

North American Natural Gas: Will the Conventional Wisdom be Wrong Again?

Ron Denhardt
Vice President, Natural Gas Services
GasFair August, 2003

Strategic Energy & Economic Research Inc.

781 756 0550 (Tel)
RonDenhardt@EnergySEER.com
www.EnergySEER.com

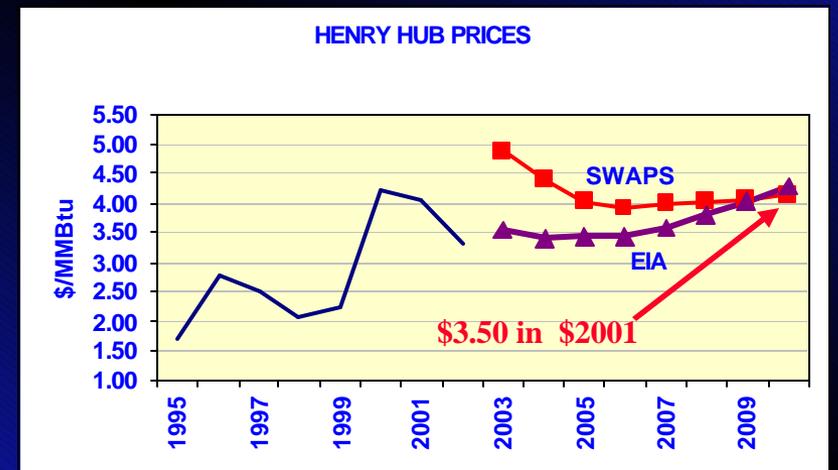
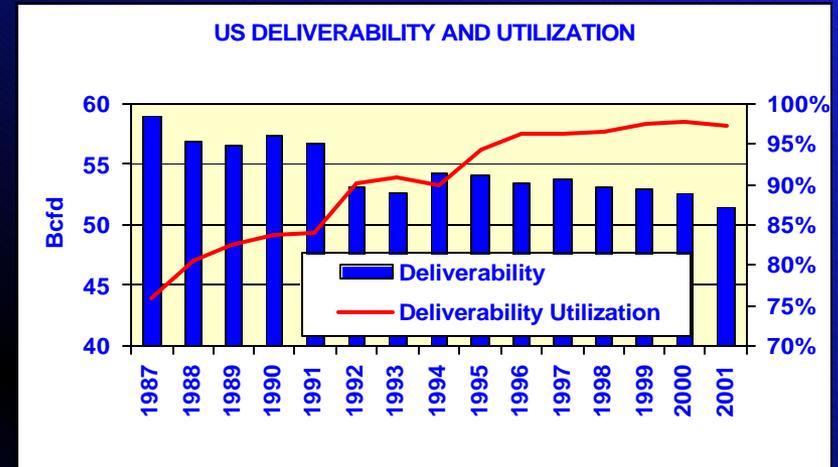
“There is a tendency in our planning to confuse the unfamiliar with the improbable.... The danger is in a poverty of expectations, a routine obsession with a few dangers that may be familiar rather than likely.”(1)

- **Overview of current market expectations**
- **Are there reasons to believe these expectations could be wrong?**
 - **New Technology**
 - **Regulations and Policy (changes to resource access, environmental regulations).**
 - **Demand Response to Price (loss of industrial gas demand)**
- **What potential paths might the market take?**

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

“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 “Conventional Wisdom” is for high prices and a difficult transition to a period when LNG will account for 10% to 15% of US supplies.

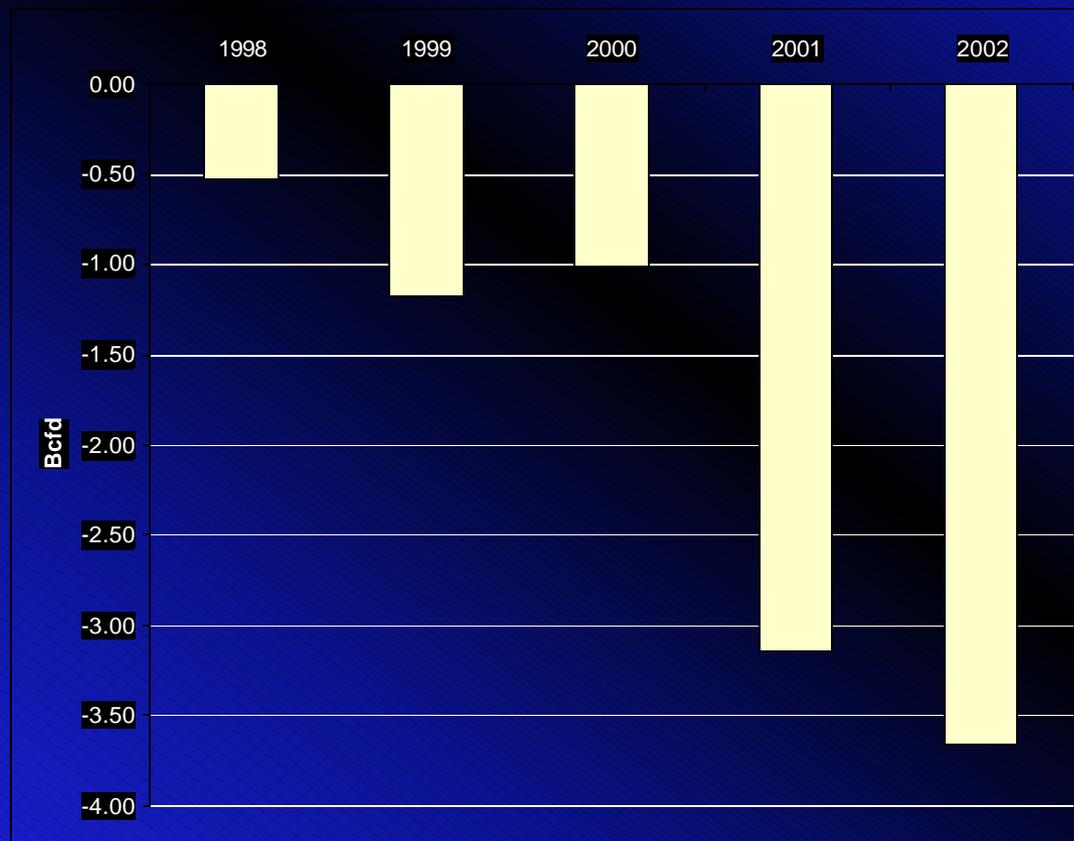
- US production will be down 1% in 2003. US production is at the same level as five years ago.
- Canadian production will be down 2% to 4% in 2003 and decline in 2004.
- Availability of ships and LNG terminal capacity will limit increased LNG imports until at least 2006.
- Gas consumption for power generation will cause gas demand to grow 1-2% 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.
- 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 oil sands production and to offset the decline in Alberta.

Are there reasons to question the “Conventional Wisdom”?

- **During the non-heating season, weather adjusted working gas storage injections averaged well above 2002:**
 - 6 Bcfd early in the non-heating season (11% of consumption)
 - 4 Bcfd in July (7.5% of consumption)
- **Most long term gas consumption forecasts are for 1 to 2% annual growth. The recent lost consumption (and/or increased production) is equal to five to ten years of projected consumption growth.**
- **Production data is unclear. In 2001 US production grew by 2.9% - more than enough to meet projected growth. Has the market changed that much in two years?**
- **Financial difficulties and limited prospects are dampening the exploration and development response to high prices. Will this last?**

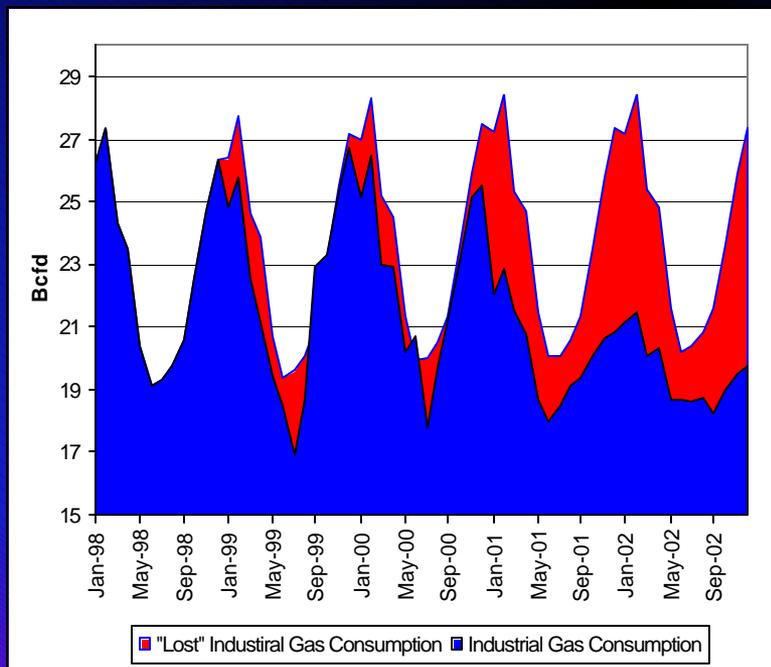
Since 1997, US industrial gas consumption has declined 3.5 Bcfd (5.8% of total consumption).

Cumulative Change in Industrial Gas Consumption from 1997

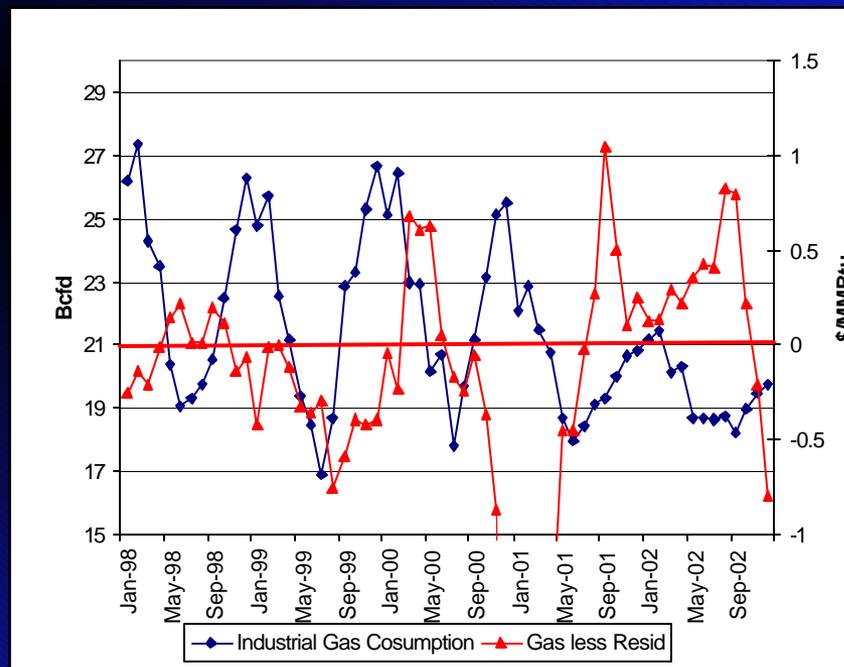


Industrial production in gas intensive industries has been flat. Industrial gas consumption has declined even when gas has been competitive with residual fuel oil.

**“Lost” Industrial Gas Consumption
Due to Change in Mix,
Conservation and Fuel Switching**

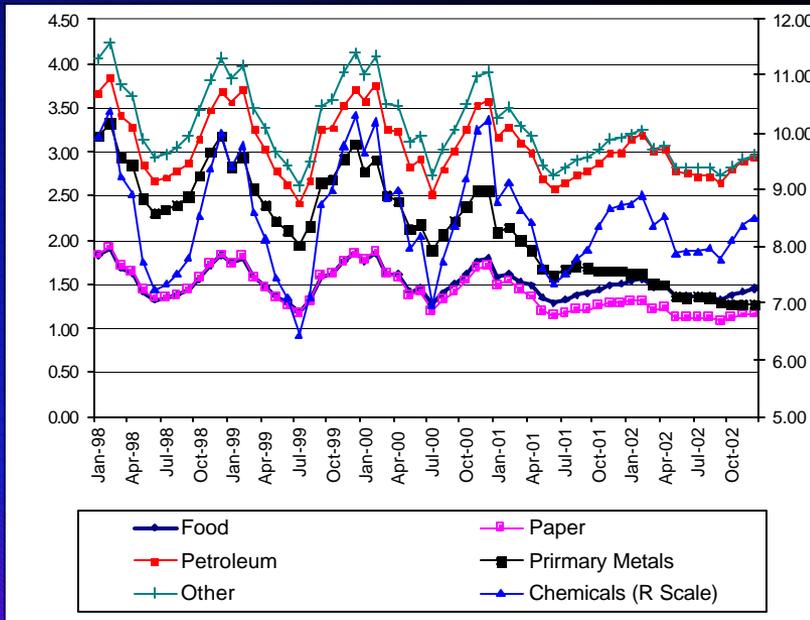


**Industrial Gas Consumption versus
(Residual fuel oil less Gas)**

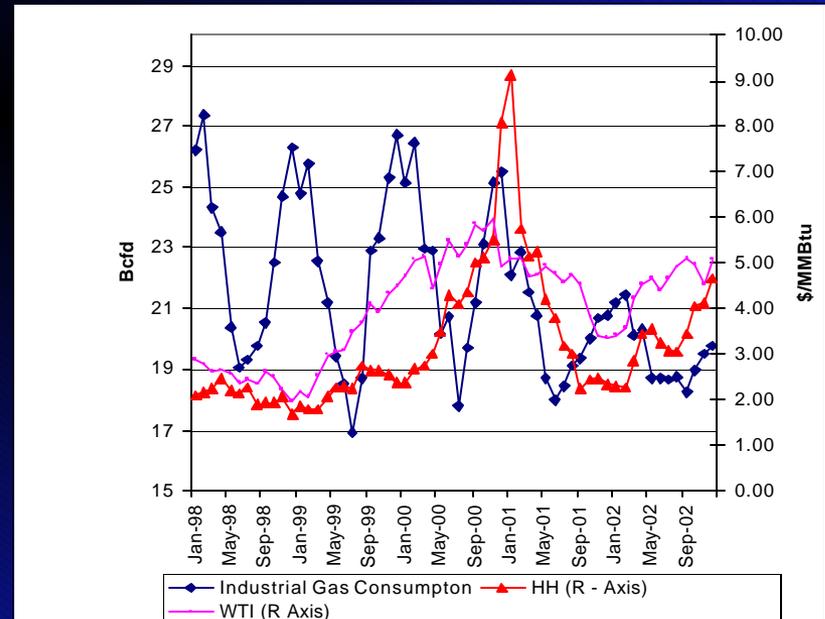


Primary metals, anhydrous ammonia, methanol and other gas intensive industries have been severely impacted? How much of these losses will be permanent?

Industrial Gas Consumption (Bcfd)

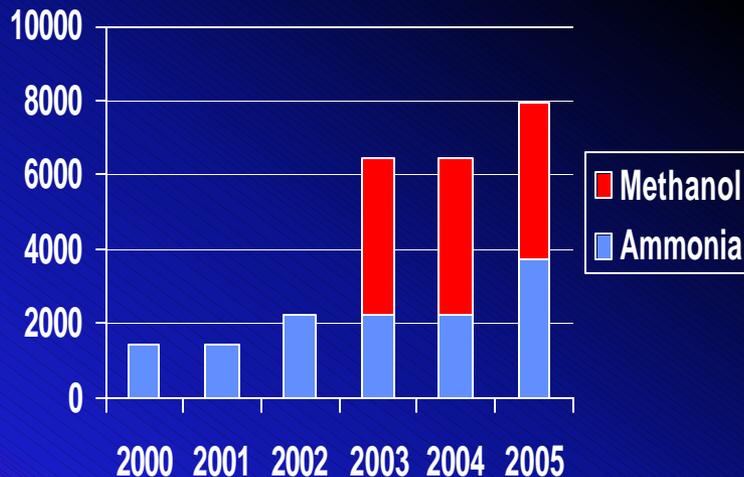


Industrial Gas Consumption (Bcfd) Versus Fuel Prices

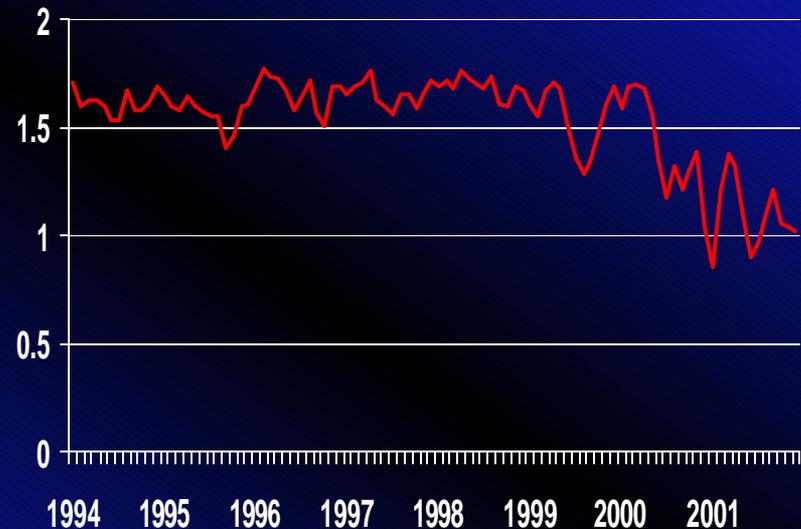


Ammonia and Methanol Capacity in Trinidad and Venezuela is increasing. Proposed capacity amounts to about 1.2 Bcfd of gas consumption. (20% of US Ammonia capacity has permanently closed in past three years).

**Million Metric Tons
Cumulative**



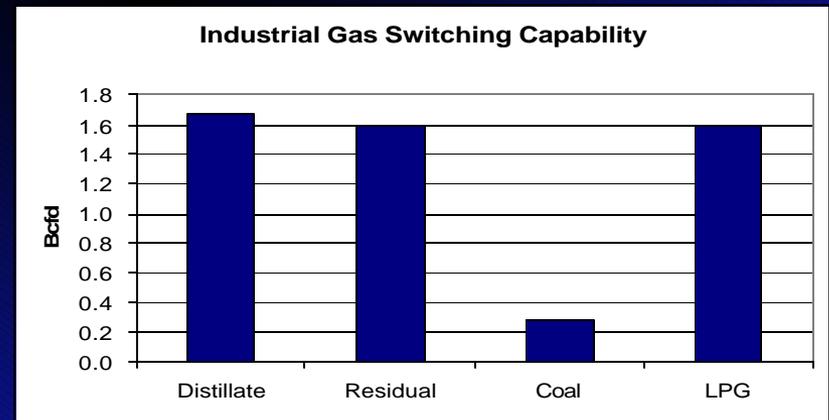
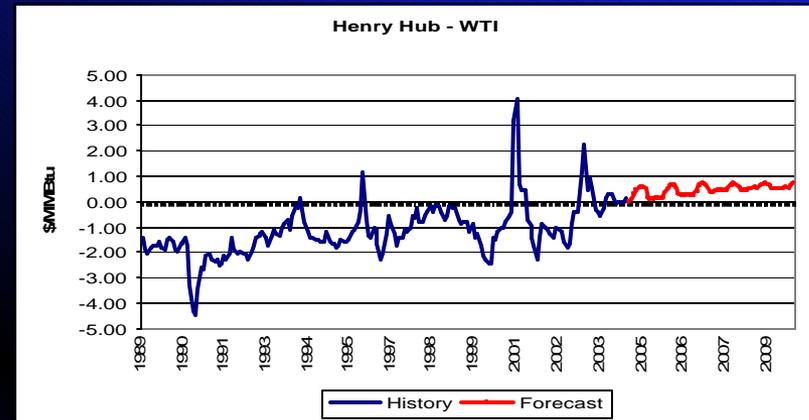
**US Anhydrous Ammonia
Production (Bcfd)**



One million metric tons is 150 MMcfd

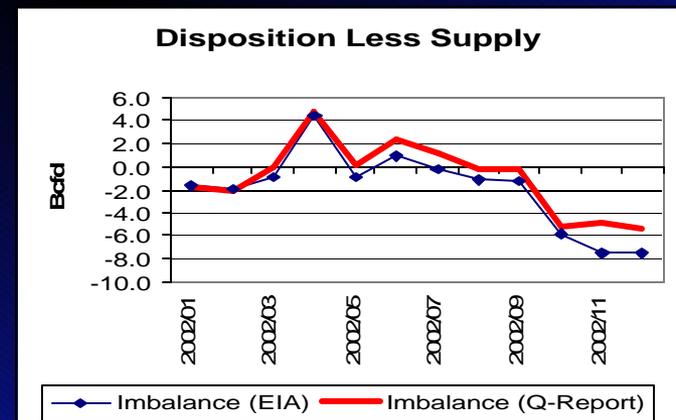
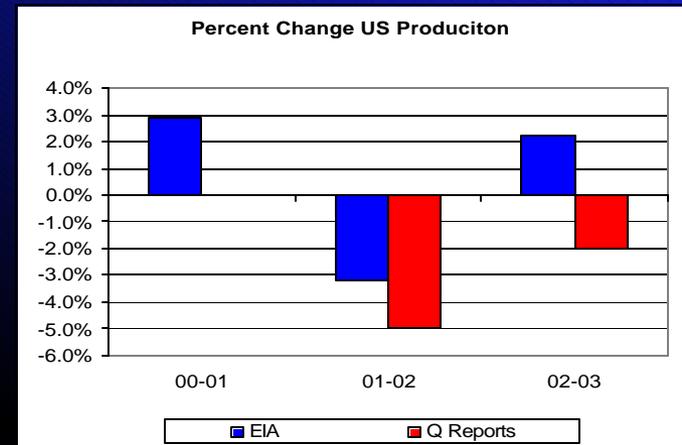
Historically gas has rarely traded at a premium to WTI. Are we entering a new era or is the forward market wrong?

- **Reported industrial sector fuel switching capability is substantial.**
- **The recent changes in weather adjusted storage injection data (4 Bcfd) suggests substantial fuel substitution occurs when Henry Hub prices exceeds WTI.**
- **Gas CCs will make the premium for switching in the power sector much higher. Residual fuel oil will have to be priced 30% to 40% below gas.**
- **Many steam units are being re-powered or shut-down.**



Is US gas production growing or declining? The truth has immense implications for the future of natural gas.

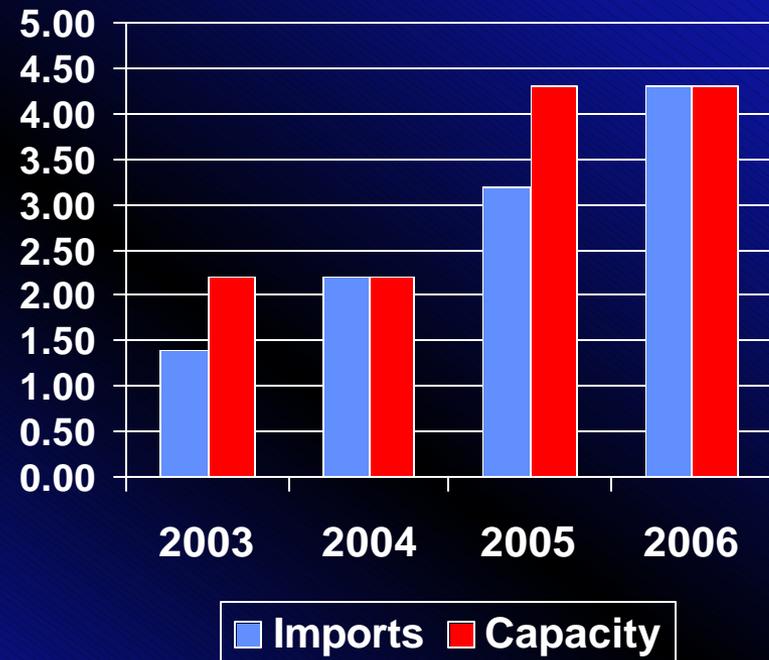
- EIA data indicates US production is growing in 2003. (Projected annual growth of 2.3%) .
- Quarterly report data of producers show US production declined by 3% during the first half of 2003 versus 2002. Quarterly report data is a biased sample. Small producers are growing.
- EIA data probably overstates production. The imbalances are large regardless of the production data.



Even with increased LNG imports, production will have to grow or prices will have to be high enough to cause substantial demand losses.

- **If demand grows about 1.5% per year, supply will have to increase by 1.1 Bcfd.**
- **Existing terminals could add approximately .75 Bcfd of supply during each the next three years.**
- **First new terminals are targeted for 2006 but will they be built on time?**
- **US production will have to grow by about .7% per year to maintain the supply/demand balance. This will be a challenge.**
- **The supply/demand balance has been loose this summer.**

**Potential LNG Imports
(Bcfd)**



While LNG has attractive economics, there will be significant hurdles to overcome

- **Will terminals overcome the citing problems?**
- **Can contractual terms be developed that make it possible to finance new projects in an open access market?**
 - LNG needs a high load factor – who will take the volume and price risk?
 - Given recent difficulties of major players, how will credit risk handled?
- **What role will technology play in altering the risk profile?**
 - ◆ Larger trains could lower the cost of LNG liquefaction by 20%.
 - ◆ New technologies for offloading LNG will change the economics of terminals.
 - ◆ Super tankers (250,000 cubic meters) will lower transportation cost by \$.20 per MMBtu or more from distant supply sources.

Be prepared for surprises. “History does not repeat itself but it sure does rhyme a lot”. – Mark Twain.

- **The evidence supports the “Conventional Wisdom”. The most likely outcome is a difficult transition to increased LNG supplies. This will cause substantial demand losses that will have major implications for the long term industry outlook.**
- **Strong economic growth, extreme weather, nuclear problems etc. could cause substantial price increases.**
- **However, there is a plausible argument that production will grow faster than expected and that demand will grow more slowly. Further lower oil prices will put pressure on gas prices. However, even under this scenario it is unlikely that Henry Hub prices will remain below \$3.50 for a prolonged time period.**
- **Long term market responses to high prices are likely to be in the “realm of the unfamiliar”.**

Negative numbers show SEER's error has been less than NYMEX on an average and absolute basis.

