

W. Bill Booth
Chair
Idaho

James A. Yost
Idaho

Tom Karier
Washington

Dick Wallace
Washington



Bruce A. Measure
Vice-Chair
Montana

Rhonda Whiting
Montana

Melinda S. Eden
Oregon

Joan M. Dukes
Oregon

February 25, 2009

MEMORANDUM

TO: Power Committee

FROM: Maury Galbraith

SUBJECT: Draft Sixth Plan Electricity Price Forecasts

Staff has developed current forecasts of future wholesale power market prices. Under “medium” fuel price and carbon dioxide (CO₂) emission price assumptions, wholesale power prices at the Mid-Columbia trading hub are projected to increase from \$45 per megawatt-hour (MWh) in 2010 to \$85 per MWh in 2030. For comparison, Mid-Columbia wholesale power prices averaged \$56 per MWh in 2008 (in real 2006 dollars).

The Council’s wholesale power price forecasts are projections of the long-term trend of future wholesale power prices. Uncertainty regarding the future trend of wholesale power prices is a source of risk for resource development in the Northwest. Staff will input the long-term wholesale power market price trends into the Regional Portfolio Model to incorporate this risk into the development of the Council’s Sixth Power Plan. Shorter-term electricity price risk, due to such factors as disequilibrium of supply and demand, and seasonal volatility due to hydro conditions and other weather related events are also incorporated into the Regional Portfolio Model, but are not reflected in the long-term trend forecasts. The long-term price projections are also used by the Council, regional utilities, and other agencies to determine the “avoided costs” of potential energy efficiency measures.

During the Power Committee meeting, Staff will present its “medium” case forecast, discuss the supply and demand conditions that underlie the forecast, and present results of several fuel price and CO₂ emission price sensitivity case forecasts.

Sixth Northwest Conservation & Electric Power Plan

Draft Wholesale Power Price Forecasts

Maury Galbraith

Northwest Power and Conservation Council

Power Committee Meeting

Portland, Oregon

March 5, 2009



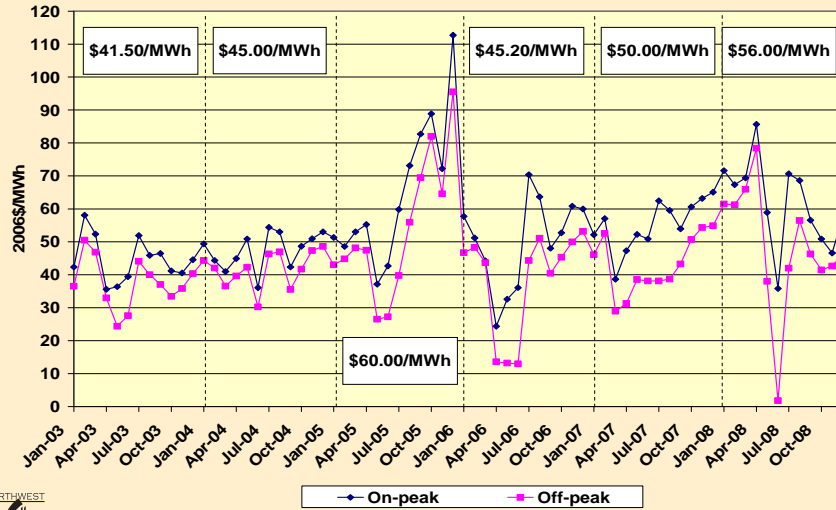
Outline

1. Mid-Columbia Wholesale Power Price Forecast
2. Supply and Demand Fundamentals
 - WECC Resource Expansion
 - PNW Resource Expansion
3. Sensitivity Cases Forecasts

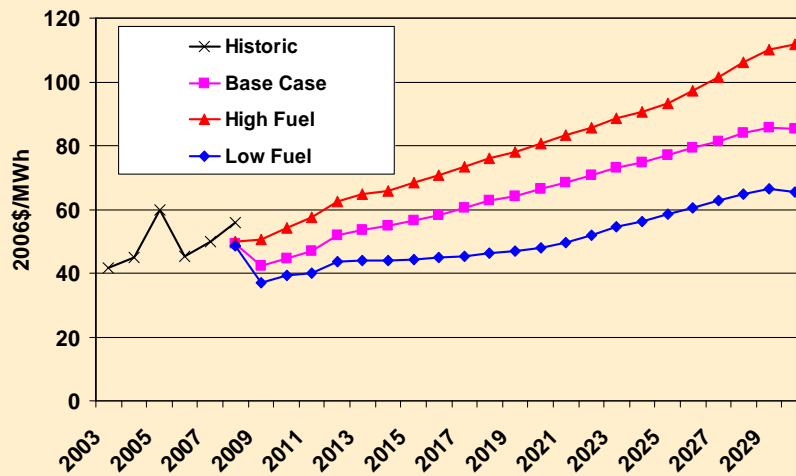


Historic Mid-C Average Monthly On- and Off-Peak Prices

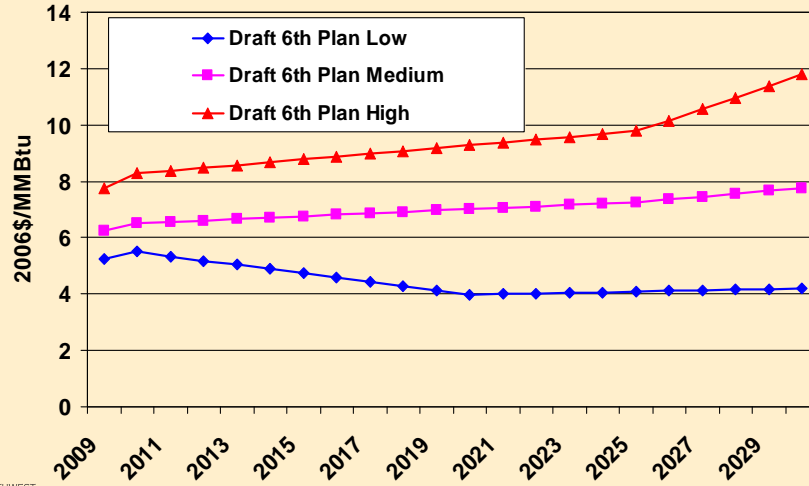
Source: IntercontinentalExchange (ICE)



Forecast Mid-C Average Annual Prices

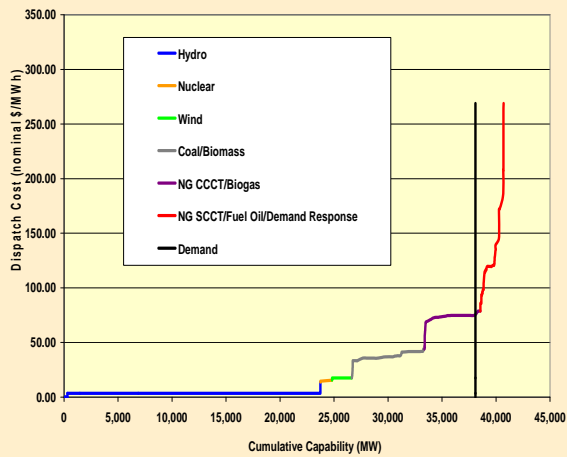


Forecast PNW Natural Gas Prices

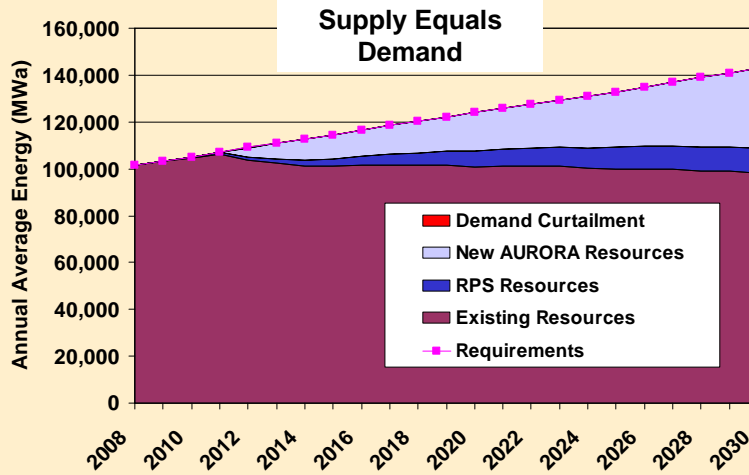


Market Fundamentals Model

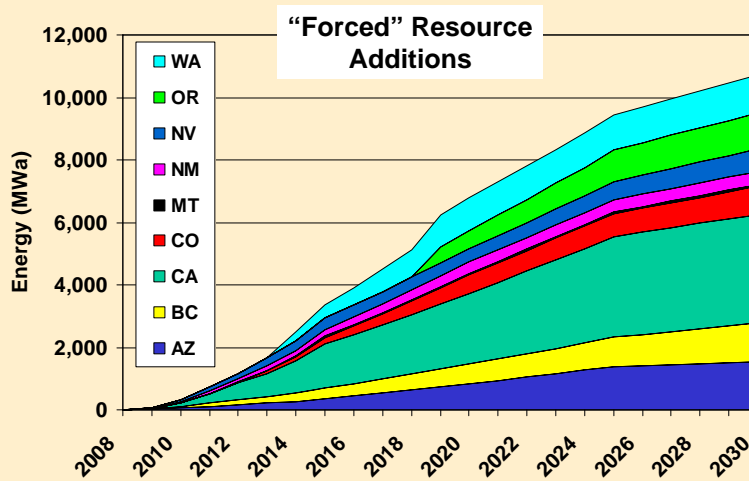
- Market Price Determined by Supply and Demand
- Hourly Market
- Price Based on Variable Cost of the Last Resource Used to Satisfy Demand



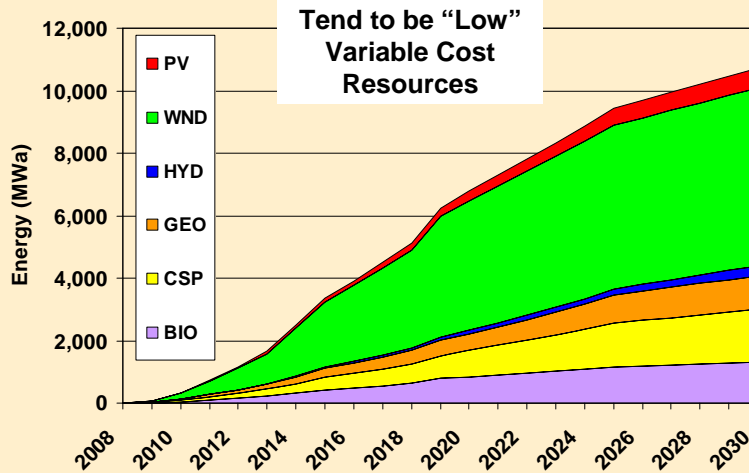
WECC Load & Resource Balance – Energy Economic Dispatch Basis Under Average Hydro Conditions



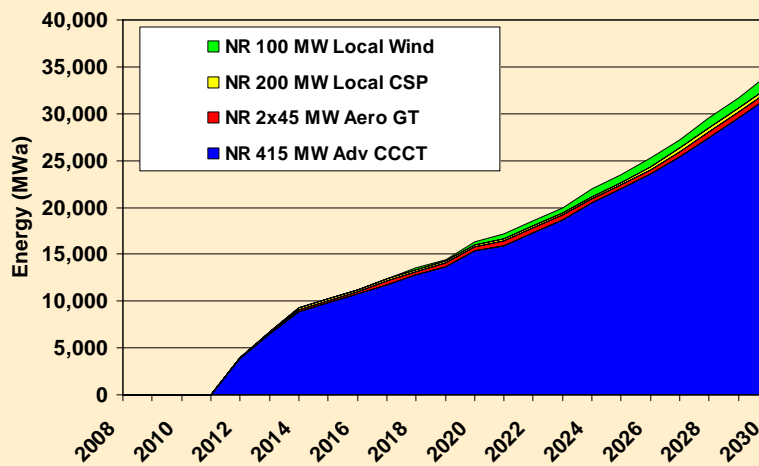
WECC Incremental RPS Energy by State



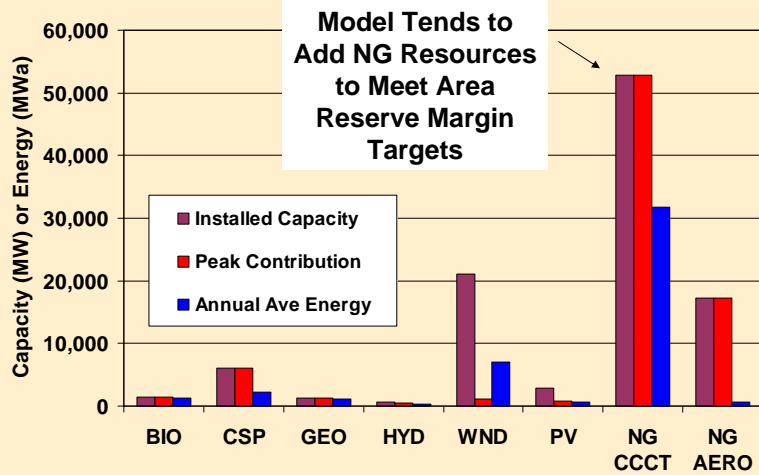
WECC Incremental RPS Energy by Technology



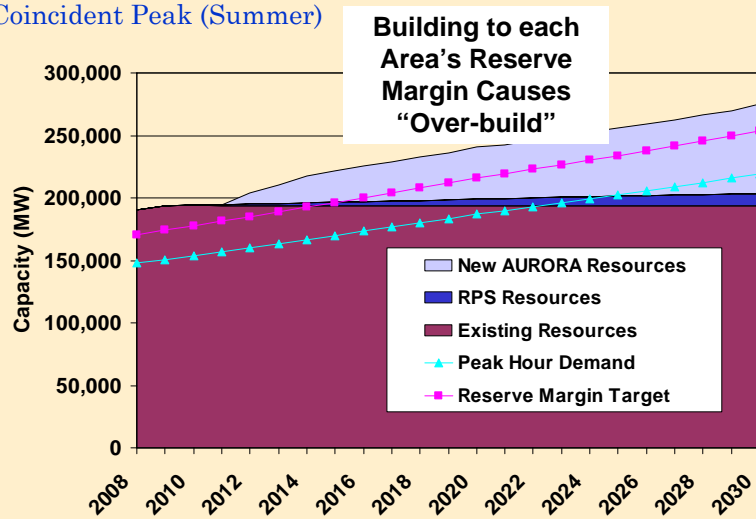
WECC New AURORA Resource Energy by Technology



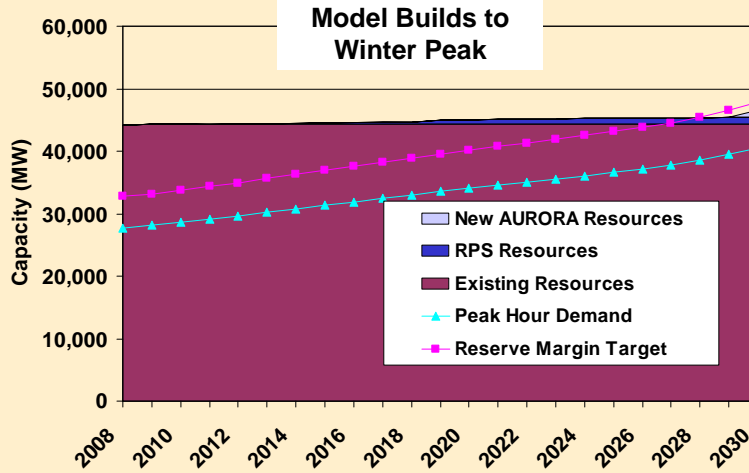
Cumulative Resource Additions by 2030



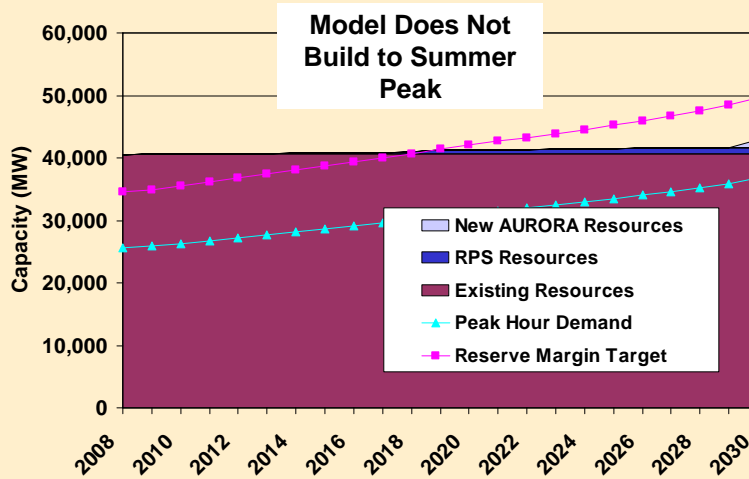
WECC Load & Resource Balance – Capacity Coincident Peak (Summer)



PNW Load & Resource Balance – Capacity Winter Sustained Peaking Capacity and 18% Reserve Margin

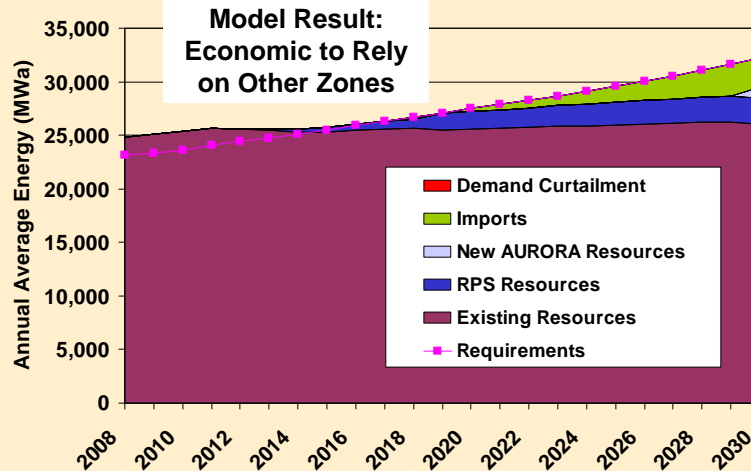


PNW Load & Resource Balance – Capacity Summer Sustained Peaking Capacity and 35% Reserve Margin



PNW Load & Resource Balance – Energy

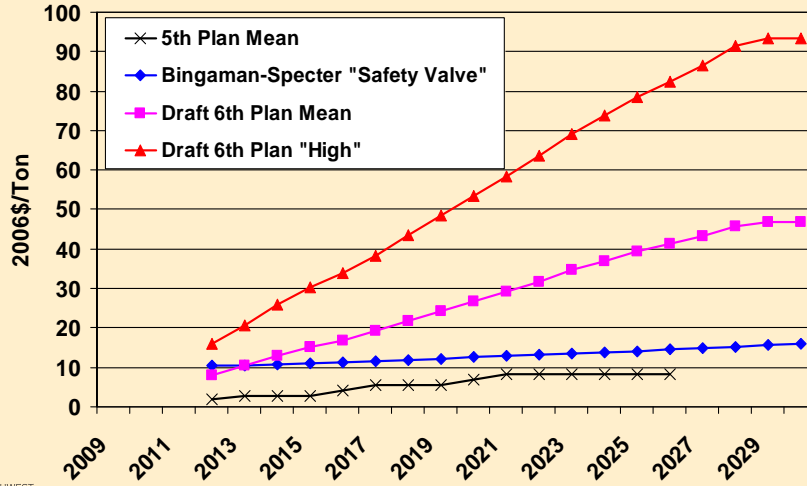
Economic Dispatch Basis Under Average Hydro Conditions



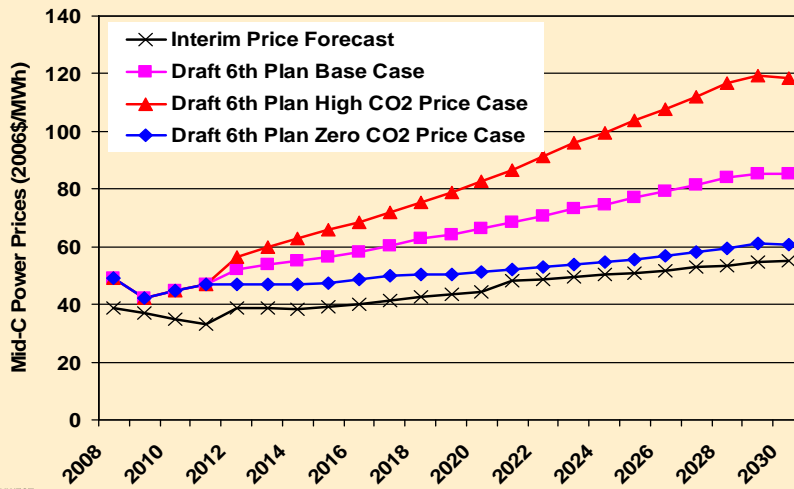
Fundamentals Summary

- Incremental RPS resources primarily provide energy
- Model tends to add resources with high capacity value to meet reserve margin targets
- Resources built for reserve margin targets tend to be under-utilized (low capacity factors)
- Other Zones Capacity Deficit Earlier than PNW
- Model result is for PNW to access under-utilized resources in neighboring zones
- This is NOT a power plan.
- Impact on wholesale power price forecast is minimal

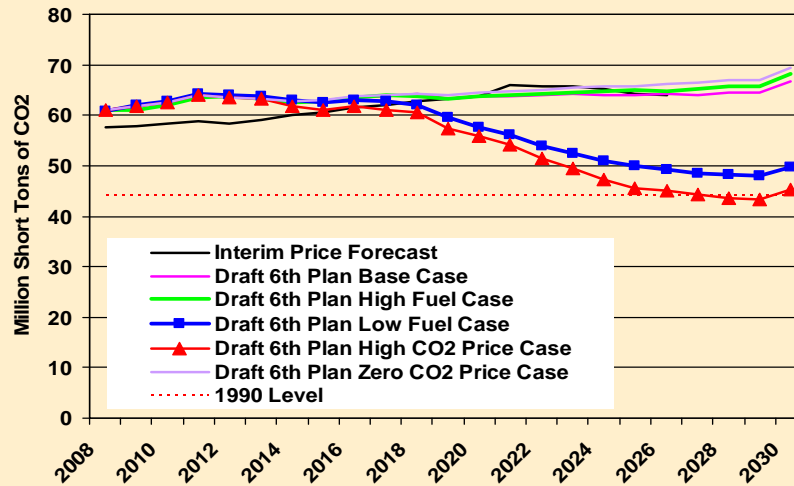
Annual CO₂ Emission Prices



Impact of CO₂ Emission Price Scenarios on Mid-C Wholesale Power Price Forecast



PNW Annual CO₂ Emissions by Scenario



Conclusions

- Mid-Columbia wholesale power prices increase from \$45/MWh in 2010 to \$85/MWh in 2030 (Base Case)
- Significant uncertainty due to underlying fuel price and CO₂ emission price uncertainty
- Significant reductions in PNW power system CO₂ emissions with:
 - \$7/MMBtu natural gas price and \$86/ton CO₂ emission price; or
 - \$4/MMBtu natural gas price and \$43/ton CO₂ emission price