Northwest Power and Conservation Council

August 10th, 2011

Update to the Council's Forecast of Fuel Prices

The Council monitors its power planning assumptions on a regular basis to identify any significant changes that might affect its Sixth Power Plan, and the action plan also calls for a biennial monitoring report (MON-1) and a mid-term check on conservation savings (CONS-16).

This report reflects the proposed changes in the Council's long-term fuel price forecast. It is often difficult to distinguish short-term variations in fuel prices, which are expected and modeled in the Council's planning, from significant long-term changes that can fundamentally alter the whole range of future expectations. This rarely happens. However, changes in the outlook for natural gas supplies in the last year appear to signal a fundamental shift in expectations about future natural gas supplies. Cost-effective technologies to obtain natural gas trapped in shale formations has changed the view of natural gas supplies from declining and constrained (as forecast in the Sixth Power Plan) to plentiful and adequate for many decades to come. Although the potential of shale gas was identified in the plan, the expected cost of developing it has been reduced through technological breakthroughs so that future costs and prices are now lower.

After working with the Natural Gas Advisory Committee, the Council is proposing a downward revision of our range of fuel price forecasts. A range of forecasts recognizes continued uncertainty about developing shale gas--its costs and environmental effects--as well as the speed of the economic recovery.

Natural Gas Price Forecast Revision

The range of natural gas prices is significantly narrower and lower in the near term compared to the Sixth Power Plan's forecast. The rapid development of shale gas has created a glut of natural gas that is likely to last for several years and depress prices. By the end of the forecast horizon in 2030, the forecast reflects a range of possible long-term equilibrium natural gas prices. The revised medium forecast is about equal to the medium-low forecast in the Sixth Plan at $6.44 in 2010 constant dollars. The revised high forecast is a little above the medium-high, and the low revised forecast is a little less than $1 below the low case.

The range of forecasts reflects the different views of supply and demand for natural gas. The high price forecast might be consistent, for example, with a rapid economic recovery in the U.S. and worldwide, environmental restrictions on shale gas development, aggressive regulation of carbon emissions leading to 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 projects. In contrast, the low forecast would be consistent

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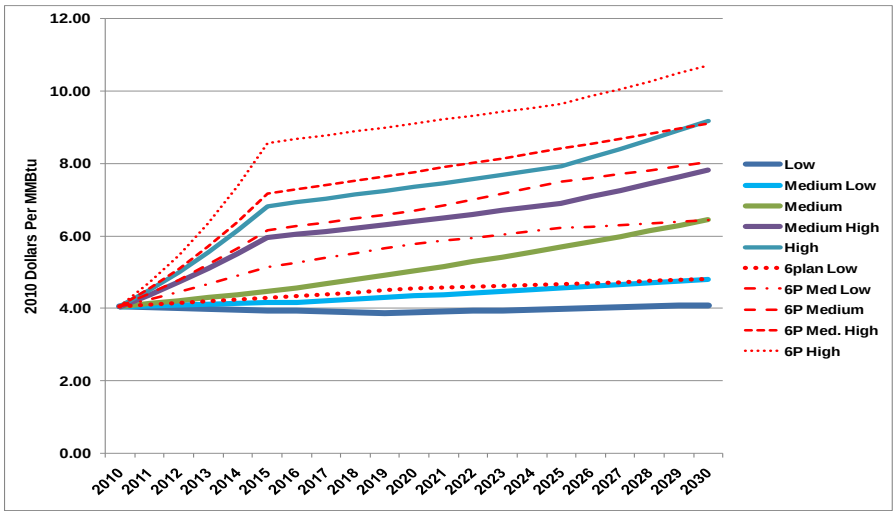
with conditions that limit the demand for natural gas and promote the rapid development of supply.

Implications of Revised Natural Gas Price Forecasts

The likely effect of the revised fuel price forecast on a revised power plan reduces the forecast of electricity prices, and to some degree, changes the inter-fuel competition between natural gas and electricity. The Council doesn't expect significant effects on the resource strategy from this change, but that will be tested at mid-term. Natural gas generation is already the fall-back resource in the plan, renewables are limited by RPS requirements, and efficiency was constrained by the assumed rates of penetration and development.

The following figures compare the Sixth Power Plan's forecast with the revised forecast. The revised forecast reflects lower natural gas prices.

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

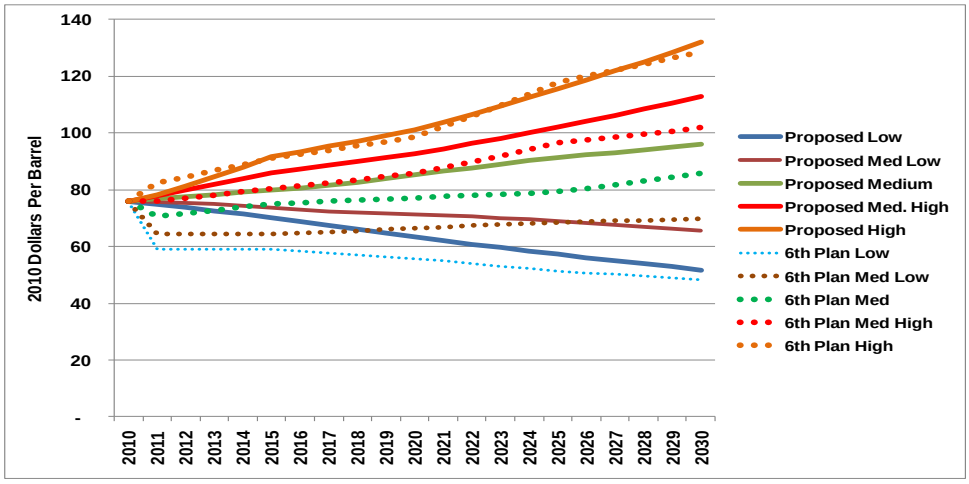


Oil Price Forecast Revision

The range of world oil price forecasts has not been revised as significantly as natural gas prices. In spite of the changes in natural gas supply and prices, oil prices have remained high, causing a significant disconnection between oil and natural gas prices. Although the Council assumed that natural gas prices would remain below oil prices on a Btu basis, the gap has widened and the proposed revision maintains the wider gap in the future, though reduced somewhat from current levels.

World oil prices have little effect on the Council's power plan because oil has, to a large degree, been relegated to a transportation fuel in the U.S. The primary effect might be on electric vehicle development, but that is largely determined by other factors relating to technology, consumer acceptance, and infrastructure development.

Comparison of Revised and Sixth Plan Oil Price Forecasts
Refiners Acquisition Cost $2010/barrel

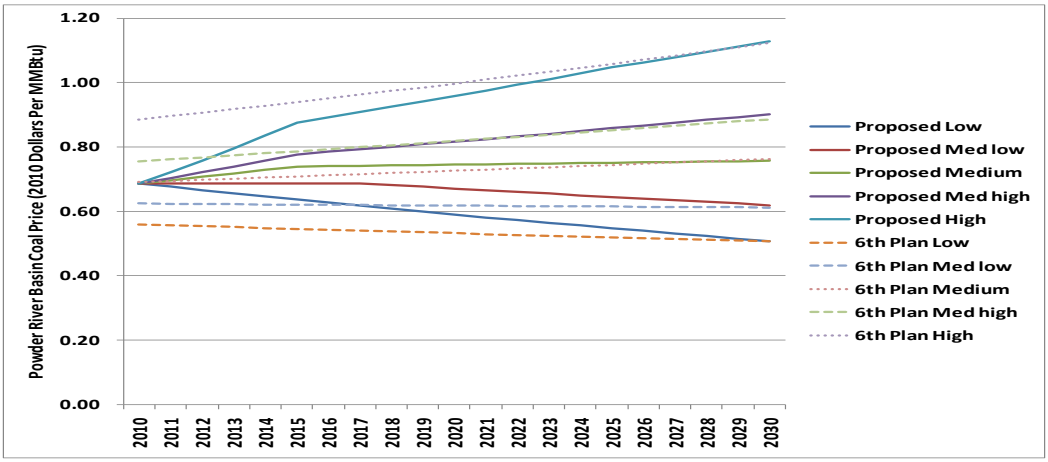


Coal Price Forecast Revision

Like oil, coal prices have relatively little effect on the Council's power plan. They can affect electricity market prices in relatively few hours and they affect the operating cost of existing coal-fired power plants. However, new coal development is pre-empted in much of the region and new plants do not appear in the Council's plan.

The primary change in the forecast is incorporating 2010 actual prices and narrowing the near-term range. The long-term forecasts for 2030 are unchanged. Unlike the natural gas price forecasts, neither the oil nor the coal price forecasts are used extensively in the region.

Comparison of Revised and Sixth Plan Coal Price Forecasts
Powder River Basin $2010/mmbtu



Range of Price Forecast

The following tables present the numeric values for the revised natural gas price forecasts, as well as the refiners' acquisition cost of oil and minemouth coal prices for Powder River Basin coal. The natural gas prices are shown for the wellhead, as well as at various hubs and delivery points. The natural gas prices at wellhead under the medium scenario are shown in constant 2010 dollars, as well as in nominal dollars.

Table 1: Proposed range of natural gas price forecast -wellhead prices in constant 2010 dollars.
Table 2: Natural gas prices delivered at various hubs and Northwest generators- medium forecast
Table 3: Wellhead price of natural gas in nominal dollars
Table 4: Henry Hub delivered price of natural gas in nominal dollars
Table 5: Refiners' cost of acquisition for oil in constant 2010 dollars
Table 6: Cost of Powder River Basin Coal in constant 2010 dollars

Table 1: 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	4.03	4.07	4.13	4.37	4.50
2012	4.01	4.09	4.21	4.72	4.99
2013	3.99	4.11	4.30	5.10	5.54
2014	3.97	4.13	4.38	5.51	6.15
2015	3.95	4.15	4.47	5.95	6.82
2016	3.93	4.17	4.56	6.04	6.93
2017	3.91	4.21	4.67	6.13	7.03
2018	3.89	4.26	4.79	6.22	7.14
2019	3.87	4.30	4.91	6.32	7.24
2020	3.89	4.34	5.03	6.41	7.35
2021	3.91	4.39	5.16	6.51	7.46
2022	3.93	4.43	5.29	6.60	7.57
2023	3.95	4.47	5.42	6.70	7.69
2024	3.97	4.52	5.56	6.80	7.80
2025	3.99	4.56	5.70	6.91	7.92
2026	4.01	4.61	5.84	7.08	8.16
2027	4.03	4.66	5.98	7.26	8.40
2028	4.05	4.70	6.13	7.44	8.65
2029	4.07	4.75	6.29	7.62	8.91
2030	4.09	4.80	6.44	7.81	9.18

Table 2: Natural Gas Prices at Key Hubs and Northwest Generators
2010$/mmBtu
Medium Case

Year	U.S. Wellhead	Henry Hub	AECO	Sumas Price	West-Side Delivered	East-Side Delivered
2010	4.05	4.25	3.47	3.82	4.40	3.93
2011	4.13	4.34	3.56	3.90	4.54	4.05
2012	4.21	4.43	3.65	3.97	4.63	4.18
2013	4.30	4.51	3.74	4.05	4.71	4.28
2014	4.38	4.60	3.84	4.13	4.79	4.37
2015	4.47	4.70	3.93	4.22	4.88	4.47
2016	4.56	4.79	4.03	4.30	4.97	4.58
2017	4.67	4.91	4.15	4.41	5.08	4.70
2018	4.79	5.03	4.28	4.52	5.19	4.84
2019	4.91	5.16	4.41	4.63	5.31	4.97
2020	5.03	5.29	4.54	4.75	5.43	5.10
2021	5.16	5.42	4.68	4.87	5.55	5.24
2022	5.29	5.56	4.82	4.99	5.68	5.39
2023	5.42	5.69	4.96	5.11	5.81	5.53
2024	5.56	5.84	5.11	5.24	5.94	5.68
2025	5.70	5.98	5.26	5.37	6.07	5.84
2026	5.84	6.13	5.41	5.51	6.21	5.99
2027	5.98	6.29	5.57	5.64	6.35	6.15
2028	6.13	6.44	5.73	5.79	6.50	6.32
2029	6.29	6.60	5.90	5.93	6.65	6.49
2030	6.44	6.77	6.07	6.08	6.80	6.66

Table 3: Wellhead Price of Natural Gas Nominal Dollars
Proposed Update August 2011 Values

	Low	Medium Low	Medium	Medium High	High
2010	4.05	4.05	4.05	4.05	4.05
2011	4.43	4.47	4.54	4.60	4.63
2012	4.48	4.57	4.71	4.85	4.89
2013	4.53	4.67	4.88	5.10	5.18
2014	4.59	4.77	5.07	5.37	5.48
2015	4.64	4.88	5.26	5.65	5.82
2016	4.70	4.99	5.45	5.92	6.19
2017	4.76	5.13	5.69	6.21	6.58
2018	4.81	5.27	5.93	6.50	6.99
2019	4.87	5.41	6.18	6.81	7.43
2020	4.98	5.56	6.44	7.14	7.90
2021	5.09	5.71	6.72	7.48	8.39
2022	5.20	5.86	7.00	7.83	8.92
2023	5.32	6.02	7.30	8.20	9.48
2024	5.44	6.19	7.61	8.60	10.08
2025	5.56	6.36	7.93	9.01	10.71
2026	5.68	6.53	8.27	9.43	11.38
2027	5.81	6.71	8.62	9.88	12.10
2028	5.94	6.89	8.99	10.35	12.86
2029	6.07	7.08	9.37	10.85	13.67
2030	6.20	7.27	9.77	11.37	14.53

Table 4: Henry Hub Price Forecasts (Nominal Dollars)
Proposed Update August 2011 values

	Low	Medium Low	Medium	Medium High	High
2010	4.25	4.25	4.25	4.25	4.25
2011	4.65	4.69	4.76	4.83	4.86
2012	4.70	4.80	4.94	5.09	5.14
2013	4.76	4.90	5.13	5.36	5.43
2014	4.82	5.01	5.32	5.64	5.75
2015	4.87	5.12	5.52	5.94	6.11
2016	4.93	5.24	5.73	6.22	6.50
2017	4.99	5.38	5.97	6.52	6.90
2018	5.05	5.53	6.22	6.83	7.34
2019	5.11	5.68	6.49	7.15	7.80
2020	5.23	5.83	6.76	7.49	8.29
2021	5.34	5.99	7.05	7.85	8.81
2022	5.46	6.16	7.35	8.22	9.37
2023	5.58	6.33	7.67	8.62	9.96
2024	5.71	6.50	7.99	9.03	10.58
2025	5.83	6.68	8.33	9.46	11.25
2026	5.96	6.86	8.69	9.91	11.95
2027	6.10	7.05	9.06	10.38	12.71
2028	6.23	7.24	9.44	10.87	13.51
2029	6.37	7.44	9.84	11.39	14.35
2030	6.51	7.64	10.26	11.93	15.26

Table 5: Refiners' Acquisition Cost of Oil ($2010/Barrel)

	Low	Medium Low	Medium	Medium High	High
2010	76	76	76	76	76
2011	75	76	77	78	78
2012	74	75	78	80	81
2013	73	75	78	82	85
2014	72	74	79	84	88
2015	70	74	80	86	92
2016	69	73	81	87	93
2017	67	72	81	88	95
2018	66	72	83	90	97
2019	65	72	84	91	99
2020	63	71	85	93	101
2021	62	71	86	94	104
2022	61	70	88	96	107
2023	60	70	89	98	110
2024	58	70	90	100	112
2025	57	69	91	102	116
2026	56	68	92	104	119
2027	55	68	93	106	122
2028	54	67	94	108	125
2029	53	66	95	111	129
2030	52	66	96	113	132

Table 6: Powder River Basin Coal Prices $2010/mmBTU

	Low	Medium Low	Medium	Medium High	High
2010*	0.69	0.69	0.69	0.69	0.69
2011	0.68	0.69	0.70	0.70	0.72
2012	0.67	0.69	0.71	0.72	0.76
2013	0.66	0.69	0.72	0.74	0.79
2014	0.65	0.69	0.73	0.76	0.83
2015	0.64	0.69	0.74	0.78	0.88
2016	0.63	0.69	0.74	0.78	0.89
2017	0.62	0.69	0.74	0.79	0.91
2018	0.61	0.68	0.74	0.80	0.92
2019	0.60	0.68	0.74	0.81	0.94
2020	0.59	0.67	0.75	0.82	0.96
2021	0.58	0.67	0.75	0.82	0.98
2022	0.57	0.66	0.75	0.83	0.99
2023	0.56	0.65	0.75	0.84	1.01
2024	0.56	0.65	0.75	0.85	1.03
2025	0.55	0.64	0.75	0.86	1.05
2026	0.54	0.64	0.75	0.87	1.06
2027	0.53	0.63	0.75	0.88	1.08
2028	0.52	0.63	0.75	0.88	1.10
2029	0.52	0.62	0.76	0.89	1.11
2030	0.51	0.62	0.76	0.90	1.13

* Subject to further updates