GLWN Offshore Wind Supply Chain Workshop – Dec 5, 2011 Review

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Topics:

- Workshop Content
- Opportunity/Logistics for state or regional hosting
- Additional services available

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Typical Workshop Content

- Industry History
- Offshore Opportunities for Manufacturers
- Anatomy of Offshore Wind Turbine & Infrastructure
- Offshore Wind Supply Chain Markets
- Industry Panel or Breakout Group Discussion
- Networking Breaks

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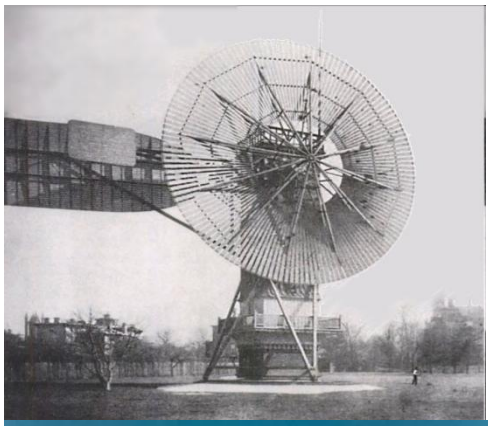
Industry History

- Wind Turbines an American Invention
  - Invented by Charles Brush 1888 Cleveland, OH 12 kW
  - 1980: 1st Commercial Wind Turbine NASA Glenn 3.2 MW in Oahu Hawaii
  - 1980 to 2000: European Industry Development
  - 2008: US DOE Report : 20% by 2030
  - Feb 2011: 54 GW at 7¢/kWh by 2030 (10 GW at 10¢/kWh by 2020)



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Offshore Opportunities for Manufactures

- Sectors of Supply Chain
  - Wind Turbine OEMs
  - Developers
  - Vessel Owners
  - Owner Operators
- Geographics of OEMs & Supply Chain
- Policy Drivers
- OEM Practices & Expectations

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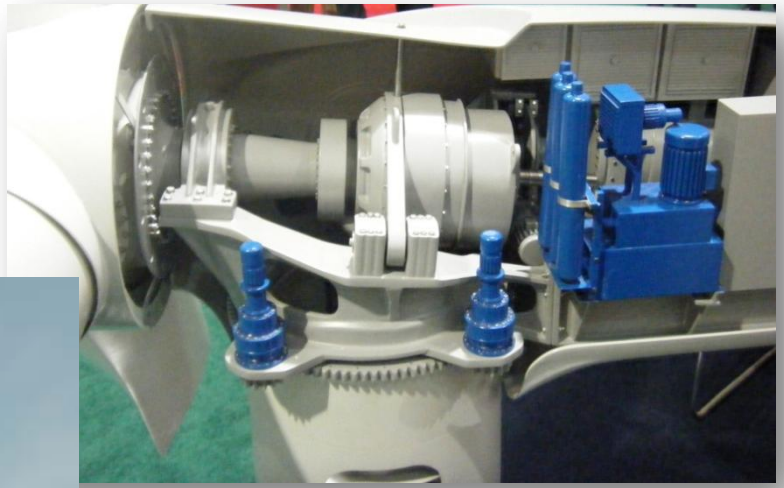
Anatomy of Offshore Wind Infrastructure

- Wind Turbine – Offshore vs Onshore
- Foundations
- Vessels
- BOP Electrical Infrastructure
- Mfg Sector Opps



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4 Wind Supply Chain Markets - Who Buys What?

- Wind Turbine OEMs
  - Original Equipment Components
- Developers
  - Foundations, Transformer, Substation, Cables
- Vessel Owners
  - Heavy Metal Fabrication, Power Generation, Jacking Systems, Cranes
- Owner Operators
  - Maintenance and Repair Parts

What's Expected of Wind Suppliers?

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Industry Panel or Breakout Group

- Workshops can be taylored to:
  - Panel Discussions of Industry Experts – OEMS, Developers, Vessels, Manufacturers
  - Roundtable Breakout Groups to allow networking in Industry Sectors

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Opportunity / Logistics for Hosting

- Held at Regional or State Level
- Workshops 4 to 6 hours in length
- Workshop Cost: $12,500
- Held at: University, Community College, Convention Centers, or Hotel
- GLWN has conducted over 50 Workshops since 2008

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Opportunity / Logistics for Hosting (cont.)

- Funding Sponsorship Sources
  - State Economic Development or other State Offshore Initiative– Funding through sponsorship and admission charge
  - NIST – MEP Centers – BGAF: Partial funding exists to enhance US Manufacturing Content (limited annual budget)
    - Requires MEP (Manufacturing Extension Partnership) involvement

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Additional Services

- Wind Capabilities Profile
  - Based on Wind Turbine OEMs Standards (European based)
  - Customized for your industry sector (fabricators, foundries, forgers, machine shops, electrical /electronics, hydraulics, composites, polymers
  - Performed by GLWN qualified assessor at ½ day onsite visit
  - Summary report that identifies your
    - Capabilities – Possible applications/components match or equip. fit
    - Qualifiability – Likely outcome of an OEM Quality Audit
    - Competiveness – Comparison with current suppliers
  - Value $5,000, discounted if supported by MEP-BGAF
- MEP Services

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