

**The Foundation for Science and Technology Meeting on
Adapting to and mitigating the impacts of climate change:
the engineering challenge**

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The slides follow the words at the end of this document

[Title Slide]

Good Evening. It is great honour to be speaking here today. In my talk I will cover how the insurance industry will be affected by climate change and along the way how the response of engineers and government can, affect the industry I work for.

[Property Damage Slide]

Many insurance lines may be affected. Policies written to pay out when property is damaged can expect greater losses.

Wind damage is likely to increase as storms become more powerful and the larger ones more frequent. The hurricane season may start earlier and end later. New locations are expected to be affected, for example a hurricane hit Portugal in 2005.

The level of flooding is likely to increase from three sources: river flooding in winter (caused by extreme rainfall in winter on already saturated ground), localised flash floods (caused by more energy in the atmosphere leading to larger thunderstorms) and storm surge (caused by higher sea levels and stronger winds). The possibility that river and surge flood could happen together is a plausible and dangerous scenario.

Some believe that heave/subsidence claims could increase caused by the extremes of winter rain followed by summer drought. In the United States research shows that the forest fire season now starts earlier than previously and ends later; and that individual fire events are larger than before. Increases in frequency and severity are not good news for homeowners or insurers.

So for insurers there is increased risks, but there are also opportunities for us to help society manage risk which I will discuss in more detail later; I will also discuss later the fact that whilst the cost of natural catastrophes has increased exponentially in recent years this is not all due to changes in the level of hazard. Demographic and economic factors are also a major cause, and these we can control if we choose to.

[Liability and political risk slide]

Legal firms are now saying that climate change related class actions are becoming more sophisticated. Some foresee a time, coupled with a changing mood within society, when such cases could win. Large greenhouse gas emitters, or those whose products lead to emissions could be sued, leading to potential general liability and Directors and Officers claims.

Directors may equally be sued for not having foreseen the adverse affects that climate change may have on their business. If it is deemed that they *should* have done so then such litigation may be successful, and claims on their insurance policies may result.

Similarly, architects and other engineering professionals may face legal action for not considering climate change in their building designs; if it transpires such buildings require expensive retrofitting. This may lead to claims against Professional Indemnity policies.

When were the effects of climate change reasonably foreseeable? Some argue that the early 1990s when the first IPCC report came out gave sufficient information, others that the fourth IPCC report issued this year marked the relevant time.

Insurers offer policies to cover against political risk and terrorism. In some cases, for example for large scale engineering projects, these policies last for 5-10 years. We can expect large numbers of people to be displaced as climate change causes sea levels to rise, as economies are affected and as crops in some areas fail to grow. This may lead to political tensions which exacerbate terrorism and political risks. A more uncertain future makes the policies that protect against these risks harder to price and more expensive to purchase.

[Treble Whammy - slide]

An insurers balance sheet is made up of liabilities (the reserves we hold to pay for claims that have and are yet to occur) and capital, on the one side, and financial assets held on the other.

My previous slides have shown that climate change will affect our liabilities. Property damage will increase; liability damage claims may be won and political risk may increase.

The scientists also predict that climate *variability* will increase leading to a more erratic series of claims; not just an increase in their average size. Insurers would say that the “tails” of their loss distribution will get fatter; and this is likely to lead to larger capital requirements or a change in terms and conditions to keep the capital growth under control.

What is less discussed is that climate change is likely to have a very significant impact on the world's economy and this surely will lead to an impact on the value of an insurer's financial assets. Arguably the equity and property markets will take the largest hit; but corporate bonds are at risk too. On the other hand, insurers could also make use of creative hedging strategies such as investing in the construction industry which tends to perform well after a hurricane.

Balance sheets that were formerly in balance will take a hit on all sides. This is a gearing of the balance sheet – a treble whammy.

[Insurance pricing slide]

So, like everyone else we have an enormous challenge ahead. A challenge we cannot meet on our own; partnerships are crucial going forward.

The simple pricing equation on this slide captures the point. Premiums are roughly equal to expected claims spread over all policyholders plus an allowance for profits. If , for example, spending on flood defences is lower than hoped, then claims will go up. Surely that is undeniable? If claims go up then premiums will go up; again undeniable.

It would seem sensible to me to avoid new building in areas that can expect catastrophic events. However, I am not a town planner and I don't know all the issues. If we must build on flood plains let us build the houses to anticipate being flooded; and thereby reduce losses when inevitably catastrophe's strike.

What's the alternative for the insurance industry? If we make regular losses then we are spending our shareholders money. It is simply not appropriate to write insurance business at an expected loss. Indeed it is wrong to write it unless a reasonable profit averaged over a number of years is expected. The risks in our business are very large and shareholders expect to be rewarded for that risk; this is basic economic theory.

We have to help governments and policyholders to realise that their actions can help to keep their property insurable at affordable rates. Clearly this is where engineers can have a huge impact. They can help with adaptation to climate change. Better flood defences; stronger and more resilient materials; stricter building codes; better drainage; in short, buildings and contents that are designed with the future in mind.

[RDS slide]

So in the meantime, how do we at Lloyd's manage the risk?

Lloyd's is a marketplace of in excess of 60 competing syndicates. There is a Central fund of assets which may pay claims if any of the syndicates is unable to. The Corporation of Lloyd's oversees the market and sets certain rules to ensure fair treatment of the participants and to protect the Central fund.

One of our requirements is that the market must annually consider the losses they would face under a number of "Realistic Disaster Scenarios". These are created in consultation with scientists and other experts and are extreme but plausible.

If we look at the changes to the scenario framework over the last couple of years we see that past Climate Change is having an effect *right now*. Take our Florida hurricane scenarios for example. In 2005 we asked the market to test a USD 70bn industry loss. By 2007 we had increased this to USD 108bn. The key point is that the new event is broadly targeting the **same** level of likelihood. Our views on the risk of extreme events changed dramatically over a short time period.

We have set guidelines that syndicate losses from these scenarios should not generally exceed certain levels; in order to comply with these guidelines the Lloyd's market have managed their loss potential down over a period; thus reducing the level of risk.

It is very important to realise the significant impact that demographic and economic trends have on the level of risk. Between 2006 and 2007 we did not change the scenario description at all. We used the same storm strength, landfall location and track. Despite this the expected industry loss for this storm leapt from USD100bn to USD 108bn; this USD 8bn increase is due to demographic effects (more people living

in the exposed area) and economic effects (the value of their contents having increased over the year).

So I'd like to stress again; It is possible for policyholders to control these issues; migration to the coast can stop and the value of exposed contents can be controlled.

It is crucial that insurers are permitted to price freely so that the price reflects the level of risk. For example recent draft work by Risk Management Solutions, a catastrophe modelling company, announced at a recent conference, suggests that adoption of appropriate building codes can reduce expected losses under a climate change scenario by 60%.

If governments seek to insulate the public from these necessary price changes they will not encourage the correct adaptive behaviours.

[research and partnerships]

In our Adapt or Bust report on climate change we stressed the importance of working with academia to better understand the impacts of climate change. Lloyds is currently sponsoring a PhD with the London School of Economics on this subject. We are also working in partnership with Benfield, Catlin and Guy Carpenter to create the Lighthill Risk Network which will link up the academic and business world; and will host “expert panel discussions” one of which will be focussed on climate change. The network hosted a conference earlier this year on flooding in London attended by underwriters and leading academics in the field.

We can engage with other business either within the financial services industry or beyond. And we can work with/ lobby government for action. For example Lloyd’s was a major contributor to the London Climate Change Partnership’s “climate change: business as usual” paper which brought together many key stakeholders in the financial services industry and also the GLA.

[ClimateWise - slide]

For some months Lloyd's has been working with other reinsurers, insurers, brokers, asset managers, the ABI and the Prince of Wales' Business and the Environment Programme to produce a set of principles on climate change.

These were launched on 13th September by the Prince of Wales at the ABI's annual climate change conference. The principles currently have 40 signatories and the list is growing.

The principles cover all aspects of our business including: risk analysis, lobbying, raising customer awareness, asset management, and carbon footprint management.

[Conclusion slide]

In conclusion climate change is a major issue for my industry. There will be many challenges in the future and risks to our profitability. However, we also have an opportunity to help society spread and manage risk, whilst remaining profitable.

Ultimately some risks are not insurable. Therefore it is crucial that we educate people on how insurance can and cannot help. Partnerships with, our policyholders, government and other industries including engineers and architects are vital. The public must begin to see itself as risk managers rather than just passing risks to their insurer. That way we can maintain cover for as long as possible; and that is in everyone's interest.

Thank you for your time.

LLOYD'S

CLIMATE CHANGE

INSURERS PERSPECTIVE

October 2007

Rolf Tolle

**“EVERYBODY TALKS ABOUT THE
WEATHER, BUT NOBODY DOES
ANYTHING ABOUT IT”**

CHARLES DUDLEY WARNER (HARTFORD COURANT, 1897)

Property damage

- Wind: Severity, Frequency, Location, Length of season
- Flood: Rivers, flash floods, storm surges
- Heave, subsidence
- Fire
- Increased costs not solely due to change in hazard



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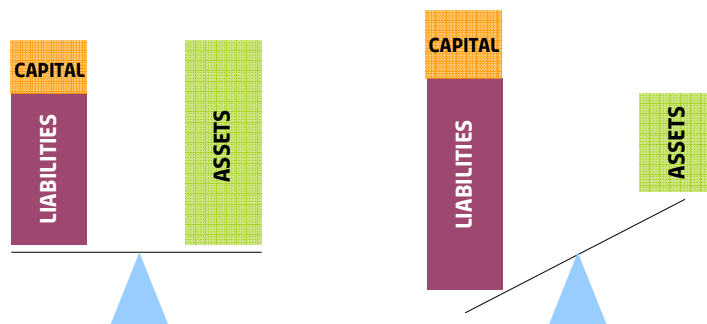
Liability/ Political Risk

- Liability
 - Blame the emitters?/ users?
 - Blame the advisors?
 - There will be a search for deep pockets
- Political risk/ Terrorism

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Assets/ liabilities/ capital – treble whammy



BEFORE

AFTER

5

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Insurance pricing

- The challenge is enormous
- We have to work together

$$\text{Price} = \frac{\text{Expected Claim Cost}}{\text{Policyholders}} + \text{Profit}$$

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Florida Windstorm RDS

- 2005 scenario – USD 70bn
- 2007 scenario – USD 108bn
- Reflecting
 - changed expectations of risk levels
 - economic growth
 - demographic trends
- Economic and demographic trends added USD 8bn alone since 2006.

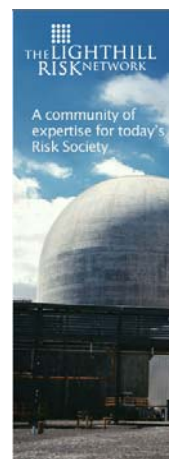


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Research and partnerships

- Invest in research
- Partnerships:
 - Public
 - Other business
 - Policymakers



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ClimateWise

- Major initiative between 39 insurance organisations
- Includes (Re) insurers, brokers and some asset managers
- A set of “principles” to bring about measurable change
- Covers all activities of business



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Summary

- There are new challenges ahead
- There are dangers for the industry
- But there are also opportunities
- Ultimately some risks are not insurable
- Partnerships are crucial
 - Policyholders
 - Government
 - Engineers/Arhitects

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