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July 2, 2013

## MEMORANDUM

**TO:** Power Committee  
**FROM:** Massoud Jourabchi  
**SUBJECT:** Update to long-term outlook for natural gas prices

The Council monitors its power planning assumptions on a regular basis to identify any significant changes that might affect the plan or the region. Last year the Council updated the short-term outlook for natural gas, reflecting lower expected prices in 2012-2015 period. This year's forecast reflects expected changes in the long-term price for the period 2015-2035 which covers the forecast horizon for the Council's Seventh Power Plan. Staff is seeking Council's approval of these forecasts. If approved these prices will be used for the development of wholesale price of electricity and preliminary load forecast for the preliminary Seventh plan and will be available to outside entities from Council website. A companion report will be produced and made available for the outside entities.

### Natural Gas Price Forecast Revision

After extensive consultation with the Natural Gas Advisory Committee (NGAC) we have proposed a downward revision in the range of fuel price forecasts for 2015-2035. In addition, the near-term prices were pushed up slightly to reflect recent observed upward changes in the marketplace.

The narrowing range of forecasts range can be linked to expected increase in supply of natural gas. The long-term fundamentals high price forecast case is consistent for example, with rapid economic recovery in the United States and worldwide, environmental restrictions on shale gas development, 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 (GTL) 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.

# Preliminary Fuel Price Forecast For use in the Seventh Power Plan July 9<sup>th</sup> 2013

Massoud Jourabchi



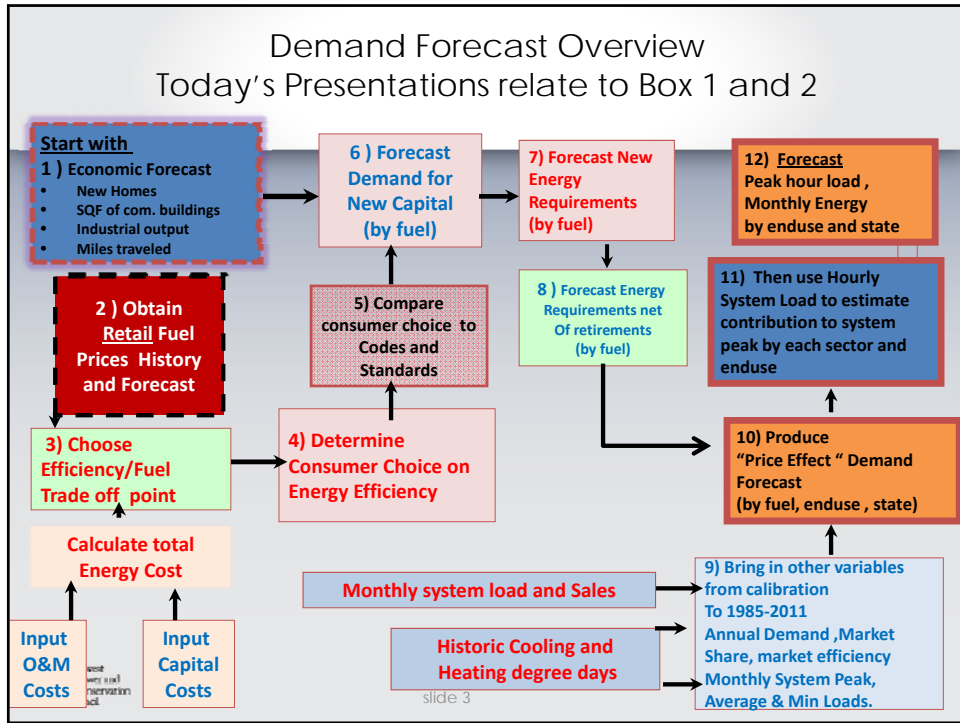
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## In Today's Meeting

- Council's modeling overview and use of forecasts
- Comparison of 2012 forecast and actual
- Northwest Gas Outlook
- Proposed Preliminary Seventh Power Plan Forecast Prices
  - Result of fuel price poll
  - Comparison to other forecasts
- Next steps




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### Comparison of Forecast and Actual 2012 (2012\$)

	Henry Hub Price Natural Gas Forecast 2012\$/mmbtu	PRB Coal Prices 2012\$/mmbtu	Refiners Acquisition Cost Forecast 2012\$/Barrel
Low	\$2.4	0.79 <b>\$0.78 Actual</b>	\$85
Med-Low	\$2.5	\$0.80	\$90
Medium	\$2.6	\$0.82	\$95
Med-High	\$2.7 <b>\$2.66 Actual</b> ←	\$0.83	\$98
High	\$2.7	\$0.84	\$105 <b>\$101 Actual</b>

Except for coal, all fuel prices were within forecasted range

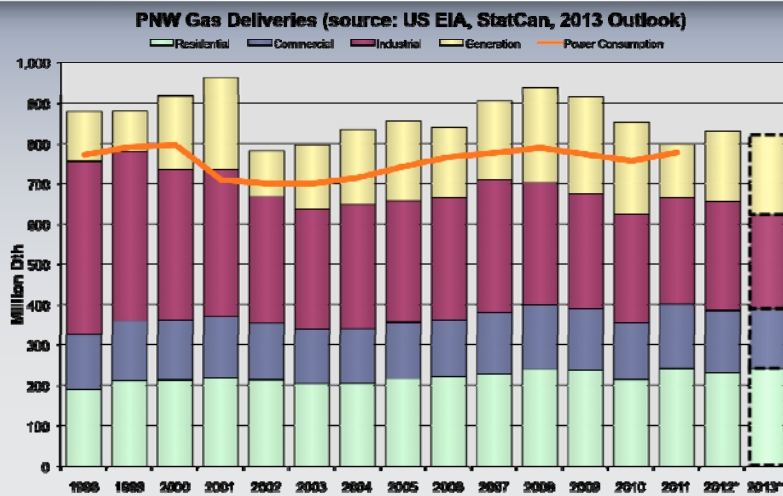

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# 2013 NWGA Outlook Overview

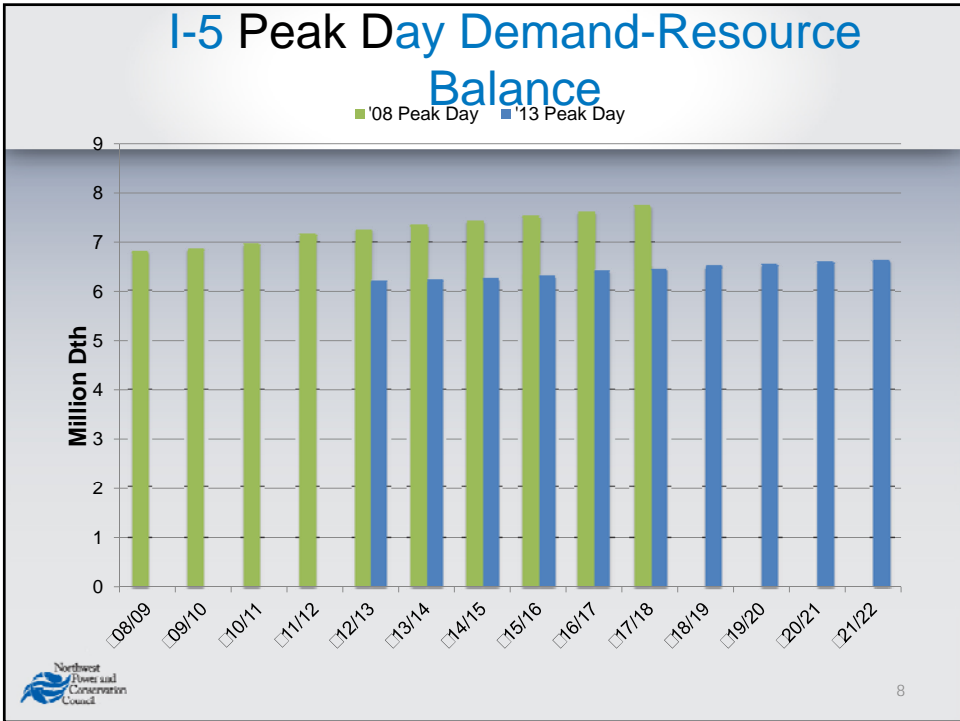
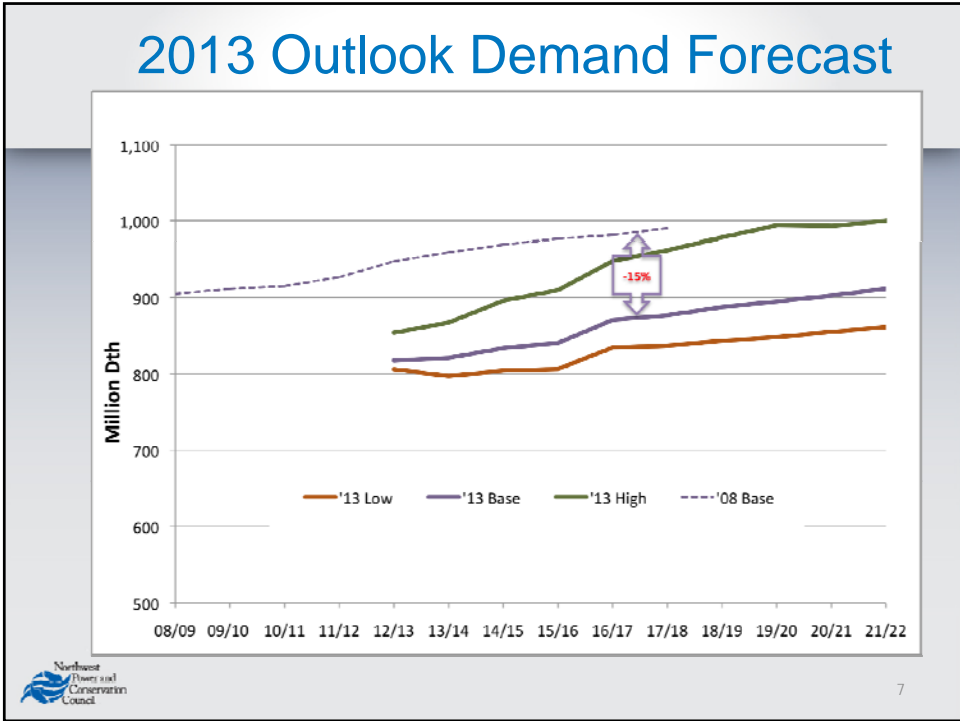
Natural Gas Advisory Committee  
June 7, 2013  
Portland, OR



## Recent Gas Demand



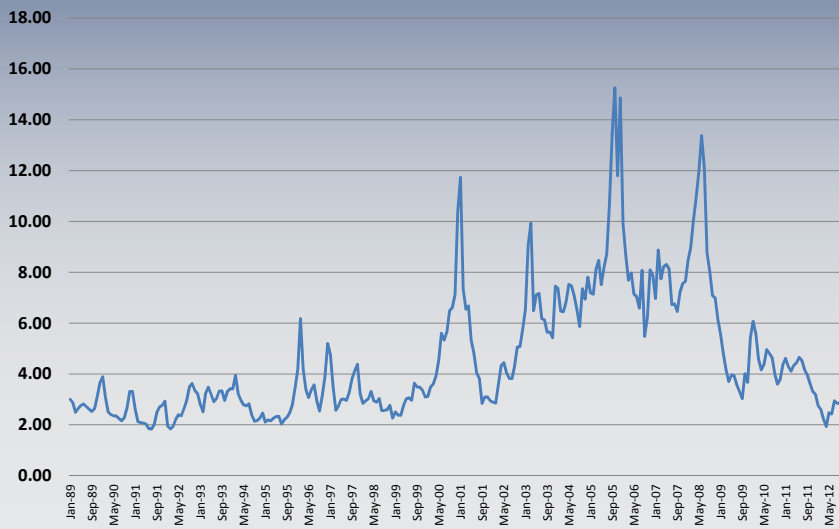
\* Estimated US December, Cascade Q4  
\*\* 2012-2013 Forecast



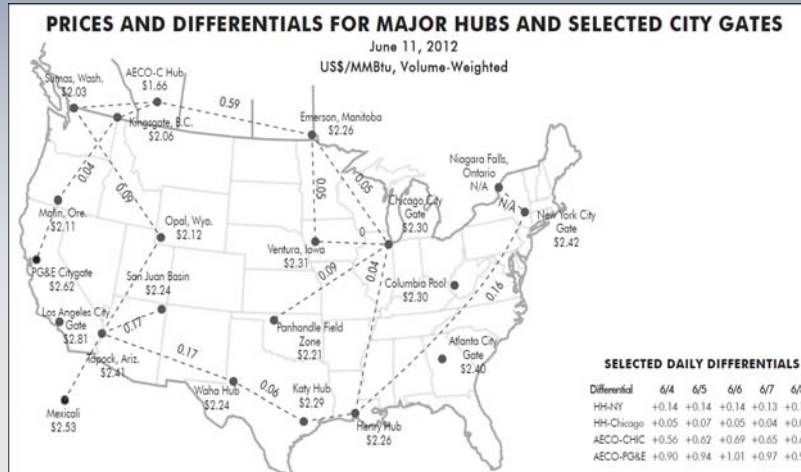
# Background



**Henry Hub Monthly Prices**  
Constant 2012 dollars

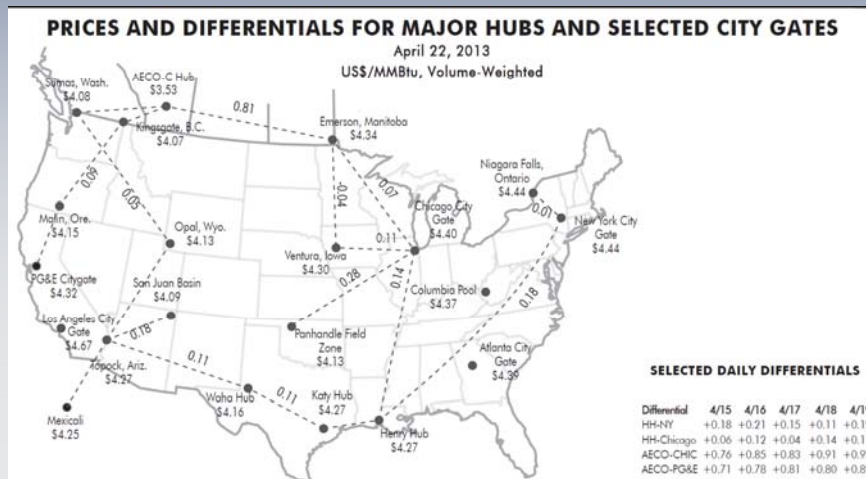


What a difference a year can make.  
June 11, 2012 : prices in low \$2 range

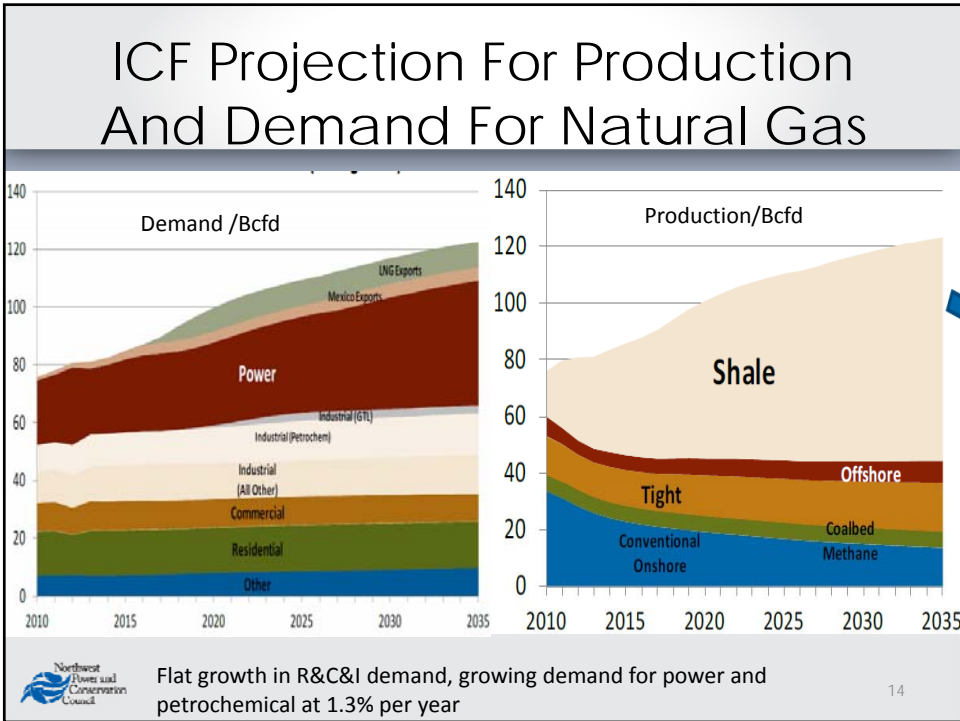
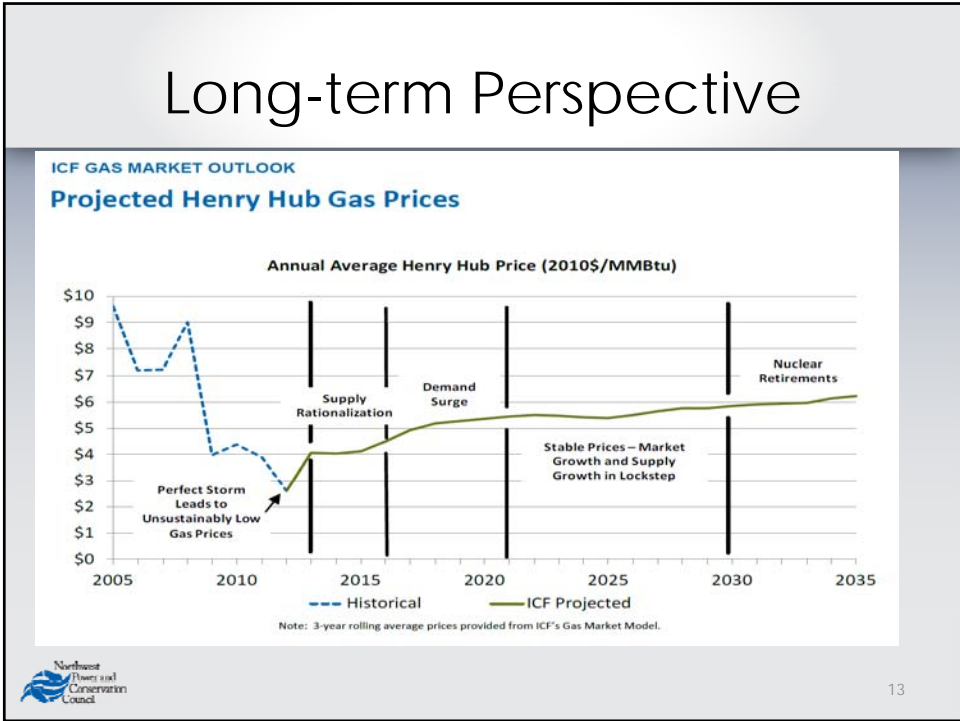


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By April 2013 prices were over \$4.

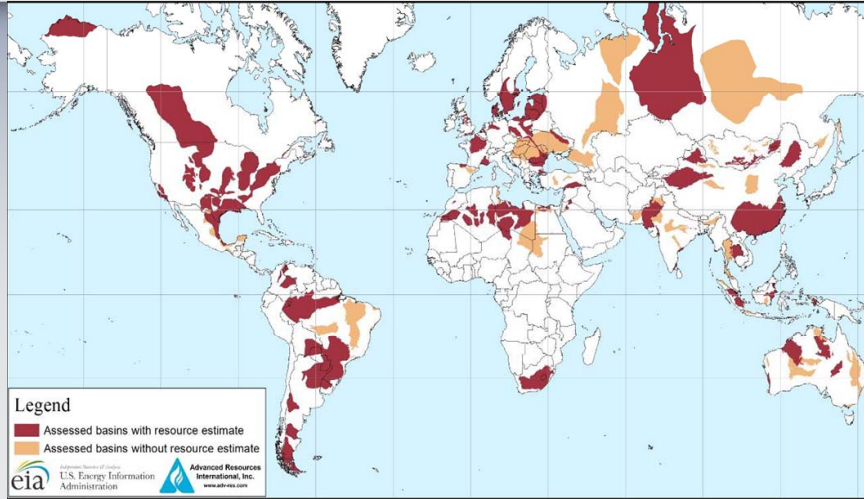


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## Global Resources for Shale oil and Shale Gas



## Impact of LNG Exports on NW Gas Market

### IMPLICATIONS OF LNG EXPORTS FOR NORTHWEST GAS MARKETS

#### Impact of LNG Exports on Gas Prices

- A recent study conducted by ICF for the American Petroleum Institute examined a range of U.S. LNG export scenarios from 0 to 15 Bcfd.\*
- Across all of the cases considered in the study, the impact on Henry Hub prices ranges from 8 to 11 cents per Bcfd of LNG exported.
- The study also found that about 80% of the volume needed to accommodate LNG exports would come from production increases.

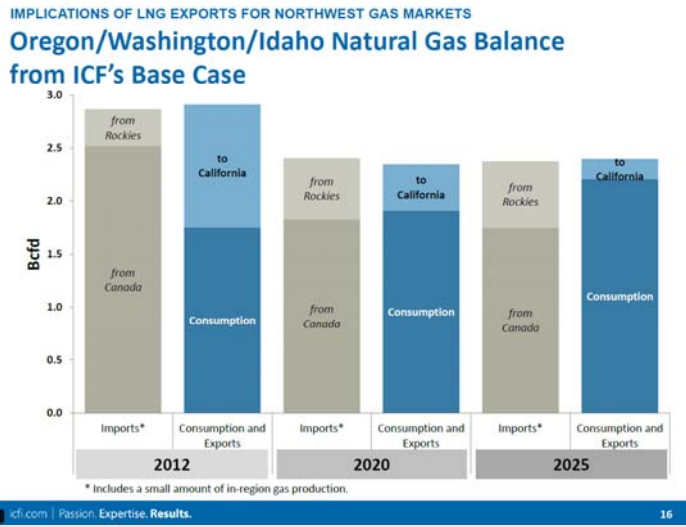
Price Changes relative to Zero Export Case by Customer Area	ICF Base Case (January 2013 Case)			Middle Exports Case			High Exports Case		
	Average Price Delta (2010\$/MMBtu)	Average Export Delta (Bcfd)	\$/bcfd	Average Price Delta (2010\$/MMBtu)	Average Export Delta (Bcfd)	\$/bcfd	Average Price Delta (2010\$/MMBtu)	Average Export Delta (Bcfd)	\$/bcfd
Price at Henry Hub	\$0.31	3.1	\$0.10	\$0.57	5.0	\$0.11	\$0.98	9.9	\$0.10
Price Avg by Production	\$0.24	3.1	\$0.08	\$0.46	5.0	\$0.09	\$0.03	9.9	\$0.09
Price Avar by Consumption	\$0.26	3.1	\$0.08	\$0.48	5.0	\$0.10	\$0.86	9.9	\$0.09

\* In the API study, U.S. LNG exports range from 0 to 15 Bcfd; LNG exports from British Columbia were held constant at 2 Bcfd in all cases.

Applying results from this recently completed study, 2.7 Bcfd of LNG exports from Western Canada would have an average gas price impact of roughly 25 cents per MMBtu.

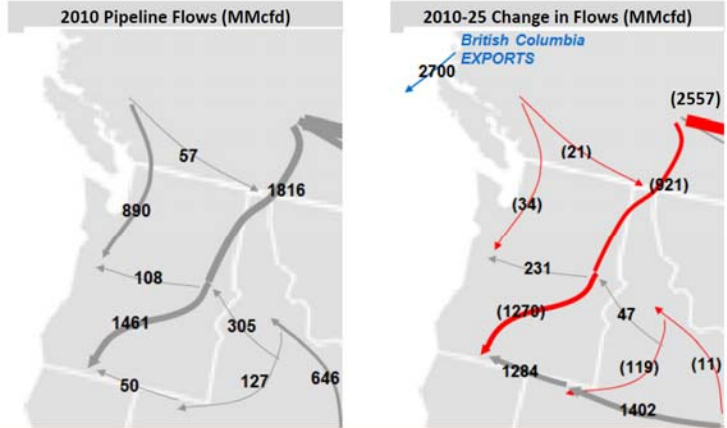


## Potential Shift in Natural Gas Resources From Canada to Rockies



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IMPLICATIONS OF LNG EXPORTS FOR NORTHWEST GAS MARKETS  
**Projected Pipeline Flows Out of Western Canada in ICF's Base Case**



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## Proposed Preliminary Forecast

- After review of a large number of existing forecasts for natural gas prices.
- After discussion with members of the Natural Gas Advisory Committee.
- The following preliminary forecast is prepared for use in the Council's Seventh Power Plan.



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## Natural Gas Advisory Committee Activities

- NGAC has been a vehicle for obtaining timely information and insight on natural gas supply, demand and prices.
- Current 30 members of NGAC come from natural gas, electric industry as well as public interest groups.
- This year's NGAC meeting was held on June 7<sup>th</sup>.
- Council's strawman price proposals were discussed and compared to a wide range of other forecasts.
- As a result of these discussions, the original proposals were adjusted.
- Detailed minutes of the June 7<sup>th</sup> NGAC meeting is available from council website.
- <http://www.nwcouncil.org/media/6867281/Natural-Gas-Advisory-Committee-Meeting-Minutes-for-June-7-2013-.pdf>



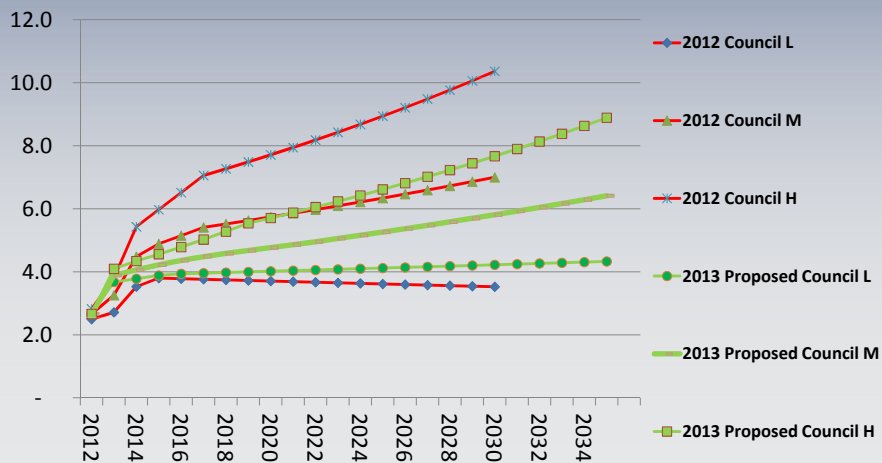
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## Preliminary Seventh Power Plan Forecast of Natural Gas Prices at Henry Hub

Proposed Henry Hub Price Forecasts	\$2012/MMBTU			Average values from NGAC Poll in 2012\$/MMBTU		
	Council L	Council M	Council H	Poll- LOW	Poll- Medium	Poll-High
2012	2.7	2.7	2.7			
2013	3.7	3.9	4.1			
2014	3.8	4.1	4.3			
2015	3.9	4.2	4.6	3.8	4.5	5.4
2020	4.0	4.8	5.7	4.4	5.3	6.5
2025	4.1	5.3	6.6	4.8	5.7	7.1
2030	4.2	5.8	7.7	4.8	5.8	7.6
2035	4.3	6.4	8.9	4.8	6.1	7.7
Average 2015-2035	4.1	5.3	6.7	4.6	5.6	6.9



## Comparison of 2012 and 2013 forecasts (2012\$/MMBTU)



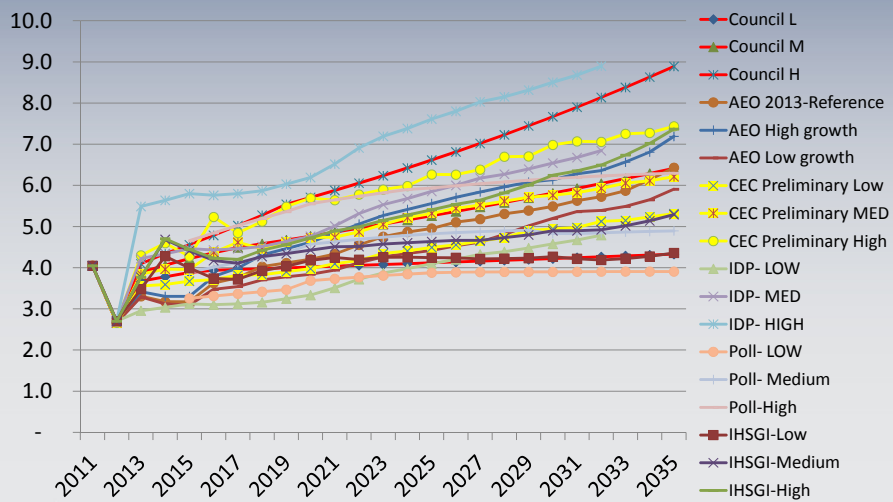
## Comparison to other forecasts

- AEO 2013 Reference case
- CEC 2013 (preliminary)
- IHS\_Global Insight
- Natural Gas Week quarterly Analysts
- Idaho Power IRP
- Poll of NGAC members
- SNL (short-term 2013-2014)

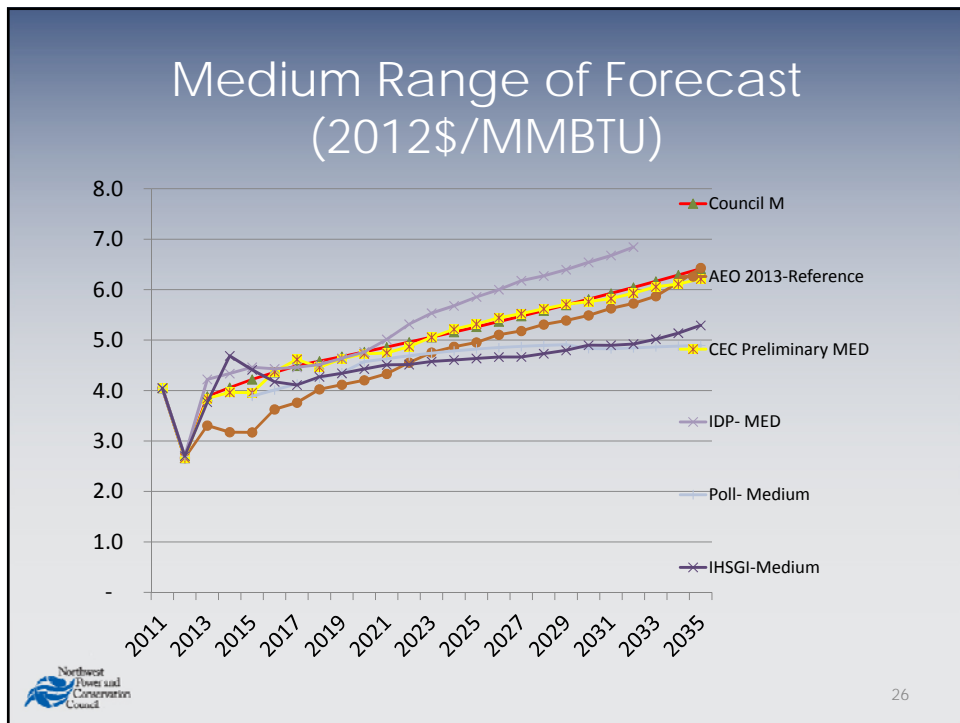
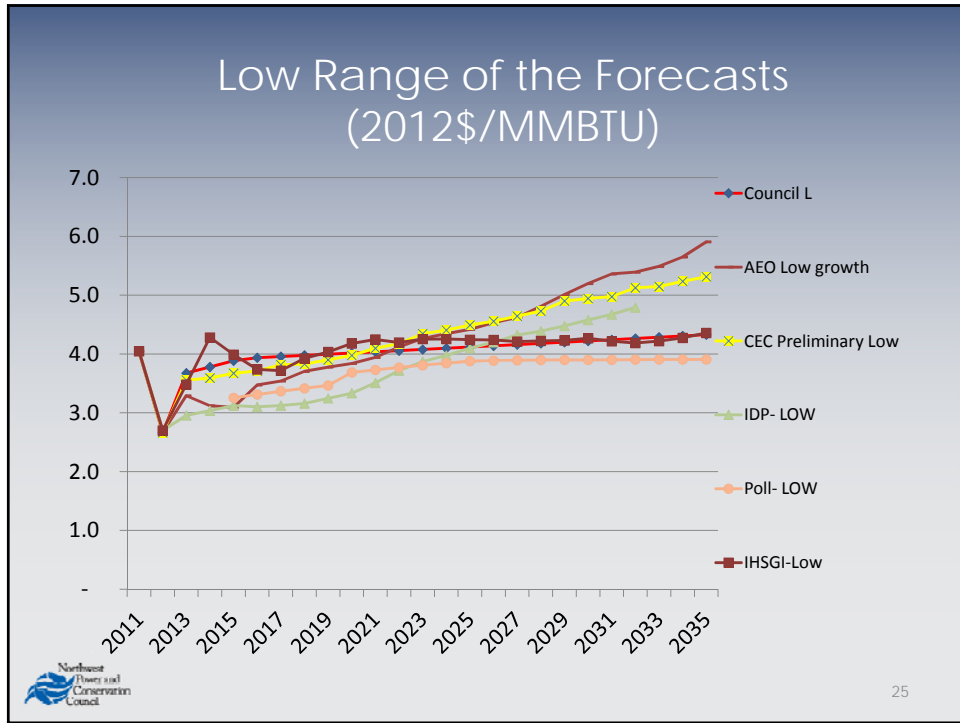


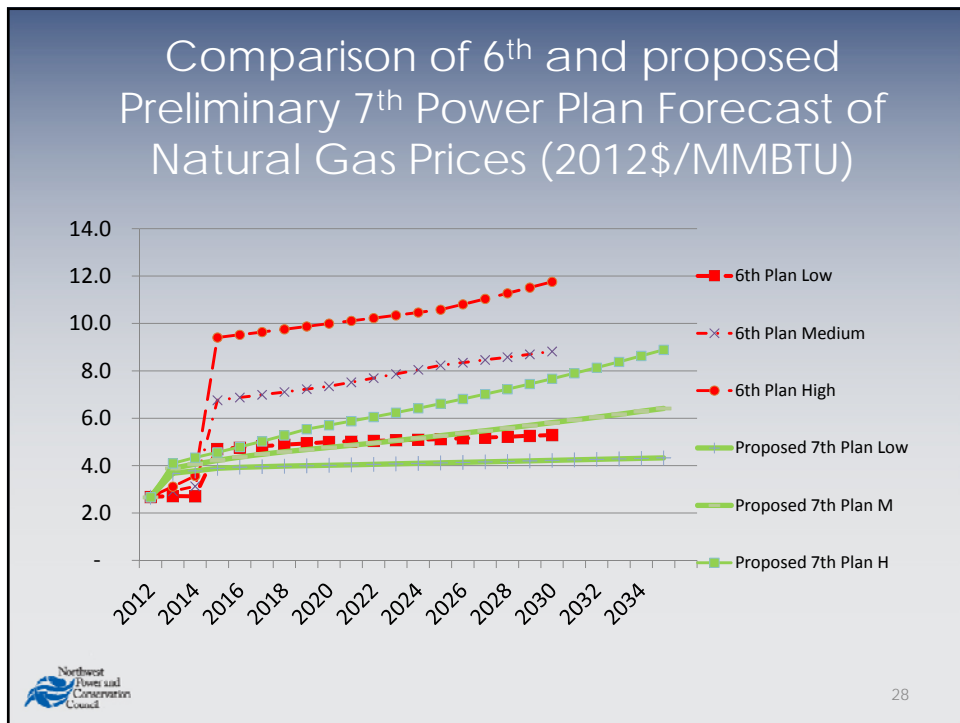
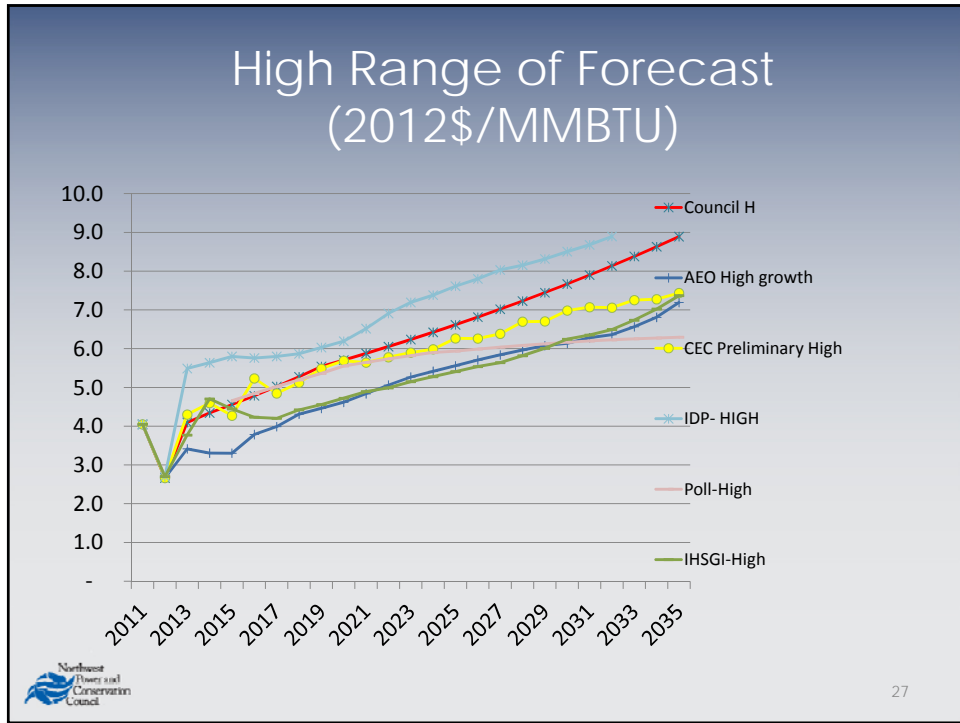
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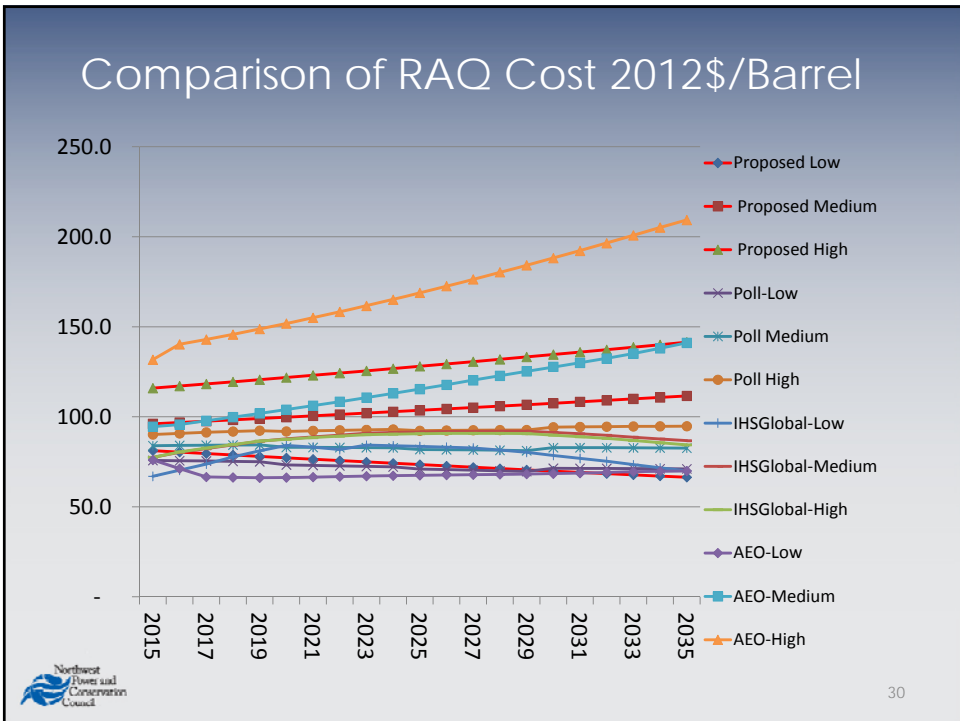
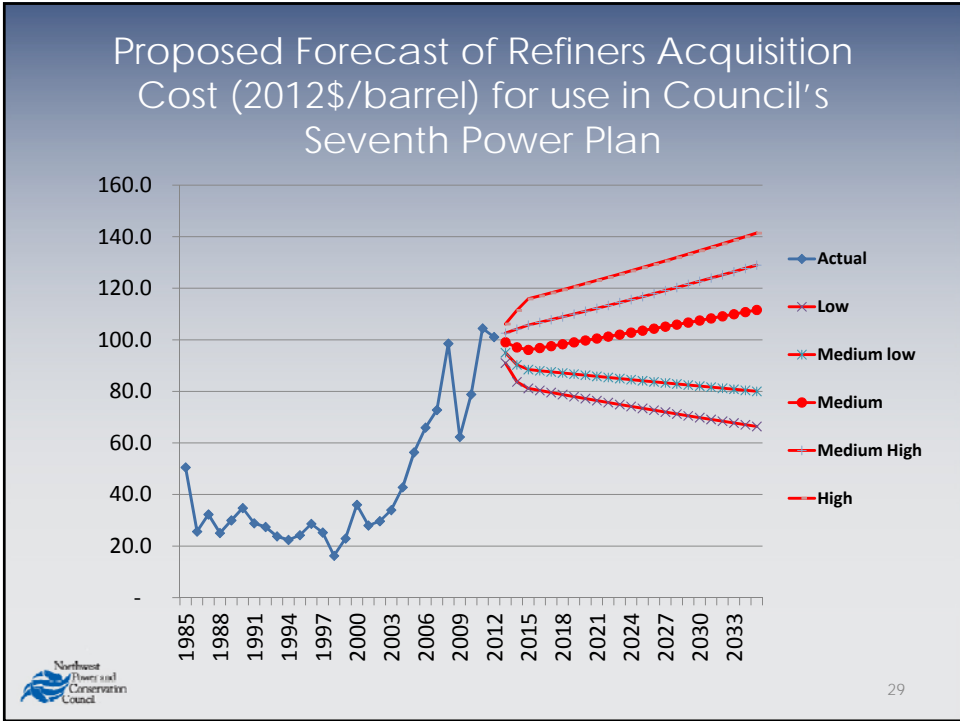
## Various Long-term forecasts (2012\$/MMBTU)



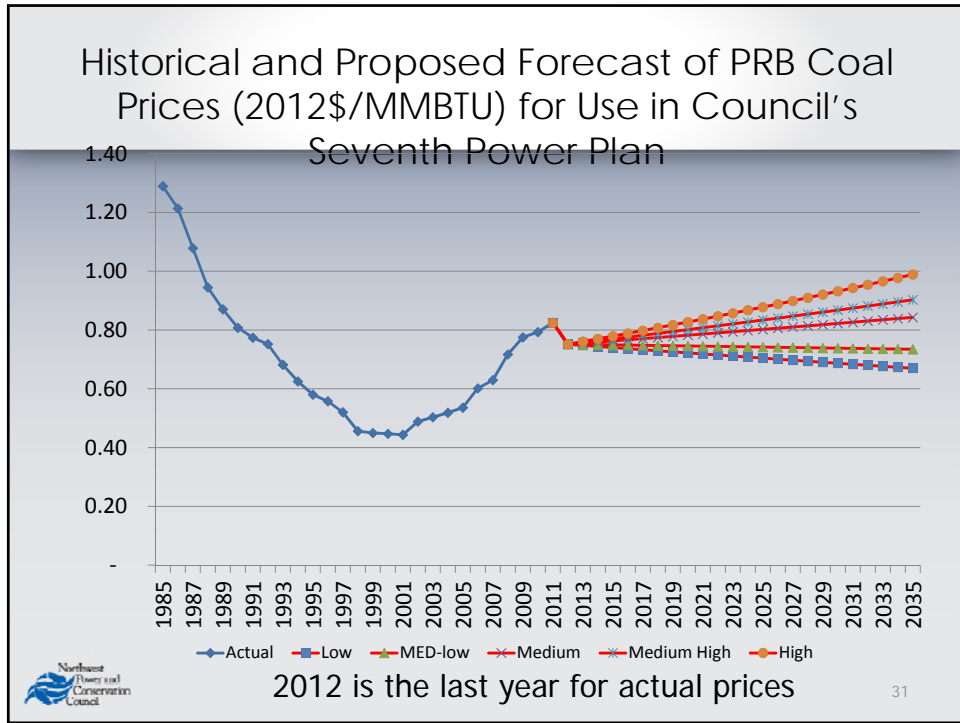
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- ## Next Steps
- Create the proposed fuel price forecasts for the Seventh Power Plan.
  - Review and seeking approval by Council- July
  - Prepare report on updated price forecast - July
  - Incorporate forecast fuel prices in:
    - Demand Forecast                      November 2013
    - Electricity price forecast            November 2013
    - Council's Portfolio Model                      2014
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**Thank you**

