

# The West's Renewable Energy Future: A Contribution by National Grid

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This Report was prepared by National Grid and Energy Strategies, LLC to contribute to the current debate on the West's renewable energy future. It builds on National Renewable Energy Laboratory (NREL) databases of renewable energy resources and compliments the work already undertaken by the California state agencies and public utilities with Phase 1A of the Renewable Energy Transmission Initiative (RETI) study.

Population in the West is growing rapidly which is, in turn, driving an increasing demand for energy in the region. In addition, many states have implemented Renewable Portfolio Standards (RPSs) requiring a certain percentage of electricity sales to come from renewable resources. This Report concludes that the US portion of the Western Electricity Coordinating Council (WECC) region will require 116,000 GWh per year of new renewable energy sources to meet 2020 RPS goals, requiring an investment in excess of \$100 billion.

The West also has adequate renewable resources to meet these requirements for renewable energy. This report concludes that two resources stand out as having the scale to meet this additional level of demand- solar in the desert southwest (DSW) and wind in southeast Wyoming. Estimates suggest that concentrating solar power (CSP) in the DSW and Wyoming wind could, in theory, meet 19 times and 8 times the 2020 RPS need of the US portion of the WECC region, respectively. Because Wyoming wind is remote from the DSW markets this Report considers the costs and issues associated with building new interstate transmission and compares the delivered cost of Wyoming wind against concentrating solar power and other generation solutions for the DSW. This Report concludes that:

- The best Wyoming wind is the lowest cost renewable energy solution for the DSW, with a delivered cost range of \$72 to \$101 per MWh (2008\$).
- Wyoming wind, delivered to the DSW, is significantly less expensive than CSP resources. As a less mature industry the future cost of CSP in the DSW is harder to predict but is forecasted to remain a more expensive solution in the range of \$143 to \$220 per MWh (2008\$).
- Under nearly all scenarios evaluated wind is competitive with natural gas fired generation as an energy resource.

The most significant barrier to developing wind resources is lack of transmission, which is one reason why DSW utilities have initially focused on the deployment of CSP resources. The Report examines the cost of building a 900 mile long, interstate transmission line between Wyoming and the load centers of the DSW, based upon National Grid's data from TransWest Express (TWE) transmission project. TWE is a proposed 3,000 MW, \$3B, 500 kV, HVDC transmission line that will run from wind rich southeast Wyoming to a terminal in southern Nevada from where the markets in Arizona, Nevada and Southern California can be accessed. The project is due to be operational by 2014. A project of this size would have a capacity of approximately 13,500 GWh and could potentially deliver 3 percent of the renewables required by WECC RPS standards and 16 percent of the renewables required by California's RPS standards.

This Report concludes that the utilization of Wyoming's wind resources provides an optimum solution in helping the West meet its renewable energy and GHG reduction targets. It also concludes that TWE could play a fundamental role in providing transmission capacity to deliver Wyoming's wind resources to the DSW markets.