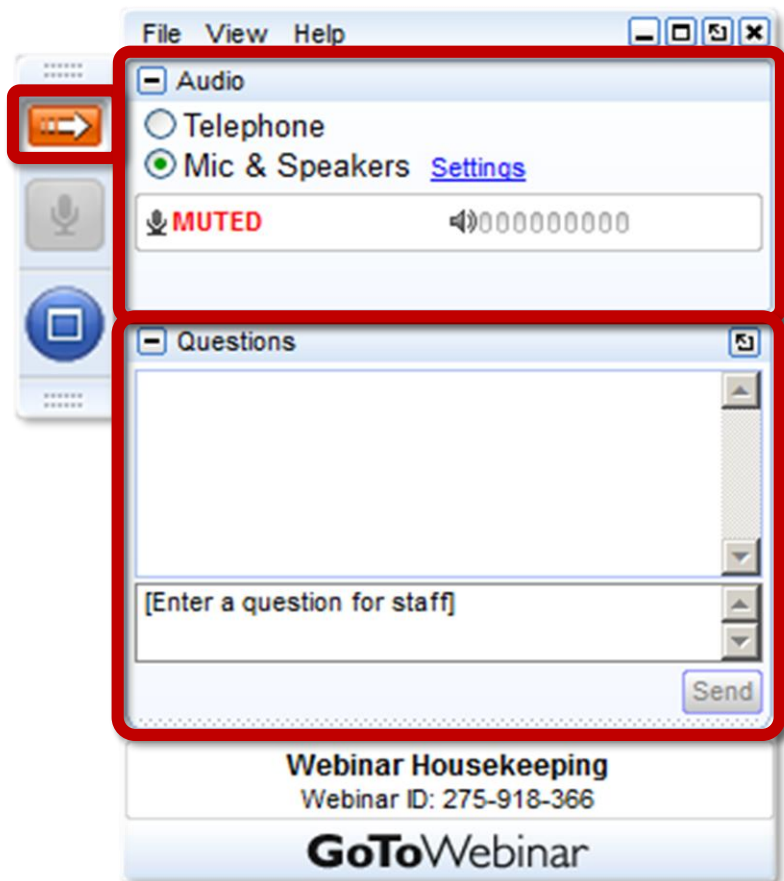




The Offshore Wind R&D Consortium: Roadmap, Research Priorities, and the Open Solicitation

May 9, 2019

Housekeeping



Use the orange arrow to open and close your control panel

Join audio:

- Choose Mic & Speakers to use VoIP
- Choose Telephone and dial using the information provided

Submit questions and comments via the Questions panel

This webinar is being recorded. We will email you a webinar recording within 48 hours. NWRC webinars are archived online at www.cesa.org/webinars

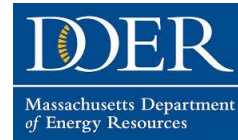
CleanEnergy States Alliance



Wisconsin Office of Energy Innovation



Department of Commerce
Innovation is in our nature.



OREGON DEPARTMENT OF ENERGY



The Northeast Wind Resource Center

The Northeast Wind Resource Center (NWRC) provides salient, unbiased information on offshore and land-based wind energy in the Northeastern United States. The NWRC serves the information needs of New England and New York for **land-based wind**, and that same region plus New Jersey in the case of **offshore wind**.

Published research, studies, and analyses associated with the issues impacting public acceptance of wind deployment are available in the NWRC **Resource Library**.

The Clean Energy States Alliance (CESA) manages the NWRC.



www.northeastwindcenter.org



The Offshore Wind Accelerator Project (OWAP)

The Offshore Wind Accelerator Project (OWAP) has two main focuses: 1) work with states to help them in their efforts to advance offshore wind, and 2) engage in broad-ranging communication efforts about offshore wind news and developments.

The Clean Energy States Alliance (CESA) manages OWAP.

Website: <https://www.cesa.org/projects/accelerating-offshore-wind-owap/>

Facebook: <https://www.facebook.com/offshorewindworks/>

Twitter: <https://twitter.com/OSWindWorks> (@OSWindWorks)

Panelists



Richard Bourgeois
Senior Project
Manager, NYSERDA



Walt Musial
Principal Engineer,
NREL



Val Stori
Project Director,
Clean Energy States
Alliance





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National Offshore Wind Research and Development Consortium

Clean Energy States Alliance Webinar | 9 May 2019

Today's Presenters



Richard Bourgeois
Senior Project Manager,
New York State Energy Research and
Development Authority (NYSERDA)



Walt Musial
Principal Engineer
Offshore Wind Platform Lead
National Renewable Energy Laboratory



About the Consortium

National Offshore Wind R&D Consortium



DOE's Goal: Facilitate a nationally-focused, not-for-profit organization collaborating with industry on prioritized R&D activities to reduce levelized cost of energy (LCOE) of offshore wind in the U.S. and maximize other economic and social benefits

Desired Impacts:

- Innovations directly responsive to the technical and supply chain barriers faced by offshore wind project developers in the U.S.
- Build strong networks connecting technology innovators, investors, and industry
- Increase U.S. content and job opportunities

Administrator: (competitively awarded by DOE in 2018): New York State Energy Research and Development Administration (NYSERDA)

Project Value: \$41 M (\$20.5 DOE funds, matched by NYSERDA) – plus member contributions

Duration: 4 years under current funding (+ 3 years to complete all projects); goal is to become self sustaining indefinitely through research partner funding

OFFSHORE WIND ENERGY

9,000 MW

BY 2035

Largest Commitment
in the U.S.

enough to power up to
6 million homes



NEW YORK
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NYSERDA

National Offshore Wind R&D Consortium

An independent not-for-profit designed for long-term self-sufficiency

Members

Public Sponsors

- U.S. Department of Energy
- NYSERDA
- Virginia DMME
- Massachusetts CEC
- Maryland Energy Administration

Independent Members

- Bob Catell, *AERTC* (Chair)
- Jan Matthiesen, *the Carbon Trust* (Vice-Chair)
- Doug Pfeister, *Renewables Consulting Group*
- Sam Aronson, *director emeritus BNL* (Secretary)
- John Bruckner, *National Grid NY* (Treasurer)

Developer Members

- Avangrid
- EDF Renewables
- EDP
- EnBW North America
- Equinor
- Innogy
- Northland Power
- Ørsted
- Shell
- Vineyard Wind

Private Sponsors

- Anbaric

Advisory Groups

Research and Development
Advisory Group (RDAG)

Strategic Advisor Network (SAN)

Tech to Market Group (TTM)

Manufacturing, Supply Chain &
Service Council (MSSC)


Roadmap and Solicitation



- Dedicated to managing industry-focused research and development of offshore wind to maximize economic benefits for the U.S.
- Supports three Research Pillars:
 1. Offshore Wind Plant Technology Advancement
 2. Offshore Wind Power Resource and Physical Site Characterization
 3. Installation, O&M and Supply Chain Solutions
- Prioritized **Research and Development Roadmap** and **Notice of Upcoming Technical Challenges** published in November 2018
- Solicitation released March 29, 2019 for Pillar 1

Consortium Now Accepting R&D Proposals!

https://portal.nyscrda.ny.gov/CORE_Solicitation_Detail_Page?SolicitationId=a0rt000000beASKAAM

 Services News Government Local

NYSERDA

FUNDING OPPORTUNITY DETAIL

[Current Funding Opportunities](#)

[Closed Funding Opportunities](#)

National Offshore Wind R&D Consortium Research Solicitation (PON 4124)

Due Date: Continuous

Description

This Program Opportunity Notice (PON) is being executed on behalf of the National Offshore Wind Research and Development Consortium (Consortium) and seeks to develop and demonstrate technology innovations that will reduce the levelized cost of electricity (LCOE) for offshore wind in the United States. The Consortium is a nationally focused, independent, not-for-profit organization funded by NYSERDA and the U.S. Department of Energy, dedicated to supporting industry-led research and development activities that will remove barriers to implementation of offshore wind in all U.S. wind regions.

Proposals should focus on new solutions that remove barriers and address issues essential for cost reduction, deployment, and industry growth specific to offshore wind regions of the U.S. Proposals should demonstrate technology with high potential for replicability, providing a feasible path to commercialization that delivers benefits to multiple categories of end-users. The Consortium's goal is to develop and demonstrate technology innovations that reduce LCOE for offshore wind in the U.S., remove risk and other barriers to implementation, and support the growth of U.S.-based offshore wind manufacturing and the supply chain.

Application Submission

- [Apply Online](#)
- [Application Instructions and Portal Training Guide \[PDF\]](#)

Associated Documents

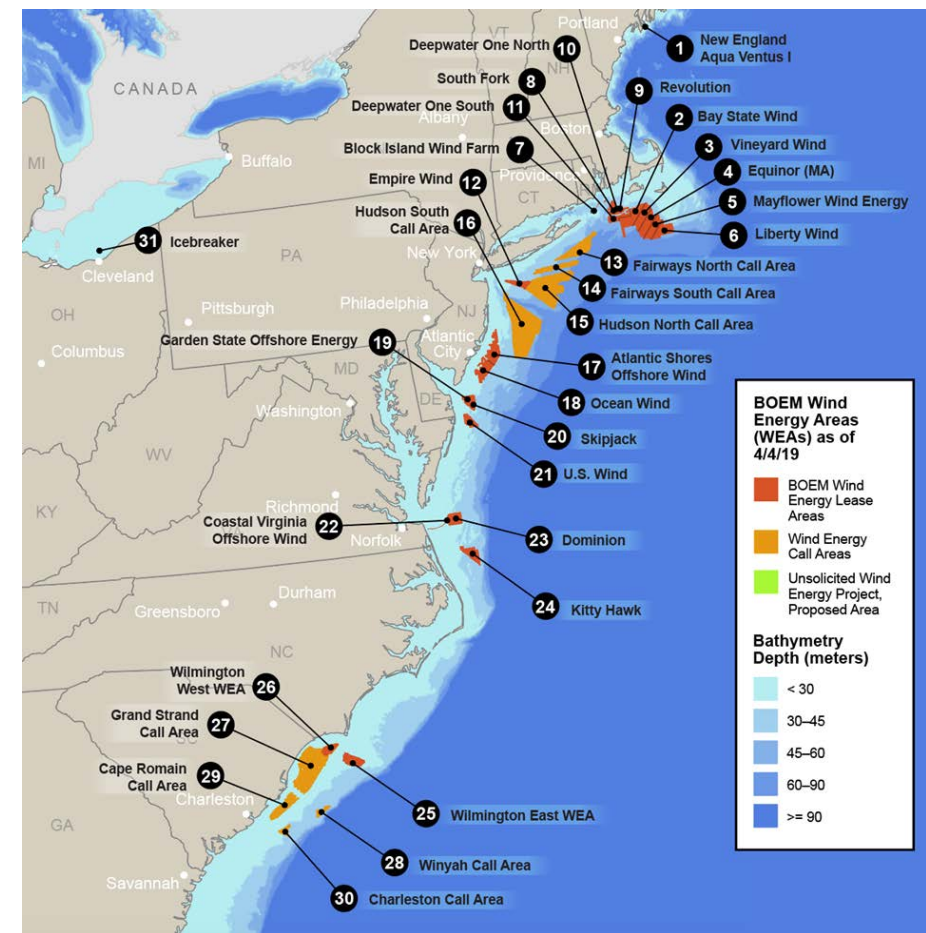
- [Summary \[PDF\]](#)
- [Attachment A - Proposal Narrative \[DOCX\]](#)
- [Attachment B1 - Sample Statement of Work \[DOCX\]](#)
- [Attachment B2 - Business Model Canvas \[PPTX\]](#)
- [Attachment B3 - TRU/CRL Calculator](#)
- [Attachment B4 - Three-Year Financial Projections Worksheet \[XLSX\]](#)
- [Attachment C1 - Milestone Payment Schedule \[XLSX\]](#)

- Proposals will be reviewed on a continuous basis, as received.
- Technical Challenge Areas will be updated regularly.
- Proposals welcomed for work supporting all U.S. wind areas.
- Go to: www.NYSERDA.ny.gov/Funding-Opportunities for complete details, and to submit your proposal!

Research and Development Priorities

Principles Guiding Prioritization of Research

- Engineering and technology-based
- Focused on needs of end-users
- Broad industry benefits
- Tailored to U.S. specific issues
- Adherence to DOE FOA 1767



How can the Consortium help get the first 10 GW in the water?

Pillar 1 Solicitation – Fixed Bottom Technology

Array Performance and Control Optimization

- ❑ Increasing energy density
- ❑ wind plant control
- ❑ modeling array effects
- ❑ plant layouts

1

Cost-Reducing Turbine Support Structures for the U.S. Market

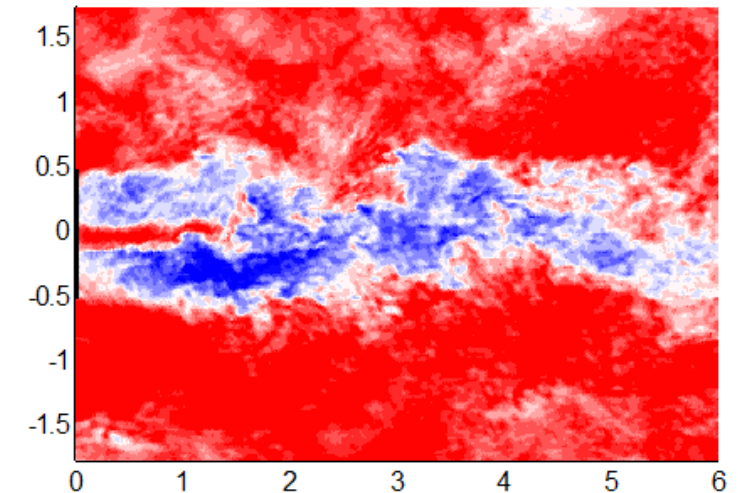
- ❑ Innovative substructure designs
- ❑ Innovative materials used as an alternative to steel
- ❑ Reduce the dependency on foreign flagged or heavy lift vessels
- ❑ An innovative fabrication methods (e.g. quayside fabrication)
- ❑ Life extension of the substructure

2

Power System Design and Innovation

- ❑ Assessment of power system infrastructure barriers
- ❑ Innovative OSW power system technologies
- ❑ New cable technology or array power system technology
- ❑ Assessment of existing onshore grid systems upgrades needed

4



Pillar 1 – Roadmap Topics – Fixed Bottom Technology

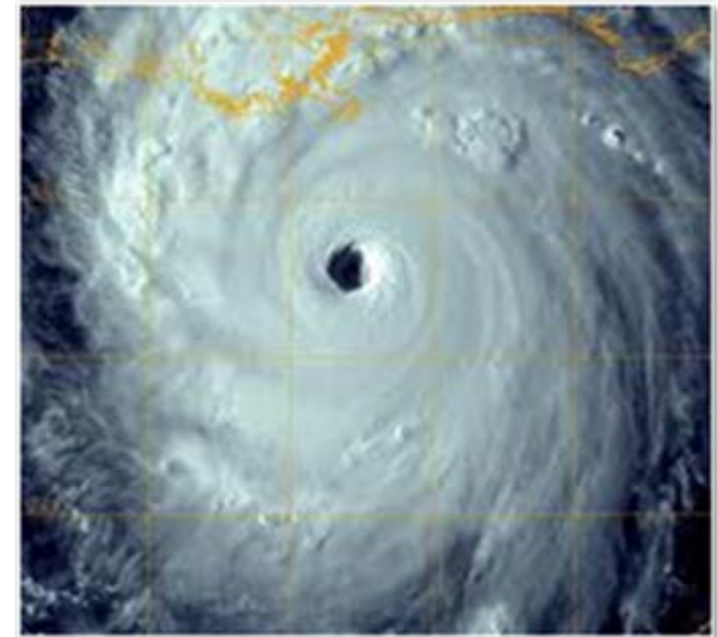
Other Pillar 1 fixed-bottom technology topics in roadmap

Enabling the Next Generation of Offshore Wind Turbines

- ❑ Scaling issues with 12 MW+ turbines
- ❑ Testing of ultra-long blades
- ❑ Drivetrain testing of 15 MW scale systems
- ❑ Vessels and infrastructure

Hurricanes Resiliency

- ❑ Strategies to maximize the robustness of fixed-bottom systems
- ❑ Management of extreme loads (wind and waves)
- ❑ Hurricane ride-through controls
- ❑ Inform development of structural design standards



Pillar 1 Solicitation – Floating Wind Technology

Floating Structure Mooring Concepts for Shallow and Deep Waters

- 3
- ❑ Addressing complexity of Atlantic siting in 50 m - 90 m depths
 - ❑ Addressing issues with Pacific siting >500 m depths

Other Pillar 1 Floating Technology Topics in Roadmap

Floating Platform Scaling

- ❑ Addressing issues with platform scaling as turbines grow (manufacturing, wave loading, infrastructure capacity, etc.)

Control of Large Floating Arrays

- ❑ Assessing dynamic 6-DOF behavior and control mitigation and optimization

Floating System Design Tool Development

- ❑ Gap filling design tools to engineer next generation commercial systems



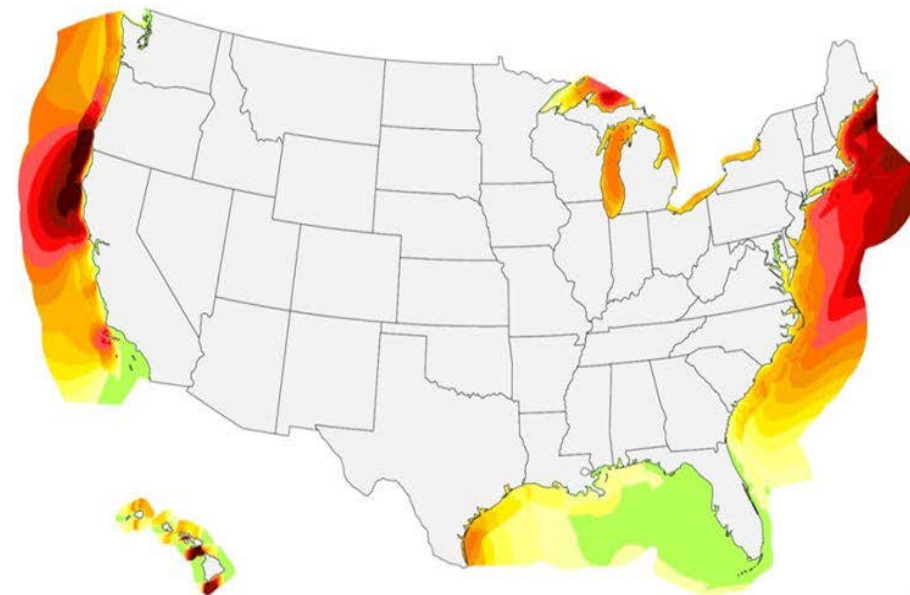
Pillar 2 Roadmap Topics

Comprehensive Wind Resource Assessment –
Addressing the uncertainties and inaccuracies of the current resource data bases for wind, extreme wave

Systematic Measurement Campaigns - Increasing the number of observations needed for validation and physical understanding

Development of a Metocean Reference Site – Providing an ocean based reference site to calibrate and verify instrumentation for wind energy areas

Sea Bed Survey Methods, Geophysical and Geotechnical Database– Improving measurement methods to streamline site development



Data Source: AWS Truepower 0-50nm; NREL WIND Toolkit beyond 50nm.

Pillar 3 Roadmap Topics

Installation Topics

Installation Technology to Reduce Siting Conflicts - Passive and active subsea acoustic monitoring, turbine controls with integrated automated optical systems for avian and bat detection, safe deterrent systems to reduce wildlife interactions

Floating Wind Turbine Installation Strategies - Strategies to allow turbine/platform systems to be assembled and commissioned at quayside in local or regional port facilities for large turbines. Methods and installation strategies that consider weights, clearances, platform dimensions, water depth, assembly methods.

Heavy Lift Vessel Alternatives – Alternative, innovative vessel solutions realized through new ship designs or the repurposing of existing U.S.-flagged vessels. Vessel alternatives enabling quayside assembly and installation of 12 MW+ wind turbines. Includes vessels involved in offshore wind construction, cable laying, crew transfer, and service operation vessels.

Pillar 3 Roadmap Topics

Operation and Maintenance Topics

Offshore Wind Digitization through Advanced Analytics - Reduce labor at sea through SCADA data analytics, machine learning, condition monitoring technologies, advanced sensors, artificial intelligence, turbine-based robotics, drones, autonomous vessels, and self-healing materials.

Testing Methods and Infrastructure – Extend current blade and drivetrain testing protocols to ultra-large drivetrain and blades, shorten test time, increase test accuracy to identify field problems in the laboratory

High Sea-State Crew Transfer Solutions - Cost-effective solutions to widen construction and O&M weather windows without lowering safety to crew or increasing overall project risk.

O&M Strategies and Tools - Address U.S. specific requirements for ports, weather conditions, and bathymetry that require customized operational strategies including logistical strategies to optimize vessel availability, crew transport and training, vessel availability, scheduled maintenance, remote monitoring and diagnostics.

Pillar 3 Roadmap Topics

Supply Chain Topics

Technology Solutions to Accelerate U.S. Supply Chain - New technologies that accelerate the maturation of the U.S. supply chain and concepts that result in increased utilization of existing U.S. manufacturing, new manufacturing, and new system designs that favor local content.

Grid Access Study –Quantifying suitable access points to interface with the existing onshore grid and understanding the cost of making the interconnections.

Grid Expansion, Reliability, and Upgrades Study – A national-scale study on the long-term integration of 86 GW of offshore wind power capacity into the U.S. electricity system

Detailed Ports and Harbor Study – National study characterizing potential ports for collective use by the industry

How to Get Involved

Advisory Groups

Support to the Consortium

Research & Development Advisory Group (RDAG)

Eligibility

- Academic Institutions
- National Laboratories
- Research Organization

Responsibility

- Technical R&D input

Strategic Advisory Network (SAN)

Eligibility

- Academic Institutions
- Utilities
- State and Federal Authorities
- NGOs

Responsibility

- Strategic, technical, commercial, regional and national input

Manufacturing, Supply Chain and Service Council (MSSC)

Eligibility

- Manufacturers
- Technical Consultancies
- Service Providers
- Supply Chain members

Responsibility

- Technical R&D and commercial input

Tech To Market Group (TTM)

Eligibility

- Venture capital firms
- Entrepreneurs
- Philanthropic organizations
- Technology incubators

Responsibility

- Invest in innovative technologies/startups

Research & Development Advisory Group (RDAG)

Open to academic institutions, national laboratories, and other research organizations engaged research and development of offshore wind or related technology in the United States

Interim RDAG Leadership Team:

Chair

Fotis Sotiropoulos



Dean, College of Engineering
and Applied Sciences



Vice Chair

Amy Halloran



Senior Manager, Renewable
Energy Program



Secretary

Habib Dagher



Director of the Advanced
Structure and Composites
Center





Questions?

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NYSERDA



Thank you for attending our webinar

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Northeast Wind Resource Center: www.northeastwindcenter.org

DOE Wind Exchange: <https://windexchange.energy.gov/>

