

North American Natural Gas: Will the New View Be Correct this Time?

The Energy Forum

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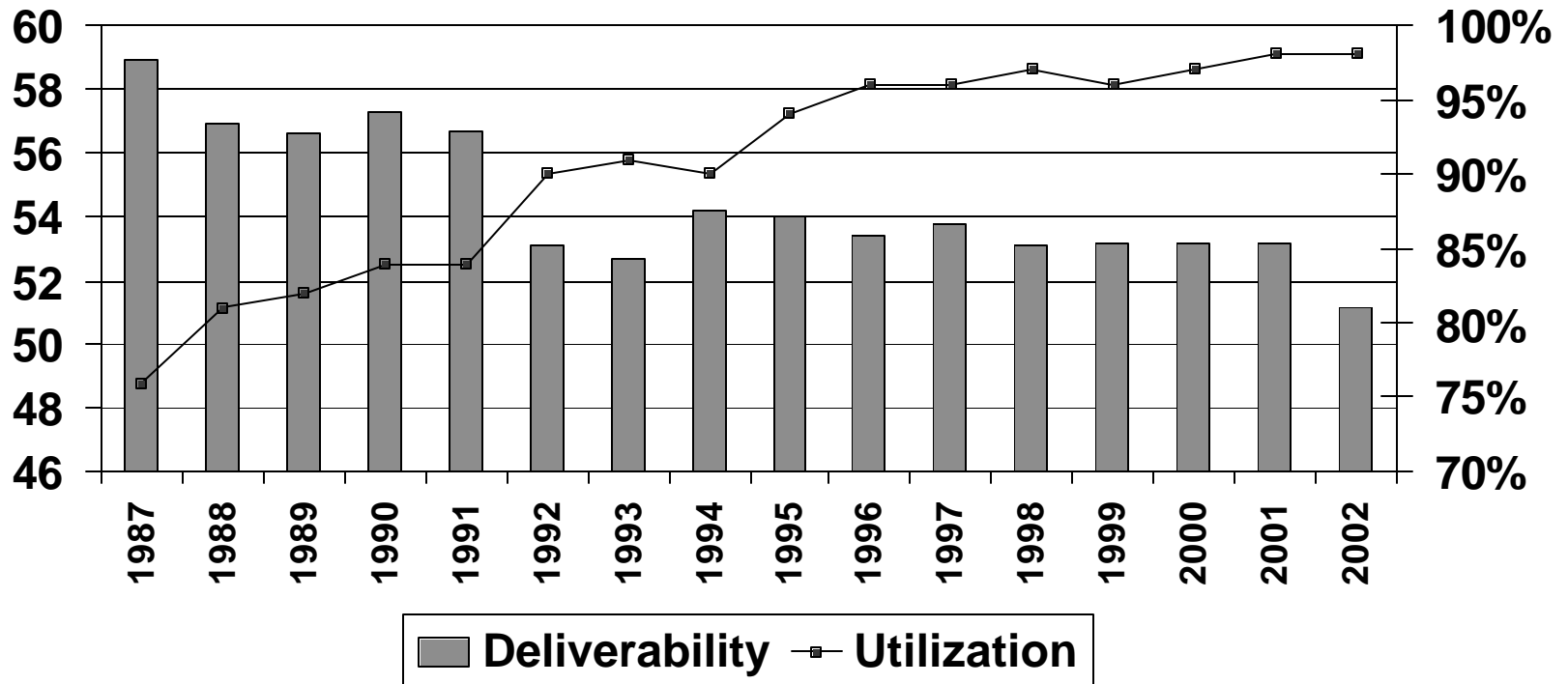
“There is a tendency in our planning to confuse the unfamiliar with the improbable.... The danger is in a poverty of expectations, a routine obsession with a few dangers that may be familiar rather than likely.”(1)

- **1973: The Department of the Interior called the Gulf the “Dead Sea.”**
- **1978: Oil prices were forecasted to reach \$100 per barrel by 1990.**
- **Coal was going to be the solution to the world’s energy needs.**
- **1996: Forecasts predicted that growth in supplies from the Gulf and Canada would cause a gas bubble by 2000.**
- **Now: Henry Hub prices for 2010 are trading at \$4.75 per MMBtu and expectations are for a difficult transition to a period when large volumes of LNG will become available.**
- **Will these forecasts be déjà vu all over again?**

(1) Pearl Harbor: Warning and Decision by Roberta Wohlstetter. Forward by Thomas Schelling

Forecasts have been wrong because of changes in policy, technology, behavior, and in many cases extremely poor analysis. When analysts were proclaiming a gas bubble, US productive capacity was declining.

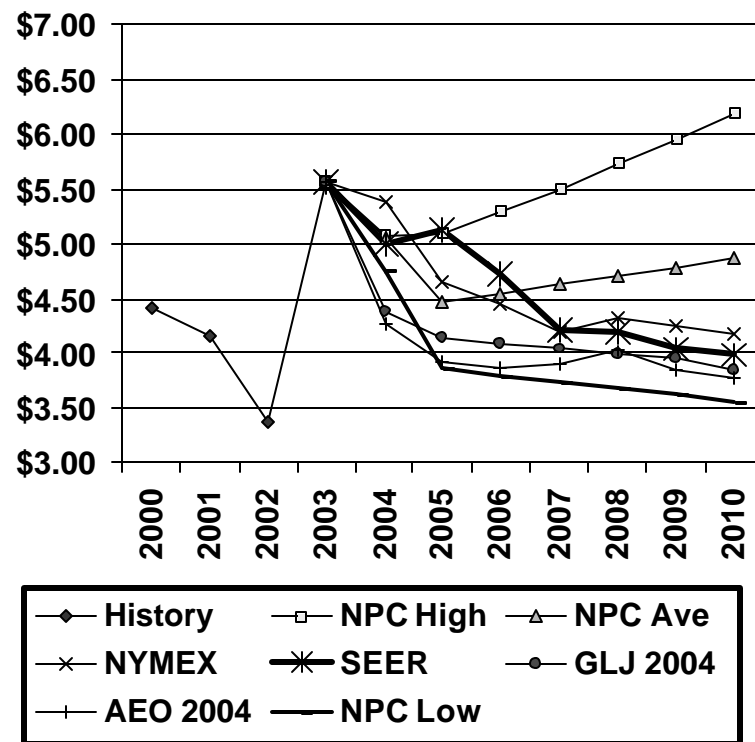
US Productive Capacity and Utilization



The NPC study suggests a wide range of outcomes driven by policy assumptions, technology, the size of the resource base etc. Some of the key near term issues are:

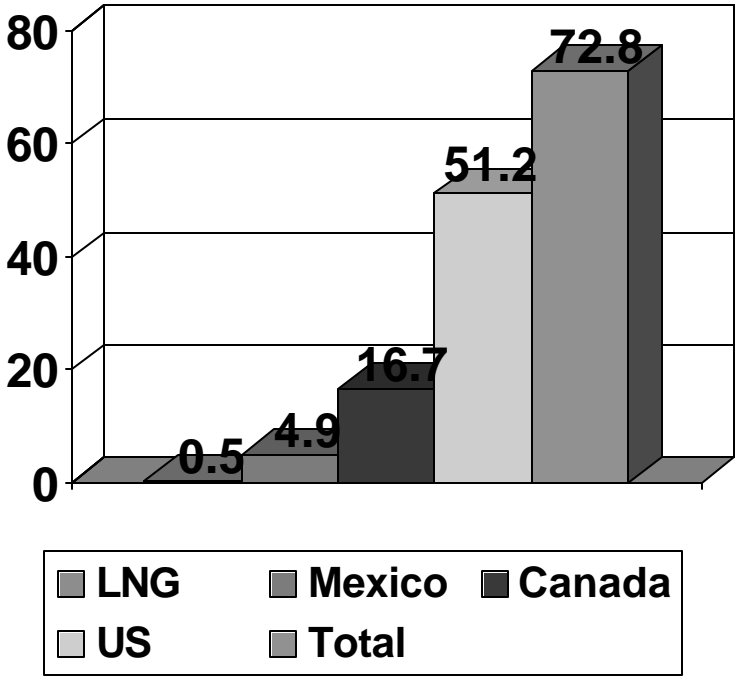
- What are the near term production prospects?
- When will significant volumes of LNG arrive?
- What are the implications of LNG supply for storage and seasonal pricing?
- What will be the demand response to high prices?
- What surprises might be ahead?

Henry Hub (\$2003/MMBtu)

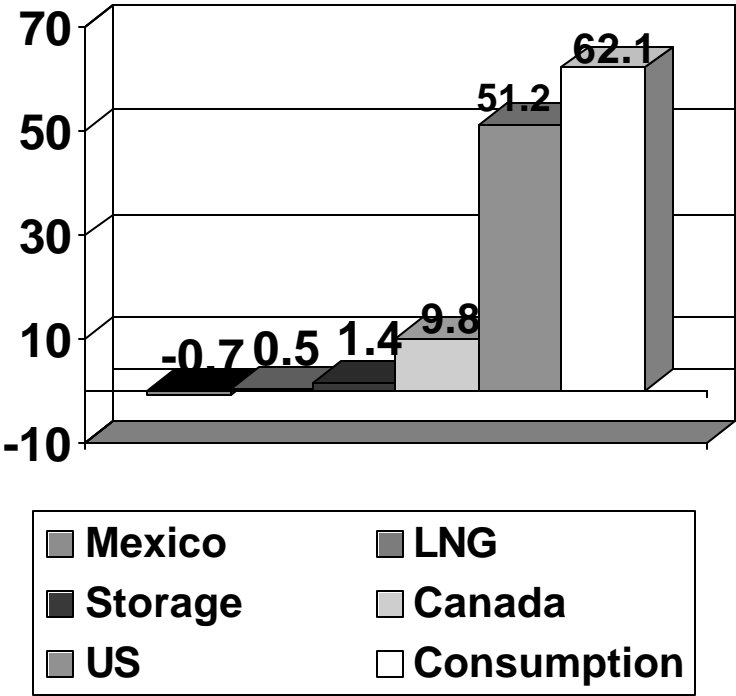


2002 North American Natural Gas Supply was 72.8 Bcfd and US Consumption was 62.1 Bcfd.

North American Natural Gas Supply (Bcfd)



US Natural Gas Supply (Bcfd)



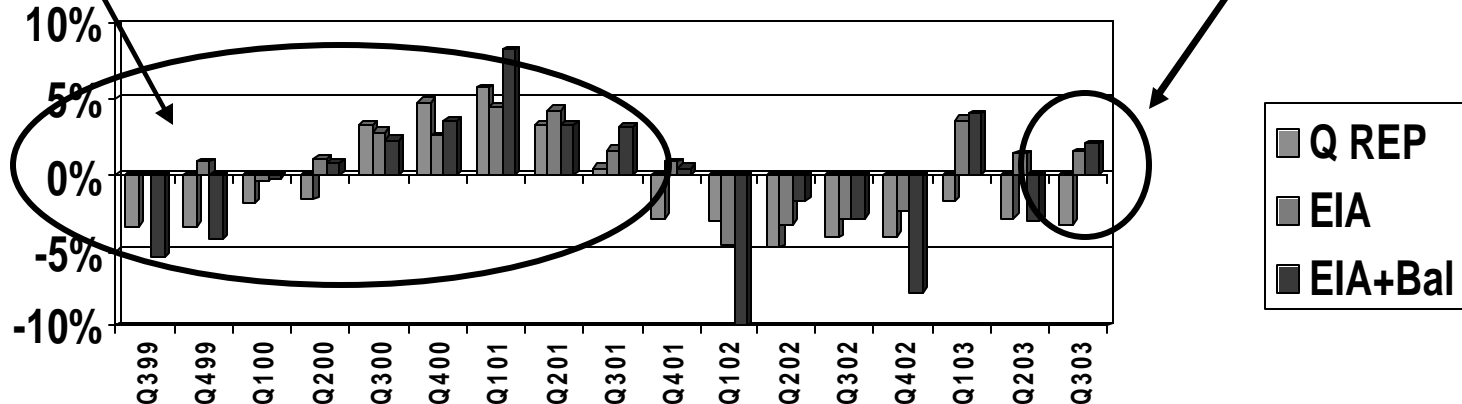
The debate about production has important short-term and long-term implications.

- Company quarterly report data suggest production in 2003 declined 2.8% YOY versus EIA August YTD shows production up 2.4%.
- SEER estimates production declined .8% in 2003 and will be flat in 2004. Supply and disposition must balance but this is a tricky area.

EIA data shows growth
Q Rep shows decline

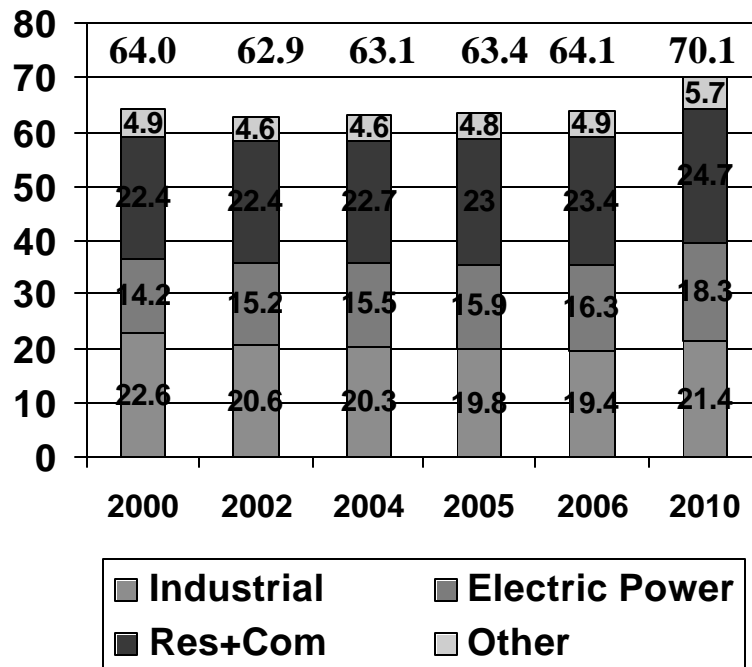
Final EIA differs
from Q Rep

YOY %Change in Production

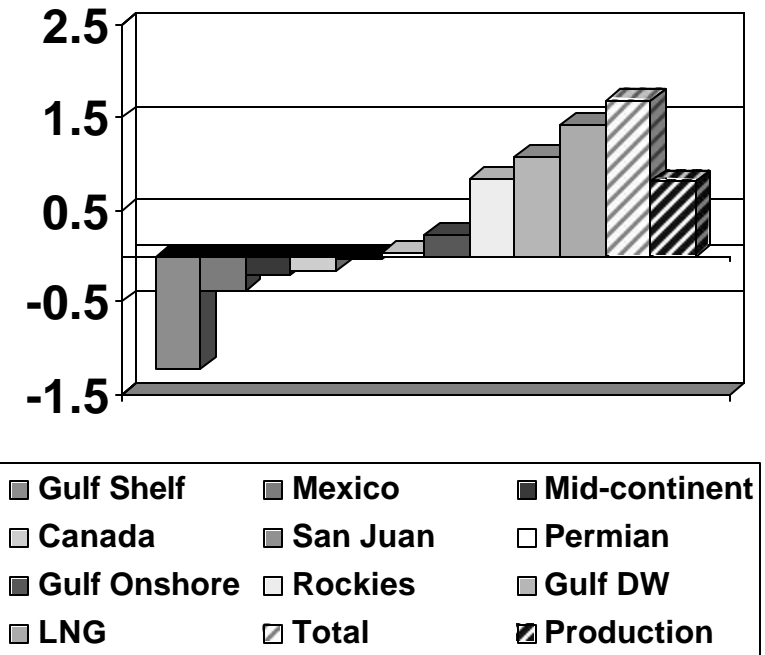


Supply growth will be difficult to achieve during the next three years and most of the growth will occur in 2006. Prices might have to be high enough to cause further declines in industrial demand.

US Gas Consumption and Supply (Bcfd)



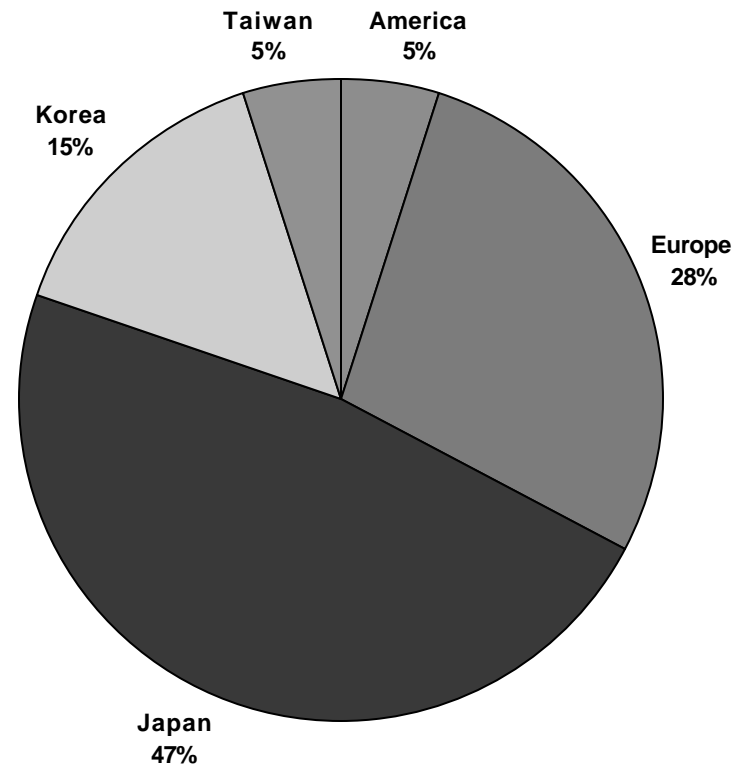
US Supply Growth (Bcfd) 2003 to 2006



The marginal cost of LNG is about \$3.50 per MMBtu and some supplies are economic at \$2.60 per MMBtu. However, liquefaction capacity will be a constraint on new supply and the US is a small player in the LNG market.

- **Asia accounts for 2/3 of LNG imports.**
- **Current world wide capacity is 17.8 Bcfd and probable expansion by 2007 is 4.3 Bcfd(1).**
- **World natural gas consumption is 155 Bcfd. Small changes in the world market can have a large impact on the availability of LNG.**

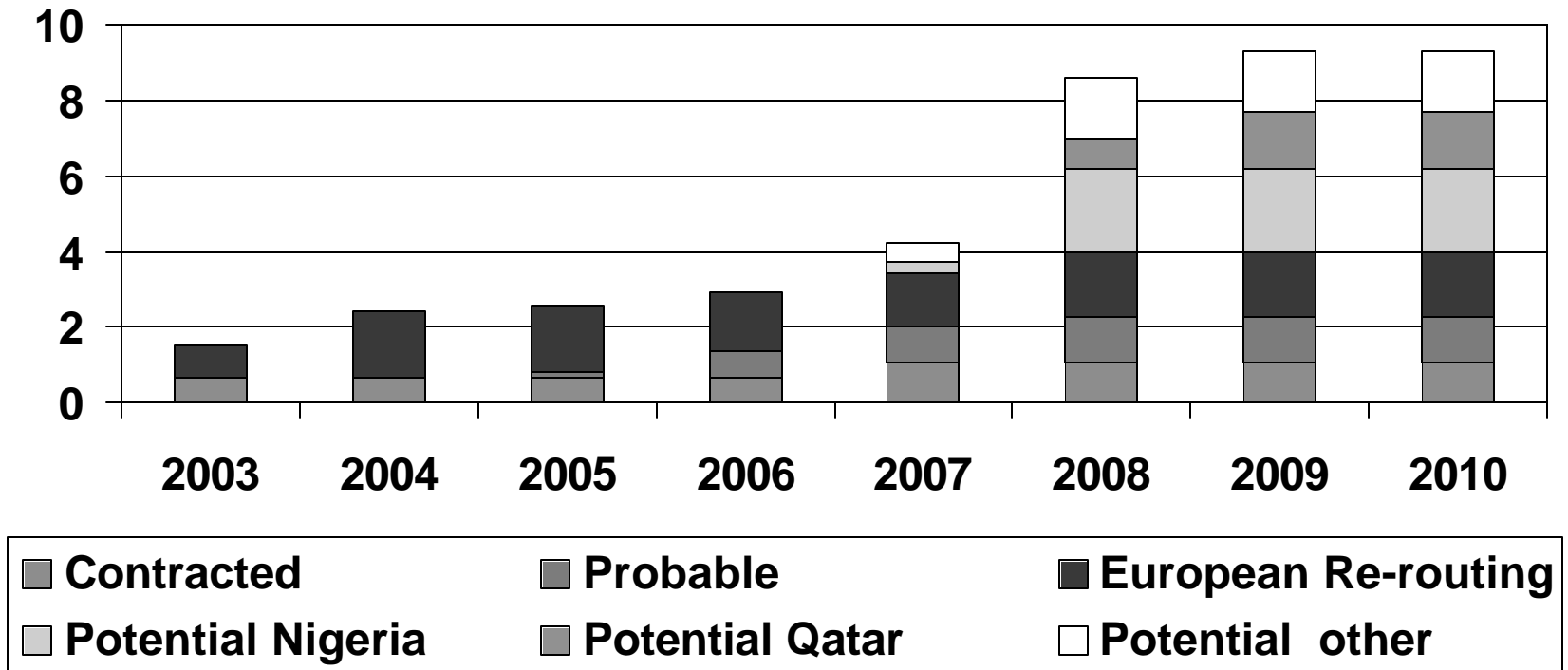
**Share of 2002 World LNG Imports
(14.7 Bcfd)**



(1) Source James T. Jensen

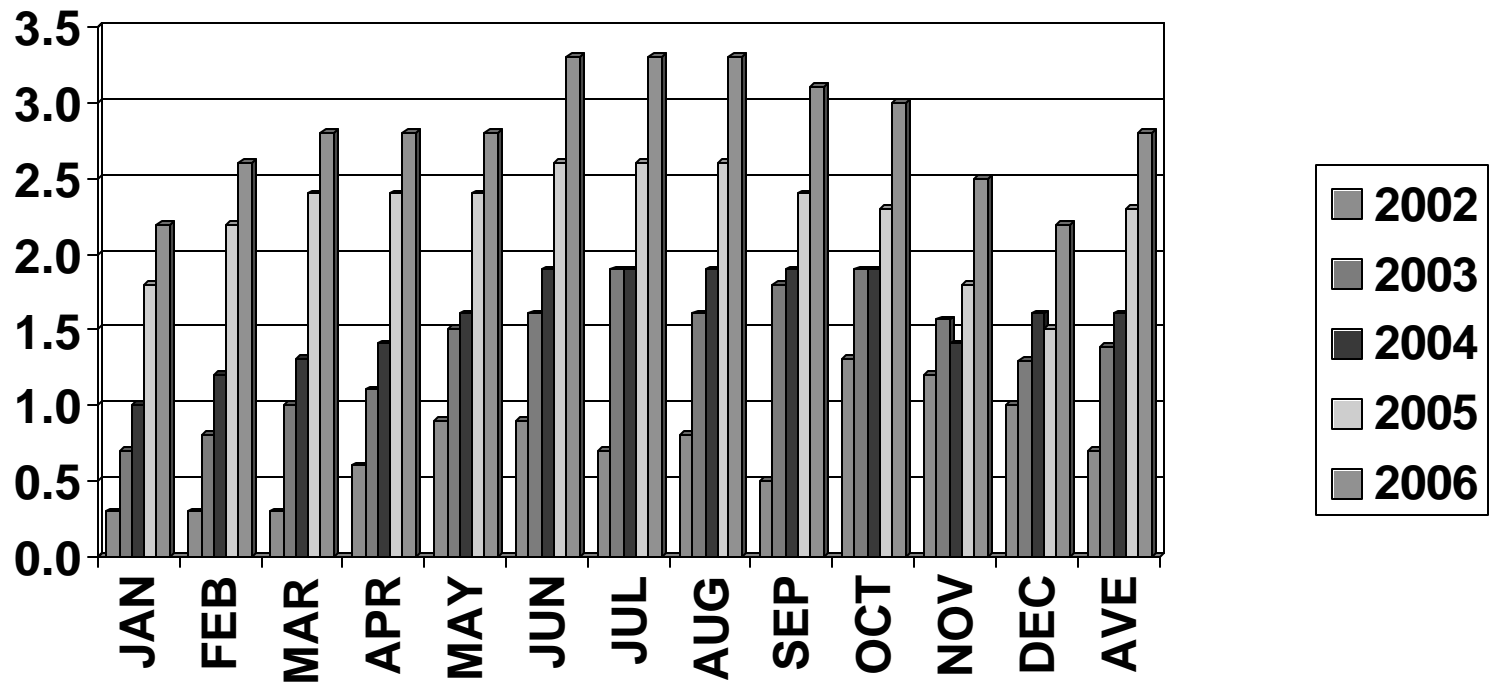
Until 2008, much of North American supply will depend upon re-routing from Europe and then increased supplies depends on potential projects.

North American LNG Imports (Bcfd)

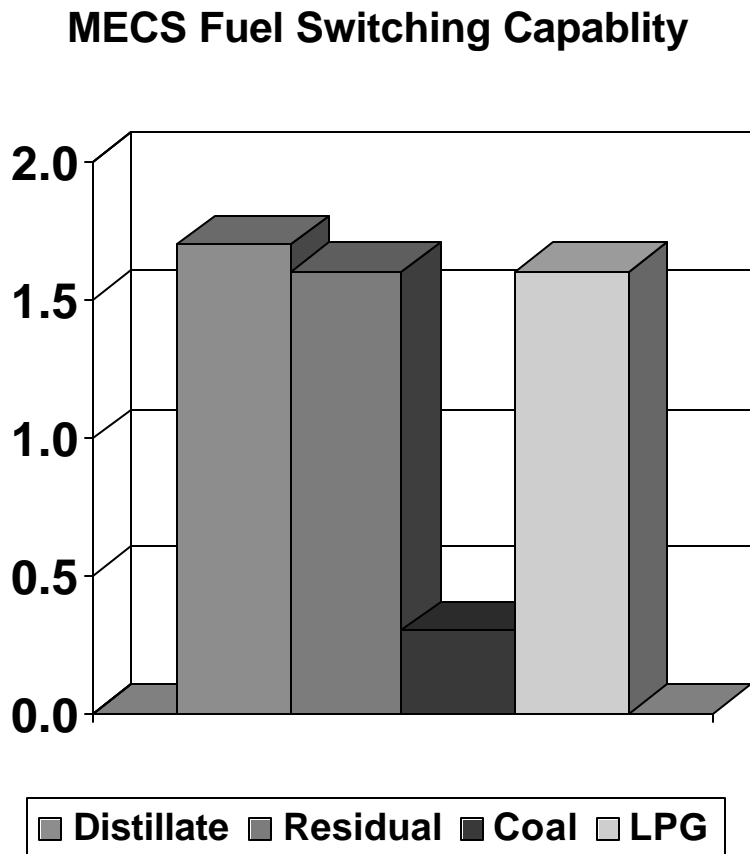


The re-routing of LNG supplies will increase the seasonality of supply and the value of storage.

US LNG Imports (Bcfd)



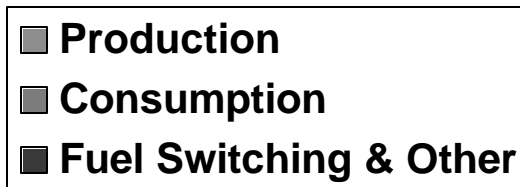
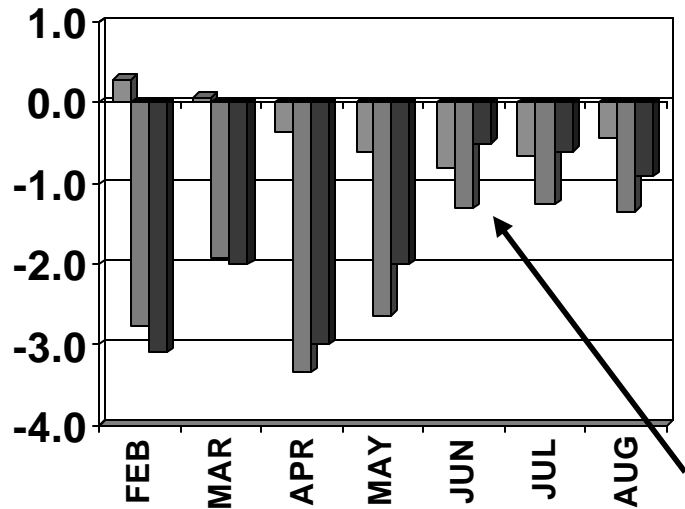
Most industrial fuel switching information is based on survey data.



- The 1998 MECS study switching capability is much higher than actual switching.
- Annual residual fuel oil consumption in the industrial sector is only about .5 Bcfd.
- A Department of Commerce study indicated about 500 Bcf per year of boiler switching capability during 1994-98.
- NPC study suggests boiler switching capability of approximately 200 Bcf per year or less (.55 Bcfd)

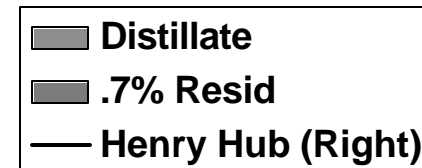
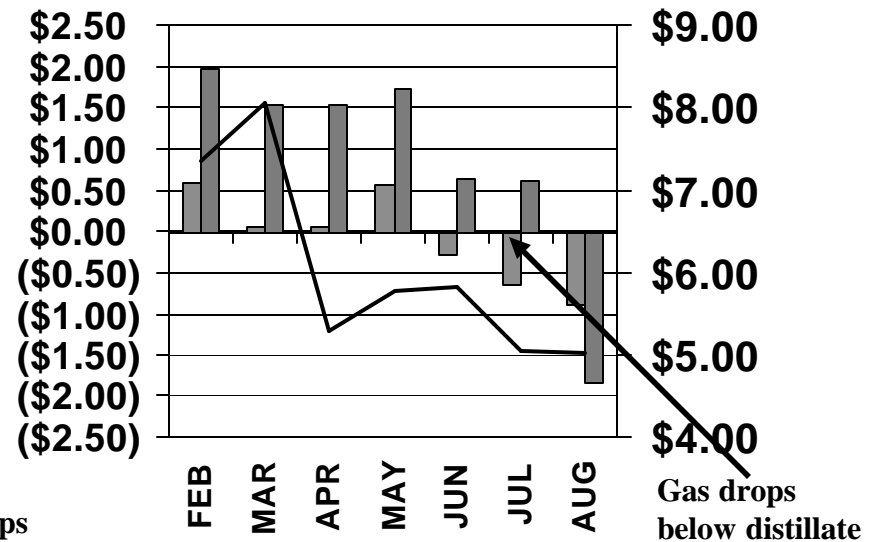
Changes in industrial production only accounted for a small portion of lost consumption in 2003. The remainder was from fuel switching, index problems, conservation, and reporting error.

Industrial 2003 vs 2002



Gas drops below distillate

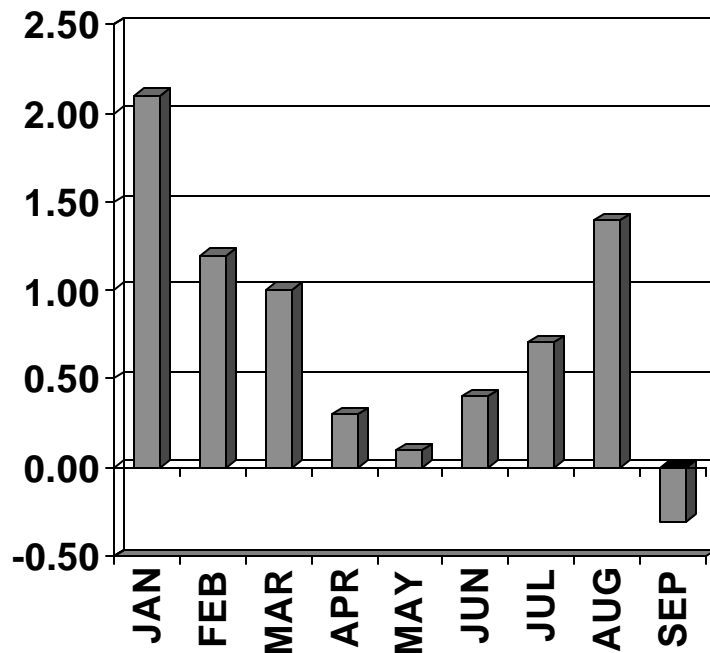
LA Gas less Oil \$/MMBtu



Gas drops below distillate

Electric power fuel switching depends upon basis and whether steam units are dispatching.

2003 - 2002 YOY Change in Oil Consumption (Bcfd)



Northeast Residual Oil Switching Prices

	\$/MMBtu	
WTI = \$30/ bbl	<u>SEP</u>	<u>JAN</u>
1% Resid NY	3.65	3.65
Taxes & Shipping	0.45	0.45
Delivered NY	4.10	4.10
Basis	0.30	1.00
Henry Hub (Steam)	3.80	<u>3.10</u>
Henry Hub (CC)	<u>5.32</u>	4.34

The bottom line is that supply is likely to be extremely tight until 2006 or later. Longer term the supply and demand response is likely to be greater than expected by many.

- **The biggest potential surprise could be NSR regulations – which could displace 3.5 Bcfd of coal generation.**
- **Distillate fuel oil prices are likely to serve as a semi-permeable ceiling.**
- **LNG is not a done deal – someone will have to absorb the price and political risk.**
- **Watch for new power technology, a push for nuclear generation, new gas plays and radical shifts in consumer behavior.**