A Northwestern Consortia to Study the Regional Wind Development Benefits of Upgrades to Nevada's Transmission Systems (T4 Wind)

By: John Candelaria
Electrical Engineer assisting the Nevada State Office of Energy

Project Information

- Primary Project Funding: Department of Energy, Sierra Pacific Power Co., Desert Research Institute, Renewable Task Force, Nevada State Office of Energy, Prominent Wind Developers.
- Project Support: Western Governors Association, DOE, Energy Offices at Oregon, Wyoming and Utah
- Project Expertise: DRI, Idaho Energy Division in Idaho, UNR, Center For Resource Solutions, Transmission Planners from Sierra Pacific Resources, NSOE, Prominent Wind Developers, Nevada Public Utilities Commission

Motivation For Project:

- There are “outstanding” wind resources in Nevada, Idaho, Wyoming and Utah;
- Transmission infrastructure in the west is inadequate to deliver the output of these wind resources;
- This project supports goal of expanding renewable energy production by eliminating barriers to renewable energy development;
- Promotes proactive regional transmission planning in the western interconnection.

Motivation For Project Cont.

- Provides an integrated transmission assessment so that State and Federal regulatory bodies can see how transmission enhancements in Nevada benefit wind development in Nevada, Idaho, and their neighboring states.

Project Tasks:

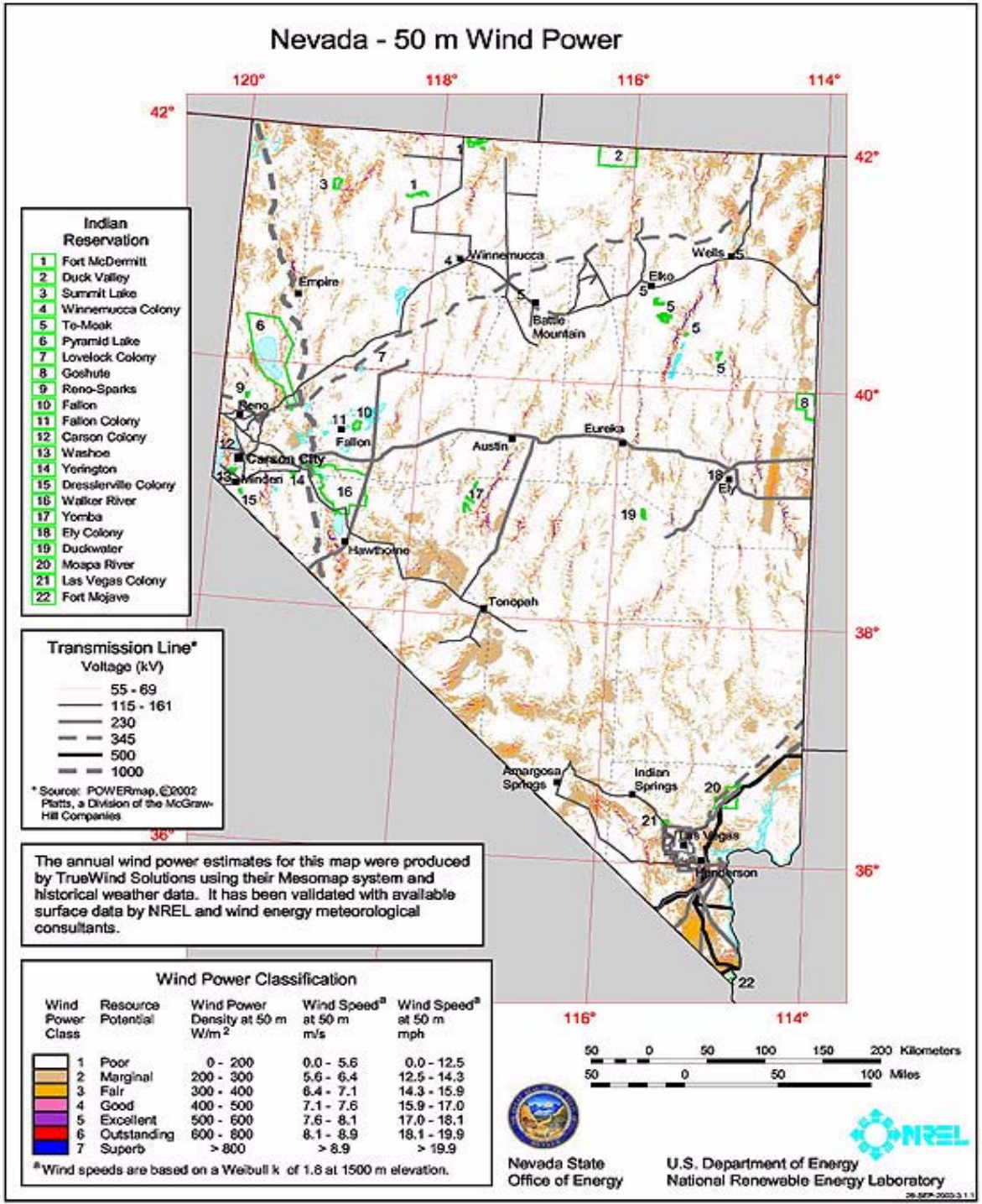
- Task 1: Wind Characterization;
- Task 2 and 3: Transmission Studies;
- Task 4: Outreach Activities;
- Task 5: Develop a White Paper for presentation to FERC, WIEB and PUCN;
- Task 6: Develop Technical Report for presentation to the DOE, and NREL.

Task 1: Wind Characterization

- The Desert Research Institute with support from University of Nevada Reno, NREL, the Nevada Office of Energy, wind working groups in Nevada and wind developers will characterize the wind energy development potential throughout northern and central Nevada;
- Idaho Energy Division will complete wind characterization in southern Idaho.

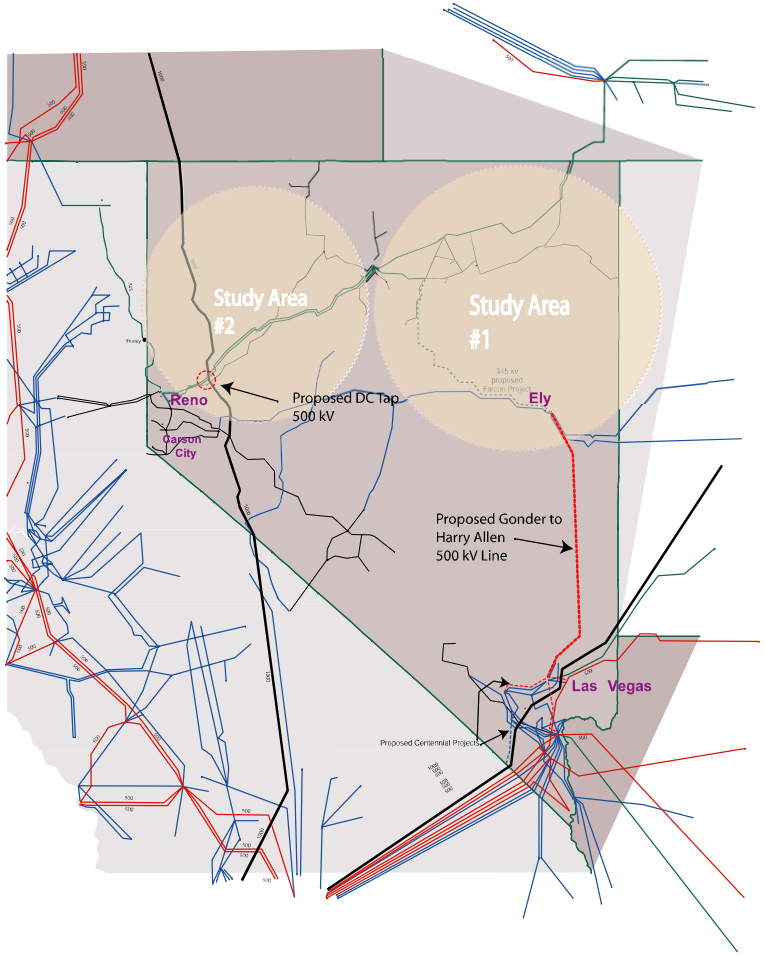
Task 1 Cont.:

- ★ The wind characterization will build on the "Wind Energy Assessment Study For Nevada" which is in progress and will or has accomplish the following:
- ✓ Creation of detailed wind resource map;
- ✓ Develop a database containing detailed wind data collected at 10 sites;
- ✓ Analysis of meteorological data collected at these sites.


Nevada - 50 m Wind Power
120°
118°
116°
114°
42°
40°
38°
36°
Indian Reservation
1 Fort McDermitt
2 Duck Valley
3 Summit Lake
4 Winnemucca Colony
5 Te-Moak
6 Pyramid Lake
7 Lovelock Colony
8 Goshute
9 Reno-Sparks
10 Fallon
11 Fallon Colony
12 Carson Colony
13 Washoe
14 Yerington
15 Dresslerville Colony
16 Walker River
17 Yomba
18 Ely Colony
19 Duckwater
20 Moapa River
21 Las Vegas Colony
22 Fort Mojave
Transmission Line*
Voltage (kV)
55 - 69
115 - 161
230
345
500
1000
* Source: POWERmap, ©2002 Platts, a Division of the McGraw-Hill Companies
Winnemucca
Wells
Elko
Empire
Battle Mountain
Reno
Fallon
Carson City
Yerington
Austin
Eureka
Ely
Hawthorne
Tonopah
Amargosa Springs
Indian Springs
Las Vegas
Henderson
The annual wind power estimates for this map were produced by TrueWind Solutions using their Mesomap system and historical weather data. It has been validated with available surface data by NREL and wind energy meteorological consultants.
Wind Power Classification
Wind Power Class
Resource Potential
Wind Power Density at 50 m W/m 2
Wind Speed[a] at 50 m m/s
Wind Speed[a] at 50 m mph
1 Poor 0 - 200 0.0 - 5.6 0.0 - 12.5
2 Marginal 200 - 300 5.6 - 6.4 12.5 - 14.3
3 Fair 300 - 400 6.4 - 7.1 14.3 - 15.9
4 Good 400 - 500 7.1 - 7.6 15.9 - 17.0
5 Excellent 500 - 600 7.6 - 8.1 17.0 - 18.1
6 Outstanding 600 - 800 8.1 - 8.9 18.1 - 19.9
7 Superb > 800 > 8.9 > 19.9
[a] Wind speeds are based on a Weibull k of 1.8 at 1500 m elevation.
50 0 50 100 150 200 Kilometers
50 0 50 100 Miles
Nevada State Office of Energy
U.S. Department of Energy
National Renewable Energy Laboratory
NREL

Task 2 and 3: Transmission Studies

- Investigate the benefits to wind development of six specific transmission upgrades in Nevada;
- Study Area 1: Collection system for delivery of wind resources to the Mead trading hub;
- Study Area 2: Collection system for delivery of wind resources to SP 15 in southern California or the Mid C trading hub by way of the DC Intertie.


Study Area
#2
Study Area
#1
Reno
Carson
City
Proposed DC Tap
500 kV
Ely
Proposed Gonder to
Harry Allen
500 kV Line
Las Vegas
Proposed Centennial Project

Transmission Study Results For Each Upgrade:

- Cost and capability of connecting wind development area to the grid;
- Permitting assumptions;
- Other transmission planning assumptions.

Project Stakeholders

- Western Interstate Energy Board of the Western Governor's Association, Wyoming Energy Office, Utah Energy Office, Oregon Energy Office, Washington State University Energy Program, Nevada Bureau of Consumer Protection, Moapa Band of Paiutes, Nevada and Idaho Wind Working Groups and the Public Utilities Commission of Nevada.

Project Schedule:

- Project Began on October 1, 2003;
- Wind characterization activities: December 2003 through February 2004;
- Selection of proposed wind development areas: by February 13, 2004;
- Complete transmission studies and write-up for inclusion in SPPC's 2004 Resource Plan: By July 1, 2004; and
- Projected Completion Date is December 2004.

Conclusion

- Questions???