Block Island Wind Farm

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

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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 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

Bladed
(turbine + tower design)

Mean Wind + Turbulence

Interface Loads

Wave train

SACS
(substructure + pile design)
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
Foundation Installation

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

17,000 homes.

300+ construction jobs.

1st in the nation.
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
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

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Thank you!