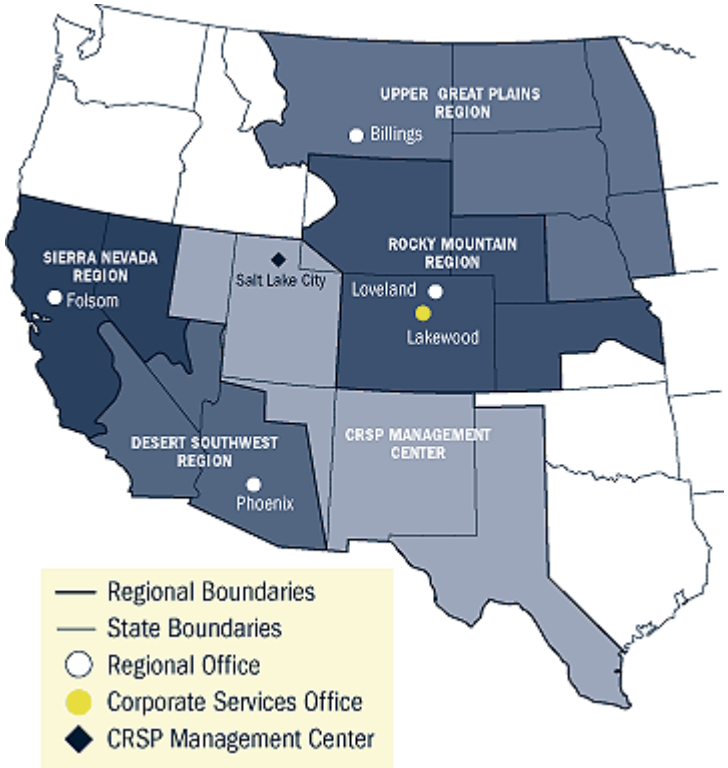
# WAPA – SNR

## Customers

- Municipalities
- Rural Electric Coops
- Public Utility & Irrigation Districts
- Federal, State & Military Installations
- Native American Tribes
- Investor-Owned Utilities
- USBR




# Sierra Nevada Region Service Area

**Northern - Central CA / NW NV**

**500 Miles 500kV**
***COTP* (CPJ-ODA)**
**+ *PACI* (Malin-RD MTN 1 & 2) =**
***COI***

**840 Miles 230kV**
***CVP***

**18 Substations**

**10 USBR Operated PP (*CVP*)**
**Approx. 2100 MW**

## COMPLIANCE - MAINTAIN SYSTEM RELIABILITY

- **NERC** - ***North American Electric Reliability Council***
  - **14 Groups of Approved Standards**
    - **TOP - Transmission Operations**
    - **BAL – Resource and Demand Balancing**
    - **CIP – Critical Infrastructure Protection**
    - **Etc.**
  - **1012 Requirements Subject to Compliance**
    - **Subsets for Each Individual Standard**
- **WECC** - ***Western Electricity Coordinating Council***
  - **16 Groups of Approved Standards**
    - **BAL-002-WECC-1 – Contingency Reserves**
    - **BAL-STD-002-0 – Operating Reserves**
    - **TOP-STD-007-0 – Operating Transfer Capability**
    - **Etc.**
  - **Hundreds of Requirements Subject to Compliance**
    - **Subsets for Each Individual Standard**

## Regulation

## WECC Standard BAL-STD-002-0 – Operating Reserves

- **WR1.**

**The reliable operation of the interconnected power system requires that adequate generating capacity be available at all times to maintain scheduled frequency and avoid loss of firm load following transmission or generation contingencies. This generating capacity is necessary to:**

- **supply requirements for load variations.**
- **replace generating capacity and energy lost due to forced outages of generation or transmission equipment.**
- **meet on-demand obligations.**
- **replace energy lost due to curtailment of interruptible imports.**

## Regulation

- Transmission losses are estimated three days in advance of actual flow day.
- As a result of “Pre-Scheduling” requirements, Regulation is used to maintain “Real-Time” system balancing for the SBA.
- When resources and load are not balanced, frequency deviations occur within an Interconnection.
- Generator governors are used to adjust a generator’s output when frequency deviations occur using regulating reserves.

## Regulation

- When resources and load are not balanced, frequency deviations occur within an Interconnection.
- Generator governors are used to adjust a generator's output when frequency deviations occur (Gov. droop setting @ 5%).
- Western is contractually obligated for approximately 30 MW of regulation for LSE interchange deviation
    - (MID – 10MW, RSC – 10MW, REDD 6MW, LLNL 4MW).
- Additional 30 MW's are used to manage transmission loss forecast Hz Bias, Inadvertent Payback, Time Error Correction and SMUD BA regulation requirements.
- Midpoint= 62MW
- Range – 0 - +122

# Regulation

- Transmission Losses may vary from as low as 5MW to as high as 150MW
- COTP Losses is largest contributor
  - Can change hour by hour based on COI schedules and other system dynamic variables

## Load Following Studies – use of Regulation

- November, December, January, February, March and April
  - loads are changing less than 50 MW per.
- May thru early June
  - Morning load pulls above 50 MW are beginning to get larger and larger and extending for longer periods of time
- Late June, July, August, and early September
  - During the hot summer month's loads are changing more than 50MW per hour
- Late September thru October
  - Loads are changing less than 50MW per hour

## Regulation

**Study performed following this past winter indicated that even with small load changes across the off peak hours, Western still used all it's down regulation on numerous occasions.**

**Questions ?**