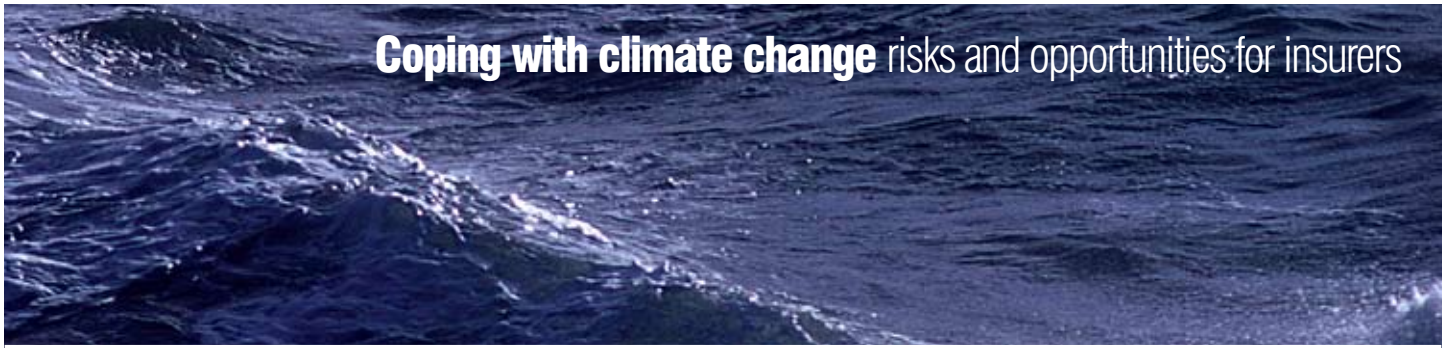


Chapter 10
Liability

10.1 Introduction

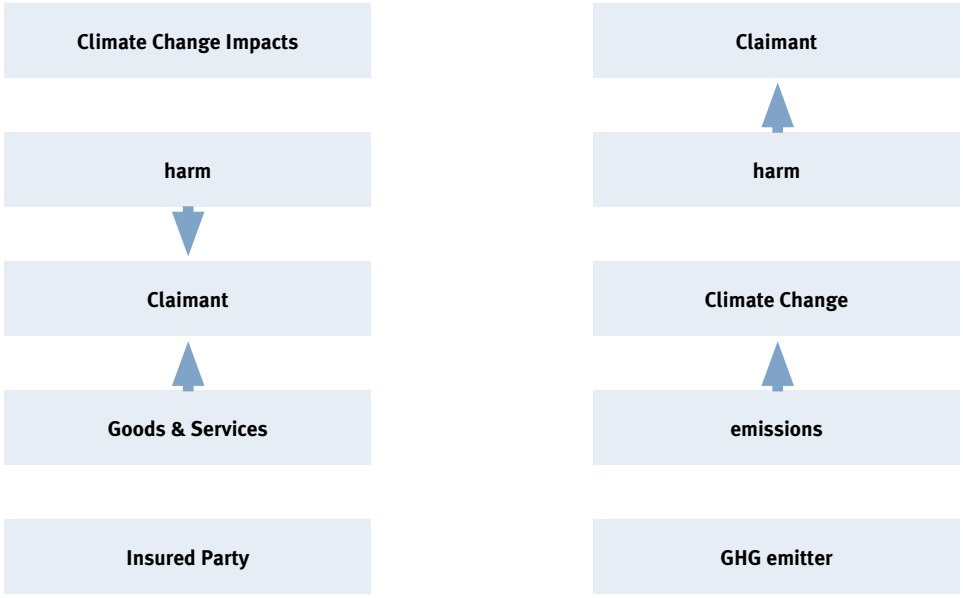
This chapter examines the main issues that liability insurers face from climate change, and makes recommendations for their procedures, and their interactions with other stakeholders like policyholders and politicians.

Two basic types of liability case are possible (see Figure 1). In the first, the defendant exposes a claimant with whom he has a contractual or other direct relationship, to an increased level of weather-related losses by supplying goods or services that are not of satisfactory quality or fit for purpose, e.g. a poor quality of flood defence. Climate change may enter into such cases, because it is now clear that historical weather conditions cannot be taken as the best guide to future experience. In this first category, the defendant is not being held liable for climate change, but for failing to account for it in his transactions. Such claims could affect insurers through a variety of liability products.

The second type concerns cases where a claimant alleges that a defendant has, by causing the release of greenhouse gases, altered the climate to the detriment of the claimant. There is no direct relationship between the two parties. Several cases have been lodged on this basis, mainly in the USA. In general, their aim is not to seek financial remedies, but to establish the principle that greenhouse gases are potentially harmful and need to be reduced. However, there has been an underlying element of seeking compensation. Some believe that using financial liability as a tactic would make governments and corporations tackle global warming faster.

This chapter considers how different parties might incur liability, then discusses how insurance liability products might respond to those situations. This analysis leads to various recommendations for the actors in a liability insurance regime. Finally, the chapter considers the role of liability insurance in supporting the mitigation of climate change.

Figure 1: Climate change liability



10.2 The potential links between climate change and liability

The potential physical effects of climate change are well documented and can all in their different ways have an impact on liability insurance. Damage, disruption and disquiet are set to increase, due to greater intensity and frequency of severe weather events, changing global weather patterns and the continuing rise in sea-level, resulting from emissions of greenhouse gases.

It may be argued that because climate change is gradual and its effects are still unclear in detail, existing market models will be able to adapt and cope. This may in part explain why climate change appears low on the radar of liability insurance (except perhaps D&O), compared to say property. The experiences of asbestos, tobacco (and almost, year 2000) should, however, alert us to what can be the unintended long term consequences of what was initially considered safe activity. We have also seen over the last few years a potentially accelerating trend, with successive Assessment Reports from IPCC painting a darker picture of climate change. Finally, one of the effects of climate change is a disproportionate increase in the frequency and magnitude of extreme events: this is to be expected (see Chapter 3), but very often it is ignored by experts, professionals, and managers.

These trends mean that the likelihood of accidents and mistakes will increase, because conditions will be different from those that were expected according to historical experience. In the circumstances, anyone supplying goods or services, or managing or owning assets or operations, could be held responsible for a third party's loss when weather-related factors are involved in a loss that stems directly from association with those operations, assets, goods or services. We term these circumstances **direct-link situations.**

In addition, parties may argue that the release of GHGs by a third party has caused the global atmospheric system to change, with deleterious effects upon themselves, either now, or potentially as trends worsen. In these **indirect-link situations**, the injured parties may attempt to seek compensation from the emitter(s).

When considering liability insurance it is also necessary to look at the broader socio-economic, legal and political background. Public awareness, availability of first party insurance or other compensation schemes, changes in the law and political drive will all affect the potential for liability claims. For example, if, because of climate change, perils' cover is reduced or more tightly defined then uninsured first party damage could become a potential liability claim against say the designer, constructor or property owner.

It is also necessary to consider action that may be taken by governments, public bodies and private enterprise to reduce or avoid the impact of climate change which could create new or modified exposures. We are already seeing the accelerating move to bio-fuels, wind farms and other environmentally sustainable energy sources, the drive for clean technologies and the re-evaluation of nuclear energy. All of these will present new challenges to the liability insurer. Only time will reveal what unintended consequences will result; targets for the use of bio-fuels have increased world market prices of staple crops, affecting food production and causing the opportunistic removal of tropical rainforest[1]. There is currently (in 2008) a surge in fossil fuel prices; but potentially regulations to reduce emissions will make such operations less profitable. Can this reversal be deemed to be foreseeable?

The key issues that are relevant to the operation of a liability insurance cover are: cause, contribution, foreseeability, public policy, duty of care, contractual obligation, type of loss, location, and date of occurrence. First we shall consider these in direct-link cases, before examining the indirect-link situation.

10.3 The liability "triggers" in direct-link situations

Few would have foreseen the impact of adding subsidence and landslip cover to domestic policies in the early 1970's, largely as a result of lobbying by Building Societies. Subsidence claim numbers have doubled since 2002 according to the ABI and the cost in 2006 exceeded £300m[2]. Clearly the primary cause relates to dry ground conditions and adequacy of foundations but there has been considerable activity in pursuing recoveries against other parties including local authorities, neighbouring occupiers, engineers and surveyors. These recovery actions often go back over a number of years and multiple policies. Perhaps there is a potential pattern here for climate change actions, quite apart from the likely further increase in subsidence claims if dry summers become more frequent?

Cause

A distinction has to be drawn between cases where there is a direct link between claimant and defendant, and cases where the link is indirect, through the alleged effect of emissions released by the defendant on the general atmospheric system. In direct-link cases, it is necessary to demonstrate that:

i. a loss was suffered either from the impacts of weather or from actions related to climate change by governments or other agencies, such as emissions restrictions, and that

[1] Sustainable Bioenergy: A Framework for Decision Makers. UN Energy Publication April 2007

[2] Halifax Home Insurance Press Release 11 April 2007

ii. the defendant's failure to factor such weather-related conditions or regulations into the design or construction of the product/structure/service caused the claimant's loss.

Whilst the claimant's own conduct might result in contributory negligence, it will not relieve the defendant of liability unless the claimant's action is so significant it was that that caused the loss.

Contribution

It may not be possible to demonstrate sole cause but it may be possible to establish that a number of parties have contributed to the cause possibly over a number of years. The experience of subsidence may again prove useful here, where the courts have shown a willingness to consider contributory liability. They have also been willing to apportion that liability where damage has occurred over a number of years and there has, for example, been more than one occupier responsible for a tree. The concepts of continuing nuisance, notification and responsibility for damage was fully reviewed by the House of Lords in Delaware Mansions Limited and Others v The Lord Mayor and Citizens of The City of Westminster.[3] Product liability in the EU has evolved to include the whole supply chain as potential sole defendants.

Date of knowledge and foreseeability

The key issues in any legal action are likely to be based around when the claim was triggered and what action should have been taken prior to that date to prevent or minimise the loss, based on the available knowledge at that time. This will of course vary on a case by case basis and the expected level of knowledge may differ for different types of claimant, professional consultants, for instance, being expected to have a higher level of knowledge than general managers.

The issue of knowledge and foreseeability was considered in Anthony and Others v The Coal Authority [2005] EWHC 1645 QB. This was in relation to the risk of spontaneous combustion in a mining spoil tip, which had been landscaped and returned to common ownership. It was held that whilst there was no identified risk when the tip was created the development in research and understanding was such that the defendant could have identified the risk and taken proper action at the time it was handed over. The risk was therefore considered foreseeable and the Defendant was held liable in nuisance for loss of enjoyment by the Claimants for a later fire resulting from spontaneous combustion that persisted for three years.

Whilst there may be debate over the precise date, it is now generally recognised, including by the legal profession, that the date of knowledge, in respect of the concept of anthropogenic climate change, has passed. The test for standard of care in professional negligence cases is whether a competent body of professionals of equivalent experience to the professional in question would have taken climate change into account. It would also be necessary to consider whether a purchaser or employer would have paid a premium for any extra measures at relevant time. In nuisance, as recognised in the context of Anthony v The Coal Authority, it is foreseeability that matters.

The earliest tenable date is 1990, the publication by IPCC of its First Assessment Report. From that date inclusive, IPCC has maintained that climate change would definitely occur due to anthropogenic greenhouse gases, although there remained a small, but well-funded minority of deniers in the scientific community after that date. IPCC admitted uncertainty about whether climate change could be seen already, but already in 1995 its considered position was, "the balance of evidence suggests a discernible human influence on global climate". In 2007 the Fourth Assessment Report stated that the evidence was "unequivocal"[4]. It is more defensible to argue that many of the effects of climate change are still uncertain, since IPCC itself takes that position. Whilst a hard core of deniers remains, denial of the phenomenon of global warming is no longer a realistic legal position.

There is likely to be an increasing expectancy that if any activity could potentially be adversely affected by climate change, then some form of risk review or assessment should have been undertaken. In cases where the root cause can be shown to pre-date 1990 (or any later date which the court decides is relevant in that particular case), lack of knowledge of climate change may remain a valid argument.

In the case of specific weather events, the issues run further, since it becomes a question of, given that climate change is accepted, what is the expected range of climatic phenomena during the period that goods, services, etc are to be provided? Ideally, a view would be based on the evidence of the available scientific projections. These might vary in detail, or even be lacking, but if no attempt were made to consider the issue, then the defendant has a weaker position. However, the Court would also consider whether the claimant would have been willing to pay extra to guard against the potential effects of climate change if they had been advised of them.

[3] www.publications.parliament.uk/pa/ld200102/ldjudgmt/jd011025/dela-1.htm

[4] The 2003 European heatwave is often cited as a watershed in terms of observational certainty.

Legislation and public policy

Increasingly, regulatory standards are recognising climate change when revising or issuing specifications for processes, products and assets, such as buildings. However, in other areas such as disclosure of information, public policy generally favours a minimalist approach. Best practice anticipates or even removes the need for future regulation, but defendants may in some circumstances base a defence upon merely observing the current regulations.

In direct-link cases, public policy is sometimes a factor. In particular, public bodies may be exempt from liability when exercising their statutory obligations or powers. It is also worth noting the case of the Netherlands, where by law no flood insurance is permitted, and the State takes responsibility for flood losses.

Duty of care

Under English law, in cases based on tort, it is necessary to establish a duty of care owed by the defendant to the claimant and that a breach of that duty caused the claimant's loss. A duty of care does not automatically exist between parties in a direct-link situation. A statutory duty to provide services might in some circumstances point to a duty of care. The situation may vary in other countries but there is generally a need to show some form of causative link.

Breach of contract

Where there is a direct contractual relationship it is only necessary to prove a breach of a contractual term (although these may be founded in a failure to act reasonably), loss or damage and a causal link between the breach and the loss. Therefore, a claim in contract is likely to turn on the degree of knowledge of climate change the defendant should have had at the time of the alleged breach and the actions that should have followed from that knowledge. It will then be a question of whether any consequent failure is sufficient to constitute a breach of the particular contract.

Those in a professional relationship, especially if involved in design and development, may be particularly vulnerable to contractual claims if both causation and damage can be established. Similar considerations may well apply to employers in respect of their employees.

Physical damage and financial loss

Under English law it is normally necessary in tort cases to show actual physical loss or damage or personal injury, as pure financial loss is rarely recoverable unless a special relationship exists between the parties. This may well prove a restricting factor for broad-based claims and mass tort actions where either there is no specific evidence of physical loss or damage or the claimants and/or defendants are very widely defined. It may also be noteworthy that in Anthony and Others v The Coal Authority [2005] EWHC 1645 QB (referred to in date of knowledge and foreseeability section) the award to each claimant for loss of enjoyment over 4 years only totalled £3,500.

Pure financial loss can be recoverable in contract, subject to the specific terms and limitations. In contract, subject to the agreed terms, recoverable losses, are generally those arising naturally and in the normal course of events and those resulting from special circumstances that were known to both parties at the time the contract was made. There is some authority for the defendant having to have assumed responsibility for any special losses[5].

Territory

Whilst there have been moves towards harmonisation of laws particularly across the EU, territories in a federal union or EU may have adopted different positions in respect of liability. In the USA, law may differ from state to state. A favourable judgement (from the claimant's perspective) in one territory is likely to result in attempts to have subsequent cases heard in that jurisdiction (forum shopping), particularly where the defendant has operations in that territory. The territory in which the case is heard may ultimately have a significant bearing on liability.

Date of occurrence

This will be important , particularly where different forms of insurance policy apply, such as "claims made".

[5] Transfield Shipping Inc v Mercator Shipping Inc [2008] UKHL 48

10.4 The liability "triggers" in indirect-link situations

This is the aspect of liability that has received more publicity, because it is being used as a tactic by some environmentally concerned groups to compel large companies and governments to reduce GHG emissions. Potentially, the sums at stake are vast, since the damage by unconstrained climate change could amount to at least 5%, and as much as 20%, of global GDP.[6] In our view, this approach is futile, and is most unlikely to result in any successful insurance claim ever (see next section). Nevertheless, defending such actions can be costly in terms of resources and reputation.

Cause

Where there is no direct link between claimant and defendant, but the case rests on the alleged effect of emissions released by the defendant on the general atmospheric system, potential plaintiffs have to overcome significant obstacles if they are to prove causation. The Third Assessment Report from IPCC in 2001 (TAR) concluded that most of the observed warming over the past 50 years is likely to have been due to the increase in greenhouse gas emissions. Subsequent IPCC reports have endorsed this. Civil courts usually require a case to be proven on 'the balance of probabilities' which is the equivalent of a 51% proof of certainty. TAR suggested a better than a two in three chance that human activities were responsible for global warming, but courts can be expected to take a cautious approach when considering the weighting to be given to TAR.

However, damage arises from specific weather events or patterns, and at present scientific models are not consistent in their projections of factors like precipitation, or wind-speed. In addition, historical data is generally inadequate to provide an estimate of "normal climate" in many regions, and projections are generally not precise enough to provide scientific estimates of the patterns of extreme events that climate change will produce, which can be compared with the actual pattern of events. The only instance of a peer-reviewed scientific attribution relates to the extreme European heatwave of 2003: "The summer in 2003 was probably the hottest in Europe since at latest AD1500…Using a threshold for mean summer temperature that was exceeded in 2003, but in no other year since the start of the instrumental record in 1851, we estimate it is very likely (confidence level >90%) that human influence has at least doubled the risk of a heatwave exceeding this threshold magnitude."[7]

This probabilistic type of statement is the most that can ever be expected, because of the high natural variability of the weather system[8]. Even if a probabilistic link can be established between climate change and a specific event, climate change may not be the sole or even primary cause, but rather an additional or exaggerating effect. For example, in the case of the flooding of New Orleans in 2005 due to extreme precipitation and storm surge, the flood defences were inadequately constructed, and so did not match their design specification.

Contribution

As has been seen, it is in practice impossible for scientists to eliminate natural variability as a contributory cause in an extreme event. In addition, emissions stem from many sources over many years, making any one actor's contribution very small and also difficult to quantify:

- There is an extended supply chain for fossil fuel use, from raw material extraction, via use in manufacture and as an energy source through to consumers. The population at large have all to some degree been willing beneficiaries and users of fossil fuels. Developing countries as well as rich ones release GHG's; China has now overtaken USA as the largest single-nation source.
- Nearly one-third of emissions do not stem from energy consumption, but from agriculture and land clearance activities.[9]
- Research suggests that we are currently undergoing a second manmade global warming; the first one occurred as early civilisations replaced hunter-gatherer communities, and may have warmed the planet as much as the post-Industrial Revolution warming.[10]

Given such a diverse range of sources, is it reasonable that any emitter, or even a group of emitters, could be held responsible for more than a small fraction of global warming? Indeed recent case law in UK on asbestos has thrown some doubt on the notion of "joint and several" liability, where there was no working connection between parties who separately contributed to the risk of injury to a claimant in the same way.

[6&9] Stern Review, 2006

[7] Human contribution to the European heatwave of 2003: P Stott, D Stone, M Allen Nature Vol. 432 2 December 2004

[8] Scientific challenges in the attribution of harm to human influence on climate change – Geneva Association 4th Conference on liability regime, Etudes et Dossiers 345, June 2008. M Allen et al Univ Pa Law Rev 1353, 2007.

[10] Plows. Plagues and Petroleum, W Ruddiman, Princeton University Press, 2005.202pp.

Date of knowledge and foreseeability

As stated above, climate change is now indisputable; the date of knowledge regarding the existence of (modern) manmade climate change can be argued to lie between 1990 and 1995, and definitely no later than 2007.

Public policy

Most national governments have taken little action domestically on climate change, but are engaged in the international political process through the United Nations Framework Convention on Climate Change (UNFCCC). In active governments, including the UK's, the emphasis at the present time is primarily on devising legislative structures, targets and monitoring designed to reduce the future effects of climate change, and next upon planning to meet the impacts of climate change. The USA is a special case, where the federal government has been resistant to recognising the issues, but subsidiary legislatures are active.

Public policy is therefore limited at most to setting targets for emissions, with fines and penalties for non-compliance. This implicitly confirms that emissions are permissible, within limits. It recognises the reality that we will continue to be largely dependant on fossil fuels for many years to come. The support and co-operation of producers, manufacturers and public bodies will be essential for governments if there is to be an orderly transition to a sustainable environment.

In fact, governments are often directly involved in the business of fossil fuels and may legislate to prevent claims. Even more, fossil fuels are a critical source of tax revenue. There is absolutely no chance that they will kill off this "golden goose" soon. Realistically also, energy companies wield huge influence in the corridors of power, and so may easily counter political support for private liability.

Within the UNFCCC process, there have been attempts to seek compensation, which started with the Alliance of Small Island States (AOSIS) campaign for a fund to deal with sea level rise[11]. Any attempt at pinning blame on specific groups of emitter countries has been blocked. In fact, under Article 4.7 of UNFCCC, matters regarding damage caused by climate change in developing countries are linked to problems caused by emissions limits, so that OPEC countries could block compensation for damage unless compensation for lost oil revenue was available! This underlines the complexity of public policy on compensation for damage.

Another difficulty with a global phenomenon such as climate change, is that potentially billions of people could be said to suffer from the impacts. How can such a large group be brought within an action for damages? Is it fair to allow the better-represented to receive compensation, while others receive nothing? The legal process is not suitable for such a situation.

The situation is neatly summarised by Munich Re. "Claims for damages have so far failed. Firstly, so the reasoning goes, these cases involve political issues that need to be decided on by the legislature and executive and not by the courts. Secondly, it does not seem acceptable to blame defendants for "doing nothing more than lawfully engaging in their respective spheres of commerce".[12]

Duty of care

Under English law, in cases based on tort, it is necessary to establish a duty of care owed by the defendant to the claimant and that a breach of that duty caused the claimant's loss. This need to establish a causative link between a particular claimant and a particular defendant reduces the likely chance of success for general actions against, for example, major energy companies for causing climate change, since the chain of causation involves the global atmosphere. Also, mass tort litigation has proved difficult to mount in the UK, although some territories such as the US are more receptive.

Breach of contract

Intrinsically, there is no contract between the parties in dispute in these cases.

Physical damage and financial loss

A significant problem regarding generalised "climate change liability" is that the damage has yet to happen, and the risk will continue for many decades, with no real prospect of stopping it. Much of the damage that has happened already is financial or ecological, rather than loss of property. For example, already the Heinz Center reports that around $500 million per year is lost from US property values due to coastal erosion. Such damage has not arisen from a single event, but rather from anticipation of a pattern of events.

[11] Silver and Dlugolecki, 2007

[12] Climate change and liability. Prof. Dr. Ina Ebert und Dr. Guido Funke, Munich Re

A key issue is who can claim for potential damage that has not yet crystallised as lower property values or lost economic opportunities. The courts generally only regard crystallised losses as recoverable, save for exceptional cases such as future loss of earnings, where a personal injury has already occurred. In the case of pleural plaques, for example, where "victims" have only the propensity to develop a serious illness, the courts have been reluctant to award compensation to claimants. Future losses may affect future generations, while on the other hand social and economic mobility is such that it would be difficult to argue that current residents in an area are the ones who will be affected by future events in that area. One approach to this may be to act through entities like communities, which are permanently located in an area, with real economic interests.

Other difficulties include the inability to quantify future losses accurately, and the practical and legal difficulties of periodic compensation over a period of decades.

Territory

With an international problem like climate change causation and impacts, it is difficult to identify a suitable forum for cases, and there is a high likelihood of inconsistent decisions, and repetitive actions. A favourable judgment (for the claimant) in one territory is likely to result in attempts to have subsequent cases heard in that jurisdiction (forum shopping), particularly where the defendant has operations in that territory.

Date of occurrence

For insurers, it is crucial to establish how many occurrences are presented by climate change-related losses, and when they happened. Is each greenhouse gas emission a separate occurrence, or is a policyholder's decision to emit greenhouse gases, despite their alleged climactic impact, a single occurrence, subject to one policy limit?

10.5 Discussion of indirect-link liability developments

This category of actions concerns cases where a plaintiff alleges that a defendant has, by causing the release of greenhouse gases, altered the climate to the detriment of the claimant. There is no direct relationship between the two parties. Several cases have been lodged on this basis, mainly in the USA[13]. In general, their aim is not to seek financial remedies, but to establish the principle that greenhouse gases are potentially harmful and need to be reduced. However, there have also been cases seeking compensation, which started with the Alliance of Small Island States (AOSIS) campaign for a fund to deal with sea level rise[14]. Some believe that using financial liability as a tactic would make governments and corporations tackle the problem of global warming faster[15].

For underwriters, what matters most is whether such actions result in successful judgments for insured compensation. Public nuisance suits typically seek abatement, an equitable remedy not generally covered by insurance policies. (For insurers as investors, and also for D&O underwriters, the issue is different, since the value of corporate assets might be affected by an adverse ruling on the permissible amount of emissions, or a reputational shift in those companies.)

The difficulty of seeking compensation legally

The targeted defendants are either government agencies, with some element of regulatory power or financial links to fossil fuel use, or private companies engaged in that sector, e.g. oil companies. This approach is misguided for several reasons:

- The current scientific state of knowledge is not advanced enough to discriminate between natural variability and anthropogenic causes of extreme events, and this is unlikely to change soon.
- The delays and uncertainty in the legal process are such that we risk losing the battle against climate change during the process. (The duration of the process to establish tobacco liability is telling, and that is a much clearer case involving wilful liability. Asbestos is another example.)
- The most serious damage from climate change lies decades ahead, so it is impossible to say who the victims will be and how much loss they will suffer.
- It is impossible to compensate financially for the loss of unique assets like natural species (though it is possible to restore/remediate damaged habitats).

[13] ABI, 2004

[14] Silver and Dlugolecki, 2007

[15] Allen, in Tang 2005

- The "polluters" are wide-spread, so it is unfair to select only a few emitters for blame. It is also impossible to recover the global damages from a subset of the emitters, because they do not have sufficient capital.
- Many of the causative emissions are not produced from fossil fuels at all.
- The phenomenon of manmade climate change is not just industrial, but goes back many millennia.
- Other factors like air quality, energy security and the high cost or limited availability of fossil fuels will be sufficient to motivate a shift to clean technologies.

Pollution exclusions

Current insurance wordings may exclude claims for global warming liability, although defending actions can be costly in terms of management time and legal expenses. In the first place, the doctrine of "expected or intended losses" allows an insurer to repudiate indemnification for harm intentionally or knowingly brought about by the insured. Insurers may argue that corporate policyholders knew about the environmental dangers of their greenhouse gas emissions, yet continued to engage in activities that contributed to global warming. On the other hand, there is case law finding coverage where the act giving rise to the damage was intentional, but the resulting damage was unintended. In many legislatures, insurers exclude everything that is not "unexpected, unusual, and unforeseen". Nevertheless some courts take the view that only intentional consequences are excluded.[16]

In the USA, an ISO pollution exclusion for the commercial general liability (CGL) policy provides that the coverage does not apply to bodily injury or property damage (1) arising out of pollution or contamination caused by oil or (2) arising out of the discharge, dispersal, release or escape of smoke vapors, soot, fumes, acids, alkalis, toxic chemicals, liquids or gases, waste materials or other irritants, contaminants or pollutants into or upon land, the atmosphere or any water course or body of water; but this exclusion does not apply if such discharge, dispersal, release or escape is sudden and accidental. Claims based on greenhouse gas emissions seem to fit this standard pollution exclusion, since The Supreme Court has effectively ruled that greenhouse gases are pollutants subject to regulation by the Environmental Protection Agency[17]. However, the Courts can be expected to scrutinise current exclusionary wordings closely. Therefore, if case law develops adversely, could we expect to see specific policy exclusions in respect of climate change? This has been postulated by Alex Hamer of RPC[18] and others. The difficulty, however, is in framing an exclusion clause wording that achieves the desired objective of excluding all potential climate change related claims without emasculating the existing policy cover.

Current cases involving compensation from the corporate sector

1. An action was launched on 20 September 2006 by Attorney General Lockyer in the US District Court for the Northern District of California on behalf of the people of the State of California against Chrysler Motor Corporation, General Motors Corporation, Ford Motor Company, Toyota Motor North America, Honda North America and Nissan North America[19], alleging that the defendants' vehicles' emissions contributed significantly to global warming, and harmed California and its citizens. The State sought a judgment holding each defendant jointly and severally liable for contributing to a public nuisance together with monetary damages for the past and present, and in addition, a declaratory judgment for such future monetary expenses and damages as may be incurred by the State in connection with the nuisance of global warming.

   The allegations were that the defendants "knowingly created or contributed to and are knowingly creating or contributing to a public nuisance – global warming." Potentially, there could have been large punitive damages, and a declaratory judgment could operate almost indefinitely for future damages where the amounts are impossible to assess in advance.

   On 18 September 2007 the judge decreed that courts do not have the authority or the expertise to decide injury lawsuits concerning global warming, and dismissed the suit. Judge Jenkins said he was reluctant in any event to expose automakers, utility companies and other industries to damages "for doing nothing more than lawfully engaging in their respective spheres of commerce within those states." He also stated that "The adjudication of plaintiff's claim would require the court to balance the competing interests of reducing global warming emissions and the interests of advancing and preserving economic and industrial development." Judge Jenkins stated that there was no sound framework in California by which damages for nuisance could be assessed.

2. Owners of properties damaged by Hurricane Katrina in 2005 sought to prosecute claims against numerous chemical and

[16] The heat is on Insurers v Global Warming A Cole Risk Management Magazine May 2007 pp 14-17

[17] Global Warming Litigation and Insurance Coverage: Emerging Issues. April 19, 2007 Simpson, Thacher and Bartlett

[18] The cost of climate change – are insurers the ultimate carriers? Reynolds Porter Chamberlain Conference 19 October 2006

[19] California Sues Six Automakers over Global Warming. Washington Post 21 September 2006

oil companies who allegedly caused damage to the plaintiffs' properties through actions that have contributed to global warming. (See, e.g. Comer v. Nationwide Mut. Ins. Co., 2006 U.S. Dist. LEXIS 33123 (S.D. Miss. 2006)). The complaint asserts claims of unjust enrichment, civil conspiracy, aiding and abetting, public and private nuisance, trespass, negligence, fraudulent misrepresentation and concealment. Numerous defendants have moved to dismiss the complaint and at least one defendant has moved for summary judgment. The court has indicated that it will not allow the case to proceed as a class action, but has yet to reach the merits of plaintiffs' individual claims[20].

3. The Climate Justice Programme was formed in July 2003. Comprising 70 environmental organisations, academics, lawyers and individuals across 29 countries, it supports litigation to combat climate change. It seeks to invoke existing law to pursue its objectives. It is, for example, illegal for one State to cause harm to another under international law. Under domestic law in a number of countries it is illegal for polluters to cause nuisances to the public and to market defective products. Violations of human rights are protected by international and domestic law. Directors of bodies such as insurance companies or pension funds are required under domestic law to act in the best interests of their shareholders, who may suffer financial harm as a result of climate change. The focus of their attention has been against governments and public agencies, on procedural and definitional issues, in order to stimulate the introduction of regulations to limit emissions.

The EU dimension

The Environmental Liability Directive is being transposed into national law in the various Member States of the EU. It is aimed at the prevention and remedying of environmental damage, specifically, damage to habitats and species protected by EC law, damage to water resources and land contamination that presents a threat to human health. It will only apply to damage from incidents occurring after it comes into force. It is not intended to cover "traditional damage" that is economic loss, personal injury and property damage. It is based on the 'polluter pays' principle, namely, that polluters should bear the cost of remedying the damage they cause to the environment or of measures to prevent imminent threat of damage. Polluters would meet their liability by remediating the damaged environment directly, by taking measures to prevent imminent damage or by reimbursing competent authorities who, in default, carry out the remedial work or take action to prevent the threatened damage. Competent authorities would be responsible for enforcing the regime in the public interest. Strict liability will apply in respect of damage to land, water and biodiversity from certain occupational activities set out in Annex III of the Directive, with fault based liability for other activities. There will be defences in respect of damage caused by armed conflict, natural phenomena or from compliance with a permit, and emissions which at the time they were authorised were not considered to be harmful according to the best scientific and technical knowledge. The latter is the equivalent of the 'state of the art defence' that currently exists in other EU originating legislation, such as the Consumer Protection Act 1987. Individuals and others who may be affected by actual or possible damage, and qualified entities may request action by a competent authority and seek judicial review of the authority's action or inaction. Public policy does not intend this Directive to be used as a stratagem to reduce GHG emissions.

10.6 Potential impact of direct-link liability on specific insurance classes:

Directors and Officers liability (D&O)

There is the risk that companies who delay taking action on climate change, or are inadequately prepared, could be sued by their investors. They may stand accused of incurring higher costs as a consequence of unduly delaying emissions, reductions, damaging their company's reputation and failing to disclose investment-relevant information. Swiss Re in 2003 stated that its underwriting practice on D&O cover is to review whether the company concerned has a responsible attitude towards climate change. For large companies, one of its reference sources is the Carbon Disclosure Project – a database for investors that holds details of corporate strategies and performance on climate change. Three years later there were no immediate plans to write climate change exclusions in D&O policies.[21] There is no evidence yet of the market following this initiative or for similar action across other liability classes.

In the UK, directors are accountable for their actions as a result of the Companies Act 2006, which came into force in October 2008. One of the key provisions of the Act is a new statutory statement of directors' duties that goes beyond mere codification of the existing law. It requires directors when making decisions to have regard to the impact of their decisions

[20] Global Warming Litigation and Insurance Coverage: Emerging Issues. April 19, 2007 Simpson, Thacher and Bartlett

[21] Gentle persuasion: the upside of CO_2 cuts. Industry Week 1 April 2006

on employees, shareholders, customers and the wider community and environment. There is also a statutory right of shareholders to sue directors in the company's name for negligence, breach of duty or breach of trust although such an action cannot be launched without the approval of the Court.

Professional indemnity

This is a potential target area for litigation in the wake of rising problems due to climate change. Professionals are rightly seen as knowledge leaders in their specialist fields and will, therefore, be perceived as being in the vanguard of anticipating and preventing the likely adverse effects of climate change. This particularly applies to those involved in design and development such as Architects, Surveyors, Engineers and Town Planners. In the event of failures to buildings and infrastructure due to extreme weather conditions, then the work of professional advisors will be closely scrutinised with a view to potential litigation.

Research has identified that a significant proportion of the world's dams are vulnerable in the event of overtopping from excessive river flows.[22] The catastrophic failure of a dam would undoubtedly lead to a close examination of all of its design parameters and the assumptions made in respect of maximum flows in the light of climate change.

It is likely that as severe weather events become more frequent they are less likely to be considered fortuitous and that the potential impacts should have been anticipated and "designed out". It is unacceptable for buildings and infrastructure to be constructed in a known earthquake zone without being specifically designed to be resistant. Why should it be any different for the anticipated effects of climate change such as increased volumes of rainfall, flooding or extreme heat and drought? The Courts already expect designers to prepare for weather extremes[23].

Examples could include claims that rainwater goods were inadequately specified where water has penetrated following a heavy downpour, or that the design of a building was inadequate to maintain a safe and comfortable working environment during an extended heatwave where previously they may have been treated as fortuitous. Drainage of groundwater is another obvious concern.

It would be wrong to restrict thinking just to construction. It is probable that as climate change takes effect and loss or damage results, the actions or lack of action of a wide range of professionals and other advisors will come under increasing scrutiny with the potential for litigation.

Public liability

It is possible to suggest a number of scenarios that could impact on public liability covers as a result of climate change by way of example. A full list is impossible, since virtually any activity can be affected.

Public authorities and highways agencies in the past faced claims for failing to grit icy roads. In the event of continued increases in average temperature, it is, perhaps, the heat, not the cold that will cause the problems and in turn, more public liability claims. In the summer of 2006, there were reports of local authorities, e.g. in Durham, Staffordshire, Lincolnshire, Cornwall and Cumbria having to deploy gritting lorries to spread crushed rock dust on melting tar to try and improve surface adhesion. Roads in Devon and Cornwall had to be closed in July 2006. Melting tarmac cannot only cause property damage to vehicles, but where it leads to a reduction in surface integrity and decreased grip, braking is affected and in turn, more road traffic accidents may occur and there may be more claims against the highways authority for failure to maintain the highway.

Drainage is also another problem area for insurers. In drought conditions, there will be increased ground movement and root growth. This causes damage to, and increased leakage from, drainage systems. In turn, this leads to greater foundation movement – 20% of these may relate to drainage problems. Conversely, during periods of high rainfall, the adequacy or otherwise of the existing drainage system plays a crucial role in determining the extent of any property damage, as was identified by the Pitt Review. After a flooding incident, it is essential that drains are cleared and as necessary, repaired, promptly, to prevent further problems. It is essential, therefore, that insurers focus on both of these scenarios and ensure that they have adequate specialist supplier arrangements in place. Individual house owners are legally responsible for the maintenance of the domestic water service pipe on their land, from the water company valve to the internal stop tap. They have a similar duty to minimise leakage. Insurers have a liability for this section of underground pipe under the "accidental damage to underground services" peril of a policy. It is essential, therefore, that any leakage is dealt with promptly to reduce the risk to adjacent property. Many insurers are developing strategies to ensure early control of such claims.

There has been a number of pollution claims following on from Hurricanes Katrina and Rita. Murphy Oil and others have

[22] Flood risk and Insurance in England and Wales, David Crichton, Benfield Hazard Research Centre, December 2004.

[23] RPC Legal Update, "Climate change: will 2007 be a tipping point for construction professionals' liability?", March 2007

been sued over ruptured oil tanks and pipelines that fouled Louisiana neighbourhoods. Another suit has been filed against the gas and oil industry alleging a role in the disappearance of wetlands that protected Louisiana from storm surges. At least two cases have been filed on behalf of Louisiana's fishing industry in respect of damage caused to estuaries, bays and oyster beds caused by oil spills. Third Party Liability policies in the US generally contain pollution exclusion clauses. However, absolute exclusions have not always been recognised in some jurisdictions. There are also variations in policy cover, including pollution clauses. Environmental Liability Policies may provide cover but this is dependent on factors such as individual circumstances, number of occurrences and expected harm. A significant proportion of the world's industrial sites are located either on the coast or on river deltas and therefore increasingly vulnerable to flooding as sea levels rise and extreme weather events become more frequent, leading to a potential increase in escapes from storage facilities, and consequent liability claims.

Hospitals and care homes could be faced with the possibility that food poisoning and exotic diseases become more prevalent in increased temperatures, putting the lives of patients at risk, with an increased potential for claims against the carer. Another impact would be the potential effect of heatwaves. The conditions which Paris experienced in the summer of August 2003 when between 2 August and 15 August, 14,802 people died in the heatwave, could become a common occurrence. Untimely deaths in care due to excessive heat which could have been prevented, by the retrofit of air conditioning, or closer monitoring of elderly residents, for example, could result in claims.

July 2005 saw extremely high temperatures being reached on public transport, particularly the London Underground. The consequences of a train being stranded in hot weather could be heat exhaustion, dehydration, severe stress or worse amongst passengers. Air-conditioned underground trains in London are not due until the next decade, so the risk will continue to deteriorate, and could result in claims for serious personal harm.

Employers liability

Employers have a high level of responsibility for the health and safety of their employees. Climate change could raise the incidence of heat-related injury, illnesses such as salmonellosis and Legionnaire's disease and respiratory attacks. Employees working outdoors may be at risk of developing skin cancer, due to increased exposure to UV radiation. High temperatures can also affect concentration, increasing the incidence of accidents.

Employers may be vulnerable to air conditioning failure, either due to breakdown or loss of the power supply. In the summer of 2006, the National Grid was stressed from the increased demand for electricity due to a rise in the use of air conditioning and other cooling systems. At present, there is no maximum temperature above which employees are not expected to work although working temperatures have to be "reasonable". Normally, this should be a minimum of 16°C for desk-bound employees and 13°C for those doing more strenuous work.

The TUC has called for maximum working temperatures of 30°C, or 27°C for those carrying out strenuous work. They have warned that employers who fail to act could be responsible for consequent health issues as well as running the risk of being sued if accidents occur due to the heat. The Health and Safety Executive has indicated that it would be inappropriate to set a maximum temperature and added that it would be difficult to enforce. Employers still, however, have an overriding responsibility to ensure a safe working environment for their employees.

Product liability

As climatic conditions alter, conventional methods of making, packaging and using products become susceptible to unexpected weather effects (see Chapter 11 Construction, for example). Perishable goods such as food are obviously at risk. Product failures because of extreme weather conditions such as high temperature could result in claims over fitness for purpose, compliance with specification and recommended usage.

Experience shows that in an increasingly global supply chain, problems can occur from unexpected events almost anywhere in the world. One problem may trigger another. For example, there have already been product liability claims and product recalls resulting from quality control issues due to temporary working following the European floods. In one particular case, in an attempt to keep up with demand, there was rapid deployment at an alternative site and the use of raw materials believed to be undamaged without adequate controls. This resulted in the supply of defective product and subsequent claims.[24] An increase in extreme events and conditions in developing/emerging countries where systems are less robust, could similarly result in an increase in product-liability claims.

[24] Details from an actual unreported case subject to confidentiality.

10.7 Strategic options for the liability insurance market on climate change

It would be unwise to drift into an unplanned situation which might bring about unexpected liabilities for insurers and their clients from climate change. This section considers the strategic options which are available for insurers and regulatory authorities.

Indirect-link liability

As discussed in 10.5, this risk is uninsurable because of the potentially enormous exposures. We also believe it is contrary to public policy to admit such claims, since the modern economy is dependent on fossil fuels, and there are more effective ways to address the issue of climate change.

Direct-link liability

There are a number of approaches that could be taken by governments and/or the insurance market in relation to potential direct-link liabilities arising from climate change. These are tabulated below.

Table 1: Strategic options for handling direct-link liability under climate change

Climate Change Liability Option	Effect
Mandated insurance	Would protect third parties against loss but would possibly cause a barrier to innovation; if the risk is uninsurable, the activity will not take place. Unlikely to be instigated by government except possibly for high risk activities.
Insurance prohibited	Would strongly encourage loss prevention activities. This is an extreme measure that government is unlikely to consider as it could expose them to compensation claims.
Strict liability regime	Likely to create a strong barrier to innovation, but would certainly encourage "precautionary" patterns of behaviour. In some areas there is already strict liability (Water Act, pollution) which could catch an element of climate change claims.
Fault-based liability regime	This is effectively the status quo for most liability classes. With some "tidying up" and clarification probably provides the best regime for a measured transition with continued insurance coverage.
No liability	This would require legislation and is unlikely to ever happen. Whilst it would promote innovation it would create inequalities and expose government to potential claims.
Limited liability	This would encourage insurers to provide/continue cover by reducing the need for capital. It would encourage innovation yet not deter challenge to faulty practices. It could become a possibility if climate change accelerates. The Insurance Market itself is likely to limit liability if certain areas become difficult to underwrite because of climate change.

Whilst climate change has undoubtedly moved up the political agenda, there are no signs at present of any direct intervention in the insurance sector in this regard, in the UK or elsewhere. One of the difficulties is that climate change has potentially wide ranging effects and is not as easily defined as say War, Nuclear Risks or Terrorism. This could change if climate change accelerates, resulting in an upsurge of claims due to failures of structures and products, and a consequent shrinking of insurance capacity for such risks.

10.8 Reducing the impact of climate change – the role of liability insurance

Liability insurance can support initiatives to reduce the impact of climate change. Liability insurance is an essential backstop in commercial activity. Making it a requirement for policyholders to regularly undertake climate change risk assessments and to implement suitable procedures and action plans could be a major influencing factor. This can be effective in two ways: in reducing the potential for losses from weather-related claims by fostering improved designs, systems and products; and in getting companies to focus on their attitudes to GHG emissions. For example, Christopher Walker, head of the Greenhouse Gas Risk Solutions unit at Swiss Re, said his company may approach Exxon Mobil and say: "Since you don't think climate change is a problem, and you're betting your stockholders' assets on that, we're sure you won't mind if we exclude climate-related lawsuits from your D&O insurance".[25] That would bring home risk directly to the boardroom.

The third way in which liability insurance can be helpful, is in supporting the development of clean technologies. In the absence of historical data, liability insurance has often been difficult to obtain for new and developing industries and products, and increasingly for services[26]. The availability of liability insurance for emerging technologies, processes and products that are climate friendly and sustainable may be a vital key to change. Development and implementation times need to be shortened, as the prognosis for climate change deteriorates. Already the EC, and in turn the UK, have strengthened their emissions targets.

Technologies that produce substances with long lifetimes, and the potential to affect thousands or even millions of people in the event of an accident are virtually uninsurable in the private market. Yet by co-operating, insurers and governments were able to design insurance schemes for nuclear electricity plants, using a layered approach of private/public cover and industry-wide pools. It is generally recognised that "clean coal" will be a critical component of the future energy economy, and a major component will be Carbon Capture and Storage (CCS). In CCS, it is necessary to store carbon dioxide from power plants for decades, so that it does not escape into the atmosphere and contribute to global warming. Clearly the operator has a significant liability exposure.

Solutions may well differ from one country to another, with international protocols to cover international transport and storage. Risk transfer for the most contentious process, long-term geological storage of carbon dioxide, may be handled in a layered or portfolio approach. Legislative limits on CCS liability are an example of a statutory response that could be helpful in facilitating private insurance to offer coverage. Another alternative could be a cut-off date after which storage is passed over to a government facility. The financial instruments could include combinations of insurance; financial instruments such as letters of credit, sureties, bonds and other financial instruments; and some risk taking or "self-insurance" by project developers or operators in consortia[27].

As Agostino Galvagni, Head of Swiss Re's Global and Large Risks Division, stated in a discussion forum at the 2007 RIMS Convention in New Orleans: "Global risks are tightly woven in today's world. Governments and enterprises need to take a holistic approach to overcome silo-thinking and acting. We need to prioritise risks effectively, improve preparedness and strengthen public-private partnerships to mitigate risks and to finance economic losses. Swiss Re has faced the problem by introducing more mitigation and adaptation into global risk management, not only through traditional risk transfer but in the development of insurance-linked securities and weather derivatives. Businesses and investors must realise that there are commercialisation opportunities in mitigating climate change. For example, we are seeing robust growth in investment in various forms of alternative energy that in the end can help reduce harmful carbon emissions".[28]

[25] Winds of climate change are about to make their impact felt in many a boardroom. Business Guardian 6 February 2006

[26] INTEREST project, final report, Geneva Papers

[27] World Resources Institute. Workshop Summary: Long Term Liability Potentially Associated with Carbon Capture and Sequestration. 1 November 2007, Washington, DC

[28] Swiss Re Exec Explores Risk and Mitigation Disconnect at RIMS. Insurance Journal 2 May 2007

10.9 Conclusions and recommendations

"Climate change" or indirect-link liability

It is most unlikely that emitters will be held liable to compensate anyone for creating climate change, and thereby harming unrelated third parties. Additionally, insurers may be protected by current pollution exclusion clauses which would exclude this risk. Nevertheless:

- insurers should monitor carefully developments in this field, which mainly affect public agencies
- insurers should review regularly the adequacy of their pollution exclusions in this regard
- insurers should resist strongly any attempts to make this an insurable risk
- insurers should not ignore the possibility of incurring significant legal costs in maintaining policy defences/insureds' defences.

Direct-link liability

As the climate increasingly diverges from historical patterns, there will be more weather-related damage to goods and property, health, and ecosystems. Insurers' clients may be exposed to claims that they did not reasonably foresee when supplying goods and services or managing assets. Insurers are particularly vulnerable at this point in time, because climate change is gathering momentum, but it has not yet been "mainstreamed" into business, professional and administrative practice. Such claims could affect insurers through a variety of liability products.

- At this time, the conventional measures of limiting liability (by price and/or policy design) and using risk management should enable insurers to absorb any additional risk.
- Insurers should identify those industries, professions, and regions most at risk to climate change and ensure that they are carefully underwritten (see Table 2). Property underwriters, and the IPCC's Fourth Assessment Report are useful sources of information.
- Insurers should require policyholders in high-hazard categories to undertake regular climate change risk assessments, both on a business-wide basis and for specific projects. In the event of a loss, policyholders will then be able to demonstrate that they assessed the risk on the basis of the best knowledge available at the time and took appropriate action.
- Consideration needs to be given to identifying claims that have a climate change element, so that cost and trend data can be gathered. Also, at the settlement stage, insurers should ensure that steps have been taken to avoid a repetition of the circumstances.

Table 2: Potentially high-hazard climate change risks for liability underwriters

Liability class	Potential high-hazard risks
D&O	Energy, Metals and Mining, Construction materials, Transport, Water, Insurance, Public Agencies serving consumers, Asset management, Property management
Public	Health care, Transport, Novel clean energy technology, Clients located in coastal zones and flood plains
Products	Food and drink, Construction materials, Clients with a supply chain extending into developing countries, or hazardous locations, e.g. flood plains
Employers	Agriculture and Forestry, Construction
Professional Indemnity	Construction, Carbon reduction projects, financial advisers at all levels.

Product innovation

There may be opportunities to develop climate-change specific liability products, extensions or wordings, similar to the way that environmental liability products have developed. There are, of course, difficulties in quantifying potential risk, defining cover and avoiding duplication with existing coverage. It may well be that a market only really develops as a response to restrictions and exclusions on standard policies. This could include retro-active cover for latent liability claims resulting from climate change which fall outside existing coverage.

- Insurers should monitor their clients' needs as the market awareness of climate change develops, and be prepared to innovate. For example, in high hazard categories, there may be a demand for higher limits of indemnity. Also, the carbon markets are spawning new processes and projects, such as emissions, certification, which require liability covers.

Property insurance market

Any attempt to restrict first party policies by way of redefining perils or by seeking to exclude the effects of climate change could increase the risk of potential claims under liability policies. So if, for instance, there was a move to a more restricted definition of storm, claimants may seek to argue that a lesser uninsured event should have been anticipated and avoided and thereby attempt to establish a liability against any party they consider responsible for that failure.

- Liability Insurers should work towards overall insurance market solutions on climate change in liaison with Property Insurers

Clean technologies

Insurers should collaborate with government agencies and manufacturers to devise liability insurance schemes that will support the development of climate-friendly technologies, like carbon capture and storage, and hydrogen. A useful starting place could be the insurance instruments for nuclear power.

Insurers as investors

Insurers may have considerable amounts of their assets invested in corporate securities. They should, therefore, ensure that those companies are alert to the risks of climate-change related liability and litigation, to minimise the risk of a decline in their asset value.

Biography

David Martin

David initially trained at Agricultural College and worked in farming before commencing his career in Loss Adjusting in 1976. He worked for Ellis and Buckle and post merger Cunningham Lindsey for almost 30 years. This was initially as a general adjuster and manager before concentrating on complex and major loss. He was part of their Specialist Adjusting Unit and during that time led the initial response to two of the largest claims resulting from the first IRA terrorist bomb in the City. In 2005 he became a founding partner and director of Adjusting Solutions a niche London Market Adjuster.

David specialises in Product Liability claims especially (but not exclusively) in agriculture, horticulture and the food industry. He also has expertise in financial loss, particularly Business Interruption and Professional Indemnity claims. His experience extends to a detailed understanding of risk managed programmes and the requirements of the corporate market. It also includes the railway industry as David managed the claims programme for railway infrastructure for a number of years.

David has given evidence at trial on behalf of Insurers in both Civil and Criminal litigation.

David has written articles and given training tutorials in agricultural, horticultural and glasshouse claims as well as business interruption and product liability claims. His interest in climate change stems from his farming background and a concern that the potential issues for liability insurance were not being addressed.

David is a Chartered Loss Adjuster and Chartered Insurance Practitioner. He is also a FUEDI European Loss Adjusting Expert and Fellow of the International Federation of Adjusting Associations. He is a Past President of the Insurance Institute of Luton and St Albans, a former examiner in Consequential Loss and Agriculture for the CILA and currently is a panel member for their Accreditation to Chartered Status.

Biography

Sarah Aslett-Jones FCII, LL.B (Hons) LPC (PG Dip),

Chartered Insurance Practitioner and Senior Associate Solicitor

Originally from a commercial underwriting background and previously with Sun Alliance and Eagle Star, Sarah developed her passion for the law and the insurance industry.

Sarah's ambitious nature is highlighted by simultaneously studying her LL.B degree through the University of London External programme, Sarah worked towards her ACII.

After achieving her LL.B(Hons) in the same year as becoming a Chartered Insurer (1995), Sarah studied at the College of Law Guildford graduating in 1996 with a distinction in their Post-Graduate Diploma in Legal Practice before qualifying in 2000.

Sarah joined Veitch Penny Solicitors, a leader in the field of Personal Injury in 2005 and became a Senior Associate in 2007. A key individual and motivator within the Insurance department Sarah regularly deals with complex legal issues for a number of high profiled clients including Local and Public Authorities, International Insurers and Healthcare Trusts.

Sarah qualified as a CII Fellow in 2007 and continues to expand her legal interests. She has an active concern in equine claims and environmental issues.

A confident and experienced lecturer, Sarah is presently an Associate Lecturer at Law with the Open University on their LL.B degree programme and is currently one of the co-authors producing the handbook on psychiatric injuries.

Sarah is a confident individual with a desire to succeed as demonstrated by her continuing education as she studies towards her Msc in Forensic Psychology and Criminology. She also has a keen interest in photography and has been awarded the LRPS (Licentiate of the Royal Photographic Society) qualification and is working towards her ARPS.

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.