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June 12, 2012

## MEMORANDUM

**TO:** Power Committee

**FROM:** Massoud Jourabchi

**SUBJECT:** Update to near-term outlook for natural gas prices

The Council monitors its power planning assumptions on a regular basis to identify any significant changes that might affect the plan or the region. Last August, Council updated its long-term outlook for natural gas. This report reflects the proposed changes in the Council's near-term fuel price forecast, covering year 2012-2014. Because several organizations use the Council's price forecasts, it is important that the Council recognize the changes and provide the revised forecast to the region. Staff is seeking Council's approval of these forecasts. If approved these prices will be used for the mid-term assessment and will be available to outside entities from Council website.

Last year's changes in the outlook were due to a fundamental shift in expectations about future natural gas supplies, and developments in shale gas. This year's update reflects the changes since Council's update from last year. After consultation with the Natural Gas Advisory Committee (NGAC) we have proposed a downward revision in the range of fuel price forecasts for 2012-2014. This adjustment reflects the expected excess supply in the natural gas prices, and continuing slow economic recovery.

### Natural Gas Price Forecast Revision

The range of natural gas prices is narrowed and lowered significantly in the near term compared to the Sixth Power Plan forecasts. The rapid development of shale gas, as well the quest for oil in the shale, and tight sand formations has created a glut of natural gas that is likely to last for several years, depressing prices. The natural gas prices dropped by about \$2 dollars per million Btu in 2012, with a slow recovery during 2013 and 2014.

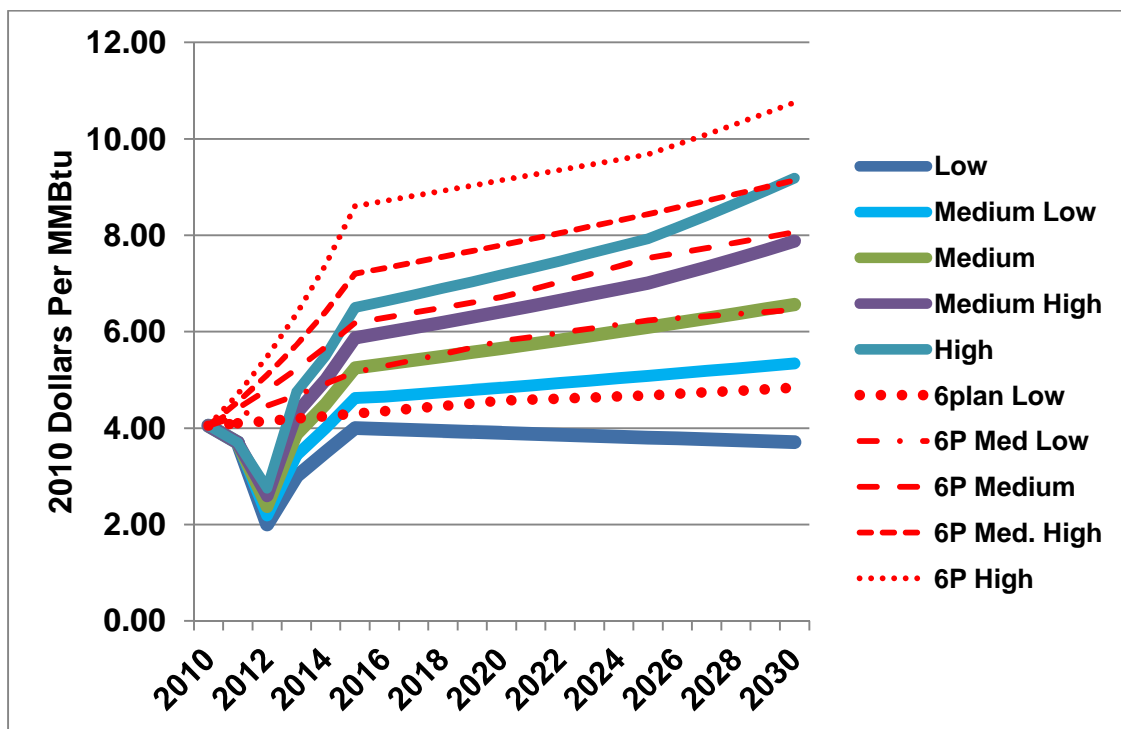
The range of forecasts can be linked conceptually to different views of the supply and demand for natural gas. The high price forecast might be consistent for example, with rapid economic recovery in the United States and worldwide, environmental restrictions on shale gas development, more substitution of natural gas electricity generation for coal, increased use of natural gas vehicles, increased demand for exports of LNG from Canada and United States, and increased demand from gas-to-liquid (GTL) projects. In contrast the low forecast would be consistent with conditions that limit the demand for natural gas and promote the rapid development of supply.

## Implications of Revised Natural Gas Price Forecasts

The likely effect of the revised fuel price forecast on a revised power plan would be to reduce the forecast of electricity prices and to some degree change the inter-fuel competition between natural gas and electricity. We do not expect significant effects on the resource strategy from this change, but that will be tested in the mid-term assessment check in. Natural gas generation is the resource in the plan for energy and capacity needs not met by conservation, which is constrained by assumed rates of penetration, and the development of renewables driven by RPS requirements.

The following figures show the comparison of the 6<sup>th</sup> Plan forecast with the revised forecast. As mentioned earlier the revised forecast reflects lower natural gas prices.

**Comparison of Revised and Sixth Plan Natural Gas Price Forecasts**  
**Wellhead Price (constant 2010 dollars per million Btu)**



In addition to natural gas prices, staff has prepared a draft update for oil and coal prices. These revised forecasts reflect higher oil prices.

# Natural Gas Price Forecast a near-term adjustment

June 12<sup>th</sup> 2012

Massoud Jourabchi



# In this presentation

- Reasons for the update
- Review of actual fuel prices
- Short-term expectations
- Proposal for update to fuel prices
- Comparison to other forecasts
- Implication of change in fuel prices



## Reasons for updating the fuel price forecast

- Last year: Development of fracking shale
- Natural gas prices were revised downward
- This year: continued slow recovery, build-up of storage
- Higher than expected oil prices
- Other organizations rely on the Council's forecast
- In preparation for mid-term assessment of the Power Plan

## Comparison of Forecast and Actual 2011 (2010\$)

	Wellhead Price Natural Gas Forecast \$/mmbtu <b>\$3.70 Actual</b> ←	PRB Coal Prices \$/mmbtu	Refiners Acquisition Cost Forecast \$/Barrel
Low	\$4.10	\$0.56	\$59
Med-Low	\$4.25	\$0.63	\$65
Medium	\$4.41	\$0.70	\$71
Med-High	\$4.54	\$0.76 <b>\$0.8 Actual</b>	\$76
High	\$4.71	\$0.90	\$83

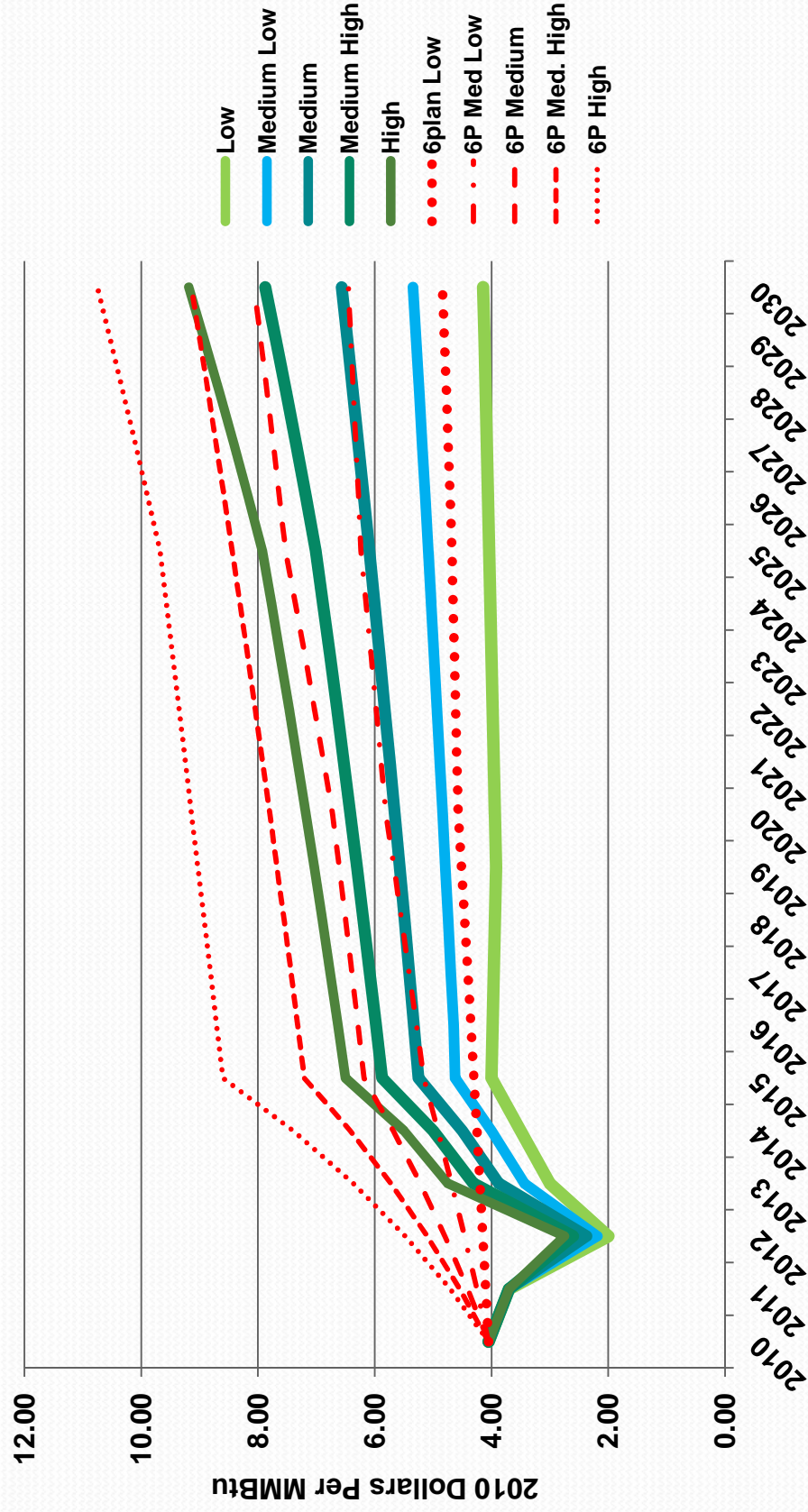
**\$100 Actual**

Coal prices are within forecast range  
 Natural gas and oil prices are out of forecast range

# Natural Gas Advisory Committee- Poll

Range of Natural Gas Price Outlook		2012	2013	2014	2015
<b>Initial Proposed range</b>		\$2 - \$3	\$3 - \$5	\$3.5 - \$5.75	\$3.95- \$6.82
April 2012 poll of NGAC		2012	2013	2014	2015
Response 1		2.00	\$3 - \$5	\$3.5 - \$5.75	
Response 2		2.25	3.91	4.09	4.38
Response 3		\$2.01-\$2.99	\$2.99 - \$4.54	\$2.97-\$5.15	\$3.2-\$6.07
Response 4		\$2 - \$3	\$3 - \$5	\$3.5 - \$5.75	\$3.95- \$6.82
Response 5		\$2 - \$3	\$2.75 - \$4.75	\$3.25 - \$5.50	\$3.95- \$6.82
Response 6		\$2 - \$3	\$3 - \$5	\$3.5 - \$5.75	\$3.95- \$6.82
Response 7		2.33	3.65	4.08	4.44
Response 8		\$2 - \$3	\$3 - \$5	\$3.5 - \$5.75	\$3.95- \$6.82
Response 9		\$2 - \$3	\$3 - \$5	\$3.5 - \$5.75	\$3.95- \$6.82
Additional Information from Energy Intelligence report					
NGW Price Forecast Score		\$1.90- \$2.80			
US EIA		2.45			
<b>2012 Revised Forecast</b>		\$2.00 - \$2.75	\$3 - \$4.75	\$3.5 - \$5.50	\$4.00- \$6.50

# Recommended Adjustment to Wellhead Natural Gas Price Forecast Draft





# Comparison of forecasts

Proposed prices for Natural Gas Lower 48 state wellhead (2010\$/MMBTU)

	Low	Medium Low	Medium	Medium High	High
2010	4.05	4.05	4.05	4.05	4.05
2011	3.70	3.70	3.70	3.70	3.70
2012	2.00	2.19	2.38	2.60	2.75
2013	3.00	3.44	3.88	4.31	4.75
2014	3.50	4.00	4.50	5.00	5.50
2015	4.00	4.63	5.25	5.88	6.50
2016	3.98	4.65	5.33	5.98	6.63
2017	3.96	4.69	5.41	6.09	6.76
2018	3.94	4.74	5.49	6.19	6.90
2019	3.92	4.79	5.57	6.30	7.04
2020	3.90	4.84	5.66	6.42	7.18
2021	3.88	4.89	5.74	6.53	7.32
2022	3.86	4.93	5.83	6.65	7.47
2023	3.84	4.98	5.91	6.76	7.62
2024	3.82	5.03	6.00	6.89	7.77
2025	3.80	5.08	6.09	7.01	7.92
2026	3.79	5.13	6.18	7.17	8.16
2027	3.77	5.19	6.28	7.34	8.41
2028	3.75	5.24	6.37	7.51	8.66
2029	3.73	5.29	6.47	7.69	8.92
2030	3.71	5.34	6.56	7.87	9.19
2010-2015	-0.2%	2.7%	5.3%	7.7%	9.9%
2015-2020	-0.5%	0.9%	1.5%	1.8%	2.0%
2020-2025	-0.5%	1.0%	1.5%	1.8%	2.0%
2025-2030	-0.5%	1.0%	1.5%	2.4%	3.0%

## EIA Short-term

2012 \$2.5/mmbtu

2013 \$3.4/mmbtu

## NYMEX

2012 \$2.5/mmbtu

2013 \$3.5/mmbtu

## Natural Gas Week

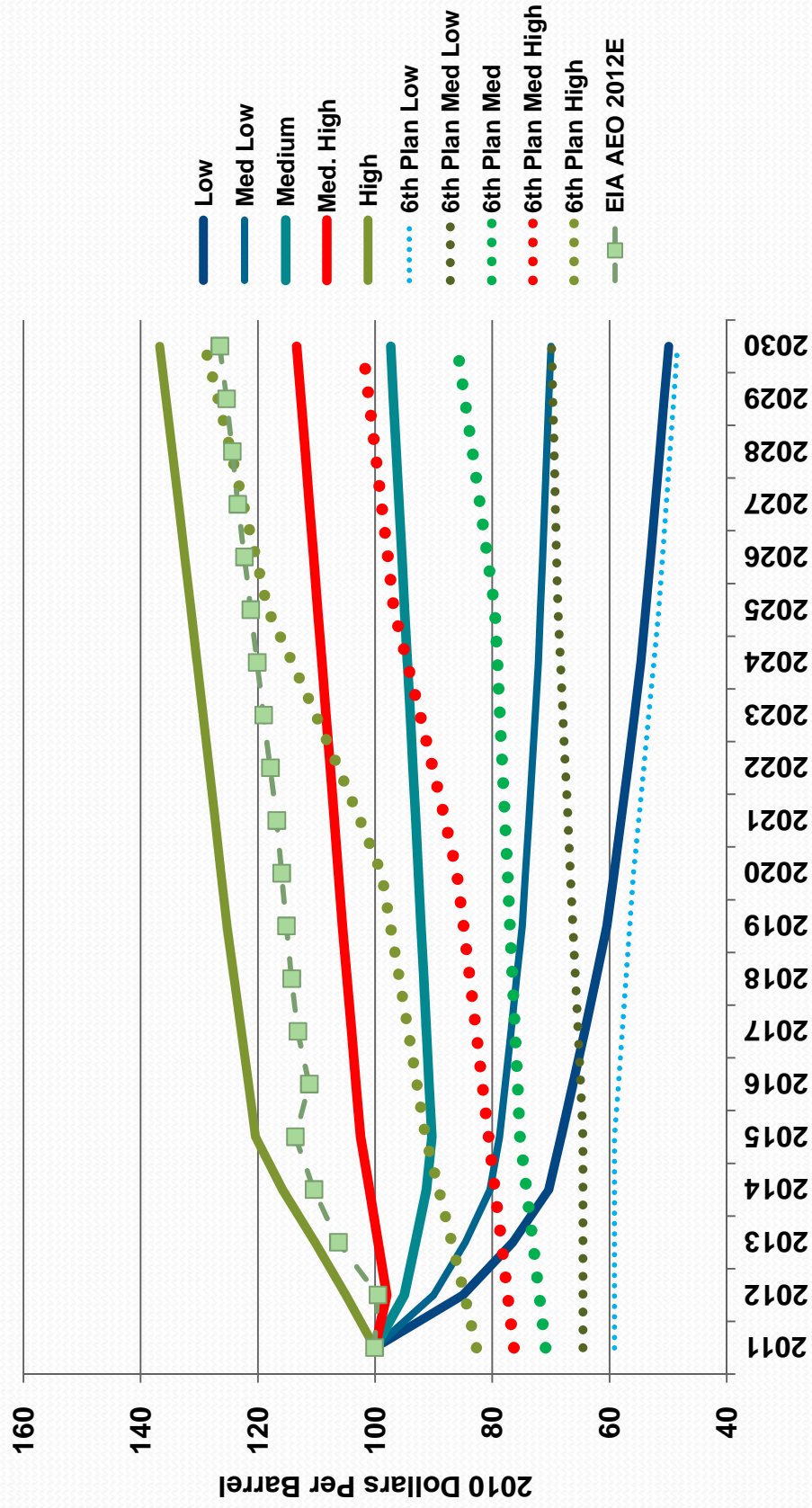
### Analyst Scorecard

2012 ~ \$2.39/mmbtu

2013 ~ \$3.29/mmbtu

# Proposed oil price revision

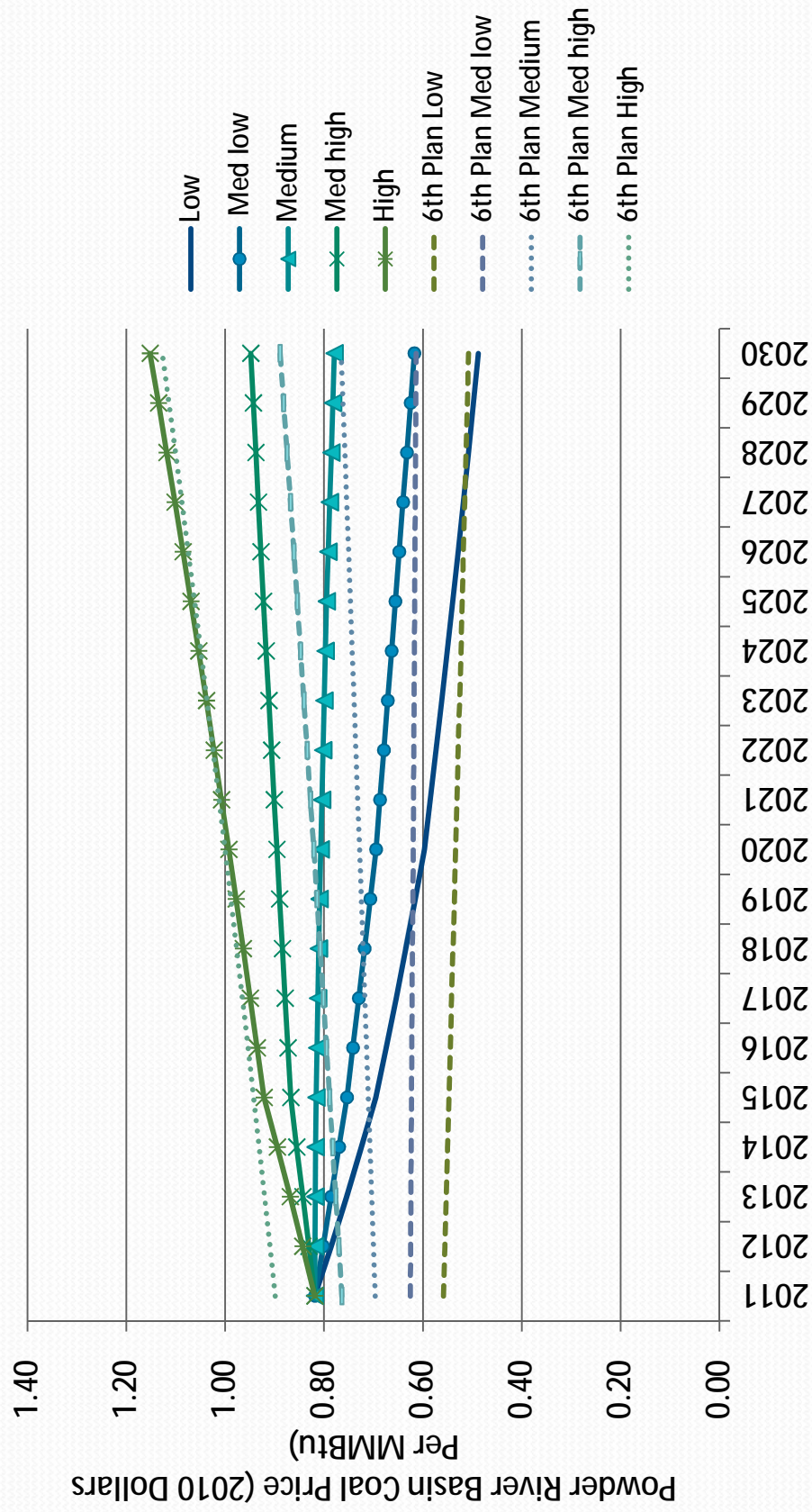
Refiners acquisition cost of oil (2010\$/Barrel)



# Proposed Oil Price forecast- Draft

	Refiners Acquisition Cost \$2010 dollars per Barrel				
	Low	Med Low	Medium	Med. High	High
2011	100	100	100	100	100
2012	85	90	95	98	105
2013	77	85	93	99	110
2014	70	80	91	101	116
2015	68	79	90	102	120
2016	66	78	91	103	122
2017	64	77	91	104	123
2018	62	76	92	105	124
2019	60	75	92	106	125
2020	59	74	93	106	126
2021	58	74	93	107	127
2022	57	73	94	108	128
2023	56	73	94	108	129
2024	55	72	94	109	130
2025	54	72	95	110	131
2026	53	71	95	110	132
2027	52	71	96	111	134
2028	51	71	96	112	135
2029	51	70	97	113	136
2030	50	70	97	113	137
2010-2015	-2.1%	0.7%	3.5%	6.2%	9.6%
2015-2020	-2.8%	-1.2%	0.5%	0.7%	1.0%
2020-2025	-1.9%	-0.7%	0.5%	0.6%	0.8%
2025-2030	-1.5%	-0.5%	0.5%	0.7%	0.8%

# Proposed coal price revision: Powder River Basin coal (2010\$/mmbtu)





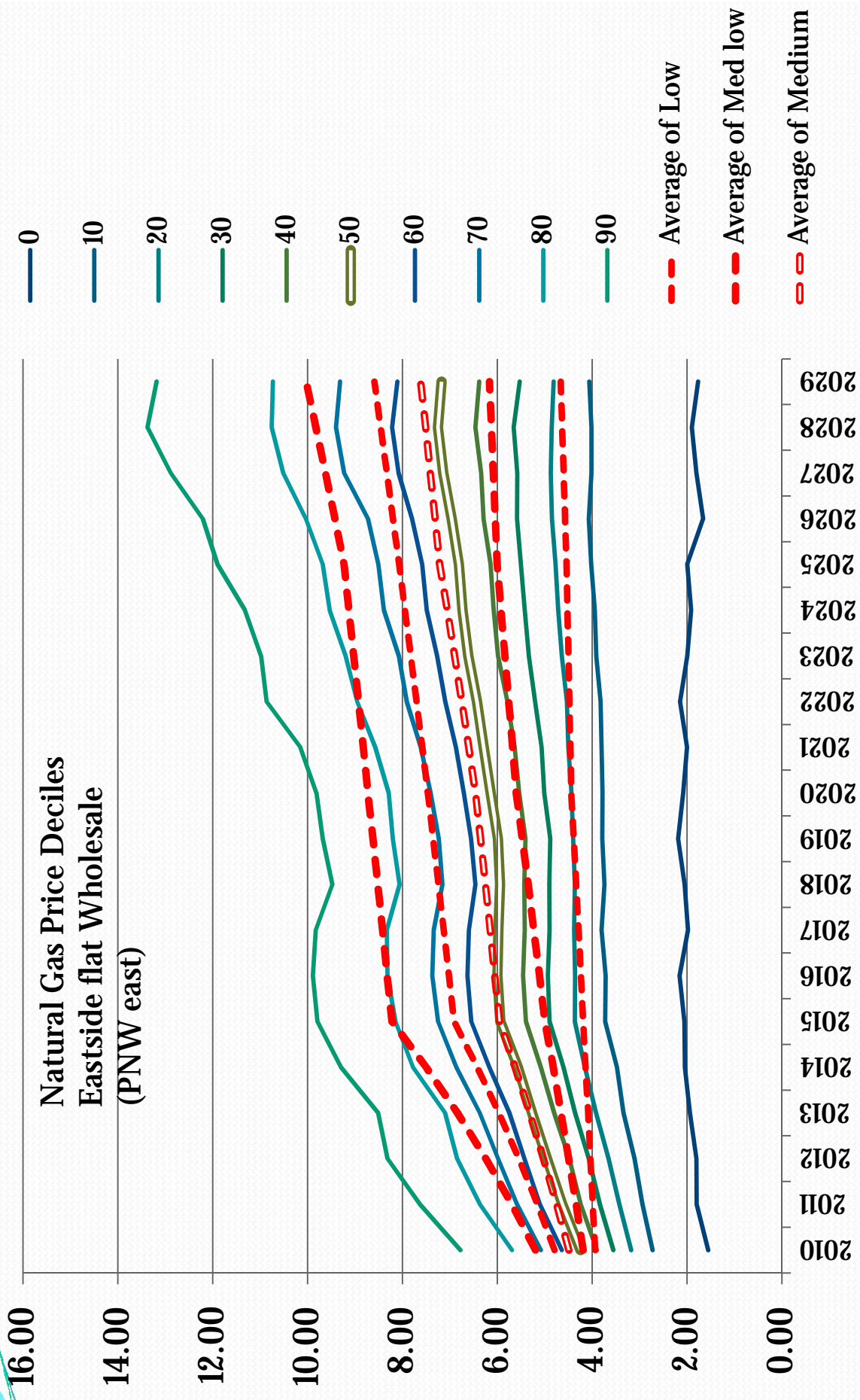
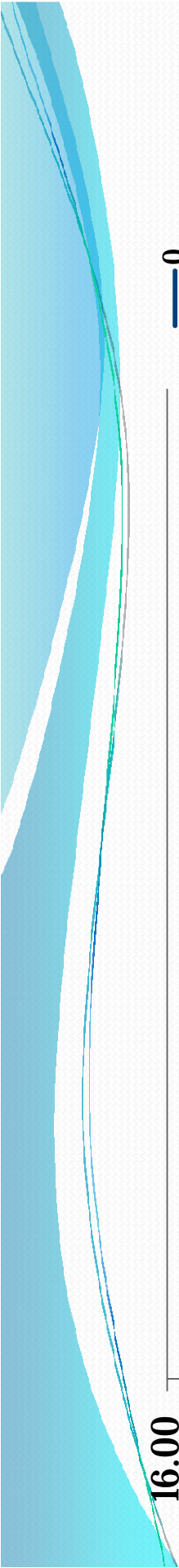
# Implications of fuel price forecast

- Lower electricity market clearing prices
- Coal prices do not significantly impact regional wholesale price of electricity.
- Impact of changing forecasts will be evaluated during the mid-term review.



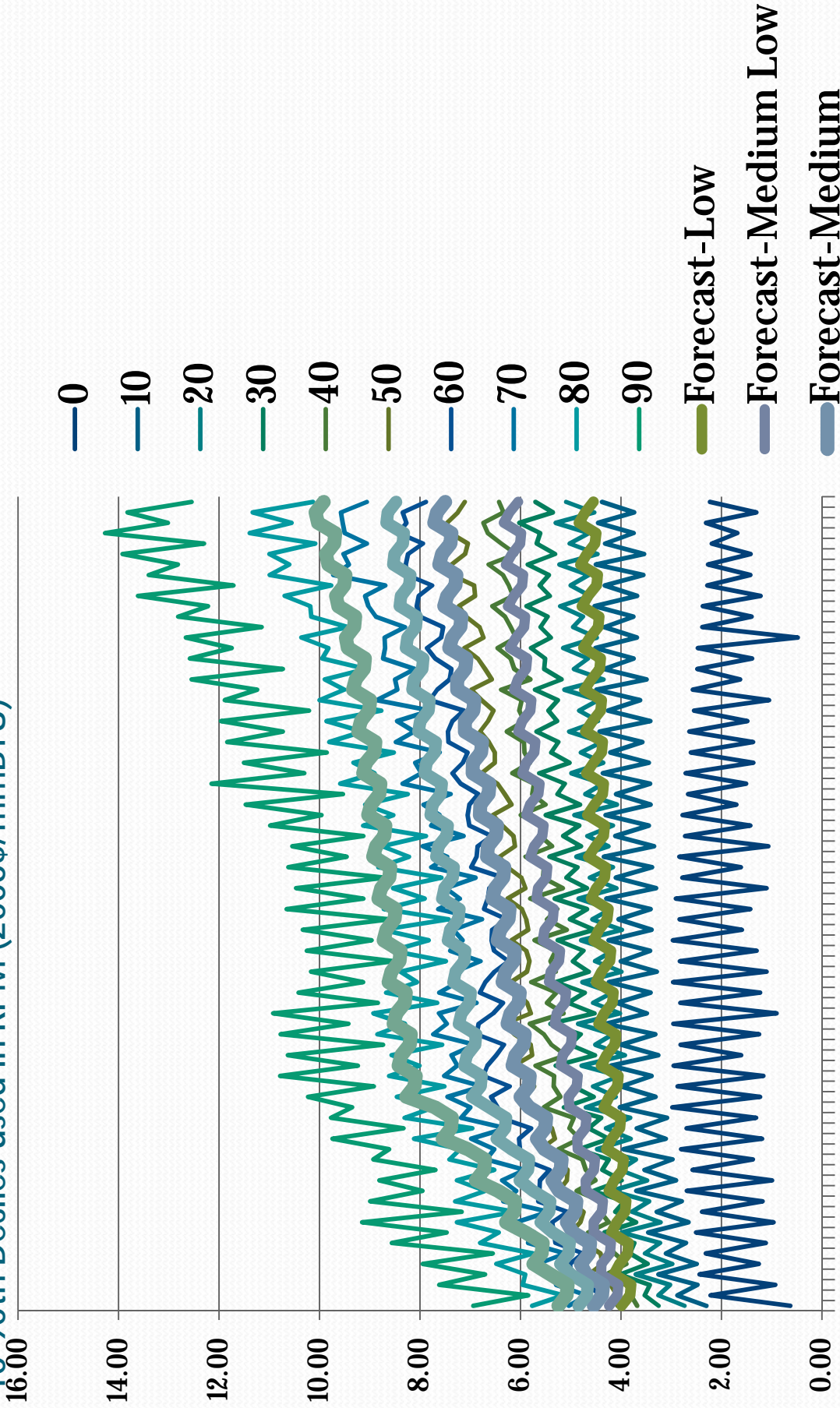
# Short-term price fluctuations

- Our long-term fundamental price forecasts are subject to monthly, seasonal fluctuations which are captured in the Regional Portfolio Model.
- The following slides show the range of quarterly fluctuations in natural gas prices modeled in RPM as well as the fundamental price forecasts



# Range of Forecast Natural Gas Price Delivered to Electric Utilities PNW East &

10-90th Deciles used in RPM (2006\$/mmBTU)



Quarterly prices - 2010-2029





# Summary

- Natural gas prices are lowered in the near-term
- Oil prices are increased
- Coal prices are within the forecasted range
- Should the council approve these updates so we can release the new fuel price forecast for use in the Mid-term assessment and other outside parties.