



Western Wind and Solar Integration Study and Virtual Control Area Study

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Western Wind and Solar Integration Study - Overview

To support multi-state interests in understanding the **operating and cost impacts** due to the **variability and uncertainty** of wind and solar power on the grid

- How can utilities manage the incremental variability and uncertainty of wind and solar?
- Do geographically diverse wind/solar resources reduce variability and increase transmission utilization?
- How do local wind/solar resources compare to out-of-state resources in terms of load correlation or cost?
- How can hydro help with wind/solar integration?
- The role and value of wind forecasting
- Can balancing area cooperation help manage the variability?
- How do wind and solar contribute to reliability and capacity value?

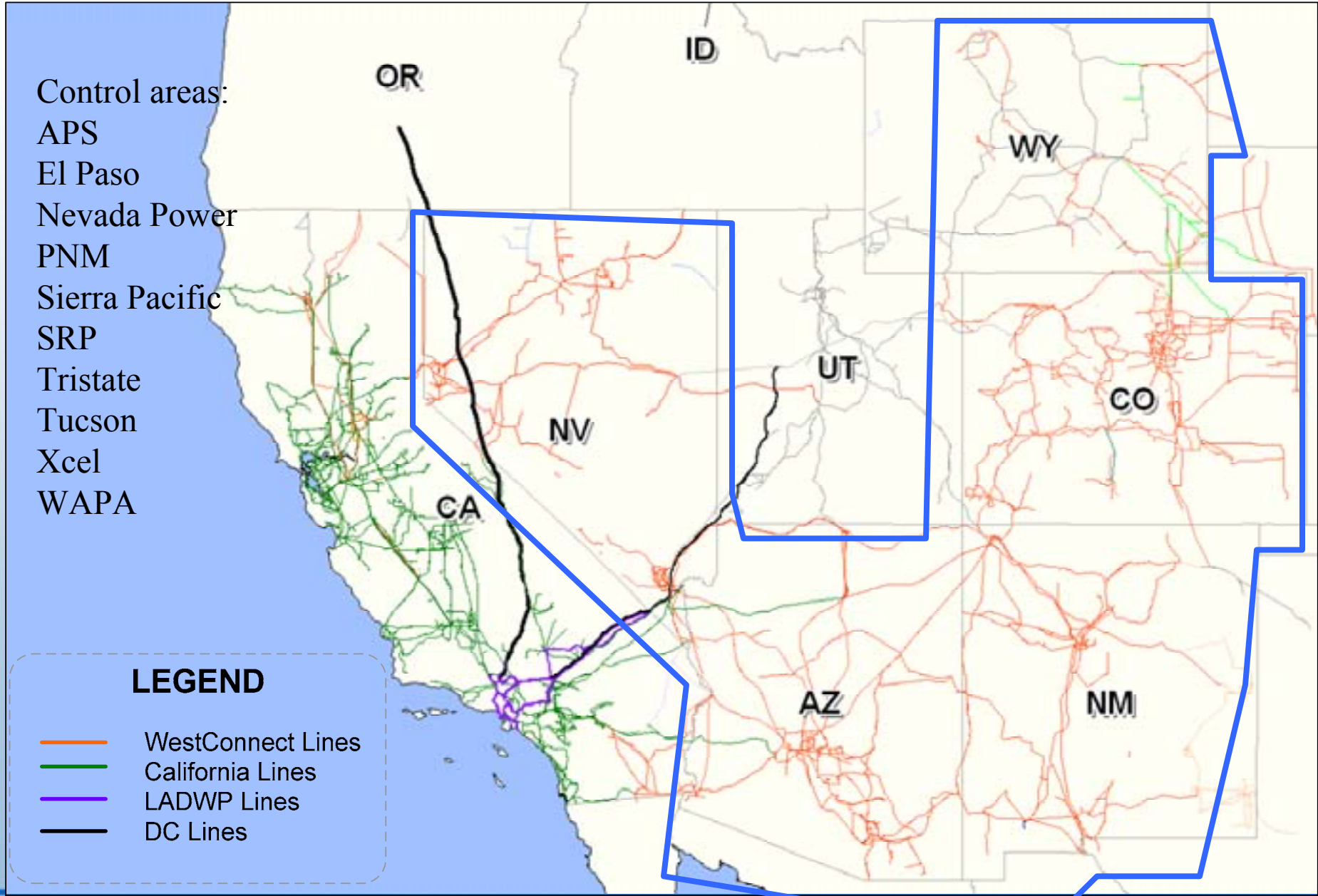
Revised Study Footprint

Control areas:

APS
El Paso
Nevada Power
PNM
Sierra Pacific
SRP
Tristate
Tucson
Xcel
WAPA

LEGEND

- WestConnect Lines
- California Lines
- LADWP Lines
- DC Lines





Tasks

- Data Collection
 - Wind and solar mesoscale modeling
 - Utility load, generator, transmission data
- Preliminary Analysis
 - Extensive statistical analysis with various options for wind/solar sites and transmission
- Scenario Development
 - In-state vs out-of-state resources
 - Geographically diverse resources
 - Mega projects
 - Best correlated with load
- Run Scenarios
 - Examine costs due to regulation, load following, unit commitment
 - “Dives” to investigate issues such as Hoover
 - Examine mitigation strategies/options
 - Determine contributions to reliability and capacity value
- Draft and Final Report



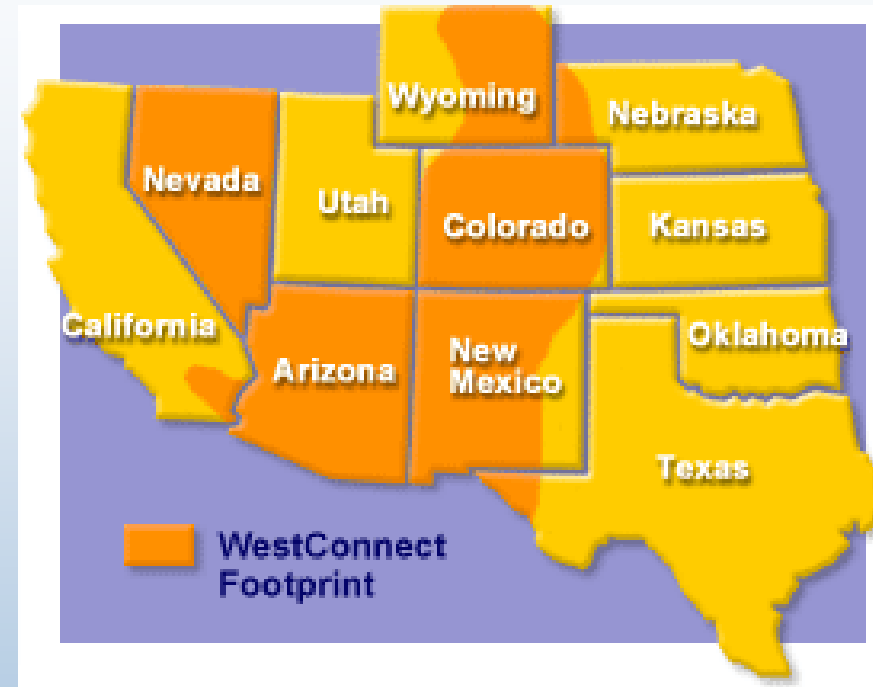
Wind and Solar Modeling

- 3Tier conducting wind meso-modeling for western half of US
 - 10 minute intervals for 2004-2006
 - 1 arc-minute resolution (approx 2 km x 2 km grid)
 - Wind speed data - 5 hub heights for entire western US
 - Wind plant output data - 100 m hub height, 10 x 3 MW Vestas turbines incl statistical variation in output, selected 30,544 grid points (900GW) to model; web-interface to be developed in summer
- Perez of SUNY conducted solar meso-modeling
 - 1 hour intervals for 2004-2006, 10km grid, Direct normal and global insolation
 - PV plant output by NSRDB weather station site (150 sites for western US) using template of different orientations and tracking
 - Concentrating Solar Power plant output - parabolic trough plants with 6 hours thermal storage



WestConnect Virtual Control Area Study

- Original response to WestConnect RFP was too expensive so NREL and BP agreed to help co-fund
- Work Group met Oct 19 and determined:
 - The Western Study will include 20 and 30% scenarios, considering control areas individually and control areas as one to determine benefits of sharing regulation and load following
 - Section or chapter of final report to report on these results
 - WestConnect will conduct reserve sharing as a separate study





Schedule

Kickoff Stakeholder Meeting	5/23/07
Data Collection	Jun-Dec '07
Wind/solar mesoscale modeling	Oct '07-May '08
Preliminary Analysis	Feb-Jun '08
Prelim. results stakeholder mtg	Jul '08
Production Cost Modeling	Jul '08-Jan '09
Interim Technical Results mtg	Dec '09
Draft report	Feb '09
Draft results Stakeholder mtg	Mar '09
Final Report	Apr '09

For more information

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