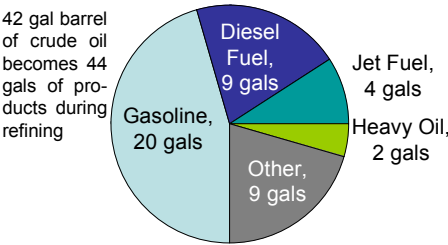


## Oil Basics

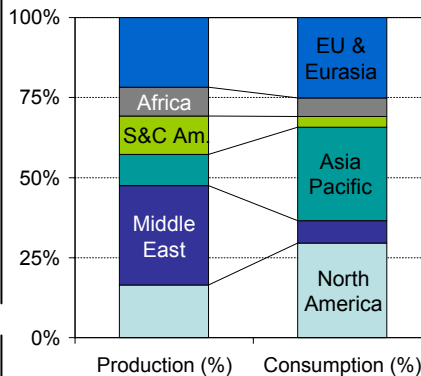
- Naturally occurring liquid hydrocarbon with chains between  $C_5H_{12}$  and  $C_{18}H_{38}$
- Supplied 168 EJ (160 Quads) in 2003, 38% of the world's primary energy
- Valuable due to high energy density (6.12 GJ / 42 gallon barrel (bbl); 5.8 mmBtu/bbl), variety of end use application, and ease of transport and storage.
- Oil consumption emitted 10.5 G tones of  $CO_2$  into the atmosphere in 2003.

## Usage Per Barrel



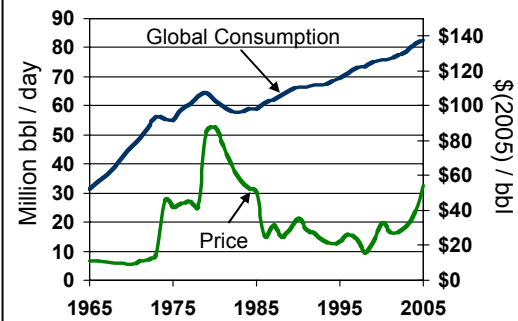
Oil consumption by end use: 57.7% for transport, 9.9% for industrial energy, 16.8% for non-energy (e.g. plastics), and 15.6% for other purposes.

## 2005 Production & Consumption

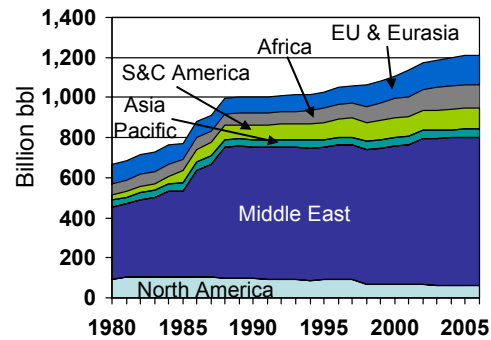


Country	Production		Consumption	
	%	M bbl / yr	%	M bbl / yr
Canada	3.7	1112	2.6	818
China	4.6	1324	8.5	2551
India	0.9	286	3.0	907
Iran	5.1	1478	2.0	605
Japan	0.0	0	6.4	1956
Russ. Fed.	12.1	3486	3.4	1005
Saudi Arabia	13.5	4028	2.3	690
USA	8.0	2493	24.6	7539
Venezuela	4.0	1098	0.7	202
World Totals	100	29597	100	30098

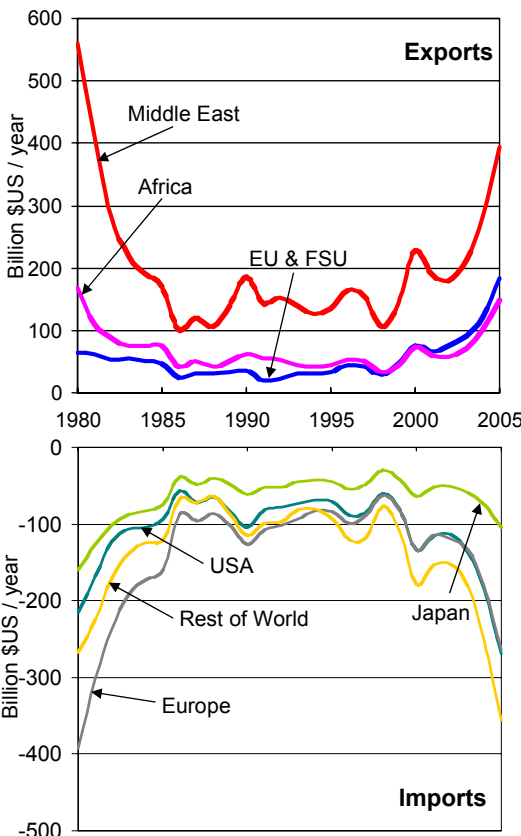
## Global Consumption & Price



## Global Reserves



## Value of Global Oil Trade



2005 Total Trade Value = \$ 993 B

## Key Issues & Future Prospects

**Energy Security:** Given the global economy's dependence on oil, many nations are becoming more concerned over instability in supply, price volatility, shortages, and their effects on the economy and national security.

**Prices:** Oil prices are established through market processes, and are affected by production issues, weather, global events, market artifacts, and a number of other factors. There is an ongoing debate about whether recent high prices are due to changes in market fundamentals, or more artificial and transient factors.

**Fungibility:** Oil is a fungible commodity, meaning that any barrel could be substituted in place of any other barrel. This limits the use of boycotts against regions or nations, since on the global market boycotted oil would be sold to non-participating nations.

**Global Warming and Emissions:** Global oil consumption is responsible for 42% of the global emissions of

carbon dioxide, which is the main contributor to global warming. Oil contains roughly 120 kg of carbon per barrel and if efforts are made to manage global warming,  $CO_2$  emissions from oil will come under scrutiny.

**Proven Reserves:** Oil reserves are defined in reference to the current oil price. So as the price of oil increases and technology improves, the size of economically viable (proven) reserves also increases. At current prices and consumption, proven reserves are forecasted to last for 40 years until 2045 (R/P ratio). The reserves and R/P ratio have increased over the past 30 years. For instance, in 1981 the R/P ratio was 32 years.

**Scarcity and Peak Oil:** Originally postulated in the 1950's, this theory speculates that oil production will hit a global peak before dropping sharply; wreaking havoc with the global economy. Critics contend that severe shortages will be prevented by the development of new oil resources in response to price signals.

## Key References

BP Statistical Review of World Energy, 2006; International Energy Agency

## Key Units:

bbl = Barrel  
 ExaJoules =  $10^{18}$  Joules  
 G tones =  $10^9$  Tones  
 Gals = gallons  
 mmBtu = million Btu's  
 Quads =  $10^{15}$  Btu

## National Abbreviations:

- Can                      Canada
- EU                        European Union
- FSU                      Former Soviet Union
- N. America            North America
- Russ. Fed.             Russian Federation
- S&C Am                South and Central America
- Saudi A.                Saudi Arabia

## Global Reserves (2005)

Reserve estimates do not include tar sands or other unconventional oil resources.

## Value of Global Oil Trade

Values are calculated from publicly available information and are believed to be accurate to within +/- 5 %.

“Rest of World” trade figures include unidentified or unaccounted trades for balancing

Import and export data for Europe and the EU do not differentiate between inter and extra regional trading.

Countries of the FSU are not included in the imports calculation since as a whole the FSU does not import significant amounts of oil

Prior to 1993, Europe and EU label excludes Central Europe (Albania, Bulgaria, Czech Republic, Former Republic of Yugoslavia, Hungary, Poland, Romania, Slovakia).

## References:

### Oil Basics

- *Petroleum*, Wikipedia, the free encyclopedia, <http://en.wikipedia.org/wiki/Petroleum>

### Oil Reserves, Consumption, Price, & Production

- *BP Statistical Review of World Energy, 2006*, BP P.L.C., London , UK, [www.bp.com/statisticalreview](http://www.bp.com/statisticalreview)

### Value of Global Oil Trade, Numbers calculated from:

- *BP Statistical Review of World Energy, 2006*, BP P.L.C., London , UK, [www.bp.com/statisticalreview](http://www.bp.com/statisticalreview)

### Usage by Sector

- *Key World Energy Statistics, 2006*, International Energy Agency, Paris, France, [www.iea.org](http://www.iea.org)

### Oil Usage per Barrel

- *Crude Oil and Refined Products Basics*, Apache Corp, [http://www.apachecorp.com/content/released/Basics\\_Oil\\_EIA.pdf](http://www.apachecorp.com/content/released/Basics_Oil_EIA.pdf)

### Units & Conversions

- Supple, D., *Units & Conversions Fact Sheet*, MIT Energy Club, [http://web.mit.edu/mit\\_energy/resources/factsheets/UnitsAndConversions.MIT%20EnergyClub%20Factsheet.v7.pdf](http://web.mit.edu/mit_energy/resources/factsheets/UnitsAndConversions.MIT%20EnergyClub%20Factsheet.v7.pdf)

### Inflation Factors

- Table 10.1—GROSS DOMESTIC PRODUCT AND DEFLATORS USED IN THE HISTORICAL TABLES: 1940–2009, <http://www.gpoaccess.gov/usbudget/fy05/sheets/hist10z1.xls>