

**North American Natural Gas:
Small Changes in Quantity - Large
Changes in Price**

GasFair

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Outline

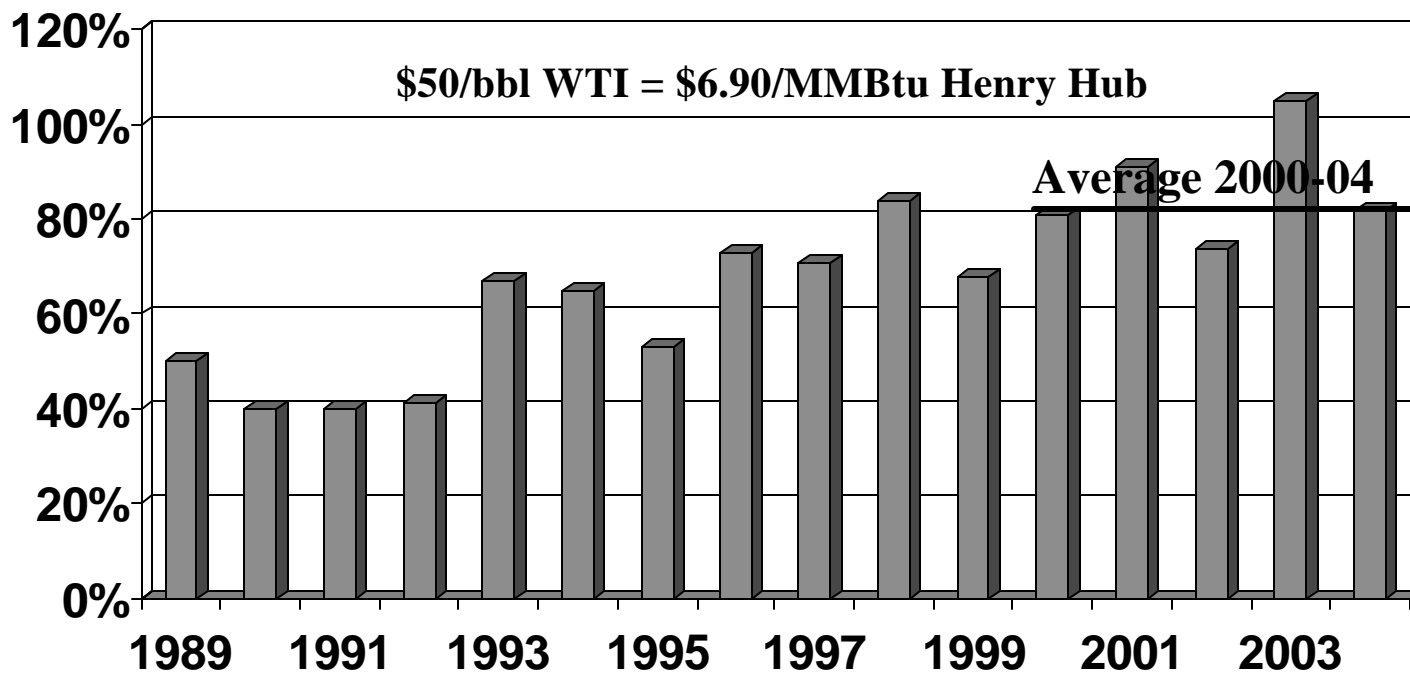
- **Price formation**
- **Natural gas outlook through October**
- **Intermediate Term Supply Outlook and the Implications for Price**
- **Long Term Price Outlook**

The short term supply and demand elasticity for both oil and natural gas is very low. Consequently, there is a wide range of prices that could balance the market in the short term and price volatility is high.

- **In the short term, West Texas Intermediate (WTI) oil could range between from \$35 to \$55 per barrel under very similar market conditions.**
- **Natural gas prices between residual fuel oil and distillate fuel oil only have a small impact on demand (\$5.50 to \$11.00 per MMBtu).**
- **There is little excess capacity in both the oil and natural gas market. Consequently, unusually high demand (for example from extreme weather) or supply disruptions can cause very large price increases.**
- **Inelastic supply and demand works both ways – an economic slow down and/or mild weather could cause sharp price declines. (2003 prices averaged \$3.30 per MMBtu.)**

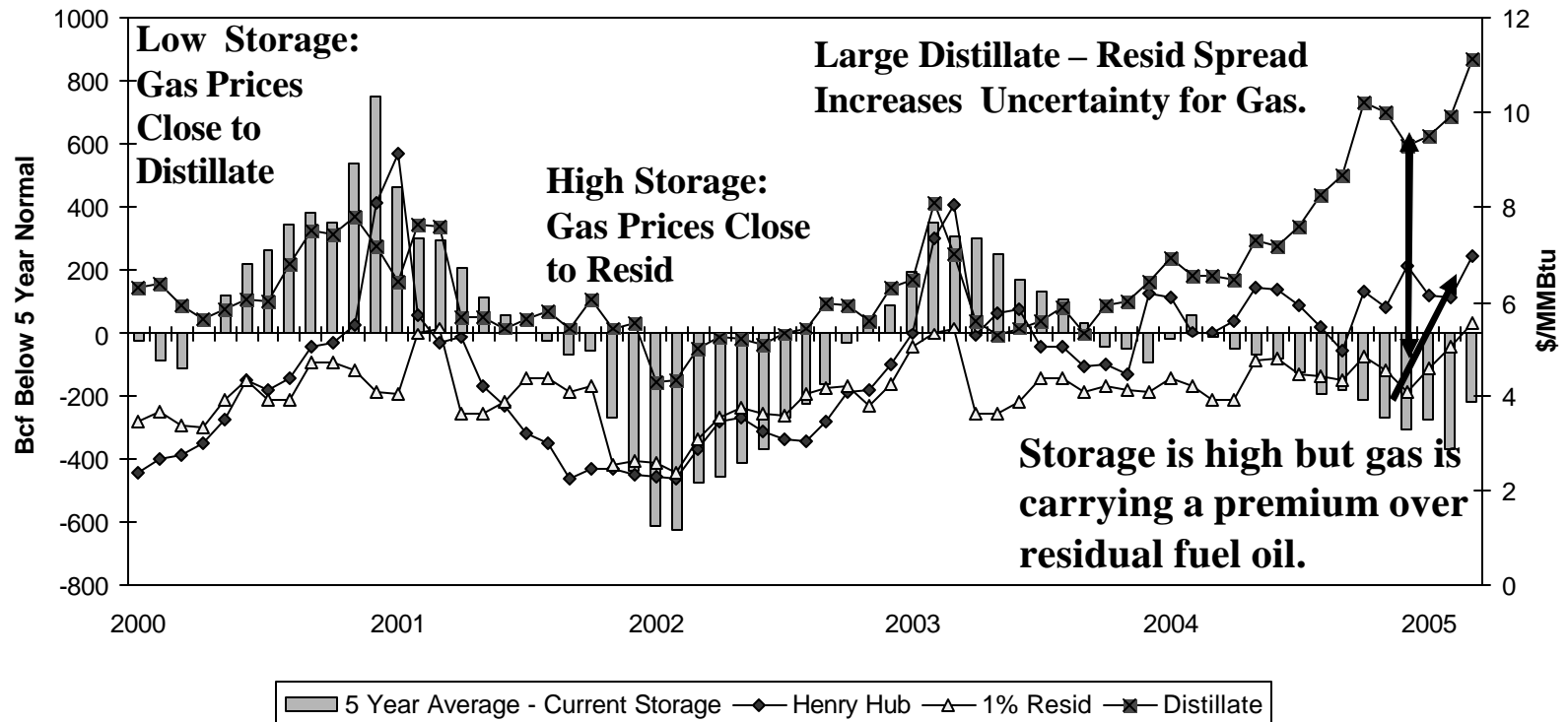
Oil prices are a key driver of natural gas prices. Slower economic growth and increased supplies could lower WTI to \$45 per barrel or below; but the oil market is tight and potential supply disruptions and currency re-valuation create upside for oil and gas.

Henry Hub % of WTI (Btu Basis)

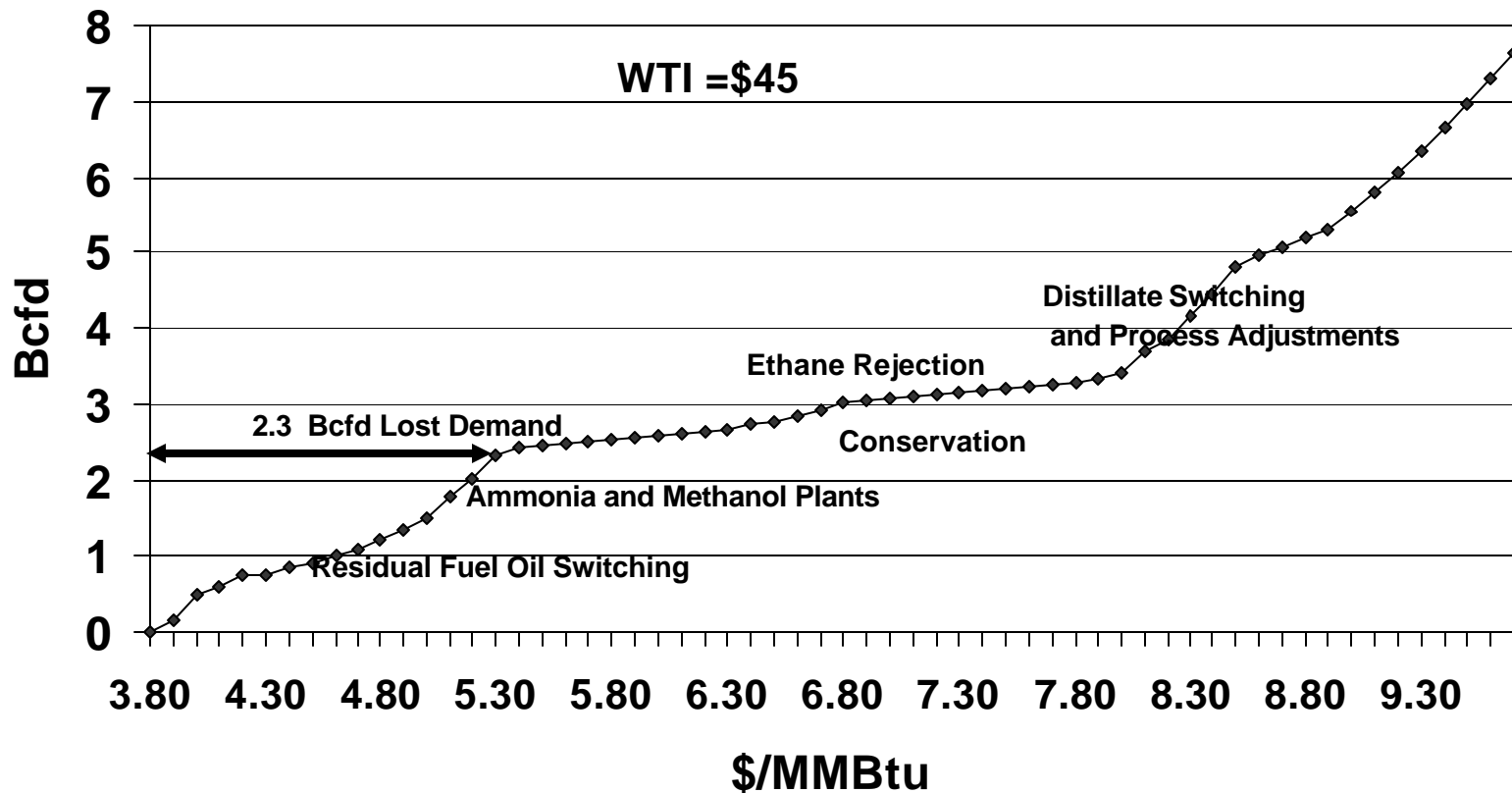


Henry Hub prices tend to be closer to residual fuel oil when storage is higher than normal, and to distillate when storage is below normal. Residual fuel oil at \$5.50 per MMBtu weakens the downside for gas.

Henry Hub Prices vs Working Gas Storage



Most of the “easy” short term gas demand reductions have taken place. With current distillate prices, it would take substantial gas price increases to reduce demand.



There is potential for substantial declines in gas prices toward the latter part of the non-heating season but a lot will depend on July and August gas consumption for power generation and hurricane activity.

- Weather adjusted storage injections are currently running about .5 Bcfd less than last year. With the same weather as last year, working gas storage would end October at about 3,450 Bcf.
- Last year gas weighted degree days were about 1% below normal but 9% below normal during the peak months.
- The supply-demand balance indicates that working gas storage will end the season about the same level as last year.
- Watch weather adjusted working gas storage injections.

May – October Season Supply-Demand (Bcfd)

<u>Sector</u>	<u>2005</u>	<u>2004</u>	<u>05-04 (Bcfd)</u>	<u>05-04 %Change</u>
Residential	4.82	4.78	0.04	0.8%
Commercial	4.20	4.16	0.04	1.0%
Industrial	19.04	18.78	0.26	1.4%
Electric Power	18.91	17.09	1.83	10.7%
<u>Other</u>	<u>4.50</u>	<u>4.49</u>	<u>0.01</u>	<u>0.3%</u>
Total Deliveries	51.48	49.29	2.18	4.4%
Production	51.70	51.08	0.62	1.2%
LNG	1.92	1.70	0.22	11.3%
<u>Canada & Mexico</u>	<u>9.86</u>	<u>7.56</u>	<u>2.30</u>	<u>23.3%</u>
Total New Supply	63.5	60.34	3.14	4.9%
Injections	12.0			
OCT Storage (Bcf)	3308	3302		

Lippman Consulting Inc. (LCI) North American Intermediate Term Natural Gas Production Model

- **111 different supply types**
- **Production by vintage at the basin level**
- **Associated and non-associated gas**
- **Conventional, coal seam modeled separately**
- **Driven by producer plans**

The LCI model projects a substantial turn around in US gas production but there is substantial uncertainty about the Gulf Coast.

US Dry Gas Production (Bcfd)

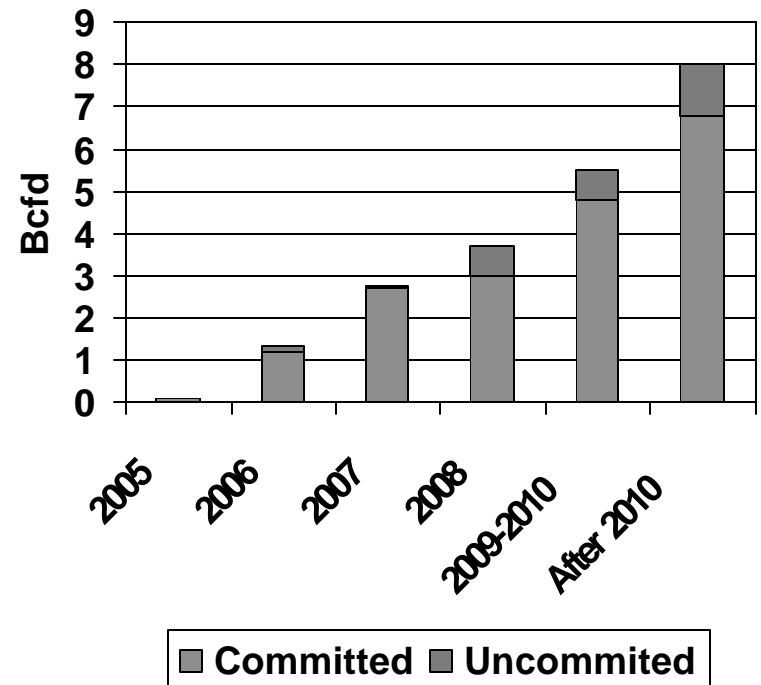
<u>Region</u>	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>
Gulf of Mexico-Offshore	12.8	11.7	12.1	12.2	12.3
Gulf Coast-Onshore	12.2	12.4	12.3	12.6	12.9
Mid-Continent	7.5	7.6	7.8	7.9	7.9
Rocky Mountain	6.6	6.9	7.2	7.5	7.7
Permian Basin	4.5	4.5	4.4	4.4	4.4
San Juan Basin	3.8	3.8	3.9	3.9	4.0
<u>Other</u>	<u>4.5</u>	<u>4.5</u>	<u>4.5</u>	<u>4.6</u>	<u>4.6</u>
Total	52.0	51.5	52.2	53.0	53.7
%Change (LCI)	0.3%	-0.9%	1.4%	1.5%	1.4%
Total (Lower Gulf)	52.0	51.5	51.9	52.2	52.5
%Change (Lower Gulf)	0.3%	-0.9%	0.6%	0.5%	0.6%

(1) Source SEER, Lippman Consulting Inc.

Substantial firm LNG is contracted for North America but there are major uncertainties.

- 1.2 Bcfd of the 1.8 Bcfd 2004 LNG imports were short-term supplies. In the future, how much spot LNG will be available to North America and at what price?
- High oil prices are causing LNG prices to be high in Europe. Will the spot market disconnect from the contract market?
- A tight market for contractors could delay LNG projects.

Incremental Firm North American LNG Supplies



Alternative production and LNG projections imply very different futures for gas prices.

US Gas Supply (Bcfd)

	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>
LNG	1.2	1.6	1.7	2.5	3.1
Canada, Mexico	<u>7.5</u>	<u>7.6</u>	<u>7.9</u>	<u>7.9</u>	<u>8.1</u>
Net Imports	8.7	9.1	9.6	10.3	11.2
US Production	<u>52.0</u>	<u>51.5</u>	<u>52.2</u>	<u>53.0</u>	<u>53.7</u>
Ref Supply	60.7	60.6	61.8	63.3	64.9
%Change Supply		-0.1%	2.0%	2.5%	2.5%
US Production (L. Gulf)	<u>52.0</u>	<u>51.5</u>	<u>51.9</u>	<u>52.2</u>	<u>52.5</u>
Low Supply	60.7	60.6	61.5	62.5	63.7
%Ch Lower Gulf		-0.1%	1.5%	1.6%	1.9%
High LNG	<u>1.2</u>	<u>1.6</u>	<u>1.9</u>	<u>3.0</u>	<u>4.4</u>
High Supply	60.7	60.6	62.0	63.9	66.2
%Ch High LNG		-0.1%	2.3%	3.0%	3.6%

Prices should soften by 2007 but there are a lot of uncertainties – especially the impact of coal generation and oil prices.

US Natural Gas Supply – Demand Balance (Bcf/d)

	2005	2006	2007	2008	%Ch 05-08
Dry Gas Production	52.2	52.6	53.1	53.1	0.5%
Canada & Mexico	8.0	8.0	8.0	8.9	2.9%
<u>LNG</u>	<u>1.7</u>	<u>2.5</u>	<u>3.2</u>	<u>3.8</u>	<u>21.9%</u>
Supply	61.8	63.1	64.4	65.8	1.6%
Residential	23.8	24.1	24.4	24.7	1.0%
Commercial	20.4	20.7	20.9	21.2	0.9%
Industrial	20.1	20.4	20.6	20.9	0.9%
L&P and Trans	4.9	4.9	5.0	5.1	0.8%
<u>Electric</u>	<u>15.9</u>	<u>16.5</u>	<u>17.3</u>	<u>18.3</u>	<u>3.6%</u>
Demand	61.8	62.8	64.2	65.8	1.6%

There is substantial disagreement about long term U.S gas prices. Price projections continue to be revised upward. The issues include environmental regulations, the cost of coal gasification, the loss of gas intensive industrial production, capital allocation, available rigs and geologists etc.

- **ICF has an extremely detailed supply model. They have been calling for prices close to \$4.50 /MMBtu by 2006 and below \$4.00 by 2015.**
- **Changes in the exchange rate could have a substantial impact on the economics of LNG. (The US dollar could lose 20% or more of its value.) The economics of a Greenfield plant in Qatar was about \$3.80/MMBtu with 20% devaluation of the US dollar that becomes \$4.56MMBtu.**

Henry Hub Price 2015

