

# *Avista Corporation* **Wind Integration Study**



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## **Introduction:**

This report has been developed to address several inquiries about wind integration into Avista Corporation (Avista) electric system. This report is based on an integration study only. The study was performed to determine the potential upgrades necessary to integrate some of the proposed wind projects mentioned. This document is intended to give wind developers a “road map” of preliminary cost estimates and upgrades to integrate into some of the potential areas.

Avista has been contacted about potential wind integration in the following areas:

- Up to 90 MW at the Reardan 115 kV substation
- Up to 50 MW at the East Colfax 115 kV substation
- At least 80 MW at the Othello 115 kV switching station,
- Up to 100 MW along the Dry Creek-Walla Walla 230 kV line at the boundary of Garfield and Columbia counties
- Up to 50 MW along the Chelan-Stratford 115 kV line.

These integration points for new wind generation are discussed below in greater detail.

## **Assumptions:**

The study was performed on Avista’s expected system in 2008 under heavy and light summer conditions. All scheduled West of Hatwai upgrades for 2008 were included in

the case. Steady state and post-contingency analyses were run on the cases before adding the potential wind generation to identify any thermal overloads or violations in Avista's system. All possible single and double contingency outages in Avista's system, along with some outside its system, were considered for the post-transient analysis.

All the potential wind generation was added to the system (cost and physical performance of one potential generator is not necessarily predicated on one or all potential generators being integrated). Potential generators were modeled using a potential "worst-case" scenario of 90% lagging power factor. The integration point was considered to be either directly at the substation or at the ownership change of the Dry Creek-Walla Walla 230kV line. Steady state and post-contingency analyses were done to identify any thermal overloads or violations to Avista's system.

No fault duty analysis, transient analysis, or voltage stability was performed for this integration study. There was no loss analysis done for any of these projects.

Below are the upgrades along with the cost estimates of this integration study.

### **Results:**

- **Garfield/Columbia county line:** 100 MW was integrated on the Dry Creek-Walla Walla 230 kV line at the ownership change between Avista and PacifiCorp. At present this line lacks capacity to support 100 MW due to current contractual obligations. Therefore, the Dry Creek-Walla Walla 230 kV line would need to be reconducted to support additional capacity. Cost: Approximately \$12M

Note that there may be a potential real time solution using real time thermal monitoring (using the Valley Group's Cat-1 or other similar technology).

- **Reardan:** 90 MW was integrated at the Reardan 115 kV substation. At a minimum the 115 kV line from Reardan to Devils Gap would need to be reconducted and an additional 115 kV line out of Reardan would need to be constructed. Substation upgrades at the Westside substation and additional capacitors at Reardan (beyond the power factor requirement) will be required. Cost: Approximately \$ 14M

50 MW should be able to be integrated at Reardan with little to no construction expense other than the direct interconnection costs, however losses may be excessive.

- **East Colfax:** The study identified no thermal overloads or violations to the system as a result of this generation addition. Therefore, little to no construction expense other than the direct interconnection costs would be required to integrate 50 MW at the East Colfax 115 kV substation.
- **Othello:** 80 MW was integrated at the Othello 115 kV switching station. At minimum the 115 kV line from Othello SS to Benton needs to be reconducted

along with added capacitors beyond power factor requirements. Cost:  
Approximately \$6M

If a project requirement were interconnection to the Mid Columbia bus, additional facilities would be required.

- **Chelan-Stratford area:** The study identified no thermal overloads or violations to the system as a result of this generation addition. Therefore, little to no construction expense other than the direct interconnection costs would be required to integrate 50 MW on the Chelan-Stratford 115 kV line.

It may be possible to increase the amount of generation at each site if real time thermal monitoring and/or generator tripping was implemented. Note that an additional cost beyond the Avista transmission rate of 3% for losses may apply due to additional losses caused by these possibilities.

**Disclaimer:**

It should be noted that rigorous study has not been completed for any of these integration points. Should any party want to integrate at any of these points an interconnection request and all necessary interconnection studies would be required. In addition, the costs provided are rough estimates of the transmission upgrades necessary to integrate the wind project that are not a “construction estimate” quality. Should any studies be performed all NERC/WECC standards/policies will need to be met.