GARDEN STATE OFFSHORE ENERGY

Renewing New Jersey's Energy Future.

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Background of NJ Offshore Wind Industry

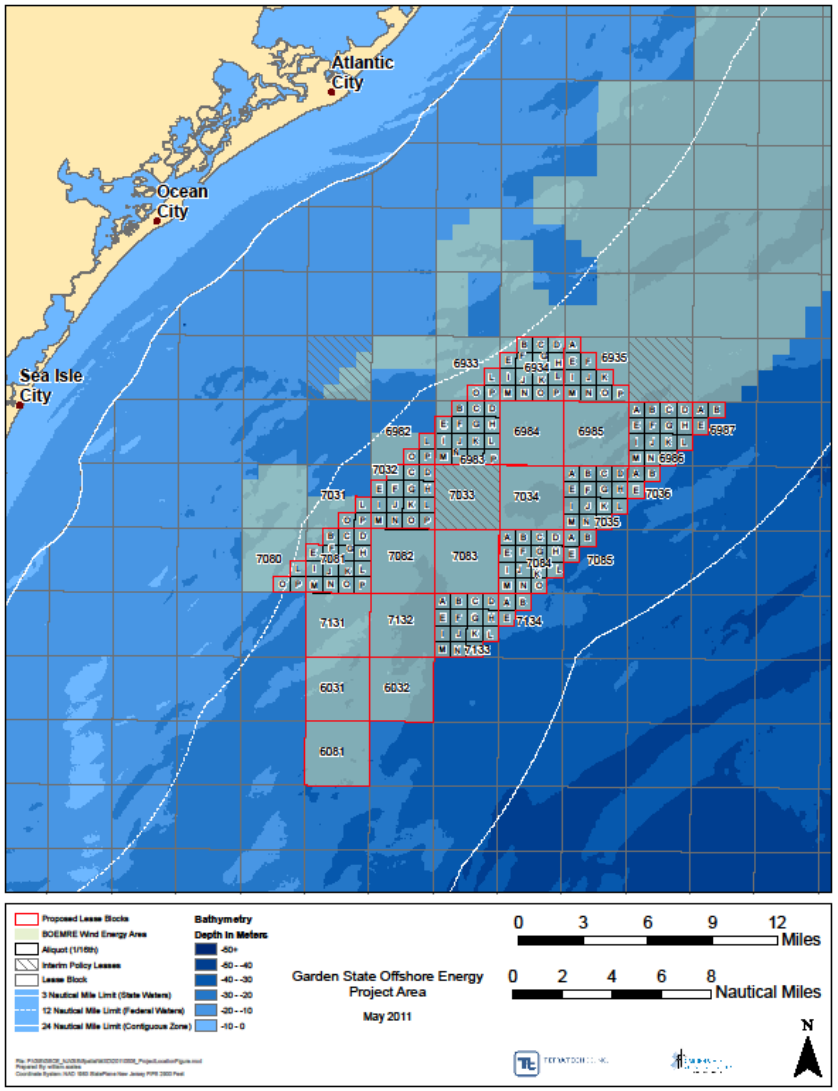
- 2004 – 2006
  - Blue Ribbon Panel created to identify and weigh costs and benefits of developing offshore wind considering both economic and environmental costs and benefits
  - Panel recommended offshore wind test project not to exceed 350MW
- 2007 – 2008
  - NJBPU issues solicitation for test project
  - Five companies responded
  - GSOE selected as the solicitation winner
  - Energy Master Plan issued with goal to develop 1000MW of offshore wind by 2012 (3,000MW by 2020)
- 2010 – present
  - Offshore Wind Economic Development Act ("OWEDA") signed into law to spur economic development and job creation from the emerging offshore wind industry in New Jersey
  - Targets 1,100MW of offshore wind (floor); state would like to see 3,000MW
  - Last stages of regulatory rule process prior to solicitation for competitive bids (expected summer 2012)

Developer's perspective on maritime risk

- Five areas identified
  - Structure (e.g. – size of projects in Wind Energy Area)
  - Technical (e.g. – grid reliability, reserve capacity, reliability etc.)
  - Operating (e.g. – personnel safety, turbine availability, etc.)
  - Natural Disasters (e.g. – hurricanes, icing, etc.)
  - Terrorism

Structure

- Large Scale projects
  - GSOE project site roughly 120 square miles in size; or the size of Essex County, NJ
  - 60-150 turbines
  - ¾ of mile spacing between each turbine
  - Offshore substations = ~5,000 sq. ft.
- Large scale shared area requires coordination with shipping and fishing industry
- Increased maritime traffic, modified ship routes, size of ships, recreational and commercial fishing activities, anchor areas, etc. all contribute to risk profile



Technical

- Although most turbines have good track record, turbine availability and reliability impact:
  - Electric grid reliability and short/long term transmission planning
  - Reserve capacity requirements
    - intermittency of wind resource requires standby reserves in the event of a drop off (think Texas!)
  - Submarine cables are exposed to natural and accidental failure risk

Operating

- Ocean environment has a great deal of influence on turbine availability and reliability
  - Corrosion, humidity
  - Sea state (waves, current, tide, etc.)
  - Ability of personnel to safely access turbines for O&M, etc.)
- Negligible spill /environmental risk

Natural Disasters

- Natural disasters pose structural and operational risks to offshore wind farms despite technological features designed to mitigate risk impacts
  - Hurricanes (high wind, waves)
  - Nor'easters (high wind, waves)
  - Earthquakes/tsunamis (structural)
  - Significant storm winds, wave heights

- Offshore wind industry cooperative initiatives
  - Meteorological forecasting modeling
  - Oceanographic modeling
  - Marine Mammal / Avian studies

Terrorism

- Project locations 10-25 miles offshore pose security risks
  - Typically unmanned
  - Over 1 hour to reach project sites from shore
  - Passive security measures most likely (security cameras, sensors)
  - You can't fence off 120+ square miles of ocean
  - Concurrent uses of the area poses challenges to site security/integrity (recreational/commercial fishing, scientific research, shipping lanes, etc.)

Terrorism cont

- U.S. Coast Guard will be primary risk mitigant:
  - Do they have the necessary resources (ships/aircraft, personnel, training, etc.) to undertake monitoring/response capabilities?
  - Are there other or new technologies (like sub-sea detectors) that can assist a project owner and government agencies like the USCG in fulfilling security requirements
- Other risk mitigants?

For further information

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