

Block Island Wind Farm

- Design and Construction
- Operations and Maintenance
- 3rd party independent verification

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ABS Group

DEEPWATERWIND

Clean energy is just over the horizon.



A reliable wind farm starts with appropriate project specific design criteria, verified by an independent 3rd party



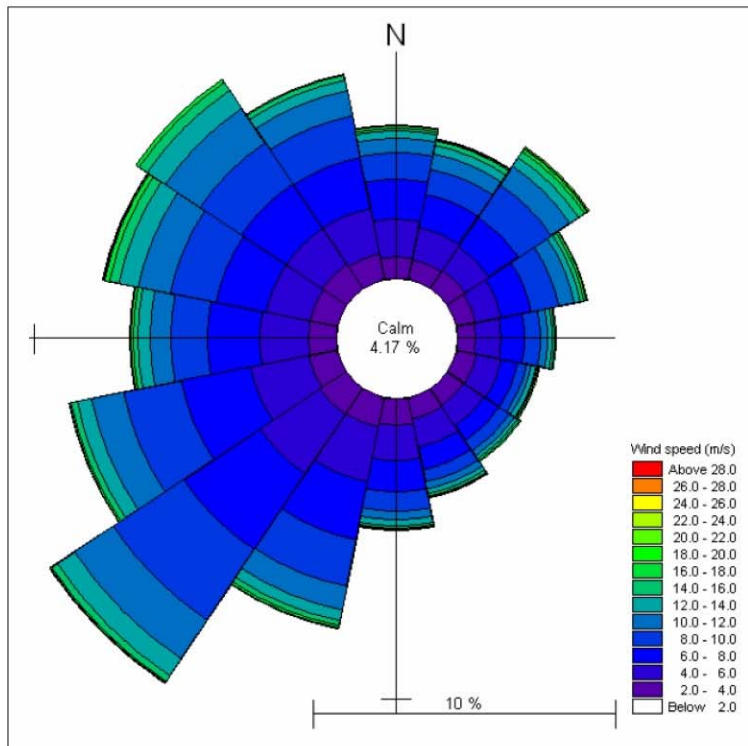
BIWF Design Conditions

- Design of the Block Island Wind Farm is based on an project specific in depth analyses of weather and sea state conditions
- Wind and wave design criteria were based on the 100 year return condition:
 - 100 year return average wind speed: 100 mph
 - For comparison, Superstorm Sandy max wind gust speed was 90 mph in NJ
 - 100 year return wave height: 50 feet
 - The foundation was also verified for the 1000 year return wind and wave conditions
 - Fatigue analysis demonstrating a fatigue life of 25 years

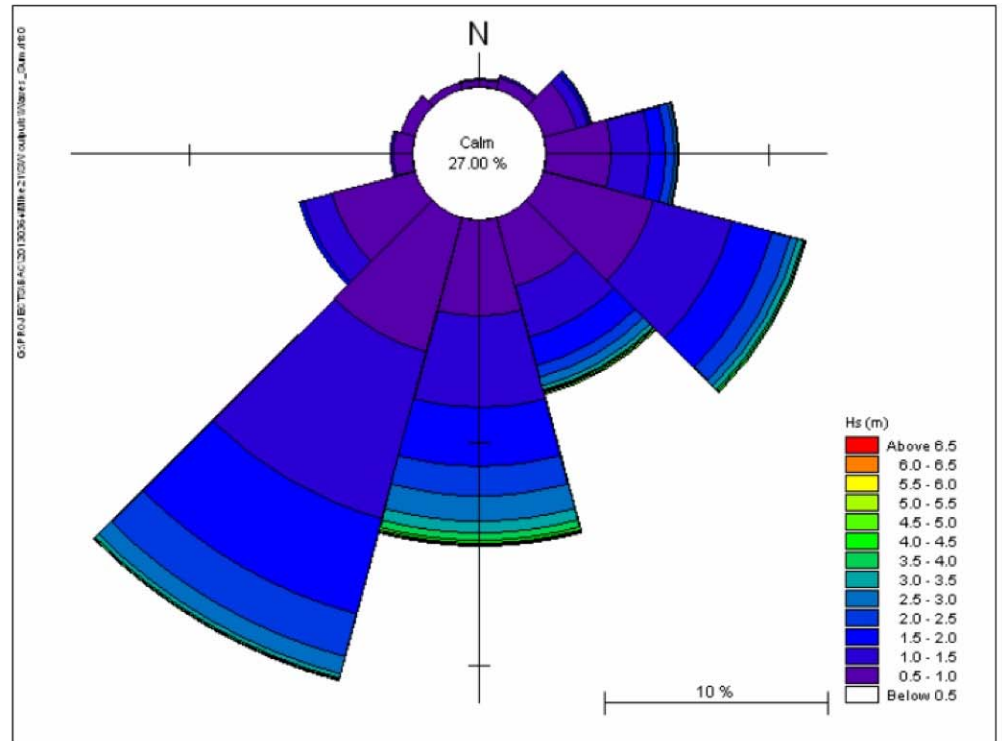
The CVA verified these criteria, including wave heights and wind speeds, and reported independently to the CRMC

Load Simulation - Inputs

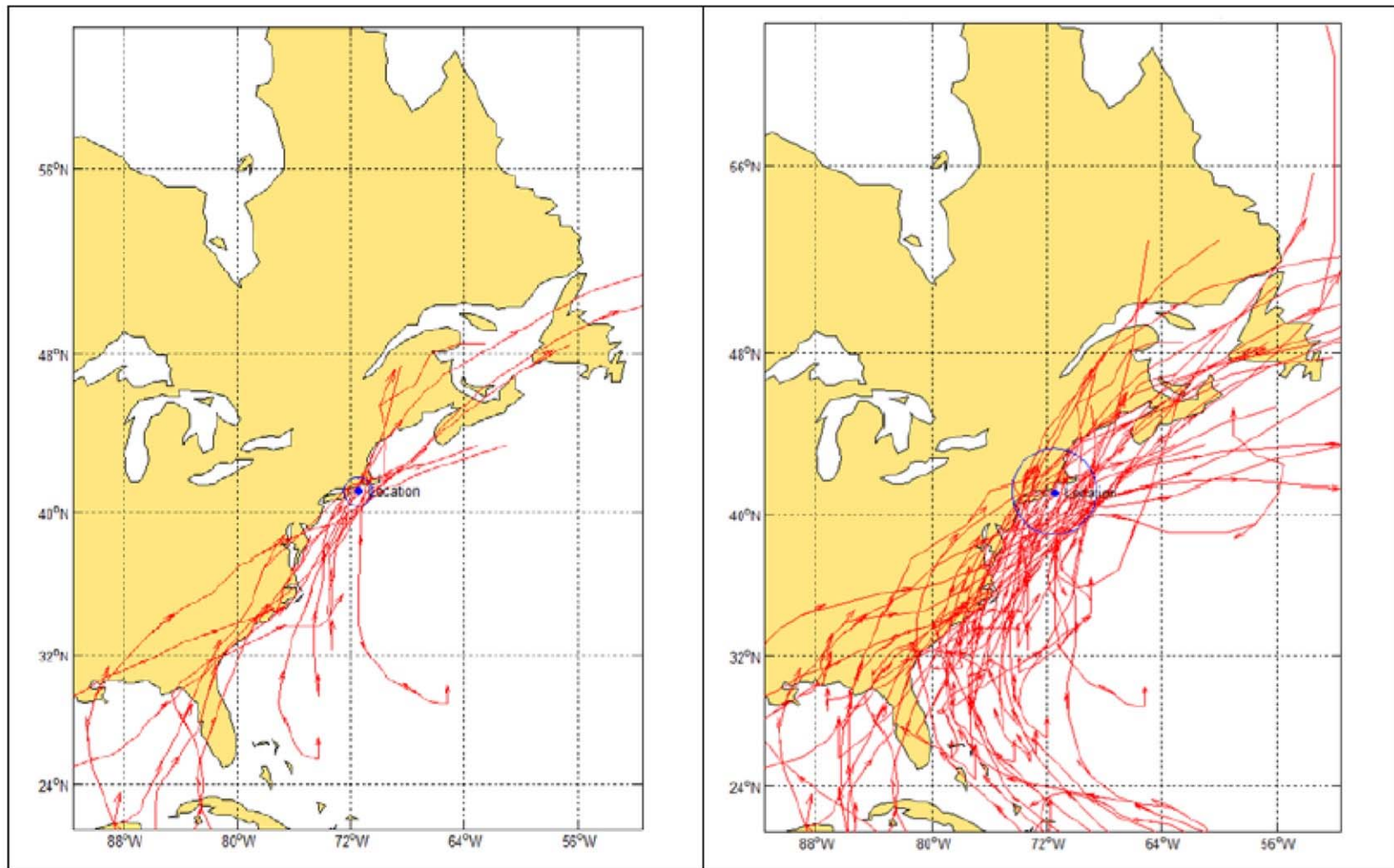
Wind Rosette



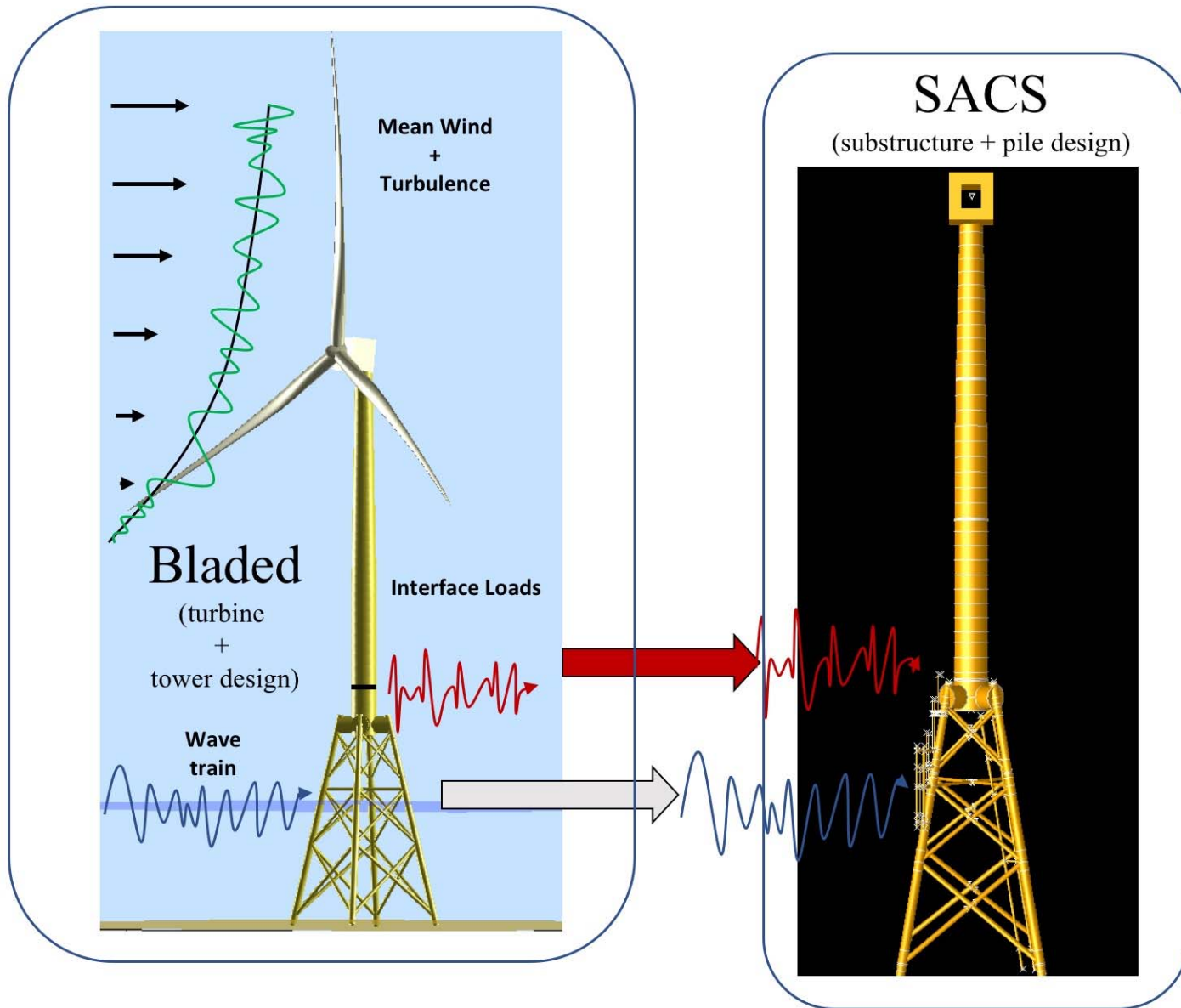
Wave Rosette



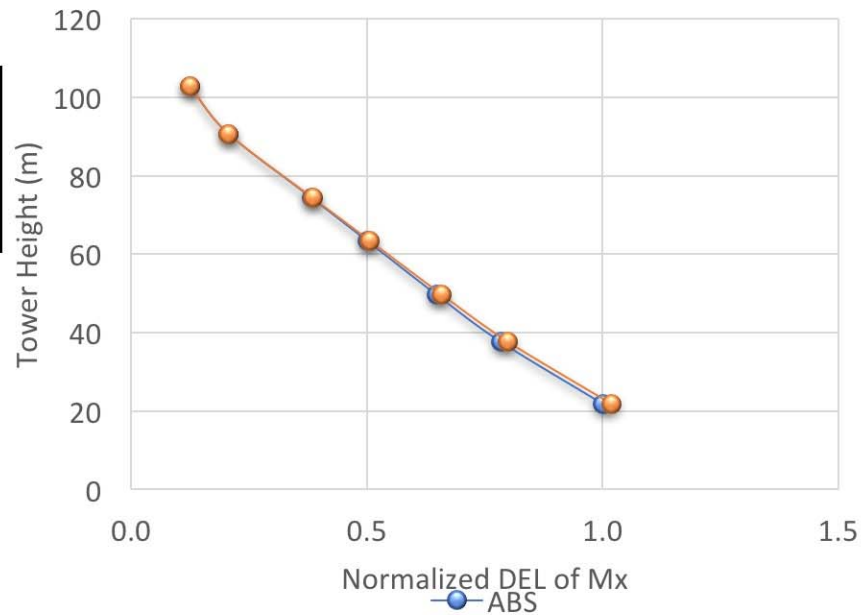
Load Simulation - Inputs



Load Simulation – Software Modeling

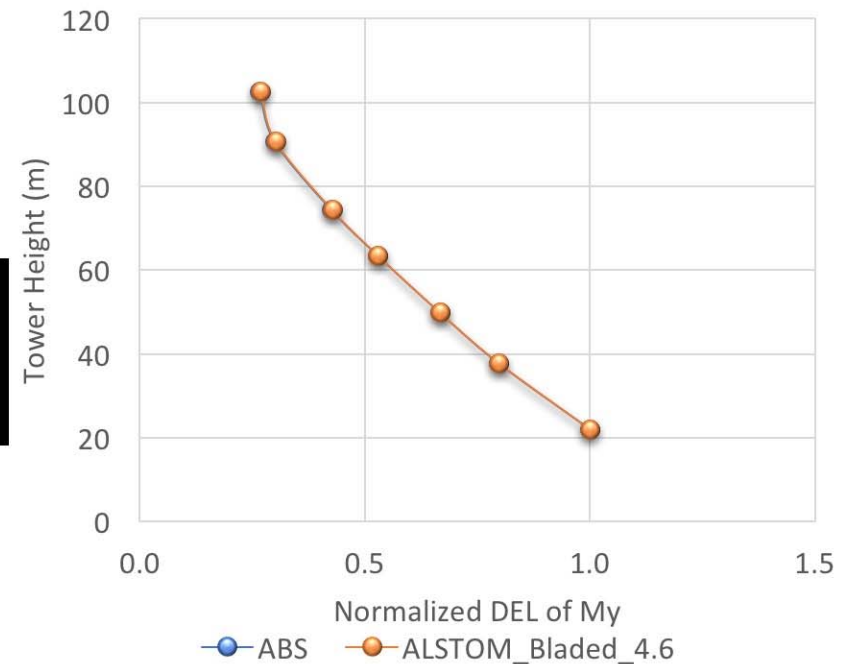


Load Simulation – Verification of Results



FLS Tower Load Comparison
Side-Side Bending Moments

FLS Tower Load Comparison
Fore-Aft Overturning Moments



Foundation Fabrication

Fatigue criteria are translated into:

- Material specs
- Welding procedures
- Quality control
- Inspection
- CVA inspection and QC review



Tapping into the US Offshore Industry

Building
Foundations in
the Gulf of
Mexico



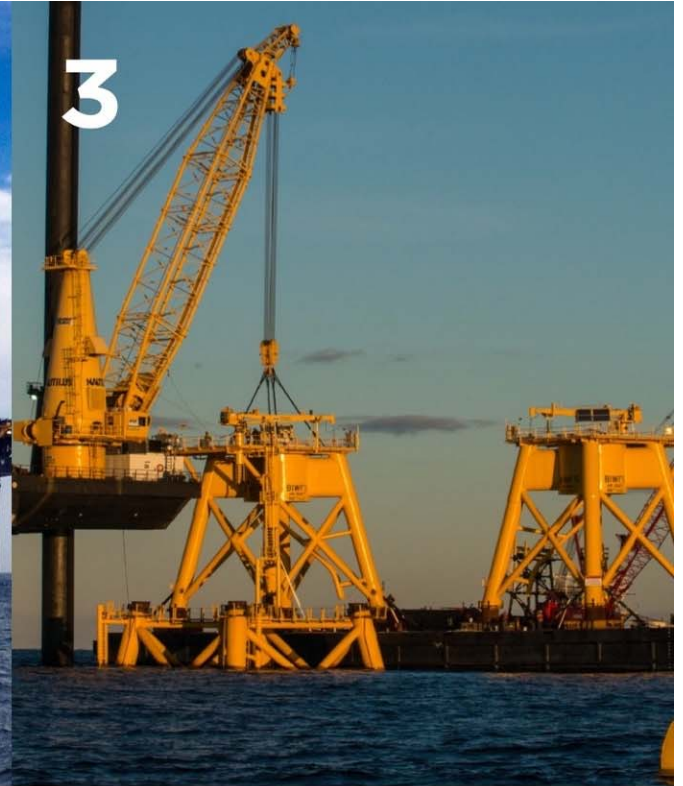
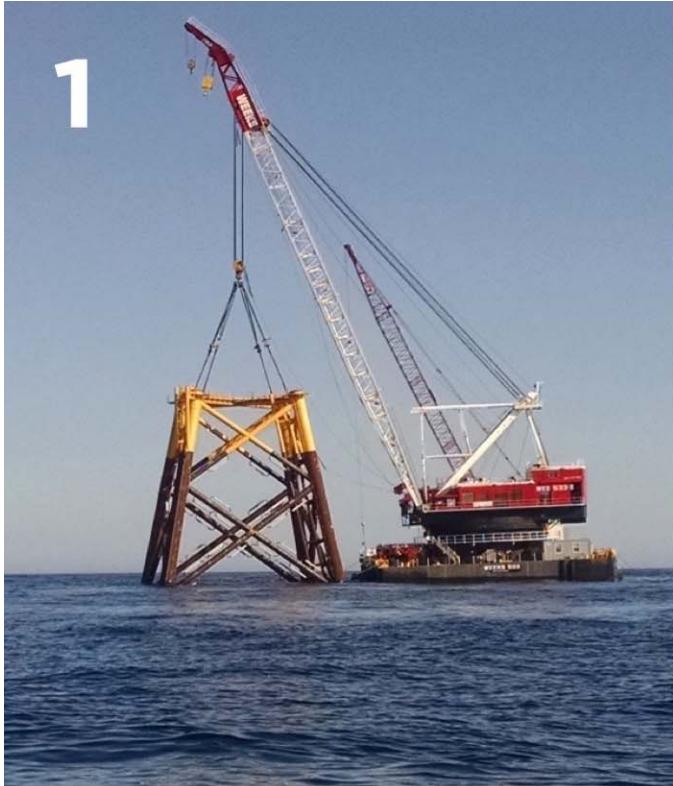
**GULF ISLAND
FABRICATION, INC.**

M_O MONTCO
OFFSHORE



Keystone
ENGINEERING INC.

 **ABS**



Foundation Installation

Installation Procedures
Pile Driving Fatigue
Welding Procedures
Weld Testing
Inspection
QC documentation incl. review

A map showing the location of the Block Island Wind Farm. It features a dark blue background representing the ocean. In the top left, a small portion of a landmass is shown in light green, labeled 'RHODE ISLAND'. Below it, a larger landmass is shown in light green, labeled 'BLOCK ISLAND'. A thin white line represents the power transmission cable, starting from Block Island and extending northeast towards the Rhode Island coastline. At the end of the cable, near the Rhode Island coast, there are five small blue circles arranged in a slightly curved line, representing the wind turbines.

RHODE
ISLAND

5 turbines.

17,000 homes.

300+ construction jobs.

1st in the nation.

BLOCK
ISLAND

BLOCK ISLAND WIND FARM
America's First Offshore Wind Farm

Submarine Cable Installation Utilizing Barge "Big Max"



Pulling Cable into Foundation





Turbine Manufacturing

- Assembly Procedures
- Material Specifications
- Testing Protocols
- Generator testing
- Inspection
- QC documentation
- CVA review, inspection and reporting

Wind Turbine Installation

Set Towers



Lift
Nacelle



Install Blades



Turbine Installation

- Installation Procedures
- Inspection
- QC documentation
- CVA review, inspection and reporting



Feeder Barge Concept



Transfer
Components
from ProvPort
to Block Island





Blade Installation



An aerial photograph of an offshore wind farm under construction. In the foreground, a large white wind turbine is being lowered into the sea by a red and white crane on a barge. The barge is connected to a larger platform. Several other wind turbines are visible in the background, already installed on yellow foundations. The sea is a deep blue, and the sky is clear.

Turbine Installation Complete

Summer 2016

Key factors & lessons learned in construction completion

- Planning/Preparation
- Independent 3rd party verification
- Stakeholder engagement + communication
- Proper plan execution
- Having the right team + good working relationships
- Construction window (weather)
- Solid coordination
- Weather!!
- International Cooperation



Operations and Maintenance

- Preventive Maintenance Plan
- 1 week planned maintenance per turbine
- unplanned maintenance as required
- balance of plant inspections
- storm event inspections
- QC documentation and inspection reviews
- reporting to the CRMC



Block Island Wind Farm Breezes Through Major Weather Events

- Strong performance during year one's worst winter conditions.
- For good stretches of multi-day storm event earlier this week, the wind farm was producing at or near its full capacity.
- Continues to perform as expected.





Collaboration

Cutting-Edge Technology at Block Island Wind Farm Helping Scientists Track Bird and Bat Activity Offshore

America's First Offshore Wind Farm is Now Operating



BLOCK ISLAND WIND FARM
America's First Offshore Wind Farm

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1st in the nation.

Thank you!

