Northwest Power and Conservation Council

Resource Adequacy Capacity Standard

Resource Adequacy Forum

Steering Committee

June 9, 2006

Northwest Power and Conservation Council

Outline

1. Objectives for a Capacity Standard
2. Form of the Capacity Metric
3. Two approaches for a Capacity Target
   - Intuitive
   - Statistical
4. Next Steps

Northwest Power and Conservation Council

Objectives for a Capacity Standard

- The capacity metric should be transparent and easy to calculate.
- The metric should be linked to a more sophisticated analysis (e.g. LOLP).
- Meeting the capacity target should assure that the power supply will adequately protect against capacity problems.

Northwest Power and Conservation Council

Form of the Capacity Metric

- A load/resource assessment (like the energy metric)
- But over the peak load period for each month (4 to 10 hours)
- In the form of a percent of resources that are surplus over the load or, in other words, a "surplus sustained peaking capacity"

Northwest Power and Conservation Council

Form of the Capacity Standard

- Metric – Surplus sustained-peaking capacity (%)
  - over the highest load period (for each month)
  - period duration is ??? hours
  - normal weather
  - under critical hydro (’37 water)

- Target – ??? percent (i.e. reserve margin)

Capacity Target Intuitive Approach

Z% for the Sustained Peaking Capacity Reserve Margin

Y% for Adverse Weather and Load Forecast Uncertainty

X% for Outage Uncertainty

5-7% for Contingency Reserve

For example: California is using a 15 to 17% reserve margin but for a single hour peak

Northwest Power and Conservation Council

Capacity Target Intuitive Approach

- 5 to 7% for Contingency Reserve
- 5% for Resource Forced Outages
- 10% for Adverse Weather
  (What should we plan for?)

- Yields a 20 to 22% target

Northwest Power and Conservation Council

Regional Capacity Assessment

(L/R Bal = –1,500 aMW, Energy LOLP = 5%)

January 2006	1-Hour	2-Hour	4-Hour	10-Hour
Hydro (’37)	26,850	21,131	20,541	18,686
Non-hydro	9,760	9,760	9,760	9,760
Firm Imports	-1,218	-1,218	-1,218	-1,218
Spot Imports	3,000	3,000	3,000	3,000
Total Resource	38,392	32,673	32,083	30,228
Load (Avg)	25,633	25,506	24,847	22,691
Balance	12,759	7,167	7,236	7,537
Reserve	**50%**	**28%**	**29%**	**33%**

This is a scenario that is just adequate for energy needs.

Northwest Power and Conservation Council

Observations

- Acquiring resources to meet the energy needs of the region (i.e. LOLP = 5%) yields a 10-hour capacity reserve of 33% for January.
- 33% may be more than is needed based on our example,
- Which means that, for January, the region is energy constrained not capacity limited.

Northwest Power and Conservation Council

Capacity Target Statistical Approach

- Define a significant "peaking" event, for example:
  - Duration – 1 Hour
  - Magnitude – Greater than 2,500 MW
- Determine an acceptable likelihood for peaking events (i.e. like the 5% energy LOLP).
- Run Genesys to assess the capacity LOLP.
- Adjust the load so that the capacity LOLP is 5%.
- Calculate the resulting reserve margin (= target).

Northwest Power and Conservation Council

Defining a Peaking Event via a Statistical Approach

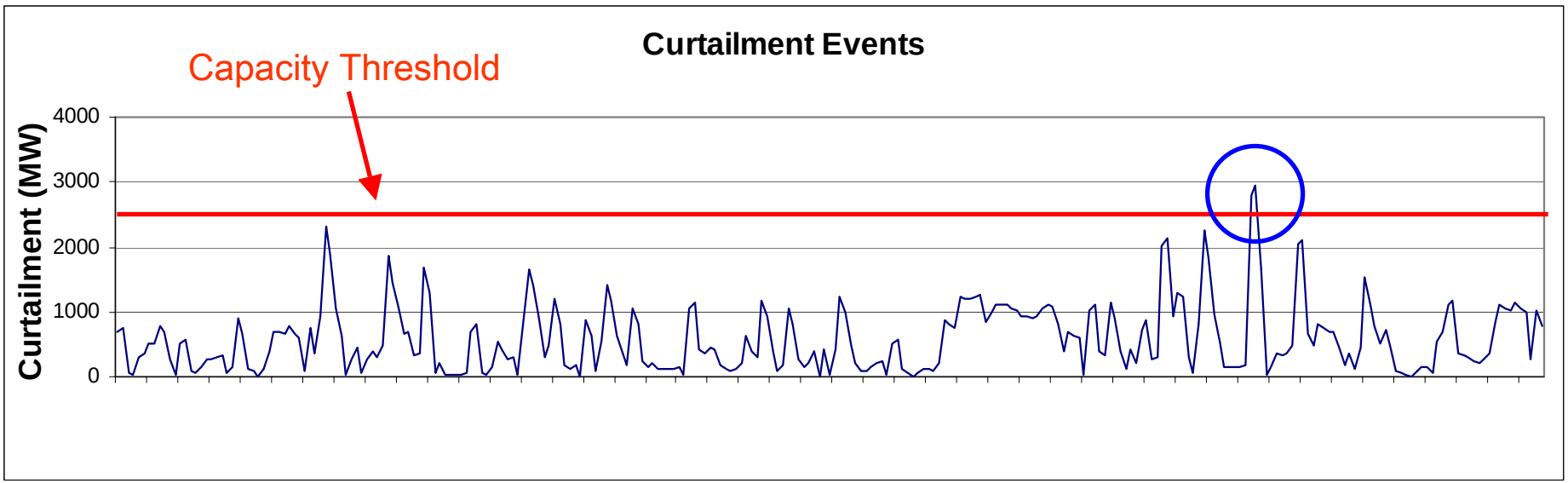
- Design a scenario that just meets the intuitive capacity target.
- Run that scenario through Genesys.
- Determine what type of event will yield a 5% capacity LOLP.
- That event becomes the peaking event (or capacity threshold).

Curtailment Events

L/R Bal = -1,500 aMW

Energy LOLP = 5%

Capacity LOLP = 2%



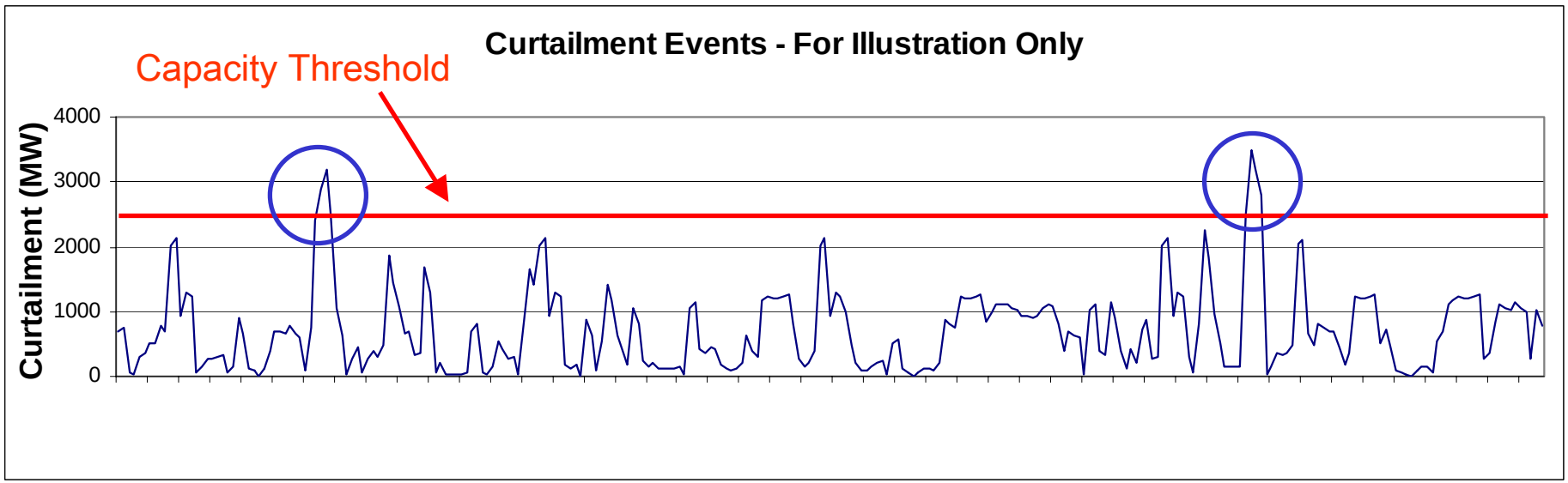
Northwest Power and Conservation Council

Curtailment Events

L/R Bal = -2,000 aMW

Energy LOLP = 7%

Capacity LOLP = 4%



Northwest Power and Conservation Council

Next Steps

- Agree on an intuitive capacity target for the peak winter and summer months.
- Use the statistical approach to determine the peaking threshold.
- Use this threshold to assess the capacity LOLP for other scenarios.