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January 6, 2009

## MEMORANDUM

**TO:** Power Committee

**FROM:** Maury Galbraith

**SUBJECT:** Draft Sixth Plan Electricity Price Forecasts

At the December Power Committee meeting, staff presented preliminary forecasts of future wholesale power market prices. The preliminary forecasts reflected the results of reducing the number of load-resource zones and updating the demand forecast used in the Council's version of the AURORA<sup>xmp</sup> Electric Market Model.

At the January Power Committee meeting, staff will present additional forecasts that reflect the results of an updated fuel price forecast, an updated projection of Regional Portfolio Standard (RPS) resource development, and a new assessment of the availability and cost of new generating resource technologies.

The final wholesale power price forecast will be input into the Council's Regional Portfolio Model as a projection of the long-term trend of future wholesale electricity prices. 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 projections of wholesale power market prices are also used by the Council, regional utilities, and other agencies to help determine the "avoided costs" of potential energy efficiency measures.

The final wholesale power price forecast is not completed for this packet. Presentation materials will be e-mailed and posted on the Council's web site prior to the Power Committee meeting.

# Sixth Northwest Conservation & Electric Power Plan

## Draft Wholesale Power Price Forecasts

Maury Galbraith

Northwest Power and Conservation Council

Power Committee Meeting

Missoula, MT

January 13, 2009



# Outline

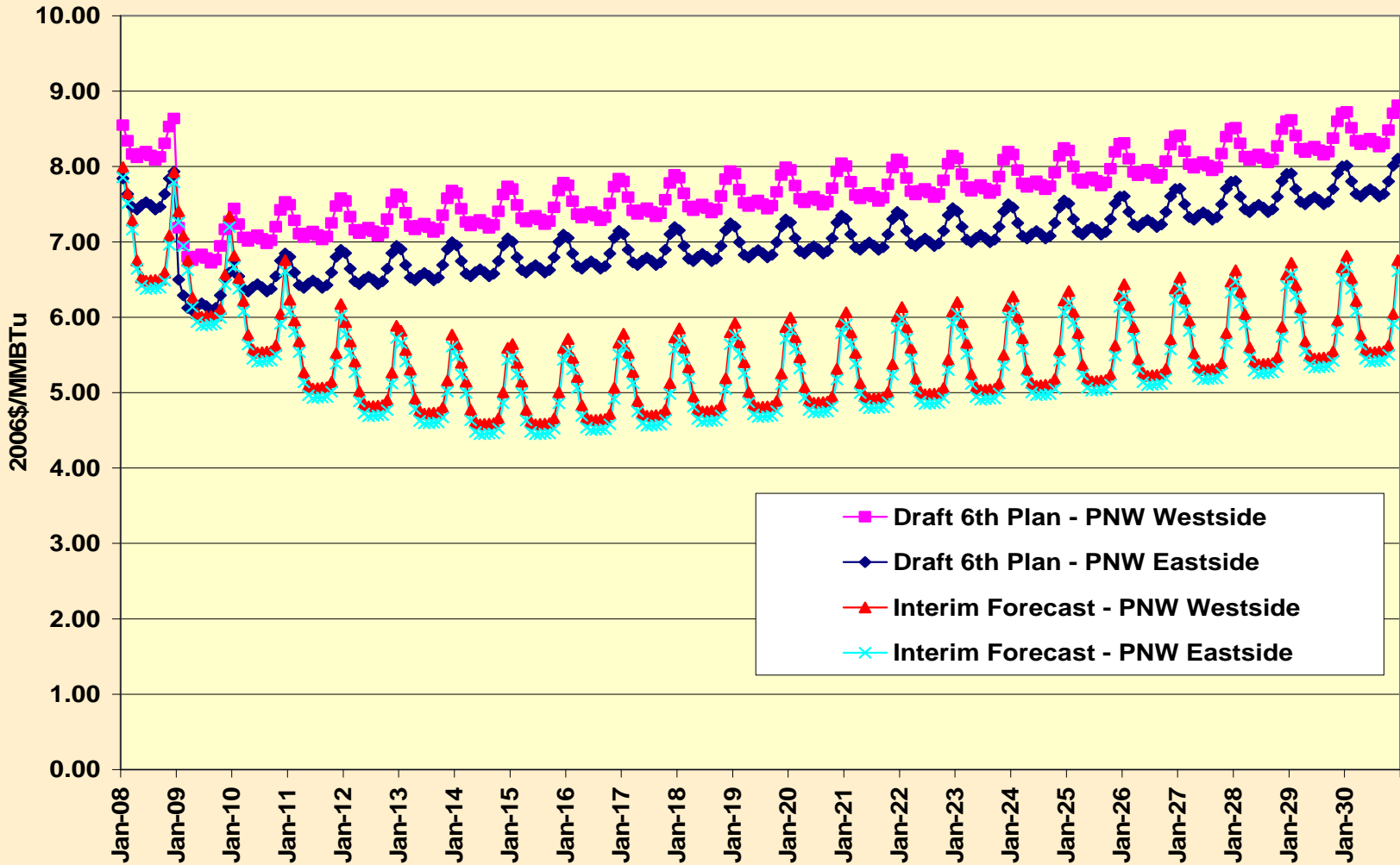
1. Recap of Major AURORA Updates
2. Update of Fuel Price Forecasts
3. Update of Regional Portfolio Standard (RPS) Resource Development
4. Partial Update of New Generating Resource Options
5. Forecast Wholesale Power Market Prices

# Major AURORA Updates

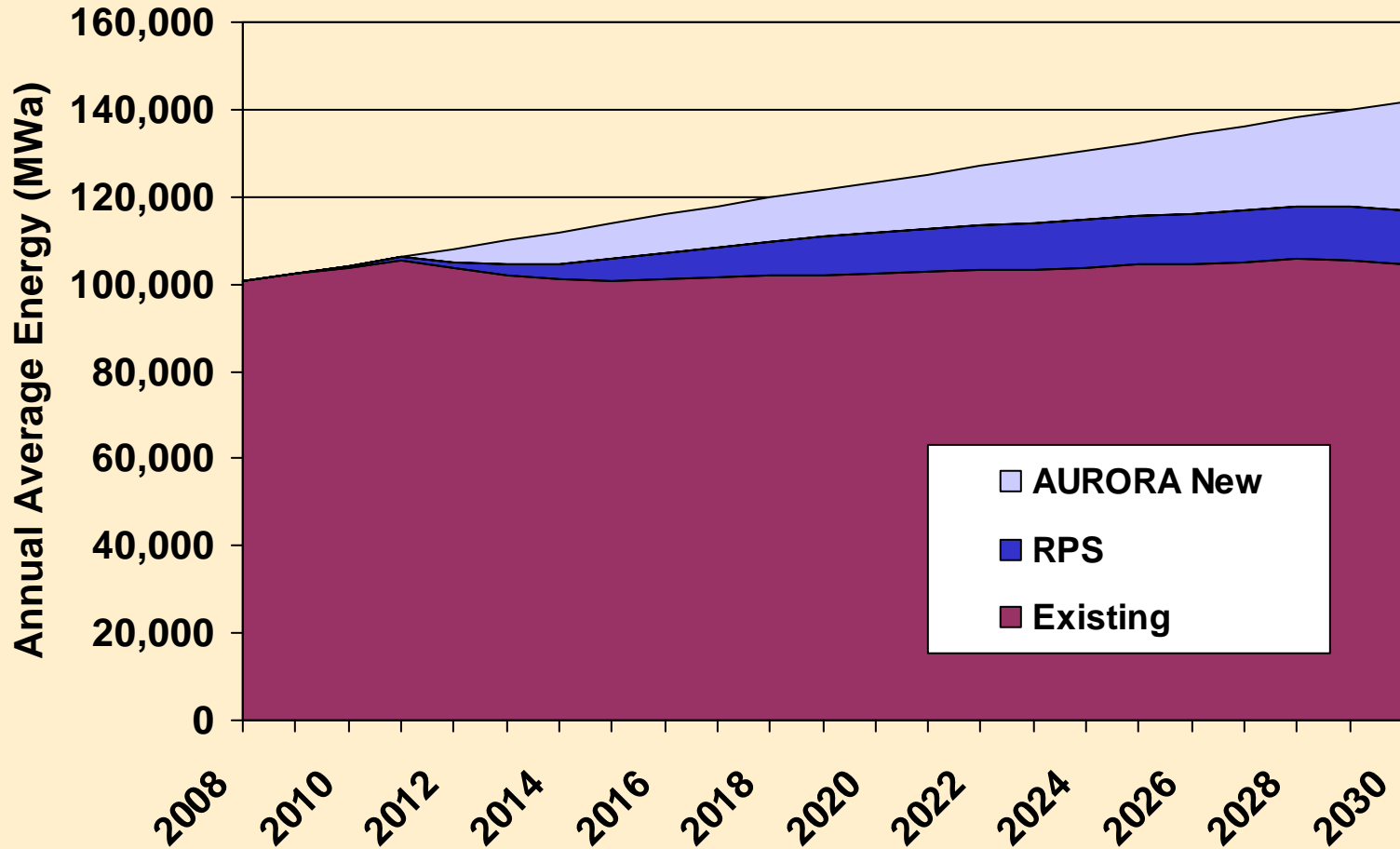
- ✓ **Reduction in the number of load-resource zones used to model the Western Interconnect**
- ❑ Updated transmission links between the modeled load-resource zones
- ✓ **Updated demand forecasts for each of the load-resource zones**
- ✓ **Updated fuel price forecasts for each of the zones**
- ❑ Updated hydro condition modeling for the Northwest zones
- ✓ **Updated inventory of existing generating resources in each of the zones**
- ✓ **Updated estimates of future Regional Portfolio Standard resource development by zone**
- ✓ **Updated inventory of candidate resources for future development by zone**
- ❑ Improved dispatch parameter for combined cycle combustion turbines
- ❑ Updated carbon dioxide price forecasts

# Higher Natural Gas Prices

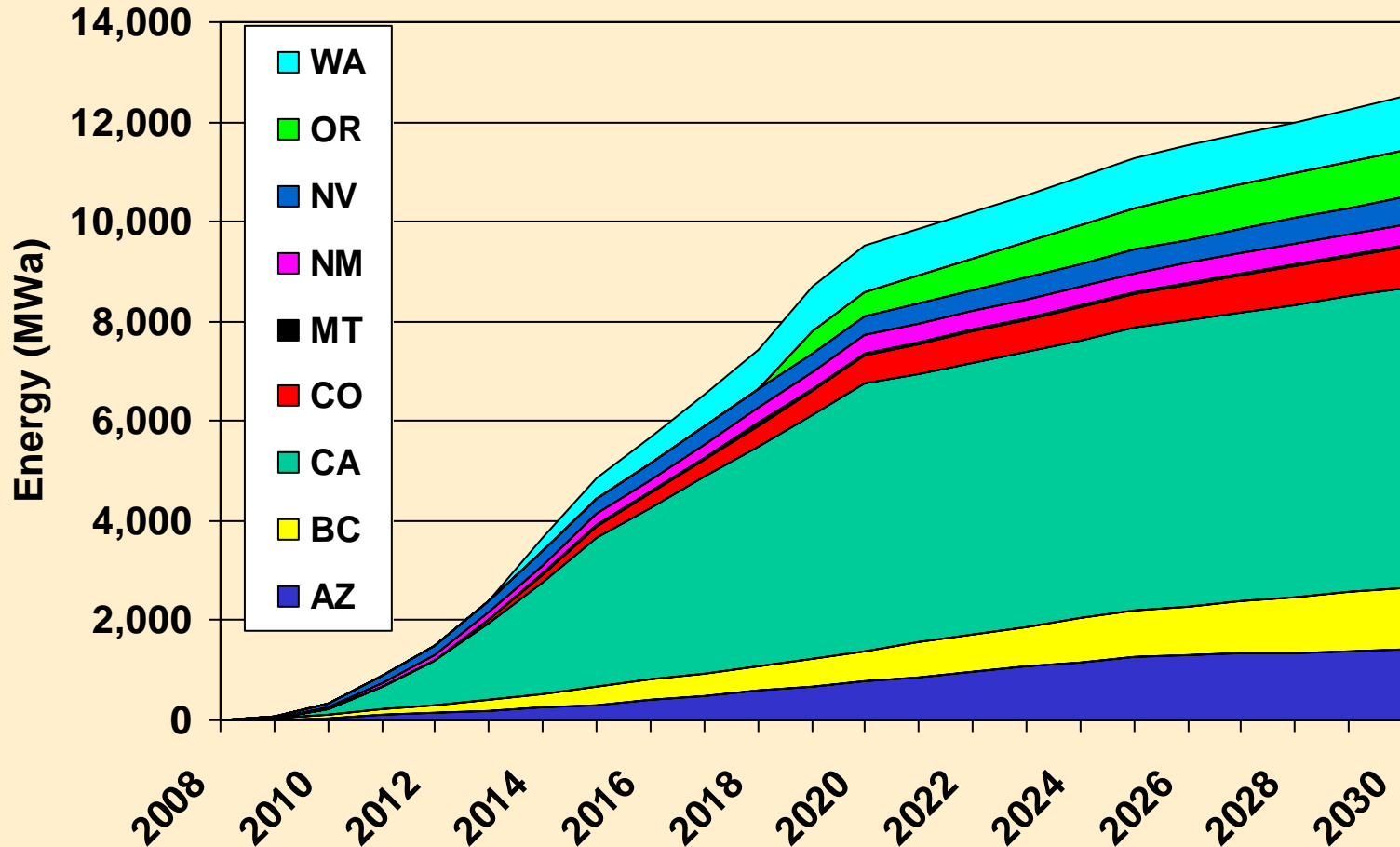
## Medium Long-term Trend Forecasts for PNW Zones



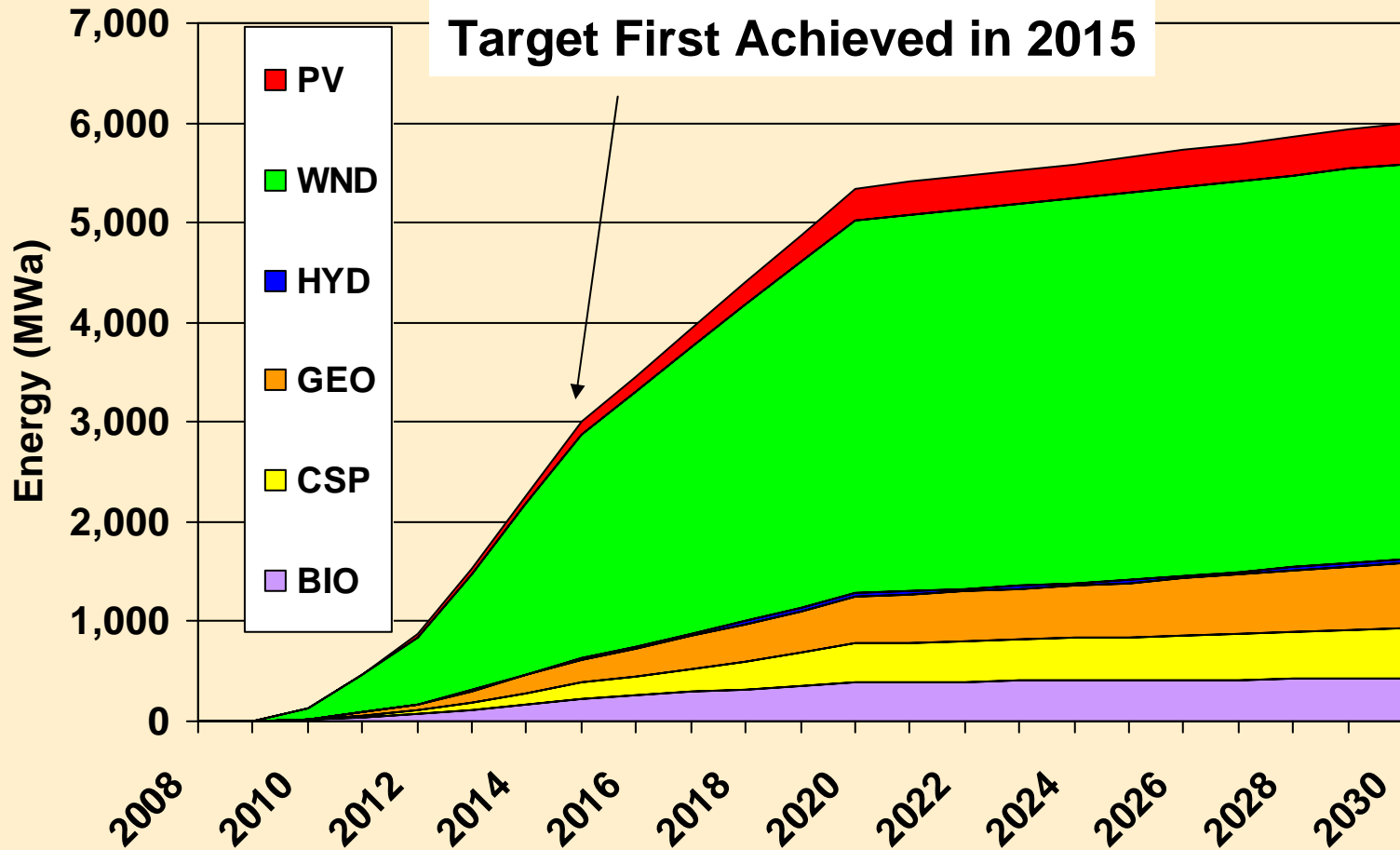
# WECC Resource Mix



# Incremental RPS Energy by State

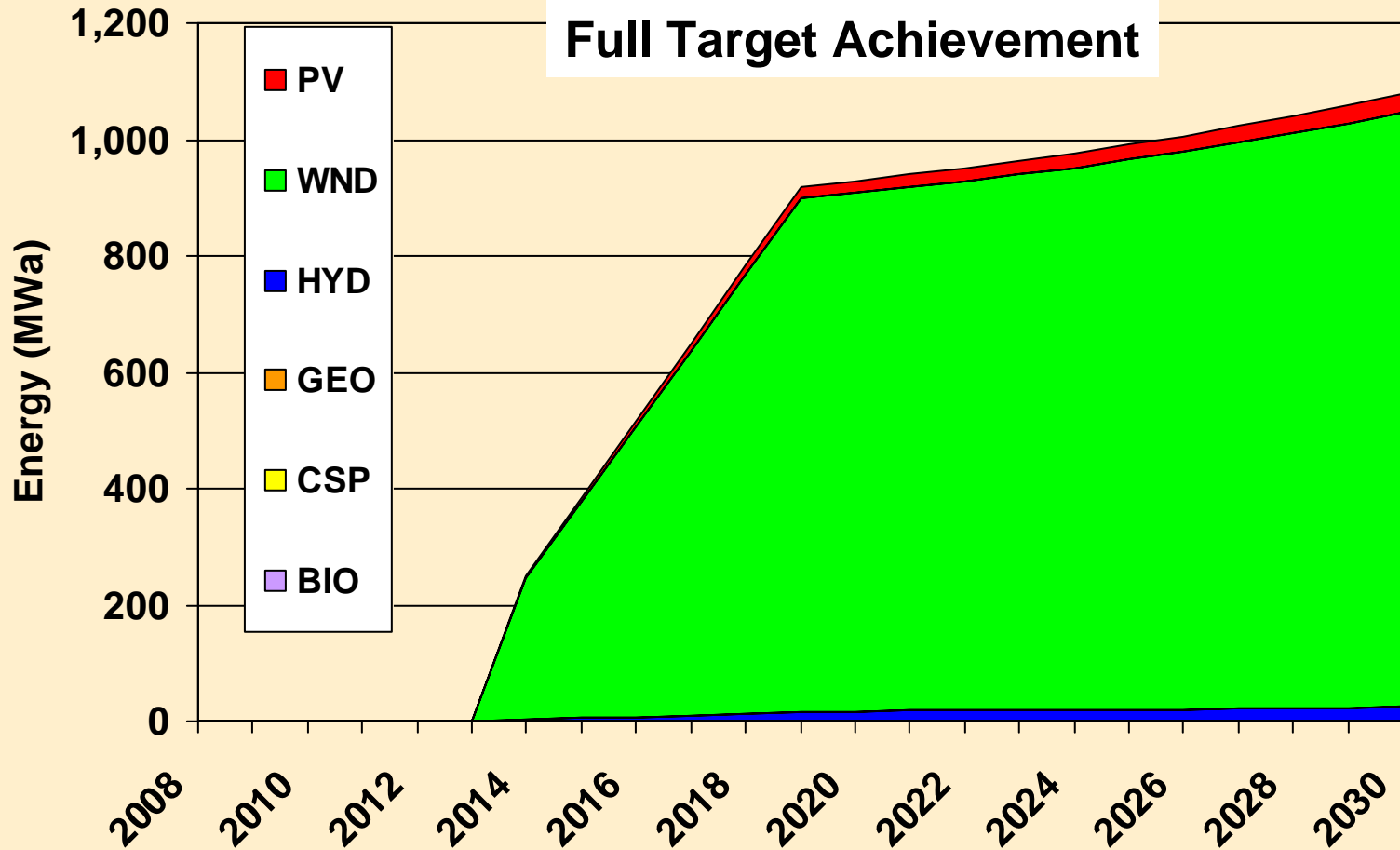


# CA Incremental RPS Energy Mix

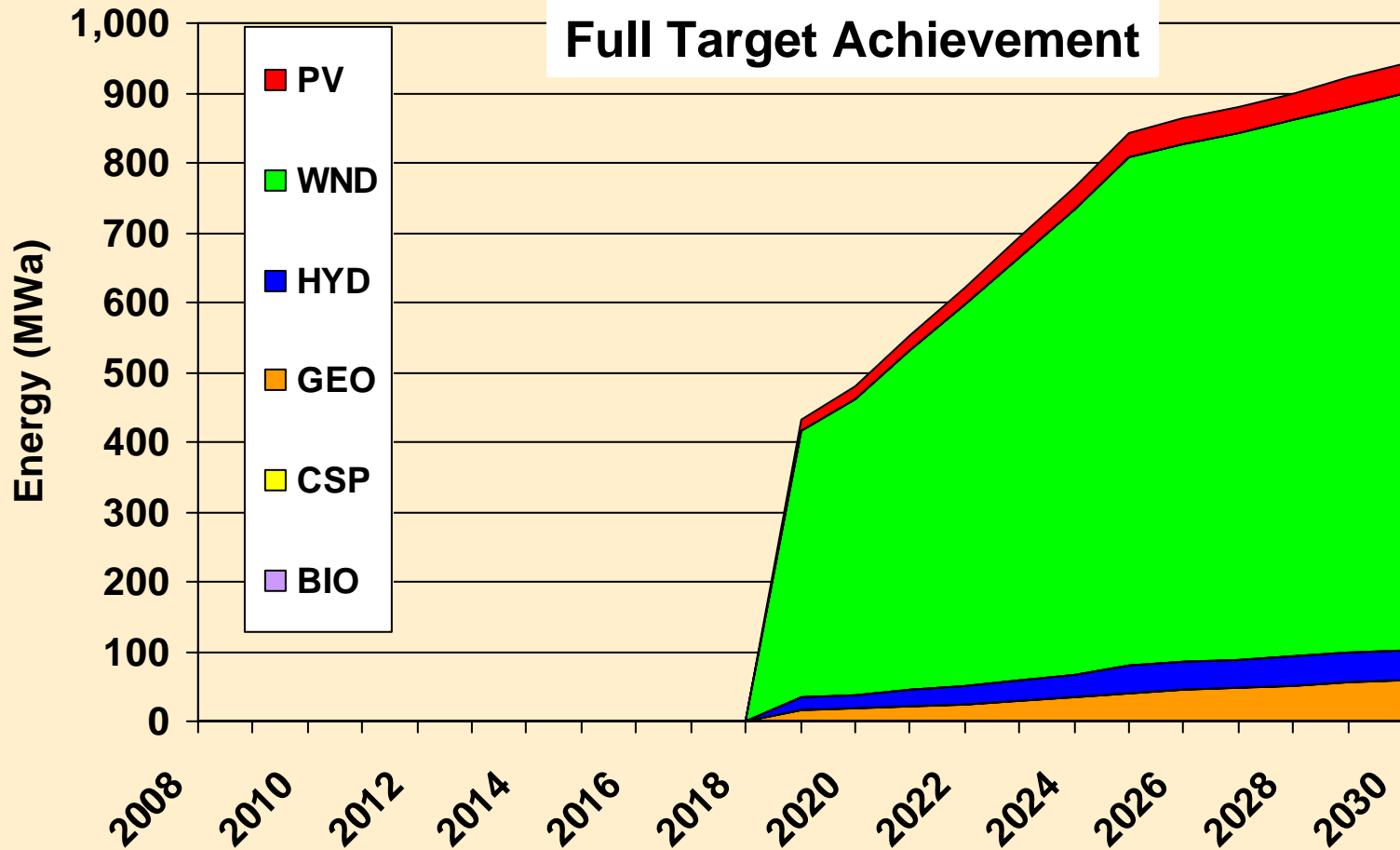




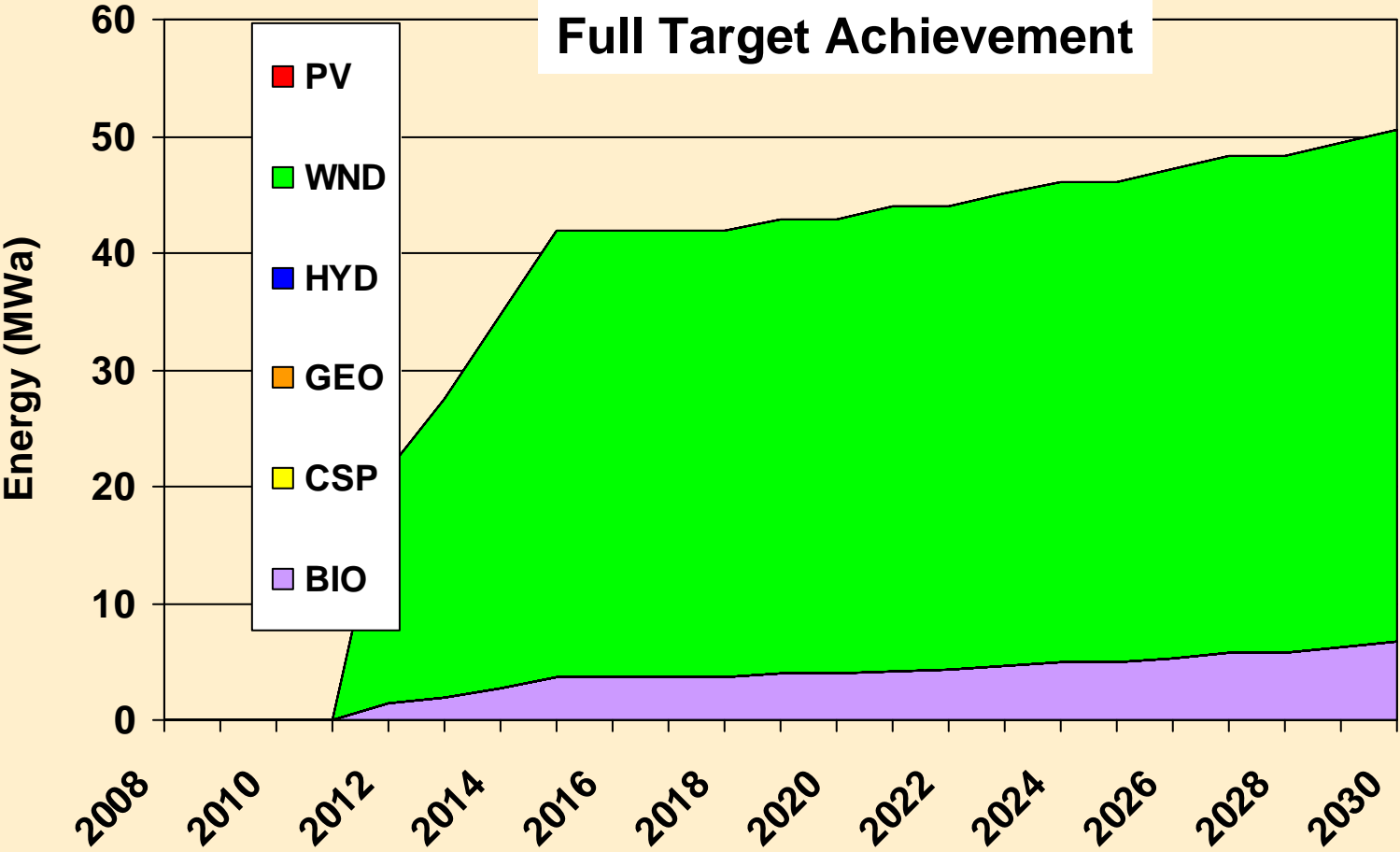
# WA Incremental RPS Energy Mix



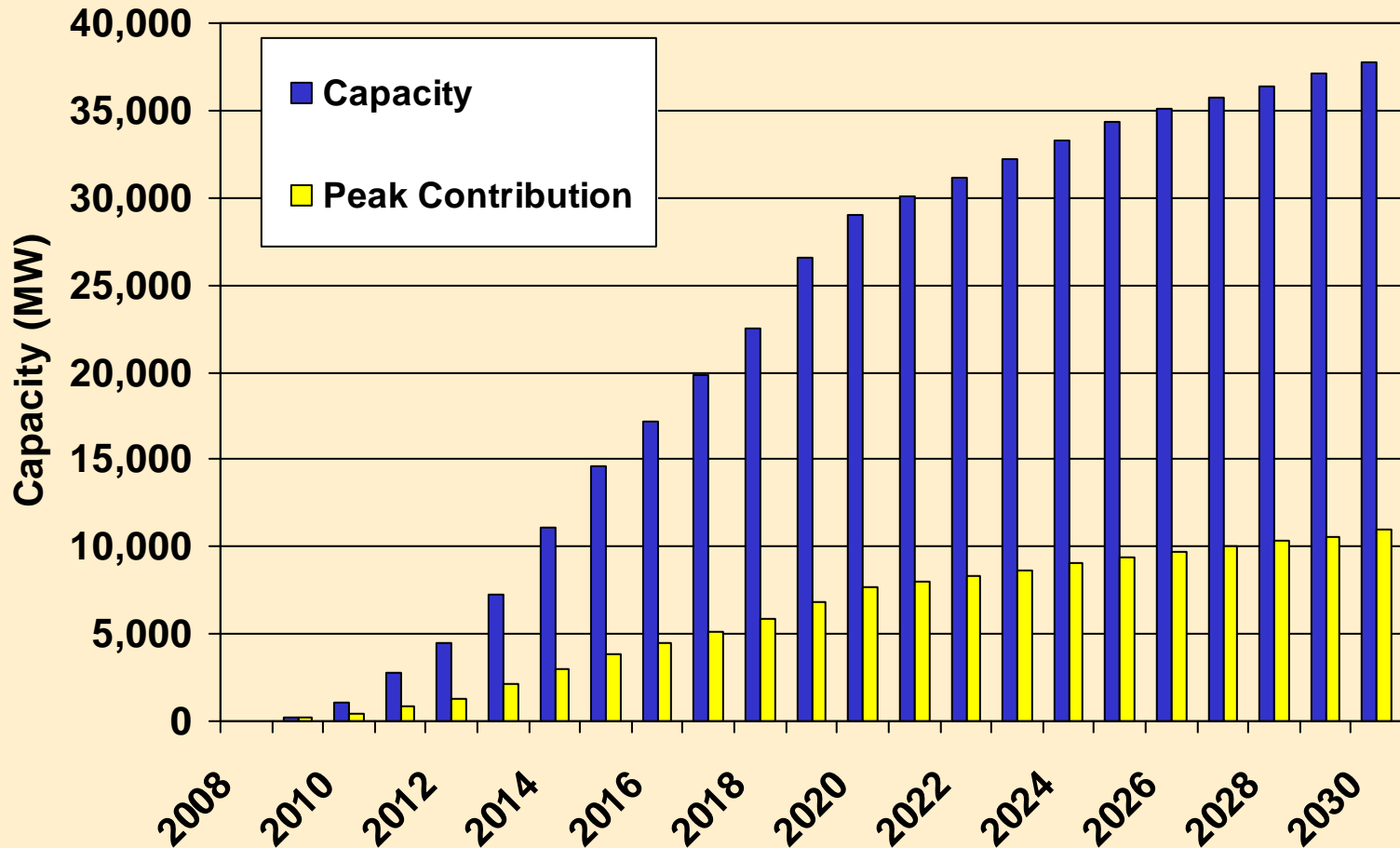
# OR Incremental RPS Energy Mix



# MT Incremental RPS Energy Mix



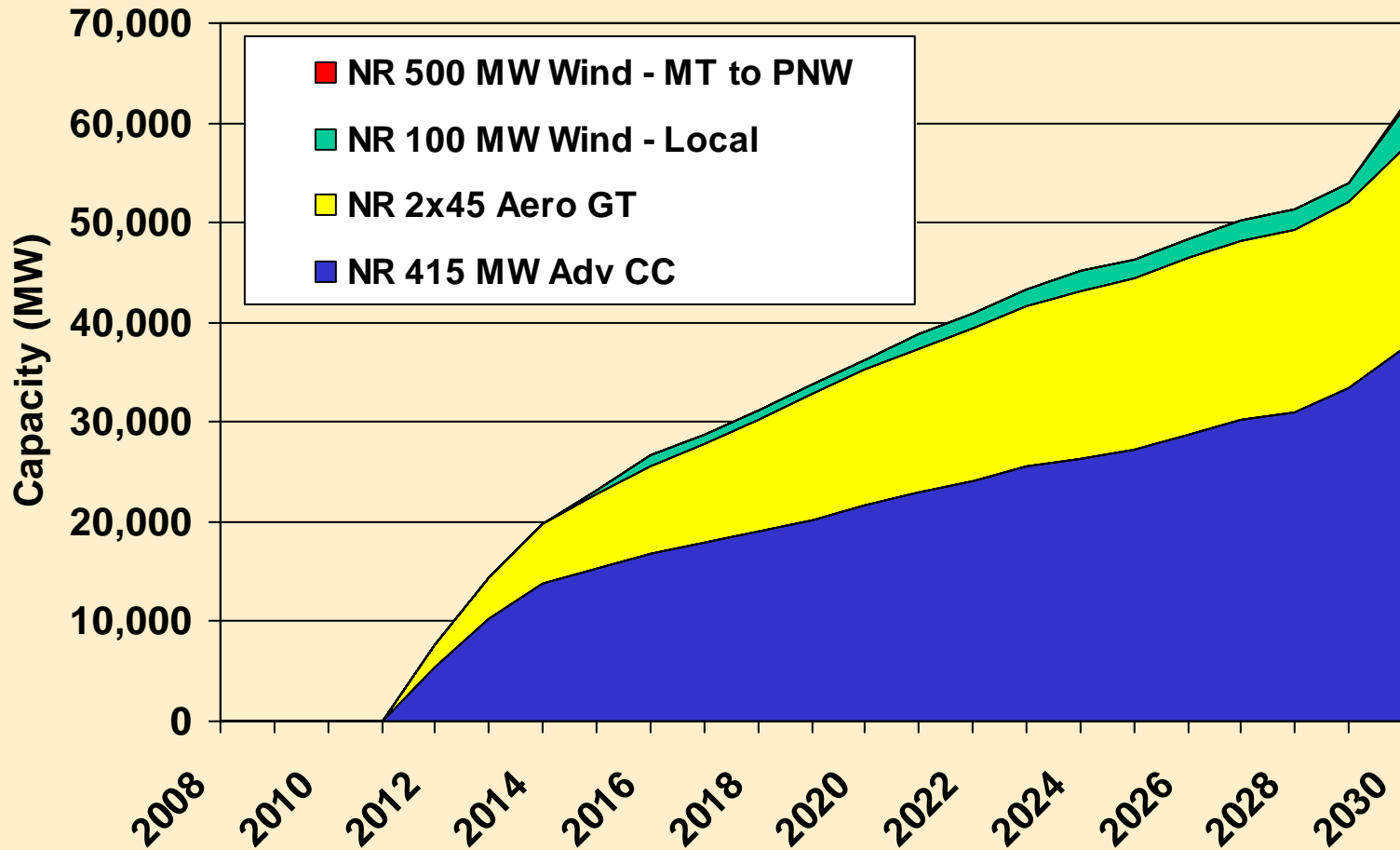
# WECC Incremental RPS Capacity and Peak Contribution



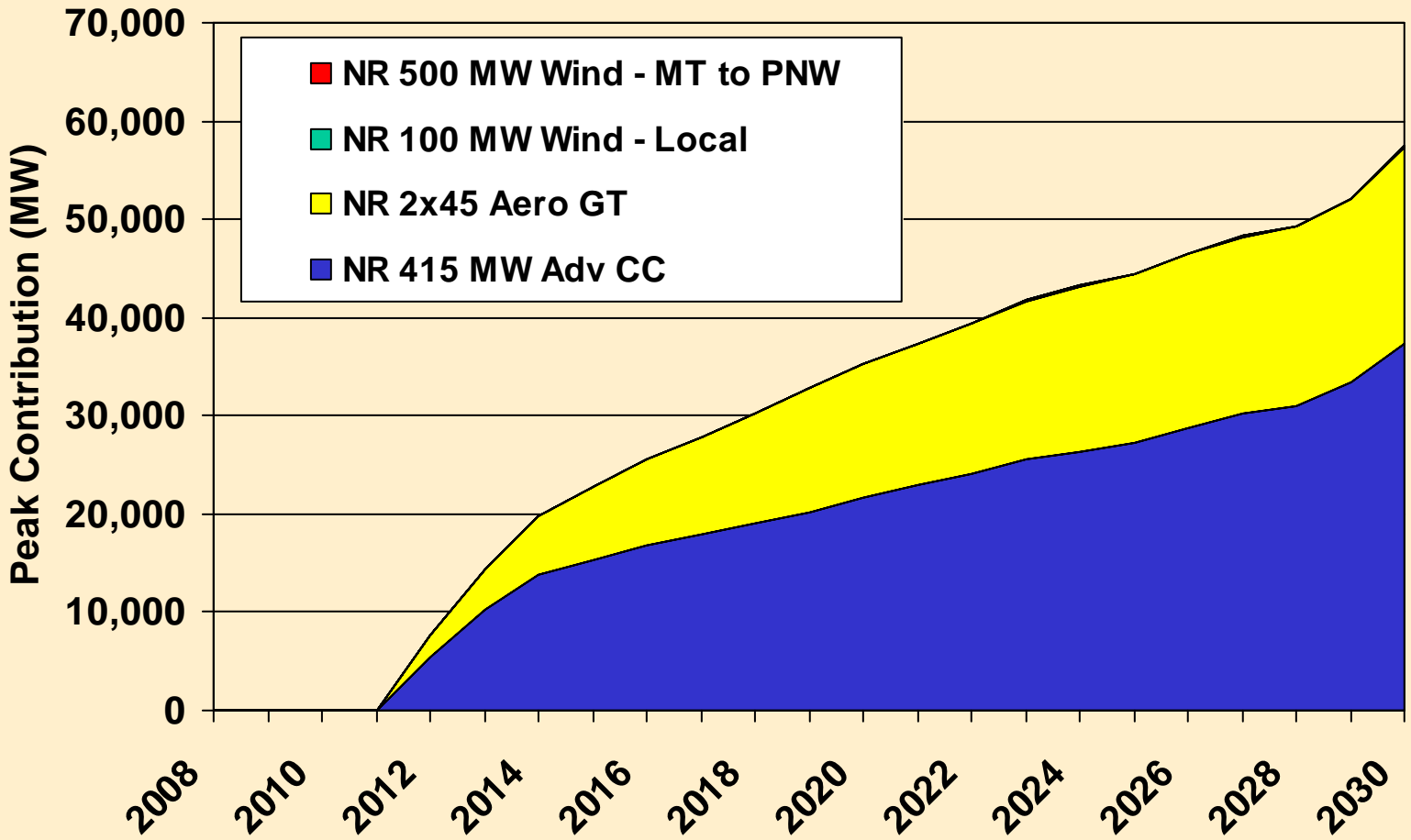
# RPS Summary

- Eight Western States and British Columbia have Renewable Portfolio Standards
- Resource Technologies Assumed to Vary by State
- Modeled 33% Targets in CA, but Assumed CA will Not Achieve Early Targets
- PNW States Assumed to Achieve Targets
- Relatively Small Peak Contribution from RPS Resource Additions

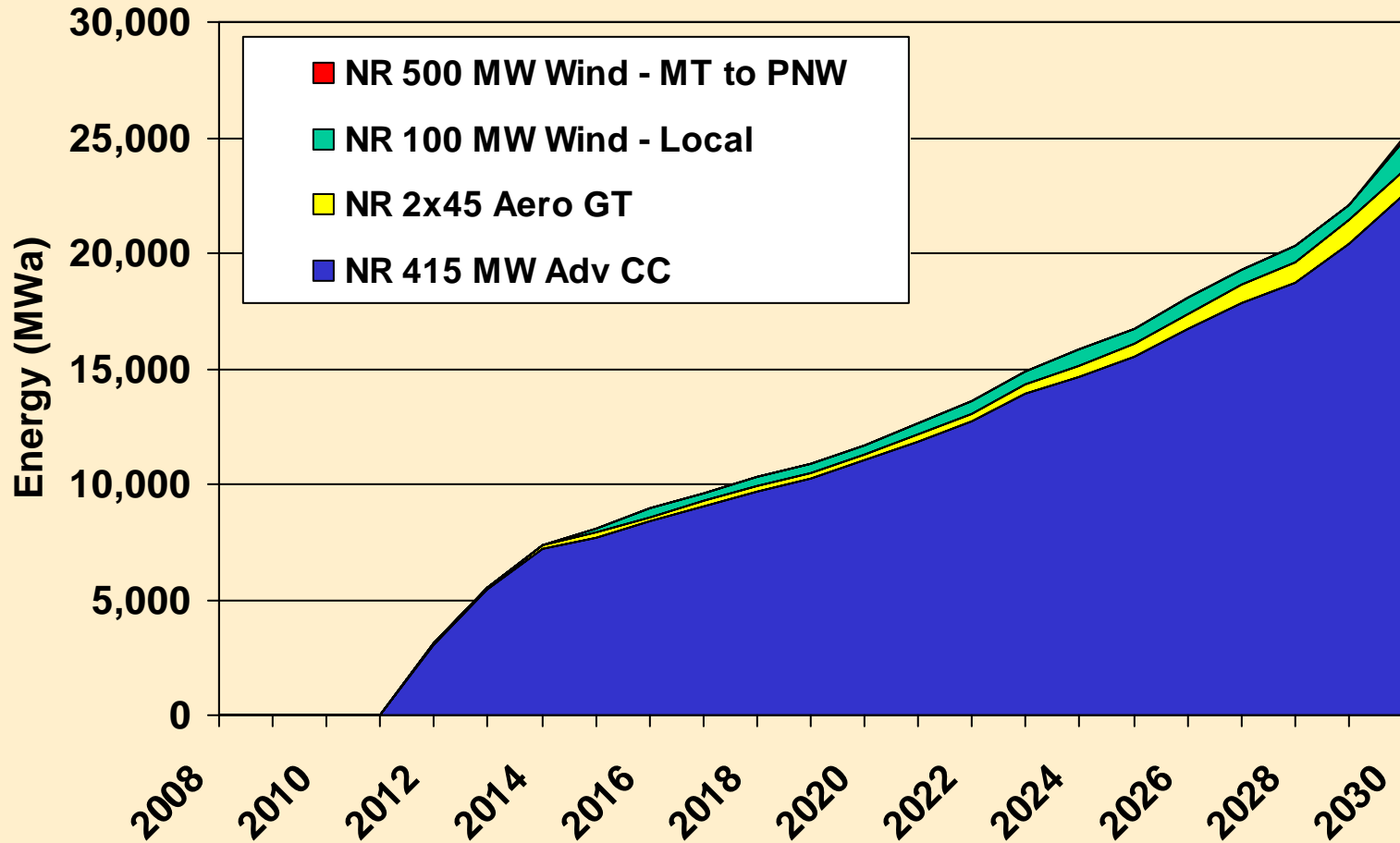
# WECC New Resource Capacity by Technology



# WECC New Resource Peak Contribution by Technology

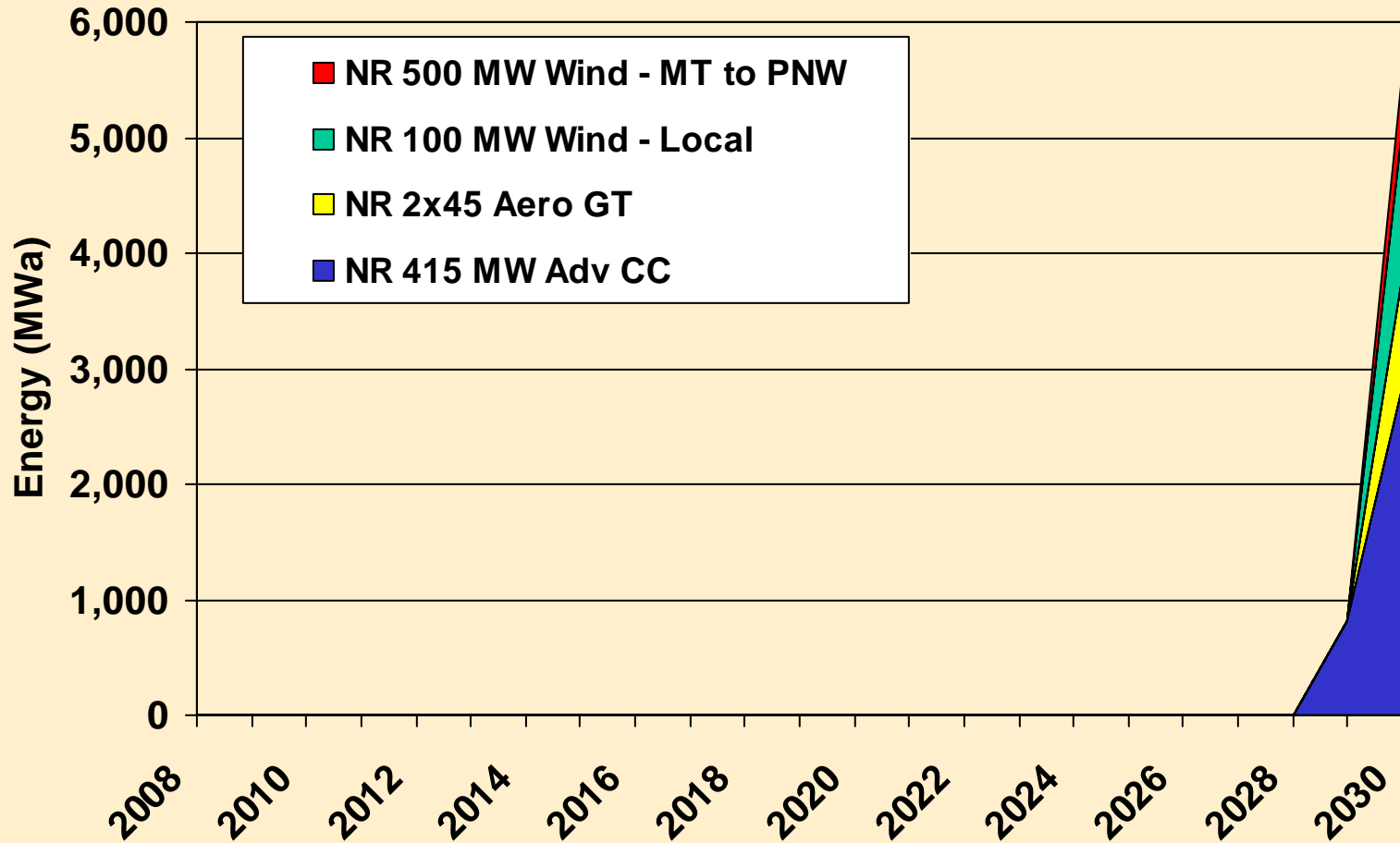


# WECC New Resource Energy by Technology

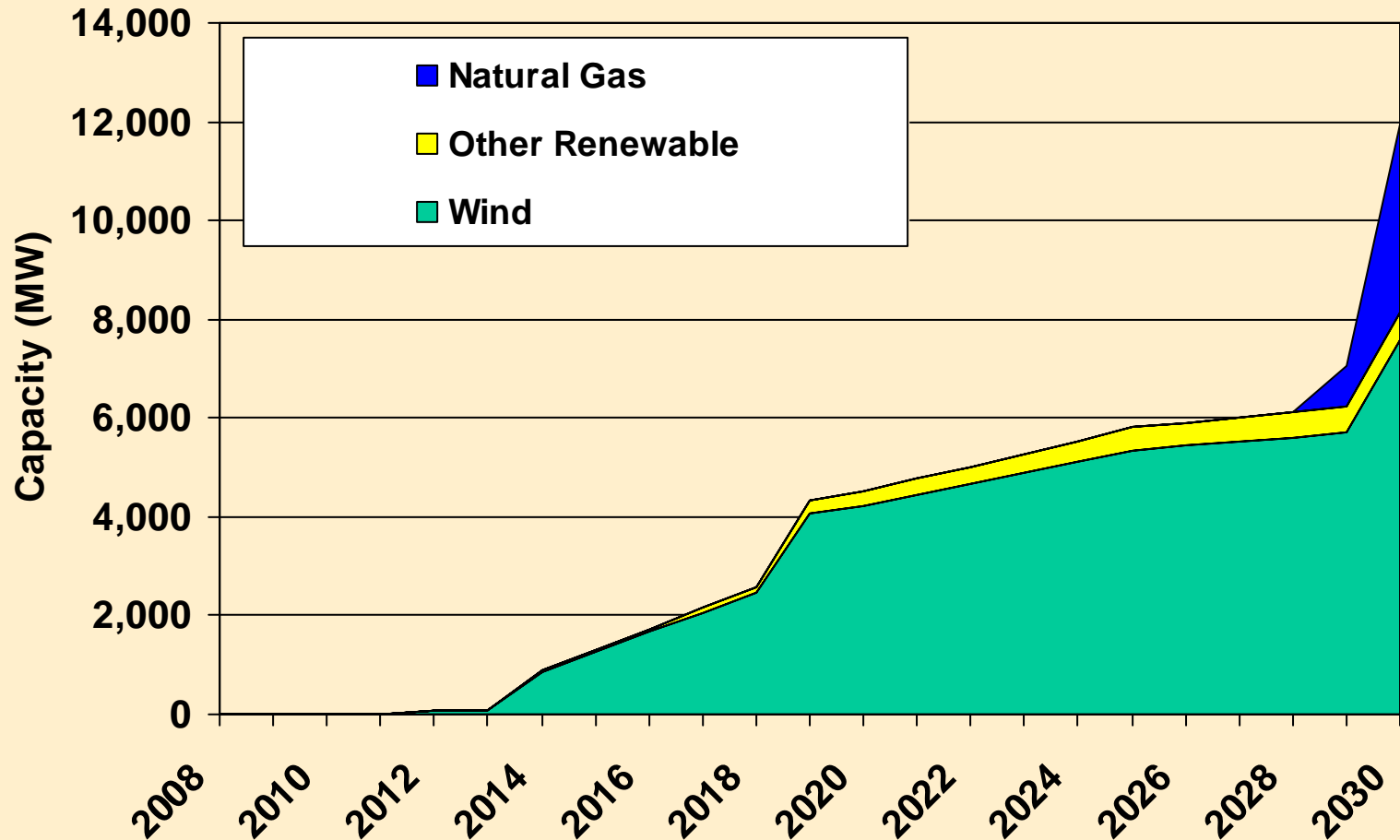




# PNW New Resource Energy by Technology



# PNW Total RPS and New Resource Capacity

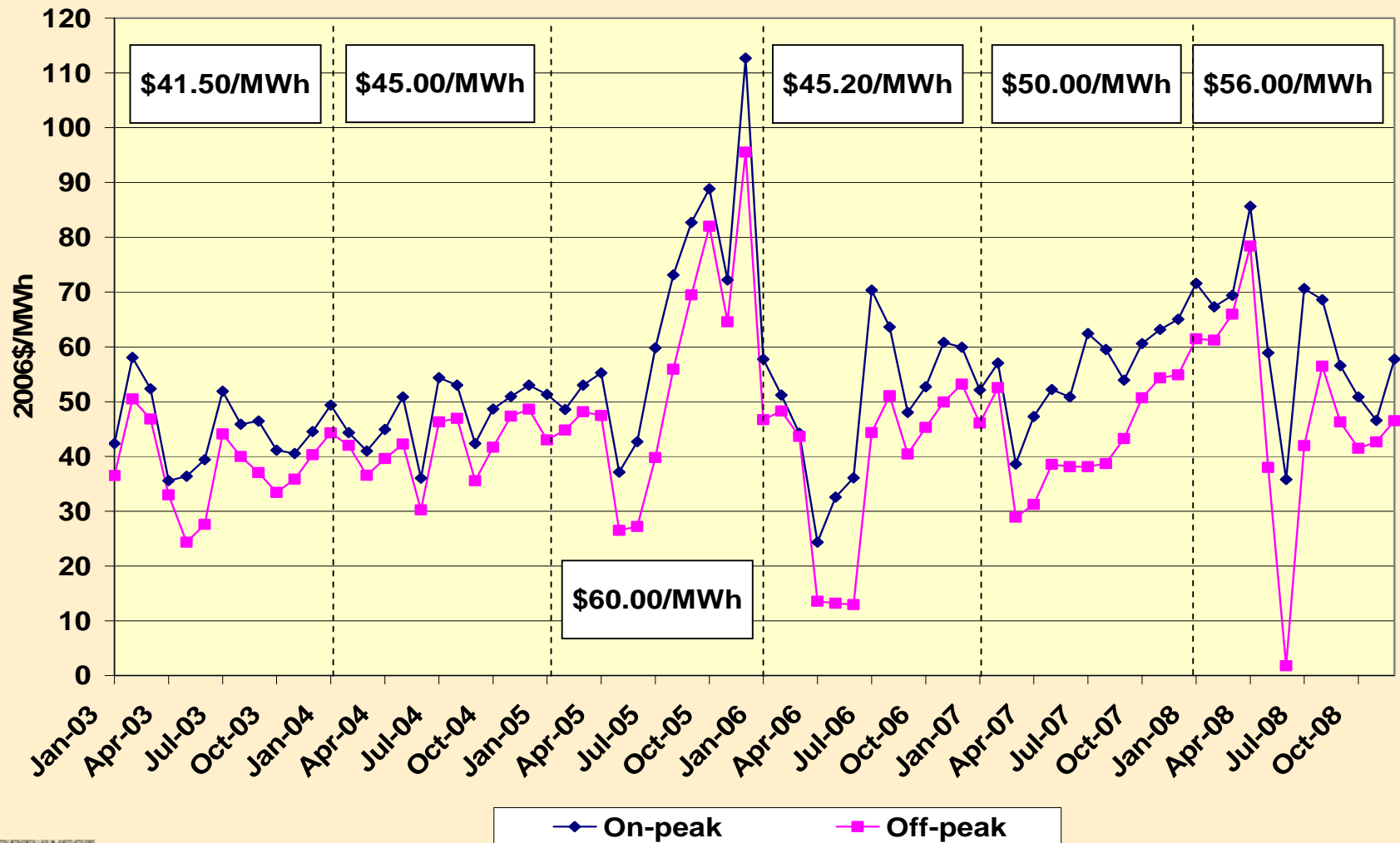


# New Generating Resource Summary

- AURORA Tends to Add Natural Gas Resources
  - Combined Cycles to Provide Energy and Capacity
  - Aero's provide Capacity to Maintain Planning Reserve Margins
- AURORA does Not Add Resources in the PNW until Late in the Planning Period
- Preliminary Results – More Resources Options in Future Model Runs

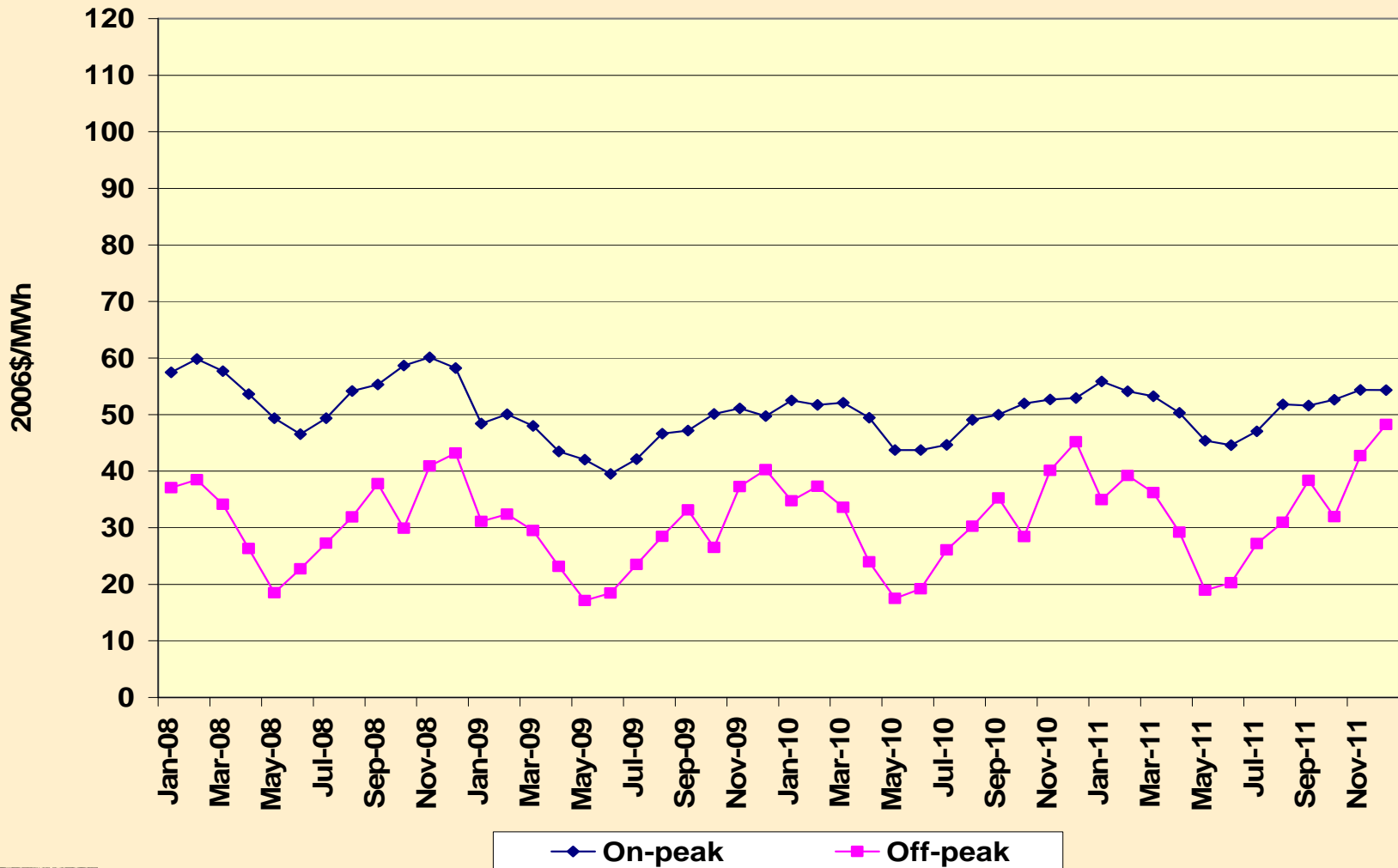
# Historic Mid-C Average Monthly On- and Off-Peak Prices

Source: IntercontinentalExchange (ICE)

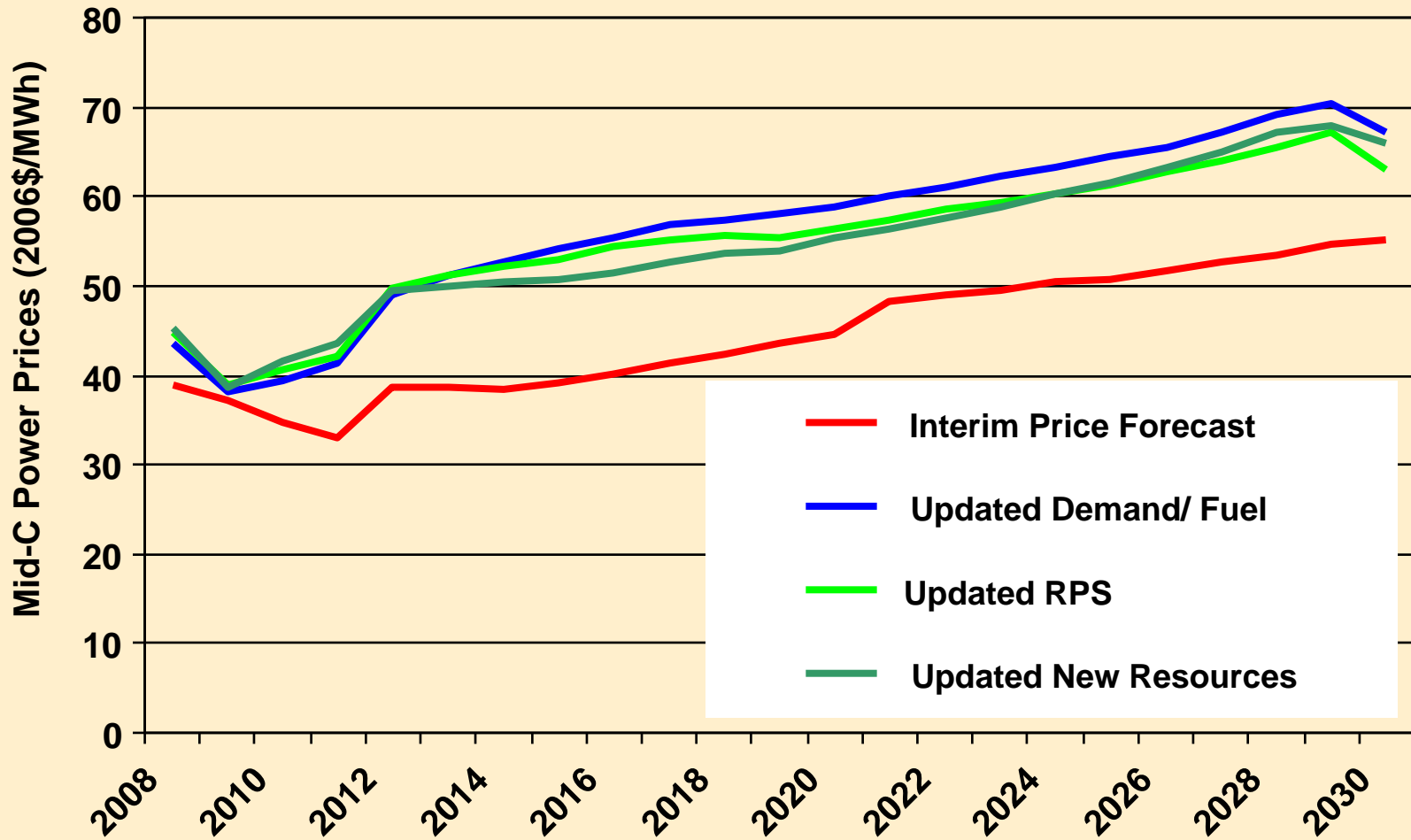


# Forecast Mid-C Average Monthly On- and Off- Peak Prices

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# Impact of AURORA Updates on Mid-C Wholesale Power Price Forecast



# Next Steps

- ❑ Updated transmission links between the modeled load-resource zones
- ❑ Updated hydro condition modeling for the Northwest zones
- ❑ Improved dispatch parameter for combined cycle combustion turbines
- ❑ Updated carbon dioxide price forecasts