



# Oil Market Outlook

September 16, 2005

**Prospects for \$120 Oil and \$4 Gasoline**  
National Capital Area Chapter, USAEE, IAEE

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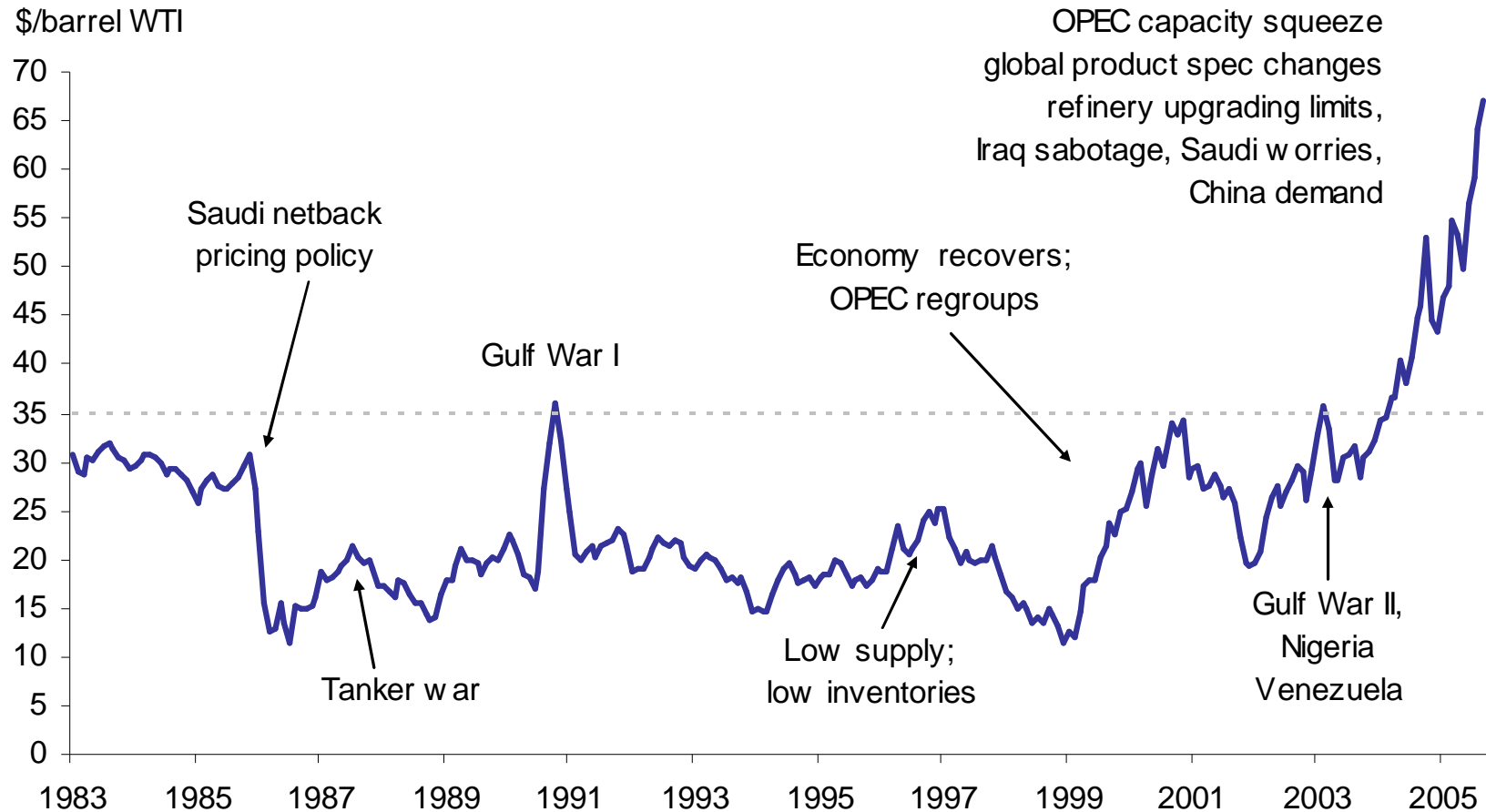
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# Oil Price Developments Since 1983

...wars, economy, strikes, weather, accidents, OPEC, China, refining



Source: Bloomberg; Deutsche Bank estimates (WTI crude)



# Which of These *Economist* Covers Got It Right?

Mar 1999 - \$10

Oct 2003 - \$100



Source: The Economist



# Analysts Have Been Terrible Forecasters

## WTI Prices, 2000-2005, Forecasts vs. Results (\$ per barrel)

| <u>Consensus Forecast*</u> |         | <u>Average WTI Prices</u> |           |
|----------------------------|---------|---------------------------|-----------|
| <b>2000</b>                | \$24.36 |                           | \$30.20   |
| <b>2001</b>                | \$25.45 |                           | \$25.92   |
| <b>2002</b>                | \$20.87 |                           | \$26.08   |
| <b>2003</b>                | \$24.22 |                           | \$31.02   |
| <b>2004</b>                | \$26.27 |                           | \$41.39   |
| <b>2005</b>                | \$37.33 |                           | \$54.77** |

\* As of November the prior year \*\*Through 09-Sep-2005

**2001 is the only exception saved by post 9/11 drop in demand**

Source: Hess Energy Trading; Deutsche Bank estimates

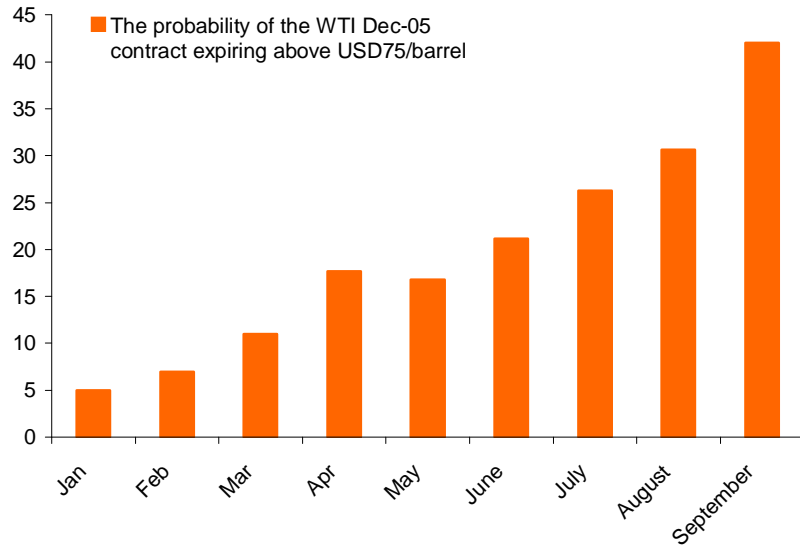


# The Options Market's View of Oil Prices

...low probabability of \$120 oil; but half of that in 2006!

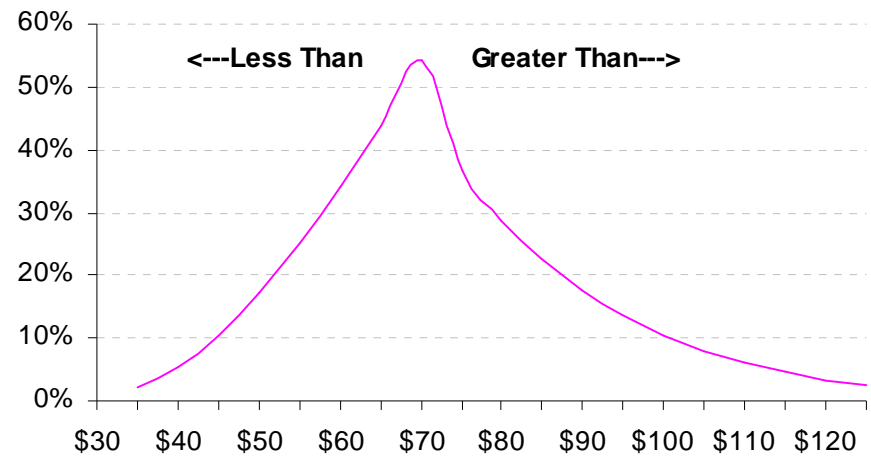
December 2005

...40%+ chance of \$75 oil



December 2006

...50% chance of of \$70



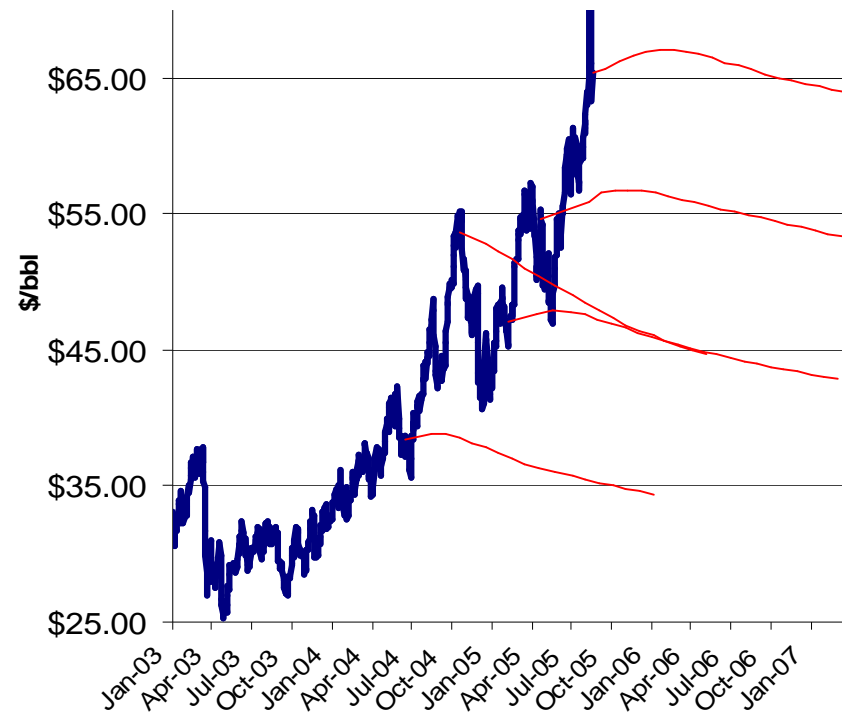
Source: Nymex market data on September 9, 2005; Deutsche Bank estimates



# The Futures Markets Don't Predict Prices Much Better ...are forward prices a proxy for the long-term or just a function of spreads along the curve?

Since 2000, futures markets have been better than analysts  
 ...but not significantly better

Spot and forward prices - WTI

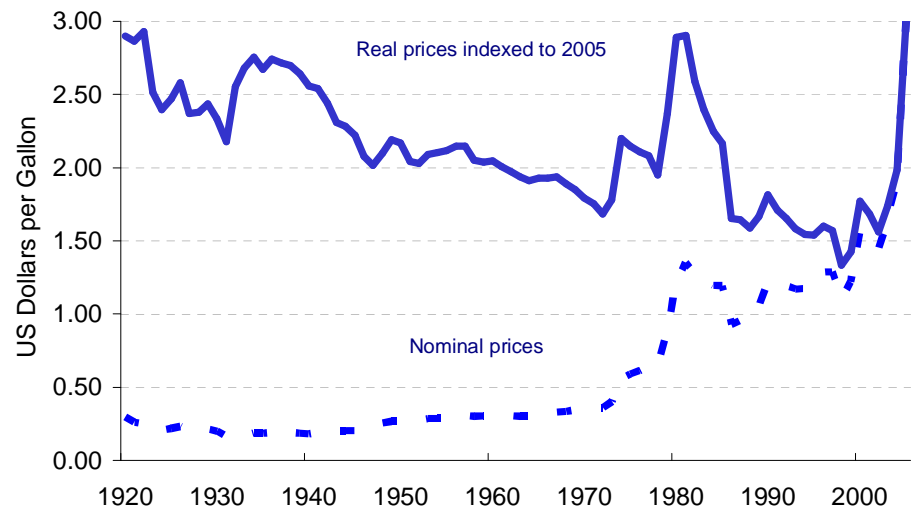
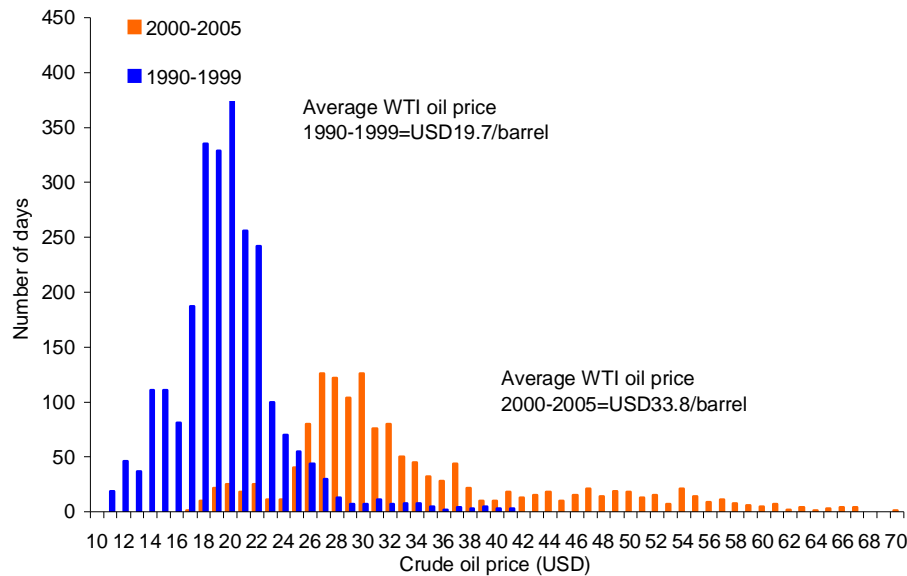


Source: Nymex; Bloomberg; Deutsche Bank estimates



# The World Is Having To Learn To Live With High Oil Prices

- n The WTI crude oil prices averaged just under USD20/barrel in the 1990s.
- n In the current decade, the oil price has averaged over USD33/barrel.
- n We expect oil prices will average over USD40/barrel during the current decade, or more than double the average of the 1990s.



Source: Bloomberg; DB Global Markets Research





## The Case for \$60 Now

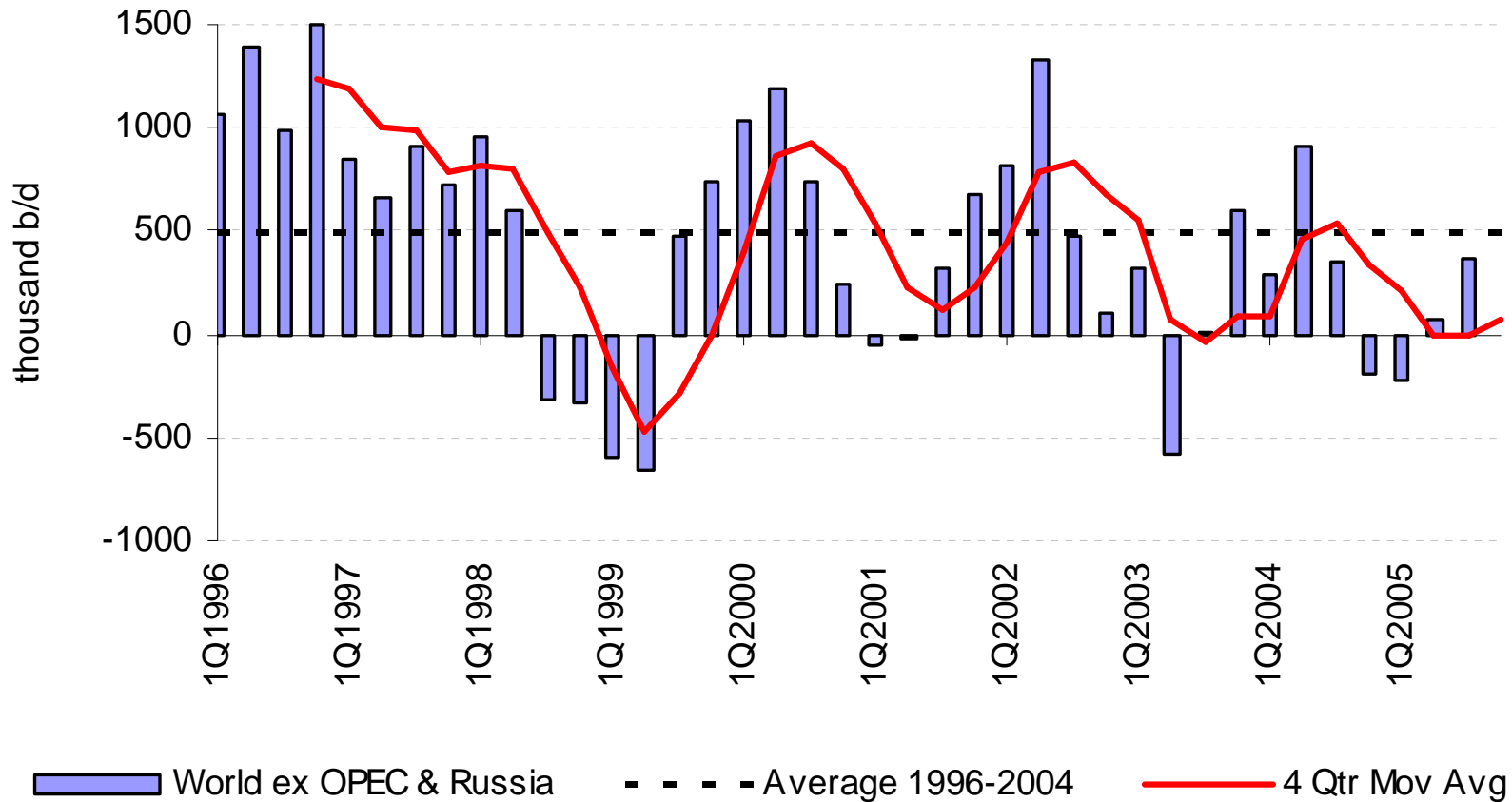
- U Non-OPEC oil has been weak
- U Russian production has slowed
- U OPEC spare capacity is low
- U Production costs are rising
- U Refinery utilization is high
- U Demand has not appeared to slow much

Source: Deutsche Bank





# Non-OPEC Supply Growth (ex Russia) Is Weak ...an investment cycle upturn coming?

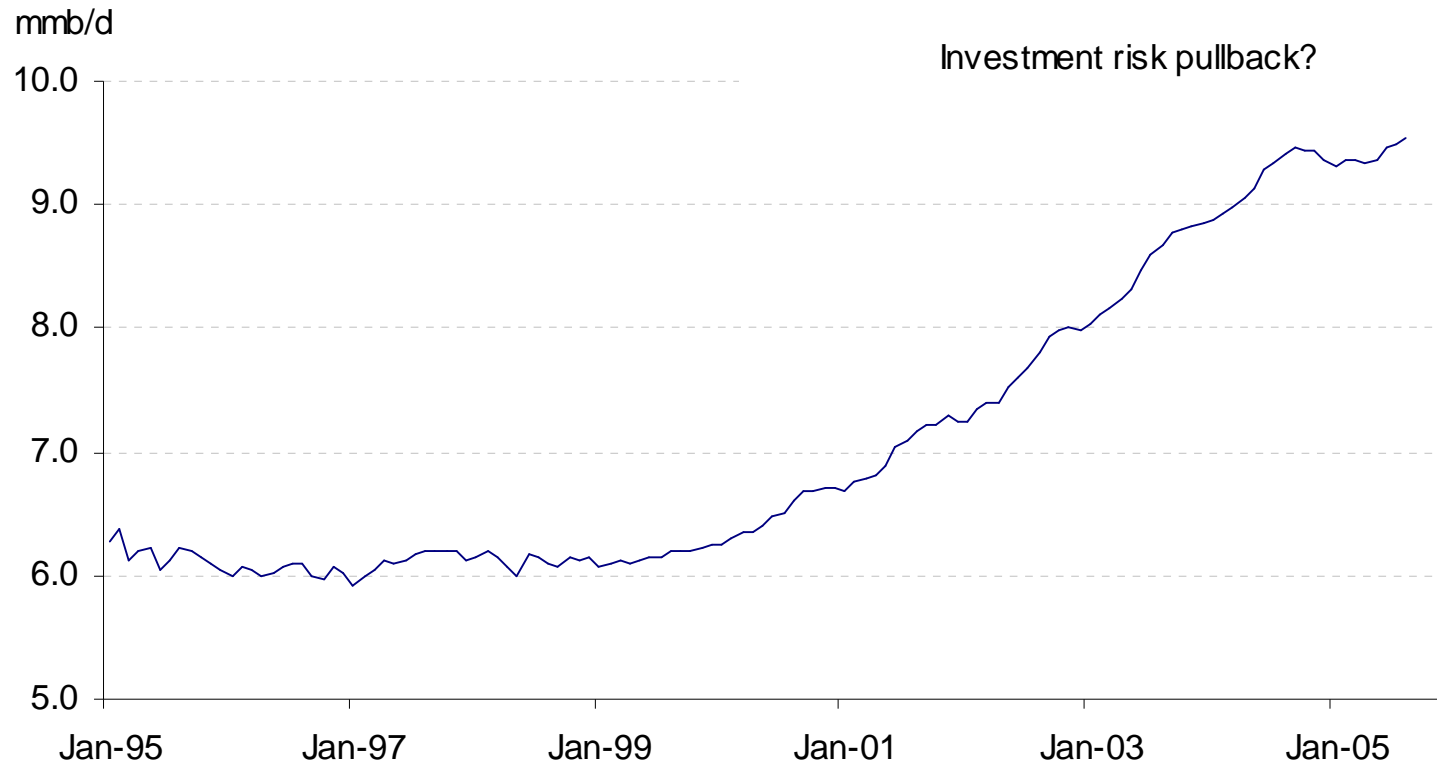


Source: IEA; Deutsche Bank estimates



# Russian Production Growth Has Slowed

...rising taxes and chilly investment climate

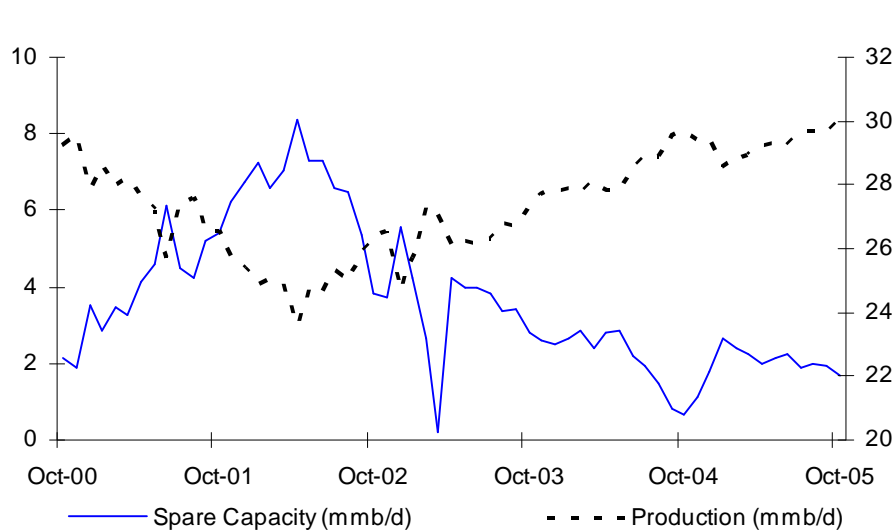


Source: IEA; Deutsche Bank estimates

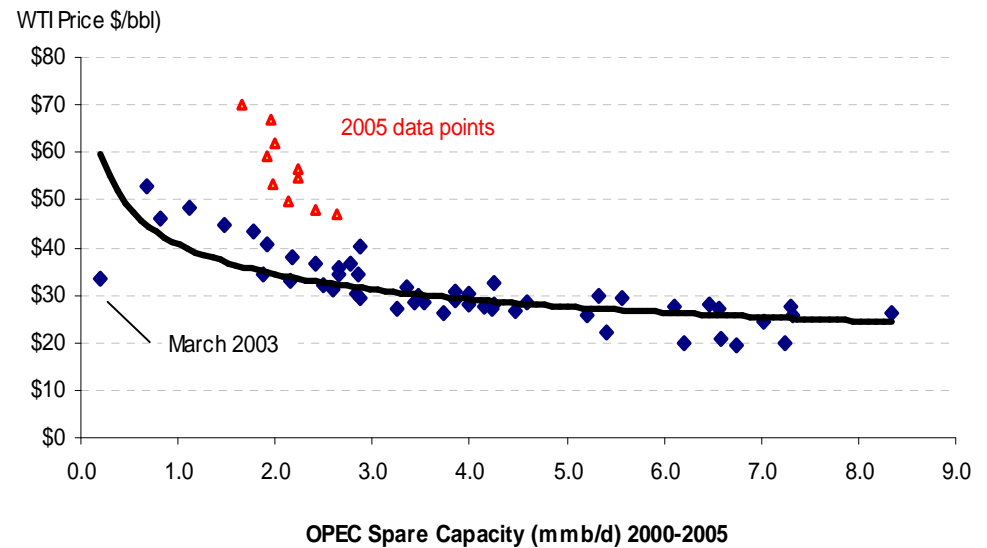


# OPEC Spare Capacity Has Declined ...and has supported higher oil prices

Spare capacity down  
as production rises



Low spare capacity drives  
oil prices higher

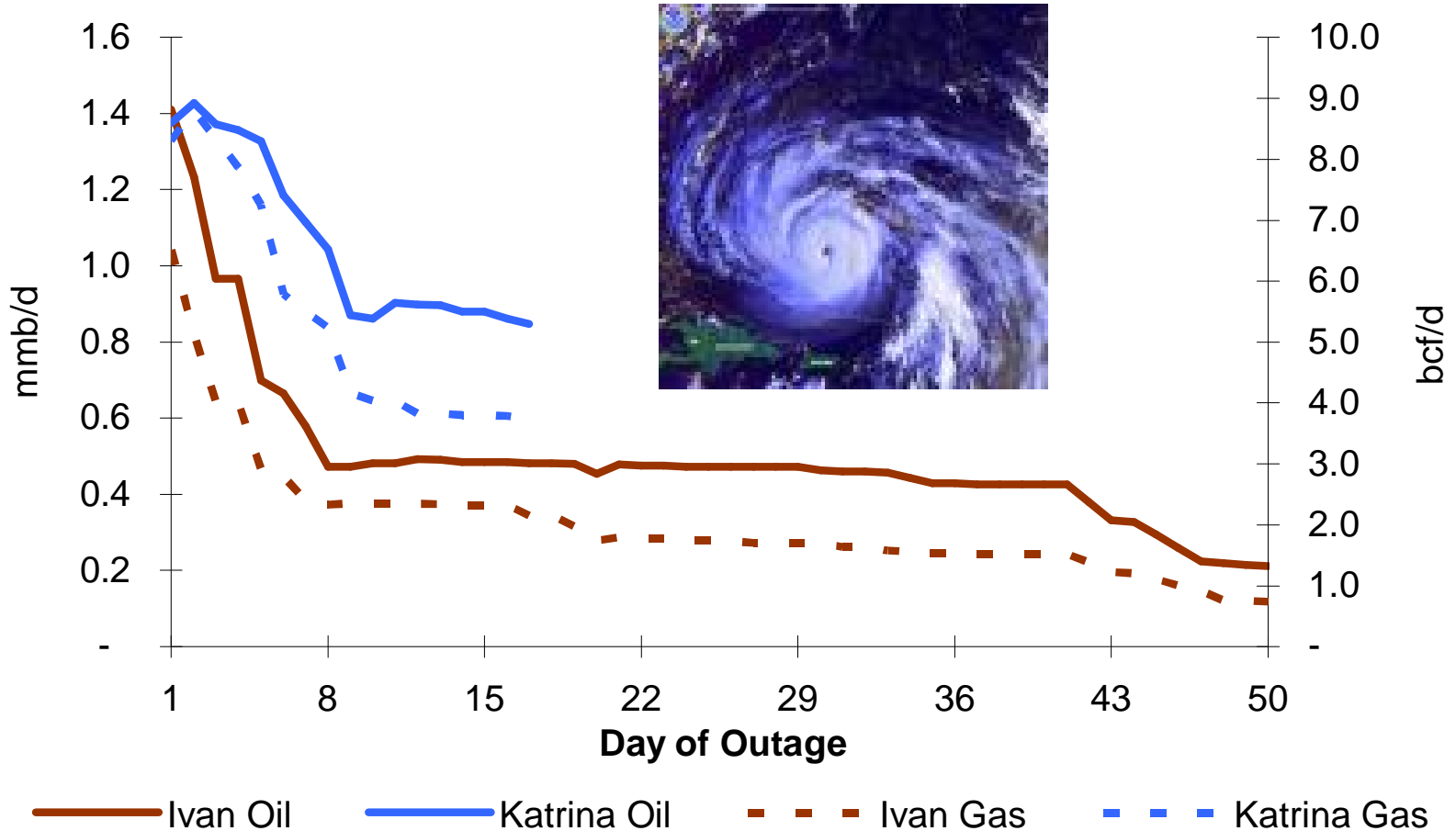


Source: IEA; BP Statistical Review; Deutsche Bank estimates



# Production Shut-In: Comparing Katrina to Ivan

...first 11 days- slower recovery from Hurricane Katrina

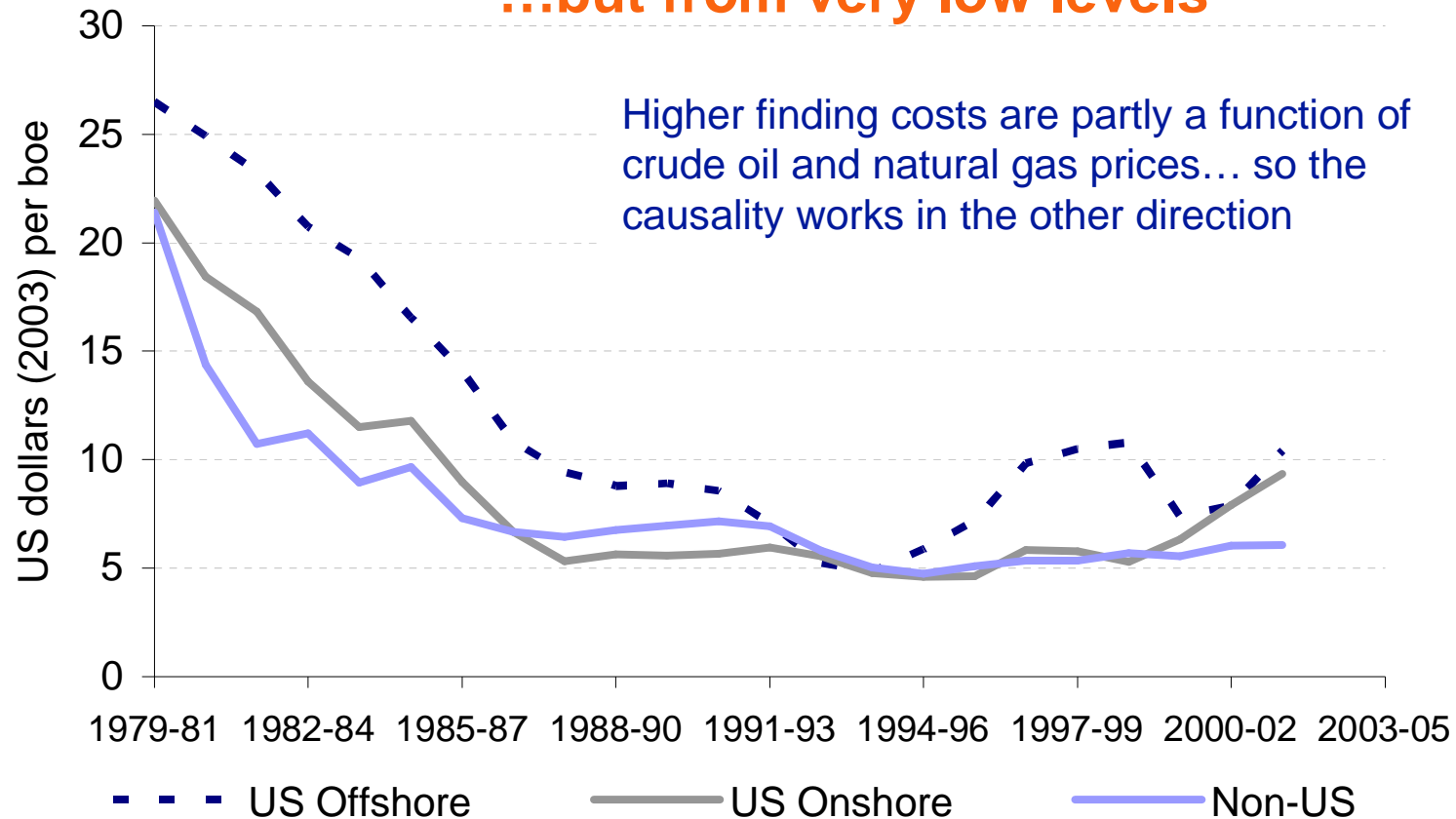


Source: US Minerals Management Service ; Deutsche Bank



# Higher Finding Costs Might Drive Oil Prices Up

...worldwide finding costs have increased since 1995  
 ...but from very low levels



Note: Finding costs are weighted averages of the annual costs for the three years specified. The labels used on the horizontal axis reflect the values plotted on the figure are 3-year averages.

Source: DOE/EIA, Form EIA-28 (Financial Reporting System)

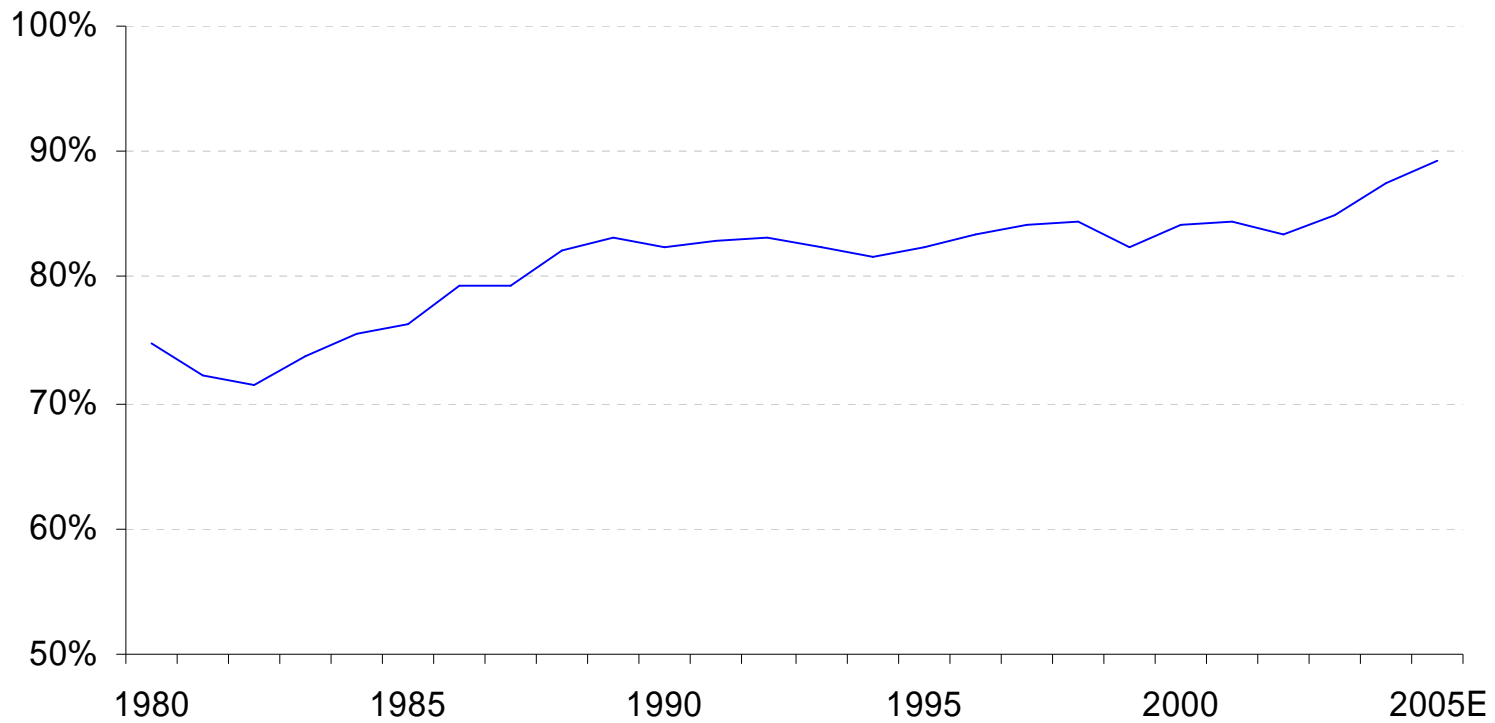




# Refinery Capacity Utilization is Tight

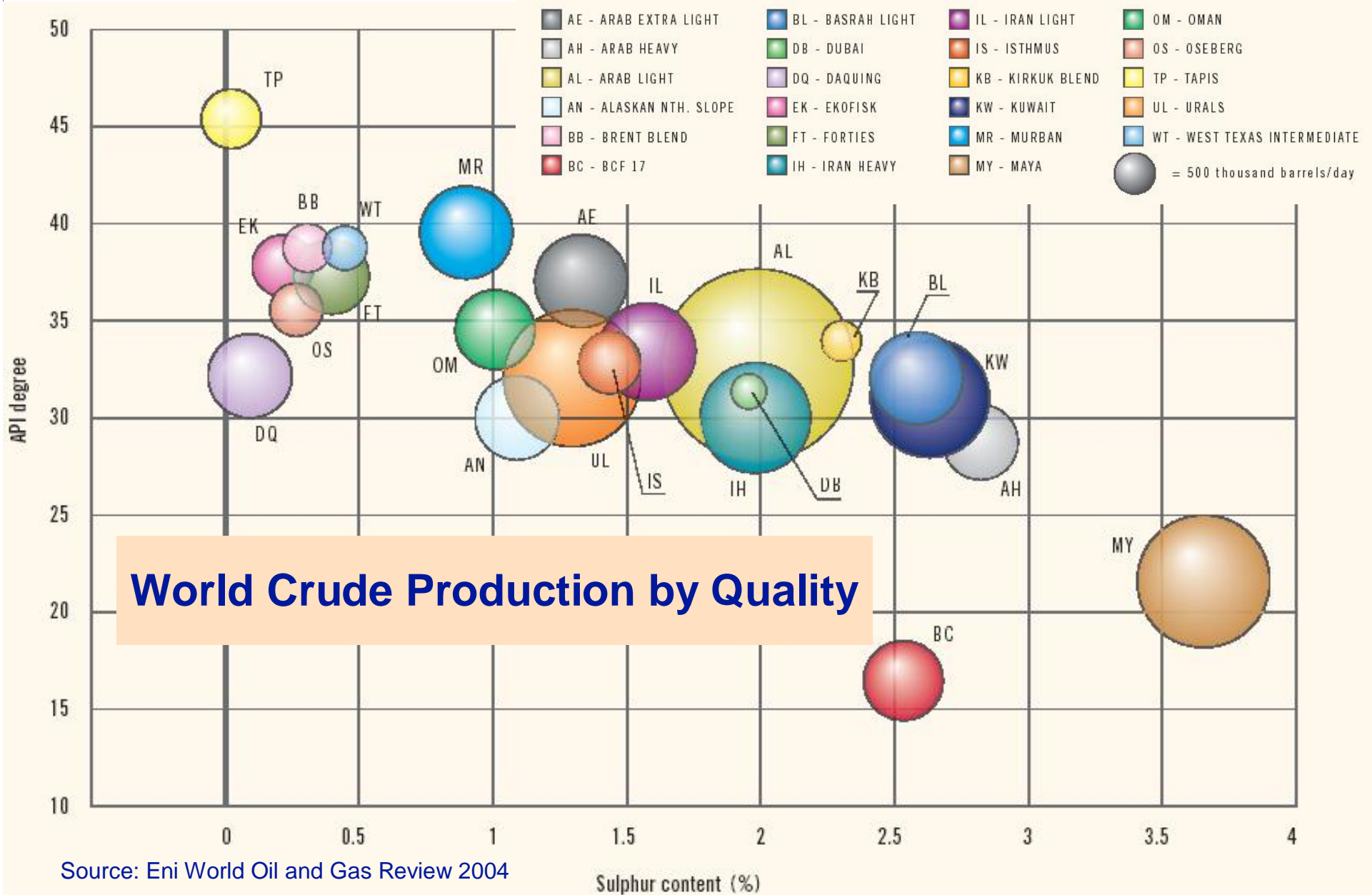
## ...ability to process heavy, high sulfur crudes tighter still

Utilization



Source: BP Statistical Review; Deutsche Bank estimates

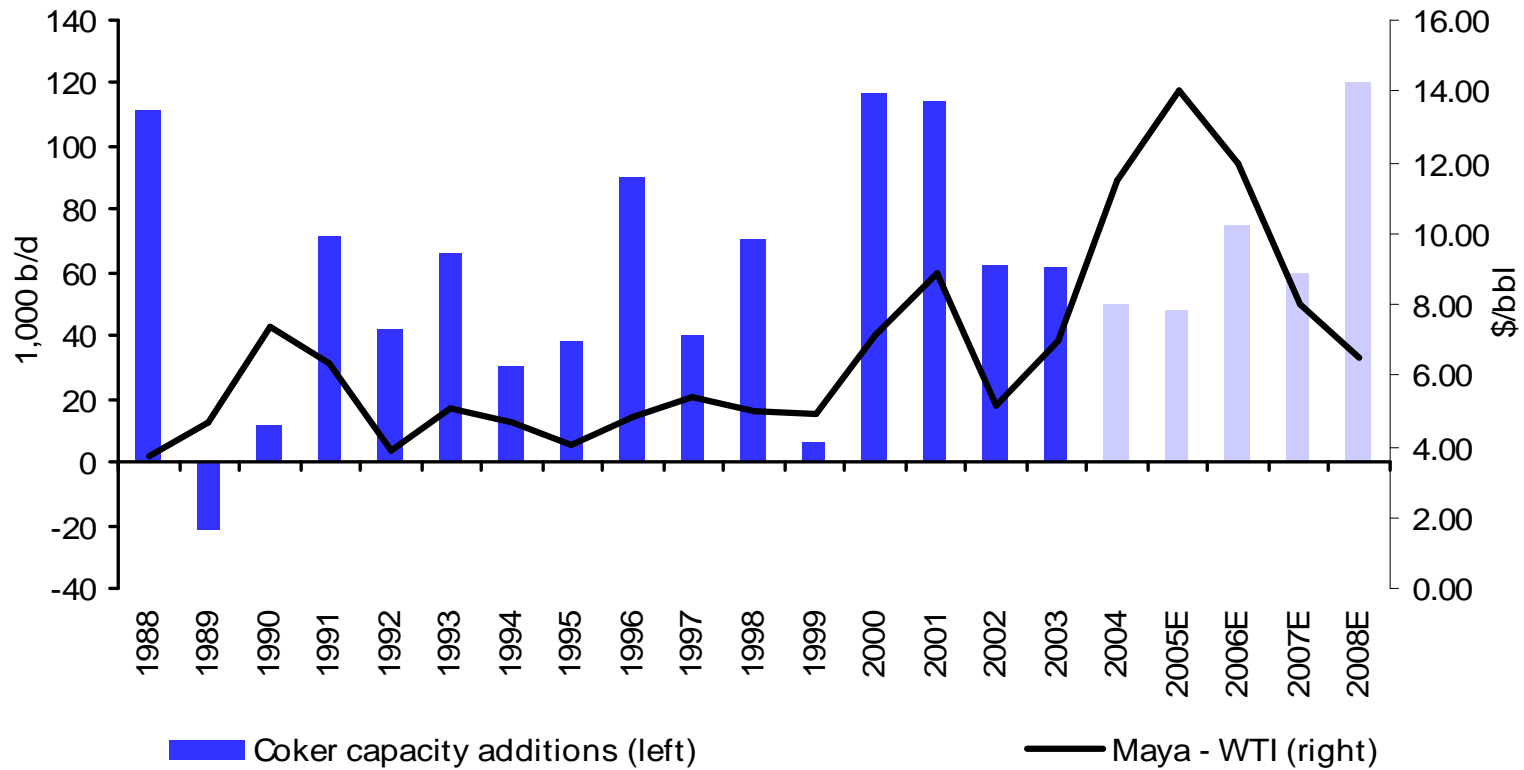




# US Coker Additions vs Heavy/Light Spread

## 3-year investment cycle - and spread – extended

### ...little plans for growth until 2008



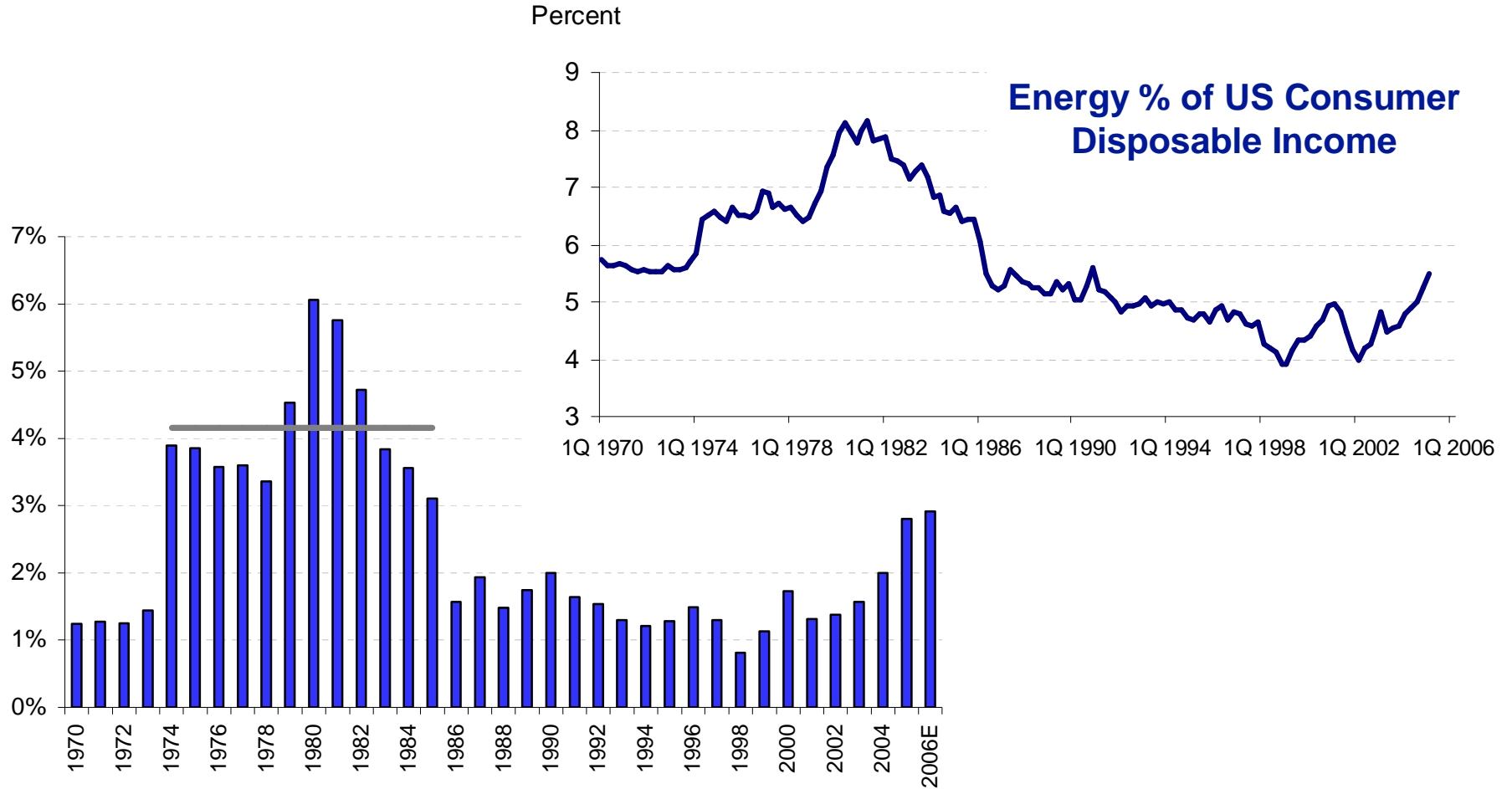
Source: DOE, Deutsche Bank





# Oil Consumption's Share of the Global Economy

...creeping back up but it takes steady \$60/bbl to get above 3%

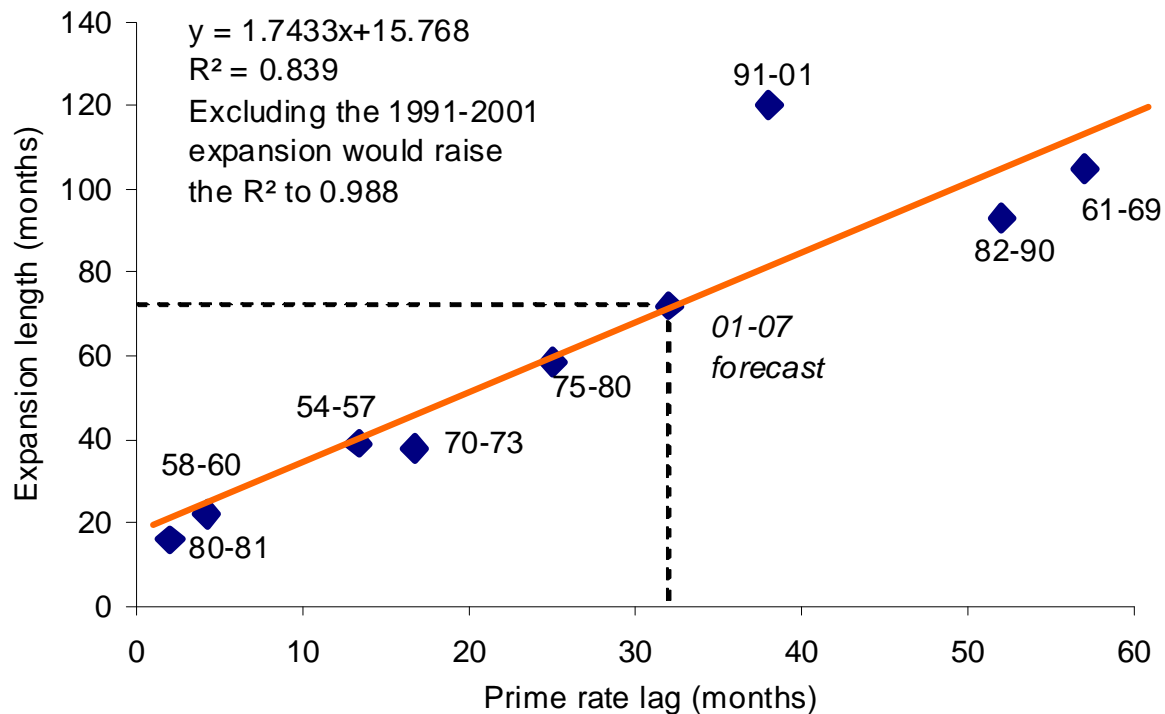


Source: BP; IEA; US EIA; IMF; BEA; Deutsche Bank estimates



# Timing The Next US Recession

- n Since 1954 we find that the longer the US Federal Reserve keeps monetary policy on hold after a recession, the more durable the eventual US expansion
- n The last US economic recession bottomed in November 2001, but the US prime rate did not start rising until June 2004 (32 months later). This would imply the next US recession will begin in 72 months after the US moved out of recession in 2001 or December 2007



Source: DB Global Markets Research, Columbia University





# The Case for \$35-40 WTI Long-Term

- U The world is not running out of oil
- U Non-OPEC oil is still growing
- U Asian growth is not insatiable
- U Speculators speculate
- U Companies not completely daft
- U Supply/Demand elasticity lives
- U OPEC able to build capacity

Source: Deutsche Bank



# The World Is Not Running Out of Oil

...concept of “Peak Oil” claimed by proponents to be immutable

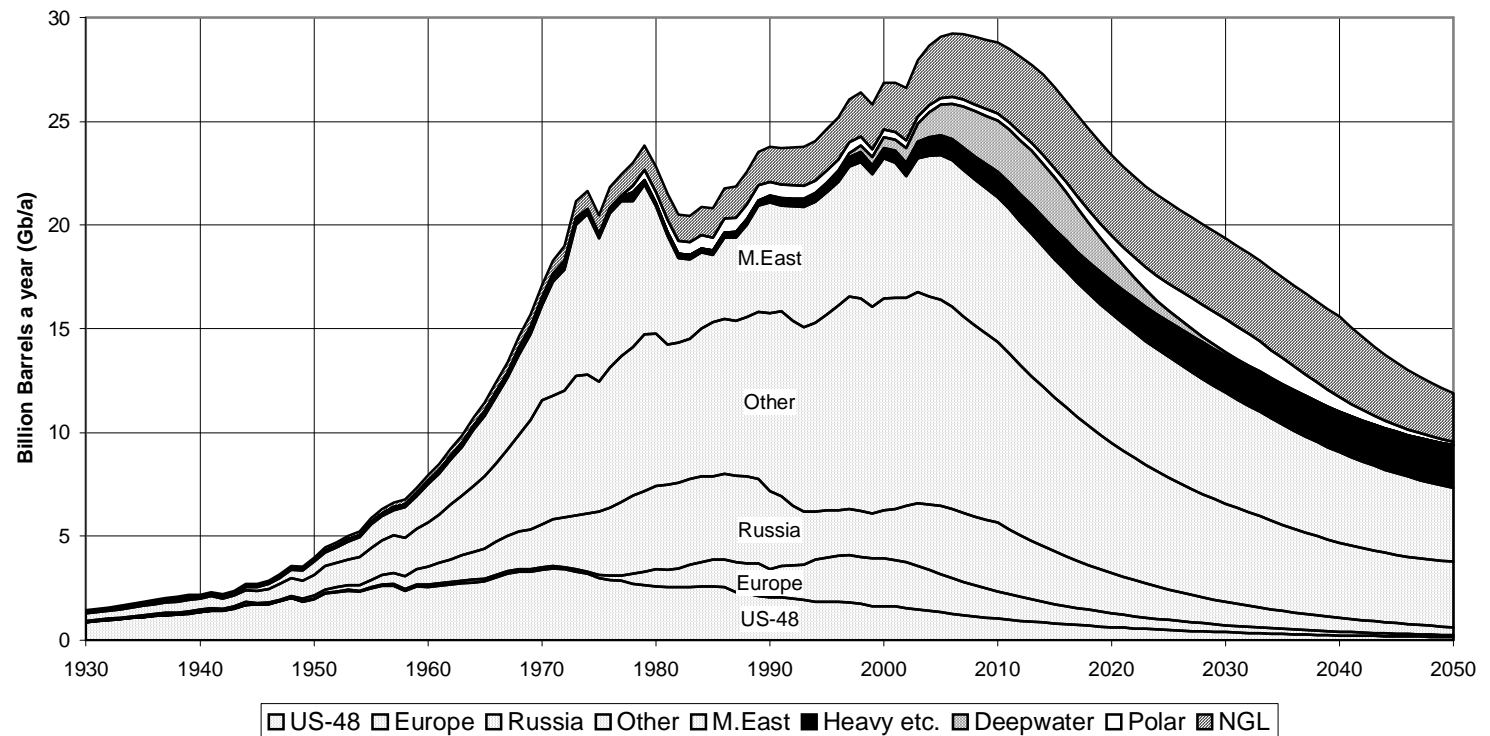
## OIL AND GAS LIQUIDS 2004 Scenario



M. King Hubbert  
b.1903 d.1989

Shell Oil & USGS

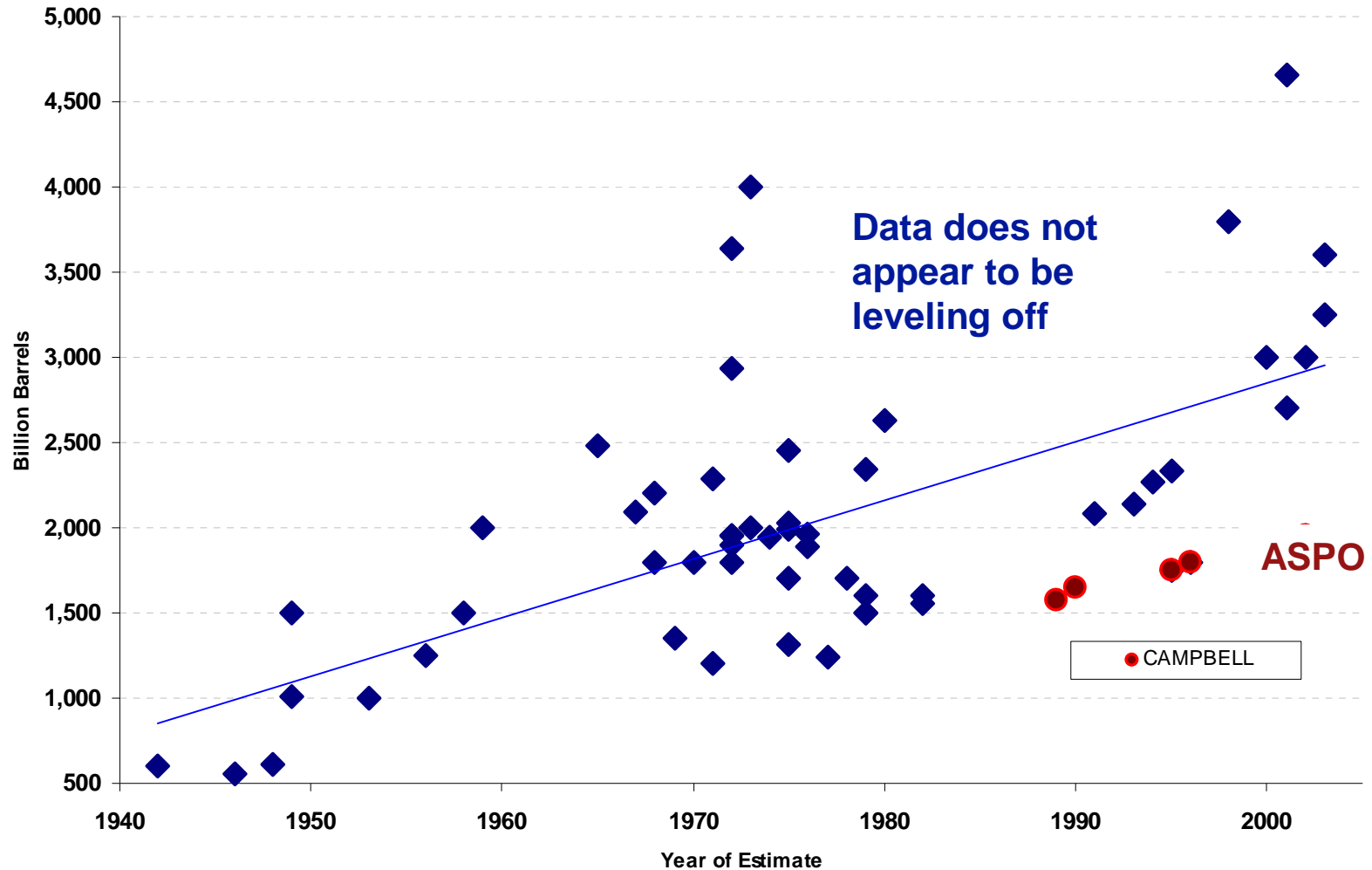
Geologist who first identified concept of bell curve “peak and decline” for oil



Source: Association for the Study of Peak Oil (ASPO)



# “Peak Oil” Requires a Fixed Value for Ultimately Recoverable Reserves ...but URR estimates have been steadily climbing for decades



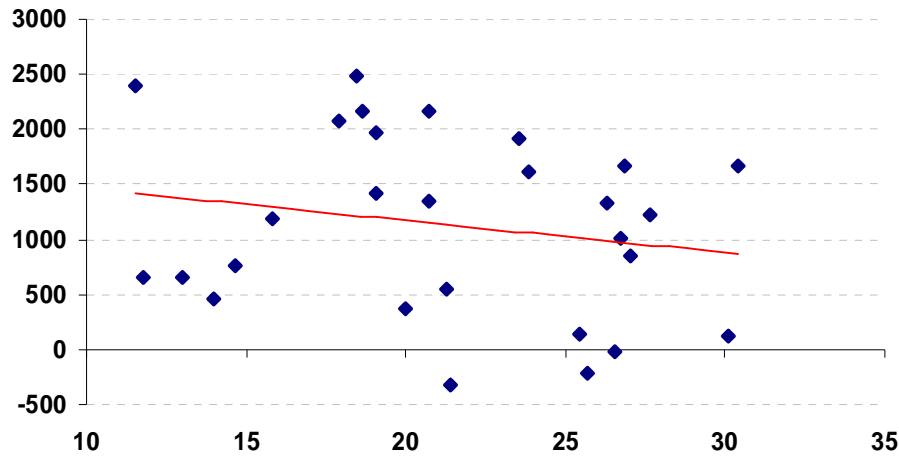
Source: Michael Lynch, Energy SEER Inc.



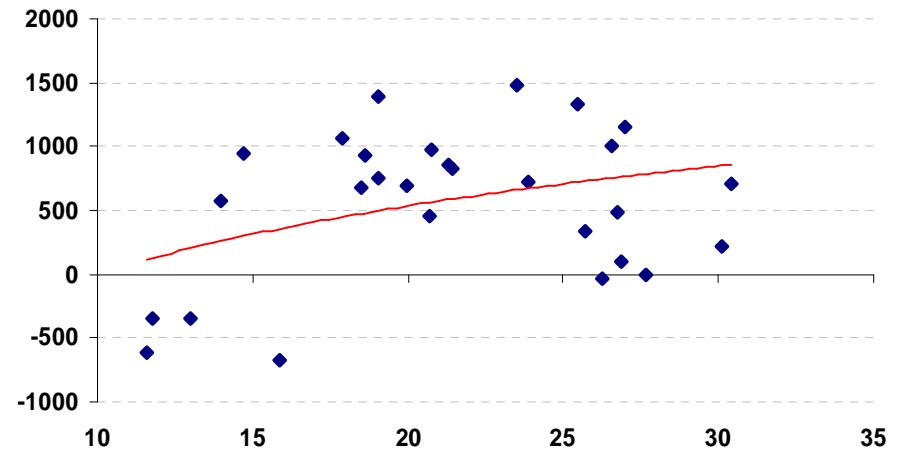
# Evidence for Oil Demand and Supply Price Elasticity

...quarterly data 1996-2002 (2003-04 excluded)

### Global Demand Growth vs. Oil Price



### Non-OPEC (ex-Russia) Supply Growth



Source: IEA; Nymex; Deutsche Bank estimates





# Why Not \$25 WTI Long-Term

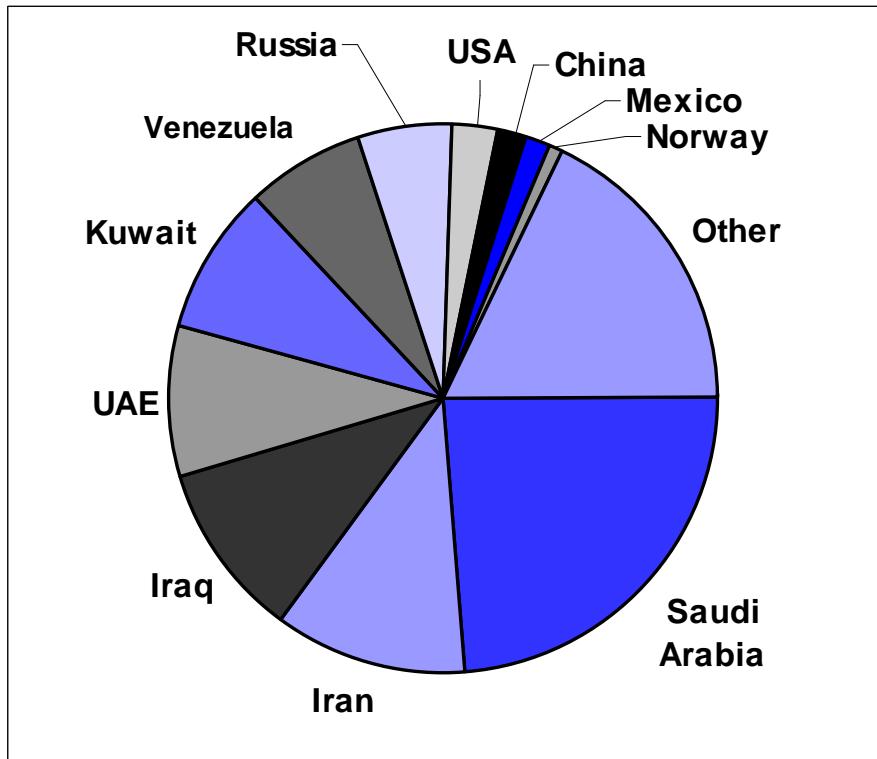
- U Reserves mismatched to production
- U Exchange rates matter
- U Infrastructure under-built
- U Demand still driven by GDP
- U OPEC has to produce a lot of oil

Source: Deutsche Bank

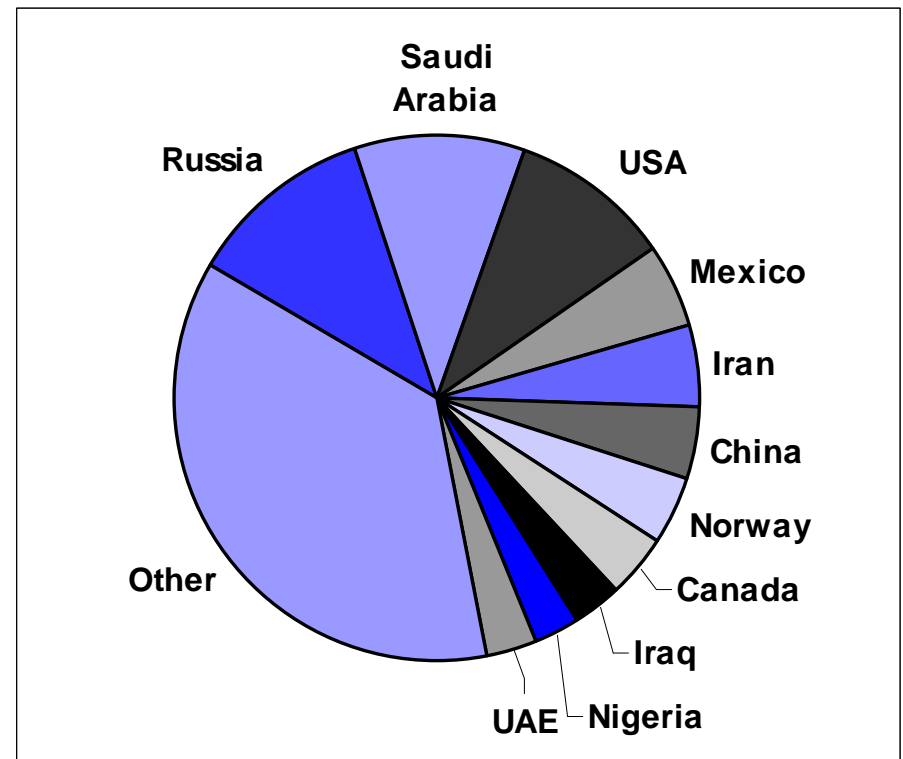


# Reserves and Production Mismatch

**RESERVES**



**PRODUCTION**



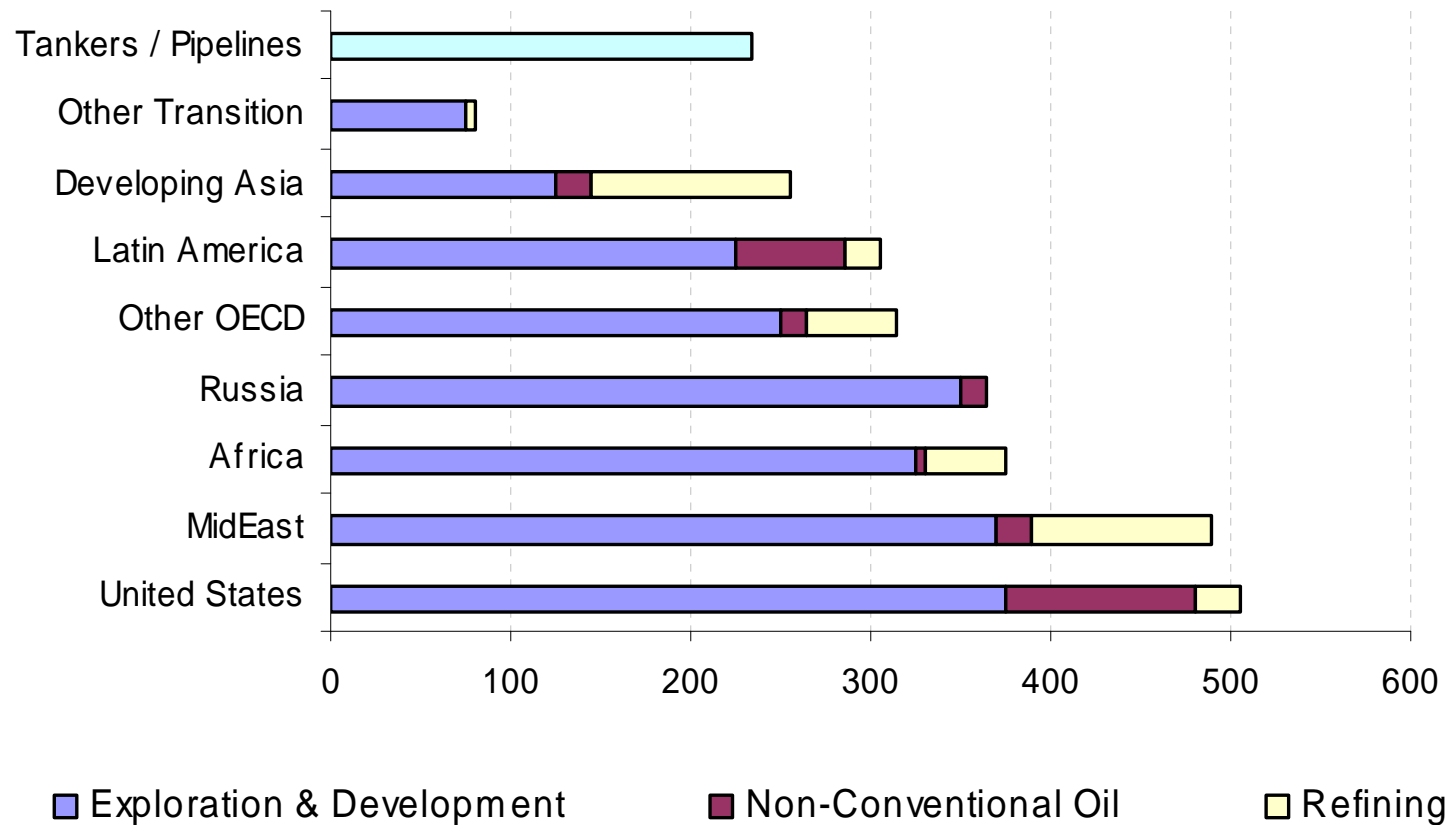
Source: IEA; BP; Oil & Gas Journal; Deutsche Bank estimates





# Cumulative Global Oil Investment Required 2005-2030

## ...\$500 billion needed in the US alone



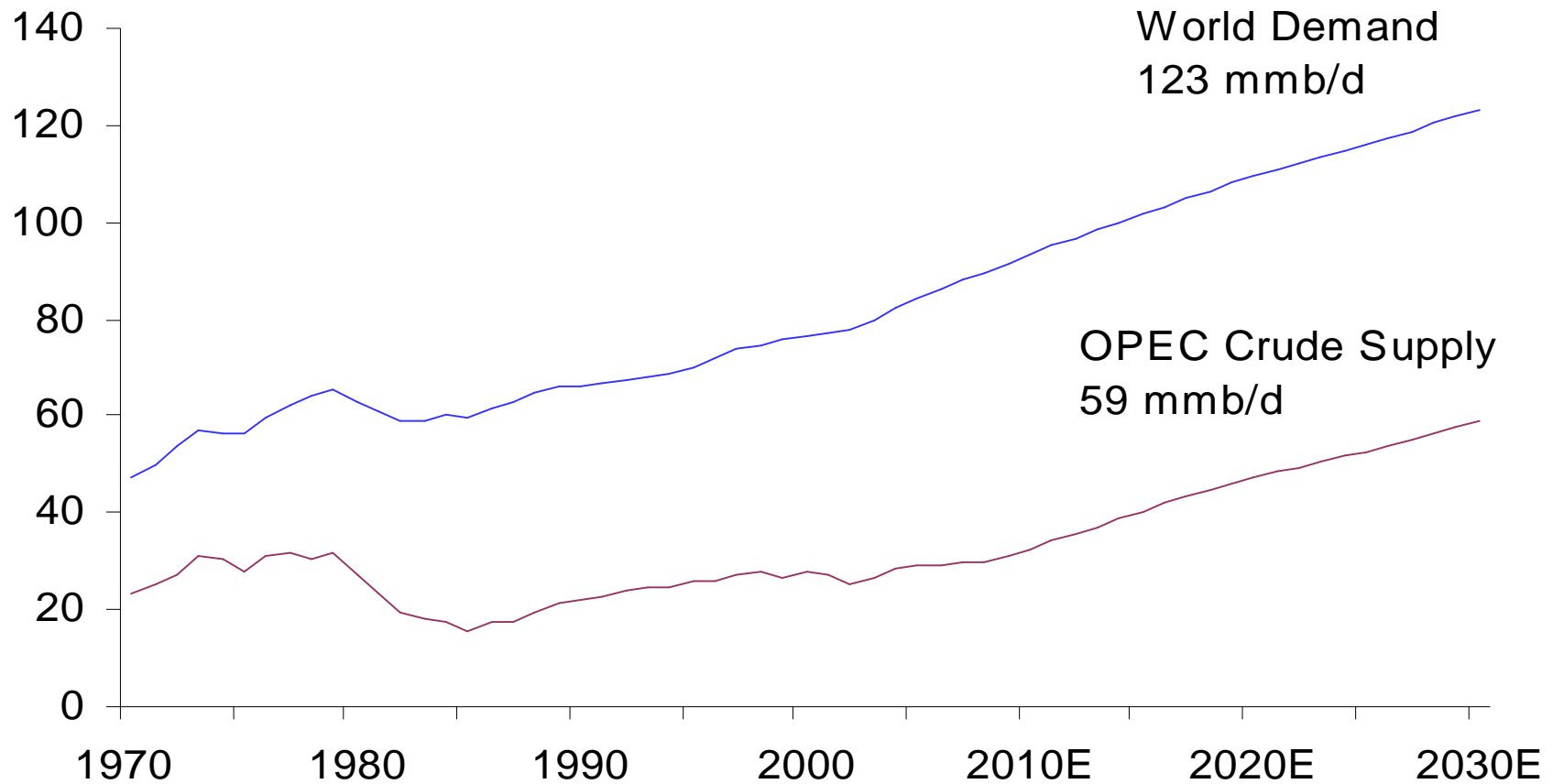
Source: IEA World Energy Outlook 2004; Deutsche Bank estimates

Cumulative oil (excluding gas) investment needed (billion constant 2000 \$)

# World Oil Demand and Required OPEC Supply

...meeting this level of demand may not be easy

Million barrels/day

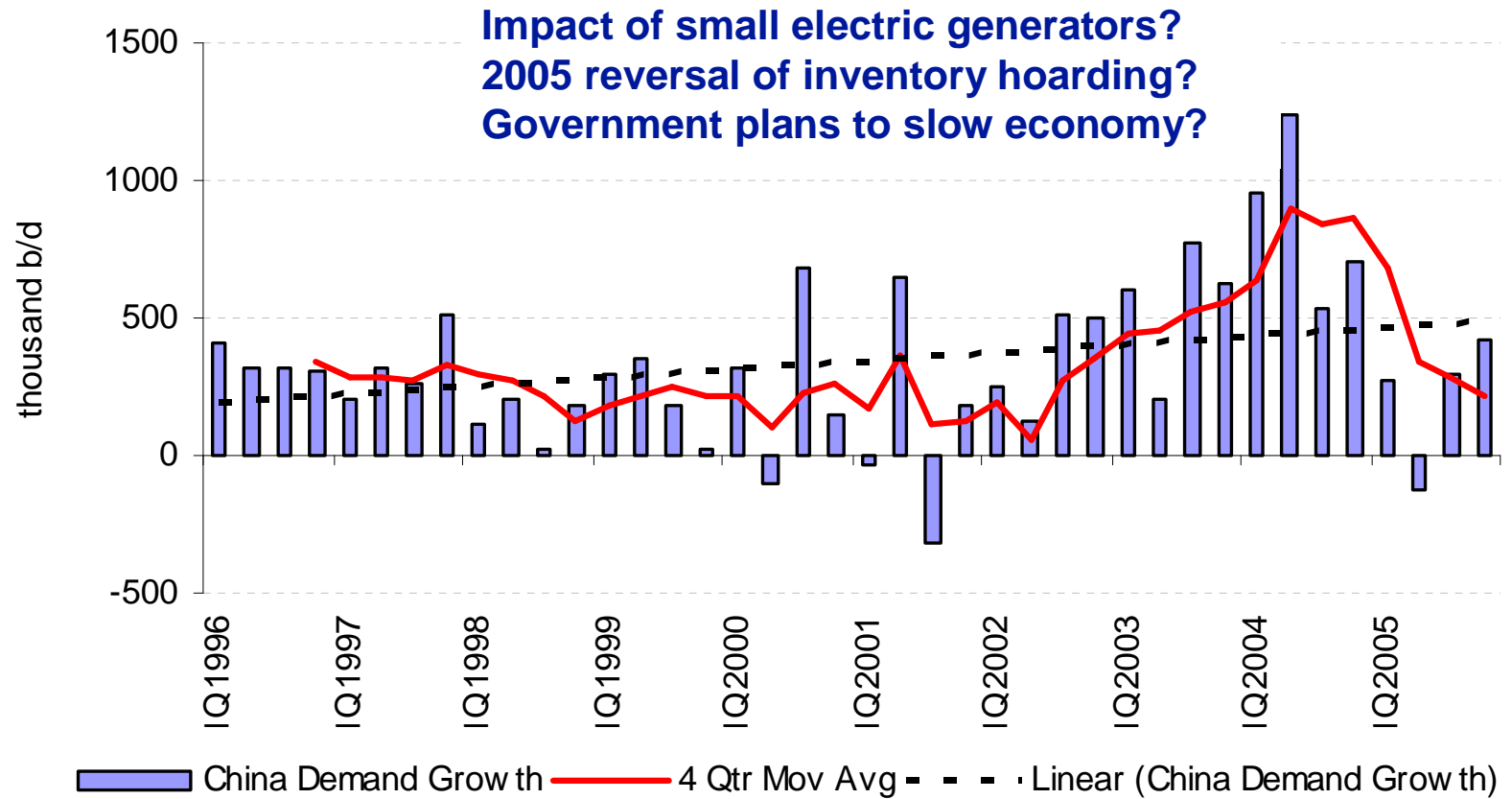


Source: IEA; Deutsche Bank estimates



# Demand Growth in China Is Not Insatiable

...deliberate slowdown? banking problems? property valuations?

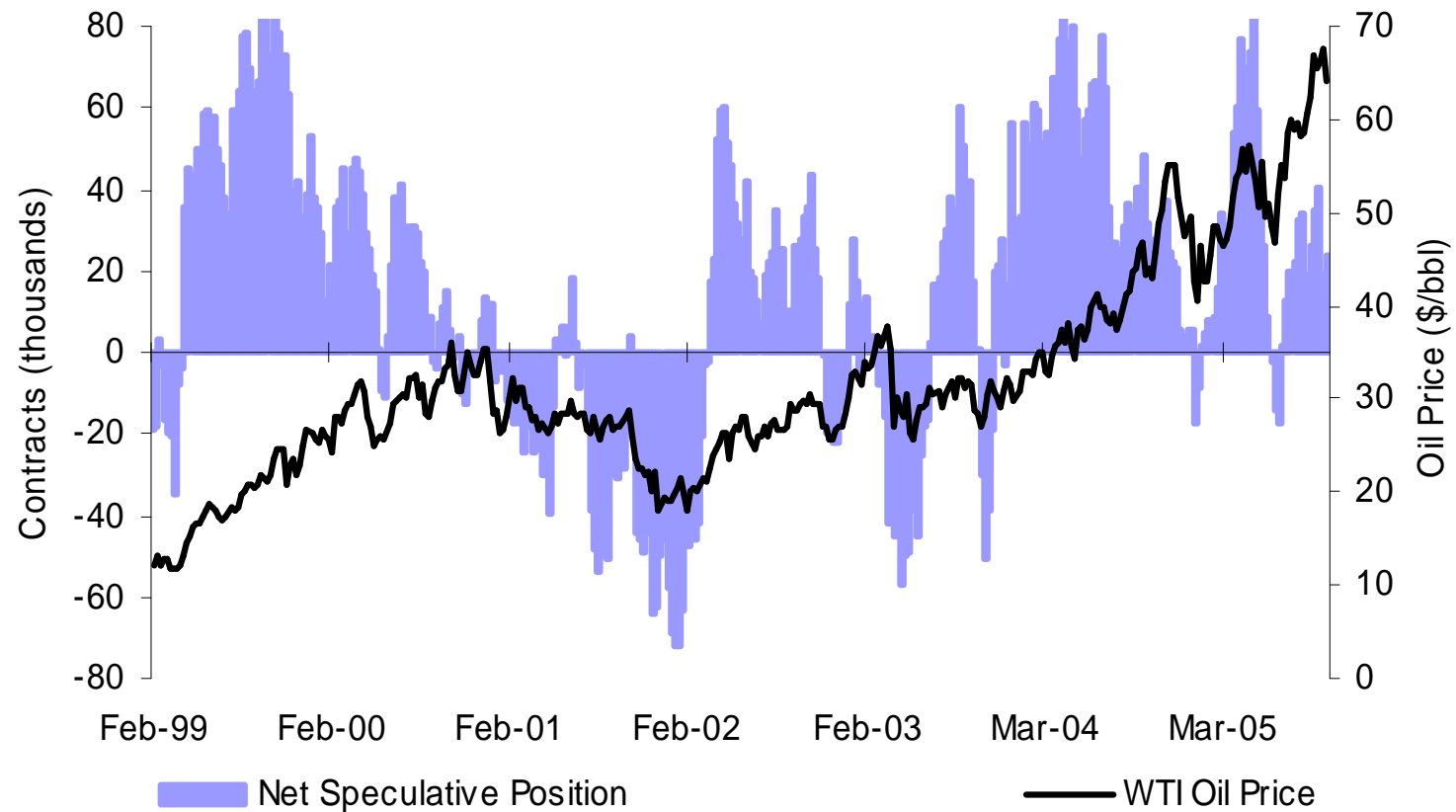


Source: IEA; Deutsche Bank estimates



# Crude Oil Speculators

...not very long despite the high price



Source: CFTC; Nymex; Deutsche Bank estimates

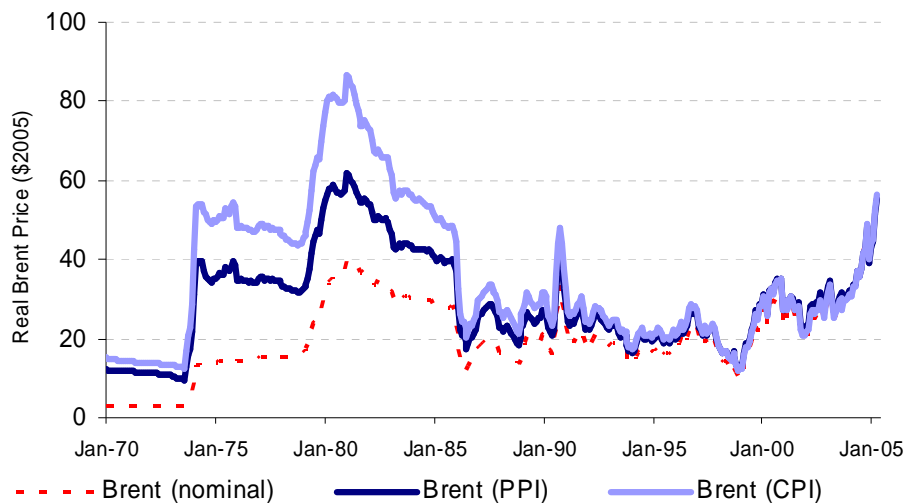


# What about \$120/barrel oil?

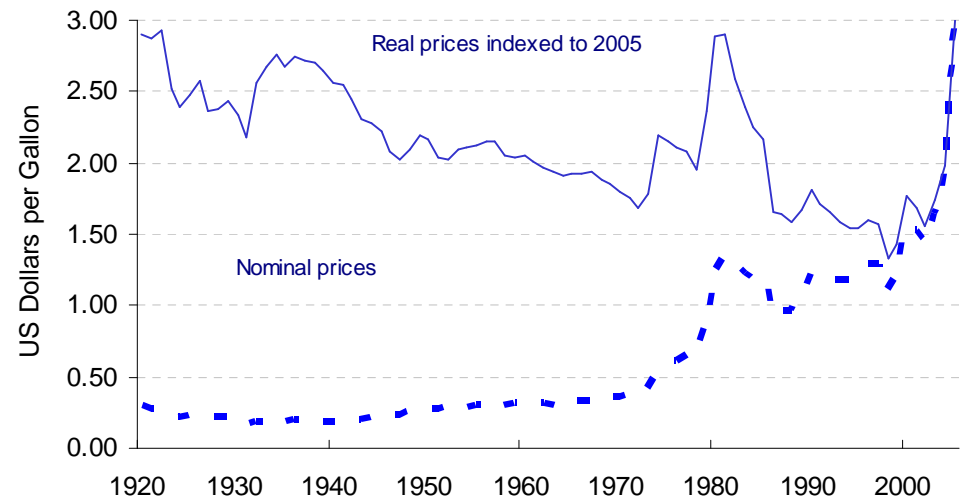
...possible, but probably takes an very unusual supply event

- Q Loss of export volumes (Iran, Saudi, Iraq ?)
- Q A weather event (cold winter? Hurricane season?)
- Q Probably NOT a demand-driven problem... but a demand solution?

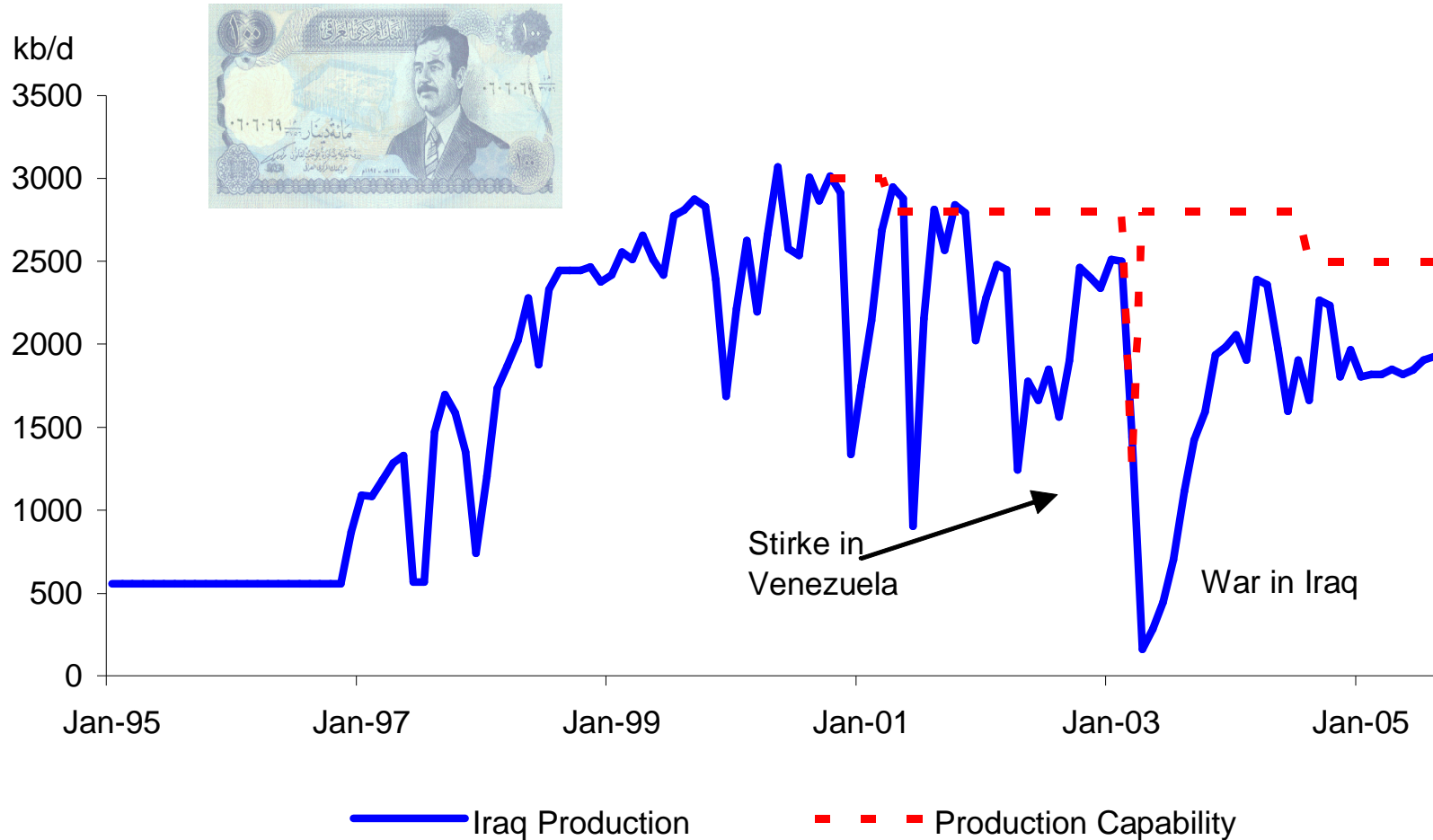
Brent Crude Prices (dollars/bbl)



US Gasoline Prices (cent/gal)



# Iraqi Production Capability Has Deteriorated ...at least 500kb/d lost since 2000

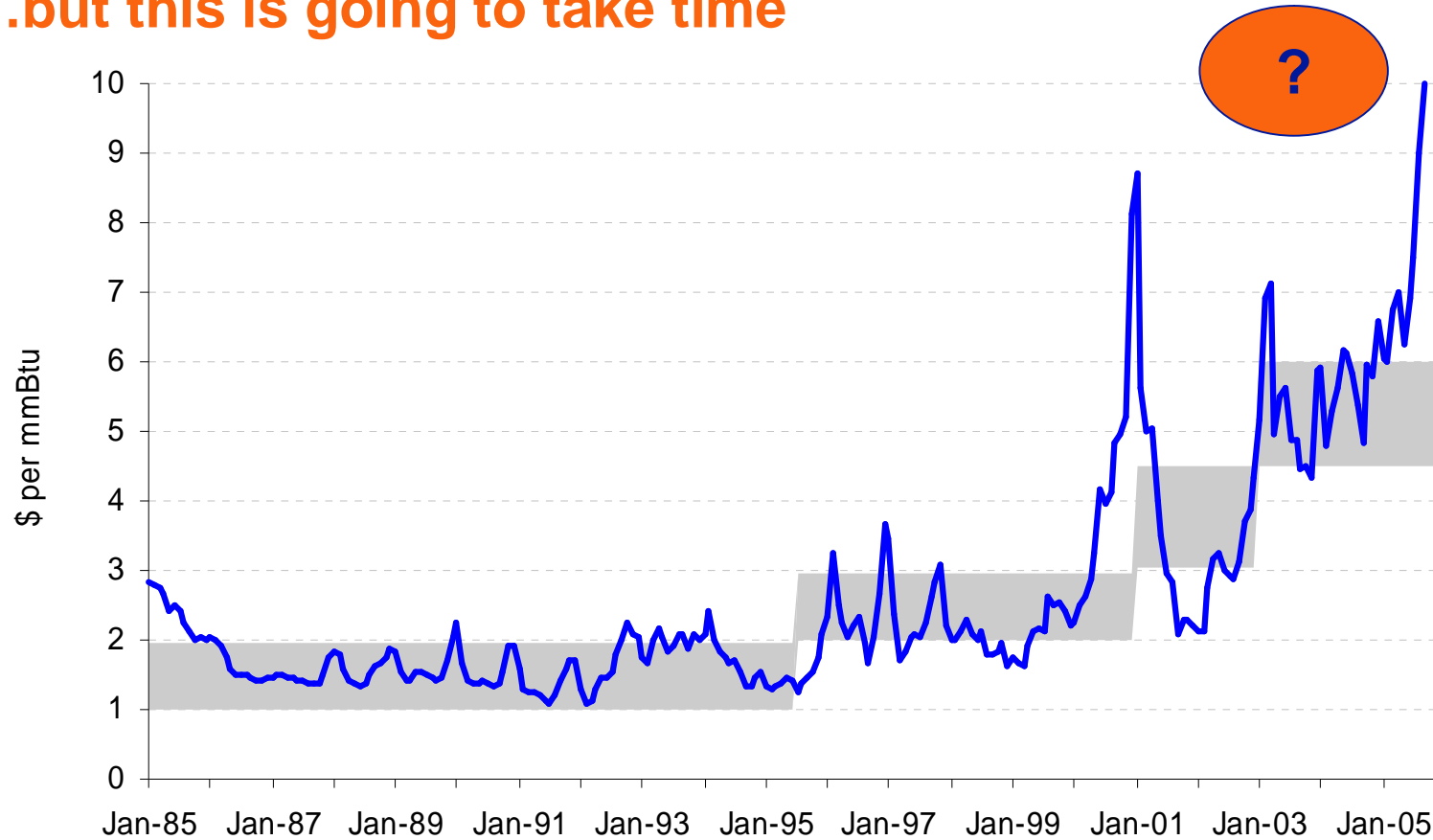


Source: IEA; Deutsche Bank estimates



# A New Trading Range for US Natural Gas?

...we are expecting prices to eventually settle near \$6  
...but this is going to take time



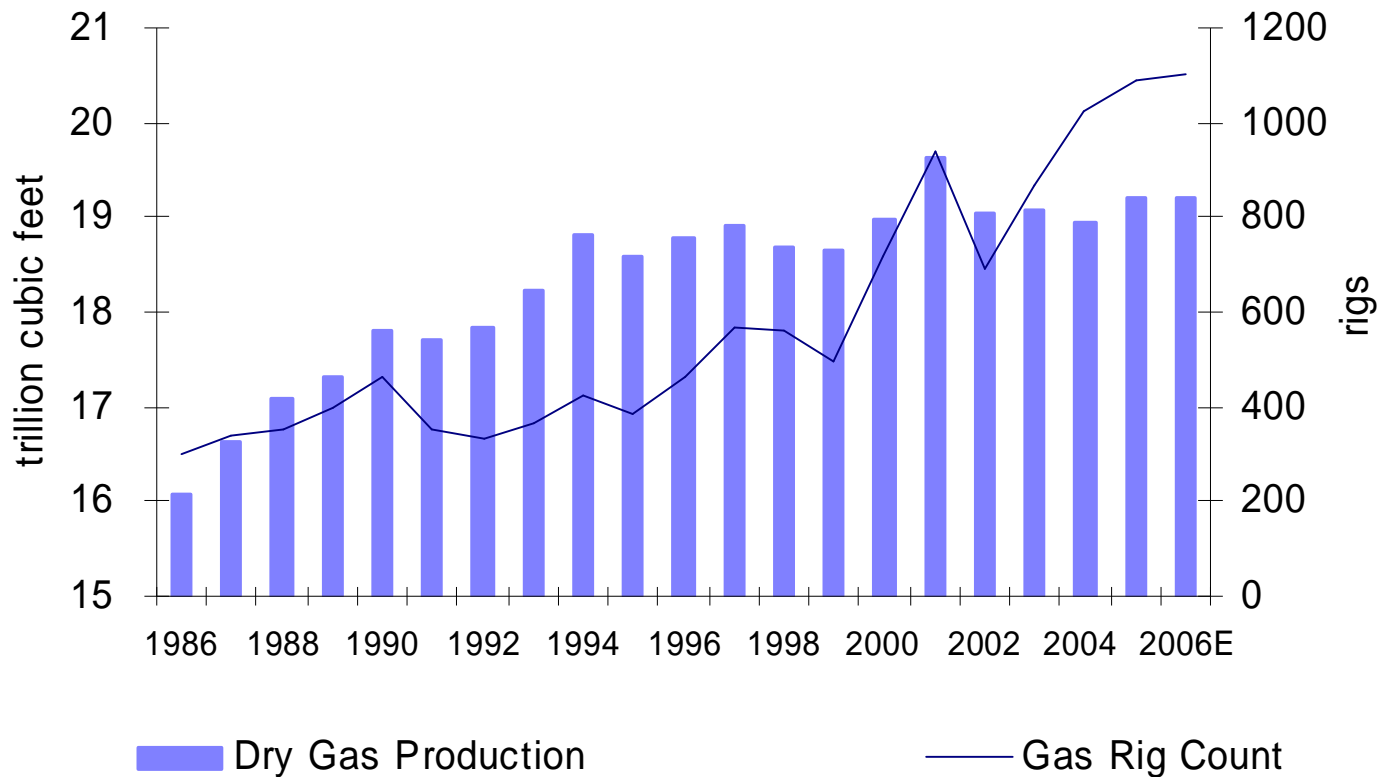
Source: Natural Gas Week; Deutsche Bank estimate



# Rig Count and Production Are Related

...but not lately

...doubtful outlook for US production upside surprise



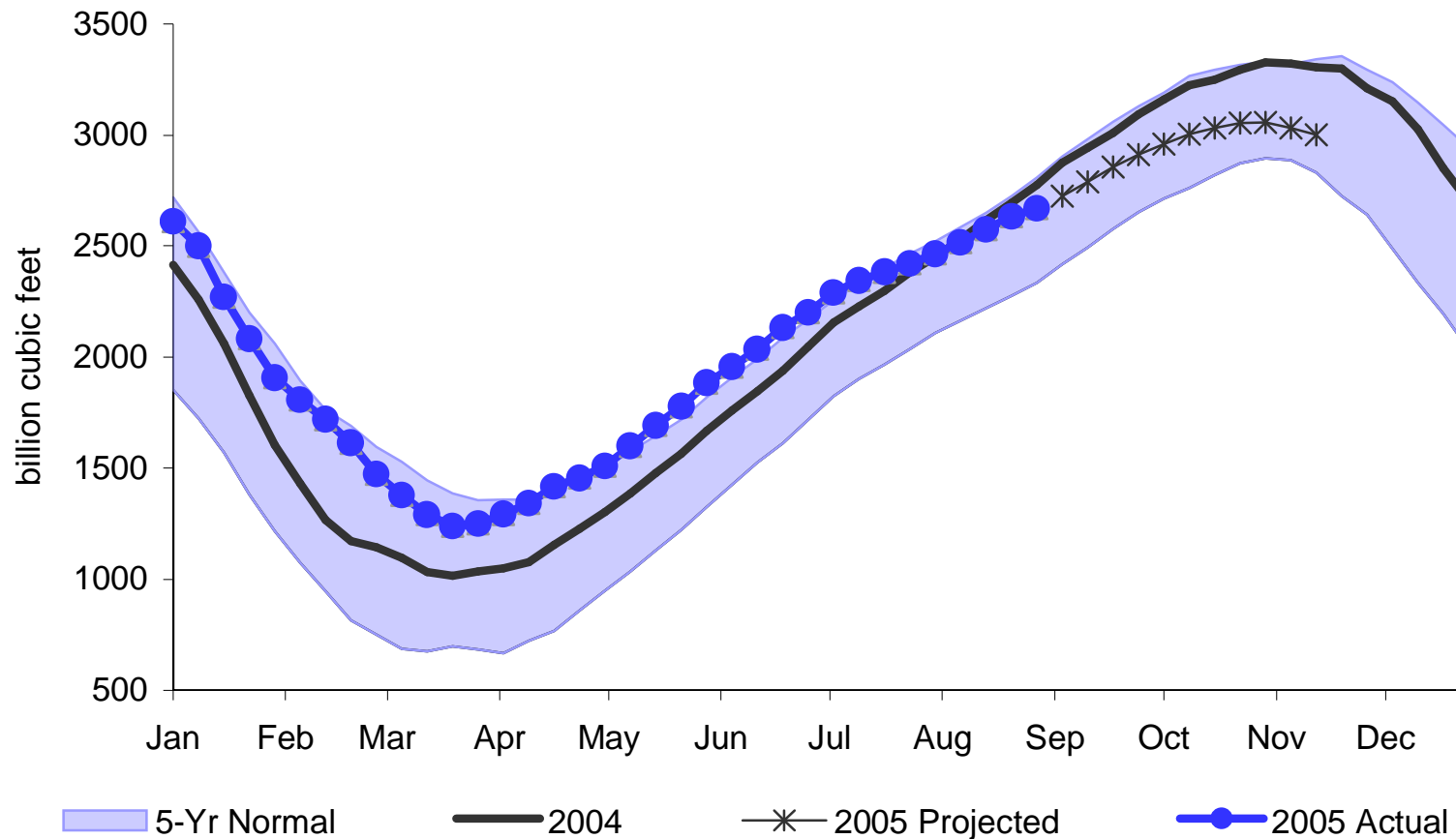
Source: DOE/EIA, Baker Hughes, Deutsche Bank estimates





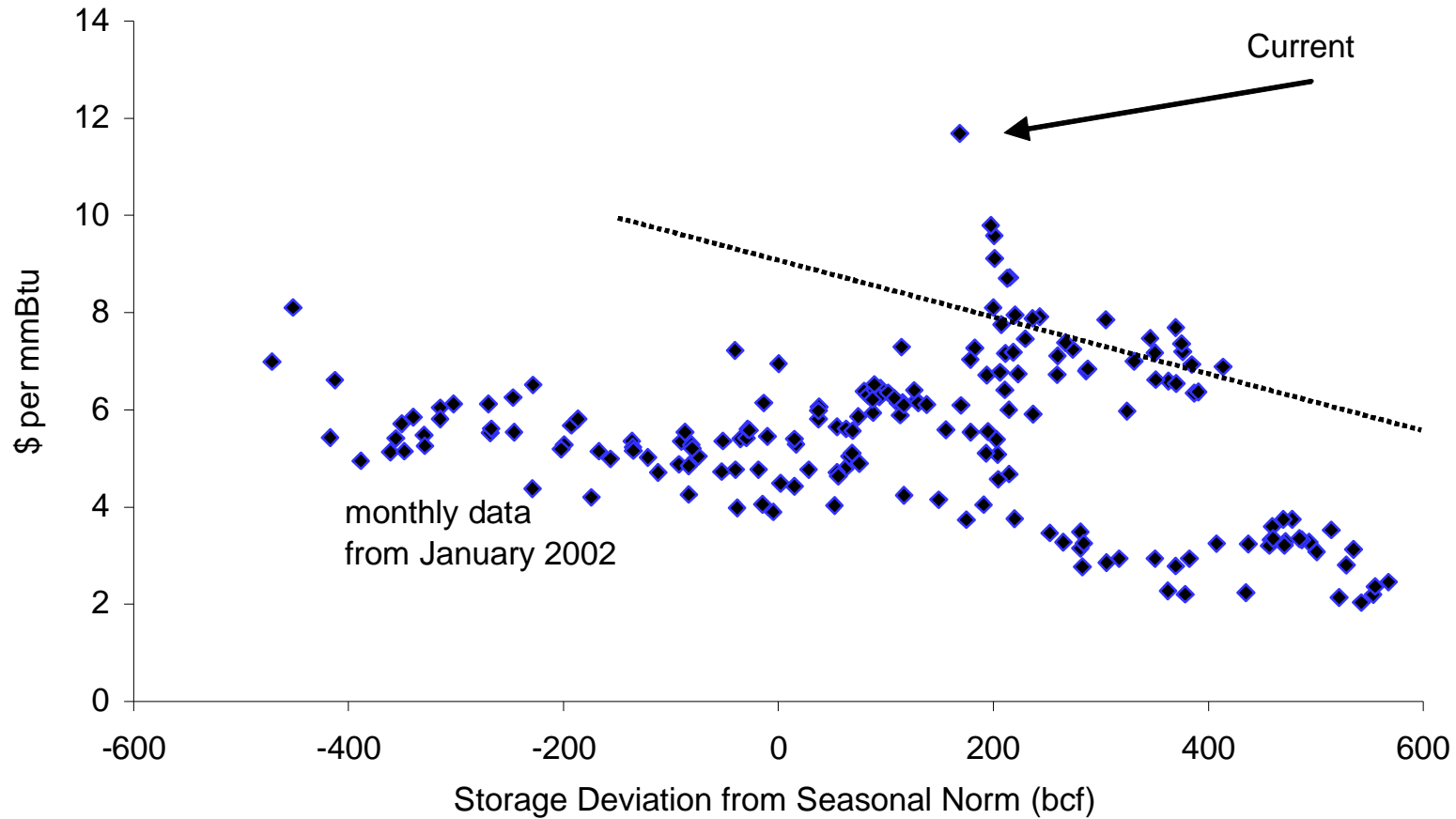
# US Natural Gas Storage

## ...heading for a problem this winter



# Natural Gas Inventories vs. Prices

...new storage normal? (old monthly data from 1/1/2002 not working)



Source: DOE/EIA; Nymex; Deutsche Bank estimates



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