

The Actuarial Profession
making financial sense of the future

Climate Change & Resource Depletion
Nico Aspinall & Hugh McNeill

The Challenge for Actuaries

17th October 2011

© 2010 The Actuarial Profession • www.actuaries.org.uk

Introduction

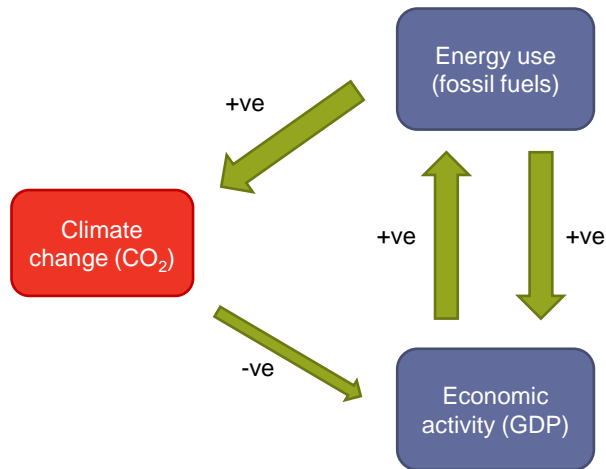
- Resource & Environment Group
- Literature Review
- 2011 Edition Focus

© 2010 The Actuarial Profession • www.actuaries.org.uk

1

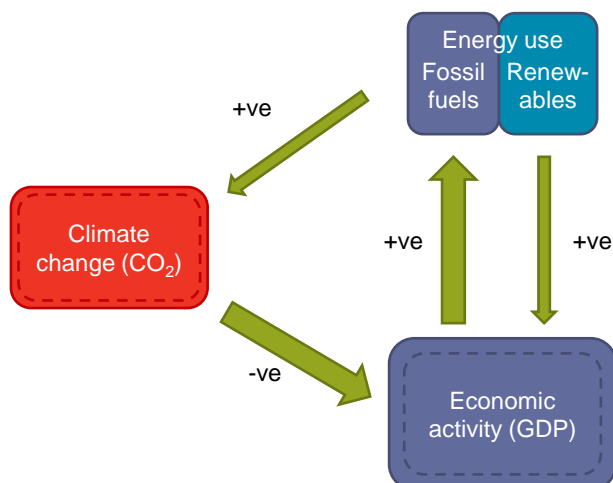
Energy, Economy and Climate Change

Mental models – Present



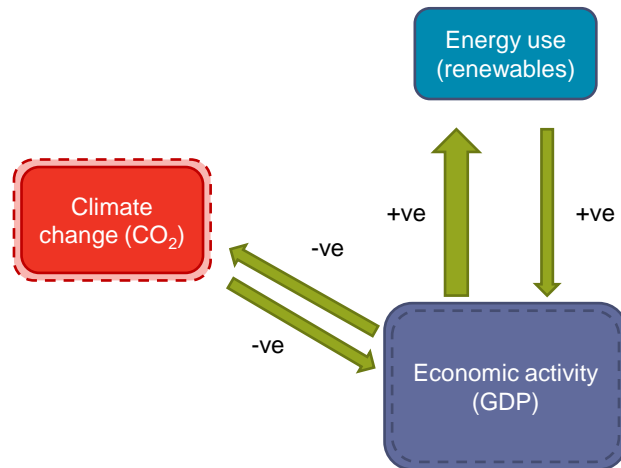
Energy, Economy and Climate Change

Mental models – Near future



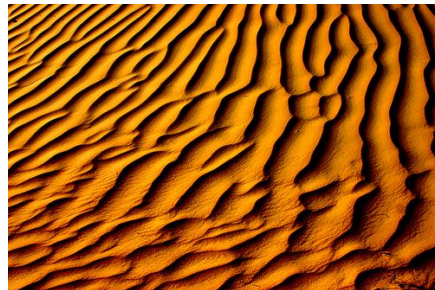
Energy, Economy and Climate Change

Mental models – Future



What about climate change?

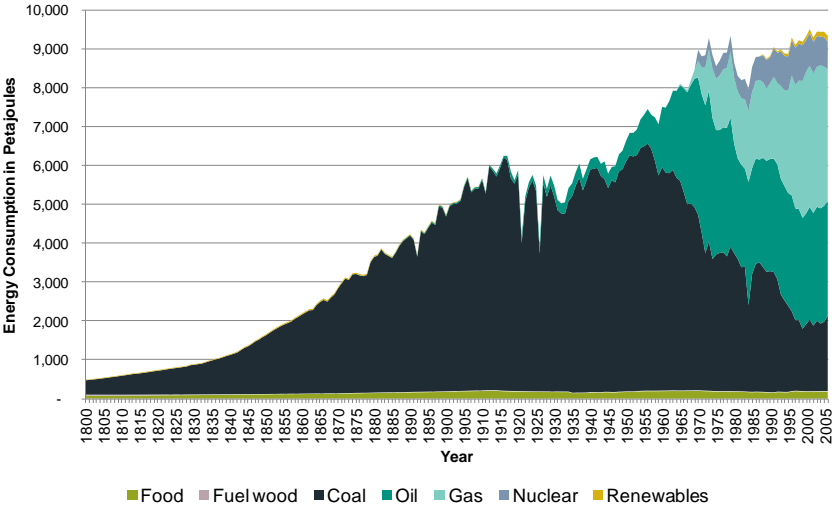
Possible end states?



Source: Left, Tamseis research communications; Right, .EVO.

Energy Production in England & Wales

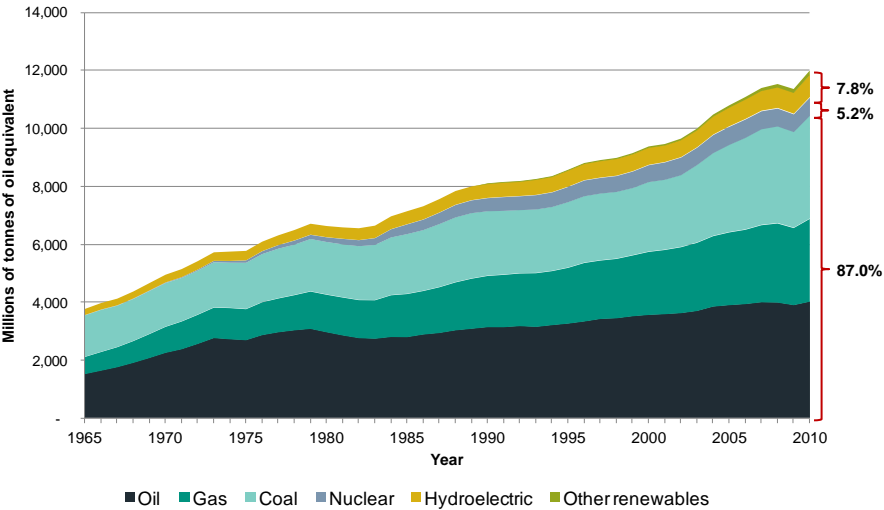
1800-Present day



6

World Energy Production

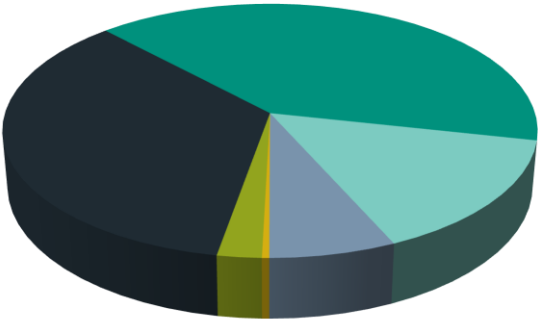
BP Statistical Review of World Energy 2011



7

2010 UK Energy Production

BP Statistical Review of World Energy 2011



Fuel	%
Fossil	90.6
Nuclear	6.7
Renewables	2.7

Total: 209.1 Mtoe

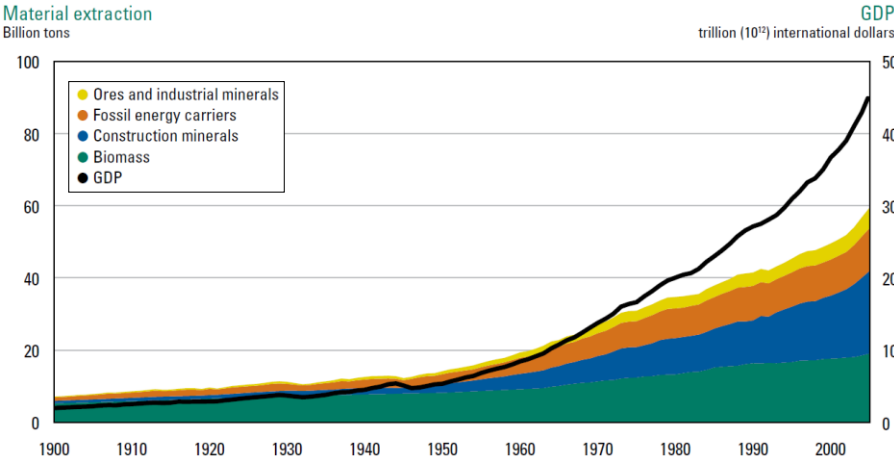
- Oil
- Gas
- Coal
- Nuclear
- Hydroelectric
- Other renewables

© 2010 The Actuarial Profession • www.actuaries.org.uk

8

Mineral Extraction & GDP

UNEP – Decoupling Natural Resource Use & Environmental Impacts from Economic Growth

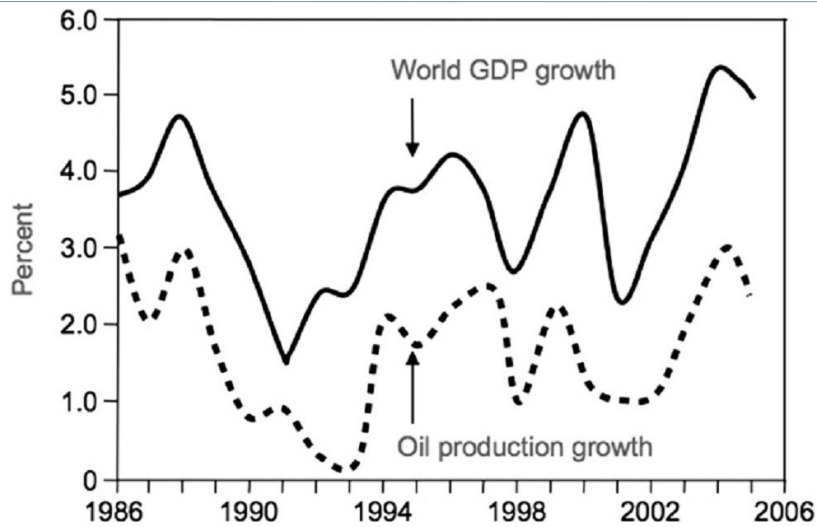


Source: http://www.unep.org/resourcepanel/decoupling/files/pdf/decoupling_report_english.pdf

© 2010 The Actuarial Profession • www.actuaries.org.uk

9

Oil Production Increases vs World GDP Increases



10

This is all very interesting...

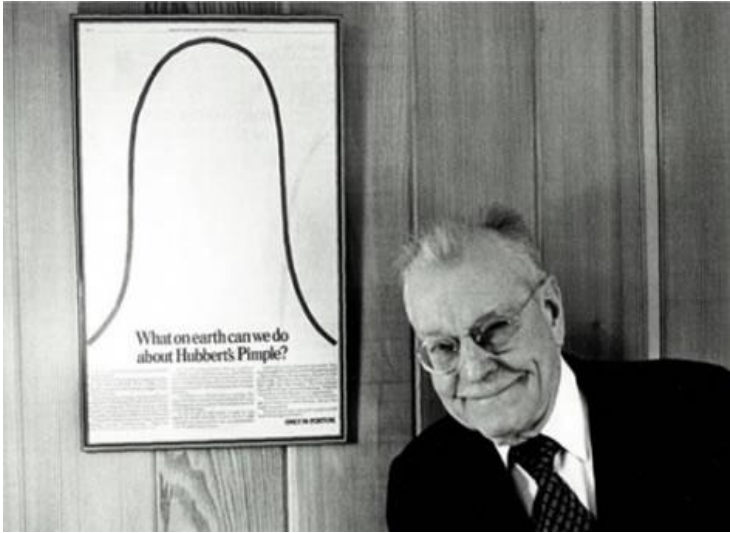
...so what?

© 2010 The Actuarial Profession • www.actuaries.org.uk

11

Peak Oil

M King Hubbert



Source: The Hubbert Tribute www.mkinghubbert.com

Peak Oil

M King Hubbert

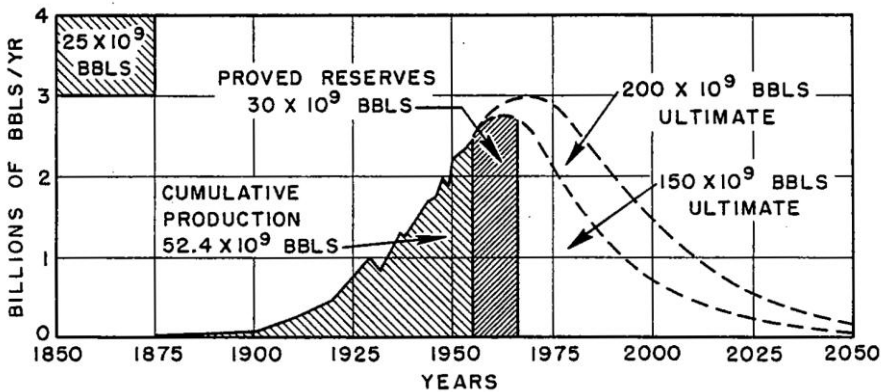
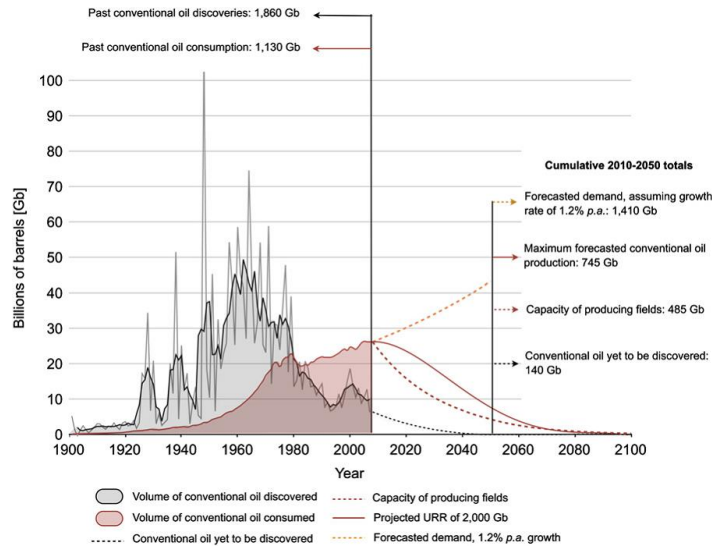


Figure 21 – Ultimate United States crude-oil production based on assumed initial reserves of 150 and 200 billion barrels.

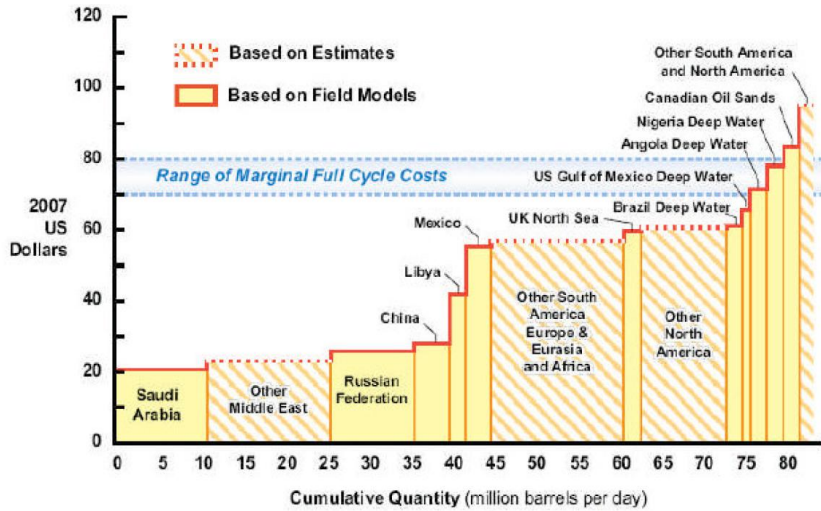
Source: Nuclear energy and the fossil fuels, M. King Hubbert (1956)

© 2010 The Actuarial Profession • www.actuaries.org.uk

Oil Discoveries versus Oil Production



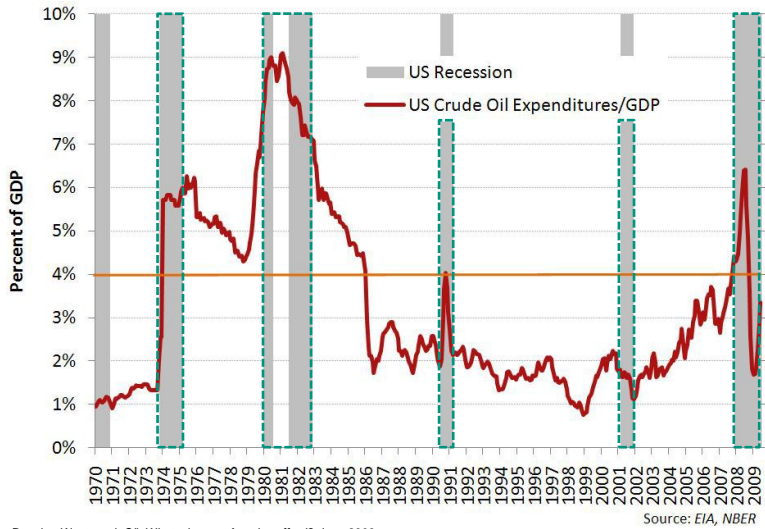
Economic Implications Estimated Oil Production Costs



Source: Horizon Oil Presentation, quoting Cambridge Economic Research Associates, "Ratcheting Down: Oil & the Global Credit Crisis", October 2008
© 2010 The Actuarial Profession • www.actuaries.org.uk

Economic Implications

Are High Oil Prices Causal Factors in Recessions?

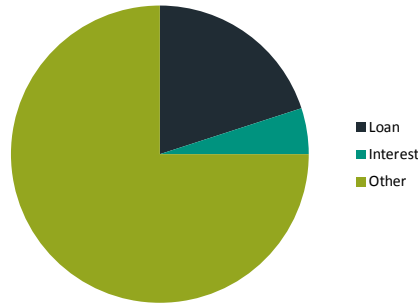


16

Economic Implications

Debt Service

- Debt repayment is substantially easier in circumstances of a growing economy



17

Summary

- Economic growth is correlated with energy inputs
- Fossil fuels, particularly oil, are significant contributors to the energy mix
- Supply constraints in oil
- Excess oil demand is met via price increases
- This reduces effective demand (and may cause recession)

The Challenges for Actuaries

- Well placed to understand the risks
- Highlighting potential range of outcomes
- Unacknowledged risks carry the greatest threats
- Do we have the right tools?
 - Assumption setting
 - Long-term forecasting
 - Scenario planning

Questions or comments?

Expressions of individual views by members of The Actuarial Profession and its staff are encouraged.

The views expressed in this presentation are those of the presenters.

