Peak Oil - the emerging reality

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Who am I?

Healthy scepticism

Not pessimistic by nature, not anti-Oil

Basic approach to Peak Oil analysis

Don’t guess, assume or hope - let the numbers talk

Observe what companies do, not what they say

An important disclaimer

In this presentation the opinions expressed are entirely those of Chris Skrebowski in his capacity as an ODAC Trustee and as such do not necessarily reflect the view of the Energy Institute for whom he edits Petroleum Review

The challenge of Peak Oil

- To meet a challenge
- You first have to recognise you face a challenge
- I aim to show you that:
- ‘Peak Oil’ is real and imminent
- That time is short
- That adaptation will not be easy

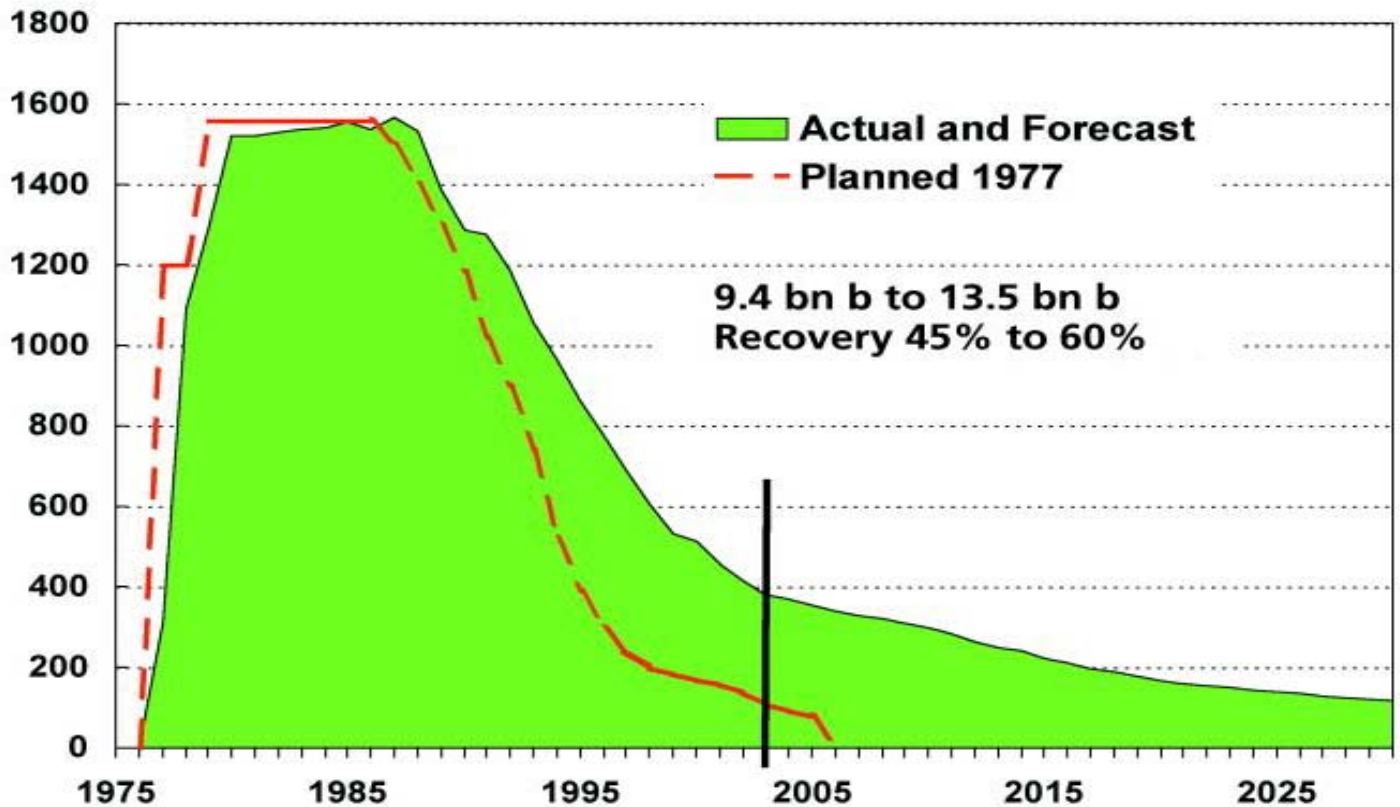
So what is ‘Peak Oil’?

- It is the point when further expansion of oil production becomes impossible because:
- New production flows are fully offset by production declines (depletion)
- You never run out of oil
- You do run out of incremental flows
- The world needs oil products to support growth

The practical realities

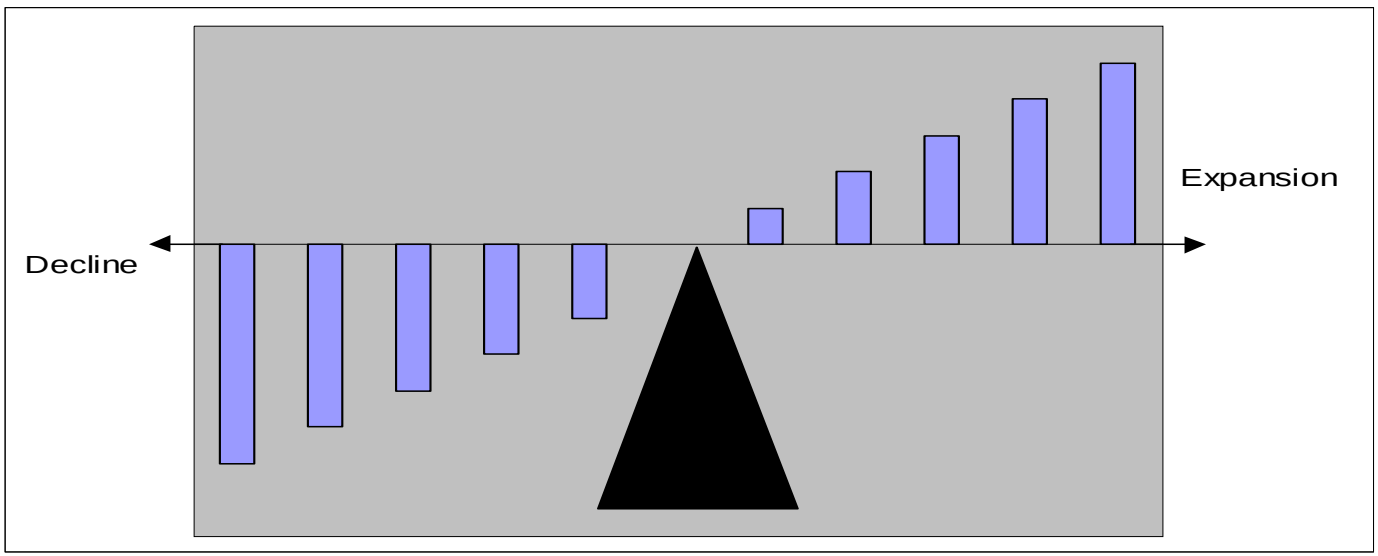
- The world needs oil production *flows*
- Consumers need delivery *flows*
- Reserves are only useful as *flows*
- Peak oil is when *flows can't* meet the required demand
- This will cause an 'Economic Tsunami'
- Worry about ***flows*** **not reserves**

Alaskan North Slope Production Reserves grow -- Production falls

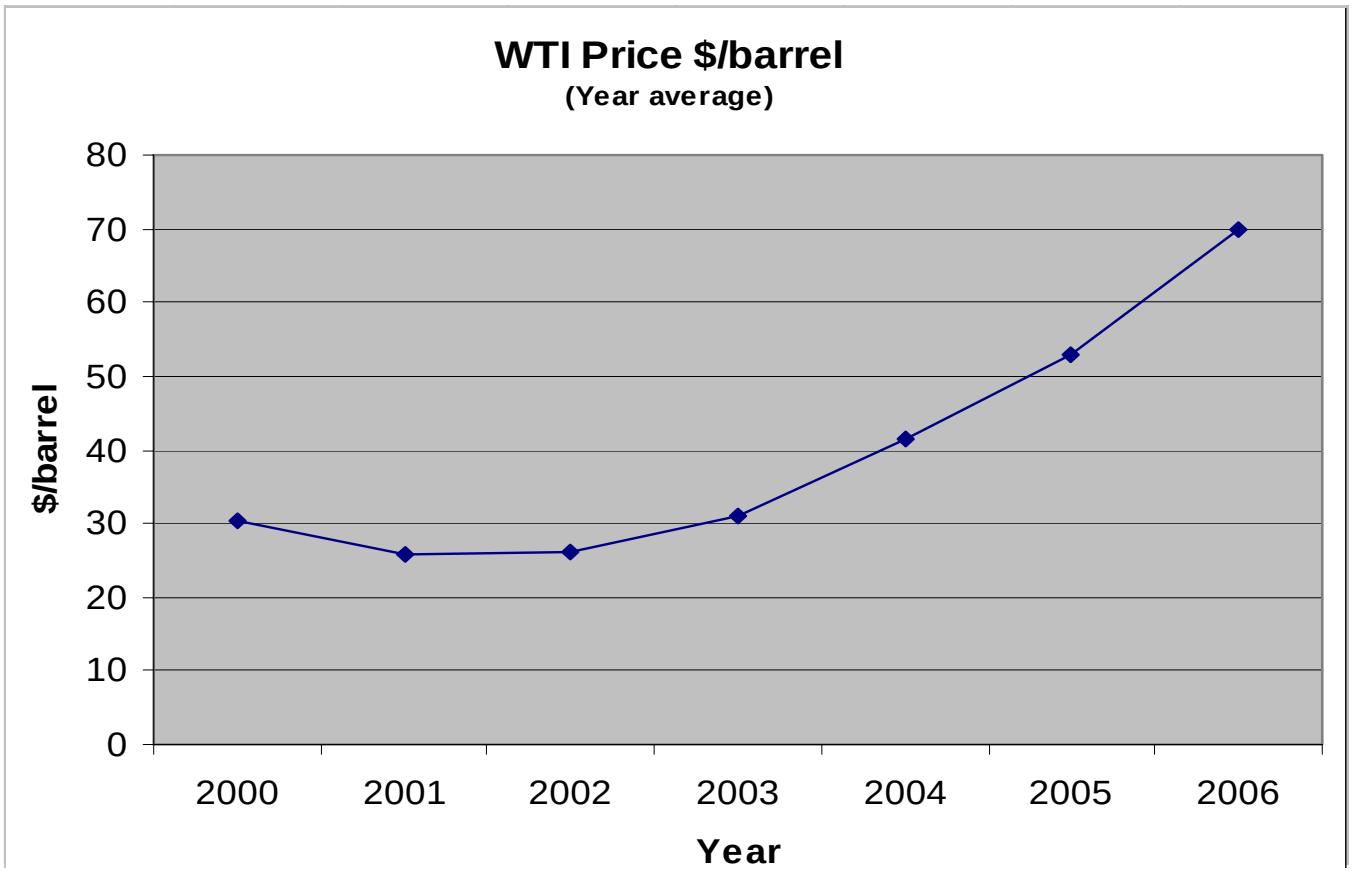


A simple observation -- or why peak will be earlier than most people expect

‘Global production falls when loss of output from countries in decline exceeds gains in output from those that are expanding.’



What is the price telling us?



What economics really says

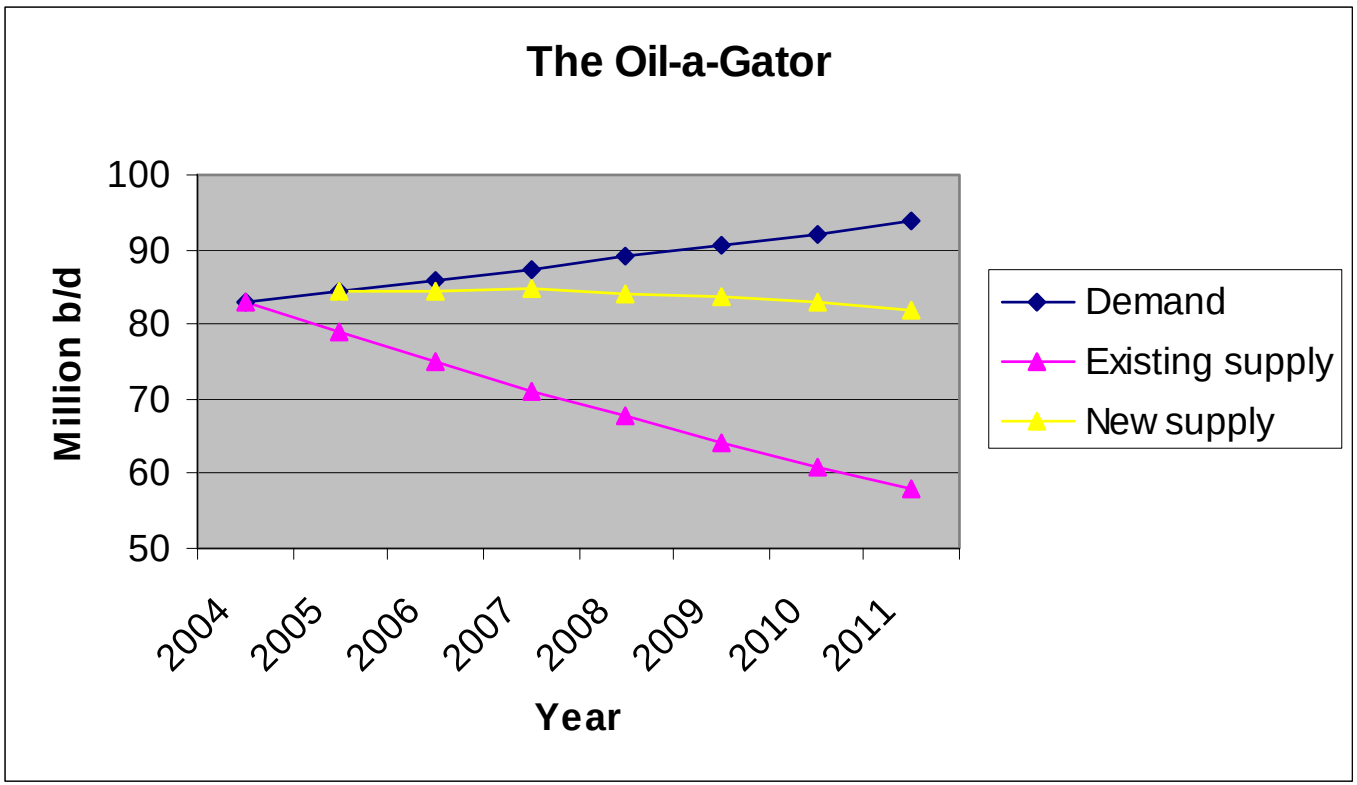
- Economics requires that supply and demand always balance
- Economists have **assumed** that supply will expand to meet demand via a high price signal
- If supply **can't** expand we need the high prices to 'destroy demand'
- How high do prices need to go?

The CIBC answer

- Assessed the likely supply shortfall and the oil price needed to reduce demand

- 2006 1mn b/d and $61/barrel
- 2008 4.8mn b/d and $80/barrel
- 2010 8.9mn b/d and $101/barrel

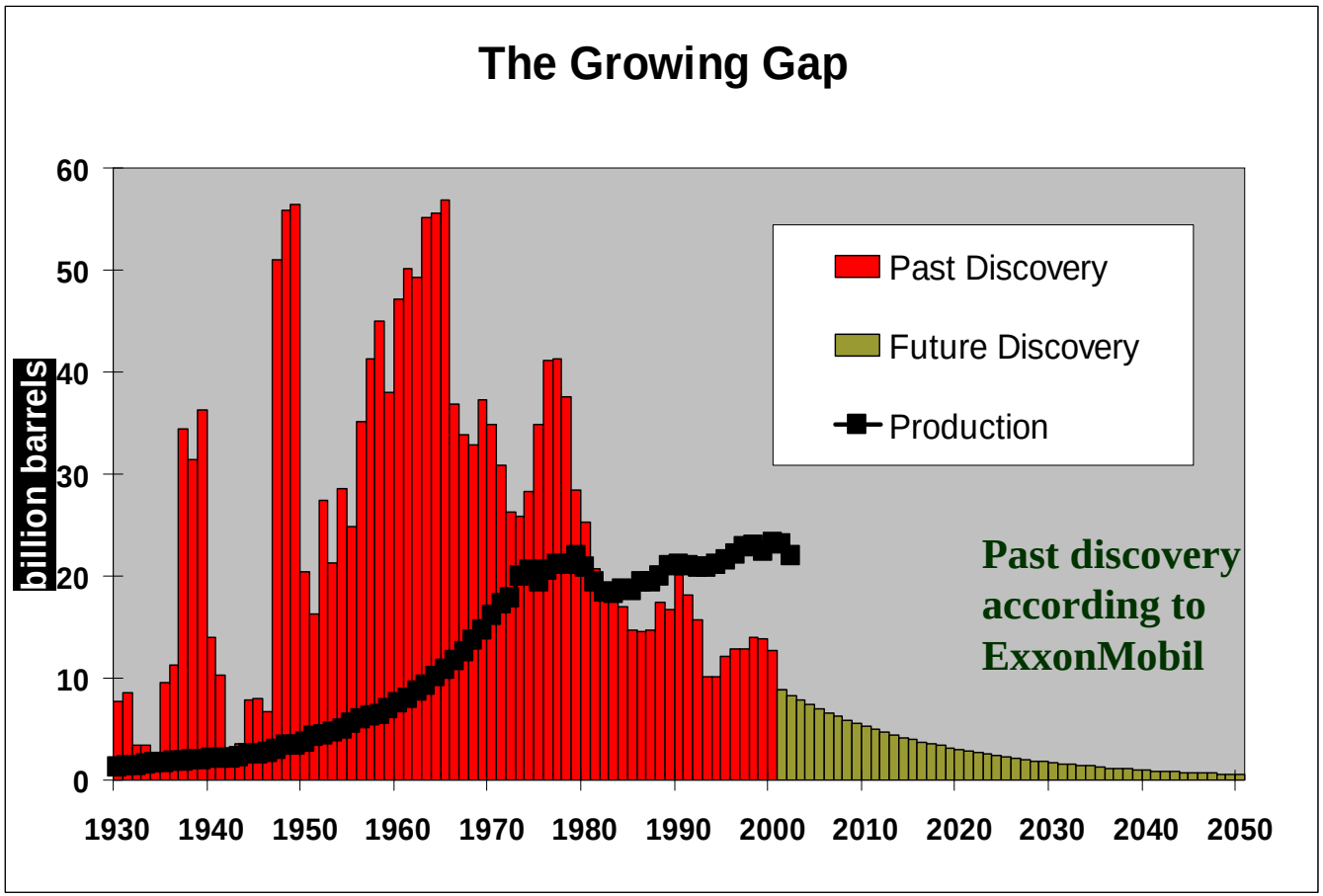
Introducing the Gator



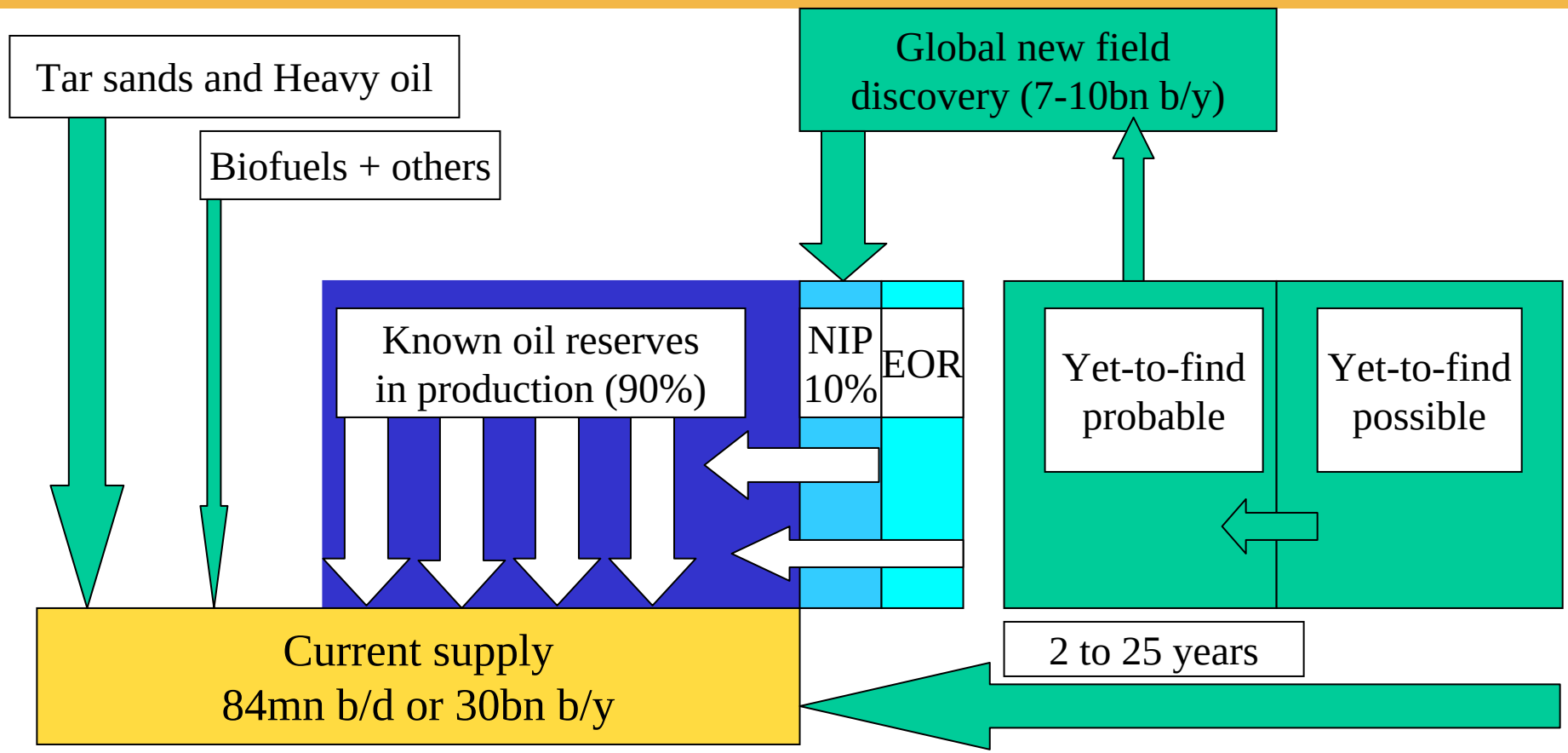
Why are oil supplies peaking?

- We are not finding oil fast enough
- We are not developing fields fast enough
- Too many fields are old and declining
- We are short of people and equipment
- Oilfield inflation is soaring
- Our societies are totally oil dependent
- Oil supply will peak soon. How soon?

The real discovery trend



Oil production flows -- all new flows take two to twenty-five years



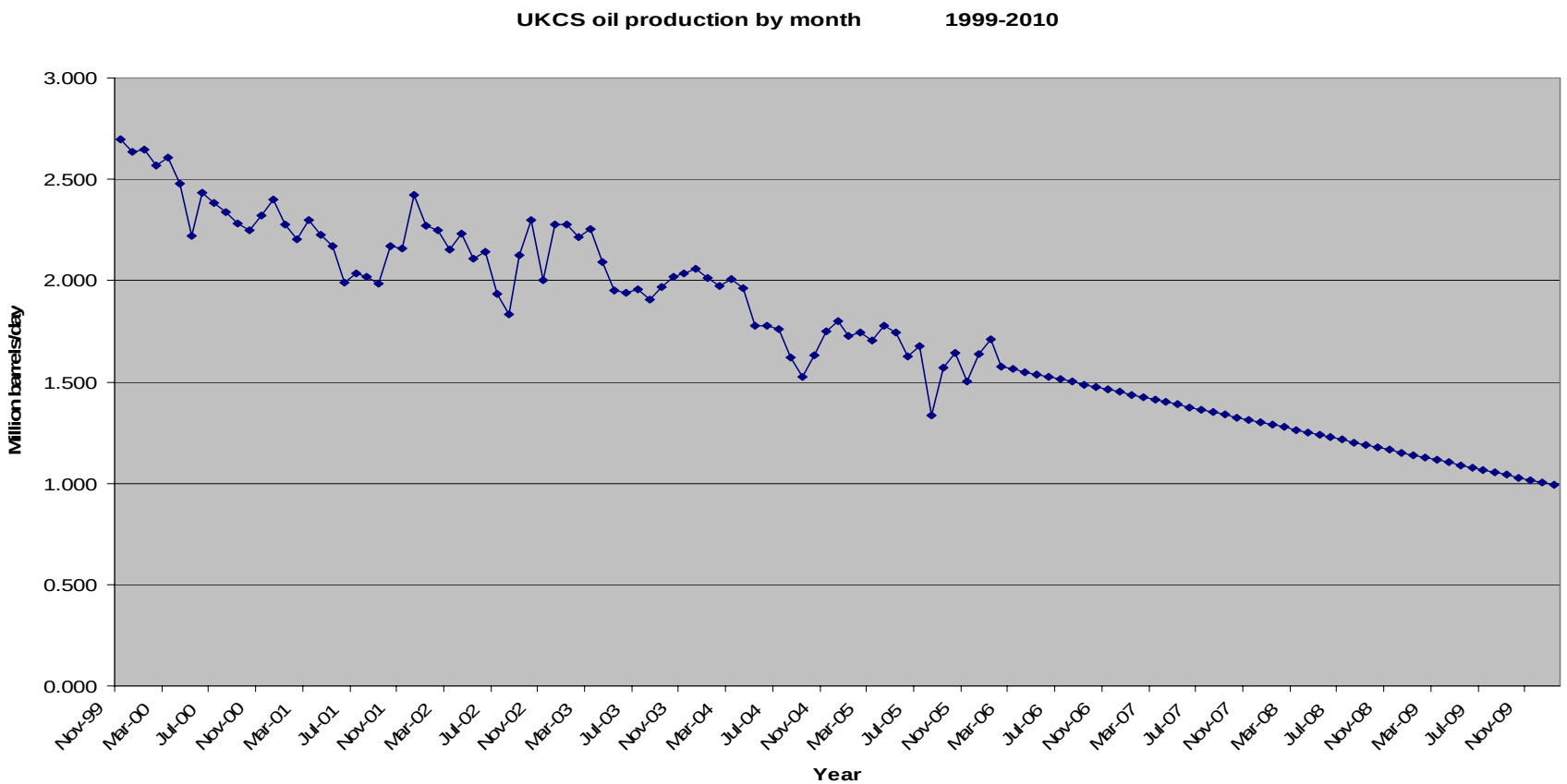
How old are the fields?

- Of the 18 largest fields, 12 are in decline, 5 have some potential and 1 is undeveloped
- The 120 largest fields give 50% of total
- 70% of production from fields 30+ years old
- Few large recent discoveries
- We’re dependent on the oil equivalent of ‘Old men and young boys’

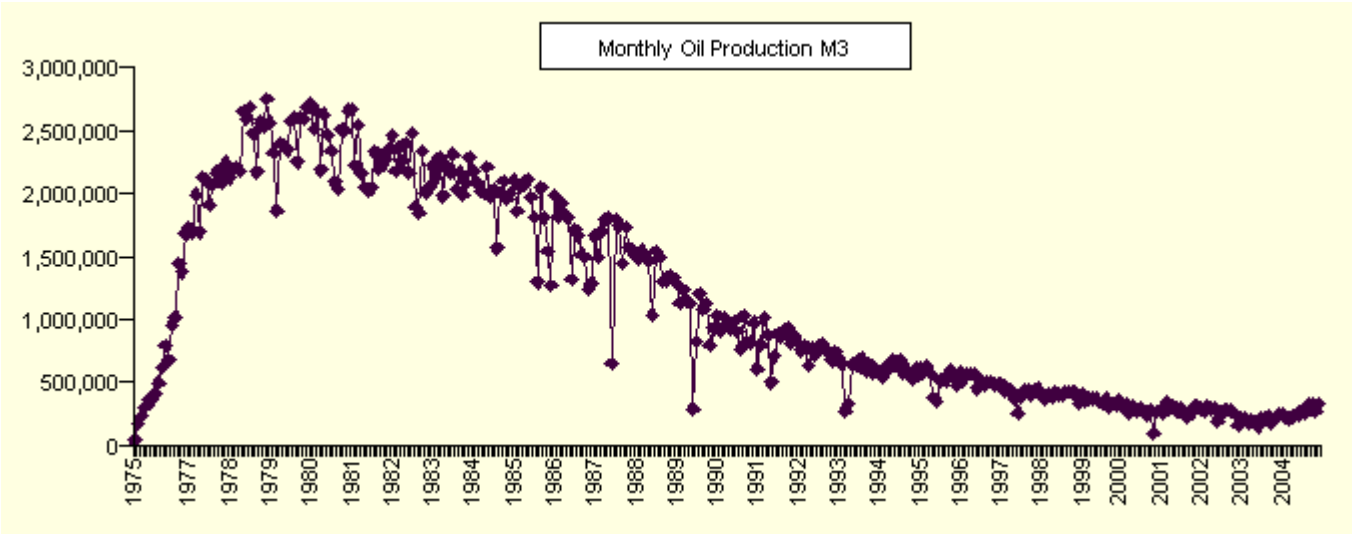
What are the BP statistics saying?

- OECD production peaked in 1997 and has now declined by just under 2 million b/d (8.8%)
- Non-Opec, non-FSU production peaked 2002
- North America/Mexico peaked in 1997
- North Sea - UK/Norway/Denmark peaked in 2000 now declined by 1.2 million b/d (19.2%)
- Around 25 significant producers in decline
- About 28% of global production from decliners

The UKCS depletion reality -- production down to 1mn b/d by 2010



North Sea production by field



Forties monthly production to date

The oil companies are already struggling to hold production

(21 quoted co.'s account for 25% of global production)

- In 2004 and 2005 oil production growth was:
  - 3.8% (04) but 0.4% (05) for the top 5 (13.5% of global)
  - 3.2% (04) but 0.5% (05) for the top 21 (26% of global)
- Annual decline rates up to 5%, quarterly 8%

The top five decliners in 2005

Country	Production	Peak Year	Decline
USA	6.8mn b/d	1985	-5.51%
Norway	2.9mn b/d	2001	-7.50%
UK	1.8mn b/d	1999	-11.00%
Mexico	3.8mn b/d	2004	-1.60%
Syria	0.5mn b/d	1995	-11.40%

About to go into decline

- Denmark 2005
- Malaysia 2005
- Mexico 2005
- Vietnam 2005
- India 2006/07
- China 2007/08
- Collectively 9.9mn b/d or 12.3% of production
- Iran is struggling -- next to go?

So what happened in 2005?

- The world added 2.58mn b/d of capacity
- 1.17mn b/d Opec, 1.40mn b/d non-Opec
- Depletion was 1.26mn b/d mostly non-Opec
- Then the Hurricanes cost 0.28mn b/d
- So that left just 1.04mn b/d to meet new demand, only 40% of gross new capacity
- No wonder prices remained high

The oil depletion balance sheet at end 2005 and by 2008/9

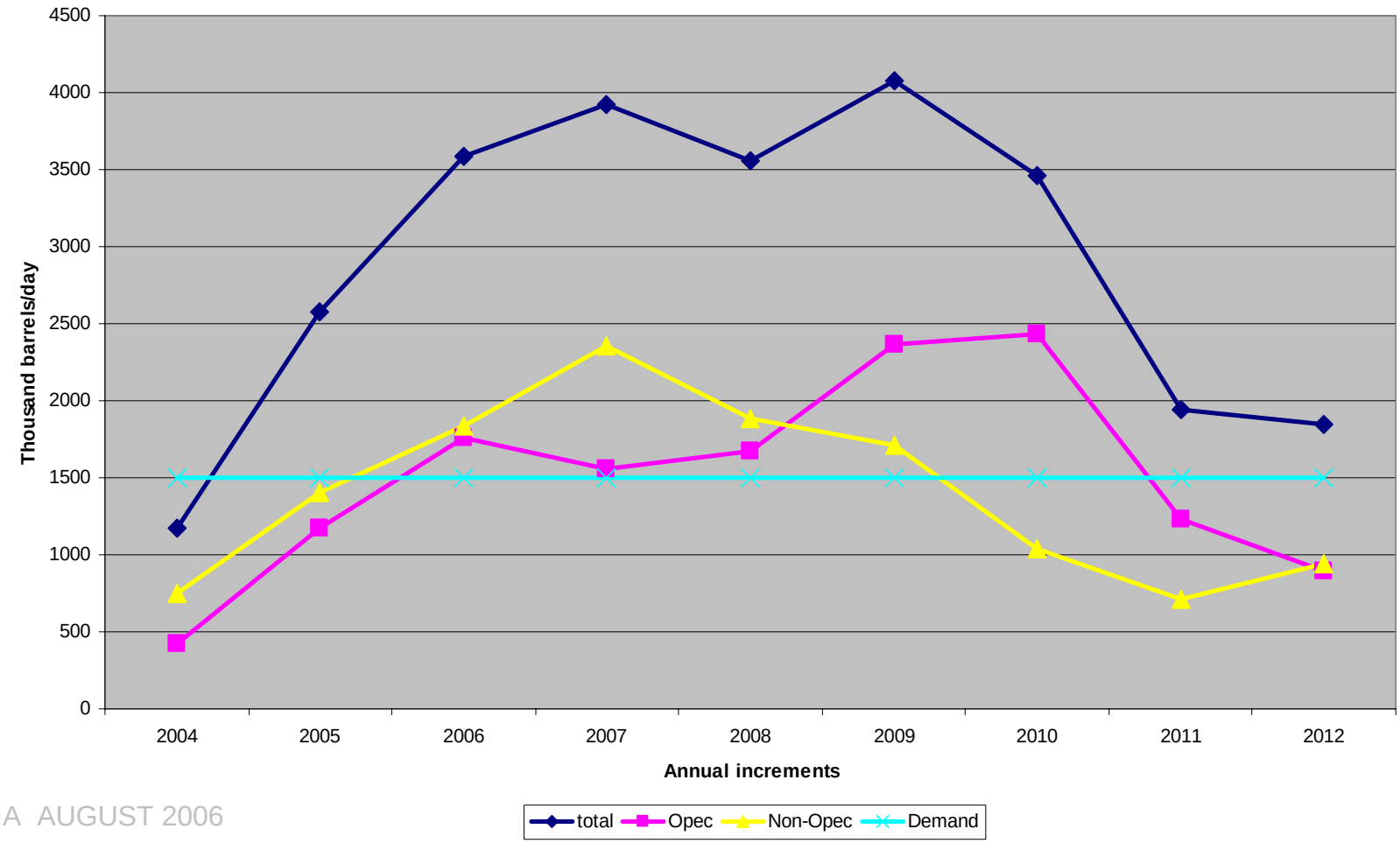
- In decline 28% but rising to 40% by 2008/9
- In danger 12% but declining to 10% by 2008/9
- Growing 48% but declining to 38% by 2008/9
- Russia 12% and steady at 12% by 2008/9
- The scales appear ‘balanced’ by 2008/9
- So does President Putin decide when decline starts? Or does Saudi geology? Or can we drive it out to 2010 to 2011?

How the Megaprojects database is created and used

- All publicly available data
- 2006-2012 148 Opec and 70 non-Opec projects
- Opec data (from their website)
- Incremental production allocated by start up date

- Graphed to show volumes available to meet demand

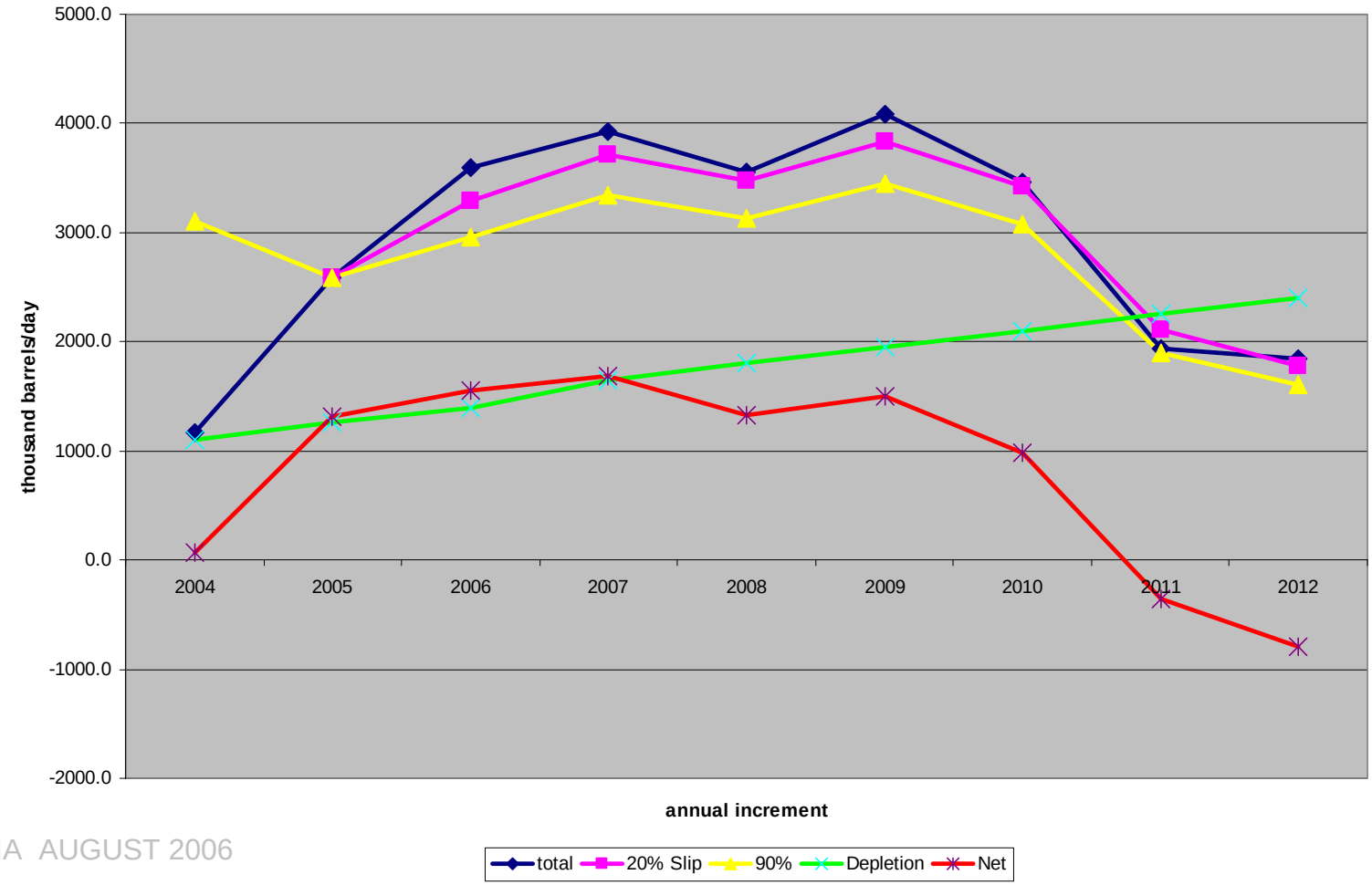
New Opec and non-Opec capacity



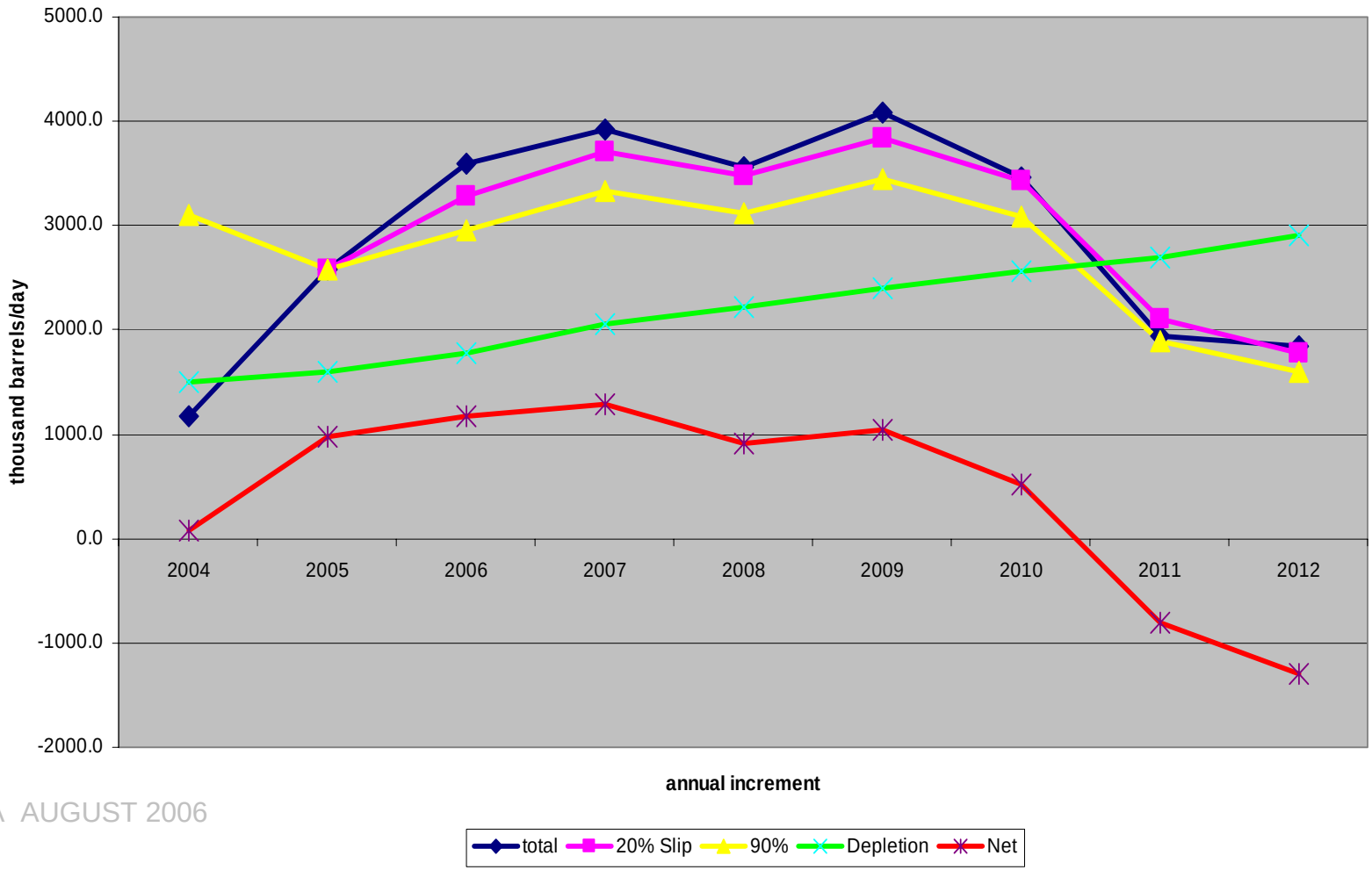
Then we add the depletion reality
(and other negative factors)

- Projects slip (typically around 20% each year)
- Companies are always optimistic (take 10% off peak)
- Depletion is already 1.2mn b/d and rising
- Enhanced recovery is slow and limited (0.5%/ yr)
- Depletion rates are rising (6%? 8%?)
- The number of countries in decline is rising
- 90% of known reserves are in production (oil higher)

This is the real new capacity to 2012 (Peak in first quarter of 2011)



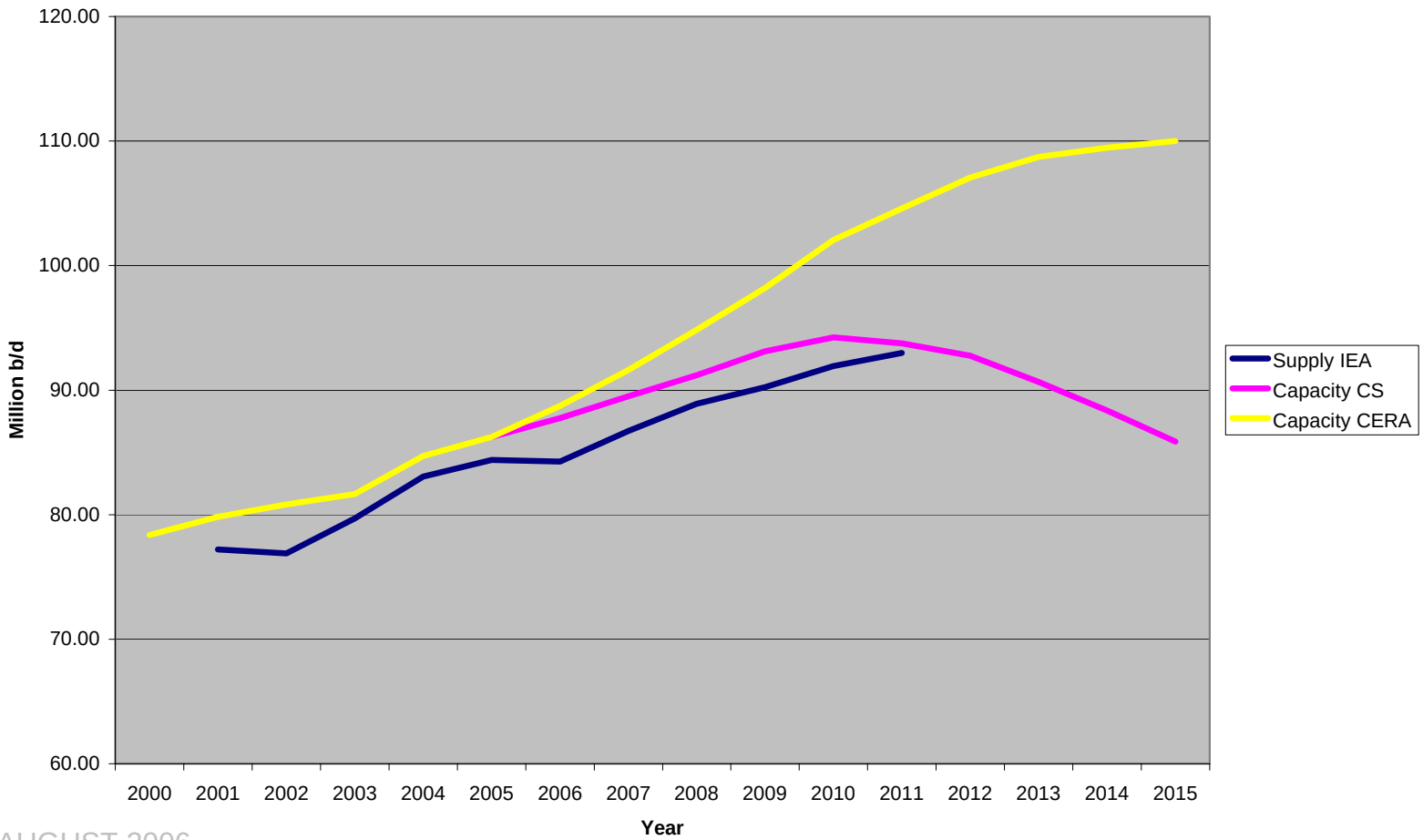
The wild card -- Oil producers own consumption -- subsidised & +4%/yr (Opec plus Russia plus Mexico)



Wild cards on the Supply side

- If Iraqis learn to love each
- Iran is struggling to hold production
- Saudi is drilling like crazy and spending freely to boost production.

Global liquids capacity to 2015



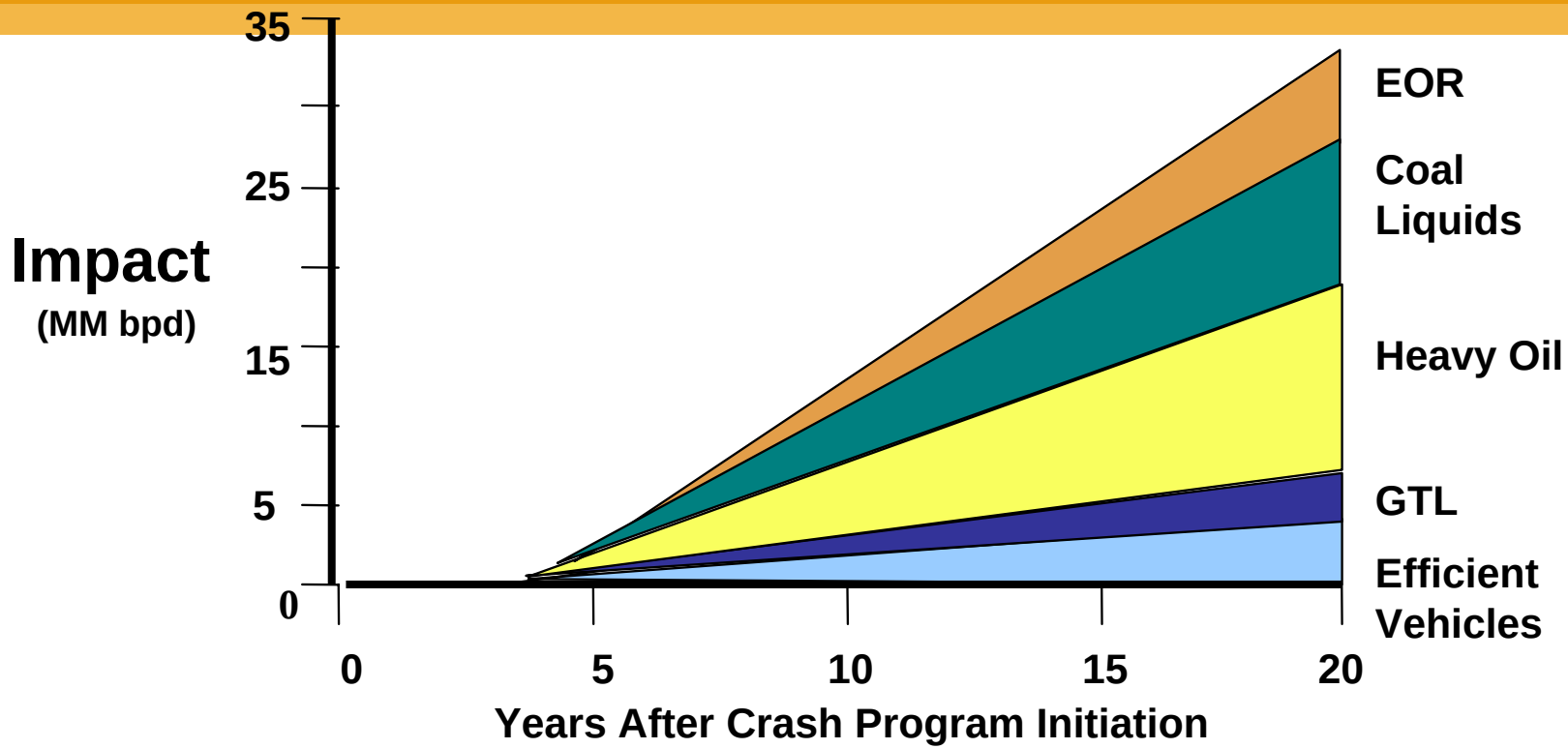
Six key mitigations -- but hurry

- Efficiency in use
- Demand management
- Biofuels
- Heavy oils and tarsands
- Clean coal to create syngas
- Gas to liquids

2005 Study

Worldwide Crash Program Mitigation of Conventional Oil Production Peaking

A Study for DOE NETL



Delay / Rapid growth.

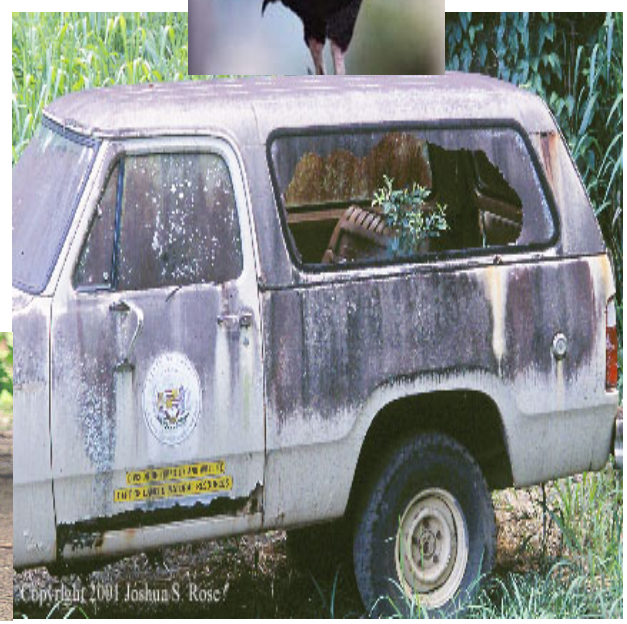
Roughly 35 MM bpd at year 20.

My conclusions

- Supply will remain tight and prices high barring a major economic setback
- Oil supply will peak in 2010/2011 at around 92-94 million barrels/day
- Oil supply in international trade may peak earlier than the oil production peak
- Collectively we are still in denial
- WE HAVE JUST **1,500 DAYS TO PEAK**

By 2012

Will this be the only practical use for SUVs or 4WDs?



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Australian Association for the Study of Peak Oil and Gas

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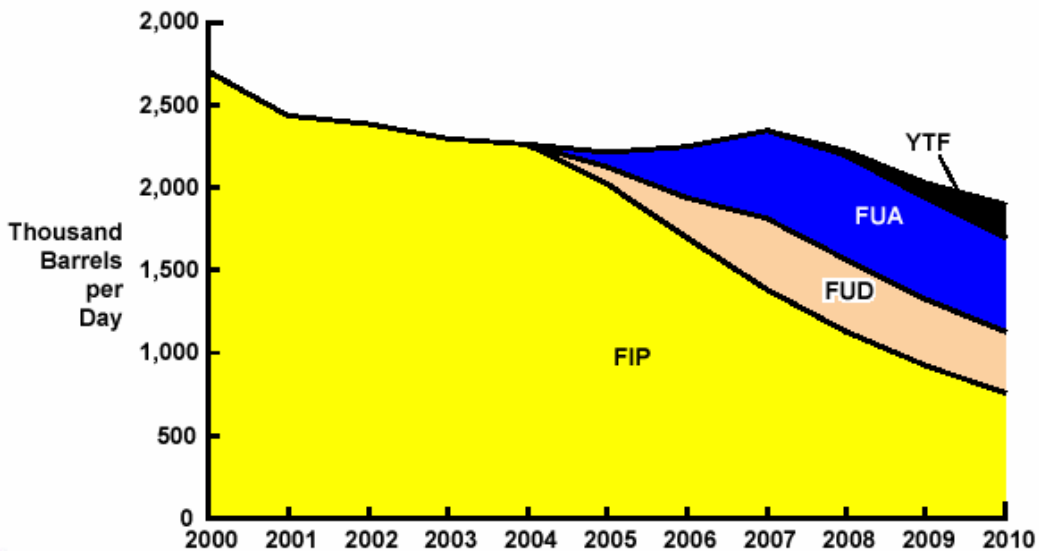
A network of professionals working to reduce oil vulnerability

North Sea -- Fact or Fantasy

United Kingdom—'Undulating Plateau'



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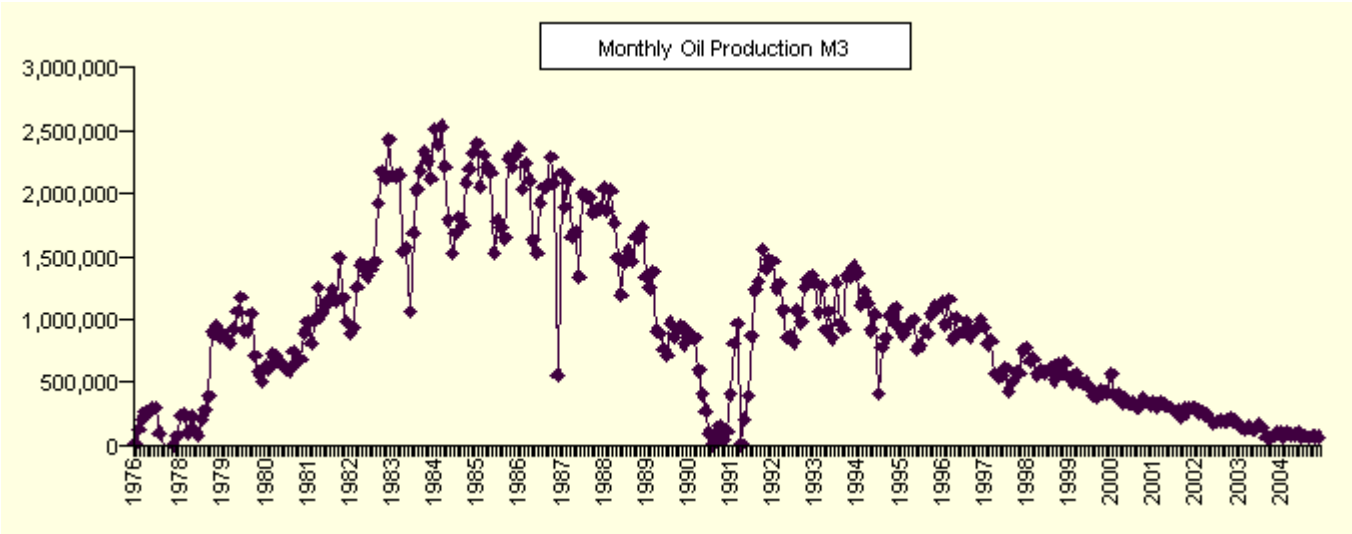
North Sea production by field



Brent monthly production to date