

Fitting the Block Island Wind Farm into a Global Economic Framework

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IGERT Wind Studio Presentation
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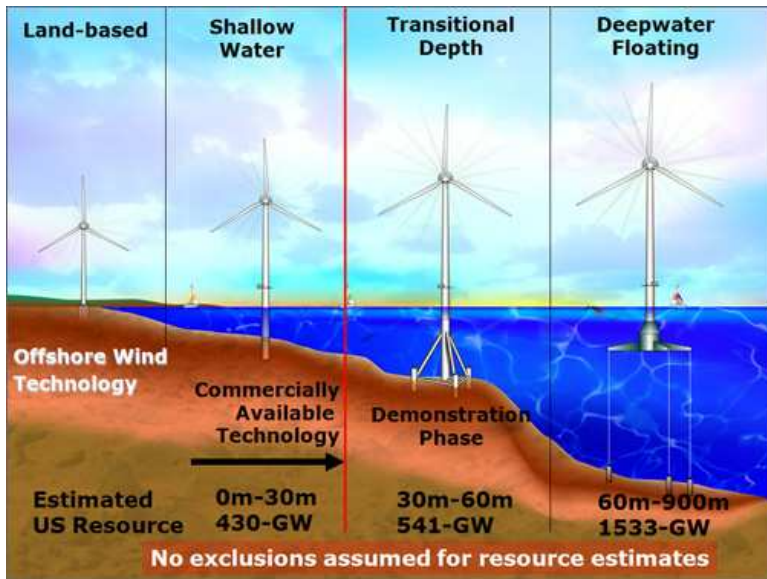
Outline

- 1 Offshore Wind Economics
- 2 European Policy
- 3 Policy In the United States
- 4 Block Island
- 5 Conclusions

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What is an Offshore Wind Turbine?

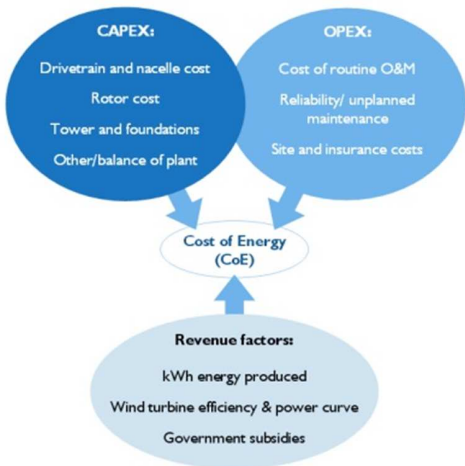


State of the Industry

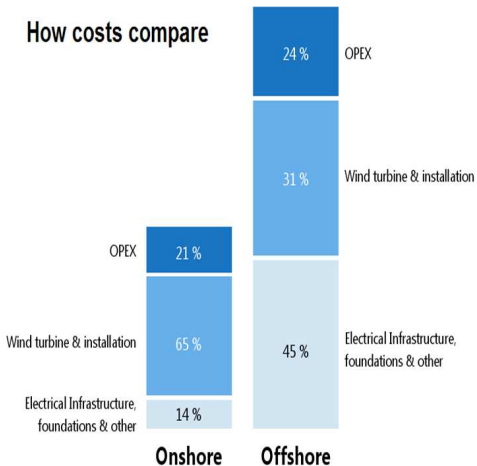
Country	US	UK	IE	SE	NO	FI	DK	NL	DE	BE	FR	SP
Current	0	1983	25	168	2	32	875	247	521	196	0	0
Proposed	29952	52208	1794	7784	20922	4735	6161	4345	34958	1660	10042	6023

Table: 1: Status of Offshore Wind Installations (Megawatts)

Onshore vs. Offshore Cost Comparisons



How costs compare



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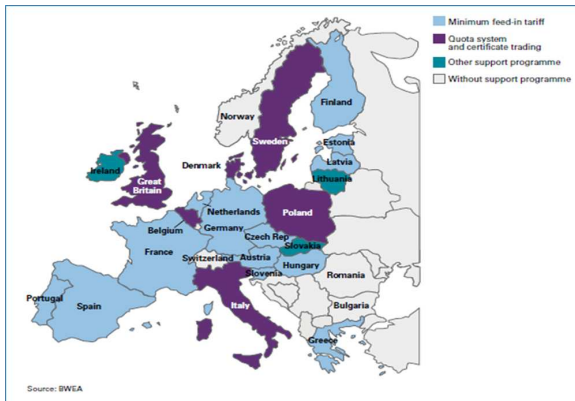
European Union 20-20 initiative

TABLE 2: NATIONAL RENEWABLE ENERGY TARGET (DIRECTIVE 28/2009/EC)

	SHARE OF ENERGY FROM RENEWABLE SOURCES IN FINAL CONSUMPTION 2005	EU TARGET: SHARE OF ENERGY FROM RENEWABLE SOURCES IN FINAL CONSUMPTION 2020	NREAP AGGREGATE SHARE OF RENEWABLE SOURCES IN FINAL CONSUMPTION 2020
EU	8.5%	20%	20.7%

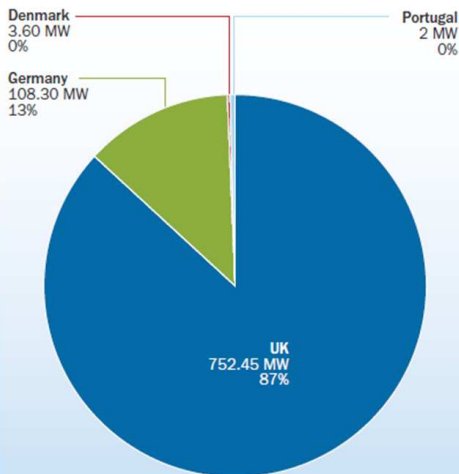
- Leader in climate change policies
- EU 20-20 initiative

Primary Policies per Country



- Feed-in Tariffs
- Renewable Portfolio Standard/Quotas
- Production Tax Credit
- Capital Grants/Loan Guarantees

European 2011 European Offshore Wind Energy Installations



- Northern Europe: higher wind speeds
- UK-Germany-Denmark: Highest Developers
- UK originally had a market based approach
- Renewable energy goals 20-20
- Primary incentive mechanisms

Cost Increases of Different Energy Production

Generating technology	Energy Review 2006	Mott Macdonald 2010	% rise
Combined cycle gas turbine (CCGT)	£42/MWh	£80/MWh	90
Coal	£32/MWh	£102/MWh	219
Nuclear	£46/MWh	£97/MWh	111
Onshore wind	£66/MWh	£88/MWh	33
Offshore wind	£99/MWh	£149/MWh	51

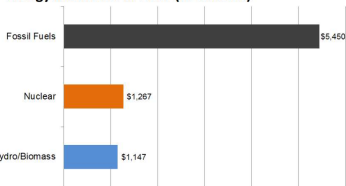
- UK climate change levy
- Increased renewable competition
- Offshore cost is high but policies have attracted highest development

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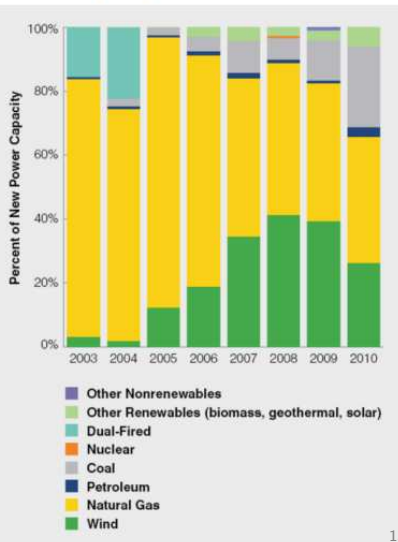
Comparison to Other Energy Generation

Energy Incentives in 2007 (in millions)



Data Source: EIA, 2008

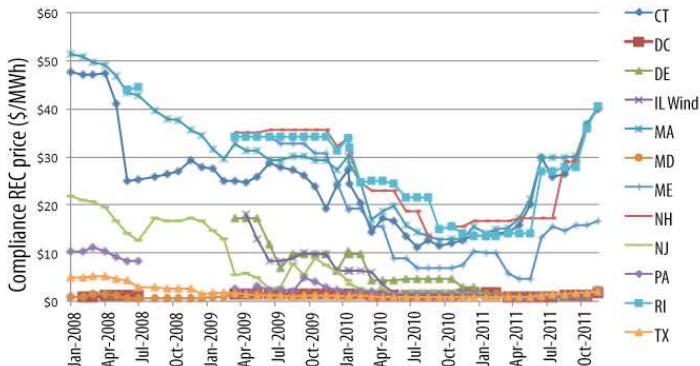
Wind provided 35% of all new U.S. power capacity in the last four years



Sources: AWEA, SEIA, EIA, SNL

- Production Tax Credit (PTC) gives renewable energy producers a \$0.022 per kWh tax credit
- Investment Tax Credit (ITC): flat 30% tax credit
- Federal subsidized loans
- PTC is set to expire in late 2012

State Policy



- Renewable Energy Standards define a percentage renewable energy goal for each state
- Renewable energy power plants generate 1 Renewable Energy Certificate for every 1000 kWh
- Power utilities are required to buy these RECs at a market price to hit the energy goals

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Overview of Project

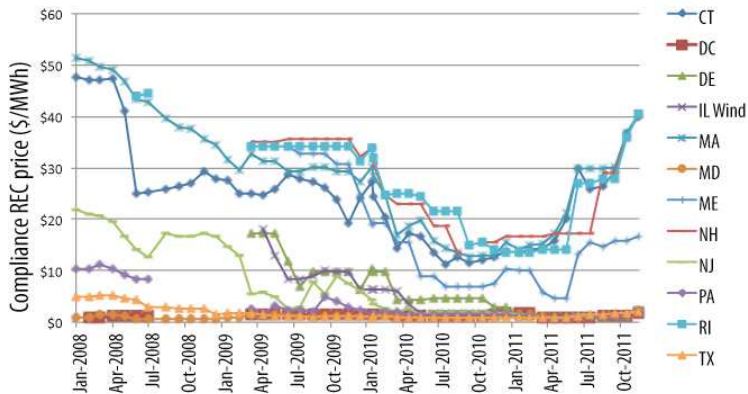


Overview of Project



- Five 6-MW turbines
- Jacket foundations
- About 3 miles offshore
- High and variable cost of diesel

Rhode Island Policies

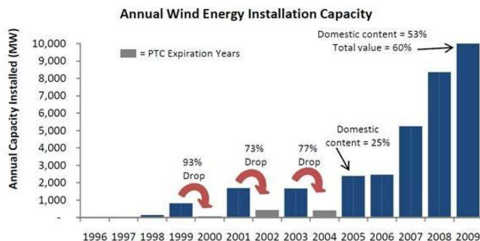


- Rhode Island has one of the best markets for RECs
- Renewable energy standard of 16% for RI
- Ocean SAMP process can be considered a policy incentive

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Unclear Future



Source: American Wind Energy Association (AWEA), "U.S. Wind Industry Annual Market Report – Year Ending 2009."

- Based on the literature, US policy needs to change to foster offshore wind development
- With the PTC set to expire again in December 2012, already tough economics for offshore wind are even more risky

Summary

- Offshore wind accesses better wind and can be placed away from people's views, but comes with a much higher cost than onshore wind.
- Europe creates artificial markets for renewable energy, using feed-in tariffs and certificates to allow otherwise un-economical offshore farms to exist.
- The US has some policies helping the economics of wind, but the uncertainty and low impact of these policies hurts offshore wind.
- The Block Island wind farm has unique economic characteristics (diesel, high value RECs and the SAMP) that may propel the project to the construction phase.