

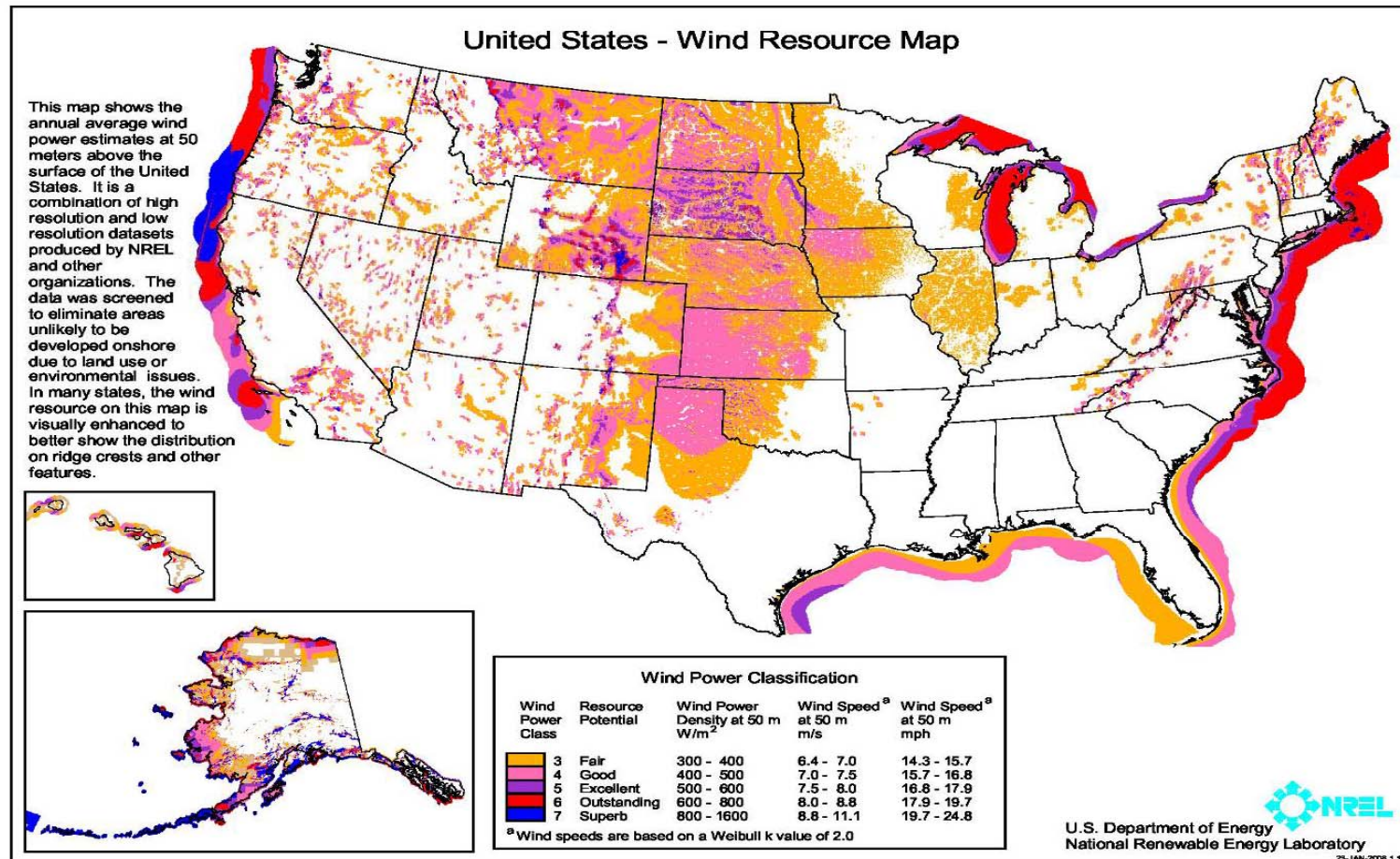
Overview of the Offshore Wind Industry

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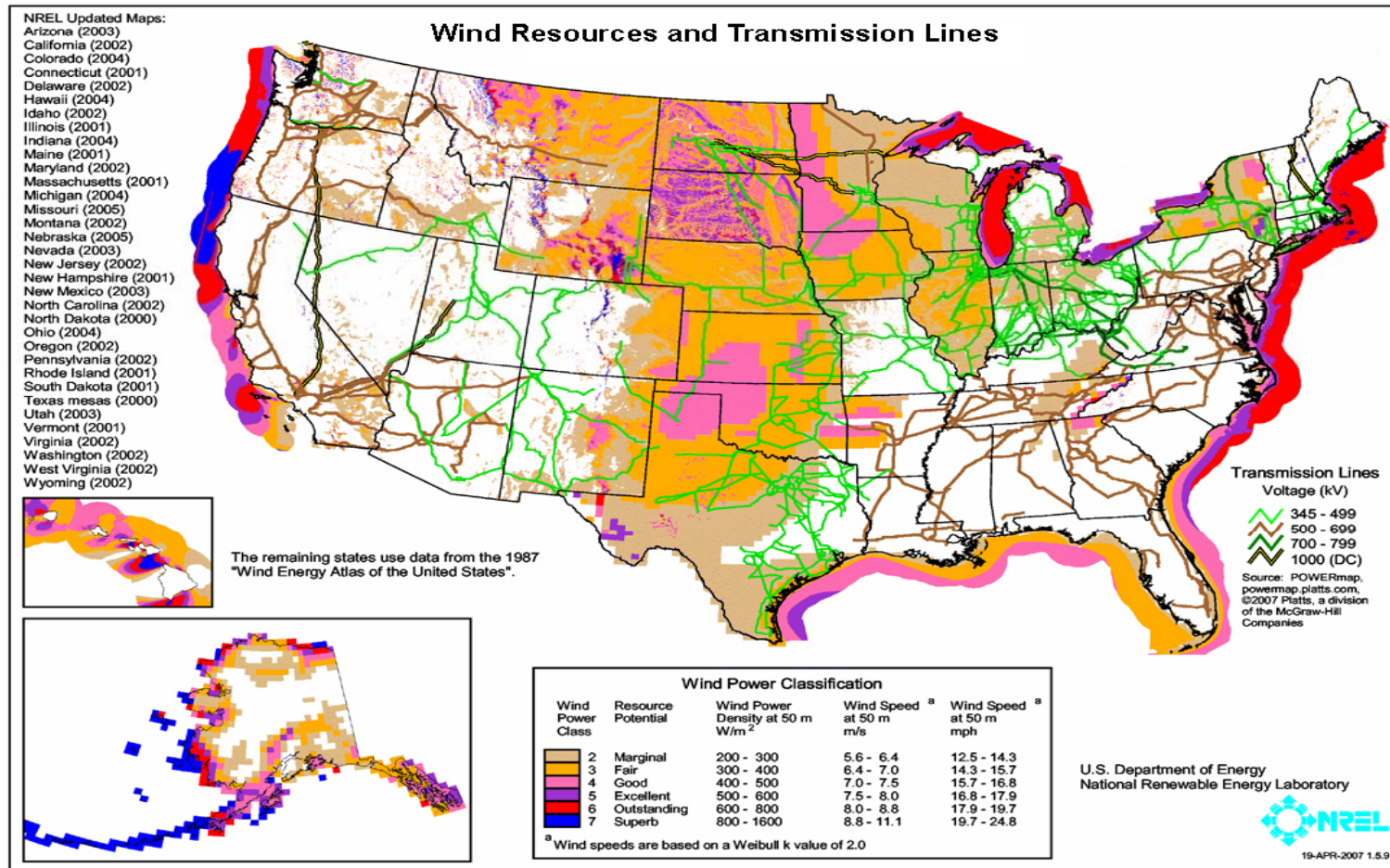
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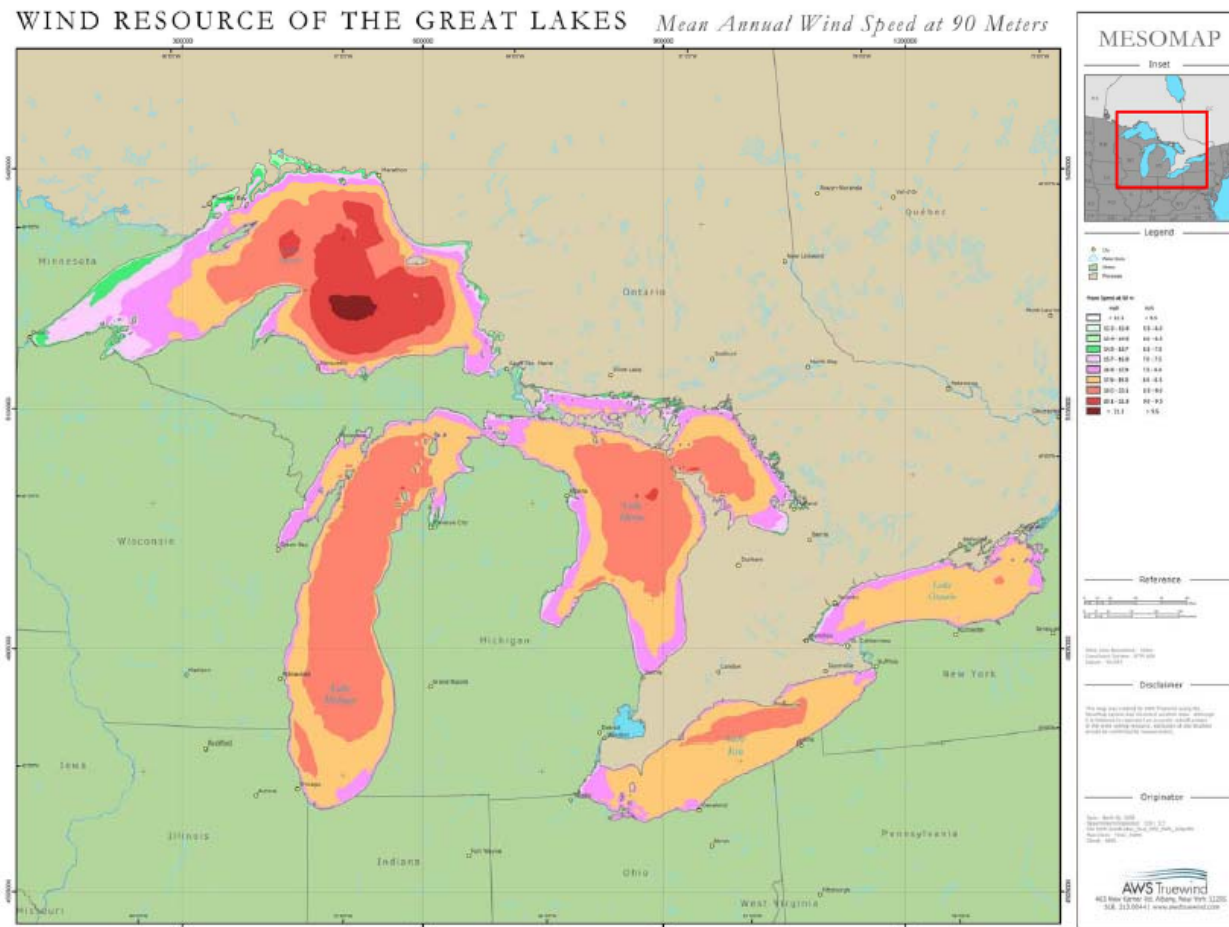
Offshore Wind Resources of the United States



Offshore Wind Resources of the United States (cont.)

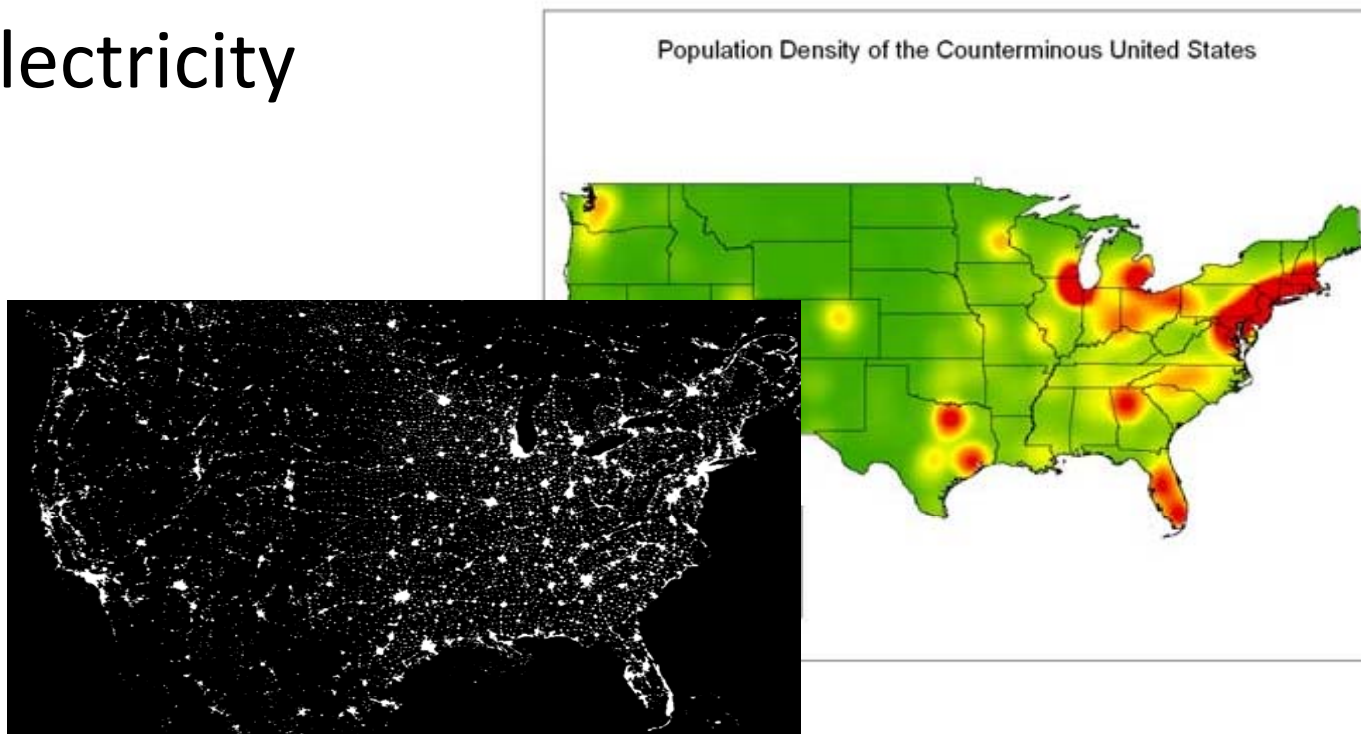


Wind Resources of the Great Lakes



Major Load Centers

- Electricity needs to go where the people are
- Coastal states use 78% of the Nation's electricity



Offshore Wind Resources of the United States (cont.)

- The U.S. Department of Energy (“DOE”) estimates that the total gross offshore wind energy resource of the United States is **4,150 GW**, or approximately four times the generating capacity of the current U.S. electric power system.
- Of this capacity, **1,070 GW** are in waters less than 30 meters deep, **630 GW** are in waters between 30m and 60m deep, and **2,450 GW** are in waters deeper than 60m.
- The Great Lakes offer **743 GW** of total offshore wind potential, with **177 GW** in waters less than 30 meters deep, **106 GW** in waters between 30m and 60m deep, and **460 GW** in waters deeper than 60m.
- DOE only considered areas up to 50 nautical miles from shore with average wind speeds of 7 m/s or greater at 9m elevation.

Is the Offshore Wind Opportunity Real?

Offshore Wind in Europe

- First offshore wind facility in the world installed in 1991 at Vindeby in Denmark
- Since 1991, over **4,300 MW** of offshore capacity has been installed and is currently operating in EU waters
- By the end of 2012, installed offshore wind capacity is expected to reach almost **5,000 MW**, and more than **3,000 MW** of additional capacity are currently under construction
- The first half of 2012 saw a 50% increase in offshore wind capacity installations compared to the same period last year, despite the economic and financial turmoil
- In 2011, three experimental deepwater floating turbines were installed off the coasts of Norway, Sweden, and Portugal, the latter being the first full-scale, grid connected floating model (2 MW)

Offshore Wind in Europe (cont.)

- The European Union has adopted a “binding” target of 20% renewable energy by 2020.
- EWEA’s target for offshore wind is 40 GW of installed capacity in the EU by 2020 and 150 GW by 2030.
- European industry leaders are pursuing development of a pan-European “electricity super-highway”, including an offshore pan-European grid, with the capacity to balance intermittent renewable resources such as wind and solar throughout the system in order to meet load demands on a consistent basis.

Offshore Wind in Asia

- With over **233 MW** of offshore wind turbines already installed and operating, China has ambitious goals for additional offshore wind development.
- In 2010, China awarded contracts for the construction of an additional **1 GW** of offshore wind turbines over the next four years.
- According to China's National Energy Bureau, China is targeting **5 GW** of installed offshore wind capacity by 2015, and **30 GW** by 2020.
- In November 2011, South Korea announced that it will be building the world's largest offshore wind farm, totaling **2.5 GW** constructed in three phases off its southwestern shore.
- Taiwan recently announced the signing of a cooperation agreement between a leading public university and Taiwan Generations Corp. to develop a **100 MW** offshore wind project.
- Japan is planning a six 2 MW floating turbine project to be installed by 2015 off the coast of Fukushima, and several small fixed-foundation projects are already operating in its waters.

U.S. Policy Initiatives

- November, 2010: Department of the Interior (DOI) announced the “Smart from the Start Initiative”, which seeks to identify and create high priority Wind Energy Areas (WEAs), conduct early environmental reviews, and coordinate state and federal permitting processes.
- February, 2011: DOI and the Department of Energy (DOE) announce a coordinated strategic plan to pursue the deployment of 10 GW of offshore wind capacity by 2020 and 54 GW by 2030.
- DOI and DOE also announced \$50.5 million in funding opportunities for projects that support offshore wind energy deployment.
- As of September, 2012, Wind Energy Areas have already been created offshore of Massachusetts, Rhode Island, New Jersey, Delaware, Maryland, and Virginia.

Great Lakes Initiatives

- **Wisconsin:** “Wind on the Waters” report, which examined feasibility of developing offshore wind in Lakes Michigan and Superior, was released in January 2009
- **Illinois:** Governor Quinn signed HB1558 in 2011 to form Offshore Advisory Council; City of Evanston’s Offshore Wind Committee is actively exploring development in Lake Michigan.
- **Michigan:** Great Lakes Offshore Wind Council created in 2009 by Governor Granholm issued report in September 2009 and conducted a “dry run” permitting process based on a hypothetical offshore wind project. Legislation to pave the way for offshore wind development was drafted based on dry run exercise and is expected to be re-introduced in 2012 session.
- Grand Valley, Michigan, & Michigan State Universities deployed a wind monitor in Lake Michigan in 2011.
- DTE received approval for a rate-based \$1 million offshore research/development project in 2012.

Great Lakes Initiatives (cont.)

- **Ohio:** Ohio Coastal Management Program developed a Wind Turbine Placement Favorability Analysis Map for the waters of Lake Erie.
- First submerged land lease option for an offshore wind project signed by the Governor in January 2011
- **Ontario:** Moratorium on offshore wind development pending further study imposed in early 2011; however, contract issued previously to Windstream Energy for 300 MW Wolfe Island project still in effect.
- In early January 2012, Windstream announced contract with Siemens for turbine supply; project expected to be constructed in 2014.

U.S. Projects in Advanced Stages of Development



Summary of Advanced Projects

State	Developer	Project Name	Location	Planned Capacity	Status of Site Lease	Status of PPA
Delaware						
	NRG Bluewater Wind, LLC	Mid-Atlantic Wind Park	Offshore of Rehoboth Beach – Outer Continental Shelf (OCS)	300-450 MW	5-year interim lease issued November 1, 2009; BOEMRE issued Notice of Determination of No Competitive Interest for a long-term commercial lease on April 12, 1011	25-year PPA for 200 MW with Delmarva Power (terminated by NRG at end of 2011)
Massachusetts						
	Cape Wind Associates	Cape Wind	Nantucket Sound (OCS)	468 MW	28-year commercial lease issued October 6, 2010; Construction and Operations Plan approved in April, 2011	15-year PPA for 50% of output with National Grid; 15-year PPA for 27.5% of output with NSTAR Electric required as condition of merger
	Town of Hull Municipal Light Plant	Hull III	Vicinity of Harding Ledge (State waters)	16 MW	To be issued by State upon completion of permitting	N/A

Summary of Advanced Projects (cont.)

New Jersey						
	NRG Bluewater Wind, LLC		Offshore of Atlantic City (OCS)	348 MW	5-year interim lease issued November 1, 2009	
	Garden State Offshore Energy, LLC		Offshore of Avalon (OCS)	345 MW	5-year interim lease issued November 1, 2009	
	Fisherman's Energy, LLC	Phase I	Offshore of Atlantic City (State waters)	20 MW	To be issued by State upon completion of permitting	
	Fisherman's Energy, LLC	Phase II	Offshore of Atlantic City (OCS)	350 MW	5-year interim lease issued November 1, 2009	

Summary of Advanced Projects (cont.)

Ohio						
	Freshwater Wind, LLC		Cleveland Bay (State waters)	20 MW	4-year option to lease site issued by State of Ohio January 7, 2011	
Rhode Island						
	Deepwater Wind, LLC	Block Island Wind Farm	Offshore of Block Island (State waters)	30 MW	To be issued by State upon completion of permitting	20-year PPA with National Grid
	Deepwater Wind, LLC	Deepwater Wind Energy Center	Southern Rhode Island Sound	1,000 MW		
Texas						
	Wind Energy Systems		Offshore of Galveston (State waters)	150 MW	Lease issued by Texas General Land Office	

Questions?