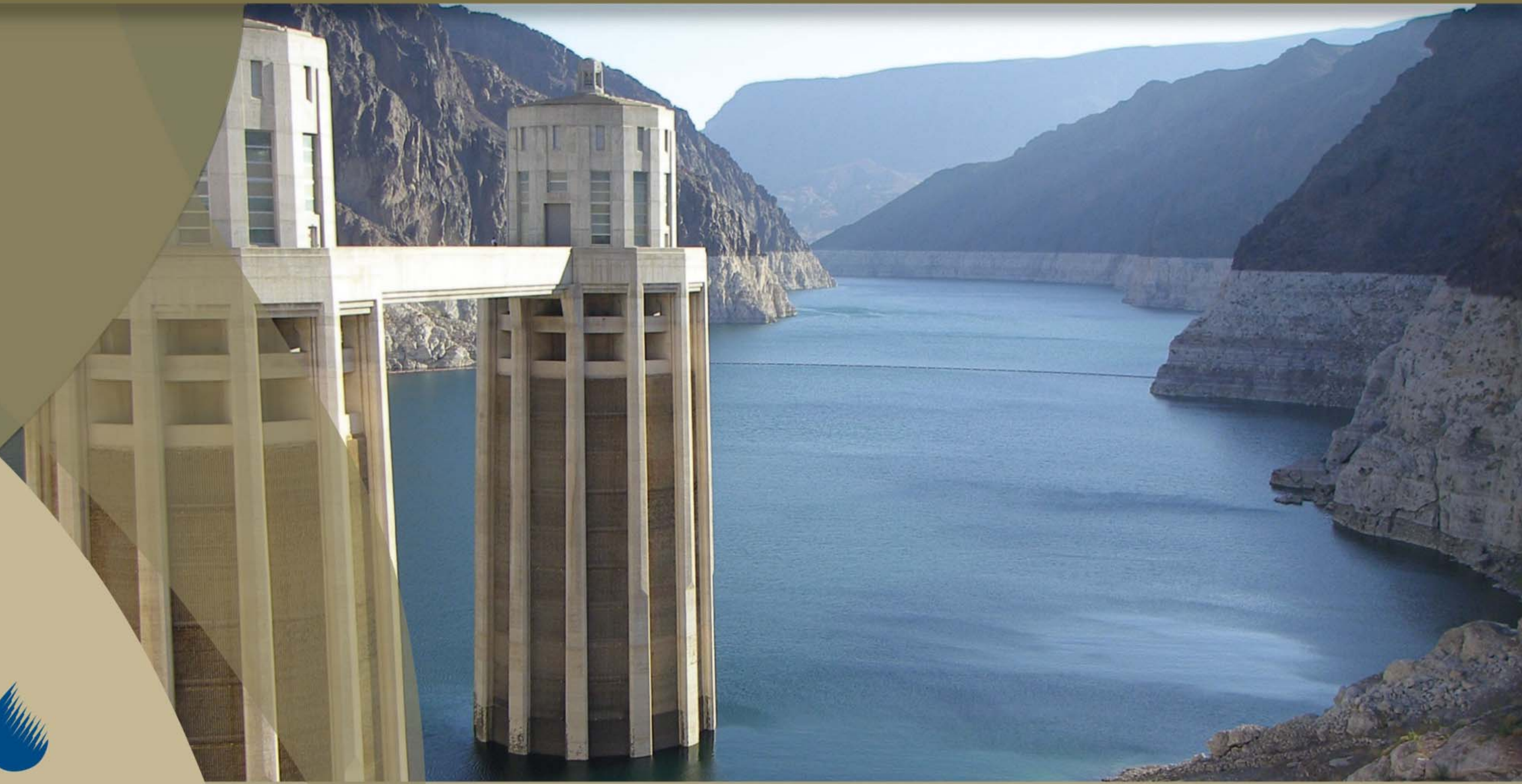
# Spring, Cave, Dry Lake and Delamar Valleys



SOUTHERN NEVADA WATER AUTHORITY

Presentation for:

Dr. Carl Linvill and John Candelaria

Aspen Environmental Group

## DR. CARL LINVILL

**Director Integrated Energy Analysis & Planning Division**

### ACADEMIC BACKGROUND

Doctorate, Economics (Ph.D.), University of North Carolina, Chapel Hill, 1993
B.A., Mathematics and Economics, University of California, Davis, 1984

### PROFESSIONAL EXPERIENCE

Carl Linvill directs Aspen's Integrated Energy Analysis & Planning which conducts integrated systems analyses of energy, climate and natural resource issues in California and the Western Electricity Interconnection. Dr. Linvill's current assignments with Aspen include serving as a Director for Western Grid Group bringing independent regulatory and technical expertise to Western Interconnection Planning activities, serving as the Technical Lead on the Western Clean Energy Vision project providing a 2050 vision to support NGO participation in the Western Electric Coordinating Council's (WECC) Regional Transmission Expansion Planning (RTEP), serving as the Project Manager for the consulting team on the Long Term Procurement Plan (LTPP) project at the California Public Utilities Commission (CPUC), supporting the California Energy Commission (CEC) in evaluating its Energy Efficiency and Demand Forecasting methodologies and serving on Majority Leader Reid's Blue Ribbon Commission on Energy Policy. Dr. Linvill also served as as co-coordinator of the Renewable Energy Transmission Initiative (RETI) for the Energy Commission in 2010 and led the Demand Modeling Methodology Evaluation project for the CEC in 2010. Dr. Linvill has previously dealt with issues of climate and electricity policy as a Public Utility Commissioner in Nevada, as Energy Advisor to the Governor, as Director of the Nevada State Office of Energy, as the Western Interconnection representative to the North American Electric Reliability Corporation (NERC), and as a member of the Western Interstate Energy Board of the Western Governors Association.

### Aspen Environmental Group — November 2006 to present

Dr. Linvill is Director of Integrated Energy Analysis & Planning at Aspen with research, project management, quality assurance and business development responsibilities involving long term energy policy analysis, conventional and renewable energy supply alternatives planning and evaluation, and energy efficiency and demand response planning and evaluation. He has provided energy and economics expertise to the following clients:

**California Energy Commission.** Dr. Linvill is **Program Manager** for the Aspen Electricity Supply Analysis Division (ESAD) Technical Services Contract and **Deputy Program Manager** for the Aspen Siting and Planning Technical Services Contract where he supports staff and sub-contractors in producing electricity and natural gas planning analysis studies. He is an active participant in long term resource evaluation projects including direct contributions to the Demand Forecast Assessment, the Demand Forecast Energy Efficiency Assessment, the Scenarios Project and technical program management support for numerous electricity and natural gas projects executed to support the

## JOHN E. CANDELARIA
**Senior Associate**

**ACADEMIC BACKGROUND**
M.B.A., Arizona State University, 1992
B.S., Electrical Engineering, Arizona State University, 1983

## PROFESSIONAL EXPERIENCE

John Candelaria is a Senior Associate at Aspen and is a specialist in power production, electric and gas resource planning, regulatory policy and utility regulation. He has 27 years of experience in the electric utility industry working for investor owned utilities and regulatory agencies. Mr. Candelaria's current assignments include: Overseeing the development of a coal retirement/renewable resource integration scenario for the WECC Transmission Expansion Planning Policy Committee's 2010 Study Cycle process on behalf of the Western Grid Group; Preparing an economic feasibility assessment of solar resource areas in eastern Nevada for the Southern Nevada Water Authority; Developing a renewable energy resource and transmission right of way land use model for a report currently being prepared for the Western Grid Group; Providing advice and recommendations to the Nevada Bureau of Consumer Protection addressing electric and gas resource planning, rulemakings, proposed legislation, and other regulatory matters; Facilitating a transmission team for the Nevada State Office of Energy to address market and transmission access issues for renewable resources in Nevada; and Assisting Nye County with the identification of transmission access options for renewable energy resources. He is a former Policy Advisor for the Public Utilities Commission of Nevada where he provided advice to Commissioners on a wide range of issues including electric and gas resource planning, conventional and renewable generation options, conventional and renewable long and short-term purchase power contracts, transmission plans, Demand Side Management plans, long and short-term fuel procurement plans, load forecasts, financial plans, rate-making, rule-making and other regulatory issues. Before becoming a Policy Advisor, he represented the Nevada Commission's Staff on electric transmission, generation and other electric resource planning issues, and also addressed gas resource planning, ratemaking and other regulatory issues. He managed the Commission Staff's effort to develop revised resource planning regulations, helped develop State mandated renewable energy regulations and assessed the Nevada utilities efforts to comply with the State's Renewable Portfolio Standard. He spent over eight years working for an investor owned utility gaining experience in power production including construction, energization, operation and maintenance of utility scale power production facilities.

***Aspen Environmental Group*** ***March 2008 to present***

Mr. Candelaria is responsible for providing advice, recommendations, testimony and comments to clients on federal and state regulatory issues including resource and transmission planning, resource adequacy, renewable energy, reliability, short and long-term resource procurement, demand side management and Nevada utility/customer issues.

**SENIOR ASSOCIATE**
**Nevada Office of the Attorney General, Bureau of Consumer Protection:** Mr. Candelaria provides advice & recommendations and prepares testimony and comments regarding electric and gas resource planning, rulemakings, ratemakings and other regulatory issues that come before the Nevada Public Utilities Commission. Since joining Aspen, he has prepared testimony, comments and supported litigation in the follow dockets:

# Spring, Cave, Dry Lake, and Delamar Valleys Renewable Energy Viability Report

**PRESENTATION TO THE OFFICE OF THE NEVADA STATE ENGINEER**

Prepared for

SOUTHERN NEVADA WATER AUTHORITY

Prepared by

Aspen Environmental Group

June 2011

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## CONTENTS





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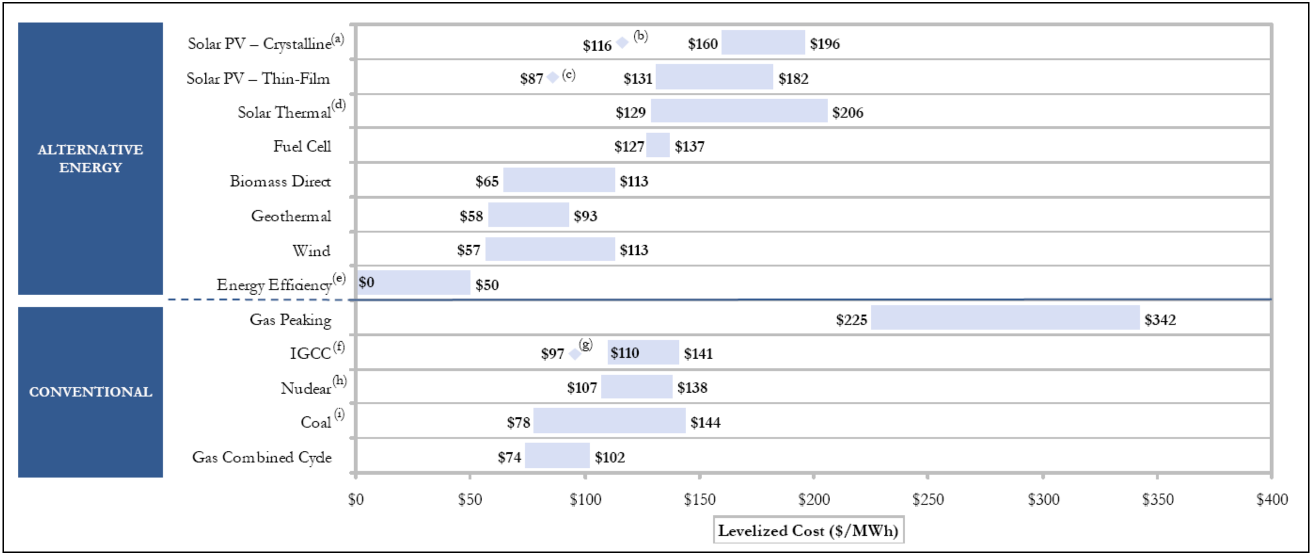
## Table 1-1
## Water Use Comparisons for Several Solar Technologies

| Solar Technology | BLM Solar PEIS-Overview (Table 3.1-1) Converted from afy/MW[a] | DOE (2009)[b] (gal/MWh) | Western Resource Advocates (2010)[c] (gal/MWh) | BLM Solar PEIS-Amargosa Valley SEZ (Table 11.1.9.2-2) Converted from afy for facilities of given MW capacity |
|---|---|---|---|---|
| Parabolic trough (wet) | 298-1,817 gal/MWh [30%-60% operation + washing] | 800 | 760 | 298-1,817 gal/MWh [30%-60% operation + washing] |
| Parabolic trough (dry) | 31-143 gal/MWh [30%-60% operation + washing] | 78 | 78 | 31-143 gal/MWh [30%-60% operation + washing] |
| Power tower (wet) | 298-1,817 gals/MWh [30%-60% operation + washing] | 500-750 | 760 | 298-1,817 gal/MWh [30%-60% operation + washing] |
| Power tower (dry) | 31-143 gal/MWh [30%-60% operation + washing] | 90 | 78 | 31-143 gal/MWh [30%-60% operation + washing] |
| Dish Stirling engine | 19 gal/MWh [washing only] | 20 | 78 | 19 gal/MWh [washing only] |
| Photovoltaic (utility) | 1.9 gal/MWh [washing only] | --- | 0 virtually none | 1.9 gal/MWh [washing only] |

[a]The Bureau of Land Management (BLM) provided a range for 30%-60% operation of annual hours for parabolic trough and power tower technologies. For all technologies, BLM considered mirror/panel washing with a conservative 100% assumption on operational time.

[b]In a report to Congress, the U.S. Department of Energy (DOE) compared the performance of wet- and dry-cooled plants in California and found that the dry-air-cooled plant provided roughly 5% less electric energy on an annual basis than the water cooled plant (DOE, 2009). Similarly, a presentation by the DOE reports that switching from wet-cooled to dry-cooled results in a performance loss of less than 7% (DOE, 2010).

[c]Tellinghuisen and Milford (2010).




Source: Lazard Estimates

Note: Reflects production tax credit (PTC), investment tax credit (ITC) and accelerated asset depreciation, as applicable. Assumes 2008 dollars, 20-year economic life, 40% tax rate and 5-20 year tax life. Assumes 30% debt at 8.0% interest rate and 40% equity at 12% cost for conventional generation technologies. Assumes a coal price of $2.50 per MMBtu and a natural gas price of $8.00 per MMBtu.

(a) Low end represents single-axis tracking crystalline. High end represents fixed installation.
(b) Represents estimated implied LCOE in 2012, assuming a total system cost of $3.50 per watt for single-axis tracking crystalline.
(c) Represents a leading thin-film company's targeted implied LCOE in 20102, assuming a total system cost of $2.00 per watt.
(d) Low end represent solar tower. High end represents solar trough.
(e) Estimates per National Action Plan for Energy Efficiency; actual cost for various initiatives varies widely.
(f) High end incorporates 90% carbon capture and compression.
(g) Represents estimated implied LCOE for Southern Company's proposed IGCC facility in Mississippi that is expected to be in service in 2013, assuming a total system cost of $3.00 per watt and 50% carbon capture per Southern Company public comments.
(h) Does not reflect decommissioning costs or potential economic impact of federal loan guarantees or other subsidies.
(i) Based on advanced supercritical pulverized coal. High end incorporates 9-% carbon capture and compression.

**Figure 1-7**
**Levelized Cost of Energy Comparison**

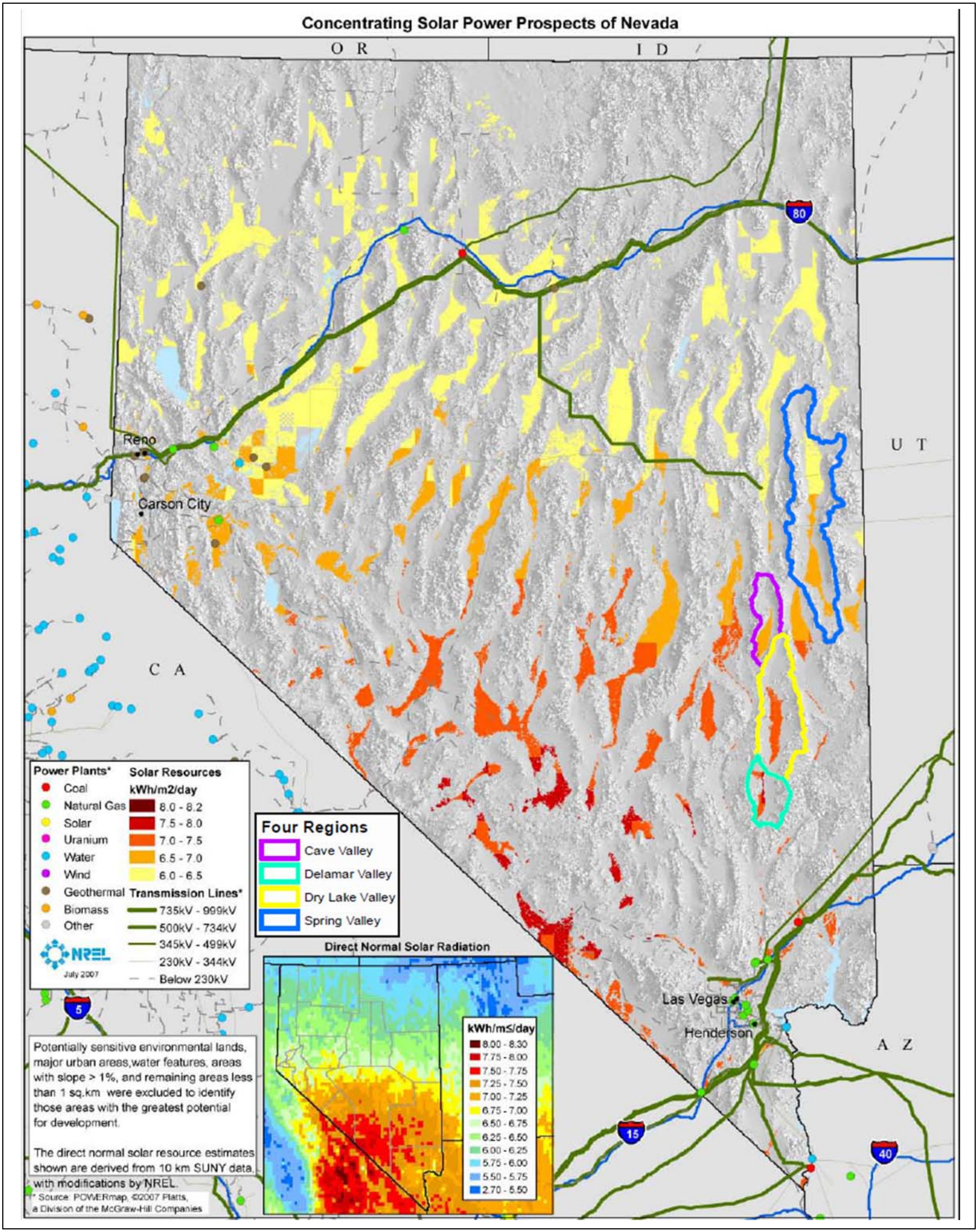



**Figure 1-6**
**Cost Competitiveness of Nevada's Solar Resources**

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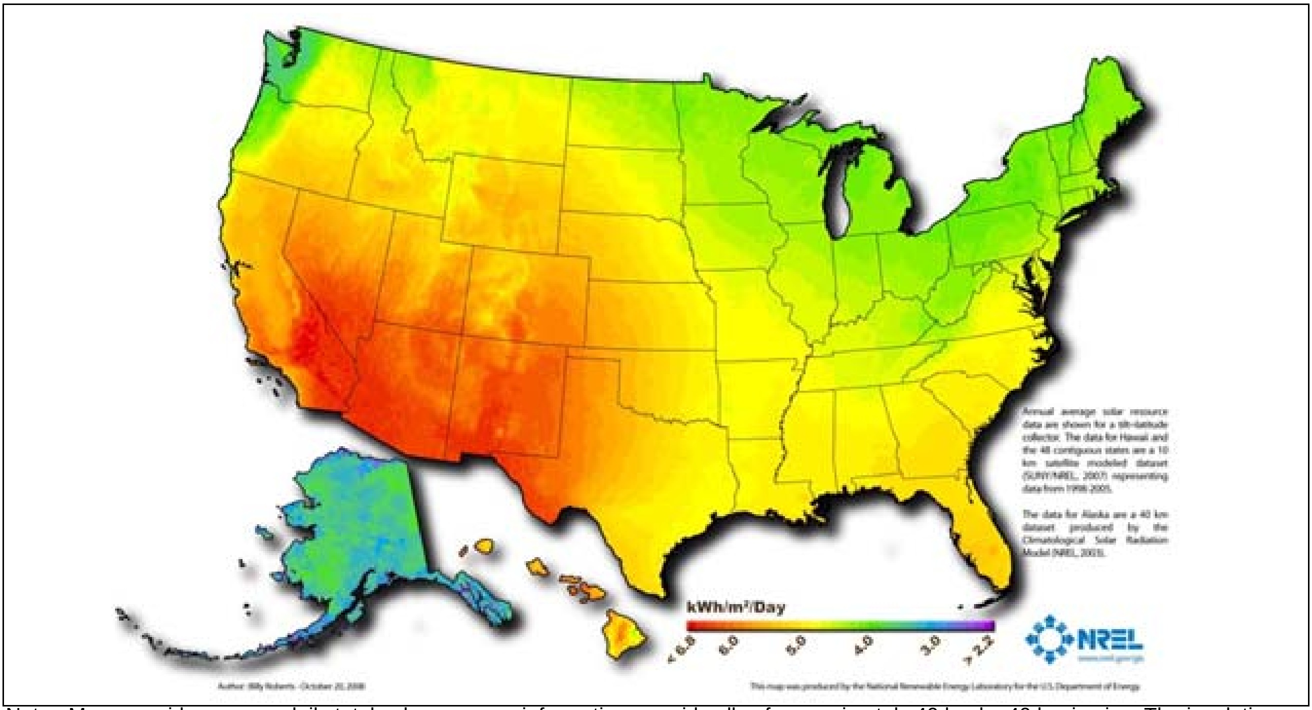
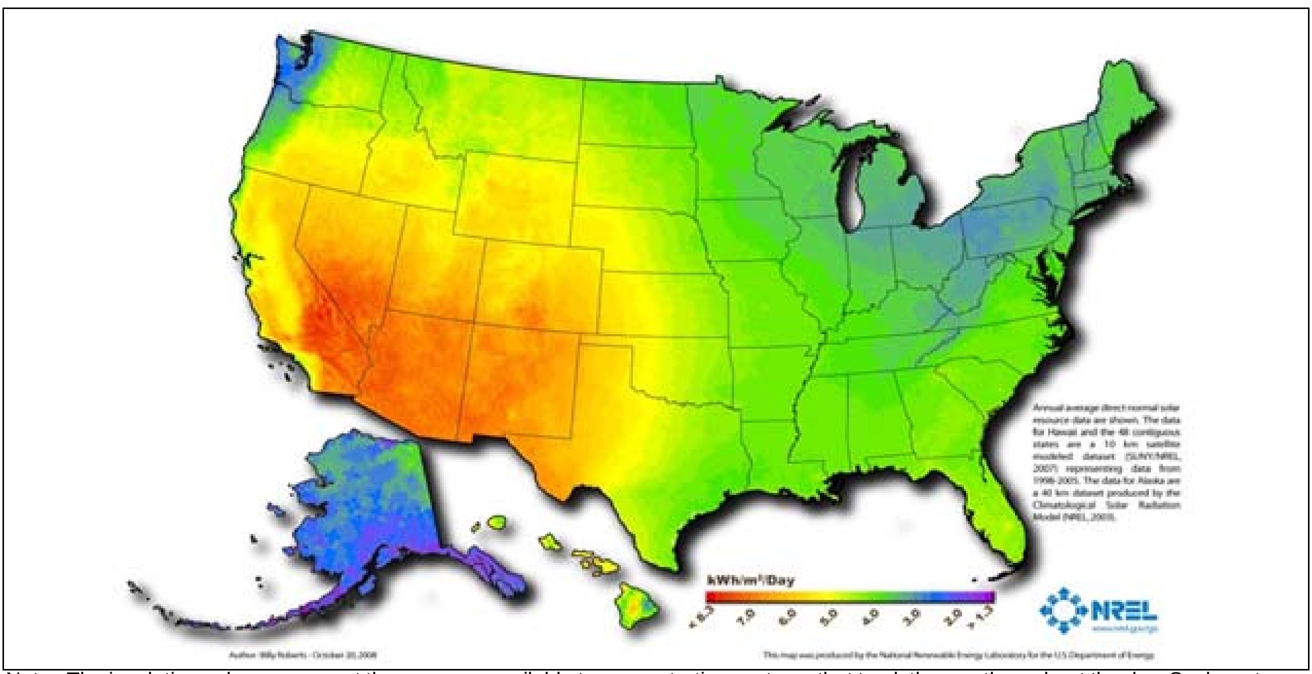


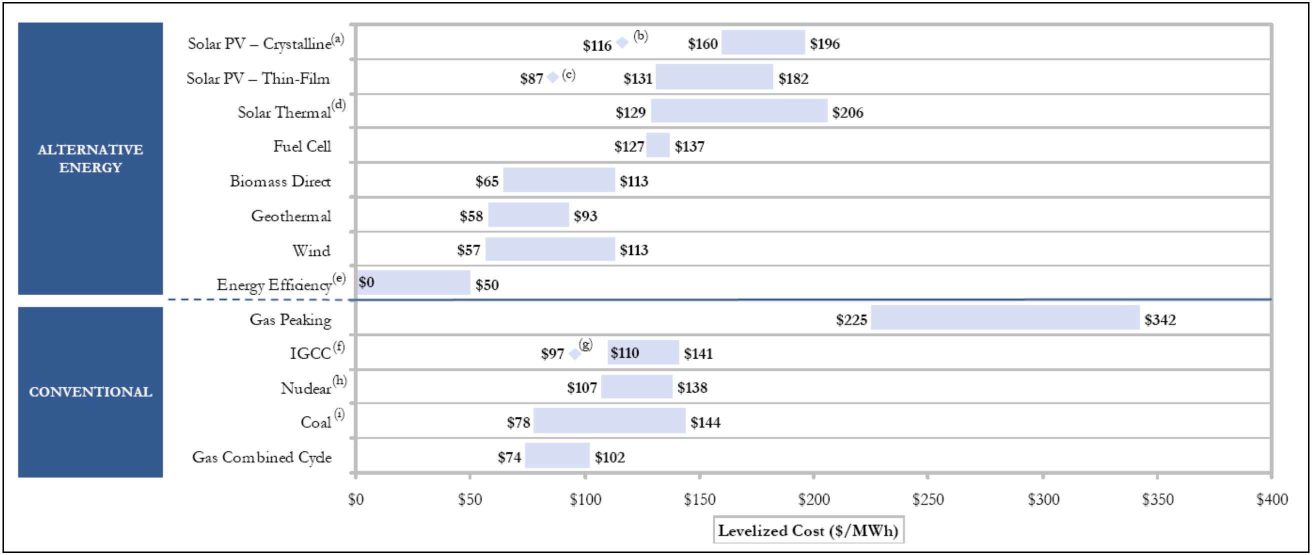

Note: Maps provide average daily total solar resource information on grid cells of approximately 40 km by 40 km in size. The insolation values represent the resource available to a flat plate collector, such as a PV panel, oriented due south at an angle from horizontal equal to the latitude of the collector location. This is typical practice for PV system installation, although other orientations are also used (NREL, 2010).

**Figure 1-4**
**Solar PV Resources**




Note: The insolation values represent the resource available to concentrating systems that track the sun throughout the day. Such systems include CSP stations such as trough collectors or dishes (NREL, 2010).

**Figure 1-5**
**CSP Resources**




Source: Lazard Estimates

Note: Reflects production tax credit (PTC), investment tax credit (ITC) and accelerated asset depreciation, as applicable. Assumes 2008 dollars, 20-year economic life, 40% tax rate and 5-20 year tax life. Assumes 30% debt at 8.0% interest rate and 40% equity at 12% cost for conventional generation technologies. Assumes a coal price of $2.50 per MMBtu and a natural gas price of $8.00 per MMBtu.

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**Figure 1-7**
**Levelized Cost of Energy Comparison**

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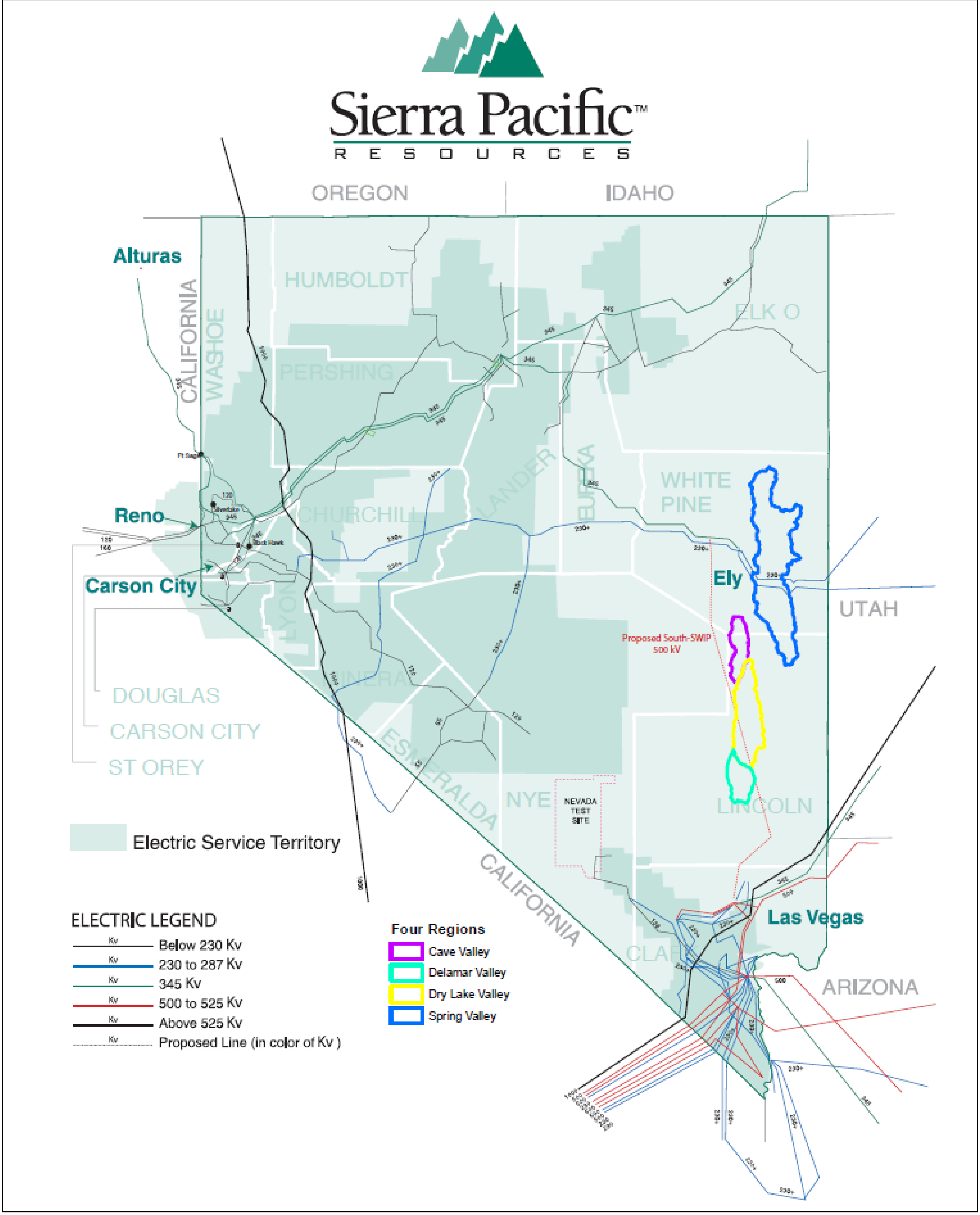


**Figure 2-2**

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**NVE and IPA Transmission Facilities Running through Spring Valley**

# Table 2-4
# Transmission Cost Estimate to Access Eldorado Valley from Zones S1 and S2

| Transmission Infrastructure | Access to Zone S1 - Option 1 ($Millions) | Access to Zone S1 - Option 2 ($Millions) | Access to Zone S2 ($Millions) |
|---|---|---|---|
| Collector Transmission Facilities | 146.4 | 0 | 220.20 |
| Network Upgrades | - | - | - |
| Substation | 29.8 | 29.8 | 23.5 |
| | - | - | - |
| Access to Eldorado | | | |
| SOI Project (Phase I) | | | |
| Harry Allen to Eldorado | 134.4 | | 134.4 |
| Northwest to Harry Allen | 65.4 | | |
| SOI Project (Phase II) | | 214 | |
| **Total** | **376.0** | **269.8** | **445.3** |

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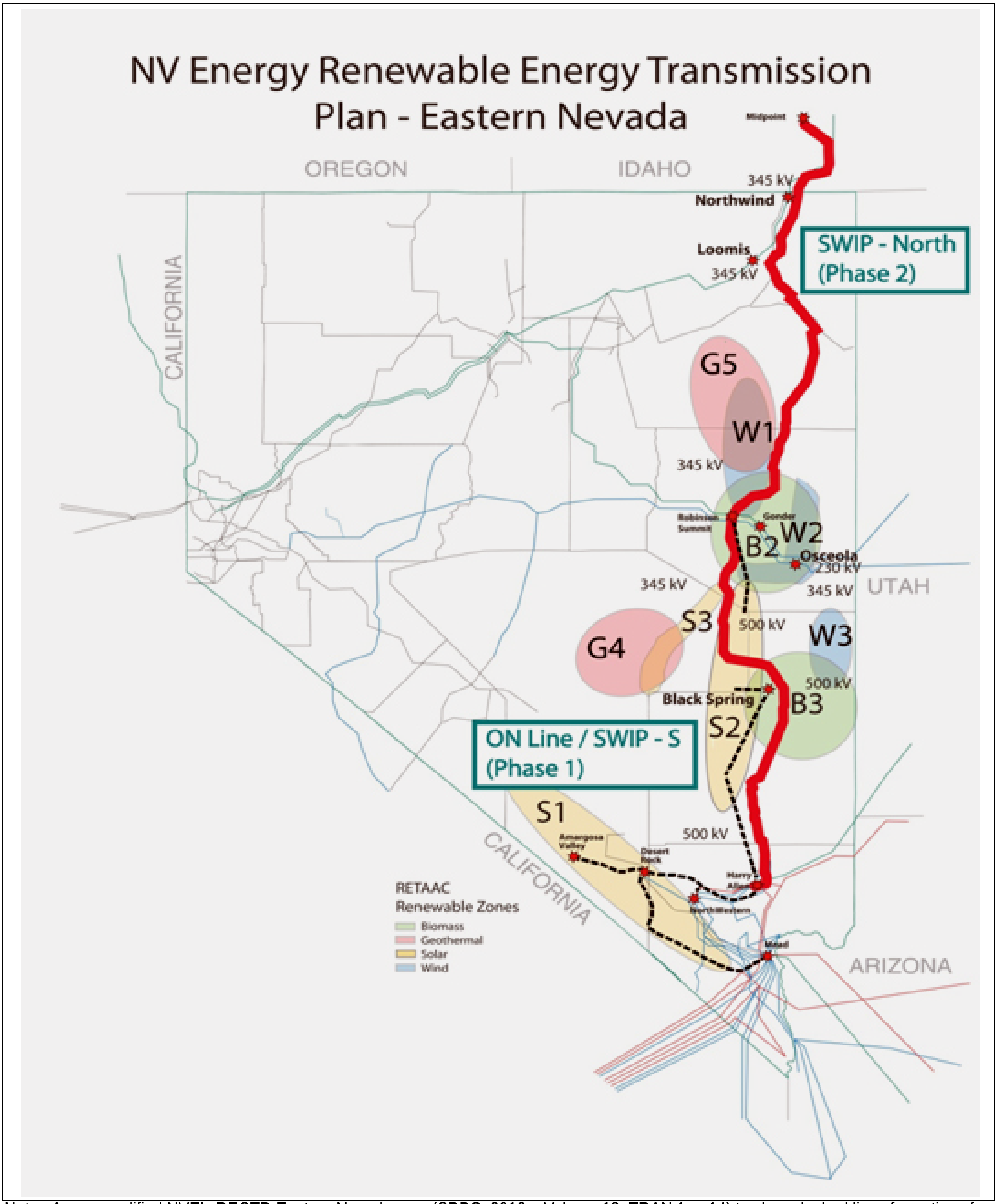


Note: Aspen modified NVE's RECTP-Eastern Nevada map (SPPC, 2010a, Volume 13, TRAN 1, p.14) to show dashed lines for options for providing transmission access to renewable energy zones in Eastern Nevada. Map provided by SPPC.

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**Figure 2-3**
**NVE Renewable Energy Transmission Plan–Eastern Nevada**

# Table 4-2
## NVE Solar Energy Requirements Through 2029

| Year | Retail Sales Forecast (GWh) | NVE RPS Requirement | Solar % RPS | Renewable Energy Requirement (GWh) | NVE Solar Energy Requirement (GWh) | Solar Energy Available from PUCN Approved Resources (GWh) |
|---|---|---|---|---|---|---|
| 2010 | 28,882 | 12% | 5% | 3,466 | 173 | 221 |
| 2011 | 29,198 | 15% | 5% | 4,380 | 219 | 354 |
| 2012 | 29,694 | 15% | 5% | 4,454 | 223 | 489 |
| 2013 | 30,252 | 18% | 5% | 5,445 | 272 | 489 |
| 2014 | 30,813 | 18% | 5% | 5,546 | 277 | 757 |
| 2015 | 31,344 | 20% | 5% | 6,269 | 313 | 1,017[a] |
| 2016 | 31,955 | 20% | 6% | 6,391 | 383 | 1,017[a] |
| 2017 | 32,413 | 20% | 6% | 6,483 | 389 | 1,017[a] |
| 2018 | 32,942 | 20% | 6% | 6,588 | 395 | 1,017[a] |
| 2019 | 33,481 | 20% | 6% | 6,696 | 402 | 1,017[a] |
| 2020 | 34,036 | 22% | 6% | 7,488 | 449 | 1,017[a] |
| 2021 | 34,504 | 22% | 6% | 7,591 | 455 | 1,017[a] |
| 2022 | 35,013 | 22% | 6% | 7,703 | 462 | 1,017[a] |
| 2023 | 35,545 | 22% | 6% | 7,820 | 469 | 1,017[a] |
| 2024 | 36,116 | 22% | 6% | 7,946 | 477 | 1,017[a] |
| 2025 | 36,618 | 25% | 6% | 9,155 | 549 | 1,017[a] |
| 2026 | 36,951 | 25% | 6% | 9,238 | 554 | 1,017[a] |
| 2027 | 37,467 | 25% | 6% | 9,367 | 562 | 1,017[a] |
| 2028 | 38,020 | 25% | 6% | 9,505 | 570 | 1,017[a] |
| 2029 | 38,485 | 25% | 6% | 9,621 | 577 | 1,017[a] |

[a]Solar Energy Available from Solar Resources Approved by PUCN through 2010.

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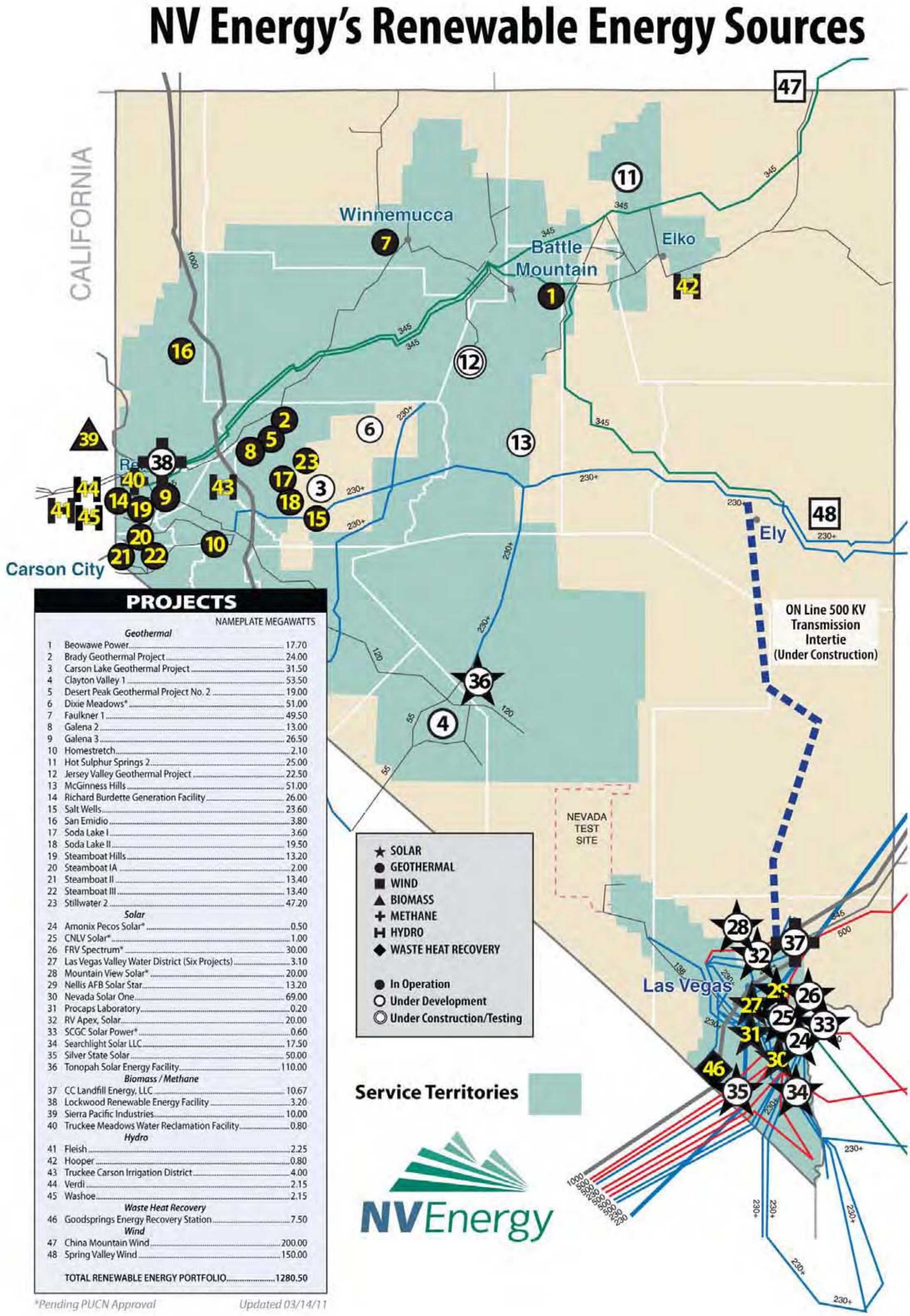
# Table 4-1
# NVE Portfolio Standard Annual Report, Renewable Projects

| NV Energy<br>Portfolio Standard Annual Report, Compliance Year 2009<br>Table 3 Renewable Projects | | | | |
|---|---|---|---|---|
| Map Reference | | MW | Increase vs. 2008 | Status |
| | **Geothermal** | | | |
| 1 | Beowawe | 17.7 | | In Service |
| 2 | Brady Geothermal Project | 21.5 | | In Service |
| 3 | Carson Lake Basin | 62.0 | | In Development |
| 4 | Carson Lake Geothermal Project | 31.5 | | In Development |
| 5 | Clayton Valley* | 53.5 | 53.5 | In Development |
| 6 | Desert Peak Geothermal Project no. 2 | 19.0 | | In Service |
| 7 | Faulkner 1 | 49.5 | | In Service |
| 8 | Galena 2 | 13.0 | | In Service |
| 9 | Galena 3 | 26.5 | | In Service |
| 10 | Homestretch | 2.1 | | In Service |
| 11 | McGinness Hills* | 51.0 | 51 | In Development |
| 12 | Hot Sulpher Springs 2* | 25.0 | 25 | In Development |
| 13 | Jersey Valley Geothermal Project | 31.5 | | In Development |
| 14 | Richard Burdette Generation Facility | 26.0 | | In Service |
| 15 | Salt Wells | 23.6 | | In Service |
| 16 | San Emidio | 3.8 | | In Service |
| 17 | Soda Lake I | 3.6 | | In Service |
| 18 | Soda Lake II | 19.5 | | In Service |
| 19 | Steamboat Hills | 13.2 | | In Service |
| 20 | Steamboat IA | 2.0 | | In Service |
| 21 | Steamboat II | 13.4 | | In Service |
| 22 | Steamboat III | 13.4 | | In Service |
| 23 | Stillwater 2 | 47.2 | | In Service |
| | Subtotal Geothermal | 569.5 | 129.5 | |
| | **Solar** | | | |
| 24 | American Capital Energy-Searchlight Solar LLC | 17.5 | 17.5 | In Development |
| 25 | Fotowatio | 20.5 | 20.5 | In Development |
| 26 | Las Vegas Valey Water District (six projects) | 3.1 | | In Service |
| 27 | Nelis AFB | 12.0 | | In Service |
| 28 | Nevada Solar One | 64.0 | | In Service |
| 29 | Next Light/Silver State* | 50.0 | 50.0 | In Development |
| 30 | Procaps Laboratory | 0.2 | | In Service |
| 31 | SolarReserve Tonopah Solar Energy Facility* | 110.0 | 110.0 | In Development |
| | Subtotal Solar | 277.3 | 198.0 | |
| | **Biomass/Methane** | | | |
| 32 | CC Landfill LLC | 10.7 | 10.7 | In Development |
| 33 | Renewable Energy Ctr @ N NV Corr. Ctr. | 1.0 | | In Service |
| 34 | Sierry Pacific Industries | 10.0 | | In Service |
| 35 | Truckee Meadows Water Reclamation Facility | 1.4 | | In Service |
| 36 | Waste Management Renewable Energy* | 3.2 | 3.2 | In Development |
| | Subtotal Biomass/Methane | 26.3 | 13.9 | |
| 37 | Fleish | 2.3 | | In Service |
| 38 | Hooper | 0.8 | | In Service |
| 39 | Truckee Carson Irrigation District | 4.0 | | In Service |
| 40 | Verdi | 2.2 | | In Service |
| 41 | Washoe | 2.2 | | In Service |
| | Subtotal Hydro | 11.5 | | |
| | **Waste Heat Recovery** | | | |
| 42 | Goodsprings | 5.8 | | In Development |
| | **Wind** | | | |
| | China Mountain | 200.0 | | In Development |
| | Spring Valley* | 150.0 | 150.0 | In Development |
| 42 | Subtotal Wind | 350.0 | 150.0 | |
| | **Total Renewables** | **1,240.1** | **491.37** | |




**PROJECTS**

| No. | Project | NAMEPLATE MEGAWATTS |
|---|---|---|
| | *Geothermal* | |
| 1 | Beowawe Power | 17.70 |
| 2 | Brady Geothermal Project | 24.00 |
| 3 | Carson Lake Geothermal Project | 31.50 |
| 4 | Clayton Valley 1 | 53.50 |
| 5 | Desert Peak Geothermal Project No. 2 | 19.00 |
| 6 | Dixie Meadows* | 51.00 |
| 7 | Faulkner 1 | 49.50 |
| 8 | Galena 2 | 13.00 |
| 9 | Galena 3 | 26.50 |
| 10 | Homestretch | 2.10 |
| 11 | Hot Sulphur Springs 2 | 25.00 |
| 12 | Jersey Valley Geothermal Project | 22.50 |
| 13 | McGinness Hills | 51.00 |
| 14 | Richard Burdette Generation Facility | 26.00 |
| 15 | Salt Wells | 23.60 |
| 16 | San Emidio | 3.80 |
| 17 | Soda Lake I | 3.60 |
| 18 | Soda Lake II | 19.50 |
| 19 | Steamboat Hills | 13.20 |
| 20 | Steamboat IA | 2.00 |
| 21 | Steamboat II | 13.40 |
| 22 | Steamboat III | 13.40 |
| 23 | Stillwater 2 | 47.20 |
| | *Solar* | |
| 24 | Amonix Pecos Solar* | 0.50 |
| 25 | CNLV Solar* | 1.00 |
| 26 | FRV Spectrum* | 30.00 |
| 27 | Las Vegas Valley Water District (Six Projects) | 3.10 |
| 28 | Mountain View Solar* | 20.00 |
| 29 | Nellis AFB Solar Star | 13.20 |
| 30 | Nevada Solar One | 69.00 |
| 31 | Procaps Laboratory | 0.20 |
| 32 | RV Apex, Solar | 20.00 |
| 33 | SCGC Solar Power* | 0.60 |
| 34 | Searchlight Solar LLC | 17.50 |
| 35 | Silver State Solar | 50.00 |
| 36 | Tonopah Solar Energy Facility | 110.00 |
| | *Biomass / Methane* | |
| 37 | CC Landfill Energy, LLC | 10.67 |
| 38 | Lockwood Renewable Energy Facility | 3.20 |
| 39 | Sierra Pacific Industries | 10.00 |
| 40 | Truckee Meadows Water Reclamation Facility | 0.80 |
| | *Hydro* | |
| 41 | Fleish | 2.25 |
| 42 | Hooper | 0.80 |
| 43 | Truckee Carson Irrigation District | 4.00 |
| 44 | Verdi | 2.15 |
| 45 | Washoe | 2.15 |
| | *Waste Heat Recovery* | |
| 46 | Goodsprings Energy Recovery Station | 7.50 |
| | *Wind* | |
| 47 | China Mountain Wind | 200.00 |
| 48 | Spring Valley Wind | 150.00 |
| | TOTAL RENEWABLE ENERGY PORTFOLIO | 1280.50 |

*Pending PUCN Approval

Updated 03/14/11

**Figure 4-1**
**NVE's Renewable Energy Resources**

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# Table 5-1
# WECC/SPSC Load Forecast

| State/ Province | State-Adjusted 2020 Loads and RPS Requirements in WECC Region (Draft 08-17-10) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2020 Load Forecast (GWh) by Balancing Areas | RPS% for IOUs in 2020[a] | RPS% for Other Entities in 2020[b] | Total RPS Energy (GWh) in 2020 | Existing RPS Energy (GWh) 2010 | Incremental RPS Energy (GWh) 2010-2020 | State % of Total RPS Energy (GWh) in 2020 | State % of Incremental RPS Energy (GWh) 2010-2020 |
| AB | 108,555 | | | | 4,839 | | | |
| AZ | 92,283 | 10.0% | 10.0% | 5,238 | 900 | 4,338 | 3.7% | 4.8% |
| BC | 63.241 | | | | 1,694 | | | |
| CA | 307,183 | 33.0% | 33.0% | 89,055 | 29,796 | 59,259 | 63.5% | 66.1% |
| CO | 68,639 | 30.0% | 10.0% | 11,632 | 3,043 | 8,589 | 8.3% | 9.6% |
| ID | 27,250 | | | | 1,142 | | | |
| MEX | 17,484 | | | | 4,666 | | | |
| MT | 13,527 | 15.0% | | 995 | 456 | 539 | 0.7% | 0.6% |
| NV | 39,426 | 22.0% | | 5,359 | 2,033 | 3,326 | 3.8% | 3.7% |
| NM | 18,871 | 20.0% | 10.0% | 2,777 | 620 | 2,157 | 2.0% | 2.4% |
| OR | 56,717 | 20.0% | 6.7% | 8,368 | 5,585 | 2,783 | 6.0% | 3.1% |
| TX | 8,104 | 5.0% | | 405 | | | 0.3% | 0.0% |
| UT | 37,415 | 13.3% | 13.3% | 4,668 | 2,140 | 2,528 | 3.3% | 2.8% |
| WA | 99,539 | 15.0% | | 11,789 | 5,665 | 6,124 | 8.4% | 6.8% |
| WY | 23,387 | | | | | | | |
| **Total** | **981,620** | | | **140,288** | **62,579** | **89,644** | **100.0%** | **100.0%** |

[a]IOU RPS% reflects path of RPS% for investor owned utilities smoother across years for discrete jumps.
[b]Municipals, publics, cooperatives, or smaller utilities

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# Table 1-2
# Weighted Average Rank Costs–All CREZ and Resource Areas
(Page 1 of 2)

| CREZ Name | Net Capacity (MW) | Annual Energy (GWh/yr)[a] | Cumulative Energy (GWh/yr)[a] | Weighted Average Rank (Cost ($/MWh) |
|---|---|---|---|---|
| Solano | 894 | 2.721 | 2.721 | -21 |
| Palm Springs | 333 | 1,047 | 3,768 | -18 |
| Round Mountain-A | 384 | 2,557 | 6,325 | -6 |
| Imperial North-A | 1,370 | 10,095 | 16,419 | 4 |
| Santa Barbara | 433 | 1,121 | 17,540 | 4 |
| Fairmont | 2,200 | 6,015 | 23,555 | 7 |
| San Diego South | 678 | 1,829 | 25,385 | 9 |
| Tehachapi | 8,626 | 21,411 | 46,795 | 11 |
| San Diego North Central | 200 | 502 | 47,297 | 15 |
| Lassen South | 410 | 1,051 | 48,348 | 18 |
| Victorville | 1,336 | 3,196 | 51,545 | 18 |
| Round Mountain-B | 132 | 339 | 51,883 | 19 |
| Barstow | 1,986 | 4,706 | 56,589 | 19 |
| UT_WE | 2,144 | 7,595 | 64,184 | 20 |
| San Bernardino - Lucerne | 1,845 | 4,829 | 69,013 | 21 |
| Lassen North | 1,467 | 3,595 | 72,608 | 24 |
| Kramer | 4,866 | 11,092 | 83,700 | 25 |
| OR_SO | 669 | 2,443 | 86,143 | 25 |
| Inyokern | 1,896 | 4,315 | 90,459 | 29 |
| OR_WE | 970 | 5,393 | 95,851 | 29 |
| NV_NO | 1,248 | 8,389 | 104,240 | 30 |
| Mountain Pass | 763 | 1,741 | 105,982 | 32 |
| Twentynine Palms | 1,354 | 3,012 | 108,993 | 33 |
| Pisgah | 1,650 | 3,680 | 112,673 | 34 |
| Cuyama | 300 | 638 | 113,311 | 35 |
| OR_NE | 2,089 | 5,719 | 119,031 | 35 |
| Carrizo South | 2,250 | 4,721 | 123,751 | 38 |
| San Bernardino-Baker | 2,513 | 5,540 | 129,291 | 38 |
| Carrizo North | 1,200 | 2,501 | 131,792 | 38 |
| Imperial East | 1,199 | 2,708 | 134,500 | 41 |
| Riverside East | 7,913 | 17,504 | 152,004 | 41 |
| Westlands | 3,750 | 7,467 | 159,472 | 42 |
| ID_SW | 1,158 | 3,906 | 163,378 | 45 |
| WY_EC | 2,595 | 8,236 | 171,614 | 45 |
| AZ_NE | 4,063 | 11,694 | 183,308 | 46 |
| NV_SW | 5,042 | 12,501 | 195,809 | 49 |
| WA_SO | 3,752 | 11,942 | 207,751 | 51 |
| Imperial North-B | 1,380 | 3,190 | 210,941 | 53 |
| Imperial South | 2,823 | 6,714 | 217,655 | 54 |
| ID_EA | 1,178 | 4,934 | 222,589 | 54 |
| Owens Valley | 3,750 | 8,194 | 230,782 | 56 |
| BJ_NO | 5,655 | 16,635 | 247,417 | 56 |
| WY_SO | 1,940 | 5,813 | 253,230 | 57 |

# Table 1-2
## Weighted Average Rank Costs–All CREZ and Resource Areas
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| CREZ Name | Net Capacity (MW) | Annual Energy (GWh/yr)[a] | Cumulative Energy (GWh/yr)[a] | Weighted Average Rank (Cost ($/MWh) |
|---|---|---|---|---|
| AZ_NW | 3,758 | 9,168 | 262,397 | 58 |
| NM_EA | 11,292 | 31,626 | 294,023 | 58 |
| AZ_WE | 9,373 | 23,130 | 317,153 | 58 |
| WY_NO | 3,061 | 9,217 | 326,369 | 58 |
| NV_WE | 7,836 | 20,109 | 346,479 | 61 |
| WY_EA | 7,257 | 22,690 | 369,169 | 62 |
| Iron Mountain | 3,662 | 8,133 | 377,302 | 64 |
| NM_SE | 1,894 | 5,376 | 382,678 | 65 |
| BJ_SO | 2,650 | 7,973 | 390,651 | 73 |
| NV_EA | 7,974 | 19,332 | 409,984 | 73 |
| AZ_SO | 6,631 | 16,265 | 426,249 | 76 |
| BC_WC | 307 | 2,121 | 428,370 | 95 |
| BC_EA | 66 | 429 | 428,799 | 130 |
| BC_SE | 230 | 829 | 429,627 | 140 |
| BC_WE | 1,370 | 3,194 | 432,821 | 142 |
| BC_NE | 4,206 | 10,638 | 443,459 | 148 |
| BC_SW | 1,922 | 4,424 | 447,883 | 155 |
| BC_SO | 2,441 | 5,208 | 453,092 | 157 |
| BC_NO | 2,254 | 5,486 | 458,577 | 161 |
| BC_CT | 1,024 | 2,497 | 461,074 | 176 |
| BC_NW | 1,402 | 3,442 | 464,516 | 185 |

Source: RETI Phase 2B report (Black and Veatch, 2010)
CREZ = Competitive Renewable Energy Zone
[a]Includes transmission losses.

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