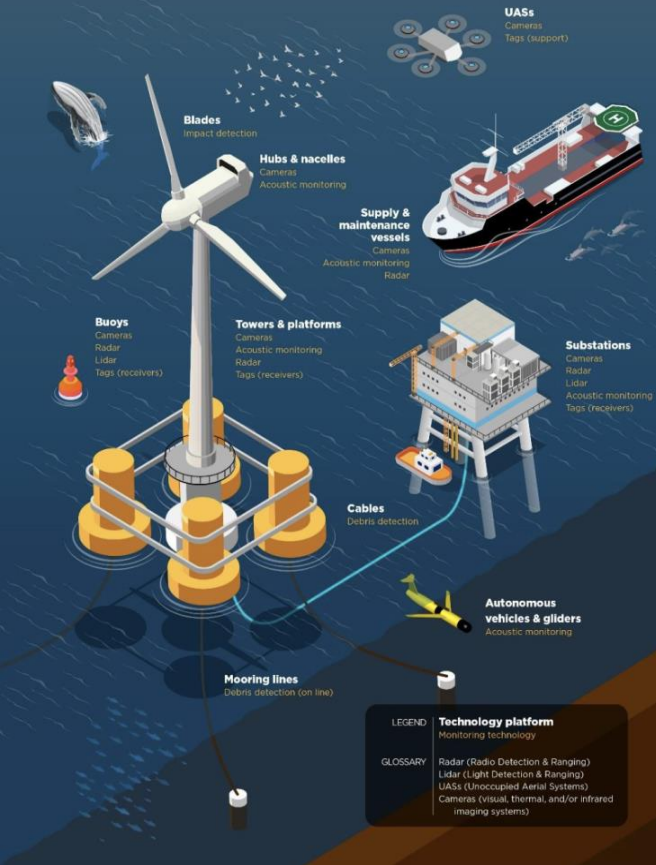


Learning from the Experts Webinar Series

Innovations and Emerging Technologies in Offshore Wind



Christine Sloan
Deputy Executive Director
National Offshore Wind Research and
Development Consortium (NOWRDC)

May 29, 2024

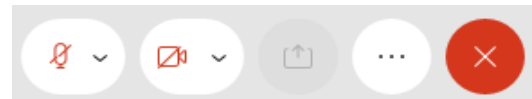
Meeting Procedures

Webinar recordings and presentations will be available at:

www.nyserda.ny.gov/osw-webinar-series

Participation for Members of the Public:

- > Members of the public will be muted upon entry.
- > Questions and comments may be submitted in writing through the Q&A feature at any time during the event. Please submit to **All Panelists**.
- > If technical problems arise, please contact Sal.Graven@nyserda.ny.gov



You'll see  when your microphone is muted

Learning from the Experts

This webinar series is hosted by NYSERDA's offshore wind team and features experts in offshore wind technologies, development practices, and related research.

DISCLAIMER:

The views and opinions expressed in this presentation are those of the presenter and do not represent the views or opinions of NYSERDA or New York State.



NYSERDA



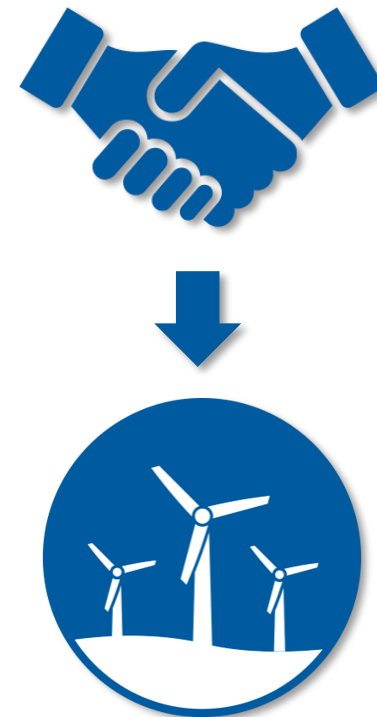


**National Offshore Wind Research and
Development Consortium**

May 29th, 2024

NOWRDC's Formation

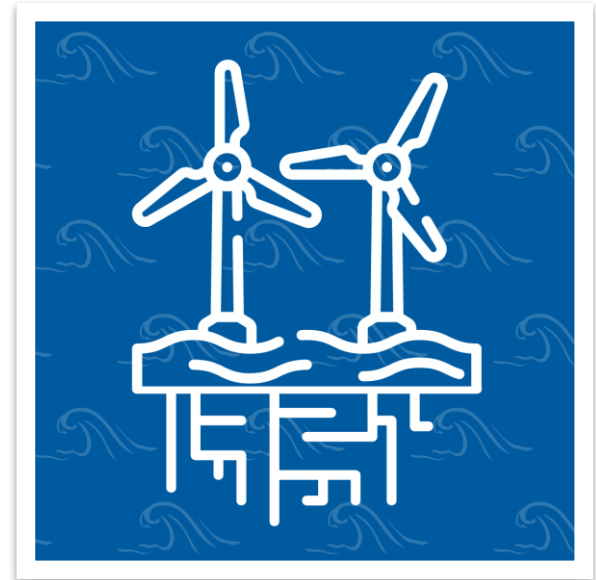
- **The National Offshore Wind Research and Development Consortium (NOWRDC) was created in 2018 when the U.S. Department of Energy selected the New York State Energy Research and Development Authority (NYSERDA), to create a new 501©3 non-profit organization to advance offshore wind technology R&D through competitive grants.**
- **DOE provided initial funding of \$20.5 million, which NYSERDA matched to form a funding pool of \$41 million.**
- **Today 7 states, 10 developers, and 12 other public and independent members make up the Consortium.**



NOWRDC's Mission

NOWRDC is a nationally-focused, not-for-profit organization collaborating with industry to fund prioritized R&D activities to:

- **Accelerate the deployment of offshore wind energy in the U.S.**
- **Address challenges and obstacles facing the offshore wind industry and maximize economic and social benefits.**
- **Reduce the levelized cost of energy (LCOE) of offshore wind in the U.S.**



Our Core Activities



Fund innovation directly responsive to the technical and supply chain barriers faced by offshore wind project developers in the U.S.



Convene strong networks (and solicit input from) connecting technology innovators, research institutions, project developers, supply chain companies, utilities, and state and federal government agencies



Increase U.S. content and job opportunities

NOWRDC Members and Board

Government & Utilities



Offshore Wind Developers



VINEYARD OFFSHORE

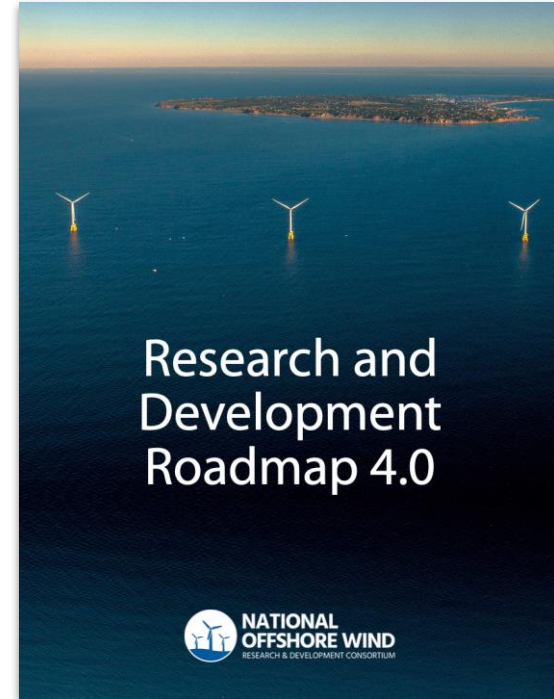


Independent Offshore Wind Industry Members



Research and Development Roadmap 4.0

- NOWRDC's R&D Roadmap serves as our overarching technical guidance document
- Specifically focused on technology advancement in 3 pillars:
 - Pillar 1: Offshore Wind Farm Technology Advancement
 - Pillar 2: Offshore Wind Power Resource and Physical Site Characterization
 - Pillar 3: Installation, Operations and Maintenance, and Supply Chain
- The Roadmap is updated approximately every 2 years
- Version 4.0 was released in April 2023



R&D Projects Funded to Date

Project Distribution by Technical Area

Wind Resource & Site Characterization

10.5%

Supply & Logistics

10.5%

O&M & Safety

22.8%

Electrical Power Systems

15.8%

Environmental and Conflicting Use

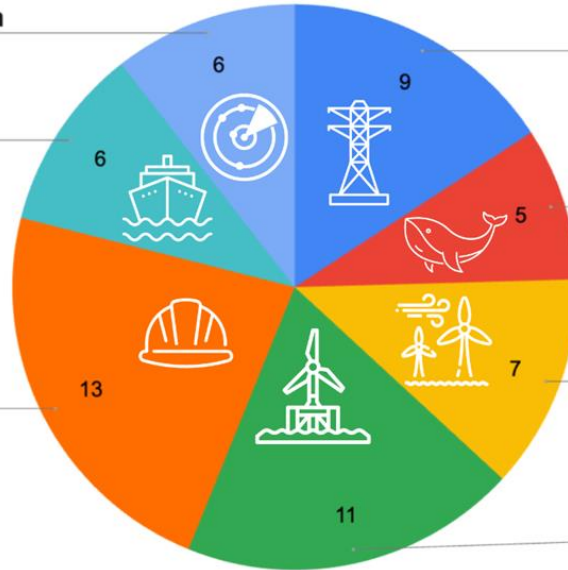
8.8%

Fixed Structure Engineering

12.3%

Floating Structure Engineering

19.3%



Supply Chain & Logistics

- **Supply Chain**
 - **Technology Solutions to Accelerate U.S. Supply Chain**
 - **Industrialization of the Floating Supply Chain**
 - **Decommissioning, Life Extension, and Infrastructure Repowering**
- **Accelerating U.S. Offshore Wind Infrastructure**
 - **Grid Integration and Market Impacts**
 - **Feasibility Studies and Bases of Design for Port Upgrades**
 - **Workforce Development**

Supply Chain & Logistics Project used in South Fork Wind Farm

NOWRDC's project with Crowley, "[Technical Validation of Existing U.S. Flagged Barges as a 'Feeder' Solution for the U.S. Offshore Wind Industry](#)," focused on the feasibility of using minimally modified U.S.-flagged barges, accompanied by tugs, to efficiently deliver WTGs to WTIVs offshore.

The Findings: A Cargo Feeder System (CFS) comprising a lead tug, a deck cargo barge loaded with WTG components, and a support tug can effectively deliver to WTIVs. This approach:

- Streamlines operations,
- Reduces downtime and costs,
- Leverages existing vessels to keep WTIVs continually erecting wind generators.



Electric Power Systems

- **Offshore Power System Design and Innovation**
 - Grid Access, Expansion, and Transmission Upgrades
- **Energy Storage Integration Resilience and Reliability**

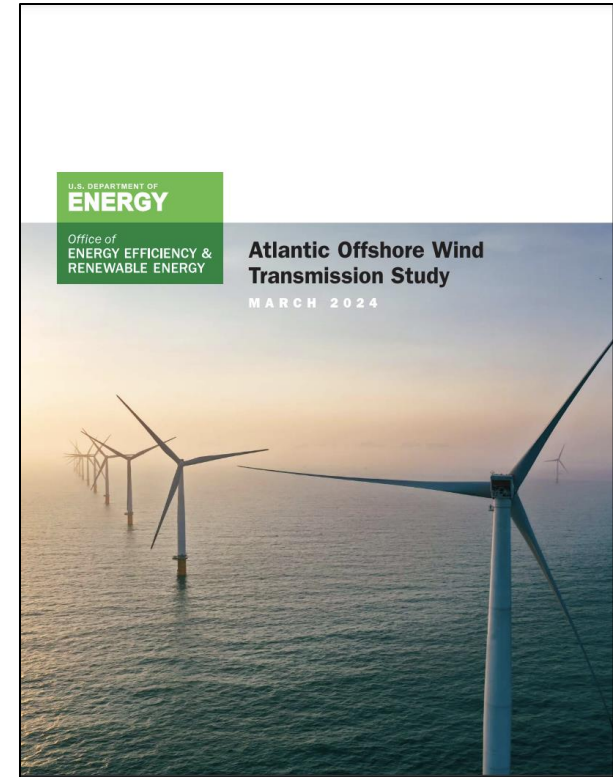
Electric Power System Projects Support the Atlantic Offshore Wind Transmission Study

NOWRDC's projects with Tufts and NREL, "[Transmission Expansion Planning Models for Offshore Wind Energy](#)" and "[Development of Advanced Methods for Evaluating Grid Stability Impacts](#)," respectively, both focused on critical grid and transmission needs relevant to enabling offshore wind energy deployment along the U.S. Atlantic Coast.

The Findings:

The Tufts project developed an integrated approach to understanding large OSW injections that includes power systems analysis, HVDC technology, and policy assessment.

Offshore plant modeling, characteristics of points of interconnections, stability aspects, and a co-simulation approach from NREL's project were all utilized in the Atlantic OSW Transmission Study.



Fixed & Floating Structure Engineering

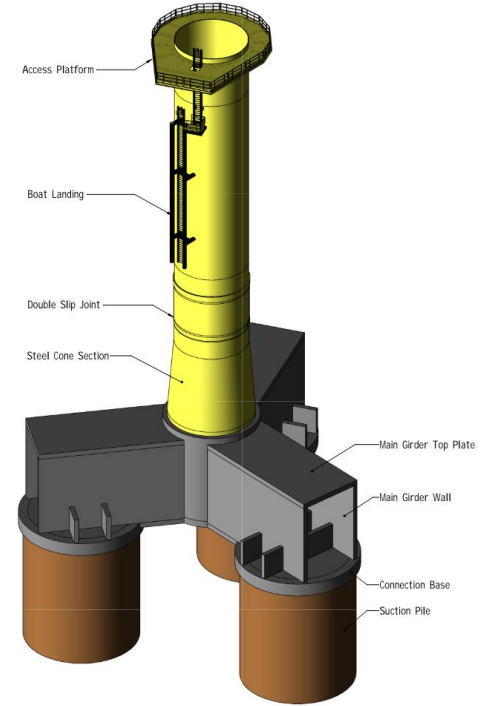
- **System Adaptations for 15 MW Turbine Platform**
 - **Cost-Reducing Turbine Support Structures for U.S. Markets**
 - **Enabling Balance of System for Large-Scale Offshore Wind Turbines**
 - **Optimization Strategies for 15 MW Class Turbines**
 - **Large Turbine and Substructure Testing Methods**
- **Array Design, Optimization, and Control**
 - **Array Design and Optimization Tools**
 - **Mitigation of Offshore Wind Inter-Array Effects**
 - **Modeling Large Floating Arrays**
- **Mooring, Anchoring, and Station Keeping**
 - **Deepwater Mooring Systems**
 - **Shallow-Water Mooring Concepts**
- **Adaptations for New Markets**
 - **Hurricane Resilient Wind Systems and Environmental Extremes**
 - **Overcoming Great Lakes Wind Design Constraints**

Fixed Structure Engineering

NOWRDC's project with DEME, "[Tri-Suction Pile Caisson Foundation Concept](#)," focused on designing this concept with basic fabrication and transport & installation methodology and then quantifying how this foundation concept compares, technically and commercially, to traditional foundation concepts.

The Findings:

- **The noiseless and vibration-free suction process employed to secure the TSPC to the seabed doesn't disrupt marine life or negatively affect the hearing abilities of marine mammals.**
- **Competes effectively on sites with limited overburden and where drilling is necessary for monopiles.**
- **More cost-effective than other noiseless foundations, such as suction pile jackets.**



Floating Structure Engineering

NOWRDC's project with Triton Systems, Inc., "[Innovative Anchoring System for Floating Offshore Wind](#)" focused on addressing the challenges associated with anchoring floating offshore wind turbines, including how high weights and forces ultimately convert into high costs.

The Findings:

- **Reduced fabrication and installation costs while also meeting floating anchoring requirements.**
- **Successfully conducted capacity testing on a pilot-scale anchor and received an ABS Type Approval.**



Environmental & Conflicting Use

- **Technology to Reduce Conflicts and Increase Coexistence with Ocean Users**
 - **Technology Solutions to Mitigate Wildlife Conflicts**
 - **Solutions for Coexistence and Co-use with Other Ocean Users**

Environmental & Conflicting Use

NOWRDC's project with Worley Consulting, "[Technology Development Priorities for Scientifically Robust and Operationally Compatible Wildlife Monitoring and Adaptive Management](#)" identified technology gaps for monitoring marine mammals and birds for fixed and floating OSW.

The Findings:

- The results include a synthesis of technology gaps, potential solutions, and opportunities to improve and implement monitoring technologies as well as integration into operations equipment.
- There remain challenges with cost-effective, safe, scalable offshore deployment of some monitoring systems, as well as with the collection of statistically robust datasets.
- Identified mismatch between the typical timing of infrastructure design and the development of monitoring plans.



Wind Resource & Site Characterization

- **Metocean Research**
 - **Validation of Wind Resources and External Conditions**
 - **Characterization of Extreme Conditions at U.S. Wind Energy Resource Areas**
 - **Development of a Metocean Reference Site**
- **Physical Site Characterization**
 - **Seabed Survey Methods, Geophysical, and Geotechnical Database**

Operations and Maintenance and Safety

- **Adapting Installation Strategies for U.S. Constraints**
- **Operation and Maintenance Innovations**
 - **Offshore Wind Digitization Through Advanced Analytics**
 - **Operations and Maintenance Strategies and Tools**
 - **Floating Wind Operations and Maintenance**

Why does it matter?

- NOWRDC's mission is to collaborate with industry on prioritized R&D activities to reduce the levelized cost of energy (LCOE) of offshore wind in the U.S. while maximizing other economic and social benefits.
- We continue to evaluate the broader impact these initiatives have had on the industry and assess for our future investments.
- By sharing key learnings and best practices from our funded projects, we aim to maximize their impact and further our overarching mission.

What Comes Next?

- There are still many opportunities for R&D and new innovations and advancements to aid the industry.
- We work closely with our partners to identify the greatest needs/challenges and prioritize resources and efforts accordingly.

- NOWRDC is planning to update and publish our next Roadmap version 5.0 in early 2025.
- We plan to release a solicitation for offshore wind R&D proposals this summer.



Thank you

*NOWRDC's full project database is available here:
<https://nationaloffshorewind.org/project-database/>*



**NATIONAL
OFFSHORE WIND**
RESEARCH & DEVELOPMENT CONSORTIUM

Next Webinars

June 12, 1:00 p.m. ET

**How Offshore Wind Connects to
New York's Electric Grid
New York Independent System
Operator (NYISO)**

July 10, 1:00 p.m. ET

**The Commercial Sale of Offshore
Wind Power Generation
Power Advisory**

Visit wind.ny.gov to register

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- U.S. and European Research to Transform Our Energy Systems
- How to Tap Into the Offshore Wind Supply Chain
- Assessing and Advancing Transmission Upgrades for Offshore Wind
- Hydrogen & Offshore Wind

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