

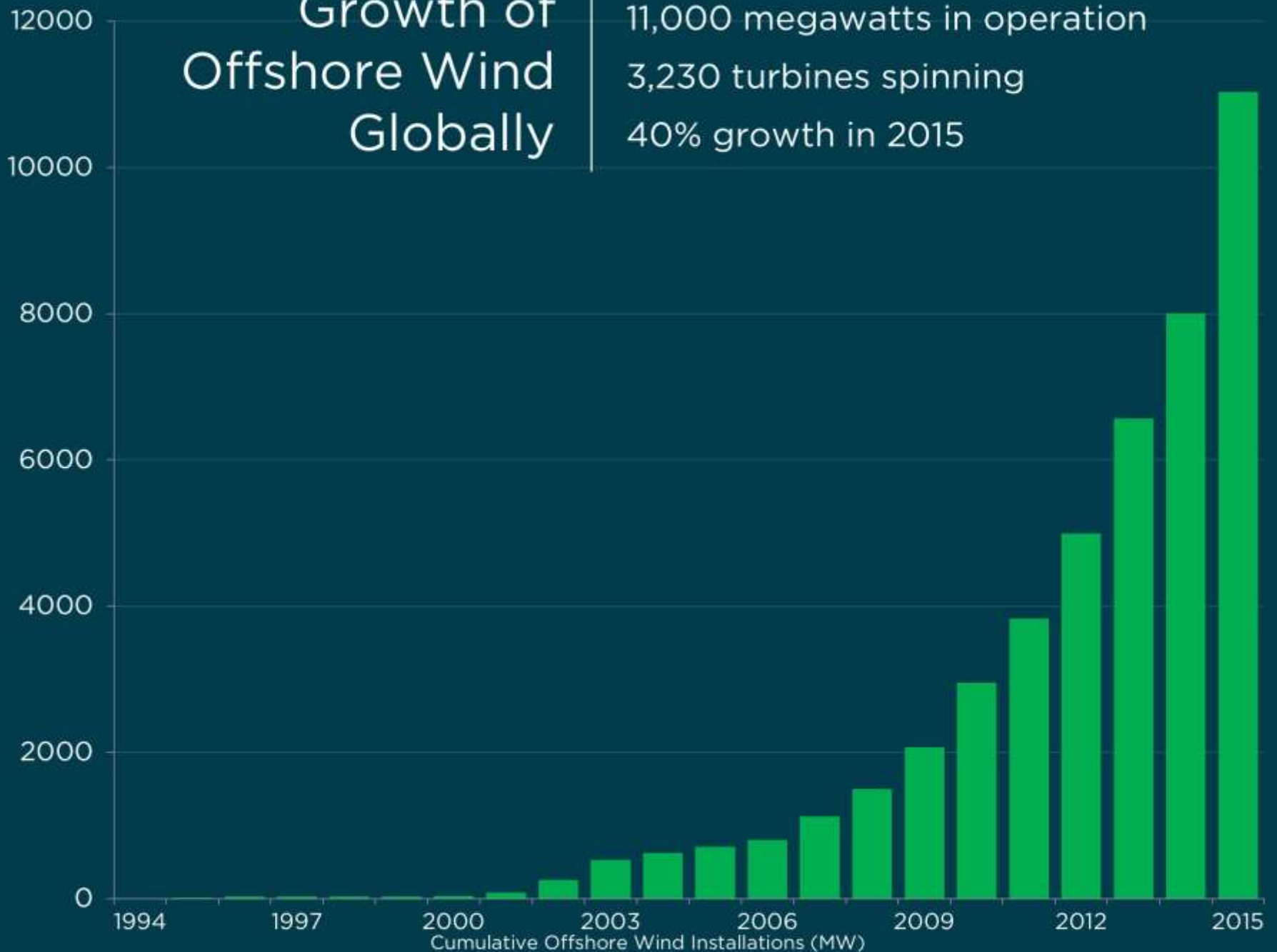


**DEEPWATERWIND**

Clean energy is just over the horizon.

# Growth of Offshore Wind Globally

11,000 megawatts in operation  
3,230 turbines spinning  
40% growth in 2015



# Rapid Advances in Offshore Turbine Technology

360'

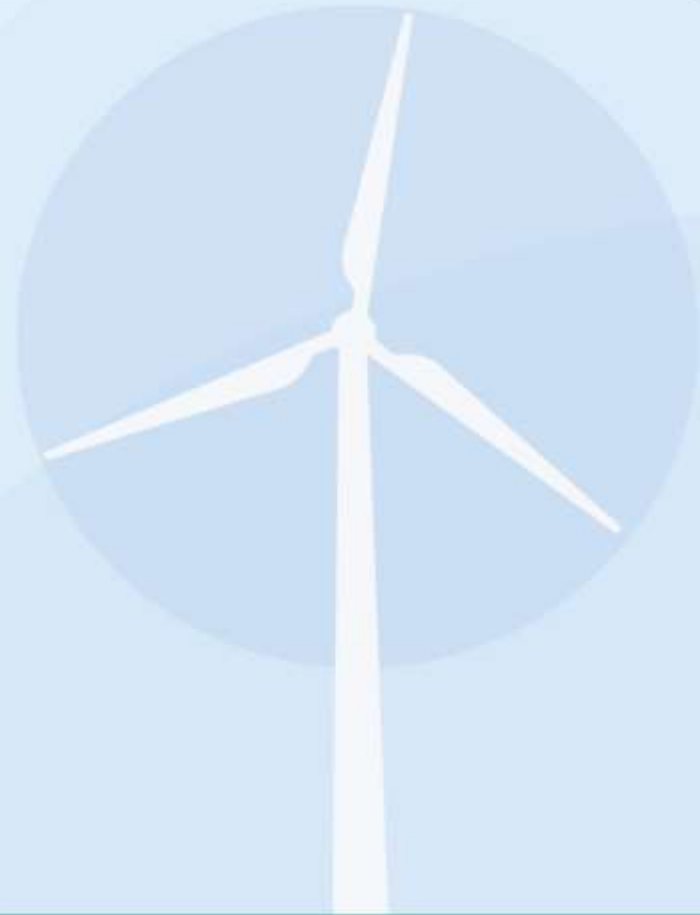


Typical Onshore Turbine

305'



600'

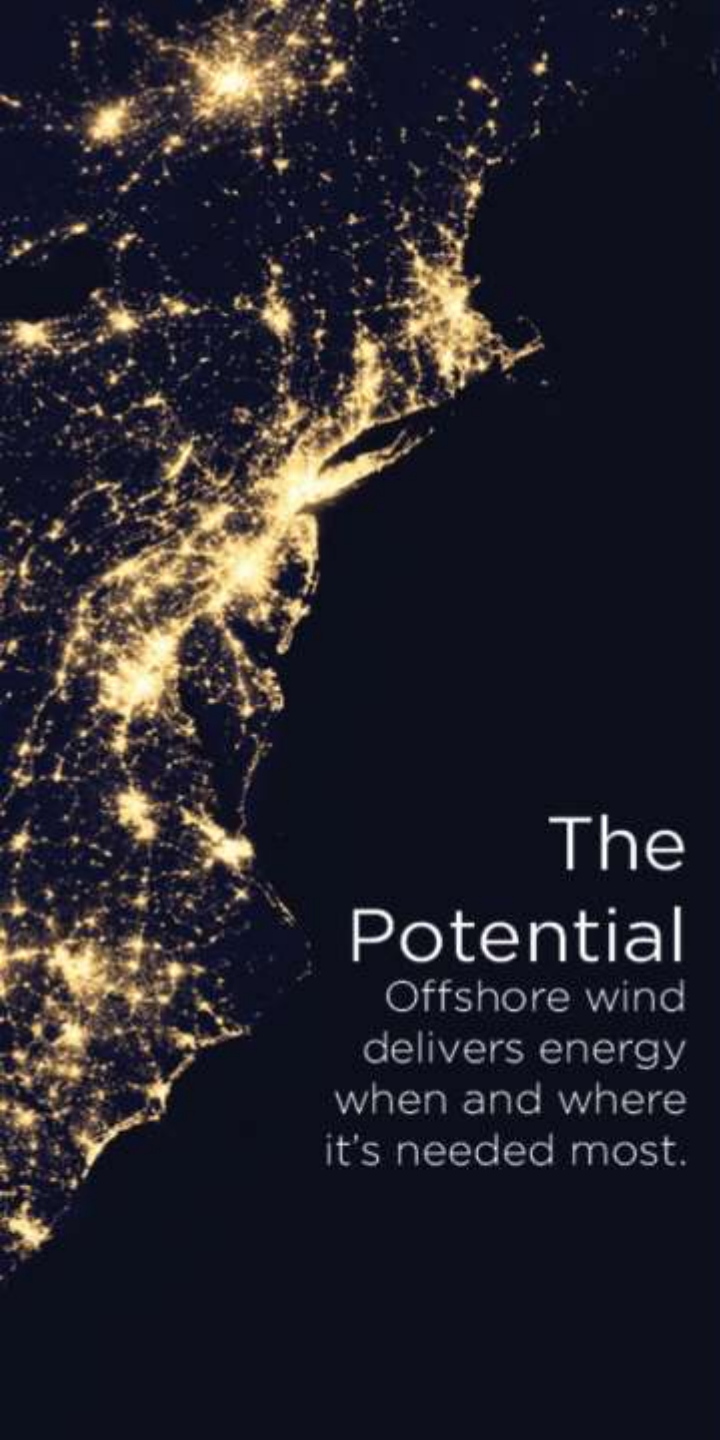


Block Island Wind Farm Turbine

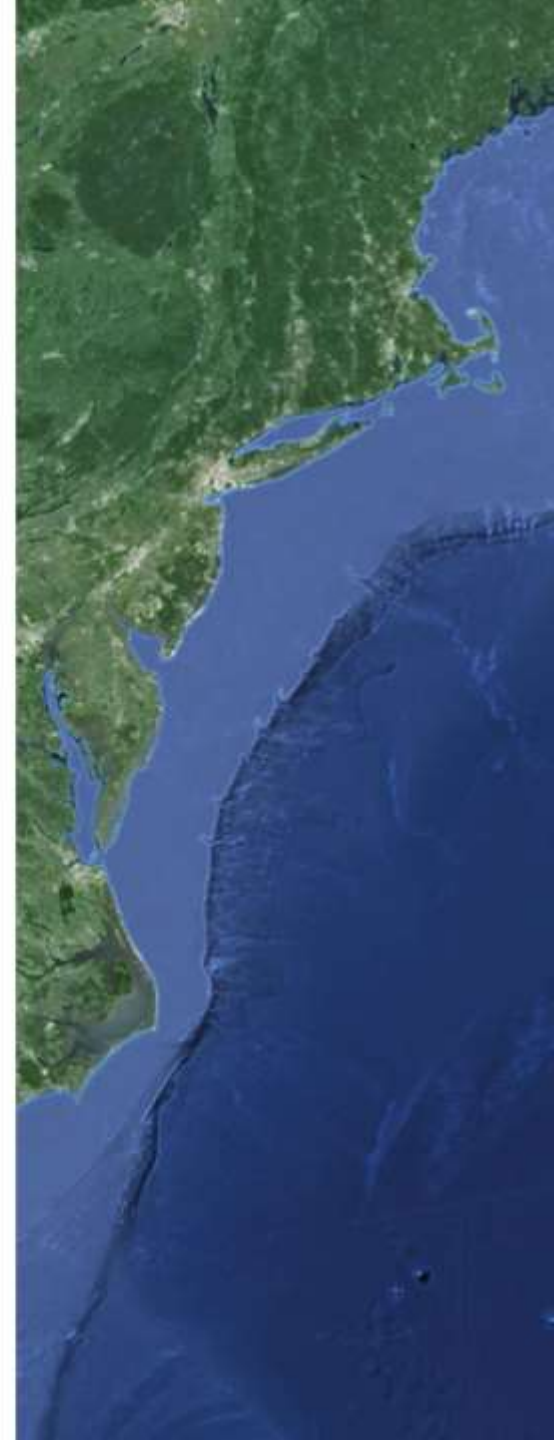
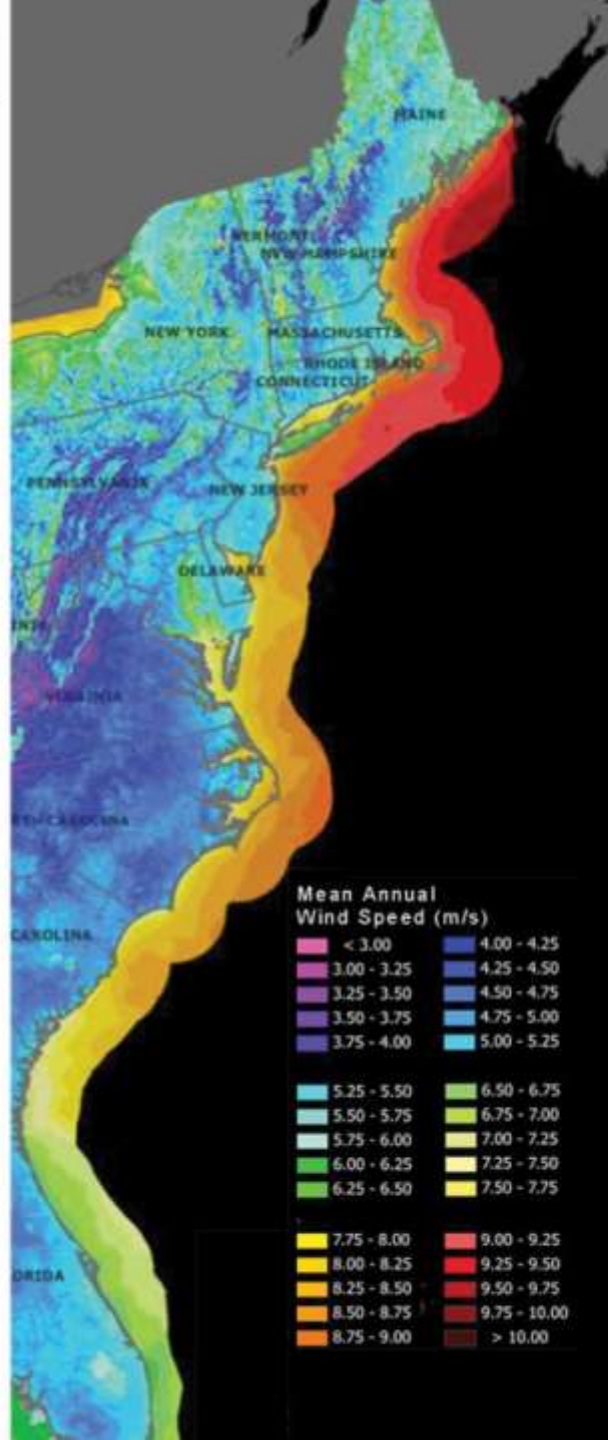


Boeing 747: 250'  
BIWF Blades: 240'





The  
Potential  
Offshore wind  
delivers energy  
when and where  
it's needed most.



# The Replacement Cycle is Accelerating in New England



# The Best US Offshore Wind Site

- > Outstanding wind resource (9.5 m/s)
- > Buildable water depths (100 - 150 ft)
- > 1500 MW capacity

MASSACHUSETTS

RHODE  
ISLAND

CONNECTICUT

LONG  
ISLAND



A map showing the location of the Block Island Wind Farm. It features a large map of Rhode Island with a red line indicating the distance from the mainland to Block Island. An inset map shows Block Island with a red line indicating the distance to the wind farm. The wind farm is represented by five red dots in a line.

RHODE  
ISLAND

5 turbines.

17,000 homes.

300+ construction jobs.

1<sup>st</sup> in the nation.

BLOCK  
ISLAND

**BLOCK ISLAND** WIND FARM  
America's First Offshore Wind Farm

# Major Project Milestones

- 
- 2008 – Project proposed
  - 2010 – Power purchase agreement approved
  - 2014 – Final permits approved
  - 2015 – \$297 million debt financing
  - 2015 – Offshore installation begins
  - 2016 – Commercial operations



# Key Siting Issues

- Marine mammals
- Fishing
- Cultural resources
- Avian and bat
- Visual
- Bottom habitat
- Other ocean uses (DOD, etc)



# Permitting

All Federal, State and Local Permits for Block Island Wind Farm are Final.



US Army Corps  
of Engineers®



# Environmental Studies



## Example Field Surveys:

- Archeological (Marine and Terrestrial)
- Visual Impact Assessment (including historic properties)
- Wetland Delineation
- Sensitive Habitat Surveys
- Avian and Bat Surveys
- Benthic Surveys
- Fishing Surveys
- Marine Mammal and Sea Turtle Surveys

## Example Desktop Studies:

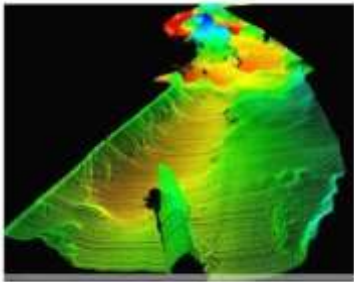
- EMF modeling
- EFH Analysis
- Navigational Risk Assessment
- Air Emissions Analysis
- Underwater and In-Air Acoustic Modeling
- Marine Mammal Risk Assessment
- Sediment Transport Modeling

• Other analyses to support

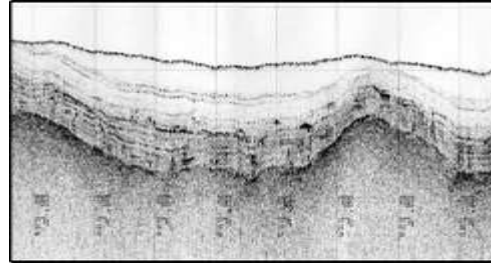




# Geophysical and Geotechnical Surveys



Multibeam depth sounder to determine water depths and general bottom topography



Sub-bottom profiler to map the near surface (chirp) and deeper (boomer) stratigraphy



Seafloor imaging (side scan sonar survey) to identify natural and man-made acoustic targets



Vibracores to collect sediment samples to ground-truth geophysical information and assess technical properties (e.g. thermal resistivity)



Magnetic intensity measurements for detecting ferrous objects



Deep geotechnical cores to sample sediment at certain foundation locations

# Widespread Community And NGO Support

From Environmental  
Business, Labor,  
Community, and  
Political Organizations



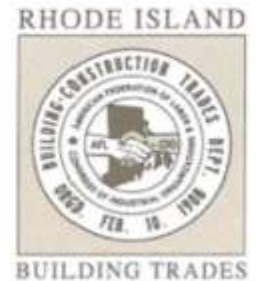
THE SIERRA CLUB  
FOUNDATION



OCEANA

**BIRA**  
Block Island Residents Association

GREATER  
PROVIDENCE  
CHAMBER OF  
COMMERCE



ENVIRONMENT  
COUNCIL OF  
RHODE ISLAND





# Setting High Standards

## Voluntary Species Protection Program



Deepwater Wind  
**“Going Above and Beyond”**



# Being a Good Neighbor

Working with Local Fishermen to Measure Impacts





# Local Contractors

AECOM  
AIS Observers  
Aladdin Electric  
Badd Brothers  
Bay Crane  
Blount Boats  
Challenge Electronics  
Communication Systems Inc.  
DiPrete Engineering  
Duffy & Shanley  
Eagle Elevator  
ESS Group  
Essex & Newbury  
EW Audet  
GZA  
Hart Engineering  
Hinckley Allen  
Keough & Sweeney  
Inspire Environmental  
Mayforth Group  
Mott MacDonald  
National Grid  
RI Fast Ferry  
Specialty Diving Services  
WF Shea  
VHB  
Waterson Terminal  
Services

# 300 Local Workers





# Rhode Island Ports

ProvPort and Quonset





1



2



3



## U.S. Vessels and Workers Completed Installation

1. Lift and set jacket on sea bed
2. Insert and drive piles into foundation legs
3. Lift and set transition deck on jacket and weld the two pieces together



# Foundation Installation Complete

Summer 2015







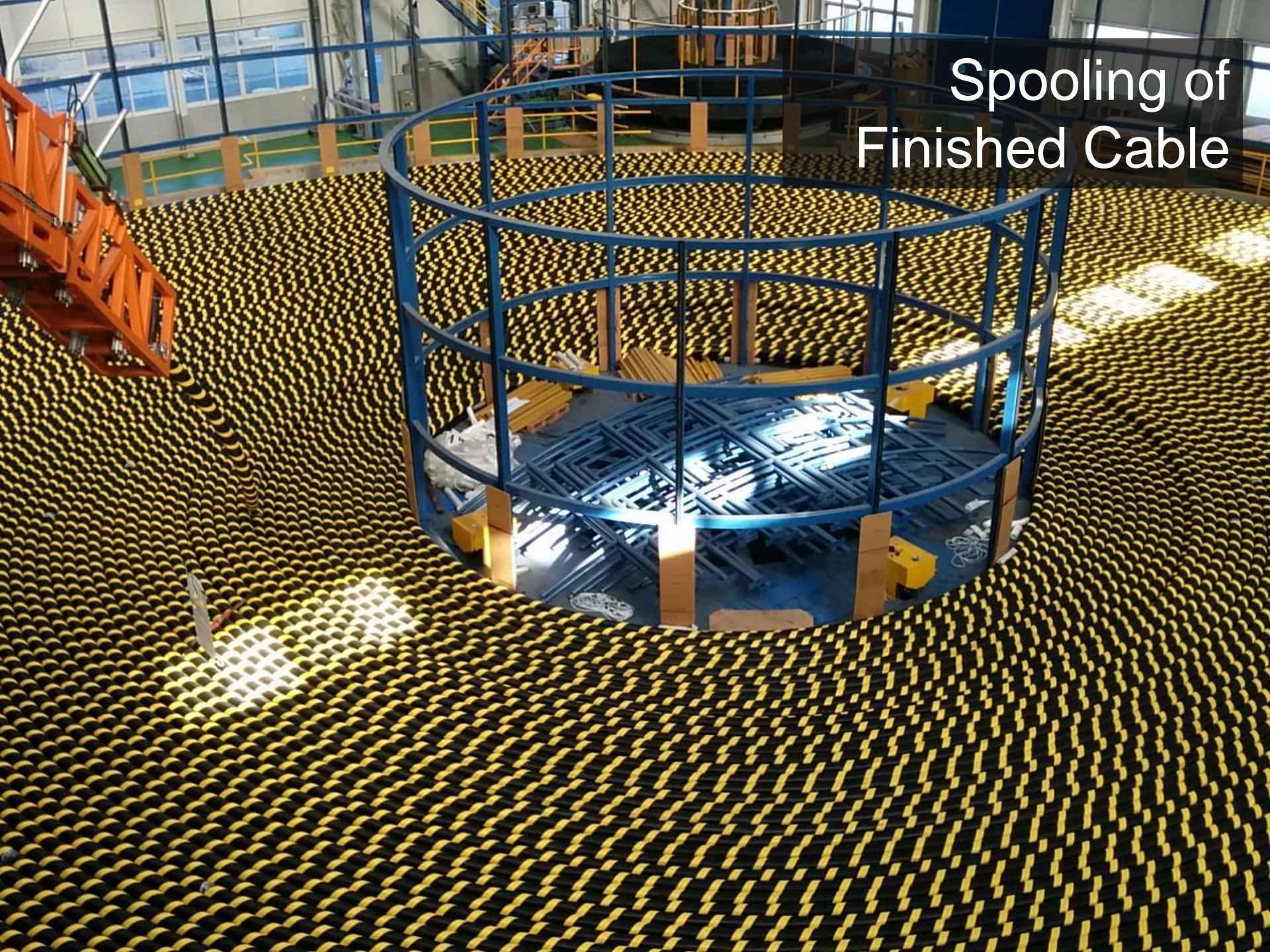
# Cable Installation Vessel

- “Big Max” arrived in RI in February
- Final outfitting work in Quonset
- Offshore installation began in April 2016





# Spooling of Finished Cable





# Cofferdam on Block Island



# Horizontal Directional Drill Rig





# Cable Installation Complete

Summer 2016

Float in of cable on  
Crescent Beach on  
Block Island



# Heavy Lift Vessels for Turbine Installation

## **Brave Tern**

Turbine installation vessel from Norway

## **Liftboats Caitlin & Paul**

Shuttled components from ProvPort





# Wind Turbine Installation

Set Towers



Lift  
Nacelle



Install Blades







# Turbine Installation Complete

Summer 2016



# Offshore Service Vessel Built in RI

- Deepwater contracted with Rhode Island Fast Ferry (Quonset, Rhode Island) to build a state of the art crew transfer vessel
- Rhode Island Fast Ferry contracted with Blount Boats (Warren, Rhode Island) to build the vessel
- The crew transfer vessel is a 70' catamaran with a tier 3 engine and custom bow to safety and efficiently transport workers from the Quonset to the Block Island Wind Farm







# **BLOCK ISLAND** WIND FARM

America's First Offshore Wind Farm  
Commercial Operations  
December 12, 2016









# DEEPWATERWIND

Clean energy is just over the horizon.

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Videos at: [vimeo.com/deepwaterwind](https://vimeo.com/deepwaterwind)



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