Northwest Power and Conservation Council

Resource Adequacy for the Pacific Northwest

Resource Adequacy Forum

Steering Committee Meeting

Portland, Oregon

September 16, 2005

Presentation Outline

1. Decisions for the Steering Committee
2. WECC Guidelines for a standard
3. A proposed standard for the NW region
4. Justification for the standard
5. Calibration of the standard
6. Further discussion

1. Decisions for the Steering Committee
(with regard to a Regional standard)

- Is the concept of using a L/R balance as an energy metric reasonable for the Pacific NW region?
- Is the concept of using a reserve margin as a capacity metric reasonable?
- What target level is appropriate – enough to "keep the lights on" or "to minimize price spikes?"

2. WECC Guidelines for a Standard

- Components:

  Metric – something that can be measured

  Target – acceptable value for the metric

- Standards for:

  Capacity – single hour peak demand

  Energy – average demand over a season

WECC Guidelines for Metrics

- Capacity

  Reserve capacity margin over the peak-hour demand,

  – normal weather

  – normal economic projections

- Energy

  Load/resource energy balance for the month, season or year

  – maintenance and forced outage rates

  – average demand

  – hydro generation based on adverse runoff

  – available spot-market energy imports

WECC Guidelines for Targets

- Capacity

  Capacity reserve margin of some yet-to-be-determined **percentage** for both winter and summer peaks

- Energy

  Energy load/resource balance for the month, season or year must be greater or equal to **zero**

3. Proposed NW Standard

- Capacity

  Reserve margin percentage set equal to value used by other regions in the west

- Energy

  Annual load/resource energy balance of zero,

  – using annual average demand (normal temperatures)
  – using the 85th percentile adverse runoff condition and
  – assuming no available spot-market energy supply

4. Justification for the NW Standard

- Choice of metric
  - Easy to calculate – doesn't require a complex model
  - Can be "calibrated" using a more sophisticated metric such as a loss-of-load probability (LOLP)
- Choice of target
  - Using critical water and assuming no available spot-market imports is too conservative (and possibly too costly)
  - Target lines up with a 5% LOLP, which the Council has used as its minimum level of protection for the Northwest

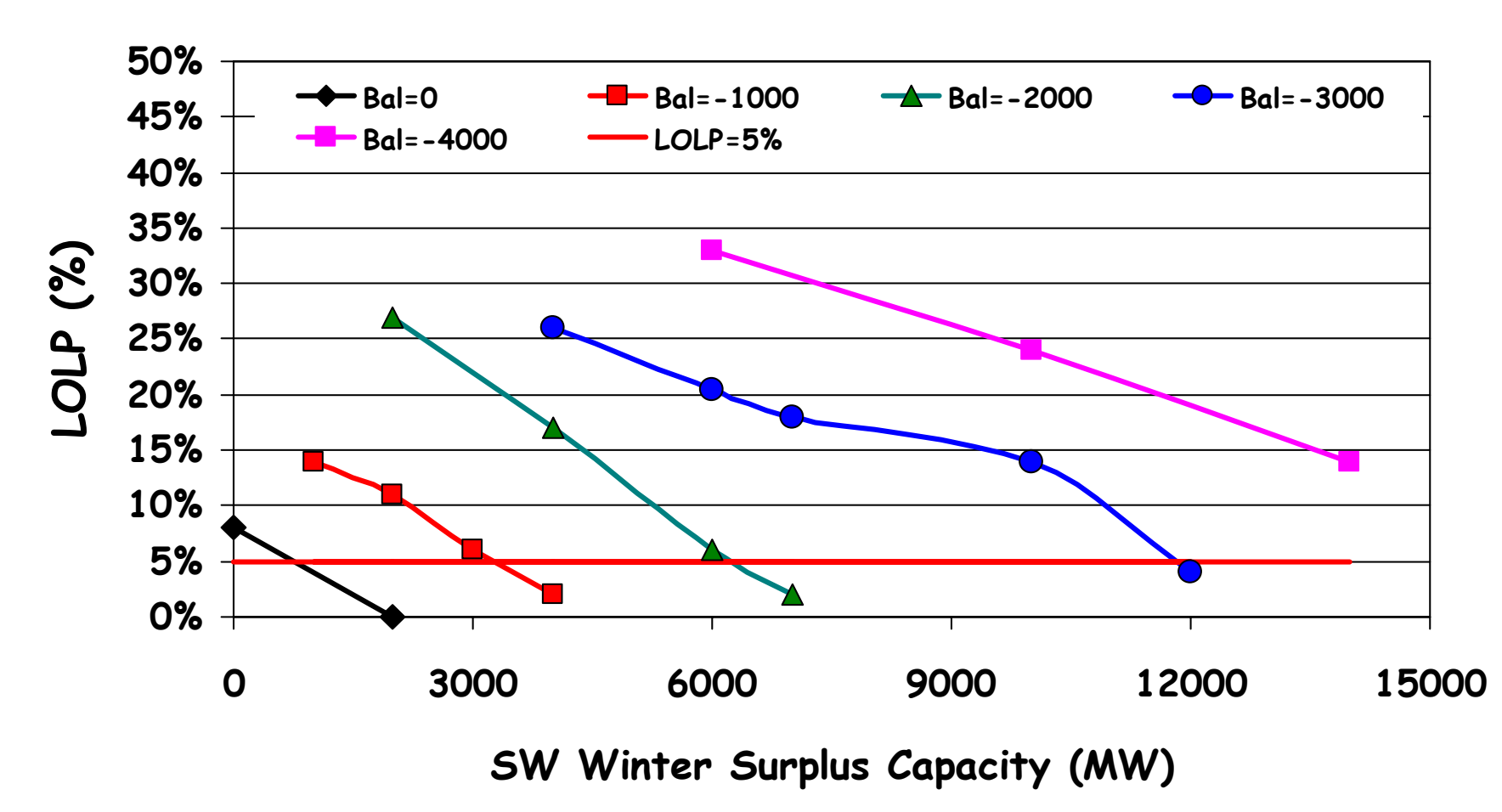
5. Calibrating L/R Balance

- Determine the relationship among:
  - L/R balance (based on critical water)
  - Available out-of-region spot-market supply
  - LOLP
- Identify the combinations of L/R balance and spot-market supply that yield the desired LOLP target
- Based on the assumed spot-market supply, choose the target L/R balance that yields a 5% LOLP
- If the target L/R balance is negative, then choose a less adverse water condition that brings the target to zero

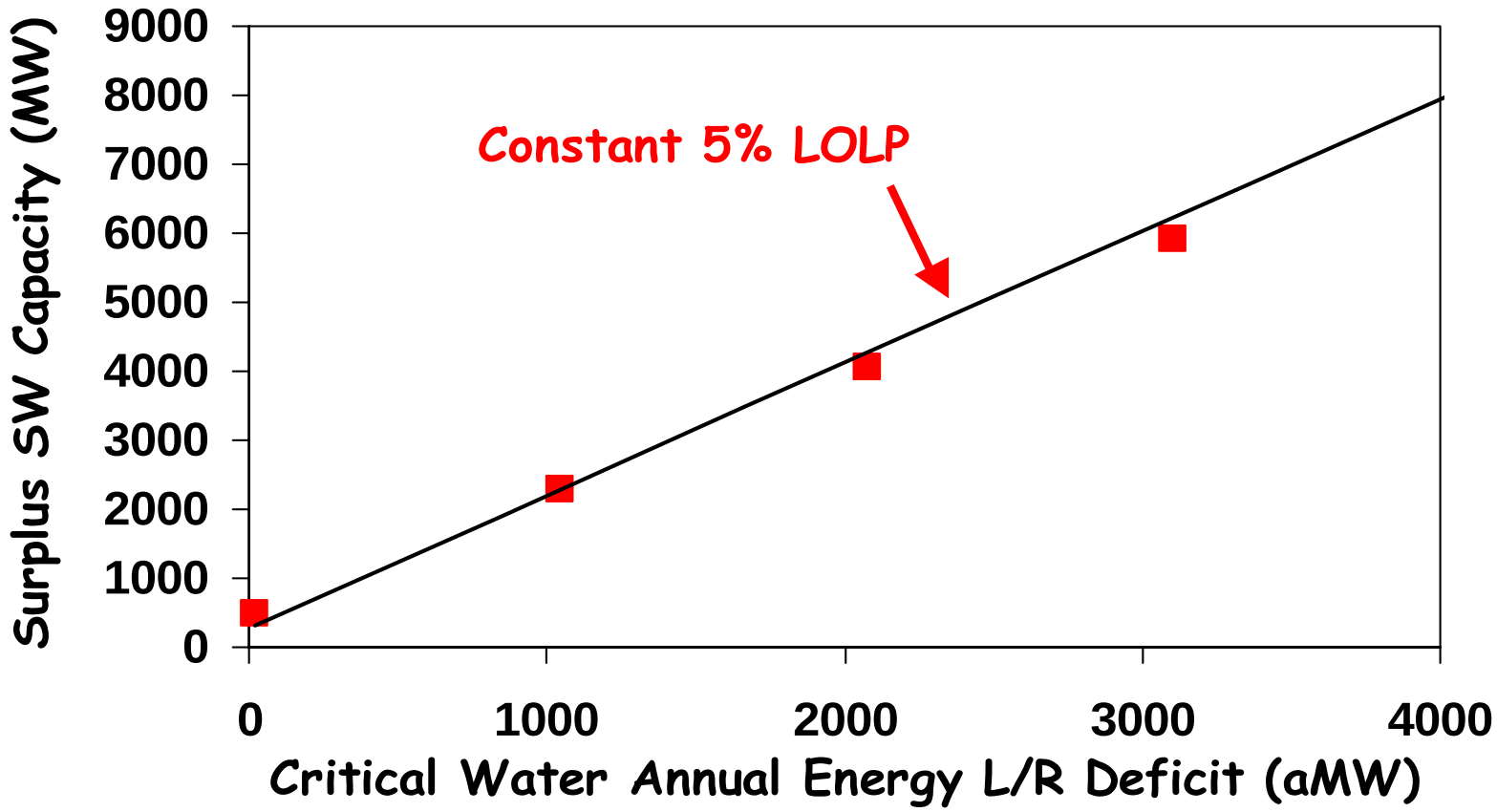
Council's LOLP Calculation

- Many potential futures are simulated, varying:
  - Water conditions
  - Temperatures (and demand)
  - Thermal resource operation
- Curtailed energy over the peak season (Dec-Mar) is recorded for each future
- If the total exceeds the threshold (1,200 mw-days) then that future is counted as a bad outcome.
- LOLP is the number of bad outcomes divided by the total number of simulations

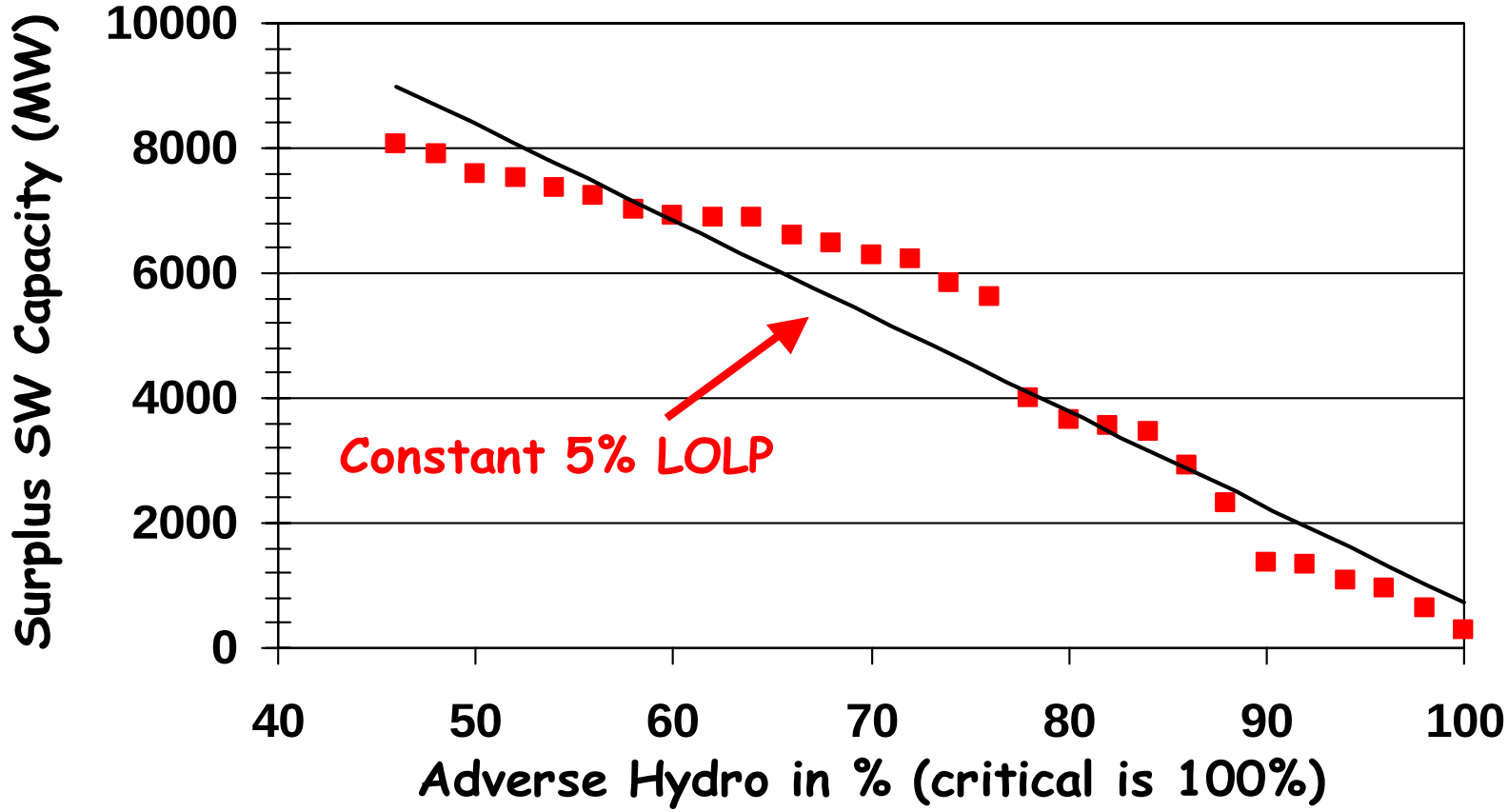
LOLP vs. Out-of-Region Supply (for different L/R balance values)



SW Surplus Capacity Needed for a 5% LOLP as a function of L/R Balance



SW Surplus Capacity Needed for a 5% LOLP as a function of Adverse Hydro



6. Further Discussion

- Method of calculating LOLP
  - Is the 1,200 MW-day threshold reasonable?
  - Should the LOLP be calculated differently?
- Is the 5% LOLP target reasonable?
- How can a regional standard be translated into one that can be used by individual utilities?