Renewables Policy and System Operations
A Case for Co-Evolution

Transmission Policies to Unlock America’s Renewable Energy Resources

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About BPA

Service area (sq. miles) 300,000
(Primarily Washington, Oregon, Idaho, Western Montana)

Transmission circuit miles 15,215

BPA substations 263

2010 Balancing Authority (BA) Statistics

<table>
<thead>
<tr>
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<th>FCRPS</th>
<th>BA Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nameplate Rating (MW)</td>
<td>20,430</td>
<td>16,032</td>
</tr>
<tr>
<td>Peak Generation (MW)</td>
<td>15,696</td>
<td>7,994</td>
</tr>
<tr>
<td>Average Generation (aMW)</td>
<td>6,882</td>
<td></td>
</tr>
<tr>
<td>Peak Load (MW)</td>
<td>10,821</td>
<td></td>
</tr>
<tr>
<td>Average Load (aMW)</td>
<td>5,997</td>
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BPA is a Federal Power Marketing Administration in the U.S. Department of Energy
Drivers of NW Wind Development

- State renewable portfolio standards (WA, OR, CA)
- Federal and state financial incentives
- Proximity to existing 500 KV lines and interties to California
- Relatively short construction lead time and quick siting & permitting (although there is growing pushback in some areas)
- Rural economic benefits + green tinge = strong political support
- Least-cost renewable available in bulk quantity

BPA Enablers of NW Wind Development

- Relaxed imbalance penalties (2001)
- Storage and Shaping Services (2004)
- 2007 NW Wind Integration Action Plan – “Yes We Can”
- BPA Network Open Seasons (2008-2010)
  - New twist on open access queue management
  - More efficient transmission planning
  - Federal financing for new lines
- Relatively low-cost wind integration rates (2009-11)
- BPA has evolved its business practices to incorporate intra-hour scheduling, self-supply of generation imbalance, new wind forecasting systems, expanded dynamic transfer capacity.
The Result: Exponential Growth of Wind

Highly Concentrated Pattern of Wind Development
1. Background - Supply

Pacific Northwest Wind Supply by Long-Term Customers

- Unknown
- California
- Northwest
- Utah
- Nevada

(Excludes Wyoming, E. Montana, and wind projects with no specified online year)

2. PNW Utility RPS Resources - Demand

Total Pacific Northwest Wind Capacity Requirements (PNW RPS + CA contracts)

- CA Obligation
- WA RPS Need (Council)
- OR RPS Need (Council)
- MT RPS Need (Council)
- BPA wind TSRs
- E3 estimate of PNW RPS Need

Information is based on Steve Enyeart’s work with the BPA’s wind interconnection queue and work done by E3.
Volatile Ramping Behavior

BPA Balancing Authority Load and Total Generation
Unintended Consequences

- The Federal Columbia River Power System is effectively tapped out. Even with additional changes in business practices (e.g., committed intra-hour scheduling), additional balancing capacity will come from conventional power plants or new technologies.

- Huge ramping requirements may diminish ultimate carbon reductions because of spinning reserve requirements for thermal generation.

- Confluence of high wind, high spring runoff and low spring loads leading to conflicts with the Endangered Species Act.

- Reductions in power prices from increased wind penetration perhaps good for many regional ratepayers, but degrading the economics of the capacity resources (e.g., hydro) needed to maintain reliability.
The Case for Co-Evolution

- The nation’s utility system operators are rightly being asked to adapt operational practices to integrate high amounts of renewable generation.
- As we scale up the nation’s renewable energy fleet, public policies supporting renewables should better acknowledge the operational realities of the power grid and the legitimate needs of LSEs.
- RPS legislation should be matched with coordinated transmission utilization/expansion and the provision of integration services.
- Important policy tools like Production Tax Credits (PTCs) and Renewable Energy Credits (RECs) are increasingly distorting markets and leading to unintended cost shifts.
- Providers of reliability services need to be compensated through effective forward markets for balancing capacity.

Your Feedback is Welcome!

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