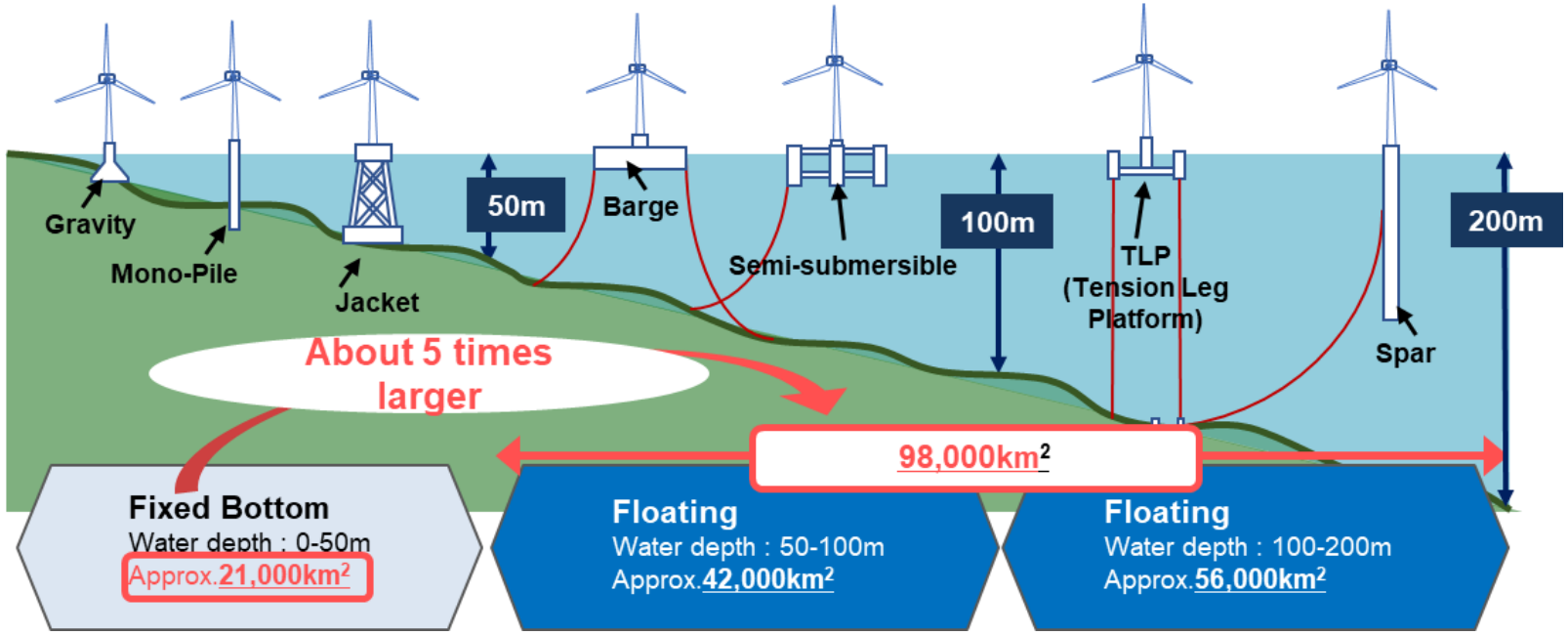
The Environment Surrounding Offshore Wind Power Generation in Japan

Research and development of wind power and related technologies, support projects for the introduction of wind power, and the Green Innovation Fund Project for cost reduction of offshore wind power. The wind power market continues to expand rapidly worldwide. In particular, as Japan is surrounded by the sea, the promotion of offshore wind power generation is expected in the future. The enforcement of the "Act on Promoting the Utilization of Sea Areas for the Development of Marine Renewable Energy Power Generation Facilities (Renewable Energy Sea Area Utilization Act)" in 2019, and the "Offshore Wind Power Industry Vision (First Edition)" presented by the Public-Private Council for Strengthening Industrial Competitiveness in Offshore Wind Power, have provided concrete goals for both the public and private sectors, further accelerating the expansion of the offshore wind power market.

In August 2025, the "Offshore Wind Power Industry Vision (Second Edition)"—with a particular focus on floating offshore wind—will be formulated, and further expansion of offshore wind power generation, especially floating offshore wind, is anticipated.

Against this backdrop, NEDO is promoting technology development that contributes to the commercialization and cost reduction of both fixed-bottom and floating offshore wind power generation.



Potential Area for offshore wind in Japan and Demonstration Project by Foundations type

NEDO Project Research and Development of Wind Power and Related Technologies

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Research and Development of Wind Power and Related Technologies Development of Next-Generation Technologies to Promote the Introduction of Floating Offshore Wind Power

Current Research and Development Themes

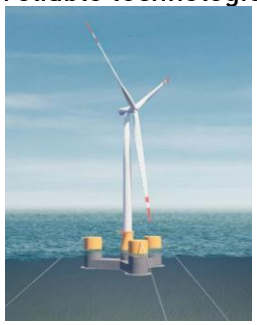
Development of Full Concrete Compact Semi-Submersible Floating Structures and Deep Water Mooring Technology

Project Operators: : Tokyo Electric Power Company Holdings, Inc., Hokkaido Electric Power Co., Inc., Taisei Corporation

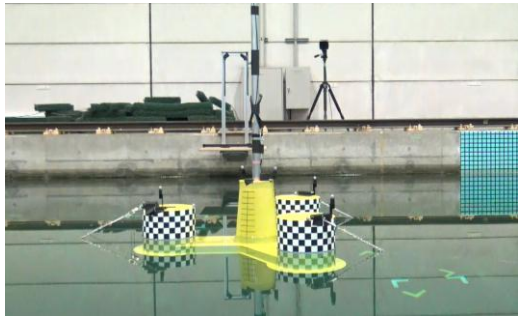
Concrete floating structures can source most of their primary materials domestically, ensuring excellent stability in material supply and contributing to the local economy through local production for local consumption.

In addition, to install them in the EEZ, it is necessary to develop a mooring system suitable for deep water that increases the use ratio of low-cost synthetic fiber ropes.

The purpose of this project is to resolve technical challenges related to concrete floating structures and deep-water mooring systems and establish them as low-cost, highly reliable technologies.



Full Concrete Semi-Submersible Floating Structure



Model Test in a Water Tank

Development of Wind Turbine Integrated Installation Technology for Cost Minimization

Project Operators：Toda Corporation

The spar-type floating structure requires assembling the wind turbine offshore, which increases the number of working days due to weather and sea conditions, becoming a factor that raises construction costs.

In this project, the goal is to reduce construction costs and achieve the minimum total cost for spar-type floating structures by developing a method that allows the wind turbine, assembled onshore or elsewhere, to be installed on the floating structure in one go, effectively shortening offshore work to just one day.

Integrated Wind Turbine Installation

NEDO Project　Research and Development of Wind Power and Related Technologies

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Research and Development of Wind Power and Related Technologies Development of Next-Generation Technologies to Promote the Introduction of Floating Offshore Wind Power

Current Research and Development Themes

Research and Development of the Double-Donut Spar-Type Floating Offshore Wind Power Generation System

Project Operators: : Kumagai Gumi Co., Ltd., Saga University, Yokohama National University, Chodai Co., Ltd.

To promote and expand the use of concrete floating foundations, we are advancing medium- to long-term technology development aimed at identifying, organizing, and verifying technical challenges based on factors such as meteorological and oceanographic conditions, water depths, and social acceptability in Japan's surrounding seas.Referring to technologies for concrete floating foundations that are planned for demonstration overseas, we are conducting development and feasibility studies for a hybrid spar-type concrete floating offshore wind power system suitable for domestic conditions.

Double-Donut Spar-Type Floating Structure

Fundamental Structure of the Double-Donut Spar

Development of TLP-Type Hybrid Floating Offshore Wind Turbine Support Structure

Project Operators : Obayashi Corporation

This project aims to develop a TLP-type hybrid floating structure to advance technologies that contribute to cost reduction and strengthening the supply chain, bringing floating offshore wind power to a stage where it can be commercialized at internationally competitive costs.

We are working on the development of key technologies, such as an original steel–concrete hybrid joint structure that enables mass production and cost reduction, as well as studying TLP-type hybrid floating structures equipped with wind turbines.

TLP-Type Hybrid Floating Structure

NEDO Project Research and Development of Wind Power and Related Technologies

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Research and Development of Wind Power and Related Technologies Development of Next-Generation Technologies to Promote the Introduction of Floating Offshore Wind Power

Current Research and Development Themes

Feasibility Study of Large-Scale Floating Vertical-Axis Wind Turbines

Project Operators: : Albatross Technology Co., Ltd., Electric Power Development Co., Ltd., Tokyo Electric Power Company Holdings, Inc., Sumitomo Heavy Industries Marine Engineering Co., Ltd., Kawasaki Kisen Kaisha, Ltd.

Vertical-axis wind turbines are lighter than conventional horizontal-axis wind turbines, making it possible to reduce the size and cost of floating structures.
This project aims to evaluate the feasibility of large-scale deployment of floating vertical-axis wind turbines (FAWT) by estimating equipment costs, maintenance and operational costs, supply chain considerations, and the domestic procurement rate for large-scale systems.

Double-Donut Spar-Type Floating Structure

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Research and Development of Wind Power and Related Technologies Development of Next-Generation Technologies to Promote the Introduction of Floating Offshore Wind Power

Current Research and Development Themes

Technical Development of Low-Cost Structures and Construction Methods for Scour Protection Works in Foundation-Based Offshore Wind Power

Project Operators: : Toa Corporation

The fixed foundations of offshore wind power facilities may face the risk of scour around the surrounding seabed due to severe waves and ocean currents. The standard method for scour protection is to use a crane vessel to install bag-type armor units tightly without gaps; however, this requires a large quantity of materials and many days to complete.

This project aims to establish an advanced construction method and shorten the schedule by developing a structure and installation technique that allows large bag-type armor units to be installed efficiently in one go, and by conducting real-sea experiments to verify the applicability of sheet structures as an alternative material.

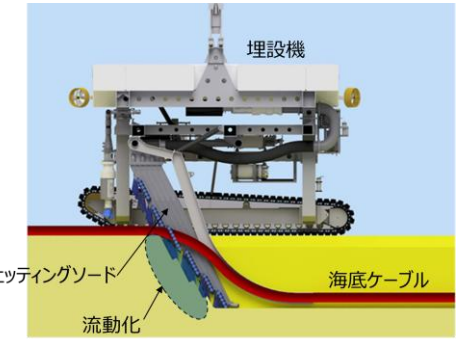
Large Experimental Bag-Type Riprap Material

Experimental Scour Protection Sheet

Demonstration of Water Jet-Type Submarine Cable Laying Machine Construction Technology

Project Operators :

In offshore wind power project areas, hard sandy ground is often present, and there are few achievements in cable laying under such ground conditions. There are many unknowns regarding the applicability and constructability of cable laying machines on hard ground, so this project will conduct demonstration experiments on the water jet laying method, verify constructability and adaptability to ground conditions, and establish cable laying technology.



Water Jet-Type Cable Laying Image

Offshore Cable Laying Barge

NEDO Project　Research and Development of Wind Power and Related Technologies

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