Nearing $100, but why?

+$80 oil caused by OPEC, low stocks, refining, spare capacity or funds?
Nearing inflation-adjusted highs

Source: IEA Oil Market Report
Stock price models broke down in 2003

Modeling the oil price

Speculation or bad modeling?
No single cause of high prices

- Funds
- Product supply
- Demand growth
- Supply growth
- Investment costs
- Marginal cost of supply
- Geopolitics
- Crude grade availability
- OPEC policy
- Refining capacity
- Crude and product stocks
- Upstream capacity
- Structure of demand growth
- Environmental regulations
- Service sector
  - Engineering
  - Equipment
  - Commodities
- Oil availability
- OPEC policy
- Crude and product stocks
OECD industry stocks down 29.5 mb in Aug, maybe off another 20.5 mb in Sep

- Falls have been predominantly in crude over past few months
- Significant regional variations
- Counter-seasonal 3Q stockdraw, 4Q 400-700kb/d

Source: IEA Oil Market Report
Forward demand cover falls below average

- OECD forward demand cover fell to 52.8 days in September, below five-year average
- European and Pacific cover is particularly low
...pushing structure towards backwardation

Source: IEA Oil Market Report
Demand growth seen in 2008, despite high oil prices

- Growth seen in most major regions
- Non-OECD: Asia demand accounts for 45%, and the Middle East for 18%
Price effects starting to show
Europe dominated by weather bounce back

OECD Europe: Demand by Driver, Y-o-Y Chg

- Transportation
- Power Generation
- Heating
- Other

Total Demand

Monthly Additions to German Consumer Heating Oil Stocks

German End User Heating Oil Stocks
Tanks % full

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Transportation growth seen slowing - but needs sustained high prices

OECD NA: Demand by Driver, Y-o-Y Chg

OECD: Demand by Driver, Y-o-Y Chg

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Oil expenditures still not as high as 1980s
Circular pressures

- Lack of structural changes in response to high prices
  - Still plenty of SUVs in the car pool
- Behavioural changes shift demand at the margin
  - Driving the small car to the shops
  - Public transport more a convenience than cost issue
- Price response in power generation related to long term price and efficiency benefits, but may not last
  - Tighter gas markets
  - Can’t go below zero
- Short-term demand shifts or other changes?
  - Refinery maintenance
  - Secondary and tertiary stock draws
- Where demand has been curbed by behavioural changes in response to high prices, it has the potential to bounce back
Economic cycle key for outcome
Institutions not good at forecasting recessions

- Subprime
- Banks and Funds Hit
- More Expensive Credit?
- Job Cuts?
- Lower Consumer Spending?
- Weaker Oil Demand?
- MEDIUMTERM
- Oil Market Report

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Demand more sensitive to growth than prices

- $50 rise to start to dent US gasoline growth
- Fuel oil switching requires heavy long-term investment
Demand growth ≠ data uncertainty


thousand barrels per day

- OECD: demand sustained by North America, which will represent 53% of the total by 2012
- Non-OECD: Asia demand will account for 47% and the Middle East for 19% of the total
Transport demand dominates growth. Ideal market for producers.

- **Geographical shift**: Demand growth will come from non-OECD countries - mostly China and the Middle East.
- **Usage shift**: Growth will be fuelled by transportation fuels.
  - Subsidies in non-OECD countries
  - Dieselisation trend, notably in Europe
  - Limited role for biofuels - less than 2% of demand by 2012.
Spare production capacity one factor among many in shaping oil prices

Inventory & refining flexibility also important

Lack of refinery upgrading capacity further diminishes utility of this sub-2 mb/d buffer
Cost inflation dampens investment impact
(long-term futures prices remain above $80)

- Tight service sector causes further cost inflation
- Call option for speculators/OPEC?
- Marginal cost of non-OPEC production influential when OPEC producing flat out
- When spare capacity exists, price OPEC are willing to keep spare capacity off the market is the key

Source: Resources to Reserve, IEA, 2005
Rising costs hamper projects

- Credit squeeze adds further difficulty to project finance
- Fixed price tenders increase risks for contractors
- Uncertainty reflected in bids, pushing costs up further
Engineering and Contractor markets stretched

- Rising costs pressure project timeframes
- Delays in awarding contracts
- Increased order times delay projects further
Despite constraints we still have growth
Key non-OPEC supply increments

Source: IEA Oil Market Report 2007
Geopolitical risks persist for key OPEC producers

- Iraq plans to increase export capacity
- Security risks still high
- But Sep/Oct surge in Ceyhan liftings

550 kb/d of Nigeria outages
- 2008 recovery possible
- Political and security situation remain uncertain
- Window for repairs short

Source: IEA Oil Market Report

Estimated Iraqi Supply 2007

<table>
<thead>
<tr>
<th>Exports via:</th>
<th>Current Effective</th>
<th>Mid-Term Potential</th>
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<tr>
<td>Ceyhan</td>
<td>&lt;100</td>
<td>500</td>
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<tr>
<td>Basrah</td>
<td>1800</td>
<td>2000</td>
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<tr>
<td>Syria</td>
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<td>300</td>
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<tr>
<td>Jordan</td>
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<tr>
<td>Basrah-Abadan</td>
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<td>200</td>
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<tr>
<td>Domestic Crude Use</td>
<td>500</td>
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</tbody>
</table>

Oil Market Report

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Supply-side response limited so far

- Adjusted call on OPEC/stock chg: +5 mb/d by 2012
- OPEC spare capacity to fall from 2.5 ->1.5 mb/d
Medium-term non-OPEC supply growth still there

- 68% of net non-OPEC growth comes from, albeit slowing, FSU
  Brazil deepwater, Canadian oilsands, GOM & global biofuels also rise
- Mexico & North Sea see major decline

Total non-OPEC Supply Growth
3270 kb/d (1.4%pa) 1997-2002
2755 kb/d (1.1%pa) 2002-2007
2585 kb/d (1.0%pa) 2007-2012

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Above-ground risks exceed below-ground risks - currently

- Net impact is the same (lower output & higher costs)...

- ...but at least some above ground risks are reversible?

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Non-OPEC net decline averages 4.6% pa
a hugely important supply variable

- Globally, 3 mb/d needs to be added to capacity just to keep production steady
- Sensitivity on non-OPEC side is the difference between an OPEC call of 31, 37 or 42 mb/d in 2012
No imminent resource scarcity: but supply response to high prices is slow

Company planning prices rising...
...partly reflecting higher cost base

But access constraints, industry bottlenecks, financial factors & competing calls on capital...
...curbing price elasticity of supply

Delays are endemic
Global refining industry - substantial growth

Crude distillation capacity investment
thousand barrels per day

- Middle East, China & Other Asia are 2/3 of the total increase
- OECD 1.8 mb/d, of which North America 1.3 mb./d
- 274 kb/d linked to new upgrading units in Spain, Greece & Hungary
Strategic investment drives growth

CDU capacity greater than demand growth

- Growth is largely reliant on a few key countries
- Cost pressures continue to affect investment economics and timing
- Large proportion of projects vulnerable to margin cycle and future returns
Upgrading investment adds flexibility

- Global refining system will benefit from addition of further upgrading capacity
- This will boost heavy sour crude processing ability
- Expansion focused on the addition of hydrocracking and coking capacity
Conclusion

- Prices may be starting to impact OECD transportation demand
  - But expenditure not back to the highs of the 1980s
  - Economic growth to continue to drive demand, particularly in Asia and Middle East

- Demand-side data uncertainties
  - Lack of data reporting from key countries
    - JODI making strong inroads
    - Still lack of stock data
  - Medium-term projections show lack of cyclical activity
  - Price
    - Policy shifts, geopolitics

- Lack of supply side response (so far) to high oil prices
  - Cost inflation, service sector constraints, access, lagged company planning prices

- Supply-side data uncertainties
  - Lack of internationally adopted standards for reporting/classification
  - "Political" reporting of reserve and production levels
  - Lack of field-by-field data for key producing countries
  - Segregation and conversion factors
  - Biofuels production reporting: still in its infancy

- Supplies currently being constrained by OPEC
  - Price does not reflect marginal cost of supply
  - Spare capacity usable

- Considerable investment in refinery capacity
  - New capacity and upgrading
  - But investment sensitive to cost overruns

- Bar recession, little reason to expect oil prices to return to pre-2004 prices