Northwest Power and Conservation Council

Draft Revised Fuel Price Forecasts

July 3, 2007

Council document 2007-10

Background

The Council's Fifth Power Plan fuel price forecast was developed in the summer of 2004. At that time the higher natural gas prices experienced in 2000 through early 2004 were widely considered to be a cyclical event, partly related to the West Coast electricity crisis of 2000 and 2001. Oil prices had increased in 2003 and 2004 but remained around $30 a barrel in the first half of 2004. Coal prices had shown little response to the increases in natural gas and oil prices by the middle of 2004.

At the time the Council's forecast was done, most forecasts of energy prices showed an expected decline in prices from those of the recent past. The futures market also showed declining natural gas prices through 2008 and early 2009. The Council's forecasts that showed declines in most fuel prices from the early 2000s levels were in line with most other forecasts at the time.

Although oil and natural gas prices were forecast to decline in the early years of the medium forecast, they remained far above the low prices experienced during the 1990s. Expressed in 2006 dollars, oil prices during the 1990s averaged just under $23 compared to $31 forecast for 2011 and beyond. Similarly, natural gas prices were forecast to average $4.50 per million Btu after 2011 compared to the 1990s average of $2.50. Coal prices were forecast to remain flat in 2006 dollars, ending a historical decline in real coal prices over the previous two decades.

In focusing on the medium price forecasts above, it is important to remember that the Council's Power Plan depends on a wide range of fuel price trends, as well as a high level of expected volatility in prices. These uncertainties and volatilities are embedded in the risks addressed by the Fifth Power Plan.

Recent Prices and Expectations

The Council issued its *Biennial Monitoring Report on the Fifth Power Plan* in January 2007. The report noted that the fuel price forecasts in the Fifth Power Plan were low compared to recent prices and recent forecasts by organizations that specialize in such analysis. As a result, the Council committed to a re-examination of its forecasts and, if necessary, development of a revised forecast that would be released as an indication of the Council's current expectations about fuel prices. It was not expected that higher fuel price forecasts would have an effect on the near term actions recommended in the action plan, so revised fuel prices would not require an early plan revision. However, the Council will be developing a new Power Plan during 2008, and the revised forecast could serve as a draft assumption on fuel prices for that work. It is also likely that higher fuel prices will translate into higher forecasts of electricity prices and a revised forecast will be developed for electricity prices.

This section provides a summary of recent fuel prices and forecasts compared to the Council's Fifth Plan. Some of the most significant developments affecting energy prices over the years since the Council's Fifth Power Plan was developed include the following:

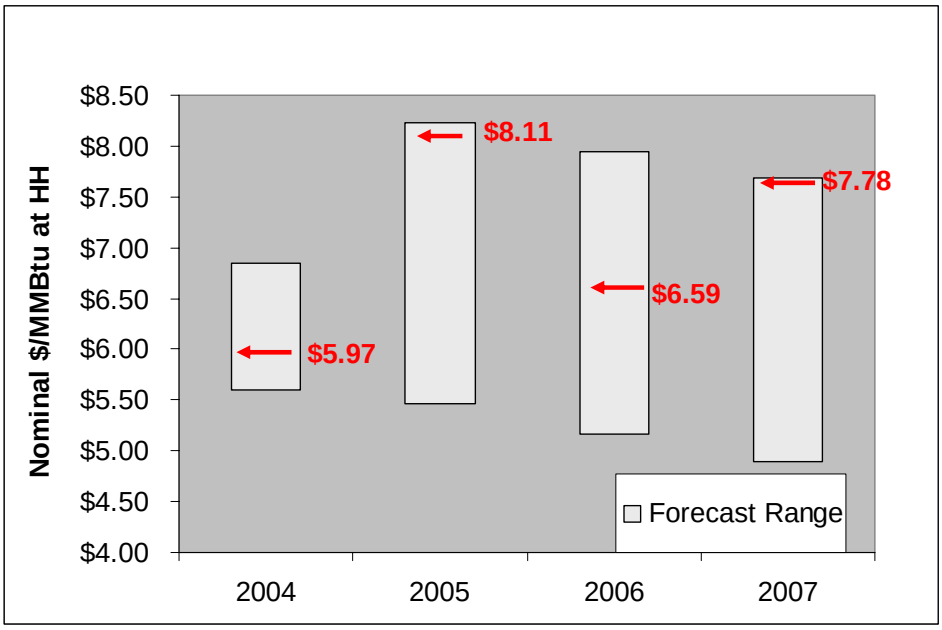
- A roughly 25 percent devaluation of the dollar relative to European currency means that oil prices that are denominated in dollars would need to increase 25 percent just to provide the same income relative to world currencies and costs. That factor could shift the OPEC target price from the mid-twenty dollar range into the mid-thirty dollar range.
- In spite of active natural gas drilling and exploration, the expansion of supplies has been disappointing. In particular, the Western Canadian Sedimentary Basin, which is the source of much of the natural gas supply for the Pacific Northwest is now expected by many to have declining production in the future.
- Climate change has become a major concern in the world and many state and federal policies have been targeted at reducing consumption of fossil fuels and substituting renewable sources of energy and more efficient use of energy. One side effect of this policy is to create uncertainty about future fossil fuel markets, which may inhibit investment in new traditional supplies and refining capacity.
- The growth of conflict and terrorist activity in the Middle East has created fear and uncertainty about oil and LNG supplies. This fear contributes to volatile and high oil and natural gas prices and has delayed needed investment in increased energy production capacity in the Middle East, which contains a large share of the world's petroleum reserves.
- Rapid growth in developing countries, especially China and India, has increased, rather suddenly and dramatically, the demand for energy and other basic commodities and resources. This rapid increase in demand has occurred faster than world supplies have been able to expand, resulting in a world boom in commodity prices.
- Devastating hurricanes in the Gulf of Mexico in the summer of 2005 did tremendous damage to the oil and natural gas infrastructure in the energy breadbasket of the United States and created additional fears about the security and vulnerability of our energy supplies.

The following sections address natural gas, oil, and coal prices and forecasts. Natural gas is the key fuel for the Council's planning because it is an important generation fuel alternative, its price dominates the cost of gas-fired generation, and the cost of gas-fired generation sets the market price of electricity in most hours. In addition, natural gas competes with electricity for several end uses of energy and can therefore affect the projections of electricity demand. Coal-fired generation is also an alternative source of electricity, but the fuel cost is a much smaller share of the cost of electricity generated from coal. Oil is little used for electricity generation in the Northwest, but it does have indirect effects on the price of natural gas, and to a lesser extent on coal prices.

Natural Gas

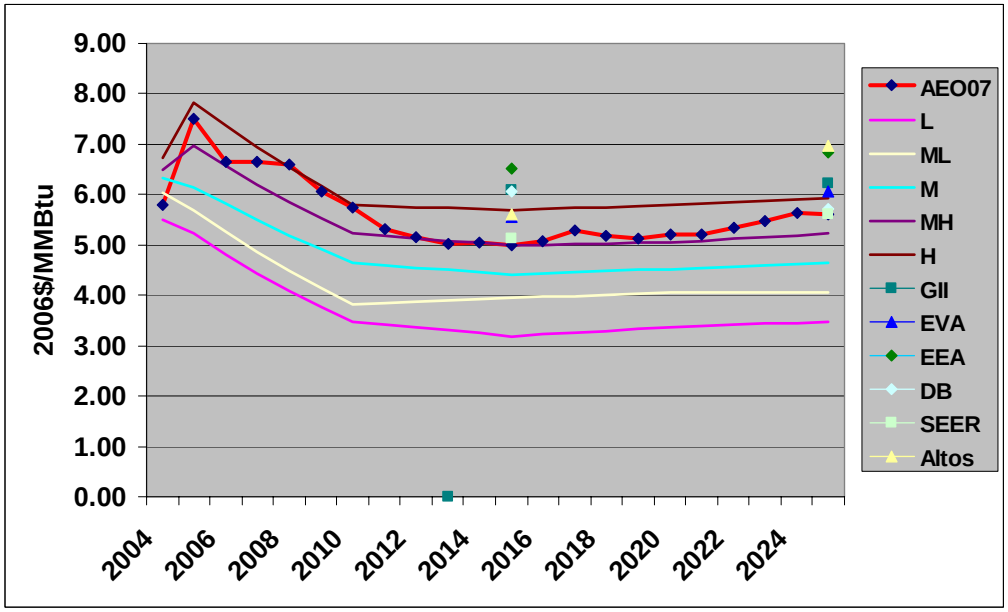
Natural gas prices have been volatile since the Fifth Power Plan was developed. Figure 2 illustrates actual spot prices for natural gas with the range of Council forecasts in 2002 through 2007. The 2007 price is estimated from historical prices through May combined with futures prices for the rest of the year. Prices in 2004 were near the Council's medium-low forecast, but the hurricanes in 2005 sent average price for that year to the high end of the Council's range. A mild winter and lack of serious hurricanes in 2006 put prices back to the middle of the Council's forecast range. However, in spite of strong storage inventories, prices so far in 2007 have remained high and if the rest of 2007 developed according to futures market prices would end the year near the Council's high-case forecast.

Figure 2: Recent Natural Gas Spot Prices at Henry Hub Compared to Council Forecast Range



More recent forecasts made by other organizations show that expectations about future natural gas prices are higher than they were when the Council developed its power plan. Figure 3 compares the Fifth Plan Range of natural gas price forecasts with the U.S. Energy Information Administration's (EIA) reference forecast in its Annual Energy Outlook 2007 (AEO07). The symbols without lines illustrate several other forecasts that were compared to the AEO07.

Figure 3: Fifth Plan Natural Gas Price Forecast Range Compared to Other More Recent Forecasts



The AEO07 forecast falls between the Council's medium-high and high forecasts. Until 2010, the EIA forecast is close to the Council's high-case forecast, but it then follows the medium-high case until near the end of the Council's forecast horizon where it moves to between the medium-high and high cases. EIA's forecast still shows falling natural gas prices from recent levels. It is also apparent from Figure 3 that most other forecasts are currently even higher than EIA's.

Oil

World oil prices increased dramatically between 2004 and 2005. Unlike natural gas prices, which have been volatile, but at least remained in the Council's forecast range, oil prices increased to far above the Council's high case forecast. Figure 4 illustrates this. In recent weeks, oil prices have been above $60 a barrel.

If oil prices in dollars were set to provide stable revenues in European currency (such as the Euro), the 25 percent devaluation in the value of the dollar would imply oil prices about 25 percent higher when Council's forecast was completed. With a 25 percent increase, the OPEC target range of $22-28 per barrel would become $28 to $35. Thus, OPEC could likely maintain prices in this range. However, some argue that even higher prices could now be maintained because energy costs are a smaller share of the economy than in the past, so that demand may not decrease as quickly in response to higher prices.

Figure 4: Recent Crude Oil Prices Compared to Fifth Plan Forecast Range

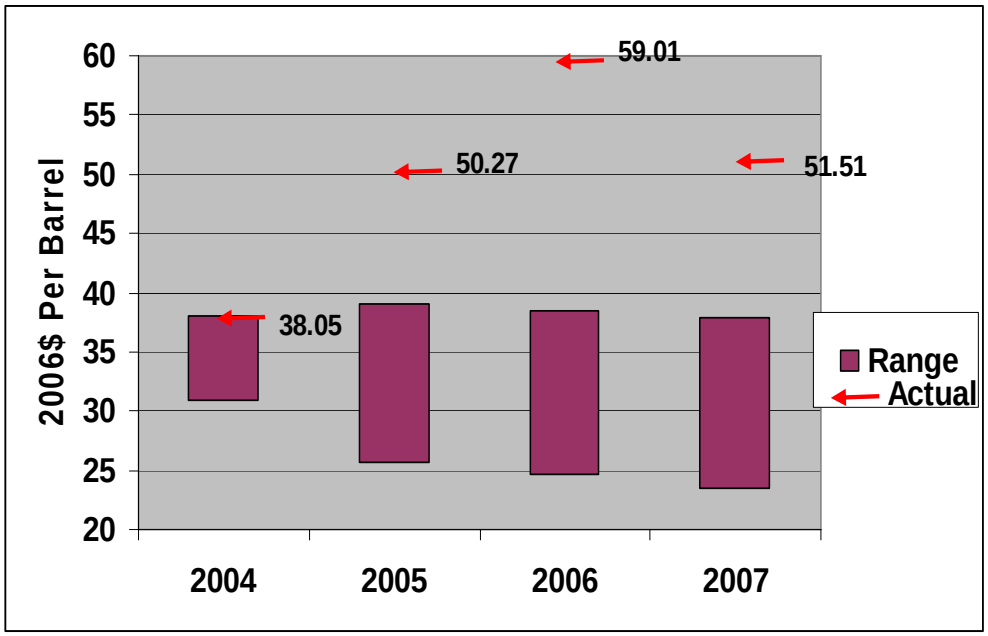
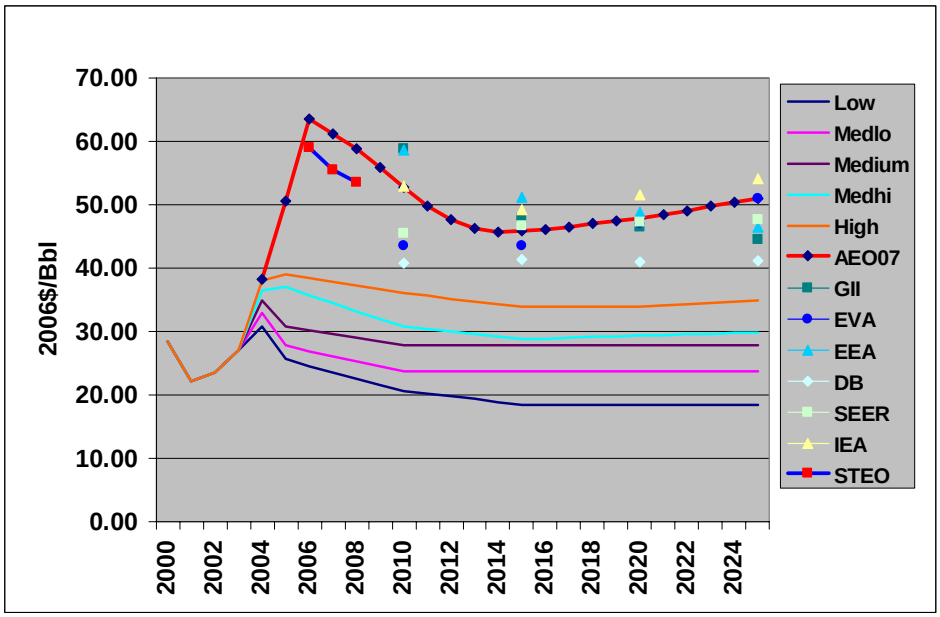


Figure 5 illustrates that many recent forecasts expect oil prices to be permanently above $40 a barrel in 2006 dollars. The forecasts included in Figure 5 generally cover the range between $40 and $50 per barrel, with some venturing above $50. As in the case of natural gas, all of the forecasts expect a decrease from recent prices. However, the entire range of forecasts lies above the Council's Fifth Power Plan range of between $18 and $35.

Figure 5: Fifth Plan Natural Crude Oil Price Forecast Range Compared to Other More Recent Forecasts



Again, it is interesting to note that when the Fifth Plan Forecasts were developed, EIA and other forecasters expected oil prices in the same range as the Council's plan.

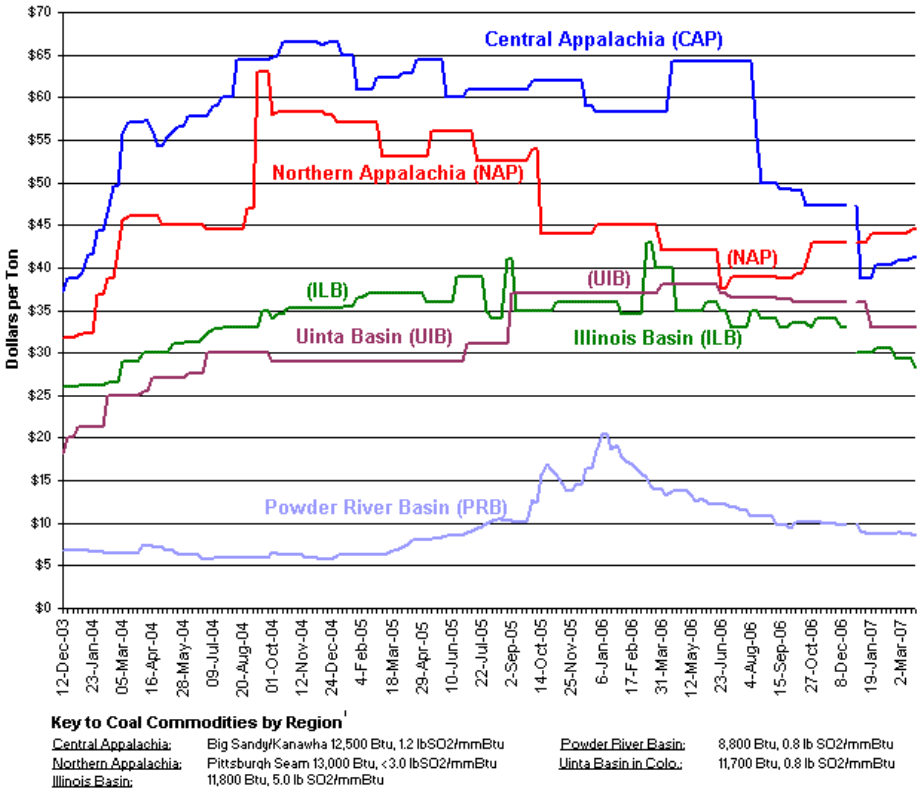
Coal

Coal prices adjusted for inflation have decreased historically. Between 1985 and 2001, Western mine mouth coal prices decreased at a rate of 5.7 percent a year. The Fifth Power Plan medium forecast assumed that Western coal prices would stop declining and remain constant in real dollars; that is, prices would increase at the rate of general inflation. The range included declines at .8 percent per year in the low case to increases at a rate of .9 percent a year in the high case.

Since 2001 coal prices have stabilized and shown some small increases. This probably reflected the higher prices for natural gas and oil. In 2005 coal prices increased substantially due to rail capacity and coal inventory shortages. As shown in Figure 6, Powder River Basin coal prices declined substantially in 2006.

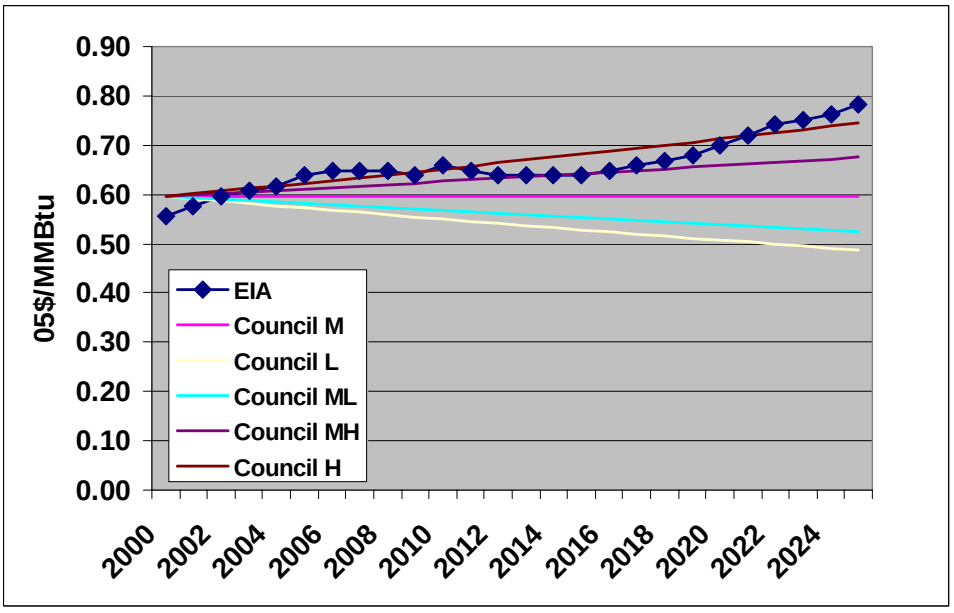
Figure 7 shows the EIA's Annual Energy Outlook 2007 forecast for Western mine mouth coal prices compared to the Council's range of forecasts in the Fifth Power Plan. EIA forecasts growing real coal prices from 2005 to 2030 at a rate of about 1 percent a year. Their forecasts do not drop in 2006 as the market did. Therefore their starting point may be too high.

Figure 6: Coal Prices since 2003 By Producing Area



Source: Energy Information Administration

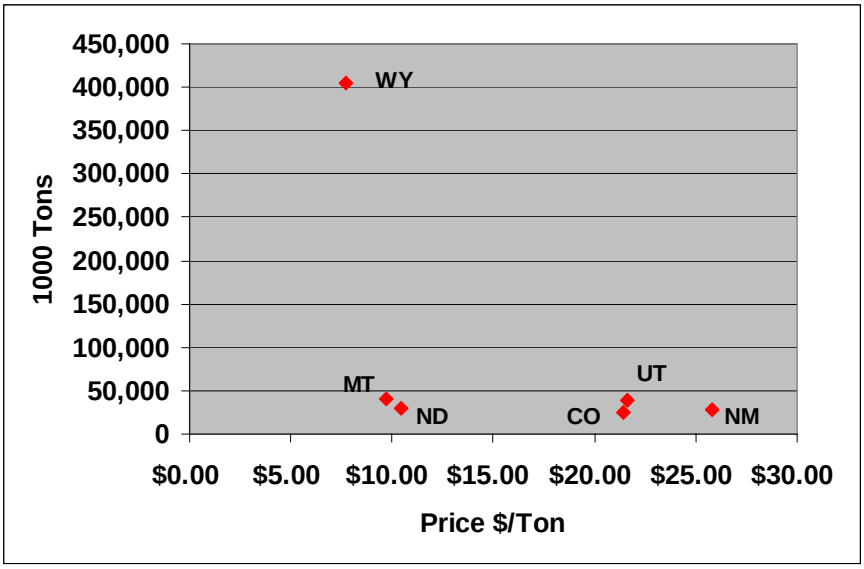
Figure 7: Fifth Plan Range of Coal Prices Compared to EIA's Annual Energy Outlook



In the Fifth Power Plan, the Council used Western mine mouth coal prices as the wholesale cost basis from which to build regional coal price forecasts. In reality, the Pacific Northwest coal

mostly originates in Montana and Wyoming. Coal prices for Wyoming, Montana, and North Dakota coal are substantially lower than other Western coal, but Wyoming coal production dominates the amount of Western coal production (see Figure 8). The low prices for these states partly reflect lower Btu coal deposits, and partly their ease of extraction. For the revised coal price forecast, the prices for Wyoming, Montana, and North Dakota will be used as the wholesale base concept.

Figure 8: Western Coal Production and Price by State, 2005



Proposed Changes to Fuel Price Forecasts

The Council is proposing to revise its fuel price forecasts at this time to provide our updated views on likely future prices. Many organizations use the Council's fuel price forecasts and have been asking for updates. As noted above, the Council does not expect that revised fuel prices would cause a substantial change to the Power Plan and, in particular, to the Action Plan.

However, updated forecasts will provide a starting point for analyses leading up to the Sixth Power Plan. They will also provide a basis for an updated forecast of electricity prices. The Council gets many requests for such forecasts and an update seems warranted at this point.

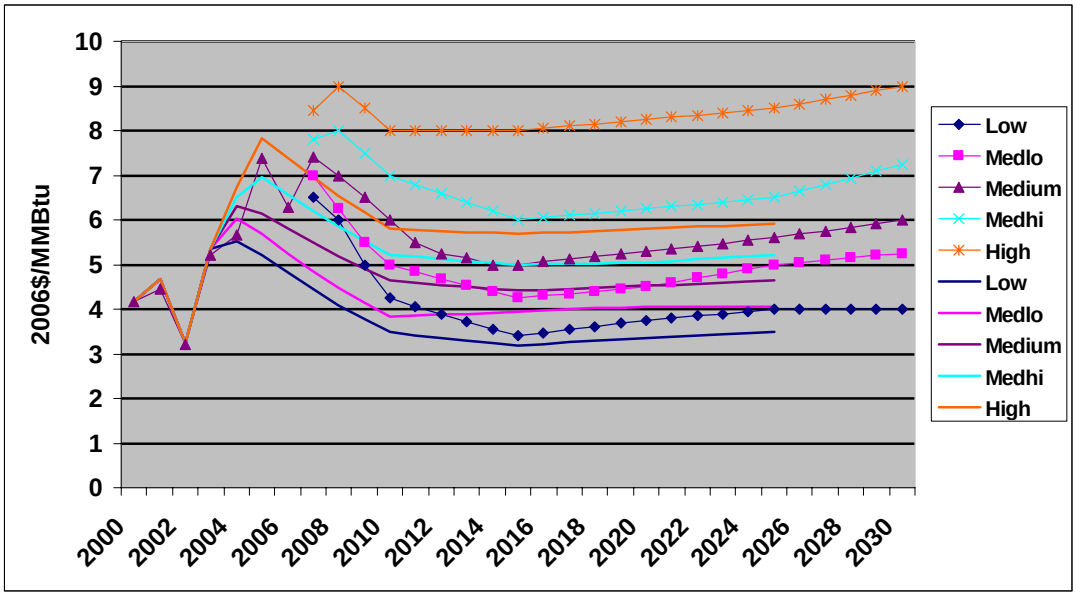
As part of the update, several changes have been made to the fuel price forecasting model. These include refining the Excel model, updating the historical data in the model, and improving the documentation of the model and the data used. In addition, the method of forecasting regional delivered coal prices has been changed to include the effect of changing diesel fuel prices.

Natural Gas

The natural gas price forecasts have been revised upwards to reflect the continued strength of natural gas prices. Figure 9 compares the Fifth Power Plan forecast of wellhead natural gas prices to the revised forecasts, which are shown as the lines with symbols on them. Higher natural gas prices are consistent with a higher forecast of world oil prices. Research shows that

natural gas prices tend to follow oil prices in the long term, although they can remain below or above oil prices for significant periods.

Figure 9: Proposed Revision of Wellhead Natural Gas Price Forecasts



The revised forecast range is wider than the range in the Fifth Plan due to relatively larger increases of the higher forecast cases. In the Fifth Plan, there was $2.44 between the low and high prices in 2025, but in the revised forecast the difference is $4.50. The high case was increased by $2.58. Most cases indicate some decrease in prices from recent levels, although the higher cases have further price increases before decreasing. However, prices are expected to increase again beginning around 2015.

The medium forecast is higher in the near term than the Fifth Plan high forecast, declines to the Fifth Plan medium-high levels by 2015, and then increases to between the medium-high and high Fifth Plan levels by 2025. In the long term, it falls between $5.00 and $6.00 per million Btu in year 2006 dollars. The high and low cases are considered unlikely to be sustainable as long-term trends. Prices between the medium-low and medium-high forecasts are considered a more likely range, roughly between $5.00 and $7.00 per million Btu in year 2006 dollars.

It is important to remember that these forecasts are intended to represent long-term trends. Significant volatility around these trends is expected and is modeled in the Council's portfolio analysis.

Figure 10 shows how the revised forecasts compare to forecasts of other organizations. The Energy Information Administration forecast is similar to the revised medium case, although a bit lower in the early years. Most other organizations are forecasting somewhat higher prices. Based on observed history, there is a tendency for forecasts to be overly reflective of recent prices. This perspective would suggest that many forecasts currently could be too high. That may very well apply to these revised forecasts as well, since they are based largely on a variety of forecasts by organizations that specialize in such analysis. In the case of natural gas prices, the revised medium forecast is toward the lower end of other forecasts.

Figure 10: Forecast Range Compared to Other Forecasts

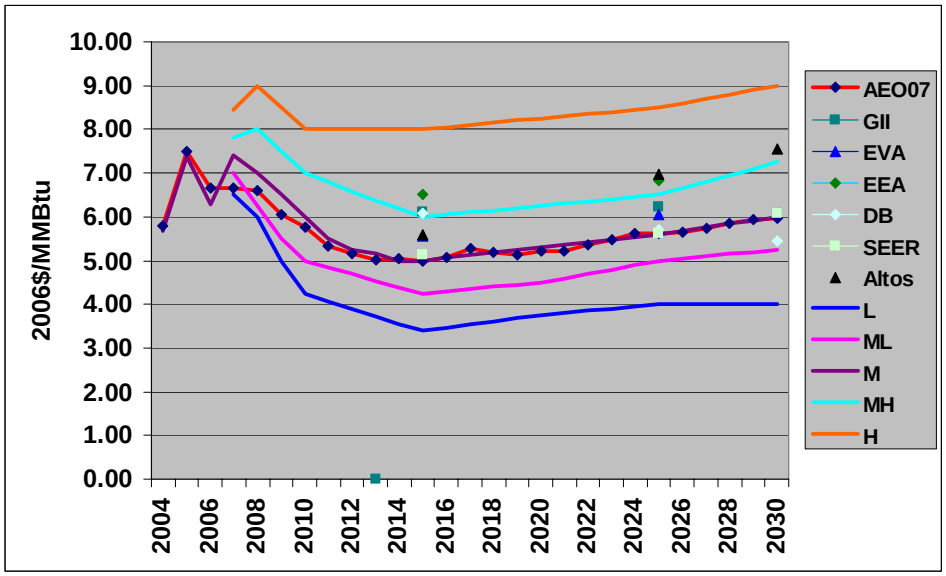


Table 1 shows the natural gas price forecasts for selected years and growth rates from the most recent year of actual prices, 2006.

Table 1: Revised Wellhead Natural Gas Price Forecasts (2006 Dollars Per MMBtu)

	Low	Medium Low	Medium	Medium High	High
2006			6.29		
2010	4.25	5.00	6.00	7.00	8.00
2015	3.40	4.25	5.00	6.00	8.00
2020	3.75	4.50	5.30	6.25	8.25
2025	4.00	5.00	5.60	6.50	8.50
2030	4.00	5.25	6.00	7.25	9.00
Growth Rates					
2006 - 15	-6.61%	-4.26%	-2.52%	-0.52%	2.71%
2006 - 30	-1.87%	-0.75%	-0.20%	0.59%	1.50%

Wellhead natural gas prices are used to estimate natural gas prices to additional locations and sectors. Of particular interest to the Pacific Northwest and the Council's Power Plan are prices delivered to electricity generators in the region. Prices of natural gas delivered from pipelines to various locations throughout the West are calculated for purposes of simulating the Western electricity markets. In addition, Pacific Northwest retail prices of natural gas delivered to industrial, commercial, and residential users are estimated. These additional details appear in the appendix tables and the methods used are described in the documentation of the Council fuel price forecasting process.[1]

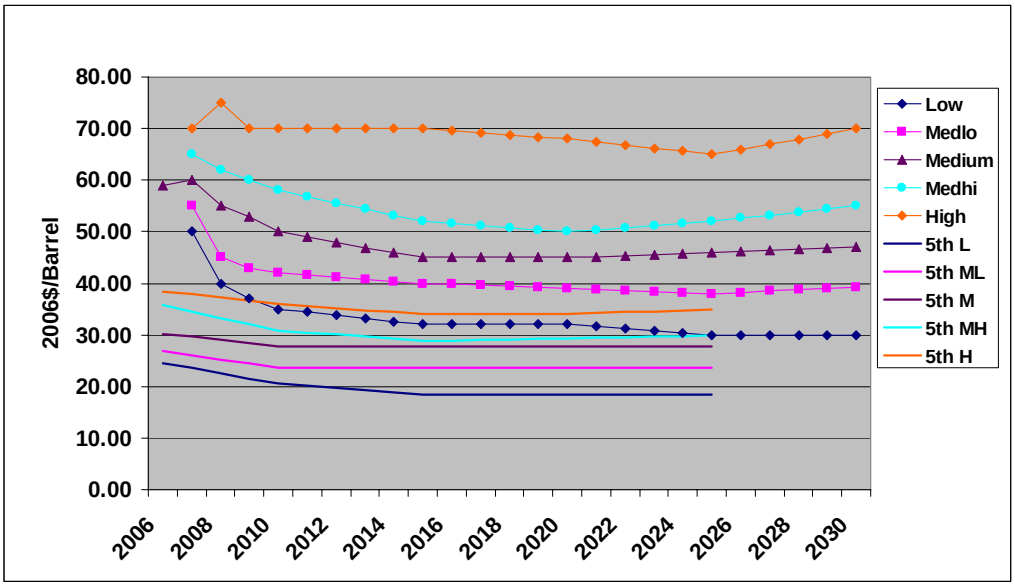
[1] Northwest Power and Conservation Council, *Fuel Price Forecasting Model*, June 2007.

Oil Prices

Nearly all organizations' forecasts of world crude oil prices have been dramatically increased. The proposed revision of the Council's forecasts reflects this change in expectations. The revised forecast range, from the medium-low case to the high case, lies entirely above the Council's Fifth Plan range. The revised price range, like natural gas prices, is both higher and wider. 2025 Oil price forecasts in the Fifth Plan for the year 2025 ranged from $18 to $35 per barrel compared to the revised range from $30 to $65. All prices are expressed in year 2006 dollars per barrel unless otherwise noted. In the Council's forecast, world oil prices are measured as the refiner acquisition cost of imported oil.

The revised forecasts are compared to the Council's Fifth Power Plan in Figure 11. The revised forecasts are shown as lines with symbols. In 2006, oil prices averaged $59. The medium-high and high cases envision the possibility of further increases in the next few years, but all but the high case assume that prices eventually will fall below $60. In the medium case, prices stabilize in the mid $40 area. The most likely range is between $40 and $55.

Figure 11: Proposed Revision of World Crude Oil Price Forecasts



Extreme volatility is possible, even likely, within these trends. Oil prices are subject to many forces that defy prediction. It is quite possible, for example, that oil prices could exceed $100 for short periods of time. However, prices that high are likely to cause significant economic disruption and reduced demand for oil, which in turn would bring prices back down. Similarly, prices could easily fall below the low case for short periods.

The much higher forecast for world oil prices reflects many factors, including a more pessimistic outlook for supplies, reduced expectations for stable conditions in the Middle East, and a decreased value of the U.S. dollar. Figure 12 shows that the revised forecast falls in line with the recent forecasts of other organizations. When the Council developed its Fifth Power Plan, these forecasts fell in line with the lower price forecasts contained in the Fifth Plan. There has been a very large change in expectations about future energy prices since the Fifth Power Plan.

The size of the change in the oil price forecast illustrates something about the nature of such forecasts. They are limited by our recent experience and what we understand about recent and current conditions. The true uncertainty about the future may be significantly greater than reflected in our range of price forecasts. Who can predict, for example, the future of the Middle East where much of the world's oil resources exist?

Table 2 shows world oil prices for 2006 and forecasts for selected years. Growth rates are shown from 2006 to 2015 and 2030.

Crude oil price forecasts are used to estimate the price of refiners' residual oil and distillate oil. Those prices are, in turn, used to estimate the retail price of residual and distillate oil to industrial, commercial, and residential users. That additional detail is available in the appendix tables and figures.

Figure 12: World Oil Price Forecast Range Compared to Other Forecasts

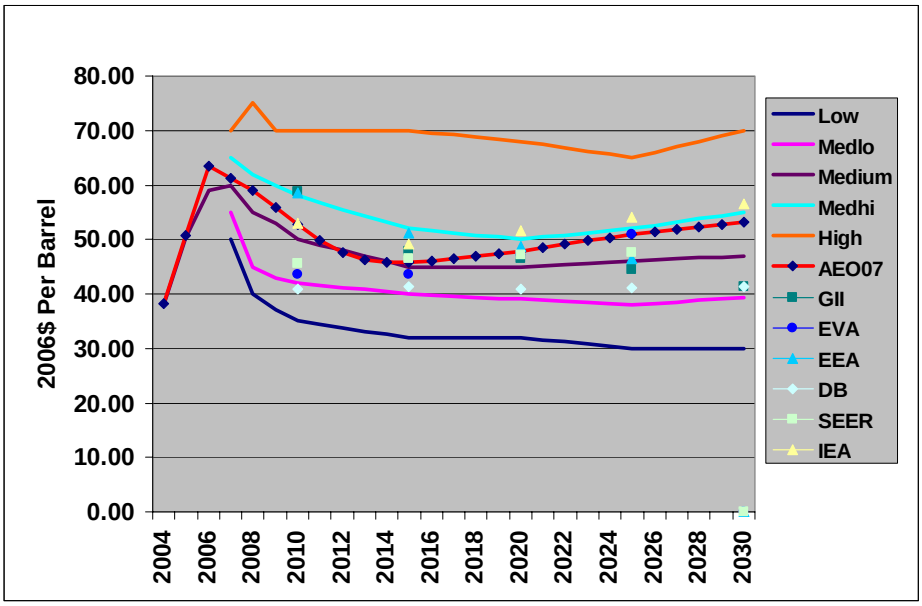


Table 2: Revised World Oil Price Forecast Range
(2006 Dollars Per Barrel)

	Low	Medium Low	Medium	Medium High	High
2006			59.01		
2010	35.00	42.00	50.00	58.00	70.00
2015	32.00	40.00	45.00	52.00	70.00
2020	32.00	39.00	45.00	50.00	68.00
2025	30.00	38.00	46.00	52.00	65.00
2030	30.00	39.30	47.00	55.00	70.00
Growth Rates					
2006 - 15	-6.57%	-4.23%	-2.97%	-1.40%	1.92%
2006 - 30	-2.78%	-1.68%	-0.94%	-0.29%	0.71%

Coal Price Forecasts

The approach to coal price forecasts has been changed from the Council's Fifth Power Plan. The first change is to base the wholesale price forecast on Power River Basin coal instead of Western mine mouth prices. The logic of that change was described above. The second change in method was to include the effects of diesel fuel prices in the delivery cost of coal. Instead of simple adders for delivery cost, the model now uses distance, cost per ton mile, and diesel fuel prices to determine delivered cost of coal from Wyoming and Montana to the Pacific Northwest and other Western markets.

The forecast of mine mouth coal prices is still based on simple growth rate assumptions. The proposed growth rates for the five forecast cases are shown in Table 3 for the Fifth Plan and the revised forecast. Prices in medium case for the Fifth Plan were assumed to remain flat. In the revision, the prices are projected to grow modestly in real terms.

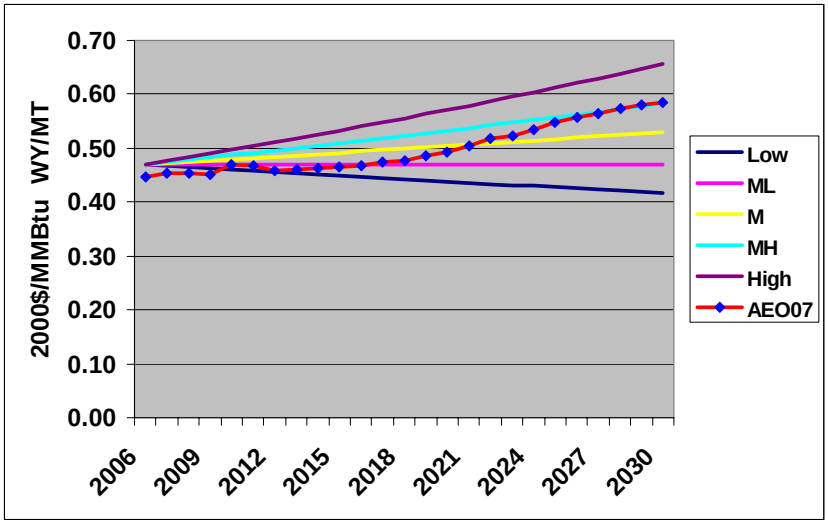
Table 3: Assumed Range of Mine Mouth Coal Prices (Constant Dollar % Per Year)

	Low	Medium Low	Medium	Medium High	High
Fifth Plan	-0.8	-0.5	0.0	0.5	0.9
Proposed	-0.5	0.0	0.5	0.9	1.4

Figure 13 shows the range of coal price forecasts compared to the EIA's 2007 Annual Energy Outlook forecast of prices. The future of coal production and prices is vulnerable to climate change policies and technology. The same is true, to some extent, for oil and natural gas. If the growing reliance on renewable portfolio standards, biofuels, and efficiency improvements continues and is successful at displacing much of the growth in more conventional energy sources, then demand for coal could be much more limited than reflected in many current forecasts of demand and prices.

Mine mouth coal prices are converted to delivered cost to industrial users and power generators in the Pacific Northwest. Delivered costs to other states need to be revised to reflect other sources of coal than Montana and Wyoming. That will be done before Western electricity prices are re-estimated.

Figure 13: Proposed Mine Mouth Coal Price Forecast Range Compared to AEO07



Comparative Fuel Prices

There is no direct link in the Council's fuel price forecasts between oil prices and natural gas or coal prices. However, it is clear that in the long run oil prices play a significant role in determining trends in natural gas prices.[2] Therefore, the Council does look at relative oil and natural gas prices to judge the reasonableness of the forecasts.

A very simple comparison is the 6 to 1 ratio of world oil prices in dollars per barrel to Henry Hub natural gas prices in dollar per thousand cubic feet. This rule of thumb is based on the Btu equivalents of a barrel of oil and a thousand cubic feet of natural gas. A barrel of crude oil contains 5.8 million Btus of energy, and a thousand cubic feet of natural gas contains about a million Btus of energy. The actual ratio of prices varies substantially over time. The 1990s was characterized by ratios near 10. During this time, natural gas was priced substantially below the Btu equivalent of crude oil. However, for much of the early 2000s, oil and natural gas traded at closer to the Btu equivalent ratio of 6.

Various forms of competition between natural gas and oil determine their relative prices. Analysis in reference 2 by Brown and Yucel found that such "burner tip" competition implies a relative price of crude oil to natural gas of about 7. Much of the competition historically has been between residual oil and natural gas because crude oil is not used directly in many applications. Figure 14 shows a comparison of crude, distillate, and residual oil prices with natural gas prices for several recent historical years and as forecast in the revised medium case.

Figure 15 shows the ratio of crude oil price to natural gas price in each of the 5 forecast cases. Both figures indicate a period of high oil price relative to natural gas, although moderated from recent ratios. In the long run, the ratio falls to near 7.

[2] See for example, Stephen P.A. Brown and Mine K. Yucel, *What Drives Natural Gas Prices*?, Federal Reserve Bank of Dallas, Research Department Working Paper 0703, February 2007.

Figure 14: Comparison of Crude Oil, Residual Oil, Distillate Oil And Henry Hub Natural Gas Prices

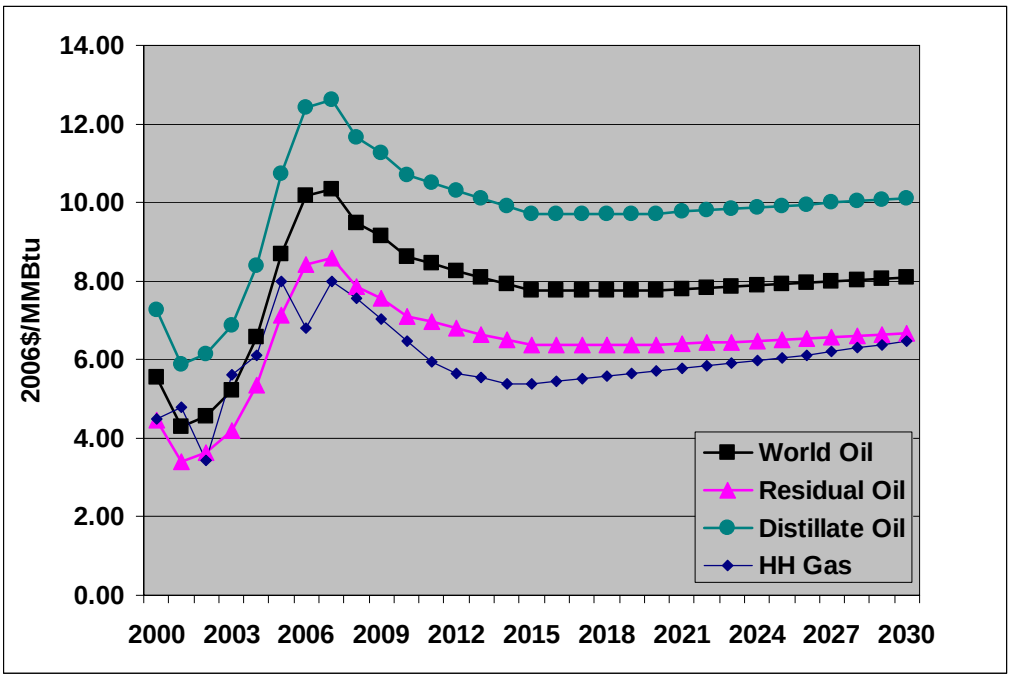
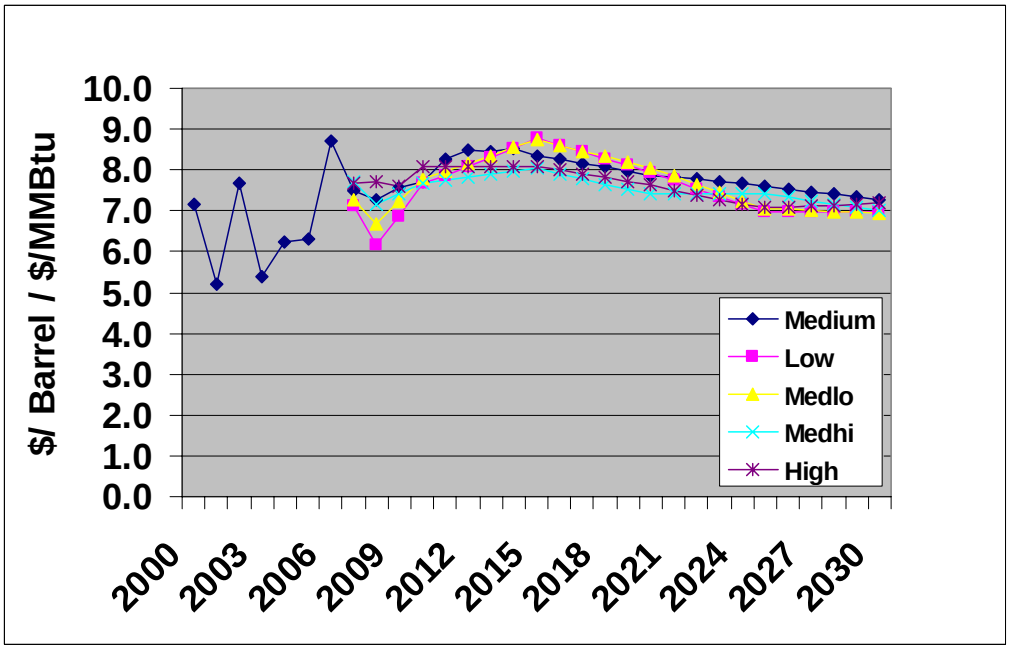


Figure 15: Ratio of Imported Refiner Acquisition Cost of Crude Oil to Henry Hub Price of Natural Gas



Appendix

Wellhead and Retail Natural Gas Prices (2006$/MMBtu)

Table A-1a: Regional Retail Natural Gas Prices (Medium Case)

Medium		Regional Retail Natural Gas Prices			
Year	U.S. Wellhead Price	Residential	Commercial	Industrial Average	Utility Average
2000	4.18	9.05	7.81	4.90	4.40
2001	4.44	9.30	8.07	5.16	4.66
2002	3.22	8.08	6.85	3.93	3.42
2003	5.21	10.08	8.84	5.94	5.45
2004	5.67	10.53	9.30	6.41	5.92
2005	7.39	12.25	11.02	8.14	7.67
2006	6.29	11.15	9.92	7.03	6.55
2007	7.40	12.26	11.03	8.15	7.68
2008	7.00	11.86	10.63	7.75	7.28
2009	6.50	11.36	10.13	7.24	6.78
2010	6.00	10.86	9.63	6.74	6.28
2011	5.50	10.36	9.13	6.23	5.78
2012	5.25	10.11	8.88	5.98	5.54
2013	5.15	10.01	8.78	5.88	5.45
2014	5.00	9.86	8.63	5.73	5.30
2015	5.00	9.86	8.63	5.73	5.31
2016	5.06	9.92	8.69	5.79	5.38
2017	5.12	9.98	8.75	5.85	5.45
2018	5.18	10.04	8.81	5.91	5.53
2019	5.24	10.10	8.87	5.97	5.59
2020	5.30	10.16	8.93	6.03	5.65
2021	5.36	10.22	8.99	6.09	5.71
2022	5.42	10.28	9.05	6.15	5.77
2023	5.48	10.34	9.11	6.21	5.84
2024	5.54	10.40	9.17	6.27	5.90
2025	5.60	10.46	9.23	6.33	5.96
2026	5.68	10.54	9.31	6.41	6.04
2027	5.76	10.62	9.39	6.49	6.12
2028	5.84	10.70	9.47	6.57	6.21
2029	5.92	10.78	9.55	6.66	6.29
2030	6.00	10.86	9.63	6.74	6.38

Table A-1b: Regional Retail Natural Gas Prices (Medium-Low Case)

Low		Regional Retail Natural Gas Prices			
Year	U.S. Wellhead Price	Residential	Commercial	Industrial Average	Utility Average
2000	4.18	9.05	7.81	4.90	4.40
2001	4.44	9.30	8.07	5.16	4.66
2002	3.22	8.08	6.85	3.93	3.42
2003	5.21	10.08	8.84	5.94	5.45
2004	5.67	10.53	9.30	6.41	5.92
2005	7.39	12.25	11.02	8.14	7.67
2006	6.29	11.15	9.92	7.03	6.55
2007	6.50	11.36	10.13	7.24	6.76
2008	6.00	10.86	9.63	6.74	6.26
2009	5.00	9.86	8.63	5.73	5.25
2010	4.25	9.11	7.88	4.97	4.49
2011	4.06	8.93	7.69	4.78	4.32
2012	3.89	8.75	7.52	4.60	4.15
2013	3.72	8.58	7.35	4.43	3.98
2014	3.56	8.42	7.18	4.27	3.82
2015	3.40	8.26	7.03	4.11	3.68
2016	3.47	8.33	7.10	4.18	3.76
2017	3.54	8.40	7.16	4.25	3.83
2018	3.61	8.47	7.23	4.32	3.92
2019	3.68	8.54	7.31	4.39	3.99
2020	3.75	8.61	7.38	4.47	4.06
2021	3.80	8.66	7.43	4.52	4.11
2022	3.85	8.71	7.48	4.57	4.16
2023	3.90	8.76	7.53	4.62	4.21
2024	3.95	8.81	7.58	4.67	4.27
2025	4.00	8.86	7.63	4.72	4.32
2026	4.00	8.86	7.63	4.72	4.32
2027	4.00	8.86	7.63	4.72	4.32
2028	4.00	8.86	7.63	4.72	4.32
2029	4.00	8.86	7.63	4.72	4.32
2030	4.00	8.86	7.63	4.72	4.32

Table A-1c: Regional Retail Natural Gas Prices
(Medium-Low Case)

Medlo		Regional Retail Natural Gas Prices			
Year	U.S. Wellhead Price	Residential	Commercial	Industrial Average	Utility Average
2000	4.18	9.05	7.81	4.90	4.40
2001	4.44	9.30	8.07	5.16	4.66
2002	3.22	8.08	6.85	3.93	3.42
2003	5.21	10.08	8.84	5.94	5.45
2004	5.67	10.53	9.30	6.41	5.92
2005	7.39	12.25	11.02	8.14	7.67
2006	6.29	11.15	9.92	7.03	6.55
2007	7.00	11.86	10.63	7.75	7.27
2008	6.25	11.11	9.88	6.99	6.51
2009	5.50	10.36	9.13	6.23	5.76
2010	5.00	9.86	8.63	5.73	5.26
2011	4.84	9.70	8.47	5.57	5.11
2012	4.69	9.55	8.31	5.41	4.96
2013	4.54	9.40	8.16	5.26	4.82
2014	4.39	9.25	8.02	5.11	4.68
2015	4.25	9.11	7.88	4.97	4.55
2016	4.30	9.16	7.93	5.02	4.61
2017	4.35	9.21	7.98	5.07	4.66
2018	4.40	9.26	8.03	5.12	4.73
2019	4.45	9.31	8.08	5.17	4.78
2020	4.50	9.36	8.13	5.22	4.83
2021	4.60	9.46	8.22	5.32	4.93
2022	4.69	9.56	8.32	5.42	5.03
2023	4.79	9.66	8.42	5.52	5.13
2024	4.90	9.76	8.52	5.62	5.24
2025	5.00	9.86	8.63	5.73	5.34
2026	5.05	9.91	8.68	5.78	5.39
2027	5.10	9.96	8.73	5.83	5.45
2028	5.15	10.01	8.78	5.88	5.50
2029	5.20	10.06	8.83	5.93	5.55
2030	5.25	10.11	8.88	5.98	5.60

Table A-1d: Regional Retail Natural Gas Prices (Medium-High Case)

Medhi		Regional Retail Natural Gas Prices			
Year	U.S. Wellhead Price	Residential	Commercial	Industrial Average	Utility Average
2000	4.18	9.05	7.81	4.90	4.40
2001	4.44	9.30	8.07	5.16	4.66
2002	3.22	8.08	6.85	3.93	3.42
2003	5.21	10.08	8.84	5.94	5.45
2004	5.67	10.53	9.30	6.41	5.92
2005	7.39	12.25	11.02	8.14	7.67
2006	6.29	11.15	9.92	7.03	6.55
2007	7.80	12.66	11.43	8.56	8.09
2008	8.00	12.86	11.63	8.76	8.30
2009	7.50	12.36	11.13	8.25	7.80
2010	7.00	11.86	10.63	7.75	7.30
2011	6.79	11.65	10.42	7.53	7.09
2012	6.58	11.45	10.21	7.33	6.90
2013	6.38	11.25	10.01	7.12	6.70
2014	6.19	11.05	9.82	6.93	6.51
2015	6.00	10.86	9.63	6.74	6.33
2016	6.05	10.91	9.68	6.79	6.39
2017	6.10	10.96	9.73	6.84	6.45
2018	6.15	11.01	9.78	6.89	6.52
2019	6.20	11.06	9.83	6.94	6.57
2020	6.25	11.11	9.88	6.99	6.62
2021	6.30	11.16	9.93	7.04	6.67
2022	6.35	11.21	9.98	7.09	6.73
2023	6.40	11.26	10.03	7.14	6.78
2024	6.45	11.31	10.08	7.19	6.83
2025	6.50	11.36	10.13	7.24	6.89
2026	6.64	11.51	10.27	7.39	7.03
2027	6.79	11.65	10.42	7.54	7.19
2028	6.94	11.80	10.57	7.69	7.34
2029	7.09	11.96	10.72	7.84	7.50
2030	7.25	12.11	10.88	8.00	7.66

Table A-1e: Regional Retail Natural Gas Prices
(High Case)

High		Regional Retail Natural Gas Prices			
Year	U.S. Wellhead Price	Residential	Commercial	Industrial Average	Utility Average
2000	4.18	9.05	7.81	4.90	4.40
2001	4.44	9.30	8.07	5.16	4.66
2002	3.22	8.08	6.85	3.93	3.42
2003	5.21	10.08	8.84	5.94	5.45
2004	5.67	10.53	9.30	6.41	5.92
2005	7.39	12.25	11.02	8.14	7.67
2006	6.29	11.15	9.92	7.03	6.55
2007	8.45	13.31	12.08	9.21	8.75
2008	9.00	13.86	12.63	9.77	9.32
2009	8.50	13.36	12.13	9.26	8.82
2010	8.00	12.86	11.63	8.76	8.32
2011	8.00	12.86	11.63	8.76	8.33
2012	8.00	12.86	11.63	8.76	8.34
2013	8.00	12.86	11.63	8.76	8.35
2014	8.00	12.86	11.63	8.76	8.36
2015	8.00	12.86	11.63	8.76	8.38
2016	8.05	12.91	11.68	8.81	8.44
2017	8.10	12.96	11.73	8.86	8.49
2018	8.15	13.01	11.78	8.91	8.56
2019	8.20	13.06	11.83	8.96	8.61
2020	8.25	13.11	11.88	9.01	8.67
2021	8.30	13.16	11.93	9.06	8.72
2022	8.35	13.21	11.98	9.11	8.77
2023	8.40	13.26	12.03	9.16	8.83
2024	8.45	13.31	12.08	9.21	8.88
2025	8.50	13.36	12.13	9.26	8.93
2026	8.60	13.46	12.23	9.36	9.04
2027	8.70	13.56	12.33	9.46	9.14
2028	8.80	13.66	12.43	9.56	9.24
2029	8.90	13.76	12.53	9.66	9.35
2030	9.00	13.86	12.63	9.77	9.46

Henry Hub and Northwest Natural Gas Prices

Table A-2a: Natural Gas Prices at Regional Hubs and Incremental Delivered Costs to Regional Electric Generators (Medium Case)

Medium					
Year	Henry Hub Natural Gas Price	AECO Price	Sumas Price	West-Side Delivered	East-Side Delivered
2000	4.50	3.78	3.92	4.46	4.33
2001	4.78	4.04	4.17	4.73	4.60
2002	3.45	2.81	2.96	3.49	3.34
2003	5.62	4.82	4.94	5.51	5.39
2004	6.12	5.28	5.40	5.97	5.86
2005	7.99	7.01	7.11	7.72	7.62
2006	6.79	5.91	6.02	6.60	6.50
2007	8.00	7.02	7.12	7.73	7.64
2008	7.56	6.62	6.72	7.35	7.21
2009	7.02	6.12	6.23	6.90	6.69
2010	6.47	5.61	5.73	6.45	6.16
2011	5.93	5.11	5.23	6.00	5.64
2012	5.66	4.86	4.98	5.80	5.37
2013	5.55	4.76	4.88	5.70	5.30
2014	5.39	4.61	4.73	5.55	5.17
2015	5.39	4.61	4.73	5.56	5.23
2016	5.45	4.67	4.79	5.62	5.33
2017	5.51	4.73	4.85	5.68	5.41
2018	5.58	4.79	4.91	5.74	5.53
2019	5.65	4.85	4.97	5.81	5.59
2020	5.71	4.91	5.03	5.87	5.66
2021	5.78	4.97	5.09	5.93	5.72
2022	5.84	5.03	5.15	5.99	5.78
2023	5.91	5.09	5.21	6.06	5.84
2024	5.97	5.15	5.27	6.12	5.91
2025	6.04	5.21	5.33	6.19	5.97
2026	6.12	5.29	5.41	6.27	6.05
2027	6.21	5.37	5.48	6.35	6.14
2028	6.30	5.45	5.56	6.43	6.22
2029	6.39	5.53	5.65	6.52	6.31
2030	6.47	5.61	5.73	6.60	6.39

Table A-2b: Natural Gas Prices at Regional Hubs and Incremental Delivered Costs to Regional Electric Generators
(Low Case)

Low					
Year	Henry Hub Natural Gas Price	AECO Price	Sumas Price	West-Side Delivered	East-Side Delivered
2000	4.50	3.78	3.92	4.46	4.33
2001	4.78	4.04	4.17	4.73	4.60
2002	3.45	2.81	2.96	3.49	3.34
2003	5.62	4.82	4.94	5.51	5.39
2004	6.12	5.28	5.40	5.97	5.86
2005	7.99	7.01	7.11	7.72	7.62
2006	6.79	5.91	6.02	6.60	6.50
2007	7.02	6.12	6.23	6.81	6.71
2008	6.47	5.61	5.73	6.33	6.19
2009	5.39	4.61	4.73	5.38	5.15
2010	4.57	3.85	3.98	4.67	4.37
2011	4.37	3.67	3.80	4.54	4.17
2012	4.18	3.49	3.62	4.42	3.97
2013	3.99	3.32	3.45	4.25	3.83
2014	3.81	3.15	3.29	4.08	3.69
2015	3.65	3.00	3.14	3.92	3.59
2016	3.72	3.07	3.21	3.99	3.69
2017	3.79	3.13	3.27	4.06	3.79
2018	3.87	3.20	3.34	4.13	3.92
2019	3.95	3.28	3.41	4.20	3.99
2020	4.03	3.35	3.49	4.28	4.06
2021	4.08	3.40	3.54	4.32	4.11
2022	4.13	3.45	3.58	4.37	4.16
2023	4.19	3.50	3.63	4.42	4.21
2024	4.24	3.55	3.68	4.47	4.27
2025	4.30	3.60	3.74	4.53	4.32
2026	4.30	3.60	3.74	4.53	4.32
2027	4.30	3.60	3.74	4.52	4.32
2028	4.30	3.60	3.74	4.52	4.32
2029	4.30	3.60	3.74	4.52	4.32
2030	4.30	3.60	3.74	4.52	4.31

Table A-2c: Natural Gas Prices at Regional Hubs and Incremental Delivered Costs to Regional Electric Generators
(Medium Low Case)

Medlo					
Year	Henry Hub Natural Gas Price	AECO Price	Sumas Price	West-Side Delivered	East-Side Delivered
2000	4.50	3.78	3.92	4.46	4.33
2001	4.78	4.04	4.17	4.73	4.60
2002	3.45	2.81	2.96	3.49	3.34
2003	5.62	4.82	4.94	5.51	5.39
2004	6.12	5.28	5.40	5.97	5.86
2005	7.99	7.01	7.11	7.72	7.62
2006	6.79	5.91	6.02	6.60	6.50
2007	7.56	6.62	6.72	7.32	7.23
2008	6.75	5.87	5.98	6.58	6.44
2009	5.93	5.11	5.23	5.88	5.66
2010	5.39	4.61	4.73	5.43	5.14
2011	5.21	4.45	4.57	5.33	4.96
2012	5.04	4.29	4.42	5.23	4.79
2013	4.88	4.14	4.27	5.08	4.67
2014	4.72	3.99	4.12	4.93	4.55
2015	4.57	3.85	3.98	4.79	4.46
2016	4.62	3.90	4.03	4.84	4.55
2017	4.68	3.95	4.08	4.89	4.62
2018	4.73	4.00	4.13	4.94	4.73
2019	4.79	4.05	4.18	5.00	4.78
2020	4.84	4.10	4.23	5.05	4.83
2021	4.95	4.20	4.33	5.15	4.93
2022	5.05	4.30	4.43	5.25	5.03
2023	5.16	4.40	4.53	5.35	5.14
2024	5.27	4.50	4.63	5.45	5.24
2025	5.39	4.61	4.73	5.56	5.35
2026	5.44	4.66	4.78	5.61	5.40
2027	5.49	4.71	4.83	5.66	5.45
2028	5.55	4.76	4.88	5.71	5.50
2029	5.60	4.81	4.93	5.76	5.56
2030	5.66	4.86	4.98	5.82	5.61

Table A-2d: Natural Gas Prices at Regional Hubs and Incremental Delivered Costs to Regional Electric Generators
(Medium High Case)

Medhi					
Year	Henry Hub Natural Gas Price	AECO Price	Sumas Price	West-Side Delivered	East-Side Delivered
2000	4.50	3.78	3.92	4.46	4.33
2001	4.78	4.04	4.17	4.73	4.60
2002	3.45	2.81	2.96	3.49	3.34
2003	5.62	4.82	4.94	5.51	5.39
2004	6.12	5.28	5.40	5.97	5.86
2005	7.99	7.01	7.11	7.72	7.62
2006	6.79	5.91	6.02	6.60	6.50
2007	8.43	7.43	7.52	8.14	8.05
2008	8.65	7.63	7.72	8.36	8.24
2009	8.11	7.12	7.22	7.91	7.72
2010	7.56	6.62	6.72	7.46	7.19
2011	7.33	6.41	6.51	7.30	6.96
2012	7.11	6.20	6.31	7.15	6.74
2013	6.89	6.00	6.11	6.95	6.57
2014	6.68	5.80	5.91	6.76	6.39
2015	6.47	5.61	5.73	6.57	6.26
2016	6.53	5.66	5.78	6.63	6.34
2017	6.58	5.71	5.83	6.68	6.42
2018	6.64	5.76	5.88	6.74	6.53
2019	6.69	5.81	5.93	6.79	6.58
2020	6.75	5.87	5.98	6.84	6.63
2021	6.80	5.92	6.03	6.90	6.68
2022	6.85	5.97	6.07	6.95	6.74
2023	6.91	6.02	6.12	7.01	6.79
2024	6.96	6.07	6.17	7.06	6.85
2025	7.02	6.12	6.23	7.12	6.90
2026	7.17	6.26	6.37	7.27	7.05
2027	7.33	6.41	6.51	7.42	7.21
2028	7.50	6.56	6.66	7.57	7.36
2029	7.66	6.71	6.82	7.73	7.52
2030	7.83	6.87	6.97	7.90	7.69

Table A-2e: Natural Gas Prices at Regional Hubs and Incremental Delivered Costs to Regional Electric Generators
(High Case)

High					
Year	Henry Hub Natural Gas Price	AECO Price	Sumas Price	West-Side Delivered	East-Side Delivered
2000	4.50	3.78	3.92	4.46	4.33
2001	4.78	4.04	4.17	4.73	4.60
2002	3.45	2.81	2.96	3.49	3.34
2003	5.62	4.82	4.94	5.51	5.39
2004	6.12	5.28	5.40	5.97	5.86
2005	7.99	7.01	7.11	7.72	7.62
2006	6.79	5.91	6.02	6.60	6.50
2007	9.14	8.08	8.17	8.80	8.71
2008	9.74	8.63	8.71	9.37	9.27
2009	9.19	8.13	8.22	8.92	8.74
2010	8.65	7.63	7.72	8.48	8.22
2011	8.65	7.63	7.72	8.53	8.20
2012	8.65	7.63	7.72	8.59	8.19
2013	8.65	7.63	7.72	8.60	8.23
2014	8.65	7.63	7.72	8.60	8.25
2015	8.65	7.63	7.72	8.61	8.31
2016	8.70	7.68	7.77	8.66	8.39
2017	8.76	7.73	7.82	8.72	8.47
2018	8.81	7.78	7.87	8.77	8.58
2019	8.87	7.83	7.92	8.83	8.63
2020	8.92	7.88	7.97	8.88	8.68
2021	8.98	7.93	8.02	8.94	8.74
2022	9.03	7.98	8.07	9.00	8.79
2023	9.08	8.03	8.12	9.05	8.85
2024	9.14	8.08	8.17	9.11	8.90
2025	9.19	8.13	8.22	9.16	8.96
2026	9.30	8.23	8.31	9.27	9.07
2027	9.41	8.33	8.41	9.37	9.17
2028	9.52	8.43	8.51	9.48	9.28
2029	9.63	8.53	8.61	9.59	9.39
2030	9.74	8.63	8.71	9.70	9.50

Retail and Utility Oil Price Forecasts (2006$/MMBtu)

Table A-3a: World Oil Price and Northwest Delivered Prices to End Use Sectors (Medium Case)

Medium		Industrial	Industrial	Average	Commercial	Commercial	Average	Average	Utility	Utility
Year	World Oil Price 2006$/Barrel	Residual Oil Price	Distillate Oil Price	Industrial Oil Price	Residual Oil Price	Distillate Oil Price	Commercial Oil Price	Residential Oil Price	Residual Oil Price	Distillate Oil Price
2000	32.14	4.80	8.84	8.43	4.85	8.36	8.22	11.30	0.00	8.03
2001	24.93	3.74	7.45	7.34	3.79	6.97	6.90	9.92	0.00	6.64
2002	26.41	3.96	7.74	7.44	4.00	7.25	7.16	10.20	0.00	6.93
2003	30.22	4.52	8.47	8.24	4.57	7.99	7.89	10.93	0.00	7.66
2004	38.07	5.68	9.98	9.75	5.73	9.50	9.39	12.44	0.00	9.17
2005	50.29	7.48	12.33	12.07	7.53	11.85	11.73	14.79	0.00	11.52
2006	59.01	8.77	14.01	13.73	8.82	13.52	13.39	16.47	0.00	13.20
2007	60.00	8.92	14.20	13.92	8.97	13.71	13.58	16.66	0.00	13.39
2008	55.00	8.18	13.23	12.97	8.23	12.75	12.63	15.70	0.00	12.42
2009	53.00	7.88	12.85	12.59	7.93	12.37	12.24	15.32	0.00	12.04
2010	50.00	7.44	12.27	12.02	7.49	11.79	11.67	14.74	0.00	11.46
2011	48.96	7.29	12.07	11.82	7.34	11.59	11.47	14.54	0.00	11.26
2012	47.94	7.14	11.88	11.62	7.18	11.39	11.28	14.34	0.00	11.07
2013	46.94	6.99	11.68	11.43	7.04	11.20	11.09	14.15	0.00	10.87
2014	45.96	6.84	11.50	11.25	6.89	11.01	10.90	13.96	0.00	10.69
2015	45.00	6.70	11.31	11.07	6.75	10.83	10.72	13.78	0.00	10.50
2016	45.00	6.70	11.31	11.07	6.75	10.83	10.72	13.78	0.00	10.50
2017	45.00	6.70	11.31	11.07	6.75	10.83	10.72	13.78	0.00	10.50
2018	45.00	6.70	11.31	11.07	6.75	10.83	10.72	13.78	0.00	10.50
2019	45.00	6.70	11.31	11.07	6.75	10.83	10.72	13.78	0.00	10.50
2020	45.00	6.70	11.31	11.07	6.75	10.83	10.72	13.78	0.00	10.50
2021	45.20	6.73	11.35	11.10	6.78	10.87	10.75	13.82	0.00	10.54
2022	45.40	6.76	11.39	11.14	6.81	10.91	10.79	13.85	0.00	10.58
2023	45.60	6.79	11.43	11.18	6.84	10.94	10.83	13.89	0.00	10.62
2024	45.80	6.82	11.46	11.22	6.87	10.98	10.87	13.93	0.00	10.66
2025	46.00	6.85	11.50	11.26	6.90	11.02	10.91	13.97	0.00	10.69
2026	46.20	6.88	11.54	11.29	6.93	11.06	10.94	14.01	0.00	10.73
2027	46.40	6.91	11.58	11.33	6.96	11.10	10.98	14.05	0.00	10.77
2028	46.60	6.94	11.62	11.37	6.99	11.14	11.02	14.08	0.00	10.81
2029	46.80	6.97	11.66	11.41	7.02	11.17	11.06	14.12	0.00	10.85
2030	47.00	7.00	11.70	11.45	7.05	11.21	11.10	14.16	0.00	10.89

Table A-3b: World Oil Price and Northwest Delivered Prices to End Use Sectors (Low Case)

Low		Industrial	Industrial	Average	Commercial	Commercial	Average	Average	Utility	Utility
Year	World Oil Price 2006$/Barrel	Residual Oil Price	Distillate Oil Price	Industrial Oil Price	Residual Oil Price	Distillate Oil Price	Commercial Oil Price	Residential Oil Price	Residual Oil Price	Distillate Oil Price
2000	32.14	4.80	8.84	8.43	4.85	8.36	8.22	11.30	0.00	8.03
2001	24.93	3.74	7.45	7.34	3.79	6.97	6.90	9.92	0.00	6.64
2002	26.41	3.96	7.74	7.44	4.00	7.25	7.16	10.20	0.00	6.93
2003	30.22	4.52	8.47	8.24	4.57	7.99	7.89	10.93	0.00	7.66
2004	38.07	5.68	9.98	9.75	5.73	9.50	9.39	12.44	0.00	9.17
2005	50.29	7.48	12.33	12.07	7.53	11.85	11.73	14.79	0.00	11.52
2006	59.01	8.77	14.01	13.73	8.82	13.52	13.39	16.47	0.00	13.20
2007	50.00	7.44	12.27	12.02	7.49	11.79	11.67	14.74	0.00	11.46
2008	40.00	5.96	10.35	10.12	6.01	9.87	9.76	12.82	0.00	9.54
2009	37.00	5.52	9.77	9.55	5.57	9.29	9.19	12.24	0.00	8.96
2010	35.00	5.23	9.39	9.17	5.27	8.91	8.80	11.85	0.00	8.58
2011	34.38	5.13	9.27	9.05	5.18	8.79	8.69	11.73	0.00	8.46
2012	33.77	5.04	9.15	8.93	5.09	8.67	8.57	11.62	0.00	8.34
2013	33.17	4.96	9.04	8.82	5.00	8.55	8.45	11.50	0.00	8.23
2014	32.58	4.87	8.92	8.71	4.92	8.44	8.34	11.39	0.00	8.11
2015	32.00	4.78	8.81	8.60	4.83	8.33	8.23	11.28	0.00	8.00
2016	32.00	4.78	8.81	8.60	4.83	8.33	8.23	11.28	0.00	8.00
2017	32.00	4.78	8.81	8.60	4.83	8.33	8.23	11.28	0.00	8.00
2018	32.00	4.78	8.81	8.60	4.83	8.33	8.23	11.28	0.00	8.00
2019	32.00	4.78	8.81	8.60	4.83	8.33	8.23	11.28	0.00	8.00
2020	32.00	4.78	8.81	8.60	4.83	8.33	8.23	11.28	0.00	8.00
2021	31.59	4.72	8.73	8.52	4.77	8.25	8.15	11.20	0.00	7.92
2022	31.18	4.66	8.66	8.44	4.71	8.17	8.08	11.12	0.00	7.85
2023	30.78	4.60	8.58	8.37	4.65	8.10	8.00	11.04	0.00	7.77
2024	30.39	4.55	8.50	8.29	4.59	8.02	7.92	10.97	0.00	7.69
2025	30.00	4.49	8.43	8.22	4.54	7.94	7.85	10.89	0.00	7.62
2026	30.00	4.49	8.43	8.22	4.54	7.94	7.85	10.89	0.00	7.62
2027	30.00	4.49	8.43	8.22	4.54	7.94	7.85	10.89	0.00	7.62
2028	30.00	4.49	8.43	8.22	4.54	7.94	7.85	10.89	0.00	7.62
2029	30.00	4.49	8.43	8.22	4.54	7.94	7.85	10.89	0.00	7.62
2030	30.00	4.49	8.43	8.22	4.54	7.94	7.85	10.89	0.00	7.62

Table A-3c: World Oil Price and Northwest Delivered Prices to End Use Sectors (Medium-Low Case)

Medlo		Industrial	Industrial	Average	Commercial	Commercial	Average	Average	Utility	Utility
Year	World Oil Price 2006$/Barrel	Residual Oil Price	Distillate Oil Price	Industrial Oil Price	Residual Oil Price	Distillate Oil Price	Commercial Oil Price	Residential Oil Price	Residual Oil Price	Distillate Oil Price
2000	32.14	4.80	8.84	8.43	4.85	8.36	8.22	11.30	0.00	8.03
2001	24.93	3.74	7.45	7.34	3.79	6.97	6.90	9.92	0.00	6.64
2002	26.41	3.96	7.74	7.44	4.00	7.25	7.16	10.20	0.00	6.93
2003	30.22	4.52	8.47	8.24	4.57	7.99	7.89	10.93	0.00	7.66
2004	38.07	5.68	9.98	9.75	5.73	9.50	9.39	12.44	0.00	9.17
2005	50.29	7.48	12.33	12.07	7.53	11.85	11.73	14.79	0.00	11.52
2006	59.01	8.77	14.01	13.73	8.82	13.52	13.39	16.47	0.00	13.20
2007	55.00	8.18	13.23	12.97	8.23	12.75	12.63	15.70	0.00	12.42
2008	45.00	6.70	11.31	11.07	6.75	10.83	10.72	13.78	0.00	10.50
2009	43.00	6.41	10.93	10.69	6.46	10.44	10.33	13.39	0.00	10.12
2010	42.00	6.26	10.73	10.50	6.31	10.25	10.14	13.20	0.00	9.93
2011	41.59	6.20	10.66	10.42	6.25	10.17	10.06	13.12	0.00	9.85
2012	41.19	6.14	10.58	10.34	6.19	10.10	9.99	13.04	0.00	9.77
2013	40.79	6.08	10.50	10.27	6.13	10.02	9.91	12.97	0.00	9.69
2014	40.39	6.02	10.43	10.19	6.07	9.94	9.84	12.89	0.00	9.62
2015	40.00	5.96	10.35	10.12	6.01	9.87	9.76	12.82	0.00	9.54
2016	39.80	5.93	10.31	10.08	5.98	9.83	9.72	12.78	0.00	9.50
2017	39.60	5.91	10.27	10.04	5.95	9.79	9.68	12.74	0.00	9.46
2018	39.40	5.88	10.23	10.00	5.92	9.75	9.64	12.70	0.00	9.42
2019	39.20	5.85	10.20	9.97	5.89	9.71	9.61	12.66	0.00	9.39
2020	39.00	5.82	10.16	9.93	5.86	9.67	9.57	12.62	0.00	9.35
2021	38.80	5.79	10.12	9.89	5.83	9.64	9.53	12.58	0.00	9.31
2022	38.60	5.76	10.08	9.85	5.80	9.60	9.49	12.55	0.00	9.27
2023	38.40	5.73	10.04	9.81	5.78	9.56	9.45	12.51	0.00	9.23
2024	38.20	5.70	10.00	9.78	5.75	9.52	9.42	12.47	0.00	9.19
2025	38.00	5.67	9.97	9.74	5.72	9.48	9.38	12.43	0.00	9.16
2026	38.26	5.71	10.01	9.79	5.75	9.53	9.43	12.48	0.00	9.21
2027	38.51	5.75	10.06	9.84	5.79	9.58	9.48	12.53	0.00	9.26
2028	38.77	5.78	10.11	9.88	5.83	9.63	9.53	12.58	0.00	9.31
2029	39.04	5.82	10.16	9.93	5.87	9.68	9.58	12.63	0.00	9.36
2030	39.30	5.86	10.22	9.98	5.91	9.73	9.63	12.68	0.00	9.41

Table A-3d: World Oil Price and Northwest Delivered Prices to End Use Sectors (Medium-High Case)

Medhi		Industrial	Industrial	Average	Commercial	Commercial	Average	Average	Utility	Utility
Year	World Oil Price 2006$/Barrel	Residual Oil Price	Distillate Oil Price	Industrial Oil Price	Residual Oil Price	Distillate Oil Price	Commercial Oil Price	Residential Oil Price	Residual Oil Price	Distillate Oil Price
2000	32.14	4.80	8.84	8.43	4.85	8.36	8.22	11.30	0.00	8.03
2001	24.93	3.74	7.45	7.34	3.79	6.97	6.90	9.92	0.00	6.64
2002	26.41	3.96	7.74	7.44	4.00	7.25	7.16	10.20	0.00	6.93
2003	30.22	4.52	8.47	8.24	4.57	7.99	7.89	10.93	0.00	7.66
2004	38.07	5.68	9.98	9.75	5.73	9.50	9.39	12.44	0.00	9.17
2005	50.29	7.48	12.33	12.07	7.53	11.85	11.73	14.79	0.00	11.52
2006	59.01	8.77	14.01	13.73	8.82	13.52	13.39	16.47	0.00	13.20
2007	65.00	9.66	15.16	14.87	9.70	14.67	14.54	17.62	0.00	14.35
2008	62.00	9.21	14.58	14.30	9.26	14.10	13.96	17.05	0.00	13.77
2009	60.00	8.92	14.20	13.92	8.97	13.71	13.58	16.66	0.00	13.39
2010	58.00	8.62	13.81	13.54	8.67	13.33	13.20	16.28	0.00	13.00
2011	56.75	8.44	13.57	13.30	8.49	13.09	12.96	16.04	0.00	12.76
2012	55.52	8.26	13.33	13.07	8.30	12.85	12.73	15.80	0.00	12.53
2013	54.32	8.08	13.10	12.84	8.13	12.62	12.50	15.57	0.00	12.29
2014	53.15	7.91	12.88	12.61	7.95	12.40	12.27	15.34	0.00	12.07
2015	52.00	7.74	12.66	12.40	7.78	12.17	12.05	15.12	0.00	11.85
2016	51.59	7.68	12.58	12.32	7.72	12.10	11.97	15.05	0.00	11.77
2017	51.19	7.62	12.50	12.24	7.66	12.02	11.90	14.97	0.00	11.69
2018	50.79	7.56	12.42	12.17	7.61	11.94	11.82	14.89	0.00	11.62
2019	50.39	7.50	12.35	12.09	7.55	11.87	11.75	14.81	0.00	11.54
2020	50.00	7.44	12.27	12.02	7.49	11.79	11.67	14.74	0.00	11.46
2021	50.39	7.50	12.35	12.09	7.55	11.87	11.75	14.81	0.00	11.54
2022	50.79	7.56	12.42	12.17	7.61	11.94	11.82	14.89	0.00	11.62
2023	51.19	7.62	12.50	12.24	7.66	12.02	11.90	14.97	0.00	11.69
2024	51.59	7.68	12.58	12.32	7.72	12.10	11.97	15.05	0.00	11.77
2025	52.00	7.74	12.66	12.40	7.78	12.17	12.05	15.12	0.00	11.85
2026	52.59	7.82	12.77	12.51	7.87	12.29	12.16	15.24	0.00	11.96
2027	53.18	7.91	12.88	12.62	7.96	12.40	12.28	15.35	0.00	12.07
2028	53.78	8.00	13.00	12.73	8.05	12.52	12.39	15.47	0.00	12.19
2029	54.39	8.09	13.12	12.85	8.14	12.63	12.51	15.58	0.00	12.31
2030	55.00	8.18	13.23	12.97	8.23	12.75	12.63	15.70	0.00	12.42

Table A-3e: World Oil Price and Northwest Delivered Prices to End Use Sectors (High Case)

High		Industrial	Industrial	Average	Commercial	Commercial	Average	Average	Utility	Utility
Year	World Oil Price 2006$/Barrel	Residual Oil Price	Distillate Oil Price	Industrial Oil Price	Residual Oil Price	Distillate Oil Price	Commercial Oil Price	Residential Oil Price	Residual Oil Price	Distillate Oil Price
2000	32.14	4.80	8.84	8.43	4.85	8.36	8.22	11.30	0.00	8.03
2001	24.93	3.74	7.45	7.34	3.79	6.97	6.90	9.92	0.00	6.64
2002	26.41	3.96	7.74	7.44	4.00	7.25	7.16	10.20	0.00	6.93
2003	30.22	4.52	8.47	8.24	4.57	7.99	7.89	10.93	0.00	7.66
2004	38.07	5.68	9.98	9.75	5.73	9.50	9.39	12.44	0.00	9.17
2005	50.29	7.48	12.33	12.07	7.53	11.85	11.73	14.79	0.00	11.52
2006	59.01	8.77	14.01	13.73	8.82	13.52	13.39	16.47	0.00	13.20
2007	70.00	10.40	16.12	15.81	10.44	15.64	15.49	18.58	0.00	15.31
2008	75.00	11.13	17.08	16.76	11.18	16.60	16.45	19.55	0.00	16.27
2009	70.00	10.40	16.12	15.81	10.44	15.64	15.49	18.58	0.00	15.31
2010	70.00	10.40	16.12	15.81	10.44	15.64	15.49	18.58	0.00	15.31
2011	70.00	10.40	16.12	15.81	10.44	15.64	15.49	18.58	0.00	15.31
2012	70.00	10.40	16.12	15.81	10.44	15.64	15.49	18.58	0.00	15.31
2013	70.00	10.40	16.12	15.81	10.44	15.64	15.49	18.58	0.00	15.31
2014	70.00	10.40	16.12	15.81	10.44	15.64	15.49	18.58	0.00	15.31
2015	70.00	10.40	16.12	15.81	10.44	15.64	15.49	18.58	0.00	15.31
2016	69.60	10.34	16.04	15.74	10.38	15.56	15.41	18.51	0.00	15.23
2017	69.19	10.28	15.96	15.66	10.32	15.48	15.34	18.43	0.00	15.15
2018	68.79	10.22	15.89	15.59	10.26	15.40	15.26	18.35	0.00	15.08
2019	68.40	10.16	15.81	15.51	10.21	15.33	15.18	18.28	0.00	15.00
2020	68.00	10.10	15.73	15.43	10.15	15.25	15.11	18.20	0.00	14.92
2021	67.39	10.01	15.62	15.32	10.06	15.13	14.99	18.08	0.00	14.81
2022	66.78	9.92	15.50	15.20	9.97	15.02	14.88	17.97	0.00	14.69
2023	66.18	9.83	15.38	15.09	9.88	14.90	14.76	17.85	0.00	14.58
2024	65.59	9.74	15.27	14.98	9.79	14.79	14.65	17.74	0.00	14.46
2025	65.00	9.66	15.16	14.87	9.70	14.67	14.54	17.62	0.00	14.35
2026	65.97	9.80	15.34	15.05	9.85	14.86	14.72	17.81	0.00	14.53
2027	66.96	9.95	15.53	15.24	9.99	15.05	14.91	18.00	0.00	14.72
2028	67.96	10.09	15.73	15.43	10.14	15.24	15.10	18.19	0.00	14.92
2029	68.97	10.24	15.92	15.62	10.29	15.44	15.29	18.39	0.00	15.11
2030	70.00	10.40	16.12	15.81	10.44	15.64	15.49	18.58	0.00	15.31

Coal Prices for Industrial and Utility Users(2006$/MMBtu)

Table A-4a: Coal Price Forecasts For Selected Regions (Medium Case)

Medium			Selected Regional Electricity Generation Coal Prices					
Year	Western Minmouth Price	Regional Industrial Price	West WA/OR	East WA/OR	Idaho	Montana	Utah	Wyoming
2005	0.64	2.27	1.55	1.30	1.00	0.65	0.65	0.65
2006	0.55	2.08	1.42	1.18	0.90	0.55	0.55	0.55
2007	0.55	2.04	1.40	1.16	0.89	0.55	0.55	0.55
2008	0.55	2.01	1.39	1.16	0.89	0.56	0.56	0.56
2009	0.55	2.03	1.40	1.16	0.89	0.56	0.56	0.56
2010	0.56	2.02	1.40	1.17	0.89	0.56	0.56	0.56
2011	0.56	2.04	1.41	1.17	0.90	0.57	0.57	0.57
2012	0.56	2.04	1.41	1.17	0.90	0.57	0.57	0.57
2013	0.56	2.04	1.42	1.18	0.90	0.57	0.57	0.57
2014	0.57	2.05	1.42	1.18	0.91	0.57	0.57	0.57
2015	0.57	2.05	1.42	1.18	0.91	0.58	0.58	0.58
2016	0.57	2.06	1.43	1.19	0.91	0.58	0.58	0.58
2017	0.58	2.06	1.43	1.19	0.92	0.58	0.58	0.58
2018	0.58	2.06	1.43	1.19	0.92	0.59	0.59	0.59
2019	0.58	2.07	1.44	1.20	0.92	0.59	0.59	0.59
2020	0.58	2.07	1.44	1.20	0.93	0.59	0.59	0.59
2021	0.59	2.07	1.44	1.20	0.93	0.59	0.59	0.59
2022	0.59	2.08	1.44	1.21	0.93	0.60	0.60	0.60
2023	0.59	2.08	1.45	1.21	0.94	0.60	0.60	0.60
2024	0.60	2.08	1.45	1.21	0.94	0.60	0.60	0.60
2025	0.60	2.09	1.45	1.21	0.94	0.61	0.61	0.61
2026	0.60	2.09	1.46	1.22	0.94	0.61	0.61	0.61
2027	0.61	2.09	1.46	1.22	0.95	0.61	0.61	0.61
2028	0.61	2.10	1.46	1.22	0.95	0.62	0.62	0.62
2029	0.61	2.10	1.47	1.23	0.95	0.62	0.62	0.62
2030	0.61	2.10	1.47	1.23	0.96	0.62	0.62	0.62

Table A-4b: Coal Price Forecasts For Selected Regions (Low Case)

Low			Selected Regional Electricity Generation Coal Prices					
Year	Western Minmouth Price	Regional Industrial Price	West WA/OR	East WA/OR	Idaho	Montana	Utah	Wyoming
2005	0.64	2.27	1.55	1.30	1.00	0.65	0.65	0.65
2006	0.55	2.08	1.42	1.18	0.90	0.55	0.55	0.55
2007	0.54	1.98	1.37	1.14	0.88	0.55	0.55	0.55
2008	0.54	1.96	1.37	1.14	0.87	0.55	0.55	0.55
2009	0.54	2.00	1.38	1.15	0.87	0.54	0.54	0.54
2010	0.53	2.01	1.38	1.14	0.87	0.54	0.54	0.54
2011	0.53	2.01	1.38	1.14	0.87	0.54	0.54	0.54
2012	0.53	2.01	1.38	1.14	0.87	0.54	0.54	0.54
2013	0.53	2.01	1.38	1.14	0.87	0.53	0.53	0.53
2014	0.52	2.00	1.38	1.14	0.86	0.53	0.53	0.53
2015	0.52	2.00	1.37	1.13	0.86	0.53	0.53	0.53
2016	0.52	2.00	1.37	1.13	0.86	0.53	0.53	0.53
2017	0.52	2.00	1.37	1.13	0.86	0.52	0.52	0.52
2018	0.51	2.00	1.37	1.13	0.85	0.52	0.52	0.52
2019	0.51	2.00	1.36	1.13	0.85	0.52	0.52	0.52
2020	0.51	1.99	1.36	1.12	0.85	0.52	0.52	0.52
2021	0.51	1.99	1.36	1.12	0.85	0.51	0.51	0.51
2022	0.50	1.99	1.36	1.12	0.84	0.51	0.51	0.51
2023	0.50	1.98	1.35	1.11	0.84	0.51	0.51	0.51
2024	0.50	1.98	1.35	1.11	0.84	0.51	0.51	0.51
2025	0.50	1.98	1.35	1.11	0.84	0.50	0.50	0.50
2026	0.49	1.98	1.35	1.11	0.83	0.50	0.50	0.50
2027	0.49	1.98	1.34	1.11	0.83	0.50	0.50	0.50
2028	0.49	1.97	1.34	1.10	0.83	0.50	0.50	0.50
2029	0.49	1.97	1.34	1.10	0.83	0.49	0.49	0.49
2030	0.48	1.97	1.34	1.10	0.82	0.49	0.49	0.49

Table A-4c: Coal Price Forecasts For Selected Regions (Medium-Low Case)

Medlo			Selected Regional Electricity Generation Coal Prices					
Year	Western Minmouth Price	Regional Industrial Price	West WA/OR	East WA/OR	Idaho	Montana	Utah	Wyoming
2005	0.64	2.27	1.55	1.30	1.00	0.65	0.65	0.65
2006	0.55	2.08	1.42	1.18	0.90	0.55	0.55	0.55
2007	0.55	2.01	1.39	1.15	0.88	0.55	0.55	0.55
2008	0.55	1.97	1.37	1.14	0.88	0.55	0.55	0.55
2009	0.55	2.02	1.39	1.16	0.88	0.55	0.55	0.55
2010	0.55	2.02	1.40	1.16	0.89	0.55	0.55	0.55
2011	0.55	2.03	1.40	1.16	0.89	0.55	0.55	0.55
2012	0.55	2.03	1.40	1.16	0.89	0.55	0.55	0.55
2013	0.55	2.03	1.40	1.16	0.89	0.55	0.55	0.55
2014	0.55	2.03	1.40	1.16	0.89	0.55	0.55	0.55
2015	0.55	2.03	1.40	1.16	0.89	0.55	0.55	0.55
2016	0.55	2.03	1.40	1.16	0.89	0.55	0.55	0.55
2017	0.55	2.03	1.40	1.16	0.89	0.55	0.55	0.55
2018	0.55	2.03	1.40	1.16	0.89	0.55	0.55	0.55
2019	0.55	2.03	1.40	1.16	0.89	0.55	0.55	0.55
2020	0.55	2.03	1.40	1.16	0.89	0.55	0.55	0.55
2021	0.55	2.03	1.40	1.16	0.89	0.55	0.55	0.55
2022	0.55	2.03	1.40	1.16	0.89	0.55	0.55	0.55
2023	0.55	2.03	1.40	1.16	0.89	0.55	0.55	0.55
2024	0.55	2.03	1.40	1.16	0.89	0.55	0.55	0.55
2025	0.55	2.03	1.40	1.16	0.89	0.55	0.55	0.55
2026	0.55	2.03	1.40	1.16	0.89	0.55	0.55	0.55
2027	0.55	2.03	1.40	1.16	0.89	0.55	0.55	0.55
2028	0.55	2.03	1.40	1.16	0.89	0.55	0.55	0.55
2029	0.55	2.03	1.40	1.16	0.89	0.55	0.55	0.55
2030	0.55	2.03	1.40	1.16	0.89	0.55	0.55	0.55

Table A-4d: Coal Price Forecasts For Selected Regions (Medium-High Case)

Medhi			Selected Regional Electricity Generation Coal Prices					
Year	Western Minmouth Price	Regional Industrial Price	West WA/OR	East WA/OR	Idaho	Montana	Utah	Wyoming
2005	0.64	2.27	1.55	1.30	1.00	0.65	0.65	0.65
2006	0.55	2.08	1.42	1.18	0.90	0.55	0.55	0.55
2007	0.55	2.07	1.42	1.17	0.90	0.56	0.56	0.56
2008	0.56	2.02	1.40	1.16	0.89	0.56	0.56	0.56
2009	0.56	2.03	1.41	1.17	0.90	0.57	0.57	0.57
2010	0.57	2.04	1.41	1.18	0.90	0.57	0.57	0.57
2011	0.57	2.05	1.42	1.18	0.91	0.58	0.58	0.58
2012	0.58	2.05	1.43	1.19	0.92	0.58	0.58	0.58
2013	0.58	2.06	1.43	1.19	0.92	0.59	0.59	0.59
2014	0.59	2.06	1.44	1.20	0.93	0.59	0.59	0.59
2015	0.59	2.07	1.44	1.20	0.93	0.60	0.60	0.60
2016	0.60	2.08	1.45	1.21	0.94	0.60	0.60	0.60
2017	0.60	2.08	1.45	1.22	0.94	0.61	0.61	0.61
2018	0.61	2.09	1.46	1.22	0.95	0.61	0.61	0.61
2019	0.61	2.10	1.46	1.23	0.95	0.62	0.62	0.62
2020	0.62	2.10	1.47	1.23	0.96	0.63	0.63	0.63
2021	0.62	2.11	1.48	1.24	0.97	0.63	0.63	0.63
2022	0.63	2.12	1.48	1.24	0.97	0.64	0.64	0.64
2023	0.64	2.12	1.49	1.25	0.98	0.64	0.64	0.64
2024	0.64	2.13	1.49	1.26	0.98	0.65	0.65	0.65
2025	0.65	2.13	1.50	1.26	0.99	0.65	0.65	0.65
2026	0.65	2.14	1.51	1.27	0.99	0.66	0.66	0.66
2027	0.66	2.15	1.51	1.27	1.00	0.67	0.67	0.67
2028	0.66	2.15	1.52	1.28	1.01	0.67	0.67	0.67
2029	0.67	2.16	1.52	1.29	1.01	0.68	0.68	0.68
2030	0.68	2.17	1.53	1.29	1.02	0.68	0.68	0.68

Table A-4e: Coal Price Forecasts For Selected Regions (High Case)

High			Selected Regional Electricity Generation Coal Prices					
Year	Western Minmouth Price	Regional Industrial Price	West WA/OR	East WA/OR	Idaho	Montana	Utah	Wyoming
2005	0.64	2.27	1.55	1.30	1.00	0.65	0.65	0.65
2006	0.55	2.08	1.42	1.18	0.90	0.55	0.55	0.55
2007	0.55	2.10	1.43	1.19	0.90	0.56	0.56	0.56
2008	0.56	2.07	1.42	1.18	0.91	0.57	0.57	0.57
2009	0.57	2.03	1.41	1.18	0.91	0.58	0.58	0.58
2010	0.58	2.06	1.43	1.19	0.92	0.58	0.58	0.58
2011	0.58	2.07	1.44	1.20	0.93	0.59	0.59	0.59
2012	0.59	2.08	1.45	1.21	0.93	0.60	0.60	0.60
2013	0.60	2.09	1.45	1.22	0.94	0.61	0.61	0.61
2014	0.61	2.09	1.46	1.22	0.95	0.62	0.62	0.62
2015	0.62	2.10	1.47	1.23	0.96	0.62	0.62	0.62
2016	0.63	2.11	1.48	1.24	0.97	0.63	0.63	0.63
2017	0.64	2.12	1.49	1.25	0.98	0.64	0.64	0.64
2018	0.64	2.13	1.50	1.26	0.99	0.65	0.65	0.65
2019	0.65	2.14	1.51	1.27	0.99	0.66	0.66	0.66
2020	0.66	2.15	1.51	1.28	1.00	0.67	0.67	0.67
2021	0.67	2.15	1.52	1.29	1.01	0.68	0.68	0.68
2022	0.68	2.16	1.53	1.29	1.02	0.69	0.69	0.69
2023	0.69	2.17	1.54	1.30	1.03	0.70	0.70	0.70
2024	0.70	2.18	1.55	1.31	1.04	0.71	0.71	0.71
2025	0.71	2.19	1.56	1.32	1.05	0.72	0.72	0.72
2026	0.72	2.21	1.58	1.34	1.06	0.73	0.73	0.73
2027	0.73	2.22	1.59	1.35	1.07	0.74	0.74	0.74
2028	0.74	2.23	1.60	1.36	1.08	0.75	0.75	0.75
2029	0.75	2.24	1.61	1.37	1.09	0.76	0.76	0.76
2030	0.76	2.25	1.62	1.38	1.10	0.77	0.77	0.77

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