Opportunities for Montana Wind
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Montana Wind Exports?

OPPORTUNITY

• Puget Sound Energy’s 2015 Integrated Resource Plan calls for ~200 MW of incremental wind by 2024 to meet projected RPS requirements

PROS OF MONTANA WIND RESOURCES

• Higher average NCF (41%) compared to Washington (34%); more energy and PTCs
• Larger peak capacity credit (55%) versus Washington (8%); winter wind profile more closely aligns with PSE load
• No sales tax associated with plant construction

CONS OF MONTANA WIND RESOURCES

• Premium wind resources not always adjacent to existing lines
• Distance from load = more wheeling charges and line losses
• Currently limited/no excess transmission capacity
• To qualify for WA RPS, Montana wind would need to be located in the BPA drainage basin or be dynamically scheduled to WA
WA vs. MT Transmission

Transmission Costs - Building 265 MW Wind Facility Near Judith Gap

Multiple transmission wheels diminish higher MT NCF

Transmission and Substation Costs
Assumed Colstrip Retirement
- $52.5 Million - Upgrade JG-Broadview Line
- $114 Million - New JG-Broadview Line

Colstrip Operating
- $682.5 Million - Upgrade JG-Broadview Line + Expand
- $741 Million - New JG-Broadview Line + Expand

Legend
- BPA
- BPA Conceptual Upgrade
- Northwestern Montana
- PSEI

+ $1 Billion (New Garrison to Ashe Transmission Line)

Broadview to Garrison = 225 Miles

* Garrison to Ashe project is not reflected in costs
* Right Of Way costs are not included in estimate of new transmission lines
* Assuming plant size of 265 MWs
* Costs only reflect additional substation/transmission equipment does not include transmission wheeling or cost to build wind facility
* Overheads not included

Table:

<table>
<thead>
<tr>
<th>Wind Capacity</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>MT Wind Capacity Factor</td>
<td>41.00%</td>
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<tr>
<td>Loss Factor</td>
<td>6.70%</td>
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<tr>
<td>Wind Capacity Net of Losses</td>
<td>38.30%</td>
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Transmission Costs $/KW-Year

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<tbody>
<tr>
<td>Judith Gap to Broadview</td>
<td>$3.3000</td>
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<tr>
<td>Broadview to Townsend</td>
<td>$9.1550</td>
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<tr>
<td>Townsend to Garrison</td>
<td>$7.3640</td>
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<tr>
<td>Total</td>
<td>$19.8190</td>
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<tr>
<td>$/MWh</td>
<td>$5.5200</td>
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PSE

Puget Sound Energy
WA vs. MT Wind Profiles

MT generation concurrent with PSE peak load