARRATIVE (15 points)

The budget and budget narrative must clearly link all project costs including personnel and activities with the technical approach and operation plan. The budget and budget narrative must provide evidence of institutional commitment to the project including the amount of staff time dedicated to the project and any matching cash or in-kind contributions if they are supplementing the project. Indirect cost recovery of up to ten percent of the requested grant funds is permitted. The budget and budget narrative do not count toward the fifteen page narrative limit. The application's budget and cost-effectiveness will be evaluated on the extent to which:

- the budget is adequate to support the project -- it must be clear that all activities are accounted for in the budget;
- the costs are reasonable in relation to the project design and activities;
- the budget complies with the guidelines laid out in this Request for Application;
- there is adequacy of support—including facilities, equipment, supplies, and other resources—from the lead institution and the any other partners identified; administrative costs are kept to a minimum; and
- institutional in kind contribution or matching costs, while not required, are reported where applicable.

Indirect costs may be charged to the grant up to 10% of the total grant award.

Budget Proposal Form

The proposed budget including both requested grant funds and institutional in kind or other institutional contribution must be presented using the form provided in Appendix 2. A copy of the excel document is also posted to the MHEC website at <http://www.mhec.state.md.us/Grants/index.asp>.

Use the same budget categories as indicated on the budget form. Add as many rows as needed to provide a listing of expenditures where "list" is indicated. Report anticipated grant expenditures for year one in the first column (1) and anticipated grant expenditures for year two in column two (2). Column three (3) is the sum of requested grant funds for years one and two. Any institutional in kind or other contribution, if provided, should be reported in column four (4). Column five is the total project cost and includes all grant funds requested in years one and two and institutional in kind or other support.

If well justified, certain project related expenditures made before June 20, 2013 but after May 20, 2013, may be approved for reimbursement through the approved grant budget for any applicant awarded funds through the MOWER grant. This consideration is given since the original timeline for the grant period has been revised after the original RFA was published. An amended budget request to cover such expenses, if not included in the original budget proposal, must be submitted no later than September 30, 2013.

Budget Narrative

The budget narrative is used to explain and justify the proposed grant funding request and in kind or other contribution for the project. It explains the rationale for each line item in the budget and provides specific information about how such costs were computed. Label the budget narrative using the same budget categories in the same order as the budget proposal form. An explanation of budget categories and application expectations follow.

Salaries and Wages

List individually, all key personnel and the requested salary amounts to be funded during the summer and/or academic year by indicating what percent of the individual's annual time will be committed to the project. If effort is committed as an in kind institutional contribution, the value must be noted in column four.

List individually, all support personnel by support category and the requested rate of pay. Support personnel must be clearly justified and may include clerical and graduate or undergraduate assistants. If effort is committed as an in kind institutional contribution, that must be noted in column four.

Estimates of personnel time must be justified in terms of the tasks to be performed. Salaries are to be a function of regular appointment (% time commitment) for the academic year or the summer session(s), if applicable. Salaries cannot be drawn at a higher pay rate than that which the individual normally receives. Information showing how computations for salary or wage project staff should be included (e.g. 20 hours @ \$15 an hour, or 10% of 10 month salary, one course release for each of fall, spring and summer semesters @ \$x,xxx per course release).

Fringe Benefits

Fringe benefits are calculated at the costs normally paid by the institution for the salaried members of its faculty and staff who will be involved in the project. The amount of fringe requested by the grant should represent the percentage of effort in the project. If fringe is paid on wage employees, show how that was computed separately.

Travel

Enter travel costs if necessary for key personnel to conduct off-campus activities. Mileage allowances may not exceed the State's approved rate for mileage reimbursement at the time of travel. Currently this rate is \$0.55 per mile. All travel funding must be specifically designated by place and position, approximate date, distance, and method of travel and be approved in the project budget. No out-of-state travel for conferences may be funded by this grant, excluding travel throughout the Maryland and District of Columbia metro area.

Equipment

Equipment means an article of non-expendable tangible personal property having a useful life of more than one year and an acquisition cost per unit that is consistent with institutional policy. Equipment expenses must be documented with written estimates, invoices, etc. and be purchased in compliance with institutional procurement procedures. Discuss the “life expectancy” of any grant purchased equipment, role of equipment in the project, any maintenance plans if applicable, and how equipment will be used after grant period has ended.

Materials and Supplies

Materials and supplies refers to non-expendable supplies, including but not limited to books, computer software, laboratory or field supplies, and other items necessary for the effective implementation of the funded activity.

Contractual Services

Use of program consultants or other contractual services must be justified and reasonable. Consultant pay must be a reflection time spent delivering direct services. Travel and per diem expenses for consultants must not exceed the State rate. Preparation time for consultants will not be paid by the grant. Properly documented contractual agreements for expenditures to consultants or outside agencies for fees, travel, and routine supplies must be filed per institutional policy; and contractual payments may not exceed institutional salary levels for similar work. Documentation for consultant services performed must be filed showing the consultant’s name, dates, hours, and amount charged to grant and results of subject matter of the consultation. Any consultant final reports will be part of the grantees final report. All contractual services must be procured in accordance with institutional procurement requirements and procedures.

Other (list each expenditure separately)

All expenditures that do not fall into any of the above budget categories should be detailed in the OTHER category. List each expenditure separately. “Other” expenditures might include insurance, cost associated with space rental not covered by a long term lease or other contract, miscellaneous expenditures related to permits, etc. Explain why costs are necessary for the implementation of the project. Show specific information that shows how amounts were computed.

Total Direct Costs

Total direct costs are derived by summing all requested grant funds or matching funds by column.

Indirect Costs

Up to 10% of the grant funds requested (sum of year one and year two requested grant funds) may be used to claim indirect costs recovery. Any indirect costs exceeding this limitation must be provided from institutional matching funds or in kind services.

Applicants must provide evidence of how indirect costs were established if claiming as in kind contribution (e.g. approval by federal government).

Total

Total refers to total project costs and is the sum of the requested grant funds and the institutional match or in kind support if provided. Be sure to reconcile the total in each line and each column.

Note: Be sure to reconcile the budget form totals with the budget narrative. If changes are made to the budget in the final stages of application preparation, be sure to update the narrative and vice a versa. If the narrative and the budget form have different numbers, reviewers will recommend funding the lower of the two amounts.

ASSURANCES (required no points)

Each grant application must be accompanied by a Statement of Assurances signed by the appropriate organizational representative. Use the form provided in Appendix 2.

APPLICATION REVIEW PROCESS

Overview of Review Process

- Applications must include all requisite forms. The RFA and application forms are available at <http://www.mhec.state.md.us/Grants/index.asp>
- Applicants will receive electronic notification that their application has been received and assigned an application number.
- A panel of qualified reviewers will read each application and score each according to the criteria summarized in the Evaluation and Selection Criteria section below. Each application is read and scored by at least three reviewers. Every effort is made to ensure that there are no conflicts of interest and reviewers are required to sign a conflict of interest agreement.
- The review panel is convened after members read the assigned applications individually. Panel members discuss their scores, recommendations for funding, and any recommendations for adjustments to projects. They share comments about improvements that are required to enhance fundability of a given project. Reviewer comments will be made available to all applicants whose applications are not funded. The Secretary of Higher Education and the Secretary of Energy will take the review panel recommendations, along with funding priority and geographic distribution of awards into consideration. The Secretaries (or designees) shall jointly name the final awardees.

Evaluation and Selection Criteria

The rating given for each criterion (see below) will serve as a significant, but not the only, aspect of the judgment made by the Review Panel. The overarching evaluation of the application will be based on the following:

- The proposed project or research topic should have relevance to Maryland's offshore wind energy sector.
- Where appropriate, there should be a clear demonstration of how the proposed project is expected to build upon previous efforts in the field.
- Proposals should describe how the project will highlight the higher education institution's expertise or raise institutional prestige in the field of offshore renewable energy.
- Where possible, participation among multiple academic institutions is encouraged.
- Where possible, project proposals that have a longer time frame should include any appropriate plan to secure additional support or funding in the future.
- The project should have a demonstrated link for practical or commercial application.
- Applications should describe potential 'cross-points' for private sector business engagement (existing corporations as well as Minority Business Enterprises (MBE), Women's Business Enterprises (WBE), and small businesses).

Each application will be specifically evaluated by the review panel as follows:

Application Scoring Rubric

Category	Maximum Points
Research Question (s) or Problem to be Addressed	25
Project Personnel and Institutional Resources	15
Technical Approach and Operation Plan	45
Budget and Cost Effectiveness	15
TOTAL	100

The Maryland Higher Education Commission and Maryland Energy Administration reserve the right to negotiate budgets and application activities before awarding a grant.

NOTIFICATION OF AWARDS

Preliminary notification of awards will be made on **JUNE 19, 2013** by email. A formal award letter, grant award notice, copy of invoice initiating first payment, and the mandatory grant provisions will arrive by mail shortly thereafter. Projects may begin at the time of preliminary award notice. No funds will be disbursed for conditional awards until all conditions of the award are met and the acceptance of any negotiated changes by the principal investigator. Fifty percent of funds will be issued within 60 days of notice of award. An additional 25% of funds will be released pending approval for the first interim report. The final balance will be released after the second interim report is submitted and approved. All payments are contingent upon continued funding by the grantor. Please refer to Appendix 3 for Post Award Grants Management Procedures.

CONTACT INFORMATION AND RESOURCES

Institutions that are interested in applying for one of these grants may contact Ross Tyler, Maryland Energy Administration at RTyler@energy.state.md.us or 443.694.3077 for more information about the technical programmatic aspects of the Maryland Offshore Wind Energy Challenge Grant Program.

Contact Melinda Vann, Director of Outreach and Grants Management at the Maryland Higher Education Commission for questions about the application, review, award and post award procedures at mvann@mhec.state.md.us or 410.767.3269.

Refer to Appendix 1 and to the *Topics* section in this Request for Application for examples of past Offshore Wind Energy projects funded through other programs.

APPENDIX 1

U.S. Department of Energy Offshore Wind Energy Funded Grant Projects & Other Promising Projects: Summaries by Topic

Topic Area One: Modeling & Analysis Design Tools to Assess Offshore Wind Turbine Technologies including Market Analysis and Barrier Removal

Penn State University

This project will develop a computer model “Cyber Wind Facility” to generate data over an entire wind turbine farm both on and offshore simulating wind and wave impacts on wind turbine structures.

Regents of the University of Minnesota

To develop a computational framework to simulate wave and wind interactions with offshore wind farm designs. In addition, another award has been made to develop a modeling tool to simulate surface water ice impact on offshore wind turbine designs, especially designs involving innovative substructures.

University of Texas

Computer models to simulate mooring dynamics of offshore wind turbines taking into account a variety of interactions between platform anchors and the seabed.

Navigant

To develop a comprehensive assessment of the U.S. offshore wind market over three years, providing stakeholders with a roadmap for removing technical, regulatory, financial, economic and workforce development market entry barriers

Topic Area Two: Innovative Offshore Wind Plant System Design Studies including Environmental Risk Reduction

Alliance for Sustainable Energy, LLC (NREL)

To assess the design of a 500 megawatt wind plant comprised of 10 megawatt wind turbines in the Western Gulf of Mexico and to demonstrate the cost effectiveness of deploying offshore wind farms in hurricane-prone regions.

Clear Path Energy, LLC

To create a conceptual design for an offshore wind turbine farm that can be deployed in water deeper than 35 meters using innovative foundation technology.

Freshwater Wind I, LLC

This project will develop a computational model to study how existing wind turbine systems could be optimized for shallow water conditions found in the Great Lakes.

Nautica Windpower LLC

To develop a conceptual design for a deep-water offshore wind farm using lightweight floating platforms with improved access for maintenance.

University of Delaware

The project will analyze design trade-offs for offshore wind farms in 20-40 meter water depth for turbine production, deployment, and maintenance in order to maximize energy production, improve reliability, reduce and simplify operations at sea, and decrease

operating and capital cost. Also, the University of Delaware received a second award to analyze design trade-offs for offshore wind farms in 20-40 meter water depth for turbine production, deployment, and maintenance in order to maximize energy production, improve reliability, reduce and simplify operations at sea, and decrease operating and capital cost.

Virginia Electric and Power Company (Dominion)

To analyze performance and cost-of-energy estimates of a hypothetical 600 megawatt offshore wind project for a variety of sites on the U.S. Atlantic coastline in water depths up to 60 meters.

The Glosten Associates, Inc.

To consider specific technology elements needed to integrate a floating foundation with an existing wind turbine for deploying offshore wind farms in water depths exceeding 60 meters.

Biodiversity Research Institute

This work will synthesize existing data on bird, sea turtle, and marine mammal abundance and movement in the mid-Atlantic, perform baseline surveys of species at high risk to turbine interactions using a variety of technologies, and develop predictive and risk assessment frameworks.

Oregon State University

This project will monitor avian and bat interactions with offshore wind turbines using a fully integrated sensor array monitoring system with on-board custom designed data post-processing and statistical-based software.

Stantec, Inc.

To collect information on offshore bird and bat activity and refine equipment, methods, and logistics to aid in the development of a remote offshore bird and bat migration data collection and monitoring system.

Topic Area Three: Manufacturing and Supply Chain Development

Navigant Consulting, Inc.

This study will examine the existing U.S. supply chain, identify current or anticipated gaps and identify barriers to filling these gaps through industry surveys and stakeholder forums, and recommend strategies for developing a robust supply chain

Topic Area Four: Transmission Planning and Interconnection Studies

ABB Inc Raleigh, NC

This research will determine likely offshore wind development sites and associated wind production profiles, perform an initial integration analysis and assess the applicability of traditional integration study methods, and evaluate various potential energy collection and delivery technologies.

Case Western University

This project will evaluate potential impacts of offshore wind on the electric grid in the Great Lakes region and determine requirements on interconnection points, control systems, and the application of system reinforcements for different transmission system characteristics.

University of Delaware

To examine potential effects of wind penetration on the Mid-Atlantic electric grid and will facilitate grid operations planning by identifying necessary system upgrade and grid management market strategies to ensure reliable and efficient operation of the electric system.

Duke Energy

This investigation will examine the effects of offshore wind development on the Duke Energy Carolinas system by determining the cost of upgrading the transmission system, and assessing system impacts and changes in the generation dispatch needed for integration.

Topic Area Five: Optimized Infrastructure and Operations

Garrad Hassan America, Inc

This project will examine lessons learned from Northern European offshore wind projects to identify port requirements needed for an offshore wind industry in the United States and create an analysis tool for stakeholders to address their needs and perform cost-benefit assessment of infrastructure investments. An additional project will identify and quantify key areas of offshore wind project installation and operations where advancements in the approach or technology may lower the cost of energy from offshore wind. Cost of energy impacts of these key areas will be packaged in a user-friendly tool, which will be distributed among industry.

Douglas-Westwood LLC

This work will identify vessel requirements for installing 54 gigawatts of offshore wind by 2030, build relationships with the vessel industry, and identify resources within the value chain, thereby assisting states in implementing innovative strategies, policies, incentive programs and cooperative efforts to support companies seeking to develop products and services in the area of vessels for offshore wind.

Alliance for Sustainable Energy, LLC - NREL

This research will leverage existing models, European experience, and industry expertise to identify principal cost drivers and quantify their impacts on cost of energy; select and analyze practical, innovative concepts for optimization; and identify and quantify technology improvement opportunities.

Topic Area Six: Resource Characterization and Design Conditions

Stevens Institute of Technology

This project will systematically evaluate the capability of both scanning and vertically-profiling LIDARs (light detection and ranging) to accurately measure the three-

dimensional wind field, as compared to fixed meteorological towers. It will also quantify variability in offshore winds off the coast of New Jersey

State University of New York, Stony Brook

This study will verify and improve boundary layer physics and modeling through intensive data collection around the Cape Wind site. The improved modeling will be applied to construct more accurate wind resource maps for the East Coast of the United States.

Regents of University of Michigan

This research topic will evaluate the unique processes associated with freshwater ice development on offshore wind turbines and other structures in the Great Lakes by evaluating the seasonal and decadal trends in historical icing data, conducting field measurement on structures of opportunity and by evaluating extreme loading due to combined wind, wave, and icing effects.

Indiana University

To integrate wind data from remote sensing, aerial and satellite measurements, and meteorological towers to produce a high resolution wind characterization for Lake Erie. This project will also analyze instruments and develop best practices for each measurement type.

University Corporation for Atmospheric Research

To establish reliable wind data at the hub height of offshore wind turbines to aid in the siting and design of turbines and in improving the accuracy of energy predictions. Also an additional project is to examine the dynamics of the part of the atmosphere that has direct contact with the ocean, or marine boundary layer, with an emphasis on how momentum or temperature changes in the atmosphere can affect the ocean, or vice versa.

Topic Area Seven: Impact on Electronic Equipment for Marine Environment

The University of Texas, Austin

To assess the impact of offshore wind farms on electronic equipment and recommend mitigation methods.

Additional possible projects or research topics

Below are a few potential project areas that do not fall into the DOE categories. They are offered simply as examples of other thematic possibilities and are included to illustrate the increasing breadth of research areas. Maryland's academic institutions should not restrict their interests to the DOE framework. Also for clarity, the suggestions below do not infer any preference over those categorized and identified by DOE or any novel thematic areas not mentioned.

Topic Area Eight (non USDOE): A business case for developing secondary and tertiary components suppliers for OEMs.

The University of Hull in the UK is investigating the secondary and tertiary component manufacturers and suppliers at various radial distances from the port of Hull which is

the expected staging ground for Round 3 assembly and deployments, as well as a potential manufacturing site for Siemens' wind turbines. A similar approach could be adapted for the mid-Atlantic region of the US.

Topic Area Nine: Optimizing Deployment Facilities and Processes (Lessons Learned)

As European and Asian offshore wind developers continue to develop larger and more complicated projects, certain logistical and strategic limitations are coming into focus. Developers are looking beyond infrastructure assets such as shipping berths, cranes, and port facilities, to include weather patterns, tide variations and wind strengths at staging facilities. Experience reveals that these considerations may contribute to bottlenecks and additional costs in the deployment process. There is an increasing tendency to transport wind components to sea in batches as a way to offset transportation costs and to increase overall deployment efficiency. However, this approach comes at the expense of lower risk land-based pre-assembly work. Applying and transferring such European lessons to the U.S. market may help reduce deployment risk and support overall reduction of LCOE for U.S. and Maryland generated offshore wind electricity.

APPENDIX 2

Application Forms

Cover Sheet
Abstract
Budget Form
Statement of Assurance

Maryland Offshore Wind Energy Research Challenge

Application Cover Sheet

Lead Institution: _____

Project Title: _____

Principal Investigator _____ Email: _____

Phone: _____ Mailing Address: _____

Co-Investigator: _____ Email: _____

Phone: _____ Mailing Address: _____

Partnering Institutions (add rows as needed)

Institution	Contact Person	Contact email

Post Award Grants Office Contact Name & Title:

Email: _____ Phone: _____

Mailing Address: _____

Finance or Business Office Contact, Name & Title:

Email: _____ Phone: _____

Mailing Address: _____

Certification by Authorizing Institution Official
(Chief Academic Officer, Provost, V.P. level or above):

Name: _____ Title: _____

Signature: _____

Maryland Offshore Wind Energy Research Challenge

Project Abstract

Project Name:

Institution:

Principal Investigator:

Maryland Offshore Wind Energy Research Challenge Grant Application					
Proposed Budget					
Institution:					
Principal Investigator:					
	(1)	(2)	(3)	(4)	(5)
Budget Category	Grant Expenditures Year 1	Grant Expenditures Year 2	Total Grant Funds Requested	Match/In Kind Year 1 & 2	Total Budget
Salaries and Wages					
(list each name/position)					
subtotal					
Fringe Benefits					
Travel					
Equipment (list)					
subtotal					
Materials & Supplies					
Contractual Services					
Other (list)					
subtotal					
Total Direct Costs					
(sum of all budget categories above)					
Indirect Cost					
cannot exceed 10% of total grant funded direct costs)					
Total Cost (Direct + Indirect)					

Maryland Offshore Wind Energy Research Challenge

STATEMENT OF ASSURANCES

The applicant hereby affirms and certifies that it will comply with all applicable regulations, policies, guidelines, and requirements of the Maryland Higher Education Commission, the State of Maryland, and the Federal Government as they relate to its acceptance, and use, of funds for this project. Also, the applicant affirms and certifies that:

1. It possesses legal authority to accept the award; e.g., an official act of the applicant's governing body has been duly adopted or passed, authorizing the filing of the application, including the acceptable of all understandings and assurances contained therein, and directing and authorizing the person identified as the official representative of governing body on the application and to provide such additional information as may be required.
2. It will comply with Title VI of the Civil Rights Act of 1964 (42 U.S.C. 2000d) prohibiting employment discrimination where discriminatory employment practices will result in unequal treatment of persons who are or should be benefiting from the grant-aided activity.
3. It will comply with all federal and state laws prohibiting discrimination and will comply with the Americans with Disabilities Act, the Family Educational Rights and Privacy Act, the Pro-Children Act (prohibiting smoking in the presence of children), and the laws set forth in OMB Standard Form 424B.
4. It will comply with all required assurances, certifications and research-related regulations as defined by the applicant institution's Office of Sponsored Research or its equivalent.
5. It will expend funds to supplement new and/or existing research projects and not use these funds to supplant non-grants funds.
6. It will participate in any statewide assessment program or other evaluation program as required by the MHEC or the State of Maryland, and make its research and research records available to MHEC if requested.
7. It will give MHEC and/or the Maryland Legislative Auditor, through any authorized representative, the right of access to, and the right to examine all records, books, papers, or documents related to the grant.
8. It will comply with all requirements imposed by MHEC concerning special requirements of law and other administrative requirements.
9. It certifies that no federally appropriated funds have been paid or will be paid to any person influencing or attempting to influence an officer or employee of any agency, a member of Congress, an officer or employee of Congress, or an employee of a member of congress in connection with making or renewal of federal grants related to this program.
10. The applicant further certifies that all of the facts, figures and representations made with respect to the grant application and grant award, including the exhibits and attachments, are true and correct to the best of applicant's knowledge, information, and belief.

Institution: _____

Signature of Authorized Institutional Authority

Name and Title, Printed

Date

APPENDIX 3

Grant Management Post Award Procedures

POST AWARD GRANT MANAGEMENT PROCEDURES

1. FISCAL PROCEDURES

All funds under this program must be assigned to a specific account. If an institution receives more than one grant award, separate accounts must be established for each. For this grant cycle, grant awards will be disbursed in three payments. The first payment will be 50% of the total grant award. The second and third payments will be 25% each of the balance of the total grant award. Payments one and two will be released pending receipt and approval of required interim progress reports. Expenditures in excess of approved budget amounts will be the responsibility of the recipient institution.

2. POST-AWARD CHANGES

The grant recipient shall obtain prior written approval for any change to the scope of the approved project. To request changes, request a project amendment form from Melinda Vann at mvann@mhec.state.md.us. The request must include an explanation of the specific project changes proposed and/or a revised budget, as applicable. Justification for the changes must be provided. If project activity dates have changed significantly since the application submission, you must submit a revised calendar of activity dates and milestones.

The grant recipient shall also obtain prior written approval from the Office of Outreach and Grants Management at the Maryland Higher Education Commission:

1. to continue the project during any continuous period of more than three (2) months without the active direction of an approved principal investigator director;
2. to replace the principal investigator or any other persons named and expressly identified as a key project person in the application or to permit any such person to devote substantially less effort to the project than was anticipated when the grant was awarded;
3. to make changes resulting in additions or deletions of staff and consultants related to or resulting in a need for budget reallocation; and
4. to make budget changes exceeding \$1,000 or 10% in any line item budget category, whichever is greater.

3. PROJECT CLOSEOUT, SUSPENSION, TERMINATION

Closeout: Each grant shall be closed out as promptly as feasible after expiration or termination. In closing out the grant, the following shall be observed:

- The grant recipient shall immediately refund, in accordance with instructions from MHEC, any unobligated balance of cash advanced to the grant recipient.
- The grant recipient shall submit all financial, performance, evaluation, and other reports required by the terms of the grant in accordance with the due dates spelled out in this Request for Application.
- The closeout of a grant does not affect the retention period for State and/or grantor rights of access to grant records.

Suspension: When a grant recipient has materially failed to comply with the terms of a grant, MHEC may, upon reasonable notice to the grant recipient, suspend the grant in whole or in part. The notice of suspension will state the reasons for the suspension, any corrective action required of the grant recipient, and the effective date. Suspensions shall remain in effect until

the grant recipient has taken action satisfactory to MHEC or given evidence satisfactory to MHEC that such corrective action will be taken or until MHEC terminates the grant.

Termination: MHEC may terminate any grant in whole or in part at any time before the date of expiration, whenever MHEC determines that the grant recipient has materially failed to comply with the terms of the grant. MHEC shall promptly notify the grant recipient in writing of the termination and the reasons for the termination, together with the effective date.

The grant recipient may terminate the grant in whole or in part upon written notification to MHEC setting forth the reasons for such termination, the effective date, and, in the case of partial terminations, the portion to be terminated. However, if in the case of a partial termination, MHEC determines that the remaining portion of the grant will not accomplish the purposes for which the grant was made; MHEC may terminate the grant in its entirety.

Closeout of a grant does not affect the right of MHEC to disallow costs and recover funds on the basis of a later audit or review, nor does closeout affect the grantee's obligation to return any funds due as a result of later refunds, corrections, or other transactions.

4. RECORDS

A grant recipient shall retain the following records for a period of five (5) years after the completion of the grant project:

- records of significant project experience and evaluation results;
- records that fully show amount of funds under the grant, how the funds were used, total cost of projects, all costs and contributions provided from other sources, and other records to facilitate an effective audit

5. REPORTING REQUIREMENTS

To ensure accountability and sound fiscal management, the MHEC Office of Outreach and Grants Management serves as the State monitor of grant activities for Request for Applications under its purview. In addition to requiring interim and final reports, MHEC staff may conduct site visits, undertake telephone interviews, or request written materials for this purpose.

Formal interim and final reports will also be required from all grantees. At the end of the grant, both a financial and a narrative report will be due to the Commission.

6. INTERIM REPORTS

Interim reports will include a narrative and budget report that include but are not limited to:

- Responses to questions posed on the interim report form. (e.g. describe progress to date, is project on track with timeline, what challenges have been encountered)
- Evidence that the project is progressing sufficiently to continue
- Any data as required by the RFA and/or grantor
- The budget report shows how much of the grant has been spent and how much remains in each line item of the original accepted budget application. Fiscal reports for the project must be signed by a financial officer at the institution who is serving as the fiscal agent for the institutional grant. Grantees should keep records indicating how funds are expended, the total cost of project activities, the share of the cost provided from other sources (in kind or otherwise), and any other relevant

records to facilitate an effective audit; such records should be held for five (5) years after the grant ends. Any unspent grant funds must be returned with the final fiscal report.

- Forms will be provided at <http://www.mhec.state.md.us/Grants/index.asp>.

7. FINAL REPORTS

Final reports should address the success and challenges of the fully implemented project and will include but are not limited to:

- Final reports should address items on the interim report(s) but for the full term of the grant.
- Final reports must be submitted. Principal investigators who fail to submit a final report may be ineligible to apply for future grants managed by MHEC.
- Final reports have a financial report section and a narrative report section (see below for details).
- The final report includes the comprehensive evaluation of the grant. This evaluation will include the evaluation plan components from the accepted application. The evaluation should restate the research questions or problems to be addressed and discuss how the project outcomes compared to those stated in the application. Include copies of the evaluation instruments, if applicable.

Final reports must be submitted by the stated deadline. Failure to submit a final report may make the principal investigator and/or institution ineligible to apply for future grants from the State of Maryland.

8. ACKNOWLEDGMENT OF SUPPORT AND DISCLAIMER

An acknowledgment of the Maryland Higher Education Commission and the Maryland Energy Administration must appear in any publication of materials based on or developed under this project. Publications other than academic journal publications must also contain the following disclaimer:

“Opinions, findings, and conclusions expressed herein do not necessarily reflect the position or policy of the Maryland Higher Education Commission and/or the Maryland Energy Administration, and no official endorsement should be inferred.”

All media announcements and public information pertaining to activities funded by this grant program should acknowledge support of the Maryland Higher Education Commission and the Maryland Energy Administration and adhere to the restrictions laid out herein.

At such time as any article resulting from work under this grant is published in a professional journal or publication, two reprints of the publication should be sent to the Maryland Higher Education Commission Office of Outreach and Grants Management, clearly labeled with appropriate identifying information.