

# Energy Markets Outlook

## April 2008



**GSC Energy**  
Ashmead Pringle – Matt Ward



# GLOBAL MARKET ISSUES

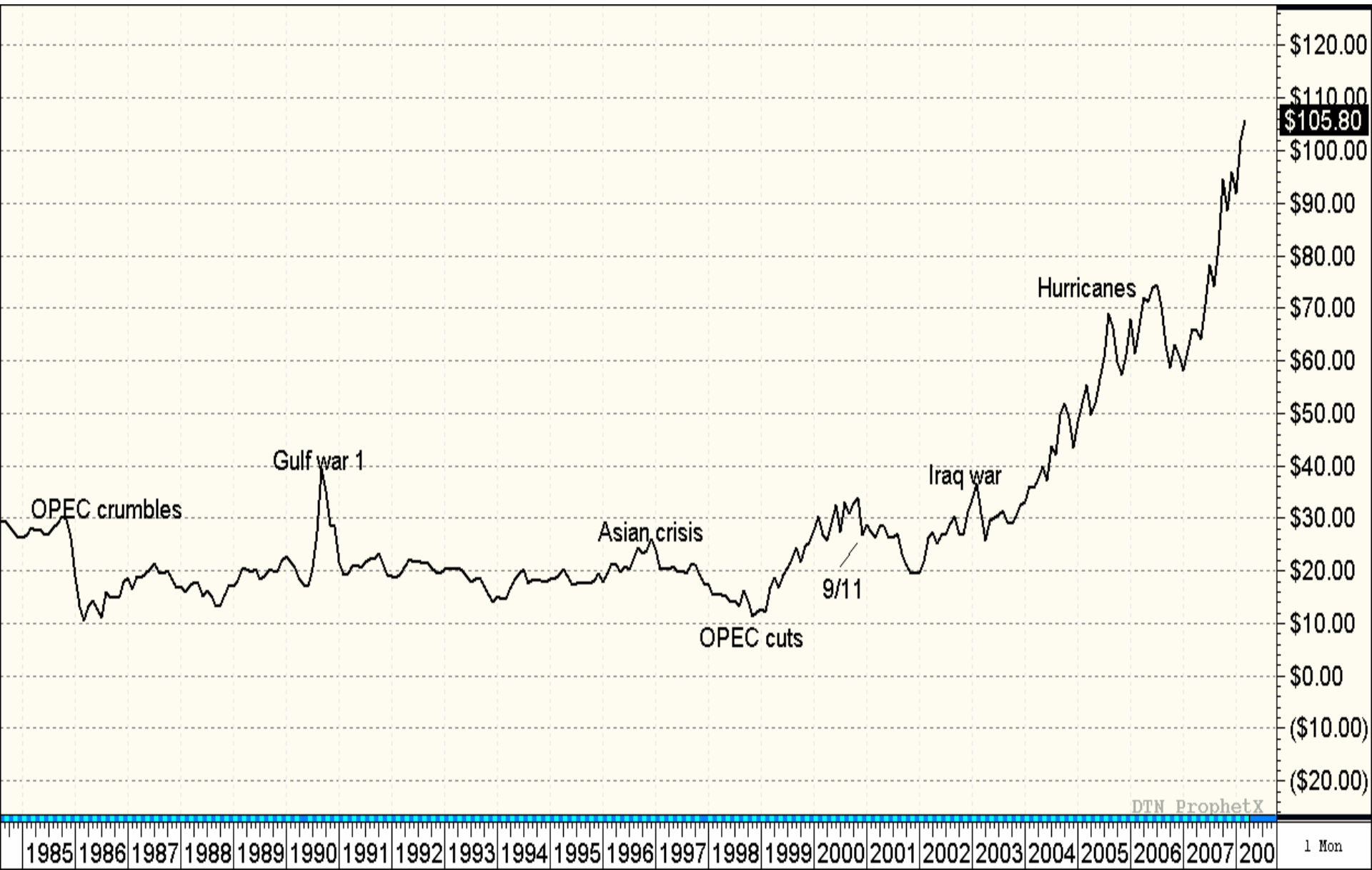
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- Developing countries are demanding more energy, food and raw materials.
- Commodity prices have surged.
- U.S. is struggling to finance war and tax cuts - deficits are huge, dollar is weak.
- Higher interest rates (and inflation?) ahead.
- Mideast crisis and turmoil continues.
- Financial crisis unfolding?
- Global economic outlook is uncertain.

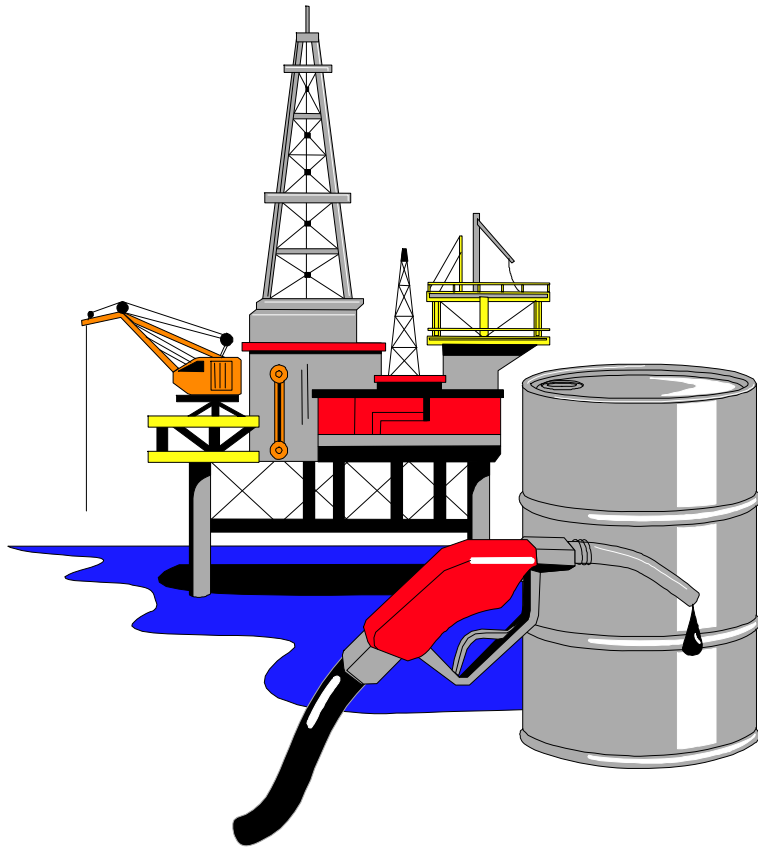
# In Mch 07 – our High Price Case

- global economy is strong
- severe weather in the U.S. and Europe
- mideast turmoil intensifies
- crude supply interruptions
- dollar is weaker
- crude is \$70-90
- HO is \$2.00-2.60
- gasoline is \$2.00-3.00
- natural gas is \$9-13
- Propane is \$1.00-1.50

# Crude Price History



# Drivers Behind Crude Prices

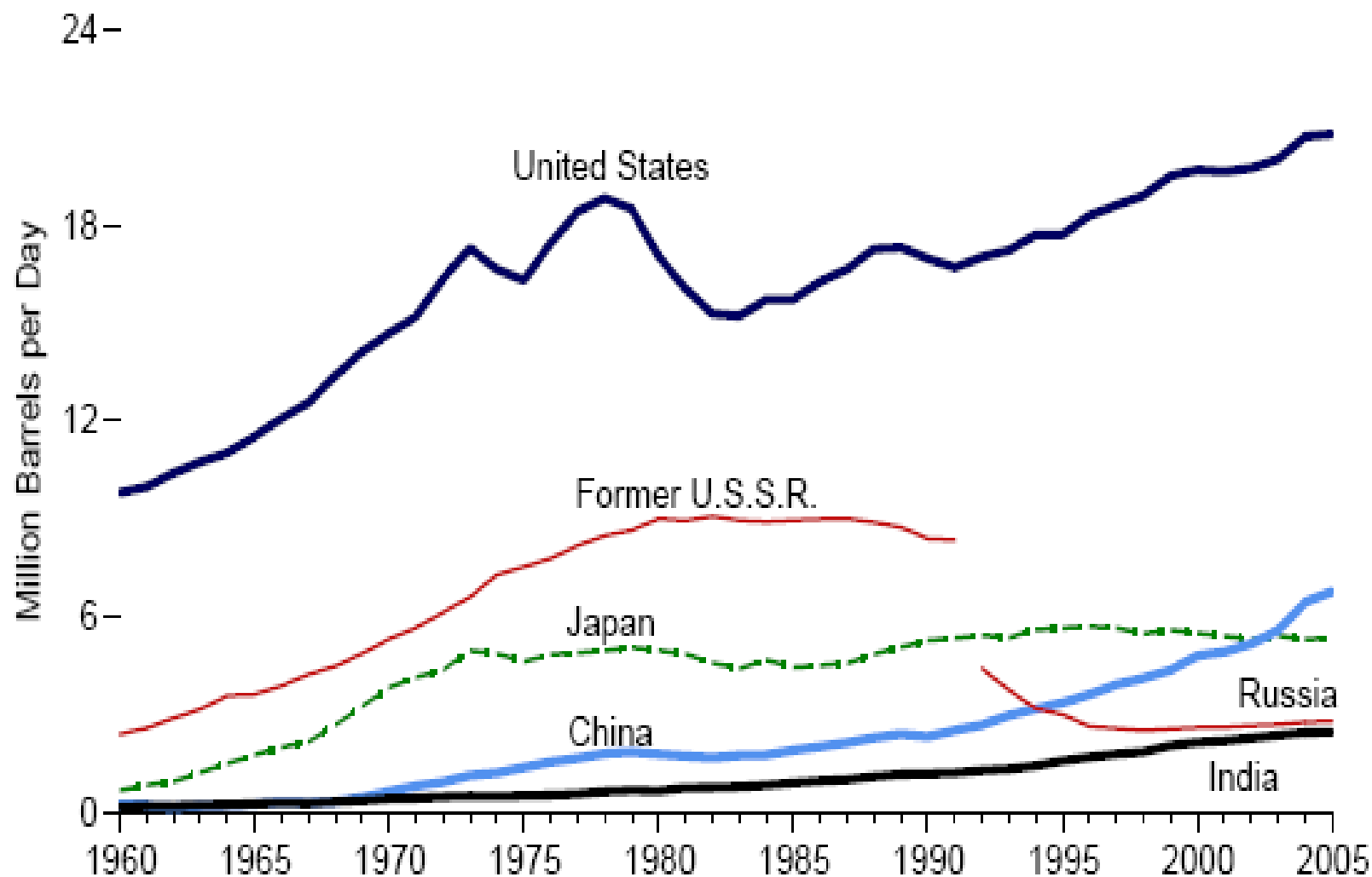


- Weak dollar
- Strong demand
- Tight markets
- Little spare crude oil capacity
- Index funds

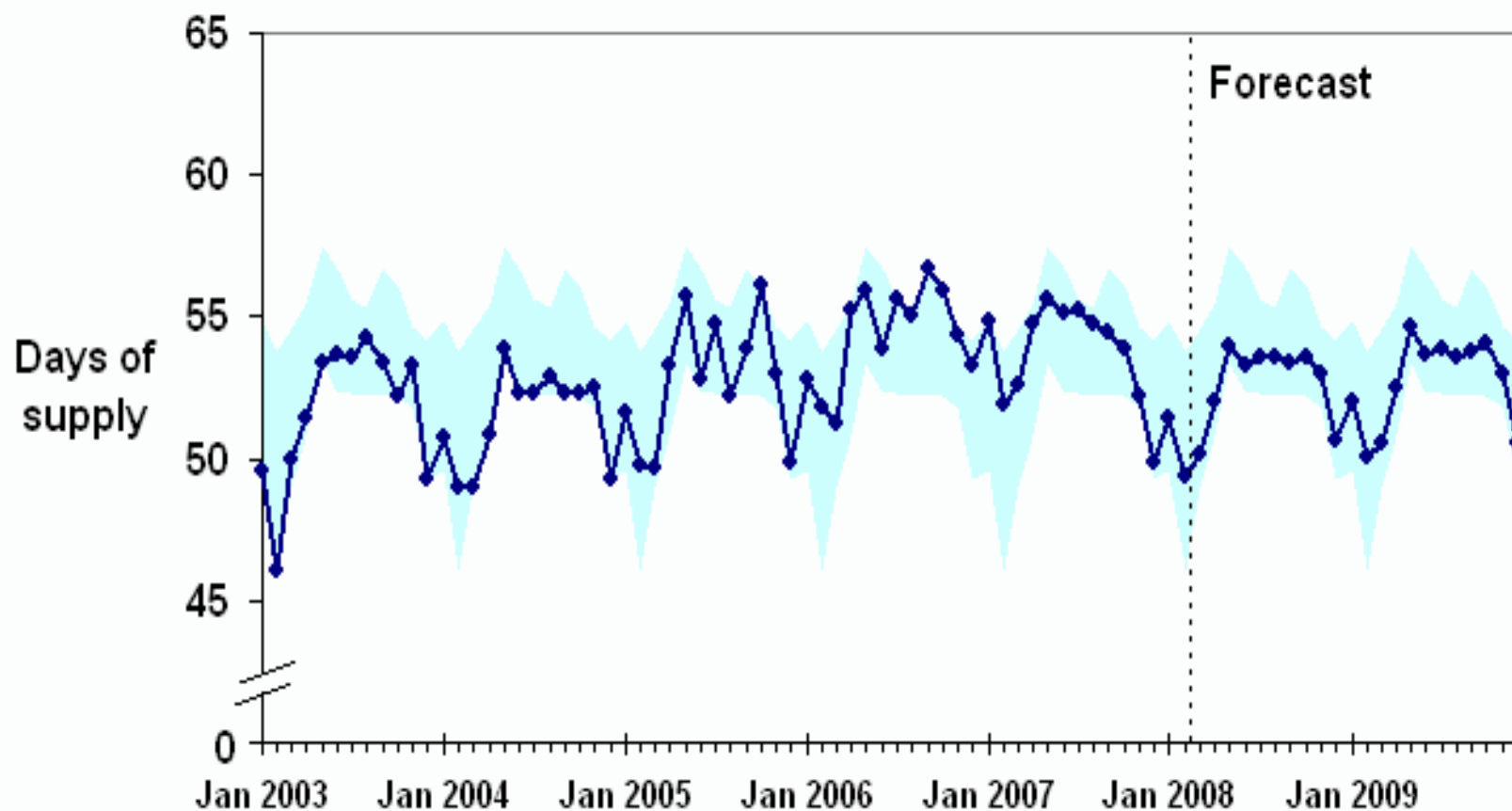
# US Dollar Index



## Top Consuming Countries, 1960-2005



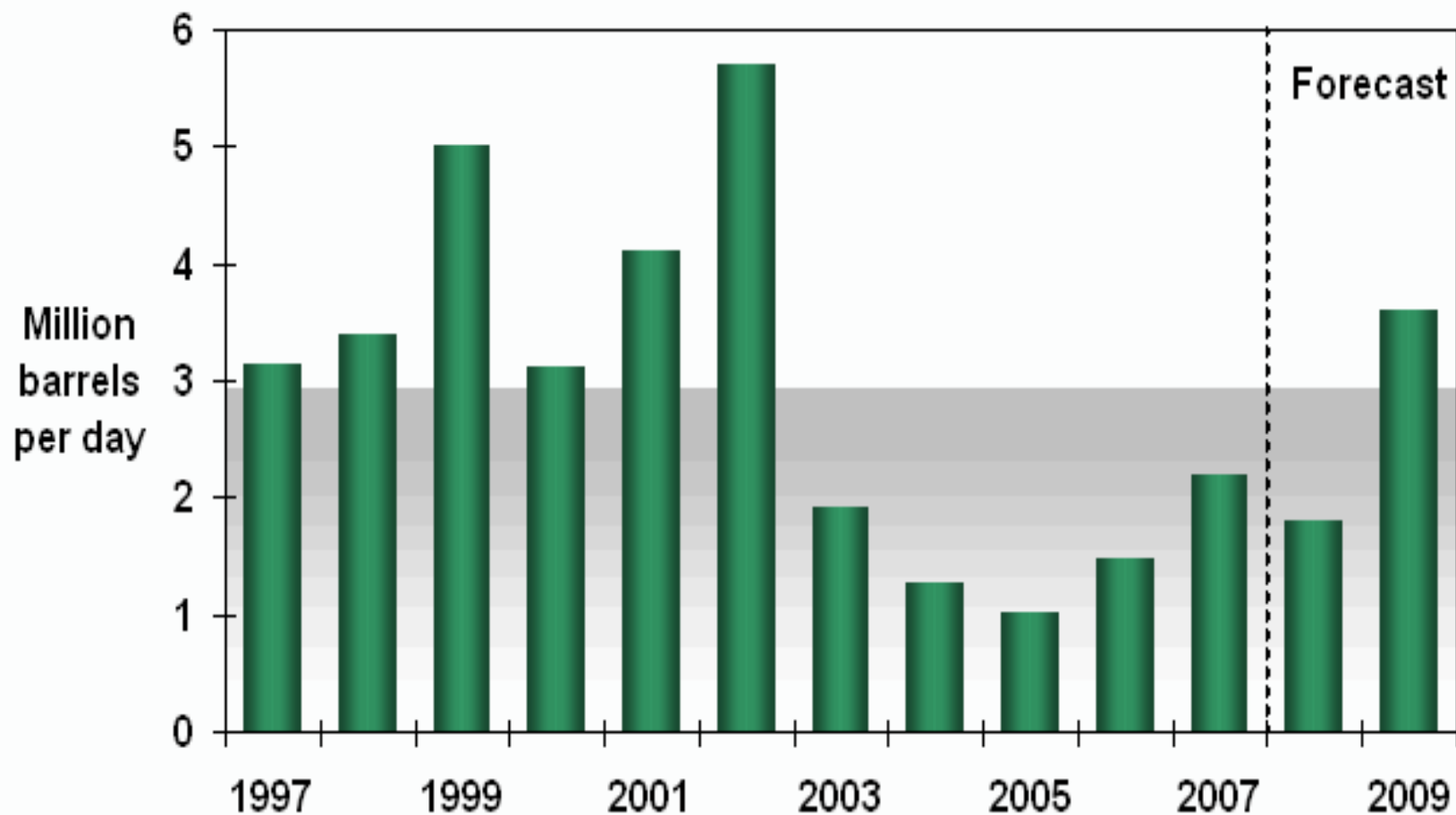
## Days of Supply of OECD Commercial Oil Stocks



NOTE: Colored band represents the 5-year minimum/maximum range for each month.

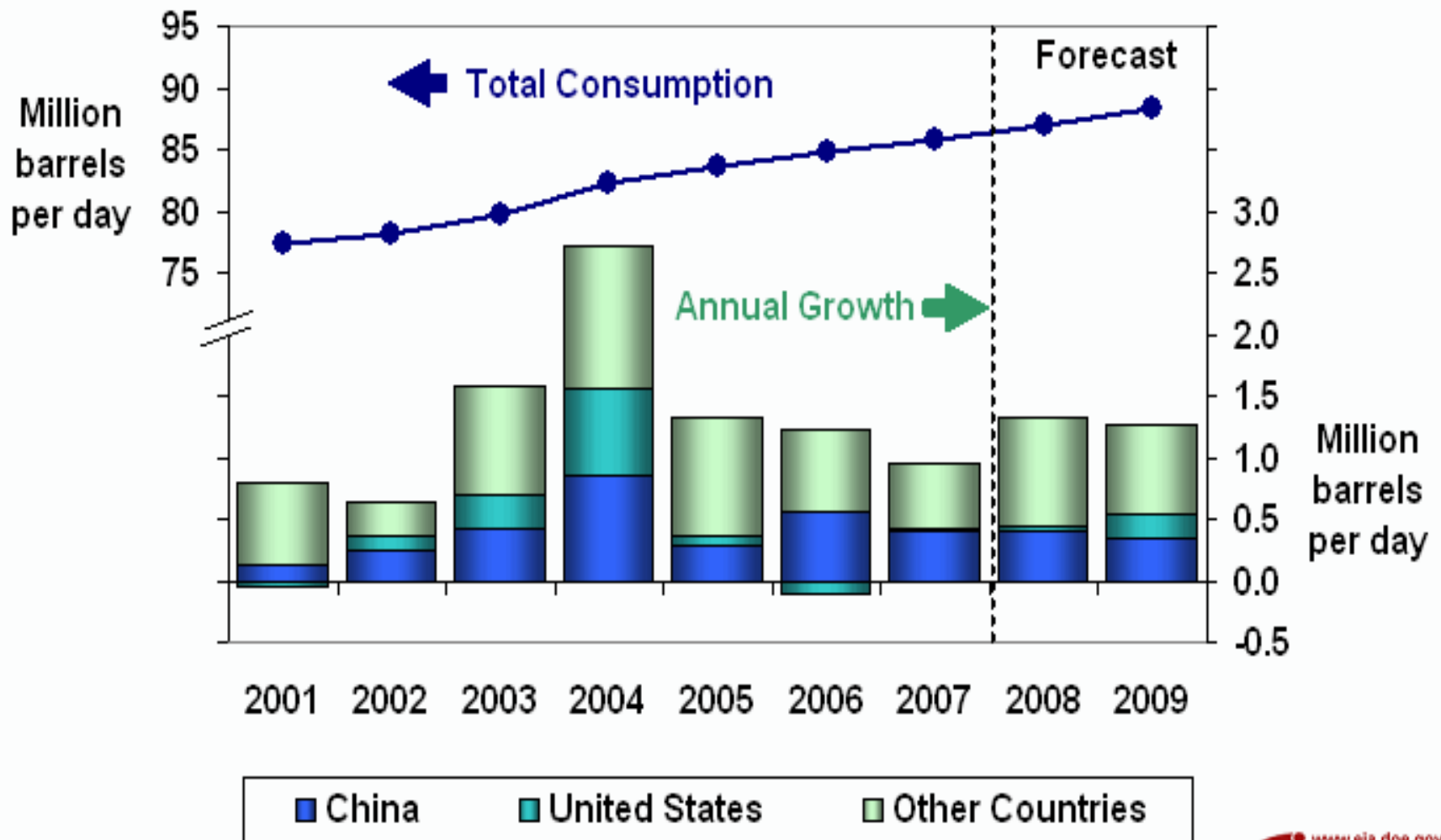


## OPEC Surplus Crude Oil Production Capacity

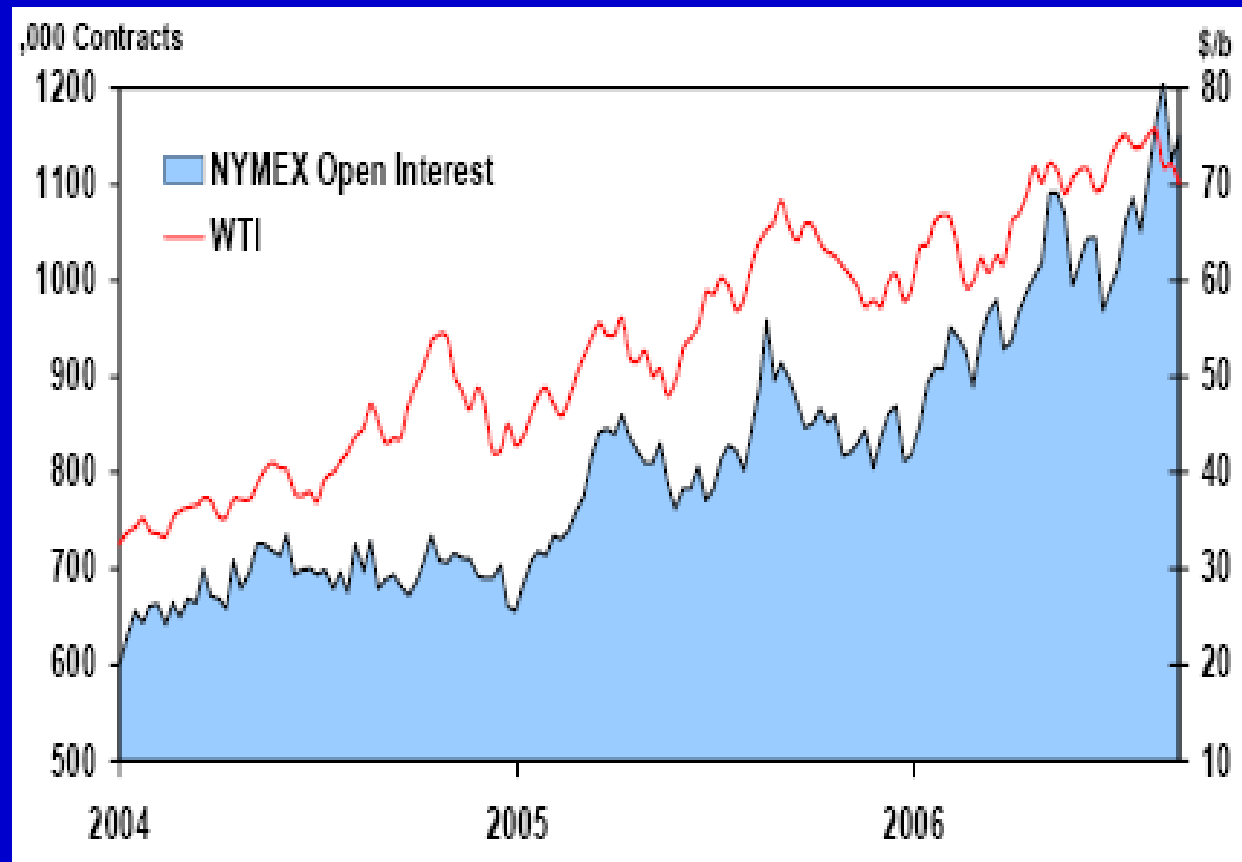


Note: Shaded area represents 1997-2007 average (2.9 million barrels per day)

# World Oil Consumption

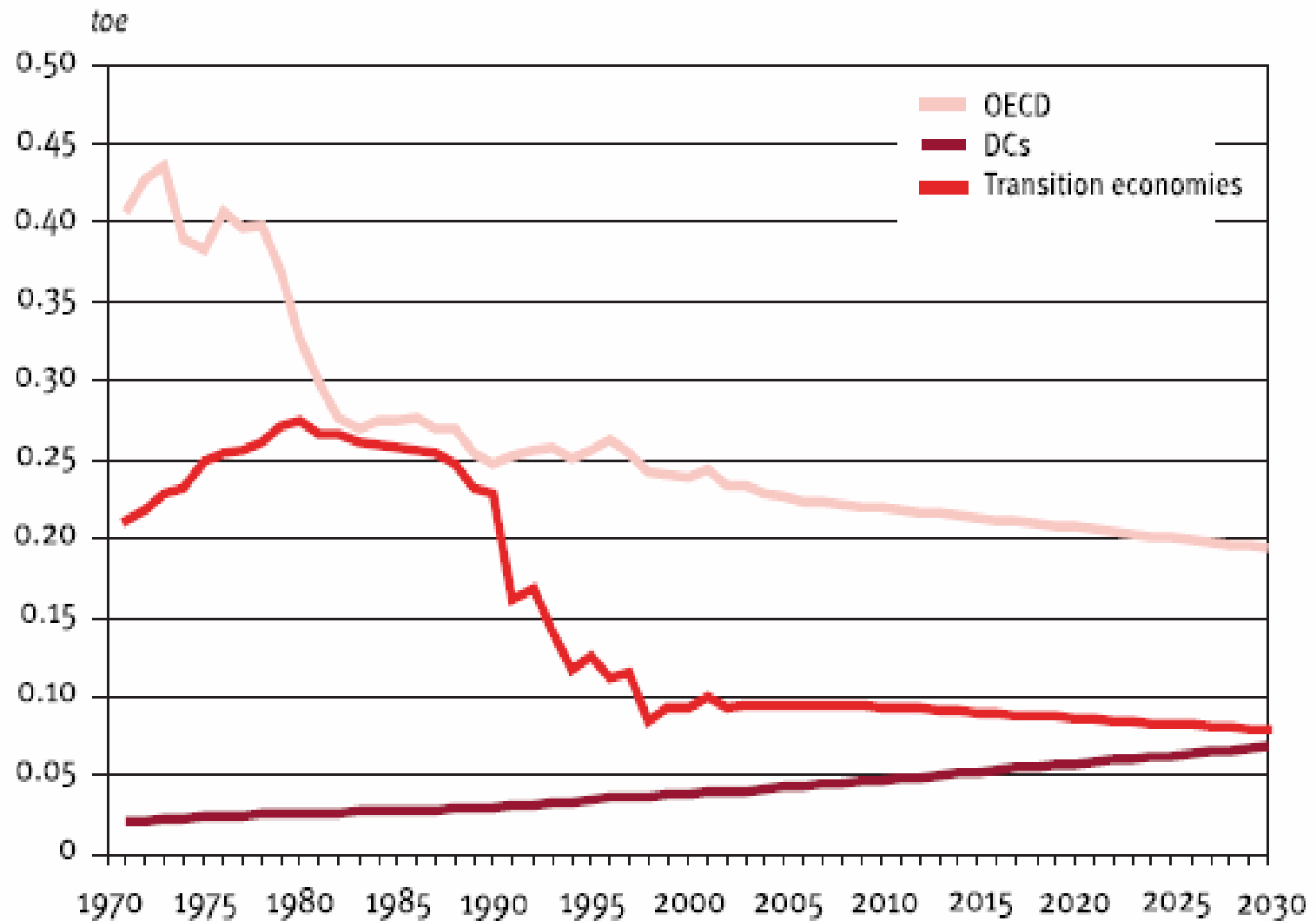


# Strong growth in “paper-oil” markets



Speculation is an additional source of price volatility

**Figure 2.7**  
**Oil demand per capita, residential/commercial/agriculture**



**Figure 1.5**  
**Oil use per capita in 2030**

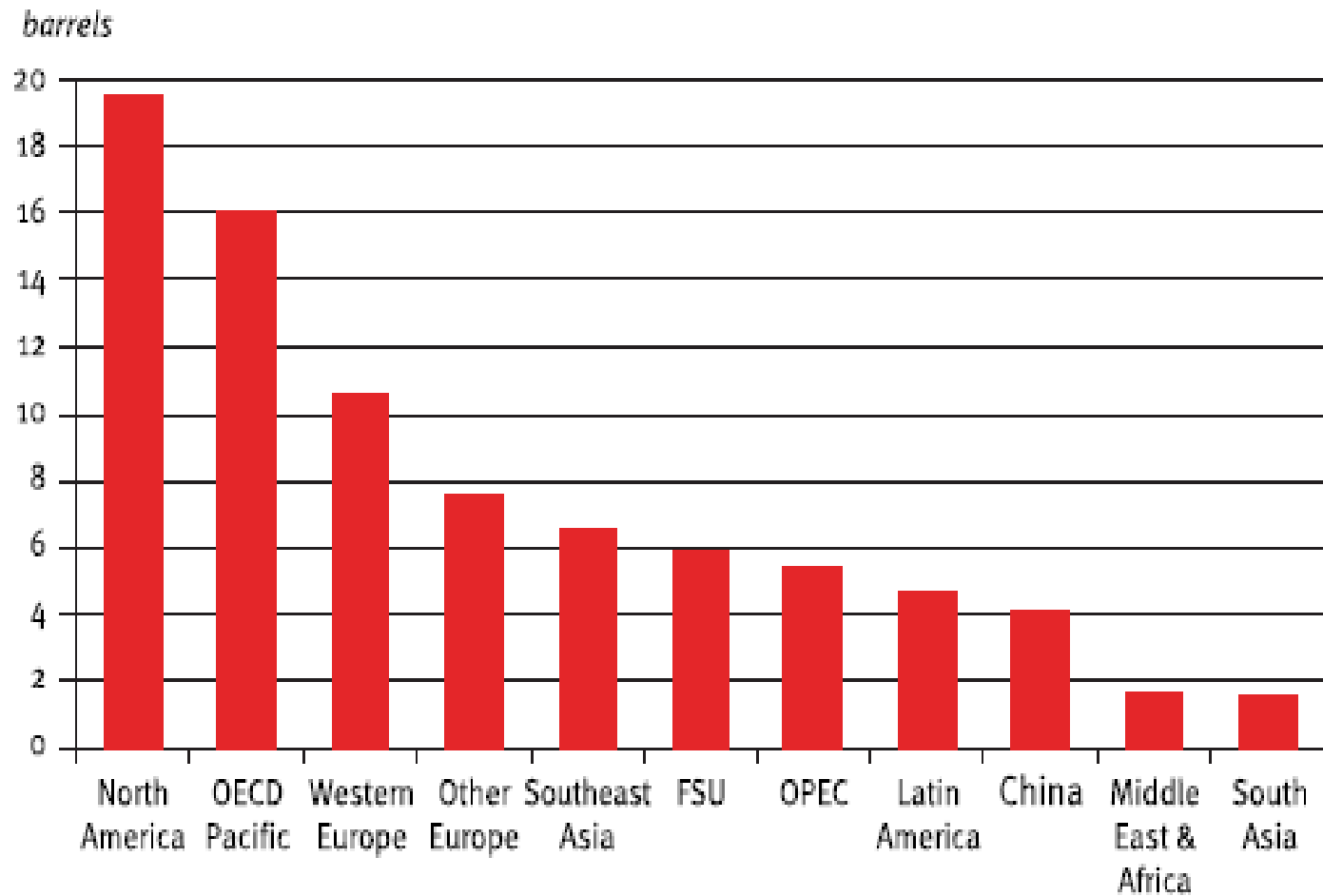
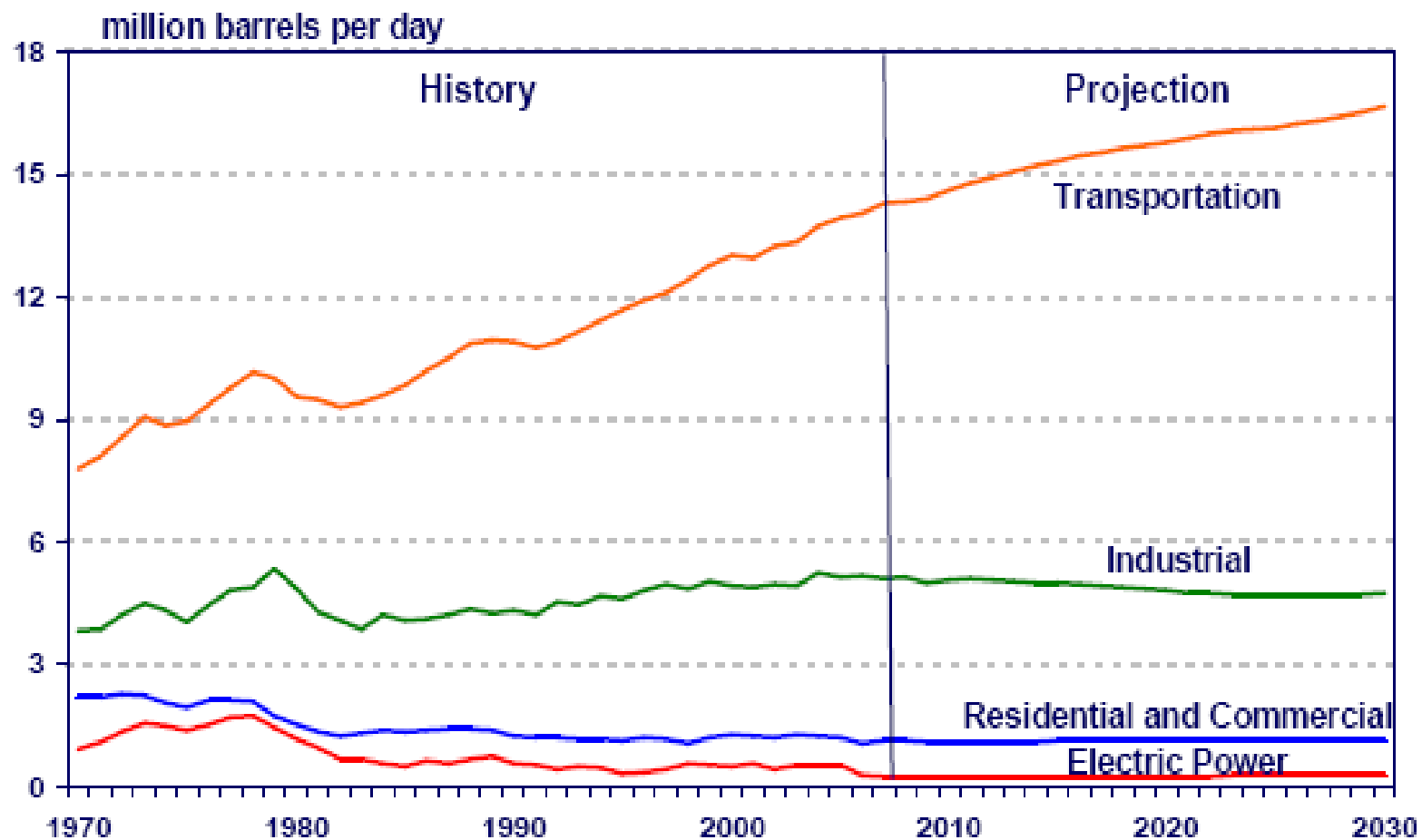
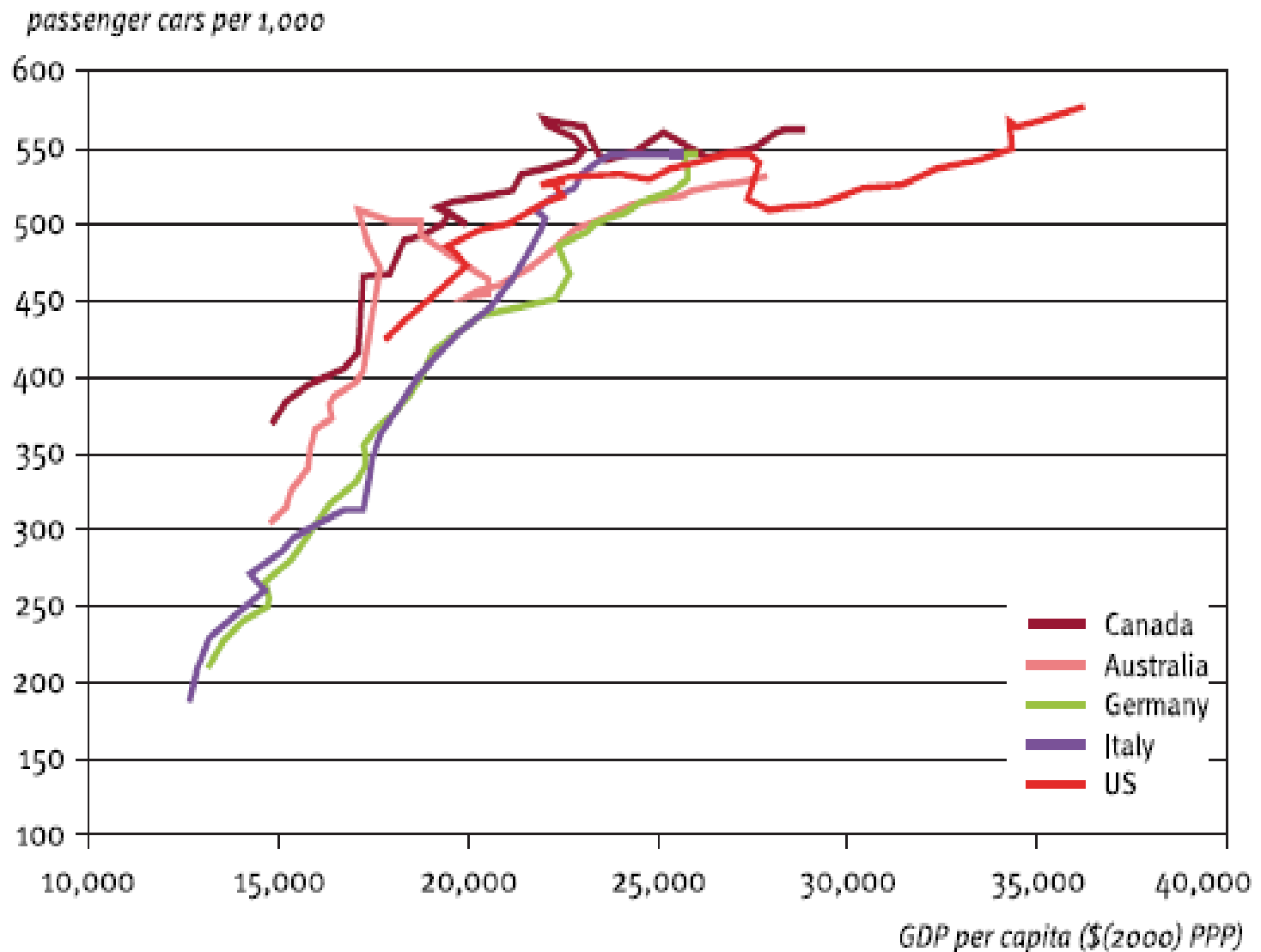


Figure 4. The transportation sector dominates liquid fuel consumption.

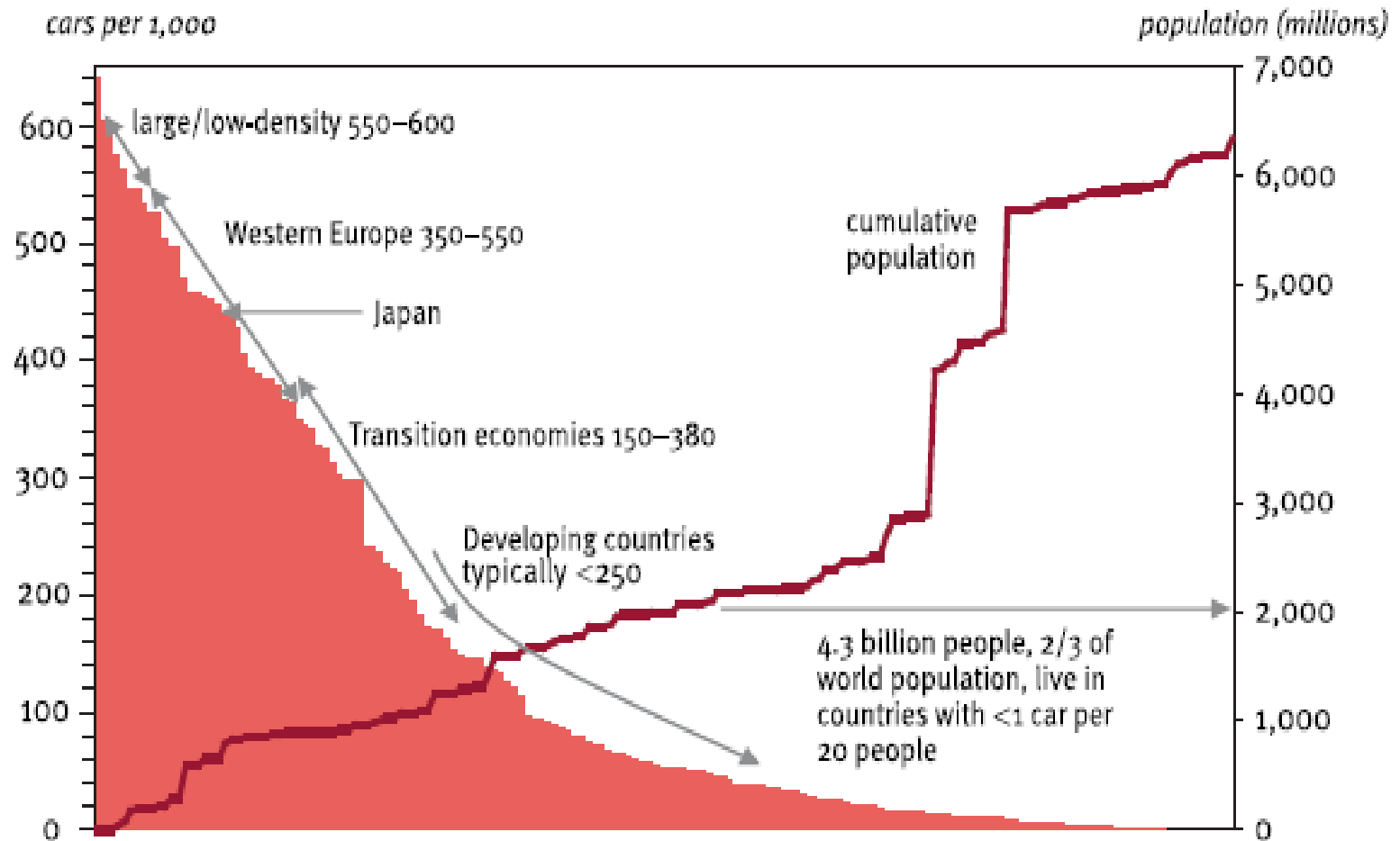


**Figure 2.2**

**Development of car ownership in five OECD countries, 1970–2004**

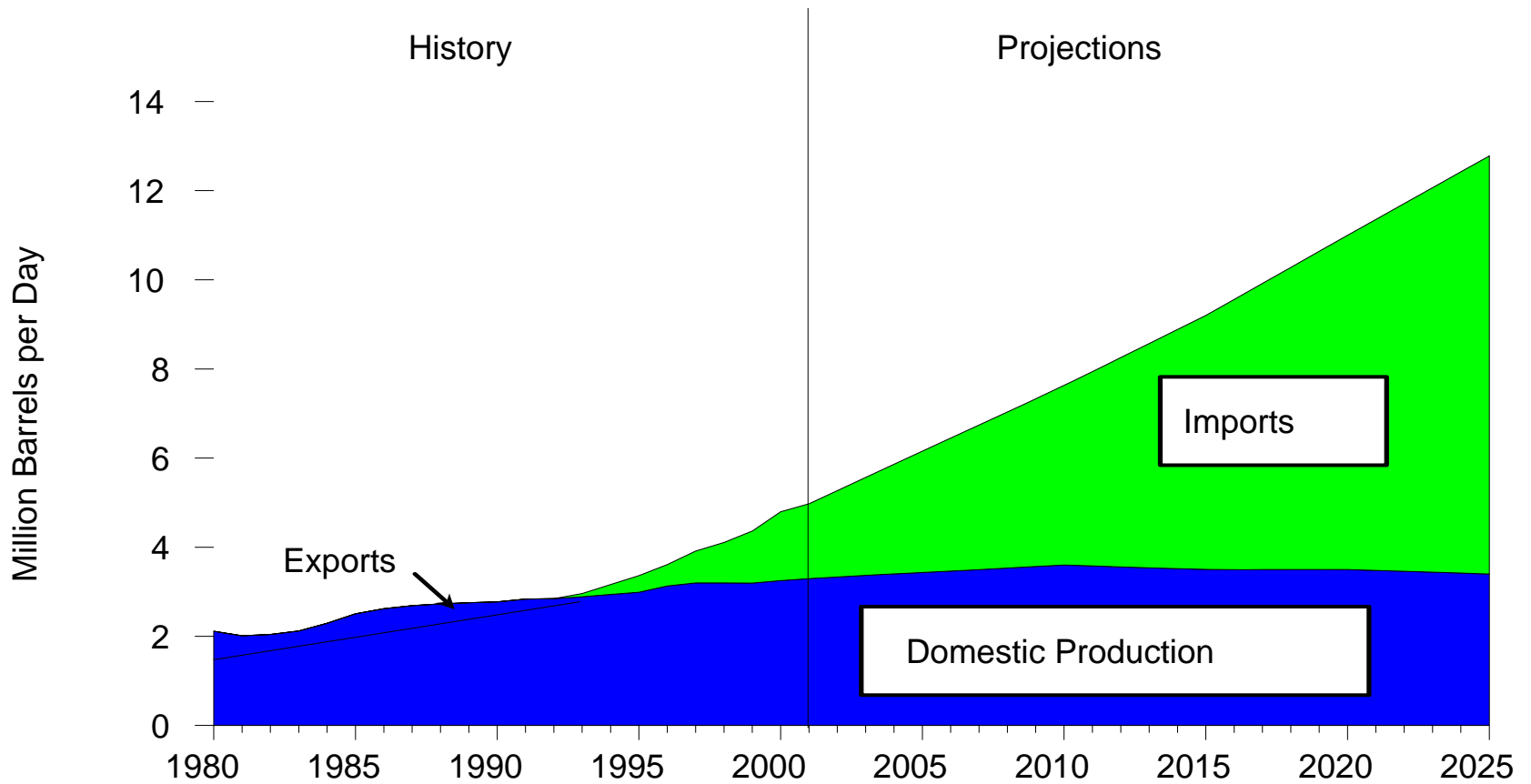


**Figure 2.1**  
**Passenger car ownership per 1,000 of population, 2004**



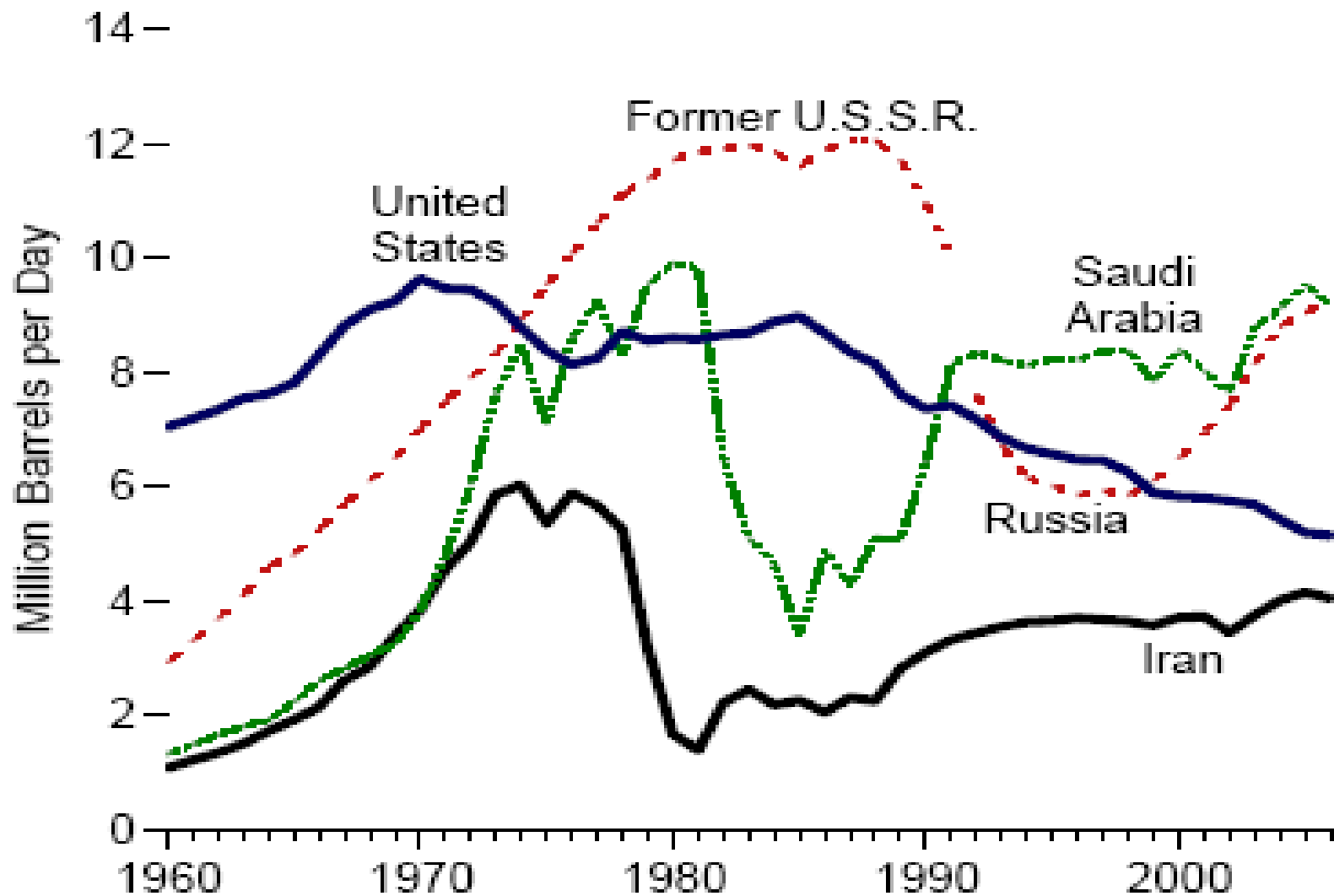
Source: *World Road Statistics, International Road Federation (various editions), OPEC Secretariat estimates.*

# China's Oil Balance

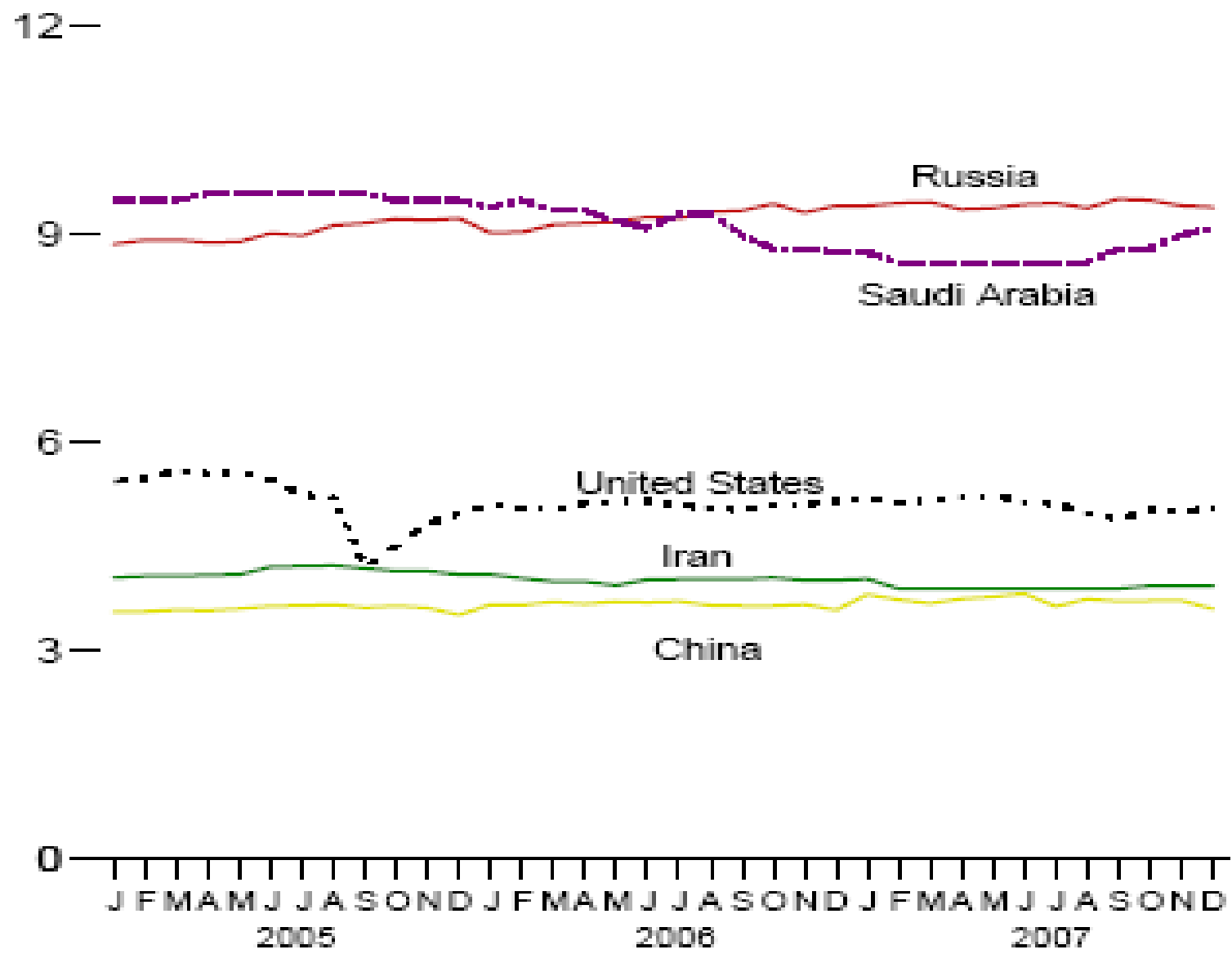


Source: EIA, *International Energy Outlook 2004*

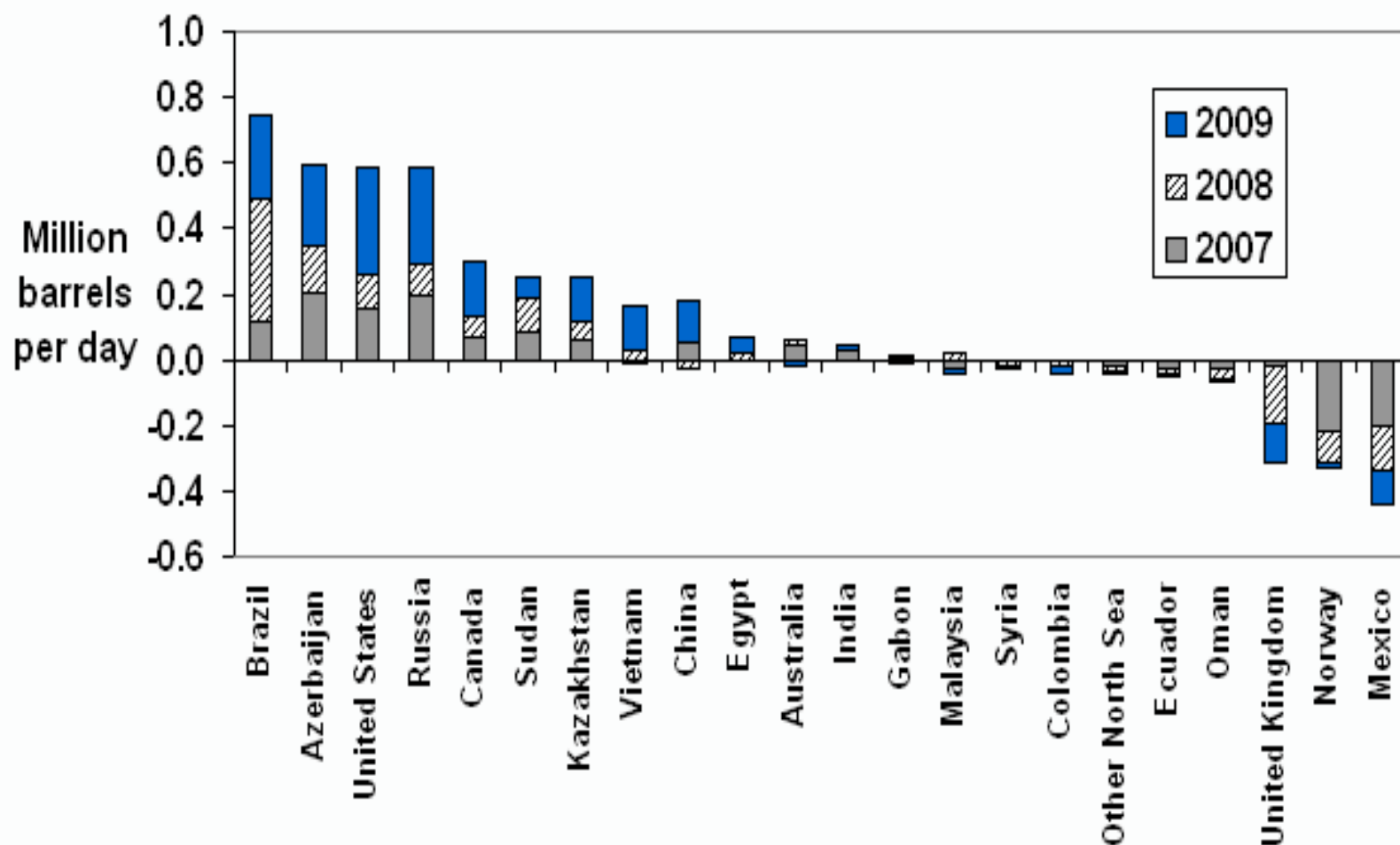
# Top Producing Countries, 1960-2006



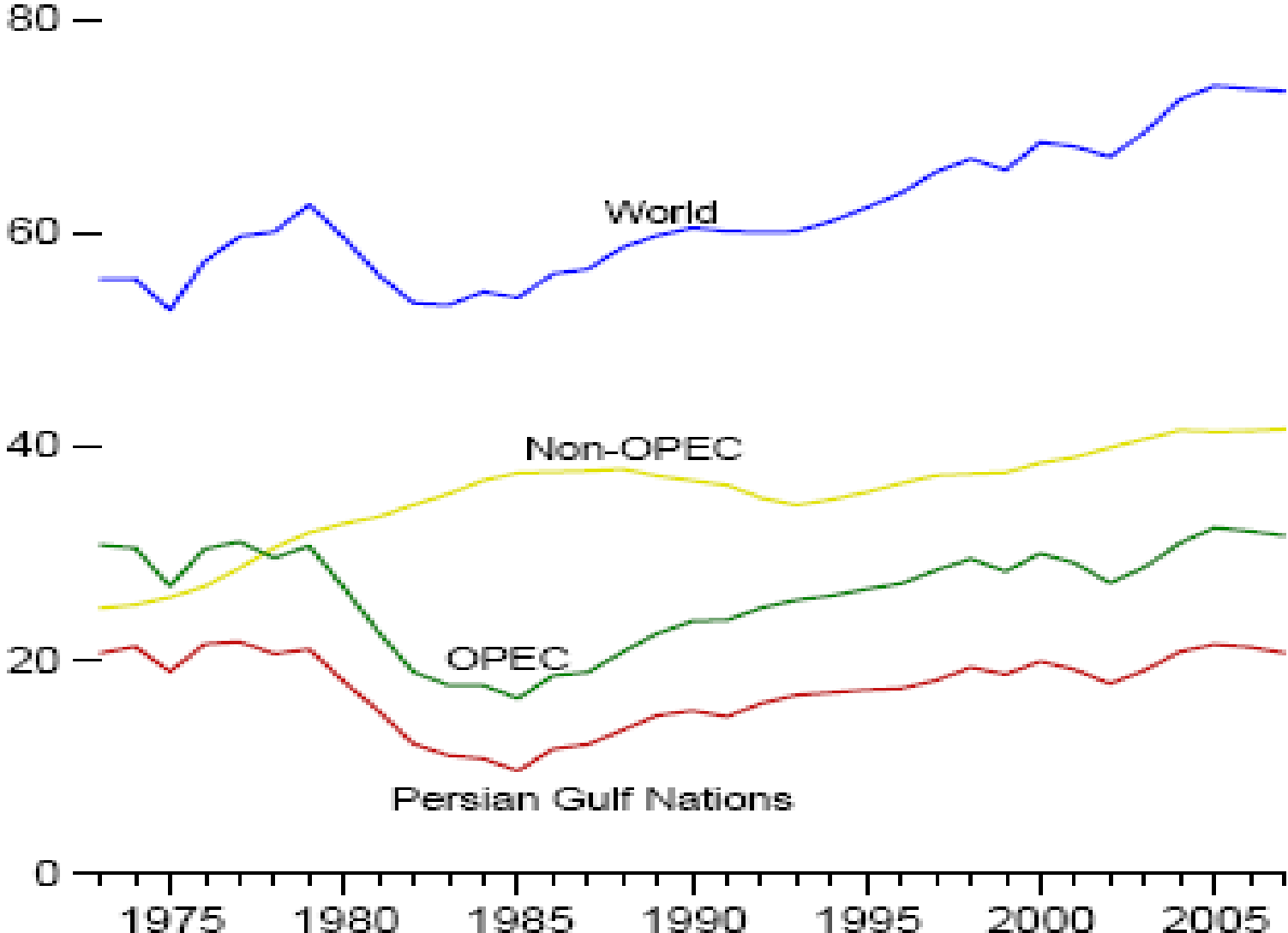
# Selected Producers, Monthly



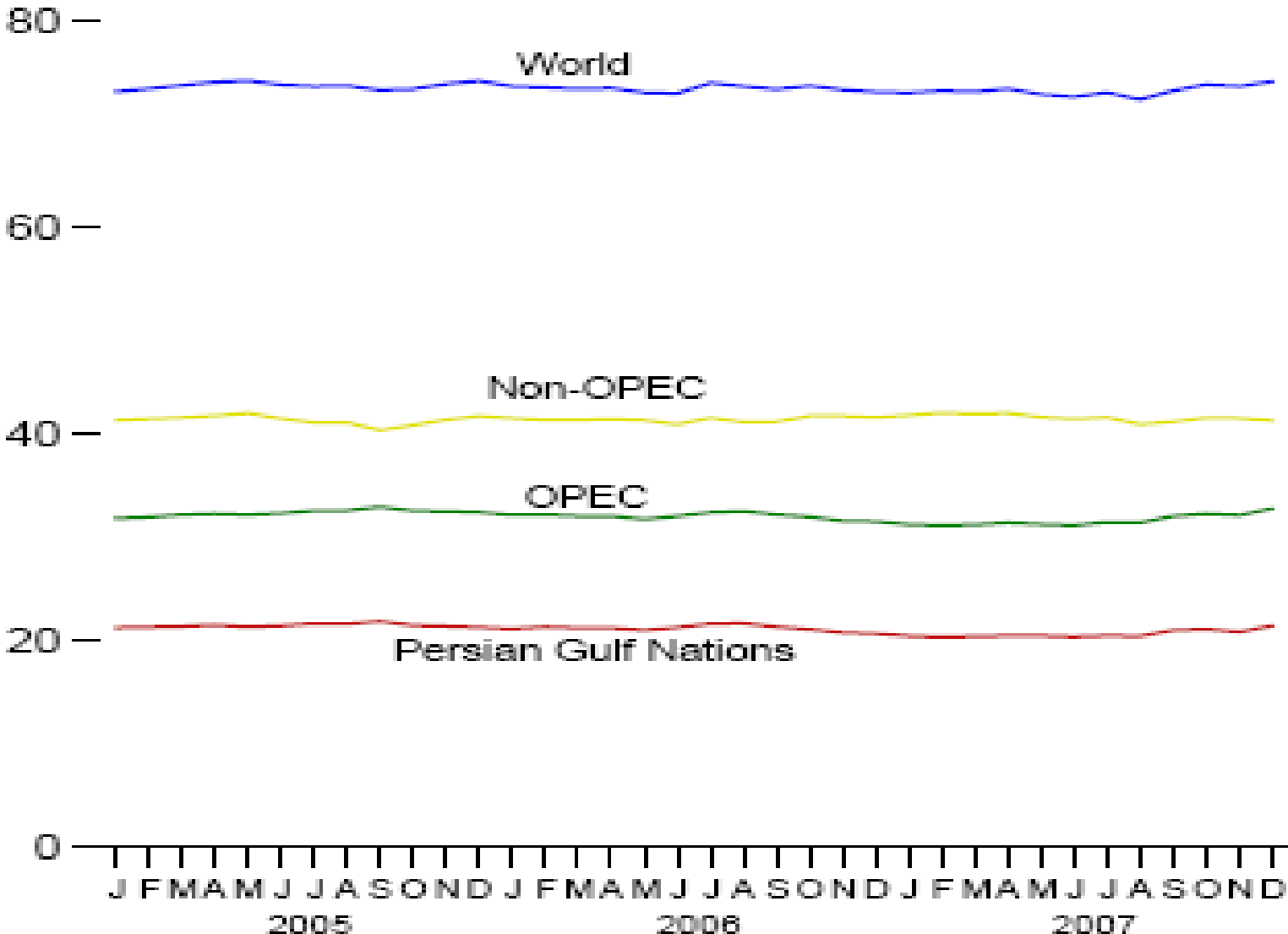
## Non-OPEC Oil Production Growth (Change from Previous Year)



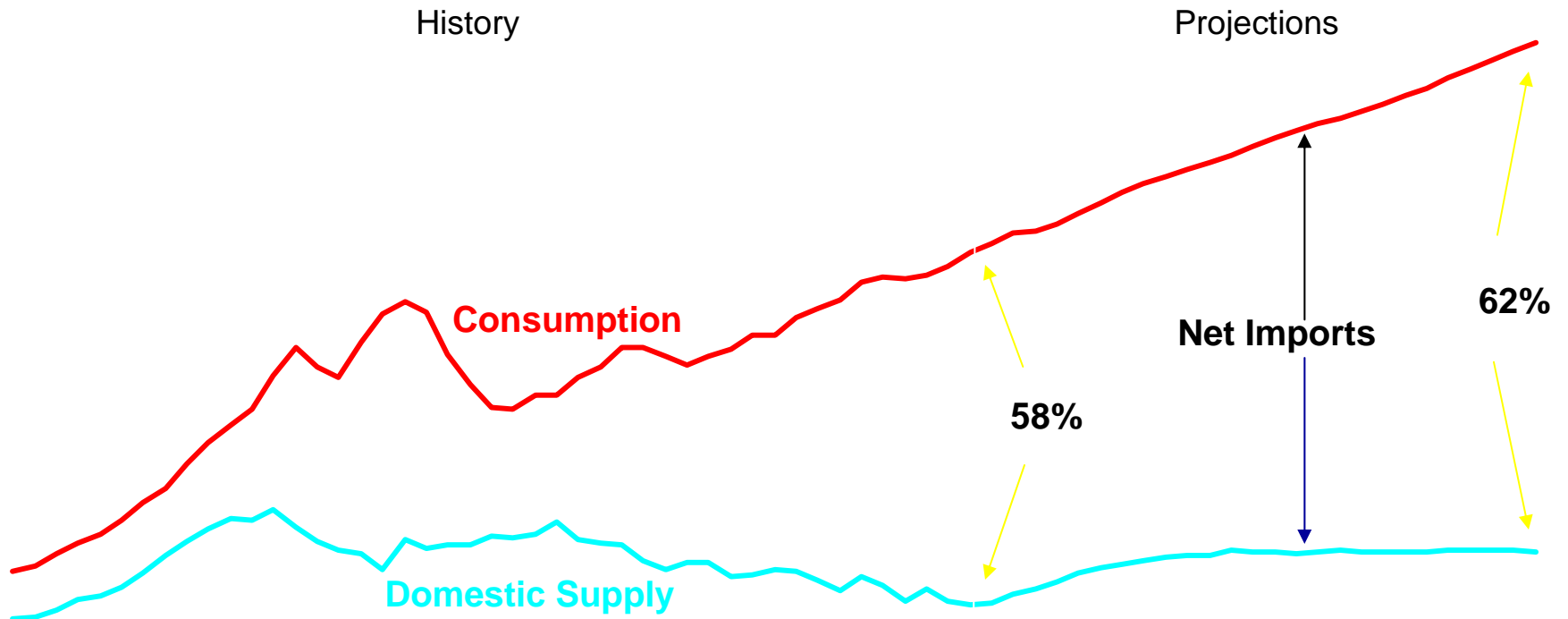
World Production, 1973-2007



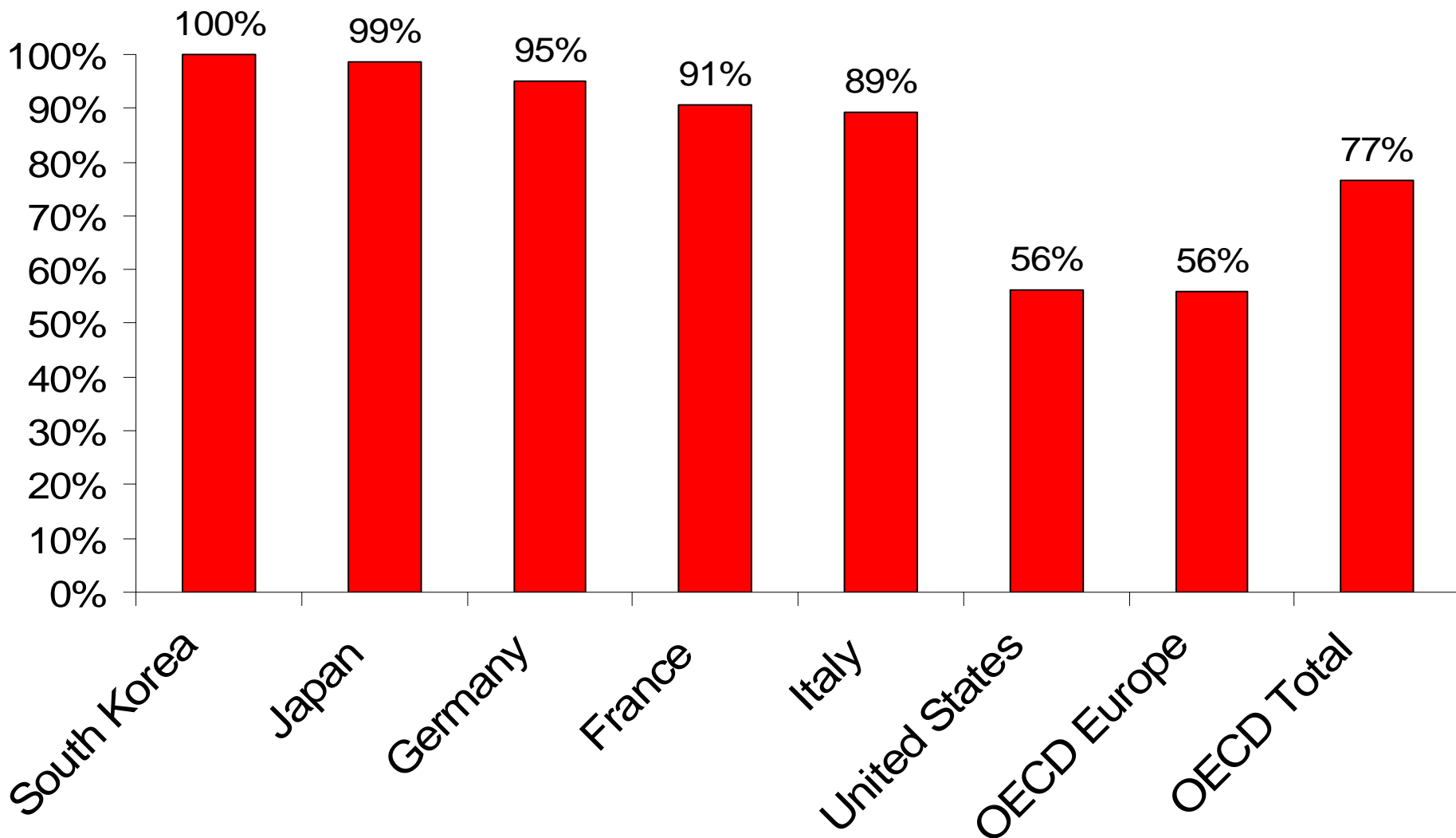
# World Production, Monthly



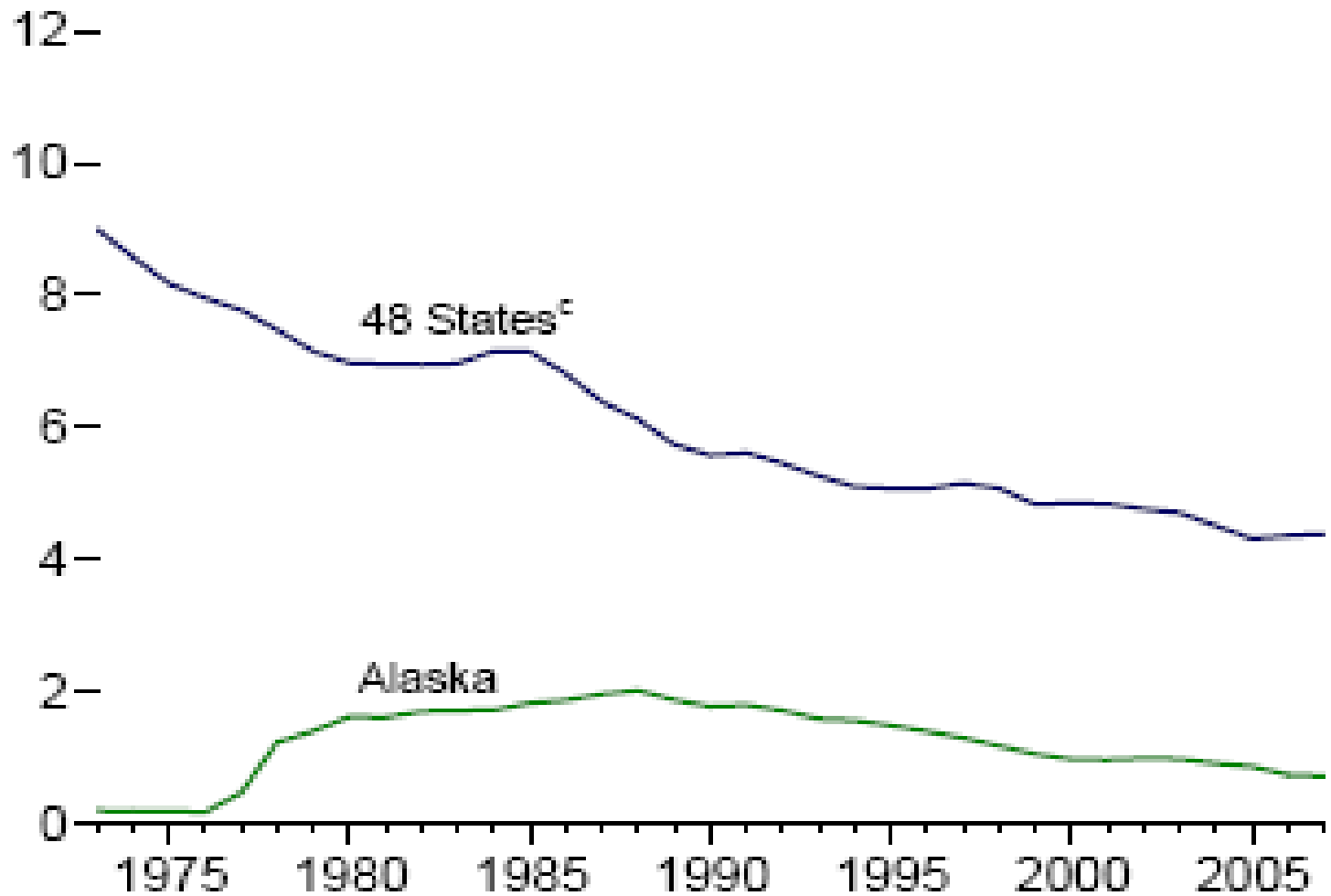
# U.S. Petroleum Supply, Consumption, and Net Imports, 1960-2030 (million barrels per day)



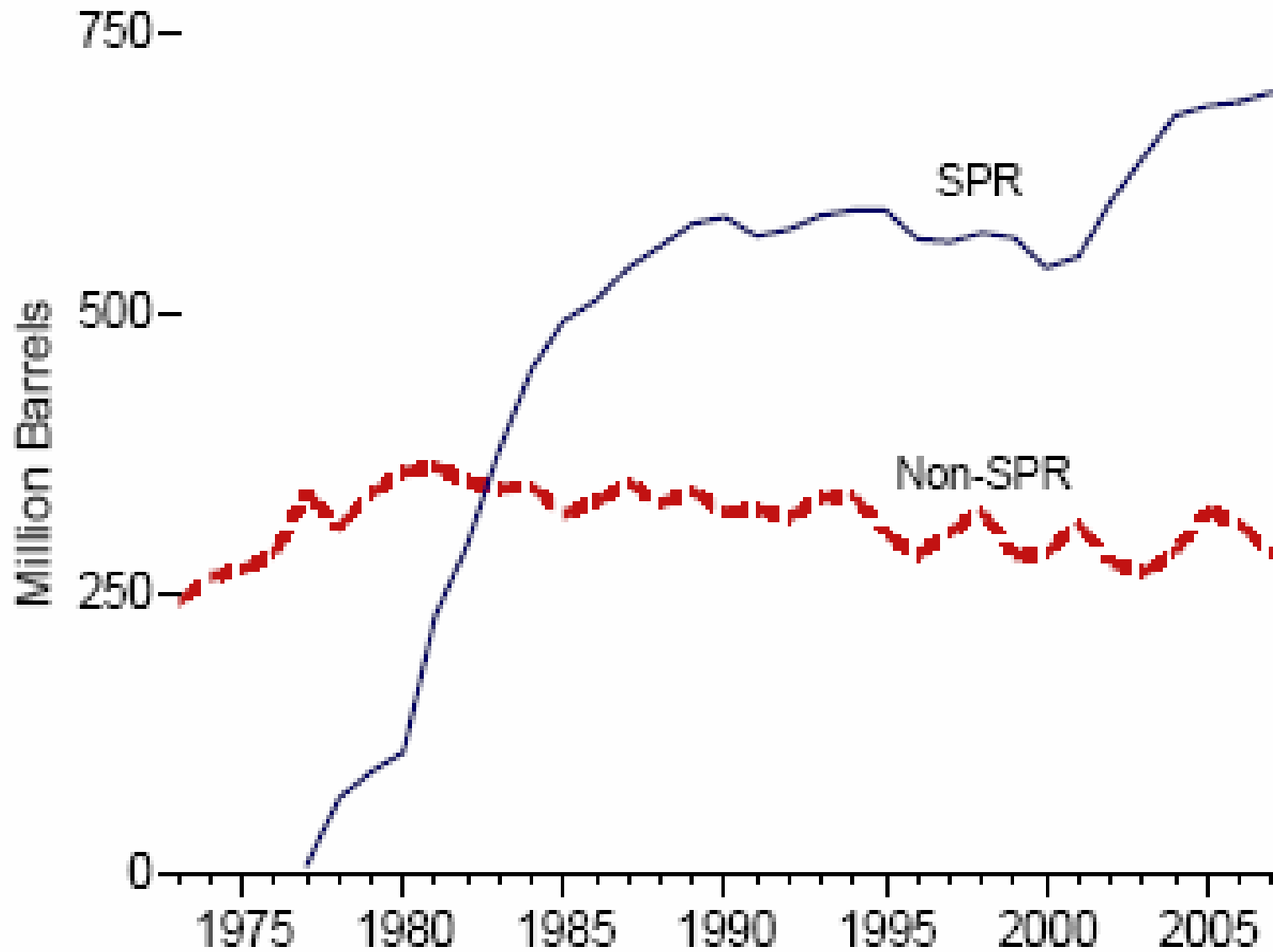
# Oil Import Dependence for Selected OECD Countries, 2003



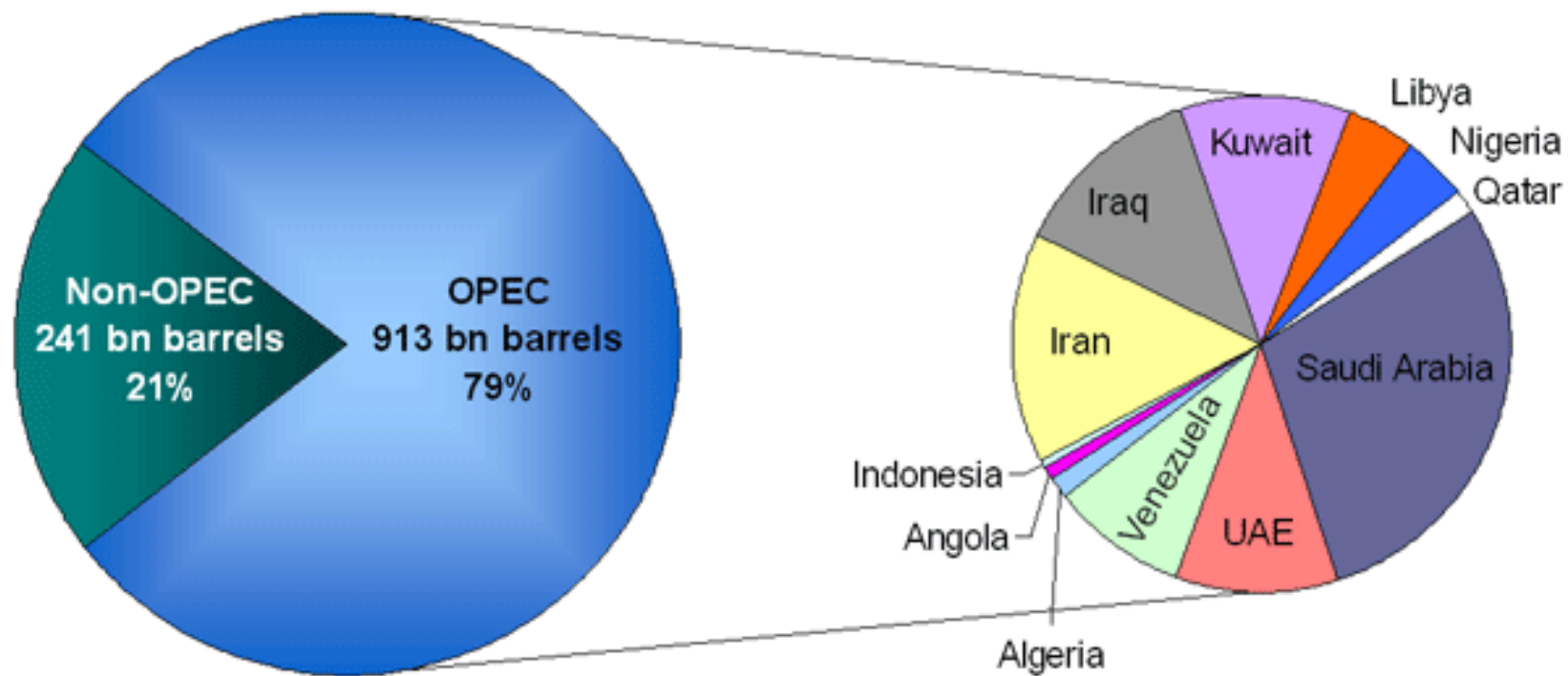
# Crude Oil<sup>b</sup> Field Production, 1973-2007



# SPR and Non-SPR Crude Oil Stocks, 1973-2007



## OPEC Share of World Crude Oil Reserves (2005)



# Long-term oil demand and supply outlook

## Reference case (mb/d)

|                        | 2005 | 2010 | 2015 | 2020  | 2025  |
|------------------------|------|------|------|-------|-------|
| <b>World demand</b>    | 83.2 | 90.7 | 98.0 | 105.6 | 113.1 |
| <b>Non-OPEC supply</b> | 50.1 | 55.8 | 58.3 | 59.4  | 58.9  |
| <b>OPEC supply*</b>    | 33.1 | 34.9 | 39.7 | 46.2  | 54.3  |

\* incl. NGLs

# The Big Questions

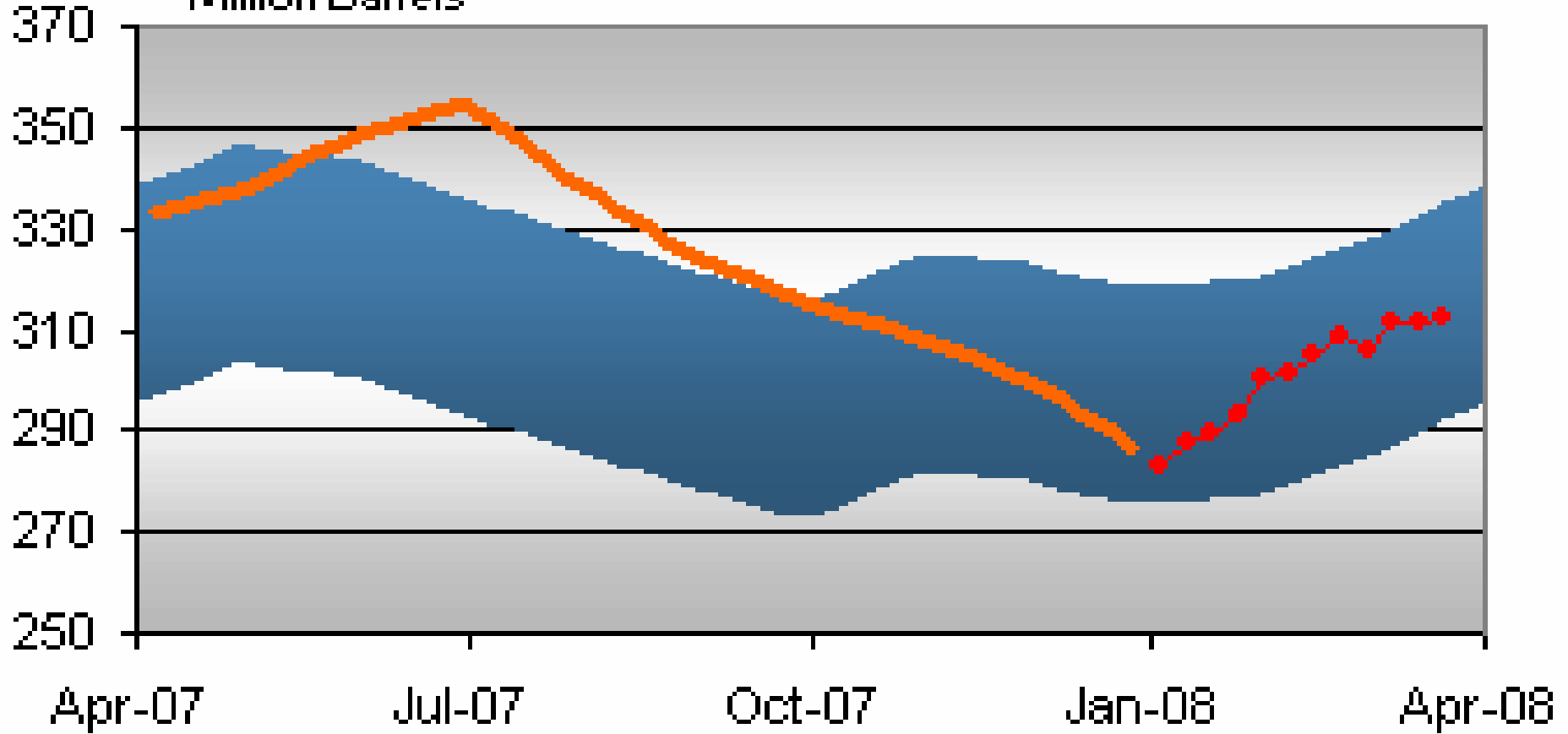
- Can the world increase crude production by 30 mbd over the next 20 years?
- How will the supply be rationed?
- Can transportation demand for petroleum be reduced?
- If crude can't meet the demand for more energy, what will?

# Long Term Crude Oil Outlook

- Global crude production is peaking, if not already past the peak.
- Within OPEC, only Saudi Arabia has the capacity to increase production and even that is in question.
- Consumption will have to fall by about 2% per year when the peak passes (to match production)
- The U.S. and other developed countries may become even more dependent on imports.
- In real terms, high prices will ration supplies and reduce consumption.
- Current forward crude prices provide ample incentive for investing in alternative energy sources.

# U.S. Crude Oil Stocks

Million Barrels

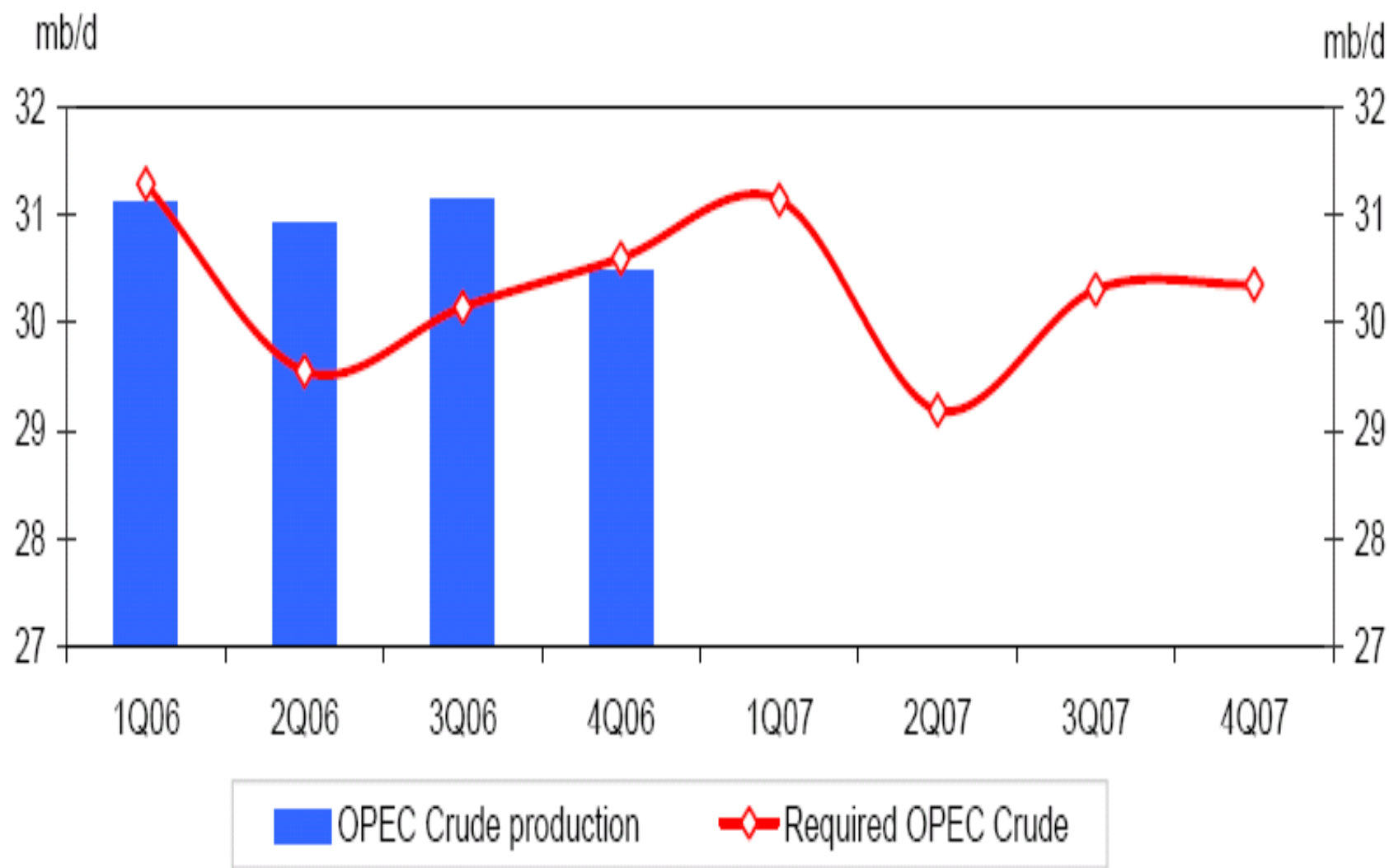


■ Average Range

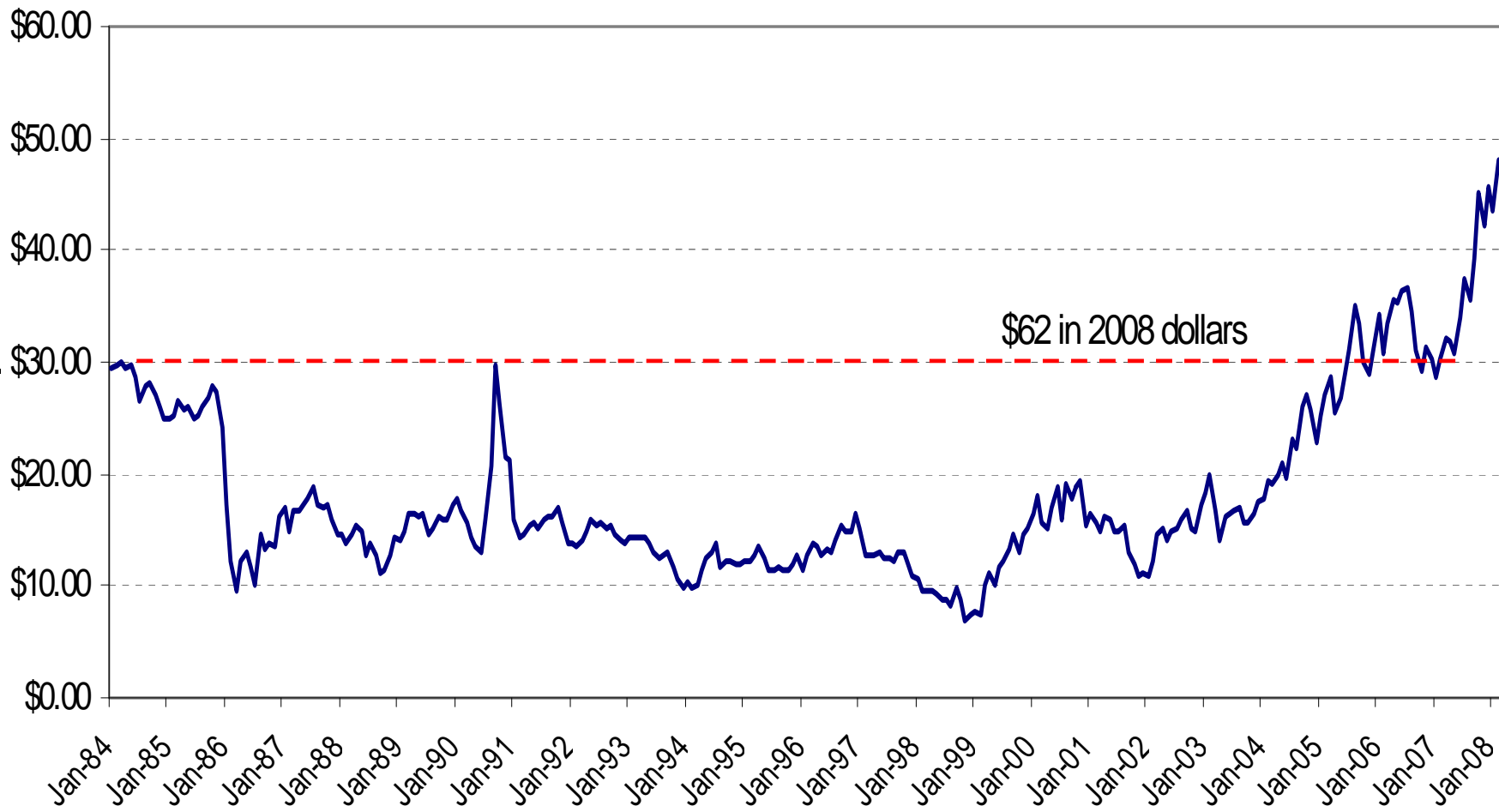
— Monthly

—♦ Weekly

Graph 24: Balance of supply and demand



**NYMEX Crude in Constant 1984 Dollars**  
**(Adjusted by Bureau of Labor Statistics Consumer Price Index)**



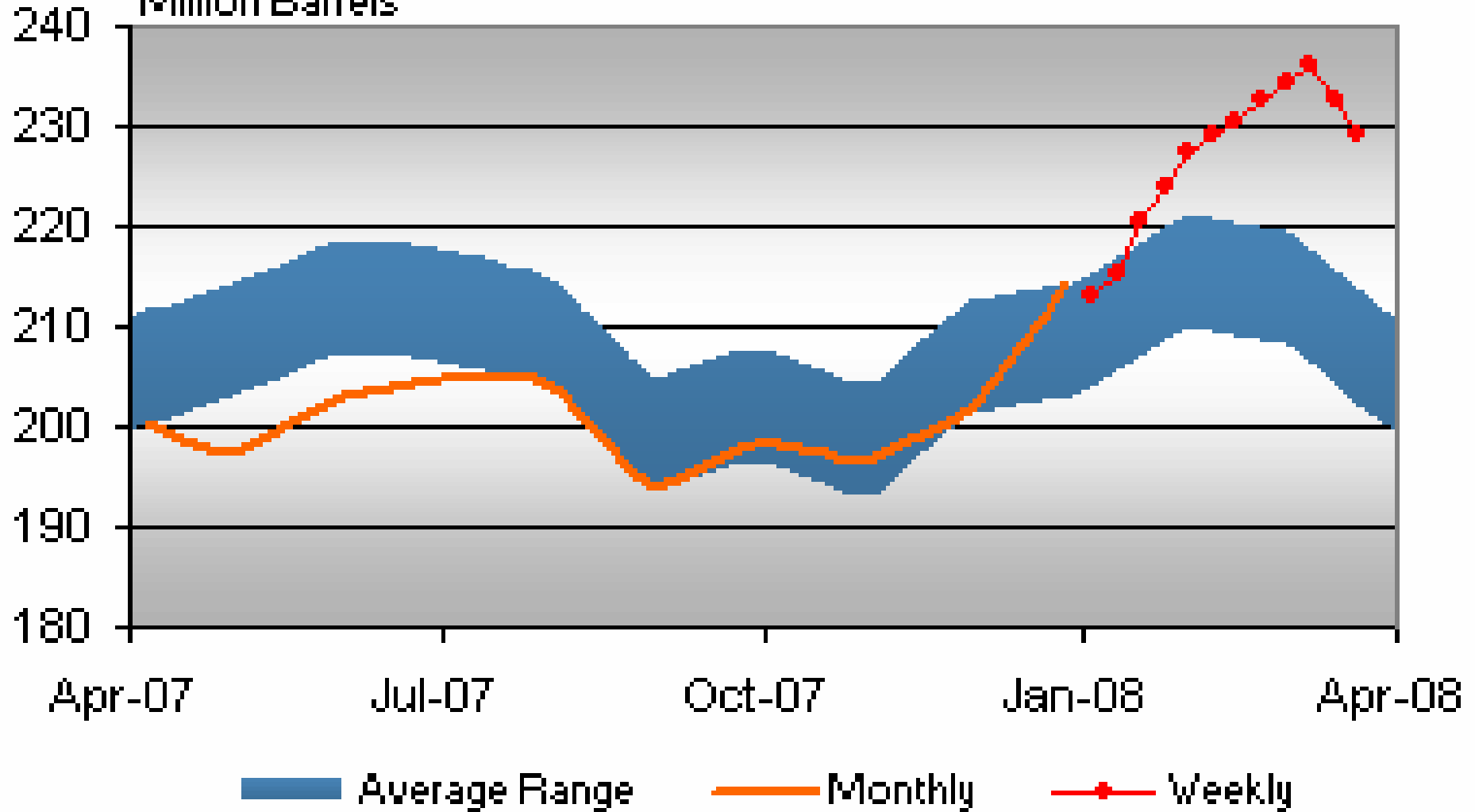
# Short-Term Crude Outlook

- US inventories are average.
- “new money” is buying commodities, especially energy.
- OPEC will defend \$80-90 price level.
- supply/demand balance is still tight.
- market is nervous about Iraq, Iran.
- Diesel is taking the lead, refining margins are adequate.
- Product demand in the US is down, and could allow crude to fall.
- Weak dollar is boosting crude price.
- Downside appears limited to about \$85/bbl.

# The Products

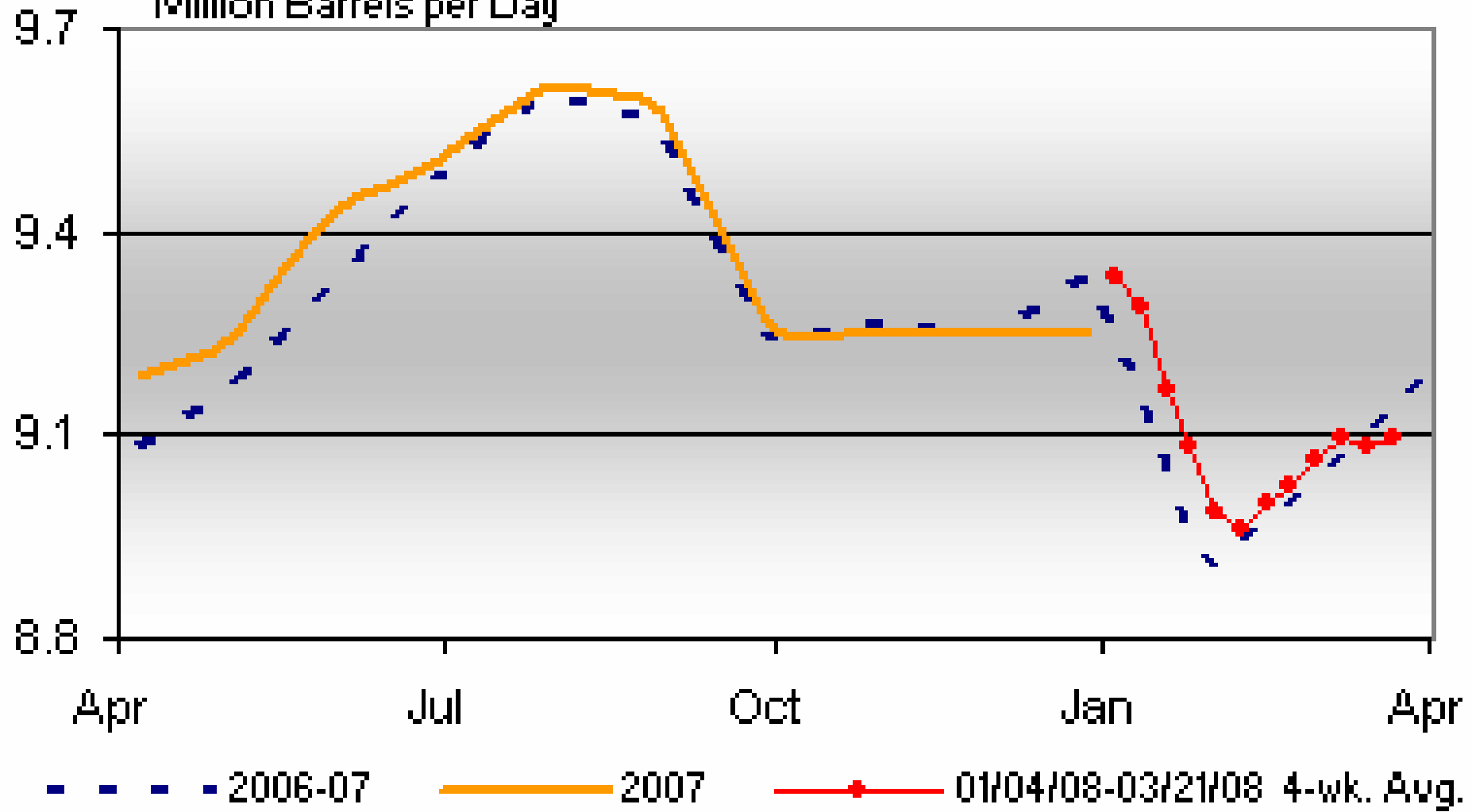
# U.S. Gasoline Stocks

Million Barrels

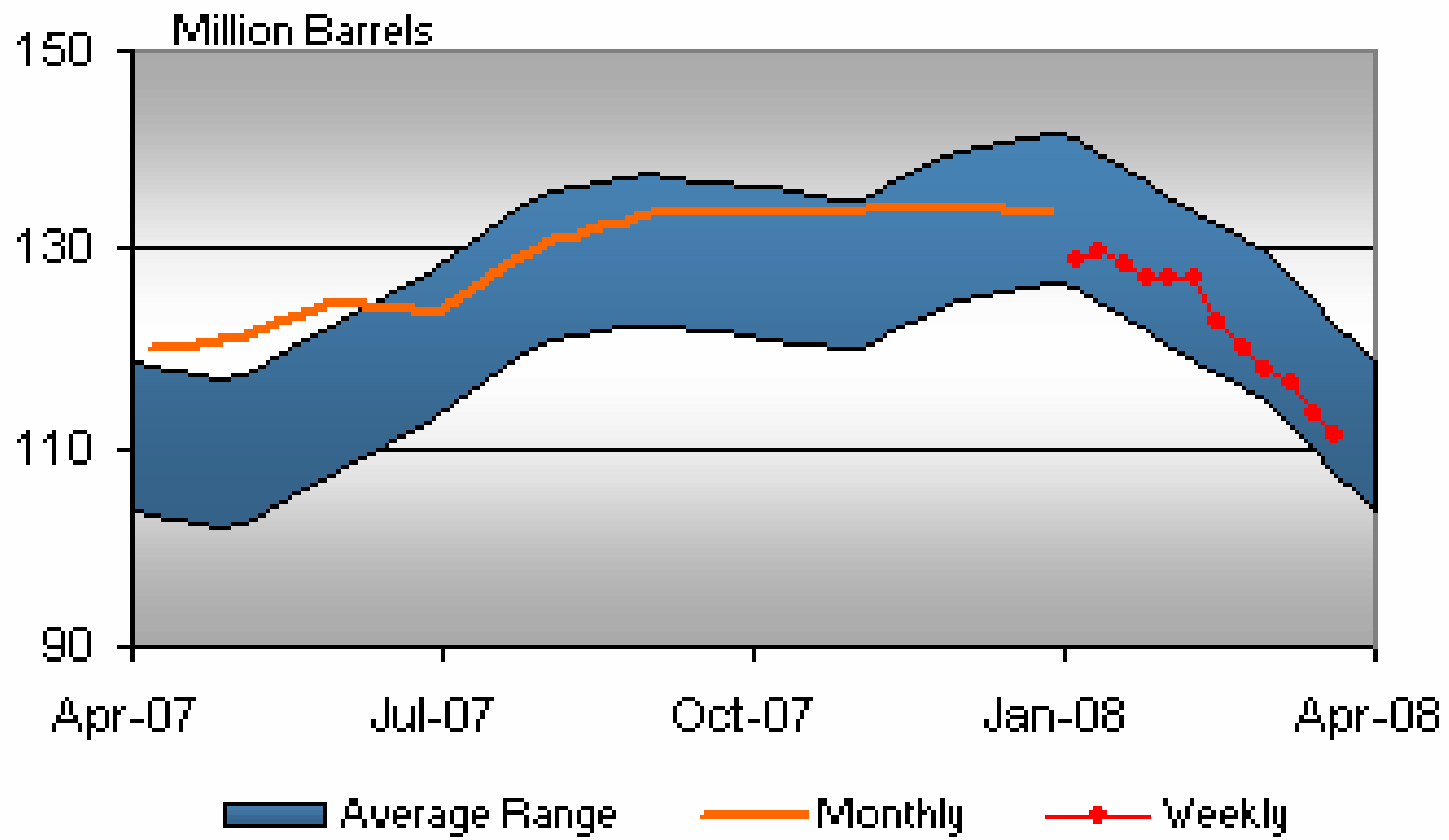


# U.S. Gasoline Demand

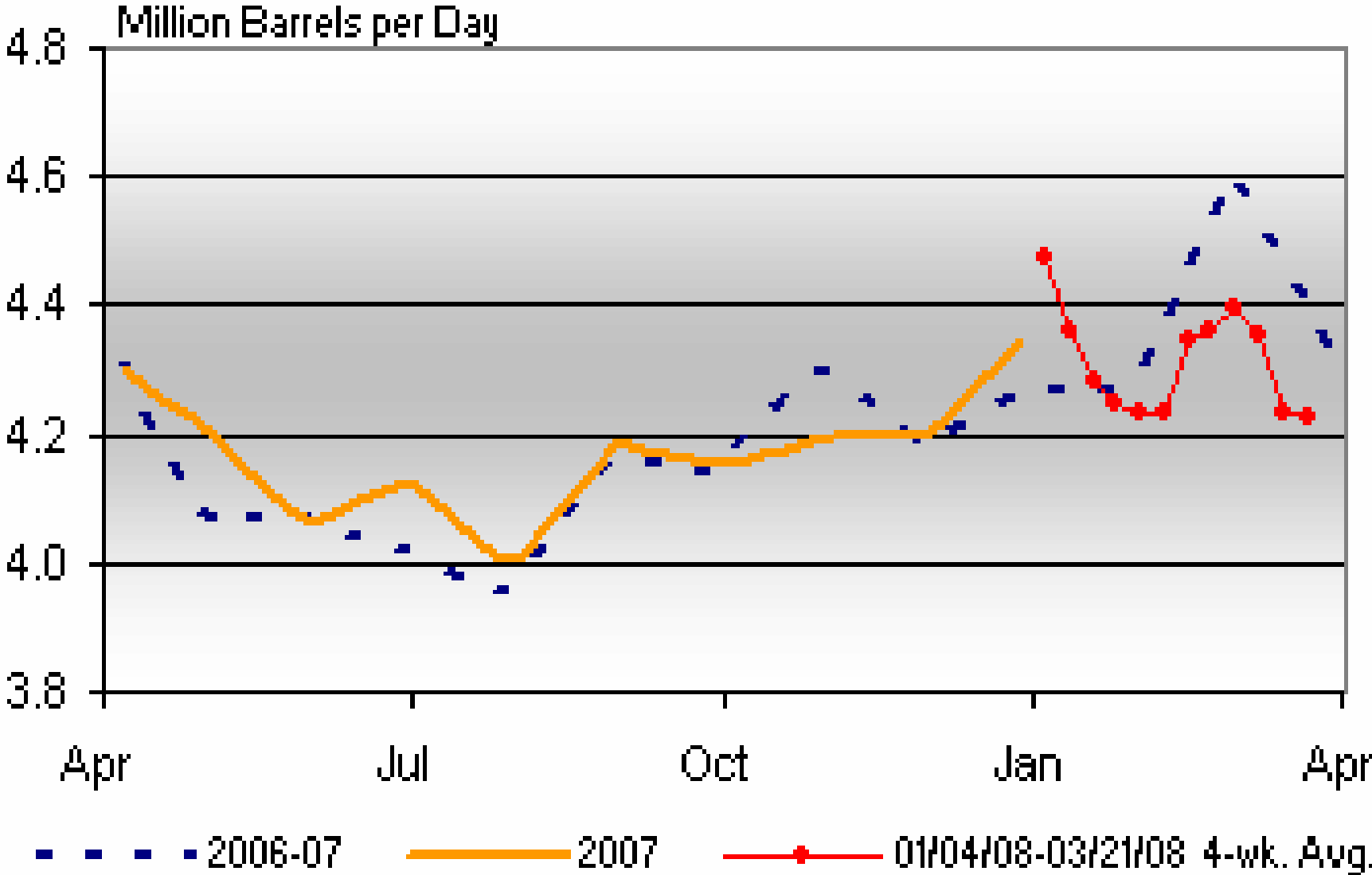
Million Barrels per Day



# U.S. Distillate Stocks

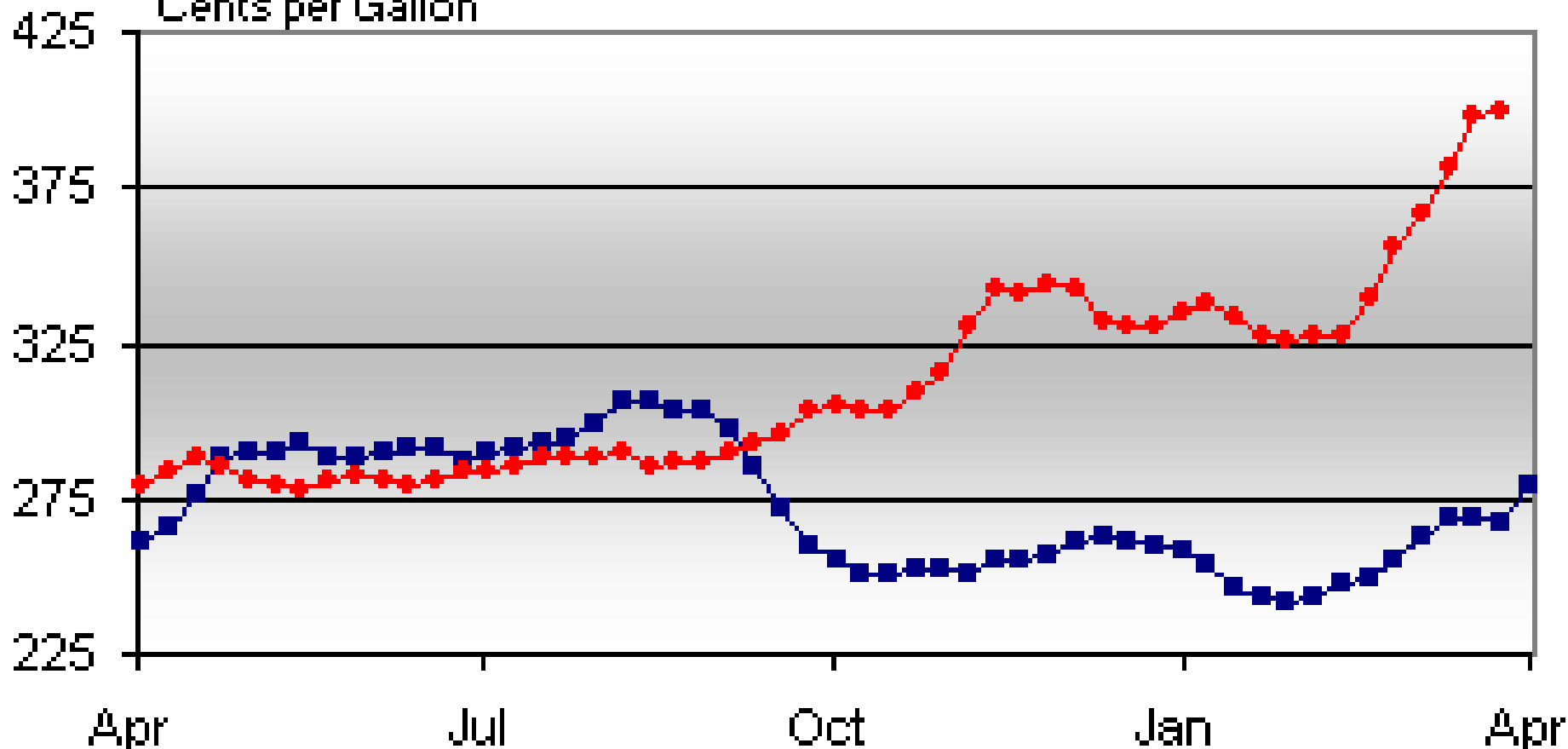


# U.S. Distillate Demand



# U.S. Average All-Types Diesel Fuel Prices

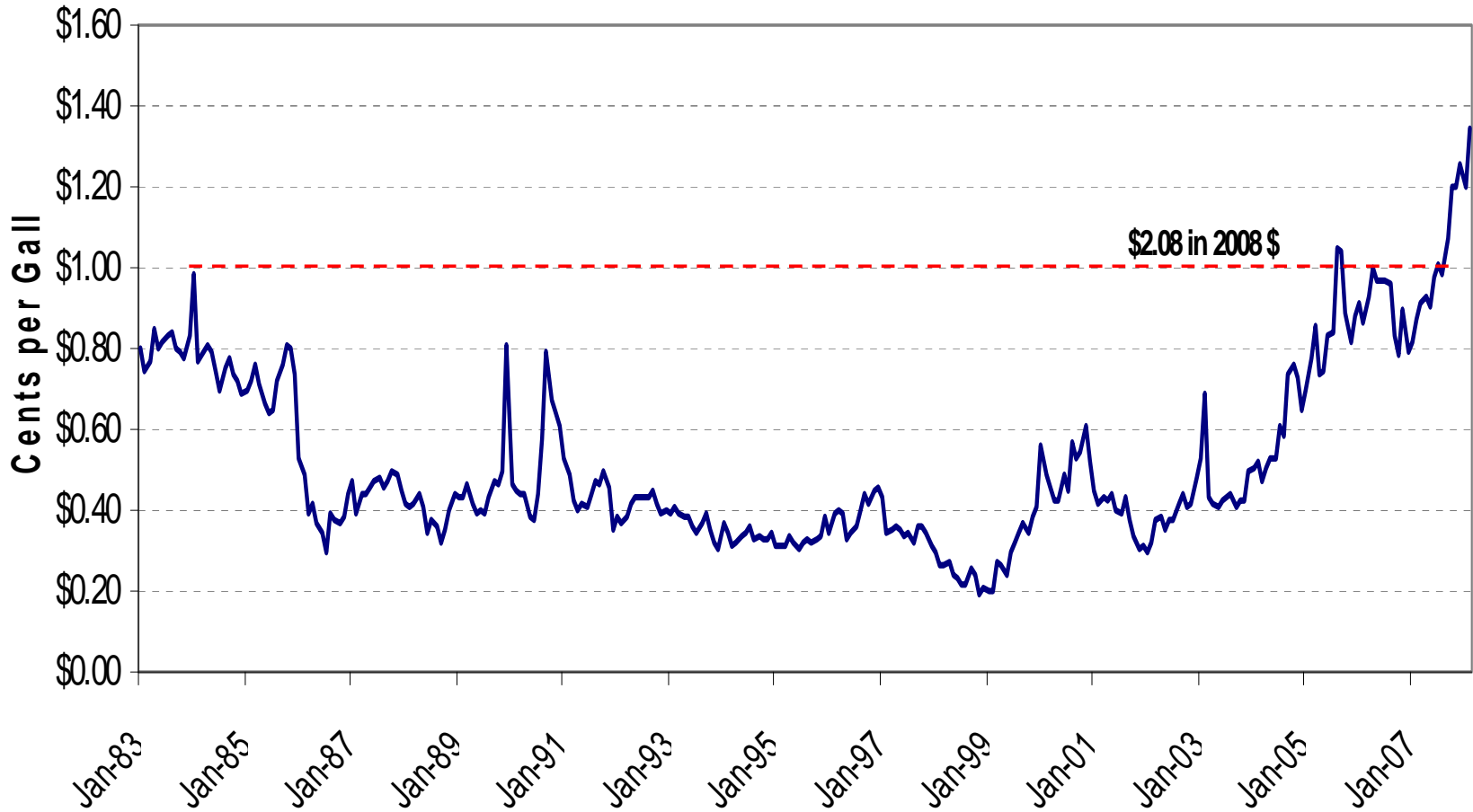
Cents per Gallon



■ 2006-07

◆ 2007-08

# NYMEX Heating Oil in Constant 1984 Dollars (Adjusted by Bureau of Labor Statistics Consumer Price Index)

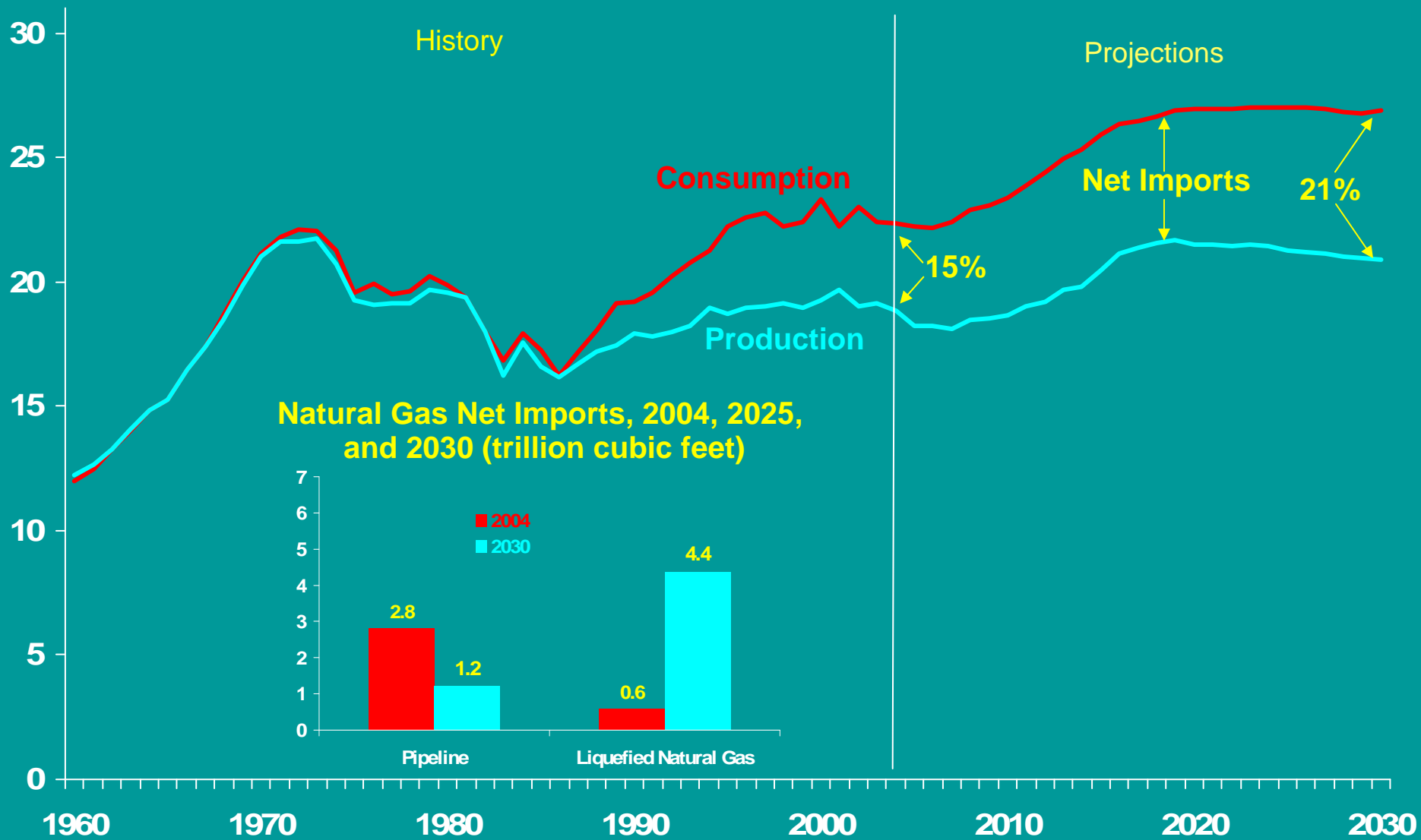


# Products Outlook

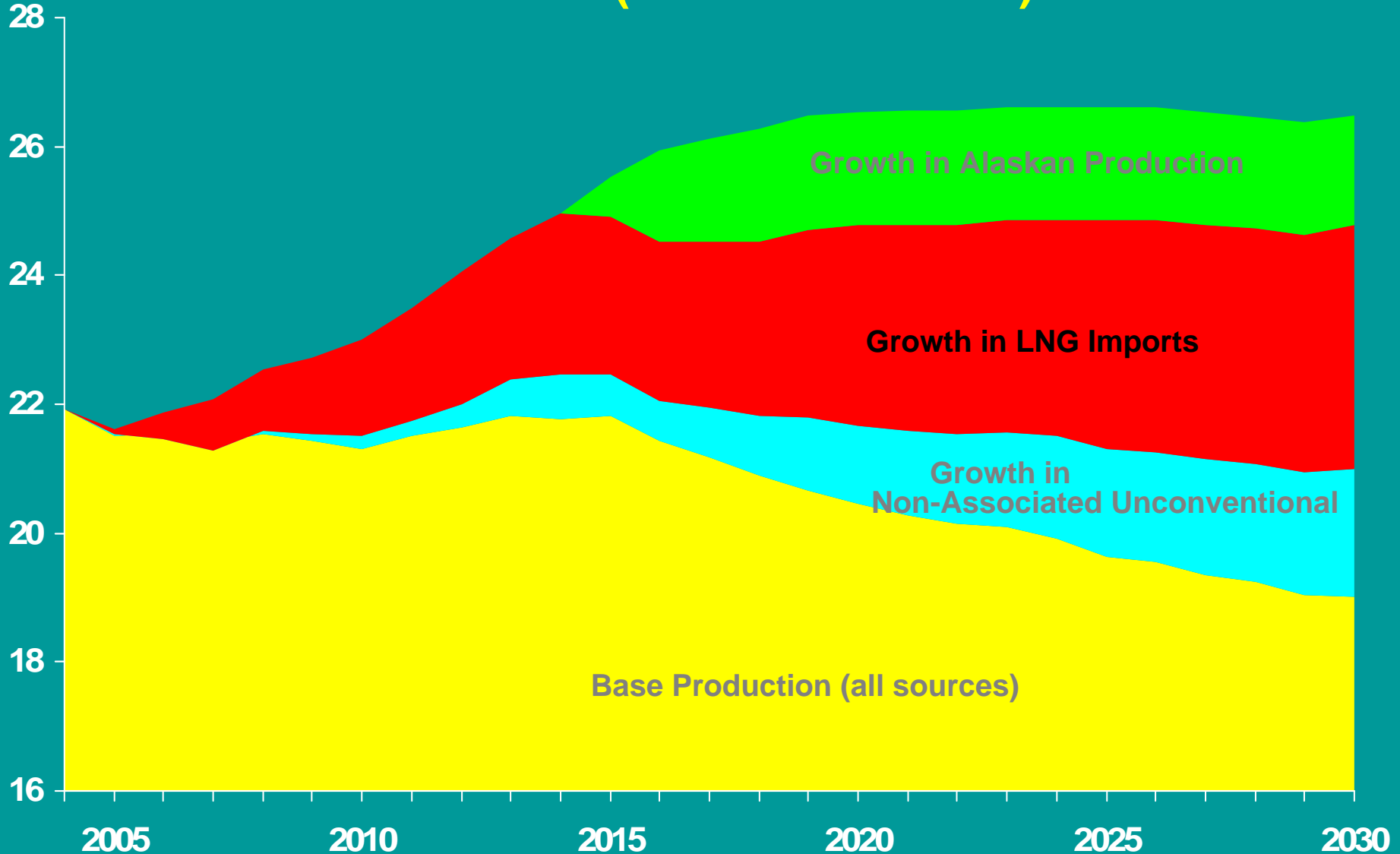
- Demand for both distillates and gasoline is down in response to high prices.
- Distillate stocks are below average, especially on the east coast, but should improve in Apr-Jun.
- Gasoline stocks are quite high, but have turned down, and refining margins are weak.
- Ethanol use is increasing, in effect adding to gasoline availability.
- Expect short-term weakness in product prices.

# Natural Gas

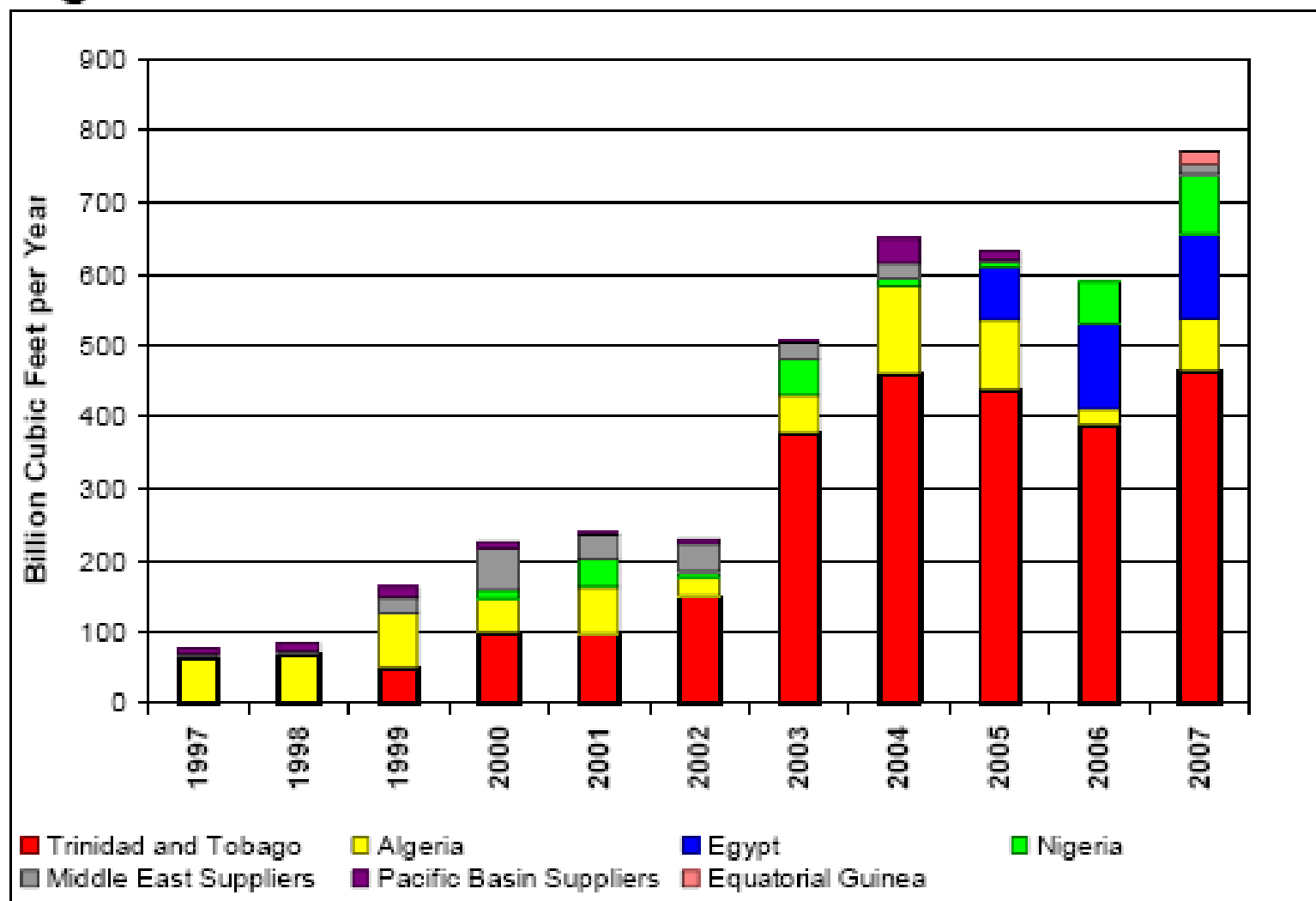
# U.S. Natural Gas Production, Consumption, and Net Imports, 1960-2030 (trillion cubic feet)



# Major Sources of Incremental U.S. Natural Gas Supply, 2004-2030 (trillion cubic feet)

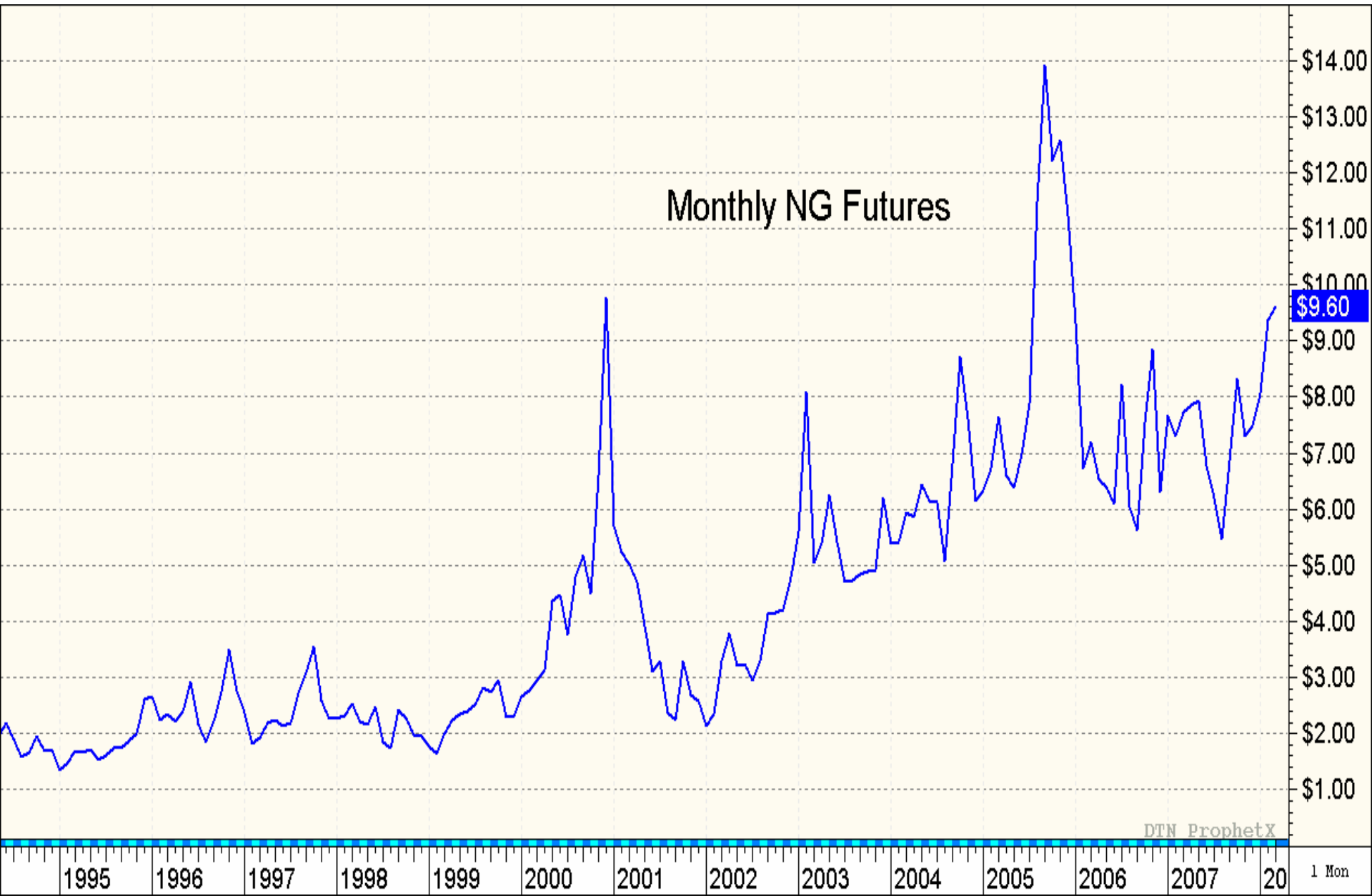


# Figure 5. U.S. Receipts of LNG Reached Record High Volumes

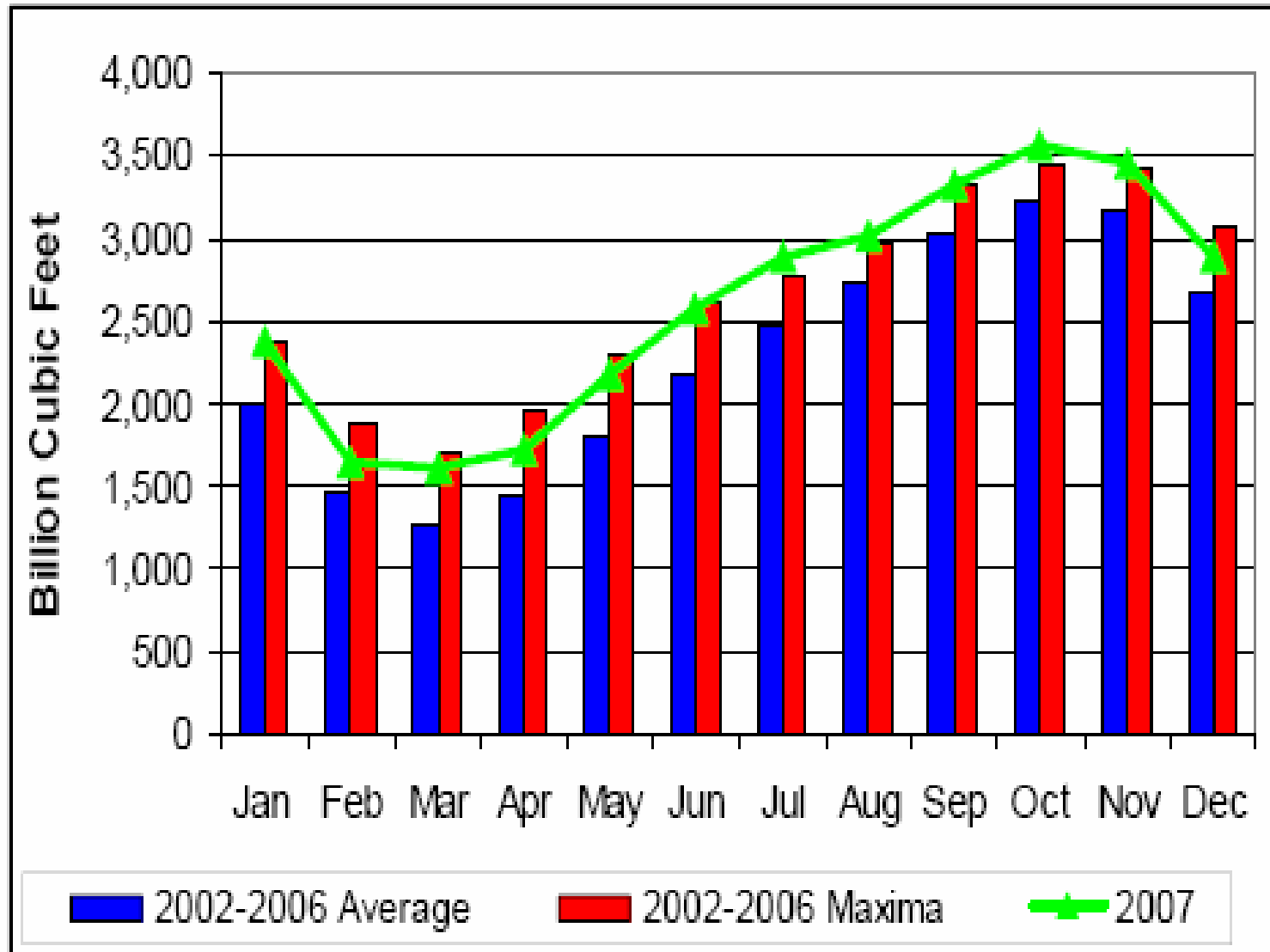


Source: Department of Energy, Office of Fossil Energy.

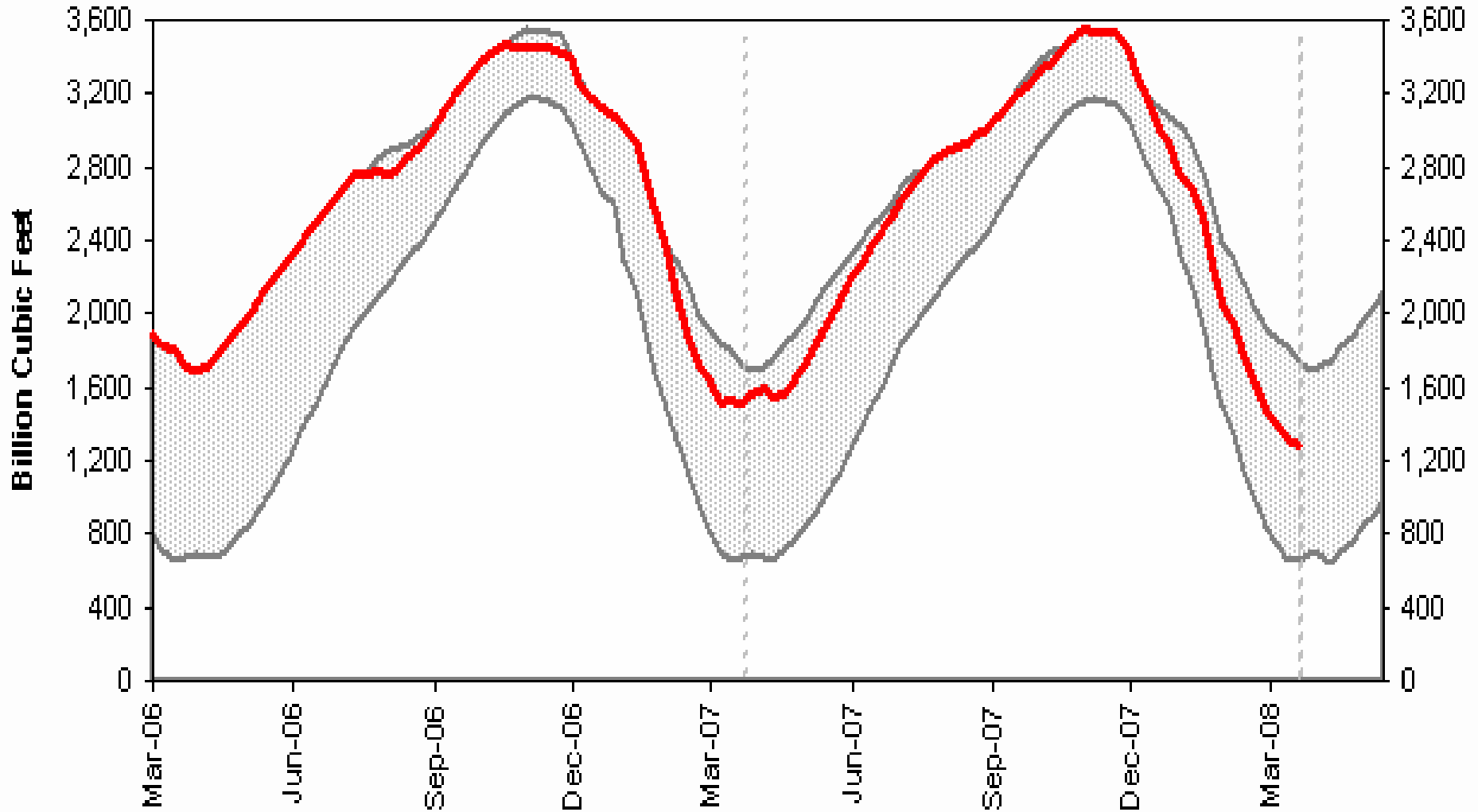
# Natural Gas Futures Prices



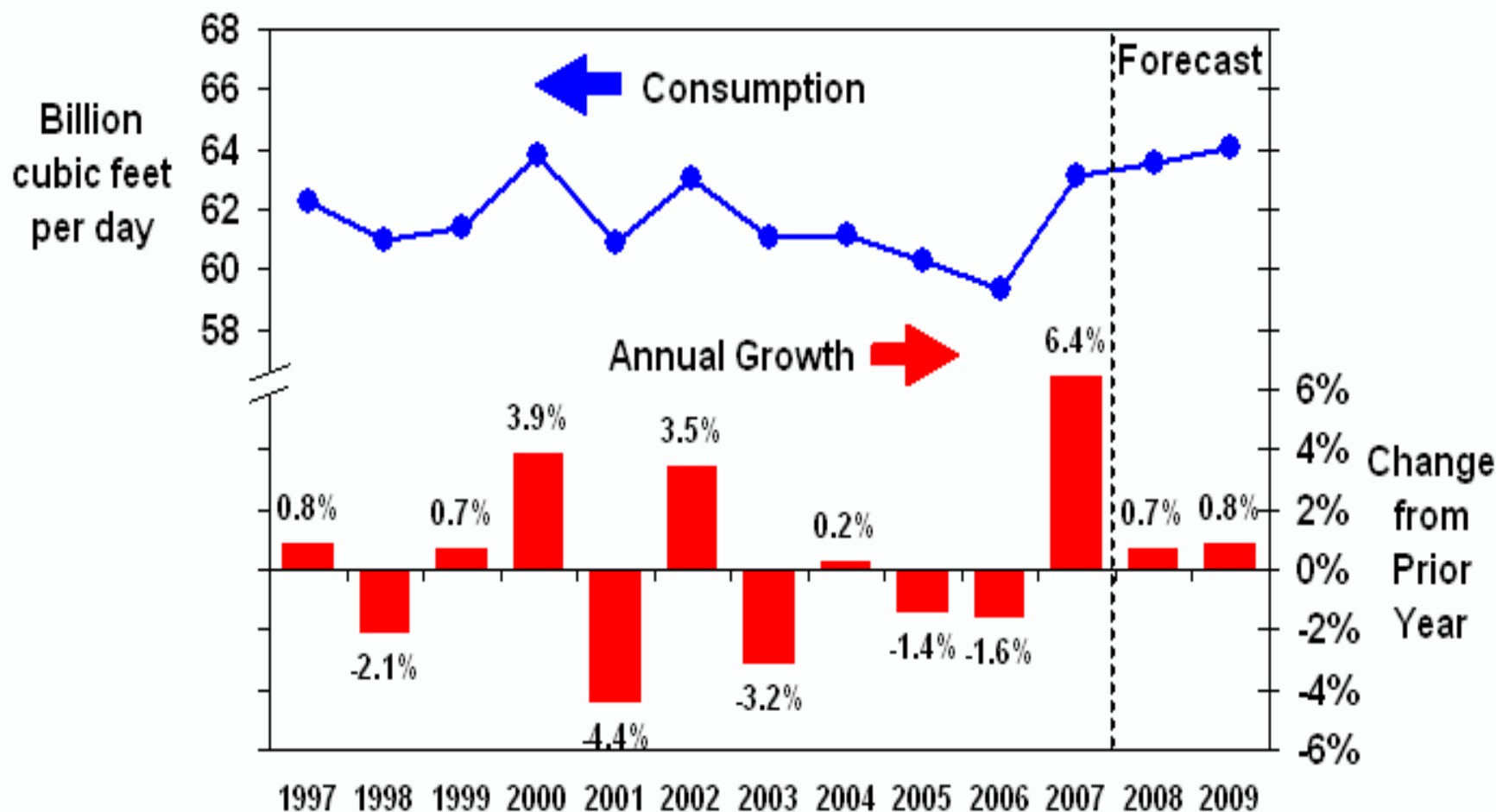
# Figure 4. Gas Storage Volumes in 2007 Consistently Exceeded the 5-Year Average Level



# NG stocks have dropped to average

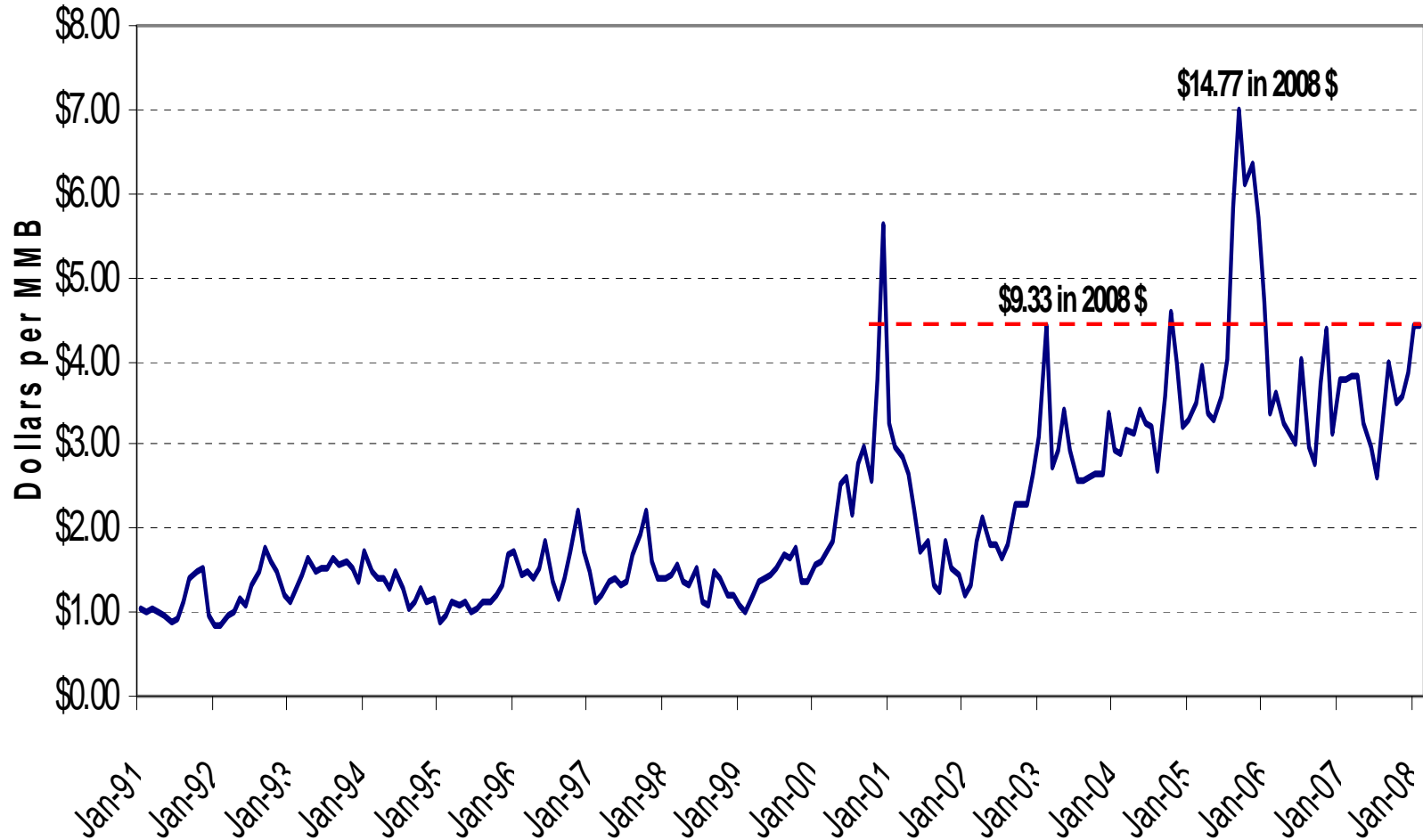


## U.S. Total Natural Gas Consumption

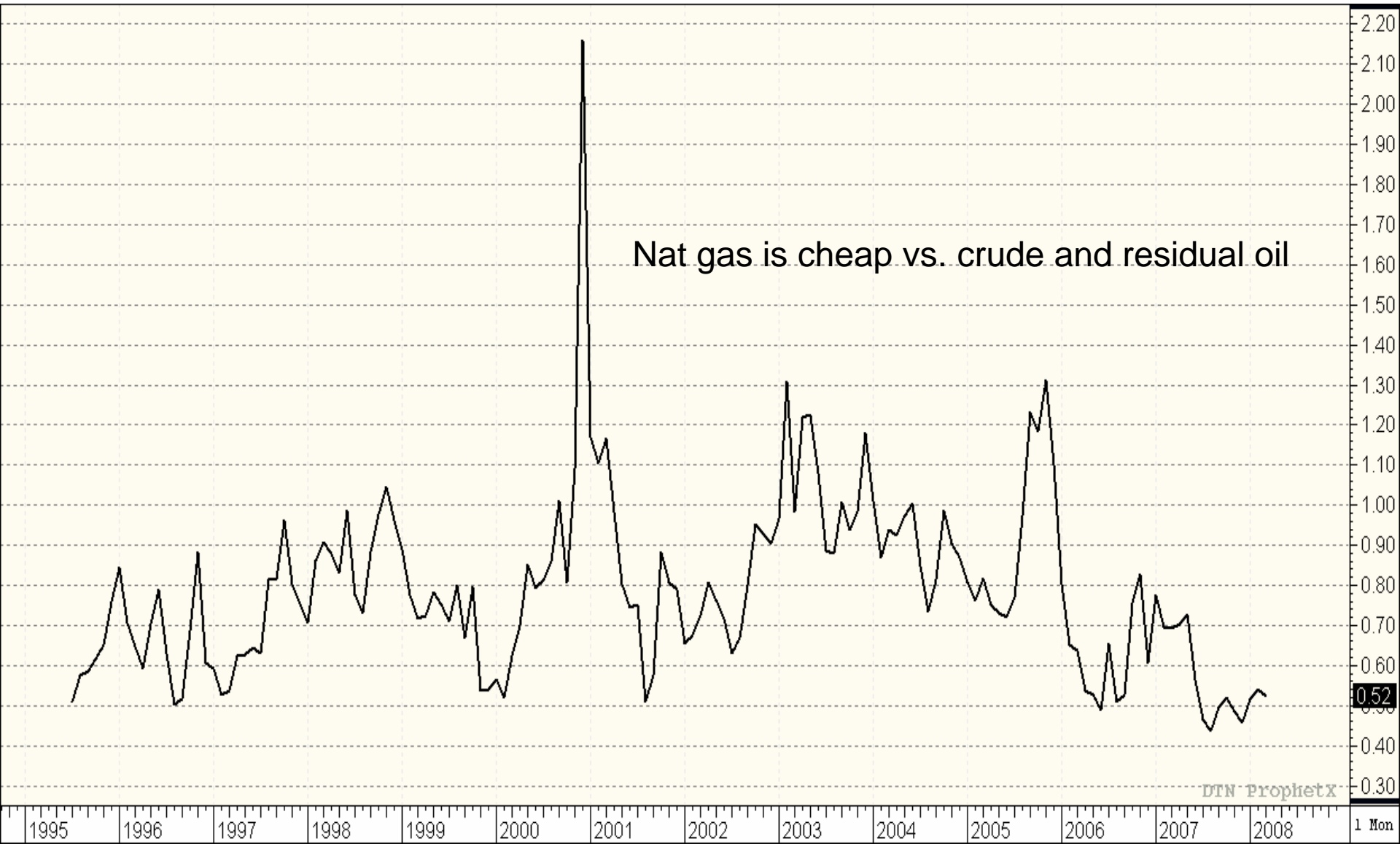


# NYMEX Natural Gas in Constant 1984 Dollars

(Adjusted by Consumer Price Index)



# NG vs Crude, cost/mmbtu



# Natural Gas Outlook

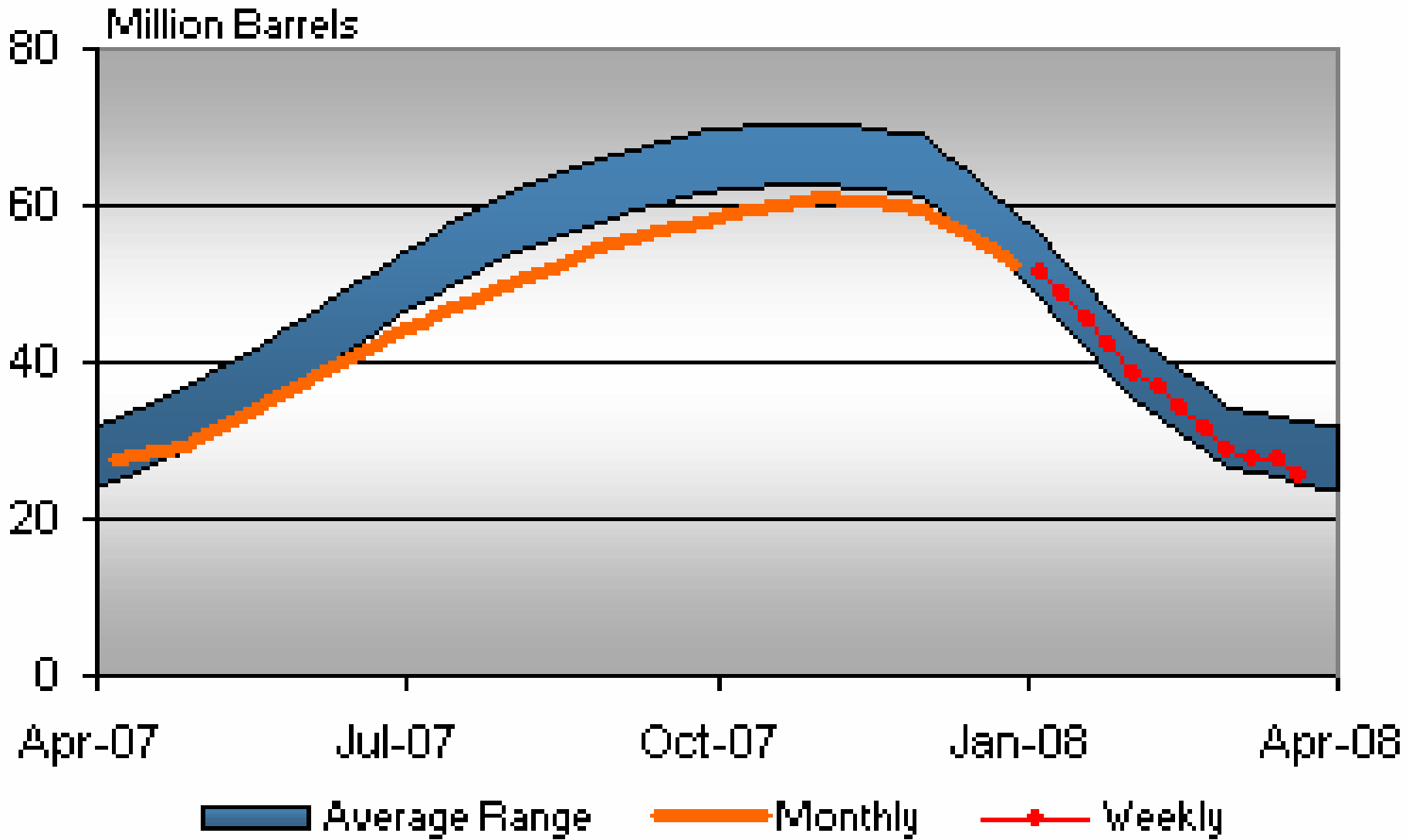
- Beginning stocks were high, but ending stocks are average, thanks to strong industrial demand.
- Rising demand for summer power generation has dampened seasonal price swings.
- Hurricane threats will continue to produce summer spikes.
- LNG imports continue to gradually increase.
- Need for increased imports will underpin gas prices, as will high crude oil prices. NG is cheap relative to crude, but its absolute price is record high.
- Prices should ease during Apr-Jun period.

# The Propane Market

# Propane Price Factors

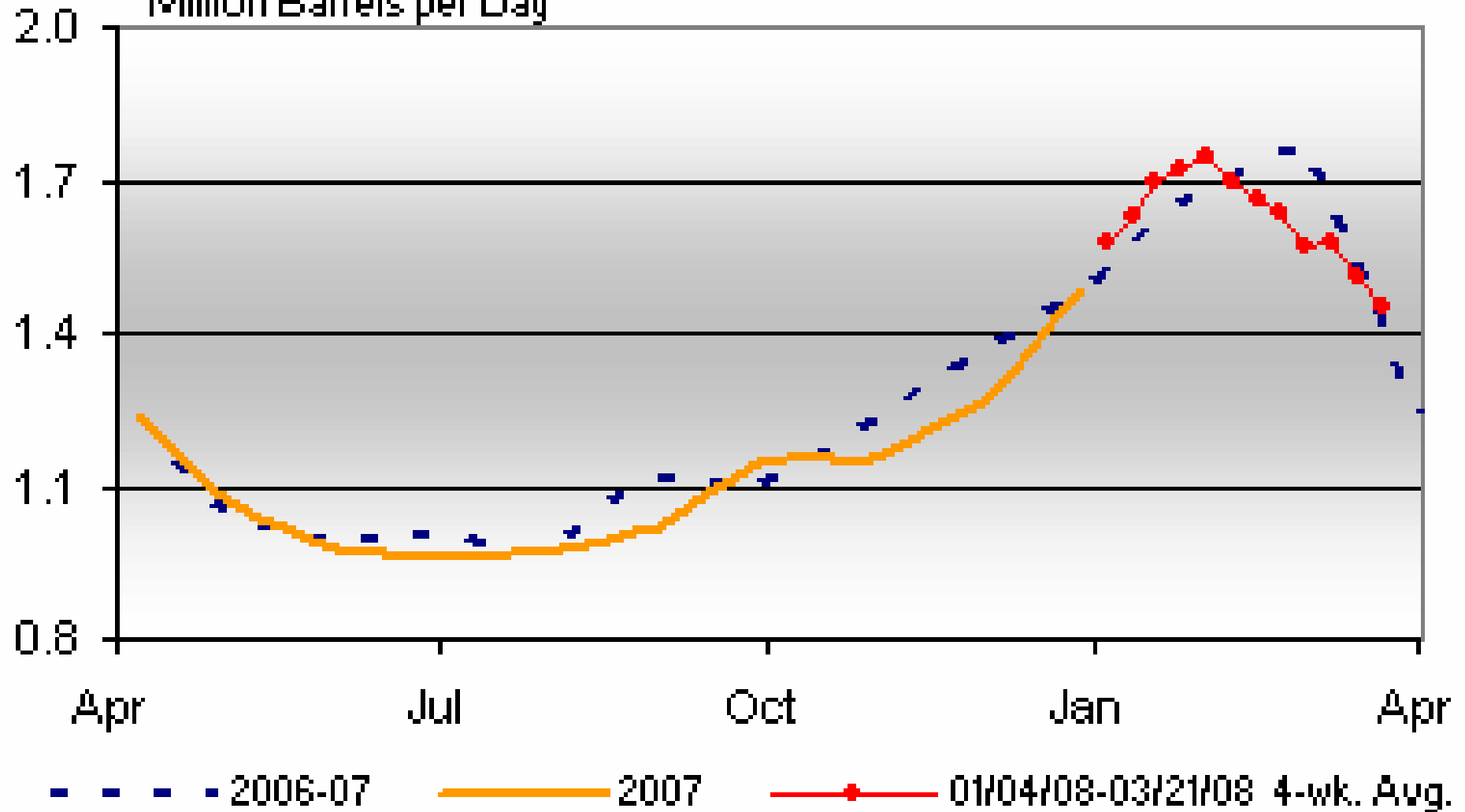
- crude and natural gas prices
- inventories
- refinery & gas plant production
- weather
- petrochemical demand
- imports

# U.S. Propane Stocks



# U.S. Propane Demand

Million Barrels per Day



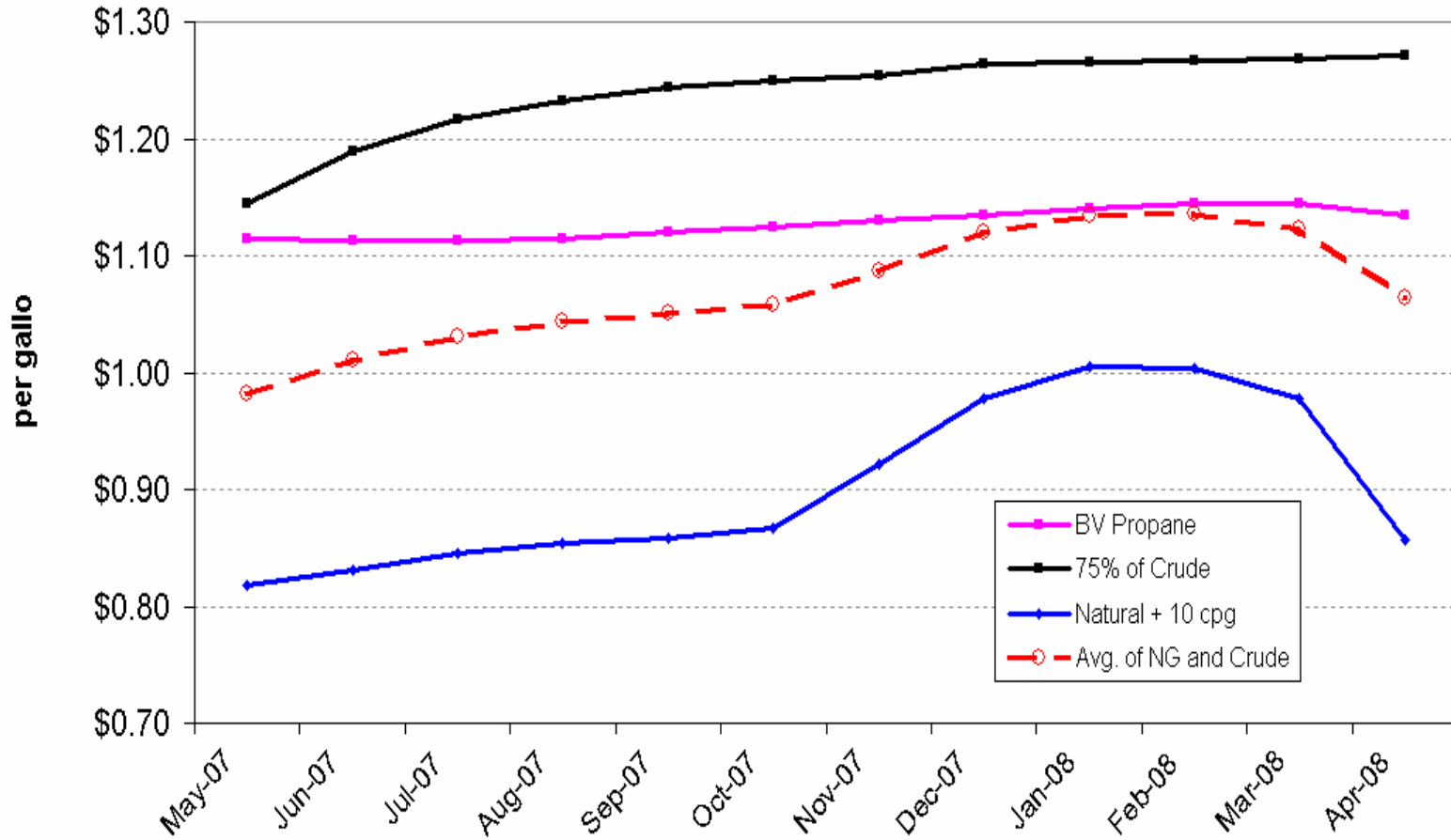
# Propane vs. Crude Pricing

|                    | <b>Ratio of Propane to Crude</b> |                    |            |            |            |
|--------------------|----------------------------------|--------------------|------------|------------|------------|
|                    |                                  | <b>60%</b>         | <b>70%</b> | <b>75%</b> | <b>80%</b> |
|                    |                                  | <b>Propane cpg</b> |            |            |            |
|                    | <b>\$50</b>                      | 71.4               | 83.3       | 89.3       | 95.2       |
|                    | <b>\$60</b>                      | 85.7               | 100.0      | 107.1      | 114.3      |
|                    | <b>\$70</b>                      | 100.0              | 116.7      | 125.0      | 133.3      |
| <b>Crude price</b> | <b>\$80</b>                      | 114.3              | 133.3      | 142.9      | 152.4      |
|                    | <b>\$90</b>                      | 128.6              | 150.0      | 160.7      | 171.4      |
|                    | <b>\$100</b>                     | 142.9              | 166.7      | 178.6      | 190.5      |
|                    | <b>\$110</b>                     | 157.1              | 183.3      | 196.4      | 209.5      |
|                    | <b>\$120</b>                     | 171.4              | 200.0      | 214.3      | 228.6      |
|                    | <b>\$130</b>                     | 185.7              | 216.7      | 232.1      | 247.6      |
|                    |                                  |                    |            |            |            |
|                    |                                  |                    |            |            |            |

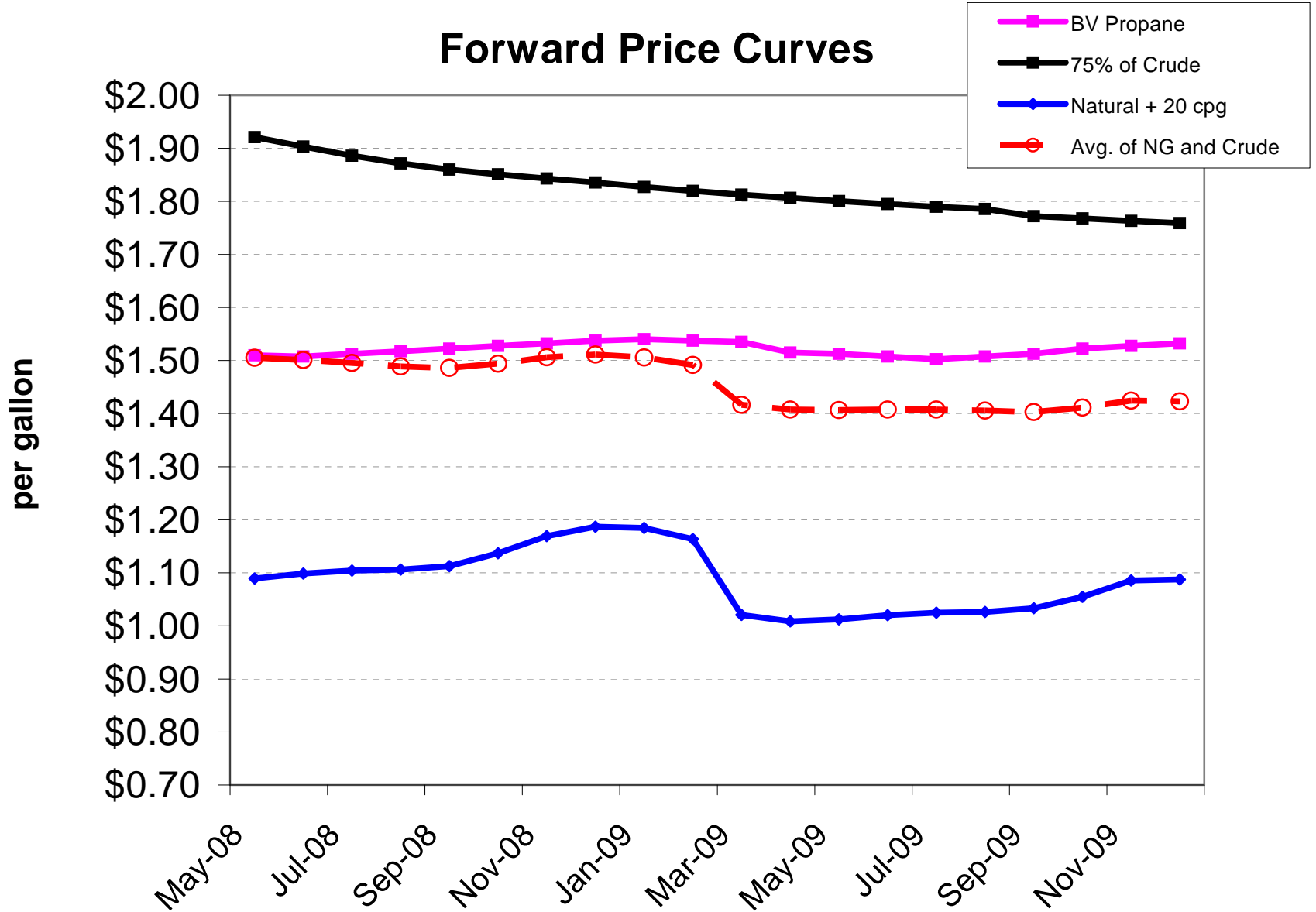
| <b>Propane value vs. Natural Gas</b> |          |            |          |  |
|--------------------------------------|----------|------------|----------|--|
|                                      |          | margin/gal |          |  |
| <b>NG Price</b>                      | \$ -     | \$ 0.10    | \$ 0.15  |  |
| \$ 6.00                              | \$ 0.541 | \$ 0.641   | \$ 0.691 |  |
| \$ 7.00                              | \$ 0.631 | \$ 0.731   | \$ 0.781 |  |
| \$ 8.00                              | \$ 0.721 | \$ 0.821   | \$ 0.871 |  |
| \$ 9.00                              | \$ 0.811 | \$ 0.911   | \$ 0.961 |  |
| \$ 10.00                             | \$ 0.901 | \$ 1.001   | \$ 1.051 |  |
| \$ 12.00                             | \$ 1.081 | \$ 1.181   | \$ 1.231 |  |
| \$ 14.00                             | \$ 1.261 | \$ 1.361   | \$ 1.411 |  |
| \$ 16.00                             | \$ 1.441 | \$ 1.541   | \$ 1.591 |  |

# Last Year's Market

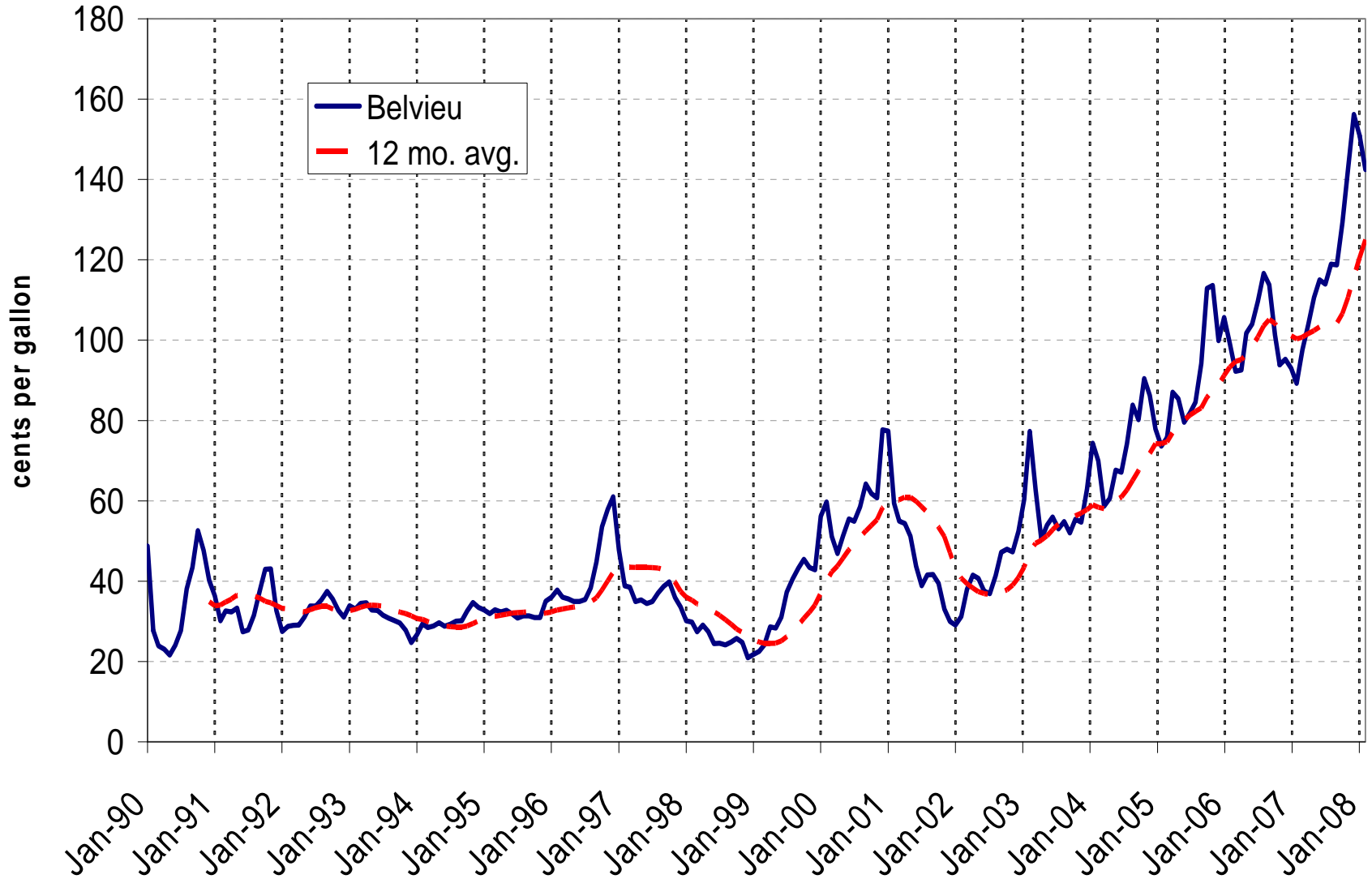
## Forward Price Curves



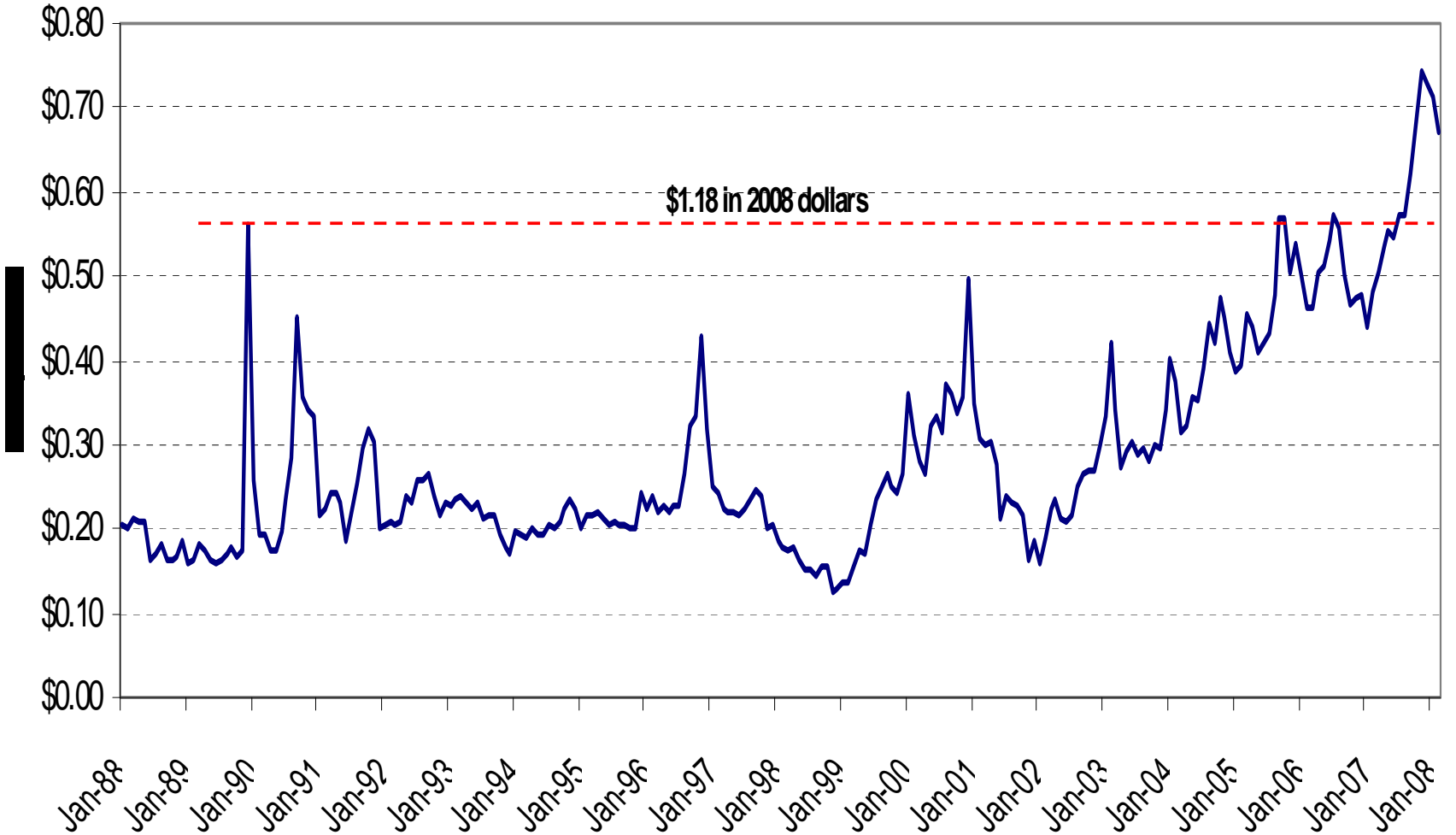
# Forward Price Curves



# Belvieu Monthly Average Jan 90 - Feb 08



# NYMEX Propane in Constant 1984 Dollars (Adjusted by Bureau of Labor Statistics Consumer Price Index)



# Apr 08 – 08/09 Low Price Case

- global economy slumps
- weather is mild
- no “event shocks,” Mideast stabilizes
- dollar firms
- no crude supply interruptions
- crude is \$70-90
- diesel is \$2.00-2.60 (pre-tax)
- gasoline is \$2.00-2.60 (pre-tax)
- natural gas is \$6-10/mmbtu
- **propane is \$1.00-1.70**

# Apr 08 – 08/09 High Price Case

- global economy is strong
- severe weather in the U.S. and Europe
- mideast turmoil intensifies
- crude supply interruptions
- dollar is weaker yet
- crude is \$110-140
- HO is \$2.85-3.95
- gasoline is \$2.85-3.95
- natural gas is \$8-14/mmbtu
- **propane is \$1.50-2.60**

# Apr 08 – 08/09 Medium Price Case

- global economy is stable
- normal weather
- OPEC maintains output
- dollar is flat
- mild event shock(s)
- crude is \$90-110
- diesel is \$2.40-3.10
- gasoline is \$2.40-3.10
- natural gas is \$7-12
- **propane is \$1.30-2.10**

# Propane Outlook

- Beginning stocks were skinny, and will end March at a low 25 mil bbls. The need for a strong stock build this summer will support prices.
- Propane is low relative to crude, high relative to natural gas, and close to the average of the two.
- Prices will continue to be driven primarily by crude and, to a lesser extent, natural gas.
- Crude remains the wild card – summer hinges on products and the middle east.
- Next winter's Belvieu at \$1.40 or lower is a good hedge opportunity.