Northwest Power and Conservation Council

January 6, 2009

MEMORANDUM

TO: Power Committee

FROM: Terry Morlan

SUBJECT: Revised Fuel Price Forecasts

The Council received comments on its preliminary draft fuel price forecasts in November. Staff made revisions to the forecasts in response to the comments received and to reflect new data, correct errors, and meet changing data needs for other models that use the fuel price forecasts. A summary of comments and responses is attached.

The second attached memorandum to the record describes specific changes made to the technical analysis. In addition, the attached PowerPoint includes some illustration of the effects of the changes. Generally, four types of changes were made:

- Actual historical data was updated for recent months' prices, and the near-term forecasts were adjusted to reflect greater weakness due to economic recession and collapsing fuel prices in recent months.
- The long-term forecast ranges were generally made wider, more so on the high price end of the range.
- Sumas prices at the Washington / B.C. border were increased relative to Henry Hub prices and other PNW pricing hubs in Alberta and the U.S. Rockies.
- A number of changes were made to the model to improve the monthly fixed and variable natural gas price inputs to the Aurora model.

Conforming changes were made to the draft fuel price forecast appendix. In addition, language was added in several parts of the paper to clarify assumptions and further explain the thinking behind some of the forecasts. The five data appendices were revised to reflect the forecast changes. Finally, Appendix F, which is the description of the forecasting model, was completely overhauled.

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For those who want the detail, the revised draft fuel price appendix and its appendices are available. The draft forecast appendix is also available in redline revision mode for those who want to see the specific changes made. I am attaching the draft fuel price appendix. I will show some slides in the web conference that illustrate the forecast changes.

Let me know if any of you want a copy of the other materials. They are also posted on the Council web site at http://www.nwcouncil.org/library/2008/2008-14.htm.

Attachments

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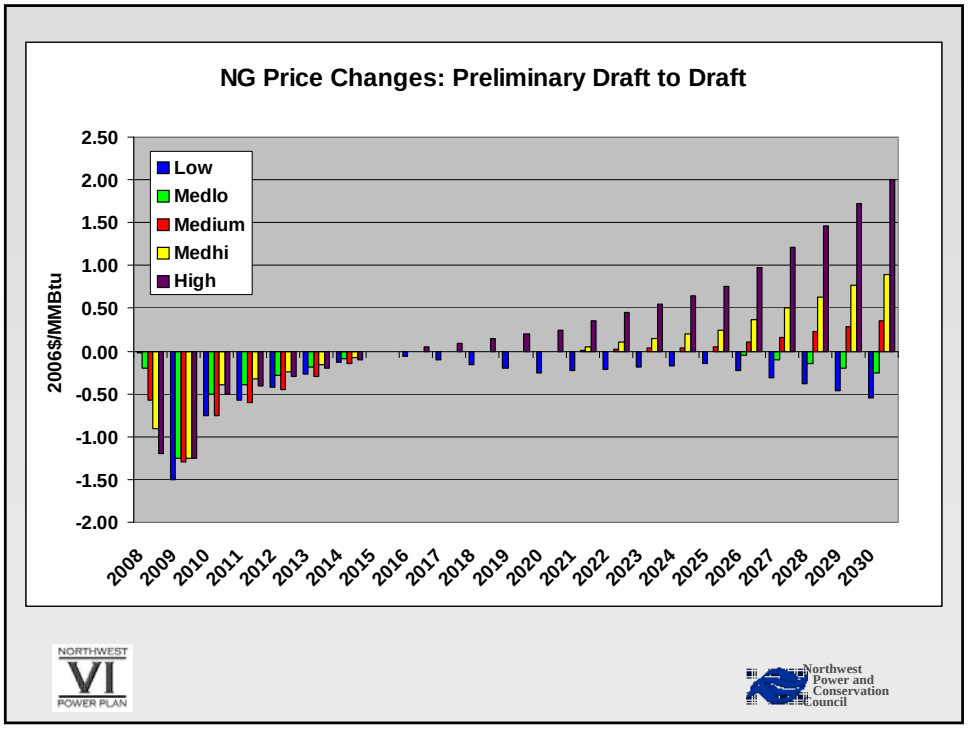
q:\tm\council mtgs\2009\jan09\(wc-3) fuel price changes.doc

Revisions to Preliminary Draft Fuel Price Forecasts

Power Committee
Web Conference Call
January 8, 2009

Comments Received

- Comments closed November 14, 2008
- 12 comments received (4 from NGAC members)
- Forecasts and appendices revised in December
- Major changes: lower near term prices, higher and wider ranges long-term


NG Price Changes: Preliminary Draft to Draft
2006$/MMBtu
2.50
2.00
1.50
1.00
0.50
0.00
-0.50
-1.00
-1.50
-2.00
Low
Medlo
Medium
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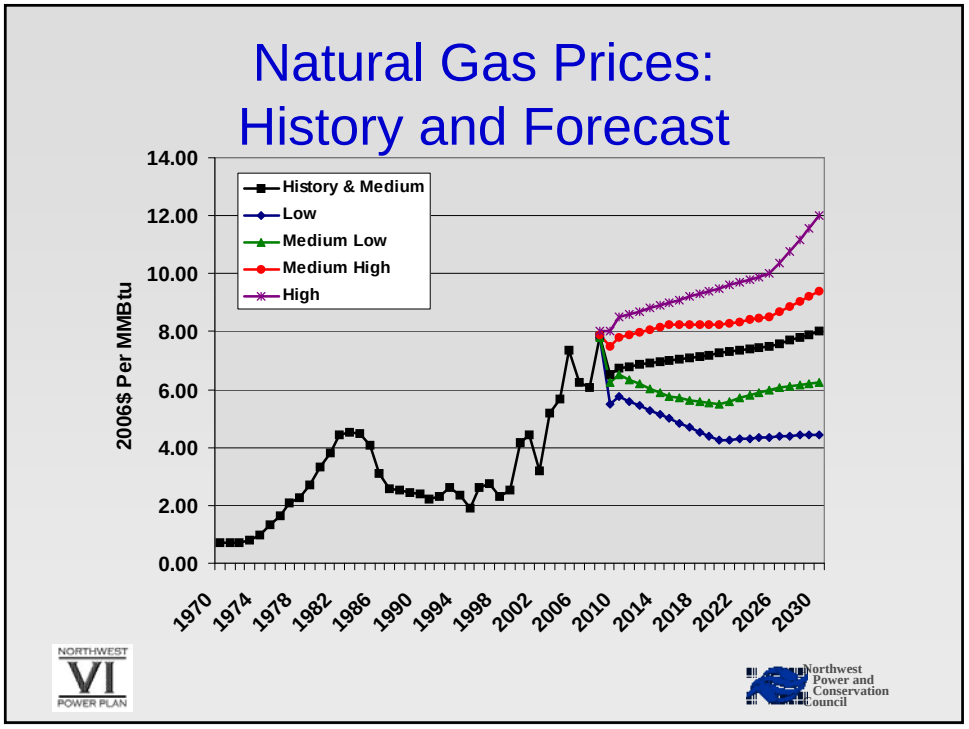
NORTHWEST VI POWER PLAN
Northwest Power and Conservation Council


Natural Gas Prices:
History and Forecast
2006$ Per MMBtu
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
History & Medium
Low
Medium Low
Medium High
High
1970
1974
1978
1982
1986
1990
1994
1998
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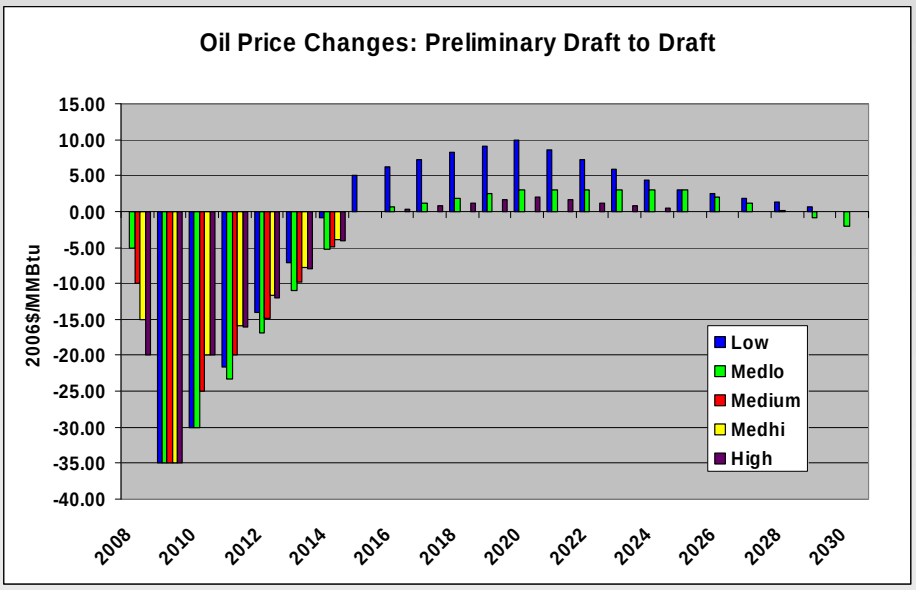
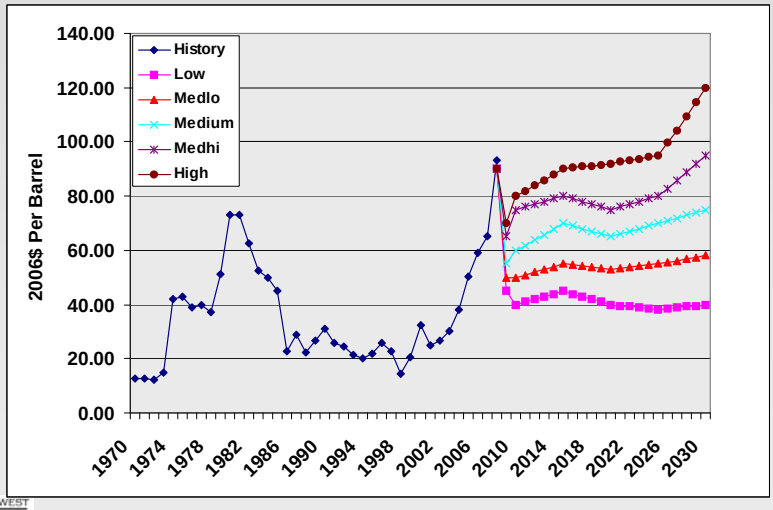
2006
2010
2014
2018
2022
2026
2030
NORTHWEST VI POWER PLAN
Northwest Power and Conservation Council



NORTHWEST VI POWER PLAN

Northwest Power and Conservation Council

Oil Price: History and Forecast



NORTHWEST VI POWER PLAN

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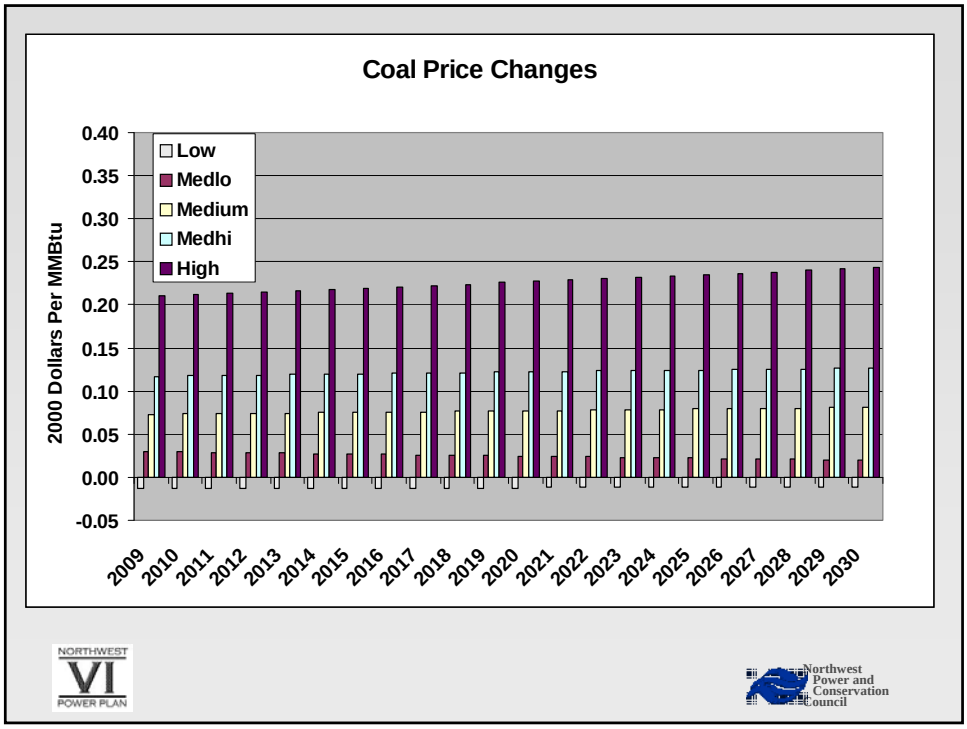
Coal Price Changes
2000 Dollars Per MMBtu
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
-0.05
Low
Medlo
Medium
Medhi
High
2009
2010
2011
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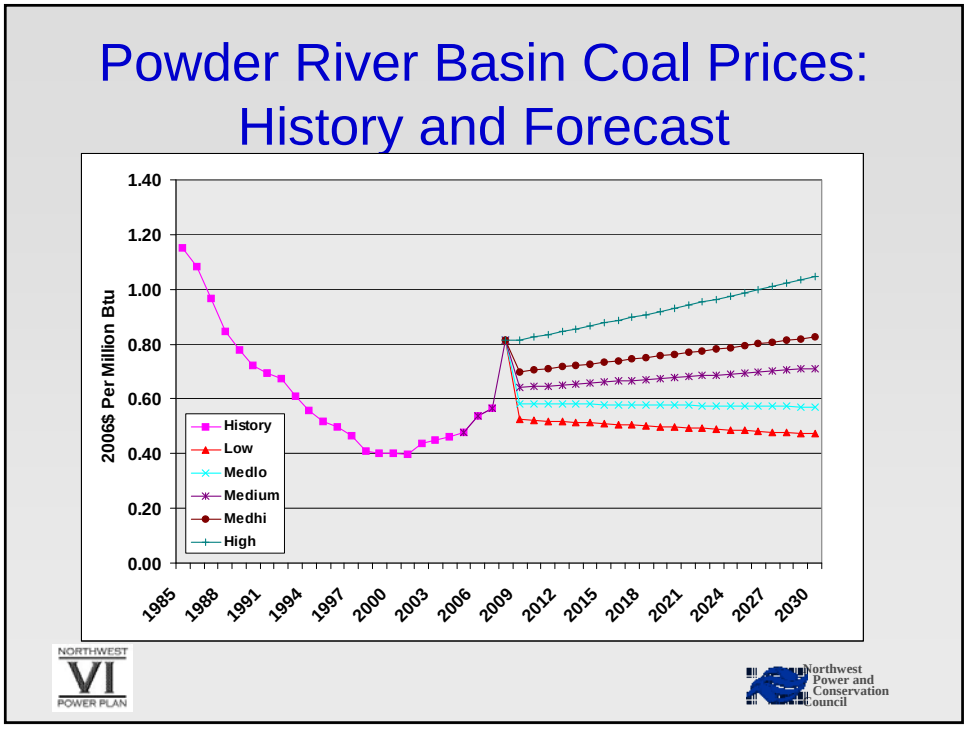
Powder River Basin Coal Prices:
History and Forecast
2006$ Per Million Btu
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
History
Low
Medlo
Medium
Medhi
High
1985
1988
1991
1994
1997
2000
2003
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2009
2012
2015
2018
2021
2024
2027
2030

Northwest Power and Conservation Council

December 17, 2008

MEMORANDUM

TO: Record

FROM: Terry Morlan

SUBJECT: Change to Fuel Price Forecast from Preliminary Draft to Draft

A number of changes were made to the fuel price preliminary draft forecasts, based on comments received and input needs for other Council models. The following bullets document the changes:

- Estimates of 2008 prices for natural gas and oil were updated using the latest EIA data combined with futures prices. The 2008 price for natural gas was estimated at $8.15 in nominal dollars, or $7.83 in 2006 dollars. The oil price in 2008 was estimated to be $94 per barrel in nominal, or $90.35 in 2006 dollars.
- The near term forecast path was modified to reflect a more severe recession. The modification started by estimating 2009 prices. 2009 natural gas prices were estimated at $6.46 per MMBtu, and oil prices at $52 per barrel.
- The 2008 coal price was changed to reflect the higher actual prices to about $.82 per MMBtu. The range of price forecasts was widened by introducing various impacts from recession and recovery from energy price bubble. The long-term range of coal prices is now wider.
- The forecast range of natural gas prices was adjusted to reflect the effects of recession in the early years. In addition, the range of the forecast range in the last 10 years was widened, and tilted toward the high end. The high case in 2030 is $2 higher and the low case is $.50 lower.
- The oil price forecasts were reduced in the early years also, but changes after 2015 were relatively small. The low and medium-low forecasts were raised slightly in the middle years of the range, mostly to bring the parity ratios into line better.
- Sumas natural gas prices have become higher than AECO or Rockies prices in the last year. Comments suggested this would continue. An equation for Sumas prices that has a dummy for the recent period was substituted into the model. The effects of the dummy continue into the forecast, but at a reduced level to not over-emphasize the recent patterns.

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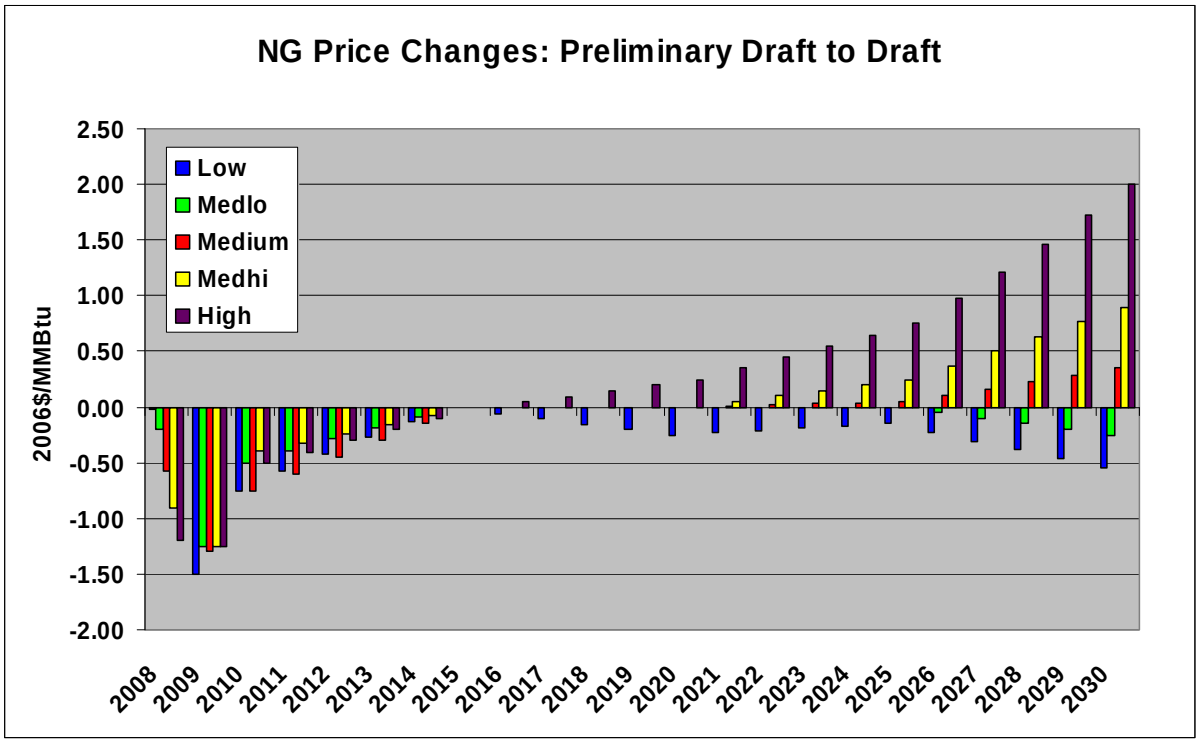
- Significant changes were made to the model to directly estimate monthly natural gas prices for input to the Aurora model. This allows different monthly patterns of prices in different hubs.
- An error was corrected in the treatment of plant capacity factors. Pipeline fixed costs are now increased due to the assumed capacity factor of the customer. The capacity factor was removed from the conversion of fixed cost to $/KW/year.
- The treatment of pipeline fixed costs in non-PNW areas of the model was changed. It is now simply assumed that pipeline costs are fixed values in all non-PNW areas. Before, the assumption was that 80 percent of the price differential between a state utility natural gas price and the related hub price was pipeline capacity cost. The problem was that for some areas, the state price was lower than the hub price, resulting in negative fixed costs that were set to zero. The pipeline capacity cost is higher for new plants than existing, and the capacity cost for new plants escalates in real terms over time.
- There were a number of other minor corrections to the model, mostly to calculations of fixed and variable costs for natural gas.
- Conforming changes were made to the Appendix and its appendices. I revised the model documentation, Appendix F, to incorporate the hub equations and their descriptions from Chris and my papers.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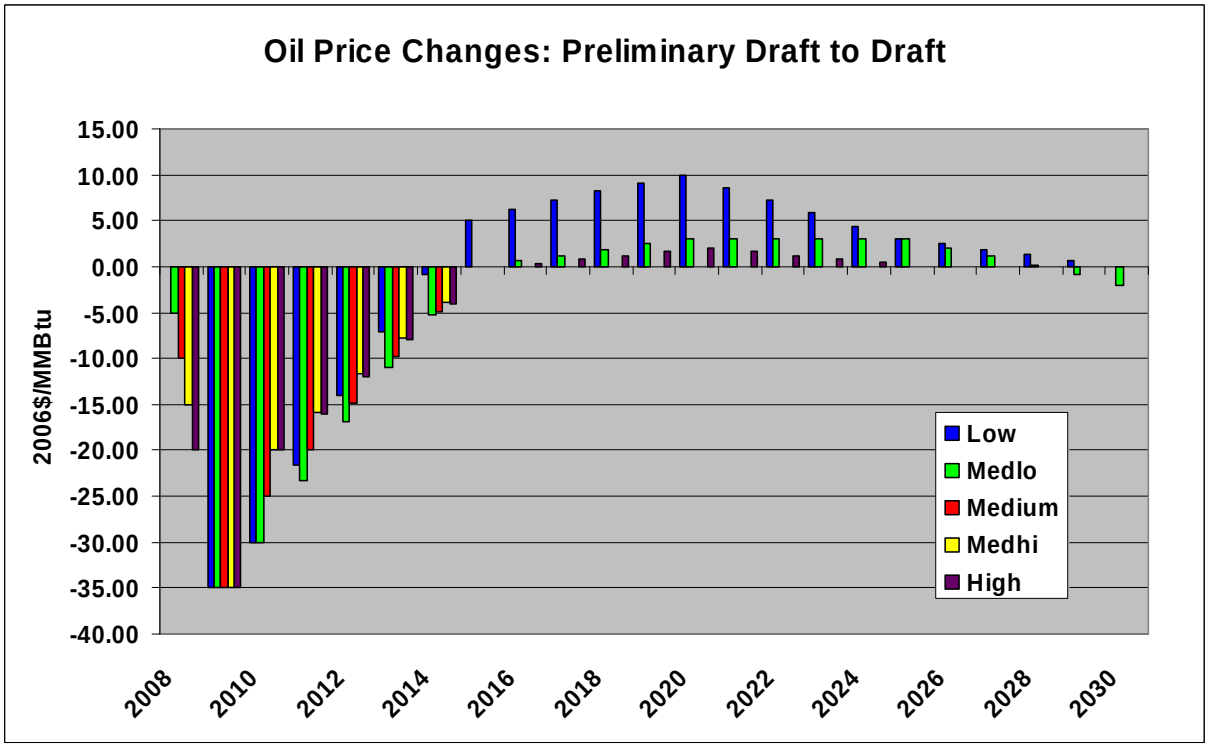
Oil Price Changes: Preliminary Draft to Draft
2006$/MMBtu
15.00
10.00
5.00
0.00
-5.00
-10.00
-15.00
-20.00
-25.00
-30.00
-35.00
-40.00
Low
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