

Overview of the Offshore Wind Industry and Lessons Learned for California

Prepared for
BOEM Offshore Renewable Energy Workshop
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July 29, 2014



European Offshore Wind Statistics (as of July 1, 2014)

- Offshore wind generating power in Europe since 1991
- 73 wind farms in 11 countries
 - only 26 wind farms in 2008
- 7,343 MW installed capacity
 - only 1,975 MW installed capacity in 2008
- 2,304 turbines in the water
- By 2030, more than 375,000 people to be employed directly in the sector – 160,000 onshore and 215,000 offshore.
- In 2013, average nameplate capacity of 485 MW
- Average water depth – 20 m (65.6 feet)
- Average distance from shore – 30 km (18.6 miles)

Source: European Wind Energy Association (EWEA)

Huge Global Growth in Offshore Wind – Significant Economies of Scale to be Realized

| REGIONS (Countries listed in descending order of 2013 installed capacity) | INSTALLED OFFSHORE WIND CAPACITY (MW) | | | |
|---|---------------------------------------|--------------|----------------|---------------|
| | 2006 | 2013 | 2020 Projected | |
| | | | Low Growth | High Growth |
| EUROPE UK, Denmark, Germany, Belgium, Netherlands, Sweden, Finland, Ireland, Spain, Norway & France | 875 | 6,652 | 26,800 | 40,000 |
| ASIA China, Japan & South Korea | 0 | 480 | 9,441 | 18,154 |
| NORTH AMERICA United States & Canada | 0 | 0 | 940 | 2,794 |
| TOTALS | 875 | 7,132 | 37,181 | 60,948 |

Sources: European Wind Energy Association (Europe), UK Carbon Trust and Global Wind Energy Council (Asia), NREL and personal knowledge of industry (North America)

The European and U.S. Approach to Energy Policy

| | <u>Europe</u> | <u>U.S.</u> | <u>California</u> |
|--|---------------|----------------|-------------------|
| Action on Climate Change | Yes | Sort of | Yes |
| Energy Policy | Yes | No | Yes |
| Aggressive Energy Conservation Initiatives | Yes | Not Really | Yes |
| Energy Independence Initiatives | Yes | Does Not Apply | Leans Yes |



Developing a Sustainable Offshore Wind Industry in the U.S. – I

- Federal Government Role – Establishing a Workable Regulatory Framework
 - US DOI Smart from the Start Initiative
 - Lease Auction Process
 - Marine Spatial Planning
 - Standard Setting
- Federal Government Role – Ensuring a Level Playing Field
 - Royalty Payments
 - Loan Guarantees
 - Investment Tax Credits
 - Grants



Developing a Sustainable Offshore Wind Industry in the U.S. – II

- State Government Role – Ensuring markets
 - Enforceable Renewable Portfolio Standards
 - Power Purchase Agreements
 - Offshore Wind Carve-outs
 - Infrastructure support; e.g., ports, staging areas
- Developers Role – Engaging Stakeholders Early in the Process
 - National and Regional Environmental and Labor Organizations
 - Ocean Users
 - Commercial fishermen
 - DOD and USCG
 - Shipping industry
 - Recreational users
 - Tribal Nations
 - Tourism officials



Big Picture Overview of U.S. Offshore Wind Industry – I

- Massachusetts
 - BOEM Proposed Sale Notice for leases
 - Cape Wind's 468 MW project
- Rhode Island
 - BOEM issues two leases to Deepwater Wind
 - Block Island Wind Farm (Deepwater Wind) 30 MW pilot project progressing
- New York
 - New York Power Authority and other bidders express interest in offshore leases
 - Long Island Power Authority considering responses to RFP for in-state renewable energy bids for up to 200 MW of power
- New Jersey
 - BOEM Proposed Sale Notice for leases
 - Fishermen's Energy wins second round DOE funding for 25 MW pilot project
 - OREC revenue stream potential for 1100 MW
 - Atlantic Wind Connection's New Jersey Energy Link



Big Picture Overview of U.S. Offshore Wind Industry – II

- Delaware
 - BOEM issues lease to NRG
 - PPA with offtaker allowed to expire
- Maryland
 - Lease auctions to be held August 19; 16 qualified bidders
 - NJ-like OREC bill for 200 MW, requires OREC bidders to have “site control” for wind farm
- Virginia
 - Dominion Resources wins second round DOE funding for 12 MW pilot project
 - BOEM issues lease to Dominion
- North Carolina, South Carolina and Georgia
 - BOEM supporting R&D and site identification
- Oregon
 - Principle Power wins second round DOE funding for 30 MW floating foundation pilot project
 - BOEM issues lease to Principle Power



Essential Elements in Place for Wind Farm Development off California Coast

- Rapidly evolving technology
- Strong state renewable energy policies
- Established federal lease process
- Extensive state permitting experience

