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
<table>
<thead>
<tr>
<th>Year</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>2001</td>
<td>Discovery rates continue decades-long fall. Calculations suggest reserves can’t meet demand projections. Some recognition of political, investment risk in developing resources.</td>
</tr>
<tr>
<td>2008</td>
<td>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.</td>
</tr>
</tbody>
</table>
Buying your barrels ...

Oil consumption per capita

Consumption per capita 2007
Tonnes

0-0.75
0.75-1.5
1.5-2.25
2.25-3.0
> 3.0
... from those who have lots

Who has the oil?
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

US Outer Continental Shelf (OCS)

Statistics

- North Aleutian Basin (0.75 Bbbl)
- 25.9 Bbbl
- 40.9 Bbbl
- 4 Bbbl
- 3.8 Bbbl
- 2.3 Bbbl
- 2.1 Bbbl
- 0.4 Bbbl

BANNED
AVAILABLE FOR LEASE

Source: MMS
The R/P Placebo

1. Reservoirs don’t do 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 Rig Usage**
- **US Rig Usage**

Year: 2000 to 2008

World Oil Production

- **Average Production Rate**

Year: 1997 to 2007
If it looks like a peak – and it feels like a peak – then ....!
If it looks like a peak .....

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

- Observed (EIA)
- Resource Base

Millions of Barrels per day

Years: 1990 to 2020
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...
World Oil Production Changes

Average annual change, 2003-2007

<table>
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<tr>
<th>Mb/d</th>
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<th>Decline</th>
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</thead>
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Change 2007

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... but not as we had expected!
The Problem – and part of the Solution?

Energy Growth Relative to GDP Growth

OECD

Non-OECD

Ratio of energy : GDP growth

10-year average

Money talks!!

US Gasoline Consumption Growth

Source: EIA © BP 2008
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

Source: 13D Research, NY
"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

Exporters and importers

Taxes and subsidies

BP Statistical Review of World Energy 2008
Renewables are diffuse

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

Source: 13D Research, NY