

The Actuarial Profession
making financial sense of the future

Actuarial Resource and Environment Networking Event
Oliver Bettis and Barry Maher



Risks and Opportunities for General Insurance Actuaries

13 September 2011

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Risks and Opportunities for General Insurance Actuaries

Oliver Bettis

- Why I got interested in environmental and resource issues
- Risks for GI actuaries
- Why actuarial skills are needed

Barry Maher

- Opportunities for GI actuaries

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Why I got interested in climate change Subsidence Insurance



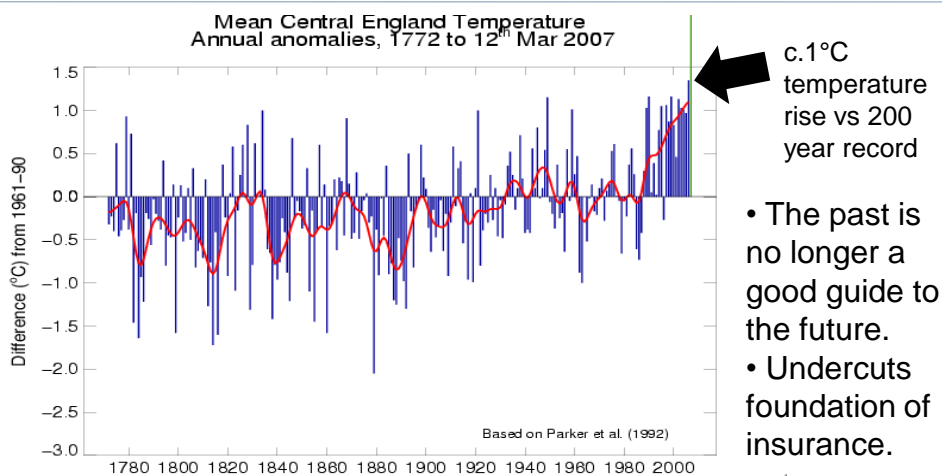
Most subsidence claims arise from:

- hot dry summer weather
- trees taking moisture from clay soil
- differential shrinkage on one side of building

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Climate Change in the United Kingdom



Met Office

Hadley Centre for Climate Change

bs 13/03/2007 1131

Difficulties in Pricing Insurance/Reinsurance

- As of 2007, half the climate models said UK summer would become drier and half wetter.
- How do you price for subsidence insurance?
- The penny dropped - this was serious, I was scared. My career was at risk!

Risks and Opportunities for General Insurance Actuaries

- Why I got interested in environmental and resource issues
- **Risks for GI actuaries**
- Why actuarial skills are needed

Risks for General Insurance

Property

- Subsidence
- Wind – stronger, more often?
- Flood – more intense rainfall, higher sea level
- Fire – bushfires

D&O – negligent management causing:

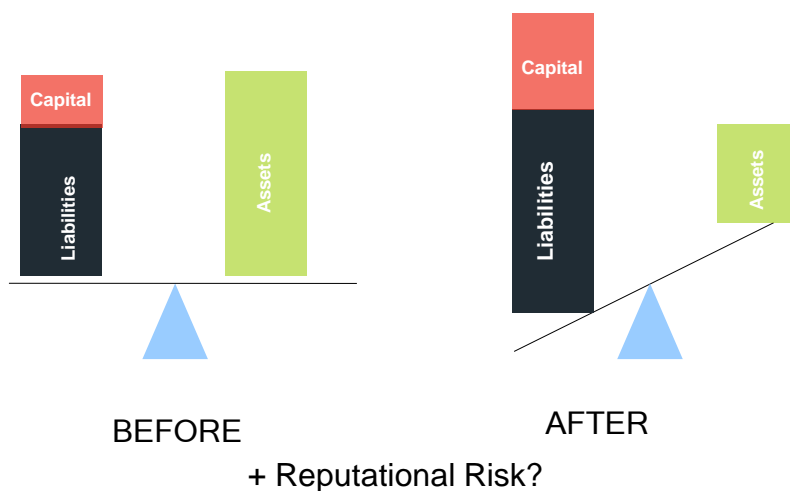
- 3rd party losses as a result of their company's emissions
- Exposure to impacts of climate change

Professional Indemnity - bad planning?

- architects, consulting engineers, surveyors, contractors, developers and financiers (etc)

Also Political Risk/Terrorism

From the 2007 GIRO Climate Change Working Party A treble whammy: Assets/Liabilities/Capital



From Graham Fulcher's presentation for 2007 GIRO

Risks and Opportunities for General Insurance Actuaries

- Why I got interested in environmental and resource issues
- Risks for GI actuaries
- **Why actuarial skills are needed**

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The Climate Congress Copenhagen, 10-12 March 2009



- I presented with Nick Silver at this conference, on “Risk of Ruin” from climate change.
- Following the economist Martin Weitzman’s work on tail risk.

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Source: www.extremeicesurvey.org, Ilulissat Isfjord, Greenland

Outcome of the Climate Congress

“Did climate conference just confuse the politicians?”

- “Have scientists muddled the waters over what needs to be done to stave off dangerous climate change? ...

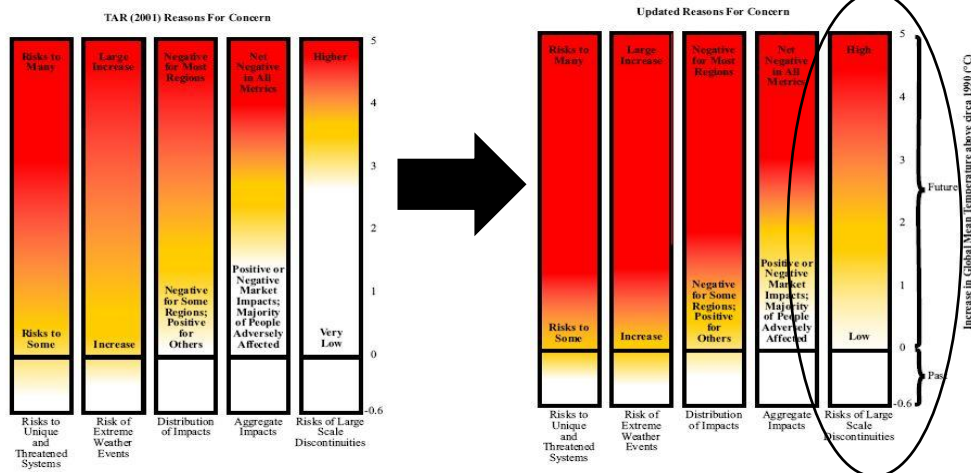
That's what many are asking in the wake of a major meeting intended to inform politicians before vitally important negotiations later this year.”

From an article in New Scientist magazine 18 March 2009

Trend in Forecasting: 2°C Temperature Rise is not safe!

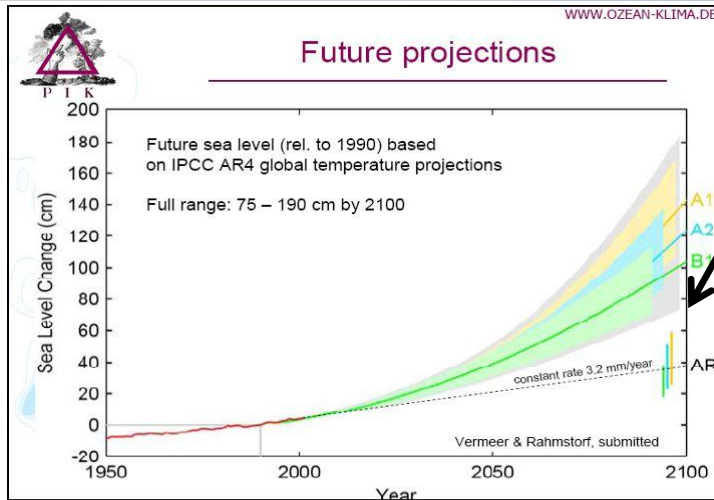
From IPCC Third Assessment
(2001)

Updated with latest science
(2008)



J.B. Smith et al, PNAS (2008) www.pnas.org/cgi/doi/10.1073/pnas.0812355106

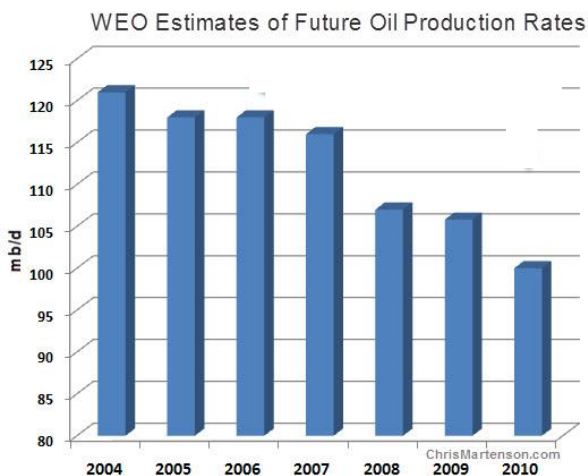
Trend in Forecasting: Revised estimated sea-level rise vs IPCC AR4 (2007)



The bottom end of the new range is higher than the top end of the old range!

From a presentation at the Climate Congress by Stefan Rahmstorf, March 2009

Trend in Forecasting: Global Oil Production



In the 2004 WEO, forecast oil price until 2030:

- Baseline forecast was \$25 a barrel.
- "High" scenario was \$35 a barrel

Source: Chris Martenson summary of IEA WEO's <http://www.chrismartenson.com/>

Resource and Environmental Issues Risks and Opportunities for the Actuarial Profession

- The world needs unbiased forecasting – not optimistic or pessimistic. Actuaries are ideally suited for this role because we:*
 - Think long term
 - Base decisions on data; scientific approach
 - Have a deep understanding of risk and uncertainty
 - Are experts in modelling
 - Exponential growth is bread and butter
 - We are used to giving bad news!
- Environment and resource issues are potentially a huge area of work for actuaries; we can be leaders in this field.

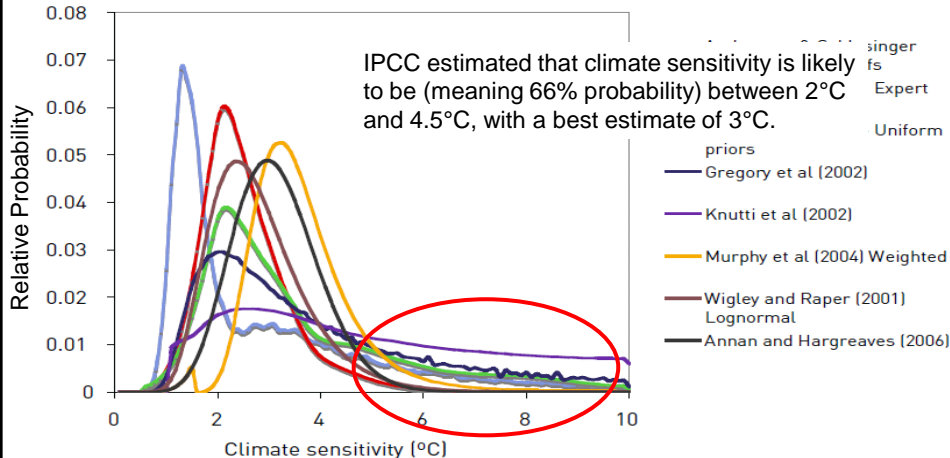
*We care about removing bias - see "Making actuaries less human: Lessons from behavioural finance" by Nigel Taylor http://www.sias.org.uk/siaspapers/listofpapers/view_paper?id=BehaviouralFinance.

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Uncertainty in Climate Change (Climate Sensitivity) °C Warming over pre-industrial for doubled Carbon Dioxide

Some pdfs for Climate Sensitivity - +ve skew with long right tail



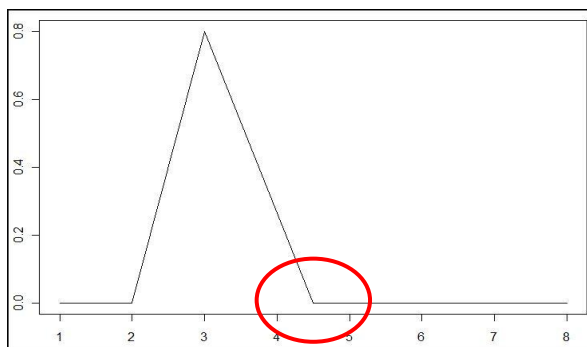
°C warming over pre-industrial for doubled CO₂

Source: Baer and Mastrandrea 2006 'High stakes: Designing emissions pathways to reduce the risk of dangerous climate change' – Institute of Public Policy Research

Stern Review on the Economics of Climate Change

- Lord Nicholas Stern is an economist and one of the world's top climate change experts.
- He has carried out a huge amount of important work publicising the danger from climate change.
- In 2006 the British Government commissioned a review of the economics of climate change.
- Answered question, is it worth spending money to fight climate change?
- The Review concluded that strong early action is justified – it was a very important, ground-breaking study.
- Since the review Stern has said that he underestimated the risk from climate change.

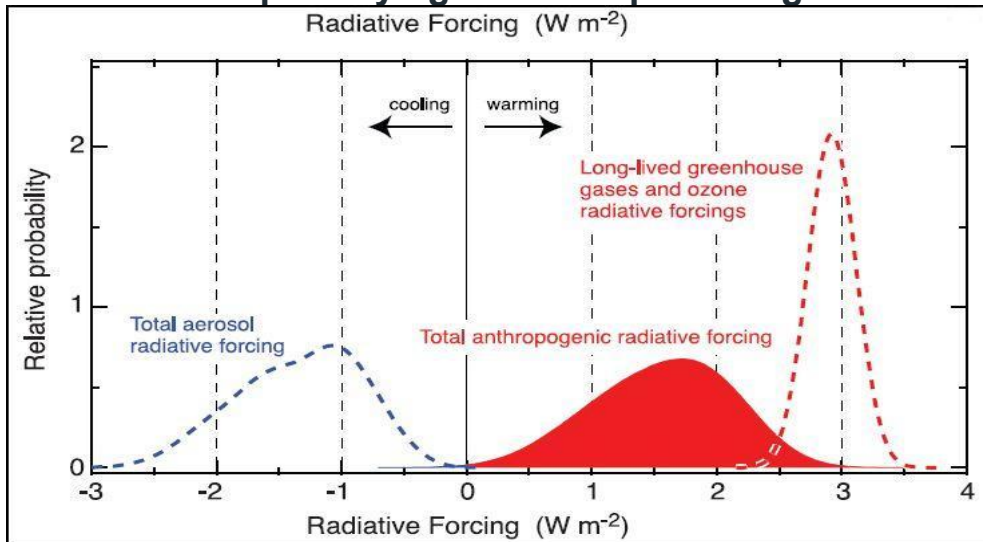
Uncertainty in Climate Sensitivity 2006 Stern Review of the Economics of Climate Change



PDF used in Stern Review to do a cost-benefit analysis. Right tail truncated at 4.5°C

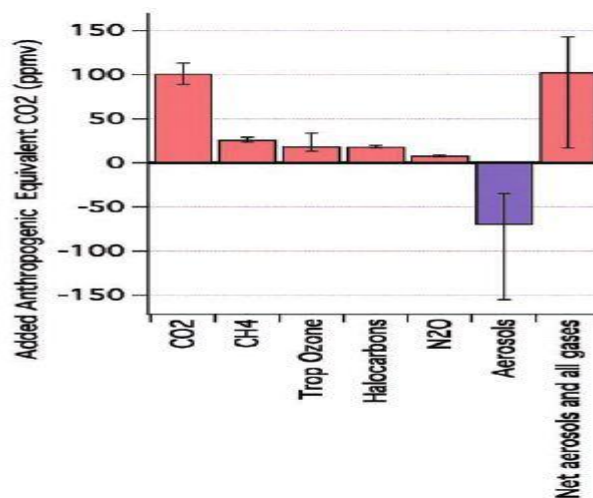
"The range covered by PAGE is cautious on climate sensitivity, using only triangular distributions for its parameters—its spread from all Monte Carlo runs is within the IPCC AR4 "likely" (66 percent confidence interval) range."
- Lord Nicholas Stern, 2008

Uncertainty in Climate Change: Aerosols Time to “stop worrying and start panicking”?



Source: IPCC 4th Assessment Report, 2007

Uncertainty in Climate Change Aerosols – 2011 update



Source: National Academy of Science report 2011 “Climate Stabilization Targets”

Resource and Environmental Issues

What are we doing?

Opportunities:

- Research on the limits to economic growth is being commissioned.
- The Resource & Environment Member Interest Group are producing the 2nd Edition Literature Review “Climate Change and Resource Depletion: The Challenges for Actuaries”, launch date 17th October 2011.
- Liaising with CAS/Society of Actuaries.
- IAA have organised an environmental committee, we will contribute.
- We are just getting started – the opportunities are limitless!

Contents

- Quick intro & background
- Opportunities for Actuaries:
 - Parhelion
 - Microinsurance Fellowship
- Questions?

Useful Links

- Parhelion Risk Mapping Exercise
 - http://www.parhelion.co.uk/pdf/Parhelion_Climate_Financing_Risk_Mapping_Report_2010.pdf
- Resource and environment member interest group
 - <http://www.actuaries.org.uk/members/pages/resource-and-environment-member-interest-group>
- Mircoinsurance Working Party
 - <http://www.actuaries.org.uk/members/pages/micro-insurance-member-interest-group>

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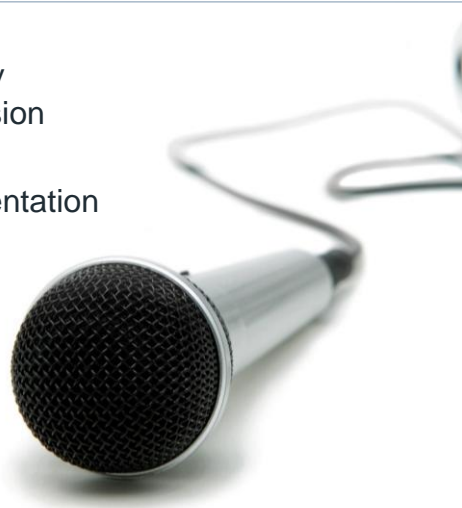
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Questions or comments?

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 presenter.



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