Northwest Power and Conservation Council

October 3, 2007

MEMORANDUM

TO: Council Members

FROM: Terry Morlan and Jeff King

SUBJECT: Release of Revised Electricity Price Forecast for Comment

Staff is developing a revised electricity market price forecast. The purpose of this forecast is to provide current estimates of future wholesale power prices and the value of capacity for utilities and agencies that use the Council's forecasts for guidance. The forecast will also provide a cost effectiveness "bookend" to guide the initial resource assessment of for the next power plan.

The revised forecast incorporates the recently adopted assumptions about future natural gas, oil, and coal prices and the findings and conclusions of the Biennial Assessment regarding the capital costs and performance of new resources. The forecast also explores the possible effect of current renewable portfolio standards on supplementary resource additions, market prices of electricity and the value of capacity.

The Power Committee will discuss whether to request public comment on the paper or not. If it is to be released for public comment, we would like Council agreement for its release. If the power committee feels that public comment is not required for this paper, this Council agenda item will likely be dropped.

~~The forecast is not completed for this packet.~~ A description of the market price forecast and a paper will be provided before the Council meeting.

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Sixth Power Plan Initial Revised Wholesale Electricity Price Forecast

Maury Galbraith/Jeff King

Northwest Power and Conservation Council

Missoula MT

October 16, 2007

Objective & purpose

- Provide benchmark capacity and energy costs for conservation and generating resource assessments.
- Provide a mean value forecast for portfolio risk analysis
- Provide a forecast for the Regional Technical Forum (RTF) assessment of conservation measure cost-effectiveness.
- Provide a base case for a subsequent assessment of the marginal CO_2 offset value of conservation (also used by the RTF).
- Provide an "Official" Council forecast of electricity prices for use by other organizations.

Why "Initial"?

- Expect at least one iteration during development of the Sixth Plan when the following become available:
  - Revised conservation supply curves
  - Revised demand forecast
  - Revised generating resource supply curves
  - Revised fuel price forecast
- Followed by a final Sixth Plan forecast based on the recommended resource portfolio of the Sixth Plan

Development: Four steps + sensitivities

1. "Base" case – AURORA setup for CO_2 study converted to 2006 dollar values
2. Revised coal and natural gas price forecasts
3. Revised new resource capital costs from Biennial Assessment
4. Current state renewable portfolio standard acquisition targets (100% achievement of statutory targets)
5. Sensitivities:

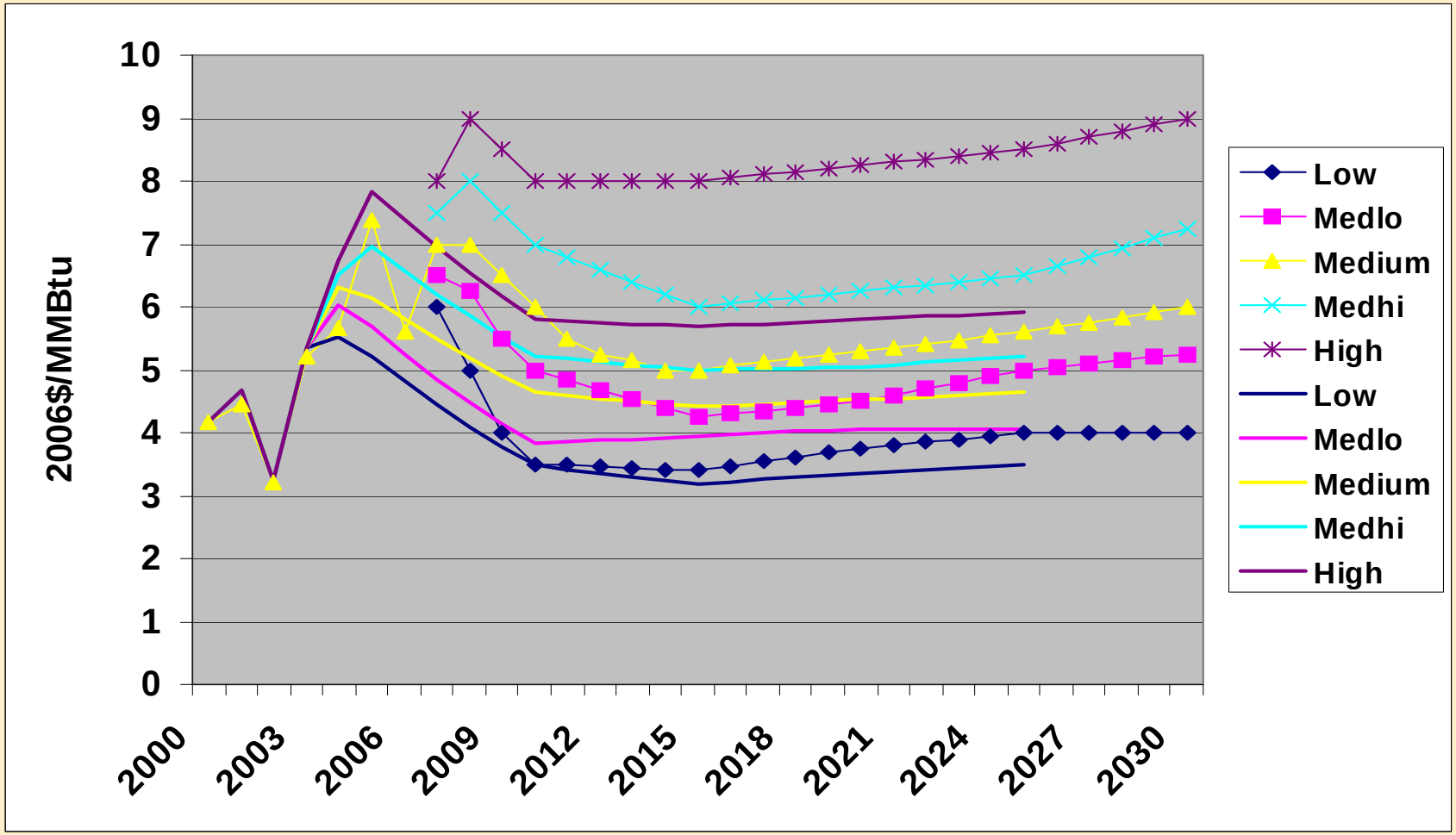
   High fuel price forecast

   Low fuel price forecast

   High CO_2 tax (from 5th Plan)

   75% achievement of RPS targets

Revised natural gas price forecast



Revised new resource costs

- Based on conclusions of Biennial Assessment (Jan 2007)
- Technology cost reduction rates set to zero (except PV).

Resource	5th Plan	Biennial Assessment
Gas turbines (Aeroderivative)	$666	$676
Gas Turbines (Frame)	$416	$422
Combined-cycle	$585	$591
Pulverized Coal	$1449	$1457
IGCC	$1725	$1750
Solar Photovoltaics	$3288	$3288
Wind	$912	$1500

2006 year dollars; 2010 service

Renewable portfolio standards

Area	Basic Standard	Assumed Mix
Arizona	15% by 2025	33% biomass 67% solar PV
California	20% by EOY 2010	75% biomass (N. CA) 50% geothermal (S. CA) 25% solar PV (S. CA) 25% wind
Colorado	20% by 2020 (IOUs) 10% by 2020 (COUs)	33% biomass 67% wind
Montana	15% by 2015	10% biomass 90% wind
New Mexico	20% by 2020 (IOUs) 10% by 2020 (Coops)	33% biomass 67% wind
Nevada	15% by 2015	100% geothermal (N. NV) 50% geothermal (S. NV) 50% solar (S. NV)
Oregon	25% by 2025 (Large utilities)	20% biomass 80% wind
Washington	15% by 2020	15% biomass 85% wind

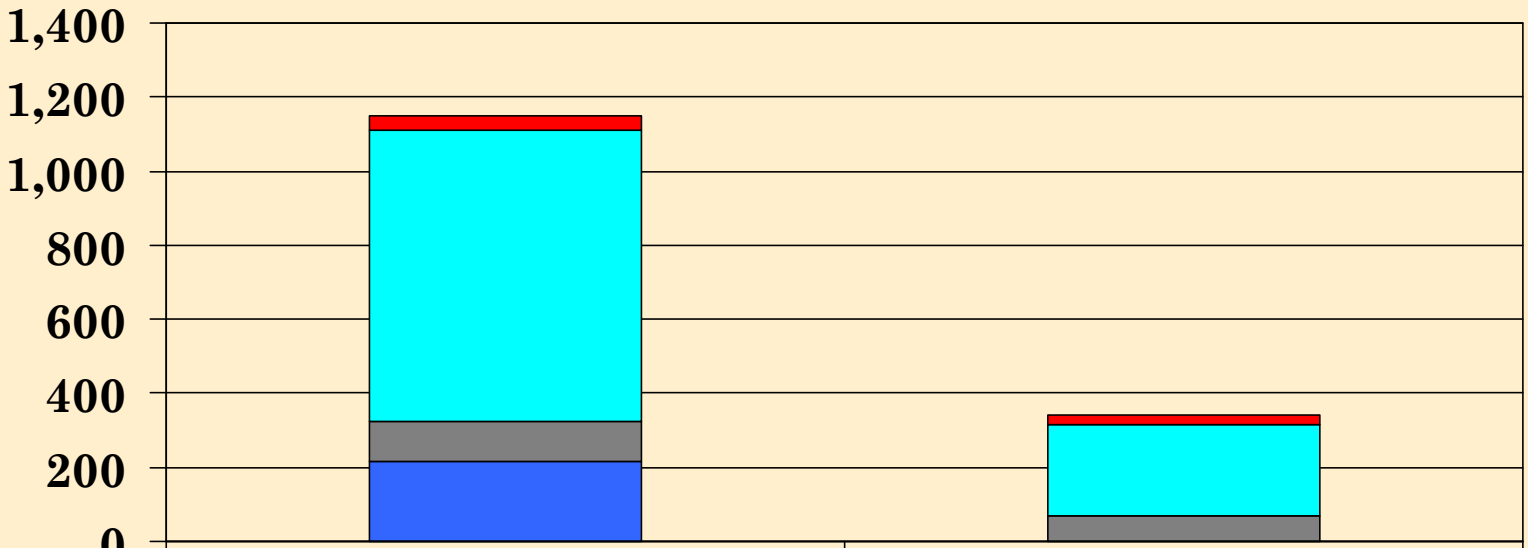
Other updates

- Implemented Capacity Reserve Margin feature:
  - First time used in AURORA modeling.
  - AURORA produces a development schedule co-optimized for revenues from energy and capacity prices.
  - Pool or zone reserve margins:

NW Power Pool:	15% during April – September
	25% during October – March
CA ISO:	15% during all months
Other Zones:	15% during all months

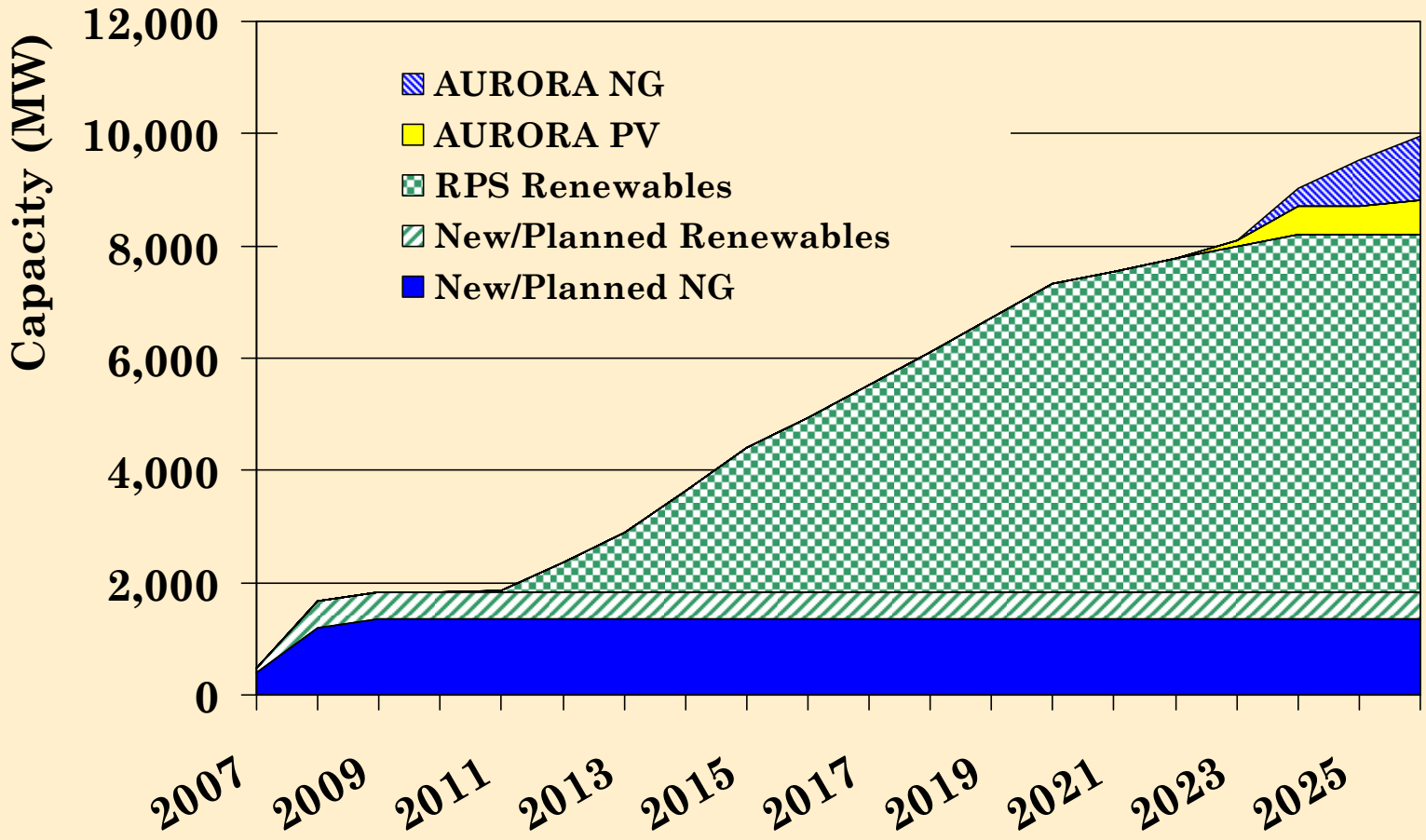
- Updated to AURORA version 8.4
- Updated costs to 2006 dollars

Projects entering service 2005 - 2006

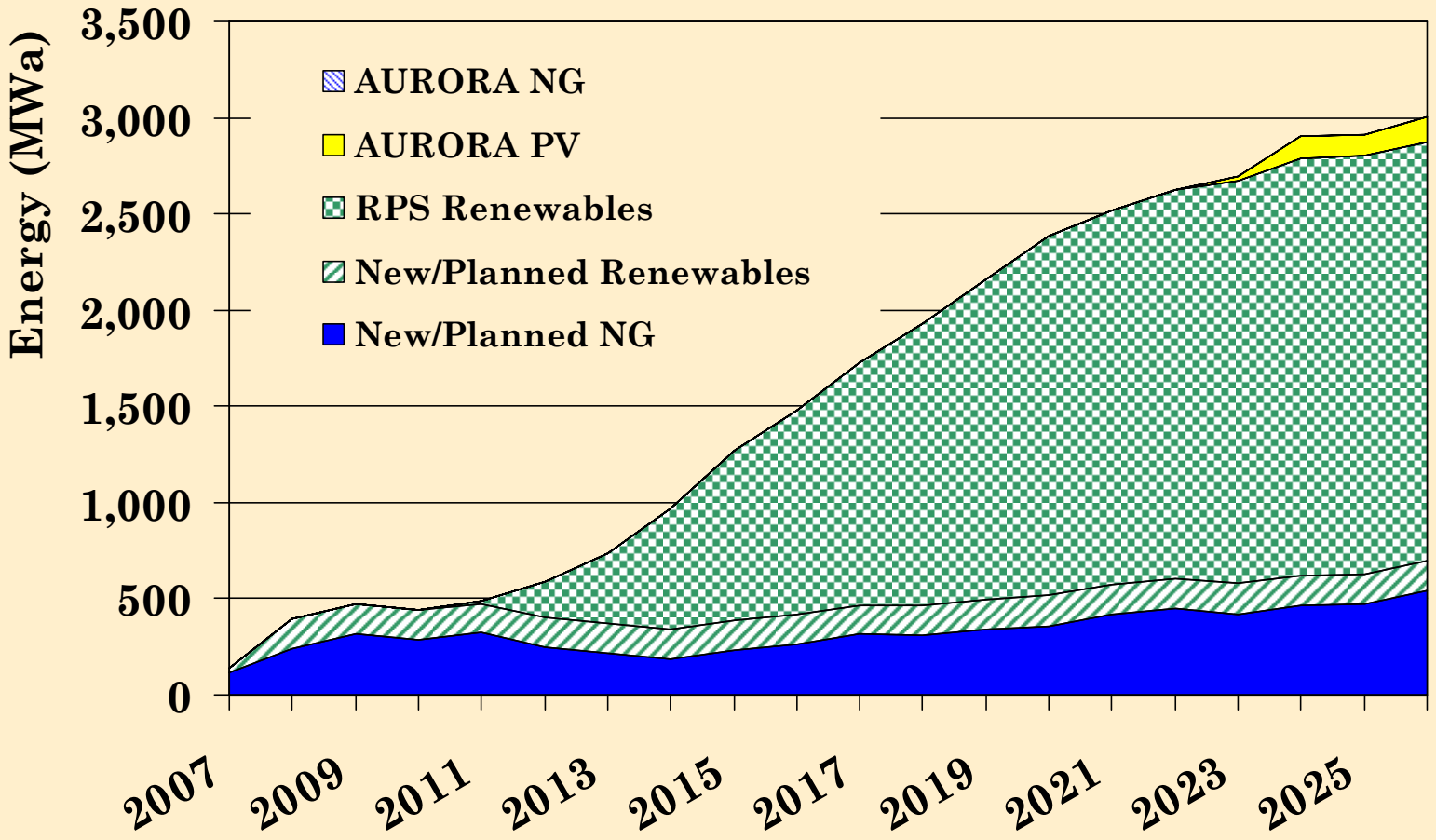


	MW	Mwa
Other	39	28
Wind	788	245
Coal	109	69
NG	214	0

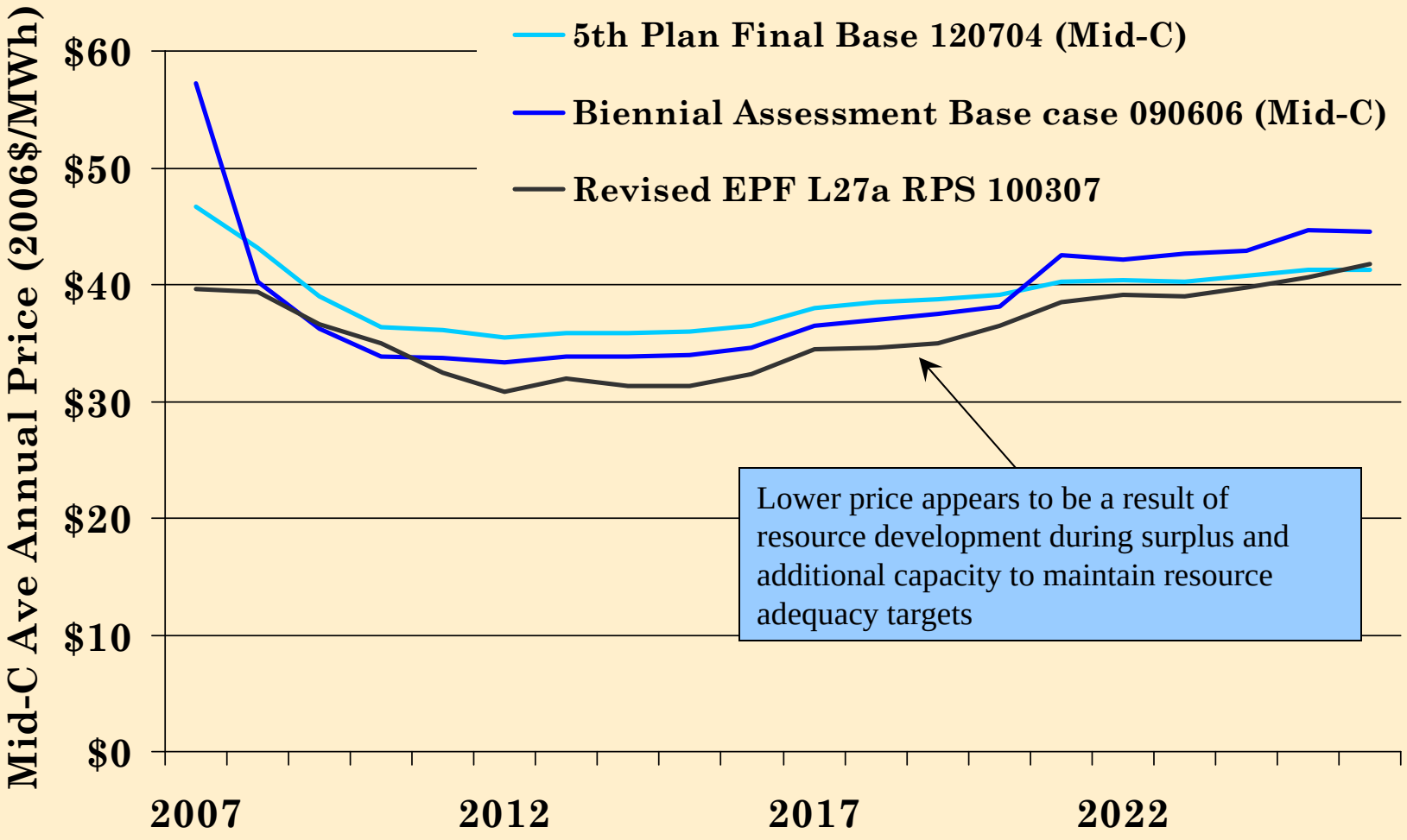
PNW Resource Expansion 2007-26 (MW)



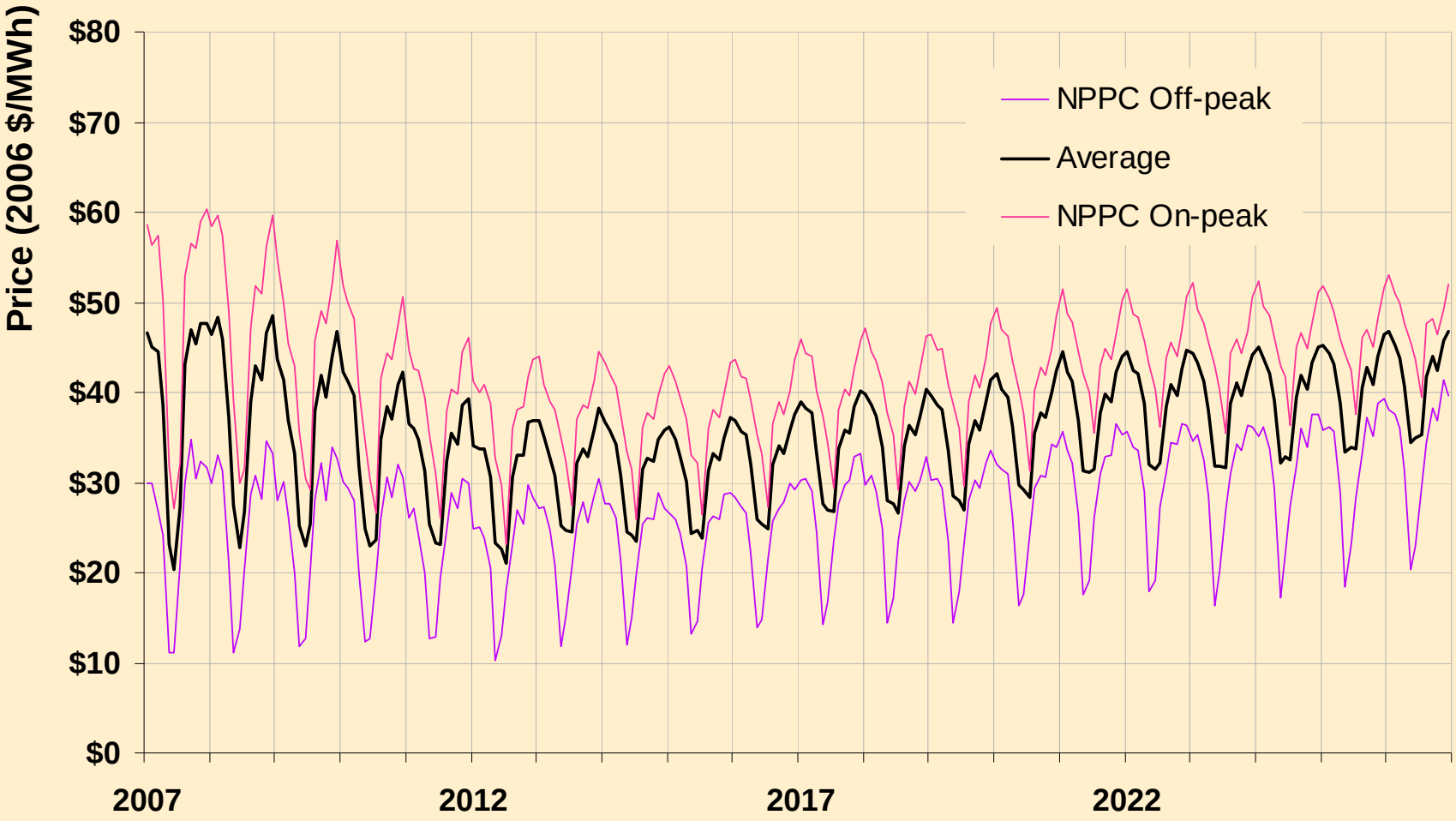
PNW Resource Expansion 2007-26 (MWa)



Comparison to earlier forecasts

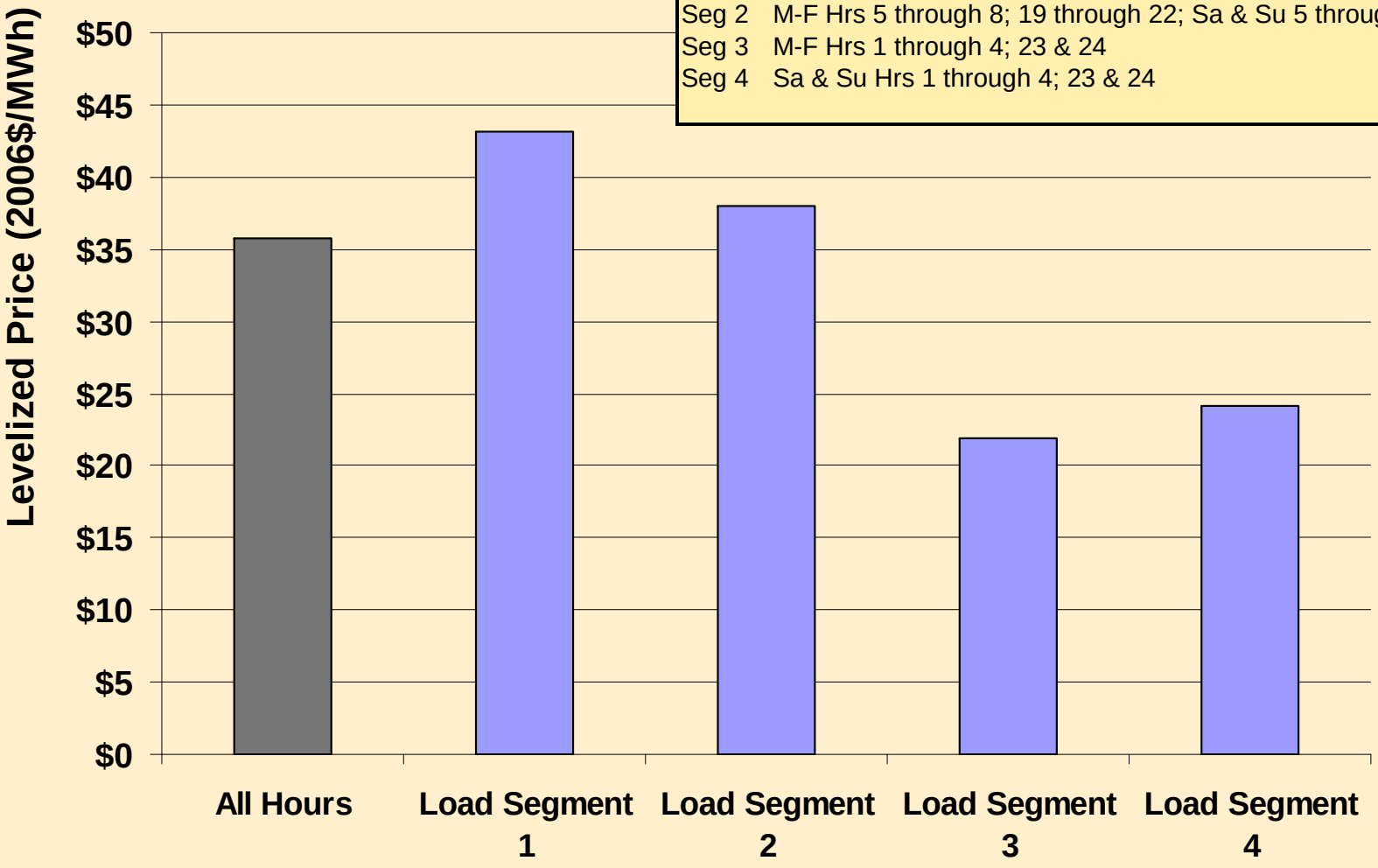


Mid-Columbia average monthly prices

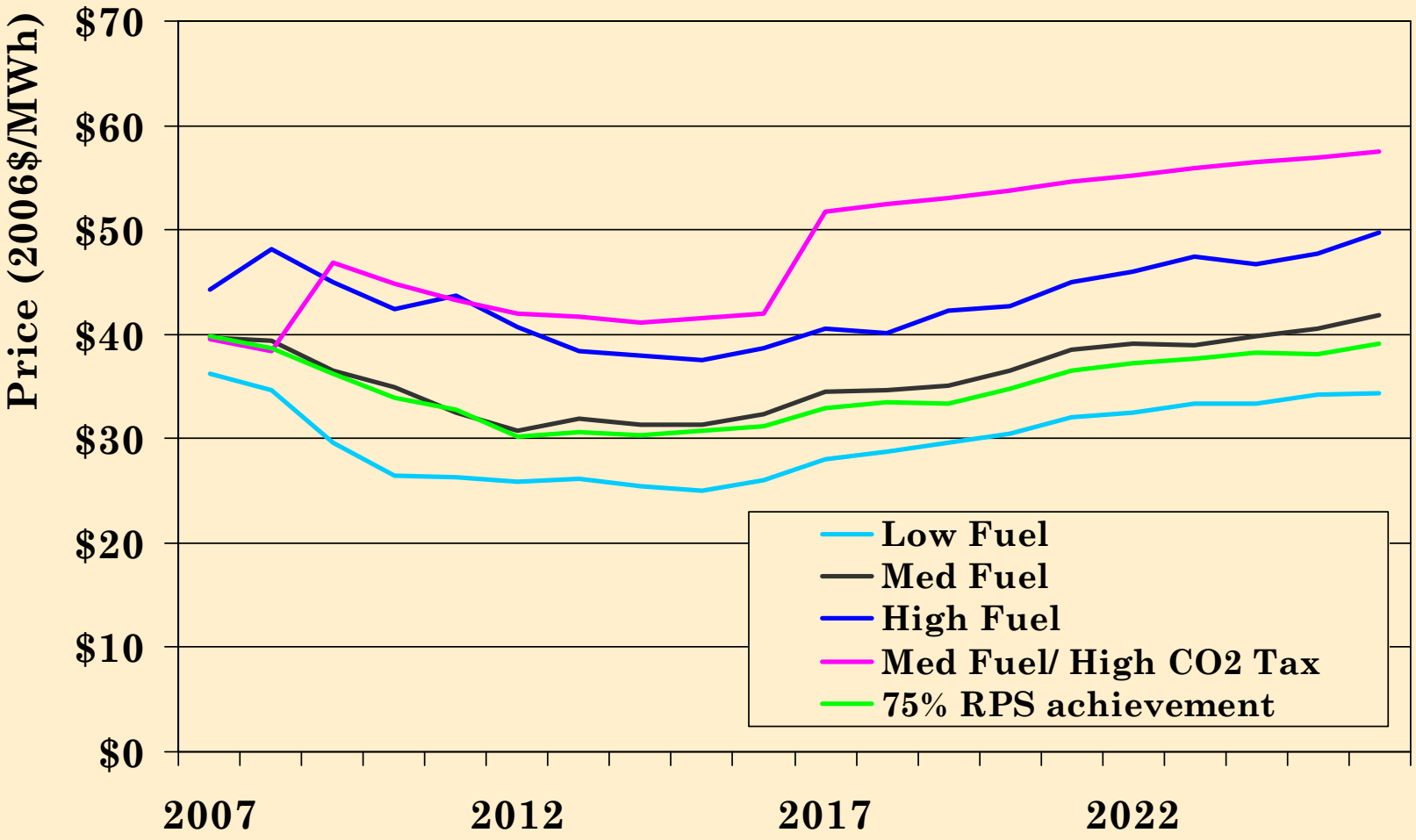


Mid-Columbia levelized prices by load segment

Seg 1 M-F Hrs 9 through 18
Seg 2 M-F Hrs 5 through 8; 19 through 22; Sa & Su 5 through 22
Seg 3 M-F Hrs 1 through 4; 23 & 24
Seg 4 Sa & Su Hrs 1 through 4; 23 & 24



Sensitivities



The price forecast will not necessarily equate to the value of the marginal new resource

- Costs missing from the price forecast:
  - Capital and other fixed costs of the marginal resource will not be reflected in the energy market price if RPS or capacity resources are being forced in.
  - Intra-hour ancillary service costs (e.g., for regulation or load-following) are not fully captured in an hourly model such as AURORA.
  - Because wind and solar are represented with flat output, hour-to-hour shaping costs are not captured.
- The value of a non-RPS marginal resource will be the sum of its:
  - Energy market value.
  - Capacity market value.
  - Value of regulation, load-following and inter-hourly storage and shaping services.
- The cost-effective resource during periods when acquisitions are needed to meet RPS targets is the least-cost qualifying RPS resource.