



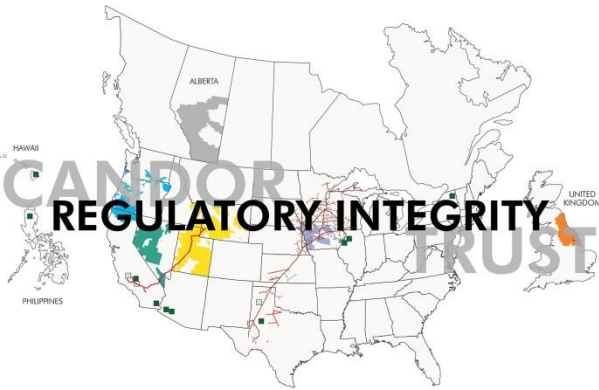
CUSTOMER SERVICE



EMPLOYEE COMMITMENT



ENVIRONMENTAL RESPECT



OPERATIONAL EXCELLENCE



**BERKSHIRE
FINANCIAL STRENGTH
OWNERSHIP**

NV Energy
Generation, Transmission, and Delivery
Shahzad Lateef & Marc Reyes



NV Energy Today



- Headquartered in Las Vegas, with major operations in Reno and Carson City
- 2,461 employees (month-end May 2017)
- 1.25 million electric and 163,000 gas customers
- Service to 90% of Nevada population, along with tourist population in excess of 45 million



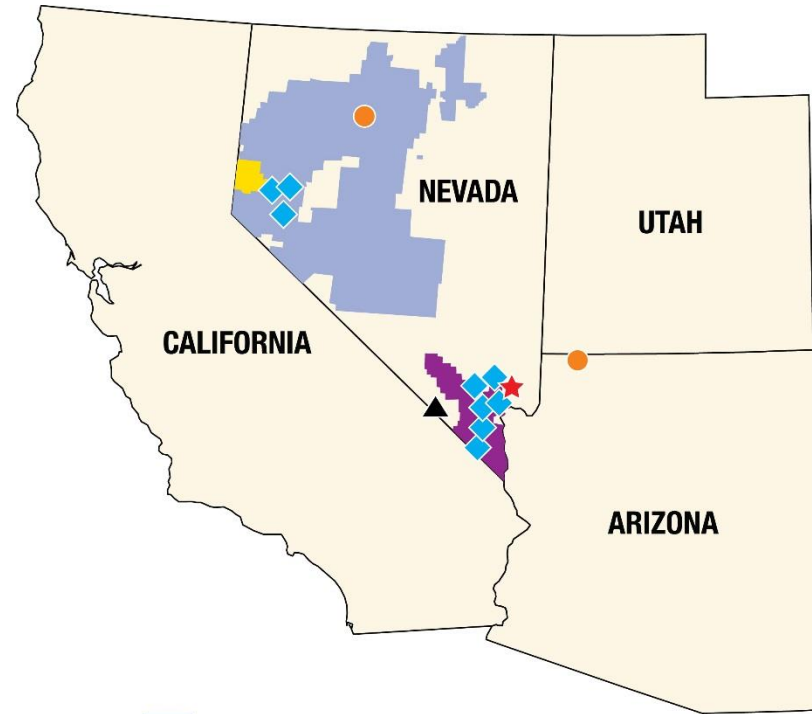
Nevada Power Company

Sierra Pacific Power Company

- Provides electric services to Las Vegas and surrounding areas
- 910,000 electric customers
- 4,639 megawatts of owned power generation capacity⁽¹⁾

- Provides electric and gas services to Reno and northern Nevada
- 340,000 electric customers and 162,000 gas customers
- 1,372 megawatts of owned power generation capacity⁽¹⁾

⁽¹⁾ Net summer peak megawatts owned in operation as of May 31, 2017



- NVE SPPC Electric Service Territory
- NVE NPC Electric Service Territory
- NV Energy Gas Service Territory
- Coal Plants
- Natural Gas Plants
- Energy Recovery Plant
- Solar Energy Plant



- Resource planning and analysis
 - Resource planning in Nevada
 - Integrated Resource Plans
 - Energy Supply Plans
 - Planning reserve margin
 - Production cost modeling
- Electric system operations
 - Reliability standards
 - Must run conditions
 - Interchange

Integrated Resource Plan



- Nevada established the integrated resource planning process following the 62nd Session of the Nevada Legislature in 1983
- The integrated resource planning process is used to develop NV Energy's plan for serving customer's annual peak electrical demand and energy requirements, plus an adequate planning reserve margin, through a combination of demand-side and supply-side resources

Integrated Resource Plan



- NV Energy prepares and files an integrated resource plan every three years pursuant to requirements outlined in the Nevada Revised Statutes and Nevada Administrative Code
 - Resource plans are developed for meeting long-term (20-year) needs of our customers
 - Amendments filed as necessary
 - Seeks approval of long-term, major capital investments
 - NV Energy will file a joint integrated resource plan on June 1, 2018

Integrated Resource Plan



- Elements of the integrated resource plan
 - Forecasts
 - System and customer load
 - Wholesale market prices (coal, natural gas, power, emissions)
 - Demand side plan
 - Supply side plan
 - Renewable resources
 - Transmission plan
 - Distributed resource plan
- Planning reserve margin



- Energy supply plan
 - Filed concurrent with the integrated resource plan and updated annually
 - Amendments filed as necessary
 - Seeks approval of strategies for shorter term fuel and purchased power plans
 - Balance objectives of: minimizing cost, minimizing retail price volatility, and maximizing the reliability of energy supply over the term of the energy supply plan



- Elements of the energy supply plan
 - Load forecast
 - Power procurement and sales plan
 - Renewable energy
 - Wholesale market purchases
 - Fuel procurement plan
 - Natural gas supply and transportation
 - Natural gas hedging
 - Coal
 - Risk management strategy



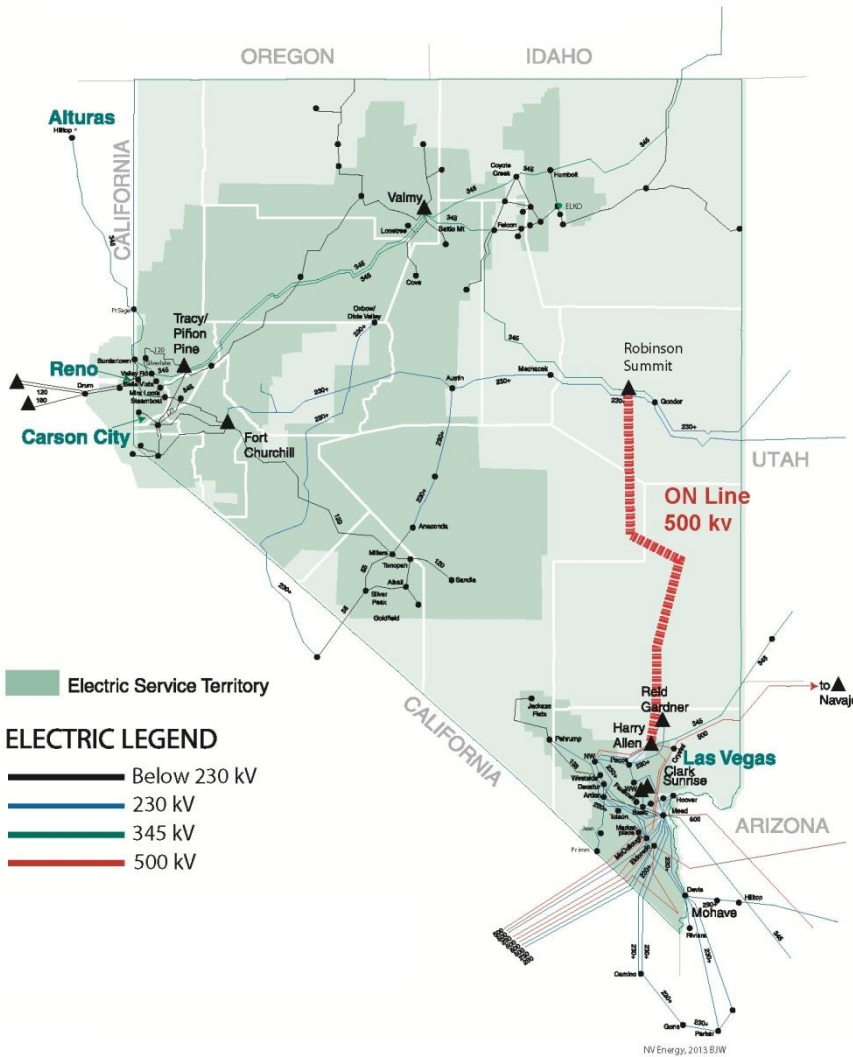
- The role of planning reserves
 - Planning reserve margins are long-term metrics intended to assure sufficient resources are available to meet real-time operating reserve requirements and avoid the possibility that a loss of load occurs no more frequently than one day in 10-years
 - Planning reserve margins are established as a percentage of net customer requirements and is 12 percent for NV Energy customers in southern Nevada and 15 percent for NV Energy customers in northern Nevada

Evaluation of Resource Plan Options



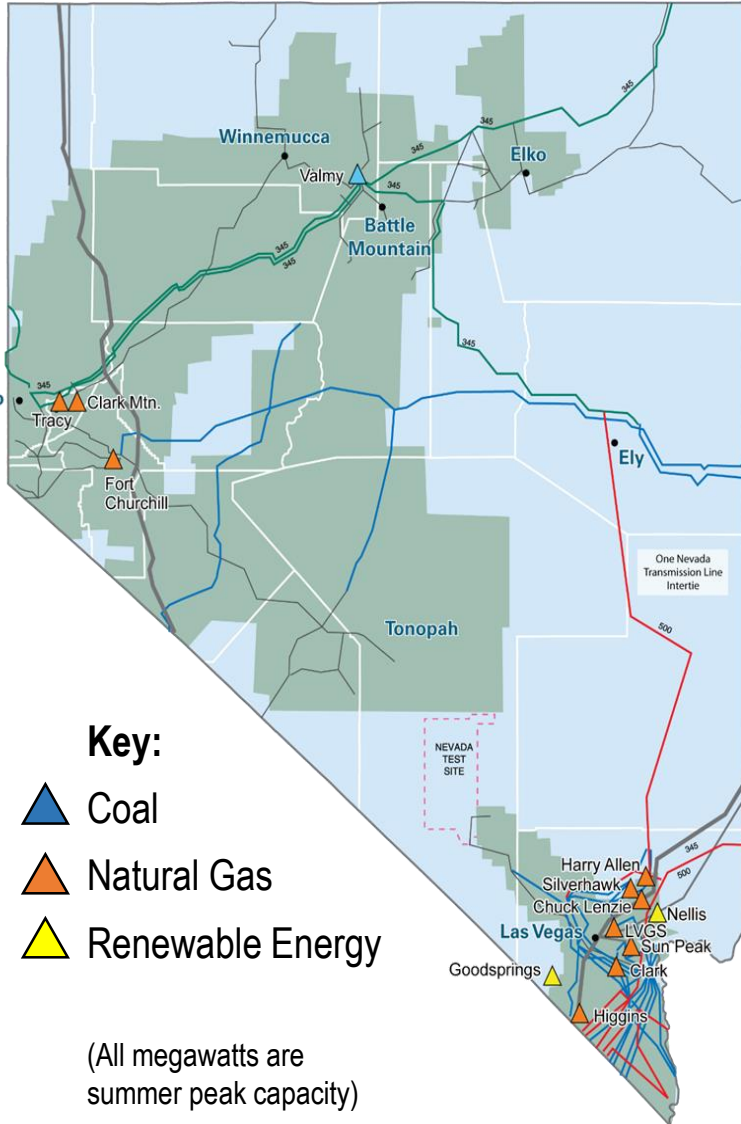
- Production cost models are used to compare the energy costs of resource plans alternatives
 - Sensitivity analysis is performed to evaluate the performance of resource plans under varying load forecasts, fuel and purchase power price forecasts, and greenhouse gas sensitivities
- Capital expense recovery
 - The capital investment associated with each resource plan alternative is evaluated to determine the impact to revenue requirement
- Present worth of revenue requirement
 - The production cost analysis and capital expense recovery analysis are discounted to present value in order to identify the least cost resource plan
- Present worth of societal cost
 - Analysis is performed to evaluate the environmental costs and net economic impact associated with each resource plan alternative

NV Energy Transmission System



Voltage Level	Number of Lines	Total Mileage
500 kV	10	403 miles
345 kV	16	991 miles
230 kV	44	1206 miles
120/138 kV	189	1843 miles

NV Energy Generation Assets



▲ Chuck Lenzie Generating Station	North Las Vegas	1,102 MW
▲ Clark Mountain Combustion Turbines	Sparks	132 MW
▲ Edward W. Clark Generating Station	Las Vegas	1,102 MW
▲ Fort Churchill Generating Station	Yerington	226 MW
▲ Frank A. Tracy Generating Station	Sparks	753 MW
▲ Goodsprings Energy Recovery Station	Goodsprings	5 MW
▲ Harry Allen Generating Station	North of Las Vegas	628 MW
▲ Las Vegas Generating Station	North Las Vegas	272 MW
▲ Navajo Generating Station <i>(NVE owns 11.3%; SRP is operator)</i>	Arizona	255 MW
▲ Nellis Solar Array II	Northeast of Las Vegas	15 MW
▲ North Valmy Generating Station Valmy <i>(Idaho Power owns 50% of 522 MW total)</i>		261 MW
▲ Silverhawk Generating Station	North of Las Vegas	520 MW
▲ Sunpeak Generating Station	Las Vegas	210 MW
▲ Walter M. Higgins Generating Station	Stateline	530 MW

Balancing Authority



The NV Energy Balancing Operations have been performed at the Primary Control Center since 2005 and include the following services:

- Load/Generation Balancing
- Power Flow Control (Directs TOP to Operate Flow Control Devices)
- Frequency Response
- Time Error Correction
- Automatic Generation Control
- Inadvertent Interchange Management
- Demand Side Load Management
- Energy Imbalance Market Operations (Started December 1st, 2015)

The Balancing Authority Operations of Nevada Power Company and Sierra Pacific Power Company were merged into a single Balancing Authority on January 1st, 2014 at energization of ON-Line (500kV Transmission)

Balancing Authority



- Balancing Area Peak Load – 8,532 MW (July 7th, 2017 @ 1600 Hrs.)
- All Time Coincidental Peak Load (Native) – 7,961 MW (2016)
- 2017 Coincidental Peak Load (Native) – 7,678 MW (June 20, 1600 Hrs.)
 - South Native Load Peak – 5,929 MW (June 20, @ 1600 Hrs.)
 - North Native Load Peak – 1,824 MW (August 1, # 1700 Hrs.)
- Grid Connected Solar – 790 MW
 - Photovoltaic – 680 MW
 - Non Photovoltaic – 110 MW
- Grid Connected Wind – 150 MW
- Mostly Natural Gas Combined Cycle & Peaker Type Generation
- Coal Generation – Planned for retirement
- Very limited Hydro allocation (Hoover) for NVE BA loads

Balancing Authority



Balancing Services are provided for the following Load Serving Entities

- NV Energy
- Lincoln County Power District
- Overton Power District
- Colorado River Commission
- Truckee Donner Public Utility District
- City of Fallon
- Mt Wheeler Power
- Barrick Goldstrike Mines
- Wells Rural Electric Association
- Harney Electric
- Liberty Energy
- MGM Resorts
- Wynn Resorts
- Switch

Balancing Authority – Load Forecasting



- California Independent System Operator provides 7-day ahead (hourly) load forecast for NV Energy Balancing Authority
 - Uses historical load patterns based on temperature, humidity, and other factors
 - Adjusted for Demand Side Management
 - Adjusted in real time based on actual load and real-time weather information
- The Balancing Authority load forecast is used for load generation balance, outage scheduling and coordination, and Energy Imbalance Market participation
- Each Load Serving Entity within NV Energy provides 7-Day ahead hourly load forecast
- Third party vendor (AWS Truepower) provides 7-Day ahead (hourly) Variable Energy Resource (Solar and Wind) forecast for generators within the NV Energy Balancing Authority
 - Variable Energy Resource forecast is used for Energy Imbalance Market base scheduling

Transmission Operations



NV Energy Transmission Operation functions are performed in the respective Control Centers and include:

- Real-time Monitoring of Transmission System, Load Trends.
- Management of Reactive Power and Voltage Schedules
- Real-time Monitoring of System Operating Limits
- Monitor Protective Relays Systems and Under Frequency Load Shedding
- Outage Coordination (dedicated staff position)
- Transmission & Sub-Transmission Switching

Transmission Operations – Must Run Generation

- Transmission Operations required to maintain 100% reliability (no overloads or voltage sags/swells) under loss of any transmission or generation system element
- Several generation “Must Run” conditions to manage bulk electric system contingencies.
 - Fort Churchill Generation – Carson City voltage management
 - Valmy Generation – Carlin Trend area overloads and voltage management
 - Clark Generation – Las Vegas area overloads
 - Clark Mountain Generation – Tracy/Fernley area voltage sags/swells
 - Valmy Generation – Overloads due to loss of the intertie with Idaho Power Company
- Must run conditions are continually evaluated and updated based on changes in system conditions resulting from forced outages, fires, and other electric system conditions.
- Based on system conditions, new “Reliability Must Run” conditions may emerge. These conditions may require deviation from optimal economic dispatch.

Transmission Operations – Must Run Generation

- Generation must run conditions may need to be eliminated to support a fully competitive electric supply market if the ownership of transmission and generation is not integrated.
- **Must Run Conditions – Overload Mitigation**
 - Increase transmission capacity in the overloaded areas
 - Increase equipment capacity to mitigate equipment overloads
 - Deploy “non-wire” solutions (e.g. storage, distributed generation, demand side management etc.)
- **Must Run Conditions – Voltage Management**
 - Install Capacitors and/or Reactors for static voltage control
 - Install Synchronous Condensers

Interchange Operations



Interchange Functions – conducted in Reno control center for NEVP:

- Transmission Reservations
- Transmission Scheduling
- OASIS Management
 - ATC
 - Standards of Conduct
 - Outage Notification/Posting
- Real-time Transaction Scheduling

NV Energy Transmission Interconnections



Los Angeles Department of Water and Power

- Crystal 500 kV (part of EOR P-49)
- McCullough 230 kV
- Gonder 230kV

Western Area Lower Colorado

- Mead 500, 230 and 69 kV

Southern California Edison (CAISO Balancing Authority)

- Mohave 500 kV
- Eldorado 230 kV
- Silver Peak 55kV

PacifiCorp

- Red Butte 345 kV
- Gonder 230kV

Idaho Power Company

- Midpoint 345kV

Pacific Gas and Electric (CAISO Balancing Authority)

Donner Summit 60/120kV

Bonneville Power Administration

- Hilltop 230kV

NV Energy Transmission Limits



Southern Interconnections – Transfer Limits:

Harry Allen – Red Butte 345kV Tie (PacifiCorp East Tie)

Import: 470 MW

Export: 470 MW

Crystal 500/230: (Navajo, LADWP Ties)

Import: 950 MW

Export: 950 MW

Southern Nevada Transmission Interconnection (Multiple Transmission Lines)

Import: 3555 MW

Export: 3816 MW

Northern Interconnections – Transfer Limits:

Humboldt – Midpoint 345kV (Idaho Power Tie)

Import: 390 MW

Export: 262 MW

Gonder – Pavant, Gonder IPP 230kV (PacifiCorp East and LADWP Tie)

Import: 389 MW

Export: 239 MW

Hilltop 345kV (Bonneville Power Administration Tie)

Import: 300 MW

Export: 220 MW

Summit 120kV (Pacific Gas and Electric, CAISO Tie)

Import: 100MW

Export: 60 MW (Summer rating)

NV Energy Transmission Limits



Southern Nevada Import Limit (Summer 2017): 5,331 MW

Northern Nevada Import Limit (Summer 2017): 1,000 MW

Total import limit is based on maximum allowable flows without exceeding the operating criteria and limits under a single contingency. Total import limit is not a summation of all individual import limits.

Transmission Sufficiency to Serve Peak Loads

- BA Peak Load – 8,532 MW (July 7th, 2017 @ 1600 Hrs.)
- All Time Coincidental Peak Load (Native) – 7,961 MW (2016)
- 2017 Coincidental Peak Load (Native) – 7,678 MW (June 20, 1600 Hrs.)
 - South Native Load Peak – **5,929** MW (June 20, @ 1600 Hrs.)
 - North Native Load Peak – **1,824** MW (August 1, @ 1700 Hrs.)
- Operating reserve, regulation reserve, and frequency response requirements are additive to the load values

Considerations for implementing ECI

- Choice of wholesale electric supply for sale is limited by the existing import limits
- The executive order requires the Governor’s Committee address issues: “that develop and expand Nevada’s energy industries such that Nevada becomes a net exporter of energy”

NERC Registrations for Regulatory Oversight and Compliance

- Balancing Authority (Nevada Power Only – Single Balancing Authority)
- Distribution Provider
- Generator Owner
- Generator Operator
- Planning Authority and Planning Coordinator
- Resource Planner
- Transmission Owner
- Transmission Operator
- Transmission Planner
- Transmission Service Provider

Preparing Nevada's Electric System for a Competitive Electric Market



- Establishing Planning Reserve and Resource Adequacy Programs requirements in advance of the open market
 - ISO Tariff Provisions requiring load serving entities to provide evidence of adequate qualifying resources and reserves
 - Forward Capacity Market Auctions
 - Energy Only Market with High Price Caps and Scarcity Pricing
- Expanding import and export transmission capacity to provide more energy supply choice for customers and providers and enable Nevada to become a net exporter of energy
- Mitigating generation reliability must run conditions to facilitate a more competitive market