



CLEAN ENERGY IS JUST OVER THE HORIZON

Offshore Wind, the CZMA and the Nation's Policy on the Oceans, Coasts and Great Lakes

October 9, 2009

ABOUT DEEPWATER WIND

- **Rhode Island**

- Selected by the State of Rhode Island to be RI's preferred offshore wind developer
- Seven companies participated in that RFP
- Developing two offshore wind parks:
 - Block Island Wind Farm (up to 8 turbines in state waters)
 - Rhode Island Wind Farm (up to 130 turbines in federal waters)

- **New Jersey**

- Selected by the State of New Jersey (along with our partner, PSEG) to develop NJ's first (pilot) offshore wind farm
- Four companies participated in that RFP
- Selected by New Jersey to receive \$4 million rebate, upon successful installation of offshore met mast (two other offshore wind developers to receive similar rebates) These awards supersede pilot project.

ABOUT DEEPWATER WIND

- **New York**

- Developing project to meet goals of Long Island – New York City Offshore Wind Collaborative

- **Massachusetts**

- Developing project to meet goals of Massachusetts Green Communities Act of 2008

- **US Department of the Interior's
Minerals Management Services (MMS)**

- Awarded Deepwater Wind two leases to develop met masts off New Jersey coast on Outer Continental Shelf

- **US Department of Energy**

- Awarded Deepwater Wind \$300,000 for advanced bird and bat studies

OFFSHORE WIND WORKS

- Winds are stronger offshore
 - Each turbine can create 50% more energy than on land
- Power can be generated near high population centers
 - 60% of the U.S. population lives in coastal states
 - Electric users in many coastal areas are forced to pay high electric prices due to congested transmission systems
 - Energy from offshore wind farms flows from east to west, thereby avoiding congested transmission lines
- Utility-scale wind farms can be located more than 20 miles from shore
 - Projects *can* be located to avoid viewshed concerns and to be further away from migratory flyways

OFFSHORE WIND WORKS

- Offshore wind is widely accepted in Europe
- It has been extensively studied by European governments and NGOs – pre- and post-construction
- It represents a huge potential source of renewable energy in the U.S.
- Offshore wind is the most commercially-proven means of producing energy in the ocean
- It competes cost-wise with new power sources

OFFSHORE WIND DEVELOPMENT INITIATIVES

- **Maine**

- Governor's Task Force on Wind Power Development and Maine Wind Energy Act: 300 MW

- **Massachusetts**

- Cape Wind: 420 MW
- Potential additional project: 350 MW
 - Governor's goal: 2000 MW by 2020

- **Rhode Island**

- Deepwater Wind: State's Preferred Developer
- 400 MW – Block Island Wind Farm and Rhode Island Offshore Wind Farm

OFFSHORE WIND DEVELOPMENT INITIATIVES

- **New York**

- NYPA: Great Lakes RFEI – 350 MW*
- Long Island – New York City Offshore Wind Collaborative RFI: 350 – 700 MW
 - RFI mentions that total could reach 1,400 MW

- **New Jersey**

- Garden State Offshore Energy (Deepwater Wind and PSEG partnership): 350 MW
- Bluewater Wind: 350 MW
- Fishermen's Energy: 350 MW
- 3000 MW total by 2020

- **Delaware**

- Bluewater Wind: 350 MW*

- **Maryland**

- RFEI: 350 MW*

*For discussion purposes, a utility-scale 350 MW facility is assumed for NY (Great Lakes), DE, and MD.

RELATIVELY NEAR-TERM TOTAL FOR OFFSHORE WIND DEVELOPMENT INITIATIVES

Maine	300 MW
MA	770 MW
RI	400 MW
NY	1,050 MW
NJ	1,050 MW
DE	350 MW
<u>MD</u>	<u>350 MW</u>
TOTAL MWs	4,270 MW

OFFSHORE WIND – SUPPORTING THE EFFORTS TO FIGHT CLIMATE CHANGE AND SEA LEVEL RISE

- A 350 MW utility-scale offshore wind farm generates enough power to avoid the following emissions *annually*:
 - 965,125 tons of CO₂
 - 1,292 tons of SO₂
 - 1,132 tons of NO_x
- An offshore wind farm produces only 2% of the carbon emissions of a coal-fired power plant, per MWh of power delivered
- 17 million barrels of oil imports *avoided annually*
- No fuel adjustment charges associated with wind, since our fuel, the wind, is always free

TWENTY-YEAR EMISSIONS AVOIDANCE IF JUST HALF OF THIS CAPACITY IS BUILT IN NEAR-TERM

- 117,745,250 tons of CO₂
- 157,624 tons of SO₂
- 138,104 tons of NO_x

OFFSHORE WIND IN THE U.S. – A SELECTED HISTORY

- **August 2005:** Energy Policy Act of 2005
 - Congress mandated that regs come out in nine (9) months; it took 44 months
- **December 2008:** End of prior administration – key issues unresolved
- **January 2009:** New administration takes office, acts decisively
- **April 2009:** MMS – FERC Jurisdiction Issue resolved
- **April 2009 (Earth Day):** President announces MMS to release Final OCS Rule
- **May 2009:** 23,000+ attend AWEA Annual Conference
 - European suppliers aggressively seek out offshore wind developers
- **June 2009:** Mid-Atlantic Governors' Agreement on Ocean Conservation
- **June 2009:** Executive Order creating Ocean Policy Task Force
- **Currently:** Developers and manufacturers of offshore wind equipment ask: What is the administration's offshore wind policy?

UNCERTAINTIES NEED TO BE ADDRESSED

- Developers must know the rules of the game
- Manufacturers, contractors, vendors, and state officials must know the rules of the game
- Uncertainty will:
 - Limit the important role renewable energy can play in our country's efforts to fight climate change
 - Limit the establishment of the new offshore wind industry in the U.S.
 - Limit the creation of thousands of new jobs
- The U.S. will realize substantial economic and environmental benefits by satisfactorily addressing these uncertainties

DEVELOPING RATIONAL MANAGEMENT REGIMES FOR OFFSHORE WIND

- **THE CHALLENGE:** Since there are no offshore wind farms in the waters of the United States, no studies exist on how these wind farms actually interact with all other ocean resources and uses.
- Existing federal laws and regulations will protect all ocean resources while a comprehensive and rational ocean use policy is developed
- States' marine spatial planning-related activities can serve as models for federal initiatives
- Suggested initial federal research for offshore wind farms
- Early offshore wind farms as laboratories
- Long-term research issues

FEDERAL ACTIVITIES

EXISTING FEDERAL POLICIES WILL PROTECT THE OCEAN

- Project development timeline is long
- First utility-scale offshore wind farm will not be completed for three or four years
- NEPA process ensures comprehensive ecological evaluations
- Conclusion: ***Offshore wind parks will not spring up overnight***

CURRENT FEDERAL PERMITTING REGIME FOR OFFSHORE WIND FARMS PROTECTS OCEAN RESOURCES

- OCSLA – MMS
- Submerged Lands Act – MMS
- NEPA – CEQ and Other Agencies
- Marine Mammal Protection Act – FWS and NMFS
- Estuary Protection Act -- FWS
- National Marine Sanctuary Act -- NOAA
- Migratory Bird Treaty Act – FWS
- Endangered Species Act – CEQ
- Marine Protection, Research. and Sanctuaries Act – EPA, ACOE, NOAA
- Clean Water Act – EPA
- Rivers and Harbors Act -- ACOE
- Clean Air Act – EPA and MMS
- Federal Power Act – FERC
- Coastal Zone Management Act -- NOAA
- Federal Aviation Act – FAA
- National Historic Preservation Act – NPS
- Other Agency Involvement: DOD, Homeland Security, USCG

ESSENTIAL NEW POLICY RECOMMENDATION

An expedited inter-governmental, multi-agency dispute resolution process is needed to address the conflicting and competing uses for the ocean, our coasts, their inhabitants and the nation's natural resources.

STATE ACTIVITIES

RHODE ISLAND OCEAN SPECIAL MANAGEMENT PLAN

Implemented by Rhode Island Coastal Resources Management Council
Supported by University of Rhode Island scientists and researchers
August 2008 – August 2010

- Define zones to protect or enhance current habitat uses, commercial and recreational uses, and shipping and to plan for future uses
- Assess the following:
 - Wind and waves
 - Geology and geophysics
 - Fishing and fisheries
 - Ecology
 - Marine mammals and sea turtles
 - Marine and coastal birds and bats
 - Air quality and meteorology
 - Acoustics and EMF
 - Physical oceanography and water quality
 - Wind farm technology (structures and foundations)

NJ OCEAN/WIND POWER ECOLOGICAL BASELINE STUDIES

New Jersey Department of Environmental Protection's

– 2007 and continuing

- Environmental assessment and potential impacts
 - Avian utilization, abundance, and distribution (and migratory routes)
 - Marine mammal utilization, abundance, and distribution
 - Sea Turtle utilization, abundance, and distribution
 - Federal and State threatened and endangered species
 - Aquatic life and their habitat
 - Lighting
 - Air quality
 - Water quality
 - Seabed, wetlands and uplands (e.g., transmission cables)
 - Noise
 - Cumulative implications

MARINE SPATIAL PLANNING-RELATED ACTIVITIES MA AND CA

- Massachusetts Draft Ocean Plan Goals:
 - Balance and protect the natural, social, cultural, historic, and economic interests of the marine ecosystem through integrated management
 - Recognize and protect biodiversity, ecosystem health, and the interdependence of ecosystems
 - Support wise use of marine resources, including renewable energy, sustainable uses, and infrastructure
 - Incorporate new knowledge as the basis for management that adapts over time to address changing social, technological, and environmental conditions
- California Ocean Resources Management Program
 - **Stewardship:** To assess, conserve, and manage California's ocean resources and the ecosystem that supports those resources.
 - **Economic Sustainability:** To encourage environmentally sound, sustainable, and economically beneficial ocean resource development activities.
 - **Research, Education and Technology:** To advance research, educational programs, and technology developments to meet future needs and uses of the ocean.
 - **Jurisdiction and Ownership:** To maximize California's interests within State Tidelands, the Territorial Sea, and the Exclusive Economic Zone.

SUGGESTED INITIAL FEDERAL RESEARCH FOR OFFSHORE WIND FARMS

SUGGESTED INITIAL RESEARCH RELATED TO OFFSHORE WIND

- Where in the ocean should offshore wind farms be allowed?
- Answers to the following types of questions are needed:
 - Where in the ocean are the best wind resources for OSW farms?
 - Where in the ocean are the best subsurface conditions for OSW foundations?
 - Where on land are the best grid interconnection points?
 - What are the locations of land-based substations with adequate capacity?
 - Which interconnect points will not result in unacceptably high upgrade costs that would be charged to electricity ratepayers?
 - What land-based constraints (e.g., risk to high-value ecological areas) exist that limit which grid interconnection points can be accessed?
 - Will coastal states adopt permitting and economic policies that encourage and support the development of offshore wind? Which states will they be?

EARLY OFFSHORE WIND FARMS AS LABORATORIES

USE EARLY OFFSHORE WIND FARMS AS LABORATORIES

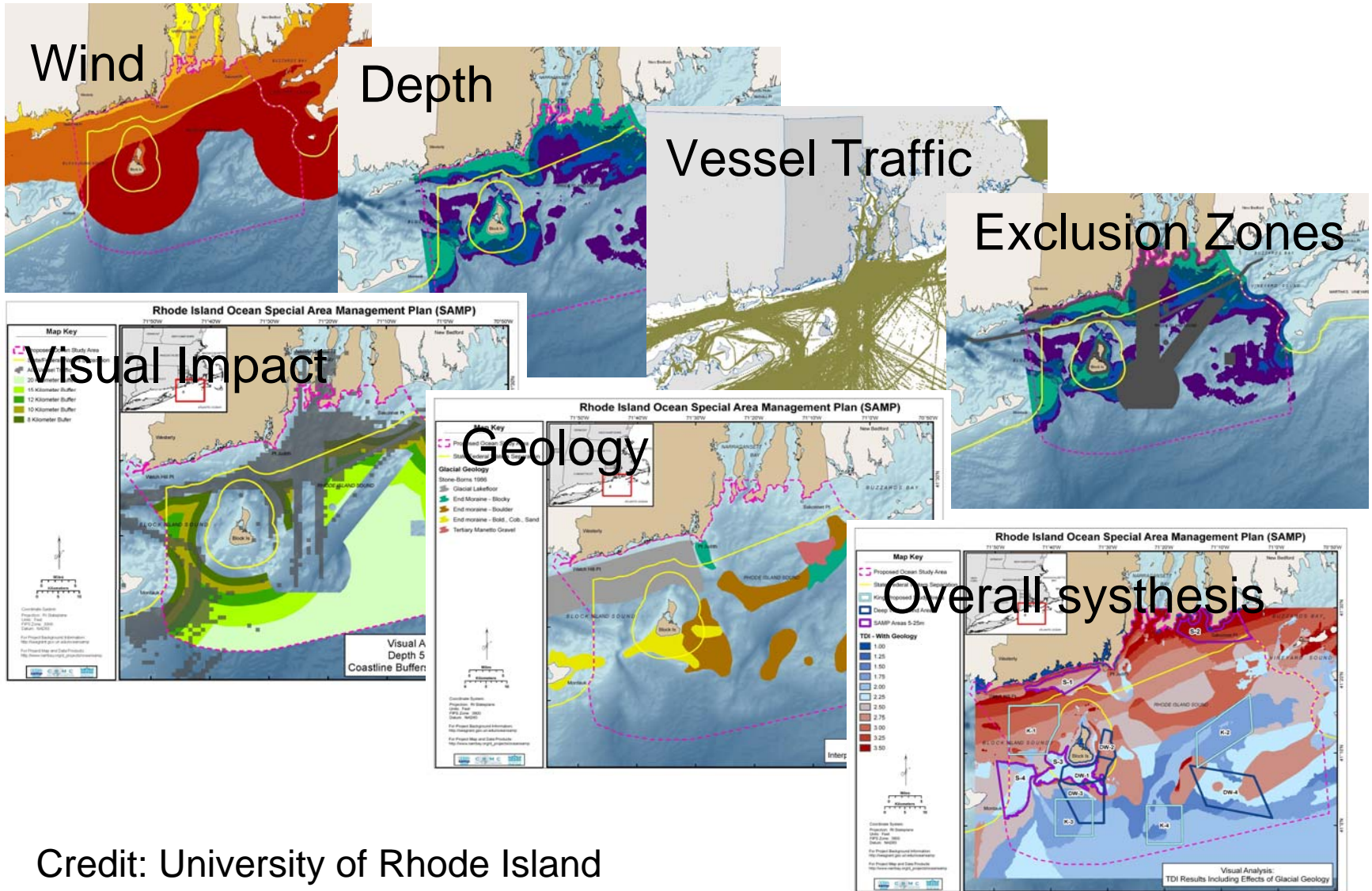
- Expedite permitting and construction of three or four offshore wind farms
- Enable federal and state agencies to begin to collect data necessary to develop comprehensive and rational ocean and coastal plans:
 - Thorough review of pre-construction assessments
 - Observe construction of offshore wind farms
 - Require collection and analysis of extensive post-construction data
 - Evaluate all data collected to inform policies for next round of offshore wind development

LONG-TERM RESEARCH ISSUES

LONG-TERM RESEARCH STUDIES

- Cumulative impact of taking energy out of ocean winds
 - We know what happens when we take energy out of the ground: burning oil and natural gas causes global warming
- Commercial fishing considerations
 - Large trawlers
 - Clam dredges
 - Long lines
 - Gill Nets
- Aides to navigation and tower lighting

SITING ANALYSIS - EXAMPLES



Credit: University of Rhode Island



- Public support grows the further a wind farm is from shore
- Developing further off shore will allow the industry to achieve scale

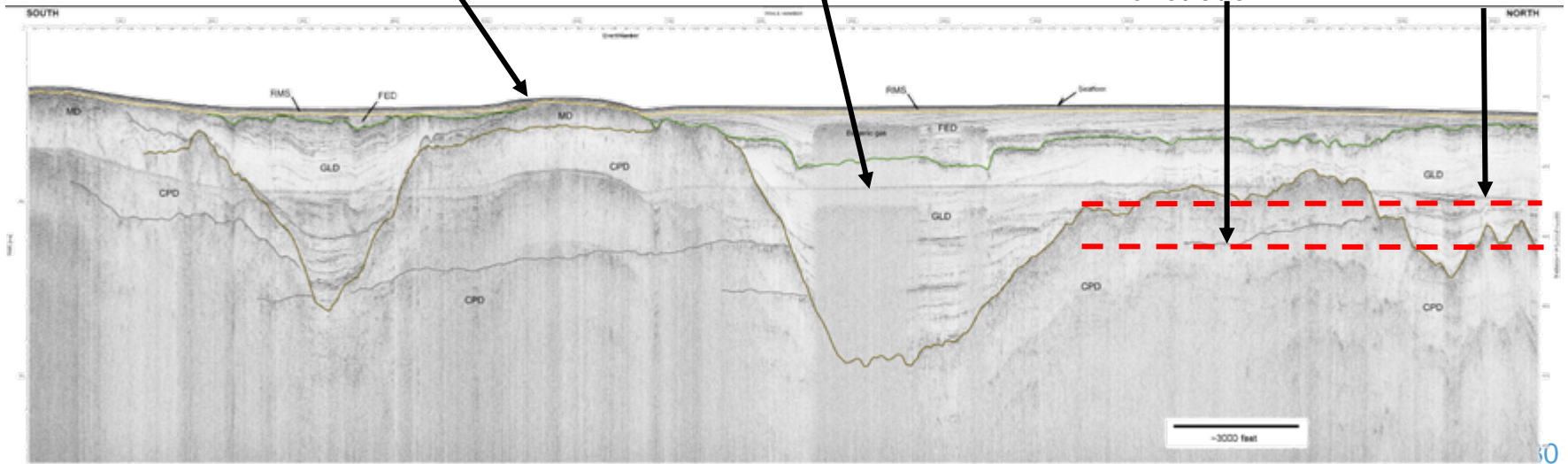
OCEAN GEOLOGY

Outcropping of hardpack – typically characterized by boulders at the surface – To be avoided

Softer deposits – better for foundation installation



LIFTBOAT KAYD



MET MAST



ON-SHORE WIND CONSTRUCTION



ON-SHORE WIND CONSTRUCTION



Monopile:

- Limited to shallow water (+/-70')
- Forces most projects near shore



Jacket:

- Up to 150' depths
- Allows projects to be 15-20 miles off shore



Jackets have been the standard for the offshore oil and gas industry for more than 50 years

OFFSHORE WIND CONSTRUCTION



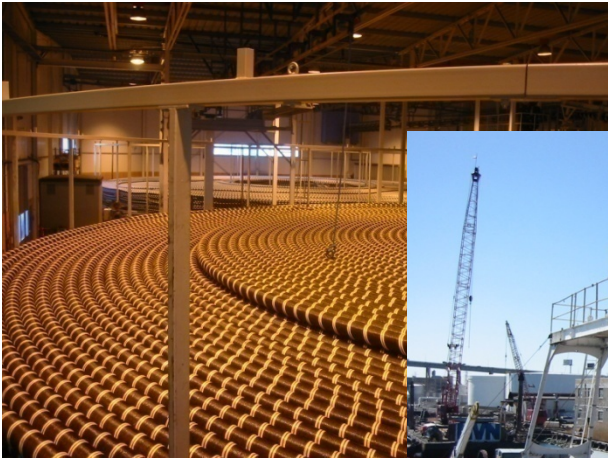
OFFSHORE WIND CONSTRUCTION



OFFSHORE WIND CONSTRUCTION



SUBMARINE CABLE INSTALLATION



230KV
Export
Cable



35KV Inter-
Turbine
Cable

SUBMARINE CABLE INSTALLATION



Shallow Water Installation Barge



*Horizontal Directional Drilling
(HDD)*

CONCLUSIONS

- Offshore wind works
- We need certainty and firm federal and state policies related to the siting, permitting and economics of offshore wind farms
- There is an important role for coastal states and the federal government to play in regard to offshore wind projects; that role, however, should not slow down development of our country's first round of offshore wind projects
- Doing this right will result in the creation of a robust, climate-friendly, ecosystem-friendly new offshore wind industry that employs thousands of people in high-paying jobs

BAN KI-MOON, SECRETARY GENERAL OF THE U.N.

“Climate change is the preeminent geopolitical issue of our time. It rewrites the global equation for development, peace, and prosperity. It threatens markets, economies and development gains. It can deplete food and water supplies, provoke conflict and migration, destabilize fragile societies and even topple governments.”

International Herald Tribune, September 18, 2009



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