

Overcoming the Challenges to Acceptance of Wind Energy in PJM



MARSHALL UNIVERSITY
CENTER FOR BUSINESS AND ECONOMIC RESEARCH

Christine Risch
October 20, 2009



DOE Research

Market Impact Issues:

- Property Values
- Siting Requirements
- Grid Integration
- Recommendations to Avoid System Fuel Inefficiency
- Promote development of wind facilities on former surface mine sites in Southern West Virginia (with Marshall's CEGAS)

Work will be performed via WVDOE and DOE's Wind and Hydropower Technologies Program (EERE).



Property Values

- Still a paucity of data to describe the scene; can't expect either positive or negative impact.
- Can't promise that no negative impact will occur.
- Sound evidence that no negative impacts occur in aggregate within a 4-mile radius.
- Impacts have occurred in both directions for transactions within one to $\frac{1}{4}$ mile of an installation.
- U.K. and E.U. studies may shed some light.
- Ben Hoen/Ryan Wisser study still not available.



To achieve statistical significance...

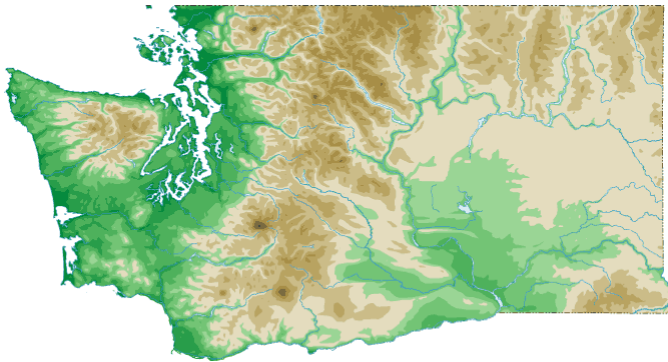
..many factors have to line up:

- Homes sold within one mile of a turbine
- Homes sold w/in 1 mile of turbine in Appalachia
- Modern Appalachian homes sold within 1 mi of turbine
- Modern Appalachian homes sold within 1 mi of turbine with a “good” view of the turbine
- Modern Appalachian homes sold within 1 mi of turbine with “good” turbine views and good “viewshed”

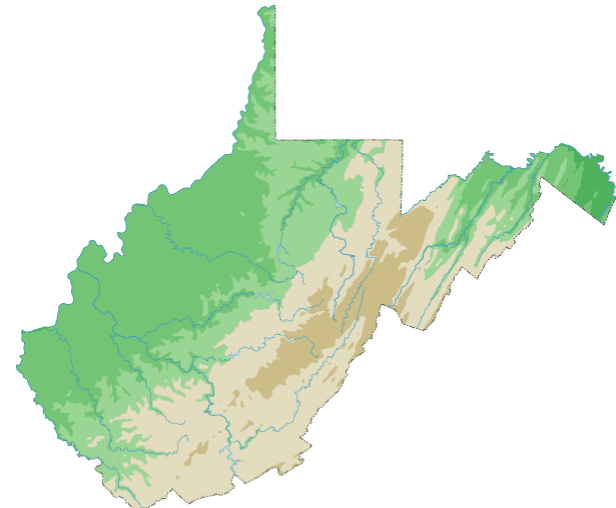


Siting Requirements

- Is there a State Authority for Wind Siting? Can it preempt local decisions? EX: OR
- Are there formal land use guidelines at the local level? Must get a local approval? EX: MI, VA, CA
- How complicated is the application process?
- Does conditional permit approval cause delays?
- Is the “simplified” approach used by WA & OR better?
- Is Appalachia different?



vs.





System Efficiency Questions

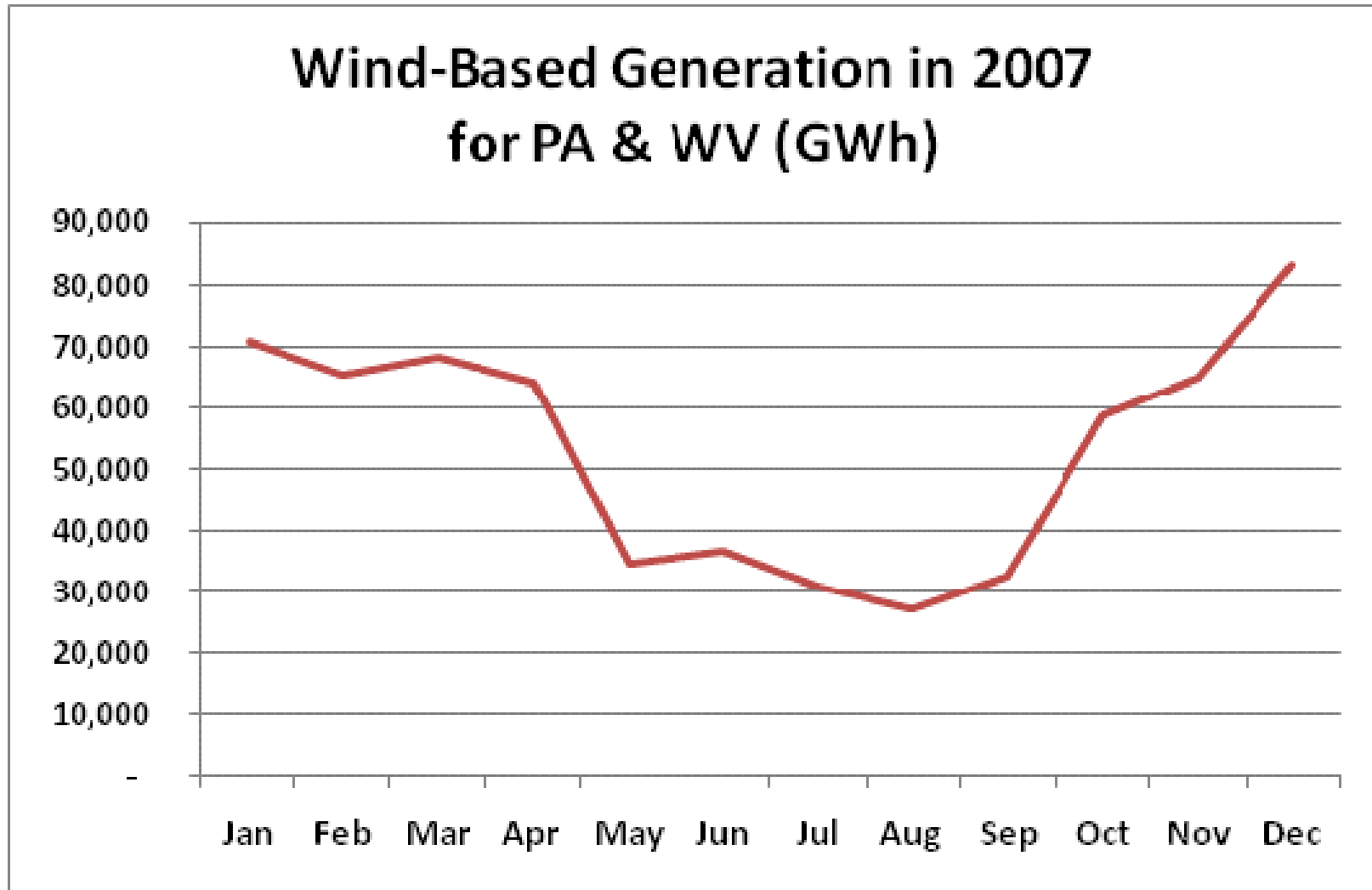
- What is the impact of wind plant generation on fossil plant fuel input?
- How much can/do fossil plants ramp down when the wind blows?
- How much system reserves are required to balance wind capacity on the system? $\rightarrow f(\%MW)$
- How is PJM different from Texas?



- What are the recommendations to maximize fuel efficiency as wind capacity increases?



Wind Capacity Value in PJM



- A 12 or 13 percent capacity value is imposed...what “can reliably contribute during summer peak hours” – 3 to 6 pm June 1 to Aug 31.



Issues of Efficiency:

- Currently effective class average capacity factors are 13% for wind and 38% for solar units in PJM.
- PJM allows wind plants to bid into the capacity market at negative prices – both day ahead and in real-time. Three wind resources have done this since June 2009.
- Coal plants can't respond to very short-term volatility (5 minutes no – what about 1 or 2 hours?). What conditions are conducive to response? (time of day, season, price)
- Wind plants ramp up and down and PJM must compensate for that with ancillary services to balance itself; don't need to provide positive contribution, i.e. demand-side can provide



Some Comments

- ❑ *“....quite often, wind actually displaces nothing. The wind blows, nothing gets shut off (especially not baseload coal), prices crash for a few minutes and then things stabilize.”* Comment by bartman - March 16, 2009 @ 2:58 pm
 - ❑ *“...fuel input and electricity output for coal units do vary up and down together.”* Response by D.O.U.G. - - March 18, 2009 @ 9:31 am
 - ❑ *“..coal units can be modulated in response to hourly day-ahead price signals.”* Comment by bartman - March 18, 2009 @ 10:20 am
 - ❑ *“..[many coal units] cycle to some extent every day, in concert with day-ahead prices signals. ..not in response to day-ahead prices, but as components of the market system that results in the day-ahead prices.* Response by D.O.U.G. - - March 18, 2009 @ 10:48 am
-
- *“... the fact that wind does not directly displace fossil fuel generating capacity, but will make this capacity less profitable to maintain.”* Ross McCracken of Platt's, April 2009



Possible Solutions

- Wind forecasting – will improve with time. Is better in very short-term (2 to 3 hours).
- Consolidation of balancing areas – requires improved interconnection.
- More storage capability
- Real-time pricing - Incentivizes demand-response and can reduce dispatching needs as wind declines.

West Virginia Brownfields

- Economic development angle
- EERE's Wind Power Strategic Plan includes goal to "Promote use of unused existing transmission and distribution present at old mining/factory sites."
- Work with MU's CEGAS on:
 - Site/partner identification
 - Wind assessment
 - Site ranking

A landscape photograph showing a valley with a construction site in the middle ground. The site features a large, dark, excavated area with some structures and equipment. Power lines and poles stretch across the scene. The background is a dense forest of green trees, partially obscured by a light mist or haze. The foreground is filled with lush green vegetation, including tall grasses and leafy plants. The overall atmosphere is soft and slightly overcast.

Thank You