ASPHALT SUPPLY IN A VOLATILE OIL WORLD

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Issues to be Discussed

- Crude Oil Supply
- Crude Oil Pricing
- Refining Capacity
- Products Supply
- Products Pricing
- Future of the Industry
CRUDE OIL SUPPLY

A WORLD LOOK
Crude Oil Supply (2006)

World Crude Oil Production
Millions of Barrels Per Day

- FSU/E. Europe: 12.6
- W. Europe: 6.3
- Latin America: 10.6
- US/Canada: 8.4
- Africa: 9.3
- Asia/Pacific: 11.3
- Middle East: 25.5

Total: 84MMB/D

World Proven Crude Oil Reserves
Billions of Barrels

- FSU/E. Europe: 79
- W. Europe: 116
- Latin America: 743
- US/Canada: 201
- Africa: 36
- Asia/Pacific: 102
- Middle East: 15

Total: 1,292 BB
Crude Oil Demand

- Demand has risen by 7 MMBD (9%) since 2002.
- Demand nearly 85 MMBD or 98% of world daily delivery capacity.
- Vulnerable to supply disruptions caused by storms, accidents, breakdowns, political unrest.
- 65% of proven reserves within national oil companies and 16% held by Russia.
- Traditional companies have full access to 7% of reserves and 12% through partners (if allowed).
WTI Price by Year

![WTI Price by Year Graph](graph.png)
WTI Price by Quarter
REFINING CAPACITY
Topping Refinery

CRUDE OIL

DU

650-

GASES

NAPHTHA
AND

GASOIL
FEEDSTOCKS

650+

“Tea Pot”
Not A Refinery
Really Just A
Crude
Distiller

6OIL or
ASPHALT
(if heavy crude)
Simple Refinery

CRUDE OIL

DU

650-

GASES

NHT

CRU

KHT

DHT

650+

TO MOGAS

JET/KERO

TO NO.2

60IL or ASPHALT
(if heavy crude)

“Hydroskimming” Refinery, many exist all over the world
CCU/HCU/Coker - “Very Complex” Refinery
Refinery Yield (% of Crude Intake)

- TOPPING RFY
- SIMPLE RFY
- CCU RFY
- COKER RFY

Legend:
- OTHER
- MOGAS
- JET
- LT NAPH
- HVY NAPH
- GAS OIL
- NO.2
- NO6 or Asphalt
- COKE
U. S. Refining Capacity

Last New U. S. Refinery Built in 1976

Source: Oil & Gas Journal
Total U.S. Capacity Utilization

- Demand growth has outpaced capacity expansion
- Investment focused on clean fuels
- Insufficient global capacity to process more difficult crudes

Source: U.S. Department of Energy
1 Percent utilization defined as: gross input to refineries /operable capacity.
U. S. Asphalt Refining Capacity

Production Range: 600 B/D to 60,000 B/D
Source: Oil & Gas Journal
U. S. Refining Coking Capacity

- # Refineries w/Cokers
- Coke Production, MT/D
U.S. Coker Construction Projects 2005 - 2011

- Engineering, Procurement & Const. Phase
  - Total Refineries: 245 MB per day
  - Asphalt Refineries: 135 MB per day

- Planning or Early Engineering Phase
  - Total Refineries: 176 MB per day
  - Asphalt Refineries: 121 MB per day

* Source: Argus Asphalt Report
Worldwide Coker Additions

- Refinery Coker Additions – 1,570M Barrels
- Crude Upgraders - 1,214M
- Total Resid Destruction - 2,784M*

*Reduces world asphalt and #6 oil supply

Source – Argus Asphalt Report
PRODUCTS
SUPPLY/DEMAND
Supply Source for U. S. Demand

Graph showing the supply source for U. S. demand from 1995 to 2005. The graph includes categories for Domestic Crude Production, Imported Crude, and Imported Products.
Historical Asphalt Supply/Demand
Millions Tons - Liquid

Source: Oil & Gas Journal
PRODUCTS PRICING
Prices by Quarter

WTI

Gasoline
Asphalt vs Coker Feed Value

![Graph showing asphalt vs coker feed value with data points from January 2002 to September 2006.

- WTI
- P&P MC Avg
- Gulf coast coker value]
Light-Heavy Product Price Spread Drives Refinery Investment Cycle

1995-2000
Six New Cokers
Economic Analysis

**Gasoline/Diesel Pricing**
- Jan., 06 Price: $70.00/BBL
- Less Distribution: 6.30/BBL
- Net to Refinery: $63.70/BBL

**Kansas Asphalt Pricing**
- 12/05 YTD: $32.94/BBL*
  - ($35/Ton): 6.25/BBL
- Lost Value: $37.01/BBL

* Source – Poten & Partners
Coking Economics

- 30,000 BBLs/Day Asphalt Production
- X 70% Gasoil Production

- 21,000 BBLs Gasoil for Gasoline/Diesel
  - X $37.01/BBL Gasoline/Diesel diff. To Asphalt

- $771,210 per day added margin

- $1 Billion / $771,210 = 1,297 days (3.55 years payoff)
FUTURE OF THE INDUSTRY
Current Realities

- Crude production at maximum rates based on exiting infrastructure
- U.S. refining running at maximum capacity
- No new refineries in the near term
- Existing refinery expansions must fill gap
- Increase crude capacity and conversion capabilities to meet light product demand
- Asphalt must keep pace with conversion feed values to encourage production
- Asphalt not as politically charged as fuels
Factors Influencing Asphalt Price

- Absolute price of crude (WTI benchmark)
- Light/Heavy crude price differential
- Light product “crack spread”
- Coking economics
- Impact of clean fuels (sweet crudes)
- Heavy crude availability (Venezuela)
- Transportation costs
- Supply/Demand
Future For Asphalt

- More heavy crude being run (availability and price)
- Clean fuels capital behind refiners, up-graders next?
- Asphalt is more expensive in a $60.00+ crude world
- Asphalt has to trend faster with crude oil prices
- Asphalt has to be more competitive with light products
- Transportation costs rising – Rail, Barge, Terminalling
- Refiners less willing to shoulder price risk
- Many states implementing asphalt price indexes
QUESTIONS