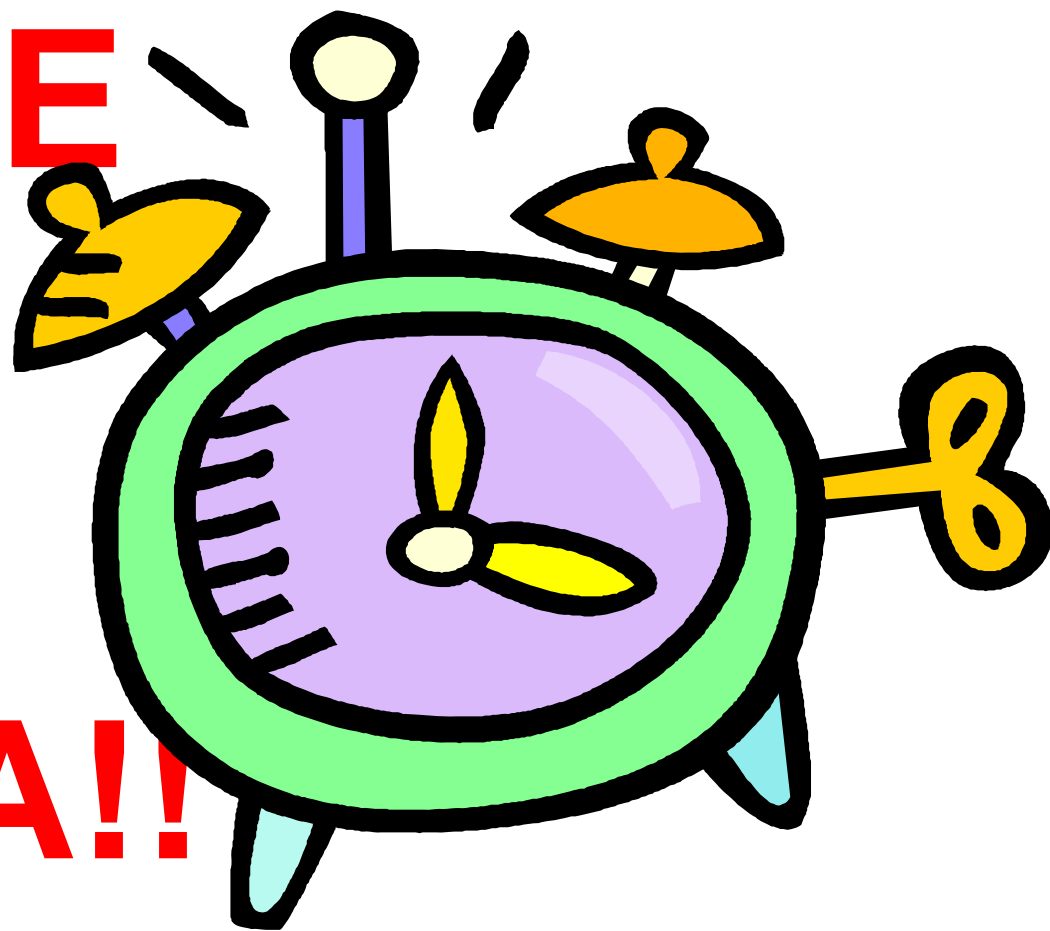


**IT'S TIME**

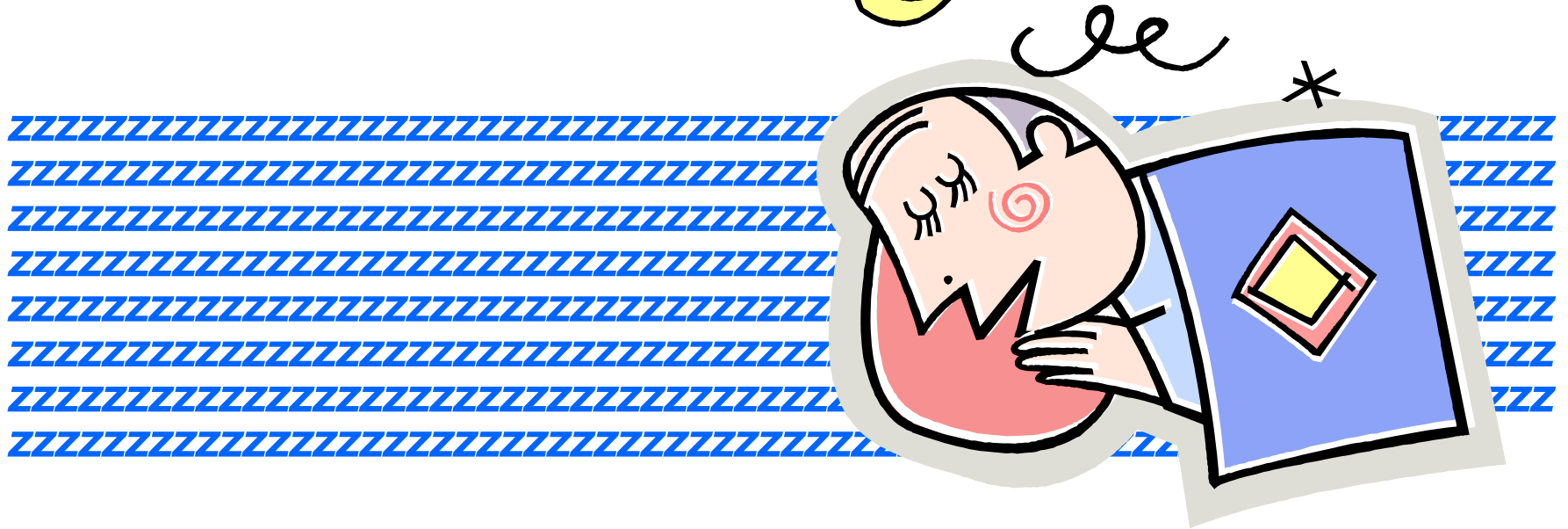


**AMERICA!!!**

# *How long until you wake up?*

**First call: Uppsala 2001**

**Next: Denver 2005**



**Now!**

**After seven long years: what's changed?**

# ***While America has slept on:***

**2001**

**Discovery rates  
continue decades-long  
fall**

**Calculations suggest  
reserves can't meet  
demand projections**

**Some recognition of  
political, investment  
risk in developing  
resources**

# ***While America has slept on:***

**2001**

**Discovery rates  
continue decades-long  
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**Calculations suggest  
reserves can't meet  
demand projections**

**Some recognition of  
political, investment  
risk in developing  
resources**

**2008**

**No improvement in resource  
situation**

**New, more accurate,  
calculations of supply define  
earlier and clearer peak**

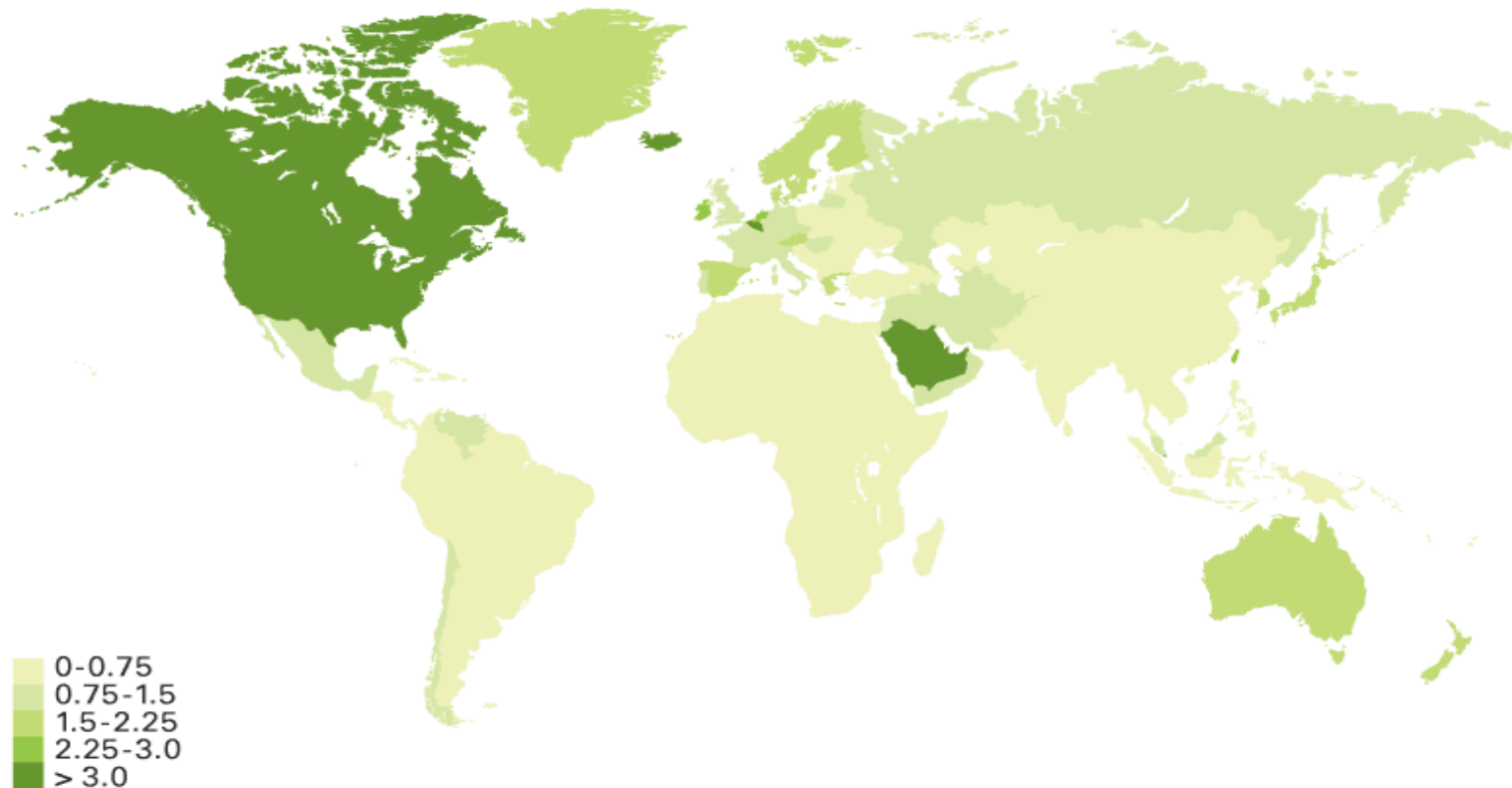
**Political will to increase  
supply clearly absent; prices  
not stimulating investment  
to increase supply**

# Buying your barrels ...

## Oil consumption per capita

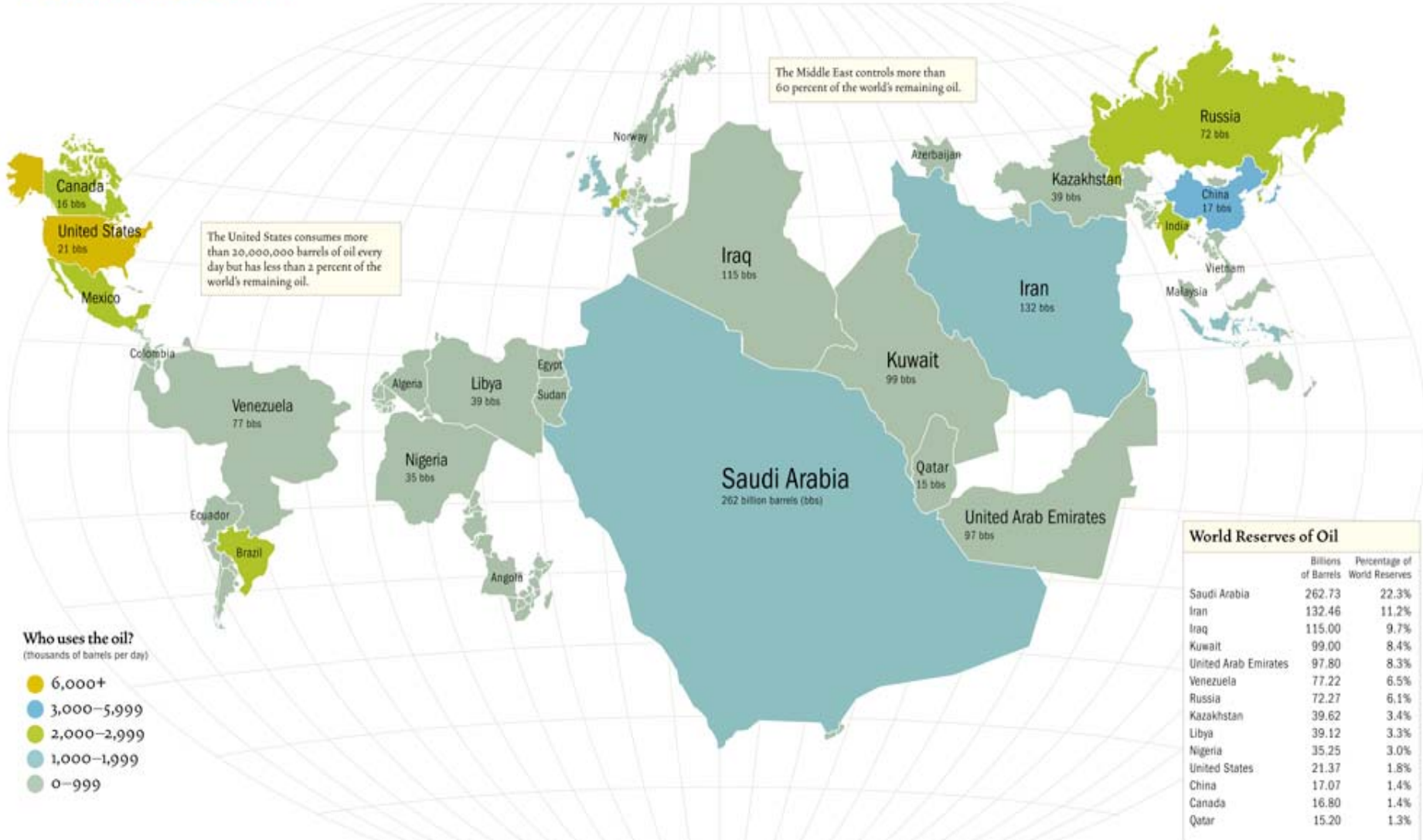


Consumption per capita 2007  
Tonnes



# ... from those who have lots

## Who has the oil?



Each country's size is proportional to the amount of oil it contains (oil reserves); Source: BP Statistical Review Year-End 2004 & Energy Information Administration

# ***International Energy Association's wake-up call:***

**“ There are three problems:**

**Geology**

**Investment**

**Policy of main producers**

**These, taken together, make  
the future of oil very difficult ”**

**Fatih Birol**

**Chief Economist**



## ***In your dreams ....***

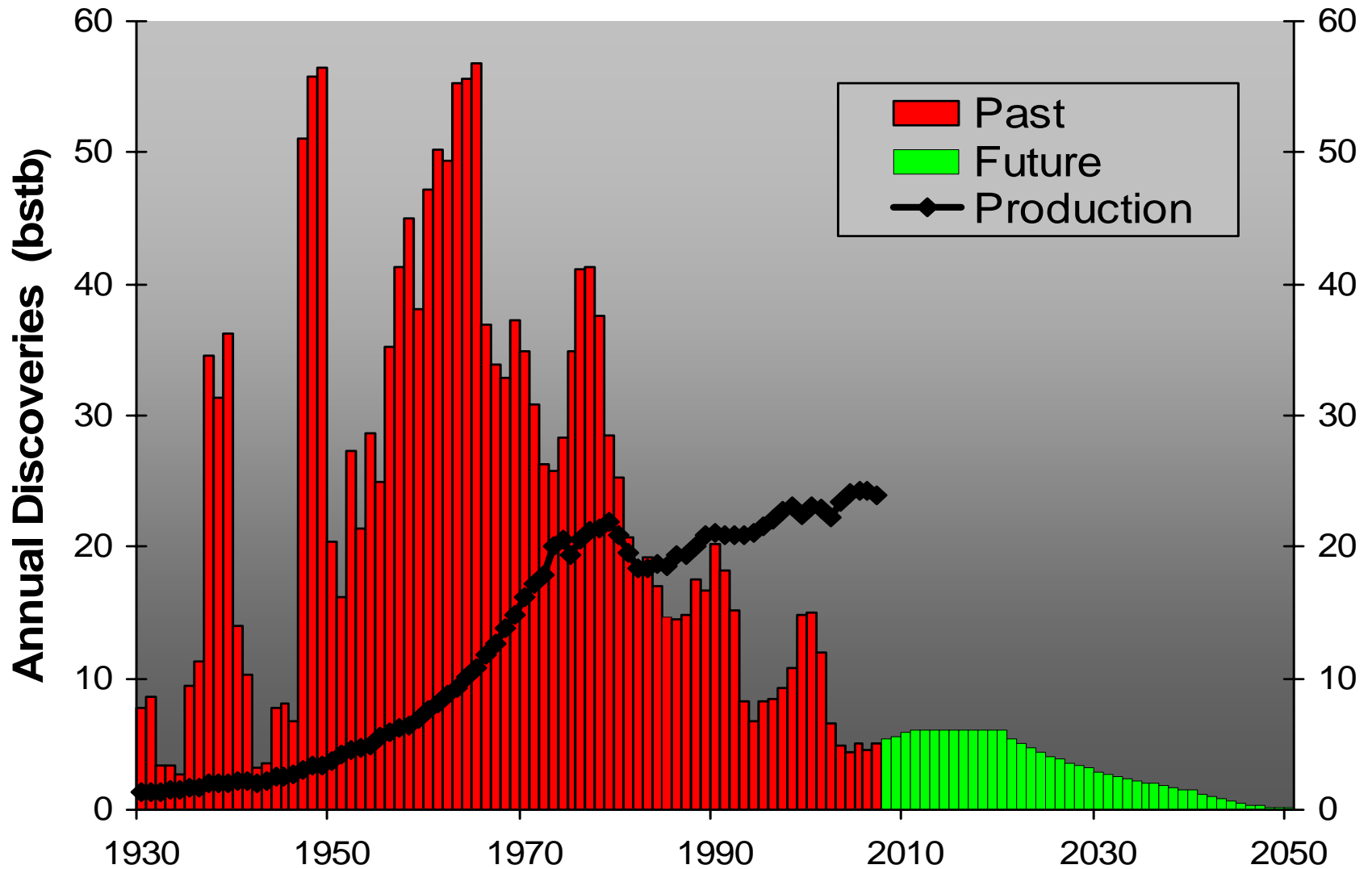
**‘The explorers will fix it; there’s lots of oil out there - think of Jack and Tupi; add in the OCS and ANWR’**

**‘Worldwide reserves/production ratio is still 40, there’s lots of time to find other energy sources’**

**‘Technology will deal with the problem: add just 10% to recovery efficiency and we’re fine’**

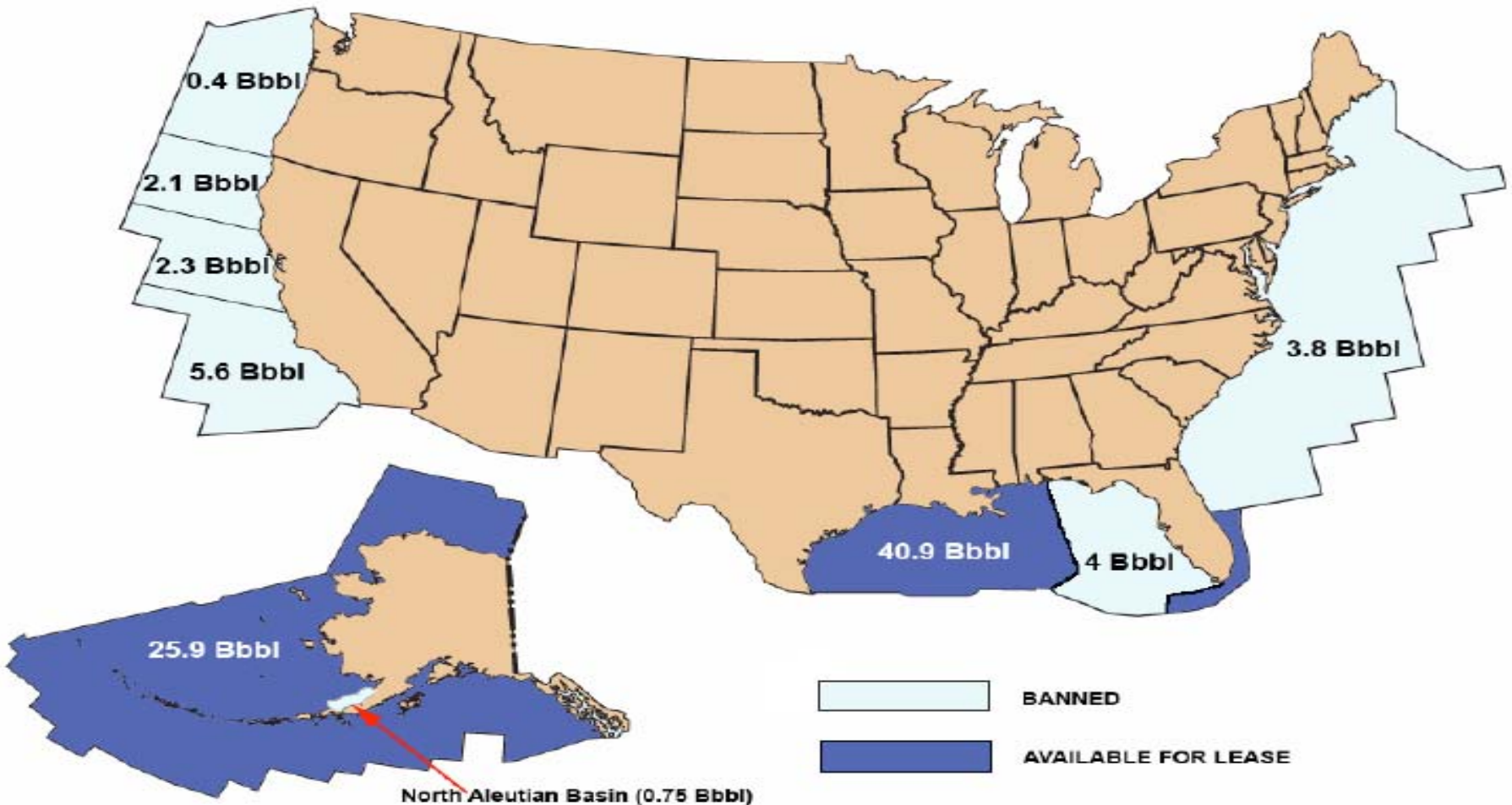


# *Discoveries – the trend continues!*



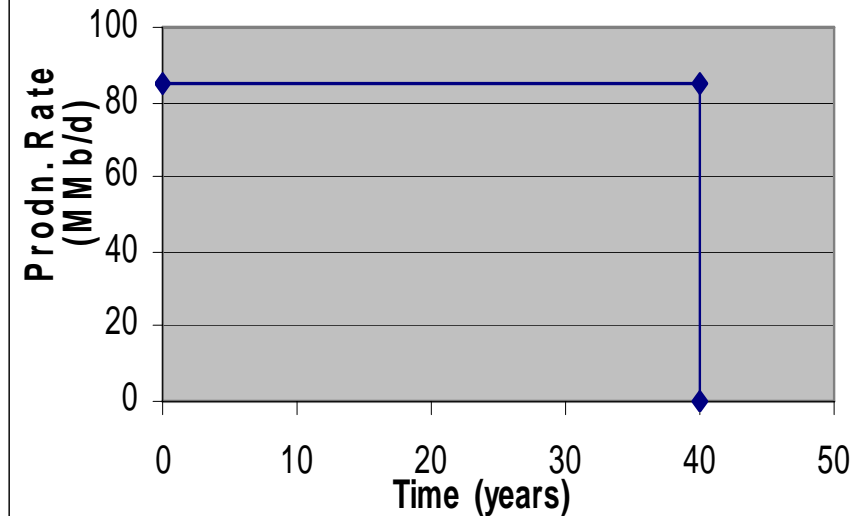
# Technically Recoverable Oil Source: MMS

## US Outer Continental Shelf (OCS) Statistics

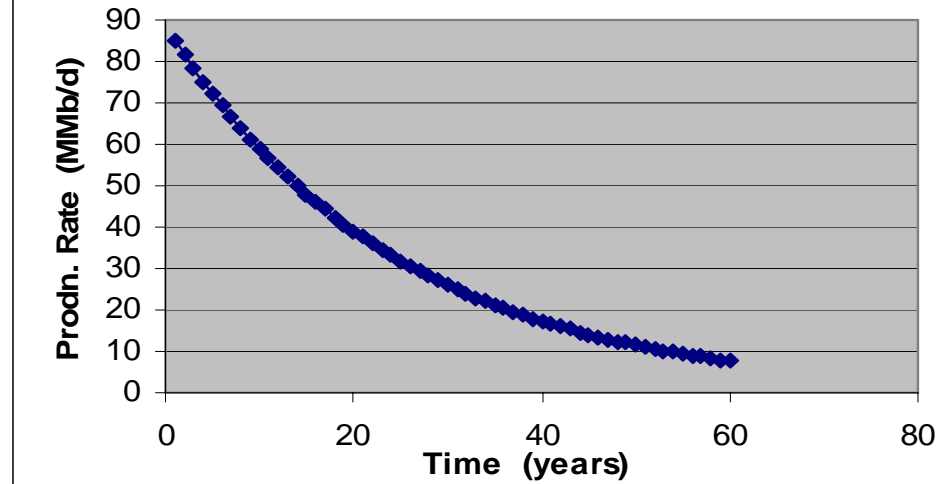


# The R/P Placebo

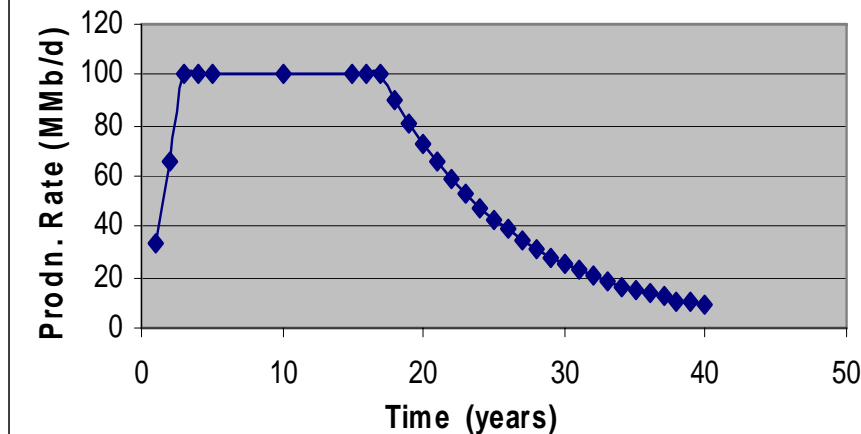
1. Reservoirs don't do this:.



3. So production from known fields will look like this:



2. .... but this:



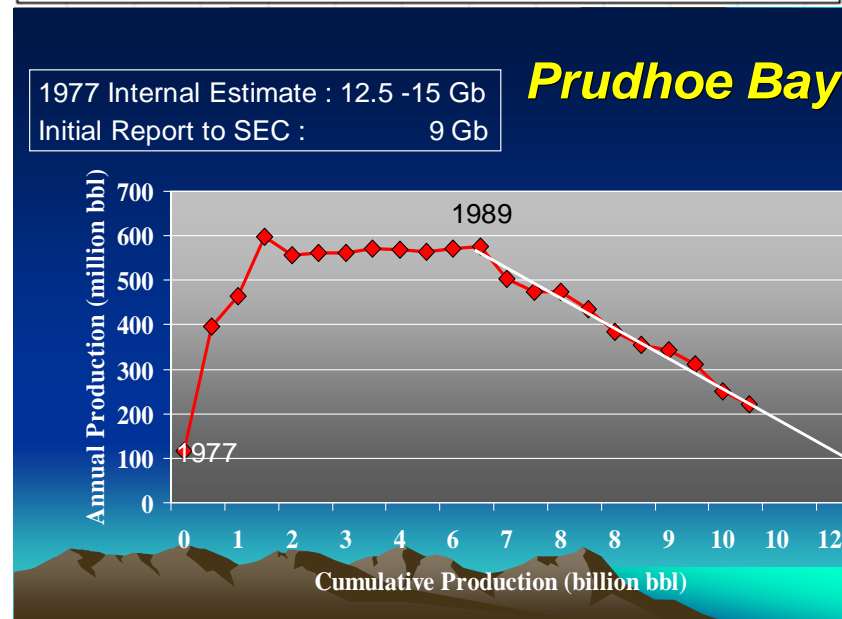
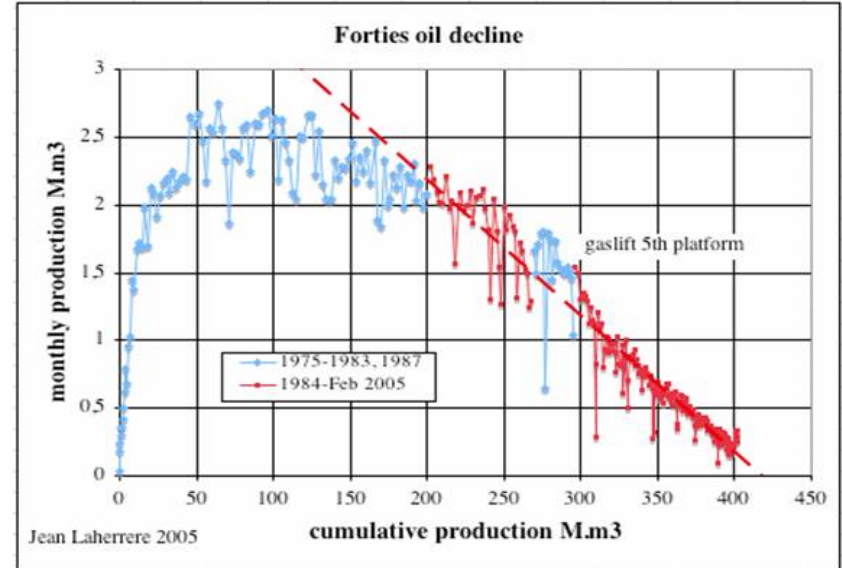
**Field rate declines after ~ 50% of reserves produced**

**Total rate not constant, declines ~ 4% /year. After 40 years rate is ~ 20% of original**

# Effects of New Technology

Little indication that recovery efficiency is increasing in established fields.

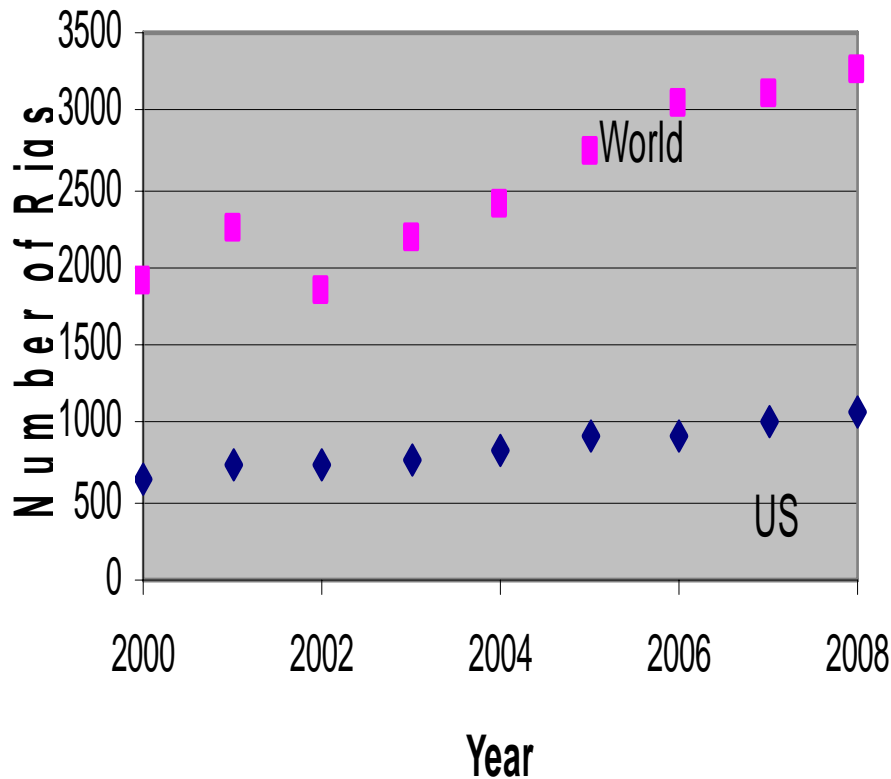
Main benefits seems to be in dealing with unexpected problems and in finding small accumulations



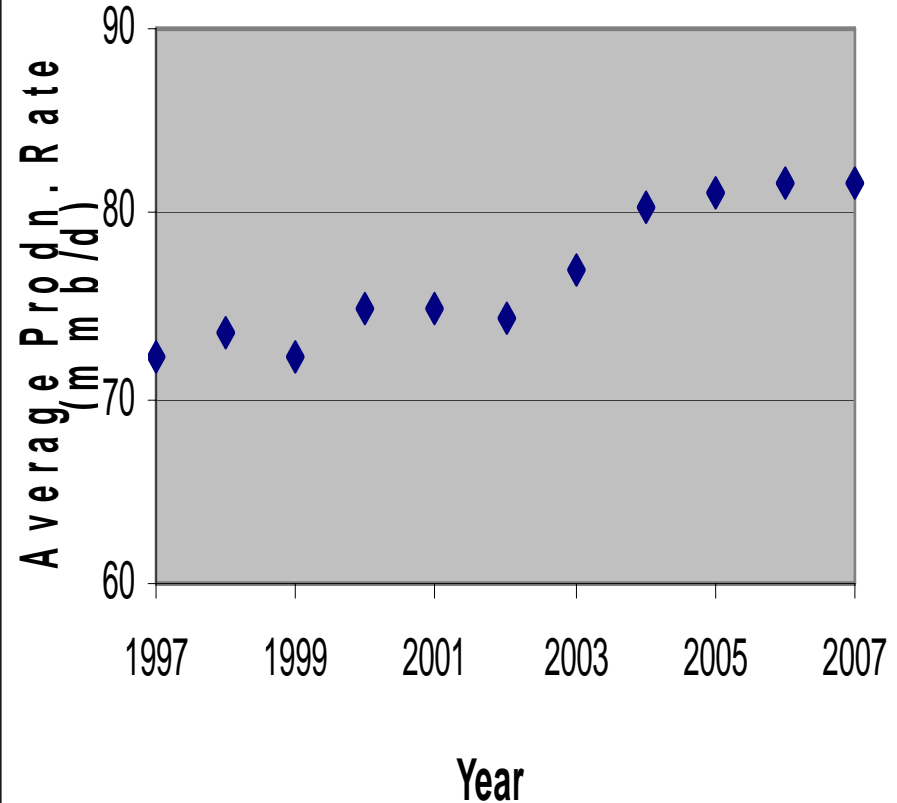
# *We're trying harder, but ....!*

Source: BP, Baker Hughes

## World and US Rig Usage



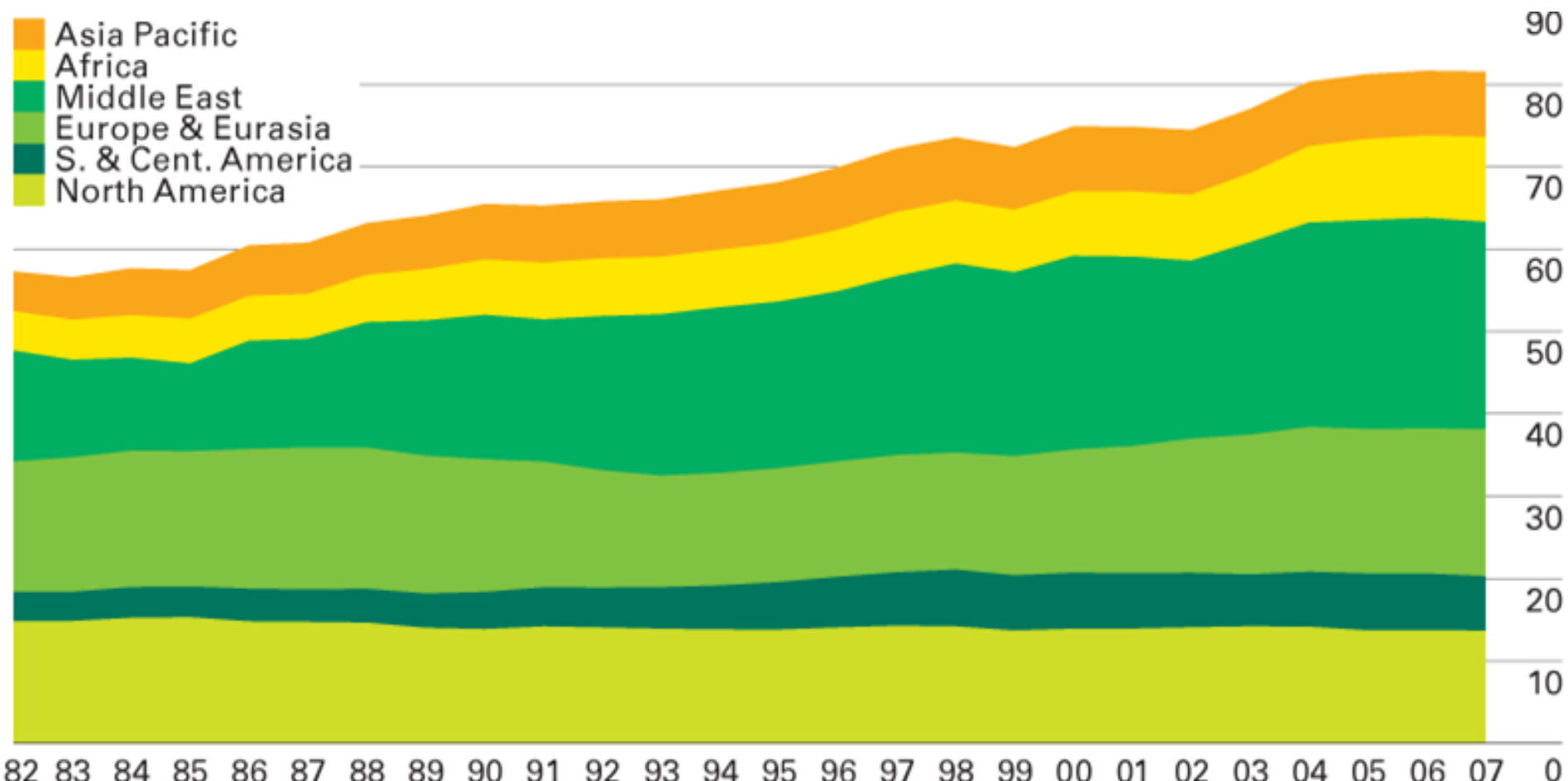
## World Oil Production



***If it looks like a peak – and it feels like a peak – then ....!***

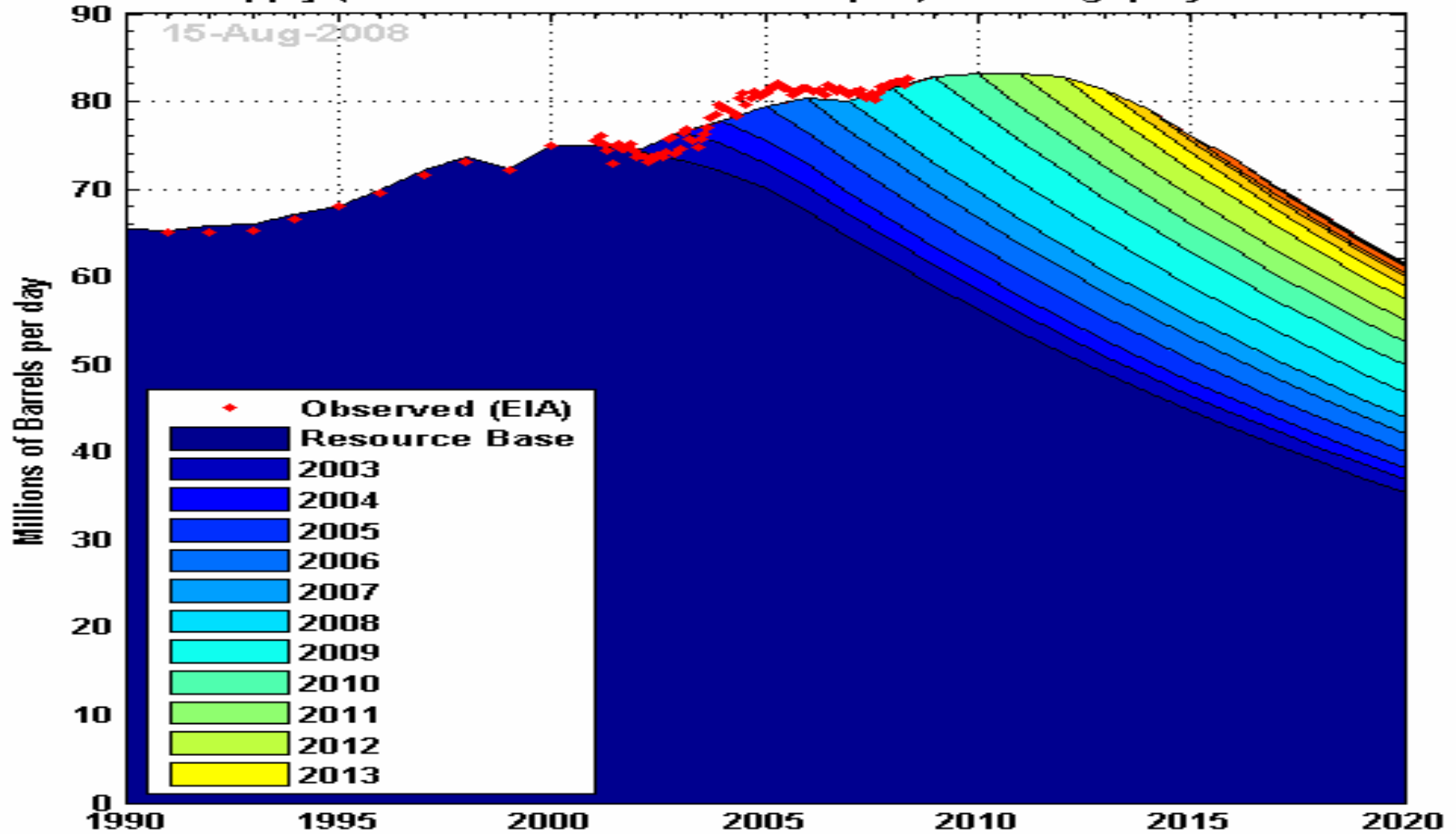
## World Oil production (mmb/d)

Source: BP

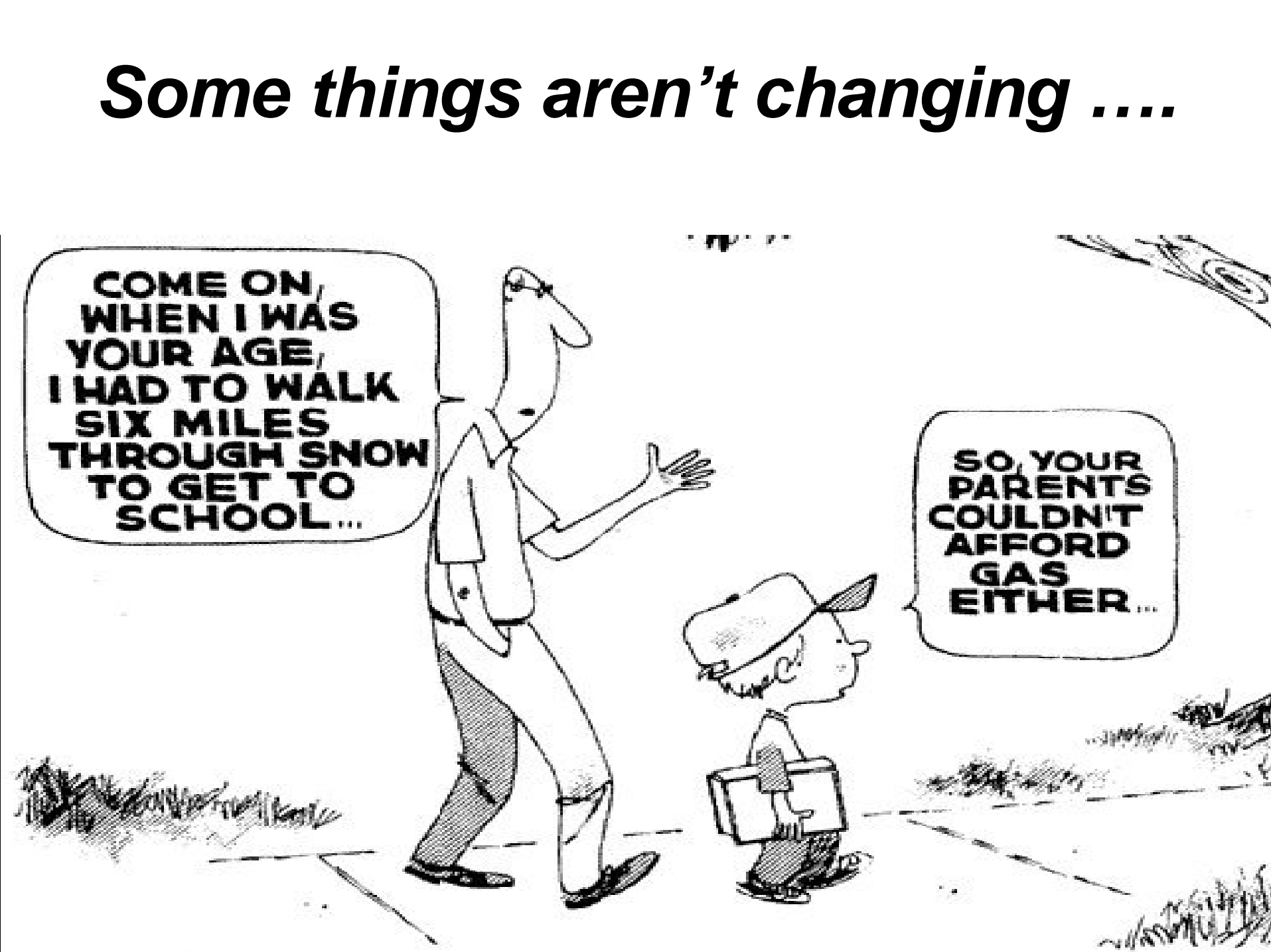


# *If it looks like a peak .....*

**World Oil Supply (Crude Oil + Natural Gas Liquid) and Megaproject Contributions**



# *Some things aren't changing ....*



**COME ON,  
WHEN I WAS  
YOUR AGE,  
I HAD TO WALK  
SIX MILES  
THROUGH SNOW  
TO GET TO  
SCHOOL...**

**SO, YOUR  
PARENTS  
COULDN'T  
AFFORD  
GAS  
EITHER...**

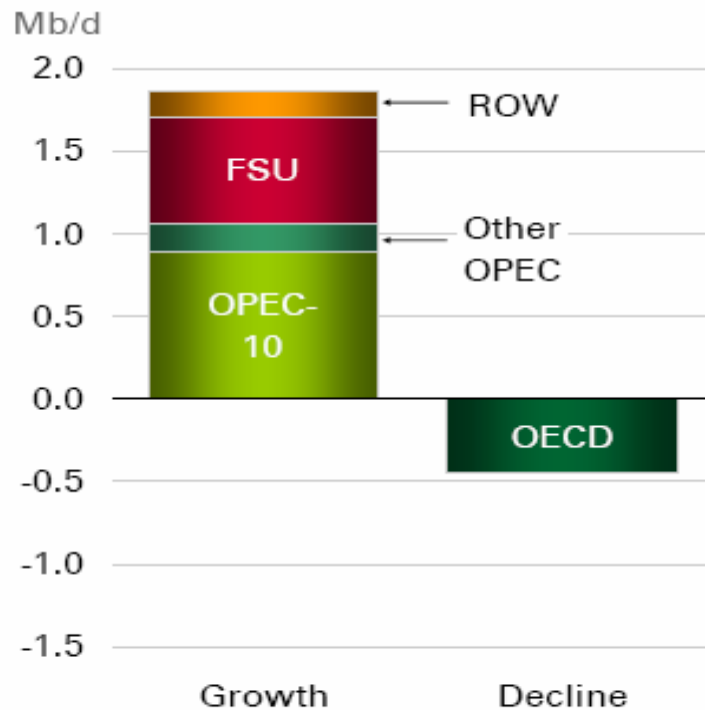


# ... others are .....

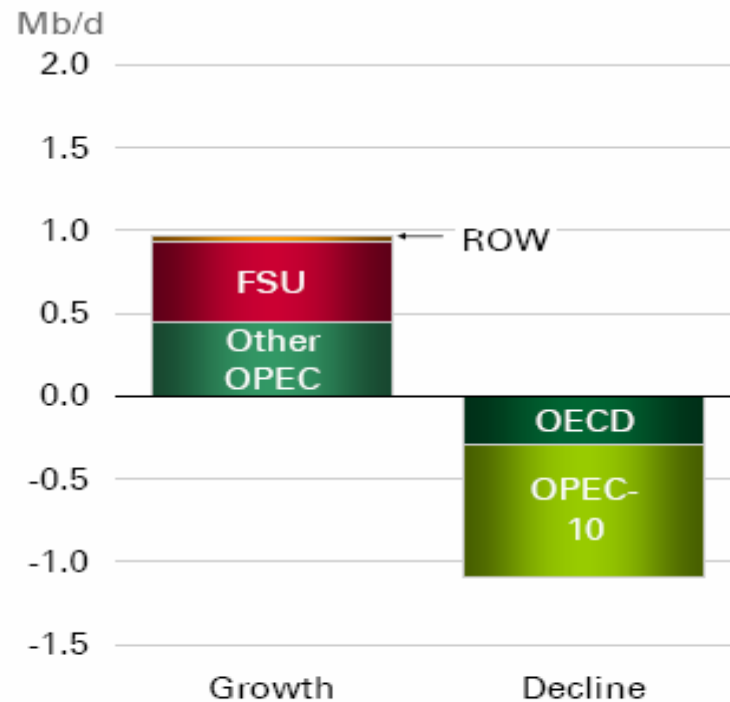
## World Oil Production Changes



Average annual change, 2003-2007



Change 2007

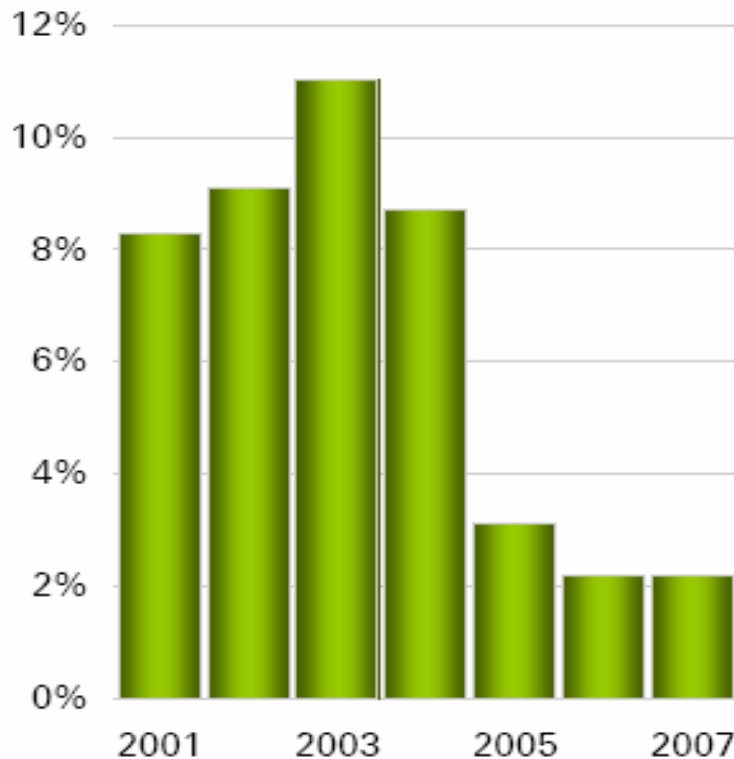


# *... but not as we had expected!*

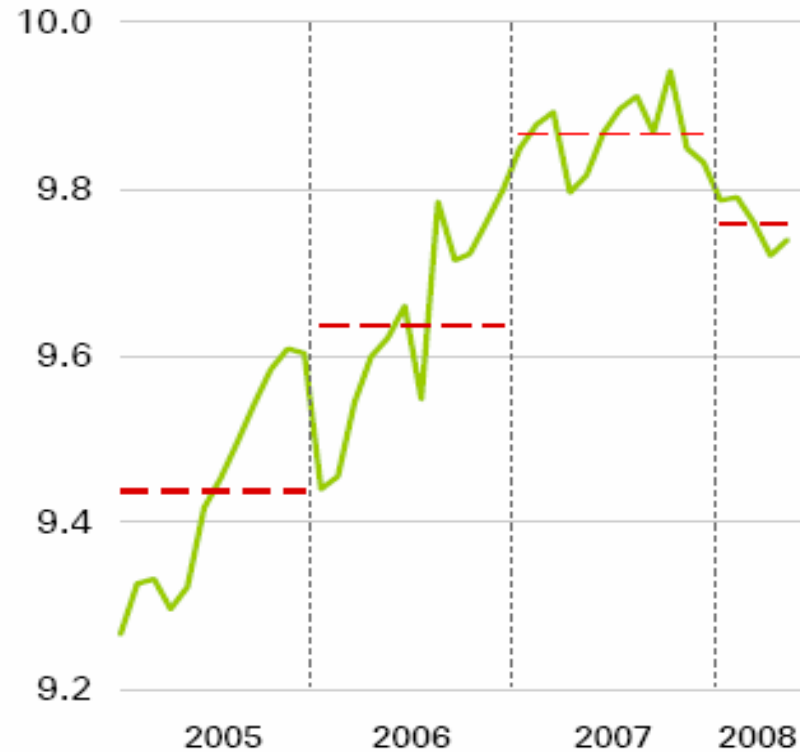
## Russian Oil Production



y-o-y growth

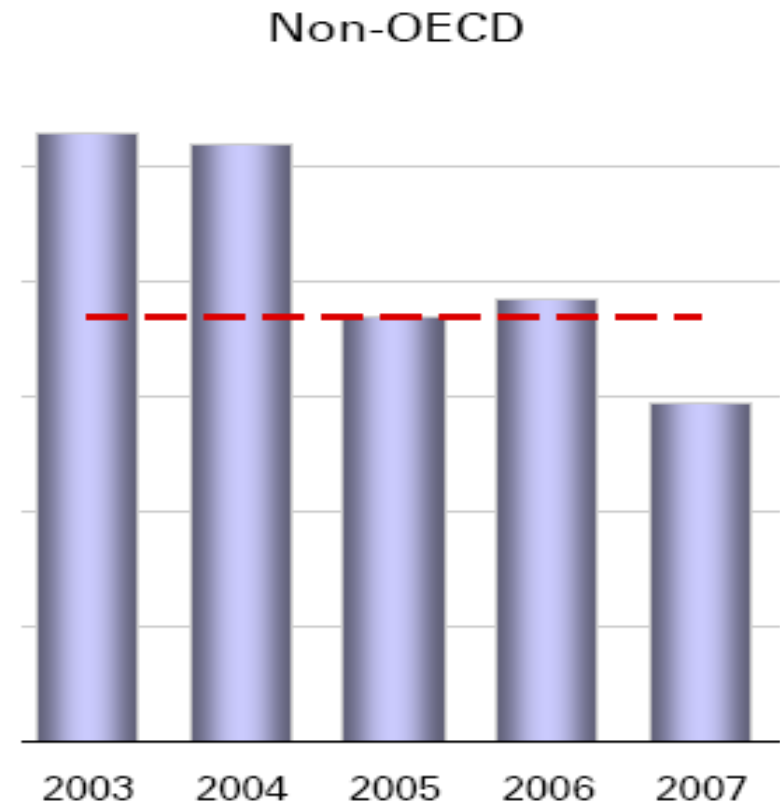
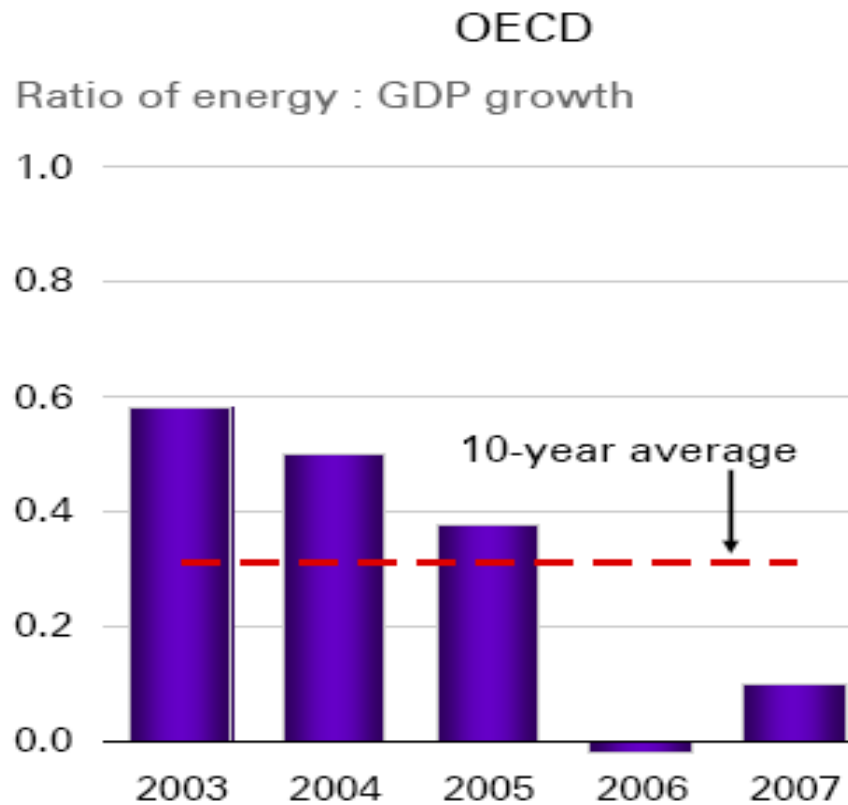


Mb/d



# The Problem – and part of the Solution?

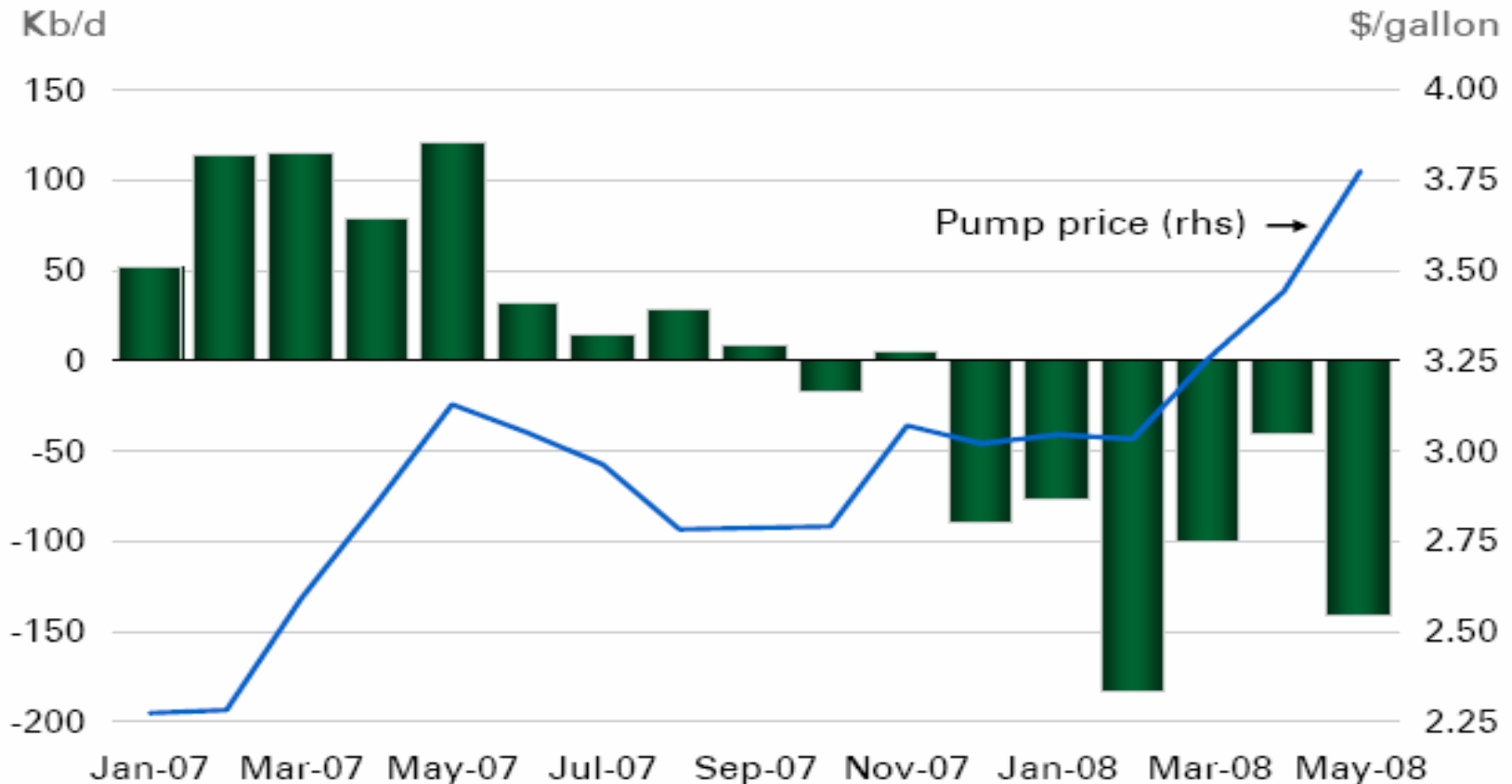
## Energy Growth Relative to GDP Growth



# Money talks!!



## US Gasoline Consumption Growth



# *Not a nightmare, it's real!*



*Queuing for diesel at a Sinopec station in South China, Apr. 2008*



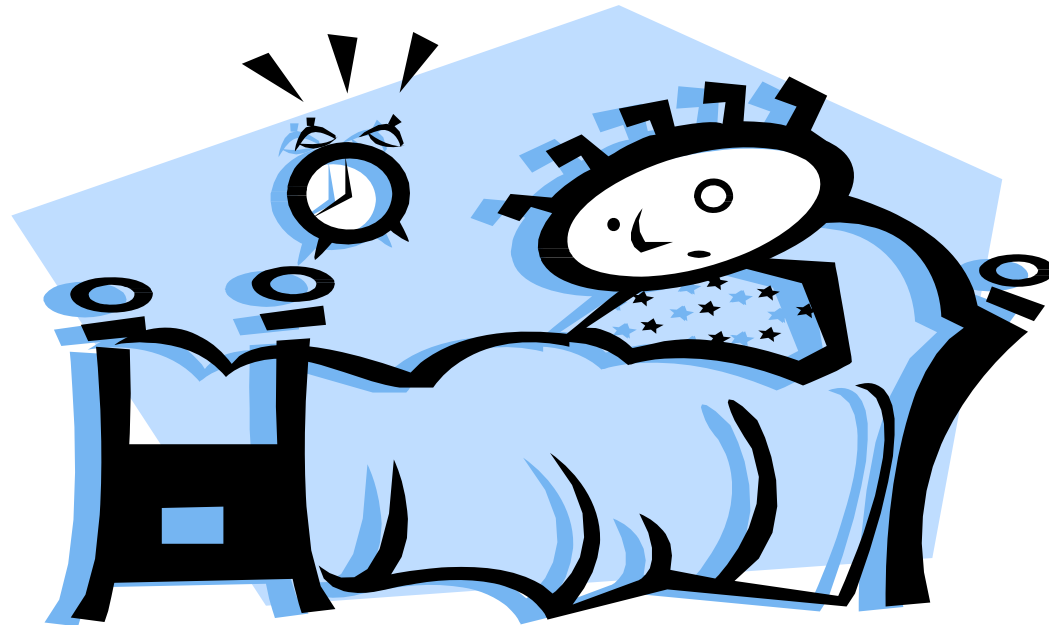
*Waiting in line for gas when Grangemouth refinery workers were on strike, Apr. 2008*



**“OK, it’s agreed – we announce that to do nothing is not an option and then we wait and see how things pan out”**

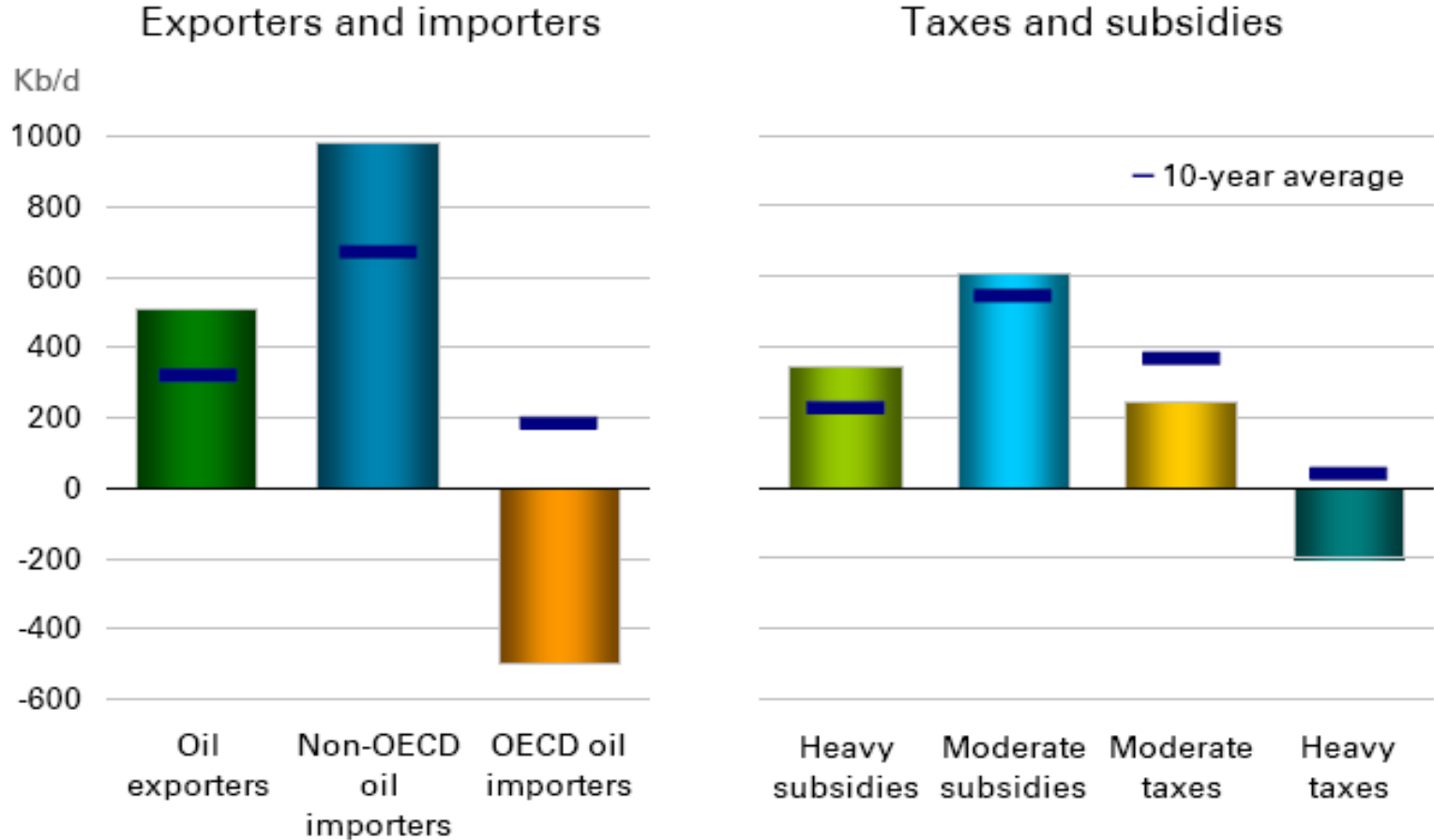
*from "Private Eye"*

# The End





# Global Oil Consumption Growth





# *Renewables are diffuse*

<b>Power Source</b>	<b>Power/Unit / Land Area (W / (m**2))</b>
<b>Wind - onshore</b>	<b>2</b>
<b>Wind- offshore</b>	<b>3</b>
<b>Tidal Pools</b>	<b>3</b>
<b>Tidal Streams</b>	<b>50</b>
<b>Solar PV Panels</b>	<b>5</b>
<b>Plants</b>	<b>0.5</b>
<b>Concentrating Solar - deserts</b>	<b>15</b>
<b>Ocean thermal</b>	<b>5</b>

**To make a difference, renewable facilities must be country-sized**

# ***Rationing: First step to a solution?***



***Queuing for diesel at a Sinopec station in South China, Apr. 2008***



***Waiting in line for gas when Grangemouth refinery workers were on strike, Apr. 2008***