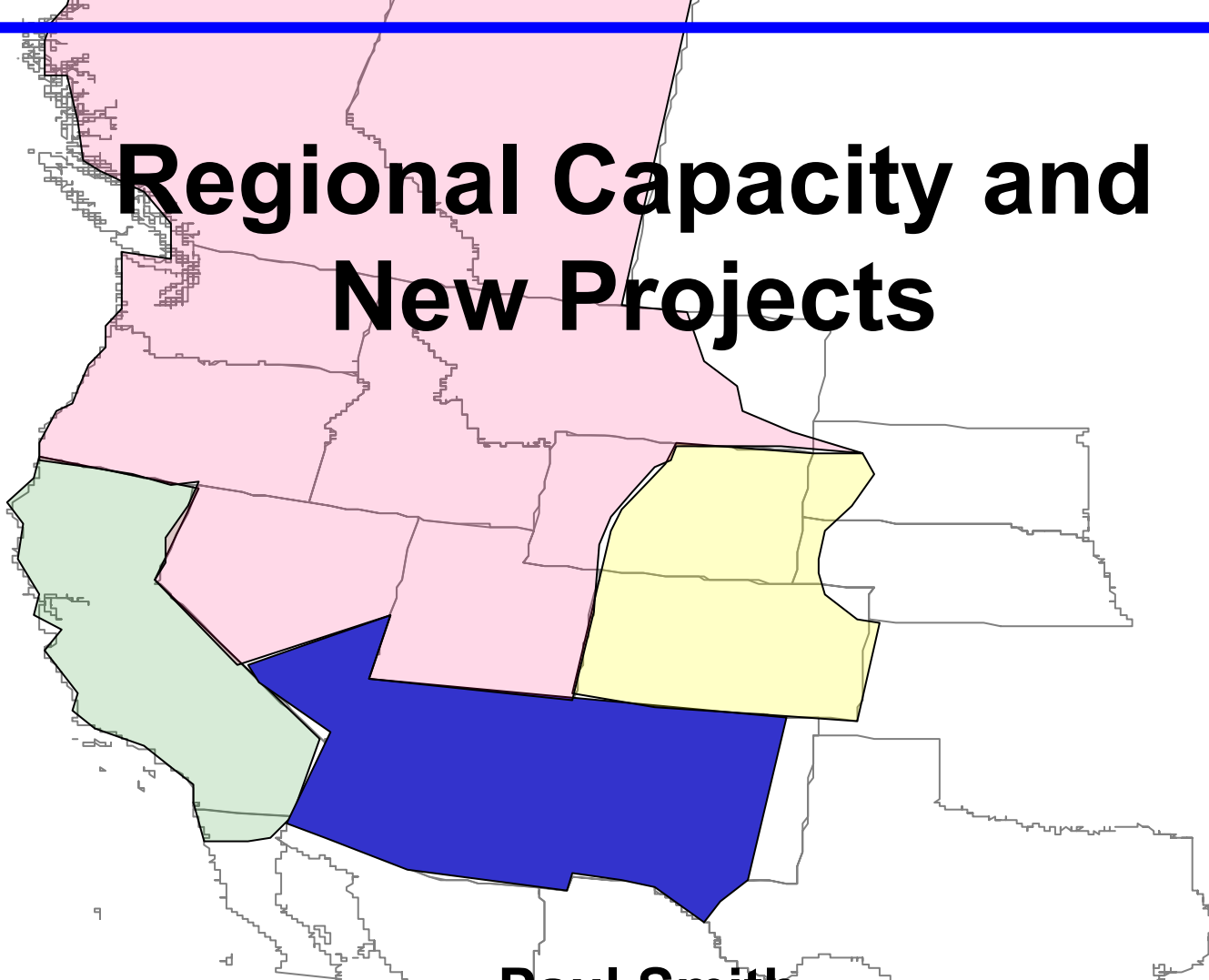


Regional Capacity and New Projects



Paul Smith

Manager, Generation Market Analysis and Planning

March 7, 2008

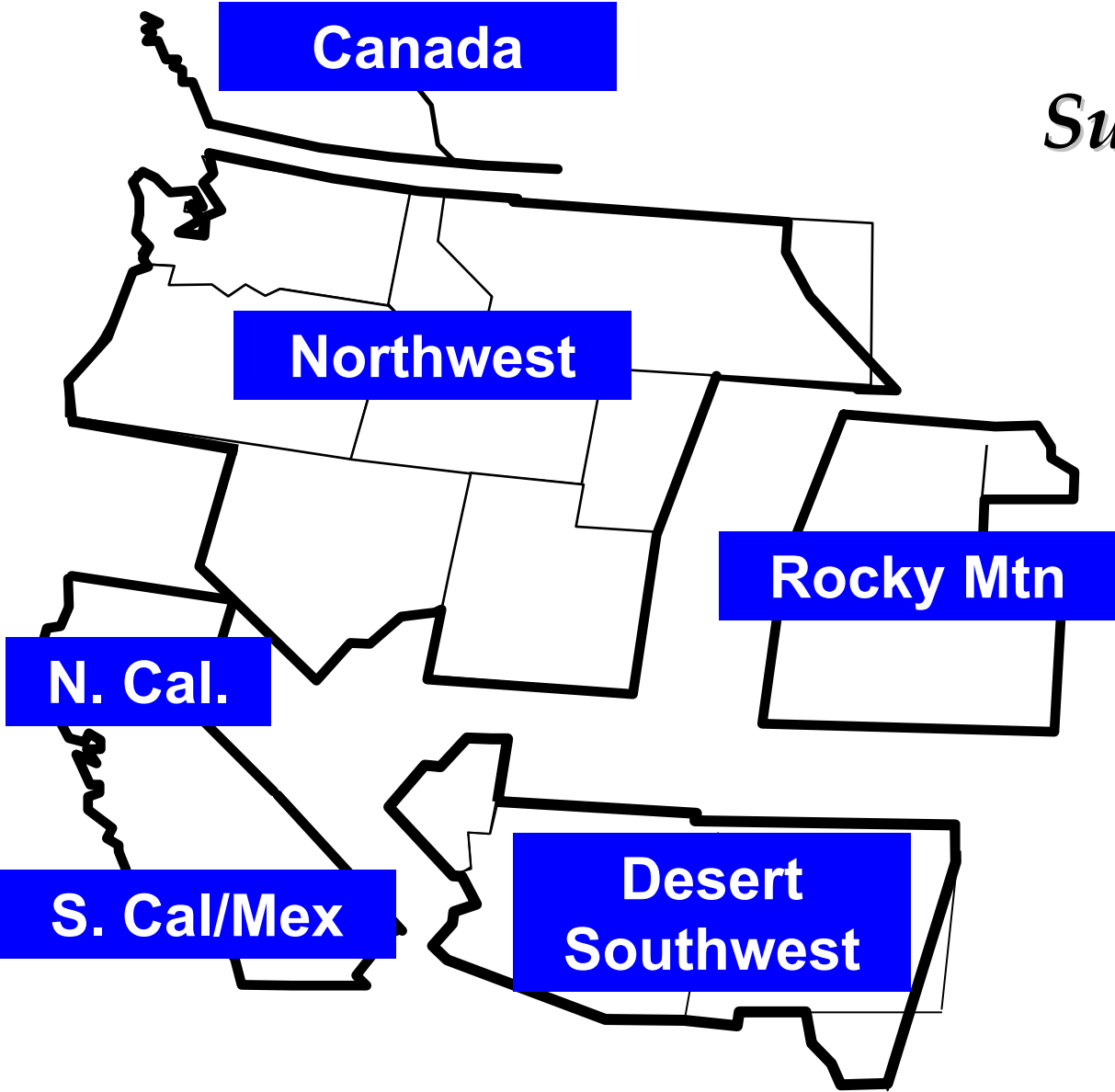
Agenda

- Summary & Conclusions
- WECC Supply and Demand
- Power Supply Assessment
- New Generation

Summary & Conclusions

- **WECC 2006 actual values**
 - Peak load 161,000 MW
 - Installed generation 192,000 MW (summer rating)
 - Reserve margin 14.8% after adjustments
- **Desert Southwest (DSW) 2006 actual values**
 - Peak load 30,011 MW
 - Installed generation 35,000 MW (summer rating, after firm transfers)
 - Reserve margin 16.9% after adjustments
- **DSW transmission ties are strong with Southern California, weak with rest of WECC**
- **DSW load is projected to grow about 2.8% per year (900 MW per year), 33% higher than WECC average**
- **Southern California is projected to grow at an average of about 600 MW per year**
- **Based on the WECC's 2007 Power Supply Assessment (PSA) supply margins in the DSW and Southern California appear to be adequate through 2010**
- **New dependable generation capacity needed by 2016**
 - WECC wide 17,000 MW
 - Desert Southwest 8,000 MW
- **Over 40,000 MW of new generation is under construction, under regulatory review or announced in the WECC**
- **Several interregional transmission projects are being evaluated which may deliver power from resource rich areas in the Rocky Mountain / Northwest areas to the DSW and California in the long term**
- **Renewable resources will play an important role in the West's energy future, and much additional firm capacity additions will still be required**

WECC *Sub-Regions*



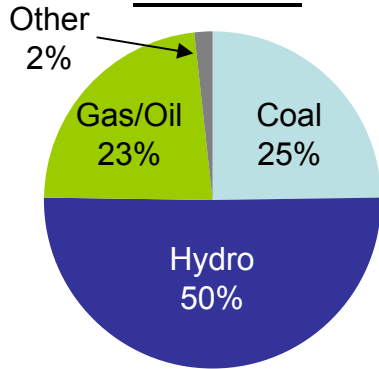
TOTAL WECC

| | | |
|---------|---------|-------|
| Hydro | 62,652 | 32.5% |
| Nuclear | 9,555 | 5.0% |
| Coal | 36,450 | 18.9% |
| Gas/Oil | 79,361 | 41.2% |
| Other | 4,803 | 2.5% |
| | <hr/> | |
| | 192,821 | 100% |

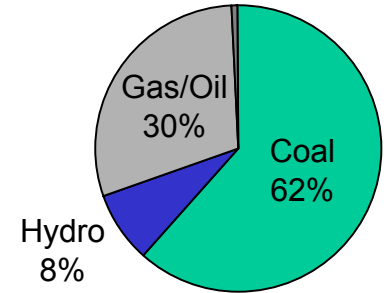
Capacity Mix of WECC Sub-Regions

Based on Geographic Location and Summer Capacity Ratings

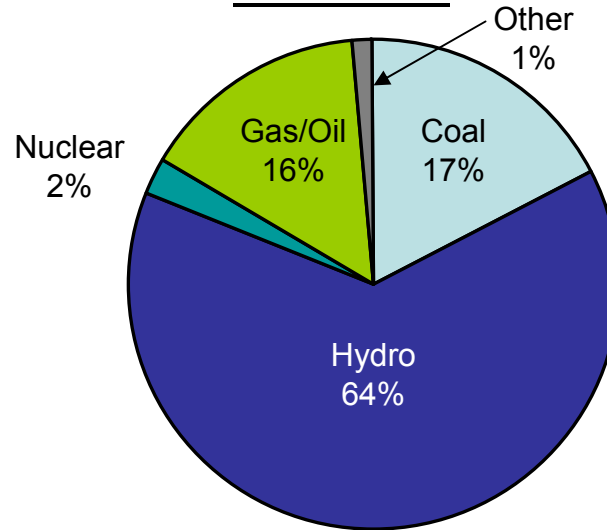
Canada



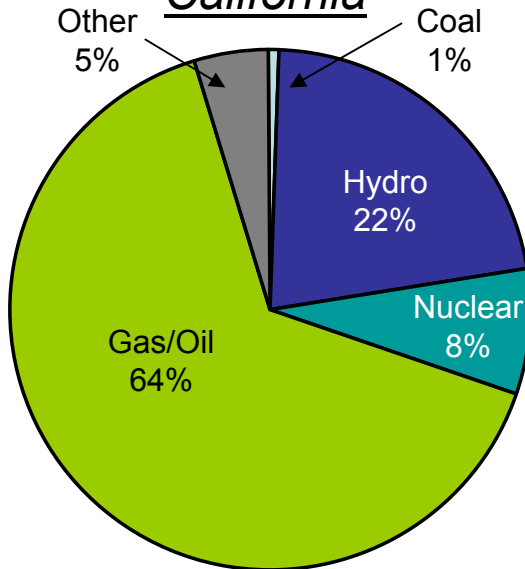
Rocky Mtn



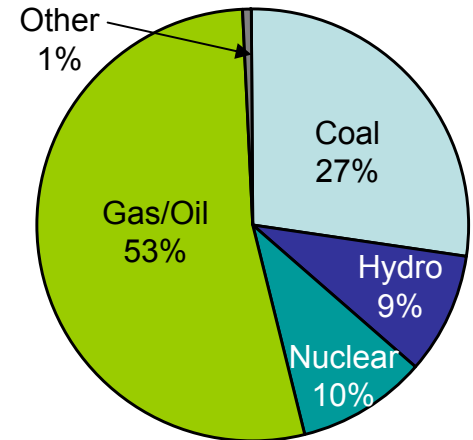
Northwest



California

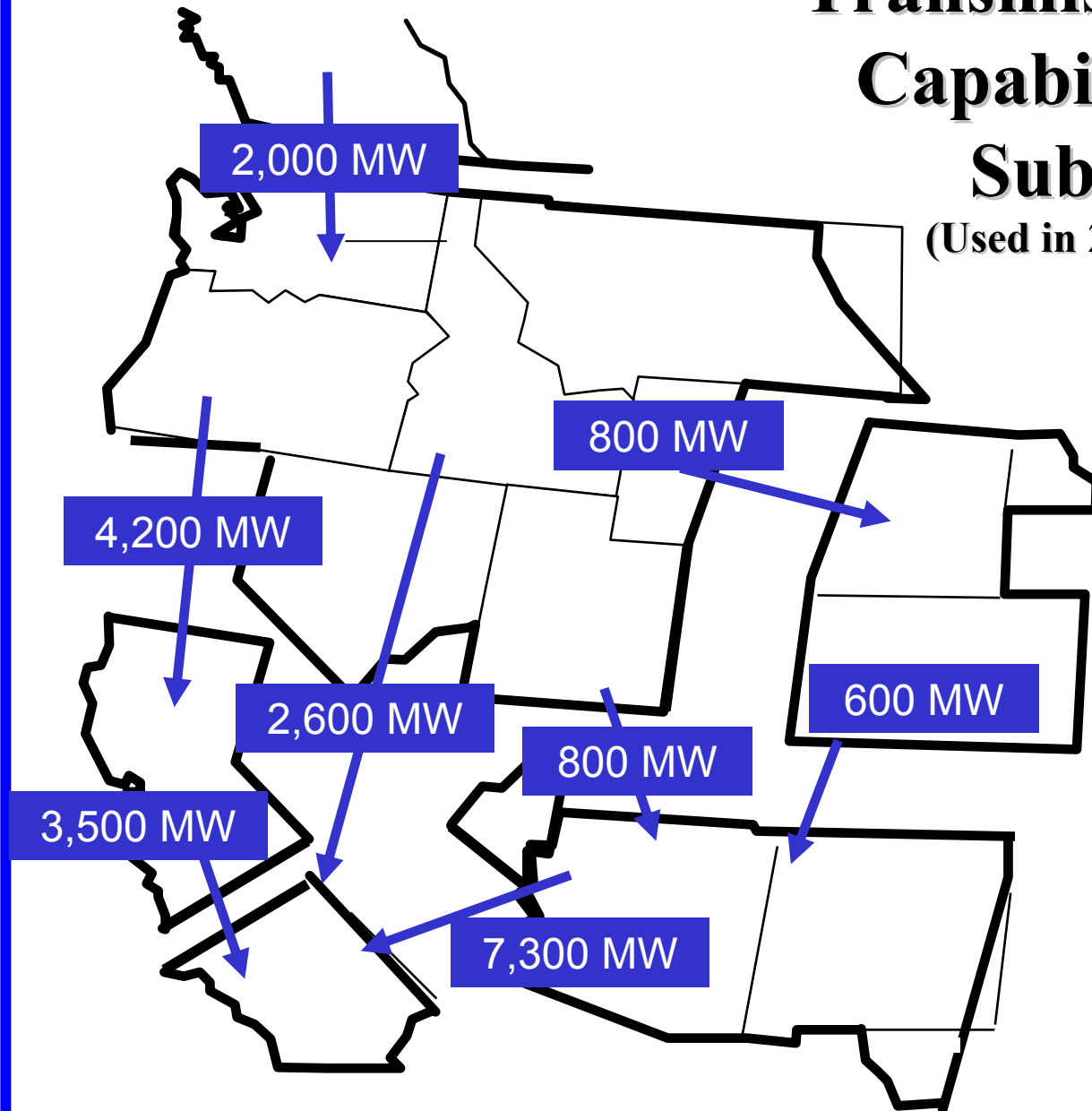


Desert Southwest



Transmission Transfer Capability Between Sub-Regions

(Used in 2007 WECC PSA)



Average Annual Load Growth

Ten Years Historical, Ten Years Projected

| | Actual | | Forecast | |
|------------|--------------|--------------|--------------|--------------|
| | <u>95-00</u> | <u>00-05</u> | <u>05-10</u> | <u>10-15</u> |
| DSW | 4.3% | 5.2% | 2.8% | 2.9% |
| California | 0.5% | 2.3% | 2.0% | 1.9% |
| Northwest | 2.5% | 0.4% | 1.3% | 2.0% |
| Rocky Mtn | 3.4% | 5.2% | 2.5% | 2.2% |
| Canada | 2.8% | 2.2% | 2.7% | 1.8% |
| Mexico | 7.4% | 3.3% | 4.9% | 4.4% |
| WECC | 3.0% | 2.1% | 2.2% | 2.1% |

WECC Summer Peak Load

Ten Years Historical / Ten Years Projected (MW)

| | Actual | | | Projected | | Growth |
|-------------|----------------|----------------|----------------|----------------|----------------|------------------|
| | <u>1995</u> | <u>2000</u> | <u>2005</u> | <u>2010</u> | <u>2015</u> | <u>2005-2015</u> |
| DSW | 17,632 | 21,724 | 27,974 | 32,178 | 37,047 | 9,073 |
| California | 48,340 | 49,638 | 55,535 | 61,448 | 67,401 | 11,866 |
| Northwest | 31,426 | 35,535 | 36,165 | 38,588 | 42,508 | 6,343 |
| Rocky Mtn | 7,266 | 8,589 | 11,086 | 12,556 | 14,029 | 2,943 |
| Canada | 12,945 | 14,861 | 16,533 | 18,874 | 20,621 | 4,088 |
| Mexico | 1,104 | 1,575 | 1,854 | 2,359 | 2,920 | 1,066 |
| WECC | 115,681 | 134,232 | 149,147 | 166,003 | 184,526 | 35,379 |

Desert Southwest Summer/Winter Peak Load

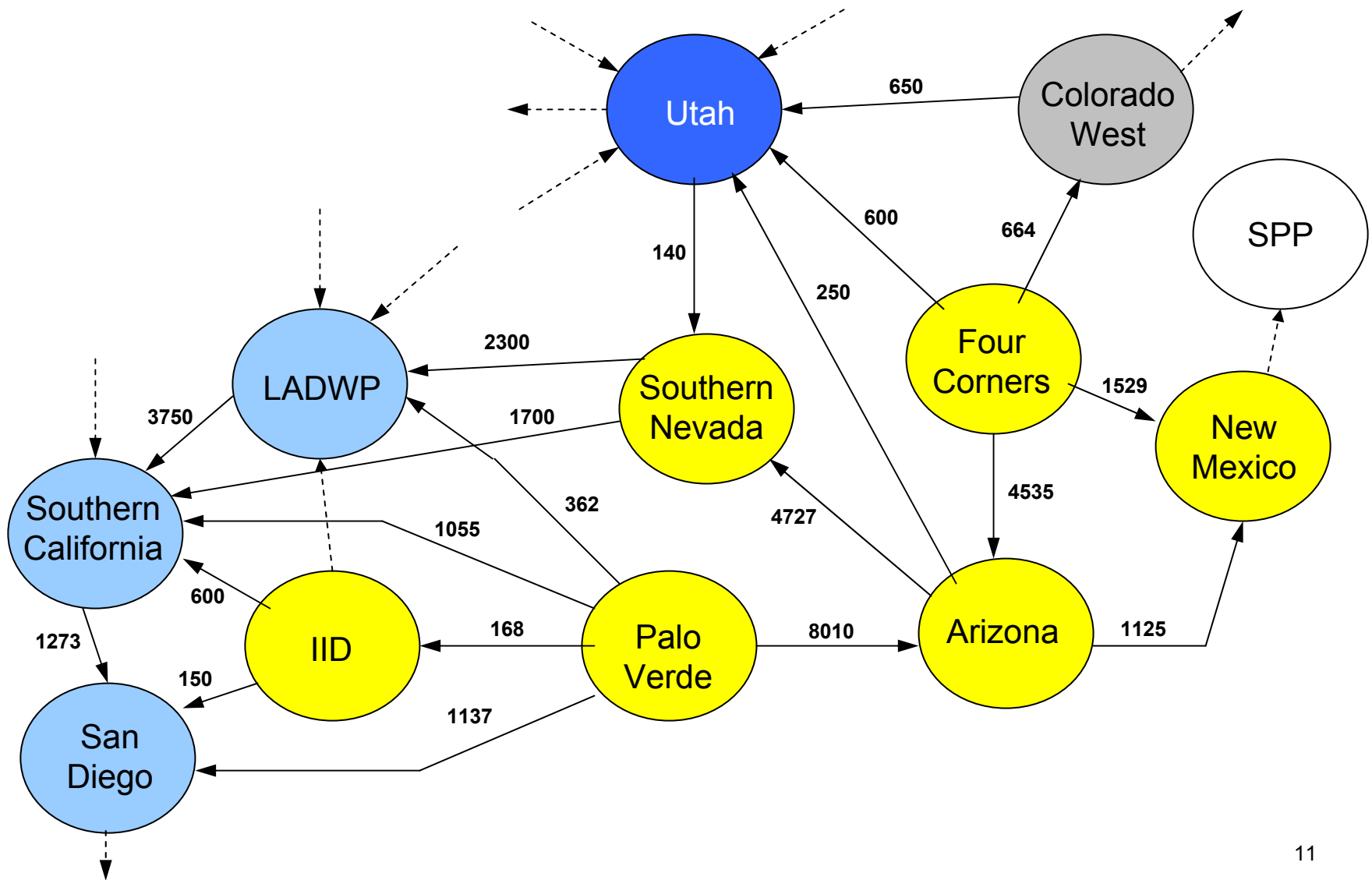


2007 Power Supply Assessment

WECC December, 2007

- **Assessment of generation resource capacity margins (in MW) for the WECC summer and winter peak hours 2008-2016**
- **Conducted by WECC staff**
- **Based on data submitted by WECC member utilities**
- **Identifies sub-regions within the WECC that have the potential for electricity supply shortages based on reported demand, resource, and transmission data**
- **At some point study results shift from a determination of supply margin to an estimate of future resource needs**
- **Capacity margin is a measure of a sub-region's ability to meet its load requirements**
 - Including a specified reserve amount
 - Uses resources in the sub-regions and imports from other sub-regions as calculated by SAM
- **Supply Adequacy Model (SAM) used to conduct study**
- **26 zones aggregated to seven sub-regions shown in graphs**
- **Analysis for the Northwest sub-region does not adequately capture the limitations on the ability of the NW hydro system to sustain capacity output levels beyond a single hour**
- **APS participates in many WECC subcommittees, including Load and Resource Subcommittee**

DSW Topology (Summer)



SAM Zones and Building Block Margins

| Sub-Region | SAM Zones Included in Sub-Area | Summer Margin | Winter Margin |
|----------------------------|---|---------------|---------------|
| Canada | British Columbia, Alberta | 12.0% | 12.8% |
| Northwest Basin | Pacific Northwest, COB, Montana | 13.7% | 16.3% |
| Rockies | Idaho, Northern Nevada, Utah, IPP | 12.8% | 13.5% |
| Desert Southwest | Colorado East, Colorado West, Wyoming | 14.2% | 15.4% |
| Norther California | Arizona, New Mexico, Southern Nevada, IID, Four Corners, Palo Verde | 15.7% | 14.6% |
| Southern California/Mexico | Northern California, Central California, San Francisco, SMUD | 16.5% | 12.5% |
| | Southern California, San Diego, LADWP, Comision Federal de Electricidad (CFE) | 16.6% | 13.0% |
| WECC Total | | 15.0% | 14.1% |

Notes:

- 1) Planning Reserve Margin (MW) = Generation Resources – Peak Load
- 2) Reserve Requirement (%) = Reserve Margin / Peak Load
- 3) Building Block Planning Reserve Margin is WECC Guideline/Target, NOT a requirement
- 4) Building Block Components include contingency reserves, regulating reserves, forced outages, and temperature adders

New Resource Addition Categories

- Class 1 – Reported to be under active construction as of the reporting date (12/06) and projected to be in service before January 2011
- Class 2 – Reported to be under active regulatory review with an expected in-service date before January 2013
- Class 3 – Reported, but didn't meet the criteria for Class 1 or Class 2.
 - Not included in the analysis
 - Intended to highlight the importance of ongoing resource development and acquisition to bring resources on line at appropriate times

Desert Southwest Class 1 Additions

| Area | Balancing Authority | Name | Unit Type | Net Capability MW | | Fuel Type | COD |
|------|---------------------|---------------|-----------|-------------------|--------------|-----------|------|
| | | | | Summer | Winter | | |
| NVS | NPC | Clark | GT | 416 | 416 | NG | 2008 |
| PV | APS | Palo Verde | NP | 71 | 71 | NUC | 2008 |
| NVS | NPC | Clark | GT | 208 | 208 | NG | 2009 |
| AZ | SRP | Springerville | ST | 400 | 400 | SUB | 2009 |
| | | Total | | 1,095 | 1,095 | | |

Note: None of the reported resource additions in the DSW fell into Class 2 category.

Regional Generating Reserves With Class 1&2 Additions Summer, 2016

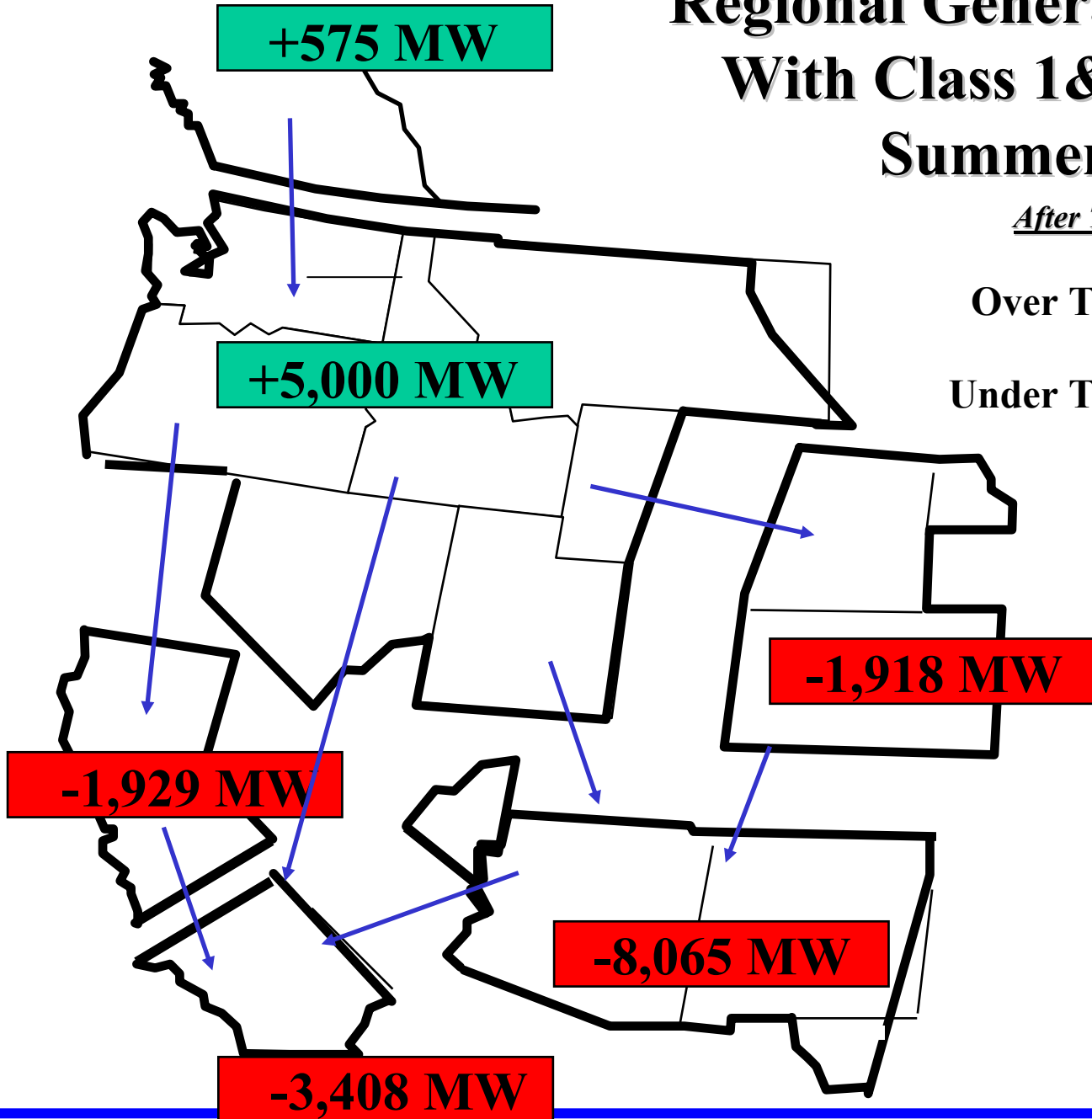
After Transfers

Over Target

5,575 MW

Under Target

-17,083 MW



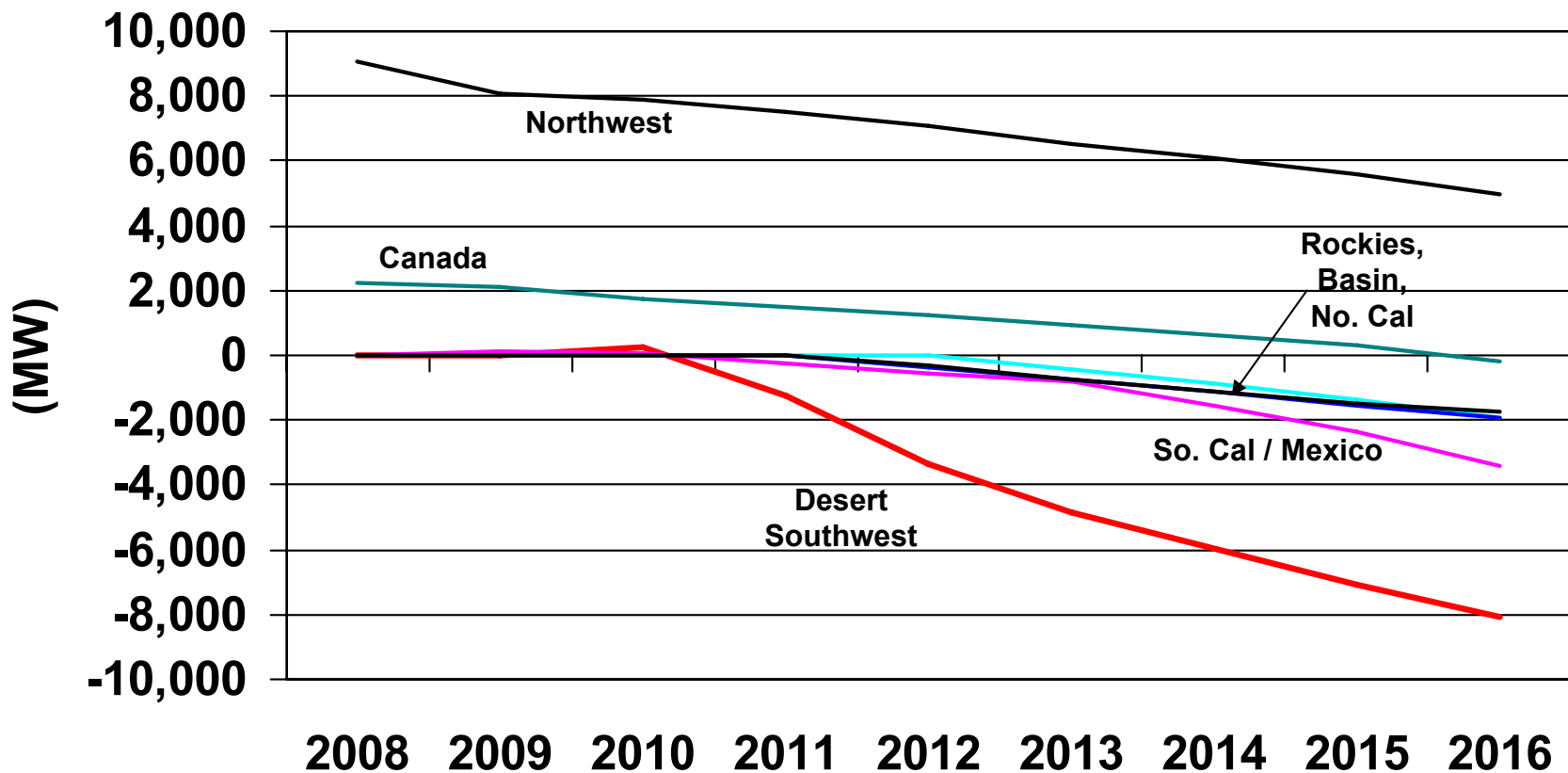
Regional Reserves
Over Target Margin



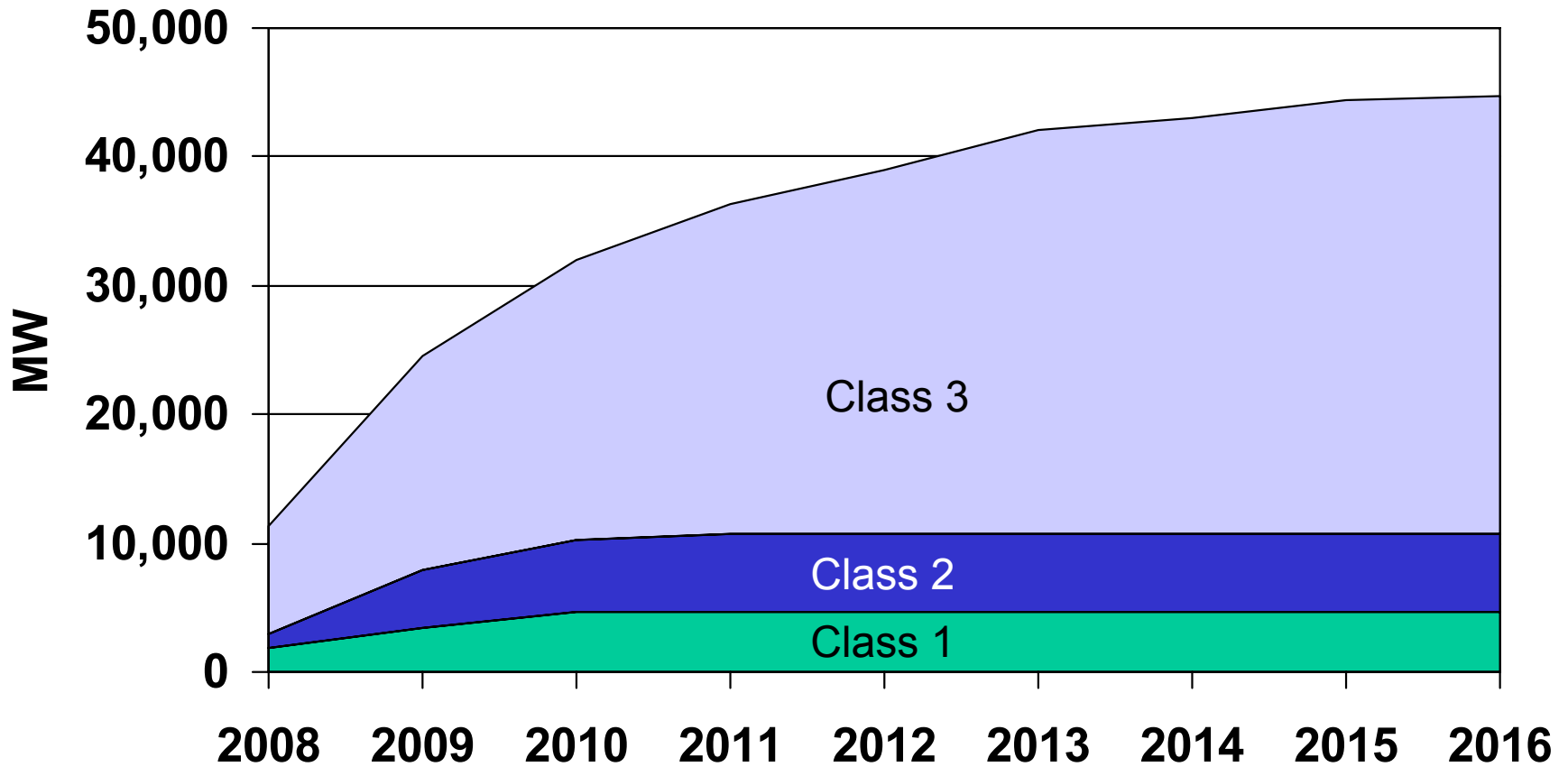
Regional Reserves
Under Target Margin



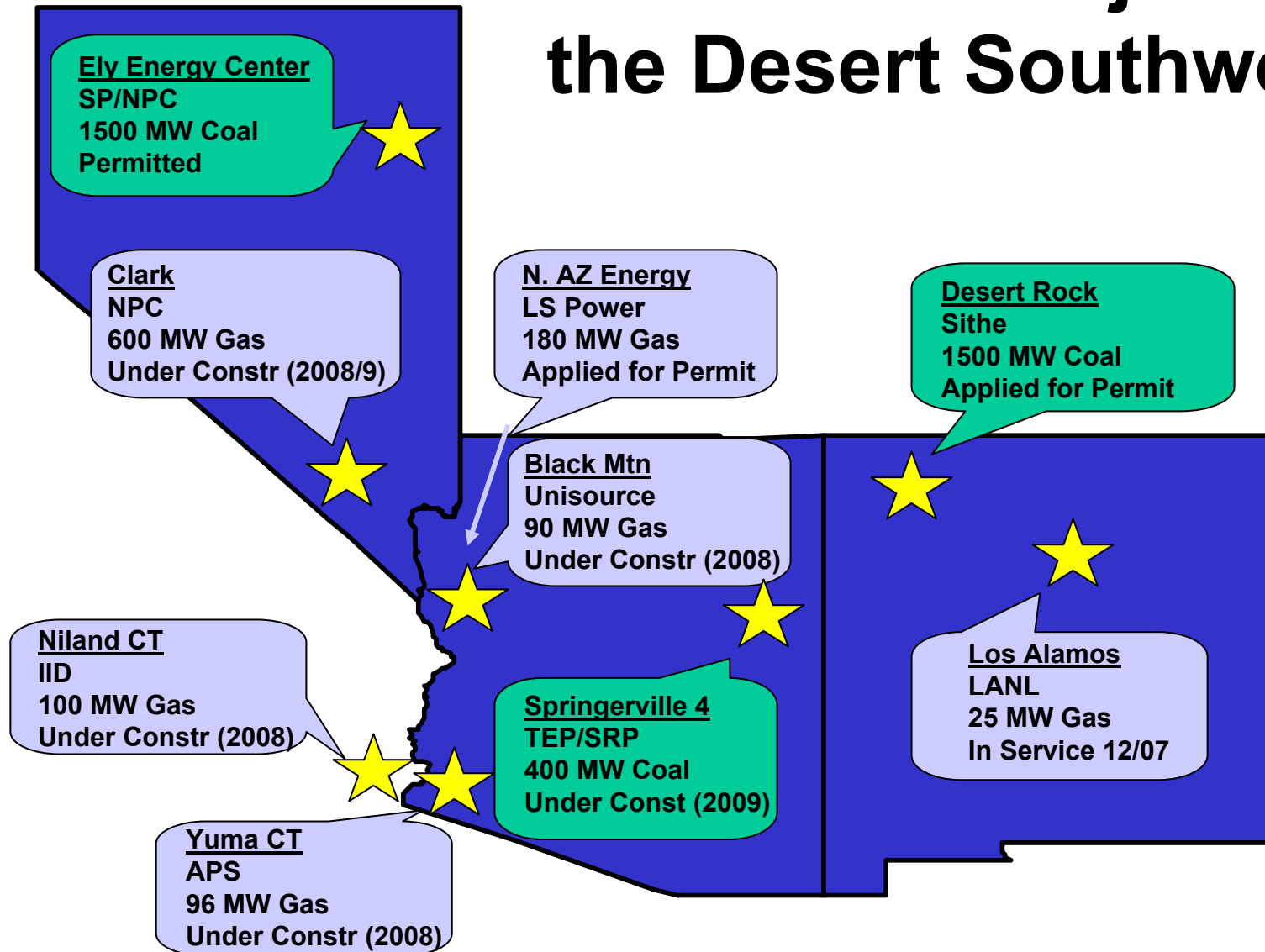
Power Supply Margin in the WECC With Class 1&2 Resource Additions



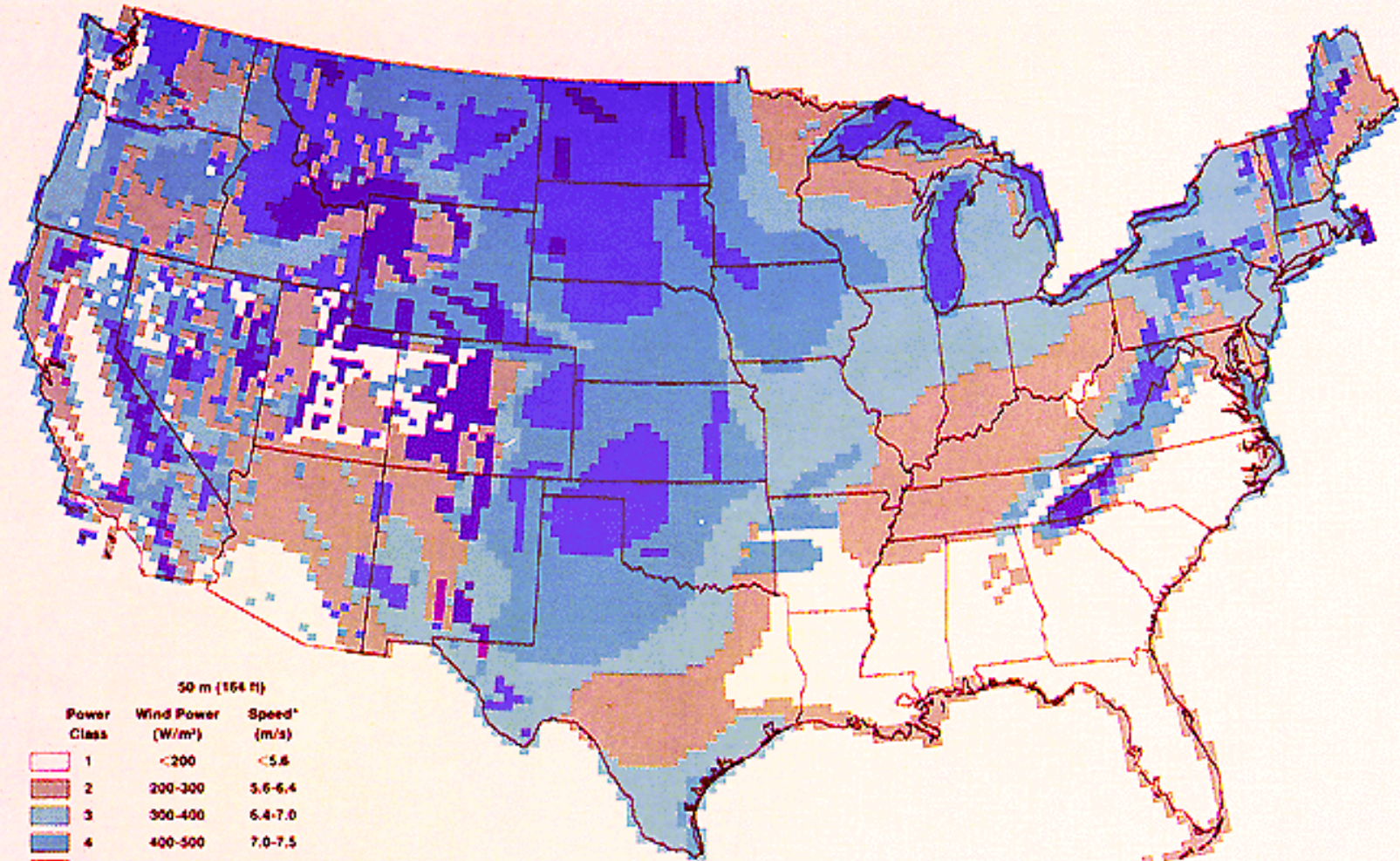
Reported Resource Additions Total WECC



Generation Projects In the Desert Southwest



Spring Wind Resource Estimate



*Equivalent wind speed at sea level for a Rayleigh distribution.

Wind Capacity By State (as of 1/01/2007)

MW

| <u>State</u> | <u>Name Plate</u> | <u>Firm Capacity %</u> | | | |
|--------------------------|-----------------------|------------------------|---------------|---------------|---------------|
| | | <u>Summer</u> | <u>Winter</u> | <u>Summer</u> | <u>Winter</u> |
| California | 2,524 | 202 | 156 | 8% | 6% |
| Colorado | 292 | 26 | 26 | 9% | 9% |
| Idaho | 75 | 15 | 16 | 20% | 21% |
| Montana | 144 | 36 | 36 | 25% | 25% |
| Nebraska | 11 | - | - | 0% | 0% |
| New Mexico | 204 | - | - | 0% | 0% |
| Oregon | 410 | 56 | 56 | 14% | 14% |
| Texas | 1 | 1 | 1 | - | - |
| Washington | 871 | 169 | 169 | 19% | 19% |
| Wyoming | 287 | 56 | 56 | 20% | 20% |
| Total (US) | 4,819 | 561 | 516 | 12% | 11% |
| Canada | 646 | - | - | 0% | 0% |
| Total (US+Canada) | 5,465 | 561 | 516 | 10% | 9% |