North American Natural Gas Outlook: Expectations and Potential Surprises

Northeast Energy and Commerce Association

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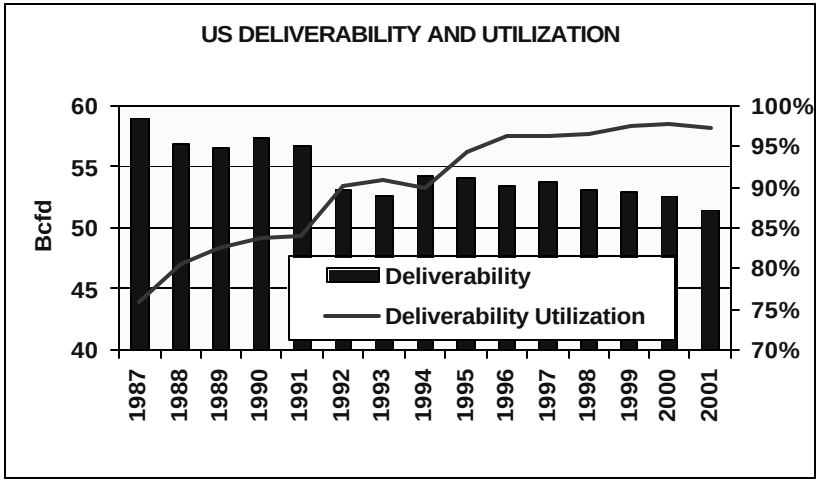
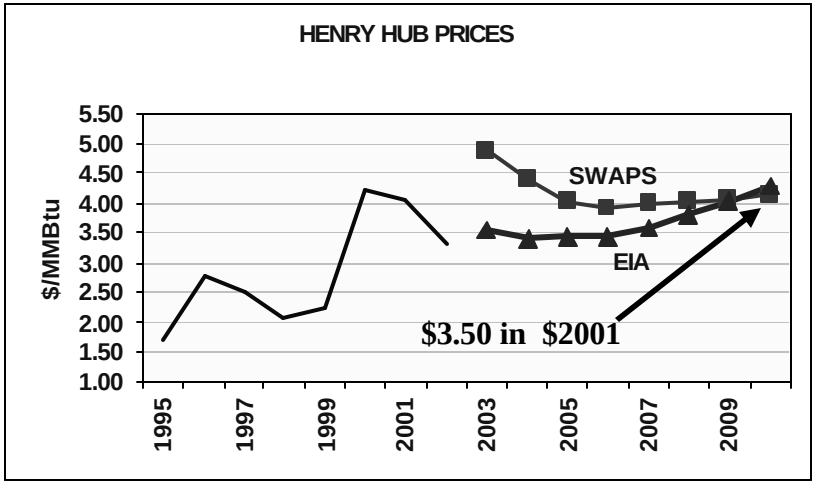
- **Overview of market expectations**
- **Are there reasons to believe these expectations could be wrong?**
  - **New Source Review**
  - **Demand Response to Price (loss of industrial gas demand)**
  - **Production**
- **Price Bounds**
- **Long Run Supply Sources**

“The Future Ain’t What It Use to Be”
Yogi Berra

- **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 $4.50 to $4.75 per MMBtu.**



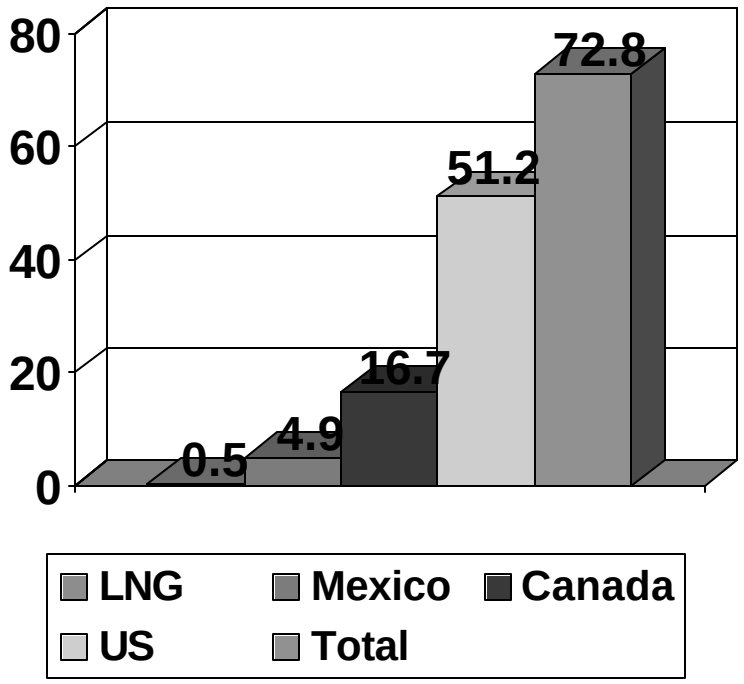


The current view of most analysts is for high prices and a difficult transition to a period when LNG will account for 10% to 15% of US supplies.

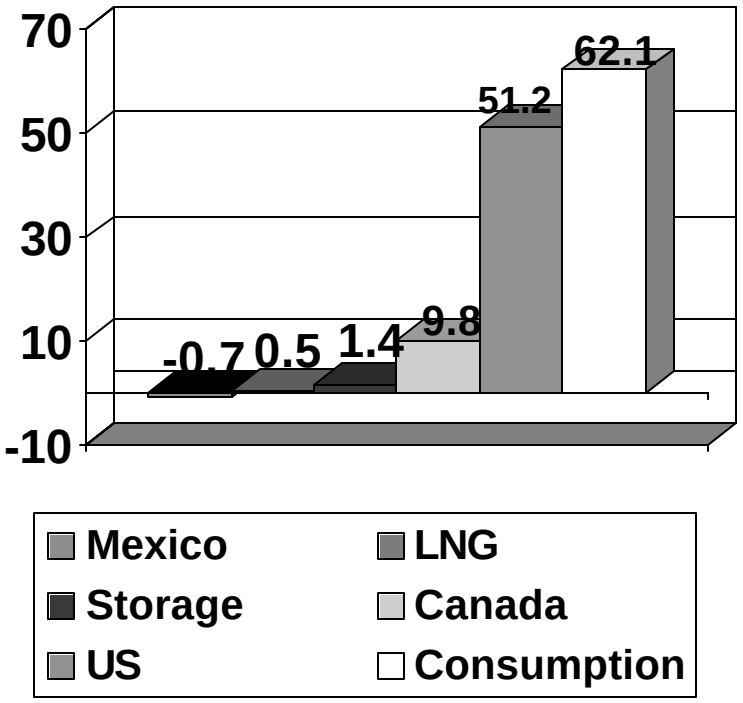
- **US production will be down 1% in 2003. US production is at the same level as five years ago.**
- **Canadian production will be down 2% to 4% in 2003 and probably decline in 2004.**
- **Availability of ships, LNG terminal capacity, and liquefaction capability will limit increased LNG imports until at least 2006.**
- **Gas consumption for power generation will cause gas demand to grow 1% to 2% per year.**
- **Henry Hub prices will range between $4.00 and $6.00 per MMBtu through 2010.**
- **Alaskan supply will require $4 to $5 prices. (Developed in 2015)**
- **Most LNG supplies can be imported at less than $3.50 per MMBtu.**
- **Conventional Alberta supplies have peaked (EUB).**
- **Mackenzie Delta gas will be needed for bitumen production and to offset the decline in Alberta.**

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

North American Natural Gas Supply (Bcfd)

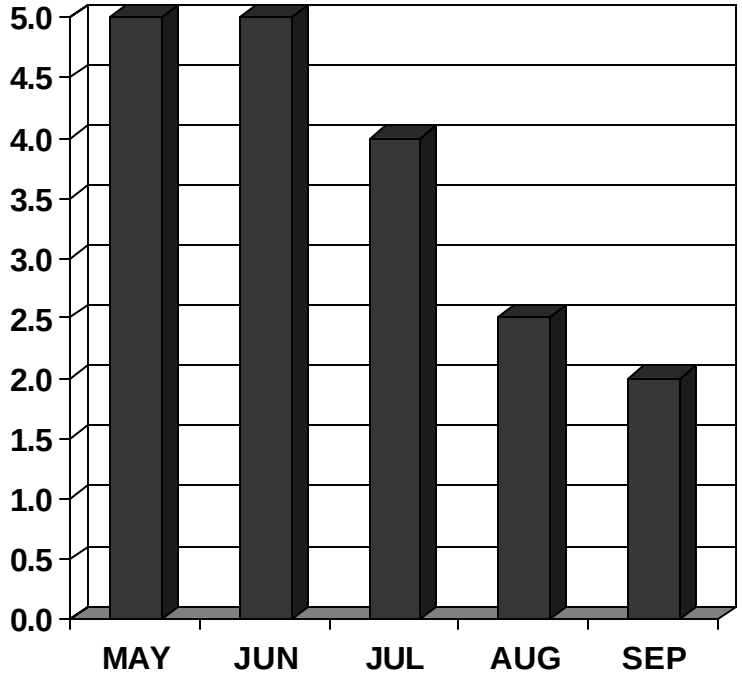


US Natural Gas Supply (Bcfd)

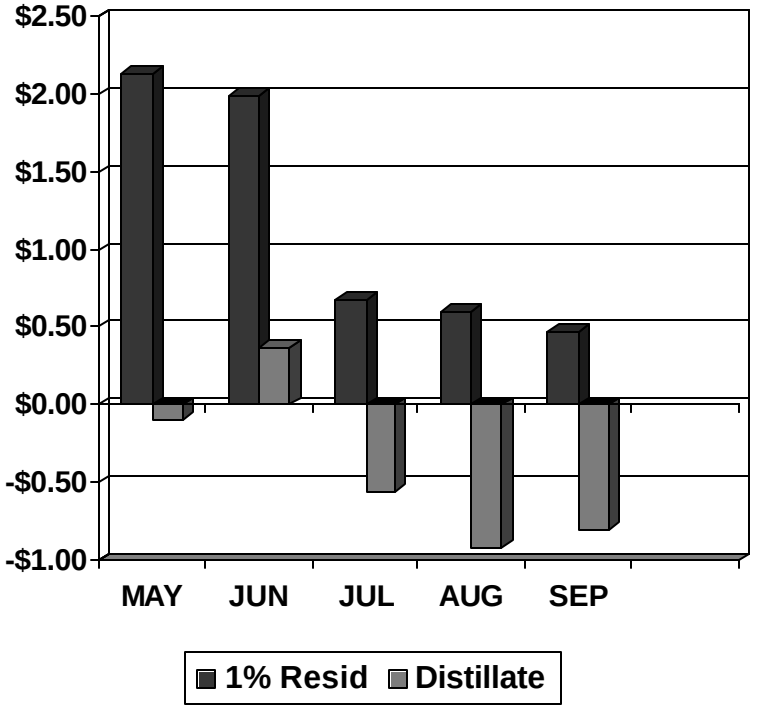


Prices above distillate cause substantial losses in gas consumption. Even with lower gas prices weather adjusted storage injections are running 2 Bcfd above last year.

Weather Adjusted Storage Injections vs. 2002 (Bcf/day)



NY Gas Premium over Oil ($/MMBtu)



Quarterly report data shows 1st quarter production was down 2% from last year. EIA shows production up 3.2%.

- Quarterly report data is biased – large producers overstate production decline.
- Last year EIA revised initial production estimates down 2%.
- OCS is the big question. Substantial deepwater came on the 1st quarter. However, the first quarter data are estimates and the rig count has not changed from 2002.
- Texas is up 3% in June, Rockies up close to 1 Bcfd (15%), New Mexico is growing.

1st Quarter Production (Bcfd)

AREA	2002	2003	2003 -2002	%CH 03 02
NM	4.17	4.40	0.23	5.4%
LA	3.69	3.59	-0.10	-2.7%
OCS	12.59	12.93	0.34	2.7%
TX	15.85	15.48	-0.38	-2.4%
SUBTOTAL	36.31	36.40	-0.39	0.3%
		EIA		
ROCKIES	6.61	7.19	0.58	8.8%
OK	4.40	4.56	0.16	3.6%
SUBTOTAL	11.01	11.75	0.74	6.7%
TOTAL	47.32	48.15	0.34	1.8%

The forward market appears to be priced for a repeat of last winter.

- 100 Bcfd of storage over the heating season is worth about $.50 per MMBtu in HH-WTI difference.
- Normal weather would be worth 240 Bcf.
- Assuming normal weather plus lower oil prices yields a Henry Hub price of $4.30 versus $5.90 last year.
- Henry Hub prices with last year's weather would average about $5.30 per MMBtu.
- The analysis is overly simplistic but strongly suggestive.
- A good possibility of ending the heating season with above average storage.
- Will next summer be a mirror image of last year?

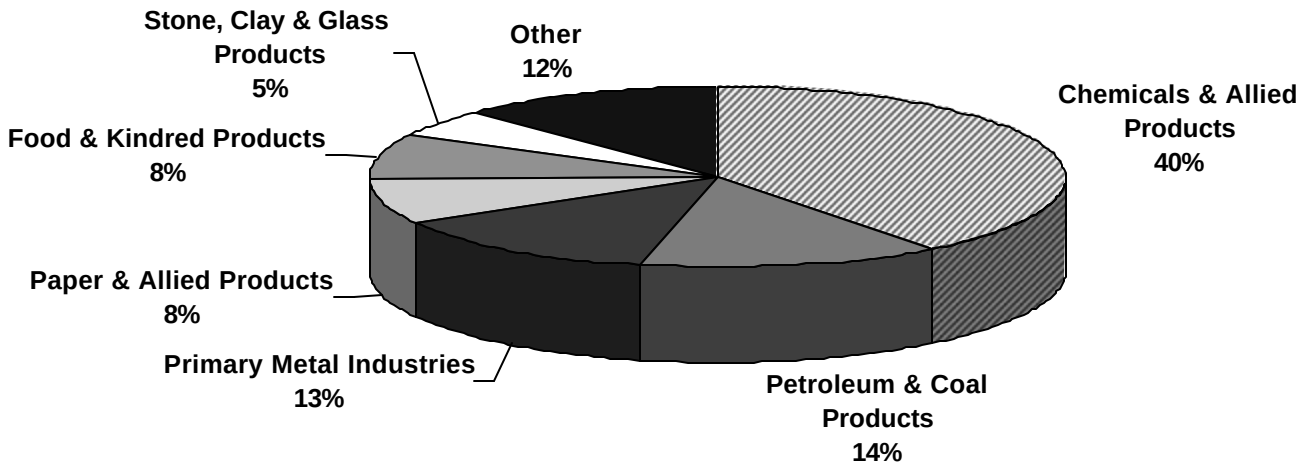
The pressures for the coming heating season are for lower prices than last year.

- **Last heating season was 2.1% colder than normal, 4.5% colder than normal in the East + Producing Regions.**
- **This year weather forecasts are all over the map.**
  - a repeat of last year.
  - NOAA - equal chance of above and below normal.
- **WTI $.60 per MMBtu less than last year.**
- **October working gas storage slightly below last year.**
- **Weather adjusted working gas storage injections are running 2 Bcfd above last year.**

August EPA ruling could cause the loss of 3.6 Bcfd of gas consumption (three years of gas consumption growth).

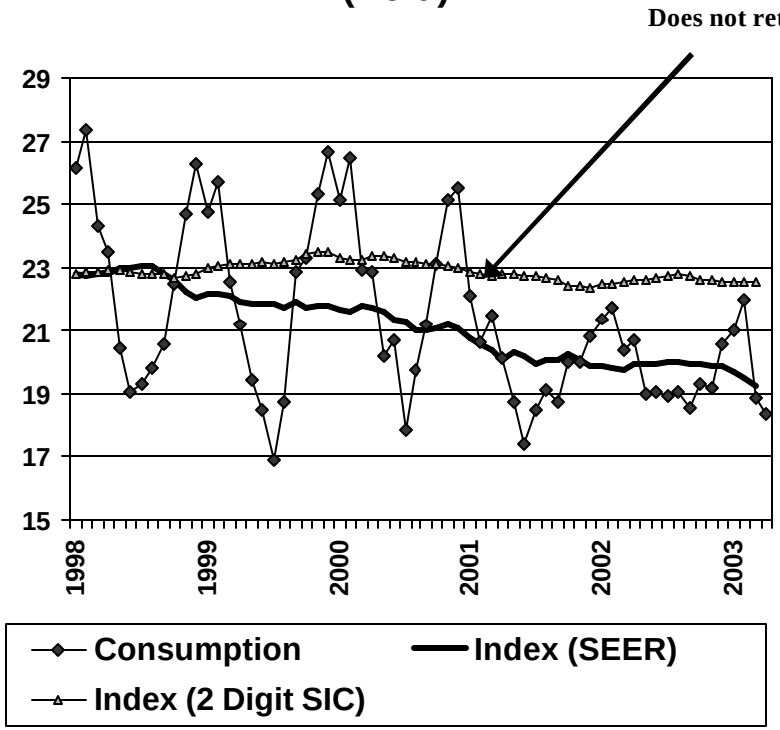
- Ruling applies to grandfathered plants that were not required to install Best Available Control Technology - BACT (1977 Clean Air Act).
- The ruling would allow up to 20% of cost of the plant to be spent on maintenance and not be subject to New Source Review (NSR).
- Approximately 110 GW of coal fired plants could increase capacity by 15% to 25%. 70 GW could be expanded within one year. The interpretation of this ruling is controversial.
- The ruling is being challenged in the courts and the probability is high that it will be overturned.
- Still, some power plants are expanding capacity.

Industrial gas consumption is about 20 Bcfd. It accounts for one-third of US consumption Two-thirds of consumption is in the Chemicals, Petroleum and Primary Metals sectors.

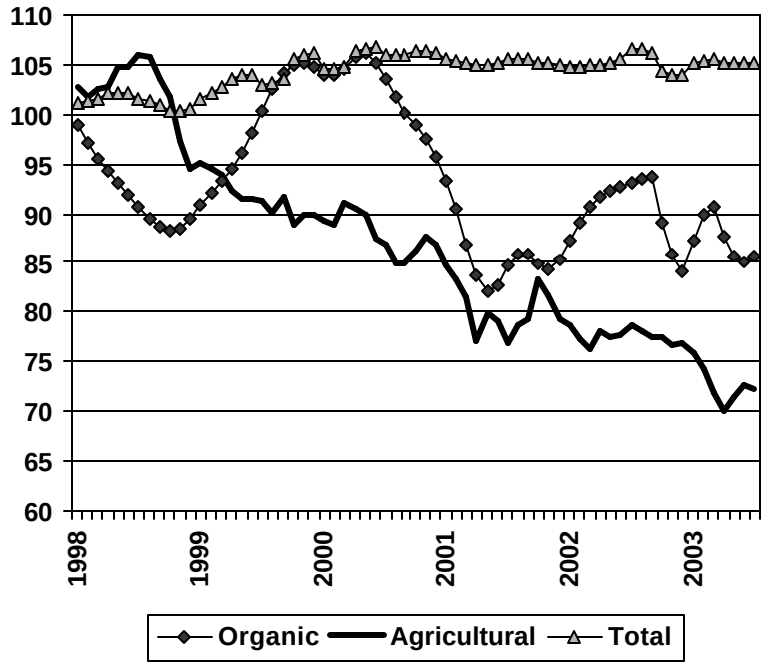


Industrial gas consumption will be less than expected.

Industrial Production Indices versus Industrial Production (Bcfd)

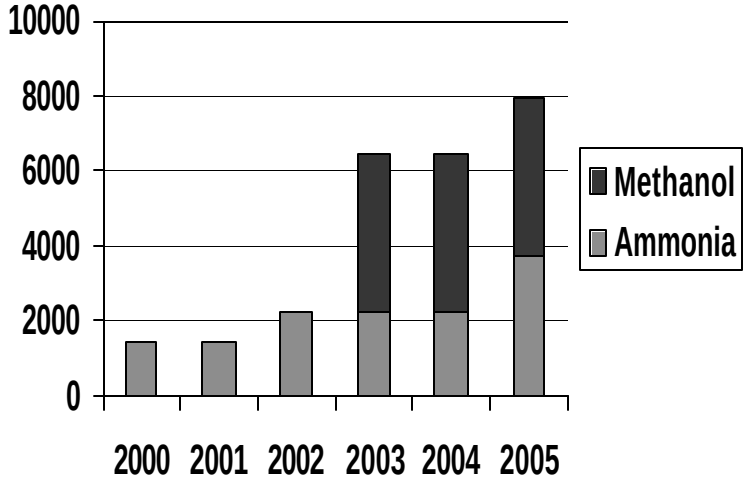


Gas Intensive Chemical Production Indices vs. Total Chemicals

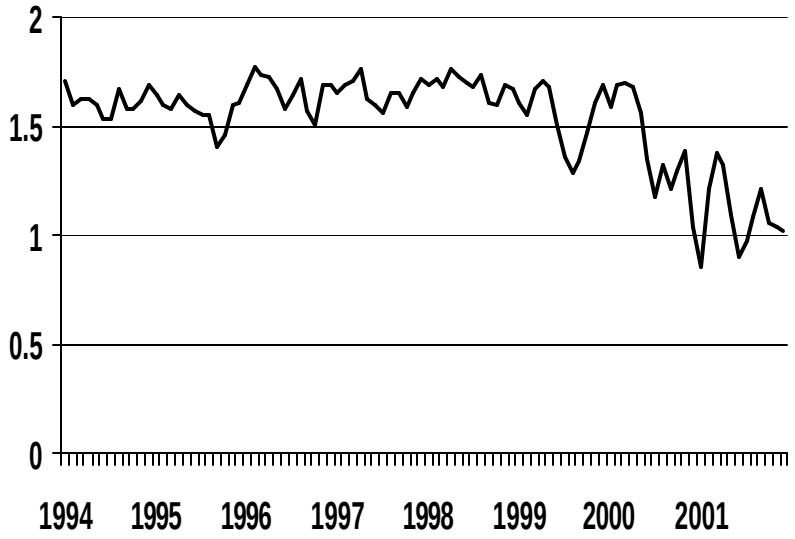


Ammonia and Methanol Capacity in Trinidad and Venezuela is increasing. Proposed capacity amounts to about 1.2 Bcfd of gas consumption. (20% of US Ammonia capacity has permanently closed in past three years).

Million Metric Tons Cumulative



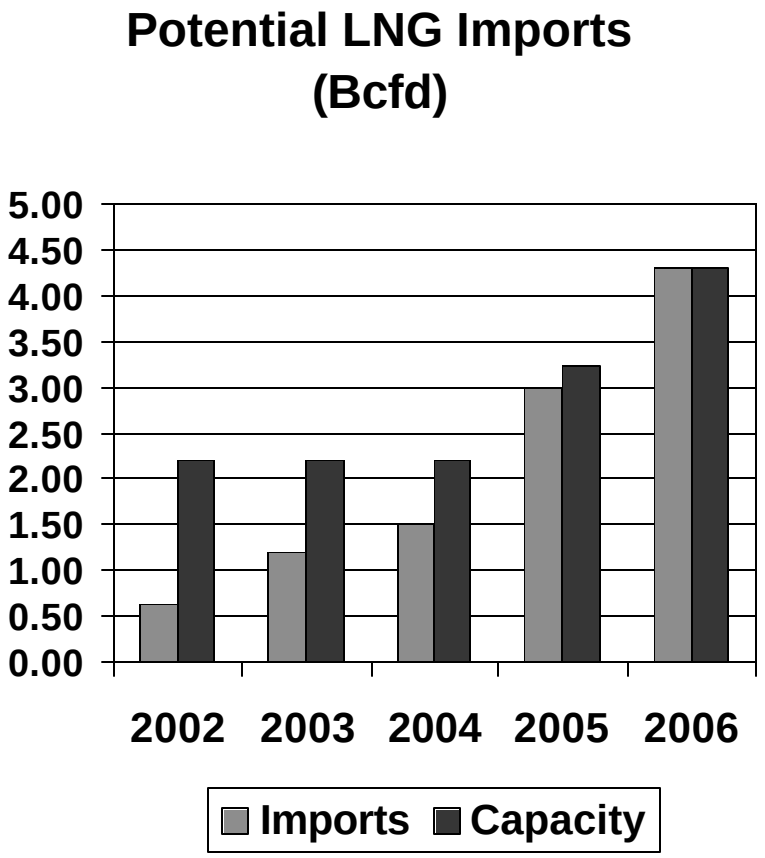
US Anhydrous Ammonia Production (Bcfd)



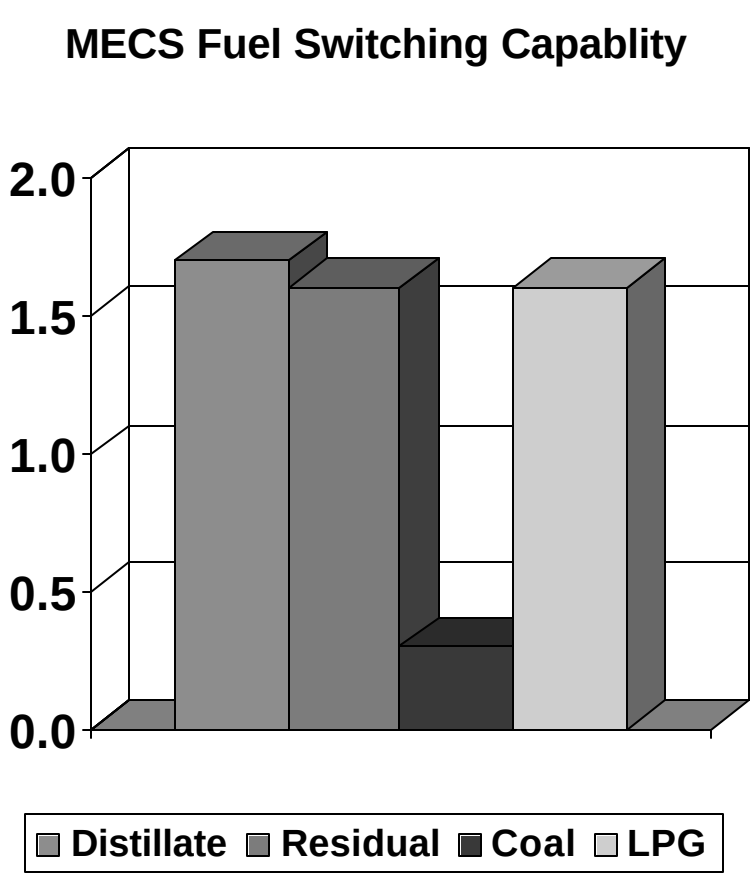
One million metric tons is 150 MMcfd

Until 2007 or later, liquefaction capacity is likely to be the greatest constraint on increased LNG imports.

- If demand grows about 1.5% per year, supply will have to increase by 1.0 Bcfd per year.
- Existing terminals could add approximately 1 Bcfd of supply during each the next three years.
- LNG supply would have to be diverted from Europe or Asia.
- Exports to Mexico could grow and Canadian imports could decline.



Near term upper bound on prices will distillate fuel oil and the lower bound will be production cost ($3.50 per MMBtu or higher). Shocks, such as unusual weather and sharp changes in oil prices will cause prices to exceed these bounds on a temporary basis.



- **LNG from marginal sources such as Qatar less than $3.50 per MMBtu. 2-3 Bcfd is already targeted for the US after 2008.**
- **Qatar - 900 Tcf of reserves (27 years of NA consumption)**
- **Cost is not necessarily price. Worldwide LNG demand is predicted to grow at 2- 4.5% per year.**
- **Mackenzie Delta at less than $3.00 per MMBtu.**
- **Alaska 4-6 Bcfd, $3.50 per MMBtu 2002 dollars (about 2015).**