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April 30, 2008

## MEMORANDUM

**TO:** Power Committee

**FROM:** Ken Corum

**SUBJECT:** Demand Response Challenges for the Sixth Power Plan

The Council evaluated demand response for the first time in the Fifth Power Plan. Some of the issues that were identified at the time, such as uncertainty regarding the amount and cost of demand response that is available and questions about the proper method for evaluating the cost effectiveness of demand response, remain concerns as we develop the Sixth Power Plan, although we have increased our understanding of these issues in the meantime.

Since the Fifth Power Plan, we have gained experience in reducing peak loads in the summer through reductions in electricity use for air conditioning and irrigation, but we still have more to learn about the potential for demand response in the commercial and industrial sectors, and in other end uses. We still lack a consensus on clear guidelines for determining cost effectiveness of demand response measures and some discussions of demand response seem to lack distinction between the long run perspective and the short run.

In this presentation I will review the basic features and problems of demand response and describe the areas in which the Sixth Power Plan can make the greatest contribution to the regional discussion of demand response.



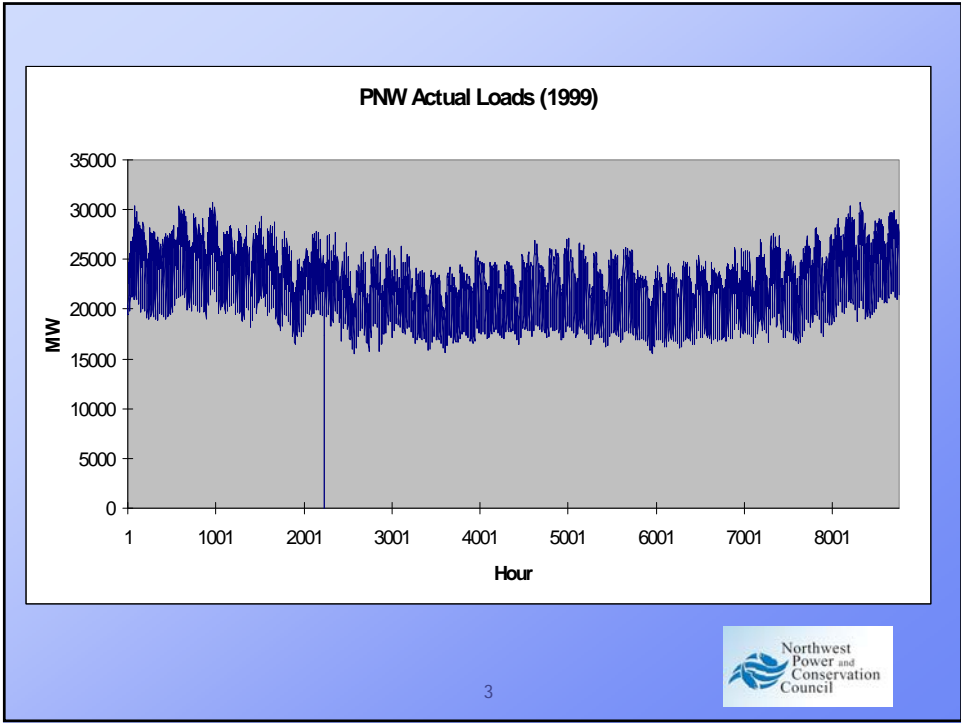
# Demand Response in the 6<sup>th</sup> Power Plan

NW Power and Conservation Council  
Power Committee  
Walla Walla WA, May 13, 2008  
Ken Corum

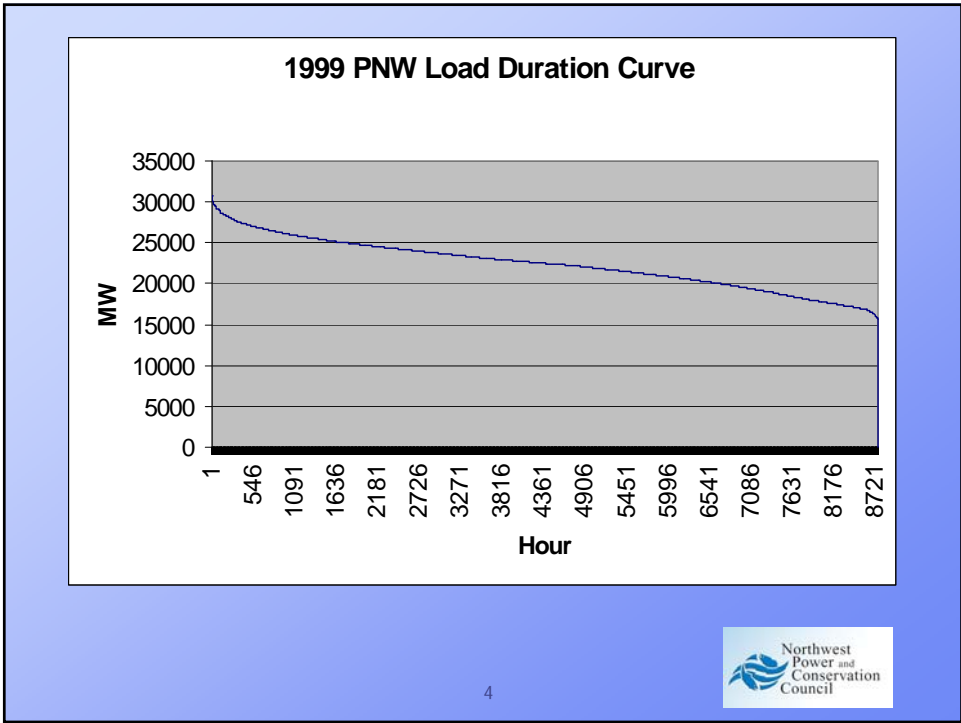
## What is DR?

- Temporary, voluntary reduction in use when power system is stressed, e.g.
  - Peak demand
  - Unexpected transmission or generation problem
- Usually compensation for reductions





3



4

## Economics

- Serving peak loads more expensive
- Consumers generally don't pay "time-sensitive" prices
- Total system cost increased, off-peak customers subsidize on-peak

5



## Available Options

- Price
  - Real time prices
  - Time of use prices
- Payments for reductions
  - Buybacks (long and short term)
  - Demand side reserves
  - Interruptible contracts
  - Direct control
- Third parties between utilities and customers (e.g. EnerNoc, Comverge)

6



## Challenges for 6<sup>th</sup> Plan

- Supply curve
- Cost effectiveness
- Making the case for investing in capability ahead of need

7



## Supply Curve

- In contrast to curve for conservation; less an analysis of engineering than of consumer behavior
- What compromises in quality of service are acceptable by consumers?
- We need experience, here or elsewhere

8



## Cost Effectiveness

- Does DR avoid more expense than it costs?
- PNW DR Project and workgroup
- Among other issues, short run vs. long run perspectives

9



## Short Run/Long Run - 1

- SR – system somewhat long, including hydro ability to cover peaks
  - Avoided cost is low, variable cost of generators
    - Spot energy prices < \$100/MWh
    - Capacity contracts < \$50,000/MW-yr
  - DR doesn't save much, utilities can't offer much incentive, don't get much response
  - Utility investment in DR (equipment, recruiting, experience) looks risky in LR

10



## Short Run/Long Run - 2

- LR – system outgrowing hydro, adding wind, eventually needs peakers
  - Avoided cost based on building new peakers is higher -- \$70,000-120,000/MW-yr
- Utilities can offer more compensation for DR, get more response

11



## Short Run/Long Run - 3

- When do we get to long run?
- Council staff and BPA upgrading Genesys to better capture use of hydro for load following and wind integration
- How much more load/wind can hydro accommodate?

12



## Value of Genesys Analysis

- For DR, will help us focus on choice:
  - If LR is more than ~5 yr out, concentrate on getting experience, operate cheapest DR programs
  - If LR is less than ~5 yr out, use result to persuade utilities and regulators that need is imminent
- For wind, better understanding of integration costs

13



## Value of Getting Experience Now

1. In SR, DR avoids operating cost
  - infrequently “in the money” so little experience
2. In LR, DR avoids all-in cost
  - more often in the money, we get experience
3. But w/o experience, utility planners likely to rely on peakers
4. If utilities build peakers, return to 1. above
5. Solution: exercise DR for experience, not just when it’s in the money (Action Plan)

14

