



Beech Ridge Update

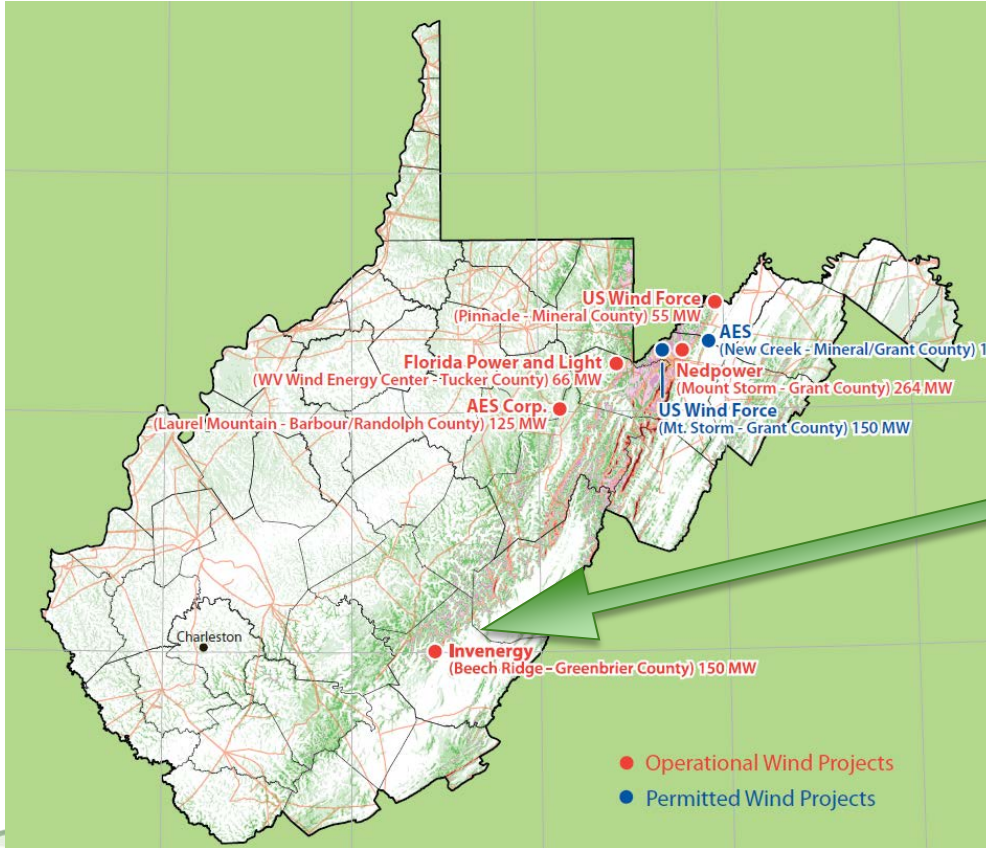


West Virginia Renewable Energy Meeting

Flatwoods, WV
June 5, 2014



Beech Ridge Basics



- **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**




Beech Ridge Operations

➤ On-Site Operations Team

- 6 technicians, 1 manager.
- Locally hired
- Training by Invenenergy, 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

<u>Years</u>	<u>Process</u>
1-3	Studies
<1	PSC Approval (Oct 2005-Aug 2006)
0.5	PSC Appeals (Aug 2006 – Jan 2007)
1.0	WV Supreme Court (Feb 2007 – Jan 2008)
1.5	Construction & Federal Litigation (Apr 2009 - Aug 2010)
3.5	Incidental Take Permit (Summer 2010 - Dec 2013)



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)

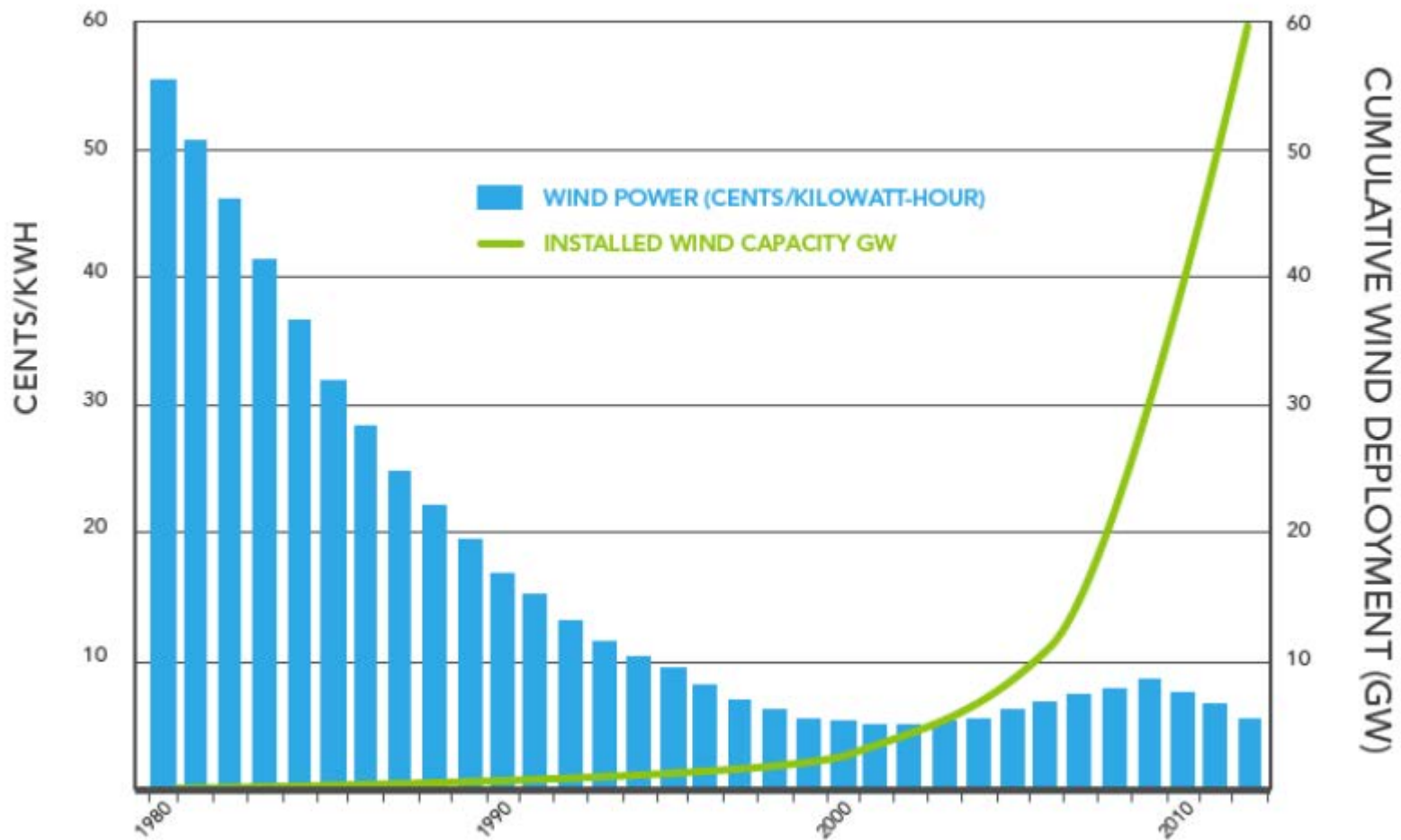
Advantages

- Fuel independence
- Carbon reduction
- Manufacturing and jobs
- Cost (price stability)

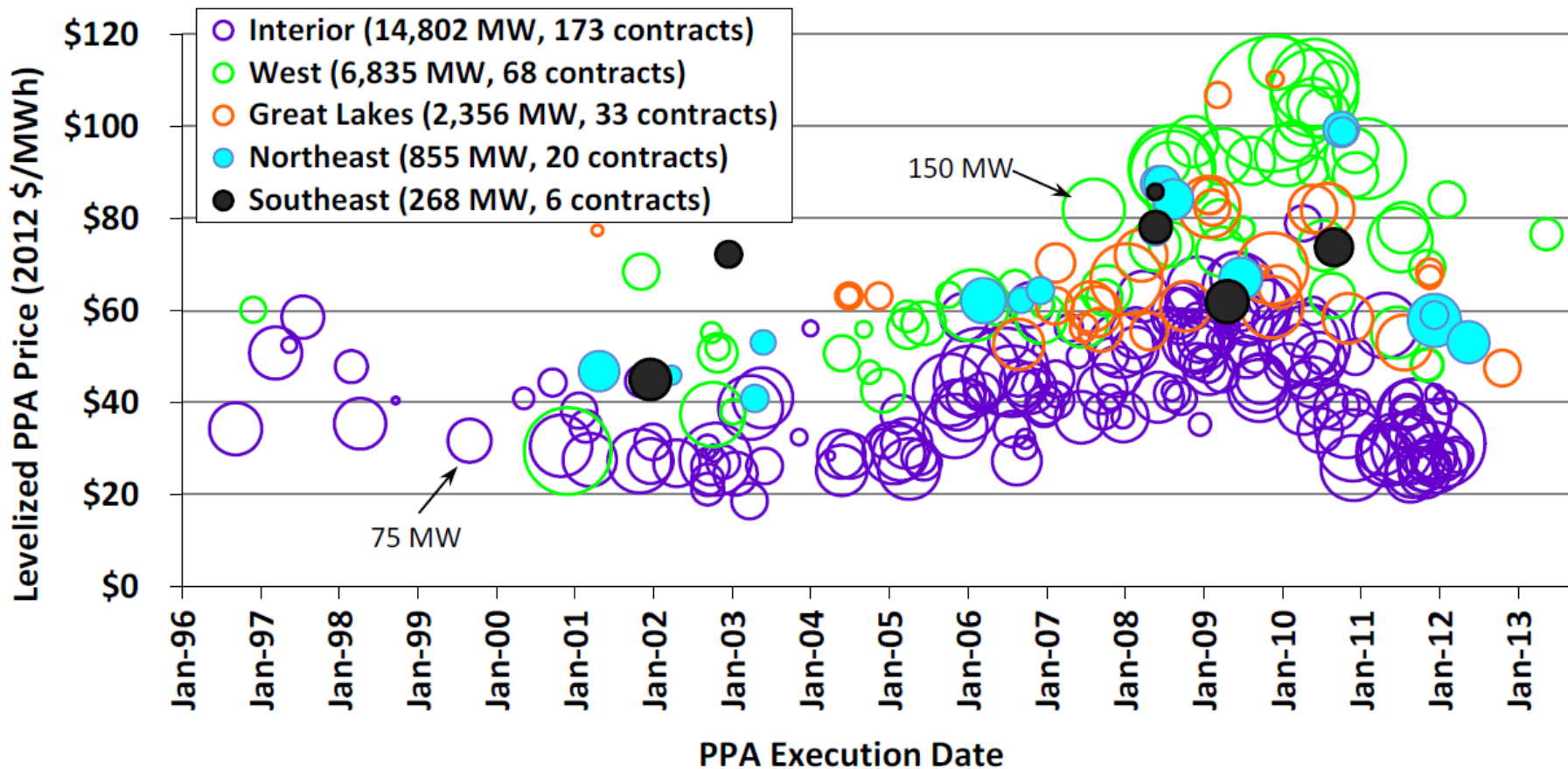




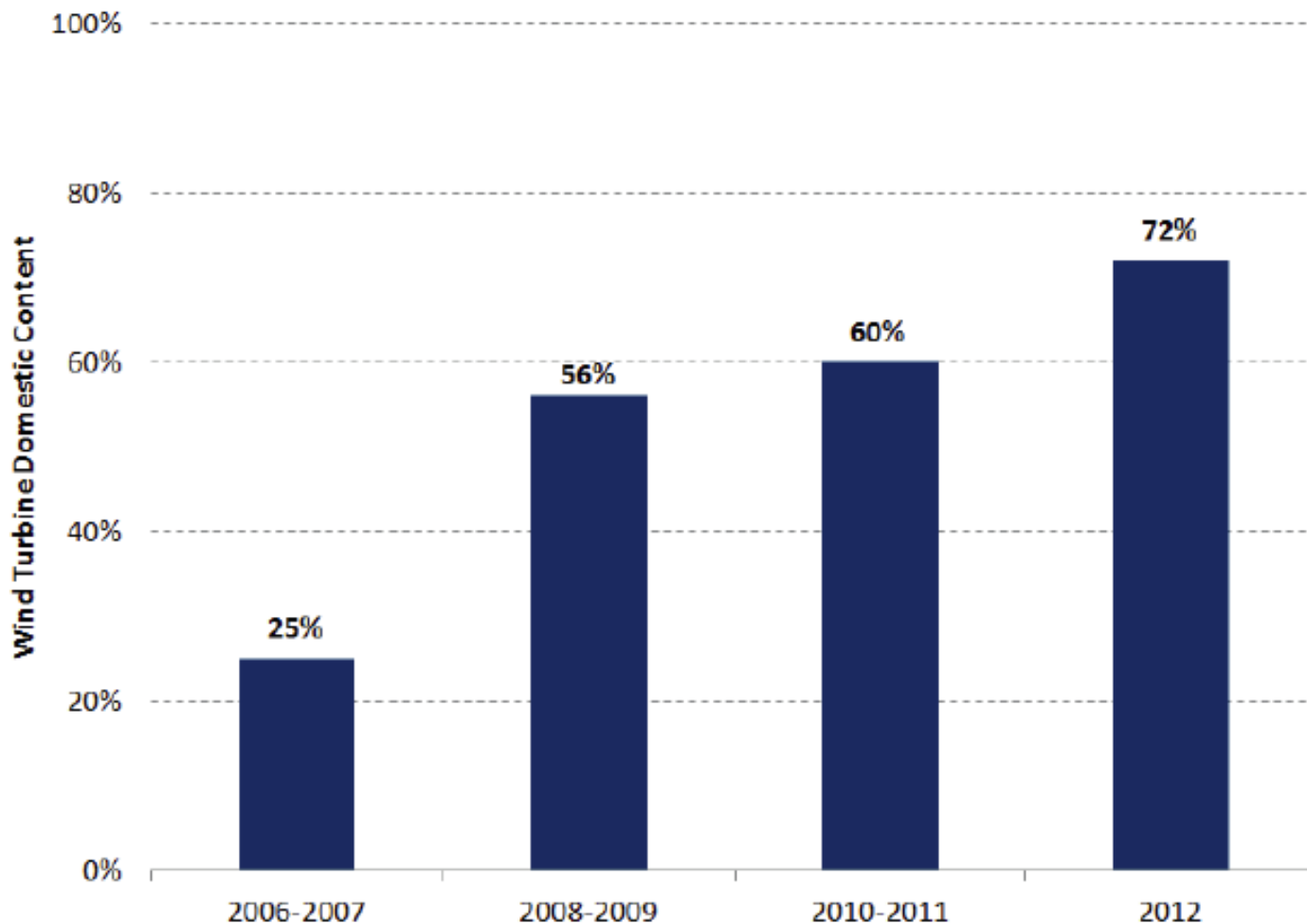
Cost of Wind Energy



Cost of Wind Energy



US Content of Wind Turbine has Grown to 72%





US Manufacturing of Wind Turbines

Active Wind-related Manufacturing Facilities end of 2013

