

Challenges to Integrating Renewables into the Western Grid

Roundtable Congressional Issue Briefing
March 27, 2009

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SRP

- **Public Power Entity formed in 1903**
- **Provides electricity to approximately 930,000 retail customers in the Phoenix Area**
- **Operates/Owns**
 - **Variety of generation resources including nuclear, coal, gas, and renewables including hydro**
 - **Approximately 2,700 miles of transmission**
- **Renewable target of 15% of retail sales by 2025**

Renewables in the West

- **Significant potential for development in the West**
- **Black and Veatch Study estimated over 5,000 MW of potential renewable generation in AZ by 2025**
- **Western Governors Association calling for the development of 30,000 MW of new clean energy by 2015**

Challenges to Achieving these Goals

- **Variability of renewable resources**
- **Reliability**
- **Remote location of wind resources**

Variability of Renewable Resources

- Energy from renewable resources varies from moment to moment
- More pronounced with wind and solar PV
- Requires increased regulating reserves over traditional levels
- Unable to dispatch in the same manner as traditional resources
- Requires firming capacity and energy
- Increased O&M costs on existing generation units

Reliability

- **Challenge to maintain stability and voltages during contingency events (sudden loss of a line or element due to a fault)**
- **Other forms of generation required to supplement renewable resources to meet reliability standards**
- **Difficult to provide for minimum planned capacity resources**

Remote Location of Wind Resources

- **Longer lines to access resources**
- **Greater losses due to length**
- **Higher voltages required for capacity requirements**
- **Potential utilization of new transmission may be underutilized if restricted to renewables only**

Conclusion

- **Variety of challenges to integrating renewables**
- **Utilities working to understand and mitigate these challenges**
- **Mitigation needs to be quantified**
- **Questions?**