

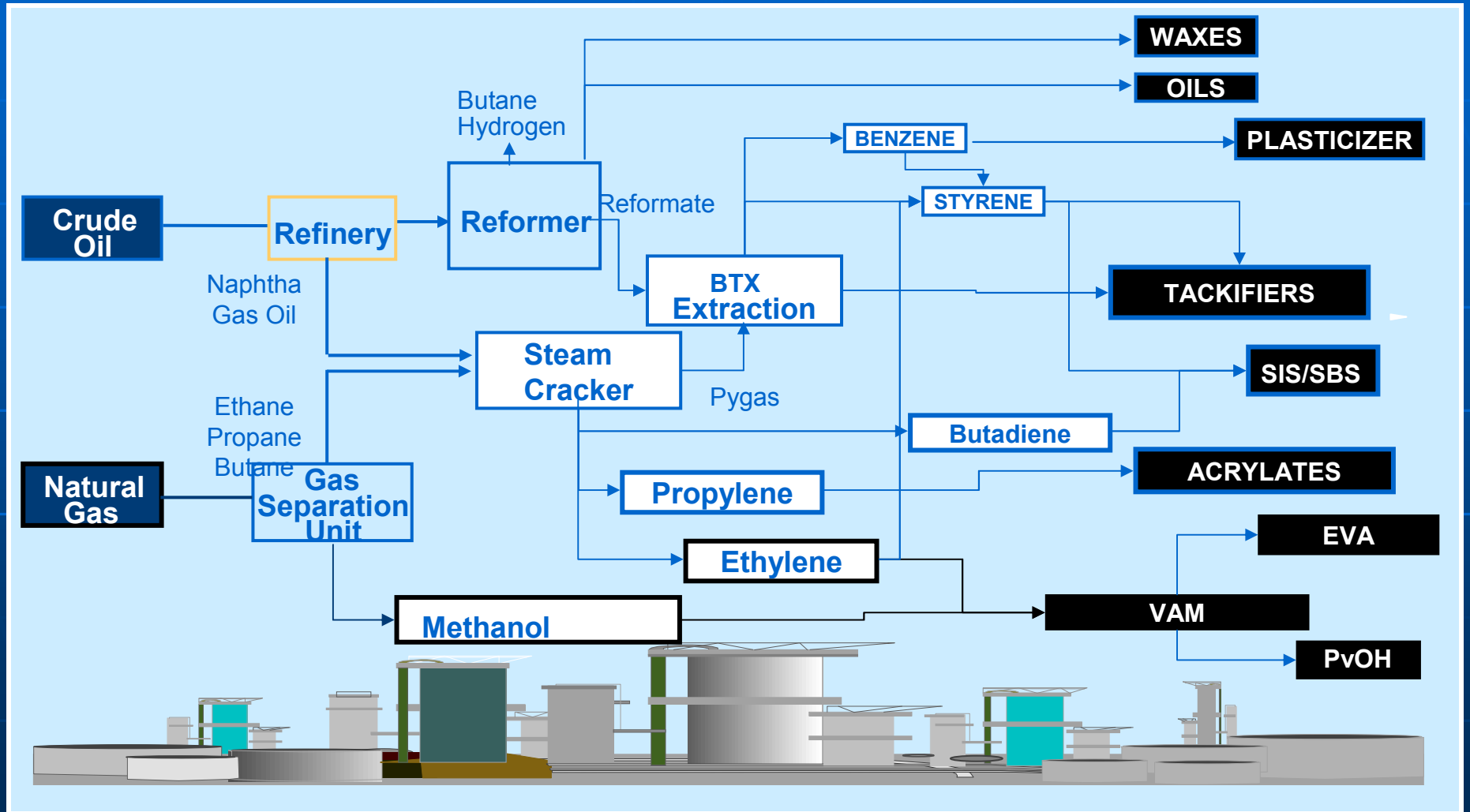
THE CHANGING WORLD OF RAW MATERIALS: IMPACT OF ADHESIVES AND COATINGS

Ingrid Brase

Presentation Outline

- Supply chain overview
- Factors impacting feedstock supply
 - Crude oil
 - Natural gas
- Supply chain
 - Raw material suppliers
 - Demand shifts
- Summary and Conclusions

SUPPLY CHAIN OVERVIEW

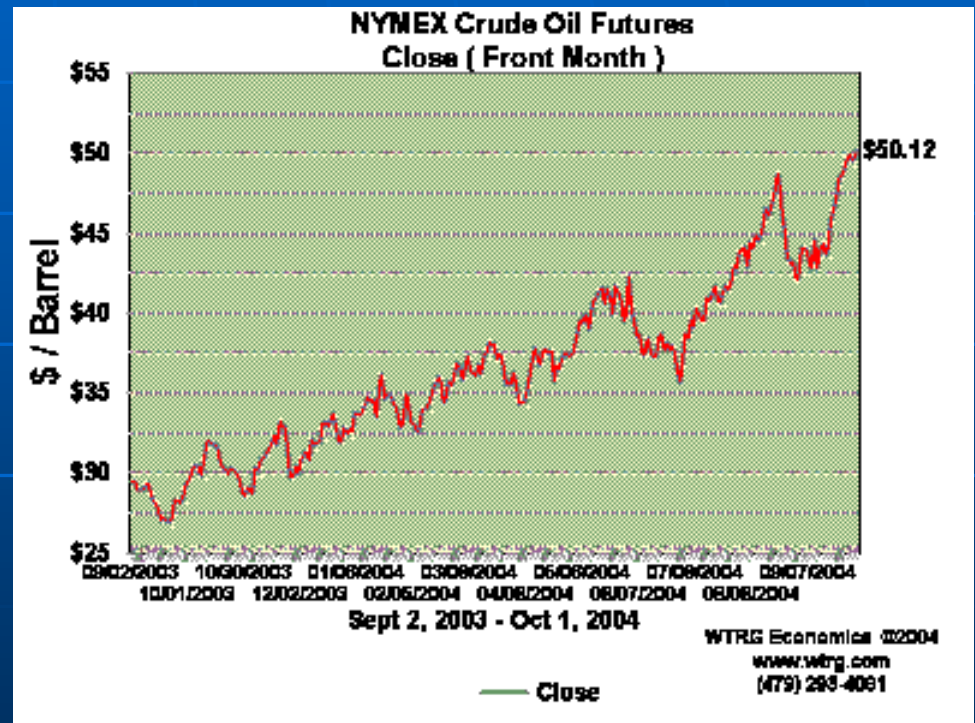


Feedstock Issues

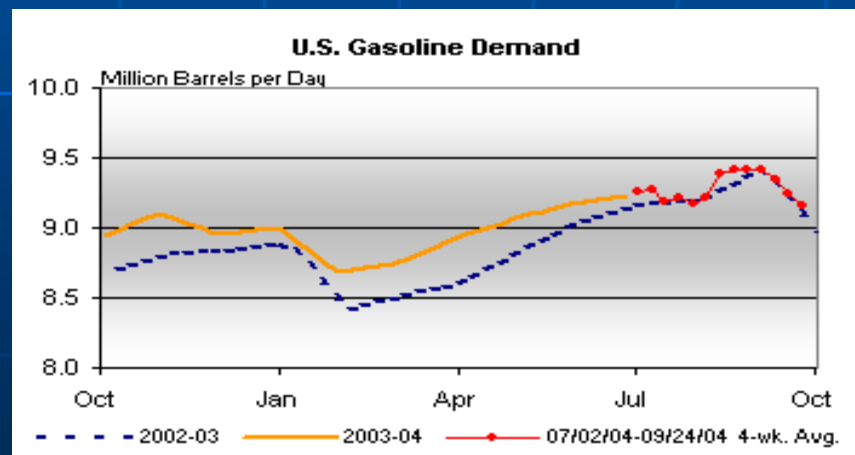
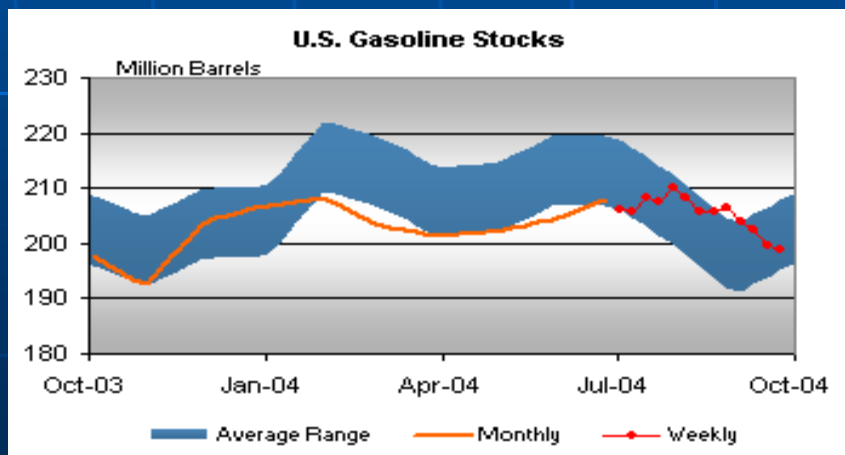
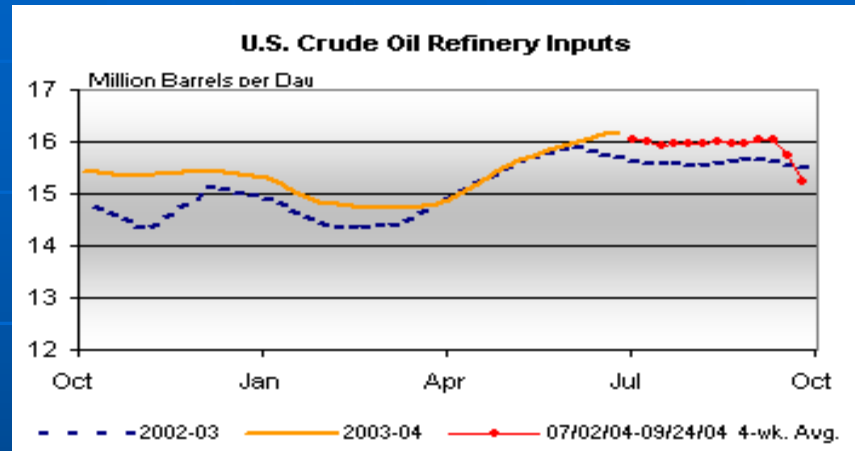
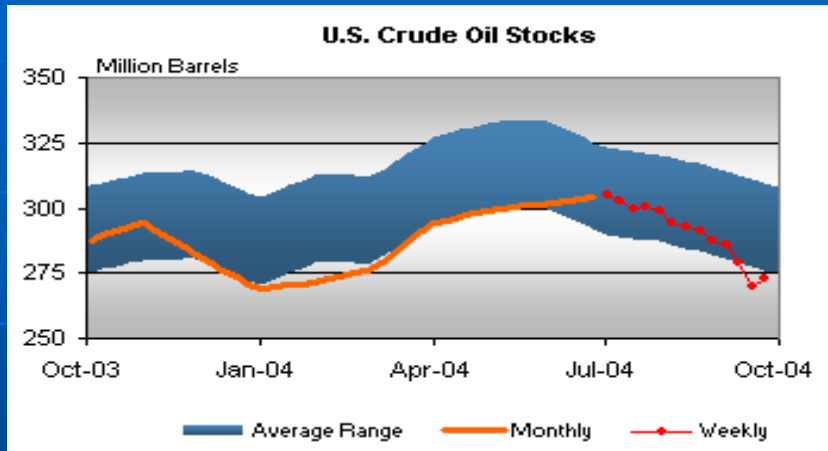
- Crude Oil
 - Futures trading at record highs
- Natural Gas
 - Uncertain oil supply driving pricing

CRUDE OIL

Instability in the Middle East and speculative money in the future market have driven oil futures from \$30 (Late '03) to \$45+ per barrel. Oil recently trading at new historic all time high of \$50!!



Oil – Gasoline Supply/ Demand



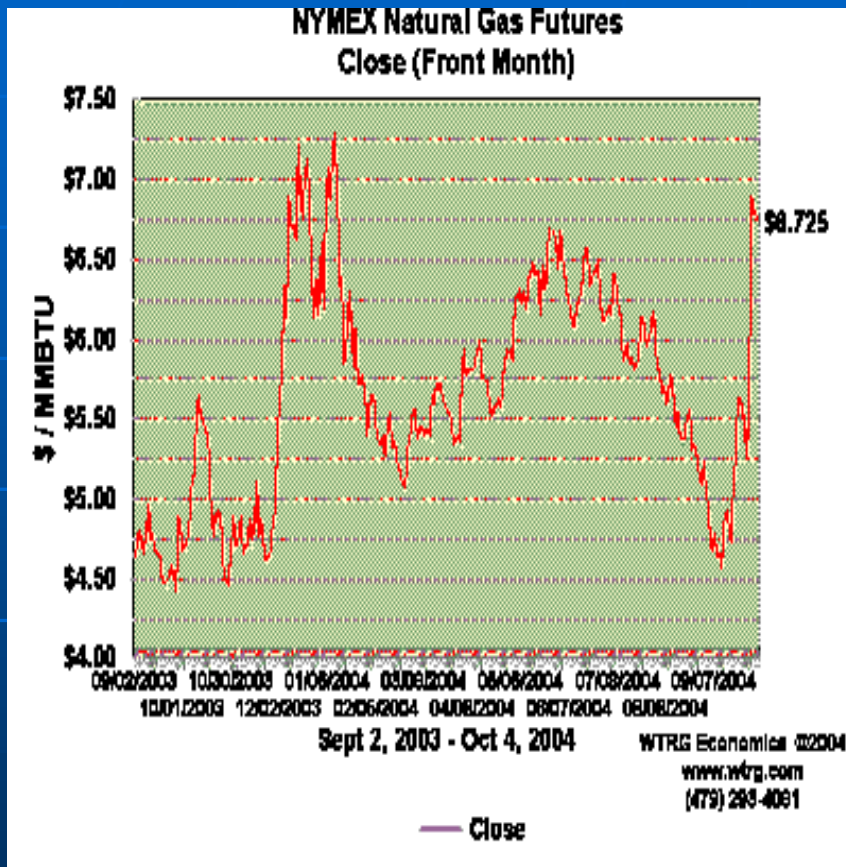
DEMAND INCREASING

- **Global demand 2004**
 - **2.4 Million barrels/day**
 - **3.2% increase vs. 2003**
- **Chinese demand 2004**
 - **Rose from 300,000 to 400,000 barrels/day**

NATURAL GAS

Natural gas fundamentals –

1. Gas futures were below \$5 per mMBTU in '03
2. Elevated oil prices are acting as a “floor” keeping natural gas prices at levels higher than justified by the aforementioned fundamentals
3. As is the case with OIL, speculative money also influences the natural gas market

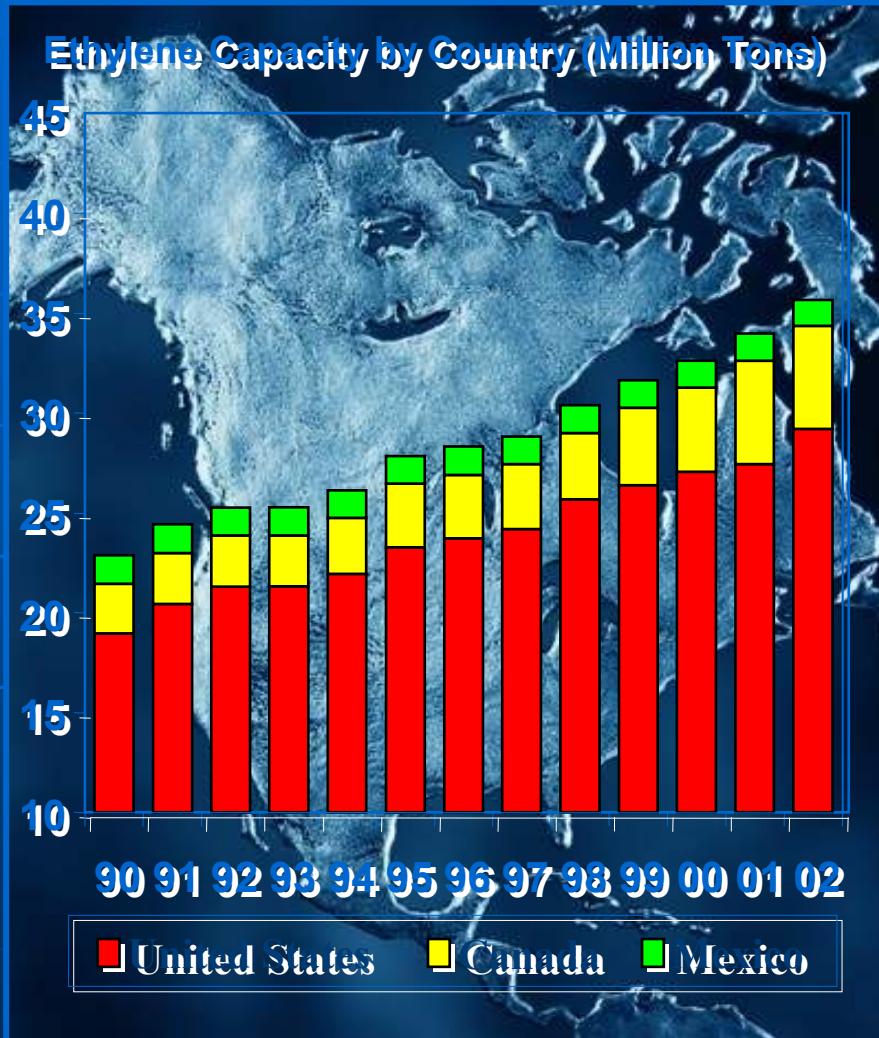


Natural Gas Is The Key

High natural gas prices relative to crude impacts regional competitive position

- International trade is no longer a major source of demand growth**
- Growing imports of non-durable goods threaten future demand growth**

Impact on supply chain for Adhesives & Coatings



- A decade of olefins and derivative investments were driven by an assumption of *readily available low cost natural gas*
 - Ethylene capacity grew at a rate of 1.0 MM tons per year
 - North America was a primary supplier of ethylene derivatives to the global market

U.S. Ethylene Units Identified As Shut Down, Idle, Or For Expansion – Sep 2003

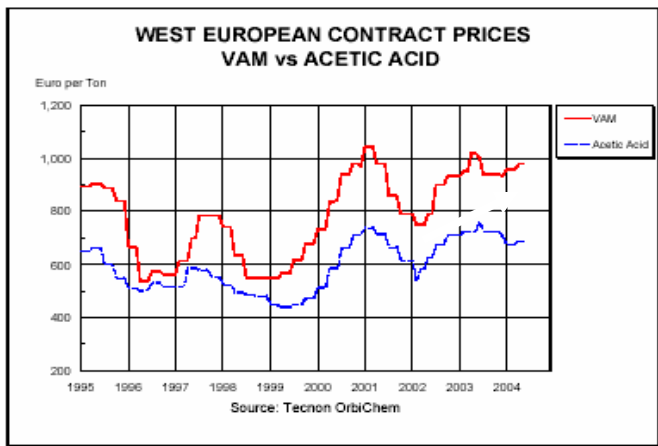
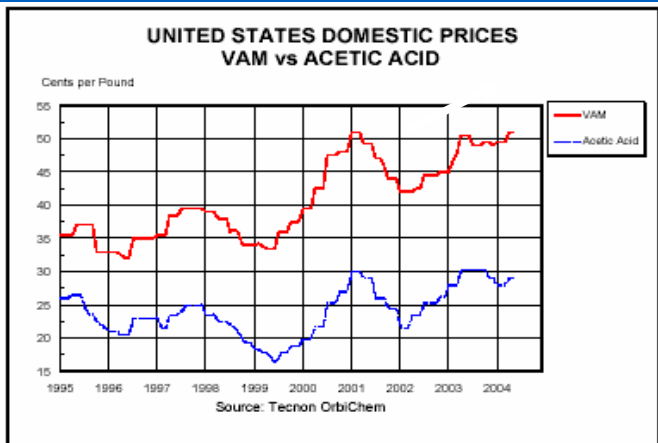
<u>Company</u>	<u>Location</u>	<u>Capacity (MMLbs)</u>	<u>Status</u>	<u>Comments</u>
ChevPhill	Sweeney, TX (#12)	400	Shutdown	2001
Dow	Texas City, TX	1500	Shutdown	June 2003
Dow	Seadrift, TX	910	Shutdown	Sept 2003
ChevPhill	Sweeney, TX (#22)	650	Idled	Idled - 2002
Equistar	Lake Charles, LA	800	Idled	Idled - 2001
Huntsman	Port Neches, TX	500	Idled	Idled - 2002
ExxonMobil	Houston, TX	755 (250)	Idled ?	Reduced Capacity
Shell	Deer Park, TX	1100	Expansion	Startup Feb-04
bp	Choc. Bayou, TX	650	Expansion	Startup Mid-05

Net Capacity Shut Down / Idled, 3.5 Billion Pounds

Monomer Suppliers

- **Low profitability of key producers**
- **Consolidation of suppliers**
- **Determination to increase prices**

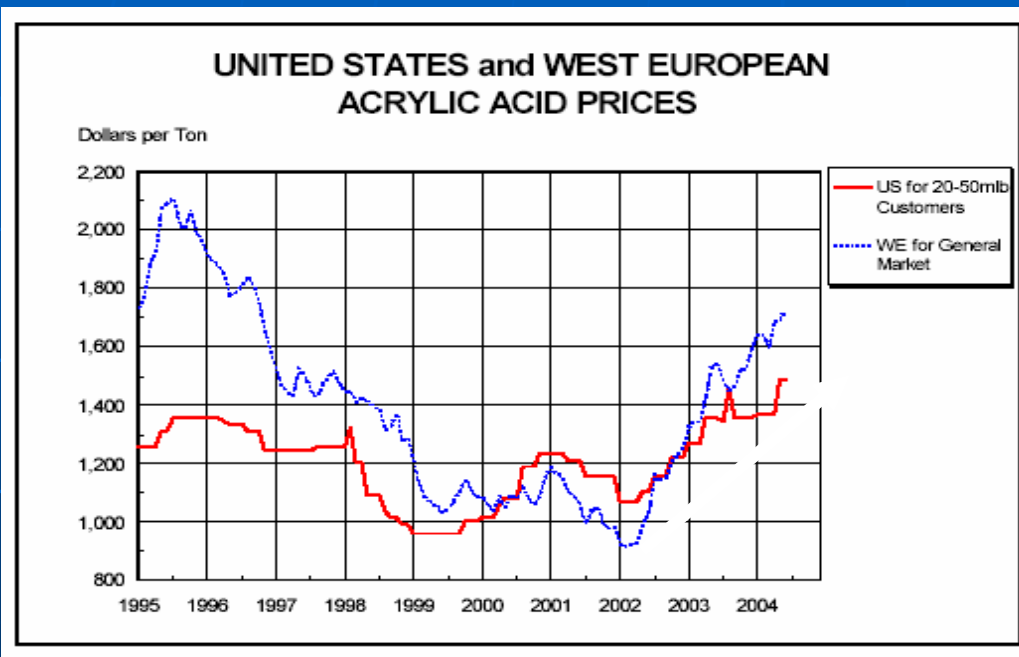
VAM – VINYL Acetate Monomer



1. In North America, VAM pricing for large buyers is determined by a formula – gas, MeOH & C2
2. As natural gas moves, so moves VAM
3. Smaller buyers price is determined by market dynamics – their price is much higher today than 12 months ago
4. Europe, as a result of BP's 'Force Majeure' sales allocation, consumed large amounts of US VAM in 1Q04

ACRYLIC MONOMERS

1. Monomer producers needed to improve margins
2. Capacity was reduced as new plants were delayed/cancelled & older plants shutdown
3. Propylene – the primary feedstock – prices escalated as oil prices rose
4. Demand & prices in China increased dramatically in 1Q04
5. The weak \$ makes exports into Europe much more economical for monomer producers
6. The outlook is bleak – demand growth will offset ALL capacity increases UNTIL margins improve



Shift in Demand

- Lower production costs shifting manufacture to Asia
- Rapidly growing Asian economy – greater demand for consumer goods
- Increasing demand for raw materials

US vs. China

Bag Cost Comparison Q1 2003

	<u>Direct Costs</u>	% Reduction in <u>China</u>	<u>% Cost Reduction</u>
1. Raw Materials (resin / color / ink)	50%	20-30%	10-15%
2. Labor	20%	60-75%	12-15%
3. Overhead	30%	30-40%	9-12%
Subtotal	100%		31-42%
4. Added freight, customs, insurance, logistics costs		6-12%	<u>6-12%</u>
Net Cost Reduction			<u>25-30%</u>

Above illustrates cost sensitivity typically found in plastic bag manufacturing.

Acrylic Monomer US Balance of Trade

ACRYLIC MONOMERS USA Import : Export Data IMPORTS

	1Q03	1Q04	Delta
GAA	4,418	212	(4,206)
Esters	19,081	15,661	(3,420)

EXPORTS

	1Q03	1Q04	Delta
GAA	9,119	18,836	(9,717)
Esters	69,428	85,321	(15,893)

NET DECREASE

Delta

GAA	(13,923)
Esters	(19,313)
TOTAL	(33,236)

All values in MTs

Source: Tecnon Orbichem 03June04 MA/AA Newsletter

Net Impact

- Rising raw material prices = rising adhesive and coating prices
 - Multiple increases
 - Rising cost of R & D to explore options
- Supply shortages
 - Increased use of order control/allocation
 - Some raws discontinued

Conclusions

- Demand will continue to rise for oil and gas
- Until new gas supplies are found and increased storage is created, US gas prices will remain high
- Costs for specific raw materials will remain volatile as suppliers seek the markets that will pay the best price
- Potential increases in raw material costs in the near term
- Global leverage needs to be used to get best pricing.

Future Outlook

- Fundamental shift in raw material supply chain
 - Run near capacity
 - Improve margins
 - Global vs. regional
- Driven by world politics and economy
 - Middle East – uncertainty
 - Asia – sustainability of growth

Summary

- Changes in supply chain will drive change in market structure
 - Profitability: need to drive price increases to consumer
 - Technology options: consider alternatives

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