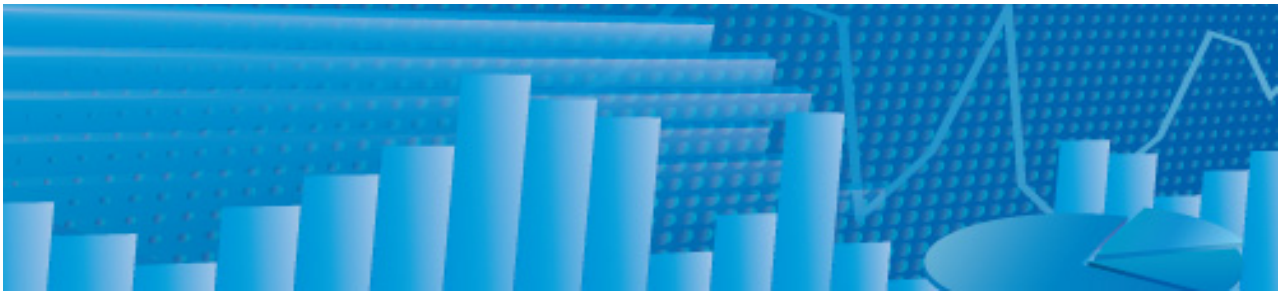
Fuel Price Forecast



The Seventh Power Plan
Proposed Fuel Price Forecasts

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Objective:

The Council monitors its power planning assumptions on a regular basis to identify any significant changes that might affect its power plan and adjusts its forecasts accordingly. Because various organizations also use the Council's price forecasts for their own purposes, the Council provides the updated forecasts to the region. This forecast will be used in developing the Council's Seventh Power Plan. The plan's forecast horizon starts in 2015 and ends in 2035.

Caveat:

The Council monitors its planning assumptions on a regular basis. Significant changes in supply or demand are evaluated and, if warranted, the forecast is updated.

Methodology:

The Council develops the range of natural gas and oil price forecasts with input from a 30-member Natural Gas Advisory Committee. Members include U.S. and Canadian industry experts from natural gas and electric utilities, pipeline companies, public interest groups, and other regional energy organizations.

Council staff starts with collecting the most recent forecasts from numerous organizations. The forecasts are converted to a constant dollar and compared. Along with other organizations price forecasts, Council staff also conducts a confidential poll of the Natural Gas Advisory Committee members. The findings from the comparison with other forecasts and the poll results as well as a strawman proposal developed by Council staff is then discussed and debated at a meeting of advisory committee. Council staff then synthesizes the insight and finding from the advisory committee in the final price forecast range.

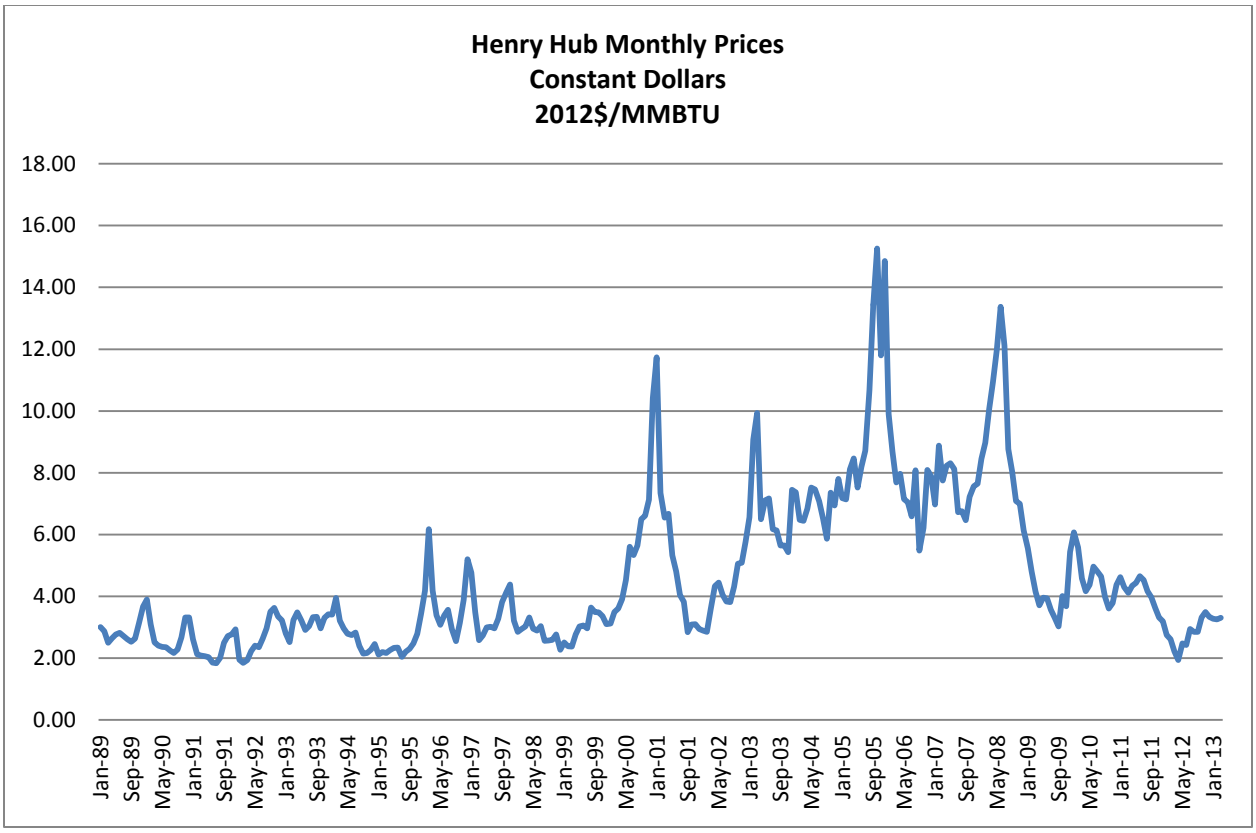
A listing of organizations used in development of Council's 2013 fuel price forecast is provided below:

- Department of Energy- AEO 2013
- California Energy Commission
- IHS_Global Insight
- Natural Gas Week quarterly analysts report
- Idaho Power IRP
- Poll of NGAC members
- SNL (Short-term market transactions 2013-2014)

Similar approach is used in development of oil and coal price forecast, although to a lesser degree.

Background:

The rapid and unprecedented development of shale gas has created a glut of natural gas that is likely to last for several years and depress prices. The price of natural gas in 2011 and the first two quarters of 2012 were the lowest since 2002. The price of natural gas has recovered from the low levels set in 2012, and recently, the forward market for natural gas prices have increased, due in part to higher demand from electric utilities. Analysts are now expecting prices in the $3.7-$4.20 per mm BTU range for 2013-2014 at Henry Hub in constant 2012 dollars.



It's often difficult to distinguish short-term variations in fuel prices (which are expected and modeled in the Council's regional planning model) from significant long-term changes that fundamentally alter the range of future expectations. The changes in natural gas supplies represent such a shift. Although the potential of shale gas was addressed in the Sixth Power Plan, new technologies to access cost-effective natural gas trapped in shale formations has improved the supply outlook from constrained to plentiful for decades to come.

In the past three years, after working with the Natural Gas Advisory Committee, the Council has lowered its range of natural gas price forecasts. The Council uses a range of forecasts, rather than a single price point, to reflect the differing views on supply and demand, the continued uncertainty about shale gas

development, its costs and environmental effects, as well as the speed of economic recovery.

In developing the forecast of natural gas prices for the Seventh Power Plan, the Council used the forecast data from five different regional and national organizations, as well as feedback from members of its Natural Gas Advisory Committee. It also used information from the Energy Information Administration's 2013 Annual Energy Outlook, analyst reports from Natural Gas Week (Energy Intelligence), California Energy Commission, Idaho Power IRP, HIS-Global Insight, and SNL Natural Gas forward price curves. This year's forecast extends the 2010-2030 forecast time horizon used in the Sixth Power Plan to 2015-2035 for the Seventh Power Plan. This year's forecast also changes the base year dollars from 2010 to 2012. Comparable dollar values should be used when comparing the Council's forecast to other forecasts.

Natural Gas Price Forecast

Compared to the Sixth Power Plan forecasts, the range of natural gas prices in this forecast is narrower and significantly lower in the near term. For the medium case scenario, by 2030, the Seventh Power Plan forecast is lower by about $2 dollars compared to the Sixth Power Plan's medium forecast. The high price forecast relates to a rapid economic recovery in the U.S. and worldwide; environmental restrictions on shale gas development; aggressive regulation of carbon emissions leading to more natural gas generation instead of coal; increased use of natural gas vehicles; increased demand for exports of liquefied natural gas from Canada and United States; and increased demand from gas-to-liquid 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.

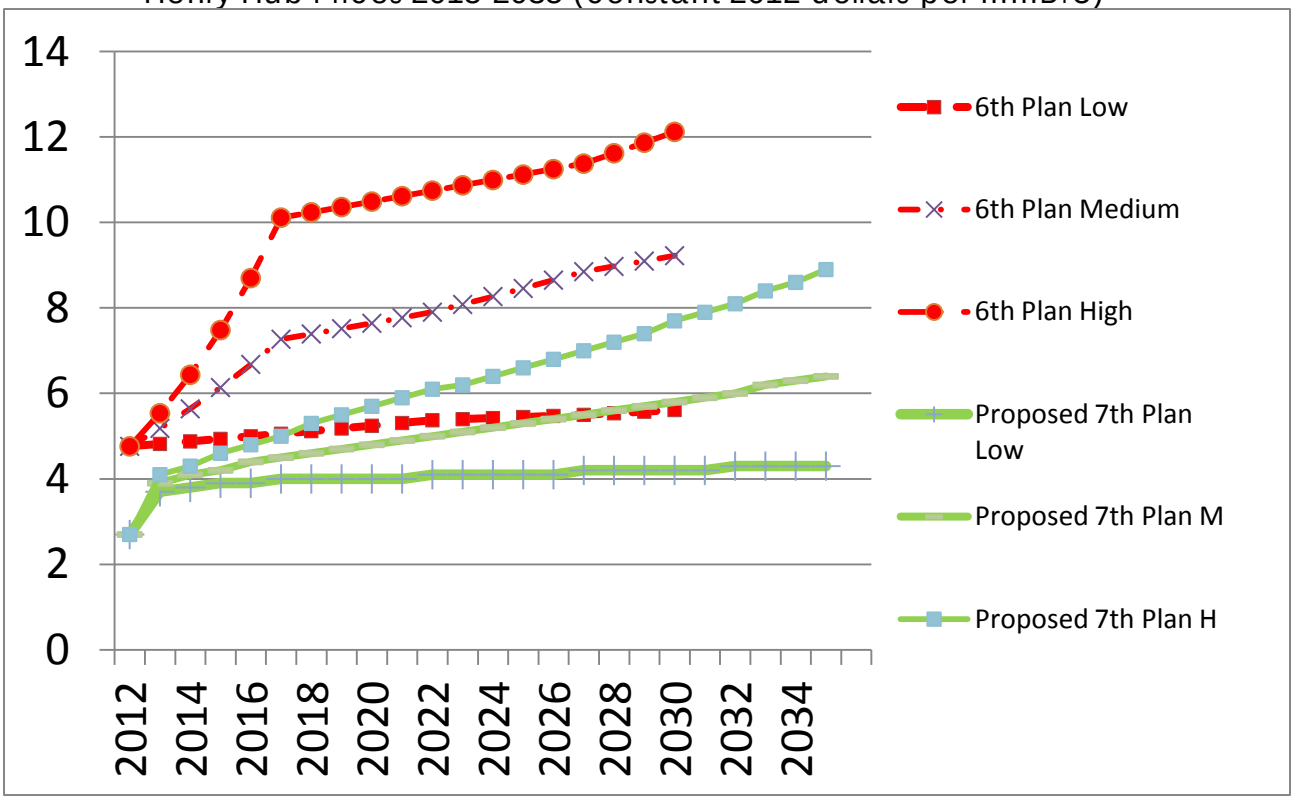
Implications of the Natural Gas Price Forecast

The fuel price forecast reduces the forecast of electricity prices, and to some degree changes the inter-fuel competition between natural gas and electricity. The full impact of these fuel prices will be tested during the development of the Seventh Power Plan.

The following figures compare the Sixth Power Plan's forecast with the revised Seventh Power Plan's forecast. Important note: Analysts using this forecast are advised to use the full range of the price forecast in making decisions, and not to use a single price trajectory in their analysis.

Comparison of Seventh and Sixth Power Plan Natural Gas Price Forecasts

Henry Hub Prices 2015-2035 (constant 2012 dollars per mmBTU)



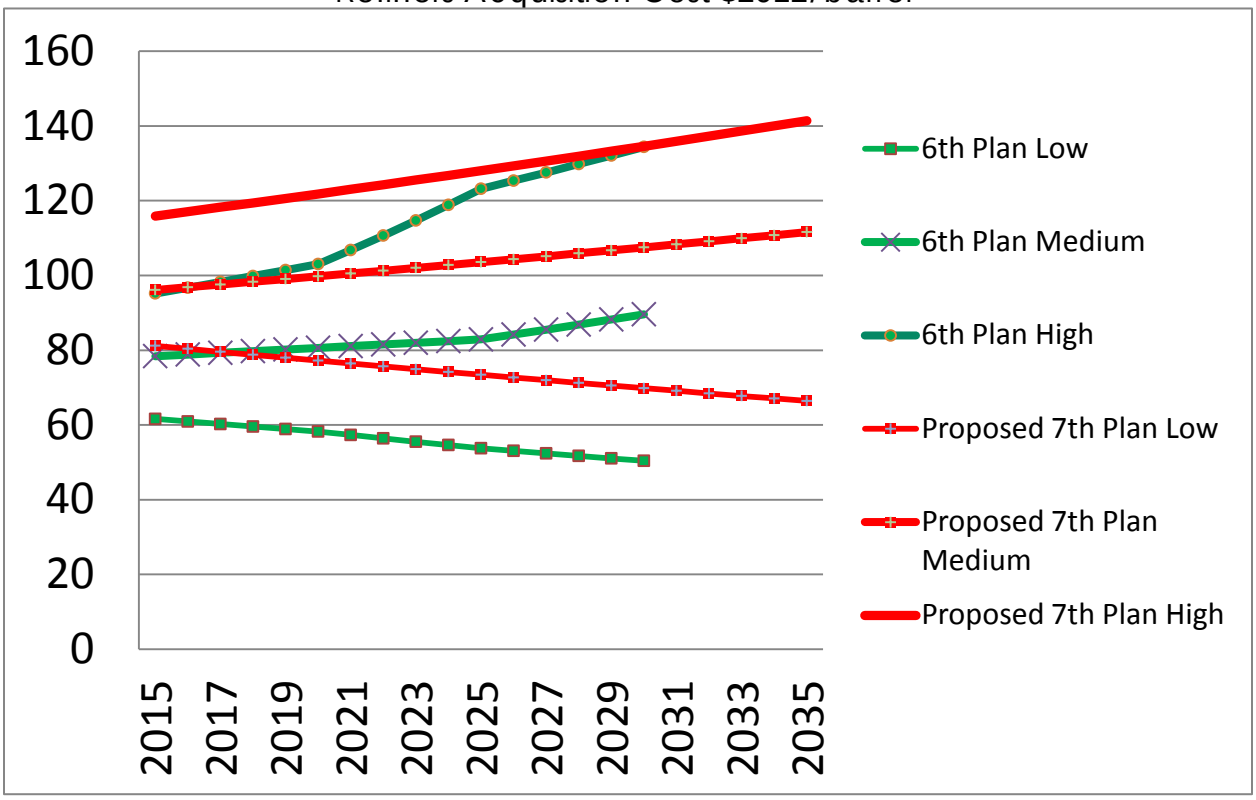
Oil Price Forecast

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 divergence between oil and natural gas prices. Although the Sixth Power Plan assumed that natural gas prices would remain below oil prices on a Btu basis, that difference has grown and should persist in the future, though somewhat reduced 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 Sixth and Proposed Seventh Power Plan Oil Price Forecasts

Refiners Acquisition Cost $2012/barrel



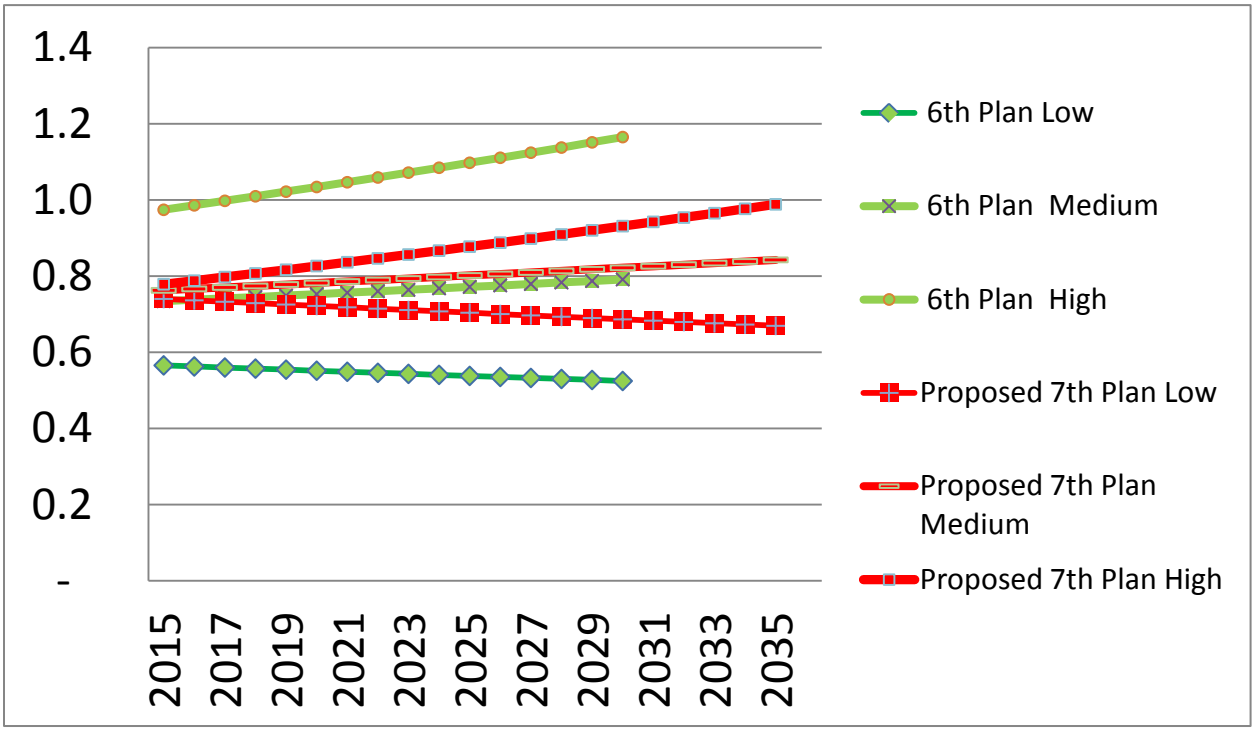
Coal Price Forecast

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 2012 actual prices and narrowing the long-term range. The long-term forecasts for 2035, for the low and high range of prices are lower than earlier forecasts, while the medium range of prices are practically unchanged. Unlike the natural gas price forecasts, neither the oil nor the coal price forecasts are used extensively in the region.

Comparison of Proposed Seventh and Sixth Power Plan Coal Price Forecasts

Powder River Basin $2010/mmbtu



Range of Prices Forecast

The following tables present the numeric values for the proposed:

- Range of base natural gas price forecasts
- Medium case, natural gas prices at various hubs in the West
- Refiners acquisition cost of oil
- Minemouth coal prices for Powder River Basin
- Adjustment factors for converting 2012 constant dollars to nominal dollars.

Table 1. Range of natural gas price forecast: Henry Hub prices in constant 2012 dollars

Table 2. Natural gas prices delivered at various hubs and Northwest generators: medium forecast

Table 3. Range of refiners cost of acquisition for oil in constant 2012 dollars

Table 4. Range of cost of Powder River Basin coal in constant 2012 dollars

Table 5. Inflation adjustment factors to convert from constant 2012 dollars to nominal dollars.

Table 1: Proposed Henry Hub Price Range ($2012/MMBTU)

	Low	Med. Low	Medium	Med. High	High
2012	2.7	2.7	2.7	2.7	2.7
2013	3.7	3.8	3.9	4.0	4.1
2014	3.8	3.9	4.1	4.2	4.3
2015	3.9	4.1	4.2	4.4	4.6
2016	3.9	4.1	4.4	4.6	4.8
2017	4.0	4.2	4.5	4.8	5.0
2018	4.0	4.3	4.6	4.9	5.3
2019	4.0	4.3	4.7	5.1	5.5
2020	4.0	4.4	4.8	5.2	5.7
2021	4.0	4.4	4.9	5.4	5.9
2022	4.1	4.4	5.0	5.5	6.1
2023	4.1	4.5	5.1	5.6	6.2
2024	4.1	4.5	5.2	5.8	6.4
2025	4.1	4.6	5.3	5.9	6.6
2026	4.1	4.6	5.4	6.1	6.8
2027	4.2	4.7	5.5	6.2	7.0
2028	4.2	4.7	5.6	6.4	7.2
2029	4.2	4.8	5.7	6.6	7.4
2030	4.2	4.8	5.8	6.7	7.7
2031	4.2	4.9	5.9	6.9	7.9
2032	4.3	4.9	6.0	7.1	8.1
2033	4.3	5.0	6.2	7.3	8.4
2034	4.3	5.0	6.3	7.5	8.6
2035	4.3	5.1	6.4	7.7	8.9
Average 2015-2035	4.1	4.6	5.3	6.0	6.7

Table 2. Natural Gas Prices at Key Hubs and Northwest Generators (2012$/mmBTU, Medium Case)

Year	Henry Hub	AECO	Sumas Price	West-Side Delivered	East-Side Delivered	S. ID Delivered
2012	2.77	2.29	2.72	3.31	2.78	3.26
2013	3.86	3.00	3.48	4.08	3.49	3.79
2014	4.04	3.18	3.63	4.25	3.67	3.94
2015	4.20	3.34	3.78	4.39	3.84	4.08
2016	4.34	3.48	3.90	4.52	3.99	4.19
2017	4.47	3.61	4.02	4.64	4.12	4.30
2018	4.56	3.71	4.10	4.73	4.23	4.38
2019	4.65	3.80	4.18	4.81	4.32	4.46
2020	4.74	3.89	4.27	4.90	4.42	4.54
2021	4.83	3.99	4.35	4.99	4.51	4.62
2022	4.93	4.09	4.44	5.08	4.62	4.70
2023	5.03	4.19	4.53	5.17	4.72	4.79
2024	5.13	4.29	4.62	5.26	4.82	4.87
2025	5.23	4.40	4.71	5.36	4.93	4.96
2026	5.34	4.50	4.80	5.46	5.04	5.05
2027	5.44	4.61	4.90	5.56	5.15	5.14
2028	5.55	4.72	5.00	5.66	5.27	5.24
2029	5.66	4.84	5.10	5.76	5.38	5.33
2030	5.78	4.95	5.20	5.87	5.50	5.43
2031	5.89	5.07	5.30	5.97	5.62	5.53
2032	6.01	5.19	5.41	6.08	5.74	5.63
2033	6.13	5.31	5.52	6.20	5.87	5.73
2034	6.25	5.44	5.63	6.31	6.00	5.84
2035	6.38	5.57	5.74	6.43	6.13	5.94

Table 3. Refiners Acquisition Cost of Oil ($2012/Barrel)

	Low	Medium low	Medium	Medium High	High
2012	101	101	101	101	101
2013	91	95	99	103	106
2014	84	90	97	104	111
2015	81	88	96	106	116
2016	80	88	97	107	117
2017	80	88	98	108	118
2018	79	87	98	109	119
2019	78	87	99	110	121
2020	77	86	100	111	122
2021	76	86	101	112	123
2022	76	85	101	113	124
2023	75	85	102	114	126
2024	74	85	103	116	127
2025	73	84	104	117	128
2026	73	84	104	118	129
2027	72	83	105	119	131
2028	71	83	106	120	132
2029	71	82	107	122	133
2030	70	82	108	123	135
2031	69	82	108	124	136
2032	68	81	109	125	137
2033	68	81	110	126	139
2034	67	80	111	128	140
2035	66	80	112	129	141

Table 4. Powder River Basin Coal Price ($2012/mmBTU)

	Low	Med-low	Medium	Medium High	High
2012	0.75	0.75	0.75	0.75	0.75
2013	0.75	0.75	0.76	0.76	0.76
2014	0.74	0.75	0.76	0.76	0.77
2015	0.74	0.75	0.76	0.77	0.78
2016	0.74	0.75	0.77	0.78	0.79
2017	0.73	0.75	0.77	0.78	0.80
2018	0.73	0.75	0.77	0.79	0.81
2019	0.73	0.75	0.78	0.79	0.82
2020	0.72	0.75	0.78	0.80	0.83
2021	0.72	0.74	0.79	0.81	0.84
2022	0.71	0.74	0.79	0.81	0.85
2023	0.71	0.74	0.79	0.82	0.86
2024	0.71	0.74	0.80	0.83	0.87
2025	0.70	0.74	0.80	0.83	0.88
2026	0.70	0.74	0.81	0.84	0.89
2027	0.70	0.74	0.81	0.85	0.90
2028	0.69	0.74	0.81	0.85	0.91
2029	0.69	0.74	0.82	0.86	0.92
2030	0.69	0.74	0.82	0.87	0.93
2031	0.68	0.74	0.83	0.87	0.94
2032	0.68	0.74	0.83	0.88	0.95
2033	0.68	0.74	0.83	0.89	0.97
2034	0.67	0.74	0.84	0.90	0.98
2035	0.67	0.73	0.84	0.90	0.99

Table 5. Conversion Factors

To change from constant 2012 dollars to nominal dollars

2012	1.00
2013	1.02
2014	1.03
2015	1.05
2016	1.07
2017	1.08
2018	1.10
2019	1.12
2020	1.14
2021	1.16
2022	1.18
2023	1.20
2024	1.22
2025	1.24
2026	1.26
2027	1.28
2028	1.31
2029	1.33
2030	1.35
2031	1.38
2032	1.40
2033	1.43
2034	1.45
2035	1.48