

NortekUSA Technical Symposium

New England Marine Renewable Energy Center



John Miller
Executive Director

The Problem

Energy is the Critical Challenge of the 21st Century

- Developing Countries are Straining a Limited Supply
- Climate Change Issues



New England is in an Energy Crisis

- Large Demand but Distant Supply
- High Prices Hurt Competitiveness
- Aging and Unreliable Grid

Bio/Solar are Needed, but New England Has Limited Resources

New England Was Built With Renewable Energy



Wind



Water



Biofuel





Saudi Arabia

The New Bedford Of Petroleum

Ocean Energy - US

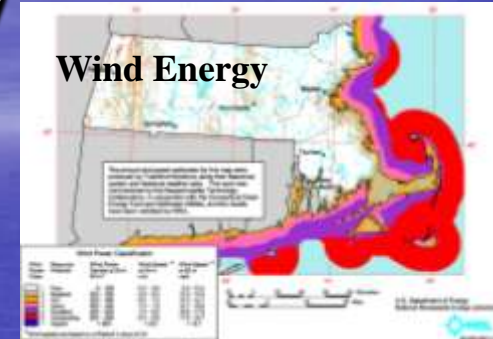
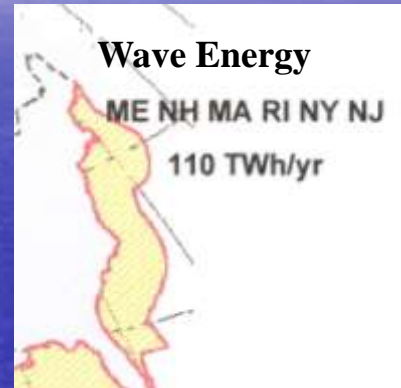
	Resource TWHr/yr	Utilization Percent	Predict Time
Demand	4000		Hours
Wind	900	20-30%	Hours
Wave	260 (~Hydro)	30-40%	Days
Tidal	110	20-30%	Centuries
Current	50	>90%?	Months

Also Thermal (OTEC), Barrage, Osmotic

The New England Opportunity

Ocean Energy Resources are Undeveloped in US

New England Peak	28 GW
Off Shore Wind	>500 GW
Wave	10-30 GW
Tidal	<0.5 GW



New England has Resources

Significant Off-Shore Wind, Wave, Some Tidal
 Intellectual Power – Wind, Marine Engineering

Available Manufacturing and Construction Infrastructure

Manufacturing Costs below Competitive Coastal Regions
 Deep Water Ports with Construction Capability
 Could Represent \$2 Billion in Economic Impact

Opportunities

Tidal

Cape Cod Canal

Elizabeth Island

Muskeget Channel

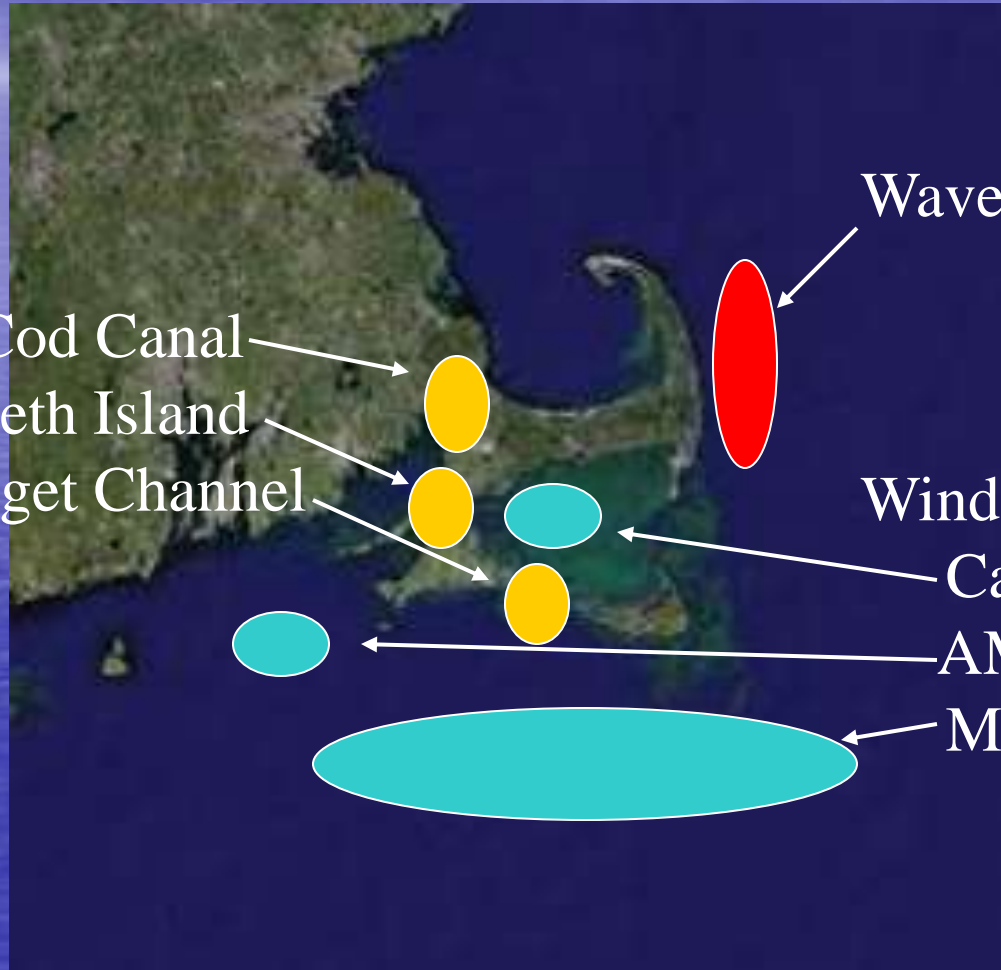
Wave

Wind

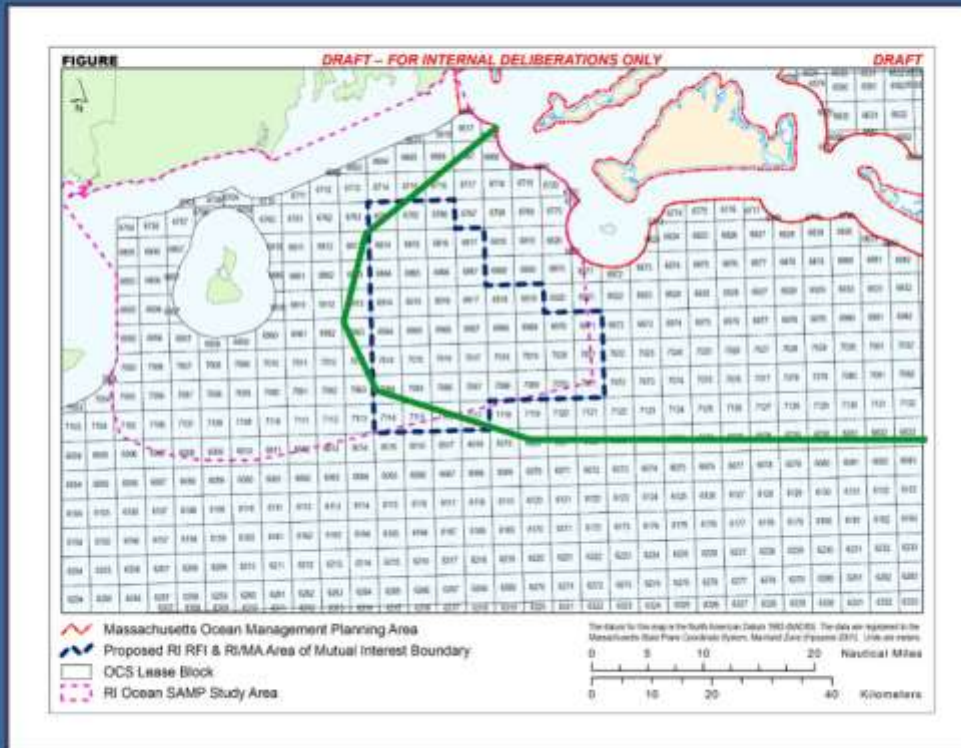
Cape Wind

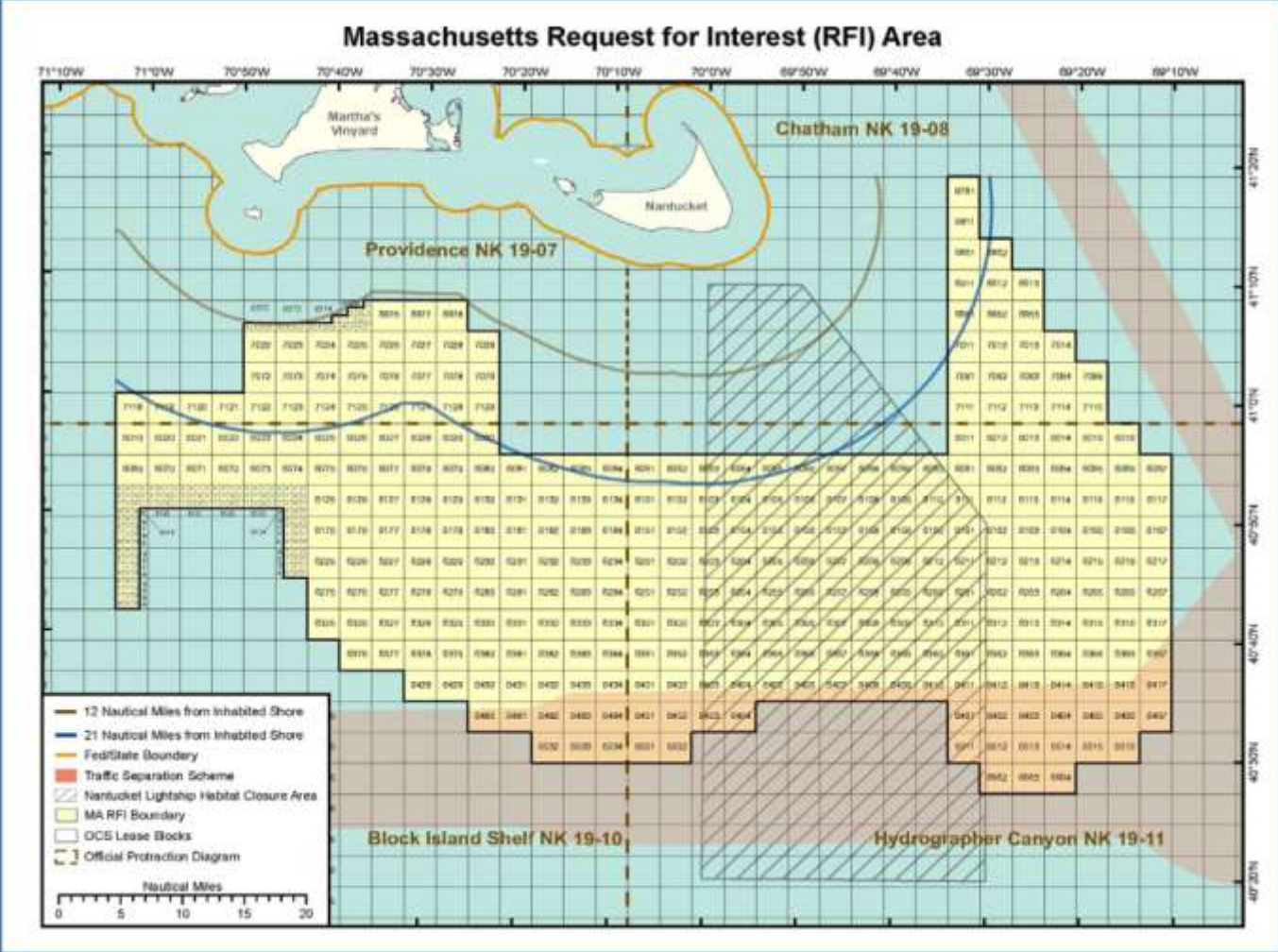
AMI RFI

Mass RFI



MA/RI Area of Mutual Interest

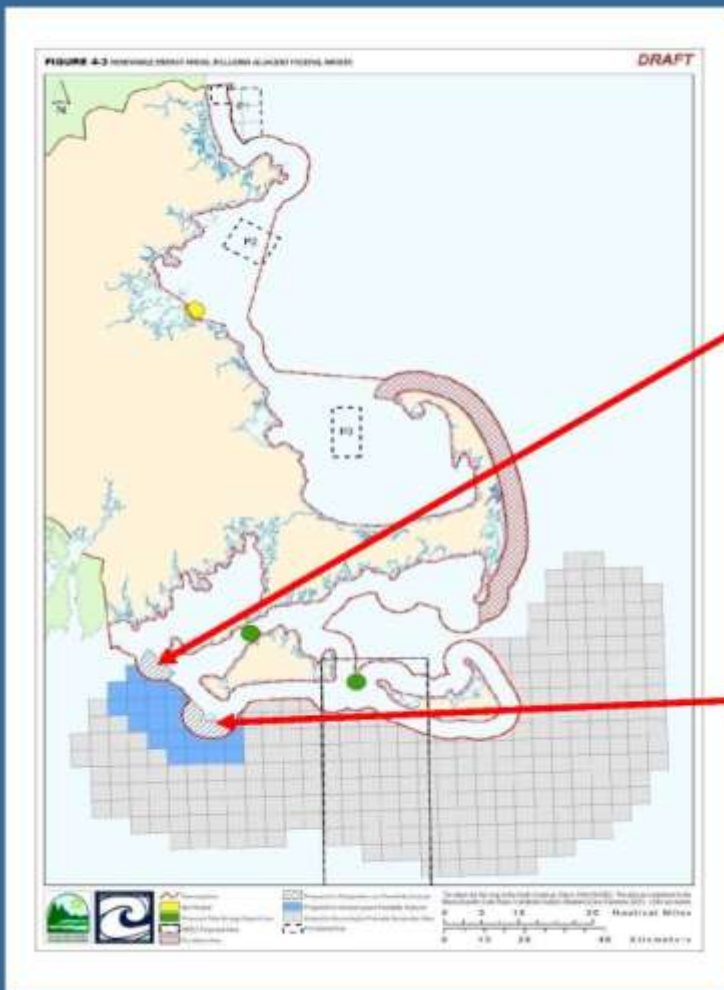






Community-scale Development Regional Turbine Allocation:

Merrimack Valley Planning Commission	7
Metropolitan Area Planning Council	22
Old Colony Planning Council	9
SE Reg. Planning and Econ. Dev. District	10
Cape Cod Commission	24
Nantucket Planning and Econ. Dev. Comm.	11
Martha's Vineyard Comm.	17



Commercial Scale Wind

Gosnold Wind Energy Area

- EEA/Gosnold collaborative development

Martha's Vineyard Wind Energy Area

- MVC exclusive siting jurisdiction



New England Marine Renewable Energy Center

Purpose

Foster the Sustainable Growth of Marine Renewable Energy
(Tidal, Wave, Off-Shore Wind, and Others)
In New England
Through Research, Development and Demonstration



Stakeholders

Universities



3rd Annual
New England MREC
Technical Conference
November 7-8, 2011 Cambridge, MA



MARINE RENEWABLE
ENERGY CENTER



Public Interest



Industry

Public



Government





University Research Consortium



Affiliates





Industry Members Program



Benefits

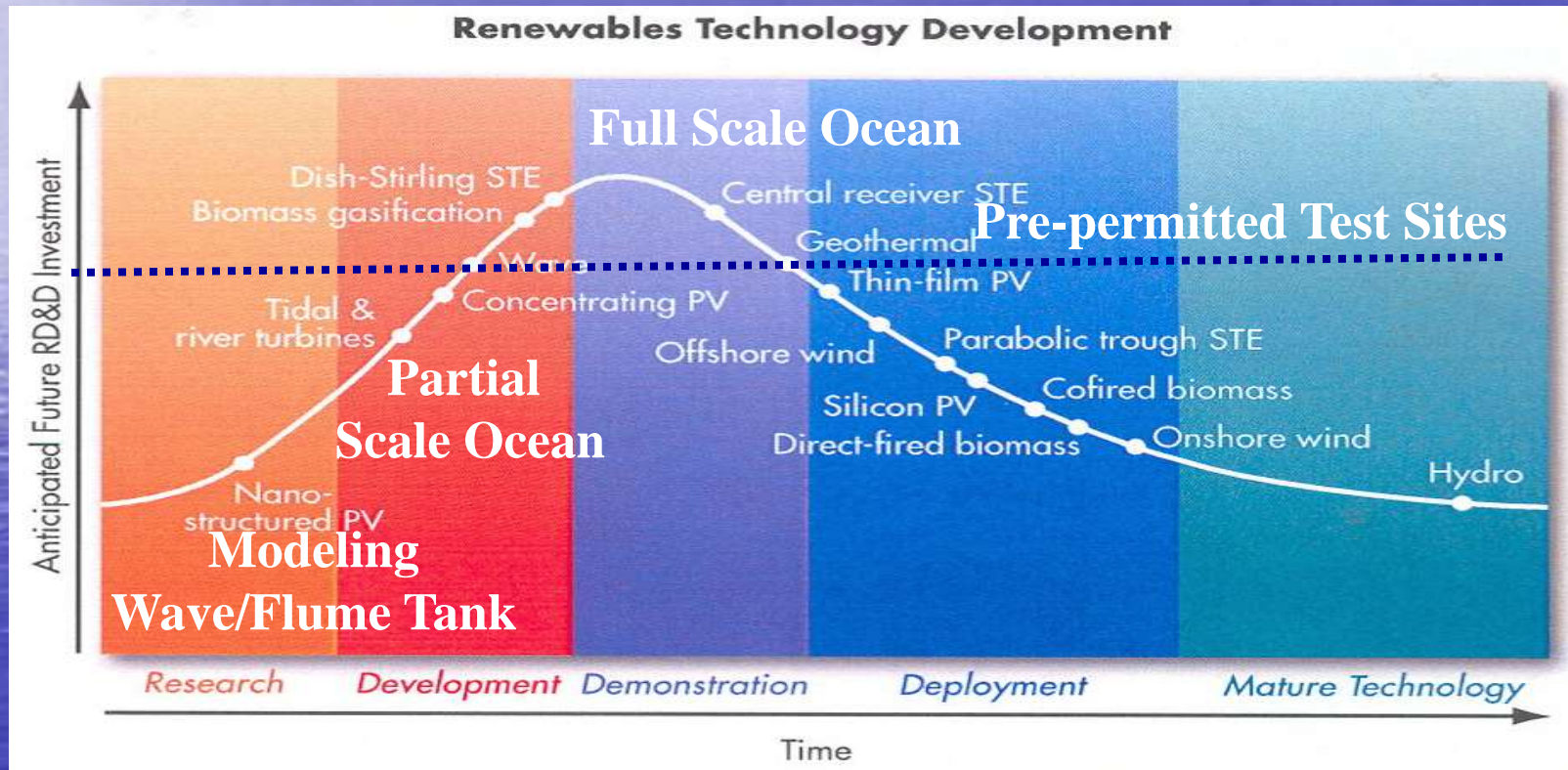


- Research – Input on Topics, Early View of Results
- Test Sites – Preferred Access
- Collaboration – Partnering Opportunities
- Marketing – Exposure through Website, Conferences, etc.



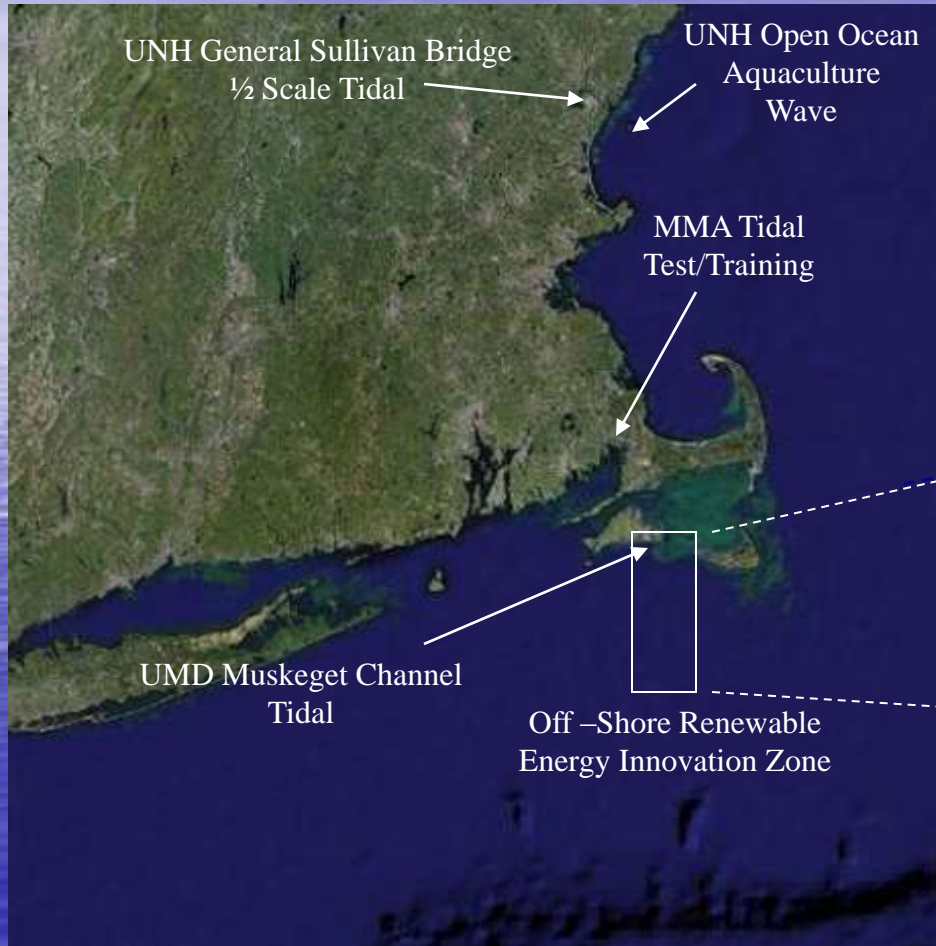
The Challenges

Survivability is **THE** Technical Challenge



Regulation/Permitting is a Cost Driver

Proposed Demonstration Sites



Tidal
 Shallow Wind

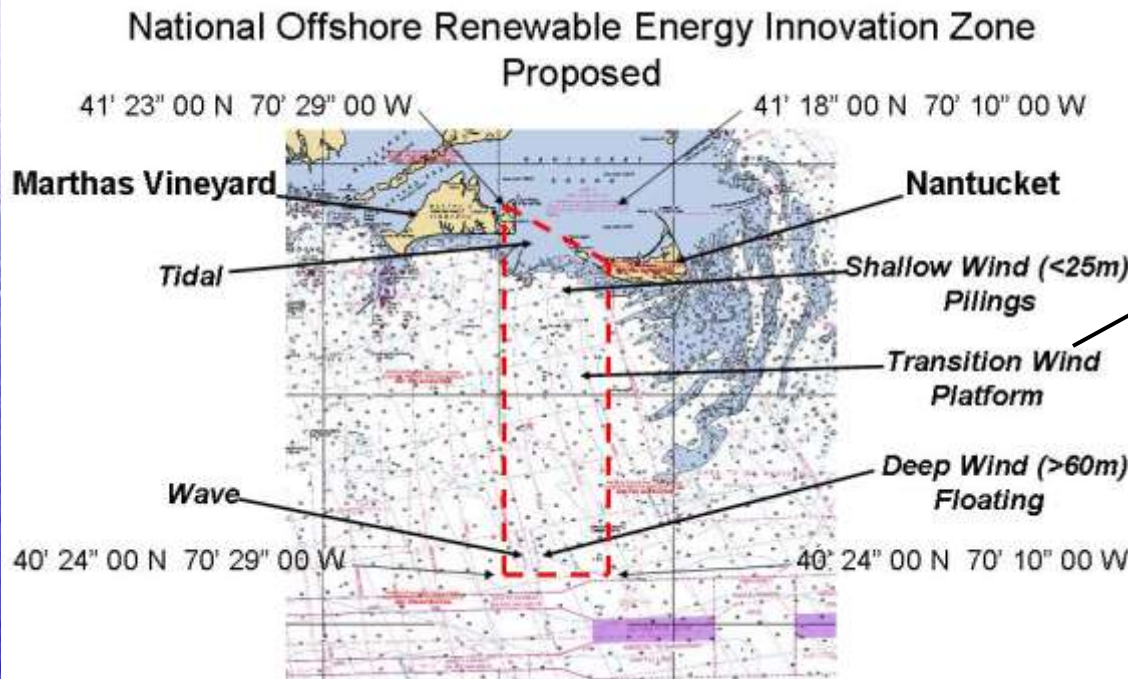
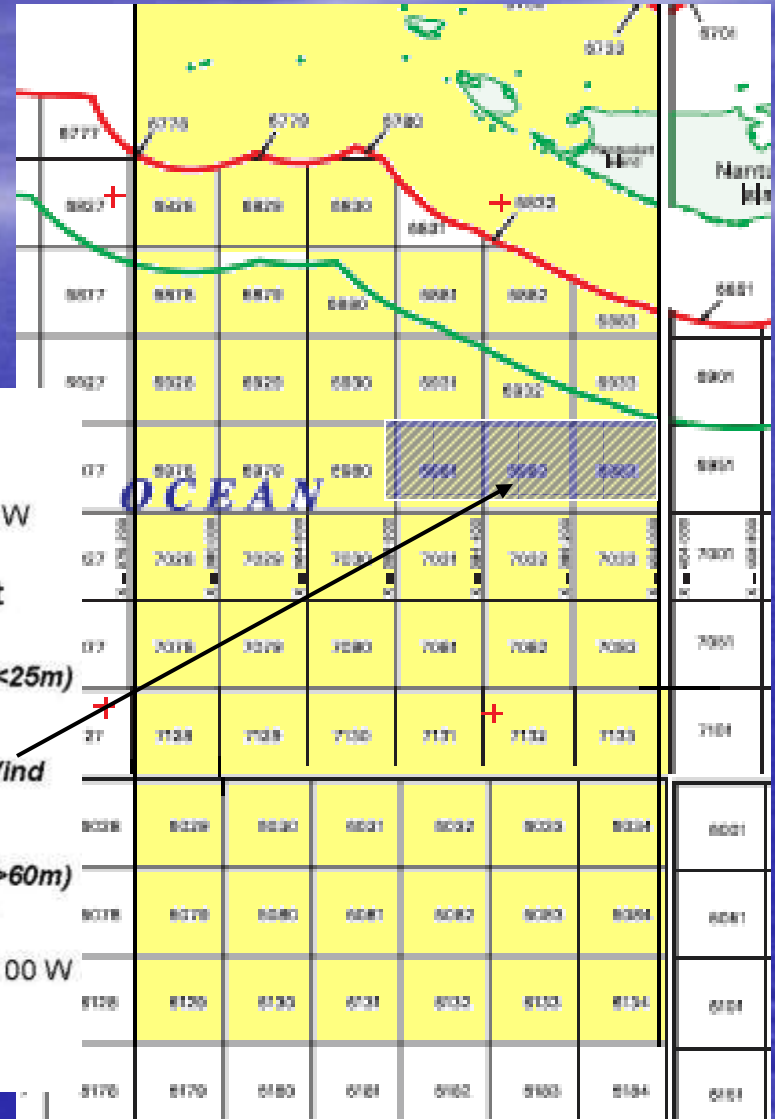
Transition
 Zone Wind
 Wave

Deep Wind
 Wave

National Off-Shore Renewable
 Energy Innovation Zone
 (Proposed)

BOEMRE Research Lease Joint Application

- Commonwealth of Massachusetts
- University of Massachusetts



NOREIZ Platform

Cost Effective Innovation Accelerator

- Study Platform, Steel in Water - FINO
- Node for Demonstrations - NaREC



Floating Wind and Wave

FINO

Platforms and Turbines



NOREIZ and MREC – Regional Approach

- 1) UMass/SMAST
MREC Coordination
Lead for Surveys in Muskeget/Tidal Resources
- 2) UNH – Center for Ocean Renewable Energy (CORE)
Tidal Test Integration – Flume, GSB, Muskeget
- 3) URI – Center for Research in Offshore Renewable Energy (RORE)
Off Shore Wind Test Site Development
- 4) WHOI – Resource Assessments and Technology Evaluation
- 5) MIT – Modeling, Technology Development



NOREIZ Benefits

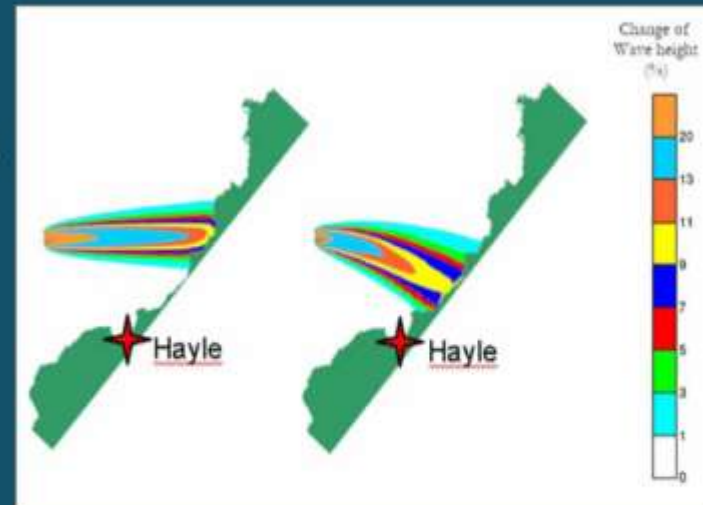
- 1) Accelerates technology development with public infrastructure
- 2) Provides developers/regulators information on resources and environmental considerations, including impacts on other uses like fishing
- 3) Acts as prototype for interagency cooperation
- 4) Enables training of engineers/technicians for industry

Impact Analysis Example

SURFING

- Wave monitoring - Baseline
- Numerical modelling of waves
- Typical vs. worst case scenario

	Typical case	Worst case
Spectral Waves	3%	5%
Monochromatic Waves	5%	11%



Changes under worst case WEC layout scenario to wave heights during small (left) and big (right) wave surfing conditions



Contact Information

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Marine Renewable Energy