



U.S. Outer Continental Shelf Renewable Energy

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BOEM North Carolina Virginia Intergovernmental Renewable Energy Task Force Webinar

July 23, 2019 | Sterling, Virginia



Outer Continental Shelf (OCS) Energy

OCS Lands Act: "... vital national resource ... expeditious and orderly development ... environmental safeguards"

Energy Policy Act of 2005: "... energy from sources other than oil and gas ..."

Alaska OCS



Pacific OCS



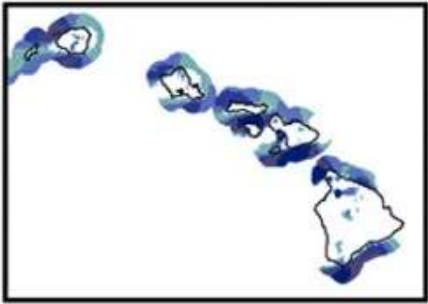
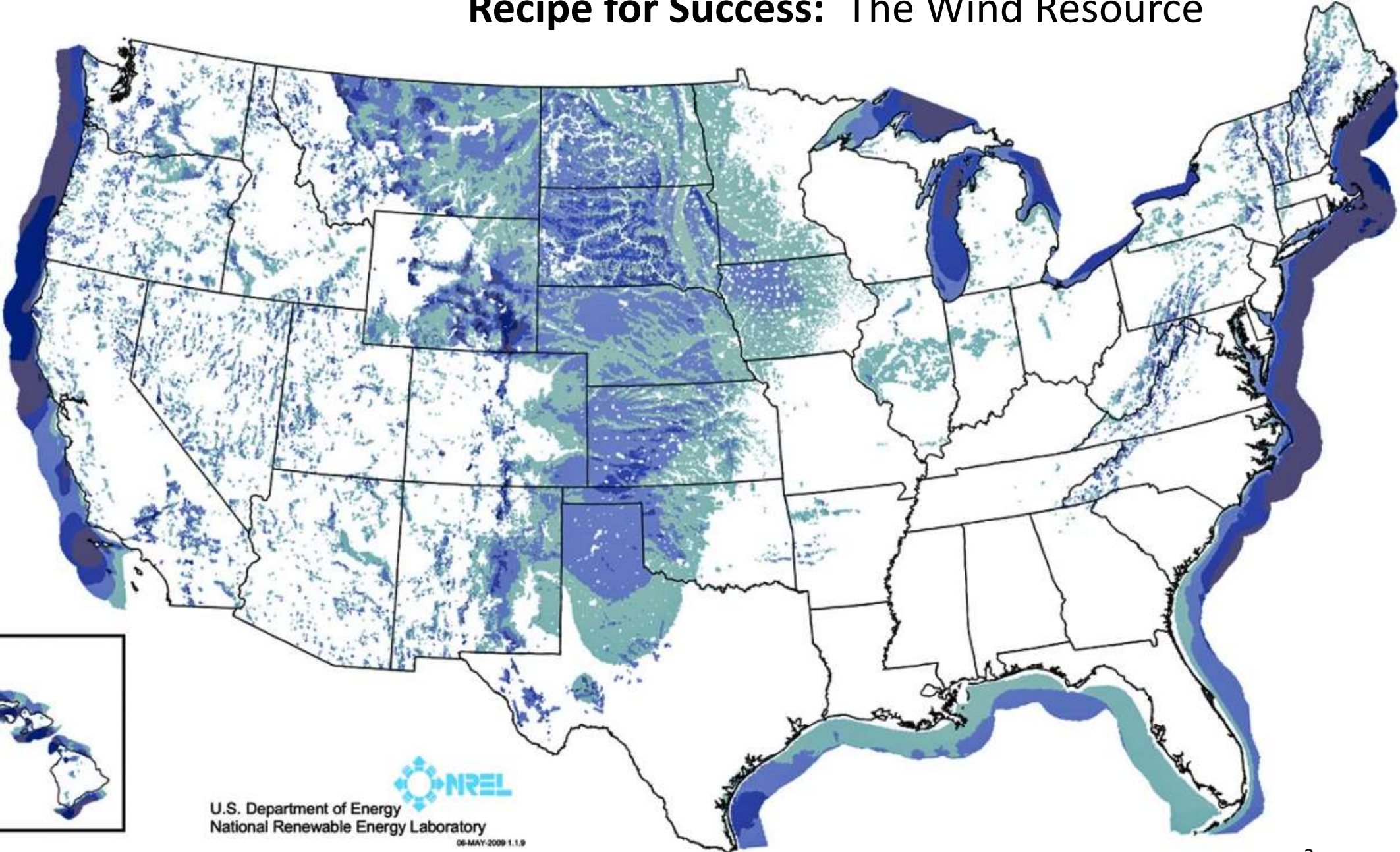
Gulf of Mexico OCS



Atlantic OCS



Recipe for Success: The Wind Resource

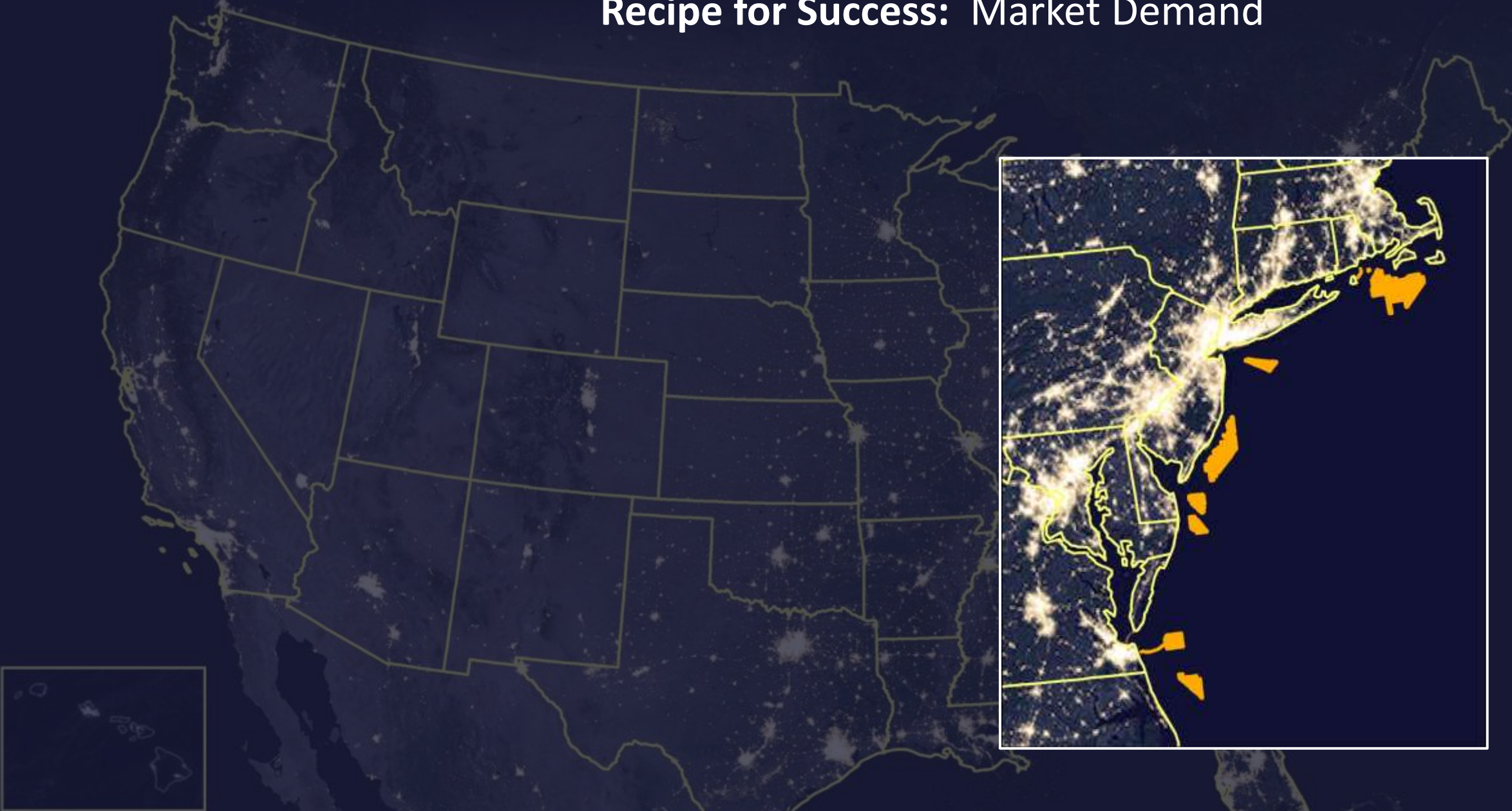


U.S. Department of Energy
National Renewable Energy Laboratory
06-MAY-2009 1.1.9

Recipe for Success: Buildable Environment



Recipe for Success: Market Demand



Atlantic OCS Renewable Energy: State Leadership



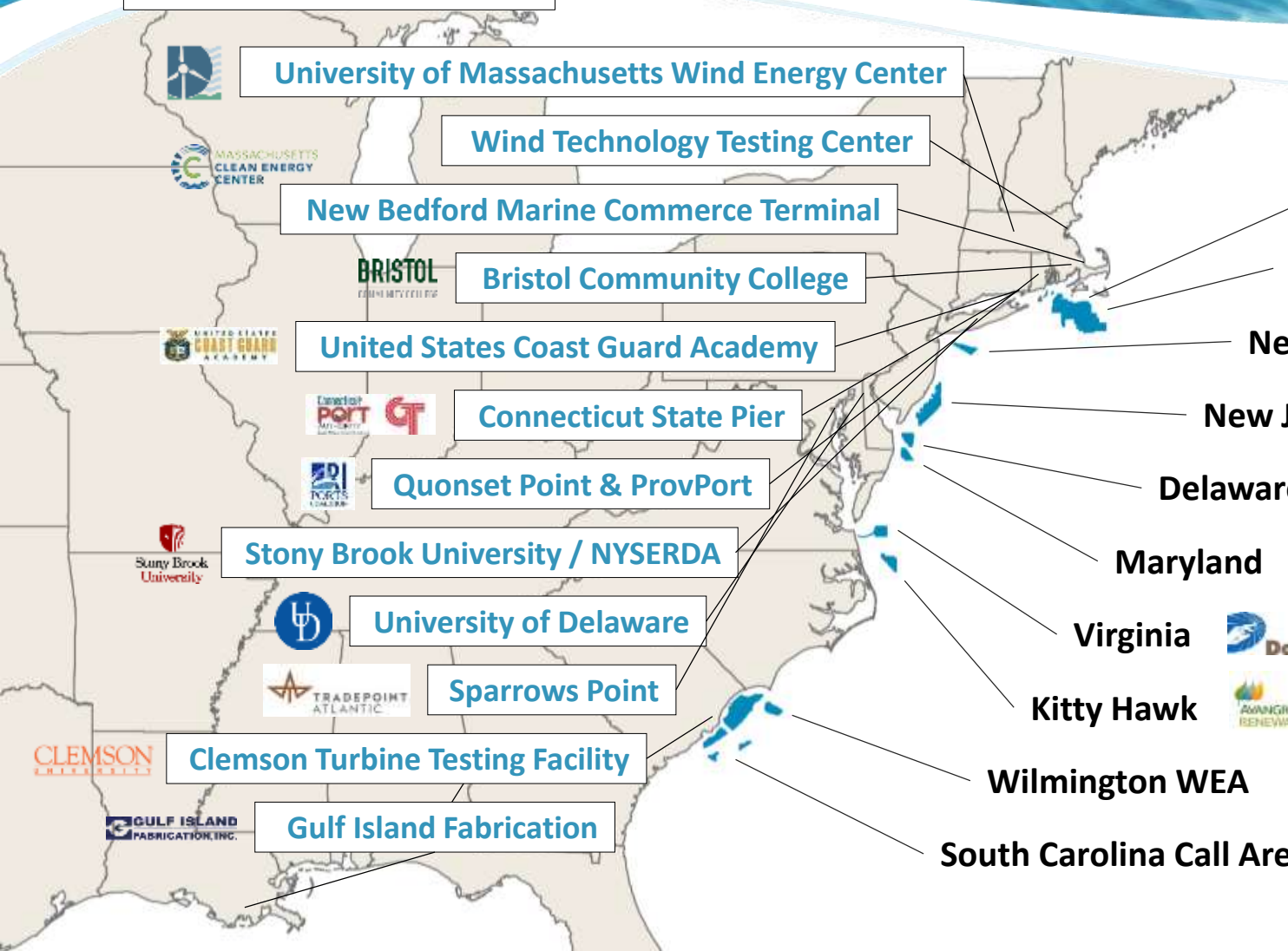
| | Goals (MW) | Renewable Goals |
|---------------|------------------|-----------------|
| Massachusetts | 3,200 | 35% by 2030 |
| Rhode Island | 1,000* | 38.5% by 2035 |
| Connecticut | 2,000 | 48% by 2030 |
| New York | 9,000 | 70% by 2030 |
| New Jersey | 3,500 | 50% by 2030 |
| Maryland | 2,000 | 50% by 2030 |
| TOTAL | 20,700 MW | |

*Clean Energy Goal



Issues & Opportunities: Atlantic OCS Renewable Energy Activities

INDUSTRIAL FACILITIES





Office of Renewable Energy Programs

Leasing

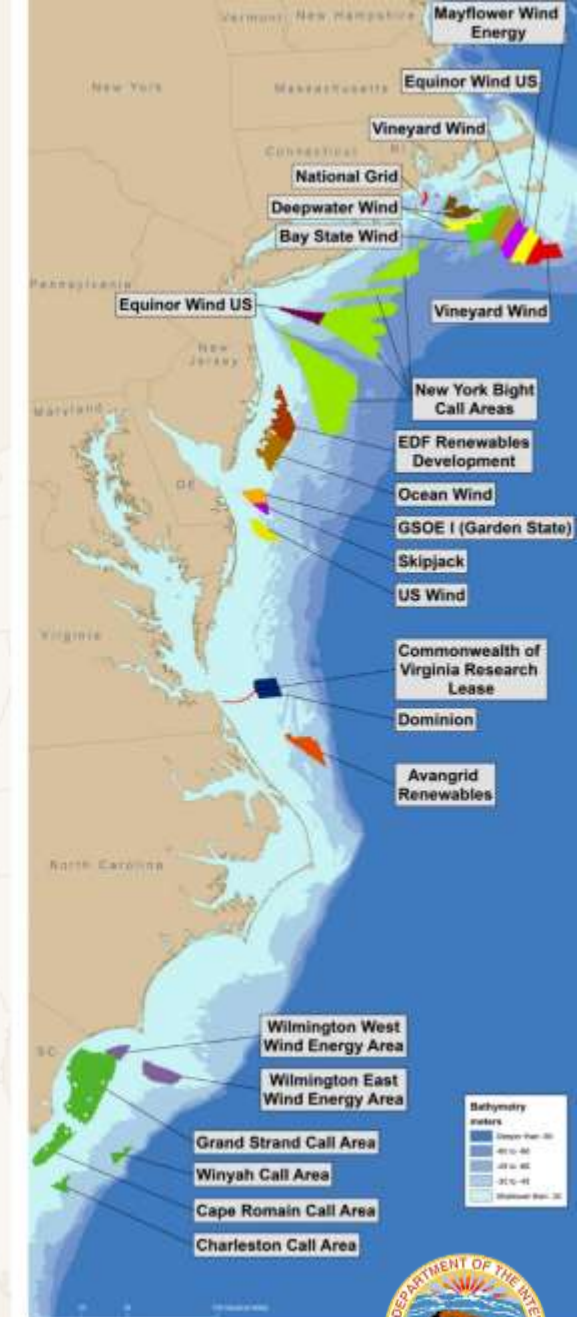
- 15 commercial wind energy leases in the Atlantic
- Upcoming lease sale in New York

Site Assessment Plans (SAP)

- 7 approved (MA, RI, VA, MD, MA, NJ, NY)

Construction And Operations Plans (COP)

- 4 processing (Vineyard Wind, Deepwater Wind South Fork, Bay State Wind and Skipjack)
 - 7 expected within next 12 months
- Planning activities continue off Hawaii, California, Carolina, New York Bight and Gulf of Maine
 - Guidelines: Lighting & Marking
 - California received 14 nominations from the Call for Information and Nominations issued October 19, 2018



Issues & Opportunities: Job Creation

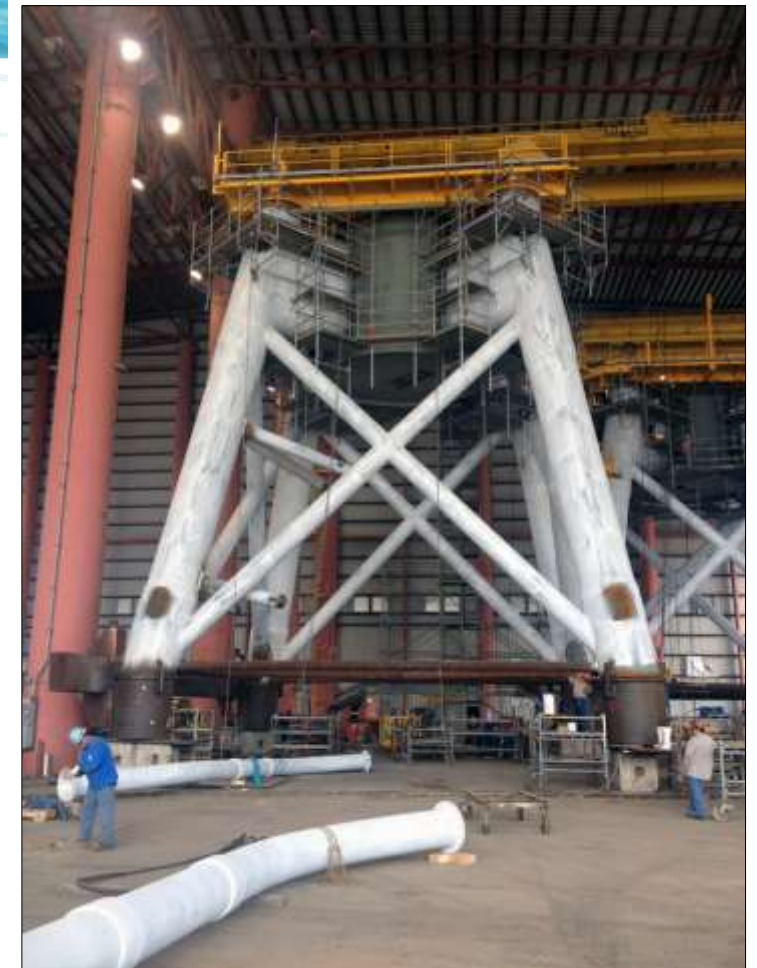
- **10,000** full-time equivalent jobs for construction of 800 MW wind farm
- **10,000 - 15,000** full-time equivalent jobs ongoing for multiple wind farm projects
- Local content expanding from 40% to 70% as industry matures

NREL Jobs and Economic Development Economic Impact Model;
BVG Associates Limited, "NYSERDA Report 17-22"



Issues & Opportunities: Industrial Synergies

Gulf Island Fabrication facility in Louisiana provided structures for the Block Island Wind Farm



Issues & Opportunities: Transmission

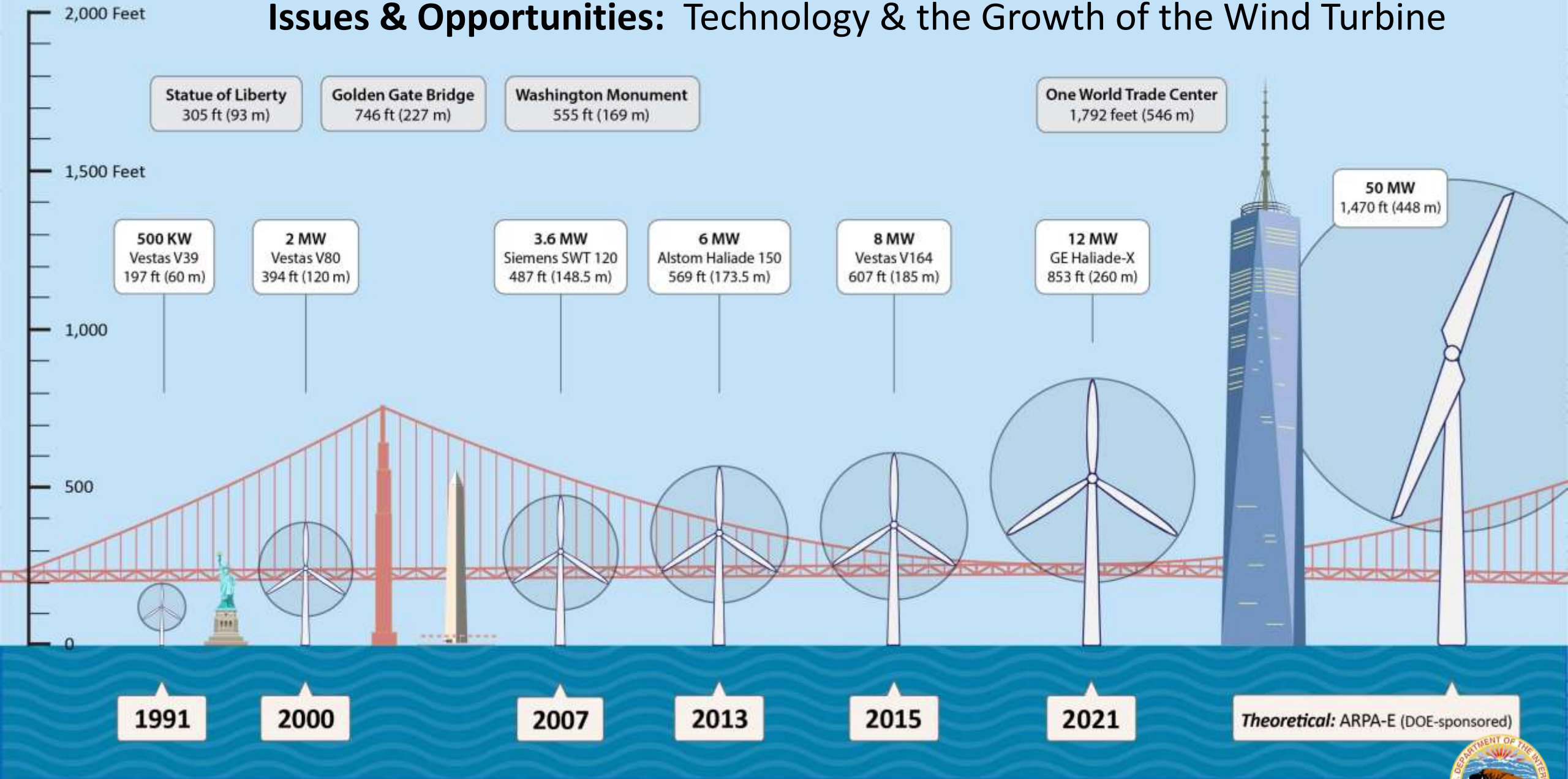
As the Construction and Operations phase nears for several projects, power transmission becomes increasingly important. Technical, economic, policy, and regulatory questions must be addressed.

Transmission models:

- Generator-developed transmission
- Third-party developed transmission
- Transmission company-developed system



Issues & Opportunities: Technology & the Growth of the Wind Turbine



Issues & Opportunities: Commercial & Recreational Fishing

- Loss of fishing ground
- Fishing practices
- Monitoring and modelling to inform future leasing
- Safety
- Access / Egress



Issues & Opportunities: Viewshed/Visual Impact

- Tourism
- Historic Landmarks and Properties
- Property Values
- Night Sky



Issues & Opportunities: Navigation & Safety

- Vessels transit through a wind farm
- Increased transit times
- Potential for allision/collision

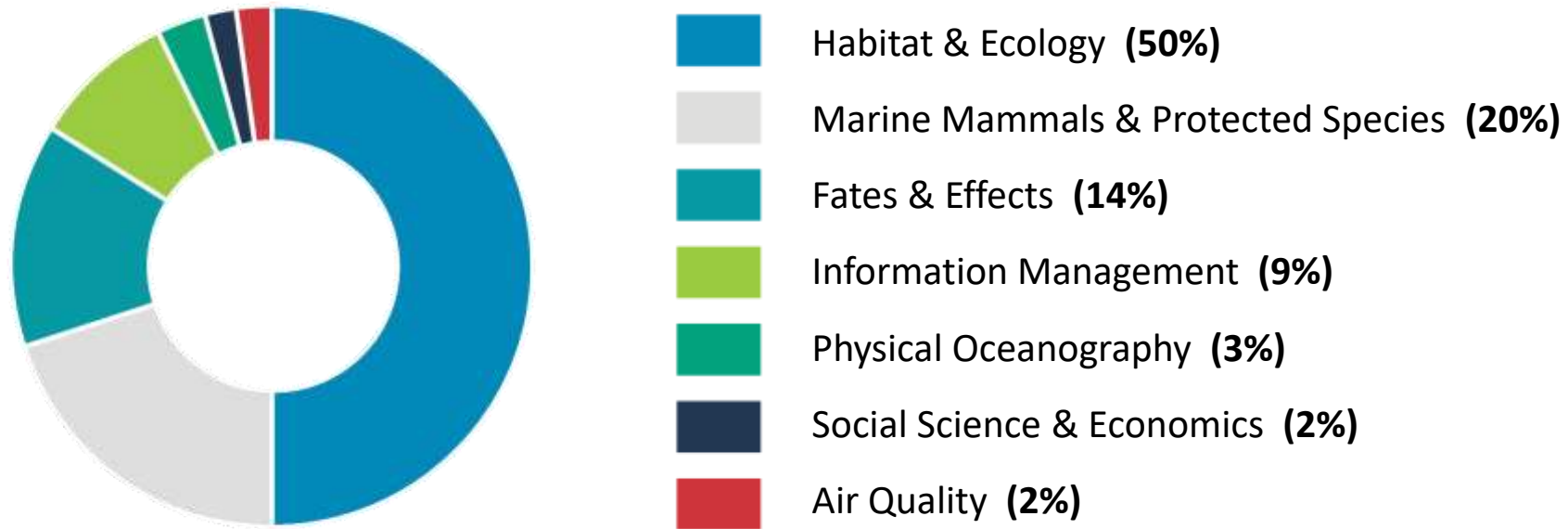


Issues & Opportunities: Wildlife

- Protected species avoidance
- Project impacts and cumulative impacts
- Post-construction monitoring at the regional scale
- Public / private partnerships
- BOEM's Environmental Studies Program



Funds for Renewable Energy Information Needs | FY 2011-18 Cumulative (~\$47M)



Includes obligations for all regions supporting environmental information needs for renewable energy, totaling \$47.3 million

Real-time Opportunity for Development Environmental Observations (RODEO)

- First facilities' actual environmental effects
- Mitigation measures
- Air quality / sound / seafloor disturbance



Collecting sound measurements at Block Island Wind Farm, *September 2015* >>

OCS Renewable Energy Authorization Process

Planning & Analysis



Leasing



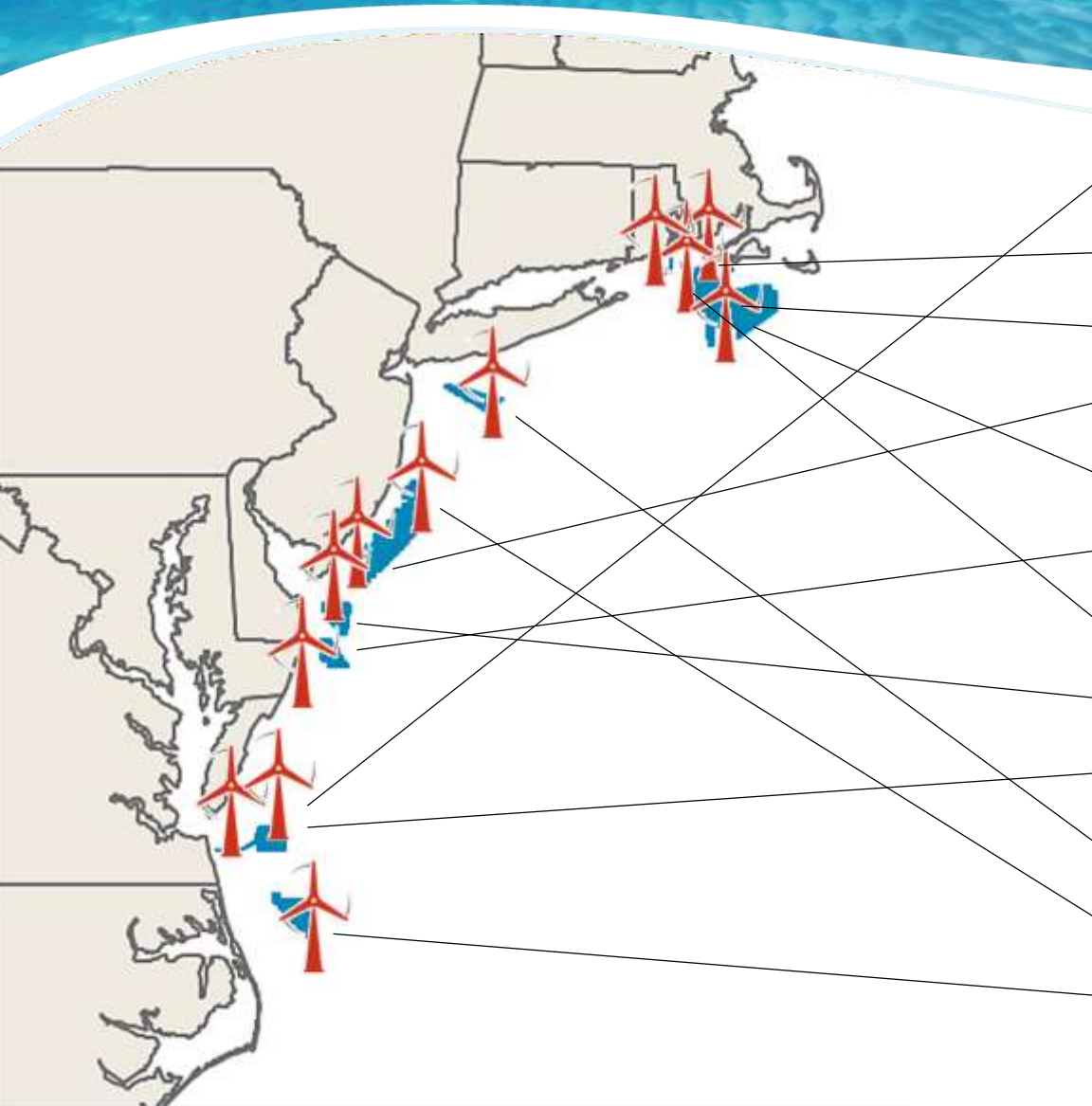
Site Assessment

















Construction & Operations



Atlantic OCS Renewable Energy: “Projects in the Pipeline”



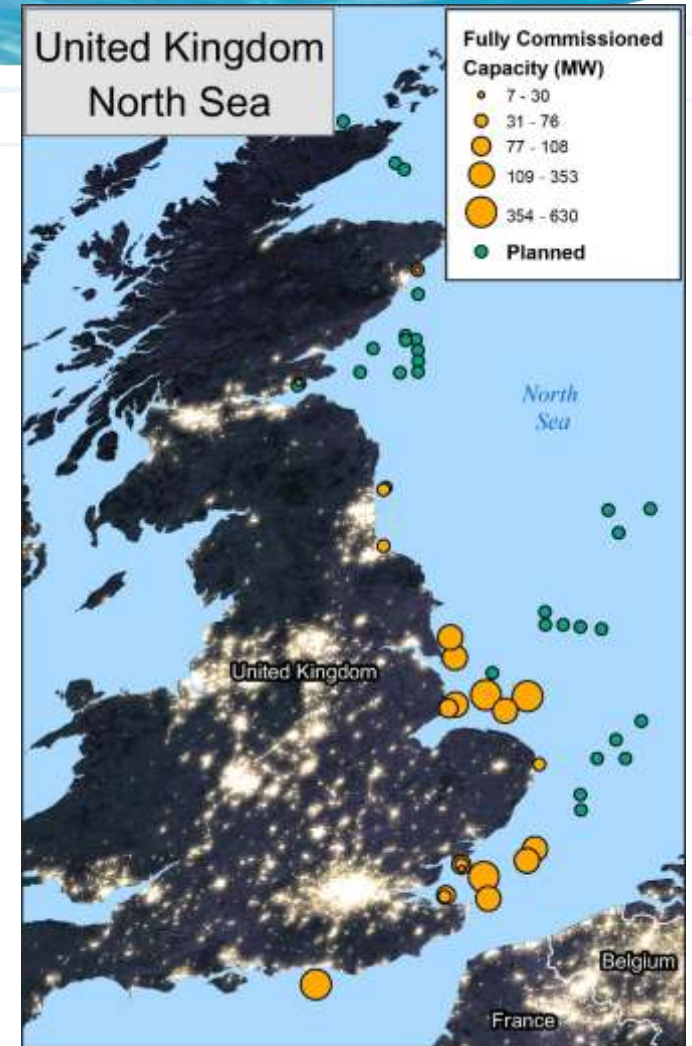
| Year | Project | Company |
|------|--------------------------------|---|
| 2020 | Coastal Virginia Offshore Wind |   |
| 2021 | Vineyard Wind |  |
| 2022 | South Fork |  |
| 2022 | Ocean Wind |  |
| 2022 | Bay State Wind |  |
| 2022 | U.S. Wind (MD) |  |
| 2023 | Revolution Wind |  |
| 2023 | Skipjack Windfarm |   |
| 2025 | Dominion Commercial Lease |  |
| 2025 | Empire Wind |  |
| 2026 | EDF Renewables |  |
| 2027 | Kitty Hawk |  |



U.S. Atlantic and Great Britain North Sea / English Channel Offshore Wind Facilities

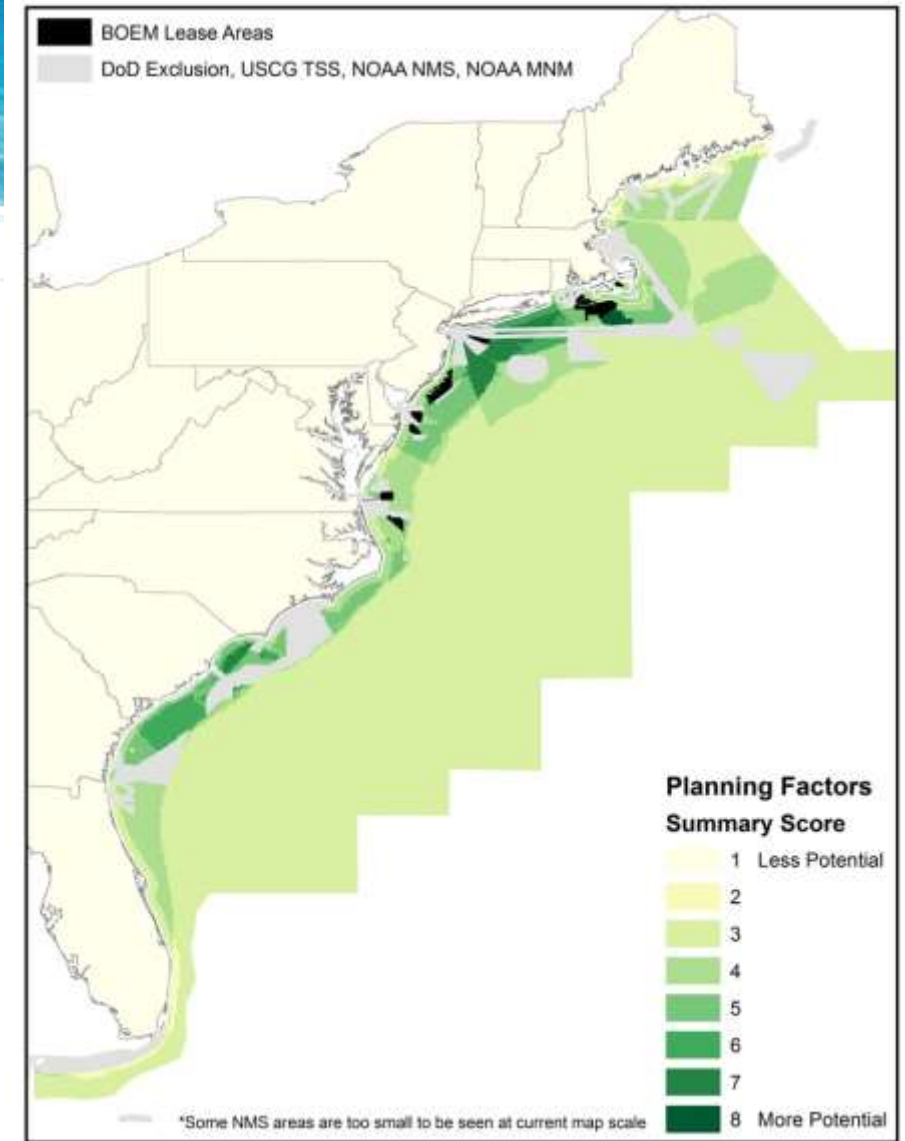


| | | | |
|---|------------|--|------------|
| Population (< 50 mi of coast) | 51,607,259 | | 41,298,308 |
| Length of Coast (NM) | 600 | | 600 |
| Number of Active Projects | 15 | | 26 |
| Production Start Date | 2020 | | 2004 |
| Active Production (MW nameplate) | 0 | | 4,991 |
| Anticipated Production (MW) | 10,118 | | 28,245 |



High-Potential Forecast Areas Criteria

- Areas prohibited by Outer Continental Shelf Lands Act
- Department of Defense (DoD) conflict areas
- Maritime navigation conflict areas
- Areas not previously removed from BOEM leasing consideration
- Areas >10 nautical miles from shore
- Areas <60 meters in depth
- Areas adjacent to states with offshore wind economic incentives
- Areas adjacent to states with an interest in identifying additional lease areas
- Areas where industry has expressed interest





Bureau of Ocean Energy Management
U.S. Department of the Interior

BOEM.gov



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