Beech Ridge Update

West Virginia Renewable Energy Meeting
Flatwoods, WV
June 5, 2014
Greenbrier County, WV
- 63,000-acre tract used for commercial timber, coal mining, and hunting.
- Few residences near the project

67 GE 1.5 SLE Wind Turbines
- 77m rotor diameter
- 80m hub height
- 100.5 MW
- 200,000-300,000 MWH / YEAR

Commercial Operations in 2010
Owned and Operated by Beech Ridge Energy LLC, an affiliate of Invenergy LLC
On-Site Operations Team
- 6 technicians, 1 manager.
- Locally hired
- Training by Invenergy, GE, and other vendors
- O&M visits to each turbine 3 times per year
- 98.3% turbine availability

Local Spending and Taxes
- Local sources for parts and supplies
- $900,000+ payroll
- $400,000+ county taxes
- $130,000+ State B&O taxes
- $2,200,000 in State Franchise taxes over first five years of operation
## Beech Ridge Development Timeline

<table>
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<th>Years</th>
<th>Process</th>
<th>Dates</th>
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<td>1-3</td>
<td>Studies</td>
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<tr>
<td>&lt;1</td>
<td>PSC Approval (Oct 2005-Aug 2006)</td>
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<td>0.5</td>
<td>PSC Appeals (Aug 2006 – Jan 2007)</td>
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<td>1.0</td>
<td>WV Supreme Court (Feb 2007 – Jan 2008)</td>
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<td>3.5</td>
<td>Incidental Take Permit (Summer 2010 - Dec 2013)</td>
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Beech Ridge Incidental Take Permit

- Covers Indiana Bats for Beech Ridge 1 and 2

- Summer Curtailment (July 15 to Oct 15)
  - Turbines shut down at low wind speeds (<10.7 mph)
  - Nighttime only

- Extensive Monitoring (April 1 to Nov 15)
  - Done Indefinitely (not just the first 1, 2, or 3 years)
  - West, Inc. 4 people. 30 WTG. Searched every day
  - Invenergy. 2 O&M Techs. 24 WTG. Searched 1x per week
  - Mowing. ~$50,000 per year.

- No Significant Findings
Beech Ridge 2

Expansion of Beech Ridge
- Same Landowner
- Same Interconnection
  - 186 MW approved by PJM, 100.5 MW operating, 85.5 MW unused.
  - All turbines would be west of existing turbines

PSC Siting Certificate
- Issued in June 2013
- Up to 33 Turbines
- Requires construction by June 2018

Possible Buildout
- Approximately 20-30 GE 1.7-100 turbines (34-51 MW)
- 2015 construction
Beech Ridge Energy Storage

- **Fast Response Battery System**
  - Lithium-Ion batteries
  - Up to 33 MW of capacity
  - Tie directly into the Beech Ridge substation

- **An Enhancement to the Existing Wind Project**
  - Enables project to smooth the flow of power to the grid
  - Can provide frequency regulation service to PJM

- **Schedule**
  - Construction in Fall 2014
  - Equipment installation and COD in Summer 2015
Why Wind?

Disadvantages
• Not dispatchable
• Visual impacts
• Wildlife (bats)

Advantages
• Fuel independence
• Carbon reduction
• Manufacturing and jobs
• Cost (price stability)
Cost of Wind Energy
Cost of Wind Energy

Levelized PPA Price (2012 $/MWh)

- Interior (14,802 MW, 173 contracts)
- West (6,835 MW, 68 contracts)
- Great Lakes (2,356 MW, 33 contracts)
- Northeast (855 MW, 20 contracts)
- Southeast (268 MW, 6 contracts)

PPA Execution Date

- 150 MW
- 75 MW
US Content of Wind Turbine has Grown to 72%
US Manufacturing of Wind Turbines