Public Service of Colorado Ponnequin Wind Farm

DOE Educational Program
Wind University Consortia

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Presentation Overview

Purpose of the Wind University Consortia

Competitive selection process

R&D and curriculum efforts at Wind University Consortia

Wind For Schools

Background/Summary

Industry Challenge: Lack of commercial-scale test facilities, lack of commercial-use test conditions in class 3 wind regimes, need for an educated wind-energy workforce – particularly at the higher education level

Solution: Universities will conduct research on commercial-scale turbines, build long-term R&D partnerships with industry and improve higher education curriculums

Public Benefit: This project will facilitate the development and testing of commercial-scale wind energy technologies, recruit underutilized and talented researchers in higher education, and educate the next generation of wind energy researchers, engineers and scientists

Merit Review Criteria

Criterion 1: Project Description and Implementation Plan [40%]

- Evaluate the “shovel readiness” of projects that can be implemented in typical wind farm regimes (Class 3+) in close proximity to university campuses with easy access to faculty, researchers, and students to conduct R&D and provide hands-on instruction.

Criterion 2: Project Research and Development Plan [40%]

- Evaluate proposed soundness of proposed research
- Demonstrate strong commitment to work with industrial partners on the R&D agenda

Criterion 3: Curriculum and Student Subsidies [20%]

- Assess the curriculum enhancement plan to provide more instruction on wind-related subject matter with private sector partners
- Fund student fellowships and internships.

Program Policy Factors

1. Geographic diversity of projects
2. Relevance of projects to support the WHTP goals
3. Relevance of projects to addressing the challenges of the “20% Wind Energy by 2030” report
4. Diversity of turbine technology
5. Level of cost share above the minimum required
6. Selection of Applications which promote and enhance the objectives of the American Recovery and Reinvestment Act of 2009, P.L. 111-5, such as job creation, and/or preservation and economic recovery in an expeditious manner

Application Evaluation Process

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Example Reviewer Team

Independent Peer Review Team

- Manufacturing Expert
- National Lab Expert
- Developer Expert
- Education Expert
- Non-profit Expert

Merit Review Criteria

Criteria 1-3

Criterion 1: Project Description and Implementation Plan (40%)

Criterion 2: Project Research and Development Plan (40%)

Criterion 3: Curriculum and Student Subsidies (20%

Scoring Criteria

9–10	Superior
7–8	Good
5–6	Satisfactory
3–4	Marginal
0–2	Unsatisfactory

Program Policy Factors

Factors

- Geographic Diversity
- Mission Relevance
- 20% Report Relevance
- Technical Diversity
- Cost Share
- Recovery Act of 2009

Criteria

- Regional Balance
- DOE R&D Activities
- Wind capacity potential
- Fill R&D “gaps”
- % share over minimum
- Green job potential

Wind University Consortia Awardees

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

ARRA Projects for R&D Turbines, land-based and offshore R&D, and Curriculum development ($7.9 - 7.1 M per award)

- Illinois Institute of Technology
- University of Maine
- University of Minnesota

FY 10 Projects for offshore R&D and Curriculum development ($750 K per award)

- University of Toledo
- University of Delaware

FY 10 Projects for Curriculum development ($65-130 K per award)

- Iowa State University of Science and Technology
- University of Massachusetts Amherst
- ABOR for and on behalf of Northern Arizona University
- Purdue University
- George Washington University
- Kansas State University
- California Institute of Technology

Total Funding = $25 million

IIT Project Overview

Install a GE 1.5 MW turbine in the U.S. focusing the university's power electronics expertise on advanced reactive power turbine technologies and integration of wind into the electric power grid.

Invenergy's Grand Ridge Wind Farm, Marseilles, IN

GE 1.5 MW turbine

IIT R&D Focus Areas

- The consortium members will develop control algorithms for enhancing the reliability of wind turbine components
- The consortium members will develop advanced operation and planning tools for accommodating the high penetration of intermittent wind energy in electric power utility systems

ILLINOIS INSTITUTE OF TECHNOLOGY

IIT’ s Curriculum and Student Financial Assistance Activities

- Offer two mandatory undergraduate wind energy courses to engineering, science, economics, law, and architectural and design students
- Offer a graduate course on sustainable energy highlighting IIT’s research grant work
- Provide financial assistance to Ph.D students to assist in IIT wind research studies
- Provide small grant subsidies to undergraduates
- Organize three wind energy conferences with consortia to continue to obtain input from industry on the R&D agenda and curriculum development

University of Minnesota

- Install the Clipper 2.5 MW wind turbine and utilize the university's wind tunnel and supercomputing capabilities.

UMore Park, NW - looking south

Clipper Liberty 2.5 MW Wind Turbine

UMN's R&D Focus Areas

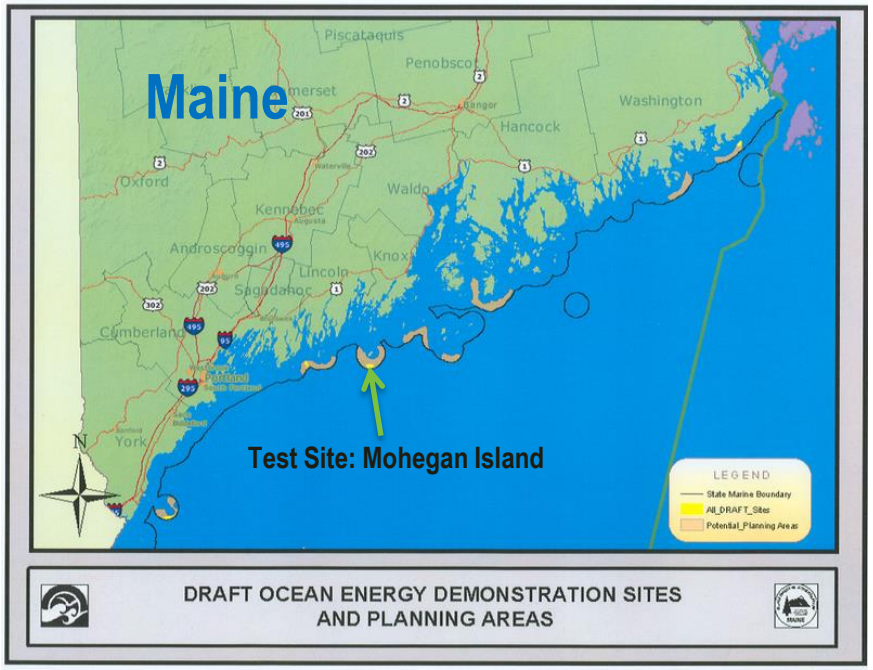
- Rotor aerodynamics, flow control, aero-elasticity, acoustics, and icing and fouling mitigation
- Wind farm siting and site-specific optimization
- Power electronics based electrical generation systems
- Radar interaction with wind farms.

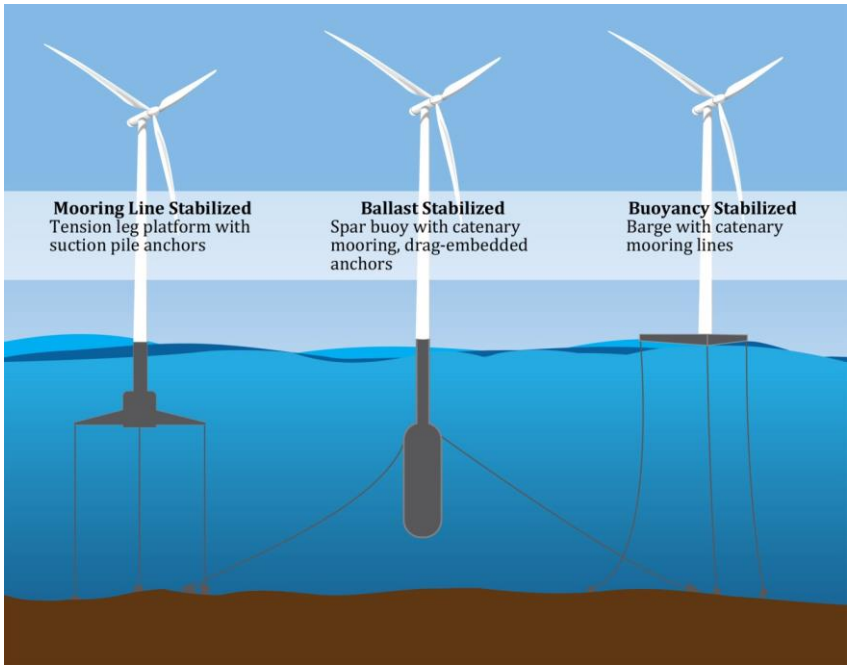
UMN Curriculum and Student Financial Assistance Activities

- Develop a Wind Essentials Graduate-Level Course with academic and practicing professionals.
- Conduct a senior-level design competition.
- Develop additional graduate-level courses with certification in wind technologies.
- Incorporate field trips to wind turbine with course curriculum.

University of Maine

- Design and build 1-3 floating offshore wind platforms using the university's composites materials expertise and coastal research facilities in cutting-edge deepwater wind R&D for deployment while studying the environmental impacts on marine ecosystems





UME R&D Focus Areas

- Characterize the seafloor environment for turbine anchoring
- Study environmental/ecological impacts
- Secure specific permits for the proposed project from all applicable local, state, and federal authorities
- Conduct wind and wave lab tests of floating turbine and platform designs
- Conduct field tests on floating platforms using innovative composite materials and small commercial turbines in the Gulf of Maine at a state-approved deep water test site

UME Curriculum

- Develop a model Master of Science degree in Renewable Energy and the Environment (MSREE) with a focus on deepwater offshore wind energy will have four main themes (30 credit hours)
  - Ocean energy structures
  - Electrical generation and transmission
  - Environmental siting and policy
  - Project management focusing on offshore projects
- Develop undergraduate minor in deepwater wind energy (18 credit hours)
- Develop associates degree program in wind power technology (10 hour safety training course)

Wind for Schools

Curricula is being developed and implemented at both the university and K-12 level

University level focuses on hands-on small wind project development through classes and field work

Curriculum replication at other universities

http://www.windpoweringamerica.gov/schools_wfs_project.asp

For further information:

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