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July 10, 2012

MEMORANDUM

TO: Power Committee

FROM: Massoud Jourabchi

SUBJECT: Natural gas price forecast update

At the June Council meeting we presented a draft update to the near-term natural gas price forecast.

During the June presentation we indicated additional information was expected to become available and that we would refine our forecast to reflect it. We received the updated information in late June and are in the process of incorporating the new information into the forecast.

When the updated natural gas price forecast is completed we will send it to you under separate cover prior to the Committee meeting.

c:\users\cblack\documents\p02_natural gas price forecast update cm.docx (Charlie Black)

Long-term Natural Gas Price Forecast a near-term adjustment

July 10th 2012
Massoud Jourabchi

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In this presentation

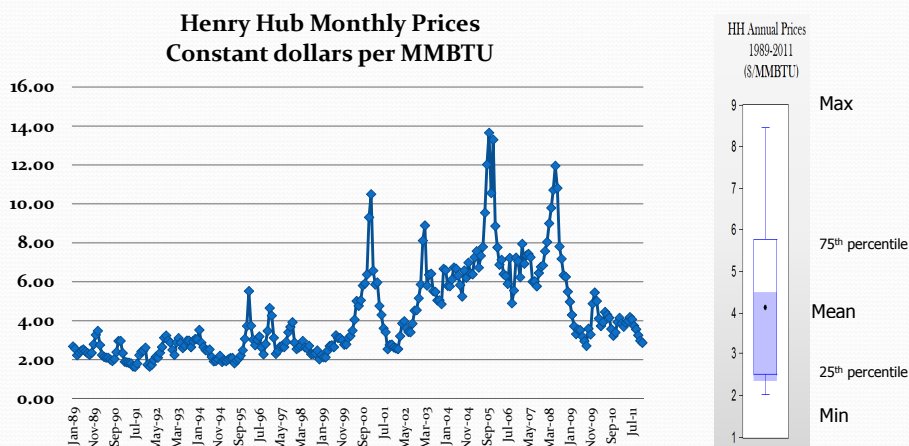
- Revision to the near term portion of the Council's natural gas price forecasts
- Comparison of the Council's Forecast with other natural gas price forecasts

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During June Presentation we indicated that:

- For the 2011 update, we lowered our long-term forecast of natural gas prices to reflect structural change in natural gas supply picture (*due to technological changes such as hydraulic Fracturing, horizontal drilling and natural gas from shale formations.*)
- In June 2012, we provided a lower price forecast for the 2012-2015 period and maintained the price forecast for 2016-2030
- Subsequent to June
 - We reviewed additional information from EIA and from the Natural Gas Advisory Committee, other forecasts and recent events and refined the June forecast.

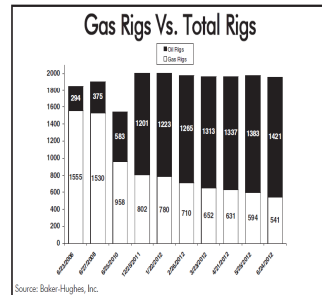
But before we proceed, a retrospective on Natural Gas Prices would be useful



Two ways of looking at natural gas prices, monthly and annual.
These graphic representations show the wide range of price swings.
The forecasts need to reflect the wide range in prices.

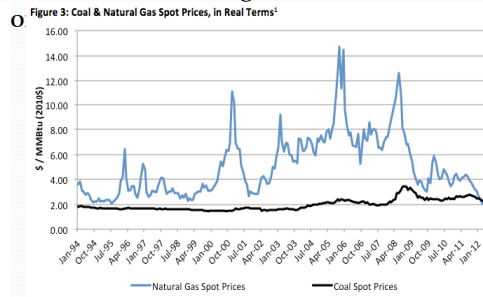
Some of the recent changes

- Natural gas prices in forward markets for 2012 and 2013 have tightened up.
- Natural gas rig count has decreased.
- Price competition between coal and natural gas for power generation has increased.
- For the first time since EIA began computing monthly statistics, natural gas and coal had the same share of total net generation of



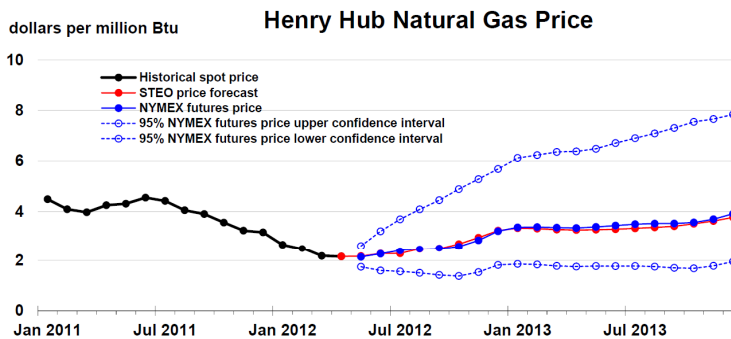
Northwest Power and Conservation Council

Source: Baker-Hughes, Inc.



Source: U.S. Energy Information Administration, NYMEX, Bureau of Labor Statistics, St. Louis Federal Reserve

Many factors can impact market prices.
Even the short-term forecast is subject to a wide range of uncertainty



Note: Confidence interval derived from options market information for the 5 trading days ending April 5, 2012
Intervals not calculated for months with sparse trading in "near-the-money" options

Source: Short-Term Energy Outlook, April 2012



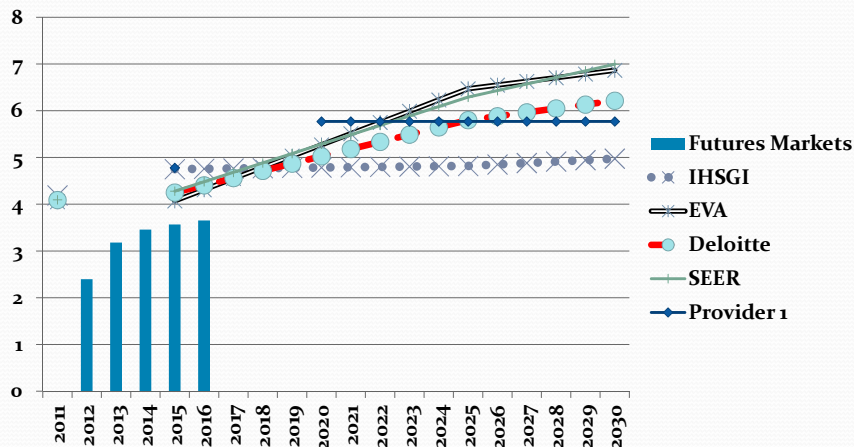
Northwest Power and Conservation Council

Other Factors Can Impact Long-term Natural Gas Prices

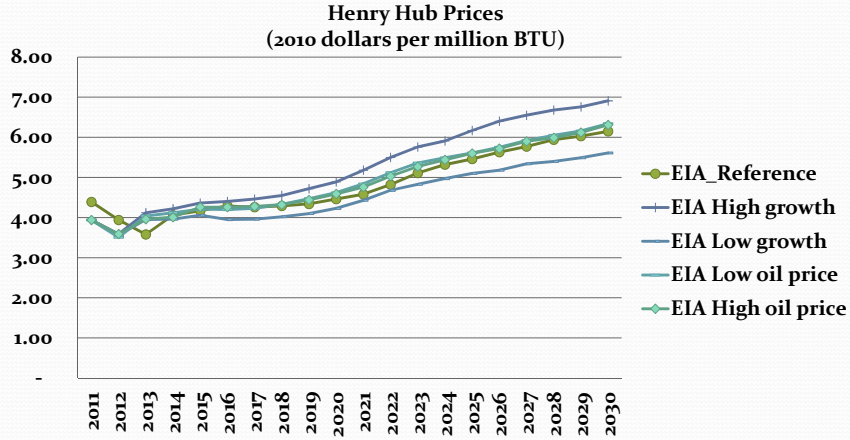
- Factors that can put downward pressure on prices
 - Continued high production rates,
 - Further technological advancement in exploration, drilling...
 - LNG export barriers causing low export.
- Factors the can put upward pressure on prices
 - High LNG exports
 - Environmental regulation pushing coal generation down
 - New demand for natural gas from power generation, natural gas vehicles....
- So in preparation of a price forecast both short-term and long-term factors need to be considered. Also the range of uncertainty needs to be considered. No single forecast should be considered correct.

In Preparing our Revised Forecast, we considered a Number of Other Forecasts

Henry Hub Prices (\$2010/million BTU)



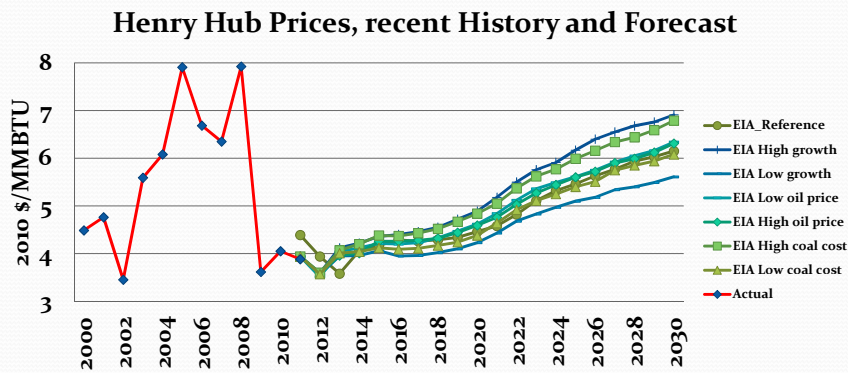
We Evaluated EIA's Annual Energy Outlook 2012 Forecast For Natural Gas Prices for 2011-2035



Annual Energy Outlook 2012 produces over 10 different scenarios. Five representative forecasts are shown here.



Comparison of EIA forecast with the historic Actual Prices shows that EIA expects prices to remain within a narrow band in forecast prices



However, actual prices have historically shown much wider year-over-year swing.



Keeping in mind the short-term and long-term factors, We refined our natural Gas Price Forecast July 2012 update

Proposed Henry Hub Price Forecasts	\$2010/MMBTU					Jul-12
	Council L	Council ML	Council M	Council MH	Council H	
2011	3.9	3.9	3.9	3.9	3.9	3.9
2012	2.4	2.4	2.5	2.6	2.7	2.7
2013	2.6	2.9	3.2	3.4	3.7	3.7
2014	3.4	3.9	4.3	4.8	5.3	5.3
2015	3.7	4.2	4.7	5.3	5.8	5.8
2016	3.7	4.3	5.0	5.6	6.3	6.3
2017	3.6	4.4	5.2	6.0	6.8	6.8
2018	3.6	4.5	5.3	6.2	7.0	7.0
2019	3.6	4.5	5.4	6.3	7.2	7.2
2020	3.6	4.6	5.6	6.5	7.5	7.5
2021	3.6	4.6	5.7	6.7	7.7	7.7
2022	3.5	4.7	5.8	6.8	7.9	7.9
2023	3.5	4.7	5.9	7.0	8.1	8.1
2024	3.5	4.8	6.0	7.2	8.4	8.4
2025	3.5	4.8	6.1	7.4	8.6	8.6
2026	3.5	4.9	6.3	7.6	8.9	8.9
2027	3.5	4.9	6.4	7.8	9.2	9.2
2028	3.4	4.9	6.5	8.0	9.4	9.4
2029	3.4	5.0	6.6	8.2	9.7	9.7
2030	3.4	5.0	6.8	8.4	10.0	10.0
Average 2015-2030	3.5	4.7	5.8	6.9	8.0	

•Using EIA short-term outlook for 2012-2013

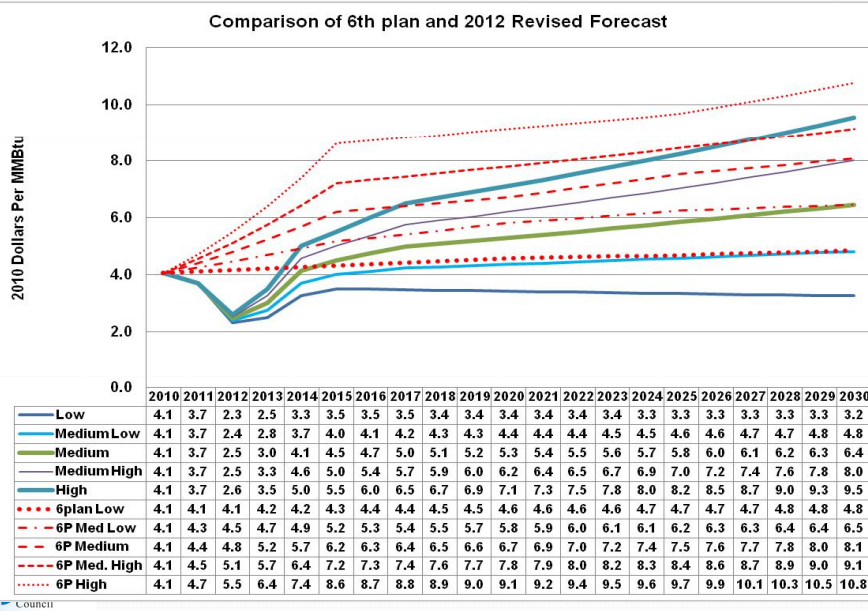
•Extended lower price period to 2016

•Widened the long term price forecast range.

•Reduced the lower bound of forecast



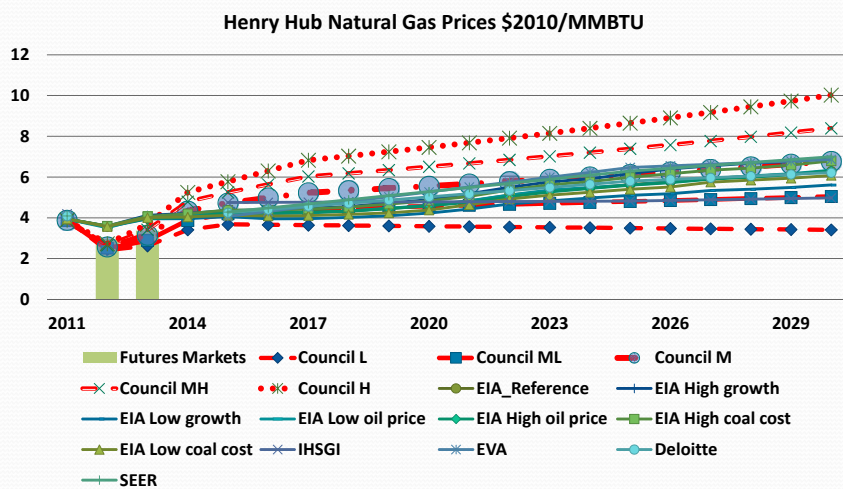
Comparison of the Wellhead Price of Natural Gas



Why a single forecast should not be used.

- Needless to say, but any forecast is subject to error
- EIA's analysis shows that its AEO forecasts have tended to under-estimate natural gas prices when compared to actual.
- Actual Natural gas prices have undergone wide swings
- For Council's analytics, single point forecasts are less important than having a realistic range of possible future.

Comparison of all of forecasts (a rather busy graph)
shows our medium case is within the range of other forecasts



For 2012 and 2013 Council's forecast are close to the Natural Gas Future, low range of AEO forecast and Short Term Outlook.
Our forecast range covers a wider range of uncertainty.

Summary

- We have lowered our forecast of natural gas prices in the near-term
- The oil prices has been increased
- Coal prices are within the forecasted range.

- Should the Council approve these updates, we can release the new fuel price forecast for use in the Mid-term assessment and other outside parties.