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Renewable energy - the future is now

Thomas Fair
Nevada Power

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Renewable Energy -
The Future is Now

Thomas Fair
Executive for Renewable Energy
August 15, 2007
Introduction

- Political, regulatory and public support for renewable energy is very strong in Nevada
- Nevada has an aggressive Portfolio Standard
- Geothermal and solar energy are a particularly significant resources in Nevada
- We estimate that over $2 billion will need to be spent on renewables by 2015 to meet the Nevada Standard
- Nevada is one of only three states that allow DSM to contribute to their Portfolio Standard.
- Sierra Pacific plans to participate in renewables projects both as an investor, and as a power off-taker
- Sierra Pacific is encouraging renewable energy companies to develop projects in Nevada
- In the past 12 months we have signed 12 renewable energy PPAs (including 230 MW geothermal) and have several more pending
- We are planning to co-develop wind and geothermal projects
Nevada’s Portfolio Standard

- Nevada requires 20% by 2015 - one of the most aggressive Standards in the U.S.
- Based on energy (kWh) sales
- Solar set-aside
- DSM can make up ¼ of 20%
- Stair-step standard multiplied by Sierra’s rapid kWh sales growth means a large amount of new renewables will be added to our mix
Required Renewable Energy

Nevada Power Company and Sierra Pacific Power Company
Combined Portfolio Standard Requirements 2005 - 2027

Compound Annual Growth Rate:
2005 - 2015: 15.4%

Compound Annual Growth Rate:
2005 - 2020 = 10.7%

- 6% 9% 12% 15% 18% 20%

Demand Side Management
Solar Energy
Non-Solar Renewable Energy
PS % of Retail Sales

Compound Annual Growth Rate:
2005 - 2020 = 10.7%
Strategy

1. Invest in renewable facilities
2. Accelerate procurement
3. Ramp-up DSM

Become owner, developer & major advocate for renewables & energy efficiency in our supply mix
Current Renewable Supplies

- Sierra Pacific has a long history of renewable QF purchases, including an extensive geothermal energy portfolio
- Renewable resources abundant in the North
- New geothermal plants being developed in North
- New solar plants in the South
- A 500 kV transmission tie is planned for 2011
Planned Additions - MW

![Bar chart showing planned additions in MW from 2005 to 2012. The chart includes categories for New Other Renew, New Wind, New Solar, New Geothermal, and In-Service.](chart.png)
RPS Outlook

Renewable (non-solar) Credits

- Portfolio Standard Requirement
- Renewable Energy and DSM Savings
- Portfolio Energy Credits
RPS Outlook - Solar

Solar Credits

Additional solar development expected before 2012 will prevent credit downturn
Geothermal Development

- Nevada’s primary renewable resource
- Nevada ranks 2nd only to California in geothermal potential
- 15 operating plants totaling close to 250 MW
- 20+ year history of resource exploration, characterization & development
- We are adding 100’s of MW to our supply
- Nevada is No. 1 in watts/capita of geothermal energy
Geothermal Energy (cont’d)

- Requires expensive well drilling (30-40% of project cost)
- High construction cost, but produces energy 24x7
- Typical project size is small (20 to 30 MW); good fit to grid
- Typical 30 MW project costs ~$100 MM for drilling & construction
- Additional wells may be required over life of project to maintain production

Ormat’s Burdette Plant:
26 MW
170,000 MWh/year
Utility’s Load vs. Geothermal Output

Load

NPC Load Profile

[Graph showing NPC Load Profile with MW on the y-axis and Hour on the x-axis, comparing NPC - Annual Average and NPC - July Average.]

NPC Annual Load Curve

[Graph showing NPC Annual Load Curve with % of Annual Total on the y-axis and Month on the x-axis.]

Output

Typical Geothermal Output Curve

[Graph showing Typical Geothermal Output Curve with MW on the y-axis and Hour on the x-axis, comparing Average Geothermal Output - December, Average Geothermal Output - July, and Hottest July Day (7/9/07).]

Geothermal Annual Output Curve

[Graph showing Geothermal Annual Output Curve with % of Annual Total on the y-axis and Month on the x-axis.]

Net Capacity Factor - 75%
Solar Development

- Southern Nevada has an excellent resource
- 64 MW Nevada Solar One solar thermal project recently completed
- Solar technologies are not yet ready to compete with other renewables on a pure economic basis, but are making strides
- 64 MW Nevada Solar One and 12 MW NAFB PV project (under construction) make Nevada No.1 in solar energy per capita
Nevada’s Solar Energy Ranking

- Nevada No. 1 at end of 2007
- Received Solar Champions Award from Solar Energy Ind. Assn.

Sources: EIA, CEC, DSIRE, Nevada Power, B&V projections.
CA: assumes 100% growth for PV from 10/06 to 12/07. Data from CEC
NJ, CO, AZ: Assumes 2007 solar matches RPS requirement
Large solar-thermal plant is lowest cost source of solar power today

Same size PV would cost much more

Photovoltaic systems have been in short supply worldwide, but situation starting to improve

PV can be used in small-scale distributed applications
Utility’s Load vs. Solar Output

Load

NPC Load Profile

NPC Annual Load Curve

Output

Typical Solar Output Curve in July

Solar Annual Output Curve

Net Capacity Factor: 18.25%
Wind Development

- Resource not comparable to Great Plains, but adequate
- Must compete on price with geothermal
- Plan to add >400 MW by 2012
- Currently evaluating sites
- Siting issues:
  - rough terrain
  - federally owned lands
  - military use of airspace
Wind Energy (cont’d)

- Strong proven wind resource is critical to project viability and cost of energy
- Intermittent energy requires other generation sources to compensate to maintain steady supply
- 27-33% average capacity factor
- Typical 100 MW project may cost $200 MM to build
- Cost has increased considerably in last three years due to steel costs, weak dollar, and high global demand
Utility’s Load vs. Wind Output

Load

NPC Load Profile

Output

NPC Annual Load Curve

Typical Wind Output Curve

Wind Annual Output Curve
Turbine Prices Up 60%

Project Cost Increases Are a Function of Wind Turbine Prices

Major Causes:
1) Euro/USD rate
2) Global demand
3) Steel prices
4) Transport costs

Since turbines are often ordered 12 or more months in advance, further project cost increases are expected.

Note: Figure depicts reported transaction price data for 32 U.S. wind turbine orders totaling 8,986 MW and placed from 1997-2006

Source: May 30, 2007 LBNL Report
Global sourcing of equipment and components

U.S. and European specialists provide scientific, engineering, legal and financial expertise

Three distinct industries: 1) geothermal, 2) wind, and 3) solar (many flavors), and other niche technologies

Many big players are entering wind and solar, with varying degrees of vertical integration to gain advantage

Nevada has a strong position in Geothermal due to its resource potential, development history, and presence of industry leaders
Summary

- Renewable energy diversifies our supplies, avoids emissions, and helps us meet Nevada’s rapid growth.
- By 2015 we expect to have spent over $2 billion on renewable energy.
- Customers want it, policy-makers want it, and we are bringing it into the mainstream.
- We are taking an active role in encouraging and developing renewable energy facilities.
- Utilities are increasingly seeking to invest in renewables, vs. purchase under long-term PPAs.
- Nevada is leading the way on geothermal and solar development, and will add wind to its mix.