Dr. Michelle Michot Foss, CEE, BEG-UT Austin

Long Run Crude Oil Price

Cushing, OK WTI Spot Price FOB (Dollars per Barrel)

Source: NYMEX
WSJ’s Oil Price History

Note: inflation adjusted high is daily close.

Current Inventories, Prices

Source: U.S. EIA
Five Factors Impacting Oil

• MTBE conversion to the “E word”

• Growth in actual demand
The Asian “Gulp”

As Asia’s share grows, the region has a bigger impact.

Thousands b/d

Percent of World

Source: BP Statistical Review of World Energy, 2005

©CEE, BEG-UT Austin, 7

Five Factors Impacting Oil

• MTBE conversion to the “E word”
• Growth in actual demand
• Artificial demand created by pricing policies
How “Artificial” Demand is Created

- Apparent demand is overstated (“artificial”)
- Price subsidies support “artificial” demand but discourage investment on supply side

RESULTS

Five Factors Impacting Oil

- MTBE conversion to the “E word”
- Growth in actual demand
- Artificial demand created by pricing policies
- Supply side problems
Who’s in Control?

- National companies only (Saudi Arabia, Kuwait, Mexico) 35%
- Limited access - National companies 22%
- Concession 21%
- Production sharing 12%
- Iraq 10%

1,032 billion barrels

Source: IEA Global Investment Survey 2003

Five Factors Impacting Oil

- MTBE conversion to the “E word”
- Growth in actual demand
- Artificial demand created by pricing policies
- Supply side problems
- Financial market speculation
Determining the Price of Oil

RESULT: Crude oil is overpriced

- Financial Speculation = $15-20
- “Artificial” demand = 10-20%
- Growth in demand
- *Political premium
- Finding and lifting cost (role of marginal producer)

* Oil for economic development

Epilogue, Post AIChE (through May 28)

- International Energy Agency (IEA) adjusted global demand downward based on demand side response in reaction to prices
- China announced it is trying to remove barriers that prevent price signals from flowing through its economy
- Emerging market funds suffered significant declines – combination of high commodity prices and inflation fears
- Gold prices increased significantly on inflation fears and US monetary policy reactions
Historical Natural Gas Prices

Source: USEIA

Long Run Oil, Nat Gas Prices

Source: NYMEX
Long Run Nat Gas Price

- Henry Hub Spot Monthly Average Gas Price ($/MMBTU)
- Inferred Natural Gas Price (6:1)

Source: NYMEX

Long Run, Actual Oil:Gas Price Ratio

Source: NYMEX
Natural Gas Storage

Total L48 Stocks: 4/14/06 1,761 Bcf vs. 1,336 Year Ago

Source: U.S. EIA

Current Natural Gas Prices

Recent pull from oil

Note: The West Texas Intermediate (WTI) crude oil price, in dollars per barrel, is converted to $/MMBtu using a conversion factor of 5.83 MMBtu per barrel. The dates marked by vertical lines are the NYMEX near-month contract settlement dates.

U.S. Gas Resource “Just in Time” Development: Reality is Perception

Source: U.S. EIA, Baker Hughes

North America Gas Production

Source: NPC Sec. 1818 Update, 2005
Impact of Prices, “Demand Adjustment”

- Process adjustments (including switching to distillate oil)
- Ethane-based ethylene plants start shutting down
- Power generation residual fuel oil switching
- Power generation distillate switching
- Methanol and ammonia plants start shutting down
- Boiler switching to residual fuel oil (without environmental restrictions)
- Boiler switching to residual fuel oil (with environmental restrictions)

Temporary or long term adjustment? Regional differentiation?

Strength in spite of historically high generation costs and excess capacity (air quality, etc)
Oil as Marginal Alternative for Power Generation

- Cushing, OK WTI Spot Price FOB (Dollars per Barrel)
- U.S. Gulf Coast No. 2 Heating Oil Spot Price FOB (Cents per Gallon)

Gas Peaks for Power Gen Remain Strong in Spite of Fuel Competition
High Cost Gas Attracts LNG

Proprietary Source

Dr. Michelle Michot Foss, CEE, BEG-UT Austin
Our energy/economy dilemma…

- In the U.S., we are an $11 trillion economy (2000$)
- We produce 28% of world economic output
- We use 25% of the world’s energy supply
- The U.S. is 43% of OECD energy and 33% of GDP
- The OECD nations use 59% of the world’s energy supply and are 83% of world GDP
- We are a nation of roughly 290 million
- OECD population is roughly 1.1 billion
- World population is roughly 5 billion
- For the rest of the world to catch up to OECD will mean at least 2-3X amount of energy currently used

...is an energy/economy opportunity
CO₂ Value Chain

CO₂ from field production
CO₂ from petrochem
CO₂ from power production

“Market” (includes bilateral contracts)

CO₂ mitigation:
• Enhanced oil recovery
• Industrial (petrochem, food processing, etc)
• Sequestration (brines, other)

Potential for competing processes

Cost of captured CO₂ vs. field production

“Finding” cost

Cost of transportation
• Recycling, ROW potential
• Revenues of existing ROW
• Storage to mitigate interruptible CO₂ supply
• Conversion
• Basis - processed vs. captured, distance from capture to injection
• Forward market for risk management
• Carbon credit system (if needed)
• Insurance, verification

Re-capture of CO₂ from refining point sources
• Development of “closed loop” for petroleum

Facilitating Commercial Frameworks (policy, regulatory, financial)