U.S. Offshore Wind: 
Targeted State Investment Policies will put an 
Abundant Renewable Resource 
within Reach

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VIRGINIA OFFSHORE WIND DEVELOPMENT AUTHORITY
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Why Offshore Wind?

- Clean energy potential -- DOE study
- Total cost -- CAP/Brattle study
- Savings -- Synapse PJM study, CRA for Cape Wind
- Economic development (US onshore, EWEA)
- Health and environmental benefits
Gas Hedge

- LCOE is not the whole story
- NREL (Bollinger) -- ONSW has actual hedge value not available on market
- Sandia labs (Awerbuch) – portfolio approach reduces risk
- Most willing to pay an insurance premium
What has worked in Europe?

- 5000 MW (2012); 28.9 GW by 2020 (BNEF)
- Feed-in Tariff has been policy tool of choice
- UK has been the leader – utilities compete with IPPs in auctions with utilities dominating
- Germany is current hub with IPPs partnering with utilities and funds
- Project finance is now the norm
- Germany has reworked the FiT
- UK is moving towards contracts for differences
A. Why no Offshore Wind in the U.S.?

- Federal policy?
- Permitting?
- Site control/lease?
- Shipping?
- Revenue certainty
- Sufficient affordable financing
Why look to Germany?

- “Late bloomer”
- Utility and project finance
- Financing program
- 8.1 GW by 2020 (Bloomberg)
- Jobs
German revenue certainty

Renewable Energy Law

- Feed-in tariff since 2000
- Goals were not being met – very few takers
- 2008 – set price at $150/MWh for 12 years
- 2010 – “compression” at $190/MWh for 8 years
- Grid operators must buy all energy produced
- Grid operators must build and pay for interconnection
- 2018 and onwards, FiT reduced 7% per vintage year
- Transmission has been the bottleneck in practice
Revenue Certainly + Financing Tool

German Offshore Wind Financed: 2008-2012

Source: Bloomberg New Energy Finance
<table>
<thead>
<tr>
<th></th>
<th>Germany</th>
<th>New Jersey</th>
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</thead>
<tbody>
<tr>
<td>Centralized procurement</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Adjustments for distance and depth</td>
<td>Yes</td>
<td>Possible</td>
</tr>
<tr>
<td>Long term stream of payments</td>
<td>20: 8 or 12 years + market price for tail</td>
<td>20 years</td>
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<tr>
<td>Ratepayer protections</td>
<td>Reductions after 2018</td>
<td>“Contract for differences” structure, net economic benefit test</td>
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<tr>
<td>Tariff optimization</td>
<td>Yes</td>
<td>Possible</td>
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What is best strategy to scale OSW?

- Demonstration projects “work” but are not enough
- Vertically integrated utility procurement
  - Utility developed/acquired, owned and financed “on balance sheet” without policy mandate
  - No guarantee that OSW will be developed
  - Good project cost controls, but difficult to build pipeline
- IPP or hybrid model with policy support
  - IPP or group develops, owns and operates
  - Project financed with refinancing after construction
  - Supportive policy: feed-in tariff, RPS/OREC program, CfD
  - Requires upfront investment, but “policy visibility” creates pipeline and accelerates learning curve; develops ecosystem
B. Why no Offshore Wind in the U.S.?

- Federal policy?
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- Revenue certainty
- Sufficient affordable financing
Currently, project finance dominates globally.
Limited project finance: the new normal

- European banking crisis and Basel III
- Limited banks with infrastructure expertise
- Projects cost $1-2 billion or more
- 20-30 possible banks but only 12 active
- U.S. projects will stress this system
- 400 MW project hypothetical
  - $5,500 per kW = $2.2 billion
  - Debt Equity ratio of 70:30 = $1.54 billion in debt requirements
  - Available commercial debt = 10 banks x $50 million = $500 MM
  - Shortfall = $1.04 billion to be filled by other sources
Figure 4: Project finance capital structures, 2006-13 (EURm)

Source: Bloomberg New Energy Finance Notes: Figures exclude non-utilised contingent facilities, VAT facilities, letters of credit and equity bridge facilities. Bars represent funding sources. The red lines show the amount of debt that commercial banks guaranteed (rather than funded) and therefore their risk exposure. For Northwind the ‘commercial debt’ proportion includes loans from Pension Danmark and Norway’s Ministry of Industry and Trade.

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Creating an OSW ecosystem in Virginia

To develop a compelling case, Virginia should consider:

- An ambitious, yet realistic policy goal for OSW to signal commitment
- OSW procurement mechanisms that provide:
  - revenue certainty through “best in class” policy mechanisms
  - ideally, bundle project rights (lease, revenue streams, anchor financing) to get the best price and developers
  - build in risk sharing between OSW companies and ratepayers (reverse auctions, contracts for differences)
- A VA or regional Green Bank or other financing entity prioritizing OSW to leverage private sector financing to fund the OSW pipeline
- Supportive industrial policy to ensure jobs
- Regional efforts to create synergies
Thank you