



# Coping with climate change

risks and opportunities for insurers

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# Executive Summary

## Executive Summary

The world's climate is changing, due mainly to human behaviour, and the effects are predicted to intensify progressively. Already the insurance industry is faced with significant challenges, such as the increase in flood risk in the UK. However, the need to manage climate change risks effectively, and deploy clean technologies to avoid further global warming will increase the demand for insurance products and services, and presents the industry with numerous opportunities.

The Chartered Insurance Institute's third major study into the effects of climate change for the insurance sector looks at strategic issues that face the insurance industry from the perspective of UK-based insurance practitioners, including the London Market, and in critical areas of developing countries. Building on previous works on climate change by the CII, in 1994 and 2001, the study considers how climate change affects all aspects of the insurance industry, including its core functions of underwriting, claims handling, investment, and management and examines the implications for customers in key market segments. It takes account of current scientific research in the field, relevant political initiatives, the recent experience of the insurance markets and developments in the global economy.

The research was undertaken by a voluntary study group of qualified insurance practitioners and scientific experts in the field, led by Dr Andrew Dlugolecki. The group liaised with other relevant bodies such as the UK Climate Impacts Programme and the Association of British Insurers, in the course of their review. The CII also sought the views of its members via a survey to establish their perspective on climate change and how it affects their professional working practices.

Climate change presents the insurance industry with new challenges in two dimensions:

1. adaptation to changing weather patterns and other environmental effects; and
2. mitigation policies to reduce emissions of greenhouse gases (GHGs).

Both issues are creating new risks and opportunities. The insurance industry can play an important role in dealing with both of these, but it needs to take on a more proactive role and collaborate with other stakeholders to prevent some risks becoming uninsurable, and to take advantage of new markets.

## Key findings

The study identifies how various customers of insurance can be affected, such as SMEs, the construction industry, farming and forestry, as well as consumers. It then highlights best practice so that individuals and organisations can manage risk more effectively. Some of the key findings are:

The IPCC's Fourth Assessment Report (AR4) concludes that **warming of the climate is “unequivocal”, and further increases in temperature are inevitable.**

Further advances are expected to improve the precision, and will probably be more pessimistic. It is important that underwriters recognise that climate risk has already increased. **(Chapter 3)**

**Catastrophe models** have become increasingly important as the scale of weather losses has risen, yet they often differ considerably.

In the current situation, best practice entails using a number of models and cross-checks, backing up exposure management with rigorous quality control to ensure that the data is good, and micro-modelling to refine the models' parameters. The way ahead is dynamical modelling, using the current climatic status to initialise probabilistic predictions for more accurate short-term and seasonal forecasting, but that will require far more computational power. **(Chapter 4)**

Climate change increases the possibility of **insurance market failure**, particularly due to events outside Europe.

The most obvious risks are from extreme weather – global warming may be compounding catastrophe losses by two percent per year. Social disorder and international tensions could also deteriorate to the point where substantial markets become uninsurable. Another potential problem is 'claims contagion', when systems cannot cope with the sheer volume of work. There is a need for an independent index of market robustness which would indicate the aggregate degree of coverage, the collective vulnerability to catastrophes, and the overall capacity to manage a disaster claims situation. **(Chapter 5)**

Two major innovations in the area of **alternative risk transfer (ART)** products offer the potential for major new insurance markets associated with climate change: catastrophe bonds and weather derivatives.

To exploit these markets, better weather data is required. If insurers volunteer their expertise in risk transfer, this may prompt the public sector to provide the information, with benefits for all stakeholders. **(Chapter 6)**

In light of the end of “flood-for-all” cover in the UK in 2013, insurers need to speedily refine their underwriting of **flood risk** to avoid anti-selection.

Insurers should press government to make flood-resilient construction mandatory in new developments, and after major flood damage, and lobby for sustainable solutions to flood risk, such as water management schemes, sustainable drainage systems (SUDS), resilient domestic construction and demountable defences. Individually insurers should promote these measures with their policyholders and intermediaries. **(Chapter 7)**

Two issues that have been neglected relate to **extreme flood risk**.

New information on reservoir and dam burst risk is becoming available to underwriters. Secondly, the industry as a whole should consult with government on the issue of coastal erosion risk and whether insurance products could assist with funding it. **(Chapter 7)**

The UK has not experienced a **major storm** for years. Recent research casts doubt on the ABI's projections that winter storm costs in Europe might be just 5% higher by 2080 due to climate change – other studies suggest 25% or 35%.

The likelihood of more vulnerable fitments on buildings, heavier rainfall, and a major storm surge, are all factors that would magnify the losses. Insurers should ensure they can cope with the sort of problems revealed by Hurricane Katrina, by stress-testing their claims disaster plans periodically. **(Chapter 7)**

**Small and medium sized enterprises (SMEs)** are not prepared for the impacts of climate change, despite the fact that the smaller the business the more vulnerable it is to climate shocks.

Most SMEs expect the emergency services or government agencies to assist them in an extreme event like flooding, but post-event surveys show that their insurers provide the most help. Insurers and intermediaries can do more to help this sector deal effectively with climate change by providing appropriately tailored products and services. **(Chapter 8)**

**Major companies, too, are vulnerable to climate change due to the employment of sophisticated technologies and systems, and the location of facilities and suppliers in developing countries.**

Insurers need to train their underwriters and risk engineers to be expert in assessing climatic risks on a site-specific basis. Underwriters should note that emissions regulations are likely to create new, potentially insurable, assets and liabilities for major companies. Also, companies may alter their processes and products to cope with climate change, and this can produce a significantly different risk profile. **(Chapter 9)**

**Climate change may affect liability risk.**

Insurers' clients may be exposed to claims that they did not reasonably foresee the possibility of weather-related damage (direct-link). Insurers should identify high-hazard categories, e.g. construction industry professions, and require policyholders to undertake regular climate change risk assessments, both on a business-wide basis and for specific projects. Secondly, claimants may argue that the release of GHGs by an insured party has caused the global atmospheric system to change, with deleterious effects upon themselves (indirect-link). While it is most unlikely that companies will be held liable for climate change or resultant damage, litigation could still be expensive and damaging to reputation. Underwriters should therefore satisfy themselves that major policyholders are pursuing responsible business policies. **(Chapter 10)**

Those involved in **personal finance and mortgages** need to acknowledge climate change risk more openly in their guidance to clients, both in regard to reinsurable impacts, but also in respect of the numerous sustainability issues that climate change will introduce to property valuation factors. **(Chapter 15)**

Globally the insurance industry has **assets** under management of 55 trillion USD. These assets will both be impacted by and have an impact on climate change, yet this factor is still largely ignored. For equities, the best strategy is likely to be a combination of monitoring, engagement with companies, and 'climate-responsive' investment. Generally, investors can be more effective in collaboration with others, due to the disparate nature of share-ownership. Working practices also need to change, to ensure that the market can deal with a long-term issue like climate change – this means different terms of trade, remuneration structures, and education. **(Chapter 16)**

**Tradable permits for GHGs and emission reductions projects form the backbone of the emerging carbon markets.**

Brokers and insurers for large industrial clients should investigate the potential for risk transfer products in this growing market, in both the underlying project activity and in the permits themselves. **(Chapter 17)**

## Sectors

The study examines four sectors particularly affected by climate change through impacts and government policy: construction, energy, farming and forestry, and tourism and leisure. The key findings are:

**Construction:** many developments are planned in hazardous zones like flood plains or drought-prone regions (both in the case of the Thames Gateway), and in themselves are so great that they are creating local ‘construction climate change’ or 3C, such as changing water-tables.

At the same time, the use of new materials to reduce the carbon footprint alters vulnerability to other perils such as fire. Insurers must engage in construction projects early to ensure that planning and design addresses these risks. **(Chapter 11)**

**Energy:** oil and gas exposures will increase as exploration enters more hostile environments, so insurers need to intensify their risk assessment, for individual installations, and on the portfolio level.

To insure the growing renewable energy (RE) market, underwriters need to learn fast about new technologies and locations. The market could provide breakdown cover and design risks, as well as specific products, e.g. weather derivatives for wind farms. Many RE projects will be small scale, e.g. combined heating and power (CHP). This offers opportunities to smaller insurers to provide customised products. **(Chapter 12)**

**Farming and forestry:** climate change affects growing conditions. In addition, the sector is a major source of and ‘sink’ for GHGs.

Insurers need to be alert to changes that farmers introduce to combat climate change, as well as changes in the climate itself. Better communications technology has improved the possibilities of insuring growing assets when combined with index-based insurance products like weather derivatives and catastrophe bonds. **(Chapter 13)**

**Tourism and leisure:** turnover is very sensitive to weather conditions.

Such risks could be transferred by products like weather derivatives. Travel insurers will need to ensure that they have facilities in place to cope with new destinations and weather-related problems, as well as reviewing their product terms and reinsurance accordingly. **(Chapter 14)**

## Implications

### Adaptation

Climate change is already here, and will have an increasing effect on the economy and the natural environment. Within decades, glaciers are projected to decline, reducing water availability for billions of people and enterprises. At the same time, heavy precipitation events and sea-level rise will increase flood risks. The most vulnerable areas include the mega-cities of China, South Asia and Africa.

In North America, a key risk area for insurers, scientists expect a period of increased hurricane activity. Combined with population growth and the rising value of infrastructure in coastal areas this means increased losses are likely. The hurricane season of 2007 was again an active one.

European regions and economic sectors will be affected in two ways; by the knock-on effects of impacts in other regions, such as migration, and commodity prices, and supply chain disruption, and directly by extreme weather here. The European floods of 2002 and heatwave in 2003 are consistent with a trend to more frequent extremes. In the UK, the return period of extremely hot months has shrunk from once a century to once in 12.5 years, while rainfall patterns have changed adversely.

Climate change is already affecting insurers through increased claims. The insurance industry needs to prepare for this continuing trend. At the same time, proactive insurers can help other stakeholders to adapt to climate change more effectively. Some key issues are:

- **Risk information:** access to public information about climatic hazards and exposure is often expensive and difficult. The public sector should provide this data to stakeholders, including insurers, as a matter of course.
- **Risk assessment:** estimates of future risk need to incorporate climate as a dynamic component. Climate change is already happening and major changes are anticipated in the future. Risk management should consider a range of climate projections, not rely on single model output.
- **Loss prevention:** insurance products could be designed more effectively to encourage risk management by at-risk policyholders. Restitution after loss is an effective time to implement risk improvements.
- **Pricing:** terms, whether multi-risk or single-peril, should always reflect the underlying climatic hazard.
- **Risk transfer:** non-indemnity products like weather derivatives and cat bonds offer a way to deal with climate variability in many sectors.
- **Reinsurance:** insurers should calculate their flood exposures with an allowance for a steady “climate change” increase of 2 to 4 per cent per year, apart from other factors. In addition they should load their storm and flood exposure by a significant “super-catastrophe factor” of around 30 per cent for storm, and 50 per cent for flood. Insurers should consider reinsuring their subsidence risk as it will become more peaky. Treaties for flood and storm should incorporate an aggregate clause, to cope with the expected increase in the frequency of events.
- **Loss analysis:** when handling claims can provide valuable ‘field’ experience to determine future design and work guidelines for construction and contingency planning.
- **Vulnerable segments of society:** they often lack access to insurance. Insurers should promote simplified products for landlords to distribute through “pay-with-rent” schemes. Collectively, insurers should press Government to recognise the fact that the vulnerable need to budget for insurance in their limited expenditure.
- **Developing countries:** there is tremendous scope for insurance to assist developing countries to adapt to climate change, through innovative techniques like microinsurance and indexed insurance products. However, it needs a kick-start from the public sector to provide risk data and appropriate regulatory frameworks for the weak financial sector in those nations.
- **Investment:** investors are exposed to climate risk in high-risk countries and regions like coastal zones through assets like real estate, corporate securities, and possibly government bonds. Some sectors like water treatment and construction can be expected to benefit.

## Mitigation

Government policies at all levels will become increasingly stringent in order to achieve cuts in GHGs of 50% globally by 2050, and as much as 80% in developed countries like the UK. This can only be achieved with a comprehensive framework like ‘Contraction and Convergence’ that embraces all countries fairly. Insurers can play a part in helping mitigation policies to be more effective. Key issues are:

- **Product design:** insurers and advisers can guide clients towards climate-friendly products and processes through pricing and other features, although this will be difficult until government policies are clearer.
- **Risk transfer:** insurers and advisers can assist the growth of clean energy through innovative risk transfer solutions developed in collaboration with the energy sector. Insurers should collaborate with government agencies and manufacturers to devise liability insurance schemes that will support the development of climate-friendly technologies, that have the potential for catastrophic risk to third parties, like carbon capture and storage, and hydrogen.
- **Procurement:** insurers can potentially influence manufacturers and retailers towards climate-friendly products due to their bulk buying power.
- **Investment:** by working collectively through initiatives like the Carbon Disclosure Project, insurers as investors can influence the corporate sector towards climate-friendly products and processes, and real estate developers towards sustainable design, and at the same time improve their own returns. There are also a number of alternative investment avenues like carbon funds and catastrophe bonds.

## Socially responsible business

Climate change should be tackled within a framework that is meaningful for business and society. The key issues are sustainability, communication and holism. Members of the profession already broadly support these principles.

### Sustainability as a principle

The best-known definition of sustainability is “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”<sup>1</sup>. In terms of climate change, the issue is how to keep GHGs at a safe atmospheric concentration, without destroying the economy. Since climate change affects insurers and their clients in many ways, they should be involved in such issues. Potentially, every insurance process could be affected from claims to product development, resource management and stakeholder engagement.

### Communication

Many insurers have been slow to acknowledge climate change, and to follow up with meaningful actions. Besides fulfilling a social responsibility, proactive firms and individuals can steal a lead on a huge issue. Three groups of stakeholders are vital.

1. **Government** Policy is crucial in the fight against climate change, but controversial and complicated. From a practical viewpoint, collective action by insurers is the best approach, and has been adopted by ABI very effectively on underwriting issues, and by the UNEP Finance Initiative on adaptation and mitigation at the global level.
2. **Customers** Client awareness of climate change is low generally. Communication with clients can alert them to climate change practicalities. For high-impact segments, product development is a priority.
3. **Staff** Poor knowledge of climate change impedes risk assessment and growth opportunities, and will become a reputational risk. Staff awareness can be raised in the context of job training, once business procedures have been revised to incorporate climate change issues, and specialised courses are becoming available for high-level professionals.

<sup>1</sup> Brundtland, G(ed.), (1987), Our common future: The World Commission on Environment and Development, Oxford, Oxford University Press.



### Holism

Since climate change affects so much human activity, there may be unexpected compounding of risk. For example, a property insurer is exposed to extreme events, but so too is a property investor, and also a property lender. A holistic view of the issue is essential, cutting through disciplinary boundaries and organisational silos.

### Survey of the profession

Over 5,400 members of the profession responded to the third survey on climate change, taken in October 2006. Over 86% believe that man-made climate change is happening. One-quarter believe it will have a significant impact on the insurance market within 5 years, and three-quarters by 2020. Many of them already take it into account in their personal and business decisions (for example, 78% conserve energy, 39% consider climate change in their travel plans, and 17% chose their home with climate change in mind). They strongly support measures by their companies such as: use less energy (86%), use climate-friendly suppliers (82%), encourage policyholders to use/produce fewer emissions (81%), invest in clean technologies (76%), and campaign for stronger emission limits (68%).

## Recommendations

### Individual professionals

Professionals should maintain their knowledge of climate change through their selection of CPD material, and should ensure that their advice and work takes due account of the implications of climate change. They should set an example by making their personal consumption sustainable in terms of climate change.

### Market bodies

Professional bodies like the CII should ensure that educational and library material is up to date concerning climate change, and should liaise closely with other relevant professional bodies on sustainability issues. They should be prepared to enter the political debate, and speak out on issues like insurability and mitigation priorities.

ABI and other insurance industry corporate representative bodies should develop holistic positions on climate change, seek to ensure that Government policy is consistent with their views, and keep their own members adequately briefed on policy and impacts. ABI should also ensure that strategic decisions relating to climate risk management are taken after due consultation with insurers.

### Companies

Companies should ensure that they have access to the best available research on climatic change impacts and policies, taking due account of uncertainties. If necessary, they should fund research individually or collectively to ensure that the topics are risk-relevant. They should then brief their staff appropriately to ensure that this knowledge is incorporated into their business strategies, processes, products and services continuously. It is important that periodic, cross-boundary reviews are conducted to ensure a holistic view of climate change risks and opportunities.

Two specific aspects need priority attention:

- Organisations involved in property insurance should review their ability to handle very extreme events.
- Insurers should also review their risk assessment procedures to ensure that the changing probability of extreme events is adequately reflected in product pricing and corporate solvency calculations.