

Sixth Northwest Conservation & Electric Power Plan

Flexibility Adequacy

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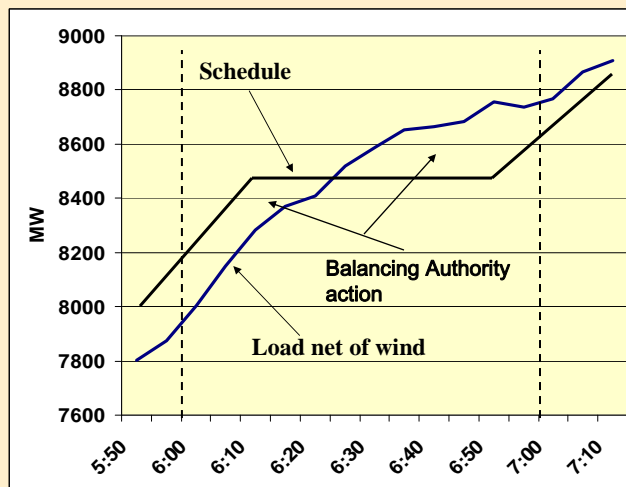
Northwest Power and Conservation Council

Portland, OR

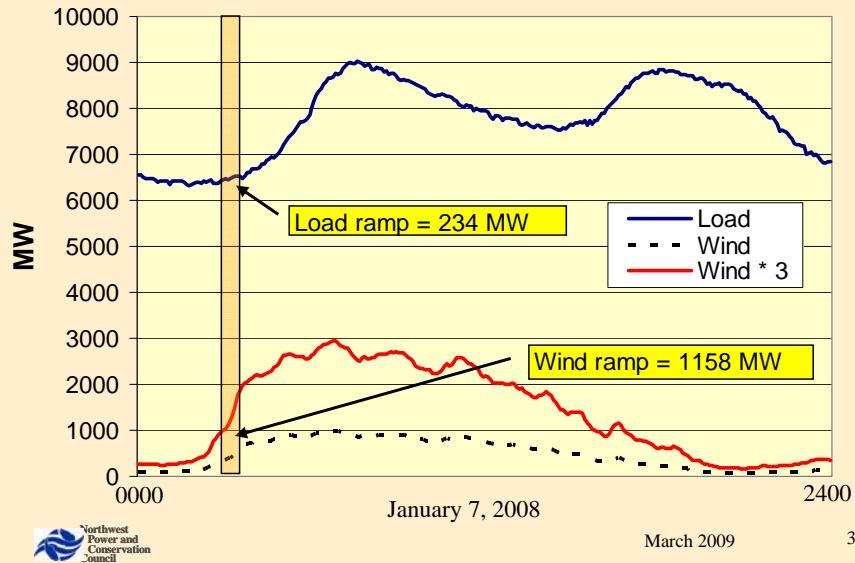
June 2009

Illustration of Hourly Scheduling

BPA 7 Jan 08 6:00-7:00 a.m.



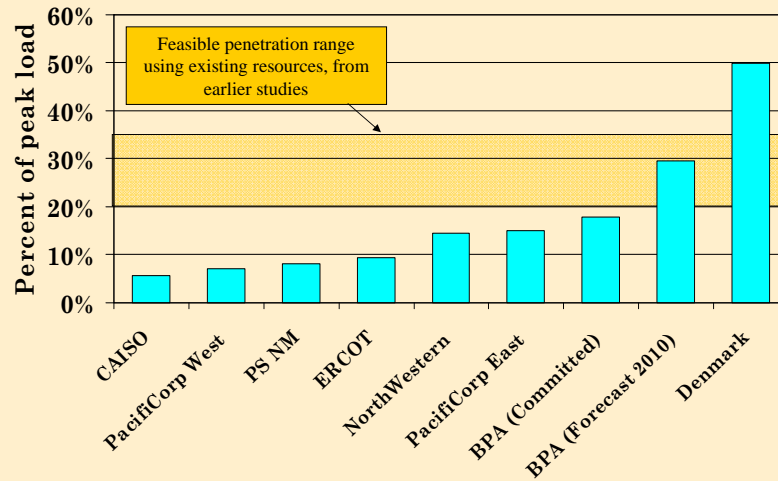
Ramping events are the principal balancing concern



Why the concern?

- Simple thought test suggests little problem:
 - Unforecasted upramp during min load - curtail wind until loads build up
 - Unforecasted downramp during peak load - dispatch reserve capacity
- Real world is more complex
 - Concentration of wind in some BAs
 - Most being passed through to other BAs
 - Lack of access to theoretically available flexibility
 - Institutional
 - Physical
 - Difficulty in implementing certain measures
 - e.g., curtailment

Wind penetration by balancing authority

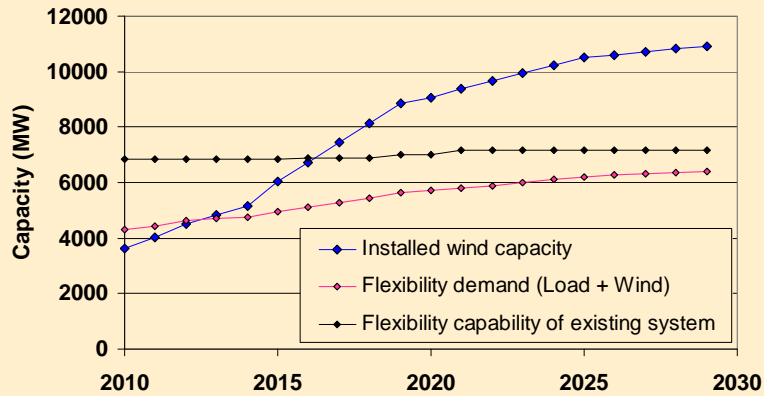


Issues re assessing flex adequacy

- Lack of sub-hourly modelling capability
- Significant uncertainties
 - Extrapolating from BA-scale integration assessments to regional scale
 - Wind development for Northwest loads
 - RPS
 - Cost & risk reduction
 - Wind development for California & other out-of-region loads
 - RPS
 - Cost & risk reduction
 - Transfer capability
 - RPS policy
 - Supply of flexibility from existing system

That hasn't stopped us from trying

Moderate Wind Development



More confident re: Broad conclusions

- Very preliminary analysis suggests adequate supply of flexibility in near-to-mid-term if region viewed as a single BA
- However, demand for flexibility is unevenly allocated among BAs
 - Bonneville, NWE
- Bonneville pressed because:
 - Scale of penetration
 - Extent of pass-through, increasingly out-of-region
- Bonneville's problem not as dire as portrayed in the Preliminary Needs Assessment
 - No assumptions regarding measures to reduce demand for flexibility
 - Demand forecast considers supply, but not potential demand
- Relatively low-cost, short-lead time measures are available to reduce demand for flexibility
- Relatively low-cost, short-lead-time measures are available to expand access to existing system flexibility
- Flexibility reserves will be needed for variable resources serving out-of-region loads
- Improved assessment of flexibility needs is needed, but will be challenging
 - Lack of modelling capability
 - Extreme uncertainties

Proposed actions related to flexibility

- GEN-3 Reduce demand for flexibility
 - Improved forecasting
 - Sub-hourly scheduling
 - Up-ramp curtailment
 - ACE diversity sharing
- GEN-4 Expand access to existing system flexibility
 - Expanded dynamic scheduling capability
 - Retrofit of candidate plants to provide flexibility
- GEN-1 (Utilities & BPA)/BPA-4 (BPA) Principles for resource acquisition, if needed
- GEN-5 Assess flexibility adequacy
- GEN-6 Evaluate flexibility augmentation options
- GEN-12 Planning for optimal system development