

Worried About High N Prices?

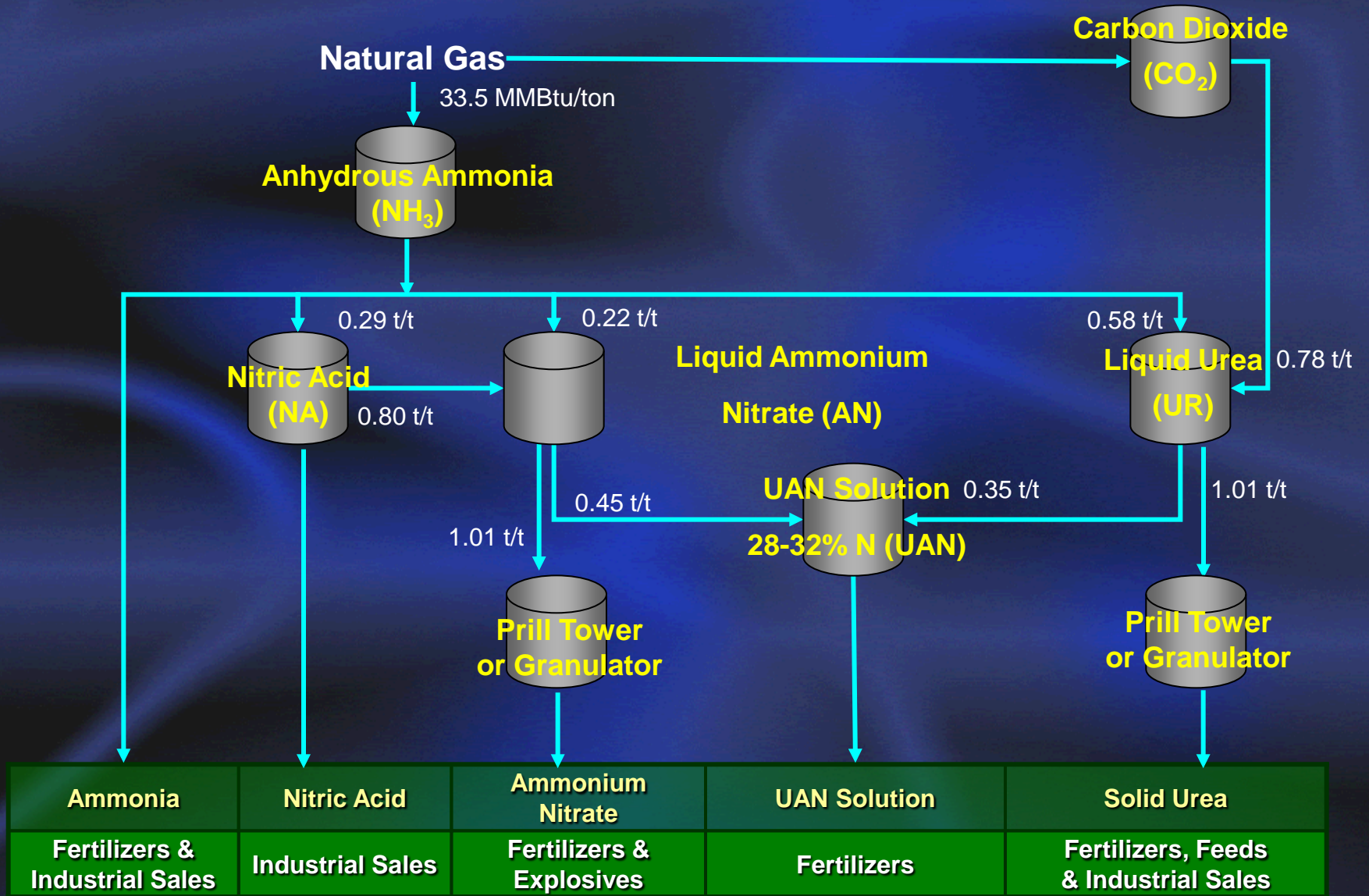
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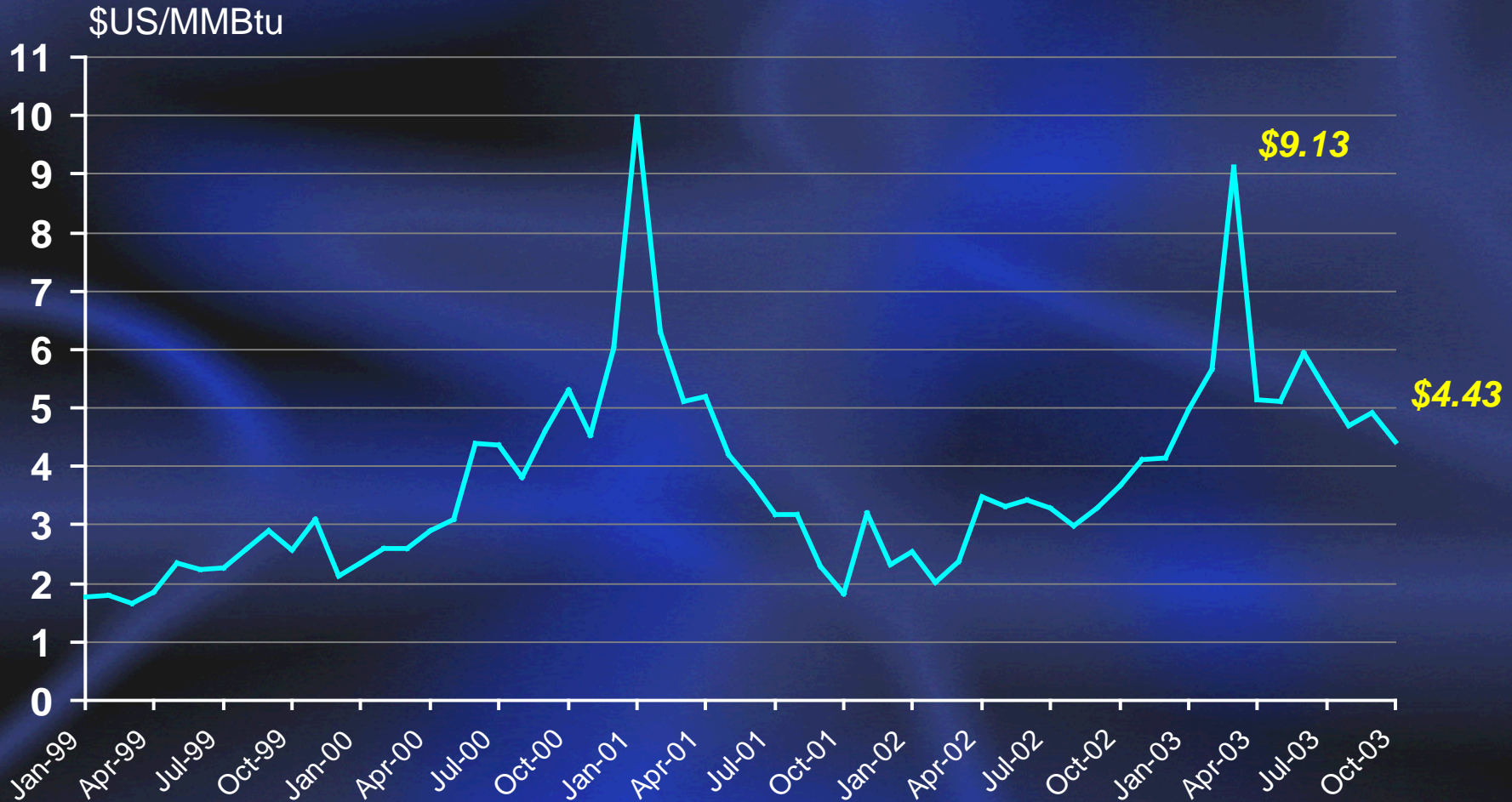
University of Wisconsin - Madison



Nitrogen - A Simplified Flow Diagram



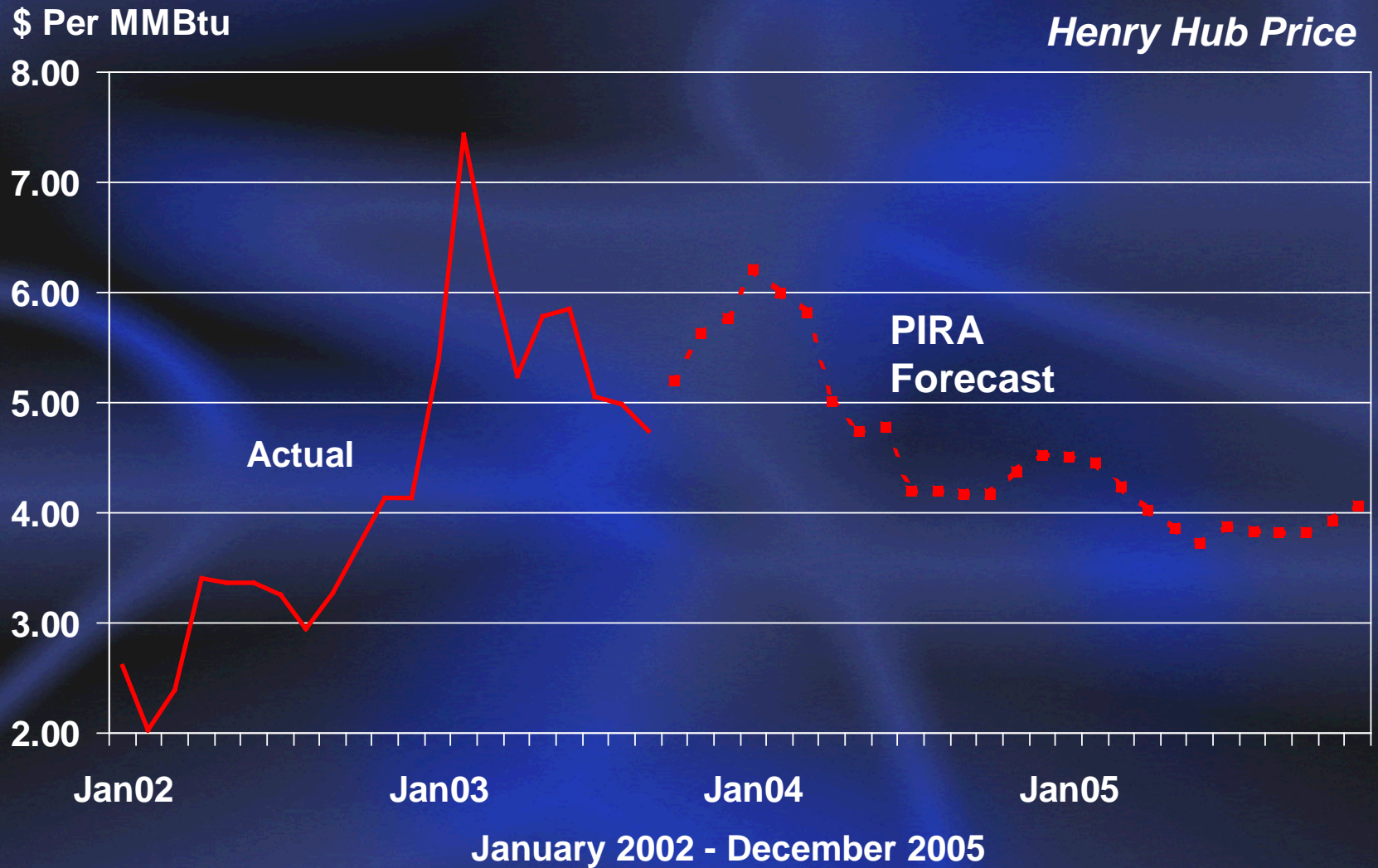
NYMEX Natural Gas Prices



Source: Monthly Closing gas prices

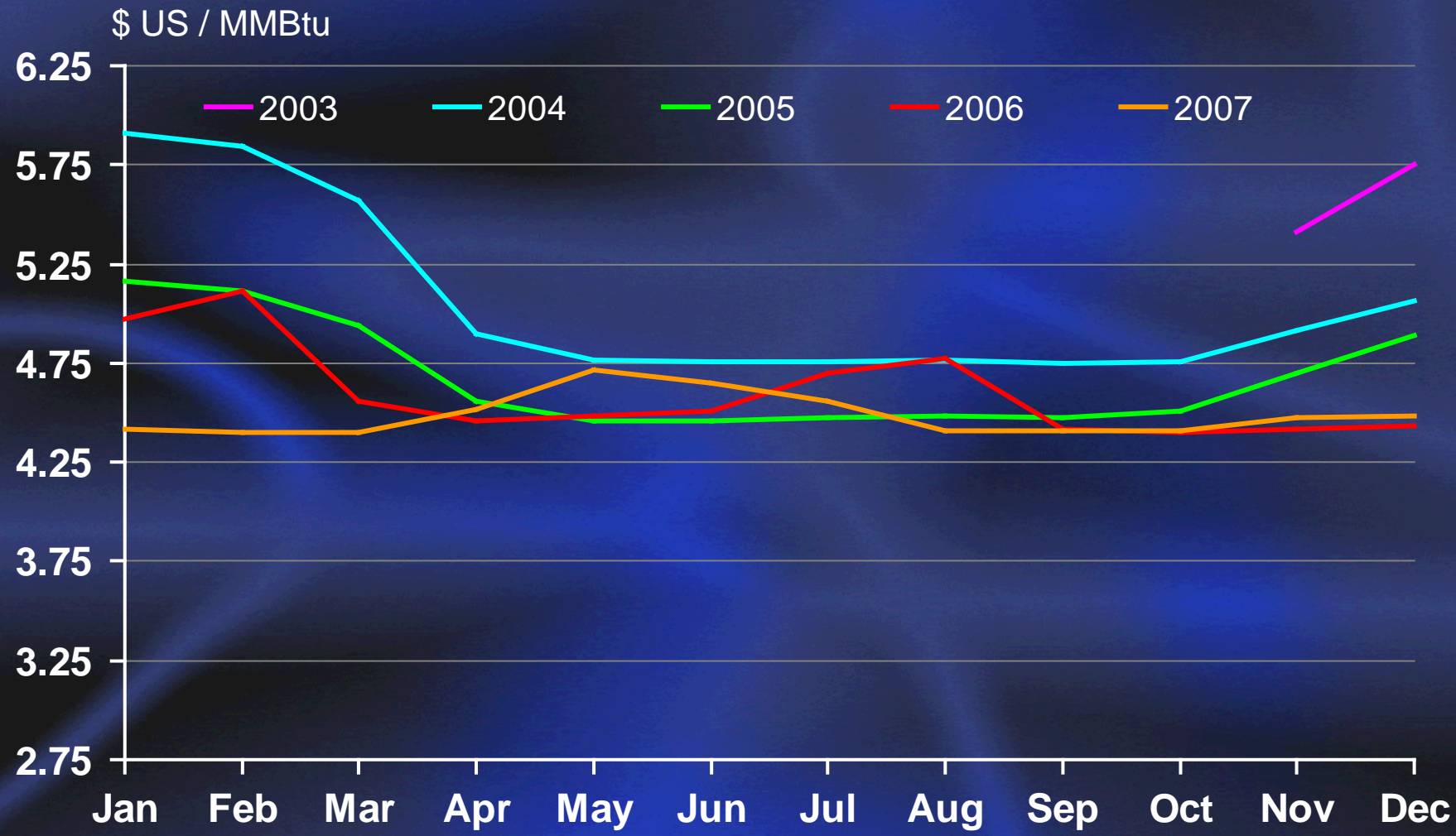


Natural Gas Prices



NYMEX US Natural Gas Futures Prices

October 16, 2003



Source: NYMEX

U.S. Natural Gas Demand

BCF/Day

	<u>2002</u>	<u>2003</u>	<u>Per Cent Change</u>
Res/Commercial	22.04	22.85	+3.7
Electric Generation	15.11	13.75	-9.0
Industrial	20.11	18.89	-6.1
Ammonia	1.14	0.90	-21.1
Misc.	<u>5.17</u>	<u>5.17</u>	<u>0.0</u>
Total	62.42	60.67	-2.8

1997-2003 Nitrogen Market Driving Factors

- High U.S. natural gas prices
- Record increase in world nitrogen capacity
- China's ban on urea imports
- Collapse of the Russian ruble (i.e. natural gas prices)

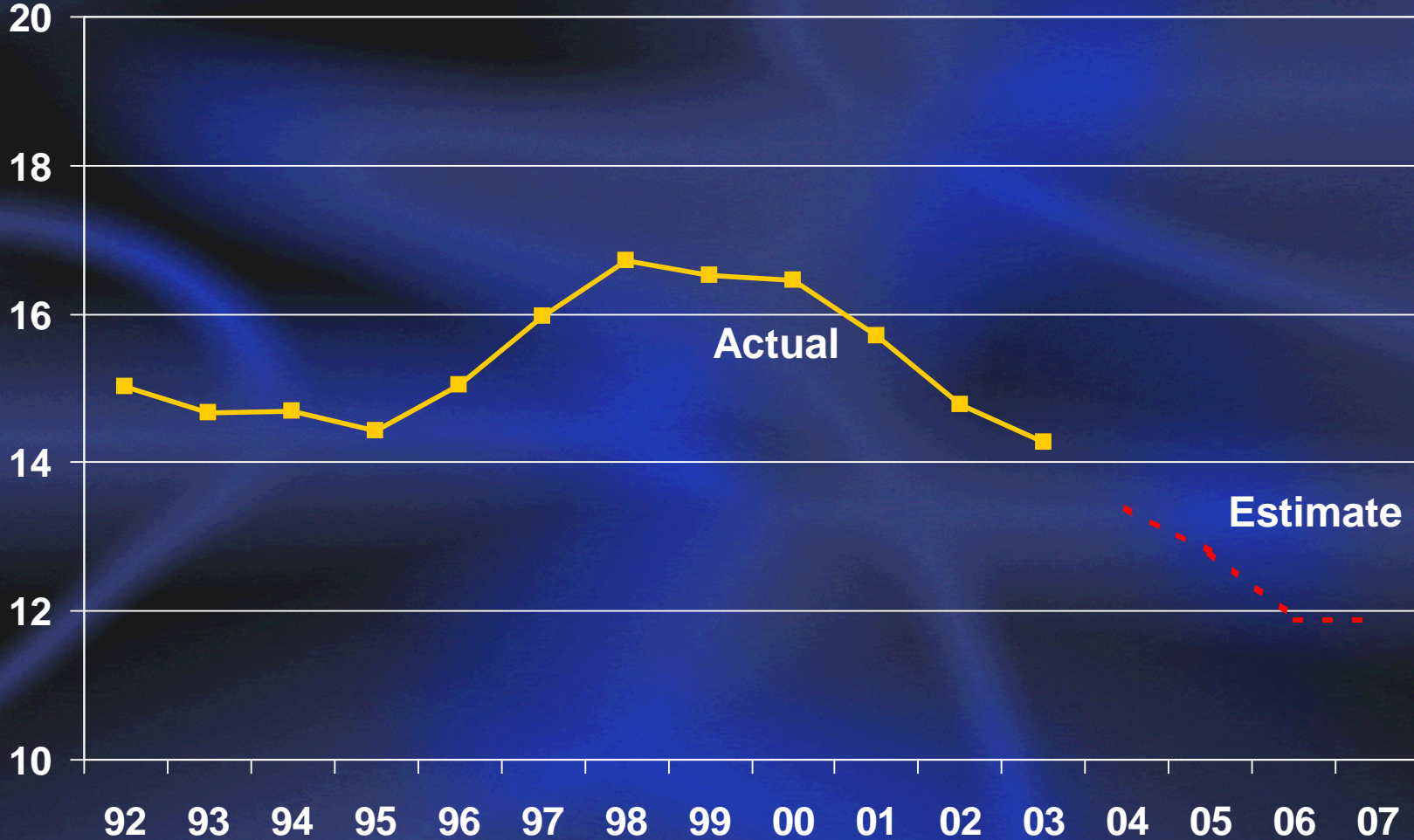


US Ammonia Production is About 25% Curtailed

- PotashCorp Geismar and Memphis still down
- Koch's Sterlington plants are still down
- Terra's Blytheville ammonia/urea brought back to 80% (was shut down on July 1)
- Miss Chem's Donaldsonville Ampro plant is still down
- Miss Chem's Donaldsonville Triad facility and Yazoo City 3 are up (Yazoo City 4 is still down).
- Dakota Gas' Beulah, ND plant down for \$3.5 million of repairs

U.S. Annual Nitrogen Production Capacity

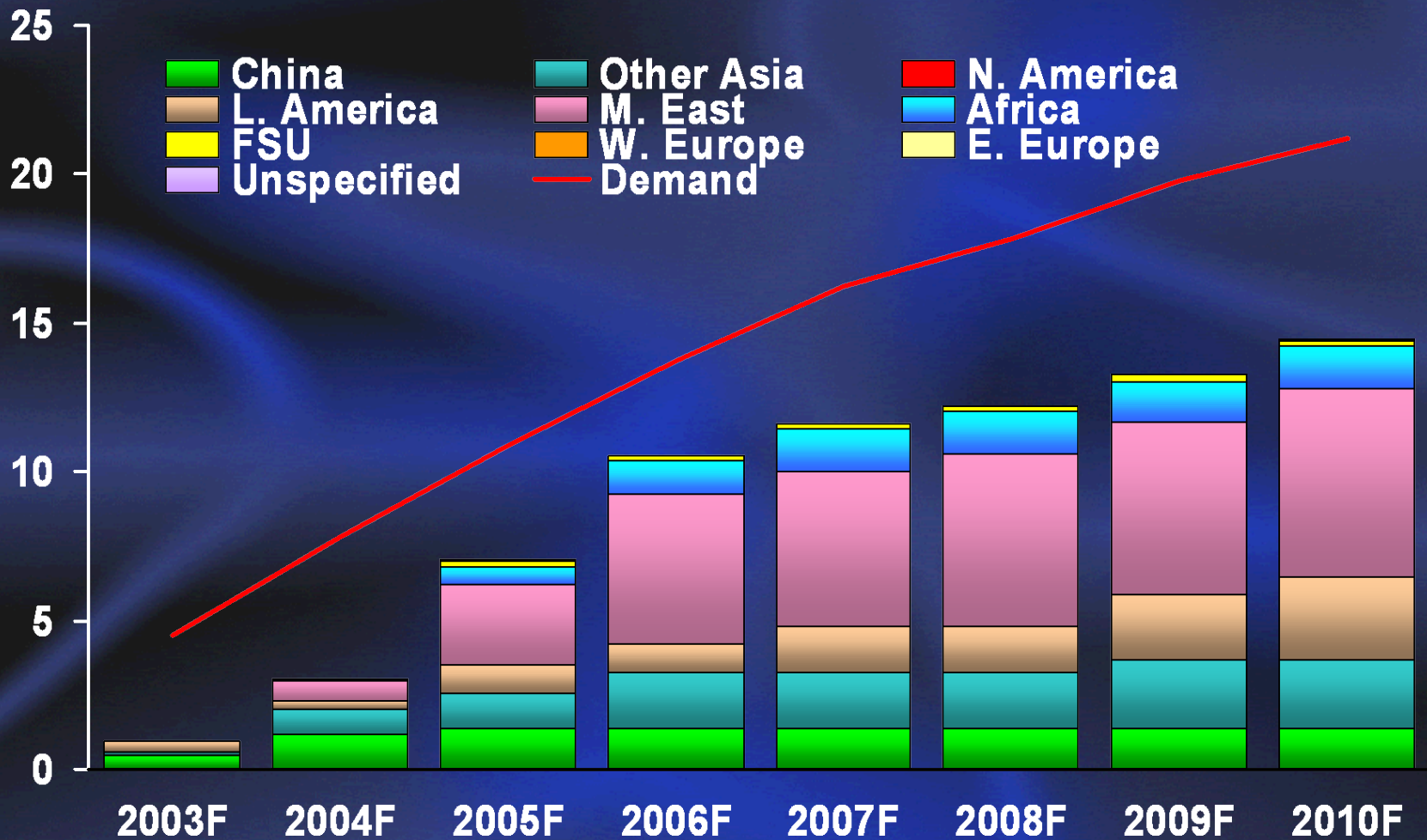
Million Tons



New Ammonia Capacity vs Demand

Cumulative Growth

Million Tonnes Product



Source: Fertecon

Several Projects uncertain

Longer-Term Outlook

U.S. natural gas prices are expected to moderate but remain above historical averages. This will likely result in:

- Increased reliance on imports
- Further consolidation of U.S. industry
 - Industrial ammonia suppliers along Gulf coast likely to close and rely on imports
 - Some urea capacity likely to close due to increased offshore competition

Tightening world balance and access to large domestic market, however, will allow the bulk of the industry to remain competitive

Y2K + 4 outlook

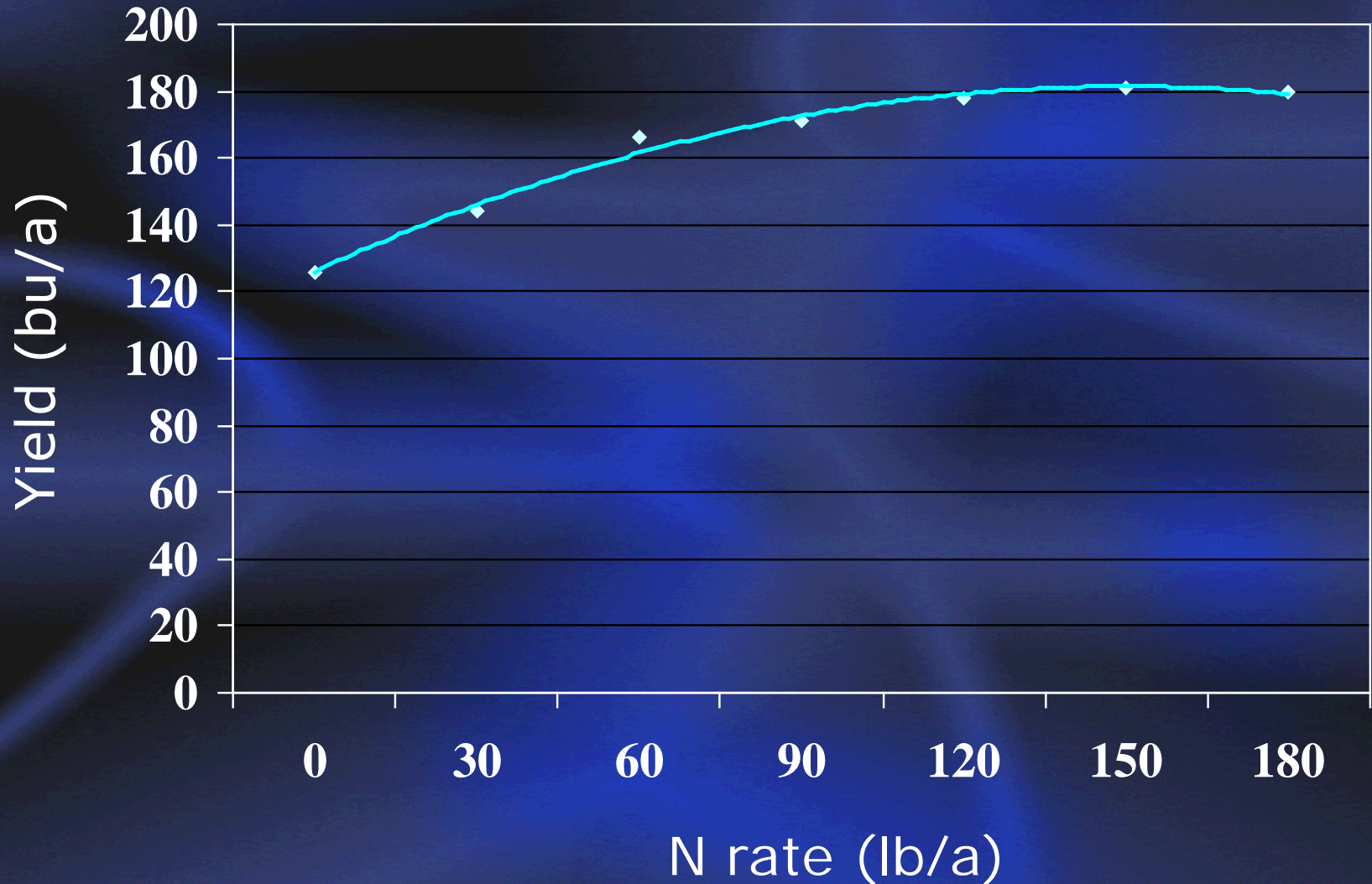
- Low commodity prices?
- Some inflation
- Large fertilizer price increases?

Possible strategies

- Cut inputs?
- Continue past practices?
- Evaluate and allocate for best returns



Corn grain yield response at Arlington 1990's



Economic Optimum N Rate (EONR)

Cost of last
increment of
N added = Value of
yield increase
produced



Calculation of economic optimum N rate for 1990's Arlington corn data

N rate	Actual Yield	Yield Increase	Increased Corn Value	Increased Fertilizer Cost	Increased Return
	----- bu/a -----	-----	-----	----- \$/a -----	-----
60	161.4	9.8	24.50	4.00	20.50
80	169.2	7.8	19.50	4.00	15.50
100	175.0	6.8	17.00	4.00	13.00
120	178.8	3.8	9.50	4.00	5.50
140	180.6	1.8	4.50	4.00	0.50
160	180.8	0.2	0.50	4.00	(3.50)
180	180.5	-0.3	(0.75)	4.00	(4.75)

Calculated at corn to N fertilizer price ratio of 12.5:1.
Check yield 126 bu/a

EONR only changes slightly with N cost or corn value changes

- Steep response curve
- Broad top plateau
- EONR not related to yield
- Needed 0.78 lb N/bu



Optimum N rates for northern Illinois sites 1999-2002

location	corn - corn			soybean - corn		
	optimum N rate	yield	lb N/bu	optimum N rate	yield	lb N*/bu
	lb/a	bu/a		lb/a	bu/a	
Perry	127	132	1.0	88	127	1.0
Urbana	187	161	1.2	163	183	1.1
Monmouth	173	174	1.0	127	202	0.8
DeKalb	206	159	1.3	126	172	1.0

*40 lb "soybean" credit added to calculate this ratio for corn following soybean.
Adapted from Nafzigen et al, 2003.

Principles of N fertilizer economies

1. EONR generally insensitive to value/price changes
2. EONR is best rate if supply and capital are unlimited = largest total return
3. "Other" N reduces EONR
4. First units applied provide biggest per unit returns
5. Management value increases in tough times

Beating Y2K + 4

- Use the EONR or slightly less
- Credit all N sources
- Guard against N losses
- Treat each management unit individually
- Grow the best possible crop



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