

Chapter 2

Developments since 2001

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2.1 Introduction

At the time of writing, the financial news is dominated by the failure of the banking system, and the worsening economic situation. Yet, depressions come and go. Climate change is at the moment a one-way process. The annual world temperature recorded a new high in 2005, and subsequent years have remained at a high level. The highest UK yearly temperature was recorded in 2006.

Most individuals have noticed changes to the climate of their own areas and how these are affecting their everyday life; including hosepipe bans in the South East of England, increased flooding in various areas of the UK, unreliable snow cover in European ski resorts, and exotic species being found outside their normal habitat. Even the US film industry has joined in with films such as “The Day After Tomorrow” or more seriously, “An Inconvenient Truth” featuring previous presidential candidate Al Gore.

This chapter links the current series of chapter-centred analyses back to the previous climate change report released by the Chartered Insurance Institute in 2001, by considering what changes have occurred since then in a number of selected areas. Section 2.2 looks at recent trends in insurance losses from weather events, globally and in the UK. Section 2.3 considers how government policy on climate change has developed in the UK, EU and internationally.

Section 2.4 examines current attitudes to climate change in the business community. The position within the insurance industry is examined next in Section 2.5, first at the corporate level, and then through surveys among UK professionals.

Section 2.6 gives a brief overview of recent insurance industry developments. Since China is a rapidly growing economic and insurance market, Section 2.7 considers the implications for insurers, in the context of climate change. Finally Section 2.8 summarises the main points of the Chapter.

2.2 Recent experience in weather losses

Figure 1 shows the global cost of great weather disasters (as defined by Munich Re). The progress has been erratic since 2000. In two years catastrophes were absent, while 2004 and 2005 witnessed new records, due to hurricane losses, including the notorious Hurricane Katrina that devastated New Orleans in 2005. The 2005 Hurricane Season set many new records:

- 4 Category 5 hurricanes (previous record 2 in 1960 and 1961);
- 28 named storms (previous record 21 in 1933);
- 15 hurricanes (previous records 12 in 1969);
- 4 major hurricanes hitting the US (previous record 3 in 2004).

Additionally Hurricane Katrina was the costliest hurricane in history, costing at least \$80bn (previous record Hurricane Andrew in 1992 at \$26.5bn), and also the deadliest hurricane since 1928, claiming over 1,800 lives. There was a lull in 2006/7, but 2008 witnessed another very active hurricane season. Sixteen named storms developed, compared to an annual average of eleven storms. Five hurricanes became major hurricanes (Category 3 or higher), compared to a normal of 1.2, an astounding increase, and consistent with predictions that more storms will reach extreme levels (see Chapter 3). Globally, the increase in the Atlantic was offset by a reduction in the Pacific, though Typhoon Nargis devastated Burma with huge loss of life (Aon Benfield, 2008).

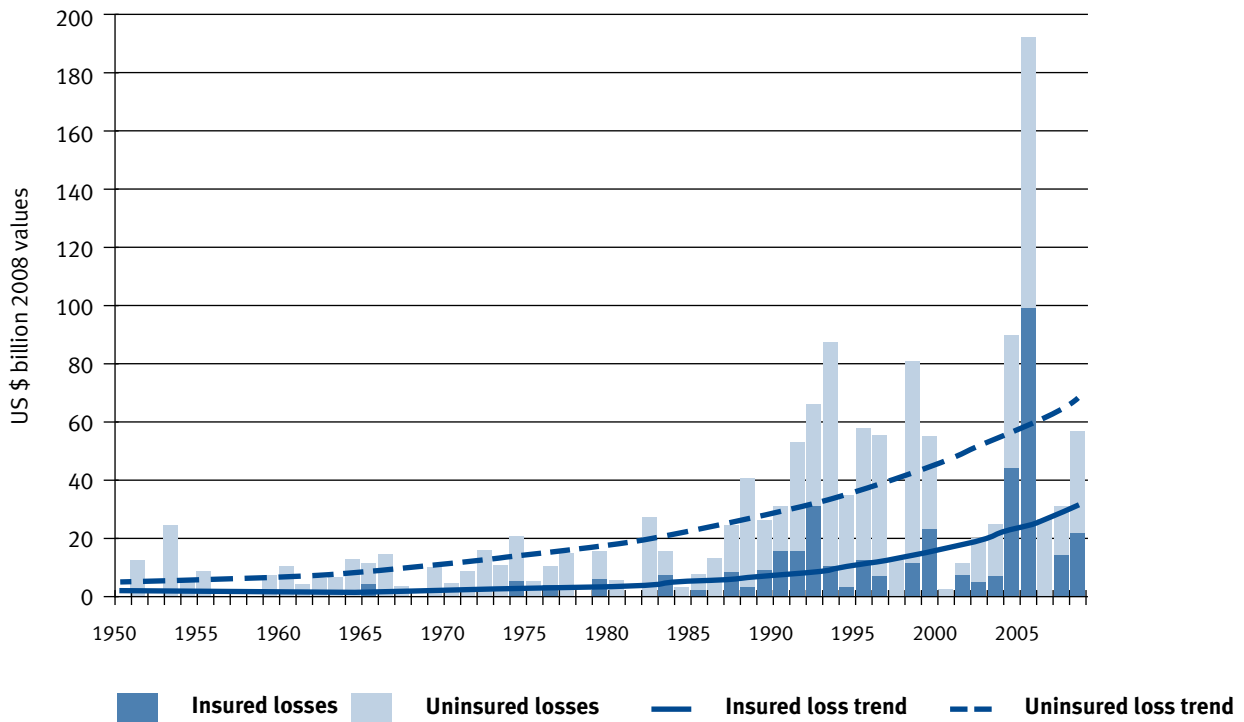
The proportion of losses that are insured has been rising, but that really reflects the fact that we have entered a period of greater hurricane activity, and the USA is quite well insured against that hazard.

The trend lines on Figure 1 indicate that there is a general upwards progression in the losses, of about six percent per year. This pattern has been analysed by numerous commentators, including Swiss Re and Munich Re. It is generally agreed that most of the rise is due to socio-economic factors. The location of major developments in flood plains and coastal zones exposes them to weather hazards. The growth of ‘megacities’ means that when an extreme event occurs, then the possibility of a very large loss is greater. Finally, the general increase in asset values, and their greater susceptibility to weather and water damage exacerbates losses. Yet it would be misguided to dismiss the action of climate change.

As Munich Re has observed, the trend in earthquake losses is much less. In the case of a specific event, Hurricane Katrina, much of the damage was caused by storm surge, and there is no doubt that climate change has raised the level of the sea. A secondary factor in Katrina was that sea temperatures were very warm, which helped to intensify the storm, and again climate change is associated with higher temperatures. An analysis by RMS suggests that perhaps one-third of the trend in losses is due to climate change (Miller et al, 2008), but that is not a consensus view.

If climate change is not already having an effect, then Figure 1 is very worrying indeed, because as Chapter 3 reports, scientists expect an increase in extreme events due to climate change. If it is not already included in the six percent annual growth, then when it does manifest itself, the trend in losses will accelerate!

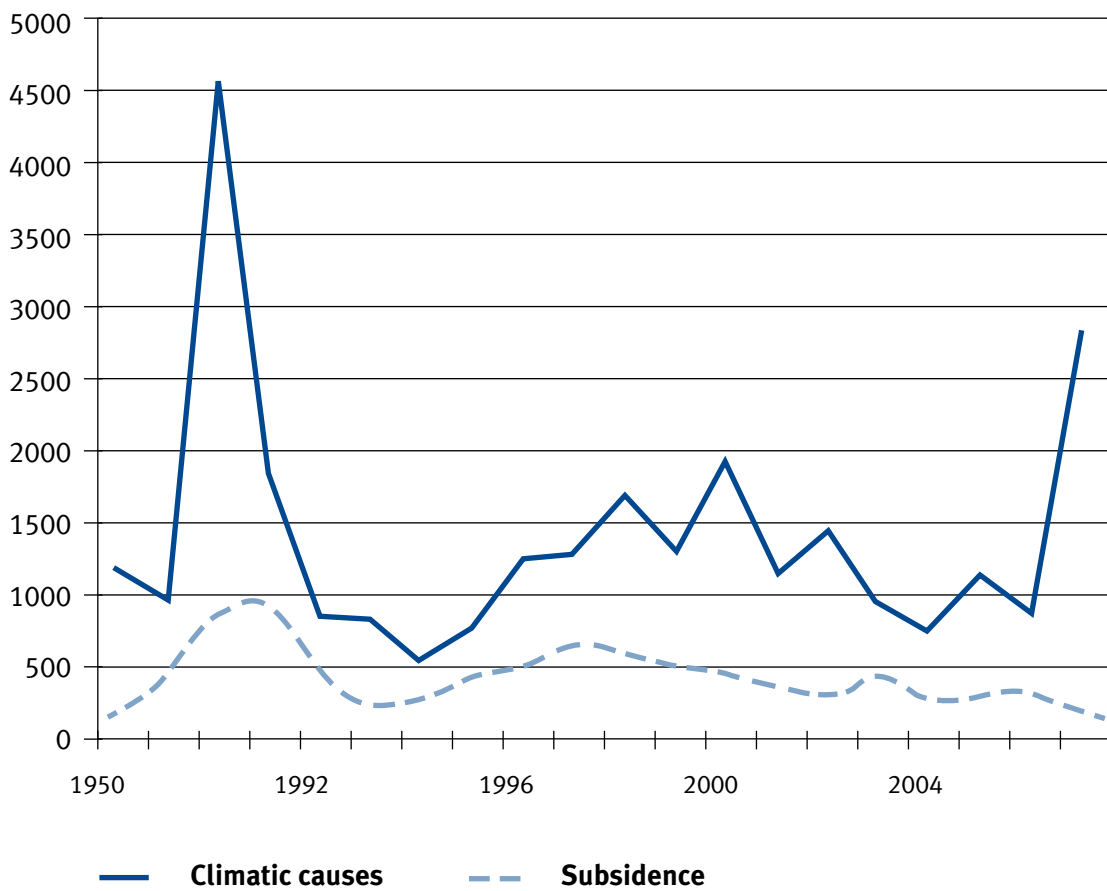
Figure 1: Great weather disasters 1950-2008



Source: Munich Re

The ABI produces statistics on UK weather losses incurred by its member companies. Figure 2 shows the data from 1988 to 2007. The solid line is the total of all reported climatic losses, including business interruption and subsidence. The dashed line relates to subsidence claims only. The data has been corrected for a change in 2004 in the treatment of burst pipe claims due to leakage, and also the exclusion of commercial claims in 1988.

Once again, the data is very erratic, being dominated by irregular very extreme events: the 1990 storms and dry summer, and the floods of 2000 and 2007. Subsidence costs do appear to be trending downward, possibly due to better repair techniques and wetter winters. Flood losses have certainly increased, with major events in 2000, and even greater losses in 2007. With other claims, it is not possible to say. The UK was very fortunate to escape major storms in 1999, 2003 and again in 2005 which devastated nearby countries and broke records for intensity. It is probable that in the near future another great spike will occur, when the overdue storm(s) materialise, and this will be accompanied by a steady rise in flood claims. The decline in subsidence will not be large enough to neutralise these negative prospects.

Figure 2: UK Insurance losses due to weather

Source: ABI

Where are we heading? Socio-economic trends are likely to increase exposure. A study of 136 coastal cities revealed that the total value of assets exposed to flooding in 2005 was around \$3 trillion, or 5% of global GDP.

By the 2070s, total population exposed could grow more than threefold to around 150 million people due to the combined effects of climate change (sea-level rise and increased storminess), subsidence, population growth and urbanisation. The asset exposure could grow even more dramatically, reaching \$35 trillion by the 2070s; more than ten times current levels and roughly 9% of projected global GDP. Population growth, socio-economic growth and urbanization are the most important drivers of the overall increase in exposure. Climate change and subsidence significantly exacerbate this effect although the relative importance of these factors varies by location. Exposure rises most rapidly in developing countries, as development moves increasingly into areas of high and rising flood risk (Nicholls et al, 2008).

Fully 30% of the exposure will be located in China. It is estimated that by 2050, 80% of China's GDP will emanate from areas that are at serious risk of flooding. India is another cause for concern. The financial and commercial centre of Mumbai, and its surrounding regions, experienced record rainfalls during July 2005 leading to extensive flooding. The Indian insurance industry experienced its most expensive natural catastrophe ever, at \$770m. By the 2070's, 115 of the global urban exposure to coastal flood will lie in India.

One projection suggests that a peak year of \$1trillion economic losses from climatic impacts will occur before 2040 (UNEPFI, 2006). A more detailed analysis (Dlugolecki, 2007) puts the cost of impacts at between \$640 and \$1,000 million per year, or around 1% of global GDP by 2030, in a range of 0.7 to 1.3%. This may seem tolerable, but in fact there will be large annual variations, and the impacts will be concentrated locally, so these are actually very worrying projections.

2.3 Government policy

It is assumed that the reader has some familiarity with the political background on climate change, so this section highlights the key developments in this area since 2001, which are relevant to the insurance industry. There are two general points to note, and then the section considers the position at three levels: international, EU and UK.

The first general point is that climate change is rising up the political agenda fast. This reflects the facts that: scientific uncertainty has dwindled to vanishing point, as seen in the latest IPCC Assessment Report and various subsequent papers; that the economic case for action is strong, as stated in the Stern Report (see later); that energy security has almost the same objectives as mitigating climate change; and that the most obdurate political obstacle, the Bush Administration, has gone. Businesses and consumers can therefore have much more confidence that a clean energy economy is coming and plan accordingly.

The second cross-cutting aspect is that adaptation has received far less attention than mitigation. This is a key point for non-life insurers, who are primarily concerned with property damage. It has held back the development of new markets for climate risk, because the public sector needs to create the framework for insurance to operate, and it has increased the possibility that existing markets may become uninsurable, because climatic risks have been increasing and economic development has been concentrated in hazardous areas. The same factors affect life and pensions business, personal finance, and institutional investment but less acutely. The insurance industry needs to lobby for more action on adaptation.

International

The Kyoto Protocol, which opened for signature on 11th December 1997, finally came into force on 16th February 2006. This agreement is a key decision of the United Nations Framework Convention on Climate Change (UNFCCC). It has been ratified by over 140 countries who account for a total of 64% of GHG emissions from the industrialised 'Annex 1', and collectively it pledges to reduce their emissions by 5.2% by 2012, relative to 1990. Although universally acknowledged as a step in the right direction, the Protocol's effectiveness is hampered by the fact that although the US, the world's largest economy, has signed the treaty, so far it has refused to ratify it, and Canada looks like failing to meet its commitments. On the positive side, Australia, major emitter, signed in 2007. Developing countries are exempted from meeting specific emissions targets in the short term, but have other goals, which many of them, particularly China, are taking seriously.

The Kyoto Protocol makes use of a number of 'flexible mechanisms' – the Clean Development Mechanism (CDM), Joint Implementation (JI), Emissions Trading, and 'sink' activities – to put limits on emissions and set a price on carbon. See Chapter 17 for more detail on this. Adaptation has been relatively ignored. UNFCCC commissions the Intergovernmental Panel on Climate Change (IPCC) to report on the climatic risks (see Chapter 3), and there is a process for assessing risk at national level (NAPA or National Adaptation Plans of Action), but there is scant finance for developing countries to carry out NAPAs or implement them.

There are many critics of the Protocol, from those who believe that it is far too modest, to those who feel it is inefficient, and those that suspect it is a capitalist plot to retard the development of the world's developing countries, or a socialist plot to transfer wealth to the Third World. On the first point, while a target of a 5.2% reduction in GHGs looks very small, it in fact represents a huge cut from 'business-as-usual', as much as 25%. President Bush attempted to undermine it by setting up an alternative for a, such as the Major Economies Meeting, and the Asia–Pacific Partnership, but these are likely to fade away now. Another forum which is long on rhetoric but short on action is the expanded G8. Tony Blair tried to inject some momentum with the Gleneagles Dialogue in 2005. The expanded G8 has been more productive, because it is focused on the major emitters and allows less formal discussion than the UNFCCC. It has created useful information and finance programmes by commissioning reports from the International Energy Agency on technological futures, and developing pilots with the World Bank on carbon financing for example.

Another initiative worth noting is the International Strategy for Disaster Reduction (ISDR). This will help to deal with the results of climate change rather than combat the causes, but it illustrates how complicated the political agenda is, with different agencies competing for funds, and creating overlapping programmes. The United Nations General Assembly convened the World Conference on Disaster Reduction in January 2005. The purpose of the Conference was to assess the progress made since the Yokohama Conference of 1994, and to plan the next ten years. The Conference resulted in the Hyogo Declaration and Framework for Action for 2005 to 2015: Building the Resilience of Nations and Communities to Disasters, which sets out how the international community will come together to face the challenges of catastrophic events.

BOX 1

The Hyogo Framework for Action

The Framework’s ten-year plan is a holistic approach to disaster risk reduction. It calls for the pursuit of three strategic goals in conformity with the Millennium Development Goals (MDGs):

- The more effective integration of disaster risk considerations into sustainable development policies, planning and programming at all levels, with a special emphasis on disaster prevention, mitigation, preparedness and vulnerability reduction.
- The development and strengthening of institutions, mechanisms and capacities at all levels, in particular at the community level, that can systematically contribute to building resilience to hazards.
- The systematic incorporation of risk reduction approaches into the design and implementation of emergency preparedness, response and recovery programmes in the reconstruction of affected communities.

The Hyogo Framework also defined five priorities for action and identified the collective and individual roles and responsibilities of key stakeholders in its implementation and follow-up:

- Ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation.
- Identify, assess and monitor disaster risks and enhance early warning.
- Use knowledge, innovation and education to build a culture of safety and resilience at all levels.
- Reduce the underlying risk factors.
- Strengthen disaster preparedness for effective response at all levels.

However, the international focus is now on how to follow up the Kyoto Protocol when it concludes in 2012. It is complicated by the need to have twin tracks, one for countries under Kyoto, one for others. The process began at Bali in December 2007, at COP13, the thirteenth annual Conference of the Parties to UNFCCC (see Box 2).

BOX 2

The Bali Roadmap

In principle, governments recognise that “deep cuts in global emissions” will be required to avoid “dangerous climate change”, and will consider “a long-term global goal for emission reductions”.

The Bali Roadmap commits developed countries to “measurable, reportable and verifiable nationally appropriate mitigation commitments or actions, including quantified emission limitation and reduction objectives ...taking into account differences in their national circumstances. “Developing countries will undertake “nationally appropriate mitigation actions... in the context of sustainable development, supported by technology and enabled by financing and capacity-building, in a measurable, reportable and verifiable manner.”

Negotiations are arranged in two workstreams;

- The Adhoc Working Group (AWG) on Further Commitments for Annex I Parties under the Kyoto Protocol, including a short review of the early experience. These negotiations will lead to further binding emission reductions targets for developed countries (excluding USA at present). Governments recognised that emission reductions of 25-40% relative to 1990 will be necessary by 2020, but did not commit to this formally.
- The AWG on Long Term Cooperation under UNFCCC. Here countries have agreed to consider mitigation activities by developing countries as well as issues related to adaptation, technology transfer, and financing. This track also permits the United States to reengage in the international process.

Deforestation:

The Reduced Emissions from Deforestation in Developing Countries (REDD) scheme was agreed, with a commitment to “early action” before 2013. Discussions will focus on how to measure changes in forest cover and associated GHG emissions. The ultimate aim is that credits will accrue from avoided deforestation under the CDM. The World Bank has announced a pilot scheme for trading forest-based carbon credits.

Technology:

Countries agreed to scale up the level of investment for technology transfer to help developing countries in the short-term. Countries also renewed the terms of reference of the Expert Group on Technology Transfer for five years. It will address technology needs assessments, technology information, capacity building including regional workshops, and mechanisms for technology transfer.

At COP14 in Poznan, Poland, very little of substance was decided. The Adaptation Fund was given authority to disburse funds to developing countries, but the amount available is very small. The UN has said that \$86 billion per year will be needed by 2015 for poor countries to adapt to climate change, but according to some estimates the Adaptation Fund will only reach \$900 million by 2012. Governments meeting under the Kyoto Protocol agreed that commitments of industrialized countries after 2012 should take the form of quantified emission limitation and reduction targets, similar to the type of

targets they have undertaken during first five-year commitment period 2008 - 2012. It was agreed that REDD should be given higher priority, but carbon capture and storage (CCS) was referred for further research. Developing countries injected some momentum, e.g. Mexico announced emission reduction objectives for 2050 of 50% compared to 2002 levels, but the EU's once proud reputation suffered as it reduced its commitment to internal GHG reductions (see later).

The subject of insurance as an adaptation tool had been discussed in 2003 at a UNFCCC workshop which ABI and other insurers attended. It was debated by negotiators for the first time at COP14. Two proposals were tabled:

- The first from the Munich Climate Insurance Initiative (MCII). It has two main components. The Prevention Pillar is aimed at loss prevention, based on risk assessment and risk-aware development. The Insurance Pillar has two tiers: a Climate Insurance Pool that would absorb a pre-defined proportion of catastrophic risk, and a Climate Insurance Assistance Facility that would provide technical support and other forms of assistance, allowing public-private insurance systems to provide cover for the middle layers of risk in these countries. The lowest level of risk would be engineered out by prevention, or self-insured. (MCII, 2008)
- The second from the Alliance of Small Island States (AOSIS) drew heavily on a paper commissioned by UNCCCC (UNFCCC, 2008). Broadly similar to the MCII, it added a third component, rehabilitation/compensation to risk management and insurance. This is to recognise the likelihood of gradual damage and relocation, which conventional insurance does not include.

It is unclear how this will develop. On the one hand, it is inefficient to separate climatic disasters from other ones in designing a scheme for disaster management, and there are other bodies responsible for managing disasters. On the other hand, climatic disasters are the major risk facing developing countries, and the UNFCCC has mechanisms for assessing risk and generating funds.

There is a huge amount to settle by COP15 at Copenhagen in December 2009, so many observers believe the negotiations will continue into 2010. The guiding principles from the view of the finance and insurance sector are summed up in two papers by UNEPFI on adaptation and mitigation (UNEPFI, 2006; UNEPFI, 2007).

BOX 3

Principles of a climate agreement: the finance sector view

Adaptation

- Mainstream climate change – ensure that the responses to projected impacts are integral to policymaking priorities at all levels and in all sectors.
- Integrate adaptation with disaster management and economic development policy to maximise the return on scarce resources, and achieve a “triple dividend”.
- Emphasise capacity building, resilience, and economic diversification.
- Improve the knowledge base about climatic hazards, and specifically ensure the availability of weather data to support the growth in weather derivatives, catastrophe bonds, insurance and other risk transfer products, especially in developing countries.
- Prepare for disasters on the basis that they will be greater than any seen to date.
- Work with the private sector to develop seamless, efficient risk transfer systems to deal with climatic disasters.
- Enable the private finance sector to operate more effectively in developing countries, by providing good governance and economic stability.

Mitigation

- End the uncertainty over international climate policy post-2012 through clear regulation by setting long-term emission reduction targets post-2012, especially for the critical period 2013-2030. Do this no later than 2009.
- Involve finance and treasury functions in this area, in order to ensure the efficient use of available funds and financial mechanisms.
- Provide clear and compatible regulation of the carbon market and further globalise the carbon market to ensure its liquidity and effectiveness.
- Promote significant upscaling of R&D and investments in renewable energy and energy efficiency, e.g. by setting clear targets and implementation mechanisms.

European Union

The EU's efforts on climate change have been focused on mitigation, where it has attempted to give a lead to other developed (Annex 1) nations. The EU launched the first large-scale emissions trading scheme in 2005, ahead of the Kyoto Protocol commitment period 2008-2012, and gained valuable experience in how to operate it. Again, the EU has committed itself to emissions trading for the period 2013-2020, in advance of any deal at COP15, to inspire confidence in other countries, and in the carbon markets.

The EU is committed to limiting the global temperature increase to 2°C by the year 2100 relative to pre-industrial levels (EC, 2007a). To achieve this goal, Member States agreed to reduce the EU's greenhouse gas (GHG) emissions by 20% in 2020 compared to 1990 levels and by 30% provided other developed countries commit themselves to comparable reduction targets. In order to achieve these objectives, the EU intends to increase energy efficiency by 20% and increase the share of renewable energy to at least 20% and biofuels to 10% by 2020.

These goals are to be achieved by a wide range of regulations under the European Climate Change Programme (ECCP), such as emissions caps and trading for energy-intensive sectors including aviation and shipping, emissions standards for vehicles and energy efficiency standards for large buildings. Sectors outside emissions trading will also have a blanket target for emissions reductions (known as 'effort sharing'). Substantial revenue from emissions trading will be reserved for funding 12 pilot carbon capture and storage (CCS) plants and for international assistance on clean technology development and transfer, deforestation, and adaptation, to encourage developing countries to adopt emissions targets in some form.

However, the EU measures were watered down significantly in the face of intense internal lobbying by some states and industries; up until 2020, some emissions permits will be distributed free to industry; the vehicle emissions standards will be phased in gradually, and countries will be permitted to purchase emissions permits for up to half of their reduction target, thereby deferring domestic action.

Internationally, the EU commits to an overall 'bubble' of emissions, which it then shares out internally among member states. The Kyoto Protocol target for the EU-15 was a reduction of 8% in emissions relative to 1990. For some time it has looked as if the target would not be met by internal action, but ironically the global recession may reduce industrial activity so much that the target is comfortably achieved.

On adaptation, the EU has lagged. A formal programme of action is well behind schedule, although a consultation process has been held. The plan is still lacking in several important areas: communication and awareness raising; recognition of the issue of climate-driven migration; co-ordination between mitigation and adaptation strategies; detailed guidance on the built environment, specifically urban areas, spatial planning, and standards for building and design; incentives and financing for adaptation. Insurers should be concerned that so much needs to be done, given their exposure to impacts. Ironically, the EC commended the insurance sector, for being proactive in building databases and models to assess risk in economic terms, and for stakeholder engagement (EC, 2007b).

One specific measure that should help insurers is the Directive for Flood Management, intended to reduce and manage risks caused by flooding. This will require member states to prepare flood risk maps and risk management plans focused on prevention, protection and preparedness. The UK is already alert to this issue so it should not pose any major issues.

In the UNFCCC framework, the EU supports the concept of a multilateral insurance pool to cover disaster losses that would complement existing funding mechanisms in case of climate related natural disasters. (EC, 2009)

United Kingdom

If the EU sees itself as the leader on climate change policy in the global community, the UK sees itself as the leader within the EC. It has had a cutting edge in the science of climate change through the Met Office, it was the first country to implement a significant carbon-emissions trading scheme, it adopted deep emissions cut targets within the EU 'bubble' under Kyoto, and it carried out the first national assessment of risk, and set up the first comprehensive domestic programme to adapt to climate change the UK Climate Impacts Programme (UKCIP). Alongside, The Carbon Trust was established to promote low-carbon technologies.

Prime Minister Blair declared that the UK would go beyond its Kyoto target, and stated that climate change would be a top priority for both his G8 and EU Presidency. The first-ever meeting of G8 Environmental and Development Ministers took place in March 2005. Climate change and addressing Third World debt were the two main topics for discussion at the G8

Conference at Gleneagles in July 2005. Unfortunately despite the rhetoric, the UK's own performance in cutting its own emissions began to falter, due to the lack of substantive initiatives. For example, the share of renewables sources in energy in 2005 was just 1.3%, and the UK's target for 2020 is 15%, still well below the EU average.

Prime Minister Brown has introduced a harder edge. In November 2006, the Stern Review was published. This report, commissioned by him when Chancellor of the Exchequer, has been hailed as the first major work to perform a comprehensive analysis of climate change and its effect on the global economy (Stern, 2006). Using the results from formal economic models, the Review estimates that if we don't act, the overall costs and risks of climate change will be equivalent to losing at least 5% of global GDP each year, now and forever. If a wider range of risks and impacts is taken into account, the estimates of damage could rise to 20% of GDP or more. In contrast, the costs of action – reducing greenhouse gas emissions to avoid the worst impacts of climate change – can be limited to around 1% of global GDP each year. The investment that takes place in the next 10-20 years will have a profound effect on the climate in the second half of this century and in the next. Our actions now and over the coming decades could create risks of major disruption to economic and social activity, on a scale similar to those associated with the great wars and the economic depression of the first half of the 20th century. And it will be difficult or impossible to reverse these changes. The key actions to prevent climate change are, in order of priority:

- 1 Stop deforestation
- 2 Improve energy efficiency
- 3 Clean energy and renewables

This was followed by the Climate Change Bill which became law on 26th November 2008. The Act aims to improve carbon management and help the transition towards a low carbon economy in the UK; and demonstrate strong UK leadership internationally.

The key provisions of the act are:

- Legally binding targets: Green house gas emission reductions through action in the UK and abroad of at least 80% by 2050, and reductions in CO₂ emissions of at least 26% by 2020, against a 1990 baseline.
- A carbon budgeting system which caps emissions over five year periods, with three budgets set at a time, to set the trajectory to 2050. The first three carbon budgets are being formulated, and will followed the EU framework of an intended budget, which should apply following a global deal on climate change, and an Interim budget, to apply before a global deal is reached. The proposed intended budgets requires an emissions reduction of 42% in 2020 relative to 1990, with an Interim budget of an emissions reduction of 34% in 2020 relative to 1990.
- The creation of the Committee on Climate Change (CCC), a new independent, expert body to advise Government on the level of carbon budgets and where cost effective savings could be made. The Committee will submit annual reports to Parliament on the UK's progress towards targets and budgets to which the Government must respond, thereby ensuring transparency and accountability on an annual basis.
- A requirement to issue guidance in 2009 on the way companies should report their greenhouse gas emissions. The Government must, by 6th April 2012, mandate reporting, or explain to Parliament why it has not done so.
- Annual publication of a report on the efficiency and sustainability of the Government estate.

As elsewhere, the situation on adaptation is less impressive. On the positive side, since 1997, the UKCIP has been working with the public, private and voluntary sectors to assess how a changing climate will affect key issues like construction, working practices, demand for goods and services, biodiversity, service delivery and health and it has developed an excellent suite of free analytical tools for stakeholders to use themselves. An Adaptation Sub-Committee of the CCC to advise and scrutinise the Government's adaptation work is now being recruited.

However, currently, the most pressing threat to the UK related to climate change is flooding. In terms of finance, there has been "a trend in which investment in flood defence has fallen back in real terms three times in the past decade, followed by significant increases, in response to high profile flood events. The impact of this "stop-start" approach has been exacerbated by the Environment Agency's move in 2002 towards a 'priority scores' based system for allocating monies for coastal and flood risk management, in which the 'priority' threshold moves annually in response to budgets" (ICE, 2007). Clearly Chancellor Brown was not consistent in his attitude to climate change.

Although the Government has announced that spending on flood defence in England and Wales will be increased progressively, to a level of £800 million in 2011, the ABI has objected that this is not fast enough. The Commons

Environment Select Committee has recommended a figure closer to £1bn. ABI estimates that approximately 570,000 homes are now at risk, partly due to increased flood risk but also due to building on flood plains and other high-risk areas (see Chapter 7 for more information).

2.4 Business attitudes to climate change

Since adapting to climate change could mean significant changes in the way insurance operates, it is worth knowing how receptive clients may be to this message, and to what extent they are already tackling it themselves. This section examines business attitudes to climate change through two lenses; firstly, the World Economic Forum (WEF), which produces an influential annual report on key risks facing the global economy, and secondly the Carbon Disclosure Project (CDP), which surveys individual corporate action on climate change.

Climate change in the WEF view of global risk

WEF has formed the Global Risk Network to identify and assess current and emerging global risks to business and society, to study the links between them, to assess their likely effects on different regions, markets and industries, and to advance the thinking around more effective risk mitigation. Current partners include Marsh and McLennan, Swiss Re and Zurich Financial Services.

A basic premise is that risks interact with each other, producing the potential for unexpected ‘perfect storms’ – cumulative events which cause damage far in excess of the sum of each individual risk event. For example, WEF uses the theme that climate change could exacerbate water scarcity, causing food and energy shortages, and leading to political instability.

Climatic risks

WEF uses scenarios to explore issues, and also presents ‘manifestations’ of severe impacts that might occur within 10 years, in terms of cost and death-toll.

From the beginning of the Global Risk project, climate change was seen as a key risk (one of ten in 2005), with the potential to trigger chains of problems, e.g. political instability due to scarcity of water. In 2006, extreme climate change was one of the four scenarios. In 2007, climate change was one of three scenarios. In 2008, climate change was implicit in two of the four major systemic risks, food scarcity and the role of energy. In 2009 WEF included climate change in its list of top concerns, as a potential cause of scarcity of basic resources (food and water).

The number of ‘manifestations’ is around 30 currently, covering geopolitical, economic, technological, societal and environmental impacts. This includes six climatic impacts (see Table 1).

Table 1: WEF view of climatic impacts within 10 years

	2007		2008		2009	
	L	S	L	S	L	S
Climate change (extreme events)	3	3	3.5	3	3.5	3
Drought/heatwave	-	-	3.5	3	3	3
Water scarcity	3.5	2.5	3	2	3	2
Tropical cyclones	2	3	2	3	2	3
Inland flood	2	2.5	2	2.5	2	2.5
Coastal flood	-	-	2	2	2	2

Note: L = Likelihood. 2 is from 1 to 5%. 3 is from 5 to 10%.
S = Severity. 2 is from 10 to 50 billion USD. 3 is from 50 to 250 billion USD.

WEF’s view of climate change has become more pessimistic, with two new impacts added since 2007. However, the presentation is rather confusing, since it is not clear what impacts are left under climate change, once one detaches cyclones, floods, drought and water scarcity. A more serious objection is that this approach downgrades climate change, since it is a worsening problem, but no account is taken of the impacts behind the 10 year horizon. The risks presented

by climate change are fundamentally intertwined with other key risks, from land-loss and ecosystem degradation to regulation and long-term energy prices, but again this simplistic table does not reflect the complexity.

True, WEF prioritises climate change in its scenarios, but the ‘manifestation’ message is much less urgent compared to other risks like terrorism or the credit crunch. As WEF itself points out, the Stern Review on the Economics of Climate Change overcame this by using the net present value of future costs, with a very low discount rate, since it is unethical to place costs on to future generations who have no say in today’s decisions.

This is unfortunate, because WEF places climate change high on its agenda for political attention, and has made sensible suggestions on what action is required, but these could be undermined by the relatively low position of climate change on the ‘radar’.

The current WEF risk model creates a complicated ‘cat’s cradle’ of correlations between risks, but it needs much further development to provide a more appropriate quantitative assessment of impacts over the long-term, so that priorities can be established transparently. For example, there is a strong connectivity between energy security and emissions reduction.

WEF has made various useful observations about how to manage risk. For example, people are much more likely to undertake protective measures when they focus on a probability of greater than 1 in 5 over 25 years, rather than the identical 1 in 100 next year, because the smaller probability is below their threshold level of concern. By extension, one could move catastrophe risk financing from the usual one year contracts towards the development of longer term contracts (as with cat bonds).

To overcome the ‘Charter for Inaction’ in Box 4, WEF proposes “5 Pathways”:

- Improving insight: moving risks from the unknown to the known through research to enable creative thinking about solutions.
- Enhancing information flow: allowing information to flow effectively between decision-makers and those experiencing the risk first-hand, to provide early warning, inform the public and exchange best practice.
- Refocusing incentives: creating the incentive frameworks that will allow decisions to be made to reduce risks previously considered to be someone else’s problem.
- Improving investment: providing the finance necessary to implement loss prevention.
- Implementing through institutions: improving (or creating) the framework needed for stakeholders to collaborate on risks.

Corporate attitudes to climate change in the Carbon Disclosure Project

The Carbon Disclosure Project (CDP) is the largest investor coalition in the world. Over 385 signatory investors, with a combined asset base of \$57 trillion, signed CDP’s sixth annual request for corporate information (CDP6), which was sent to over 3,000 companies worldwide in 2008. The survey covers:

- 1 Management’s views on the risks and opportunities that climate change presents to the business;
- 2 Greenhouse gas emissions accounting;
- 3 Management’s strategy to reduce emissions/minimize risk and capitalize on opportunity; and
- 4 Corporate governance with regard to climate change.

The data therefore provides a valuable insight into how companies are dealing with climate-related risks and opportunities at the strategic level, which in turn indicates

BOX 4 The charter for inaction

It’s someone else’s job

Not relevant to us

Too busy

No-one else thinks it’s necessary

What’s in it for me?

It would be cheaper to do nothing

It won’t happen, or if it does it will be after I’ve gone.

It’s too difficult – it involves too many others, and it’s complicated

how effectively they are managing their risks, and changing their operations and product lines. This information is relevant for insurers as underwriters, and also as investors. This section simply identifies some key features of the data to illustrate possible directions for further research, because there are huge quantities of information, much of it in free-format text.

The overall response rate for CDP6 at the global level is 77%. European and North American companies set the pace with 83% and 82% response rates respectively. This means the data is robust enough.

Table 2: Corporate response to climate change

Note- bold face for numbers indicates equal or higher than Global 500 level

Stock market selection	Climate change represents commercial risks	Climate change represents commercial opportunities	Board-level or upper management responsibility for climate change issues	Emission reduction programmes with targets
Global				
Global 500	80%	82%	64%	77%
OECD nations				
ANZ 150	97	89	93	36
Canada 200	85	86	53	24
France 120	88	84	34	43
Germany 200	77	80	38	35
Italy 40	89	83	33	22
Japan 150	78	82	93	81
Nordic 125	81	80	41	23
Switz'd 50	72	77	36	44
UK 100	98	82	53	41
UK 250	83	80	24	37
US 500	81	69	50	29
Emerging nations				
Asia/Other 80	77	79	38	38
Brazil 60	100	100	59	52
India 110	79	84	39	34
S Africa 40	80	92	60	44
Sectors				
Power 250	90	95	70	44
Transport 100	83	85	79	46

Source: Carbon Disclosure Project, 2007

The exercise is carried out in three ways: a global exercise aimed at the world's largest 500 companies by capitalisation, sectoral analyses aimed at the largest companies in a given sector (transport and power utilities in CDP6), and national surveys. Table 2 shows that there were seventeen of these surveys within CDP6 (the UK is shown divided into the top 100 companies, and the remaining 250).

Much of the survey is concerned with the technical detail of reporting GHG emissions, but Table 2 focuses on strategic issues: what proportion of companies have identified climatic risks and opportunities, what proportion has raised the issue to Board level or Senior Executive, and how many are seriously tackling the issue of emissions reduction.

The Global row in the table shows that the top companies' response to these questions is 80, 82, 64, and 77 percent respectively. These are reassuringly high responses, other than the governance one of senior responsibility, which indicates that climate change is often not treated as an enterprise risk factor, but as a functional or environmental issue. The first two columns in the table show that companies are identifying risks and opportunities as well as the Global 500, in some cases much more strongly, e.g. the power sector, and in Brazil and Australia/New Zealand. However, in terms of governance, only Australia/New Zealand, Japan, and the power and transport sectors treat climate change as a strategic issue with senior responsibility. The position on emissions reductions is much weaker, with only Japan having widespread commitment to GHG targets. The question of company size is also material; comparing the responses for the FT 100 with the next largest 250, it can be seen that in every column the attention is less for smaller companies, particularly on risk and governance. Given that these are still substantial companies, it is almost certain that attention to climate change in unquoted companies will be much lower still (see Chapter 8 on SMEs).

Generally the focus in CDP is on emissions. However, in one analysis of the CDP responses for the FT350, companies were rated on how they perceived the risks from climate change impacts : high, medium, low or none (CDP, 2006). If we assign values of 3, 2, 1, 0 to these, we can calculate a score for each sector. The overall score for the FT350 was 1.5, out of a maximum of 3.

Utilities scored the highest at 2.5, followed by banks (2.3), beverages and tobacco (2.0), then insurance and food both scoring 1.8. What is interesting is that among the lower scores were: transport (1.5), hotels and leisure (1.3), real estate (1.0), media (0.9). These latter four sectors are all either exposed to weather conditions operationally, or their customers are weather-sensitive. The replies therefore indicate a lack of awareness of climate change in a strategic issue for those sectors.

These reports indicate that companies are not managing the issue of climate change well enough yet, which means that insurers and investors may be exposed to needless risk.

2.5 Insurance industry attitudes to climate change

Having looked at general perceptions of climate change, this section considers attitudes to global warming in the insurance industry in four groups. The first is the membership of the Chartered Insurance Institute, the second is the membership of the UK actuarial profession, the third is a sample of UK investment managers, and the fourth is at corporate level.

The CII and related professions

In late 2006, CII and PFS members were surveyed to determine their attitudes towards climate change. Earlier surveys were carried out in 1994 and in 2000 for the two previous reports. The survey aimed to get the views from people across the insurance and financial services sector, most of whom have little or no day to day direct contact with climate issues. As such, it represents an important cohort of individuals, all of whom have some professional involvement in the market and 10% of whom are based outside the UK. A total of 5,443 responses were received by December 2006 – a 6% response rate, which is very high for this type of survey. Earlier surveys had elicited responses from 896 people in 2000 and 285 in 1994 – which reflected the narrower base that was targeted, and less use of e-mails, which meant that the earlier polls were largely paper based. The main findings are given here, and fuller statistics on the survey are given in the Annex to this chapter.

86.5% of those polled agreed or strongly agreed with the statement that, 'There is a noticeable human influence on the global climate system', while only 3.6% disagreed. In 2000, 82% agreed with this, so the profession supports the theory of manmade climate change.

78.4% of CII respondents answered 'Yes' to the question, 'Do you believe that changes in weather patterns have resulted in more insured weather losses?' Of those outside the UK, 84.3% said 'Yes'. These are slightly down on the views in 2000 (81% of all respondents, and 88% for overseas). This is an area where PFS members differ significantly; only 62% of them thought losses have increased due to climate change.

77% of CII respondents expect significant or considerable effects on their home insurance market within 15 years, and 31% expect this to happen within 5 years. These are slightly down from the previous survey in 2000. It is also noteworthy that PFS members are less concerned than CII members (65%, and 25% respectively for the two time horizons).

In terms of specific effects, over the next 5 years respondents expect the insurance industry to face greater underwriting losses from climate change (54% said 'yes'), and cope without government intervention, insolvencies, or withdrawing cover, but in the next 5 year consumers might expect to have to pay more (71% said 'yes'), and accept narrower cover (60% agreed). Overseas members were more concerned about underwriting losses and reinsurance.

Looking ahead to 2020, the results show that people in the industry are more concerned about the long term implications of climate change on the industry. Respondents are less pessimistic than they were in 2000 on issues such as losses, price increases and cover restrictions. However, there is greater concern that insurers will achieve this by deciding some areas are uninsurable (65% agreed). There is also a fear of government intervention (57% agreed) and insolvencies (44% agreed). In general, PFS members are less concerned than CII members, particularly about underwriting losses and reinsurance.

In terms of corporate risk management, the 2006 survey suggest little has changed since 2000, which is puzzling and of some concern. The only tool which is in greater use is mapping. One area of specific concern is with regard to accumulation control. The industry learnt lessons the hard way about risk accumulation in the troubles of the Lloyd's insurance market in the early 1990s, when the effects of reinsurance meant that some organisations had accumulated higher risks than they believed they had, through multiple layers of reinsurance. More recently, the banking crisis of 2007-9 has been due, in part, to banks acquiring a greater exposure to particular types of risk than they thought they had. The lesson must be that for both banks and insurers, it is important that decision-makers (and regulators) understand organisations' full exposure to particular risks. That should not discourage either from accepting such risks – but should help them keep their accumulated risk within acceptable limits.

In response to the question 'What practical steps do you think your home insurance industry should pursue to reduce the effects of climate change?', a majority of CII members felt there should be studies of vulnerable areas (62%), more research on weather patterns (57%), closer co-operation with public authorities on planning and construction standards, and greater emphasis on risk management (54%). However, in every case these views were much weaker than in previous surveys, perhaps reflecting a belief that the UK industry has done a lot already. However, it was notable that PFS members were much less likely to support the need for action, which indicates either complacency or misplaced confidence that everything is in hand.

Overall, respondents felt the industry had a responsibility to set the policy agenda rather than just reflect it.

They felt insurance companies should encourage policyholders to use/produce fewer emissions (81%), use less energy or green energy themselves (86%), invest in clean technology (76%), use climate-friendly suppliers (82%), and campaign for stronger emission limits (68%).

The replies showed that insurance professionals are taking climate change into account in their personal decisions by using less energy or green energy (78%), in general purchases (59%) and travel decisions (39%).

The tendency was less marked in other areas like work decisions (27%), investment decisions (18%) and house purchase/location (17%). Interestingly, PFS members, who are more involved with mortgages, seem less concerned about their house location (12%, compared to 18% for CII members).

In summary, the survey is important because it is the biggest poll of its type and it now has a track record going back over 14 years. The latest (2006) survey shows an industry that is highly aware of the issues around climate change and a workforce within that industry that is taking its personal, as well as its corporate responsibilities, seriously.

Responses suggest most people within the insurance sector believe that manmade climate change exists and that it is already affecting insurers. They feel it is likely to remain a manageable issue (rather than a survival issue) for insurers, although the view out to 2020 is less positive. As the risks deteriorate, practitioners say that consumers will face harder terms and probably a lack of insurance in some areas. There is a strong view that the insurance industry is a key stakeholder in climate change issues and that it can and should play an active role in helping to ensure that climate change is managed decisively. Individuals are taking climate change into account in many of their decisions already. In general, financial advisers are less aware of the potential problems that climate change may bring to their business.

Institute and Faculty of Actuaries

In October 2007, the Environmental Research Group (ERG), a sub-committee within the actuarial profession, surveyed the members of the Institute and Faculty of Actuaries about climate change. More than 1,100 responded, a very large number for a stand-alone exercise. The results have not been formally published but have kindly been made available for comparative purposes.

18% either thought manmade climate change was untrue, or wanted more information about it in order to consider whether it was relevant to their work. This is a high level for a profession that seeks to advise others on risk. A further 25% thought it would not affect their work, leaving 57% that considered it was a relevant risk factor.

Broadly speaking those that believe climate change is significant felt that it should be taken into account for some or all investment allocation decisions (51%), and in pricing and reserving non-life products (54%). They also felt that pension funds should engage with the companies they invest in on this issue (60%), and that the general insurance industry should be more active in promoting risk prevention amongst policyholders (54%). Only 11% had taken up the issue of climate change impacts with their clients. (This despite the fact that many actuaries practice in the non-life field, and also that 29% of the respondents felt that there would be a significant effect on mortality and morbidity, i.e. in the life and pensions area.)

In terms of subject awareness, very few had heard of the Climatewise initiative, and by a small majority the respondents did not feel the Stern Review was of much relevance, nor that the time was right for the profession to take a lead on climate change as a professional concern.

It is interesting to compare these attitudes with the interim review of the actuarial profession by the Morris review (Dlugolecki and Silver, 2005), which voiced various concerns:

Insularity

The actuarial profession was seen to be too introverted, almost obsessively preoccupied with interpreting detailed regulations, rather than observing important new societal issues that could affect its sphere of operations.

Uncertainty

Actuaries have tended to present their clients with a simplified view of the world, for ease of communication. Thus the wide range of possible outcomes, and the potentially adverse consequences of unlikely events have been glossed over.

Inattention to the public interest

While actuaries have engaged with policy-makers and other stakeholders in some areas such as genetic testing, in other areas such as climate change the profession has been absent from the debate.

Too conservative

The profession was seen as resistant to change.

In its response, the profession focused almost entirely on the issue of governance, and chose not to address these 'positional' issues.

Since it now appears that climate change will have a material effect in the areas of investment and insurance risk, the profession will need to assimilate this knowledge into 'best practice'. This could involve introducing members from other disciplines, a wider range of topics in its education and continuous professional development, collaboration with scientific institutes (Hanson et al, 2006), and techniques such as scenario planning (Dlugolecki and Silver, 2005).

Investment managers

The "disconnect" among actuaries is also prevalent among asset managers. An independent qualitative study to assess UK asset manager attitudes towards the potential effects of climate change on investment philosophy surveyed nineteen mainstream UK fund management houses, together representing over £3 trillion of assets under management (HeadLand Consultancy, 2007).

Mainstream investment managers focused on the objectives embodied in the mandates they receive from pension fund trustees. Very rarely do trustees themselves give specific instructions on climate change risk and opportunities to fund managers. (The Environment Agency Pension Fund attempted to do this in 2005 when it adopted a 'responsible investment' strategy, and found an astounding level of ignorance among the tendering fund managers.)

Furthermore, investment managers considered the impact of climate change to be slow and cumulative, so that it was outside a typical fund manager's remit as "they are not looking at 2012 let alone 2050". While most respondents understood carbon footprints in business, there was no consensus on its level of importance or usefulness in assessing

current and future company performance. The only exceptions to this disinterest were for sectors already affected by emissions trading, and insurance, which is directly exposed to disasters. Likewise, there was little attempt to identify companies which were planning for a carbon-constrained future.

The survey concluded there was “clear disconnect between the apparent seriousness of climate change and attitudes of institutional fund managers”, and “very little evidence of investment firms incorporating climate change in top-down investment strategies.”

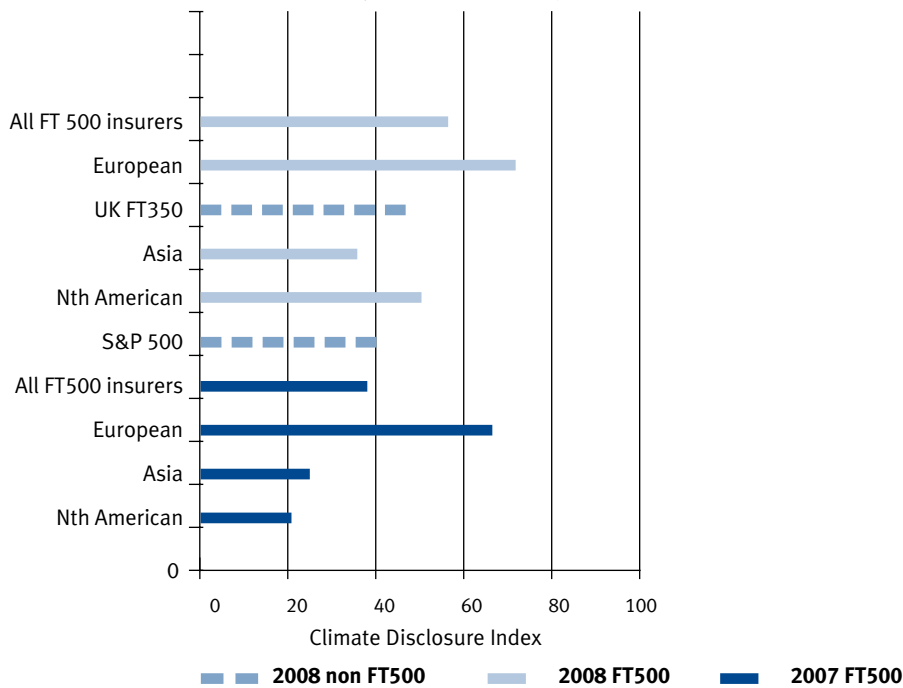
Insurance companies

At the corporate level, the insurance industry in western Europe is reasonably well positioned on climate change, particularly in the UK. Attitudes in Australia are also well-informed through the biennial Aon Re Natural Hazards Conferences, and Japan also has a progressive position, but the industry is less aware in the key USA market and in developing countries.

One way to track this is through the annual CDP survey, discussed in Section 2.4. Figure 3 displays the climate disclosure performance of insurance companies in 2007 and 2008 for the Global FT 500 companies, and also for smaller insurers in USA and UK in 2008. It can be seen that the disclosure improved between 2007 and 2008 in every category, with European companies being well ahead with a score of 75 (a notable exception is Generali), followed by US and Canada with a score of 50, and then Asia at 36 (which is a mix of high Japanese scores, and low Chinese scores). The surveys of smaller companies revealed lower scores (47 for FTSE 350, and 40 for S&P 500).

The situation in the UK and USA is confirmed by other evidence. In the UK, the Climatewise initiative was launched in 2008, and already has 41 members. There is still some way to go though. For example, one of the largest UK insurers puts responsibility for climate change under environmental issues, within CSR, reporting to the Human Resources function.

Figure 3: Climate disclosure by insurance companies



Source: Carbon Disclosure Project, 2007

The apathy in the US is confirmed by a series of surveys of insurance company filings with the SEC (Securities Exchange Commission). In the latest, just 9 out of 106 property & casualty insurers mentioned climate change as an issue (Friends of the Earth, 2006). However, this is up from 2004, when only five insurers reported on climate risks. Several factors probably underlie this. The US has always faced large catastrophes, such as hurricanes and tornadoes, so this makes the link between climate change and impacts harder to identify. Also the government has for many decades played a large

part in financing disaster recovery, so that insurers are less involved in the issue of disaster recovery (Mills et al, 2001). Another reason which most commentators forget, is that insurance in the USA is regulated at the state level, not federally, so attention is focused on local issues. But probably the biggest reason is the well-funded campaign by the energy industry and others to discredit climate science in the US, and more recently, the hostility of the Bush Administration. Insurers felt no desire to risk their reputations and incur government displeasure over apparently uncertain science

Across the global insurance industry, activity on climate change is low. The most recent survey identified just 190 organisations engaged in meaningful ways, from amongst the tens of thousands of underwriting and intermediary firms in existence. While this was double the number a year before, it is still tiny (Mills, 2007).

2.6 The Insurance market

This section tries to put climate change and insurance in context, by briefly reviewing other major developments in the insurance market under the themes of emerging risks, market structure, regulatory issues and internal processes.

Emerging risks

The world at large

since the last climate change study, globalisation has continued, the world economy recovered from the dot-com crash but has now fallen victim to poor lending practices in the financial sector (the credit crunch), China is an increasing economic force and the EU has expanded. World trade talks on services liberalisation have bogged down. Use of the internet and unsecured personal credit have soared. The UK is ageing, with a concomitant pensions gap, but populations continue to rise rapidly in developing nations.

Surveys of emerging risks among insurers and management consultants place climate change high on the list. Lloyd's put it fifth on their list after global financial instability, emerging markets, the growth of corporate liability and political risk (terrorism). Approximately a third of underwriters believe that insurance buyers are giving more consideration to climate change, but over half think that more needs to be done (Lloyd's 2008).

However, most other insurance observers and practitioners rank climate change as more serious (NYCSFI 2007, E&Y 2008).

Climate change

in the UK the Association of British Insurers has championed the issue of climate risk particularly on flood underwriting. Internationally, the United Nations Environment Programme Finance Initiative (UNEPFI) made valiant attempts to influence policymakers with a series of reports and briefings, and has now been joined by two other bodies with strong insurance connections, Climatewise and the Munich Climate Insurance Initiative, while individual companies like Allianz, Aviva and Axa have made valuable individual contributions. Lloyd's also has produced a string of strong reports on climatic hazards under its 360 Risk Project, the latest being on coastal flood risk. Investors, including pension funds and insurers, have taken action through initiatives like the Carbon Disclosure Project to track climate risk within investee companies but there is a long way to go.

Recent floods have made the UK insurance industry more aware of the risks associated with climate change and the urgency of the situation, with numerous entities hosting seminars and conferences on the subject (see Chapter 7 for more information on flood risk). Great concern has been expressed and all insurers and reinsurers are analysing their portfolios to ascertain what measures can be taken to limit their risks without losing large amounts of business. At the same time, the growth in the number of emissions related projects has provided the opportunity for the development of a niche market in the writing of risks specifically related to carbon emission trading and other climate related exposures. The first company set up to capitalise on this development was Carbon Re, established in July 2006, and major companies such as Munich Re and Swiss Re have launched their own products.

Following the Hurricane Season of 2005, most catastrophe reinsurers reassessed their rating strategy. Rather than retract sharply from the market, as has happened after similar episodes in the past, reinsurers chose to differentiate more between highly exposed zones, such as the East Coast of the US from Mexico to Maine, and most other regions of the World. Indeed, some risks were renewed at rates lower than the previous year. Overall, rate increases in the US and Mexico average 76%

and 129% respectively compared with only a 2% average increase for the rest of the World (Guy Carpenter, 2006). This measured and discerning approach is seen as an example of insurers and reinsurers coming to terms with the challenges of underwriting posed by climate change.

Market structure

Mergers and acquisitions have led to two companies (Aviva and RBIS) controlling around one-third of the second largest insurance market in the world. This places them in a responsible position vis-a vis government policy, which they do not seem to have used on the issue of climate change.

While the broker model still survives (albeit sometimes under insurer ownership), affinity schemes continue to grow, and direct marketing/access via internet remains strong. It is likely that SME business will drift towards a commoditised format also. The challenge will be for insurers to provide guidance on natural hazards without face to face contact, in a way that customers will use to reduce their risks.

Regulation

A never-ending wave of regulation has diverted attention away from issues like climate change, first with the need to register intermediaries, and then the drive on contract certainty. The next issue for nonlife underwriters is solvency. Growing concern over the ability of insurers to meet their potential liabilities, in the light of increasing exposures and emerging risks like climate change, has led to the European Commission reviewing the current solvency regime, implemented in the 1970s. CEIOPS (the Committee of European Insurance and Occupational Pensions Supervisors) has been charged with overseeing the implementation of the new solvency and supervisory standard for European insurance organisations, Solvency II. Work has been ongoing since 2001. Implementation was originally planned in 2009, but has been deferred.

The main differentiating feature compared to the historical approach is that it will be a risk-based system where risk will be measured according to coherent and consistent principles (AIR, 2008). This should reduce the risk that an insurer is unable to meet claims, provide supervisors with an early warning system, and generally promote confidence in the financial stability of the insurance sector.

Non-life cat risks, by definition, are low-frequency high-severity events that are often not adequately captured by the financial formulae. Solvency II regulation tries to mitigate this effect through the introduction of a cat risk module using loss scenarios, much as Lloyd's already does. The Solvency Capital Requirement (SCR) is calibrated to a one-year safety level of 99.5 percent, which represents the ability of an insurer to withstand a catastrophic one in two hundred year event. Such events are rare by nature. Consequently, there is a severe shortage of data in the insurance industry for the estimation at a 99.5 percent safety level. This is particularly so when the underlying risk is changing, as with climate change, but that feature has not yet been recognised.

Finally the International Accounting Standards Board (IASB) has been working for a number of years towards developing an International Financial Reporting Standard (IFRS) on accounting for insurance contracts, embracing accounting by both insurers and policyholders. The major difficulties appear to be on life insurance (KPMG 2007b).

Rating agencies

Rating agencies have also changed their methodologies as a result of the heavy hurricane losses experienced by the industry. A.M. Best have announced that it would continue to use the Best's Capital Adequacy Ratio but would update the underwriting risks to reflect current environmental factors. Although A.M. Best believe that rating downgrades are unlikely, many reinsurers are responding by reducing their limits for high catastrophe zones and also moving exposures by way of retrocession, sidecar arrangements and catastrophe bonds.

Standard & Poors has advised that it is revising its criteria for measuring catastrophe risk for primary insurers. This will involve an exposure-based catastrophe capital charge for insurers, similar to that applied to reinsurers. This revision is likely to result in negative rating actions if the new criteria reveal previously uncaptured or poorly managed catastrophe risk. The criteria for reinsurers will be unchanged.

Internal processes

There have been significant developments on several fronts: catastrophe modeling, ART, claims handling and offshoring to name but a few. Staffing may be a crunch issue in future also.

Catastrophe modelling

In the aftermath of the 2005 Hurricane Season there was criticism of many risk modelling systems and the dependence of underwriters on these products when assessing risks, due to the unexpectedly large losses. Chapter 4 details what changes have been made to address these issues. Apart from better calibration of the models, there are numerous pitfalls in how they are used. Often incorrect data is used or data is fed incorrectly from one system to another, input parameters are loosely defined and poorly controlled, models are inappropriate for a particular segment or purpose, or decision-makers do not understand model assumptions (KPMG, 2007b). This is a critical discipline, since models are being used more extensively for credit rating and solvency monitoring, as well as underwriting decisions, extreme event management and emerging risk management (KPMG, 2007a).

Alternative Risk Transfer (ART)

The catastrophe bond market has stagnated recently, but there is keen interest in accessing it when the capital markets recover. The severity of the 2005 Hurricane Season, in particular Hurricane Katrina, brought the first total loss to a publicly disclosed cat bond, KAMP Re 2005 Ltd. Issuance, a \$190m transaction, and revealed some practical difficulties (Wemmer, 2008). Transactional costs are still considerable, contracts are difficult to trade due to the thin market, and there continue to be accounting, taxation, and regulatory issues. Things may be easier under Solvency II, where risk is the basis of solvency requirements. There is also considerable interest in weather derivatives and microinsurance as techniques to enable the insurance sector to service rural markets in developing markets.

Claims

While it is recognised that there have been recent improvements within claims (better technology, a reduction in claims expenses, and a deeper understanding of customer service), claims professionals also believe that there have been negative features (a decline in the quality of staff, a dumbing down of claims jobs, and depersonalisation of service). Allied to this is the general reduction in staff numbers in internal and adjusting posts, which leaves the industry vulnerable to a series of major incidents.

Fraud would be one of the risks. In total, the ABI estimates that insurance fraud costs £1.6 billion annually. New technology-based systems can now use intelligent data mining and analysis techniques such as social network analysis, fuzzy matching and sophisticated modelling to spot suspicious patterns of activity and uncover links between claims. These systems can integrate in-house claims data and sophisticated statistical analysis with external information such as the details of known fraudsters, potential third parties involved and data from trade associations or industry bodies. Advanced data gathering and analysis allows claims to be screened when they are intimated on the basis of 'signpost' criteria, to focus on the most likely cases.

Underwriting

This is one area where information technology has made a big difference, in terms of analysing risk on the basis of claims experience, and predictively, particularly for flood risk. Some companies also use demographic 'lifestyle' data as a core component of the underwriting process.

Outsourcing offshore

This is an increasing feature of after-sales service. India has several benefits, in particular low cost advantage, trained and high quality workforce, and an acceptable time difference from Europe. As with any endeavour there are risks of course, such as data security, intellectual property protection, exit barriers, customer acceptance, and geopolitical concerns, but more business is expected out of the European insurance market, which is likely to increase from the present 24 percent of outsourcing capacity to 36 percent by 2010, with a trend towards outsourcing of higher-end insurance processes such as underwriting, actuarial and analytics (KPMG, 2007a).

Staffing

The availability of good quality staff has been a concern for some time (Lloyd's, 2008). Possibly there will be some alleviation from the decline of the banking sector. Another source may be English-speaking citizens from the 'new EC', so this problem may have passed its worst.

2.7 China

China has been singled out for attention because it has become a huge economic power, mainly as a supplier to developed nations so far and it is a rapidly expanding insurance market, while it is also vulnerable to climate change impacts and it is a major GHG emitter, but developing a strong renewable energy sector. It is therefore important strategically for insurers and in climate change, but the link is often ignored by insurers.

The importance of China to the world economy grows every year. China currently represents around 6 percent of world GDP, and getting larger, with an annual economic growth rate of over 9 percent. This has consistently outstripped the average western growth rate of 3 percent. China is currently the world's fourth largest economy just having passed the UK and is expected to be second to the USA within 20 years. China's growth has been export-led with a policy of attracting foreign investment into a number of development areas, particularly in the coastal provinces of Guangdong, Fujian, Zhejiang, Jiangsu, Shandong and Hebei (see Figure 4). Foreign investment totalling USD 650bn has been attracted to China since the 1970s with 470 of the top 500 global companies investing in China.

Figure 4: The provinces of China and climatic hazards



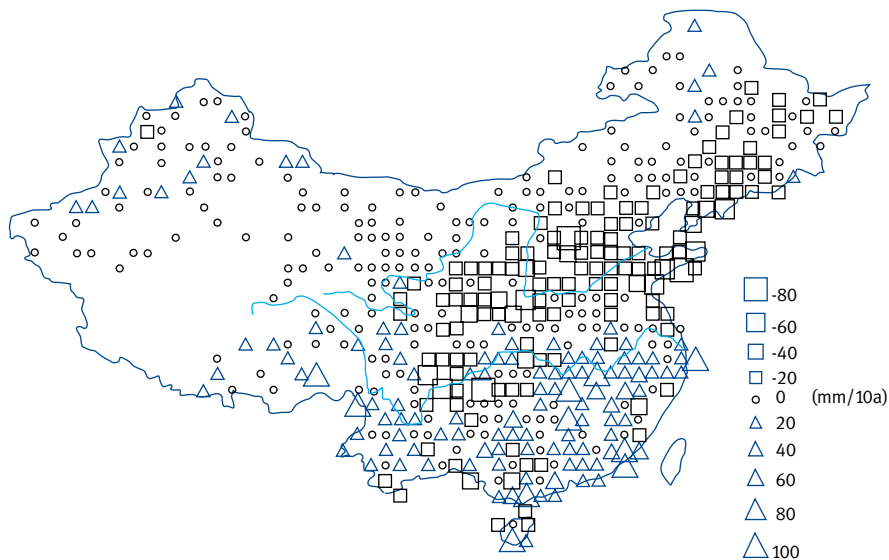
China is now the largest consumer and producer in the world of many different commodities. It is the second largest consumer of primary energy after the US, and the top global producer of coal, steel and cement. Its increasing appetite for commodities is driving global demand for everything from oil and steel to copper and aluminum. And up to 2015, half of the world's new buildings will be constructed in China (Hanson and Martin, 2006). This strong position could evolve in a number of ways, depending upon the pace of internal reform and the degree of collaboration with The West, but there is little doubt that China will be a major economic player this century (World Economic Forum, 2006).

However, there are obstacles. There is a growing gap between richer people in cities, and the majority of hundreds of millions of poorly educated rural dwellers. The domestic market is relatively small, and the country has limited resources, with some, especially water, well below world averages. China's complex topography and various climates also render the country extremely vulnerable to hydrological hazards including floods and storms, as well as earthquakes. Major rivers like the Yangtze originate in the high mountains in the west. Most portions of the east and middle portions are governed by the monsoon climate which brings significant rainfall in summer, concentrated along the Yangtze River basin, and often associated with typhoons. Climate change will exacerbate the natural hazards (NDRC, 2007). At the same time, the need to abate emissions means major changes for an economy based on coal.

Natural hazards and climate change

The most serious threat from climate change is water scarcity, characterized by less precipitation in Central Asia and the shrinking of glaciers in the Himalayan region, some of which may vanish by the year 2035. (However, the accelerated melting of glaciers will initially cause more flooding and landslides.) Figure 5 shows the trend of rainfall in China over the past 50 years. The square symbols are decreases, the triangles indicate increases; the larger the symbol, the greater the change.

Figure 5: Change in precipitation in second half twentieth century



Source: Ye 2006

Floods can arise in three ways:

- River floods have been major hazards in China for more than 3,000 years. The defences are generally designed to a 10-20 year return period giving very low levels of real protection, and are often in a poor state of repair. The expected increased frequency of extreme rains in southern parts will result in more flooding (IPCC, 2007).
- Climate change induced sea level rise would cause large-scale inundation and erosion. The projected relative sea level rise from all factors including climate change is 40-60cm, 50-70cm and 70-90cm in the Pear River, Yangtze and Yellow River Deltas respectively by 2050. Current defences are insufficient to deal with high sea level rise (IPCC, 2007).
- Even weak typhoons deliver large quantities of rain inland, and this is a major source of damage.

Vulnerability has increased due to poor development policies: deforestation, drainage of lakes, building on floodplains, and the proliferation of hard surfaces have all contributed to make flood risk much worse. In coastal areas this is exacerbated by subsidence due to construction and water extraction, and the loss of river-borne silt when dams are constructed upstream.

The typhoon season in China runs from June to October, with an average of 7 landfalling cyclones each year. The highest risk is from Hainan Province to Hong Kong, with a significant threat up towards Shanghai (see figure 4). An increase in tropical cyclone intensities is suggested in a warmer atmosphere though there is no consensus about

BOX 5 The Yangtze River

The Yangtze is the world's third largest river, with 40% of Chinese industrial output sited in its catchment area. The river floods every five to ten years. The present flood defences include dykes up to 16m high and flood basins, which need constant maintenance, due to siltation, drying out, and high flows. At the height of the 1996 flood 1 million people were involved in reinforcing the dykes to prevent breaches.

The Three Gorges Dam has been built on the Yangtze to control the flooding. It will be the biggest hydro electric dam in the world, with a reservoir stretching for 400 miles, providing access for ocean-going ships to the city of Chongqing. There will be some disadvantages also: the dam may not be able to contain the biggest floods, it will prevent 'flushing' of pollution, and it will reduce the downriver deposition of silt by 50%, which will exacerbate coastal flooding (IPCC, 2007).

changes in future frequency or location (IPCC, 2007). The ABI estimated that the cost of Japanese typhoons might increase by two-thirds by 2080, and the same arguments would apply to China (ABI, 2005).

Over the fifteen year period 1994-2008, supertyphoons¹ caused economic damage worth more than 16 Billion USD in China, two thirds in Fujian and Zhejiang provinces. There appears to a negative correlation between Pacific and Atlantic cyclones (Aon Benfield, 2008), so the outlook for the next few years may be relatively calm. However, even a ‘quiet’ season can be very costly, if a single strike hits a city, as happened with Hurricane Andrew in 1992 in the Atlantic basin.

Pronounced year to year variability in the climate in this region has been linked to ENSO² (see Chapters 3 and 4). It is unclear how this will evolve with climate change, but several research papers counsel that there is a strong likelihood of more droughts and floods during summer, with greater storm surges (IPCC, 2007).

Economic vulnerability to climatic disasters

Natural disasters, including earthquakes, cost 3-6% of China’s GDP. In China statistics showed an 18.2% average annual growth rate of government relief funds for natural disaster from 1962 to 2003, as compared to an average growth rate of 6.9% in the country’s GDP during the same period (ADB,2007). The main reasons for the growth over time are economic development, which increases the exposure, and poor development planning, which increases the vulnerability. (Ye, 2006; Ju, 2006). The majority of multinational investments and assets at risk are in coastal regions prone to damaging floods, tsunamis, typhoons, earthquakes, and land subsidence. The high concentration of physical assets and employees in these areas increases the potential cost of any one catastrophe (Marsh, 2006).

Table 3: Rivers, development, and climate risk

Features	Yellow River	Yangtze River	Pearl River
Population	25m (2000)	76m (2003)	42m (2003)
GDP USD Bn	59 (2000)	274 (2003)	241 (2003)
Mega city	Tianjin	Shanghai	Guangzhou
Saltwater intrusion (km)	n.a.	30-50	100
Natural hazards	Flood	Tropical cyclone, flood	Tropical cyclone, flood
Coastal protection (return period)	1/20-1/50	1/50-1/1000	1/20-1/100

Source: IPCC 2007

The GDP of the Yangtze delta in 2003 was 19.5% of China’s total. It is expected that the total GDP of the 3 metropolitan cities located in the Pearl River delta, Yangtze delta and Yellow River delta will represent 80% of China’s GDP by 2050, from around 33% in 2003 (IPCC, 2007). As Table 3 shows, these areas are exposed to flood and storm.

Water scarcity could become a serious issue for industry – firstly from lack of water for processing, and secondly from lack of power – either hydropower due to lower river flow, or thermally generated power, due to the lack of cooling water. In principle, water could be diverted from agriculture, but that could cause major social unrest due to food prices, and also there could be major health problems with lower river flow. By 2010, four coastal provinces, representing 25% of China’s GDP, will face a gap of 16.6-25.5 billion m³ of water per year. Companies are not factoring water risks of purification, pollution, and availability into their business decisions. (F&C Investments, 2008).

Other hazards like sandstorms and snow/freeze are also significant. In 2008, the severe winter cost China over 21 billion USD (Munich Re, 2009).

While the government has proposed a wide range of measures to deal with climatic impacts, e.g. planting mangrove forests to reduce the impact of typhoons, and prevent erosion, it has not considered insurance (NDRC, 2007). This is in contrast to India, where the government has been impressed by the success of micro-weather derivatives, and also UNFCCC, which is seriously considering how to incorporate insurance as a tool for developing countries to adapt to climate change (see Chapter 13). Multilateral finance institutions like the World Bank have also pointed out that ‘hard’ defences to deal with flood are very expensive and often ineffective. In the long run, dam construction and public relief encourage the population to accumulate by the river grow, while risk-based flood insurance possibly discourages it. (ADB, 2007)

¹ A supertyphoon is equivalent to a category 4 hurricane or stronger

² El Nino Southern Oscillation, or El Nino

Emissions mitigation

China argues that The West has higher emissions per head than her, that The West has produced much more GHGs cumulatively too, and that much of China's emissions are for the benefit of The West, since they are 'embedded' in exports. However, the new reality is that China has become the largest national source of GHGs, has a growing middle class, and has a higher emissions per head than the long-term sustainable level for the world. At 5 tonnes of CO₂ per person, it is well above the long term sustainable level of 2 tonnes per person, and is fast catching up with the EU at 8.6 tonnes per head (The Climate Group, 2008).

Without China's involvement, international efforts to mitigate global warming substantially are unlikely to succeed. In fact it is a red herring that China is refusing to take on binding emission limits. China knows that it will be one of the countries severely affected by climatic changes like drought, and she has implemented a range of policies to reduce emissions already. What she wants is firm action by The West, including the US, and assistance with clean technology, since the R&D is very expensive for technologies like CCS, and much of energy used in China is in the production of exports and infrastructure, not domestic consumption.

The energy intensity of China's GDP is falling, due to the introduction of clean/more efficient energy plant and higher added value. A wide range of policies have been introduced that help to achieve the goal of less emissions: strict population control, afforestation, a 10% target for renewables as a proportion of primary energy, and many regulations to make industrial processes, energy technology, agriculture and forestry more climate-friendly (NDRC, 2007). Already China is a leading country in wind power and solar energy. On the other hand, energy-intensive companies are vulnerable to new government policies to curb emissions. Companies will therefore be better positioned if they adapt their products and business practices to these new constraints (F&C Investments, 2008).

Business issues

More than 90 percent of multinational companies say that China is important to their global strategies, with 52 percent calling it critical. The promise of low-cost manufacturing remains one of the primary reasons companies look to China as a sourcing base (Marsh, 2006). As noted earlier, there are serious threats from natural hazards, and potential logistical bottlenecks at ports.

An amusing, but nevertheless important insight into the EU's dependence on China, came to light in 2005 (see Box 6). In this case the interruption of supplies was due to a trade quota, the sector that was affected was retail and clothing, and the supply was restored by some nifty redrafting of regulations. However, the same problem might occur as a result of natural disasters closing major Chinese ports, or reducing the supply of water for manufacturing, with much more serious consequences.

Disaster planning and business interruption have been seriously neglected in China and in Asian risk management overall. One survey of European company operations in China said just 21 percent said they had full business continuity management plans in place. Another survey of Asian suppliers of European companies revealed that only 28 percent of the survey respondents were fully prepared for – and could maintain business as usual in the event of – a natural disaster affecting one of their key facilities or suppliers. More than half said that they have some contingency arrangements in place, but that operations and suppliers would suffer significant delays if a natural catastrophe hit. One-fifth of those surveyed said they had no contingency plans at all.

BOX 6 Chinese supply is vital at bottom

In August 2005, leading retailers including H&M, Marks & Spencer, BHS, Debenhams and John Lewis – which rely increasingly on inexpensive clothing imports from China – warned that with new import quotas blocking pre-paid shipments, prices could rise and stocks might be affected. Concern was expressed over a serious knock-on effect for the Christmas shopping period, with significant effects on turnover and profits.

As reports multiplied of 'trouser mountains' and huge stocks of pants, bras, dresses and other garments languishing in European ports, and retailers frantically sought alternative suppliers, the European Trade Commissioner Peter Mandelson criticised the "shrill and hysterical" response, but he was forced to revise the terms of the controversial textile-quota deal he had negotiated with China to avert a possible trade war.

Loss control is weak, and valuations are often too low. Many local Chinese contractors have acquired the skills and capabilities to meet the construction requirements of multinational companies that build new facilities or expand existing ones, but they often leave projects uninsured or inadequately insured (Marsh, 2006). Numerous examples of poor quality control and product recall confirm the generally poor standard of risk management (Munich Re, 2007).

Insurance market

Though it has made considerable progress in implementing its commitments under the WTO, China is still lagging in the area of restrictions in the financial services area (Marsh 2006). Nevertheless, the Chinese insurance market became the tenth largest in the world in 2007 at \$92.5 billion, despite very low penetration (\$70 per capita expenditure versus \$608 world average, or 2.9% of GDP against the world average of 7.5% (Swiss Re, 2008). Further developments to be expected include less onerous regulations on foreign shareholdings, product design, foreign exchange, and investment (Benfield Group, 2006). Insurers are finding it hard to find the necessary skilled personnel and competent distributors (PWC, 2007).

A virtual explosion of property values, though the majority of this in areas exposed to natural hazards, is making this market very attractive to overseas insurers. In the Chinese domestic market the perils of Typhoon and Flood are included in most Property and Engineering policies without limitation mainly due to competition enhanced by the growth of foreign competition. This extends into CAR covers, since buildings under construction make up a significant portion of insured properties in China. In the hazardous but economically dominant region of Southeast China, insurers do not wish to risk losing market share by restricting operations in this area. Potentially this is a trap for reinsurers, since simply rating on the original premium will understate the risk. None of the domestic insurers are rated by international rating agencies like A.M.Best, Standard & Poor's, or others, which raises questions about their potential inability to pay a claim (Marsh, 2006).

The economic loss potential on typhoons already rivals Japan, and lies at about half the value of Europe (see Table 4). The low insurance penetration means that it is not a capacity issue. However, the absence of insurance must mean that there are serious risks for companies operating in the region, or which are dependent on suppliers there.

Table 4: Natural disaster potential

Country	Hazard	Economic loss (\$B)	Insured Loss (\$B)	Insured penetration (%)
China	Earthquake	107.0	1.0	1
	Flood	27.5	1.7	6
	Storm	33.4	3.0	9
USA	Storm	165.0	100.0	60
Europe	Storm	60.0	35.0	60
Japan	Storm	30.0	15.0	50

Source: Swiss Re 2006 ABI 2005

As with many other markets, life-related premiums are about 60% of the market. There is strong growth potential, given the Chinese propensity to save. In the light of issues like SARS and chicken flu, there is also clearly potential for a large exposure, which might be exacerbated by climate change through natural disasters or poor water quality and availability or the spread of diseases into new areas.

Renewable energy facilities offer a strong new market also. The most developed arm is wind energy. Insurance is broadly available with domestic markets in China but suffers due to intense competition leading to price cutting and does not provide adequate cover in respect of revenue stream protection during both construction and operational phases, because it simply treats the business as conventional property, and that is inhibiting developers' access to debt financing. There is scope for a facility to provide specialised cover and investment-grade risk transfer, but it would need a different marketing approach to establish it, by working with other stakeholders like manufacturers, and educating local insurance companies (Marsh and Ascot Renewco, 2008).

Conclusions

Climate change will intensify the existing environmental stress of air and water pollution and soil degradation, through more heatwaves and droughts, which will worsen desertification and water scarcity in northern parts. Sea-level rise and typhoons

will threaten the economically significant and populous east coast. It is conceivable that the government's capacities could be overwhelmed by the rapid pace of modernization, environmental and social crises and the impacts of climate change (WBGU, 2008). However, the Chinese government is taking determined action to deal with climate change, in terms of adapting to the impacts, and reducing emissions (NDRC, 2007).

The economy is dynamic, but the business community is unsophisticated in risk management, and this is reflected in the local insurance market. This means that the potential for catastrophic losses is underplayed, which could adversely affect not just companies and consumers in China, but also the whole of the subsequent supply chain. Insurers and intermediaries involved in the local market, or providing business interruption cover to western companies sourcing supplies from China, need to recognise this. There is scope for the insurance industry to play a more active role in helping China to deal with adaptation, through micro-weather derivatives for example, and in mitigation, with specialist products for renewable energy for example.

2.8 Summary and recommendations

Climate change is continuing to progress strongly. The potential for major economic disruption due to climate change is increasing fast due to unmanaged economic development (much as the derivatives crisis developed due to lack of controls). Major dislocation could arise within twenty years. Insurers need to monitor their exposures closely, and should point out these dangers more forcefully as markets could become uninsurable.

Political will is still lacking to take firm domestic action on emissions in the EU. Adaptation has been ignored, and it is unclear how developing countries will be assisted under the UNFCCC, to assess and reduce risk, and finance recovery. Insurers should press for firmer emissions action, and work more closely with policymakers to develop effective solutions for financing disaster risk.

The World Economic Forum's message is mixed, with climate change presented as a strategic risk, but with low costs over the next 10 years. They should consider altering their analytical approach and presentation. For insurers, corporate attitudes to climate change are of concern, since stewardship of the issue is not taken high enough, and risks are underestimated. Underwriters and investors need to make this plain to the corporate world.

CII and PFS members believe that manmade climate change is real and is affecting their industry. They consider it in many of their decisions, and believe the industry should take a more active role on the issue. They believe that the effect will worsen, and that customers face tougher terms and possibly withdrawal of insurance. Those directly involved with general insurance have a higher perception of the risks. Actuaries also believe climate change is real, but are less convinced that it will affect their work, and do not support a more active role by their profession at present. Fund managers largely ignore climate change, and take their direction from investor mandates. At corporate level, European and particularly UK companies are alive to the issue of climate change, in strong contrast to North American and developing country insurers. However, most insurers treat the issue in a defensive way, rather than providing client information and more relevant products and services.

After a sustained period of growth and a return to profit, the insurance industry is facing financial stress from the credit crunch. Improved IT is reinforcing the trend to new forms of distribution like direct and affinity groups. Cost pressures may put insurers in a position where they are unable to sustain service after a climate catastrophe. Regulatory changes like Solvency II are potentially helpful, but they rely on the quality of risk analysis, which may be inadequate in respect of climate change. Insurers should review their disaster capabilities, and their exposure to extreme events carefully.

The Chinese economy is dynamic, but the business community is unsophisticated in risk management, and this is reflected in the local insurance market. This means that the potential for greater weather losses from climate change is underplayed, which could adversely affect not just companies and consumers in China, but also the whole of the subsequent supply chain. Insurers and intermediaries involved in the local market, or providing business interruption cover to western companies sourcing supplies from China, need to recognise this. There is scope for the insurance industry to play a more active role in helping China to deal with adaptation, through micro-weather derivatives, for example, and in mitigation, with specialist products for renewable energy, for example.

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Annex to Chapter 2, Section 2.5

A total of 5,443 responses were received by the cut off date in December 2006 – around a 6% response rate, which is very high for this type of survey. Earlier surveys had elicited responses from 896 people in 2000 and 285 in 1994.

The survey started with a questionnaire being e-mailed to all 90,000+ CII members plus those who had expressed an interest in CII issues and for whom the CII held an e-mail address, mainly the Personal Finance Society (PFS). Of the 2006 responses, 3,097 were CII members, 501 non-members, 905 were PFS members and 940 non-PFS members (but likely to be involved in life insurance and financial services rather than in general insurance). Some of the key points from the 2006 survey are set out below (questions were answered by all 5,443 respondents unless shown otherwise). Our thanks go to Metra Martech for processing the survey data.

- 86.5% of those polled agreed or strongly agreed with the statement that, ‘There is a noticeable human influence on the global climate system’, while only 3.6% disagreed. This question was also asked in 2000, when 82% agreed and 5% disagreed, illustrating that the general consensus is now that there is a human influence on global climate change.
- 78.4% of CII respondents answered ‘Yes’ to the question, ‘Do you believe that changes in weather patterns have resulted in more insured weather losses?’ Of those outside the UK, 84.3% said ‘Yes’. When this question was asked in 2000, 81% of all respondents said ‘Yes’, including 88% of non-UK respondents. This as an area where PFS members differed significantly; only 62% of them thought losses had increased due to climate change.
- Longer term, most people in the industry believe that climate change will have a significant effect on their home market, although that figure has fallen since 2000.

Percentage of respondents believing that, accepting that the climate is changing, there will be significant or considerable change on their home insurance market:

		2000	2006 (CII only)	2006 (PFS only)
In the next:	5 years	43%	31.1%	25.2%
	15 years	82%	77.2%	64.6%

- A very high proportion of respondents believed that their home insurance industry should take steps to counter the growth of greenhouse gases, with little difference between CII and PFS samples.
 - Encourage policyholders to use/produce fewer emissions: 80.8%
 - Use less energy or green energy corporately: 85.5%
 - Invest in emission reducing technologies or companies: 76.3%
 - Use climate-friendly suppliers: 82.1%
 - Campaign for stronger emission limits: 68.1%
- We asked whether respondents had personally changed their behaviour in any significant way because of climate change. Again, there was little difference between CII and PFS members. The percentage answering ‘Yes’ was:
 - Using less energy or green energy: 78.1%
 - House purchase/location: 16.6% (CII 18.5 %, PFS 12.5 %)
 - Travel decisions: 39.1%
 - Other purchases: 58.9%
 - Investment decisions: 17.9%
 - Work decisions: 26.6%

6. There was a wide variety of views on the question of, ‘To what extent do the following pose threats to your home insurance market in terms of their cost and effect on property insurance?’ The table below shows views on the perceived threats, with 1 representing the least threat and 5 the most threat (it should be noted that the survey took place before the floods of 2007):

Risk	1	2	3	4	5	Don't know	Average score (out of 5)
Drought/subsidence	15.9%	18.7%	22.7%	19.5%	10.5%	12.7%	2.9
Freeze	26.9	27.8	20.5	8.9	2.2	13.8	2.2
Severe windstorm	6.4	13.4	26.8	28.5	13.4	11.5	3.3
Coastal floods	15.4	8.7	16.8	24.6	23.7	10.9	3.4
Local weather extremes	8.6	14.1	22.8	23.8	18.8	11.8	3.3

7. Looking at more specific effects, we asked, ‘In the insurance market, which of the following do you think will result from possible effects of climate change in the next 5 years?’. In most cases CII and PFS views were similar. However, overseas members differed, being significantly more concerned, especially over losses, and reinsurance. The percentage of respondents ticking each item was:

	All	CII	PFS	Overseas
• Increased underwriting losses on property business	49.2%	53.7%	40.4%	58.1%
• Withdrawal from certain geographical areas	27.8%			33.0%
• Price increases	71.1%			69.5%
• Cover changes/restrictions	59.9%			63.8%
• Insolvencies	17.0%			22.3%
• Government intervention	26.5%			34.7%
• International reinsurance cost/capacity	35.6%	40.1%	26.7%	57.0%

8. Looking longer term, we asked the same question, but based on the situation in 15 years time. This timescale (to 2021) broadly ties in with a similar question asked in 1994 and 2000 (when we looked to the year 2020), so the table below compares responses for each of the three surveys we have undertaken to date:

Issue	1994	2000	2006 All	CII	PFS	Overseas
Increased u/w losses on property business	49	82	57.9	62.8	48.4	58.1
Withdrawal from certain geographic areas	48	60	65.4	68.3	59.8	61.2
Price increases	58	89	50.5	53.1	45.6	47.5
Cover changes/restrictions	54	82	52.3	55.8	45.5	50.2
Insolvencies	15	41	44.4	46.9	39.6	53.0
Government intervention	28	53	57.2	60.8	50.0	56.6
International reinsurance cost/capacity	49	75	55.7	60.1	47.2	54.4

9. We asked, ‘Has your organisation adopted any of the following strategies to manage the effects of climate change?’ Responses in 2006 have been compared with those given to the same question in 2000 and we have only looked at CII members (3,598 respondents), rather than all respondents:

Strategy	2000	2006
Accumulation control	32	25.6
Differential rates/excesses	27	22.2
Monitor/join in the debate on climate change	25	19.5
Surveys	31	24.8
Reinsurance/alternative risk financing	25	19.2
Better maps	18	19.9
Other	3	5.4

10. Finally, we asked respondents: ‘What practical steps do you think your home insurance industry should pursue to reduce the effects of climate change?’ Responses were:

	1994	2000	2006 All	CII	PFS	Overseas
• Research on weather patterns	74%	73%	49%	57%	34%	61%
• Studies of vulnerable areas	74	73	56	62	44	58
• Education/PR about natural hazards	45	55	44	50	33	58
• Government backed catastrophe pool	27	40	39	45	28	44
• Tax allowance on catastrophe reserves	55	29	32	34	28	33
• Improved claims control	36	42	30	34	21	41
• Restriction on risk acceptance	35	22	21	24	14	34
• Emphasis on risk management	70	73	45	54	29	59
• Alternative risk transfer	n/a	27	20	24	11	35
• Closer co-operation with authorities for planning and construction standards	67	68	51	56	41	55
• Other	1	2	3	3	4	3

Biography

Dr Andrew Dlugolecki

Andrew spent his salaried career with General Accident (now part of Aviva Group), starting in 1973 as a statistical analyst. Early projects included the effect of weather on motor and property claims. There followed a variety of interesting jobs at senior level, including managing the UK branches, and then emerging countries. A merger in 2000 led to a change in corporate direction, and departure for him.

When scientists started to investigate the economic implications of climate change in 1988, they asked various industry associations to identify experts to work with them. The British Insurance Association nominated Andrew, and he continued this “sideline” even as he worked in other areas, and then as a second career after he left Aviva.

Andrew’s work on climate change covers three major aspects. Firstly, advice to politicians: he has been the chief author on insurance and financial services in major studies of climate change commissioned by the UK government, the EU, and of course the Intergovernmental Panel on Climate Change.

Secondly, in education, he has chaired three major studies of climate change by the UK Chartered Insurance Institute (1994, 2001 and 2009). He prepared and mentored modules of an e-learning training package on climate change and finance for financial institution executives, under the auspices of UNEP Finance Initiative (UNEPFI). He often gives talks and writes articles.

Thirdly, he continues to be active with business clients. He has been an advisor to the Carbon Disclosure Project and the UNEP Finance Initiative since 2000.

Andrew’s qualifications include degrees in pure and applied mathematics, and a doctorate in applied economics. Among his affiliations he is a Fellow of Chartered Insurance Institute, and a visiting Fellow at Norwich University’s Climate Research Unit. When IPCC received the Nobel Peace Prize in 2007, Andrew was one of those cited who had “contributed substantially” to their work.

Peter Bolster

Peter started his career with Generali in 1982 and, after spending time with a number of brokers, joined R J Kiln as part of the claims team in 1987, handling all classes of primary, excess and proportional non-marine claims. In 1999 he left Kiln and spent the next eight years conducting assignments for British, American and Canadian clients whilst working at Northshore International, Capita and also as a member of Veritas Consulting LLP. This involved conducting reviews throughout the UK, and also in Scandinavia, the Middle East and the USA.

Peter obtained his ACII in 1992, graduated in Business Administration at Kingston University in 2008 and is currently with Amlin plc at their St. Helen’s office in the City.

Biography

Andy Couchman

Andy is one of the leading commentators on the UK's health and protection insurance and mortgage markets. Co-author of the annual Protection Review book and monthly HealthCare Insurance Report newsletter, he also holds a number of editorial positions with specialist industry publishers and authors two of the CII's exam textbooks as well as online and other publications. Andy has written a number of books and reports on the industry, writes in the trade press and is a regular speaker at industry conferences. As a consultant, Andy works with many of the leading names in the insurance and mortgage sectors.

In 2007 he was voted one of the top 20 most influential people in protection insurance over the previous decade by his peers for Cover magazine.

A past secretary to the CII's Society of Fellows, and past president of the Insurance Institute of Swindon, Andy has been involved with the CII's work on climate change since the mid 1990s. Professionally, Andy is an FCII, a Chartered Insurance Practitioner and also holds the Certificate in Financial Planning.

He is managing director of Bank House Communications Limited. Before setting up this company in 1995, Andy's career was primarily in product development, where he managed a number of market leading insurance and mortgage products and services.

His website is at www.andycouchman.com.

Alan Milroy

Working as an Property Underwriter for in excess of 20 years Alan has seen the growing importance of Weather based risk to the bottom line from both a domestic and international standpoint. In the last 5 years this has taken on even greater emphasis with the potential to drive the insurance cycle.

In 2005 he attained a post graduate at University College London in Natural Hazards for Insurers run by Benfield Hazard Research which looked closely at many of the issues associated with climate change taking the scientists view.

The Insurance Industry needs to understand the full implications and wider issues of climate change. How this will significantly affect its business model both in the long and short term considering new business trends, changing risk profiles and growing accumulations.