



**National Offshore Wind Research and
Development Consortium**

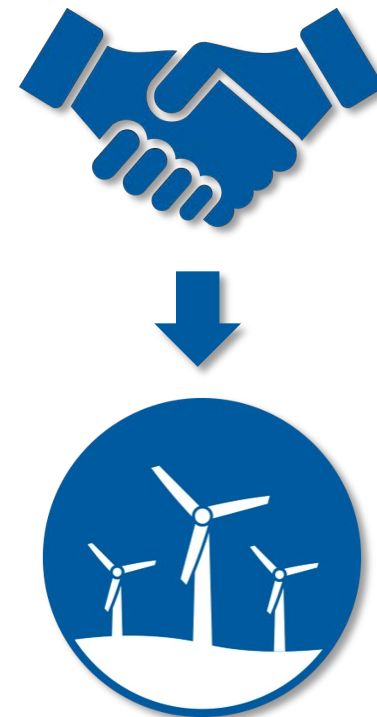
VA OSW Development Authority (VOWDA)

R&D Subcommittee

Monday, August 21, 2023

NOWRDC's Formation

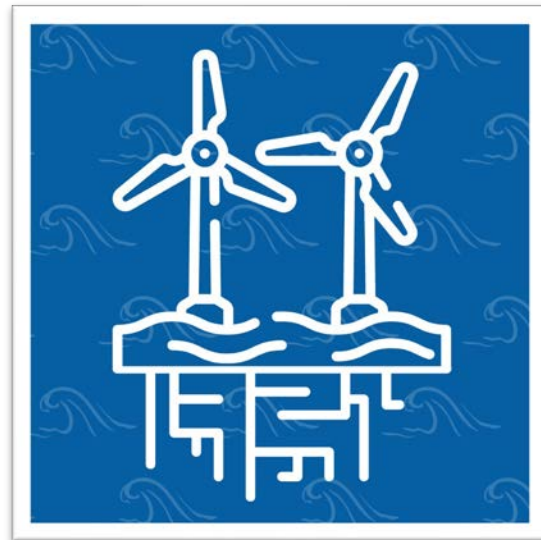
- The National Offshore Wind Research and Development Consortium (NOWRDC) was created in 2018 when the U.S. Department of Energy selected the New York State Energy Research and Development Authority (NYSERDA), to create a new 501©3 non-profit organization to advance offshore wind technology R&D through competitive grants.
- DOE provided initial funding of \$20.5 million, which NYSERDA matched to form a funding pool of \$41 million.
- Since NOWRDC's formation, 7 states, 12 developers, and 12 other public and independent members have joined 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, offshore wind and transmission developers and supply chain companies, utilities and state and federal government agencies



Increase U.S. content and job opportunities

NOWRDC Members and Board

Government & Utilities



NY Power Authority



Offshore Wind Developers



equinor



TotalEnergies



Ørsted

bp



RWE



VINEYARD WIND



RISE
LIGHT & POWER

hexicon

Independent Offshore Wind Industry Members



GE Renewable Energy



NOWRDC Staff



Lyndie Hice-Dunton
Executive Director



Kori Groenveld
Senior Program
Manager



Julian Fraize
Program Manager



Christine Sloan
Deputy Executive
Director



Melanie Schultz
Program Manager



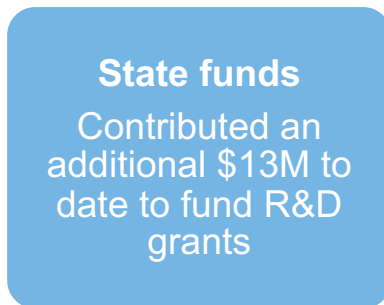
**Julia
Dombroski**
Innovation
Hub Associate

NOWRDC Innovation Funding to Date

2018



2018 - 2023



Present



Funding Result:



3 competitive solicitations to date



Resulting in 51 project awards



Totaling \$34M in core R&D grant funding



And over \$9M in cost share funding by project partners leveraged

R&D Projects Funded to Date

Project Distribution by Technical Area

Wind Resource & Site Characterization

8.3%

Supply & Logistics

10.4%

O&M & Safety

12.5%

Floating Structure Engineering

20.8%

Transmission and Grid Stability

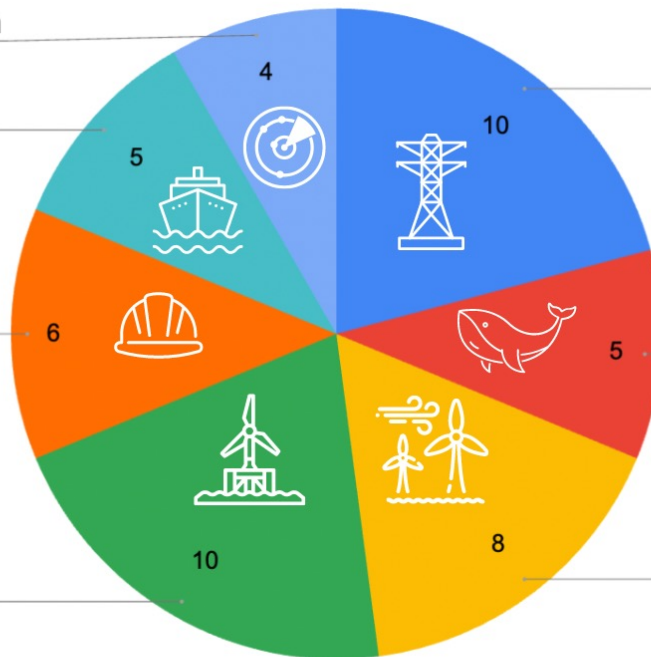
20.8%

Environmental and Conflicting Use

10.4%

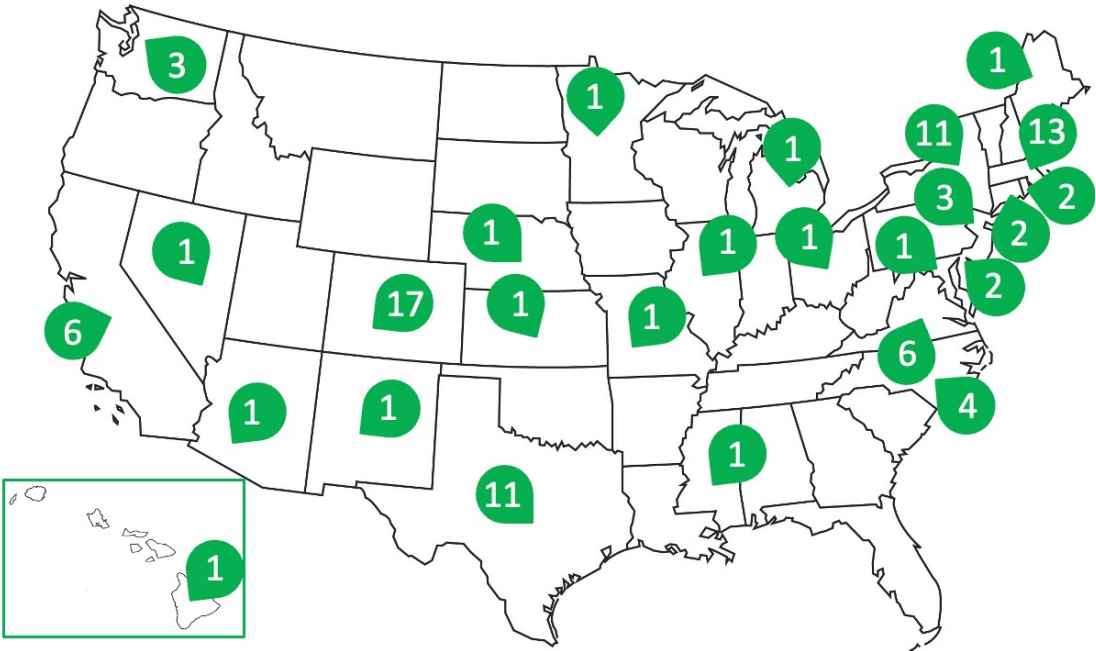
Fixed Structure Engineering

16.7%

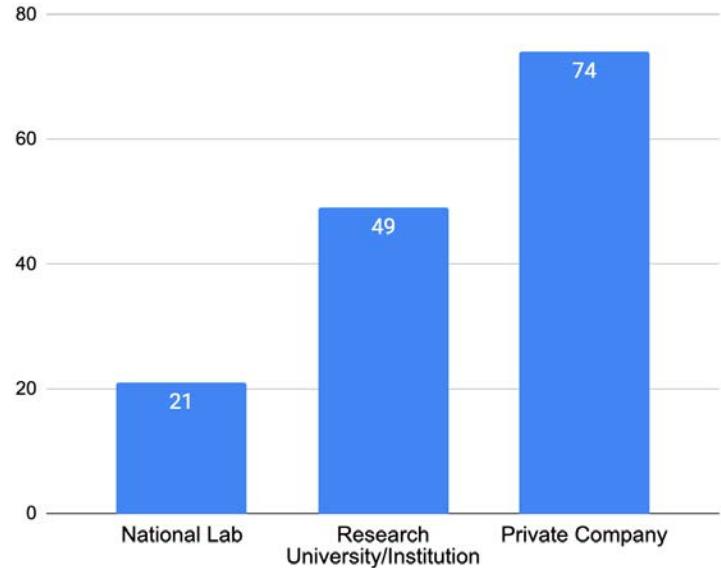


Project Map & Awardee Distribution

*Includes prime awardees and subcontractors



Award Count by Awardee Type



*National Lab awardees include National Renewable Energy Laboratory, Sandia National Laboratory, and Pacific Northwest National Laboratory



VI

Floating Structure Engineering

\$3.11m

PCCI, Inc.

1. Quarter Scale Testing of the Intelligent Mooring System for FOWT Platforms

Virginia Tech/NYSERDA/NORWRDC

2. Dual-Functional Tuned Inerter Damper for Enhanced Semi-Sub Offshore Wind Turbine

DNV-GL

Subcontracting with University of Maine

3. Design and Certification of Taut-synthetic Moorings for Floating Wind Turbines Platforms

III

O&M and Safety

\$1.08m

Metron, Inc.

Subcontracting with Anduril Industries, Inc.

4. Fully Autonomous Subsea Asset Inspection by a Shore-Launched AUV

I

Supply Chain and Logistics

\$400k

DNV-GL

Subcontracting with NREL

5. 30GW by 2030: Supply Chain Roadmap for Offshore Wind in the US

IV

Environmental & Conflicting Use

\$294k

Old Dominion University

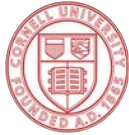
Subcontracting with CODAR Ocean Sensors LTD

6. Oceanographic HF Radar Data Preservation in Wind Turbine Interference Mitigation

Novel Approaches to Delivering on Mission



NREL



Inter-Array
Wake JIP

NOWRDC has co-formed a joint industry project with NREL and Cornell University, bringing industry and the public sector together to analyze inter-array impacts and how to mitigate them



Equinor OSW
Innovation
Hub



equinor

The Equinor OSW Innovation Hub will develop startups that can provide value for offshore wind development. NOWRDC will support this new innovation hub through technical offshore wind guidance as well as network support.



Innovate
UK

NOWRDC is planning a joint solicitation with Innovate UK – Target Fall 2023

- The solicitation aims to catalyze offshore wind innovation that responds to common challenges in the UK and the U.S.
- Solicitation will procure projects that will be based in both the UK and the U.S., focused on mutual offshore wind challenge areas

Deploying Project Results

NOWRDC has created effective means for sharing project results with the offshore wind industry:

Project Advisory Boards

- Approximately 125 project advisors across NOWRDC's project portfolio, primarily SMEs within OSW developers
- An average of 6 external industry advisors on each project

Project Database

- Accessible repository on NOWRDC's website with key info on all projects for industry to use

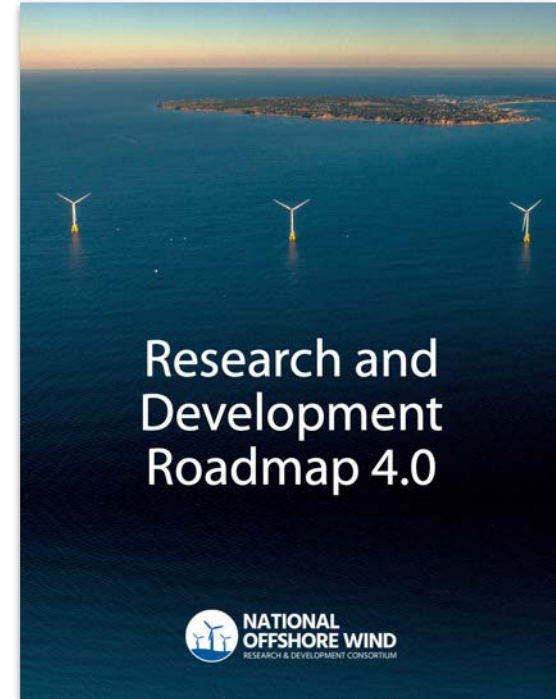
Annual National Offshore Wind R&D Symposium

- Multi-day conference showcasing NOWRDC's project portfolio and bringing together researchers to learn from each other
- 1,200 virtual registrants in 2021
- The annual Symposium will be hybrid, in-person in New York on December 4 & 5 with a virtual livestream option



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



State Member Benefits

- Participation in Board of Directors, R&D Committee, and State Action Network
 - Network connections that provide value beyond technical R&D
- Ability to steer NOWRDC's R&D agenda and resulting project awards
- Opportunities to leverage funding and form collaborative innovation programs with other states and countries



Areas for VA Energy Involvement – NOWRDC Membership



Board of Directors – meets quarterly
Next meeting Nov 15th – Virtual

State Action Network – meets quarterly
Next meeting November TBD – Virtual

R&D Committee – meets monthly
Next meeting August 22nd – Virtual



- Each contracted NOWRDC project has a project advisory board (AB)
 - ABs give industry guidance to projects
 - They also help transfer project information to the broader industry
- Full list of projects is here - <https://nationaloffshorewind.org/project-database/>
- Advisors do have to sign a confidentiality agreement

Areas for VA Energy Involvement – Leveraged Funding



- SMART-POWER Workforce and Supply Chain Analysis project
 - Builds off of previously funded 30GW by 2030 National Supply Chain Roadmap project
 - Kicking off now
- Joint solicitation processes (e.g., Innovate UK-NOWRDC)
- NOWRDC solicitations with state- and federally-leveraged funding, targeted for 2023/2024



Thank you

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



**NATIONAL
OFFSHORE WIND**
RESEARCH & DEVELOPMENT CONSORTIUM

Appendix I: NOWRDC Projects by Technical Challenge Area

NOWRDC Projects: Transmission and Grid Stability

Contractor	Project Title
NREL	Development of Advanced Methods for Evaluating Grid Stability Impacts
PNNL	An Offshore Wind Energy Development Strategy to Maximize Electrical System Benefits in Southern Oregon and Northern California
GE Research	DC Collection and Transmission for Offshore Wind Farms
Tufts University	Transmission Expansion Planning Models for Offshore Wind Energy
Offshore Wind Consultants	Shared Landfall and Onshore Cable Infrastructure for Cable Colocation Feasibility Study
ThayerMahan	Transmission and Export Cable Fault Detection and Prevention Using Synthetic Aperture Sonar
University of Michigan	Robust Stabilization of Subsea Power Cables using Nonlinear Energy Sinks
Clarkson University	Atlantic seaboard offshore stability risk evaluation & service
Rutgers University	AIRU-WRF: AI-powered Physics-based Tool for OSW Forecasting and Grid Integration

NOWRDC Projects: Environmental & Conflicting Use

Contractor	Project Title
CODAR Ocean Sensors LTD	Oceanographic HF Radar Data Preservation in Wind Turbine Interference Mitigation
Advisian	Technology Development Priorities for Scientifically Robust and Operationally Compatible Wildlife Monitoring and Adaptive Management
Cornell University	Right Wind: Resolving Protected Species Space-Use Conflicts in Wind Energy Areas
Northeastern University	Long-Term Availability and Bankability of Offshore Wind Through Hurricane Risk Assessment and Mitigation
Saildrone	Renewable Powered, Uncrewed Mobile Assets to Monitor Protected Marine Mammals
NREL	Co-Design Solutions for U.S. Floating Offshore Wind and Fishing Compatibility

NOWRDC Projects: Fixed Structure Engineering

Contractor	Project Title
ESTEYCO SL	Self-Installing Concrete Gravity-Base Substructure Sizing for 15MW Turbine
Texas A&M	Vibratory-Installed Bucket Foundation for Fixed Foundation Offshore Wind Towers
Keystone Tower Systems	Tapered Spiral Welding for US Offshore Wind Turbine Towers
DEME Offshore US LLC	Tri-Suction Pile Caisson Foundation Concept
RCAM Technologies	A Low-Cost Modular Concrete Support Structure and Heavy Lift Vessel Alternative
Stony Brook University	Computational Control Co-design Approach for Offshore Wind Farm Optimization
NREL	Wind Farm Control and Layout Optimization for U.S. Offshore Wind Farms

NOWRDC Projects: Floating Structure Engineering

Contractor	Project Title
PCCI, Inc.	Quarter Scale Testing of the Intelligent Mooring System for FOWT Platforms
ESTEYCO	Evolved Spar Concrete Substructure for Floating Offshore Wind US-Based Design
Deep Reach Technology	Application of Novel Offshore Oil & Gas Platforms to Large Wind Turbines
Virginia Tech	Dual-Functional Tuned Inerter Damper for Enhanced Semi-Sub Offshore Wind Turbine
NREL	Standardized Scalable Mooring Solutions Optimized for the U.S. Supply Chain
NREL	Shared Mooring Systems for Deep-Water Floating Wind Farms
Principle Power, Inc.	Innovative Deepwater Mooring Systems for Floating Wind Farms (DeepFarm)
Principle Power, Inc.	Demonstration of Shallow-Water Mooring Components for FOWTs (ShallowFloat)
UMass Amherst	Techno-Economic Mooring Configuration and Design for Floating Offshore Wind
Triton Systems, Inc	Innovative Anchoring System for Floating Offshore Wind
University of Maine	Design and Certification of Taut-synthetic Moorings for Floating Wind Turbines

NOWRDC Projects: O&M and Safety

Contractor	Project Title
EPRI	Verifying OSW Turbine Blade Integrity During Manufacture
GE Renewable Energy	Self-Positioning Single Blade Installation Tool
GE Research	Autonomous Vessel-Based Multi-Sensing System for Inspection and Monitoring
UMass Lowell	A Novel Structural Health Monitoring System for Offshore Wind Turbine
Anduril Industries Inc.	Fully Autonomous Subsea Asset Inspection by a Shore-Launched AUV
Tagup Inc.	Survival Modeling for Offshore Wind Prognostics
GE Research	Enabling Condition Based Maintenance for Offshore Wind
GE Research	Radar Based Wake Optimization of Offshore Wind Farms
Tufts University	Physics Based Digital Twins for Optimal Asset Management

NOWRDC Projects: Supply and Logistics

Contractor	Project Title
NREL	SMART-POWER Workforce and Supply Chain Analysis
NREL and BNOW	30GW by 2030: Supply Chain Roadmap for Offshore Wind in the US
Crowley	Technical Validation of Existing U.S. Flagged Barges as a “Feeder” Solution for the U.S. Offshore Wind Industry
Exmar Offshore Company	Feasibility of a Jones Act Compliant WTIV Conversion
MARIN USA	Comparative Operability of Floating Feeder Solutions
GE Renewable Energy	Weld Assembly of Large Castings
EPRI	Verifying OSW Turbine Blade Integrity During Manufacture

NOWRDC Projects: Wind Resource and Site Characterization

Contractor	Project Title
NREL	A Validated National Offshore Wind Resource Dataset with Uncertainty Quantification
GE Research	Impact of Low Level Jets on Atlantic Coast Offshore Wind Farm Performance
Cornell University	Reducing LCoE from Offshore Wind by Multiscale Wake Modeling
WHOI	Development of a Metocean Reference Site near the MA & RI Wind Energy Areas