

**Tackling climate change**  
*The vital contribution of insurers*

## About the CEA

The CEA is the European insurance and reinsurance federation. Through its 33 member bodies — the national insurance associations — the CEA represents all types of insurance and reinsurance undertakings, eg pan-European companies, monoliners, mutuals and SMEs. The CEA represents undertakings that account for approximately 94% of total European premium income. Insurance makes a major contribution to Europe's economic growth and development. European insurers generate premium income of €1 100bn, employ one million people and invest €6 900bn in the economy.

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## Executive summary

It is just as important and urgent to take measures — particularly disaster risk reduction measures — to adapt to the inevitable consequences of climate change as it is to reduce the emission of greenhouse gases.

This report sets out the insurance sector's role as a major player in the fight against climate change, both through mitigation and adaptation.

### Mitigation

As all businesses should, European insurers are changing their business practices in order to reduce their carbon footprint. Yet insurers' contributions to the mitigation of climate change can and do go far beyond this. Provided that their capacity for innovation is not hampered by unsuitable regulatory conditions, insurers can develop products that incentivise their policyholders to also reduce their footprints or that facilitate the development of new technologies that will reduce emissions (eg renewable energies).

### Adaptation

The insurance sector is often regarded solely as a provider of compensation for losses. This buffer function is of great importance for the economy since it allows insureds to plan with more certainty by covering specific risks that could otherwise threaten business continuity.

Yet, in adaptation too, the role of insurance goes much further. Insurance is an integral part of the whole risk-management cycle, from risk identification to risk transfer and recovery. The (re)insurance industry:

- contributes to a better understanding of risk through, for example, the development of forward-looking risk models;
- contributes to risk awareness through risk-based terms and conditions and advice to its customers, and offers incentives to increase prevention and other risk management measures;
- helps policymakers to guide society with tools such as land-use planning and building codes;
- develops solutions that contribute both to the mitigation of climate change (eg insurance cover for wind farms) and to adaptation to climate change (eg insurance against weather-related disasters); and,
- provides victims of weather-related events with compensation for their economic losses faster than *ex post*-financed schemes such as the European Solidarity Fund.

However, insurance is neither a substitute for other adaptation measures nor an instrument for the funding of adaptation or mitigation measures.

To fulfil its facilitating role, the insurance sector needs strong political support and an appropriate policy framework that ensures the active involvement of public authorities and private stakeholders:

- the creation of a long-term, strong and effective climate risk-strategy framework that includes a sound and integrated public authority risk management strategy and the favouring of *ex ante* financing mechanisms and market-driven insurance solutions, as well as, where necessary, public-private partnerships;
- the co-ordination of the dissemination of coherent data that can be easily interpreted and integrated into the decision-making process of public and private stakeholders, as well as be used by insurers to design appropriate insurance cover;
- the monitoring of the implementation of adaptation strategies and their effects on risk vulnerability in order to disseminate good practice and to take corrective measures where appropriate; and,
- the involvement of all key stakeholders, not just the European insurance industry, in developing an adaptation strategy. The active involvement of all stakeholders will help increase the awareness of those who might not yet recognise a need to take action.

The CEA is confident that, given these conditions, the insurance sector will be able to continue to make a vital contribution to the mitigation of and adaptation to climate change.

## Introduction

The CEA published its first report on climate change in 2007<sup>1</sup>. There have been a number of important developments since then:

- there has been further evidence of climate change;
- negotiations on a new climate change agreement have started;
- the world economy has been experiencing a major crisis;
- the European Union has launched several policy and regulatory initiatives to mitigate climate change (ie to reduce the emission of greenhouse gases) and to adapt to climate change; and,
- the insurance industry has developed a wider range of products and services to help global consumers and businesses reduce their exposure to climate change<sup>2</sup>.

On 1 April 2009, the European Commission published a White Paper on adapting to climate change<sup>3</sup>. It reinforces some of the messages in the Commission's Communication on disaster prevention<sup>4</sup>, and should help close the gap left by previous policy initiatives, which have tended to focus on the mitigation of climate change (eg the energy package which was adopted in December 2008).

The United Nations negotiations on a new climate change agreement, which were originally set to be completed in December 2009, have entered a crucial stage. The UN recently acknowledged, however, that it would not be possible to reach a binding international treaty to limit greenhouse gas emissions before mid-2010 at the earliest. The EU has taken on the role of "leader by example" but it is hoped that there will also be stronger commitments from other regions of the world. The new US administration is giving positive signals. The US is currently discussing ambitious legislation to reduce greenhouse gas emissions from 2005 levels by 17% by 2020 and by 83% by 2050. It also aims to create green jobs and reduce dependence on foreign sources of energy.

The CEA is pleased that, despite the economic crisis, climate change remains at the top of the European and international political agendas. The CEA believes that fighting climate change can have a positive effect on the European economy and notes with satisfaction that this opinion is shared by an increasing number of European citizens<sup>5</sup>. However, it is concerned that most of the current work is aimed at the mitigation of climate change and that the development of ways of adapting to its inevitable effects takes second place.

**Coordinated mitigation and adaptation action also benefits the economy**

<sup>1</sup> "Reducing the social and economic impact of climate change and natural catastrophes: insurance solutions and public-private partnerships", CEA, June 2007, <http://www.cea.eu/uploads/DocumentsLibrary/documents/Climate%20Change%20report%20final.pdf>

<sup>2</sup> "From risk to opportunity: insurer responses to climate change: 2008", Evan Mills, PhD, CERES, April 2009

<sup>3</sup> EC White Paper "Adapting to climate change: towards a European framework for action", COM(2009)147/4, 1 April 2009, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2009:0147:FIN:EN:PDF>

<sup>4</sup> EC Communication "A Community approach on the prevention of natural and man-made disasters", COM(2009)82, 23 February 2009, [http://ec.europa.eu/environment/civil/pdfdocs/com\\_2009\\_82en.pdf](http://ec.europa.eu/environment/civil/pdfdocs/com_2009_82en.pdf)

<sup>5</sup> 62% in 2009 compared to 56% in 2008, according to "Europeans' attitudes towards climate change", EC and European Parliament Special Eurobarometer 313, p25

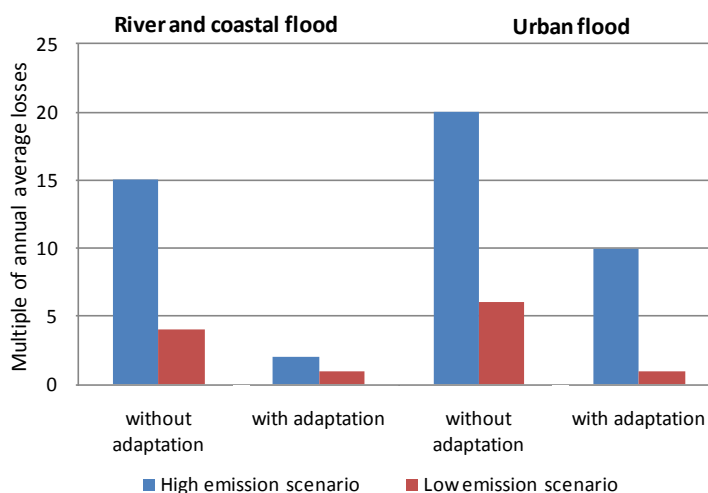
**A strong political commitment to adaptation as well as mitigation is urgently required**

Little progress has been made in this area and urgent action is required. Adapting to climate change in the most effective, efficient and appropriate ways should get the same attention as climate change mitigation. Indeed, adapting to climate change and mitigation need to go hand in hand. Both actions contribute to the building of a more resilient, competitive and innovative economy.

**Adaptation and mitigation go hand in hand**

The significance of mitigation and adaptation measures in addressing climate change can be illustrated by a study of UK floods carried out in 2005. According to the estimates (see Charts 1 and 2), not investing in either mitigation (low emission scenario) or adaptation measures would multiply economic losses by 15 compared to a situation in which there had been investment in both measures. The ratio rises to 20 for urban floods alone.

**Charts 1 & 2 | Effects of mitigation and adaptation on economic losses**



Source: Adapted from "Financial risks of climate change", Association of British Insurers, 2005, based on estimates for the UK around the 2080s

Also, investing in one prevention measure but not the other would still multiply the economic impact by a factor of 2 to 9 depending on the types of floods and the measures taken. As shown by Charts 1 and 2, investment in mitigation particularly helps reduce the impact of urban floods. Investment in adaptation measures is especially useful in reducing the impact of river and coastal floods.

Urgent action is needed to reduce the losses that result from weather-related disasters. Recent observations of key parameters such as the rise in sea levels suggest that the outlook is even worse than the worst-case scenario outlined in 2007 by the Intergovernmental Panel on Climate Change (IPCC)<sup>6</sup>.

As the impact varies across Europe, there is no EU-wide answer, but the EU has, nevertheless, an important role to play in tackling climate change. It should maintain its leading role in international efforts to combat climate change.

<sup>6</sup> This was highlighted at the International Scientific Congress that took place in Copenhagen in March 2009 as the scientific overture to the UN conference on climate change due to take place in the Danish capital in December



National and European public authorities should work together with the insurance industry to put in place adequate prevention, adaptation and mitigation measures. These should reflect both the cross-border aspects of weather-related catastrophes — floods do not stop at borders and neither should prevention measures — and regional differences in risk exposure. European insurers believe that public-private partnerships are the best way to proceed and to help reduce the burden of climate change on the public purse.

## I. The impact of climate change in Europe — the insurance industry perspective

**The lack of adaptation to weather-related disasters has contributed to increasing economic losses**

### I.1 Effects of climate change on the frequency and severity of weather-related disasters

The long-term analysis of large, weather-related catastrophes shows an increase in economic losses, which has often been attributed to climate change but which so far appears to be largely due to socio-economic factors.

This has recently been shown to be the case for floods. A Joint Research Centre study<sup>7</sup> concluded that the observed increase in flood losses was mostly driven by social factors. The relevant socio-economic factors are, for example:

- economic growth;
- a highly integrated economy;
- increasing population densities, especially in risk-prone areas;
- increasing value of people's assets; and,
- higher insurance penetration.

The increase in value and population in risk-prone areas is typical of a lack of adaptation to weather-related disasters.

It is generally recognised by a large majority of specialists that climate change will further aggravate these socio-economic effects. However, as the above-mentioned consideration shows, historical data on its own cannot be used to predict the economic effects of future weather-related disasters without considerable analysis.

The annual average number of major weather-related natural catastrophes worldwide has increased significantly from about 1.5 in the 1950s to 3.7 over the last 10 years. In addition to the increase in the frequency of weather-related natural catastrophes, the global economic impact of these events has also increased significantly (see Box 1).

Though North America and Asia suffered the most in 2008, the former in terms of economic losses (including insured losses) and the second in terms of number of victims, the EU also sustained heavy weather-related losses. According to Munich Re<sup>8</sup>, the most costly natural catastrophe in Europe was Emma, a winter storm that crossed large parts of Europe at the beginning of March 2008, causing insured losses of €1bn. More recently, Klaus, the storm that raged in the south-west of France on 24 January 2009, cost insurers €1.5bn according to the most recent estimates<sup>9</sup>.

Storms and floods are the most frequent and costly weather events in Europe, accounting for 83% of the total number of weather events and 78% of the

7 "Normalised flood losses in Europe: 1970–2006", J I Barredo, EC, Joint Research Centre, Institute for Environment and Sustainability, February 2009, <http://www.nat-hazards-earth-syst-sci.net/9/97/2009/nhess-9-97-2009.pdf>

8 "Geo-natural catastrophes", Munich Re, 2008, p35

9 FFSa Annual Report 2008, p14

### Box 1 | Economic losses caused by socio-economic factors and climate change

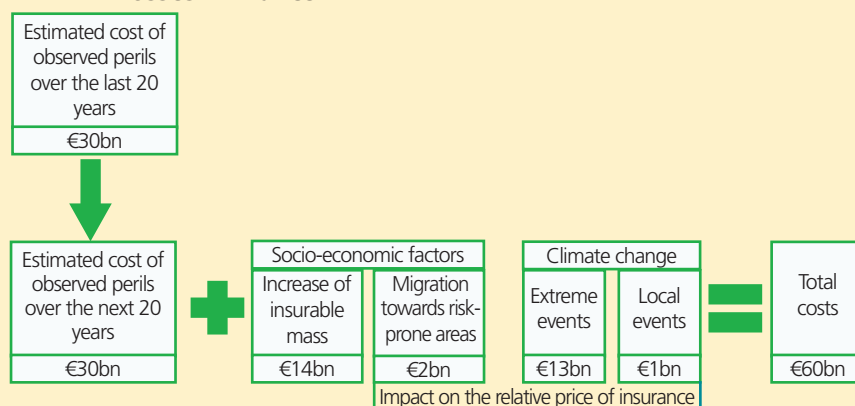
The French insurance association, the FFSA, published a study<sup>1</sup> in April 2009 in which it assessed the expected economic losses in France caused by the main weather-related disasters (excluding forest fires and coastal erosion) over the next 20 years. It looked at the respective contributions of socio-economic factors and of climate change.

According to the study, the additional costs to be expected by 2030 amount to €30bn as a result of:

- socio-economic change such as population growth, increased wealth of households and businesses, and internal migration (€16bn); and,
- climate change (€14bn).

Of this total €30bn cost, €16bn would directly affect the price of natural catastrophe insurance, which would rise to account for 25% of the property insurance costs of household and business, compared to 16% today.

### Chart 3 | Socio-economic and climate change effects on economic losses in France



Source: FFSA

1 "Synthèse de l'étude relative à l'impact du changement climatique et de l'aménagement du territoire sur la survenance d'événements naturels en France", Colloque impacts du changement climatique, FFSA, 29 April 2009, <http://www.ffsa.fr/webffsa/portailffsa.nsf/html/etudechangementclimatique>

economic losses caused by weather-related events between 1980 and 2008 (65% of overall natural catastrophic losses).

Particularly damaging in this period were the floods of 2002 which caused around €19bn<sup>10</sup> of economic losses, and the heatwave of 2003, whose direct cost was €10.9bn (2003 exchange rate)<sup>11</sup> and which caused around 70 000 premature deaths<sup>12</sup>. The total cost in France of the 2003 hot summer is estimated at somewhere between €15bn and €30bn (0.1–0.2% of French GDP)<sup>13</sup>. This total cost takes into account the overall economic loss, including the effects

<sup>10</sup> Munich Re estimate. The floods were two separate events (4-13 August and 12-20 August).

<sup>11</sup> Munich Re estimate (original value)

<sup>12</sup> "Impacts of Europe's changing climate, 2008 indicator-based assessment", Joint European Environment Agency-JRC-WHO report, 2008

<sup>13</sup> *Ibid*, p170-171, [http://www.eea.europa.eu/publications/eea\\_report\\_2008\\_4/pp161-192CC2008Ch6\\_7Adaptation\\_Consequences.pdf](http://www.eea.europa.eu/publications/eea_report_2008_4/pp161-192CC2008Ch6_7Adaptation_Consequences.pdf)

on power generation, the transport system, forests and other ecosystems, and includes fires, reduced wine production and decreased agricultural productivity. The 2003 heatwave is estimated to have led to economic losses of €10bn in European agriculture from the combined effects of drought, heat stress and fire<sup>14</sup>. It is also estimated to have increased building subsidence claims in the UK by 20% at a cost of €43m to €73m (2003 exchange rate) and led to damage to transport infrastructure (rail buckling and road subsidence) of €58m (2003 exchange rate)<sup>15</sup>.

Between 1980 and 2008, extreme weather-related events represented €322bn (84%) of the €386bn overall losses caused by natural catastrophes in Europe<sup>16</sup>.

The economic impact of extreme weather events is well illustrated by the floods in central Europe in 2002 (see Table 1), which caused losses in the Czech Republic representing 3.75% of 2002 GDP.

**Table 1 | Costliest weather catastrophes in Europe — 1980–2009**

Date	Event	Affected area	Losses (€m)*		Deaths
			Insured	Total	
26.12.1999	Winter storm Lothar	Austria, Belgium, France, Germany, Switzerland	5 900	11 500	110
18-20.1.2007	Winter storm Kyrill	Austria, Belgium, Byelarus, Czech Republic, Denmark, France, Germany, Netherlands, Poland, Slovenia, Switzerland, UK, Ukraine	4 500	7 800	49
25-26.1.1990	Winter storm Daria	Belgium, Denmark, Finland, France, Germany, Ireland, Luxembourg, Netherlands, Norway, Poland, Sweden, UK	4 400	5 900	94
12-20.8.2002	Floods, severe storm	Austria, Czech Republic, Germany, Hungary, Italy, Moldova, Slovakia, Switzerland	3 500	16 800	39
15-16.10.1987	Winter storm 87J	France, Norway, Spain, UK	2 750	3 500	18
27-28.12.1999	Winter storm Martin	France, Spain, Switzerland	2 500	4 100	30
3-4.12.1999	Winter storm Anatol	Denmark, Germany, Latvia, Lithuania, Poland, Russia, Sweden, UK	2 400	3 000	20
25-30.6.2007	Floods, severe storm	UK	2 200	3 000	4
20-23.7.2007	Floods	UK	2 200	3 000	1
7-9.1.2005	Winter storm Erwin	Denmark, Estonia, Finland, Germany, Ireland, Latvia, Lithuania, Norway, Russia, Sweden, UK	2 000	4 500	18

\*Original values, not inflation-adjusted, as at October 2009

Source: Munich Re, Geo Risks Research, NatCatService

**Between 1980 and 2008, 90% of the natural catastrophes in Europe were extreme weather-related**

Worldwide, 86% of all natural catastrophes between 1980 and 2008 were caused by weather events such as windstorms, hailstorms, severe storms, floods and extreme temperatures (see Chart 4). In Europe, the figures are even more striking. In the same period, 90% of all natural catastrophes were related to extreme weather (see Chart 5). While major natural catastrophes caused by

14 "Impacts of Europe's changing climate, 2008 indicator-based assessment", Joint European Environment Agency-JRC-WHO report, 2008

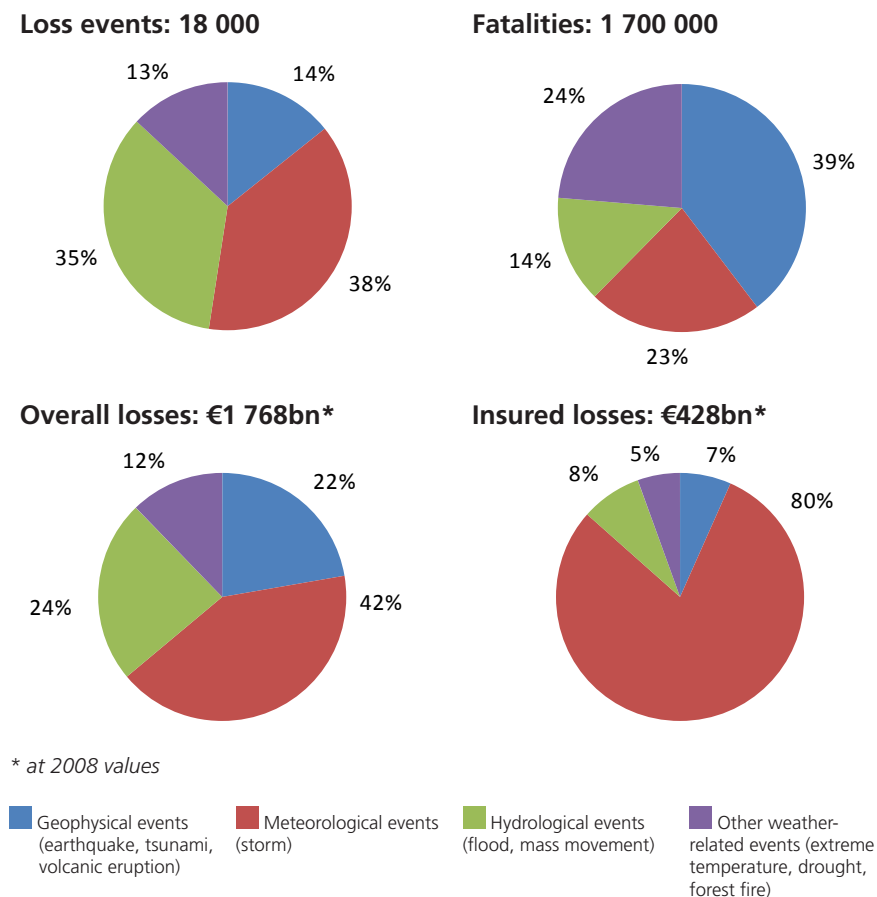
15 "The social costs of carbon (SCC) review – Methodological approaches for using SCC estimates in policy assessment", Watkiss et al, Final Report to DEFRA, January 2006

16 Both figures at 2008 values

extreme weather (for example windstorms, floods, extreme temperatures) have increased significantly in frequency during the last 50 years, major catastrophes with geophysical causes (for example earthquakes, tsunamis, volcanic eruptions) have remained relatively stable. These are clear indications that the growth in the occurrence of natural catastrophes is linked to globally observed climatic changes. Clearly, action is required to cope with the rising frequency, scale and economic impact of weather-related catastrophes.

The ability of climate data and computer models to provide enough information to make reasonable estimates about future changes in the climate will be a decisive factor in developing adequate adaptation and mitigation strategies<sup>17</sup>. European insurers have been studying the possible impact of climate change for three decades and are at the forefront of this research, which gives insight into the adverse affects of climate change on the occurrence and impact of extreme weather disasters.

**Chart 4 | Natural catastrophes worldwide — 1980–2008**

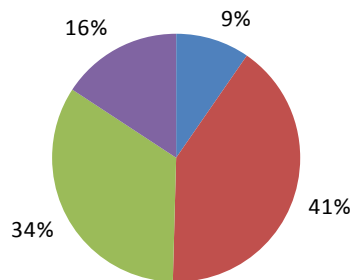


Source: Munich Re, Geo Risks Research, NatCatService, as at January 2009

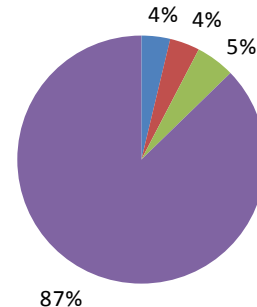
17 "Weather catastrophes and climate change: Is there still hope for us?", Munich Re, 2005, p219

**Chart 5 | Natural catastrophes in Europe — 1980–2008**

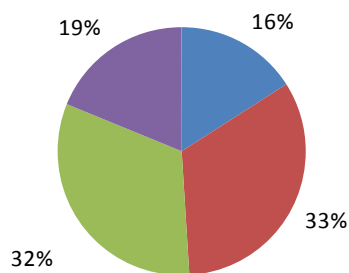
**Loss events: 3 800**



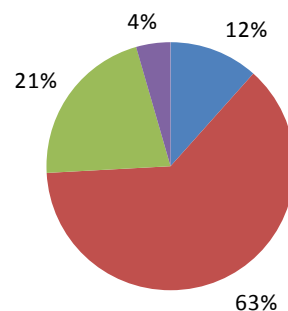
**Fatalities: 91 000**



**Overall losses: €390bn\***



**Insured losses: €111bn\***



\* at 2008 values



Source: Munich Re, Geo Risks Research, NatCatService, as at May 2009

## 1.2 Other expected impacts of climate change

The higher frequency and severity of weather-related disasters are expected to lead to<sup>18</sup>:

- a considerable rise in the risk of crop failure;
- a projected 86 000 extra deaths a year in EU member states;
- an increase in the number of disease cases of 20 000 a year by 2030 and of 25 000–40 000 by 2080.

The changing climate will also directly affect the agricultural sector (yields, habits, etc.). For example, climate-related changes in crop yields are expected to vary between at least -10% in the Mediterranean countries and the south-west Balkans to +10% in northern Europe<sup>19</sup>. The energy sector (cooling processes, demand, etc.), tourism and water management will also be directly affected.

<sup>18</sup> EC White Paper "Adapting to climate change: towards a European framework for action", COM(2009)147/4, 1 April 2009, p4, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2009:0147:FIN:EN:PDF>

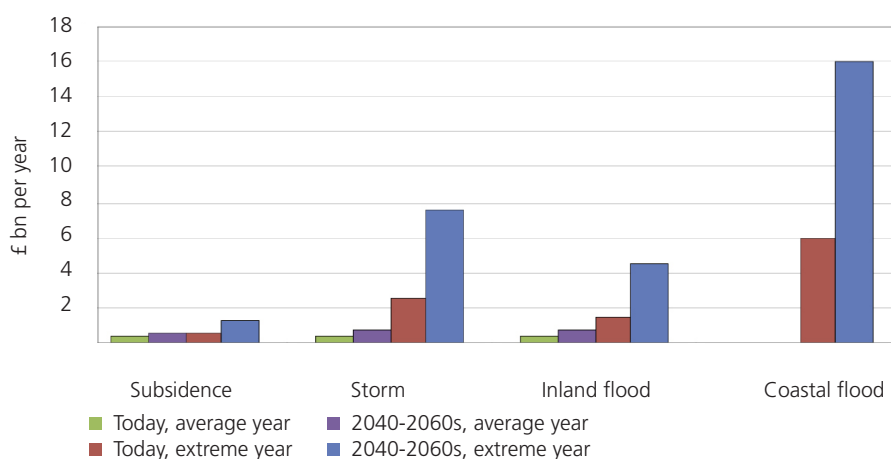
<sup>19</sup> "Impacts of Europe's changing climate, 2008 indicator-based assessment", Joint European Environment Agency-JRC-WHO report, 2008

### 1.3 Estimating the financial impact of climate change

The majority of studies on climate change focus on predicting the possible weather-related changes caused by global warming. However, these studies underestimate the potential full impact of climate change on future storm losses because they often fail to take into account the costs of flooding caused by intense precipitation (rain and snow) and by storm surges. In addition, the impact of socio-economic factors such as growing population size, wealth, infrastructure and assets at risk are often not considered, even though such factors could substantially increase society's losses from severe storms.

**Further studies are needed for the modelling of economic and social costs**

**Chart 6 | Climate change and UK weather damage**



Source: Association of British Insurers

The economic losses caused by weather-related catastrophes are already high and are increasing. Between 1990 and 2008, weather-related disasters led to worldwide economic losses of more than €1 400bn (inflation-adjusted to 2008) and 600 000 fatalities<sup>20</sup>. The UK's 2006 Stern Review<sup>21</sup> estimated that the overall costs of climate change would be equivalent to losing at least 5% of global GDP each year. According to these estimates, the annual cost of extreme weather events will double in the coming decades and account for 10-20% of the total economic impact of climate change<sup>22</sup>.

While such studies give a useful insight into the magnitude of the economics of climate change, further studies are needed to improve the modelling of the economic and social costs arising from the effects of climate change. The CEA therefore welcomes the EC's plan "to develop methods, models, data sets, and prediction tools"<sup>23</sup>. European insurers are keen to take part in these activities.

<sup>20</sup> Munich Re NatCatService

<sup>21</sup> Independent study commissioned from Sir Nick Stern by the UK Chancellor to review the economics of climate change in order to understand more comprehensively the nature of the economic challenges and how they can be met in the UK and globally

<sup>22</sup> Stern Review, executive summary, pVI

<sup>23</sup> EC White Paper "Adapting to climate change: towards a European framework for action", COM(2009)147/4, 1 April 2009, p8 <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2009:0147:FIN:EN:PDF>

## II. The impact of climate change on insurers

**Climate change will mean a paradigm shift for the insurance industry over the coming decades**

Insurance is directly affected by climate change, since it is often insurers and reinsurers that take responsibility for dealing with its consequences<sup>24</sup>.

The most apparent impact of climate change on the insurance industry is the expected increase in claims expenditure, as a result of the industry's pivotal role in the compensation of the financial losses incurred by insured households, farmers, energy providers, etc.

Climate change will have a direct impact on claims across a significant number of the industry's business lines, such as property, crop, livestock, business interruption, motor and health, but the insurance industry also faces other indirect effects which will challenge its profitability and business model. "[T]he insurance industry is exposed to climate change from extreme events which will [...] affect some assets, and on the investment side, from changes in the cost of carbon that will affect the economics of entire industries and assets like real estate"<sup>25</sup>.

More fundamentally, climate change will mean a paradigm shift for the insurance industry over the coming decades: the insurance industry will have to change its financial processes (eg funding, risk mitigation techniques and provisioning), its business processes (eg underwriting and claims) and its general operations in order to cope with the challenges of regulatory and market developments.

### II.1 Increasing claims expenditure — past experience

**An increasing share of economic losses caused by climate change is covered by insurers**

An increasing share of economic losses caused by climate change is covered by insurers.

Worldwide, in the 1980s, 16% of weather-related losses (mean value) were insured. This doubled to 31% on average during the past 10 years (1999 to 2008) and reached 41.5% during the past five years. The three highest insured losses (at 2008 values) that have occurred since 1980 took place in the past five years (see chart 7).

On average, Europe faced an annual economic loss burden of €11.1bn (at the exchange rate of the year) between 1980 and 2008 as a result of weather-related events. Some 31.4% of this was paid for by insurers. The insured percentage of economic losses has increased from an average of 25% in the 1980s to 33% during the past 10 years (1999–2008). This percentage rose to 44% during the last five years (see chart 8).

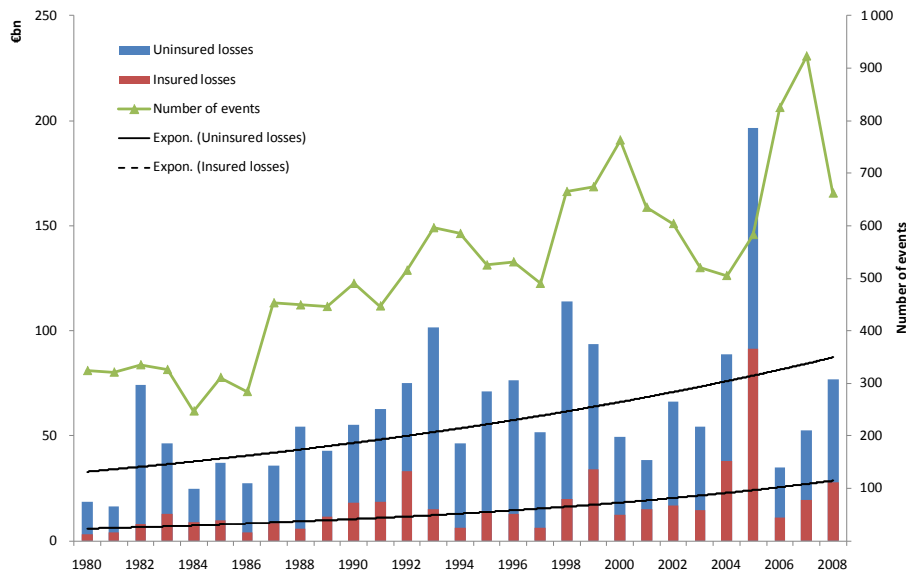
The impact on the insurance industry depends on the insurance solutions in place, which vary widely across Europe (see section II.2).

<sup>24</sup> "A changing climate for insurers", Association of British Insurers, 2004, p3

<sup>25</sup> "Coping with climate change: risks and opportunities for insurers", Climate change research report 2009, UK Chartered Insurance Institute

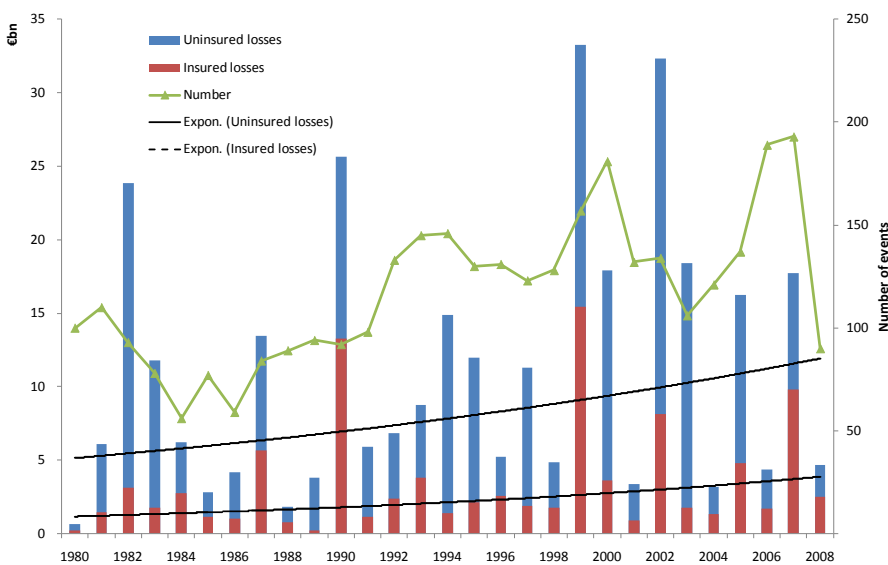


**Chart 7 | Worldwide weather-related disasters — 1980–2008**



Source: Munich Re, Geo Risks Research, NatCatService, May 2009

**Chart 8 | Weather-related disasters in Europe — 1980–2008**



Source: Munich Re, Geo Risks Research, NatCatService, May 2009

## II.2 Insurance supply and demand

There are four main categories of insurance solutions, depending on the roles of the insurance industry and the state.

In most countries there is no state intervention and most insurance for natural hazards is optional. The penetration rate of this insurance cover varies depending on the risk perception and risk exposure.

In the Netherlands and Denmark insurers play a minimal or optional role in the provision of cover for natural hazards. The state provides cover funded from its annual budget or through a tax levied on fire damage policies which are managed by a specific fund.

In Switzerland the state does not intervene in the provision of insurance but instead makes the insurance of certain risks compulsory, mostly through fire contracts.

In Belgium, France, Norway and Romania there is a mix of compulsory insurance and state intervention. A similar approach is currently being considered by Italy. In most of these countries, the natural catastrophe cover has to be included in certain insurance policies (eg home insurance), but purchase of those policies is voluntary.

**Table 2 | Natural catastrophe insurance coverage across Europe**

	Austria	Belgium	Czech Republic	Denmark	Finland	France	Germany	Greece	Italy	Netherlands	Norway	Poland	Portugal	Spain	Sweden	Switzerland	Turkey	United Kingdom
Storm	O	C <sup>1</sup>	O	O	O	C	O	S	N	O	P	O	O	P	O	C	O	O
Cyclone/hurricane	O	C <sup>1</sup>	N	O	O	C	O	S	N	O	P	N	O	P	O	C	O	O
Floods	O	C <sup>1</sup>	O	N	O	C	S	S	O	N	P	O	O	P	O	C	O	O
Hail	O	O	O	O	O	O	O	S	O	O	S	O	C <sup>2</sup>	O	O	C	S	O
Landslides	O	C <sup>1</sup>	O	O	O	C	S	S	O	S	P	O	O	S	O	C	O	O
Snow	O	O	O	O	O	O	S	S	O	O	N	O	N	O	O	C	O	O
Frost	O	O	O	O	N	O	O	S	O	O	O	O	N	O	O	O	N	O
Avalanche	O	N	O	N	O	C	S	N	O	N	P	O	N	O	O	C	N	N
Drought	O	N	S	N	N	C	N	N	N	N	N	N	N	S	O	N	N	N
Subsidence	O	C <sup>0</sup>	O	N	N	C	S	S	N	N	N	O	O	S	O	N	O	O
Earthquakes	N	C <sup>1</sup>	O			C	O	O	N	N	P	O	O	P	O	O	C	O
Forest fires	S	N	N	O	O	S	O	S	N	O	O	O	O	S	O	N	S	N
Volcanic eruption	N	N	O			C	O	O	N	N	P	O	O	P	O			N
Lightning	O	O	O		O	O	O	O	O	O				O	O		O	O

1 for simple retail risks only  
2 only if hail results from a storm

**Type of insurance cover**

- C = Compulsory cover by law
- P = Obligatory pool
- O = Optional cover
- S = Cover offered but not widely taken
- N = Non-existent

**Rate of penetration of cover**

- = > 75%
- = 25-75%
- = 10-25%
- = < 10%
- = not known

Source: CEA

Where there are state insurance schemes, they differ from country to country depending on the pricing freedom accorded to insurers. For example, insurance pricing is not regulated in the UK or Germany, but a flat rate is applied for all risks in Denmark, France, Norway and Spain.

The differences in coverage may reflect the differences in risk exposure and the difficulty in meeting the conditions of insurability. But there are other possible reasons such as underestimation or a lack of awareness of the magnitude of the risk exposure, or the anticipated receipt of compensation from public authorities.

**Differences in risk exposure**

Europe’s diverse climate makes it vulnerable to a wide range of weather-related risks. For example, areas of western, central and eastern Europe with large rivers

are vulnerable to flooding. Southern Europe is susceptible to drought and forest fires, western Europe to storms, and mountainous areas such as the Alps and the Pyrenees to landslides and avalanches.

Consequently, while almost all European countries are affected by the adverse consequences of climate change, they are not necessarily exposed to the same types of risk. Some northern and most southern and eastern European countries are also exposed to catastrophes of geophysical origin (such as earthquakes, tsunamis and volcanic eruptions). In these countries, most insurers combine coverage for these events with coverage for extreme weather catastrophes and extend the insurance coverage for property to both weather-related and geophysical hazards.

### **Difficulties meeting the conditions of insurability**

In several countries, insurance coverage for natural hazards is difficult to provide because of the potential size of the risk and the limited pool of policyholders.

Furthermore, underestimation of risk and expectations of assistance from the state or other donors limit the demand for natural catastrophe insurance. With many people uninsured for natural catastrophe risks, this reduces the pool of insureds, making the cover less economically viable for insurers and leaving many people exposed to the economic consequences of a natural catastrophe.

In some countries, compulsory insurance for natural catastrophes (with graded premiums), or incentives to buy such insurance products, helps to increase the size of the pool and thus increase insurability.

### **Lack of awareness**

The significant variation in the occurrence of natural catastrophes also leads to variations in levels of risk awareness. After a major flood or storm, people are very conscious of the risk and are more willing to invest in insurance policies and prevention measures to reduce the impact of similar catastrophes in the future. However, after several years without catastrophes, the public's focus often shifts, leading to a lack of prevention, the building of property in risk-prone areas and a reduction in insurance cover.

Moreover, the future impacts of climate change are not always sufficiently clear to the general public and are often underestimated, leading to a low take-up of weather-related disaster insurance. It is therefore very important that authorities invest in public awareness.

### **Expectation of public intervention**

There is a general expectation among the public of some state intervention in the event of a major natural catastrophe. This tends to lower the demand for *ex-ante* (before the event) protection as provided by insurance. A study by the University of Hamburg noted: "The 2002 floods as well as other catastrophic events have shown that victims to a great extent receive assistance from the state and from private sources. The low demand for fundamental risk coverage and insufficient loss prevention can therefore be explained by the potential victims' anticipation of (costless) non-insurance assistance. We need to be aware that this

**There is no one-size-fits-all solution**

**Public-private partnership is crucial, especially where risks are almost uninsurable**

**Inappropriate public intervention is counter-productive**

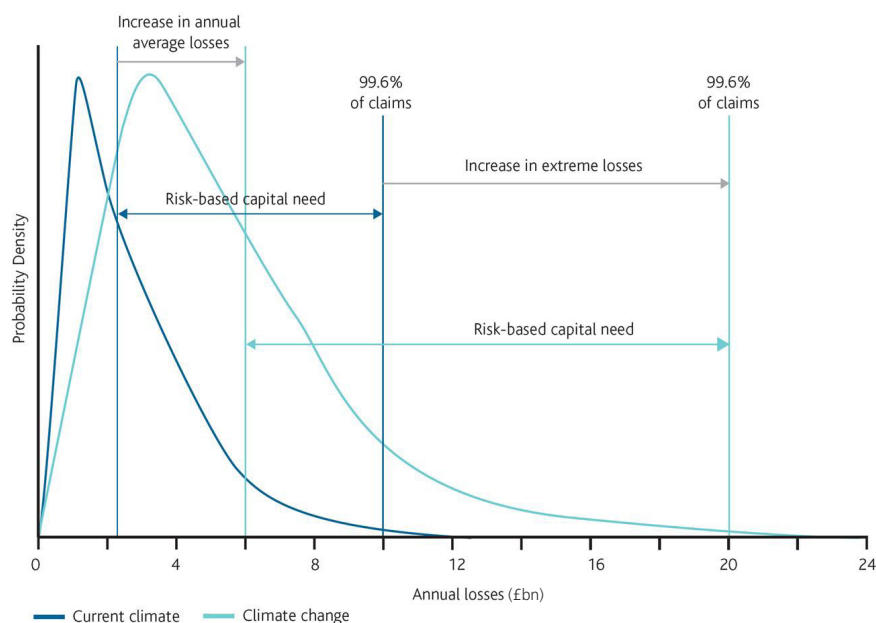
**The insurability of weather-related catastrophes in the future is in question**

considerably reduces incentives to invest in loss prevention on an individual as well as on a collective basis.”<sup>26</sup>

### II.3 Increasing claims expenditures — the future

Insured losses caused by natural catastrophes, and their volatility, will rise. This means that insurance companies will have to cope with an increasing average and maximum loss burden if the insurance coverage remains unchanged. Sufficient capital is required to bridge the gap between expected and extreme losses, as shown in Chart 9. This risk capital ensures that the insurer can pay its liabilities, even following a major catastrophe<sup>27</sup>.

**Chart 9 | Impact of climate change on risk capital requirements**



Source: “Financial risks of climate change”, Association of British Insurers, 2005, p37

As the adverse effects of climate change become increasingly apparent, the demand for insurance to cover the costs resulting from weather-related catastrophes will grow. Although this could offer a potential business opportunity, a number of requirements for insurability have to be met before the coverage can be delivered.

Increased demand goes hand in hand with increased risk exposure. The potential losses from certain weather-related catastrophes in regions with a high risk exposure might be too high for the insurance industry to bear on its own. Also, the tendency of policyholders with high risks of loss to buy more insurance

<sup>26</sup> “Catastrophic events as threats to society: private and public risk management strategies”, M Nell and A Richter, University of Hamburg, 2004, p17

<sup>27</sup> “Financial risks of climate change”, Association of British Insurers, 2005, p36. In the example distribution the annual expected loss is \$3bn. If an insurer wants to be sure that it can pay claims in 99.6% of all cases (ie including those arising from a 1-in-250 year event should it occur), it needs access to sufficient resources to pay \$10bn, as opposed to \$3bn. The 1-in-250 year event represents an “unexpected” loss, in that the corresponding claim far exceeds the expected or average loss. Unexpected losses are a financial risk to the insurer. In this case, the difference between the unexpected loss and expected loss is \$7bn, and the insurer will need to provide sufficient capital to cover unexpected losses up to a chosen threshold (ie the 1-in-250 year event). In the example, the insurer will need to allocate \$7bn of capital to this line of business.

products than buyers with lower prospects of loss — so-called adverse selection — makes it harder for insurers to spread their risks.

The insurance industry is innovative and so, if public authorities work closely with insurers and reinsurers, sustainable financial solutions should be found that provide coverage for weather-related catastrophe risks which would otherwise be commercially unviable. An example of a solution that public authorities could develop would be flood management authorities that offer contractual indemnification to the owners of land designated to be flooded to reduce the exposure and thus increase the insurability of urban settlements downstream.

In most countries, insurance against extreme weather events is sold combined with coverage against telluric hazards (such as earthquake) in order to increase risk pooling.

### II.3.1 Consequences for specific insurance classes

Climate change and the increasing occurrence and intensity of extreme weather events will have an impact on many lines of insurance business. Property insurance is the most obviously vulnerable, but a wide range of other insurance lines is likely to be affected as well. The impact of climate change on the losses in individual insurance classes is summarised in Table 3.

Climate change will have an impact on many lines of insurance business

**Table 3 | Impact of climate change on losses in individual insurance lines**

Hazards	Timeframe	Property (individual and commercial lines)	Engineering (EAR, CAR*)	Marine	Agricultural (crop and livestock)	Motor own damage	Aviation and space	Contingency risks (cancellation of event)	Life and health	Liability
Floods, storm surge	5-10 years	Yellow	Orange	Yellow	Yellow	Yellow	Yellow	Orange	Yellow	Orange
	10-30 years	Orange	Red	Orange	Orange	Orange	Yellow	Red	Yellow	Red
Storms, flash floods	5-10 years	Orange	Orange	Yellow	Yellow	Orange	Yellow	Orange	Yellow	Yellow
	10-30 years	Red	Red	Red	Orange	Red	Orange	Red	Yellow	Orange
Heatwaves and drought	5-10 years	Yellow	Yellow	Yellow	Orange	Yellow	Orange	Orange	Yellow	Yellow
	10-30 years	Yellow	Orange	Yellow	Red	Yellow	Orange	Orange	Orange	Orange
Less frost and cold weather	5-10 years	Green	Green	Green	Green	Green	White	Orange	Green	White
	10-30 years	Green	Green	Green	Green	Green	White	Red	Green	White
Rising sea levels	5-10 years	Yellow	Yellow	White	Yellow	White	White	White	White	Orange
	10-30 years	Orange	Orange	Yellow	Yellow	White	White	White	White	Red
Tropical cyclones	5-10 years	Orange	Orange	Yellow	Yellow	Yellow	Yellow	Orange	White	Orange
	10-30 years	Red	Red	Orange	Yellow	Yellow	Yellow	Red	White	Red
Extratropical storms	5-10 years	Orange	Yellow	White	Yellow	Yellow	White	Yellow	White	Yellow
	10-30 years	Red	Orange	Yellow	Yellow	Yellow	White	Orange	White	Orange
Melting of polar icecaps	5-10 years	White	White	Red	Yellow	White	White	White	White	Yellow
	10-30 years	Yellow	Yellow	Red	Yellow	White	White	White	White	Orange

\* EAR = Erection All Risks, CAR = Contractors All Risks

- generally positive
- no
- slightly negative
- fairly negative
- highly negative

Source: "Globe of Natural Hazards", Munich Re, 2009

### Property

Europe will have to deal with increased average precipitation (rain and snow) and flash floods, which will particularly affect underground infrastructures. In several places, the impact of flash floods on property insurance will be aggravated by badly maintained or ageing water supply systems and sewer infrastructures.

Coastal property is at risk from rising sea levels and the increasing strength of storm surges. Homes and industrial property located close to rivers will also come under threat from rising water levels, causing more frequent or intense floods.

Drought, on the other hand, could damage foundations by soil settling and subsidence. It is estimated that the 2003 heatwave increased building subsidence claims in the UK by 20%<sup>28</sup>.

Although rising average winter temperatures caused by global warming may reduce losses from frost, sudden and extreme frost events could negate the benefits of any such decrease.

### Life and health

**Climate change will have the greatest health implications for the most vulnerable groups in society**

The unprecedented temperatures and duration of the 2003 European heatwave demonstrated that the potential impact of climate change on health insurance is much greater than previously expected. With temperatures soaring to 6°C hotter than the average for the 20<sup>th</sup> century, the heatwave increased hospital admissions and contributed to the premature deaths of 22 000 to 35 000 people in five European countries<sup>29</sup>. It is estimated that by the 2040s, more than half of all European summers will be warmer than that of 2003<sup>30</sup>.

The increasing occurrence of floods, storms and cyclones could also lead to an increase in the risk of infectious diseases. Sunnier summers also lead to an increasing risk of skin cancer.

Climate change will have the greatest health implications for the most vulnerable groups in society, namely the very young, the elderly and the chronically ill.

In those countries where private health insurance is the primary means for covering healthcare costs, the climate change implications for insurance will be far greater.

### Agriculture

**The future viability of agriculture will depend on the funds allocated to risk-management instruments such as state-subsidised insurance solutions**

Drought and floods can also have a variety of consequences for farmers. They can increase heat stress in animals, increase the risk of damage to certain crops, reduce returns from crops and increase the risk of forest fires and lower productivity of agricultural land. Prolonged droughts can also lead to forest fires that could endanger agricultural land and result in air pollution in the affected regions.

Climate change will require increased provision to cover loss of earnings caused by natural hazards for insurers and farmers. Private provision and *ad hoc* compensation from state or occupational sources are limited and today are already insufficient in disasters such as droughts or livestock epidemics.

28 "Impacts of Europe's changing climate, 2008 indicator-based assessment", Joint European Environment Agency-JRC-WHO report, 2008, p171

29 "Climate change futures: Health ecological and economic dimensions", The Centre for Health and the Global Environment, Harvard Medical School, 2006, p55

30 "Financial risks of climate change", Association of British Insurers, 2005, p8

Fundamental political decisions will have to be taken to ensure the future viability of animal and plant production by allocating more funds to sustainable risk management instruments. This should ultimately guarantee the security of farmers' earnings even under changing production conditions. In particular, cost-sharing systems such as state-subsidised insurance solutions need to be introduced in those EU member states that do not have such solutions in place. This should be part of the new financial framework for the Common Agricultural Policy.

The existing EU legal framework for state-promoted provision schemes for plant production needs to be developed further. Schemes need to be introduced to offer protection against natural disasters, adverse weather conditions, animal and plant diseases, and epidemics. In the future, stable earnings and variety in European agriculture will only be sustainable through contractual provision and compensation schemes in a close alliance between the private insurance industry, the state and farmers.

### Motor

Summer motor accidents caused by poor weather and extreme or unexpected meteorological conditions could become more numerous. A study in 2003 by Munich University showed a link between the number of road accidents and changes in meteorological conditions. Accident statistics are affected not only by major natural events such as storms, but by changed weather conditions. The statistics showed that road accidents were more numerous on hot days (+18%), for example.

Hail is one of the costliest natural catastrophes for motor damage insurance (casco insurance). Vehicles can be damaged by hailstones of just 2cm in diameter compared with 4cm in the case of buildings. Hail cover varies considerably across Europe. In Switzerland more than 90% of registered vehicles are insured against hail, over 75% are in Germany and a mere 20% are in Italy<sup>31</sup>.

There can also be significant damage to vehicles from storms (falling trees, rocks, pieces of roof) and from floods, landslides and avalanches.

In order to address environmental concerns, vehicle manufacturers have been adopting lighter and more efficient materials in body repair and increasingly complex powertrains. This makes vehicles more difficult to repair and will lead to new types of damage patterns. Consequently, repair costs may increase and it will be necessary to train claims specialists to cope with these more complex claim settlements. Also, the pricing of motor insurance may need to take into account the characteristics of these new cars<sup>32</sup>.

### Liability

There could well be a rise in liability claims as a result of increased frequency of accidents and mistakes. Conditions will be different from those predicted on the basis of historical experience. People who are inadequately insured for their own

Accident statistics are affected by changed weather conditions

31 "Highs and lows — weather risks in central Europe", Knowledge series, Munich Re, 2008

32 "The green challenge — global vehicle manufacturers dare not take this important factor into account", Research News Issue 1/2009, Thatcham, UK, [http://www.thatcham.org/research/pdfs/research\\_news\\_vol4\\_issue1.pdf](http://www.thatcham.org/research/pdfs/research_news_vol4_issue1.pdf)

damage will look for a potentially liable party, such as the public authority or the designer, producer or supplier of a good, in order to get compensation for losses that would otherwise not be covered.

This threat will particularly affect the public liability insurance of those authorities in charge of prevention measures or defences (eg in cases of lack of maintenance) or in charge of land planning or building authorisation (eg when providing building permits in risky areas). The professional indemnity insurance of architects and builders could also be affected for, for example, failure to comply with building codes or for disregarding state-of-the-art techniques for climate-friendly and climate-resilient buildings. Liability insurance in the food sector might also be affected by higher temperatures, leading to, for instance, more incidences of food poisoning due to insufficiently refrigerated transport and storage.

Legal actions have already been filed against greenhouse gas-emitting industries such as the automobile industries in Japan and the US. However these cases have little chance of success for a number of reasons:

- the current state of scientific knowledge is not advanced enough to discriminate between natural variability and anthropogenic causes of extreme events, and this is unlikely to change in the near future;
- it is not possible to attribute unequivocally any single extreme climate event to man-made greenhouse gas emissions<sup>33</sup>; and,
- in cases of proven anthropogenic effect, it would still be necessary to define the precise contribution of the specific greenhouse gas-emitting organisation to be taken to court.

Though such proceedings are unlikely ever to result in a successful insurance claim, defending these actions can be costly in terms of resources and reputation.

### **Business interruption**

In some cases extreme weather events result in business interruption, affecting turnover and operating results. In addition to the direct loss of income and potential loss of clientele, affected businesses must continue to pay their fixed overheads during any interruption. This further worsens their situation and potentially endangers their survival.

All businesses, large and small, are exposed to such risks but the largest undertakings may have sufficient means to deal with them. Small and medium-sized enterprises (SMEs), which are considered to be the backbone of the European economy, are the most vulnerable to the impacts of climate change and are generally not prepared for them. They have fewer resources to fall back on and generally tend to be less well prepared, with poor risk assessment, inadequate insurance and no business continuity plan.

Some 60–80% of SMEs become bankrupt when hit by an extreme event if they are not properly insured against business interruption.

**Some 60–80% of SMEs become bankrupt when hit by an extreme event if they are not properly insured against business interruption**

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<sup>33</sup> "The insurance industry and climate change — contribution to the global debate", The Geneva Reports — Risk and Insurance Research, The Geneva Association, July 2009, p65



SMEs are also more dependent on staff attendance. Consequently, transport disruptions, school closures, damage to homes, and ill or injured workers and their families can all prove critical to their survival in the aftermath of a severe weather-related event. SMEs are also vulnerable to staff leaving for other jobs if they are not able to pay wages during business interruption.

In 2006, insurance group Axa conducted a survey<sup>34</sup> of small businesses in recently flooded areas and recorded the comments of managers and owners of small companies that had survived recent major floods. Such businesses should be particularly aware of the potential impacts of climate change. The survey found that although 85% of small businesses felt that climate change was a problem for the world, 46% said climate change was blown out of proportion and only 26% thought it was a real threat to them, despite having recently been flooded. Axa's research indicated that the most vulnerable businesses are the very small ones and those involved in the leisure industry.

Even though SMEs are the most vulnerable, large undertakings can also suffer from the consequences of weather-related disasters. Their equipment and processes are often tailor-made and capital intensive. Their business often depends on premises, providers and customers outside Europe in regions that are more exposed to natural disasters (eg China). Also, their supply chain is much more exposed to interruptions to transport and shipping shortages.

Because many large businesses have multiple locations, they can be more directly affected by property damage. Essential infrastructure such as power, telecommunications and roads may be affected for some time, further increasing the interruption to the operation of the business. Also, the domestic circumstances of employees can increase absence, and construction material may be hard to obtain or become very expensive, delaying reconstruction and repair. Contingency plans may not work, especially if they are reliant on inaccurate assumptions about material, personal capacities and the business environment. Also, post-loss actions need to be co-ordinated with local or government authorities, as well as other internal and external risk managers. Added together, these factors increase consequential loss and interruption time<sup>35</sup>.

While leaders need to respond decisively to the current financial market instability and the risk of a global recession, they need also to consider what implications their decisions will have in the long term. Risks related to underinvestment in infrastructure, for example, or the degradation of natural resources or climate change, may be low in the short term, but these risks and associated losses increase in the long term<sup>36</sup>.

Early action is needed to provide greater certainty for business, long-term investment and technological change. Inconsistent policies or no policies at all simply deter investment<sup>37</sup>.

34 "Climate change and its effects on small businesses in the UK", Prof. D Crichton, Axa Insurance 2006, ISBN 978 0 9554108 0 2 (condensed version available at [http://www.axa.co.uk/aboutus/corporate\\_publications/climate\\_change.html](http://www.axa.co.uk/aboutus/corporate_publications/climate_change.html))

35 "Coping with climate change: risks and opportunities for insurers", Climate change research report 2009, UK Chartered Insurance Institute

36 "Global risk 2009 — a global risk network report", World Economic Forum, January 2009, <http://www.weforum.org/pdf/globalrisk/2009.pdf>

37 "Climate change and the financial sector — An agenda for action", Allianz Group and WWF, 2005

### III. The role of the insurance industry

**Insurance is not a substitute for other adaptation measures, nor is it an instrument for funding them**

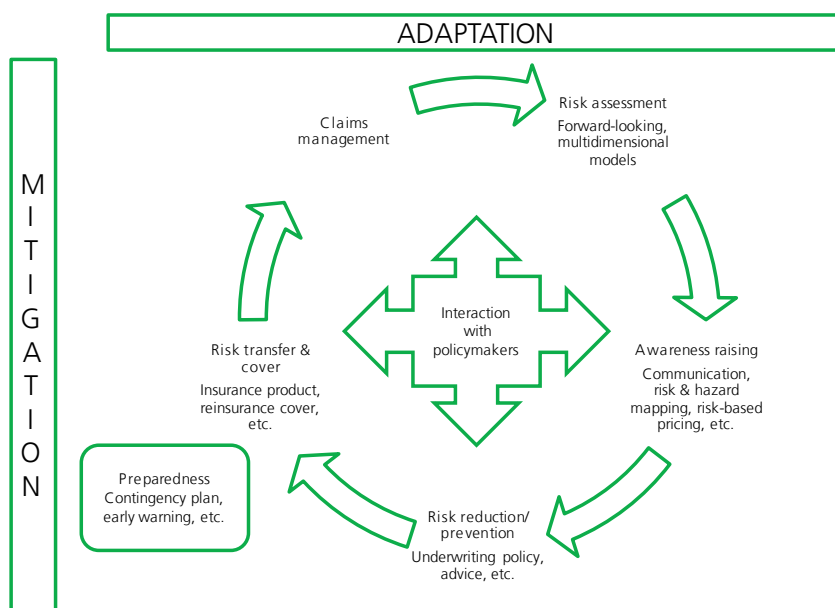
What solutions might be provided by the insurance sector? As the European Commission rightly stated in its White Paper on adapting to climate change<sup>38</sup>, insurance is an instrument for risk-sharing. This buffer function is of great importance for the economy because it allows forward planning with more certainty, covering specific risks that could otherwise threaten business continuity.

Yet the role of insurance goes far beyond risk-sharing. Insurance is an integral part of the whole risk-management cycle, from risk identification to risk transfer and recovery.

Insurance can also help insureds adapt to climate change. An insurance scheme that reflects the level of the risk exposure (such as risk-based insurance premiums) gives policyholders an incentive to invest in risk prevention and other adaptation measures.

However, it must be stressed that insurance is neither a substitute for other adaptation measures nor an instrument for the funding of adaptation measures.

**Chart 10 | Roles of the insurance industry in tackling climate change**



Source: CEA

**Insurance is an integral part of the whole risk-management cycle**

The European (re)insurance industry has a key role to play in tackling the effects of climate change:

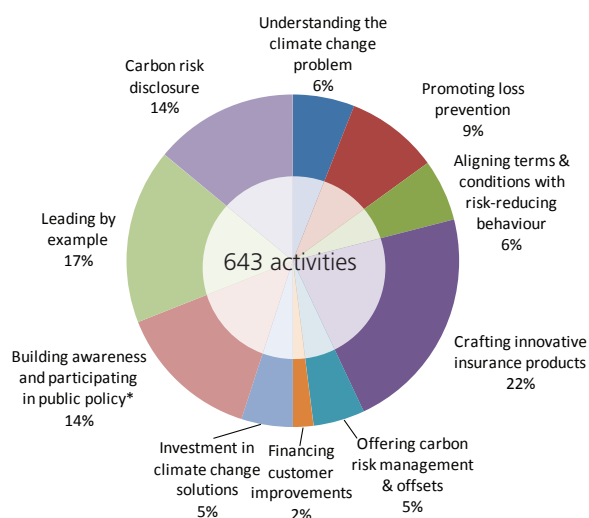
- It provides victims of weather-related events with compensation for their economic losses more quickly than *ex-post* financed schemes such as the European Solidarity Fund.

<sup>38</sup> EC White Paper "Adapting to climate change: towards a European framework for action", COM(2009)147/4, 1 April 2009, p4, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2009:0147:FIN:EN:PDF>

- It develops solutions that contribute to the mitigation of climate change (eg insurance cover for wind farms); and to adaptation to climate change (eg insurance against weather-related disasters).
- It contributes to risk awareness through risk-based terms and conditions and advice to its customers. It offers incentives to increase prevention and other risk management measures.
- It helps policymakers to guide society with tools such as land-use planning and building codes.
- It contributes to a better understanding of risk through, for example, the development of forward-looking risk models.

According to a CERES report<sup>39</sup>, the insurance industry has made significant progress in developing wide-ranging products and services to help global consumers and businesses reduce their exposure to climate change. The report also states that 2008 saw a marked increase (50%) in the number of insurance activities responding to the risks and opportunities of climate change. There were “more creative offerings, deeper institutionalisation of the activities within the companies, and a growing variety of partnerships with non-insurers”. Insurance companies and their trade allies are “drilling deeper”, said the report, and targeting more specific market segments and product types in a growing number of countries. “European insurers have the deepest history with these initiatives, and some of the more comprehensive strategies can be found there.”

**Chart 11 | Insurers’ climate activities — 2008**



These results do not represent a “census” or random sample of the insurance industry. There are thousands of insurers, many of which have no activities. The values reflect the cumulative experience up to 2008, including historical activities that might or might not still be in place.

\* Each activity is counted once, as there is too much subjectivity in assigning weights to each individual activity

Source: “From risk to opportunity — insurer responses to climate change: 2008”, Evan Mills, PhD, CERES, April 2009, p1

<sup>39</sup> “From risk to opportunity — insurer responses to climate change: 2008”, Evan Mills, PhD, CERES, April 2009. Founded in 1989, CERES is a network of investors, environmental organisations and other public interest groups working with companies and investors to address sustainability challenges such as global climate change.

## Examples of initiatives taken by the insurance industry

### Germany — Project Climate Change

In 2007 the German insurance association, the GDV, launched a climate change project to enable it to set out what the sector may contribute in the medium and long term to cope with the effects of climate change. The GDV has divided the work into five sub-projects:

1. Medium and long-term assessment of how the climate will change and what effects are to be expected in terms of insurance. Research is being done by the Potsdam Institute for Climate Impact Research (PIK).
2. GDV research project, with the PIK as a scientific partner, dealing with the ecological, socio-economic and political consequences of climate change.
3. Exploration of the products, services and incentives that the insurance industry needs to develop.
4. Examination of prevention — political and technical angles.
5. Investigation of the insurance industry's potential contribution to global climate protection.

See Annex I for more details.

### Nordic countries — climate statement

In the framework of the Nordic Climate Conference in Copenhagen on 17 September 2009, the Nordic insurance industry issued a statement to say that it will meet the challenge of climate change by:

- developing and offering climate-sustainable products within life and non-life insurance;
- incorporating climate aspects into investment strategy considerations;
- using climate-sustainable methods in loss prevention and claims settlement;
- following up systematically on climate-sustainable activities implemented in the industry; and,
- striving for climate-friendly ways of organising and conducting its business.

### ClimateWise

The 40 members of ClimateWise, the global insurance industry initiative launched in the UK in September 2007, are working individually and collectively to reduce the social and economic risks associated with climate change.

All members are committed to principles in six key areas. These cover climate risk analysis, public policy, climate awareness among customers, investment strategies and the impact of their business operations. Members are also committed to independent public reporting of these commitments (see Annex I for more details).

The second annual independent review of ClimateWise, published in November 2009, reported good overall progress despite the difficult economic environment<sup>40</sup>.

It reports that particularly encouraging is the extent to which members are responding to the need to measure and disclose their own carbon footprint, alongside activities to reflect future climate risk more accurately in their own products. This demonstrates that they recognise climate change as a core driver of business value, and accordingly have not allowed it to be de-prioritised by an increased focus on the bottom line. However, the economic climate has intensified consumer focus on cost as the key issue when selecting insurance cover, and hence restricted the opportunity for product and service innovation.

### III.1 Risk assessment

The (re)insurance industry has been accumulating and sharing expertise on climate risks for many years. Assessing and managing these risks is part of its core business.

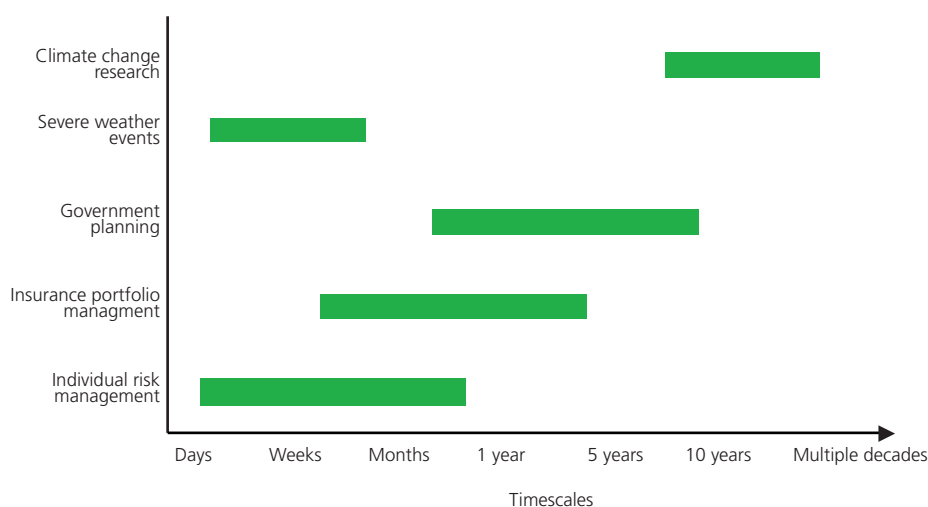
However, data about losses from earlier weather-related disasters is insufficient. This is because of the relatively low frequency of these earlier events and because data records are incomplete. Systematic storage of claims data is needed in order to be able to develop statistical models.

Moreover, as climate change disrupts historical trends, the traditional way of looking at past losses to predict the future, which is still widely used by the insurance industry, is no longer appropriate. Forward-looking models are required that take into account other types of information such as climatic, geological and socio-economic data.

Also, climate change is currently considered on a geographical level and on timescales that are fundamentally different from those on which the insurance industry and its customers operate.

**Risk assessment is part of insurers' core business but appropriate data needs to be made available**

**Chart 12 | Contrasting timescales of climate impacts**



Source: "Coping with climate change: risks and opportunities for insurers", *Climate change research report 2009*, UK Chartered Insurance Institute, chapter 4, p9

<sup>40</sup> ClimateWise the 2009 review, Forum for the Future, November 2009, <http://www.climatewise.org.uk/storage/climatewise-docs/Second%20Year%20Review%202009.pdf>

As the April 2009 CERES report stated, a number of insurers are beginning to apply their expertise in data collection, catastrophe modelling and risk analysis in order to track trends, define the problems posed by climate change and propose solutions for both the industry and society at large. Insurers are also partnering with the scientific community to perform basic research and to build forward-looking risk models that take climate change into account.

Preliminary flood risk assessment (PFRA), the first (facultative) step in the implementation of the EU Floods Directive<sup>41</sup>, is an excellent opportunity for member states to develop simple and consistent methods for assessing assets at risk. Prioritising those most at risk is the second step of flood-hazard and risk mapping.

(Re)insurance companies might benefit when countries take the PFRA approach, as it can provide an additional benchmarking tool for the preliminary assessment of the exposure of their portfolio.

### Examples of insurers' climate risk-modelling initiatives

#### Germany

For its Climate Change Project (see Annex 1), the German insurance association, the GDV, has commissioned the Potsdam Institute for Climate Impact Research (PIK) to assess how climate will change in the near future and what effect this will have on changes in loss frequency, claims expenditure, average claim amount and hence the solvency requirements that the insurance sector might have to face in the future. The first results are expected shortly.

#### UK

Insurers are concerned that the UK is poorly prepared to deal with flooding. This concern has intensified with the demand for increased development arising from the government's housing targets, a realisation that urban areas are becoming more intensively developed and the predicted impacts of climate change.

The climate change impacts include more frequent high intensity rainstorms, increased winter run-off and higher sea levels. The latest guidance suggests that 100-year return period rainfall totals will increase by 30% over the lifetime of developments being built now. All the expected changes will put an increased strain on the urban drainage infrastructure.

The flooding in the UK in 2007 exposed a number of weaknesses and the subsequent reviews and reports produced a large number of recommendations for the government to consider. Legislation aimed at improving the management of the source of flooding is now being considered. The UK insurance industry has sponsored research to provide evidence to help develop this legislation. It draws on recent projects that have aimed to manage surface water in urban areas, supplemented by two projects, in Peterborough and Bristol, where surface water management plans were developed through stakeholder groups including the key institutions involved. The research was published in April 2009. It highlights a range of institutional and process issues that need to be addressed in order to better manage the increasing risk of urban surface water flooding in the UK<sup>42</sup>.

<sup>41</sup> Directive 2007/60/EC on the assessment and management of flood risks, 23 October 2007

<sup>42</sup> Available at <http://www.abi.org.uk/BookShop/ResearchReports/20090423%20SWMP%20report13.pdf>

The Association of British Insurers (ABI) appointed a catastrophe-modelling firm and the UK Met Office to conduct research into the financial risks of climate change. This project followed on from its 2005 financial risks project<sup>43</sup> and specifically looked at the costs of climate risks. Results were published in November 2009<sup>44</sup>.

It has examined the implications of 2°C, 4°C and 6°C changes in global mean temperature on inland flooding in Great Britain, windstorms in the UK and typhoons in China. For each of these, the research assesses the impact of the changing climate by modelling:

- how these likely temperature changes will affect weather hazards and the resulting insured loss;
- the flow-through impact on insurance prices; and,
- the impact on insurance capital requirements.

The research team has used ground-breaking modelling techniques, combining the latest climate models with insurance risk models for the first time. Additional insurance capital requirements were estimated based on forthcoming EU regulation Solvency II's 99.5% requirement that a company should remain solvent for the coming 12 months and used predicted 200-year loss figures.

**Table 4 | Impact of increased temperature on losses, insurance pricing and capital requirements for rain-induced inland flooding in Great Britain**

Temperature change	2°C	4°C	6°C
Increase in average annual insured loss (AAL)	8% £47m	14% £80m	25% £138m
Increase in insured loss from 1-in-100 year events	18% £769m	30% £1 240m	56% £2 353m
Increase in insured loss from 1-in-200 year events	14% £832m	32% £1 920m	73% £4 346m
Theoretical impact on insurance pricing (based on AAL)	16%	27%	47%
Additional minimum capital required for 1-in-200 year flood*	£1 065m	£2 457m	£5 565m

\* Annual GDP growth of 2.5% is assumed

Source: "Assessing the risks of climate change: financial implications", Association of British Insurers, November 2009

### Munich Re and the London School of Economics

German reinsurer Munich Re and the London School of Economics have decided to combine their expertise on climate change. Their cooperation agreement focuses on:

- quantifying the costs of a climate-related increase in natural catastrophes;
- dealing with the uncertainties of climate models;
- evaluating the potential and consequences of emissions trading systems and the appropriate design of such schemes; and,
- estimating the economic impacts of climate change on the BRIC states (Brazil, Russia, India, China).

43 [http://www.abi.org.uk/Display/File/Child/552/Financial\\_Risks\\_of\\_Climate\\_Change.pdf](http://www.abi.org.uk/Display/File/Child/552/Financial_Risks_of_Climate_Change.pdf)

44 "The risks of climate change", Peter Dailey, Matt Huddleston, Simon Brown and Dennis Fasking, AIR Worldwide Corp. and the UK Met Office, ABI research paper n°19, November 2009

### Turkey

A Turkish insurance company, Yapi Kredi Sigorta, has been conducting studies for many years into minimising the negative effects of climate change and helping to inform policyholders. In some districts of Istanbul, Bodrum, Alanya and Bursa, for example, where flood is widespread and has destructive effects, special pricing and underwriting approaches have been devised based on risk assessment. This has also been applied to some parts of Izmir and Istanbul where there is high risk of landslide.

### Insurance contributes to risk awareness in many ways

### III.2 Risk awareness

The insurance industry has been playing an important role in the raising of risk awareness, based on the expertise it has gained through extensive research and experience.

#### Box 2 | Flood-hazard zoning tools developed by insurers

Various major national insurance associations have taken the initiative in developing proprietary flood-hazard zoning tools. These projects include ZÜRS in Germany, FRAT in the Czech Republic and SIGRA in Italy. The starting point for all these initiatives was the unavailability of public data and the lack of commercial suppliers capable of providing the statistical models needed.

In a few countries where public data was becoming more available, some public-private partnerships emerged:

- In Austria, HORA became a joint project between the Federal Ministry of Agriculture, Forestry, Environment and Water Management, the Lebensministerium (LM), and the Austrian insurance association, the VVO, with a public website that has attracted huge numbers of visitors.
- In the UK, there is an informal agreement between the Association of British Insurers (ABI) and the Environment Agency (EA) under which insurance companies have access to improved public data sets.
- In France, Mission Risques Naturels (MRN), a dedicated collaboration between the insurance market associations, developed a website from which insurance companies can get access to all publicly available zoning data.

Public-private partnerships are also under consideration in other countries where insurance market associations have their own proprietary zoning tool, in order to share costs (see arrows on Chart 13).

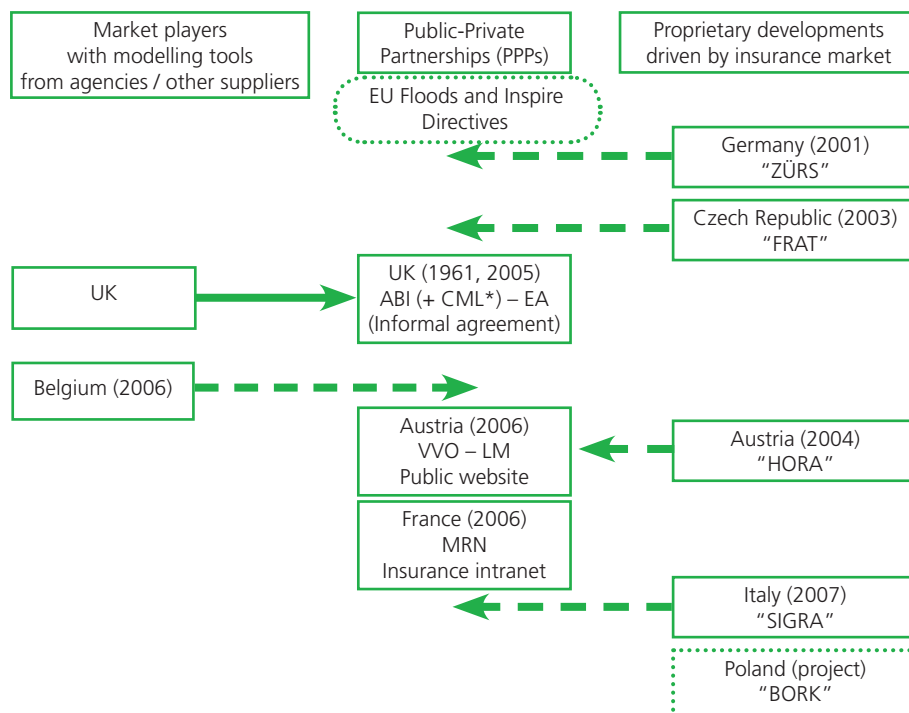
It is expected that the implementation of the EU's Floods and Inspire Directives could encourage more countries and public authorities to consider public-private partnership arrangements in the future.

The development of these various approaches is shown in Chart 13.



The European insurance industry supports land-use planning and raising of risk awareness by developing improved risk-mapping and zoning tools. In some EU member states, the (re)insurance industry has already developed or disseminated risk and hazard maps and zoning tools, sometimes in conjunction with the public authorities<sup>45</sup>. These are good examples of public-private partnerships.

**Chart 13 I Flood-hazard zoning tools (see Box 2)**



\*CML= Council of Mortgage Lenders

(Re)insurance companies also contribute to raising risk awareness via their underwriting policies (eg risk-based insurance premiums, excesses and/or deductibles, required prevention measures, terms and conditions).

When individuals and companies finance solutions themselves, they are more aware of the risks and the financial consequences. This encourages them to limit their exposure by taking preventive measures and helps to mitigate the human, economic and financial costs resulting from a disaster.

Insurers have wide experience in using differentiated premium pricing to encourage risk-reduction measures in fire, theft and motor insurance. However, their freedom to do the same for natural catastrophe insurance is often limited in practice (if not in law) since charging the full, technically required rate for properties in risk-prone areas (such as flood plains) would expose insurance companies to criticism that they were penalising those at highest risk.

Pricing based on the technical rates for the risk does, however, enable insurance premiums to be used as a way of encouraging risk reduction. Also, there is a need in many countries for risk education so that risk-based premiums are recognised as a useful and fair mechanism.

<sup>45</sup> "Reducing the social and economic impacts of climate change and natural catastrophes", CEA, July 2007, Annex, <http://www.cea.eu/uploads/DocumentsLibrary/documents/Climate%20Change%20report%20final.pdf>

Insurers also design insurance products to help SMEs to adapt to the impact of climate change and to ensure they take out adequate insurance, since SMEs do not always seek professional advice. For example, some insurers now offer package policies to small businesses that include a simple form of basic business interruption cover, including wage costs.

The insurance industry plays a key role in informing policymakers by speaking out on issues of common interest and participating in debates on policy issues. For example, the insurance industry seeks to be involved in land-use planning processes and the design and implementation of building codes. The aim is to ensure that what gets built is insurable throughout the lifetime of the property, even where levels of flood or storm risk are expected to rise dramatically because of climate change.

### **Examples of insurer initiatives to raise awareness**

#### **Germany**

From 19-21 July 2007, more than 130 l/m<sup>2</sup> of rain fell within three hours in Baiersdorf, Bavaria. Within a short time many streets and more than 1 000 buildings were flooded. There was a call for state emergency aid or compulsory insurance since most building owners had not taken out insurance cover against natural disaster risks. However, talks between the Bavarian state government, Munich-based insurers and the German insurance association, the GDV, revealed that practically all the building owners concerned should have been able to insure themselves on acceptable terms against this event without difficulty.

As a result, the Bavarian state government decided to launch a campaign to promote natural hazards insurance. Through its campaign “Voraus denken — elementar versichern” (Think ahead — insure against natural hazards), the Bavarian state government has encouraged citizens since early 2009 to protect their residential property and their contents against losses from natural hazards. Homeowners and tenants are called on to make personal provision for the appropriate insurance cover. At the same time, the state government has made clear that any future state aid will be restricted to those cases in which any damage caused to buildings and contents has demonstrably not been insurable. As a general rule, individual provision by citizens always takes priority.

The Bavarian campaign is generally considered to be a successful model for other German federal states.

#### **UK**

The Association of British Insurers (ABI) is a regular contributor to public policy debates on climate change. Its aim is to increase the UK’s resilience to climate events, reduce risk and improve emergency planning. During and after the summer floods of 2007 in the UK, the ABI, on behalf of the insurance industry, communicated with emergency services through the official recovery system and liaised with the government and local authorities to provide flood insurance advice.

In October 2007 the ABI launched a new emergency protocol, under which it and the Chartered Institute of Loss Adjusters (CILA) will be notified of the scale

of damage from a major incident by a Strategic Coordinating Group, which was set up under the Civil Contingencies Act to coordinate responses. They will then alert their members to enable the earliest possible access to the scene of the incident to help policyholders.

Following the floods, the ABI called on the UK government to develop a 25-year strategy to manage Britain's growing flood risk<sup>46</sup>. In February 2008 the ABI started a review of its statement of principles on flood insurance with the government. This was concluded with the launch of an action plan to ensure the long-term availability of flood insurance by the government and the insurance industry. The ABI has agreed to work with the UK government to put in place a long-term approach that will enable flood insurance, which is relied upon by millions of householders and businesses, to be as widely available as possible through effective long-term management of flood risk rather than through short-term deals. The UK government has committed to put in place a long-term investment strategy and to develop better methods for flood-risk assessment. The industry will continue to work closely with the government and will review progress each year.

In 2008, the ABI produced guidance for SMEs on general risk issues, with a specific section on climate risks and flooding.

### France

Increasing the awareness of the risks of climate change among citizens, businesses and policymakers is part of the sustainable development charter (see Annex I) that the French insurance association, the FFSA, has developed together with the French association of mutual insurers, GEMA.

The FFSA also contributes, through its technical arm Mission Risques Naturels (MRN), to government work on adapting to climate change, as well as to consultations and communications from the EC<sup>47</sup>.

### EU

The CEA has contributed to several EU initiatives on weather-related disasters, sharing insurance industry expertise on risk management, explaining the prerequisites for effective adaptation to climate change and facilitating the exchange of best practices and knowledge.

It took, for example, an active part in the comitology process that assisted the European Commission with the definition of the implementing measures of the Floods Directive, participating in the platforms for information exchange on best practices among member states and within the research community (eg Exchange Circles on Flood Mapping, or EXCIMAP<sup>48</sup>).

<sup>46</sup> The ABI's policy proposals were published in the report "Summer floods 2007: learning the lessons", Association of British Insurers, November 2007

<sup>47</sup> FFSA Annual Report 2008, p11, [http://www.ffsa.fr/webffsa/portailffsa.nsf/html/annualreport2008/\\$file/RAFFSAGB2008BDm.pdf](http://www.ffsa.fr/webffsa/portailffsa.nsf/html/annualreport2008/$file/RAFFSAGB2008BDm.pdf)

<sup>48</sup> See [http://ec.europa.eu/environment/water/flood\\_risk/flood\\_atlas/index.htm](http://ec.europa.eu/environment/water/flood_risk/flood_atlas/index.htm)

The CEA also shared its views with European policymakers during the consultation process on the White Paper on adapting to climate change, and on the communications on disaster risk reduction<sup>49</sup>.

The CEA and its members will continue to contribute to all climate-related EU initiatives, and in particular to the actions that the European Commission will initiate to prepare the EU adaptation strategy that will be implemented from 2013.

### Many European citizens and businesses are unaware of or underestimate risks

#### III.2.1 Low awareness among individuals and businesses

The European Commission should take a leading role in raising public awareness to levels commensurate with the challenge posed by climate change. Recent surveys show that perceptions of the seriousness of climate change and the urgency of tackling it remain low among both citizens and businesses and are in some cases even falling. The Commission should help local stakeholders to take the right decisions by, for example, developing EU climate-friendly labels for construction materials, techniques, consumer goods and so on. It could also develop communication materials and educational programmes for children and training for key professionals such as architects<sup>50</sup>.

It is vital to improve risk awareness, in some countries in particular, and to better inform citizens about the measures they can take personally to mitigate but also to adapt to climate change.

#### Individuals

According to a recent survey<sup>51</sup>, only 67% of Europeans think that climate change is a very serious problem and about 10% do not think it is a serious problem. Some 27% think that the seriousness of climate change has been exaggerated and 31% think that there is nothing that can be done about it.

Awareness had declined compared to the previous year (2008), when 75% of Europeans considered climate change to be a very serious issue. It is likely that this decrease is a result of the economic crisis, which has affected the relative perceived seriousness of climate change. Climate change has been overtaken by the global economic downturn in Europeans' ranking of the most serious problems facing the world, moving from second to third place.

On the other hand, an increased proportion of Europeans (62% in 2009, compared to 56% in 2008) believes that fighting climate change can have a positive effect on the European economy.

There are discrepancies across Europe that are not related to the level of exposure of a particular country to climate change. The proportion of citizens who consider that climate change is a very serious issue varies from about 30% in Portugal, the Czech Republic and Poland to 82% in Sweden.

<sup>49</sup> See related CEA publications, <http://www.cea.eu/index.php?mact=DocumentsLibrary,cntnt01,default,0&cntnt01linktitle=All%20Publications&cntnt01currentpage=1&cntnt01returnid=76>

<sup>50</sup> The CEA's views on priority adaptation measures at European level, CEA, 19 May 2008, AB8033, [http://www.cea.eu/uploads/DocumentsLibrary/documents/1249388649\\_the-cea-s-views-on-priority-eu-adaptation-measures.pdf](http://www.cea.eu/uploads/DocumentsLibrary/documents/1249388649_the-cea-s-views-on-priority-eu-adaptation-measures.pdf)

<sup>51</sup> "Europeans' attitudes towards climate change", EC and European Parliament Special Eurobarometer 313, July 2009

According to the survey, the extent to which respondents feel informed about certain topics related to climate change appears to be crucial to their perception of climate change and to their tendency to take action. More than 40% of Europeans do not feel very well informed or do not feel informed at all about the causes and consequences of climate change and the way to fight them.

### Businesses

According to the UK Chartered Insurance Institute, SMEs are not prepared for the impact 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 such as flooding, but post-event surveys show that their insurers provide the most help. Insurers and intermediaries can help such SMEs deal effectively with climate change by providing appropriately tailored products and services<sup>52</sup>.

Insurer research in the UK<sup>53</sup> shows that 85% of small businesses are aware that climate change poses a serious problem, but only 25% see it as a direct threat to their business. Although increasing flood damage could be serious for the economy as a whole, about 50% of small businesses think that climate change is blown out of proportion and the vast majority believe their businesses to be adequately prepared for its impacts and remain underinsured. At the same time, research compiled by the British Insurance Brokers Association (BIBA) shows that nearly half of businesses have no plans to deal with the impact of flooding, and a third of businesses have no plans to deal with the impact of storms. Nearly a third only have “rough plans”. Half of the businesses questioned by BIBA believed it would take less than a day for a serious disruption or disaster to have a significant impact on their business<sup>54</sup>.

A 2008 report by the Carbon Disclosure Project (CDP) surveyed the world’s 500 largest companies on how they were “future-proofing” themselves against the consequences of climate change. It found that climate change is still not a regular agenda item for most boards and is not a routine key performance indicator (KPI)<sup>55</sup>.

### III.3 Prevention

Prevention is the cornerstone of any insurance scheme. It is embedded in the practice of the private insurance sector, which has gained much expertise in this area over the years. This is especially true for extreme weather-related disasters which, without any prevention measures in place, would be very difficult to insure.

The return on investment of prevention measures has been shown to be very high for all concerned. The World Bank and the US Geological Survey have estimated that the worldwide economic losses from natural disasters in the 1990s could have been reduced by \$280bn if \$40bn had been invested in disaster preparedness,

**Prevention is the  
cornerstone of any insurance  
scheme**

<sup>52</sup> “Coping with climate change: risks and opportunities for insurers”, Climate change research report 2009, UK Chartered Insurance Institute

<sup>53</sup> “Climate change and its effects on small businesses in the UK”, Prof. D Crichton, Axa Insurance, August 2006

<sup>54</sup> “Business resilience survey 2006”, British Insurance Brokers Association/Populus, <http://www.populus.co.uk/biba-business-resilience-survey-071106.html>

<sup>55</sup> “Report 2008 — global 500”, Carbon Disclosure Project, p5

mitigation and prevention strategies<sup>56</sup>. According to the UK Environment Agency the value of prevention is also significant in so far as every additional £1 spent would enable the country to save £6 in repair costs<sup>57</sup>. Preventive measures reduce potential claim expenditures and ensure that insurance coverage is sustainable. Most insurance companies encourage customers and the general public to take prevention measures in a variety of ways, including communication campaigns, individual advice to customers and underwriting and pricing policies. By encouraging individuals and businesses to take preventative measures, private insurance is a key driver in reducing the human and financial costs of weather-related disasters and the other consequences of climate change.

However, there appears to be very little enthusiasm within the business community to take preventative steps such as relocation, temporary relocation, weather-proofing or seeking professional advice in order to tackle the threat posed by extreme weather conditions. The number of managers saying they would introduce any such measures fell markedly between 2006 and 2007<sup>58</sup>.

The public authorities need to encourage a move towards more preventive behaviour and to introduce mandatory measures such as land-use planning for citizens and businesses that might otherwise consider the required investment too costly.

**Insurance initiatives need to be complemented by public incentives and binding measures**

### Examples of insurer initiatives to encourage prevention

#### France

The French insurance market created an organisation, Mission Risques Naturels (MRN), to help prepare for the effects of natural catastrophes and climate change. This was launched in 2000, just after the huge losses caused by storms Lothar and Martin, and following major floods and subsidence during the previous decade.

MRN provides knowledge and prevention management services to its members companies, as well as services to the whole market. These include, for example, a contribution to collective vulnerability scoring tools for each municipality that evaluate the appropriateness and efficiency of risk-prevention plans. MRN also publishes practical guidelines for individuals containing recommendations on the actions to be taken before, during and after a catastrophic event in order to reduce losses.

#### Germany

The German insurance association, the GDV, published leaflets in which it advises SMEs on the measures they can take to reduce their exposure to floods and storms<sup>59</sup>.

<sup>56</sup> Commission staff working document. Accompanying document to the Communication "A Community Approach for the prevention of natural and man-made disasters", impact assessment, European Commission, SEC(2009)202, 23 February 2009, p26

<sup>57</sup> Mark Tinnion, regional flood risk manager, UK Environment Agency, cited in "Summer floods 2007: learning the lessons", Association of British Insurers, November 2007

<sup>58</sup> "Coping with climate change: risk and opportunities for insurers", Climate change research report 2009, UK Chartered Insurance Institute, p6 unpublished follow-up survey of SMEs and flooding, Axa, 2007

<sup>59</sup> See <https://secure.gdv.de/gdv-veroeffentlichungen/user/control.php?EVENT=category&ACTION=showOffers&catID=13>

### Europe — UNISDR platforms

Representatives of the (re)insurance sector are members of the French (COPRNM/ARFPCN), German (DKKV) and Swiss (PLANAT) national platforms of the United Nations International Strategy for Disaster Risk Reduction (UNISDR), either directly represented by their national insurance association or indirectly through an association dedicated to disaster risk reduction such as MRN (see France above).

This involvement of the insurance sector in prevention measures is an illustration of its engagement in public-private partnerships, which have been recommended as the way forward for disaster-risk reduction (see chapter 4 of the Hyogo Framework for Action<sup>60</sup>).

### III.4 Insurance cover and services

Several initiatives have already been taken by the insurance industry that encourage a climate-friendly approach to covering risk, even though the market (demand side) is not yet willing to accept these kinds of products.

The insurance industry is developing products that promote, encourage and facilitate actions to reduce greenhouse gas emissions (mitigation) and to manage the risks of inevitable climate change (adaptation). Such schemes include pay-as-you drive motor insurance, lower motor insurance premiums for hybrid (electric/internal combustion) vehicles and discounts on home insurance premiums for climate-friendly homes. Other schemes include new liability insurance products for energy management businesses that explore alternative energy sources and insurance for carbon credit-based projects. However, there is strong pressure on insurance companies from both their shareholders and from regulators to ensure that all product innovation is profitable. This is currently not always the case and incentives will probably be required to boost further innovation.

#### Construction sector

The construction sector is recognised as a major contributor to CO<sub>2</sub> emissions. Now climate change and low emissions requirements are placing an additional constraint on the sector and consequently on its insurers.

Solutions need to be developed that will take into account the changing environment to which buildings will be subject over the course of their often long lifetime. Changes in design, planning and investment policy are needed to create “climate-aware developments” that are resilient to the inevitable impacts of climate change and mitigate further change.

Changes in climate and building design will have an impact on the cost of insurance unless steps are taken now to reduce risk. Hotter summers, wetter winters, rising sea levels and more severe storms could all lead to costly insurance claims. Insurers rely on public authorities to develop planning policies and building regulations that ensure that climate risks are fully considered for all new developments, including

**High insurance innovation is limited by low demand and by profitability requirements**

**The insurance sector is developing products to meet customers’ needs in sustainable construction**

<sup>60</sup> The Hyogo Framework for Action (HFA) is an instrument adopted by members of the United Nations for implementing disaster-risk reduction. Its goal is to strengthen the resilience of nations and communities to disasters.

refurbishments. Ideally, any new development should only proceed where the climate risks to the development are acceptable for its proposed lifetime, and where the development will not increase risks elsewhere.

New developments can play a role in mitigating future climate change. Changes in design and construction are needed to reduce a building's overall energy consumption and increase its sustainability. This can be done by improving insulation to reduce the energy needed to both warm and cool buildings; by allowing the use of different, more renewable forms of energy; by reducing the use of scarce water supplies; and by providing a cooler environment in summer. New buildings should be designed to accommodate changing lifestyles by providing, for example, recycling facilities and bicycle storage.

The insurance sector is developing insurance products to meet customers' needs in the coming decade(s), taking into account the expected development of building features in the light of the considerations above. However, the success of these products has been limited so far and is mainly restricted to new buildings. For existing buildings, policyholders tend to favour modular insurance solutions consisting of basic cover with add-ons.

### Public authorities need to ensure sustainable design and location

As new designs and innovative construction techniques are developed to achieve higher levels of sustainability, it is important that the resilience of the building to future damage from any hazard — fire, for example, which presents a serious risk to life and can cause expensive damage — and not just from climate change is maintained or improved. Thus it is important that each new construction technique is tested to ensure that the resulting building components are resilient to damage and that damaged components can be easily and economically repaired.

Where entire parts of a building are pre-fabricated off-site, such as walls, roofs and even rooms, they are unlikely to be replaced as complete units if damaged, and so methods of repairing them economically need to be developed before the construction technique is used. If the risk of damage or the cost of repair to building components is increased in any way, this will have an impact on insurance premiums.

### Energy

The risks associated with oil and gas exploration will increase as the search moves into more hostile environments, thus increasing the risks for insurers.

Over the past few years, significant price fluctuations and increasing pressure on energy resources have led to the development of alternative and renewable energy sources. For instance, wind energy is an essential part of today's energy supply mix.

Rapid technological developments in energy supply are presenting the insurance industry with a number of challenges. New — and hence not always safely tested — techniques and equipment require insurers to have broad engineering knowledge. The rising power output from wind farms, for example, requires

### The European insurance industry is developing cover for innovative energy solutions



ongoing risk management. Offshore wind farms, which may be made up of several hundred wind turbines, constitute a concentration of values of several billion euro and put their potential claims risk beyond the capacity of individual insurance companies.

The European insurance industry is developing new approaches so that it can not only understand and assess the technical risks of offshore wind farms, but also offer as comprehensive cover as possible, perhaps by appropriate risk-spreading and the use of adequate deductibles.

### ***Renewable energies***

The current political discussion on climate change focuses on renewable energies (basically solar, wind, water and geothermal). The advocates of these renewable energy sources believe that they have the potential to replace conventional energy sources, including nuclear, and even satisfy the future “energy hunger” of the rapidly growing world population.

Many renewable energy technologies are already well developed and have been introduced on to the market. Others are still in development. Renewable energy is now an important factor in Europe’s economy. However, the importance and development of specific sources of energy varies across EU member states. Apart from geographical factors, political decision-making processes and the way renewable energies are promoted both play an important role in their development and expansion.

In Germany in the late 1990s, for example, the federal government introduced a Renewable Energies Act to promote the expansion of renewable energies for electricity generation. It came into force on 1 April 2000 and was updated in 2006. Similar regulations now exist in many other countries.

Today in Europe there is a large market for renewable energies. The insurance industry is aware that by insuring these new technologies it can speed up their transfer to the marketplace. This then helps to gather knowledge and data on the risks to be insured and provide a way to establish fair insurance pricing for related emerging risks.

The insurance industry supports the research into the development and use of renewable energies both for households and industry by providing tailor-made insurance solutions. There are, for instance, products available for photovoltaic and solar thermal equipment for private residential buildings, as well as for onshore and offshore wind energy parks for industrial electricity generation. Some insurers have developed comprehensive insurance packages that cover the construction of a power station, machine breakage, civil liability and other related elements.

However, the growth in availability of such insurance depends on improved technical knowledge, the availability of relevant data and the possibility of packaging risks to achieve economies of scale, risk diversification and underwriting profit.

### **Carbon capture and storage**

**Sound knowledge of the risks related to a new technology is a prerequisite for any insurance solution**

Carbon dioxide capture and storage (CCS) involves separating carbon dioxide (CO<sub>2</sub>) — the main greenhouse gas — from the waste gas stream of power stations and industrial plants, conveying it to an underground reservoir and storing it there permanently. CCS technology has the potential to mitigate climate change caused by the worldwide increase in demand for energy and the rising number of fossil power plants being built. However, the long-term risks of this new technology are unknown.

According to CERES<sup>61</sup>, insurers launched products to manage diverse risks from carbon capture and storage (CCS) projects for the first time in 2008, while publishing research to increase the understanding of the limits of insurability. Products offered cover several types of risk unique to CCS, including the process of capturing carbon dioxide at the source of the pollution and injecting it into geological formations below ground, as well as longer-term containment. The controversial process — still not demonstrated at full scale — is gaining significant interest from electricity producers, venture capitalists and regulators as a technological solution to pursuing carbon-intensive energy, such as coal, while lowering greenhouse gas emissions.

There is, however, not yet sufficient knowledge about the behaviour of CO<sub>2</sub> in underground reservoirs. There is considerable uncertainty, for example, about the dispersal behaviour of CO<sub>2</sub> underground and its consequences. Potential hazards include the formation of cracks in reservoirs, leakage of CO<sub>2</sub> into the cap rock, leaks in boreholes, the acidification of water, contamination of aquifers, and the formation of noxious substances by chemical reaction or mixing with CO<sub>2</sub>. Leaking CO<sub>2</sub> may also cause bodily injury, material damage, environmental damage and pecuniary damage. Pecuniary damage may consist of economic losses caused by damage to fishing rights, for instance, or to mussel stocks resulting from the acidification of water in the vicinity of a leak.

The European insurance industry is willing to develop new solutions to cover CCS technology. However, given the long-term character of CO<sub>2</sub> storage and the fact that the technology is still in the experimental stage, there can be no global solution to insuring such projects, only tailor-made individual solutions. Because of this, compulsory insurance is impossible for all stages of CCS, from separation to transport, injection and underground storage.

It is possible to insure CCS technology — up to and including the injection of CO<sub>2</sub> into the subsoil — by adjusting existing products. However, the long periods of subsequent maintenance and liability for underground CO<sub>2</sub> reservoirs are harder to cover, particularly as they would need to be combined with cover for the civil liability introduced by the EU Environmental Liability Directive and potential loss of emission certificates, and would necessitate high solvency requirements. Likewise, the purchase of emission rights in the case of leakage of CO<sub>2</sub> is an entrepreneurial risk and not a core line of business for the insurance industry.

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<sup>61</sup> "From risk to opportunity — insurer responses to climate change: 2008", Evan Mills, PhD, CERES, April 2009

Nevertheless, the European insurance industry will continue to carefully monitor the scientific and technological development of CCS and to assess the insurability of the risks involved.

### Insurability of CO<sub>2</sub> emission rights

The trade in CO<sub>2</sub> certificates (trade in emission rights) is another tool that is being used to try to reduce global, man-made greenhouse gas emissions.

Trade in emission rights is a macroeconomic instrument of environmental policy that is nevertheless closely linked to business decisions made by individual enterprises. Therefore, when an enterprise wants to insure its emission rights, the insurance industry has to check that the person or company does not simply want to shift the risk of making a bad decision on to the insurance industry. If this is the case there is moral hazard, for which cover will usually not be offered, since the person or company could then act irresponsibly without suffering any financial consequences. Insurance solutions are only possible when the potential damage or risk is free from any such moral hazard.

The European insurance industry has not yet reached a position on the potential moral hazard in emissions trading, since there has been no real experience so far of a multinational system of trade in emission rights. The European insurance industry will closely monitor the development of emissions trading and the needs of policyholders.

**Insurance solutions are only possible when the risk is free from any moral hazard**

## Examples of insurer initiatives to provide sustainable cover

### UK

The Association of British Insurers (ABI) has published new guidance for property developers on how insurers will assess whether new developments are climate resilient. The draft guidance was launched in January 2009 and the ABI is now facilitating a consultation process with stakeholders.

The key messages in the guidance are:

- Climate change means buildings will be increasingly vulnerable to severe weather.
- This will have an impact on the cost and availability of insurance unless steps are taken to reduce risk.
- Buildings must be located and designed to ensure that they are able to withstand climate change, particularly an increased risk of flooding. Insurers will only be able to insure buildings — vital to ensure that they are saleable — if these risks are reduced to acceptable levels.
- The ABI recommends that developers: follow national planning policy statements; provide buyers with information on climate risks and how they can be managed; and develop publicly available standards or kitemarks that certify enhanced resilience to the impacts of climate change.
- Before buying a property in a new development, prospective owners should check the flood risk and obtain information on measures taken to reduce it.

The ABI hopes the guide will help developers, planning authorities and people buying new properties to build and buy properties that address the challenges presented by climate change.

### Germany

The German insurance association, the GDV, has examined fire protection methods in wind energy plants and, together with the industry, has identified potential for the standardisation of system components in order to minimise downtime.

Developed countries are not immune to financial exclusion

### III.5 Micro-insurance

Micro-insurance provides coverage for those on low incomes who would otherwise have limited access to insurance. Many micro-insurance products are concerned with food and water shortages in rural areas of South America, Africa and Asia, and tend to be driven by European insurers. However, the demand for micro-insurance also exists in developed countries, which are not immune to financial exclusion. In the UK, for example, although 80% of households have property insurance, the figure is less than 50% for the poorest 10% of the population<sup>62</sup>.

Preparedness and close cooperation between stakeholders is key to quick settlement

### III.6 Claims management

The handling of claims following a weather-related disaster is challenging and requires quick and coordinated action.

Preparedness is also key, and disaster plans should be designed in advance in close co-operation with all stakeholders, especially insurers. Insurers have expertise in this area as well and are probably best placed to deal with the handling of any claims following a weather-related disaster, in close cooperation with the relevant public services. Moreover, since insurers receive their premiums prior to any weather-related disaster, they are able to provide quick financial support to policyholders.

On the other hand, funds such as the EU Solidarity Fund depend on financing by governments, which in turn often rely on tax revenues. As a result, where there is no or insufficient cover, it will take governments longer to organise financial compensation for losses.

Private insurance can provide more efficient solutions for compensating losses. For example, in 2005 the Spanish crop insurance system paid total claims that were larger than the size of the initial fund (ie the annual premium income), thanks to insurers' ability to manage the fund efficiently.

The insurance industry can also guide customers and suppliers on alternative methods of claims-handling that are more climate-friendly and weather-resilient<sup>63</sup> (see III.7 Mitigation).

<sup>62</sup> "Coping with climate change: risks and opportunities for insurers", Climate change research report 2009, UK Chartered Insurance Institute

<sup>63</sup> "The insurance industry and climate change — contribution to the global debate", The Geneva Reports — Risk and Insurance Research, The Geneva Association, July 2009, p80

## Examples of insurer initiatives to improve claims management

### France — fast settlement of Klaus claims

French insurance companies took exceptional measures to simplify the process for insureds and to speed up the settlement of the 715 000 claims that resulted from the Klaus storm in early 2009. For example, insurers implemented an agreement intended to avoid lawsuits, which are generally risky and take a long time to resolve when the damages sustained were caused by property belonging to a third party, and advances on compensation were granted based on need and specific circumstances.

A network of contact points was set up to coordinate, in each region, the measures taken and to liaise with the public authorities<sup>64</sup>.

### Germany — quick claims settlement of Kyrill storm

On 18 and 19 January 2007, the Kyrill storm swept over Europe. Although it caused a great deal of damage in Germany, residential buildings insurance is very popular in Germany and the risk of weather damage is normally included in the cover. As a result, private households were rapidly compensated for their material damage in the vast majority of cases.

In his 2007 annual report the German ombudsman for insurance confirmed that German insurers settled 2.35m individual losses totalling €2.4bn very quickly. According to his report, customers were, on the whole, satisfied with the way the Kyrill losses were settled. For minor losses up to certain financial limits, for instance, it was sufficient for policyholders to supply photographs of the damage and invoices. Also, permission to carry out repairs was granted more frequently than was common practice.

Nevertheless, in the aftermath of Kyrill, insurers have looked at ways of further improving their claims management procedures for future major natural events, both in terms of personnel and organisation, by implementing and continuously developing specific emergency plans. The extension of networks of service providers may also contribute to more rapid and efficient claims investigation and repair.

Kyrill demonstrated that early and intensive public relations work may have a positive effect on claims settlement. The German insurance association, the GDV, therefore published the lessons it learned in a leaflet “Stürmische Zeiten — Schäden vorbeugen und richtig versichern” (Stormy times — prevent and appropriately insure losses)<sup>65</sup>. This contains information for consumers on how to deal with storm events and what to do afterwards. It also provides information on the correct notification and documentation of a claimed loss, so that claims can be swiftly dealt with.

<sup>64</sup> FFSA Annual Report 2008, p14

<sup>65</sup> <https://secure.gdv.de/gdv-veroeffentlichungen/user/control.php?EVENT=category&ACTION=showOffers&catID=13>

### **Norway — preparedness plan**

The Norwegian Natural Perils Pool (NNPP) has a preparedness plan that covers everything from handling all reported claims from an incident through to surveying and reporting individual claims and reporting the overall figures.

The NNPP Claims Committee, which comprises five representatives from the largest insurance companies, steers the claims-handling of major events that involve several insurance companies and/or the National Fund for Natural Damage Assistance (Statens Naturskadefond)<sup>66</sup>.

As part of the overall preparedness plan, the Claims Committee is in regular contact with seven district coordinators, who are in charge of local preparedness plans tailored to local risk exposures and conditions, such as the availability of construction materials.

In February 2009, the NNPP conducted a major crisis simulation exercise (“Storm 2009”) to test the emergency preparedness of the pool and of the five largest member companies in Norway, representing approximately 80% of the market.

The exercise was carried out in two phases:

- 1) An electronic exercise to test the capacity of the emergency preparedness system’s main server, the central coordinator’s server and the lines between the two.
- 2) A physical mock-crisis to test the emergency guidelines of the pool, the insurance companies and the central coordinator. Prior to the start of the exercise, two mock weather reports and TV news items set the mood for an incoming major storm for employees. A high number of claims calls, covering a broad range of varied problems, were simulated by hired staff with scripts.

In general, the simulation exercise proved to be quite useful. It revealed that the insurance industry, via the pool, is prepared to handle a major natural disaster, such as the scenario presented in “Storm 2009”.

In early 2009, the NNPP’s efficiency was also successfully tested for real, with a clay-slide that occurred in central Norway. Luckily there were no casualties but there was a need for instant help from insurance companies. Representatives from the claims committee were at the scene the same evening.

### **UK — climate resilient repair**

The Association of British Insurers (ABI) conducted research<sup>67</sup> using real flood claims from the summer of 2007. It concluded that it is on average 40% more expensive to repair homes using resilience measures. These include using tiled floors in place of carpet, placing electrical sockets higher on walls and using plaster that is water resistant in order to minimise damage in the event of future

<sup>66</sup> The Fund, which was created in 1961, is fully financed by annual governmental budgets. It compensates damage caused to private property by natural disasters in cases where insurance against such damage is not available through ordinary insurance.

<sup>67</sup> “Resilient Reinstatement — The cost of flood resilient reinstatement of domestic properties”, ABI Research paper n°14, Association of British Insurers, 2009

flooding. The additional costs range from 15% to 70% depending on the home.

However, while the ABI's research suggests it is more expensive to repair in this way, the benefits are also likely to be greater than previously thought since the impact on asset values of regular significant flood damage was not previously considered.

Feedback from customers affected by the UK floods of the summer of 2007 has also highlighted that there are several barriers that need to be overcome to encourage more people to protect their own homes. For example, many people:

- do not fully understand the risk involved. Customers tend to believe that if their home is at a 1% risk of flooding, the fact that it has just been flooded makes it unlikely that it will be flooded again within 100 years;
- expect that if they have been flooded the government will step in to ensure that it does not happen again;
- do not like the appearance of resilient repairs and worry that building in resilience measures will show that their home is flood-prone and so deter future purchasers; and,
- choose to repair their home in a way that increases the likelihood of extensive flood damage in the future. For example, customers are now choosing laminate flooring rather than carpet as tastes have changed.

To overcome these problems, everyone involved in flood risk management needs to play their part. The provision of information and impartial advice will be essential to encourage risk management at individual level. The ABI recommends that:

- everyone interacting with people at risk of flooding needs to better explain the risk and the options for tackling it;
- the government should define which areas can be expected to be defended and, more importantly, which areas are unlikely ever to benefit from large-scale community defences; and,
- the ABI should produce a clear factsheet that enables customers who have been flooded to make an informed choice about whether to build in flood resilience as their homes are repaired. This should point out that by building in resilience features their homes will be easier to insure.

In the UK the government is currently piloting an initiative to fund local authorities to provide free flood risk surveys and professional advice. In some cases local authorities may also provide the free fitting of resilient measures in homes that are at high risk of flood and that are unlikely to benefit from large-scale community defences.

**Insurers take initiatives to reduce the carbon footprint of their business, even though they are not major CO<sub>2</sub> emitters**

### III.7 Mitigation of climate change

The costs of stabilising the climate and the risk of natural catastrophes are significant but manageable. According to the UK's 2006 Stern Review: "If we don't act, the overall costs and risks of climate change will be equivalent to losing at least 5% of global GDP each year, now and forever. ... In contrast, the costs of action — reducing greenhouse emissions to avoid the worst impacts of climate change — can be limited to around 1% of global GDP each year."<sup>68</sup>

Insurers are supportive of national, European and international measures, such as the Kyoto Protocol, to reduce greenhouse gas emissions. Although insurers are not major emitters of greenhouse gases, many are reducing their own emissions<sup>69</sup> and some have pledged to become entirely greenhouse-gas neutral across their operations by in-house energy reduction and by investing in projects that generate carbon credits.

Measures individual companies can take:

- Measure the environmental impact of the business and establish targets for its reduction.
- Offset those emissions that cannot be reduced.
- Increase the energy efficiency of buildings, by adjusting air conditioning settings to reduce energy consumption, for example.
- Purchase renewable energy.
- Work with employees to reduce their impact in the workplace by installing recycling facilities for staff, for example.
- Review business travel arrangements to cut the number of miles travelled and invest in telephone and video conferencing.
- Review the climate impact of new buildings and assess the environmental impact of refurbishments and redesigns. For example, the London office building of Swiss Re, "The Gherkin", features natural lighting and natural ventilation and is said to use half the energy of similar buildings.
- Engage with suppliers to increase the sustainability of their products and services.

#### **Examples of insurer initiatives that contribute to mitigation**

##### **Belgium — e-documents**

Belgian insurers currently send 12m billing documents a year to their customers.

This amount should be considerably reduced thanks to a new web application (e-invoicing) that is expected to be launched at the end 2009. It will be available for free for policyholders who use certain internet banking software and will enable them to view, manage and pay their insurance invoices directly via the internet.

This initiative<sup>70</sup> should not only reduce paper consumption but also make life easier for consumers and reduce costs for insurers and brokers.

<sup>68</sup> Stern Review, summary of conclusions, pVI

<sup>69</sup> "From risk to opportunity. How insurers can proactively and profitably manage climate change", CERES, 2006

<sup>70</sup> This initiative is driven by the Belgian insurance association (Assuralia) and brokers associations Fepabel, FVF and UPCA



### Germany — CO<sub>2</sub> neutrality

According to a survey conducted by the German insurance association, the GDV, (see Annex I), 50% of German insurance companies surveyed are already aiming for CO<sub>2</sub> neutrality for parts of their business activities.

### Nordic countries — environment-friendly repair

A survey conducted by Userneeds on behalf of the Danish insurance association, F&P, reveals that consumers in the Nordic countries want insurance policies that use environment-friendly products for repairs but are mostly not willing to pay extra for them.

The Nordic insurance industry recently published a report<sup>71</sup> that aims to further increase awareness among insurance companies and others involved in the claims-management process of how they can adapt their own work from an environmental and climate perspective.

The report gives an estimate of current CO<sub>2</sub> emissions associated with the management of fire and water damage as well as concrete examples of different loss prevention measures that can help to reduce these emissions, such as:

- promoting prevention measures;
- influencing construction methods, encouraging contractors and repairers to choose environment- and climate-friendly alternatives;
- requiring that transport to and from the place where repairs are being made be based on more efficient logistics; and,
- imposing waste-management requirements on tradespeople so that materials are recycled.

Some measures require the involvement of third parties, such as the training of tradespeople with a broader range of skills, for example in both carpentry and tiling, in order to reduce the number of journeys.

### UK — reduction of the environmental impact of insurance business

According to the 2009 annual review of ClimateWise<sup>72</sup>, 87% of the members of the scheme were reducing the impact of their own operations. For example:

- 86% disclosed direct emissions using a globally recognised standard to some extent, compared with only 56% in 2008.
- About 75% used their carbon footprint to set realistic targets to guide the reduction of greenhouse gas emissions.
- A majority included sustainability criteria in procurement processes.
- All were engaging their employees in a commitment to combat climate change.

Also, in order to speed up market penetration of low-carbon vehicles, the UK Motor Insurance Repair Research Centre at Thatcham, a joint research centre

<sup>71</sup> "CO<sub>2</sub> emissions associated with the management of water and fire damage in the Nordic countries", Försäkringsförbundet (Swedish insurance federation), August 2009

<sup>72</sup> ClimateWise the 2009 review, Forum for the Future, November 2009, <http://www.climatewise.org.uk/storage/climatewise-docs/Second%20Year%20Review%202009.pdf>

closely connected with the insurance industry, provides advice on standardisation and cheap repair methods for such vehicles.

### **Turkey — Turkish Insurance Institute's environmental policy**

The Turkish Insurance Institute (TII) has adopted an environmental policy as a first step towards raising climate change risk awareness. Under this policy, the TII has committed to carrying out research, organising conferences and seminars, preparing publications and keeping environmental problems on the agenda of the insurance sector:

- complying with environmental legislation and approved codes of practice and improving them. It is committed to ensuring that international agreements, such as the Kyoto Protocol, and standards are adopted in Turkey;
- communicating with relevant bodies such as the United Nations Environment Programme (UNEP) and UN Global Compact and adopting the principles set by these organisations;
- raising staff awareness of environmental issues; and,
- taking measures to reduce electricity and water consumption and to recycle. It also aims to calculate greenhouse gas emissions, take measures to reduce them and plant trees to offset it.

One Turkish insurance company has adopted a Responsible Growth Strategy, implementing environmentally friendly innovations in its internal processes and products. For its customers, the company offers motor insurance discounts for the owners of hybrid vehicles as well as fire insurance discounts for customers with an ISO 140001 Environmental Management Systems certificate.

**The insurance industry is one of the largest institutional investors, with the highest constraints**

### **III.8 Investment**

The insurance industry is one of the largest institutional investors. As at 31 December 2008, the European insurance industry had around €6 800bn invested in company shares (33%), bonds (35%) and other assets<sup>73</sup>. Its investment portfolio as a percentage of GDP, the so-called investment-to-GDP ratio, which provides an indicator of the relative importance of a sector in an economy, reached 51% in 2008<sup>74</sup>.

Insurer investment in low- and no-carbon technologies is becoming more common (it almost doubled in 2008 compared to 2007). European insurers remain far ahead of their US and Asian counterparts in investing in climate solutions and setting voluntary standards for sustainable investments<sup>75</sup>.

However, an insurer's investment policy is constrained by asset-liability management (ALM) and solvency requirements. As a consequence, the climate-friendly feature of a specific investment can only be a secondary factor in discriminating between two investment instruments that are otherwise similar in terms of risk, performance and duration.

<sup>73</sup> "European Insurance – Key Facts", CEA, September 2009

<sup>74</sup> "European Insurance in Figures", CEA, October 2009

<sup>75</sup> "From risk to opportunity — insurer responses to climate change: 2008", Evan Mills, PhD, CERES, April 2009

## Examples of insurer initiatives taken on investment

### France

French (re)insurers that signed the FFSA and GEMA charter (see Annex I) have undertaken to foster a policy of responsible investments. This involves:

- showing if, and how, social, environmental and governance-based criteria are taken into account in asset management;
- encouraging research into the connection between social, environmental and governance-based criteria and the long-term performance of both corporate groups and governments; and,
- developing and marketing a range of socially responsible investment (SRI) products.

### UK

Members of the ClimateWise initiative (see Annex I) commit to incorporating climate change into their investment strategies. This means they will:

- consider the implications of climate change for company performance and shareholder value and incorporate this into the investment decision-making process;
- encourage disclosure on climate change by companies in which they invest;
- encourage improvements in the energy-efficiency and climate-resilience of investment property portfolios;
- communicate investment beliefs and strategy on climate change to customers and shareholders; and,
- share their assessment of the impact of climate change with pension fund trustees.

The 2009 annual review of ClimateWise<sup>76</sup> found that:

- 15 members had signed up to the Carbon Disclosure Project.
- More than 60% of members had investment strategies that consider the implications of climate change on company performance and shareholder value.
- Some members referred only to their investments in clean technologies, indicating that they saw this as the primary way in which their investment strategy would have an impact on climate change.
- 40% had taken action to improve energy efficiency and climate resilience in their property portfolios. In the 2008 review they stated that the increasing attention paid by regulators and consumers to emissions from the property sector was central to their policies supporting reduction.
- Many members noted that, in the face of the recent economic climate, they had reduced the risks in their portfolio, cutting investment in equities and focusing on low-risk instruments such as government bonds. They therefore felt they had little opportunity to engage on climate change within the investment portfolio and were unlikely to have a view on the extent of their portfolio's exposure to climate change.

<sup>76</sup> ClimateWise the 2009 review, Forum for the Future, November 2009, <http://www.climatewise.org.uk/storage/climatewise-docs/Second%20Year%20Review%202009.pdf>

## IV. Requirements of the insurance industry

### IV.1 A planned approach to risk

#### Risks need to be measurable and manageable

By pooling risks among large groups of policyholders, insurers can mitigate the risks borne by individuals. Nevertheless, insurance cannot bear all risks. There are key prerequisites to the insurability of risks, especially natural catastrophes.

When considering insurance as a tool for adapting to climate change through the compensation of resulting losses, the following factors need to be considered:

#### Measurable risks

Insurers need to be able to measure a risk in order to assess whether it can be covered and, if so, under which conditions (eg required prevention measures, applicable deductibles and insurance premiums) that are sustainable in the long term. The insurer should be able to determine the average cost and the frequency of an event. Ideally, the frequency has to be high enough to allow the law of large numbers<sup>77</sup> to be applicable, and the average loss has to remain moderate if the insurance premium is to be acceptable.

The frequency of natural catastrophes is relatively low compared with insurance risks such as fire or motor insurance, and can vary considerably from year to year. The use of past data and of projections from scientific models assists insurers in measuring risks.

#### Maximum loss

The maximal loss of an event also has to be manageable. Natural catastrophe insurance is characterised by large variations in the size of events and consequent losses (see Charts 7 and 8). These large-scale events can have a significant effect on average losses and consequently on the price of insurance premiums (see Chart 9).

Natural disasters that affect a whole region or country may give rise to extremely high costs which may be difficult to cover. If the total potential loss of a single extreme event endangers the financial stability of an insurer, then no insurance will be made available. If it were, it would be prohibitively expensive for the customer.

Risk transfer, either through (re)insurance or state intervention, can increase an insurer's ability to cope with the potential average and maximum losses. In order to increase the insurability of natural catastrophes, the risk must first be reduced as much possible. This can best be achieved by adequate risk prevention, adaptation and mitigation measures. These will also have a positive effect on (re)insurance prices and limit the need for government support as the insurer of last resort.

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<sup>77</sup> The law of large numbers states that if a sample of observations drawn from a given population of independent events is sufficiently large, then the average value of the sample will be close to the average value of the overall population. For example, the claims frequency of 1 000 randomly-selected motorists will be close to that of the overall population ("Innovating to insure the uninsurable", Swiss Re, Sigma N°4/2005, p5)

### Adverse selection and moral hazard

Adverse selection is the tendency of customers with a high likelihood of loss to buy more insurance than those with lower prospects of loss. Wider risk pooling and lower premiums serve to minimise the adverse selection problem.

Moral hazard refers to the tendency of insureds to behave in a more risky manner than those without insurance coverage, because the insureds do not suffer fully from the consequences of their behaviour. An insured energy supplier, for example, might install an electricity supply network below the expected water height in a flood zone. Insurance conditions therefore include appropriate deductibles as an incentive to avoid moral hazard.

### Widespread and large pools

Insurance works efficiently when the pool of insureds across which risks are spread is sufficiently large and widespread. The more policyholders, the better the law of large numbers will apply. For natural hazards, since a large geographical zone may be affected by a single event, it is important for insurers to have geographically diversified risk portfolios.

Insurers need to have a large pool of policyholders. Where other methods are not sufficient to achieve an adequate pool, compulsory insurance is sometimes used as a solution. For example, natural catastrophe insurance is compulsory in Belgium, France and Spain (see Table 2).

For countries with high risk exposure to a variety of natural hazards (eg both weather and geophysical events) and with a large potential for cumulative losses, the pooling of risks can be achieved by combining these perils in the same extended property damage cover.

Natural catastrophe insurance, whether or not it is compulsory, should include a graded premium system linked to the risk profile, in order to give policyholders incentives to reduce their risk exposure.

## IV.2 Access to data

The European Commission recognised in its White Paper on adapting to climate change that special importance has to be attached to the provision and use of reliable data to create a knowledge base.

Access to detailed data will enable correct risk assessments to be made and ensure that the solutions provided by the insurance market are adequate and sustainable. The CEA believes that access to detailed data will improve decision-making and facilitate climate change adaptation, not only for the insurance sector but also for society as a whole.

Where data exists, it is not always or not easily accessible. Much of the data that exists today is geo-referenced. This is important to the insurance industry, since geo-data is well suited to modelling claim scenarios, making a rapid assessment of losses and assigning skilled personnel appropriately to the site of a natural disaster.

**Moral hazard and adverse selection need to be minimised and the risk pooling maximised**

**Access to detailed data is the key to adequate and sustainable insurance solutions**

Most of this useful geo-data is held by public authorities which have collected, edited and administered it. Public authorities are the largest holders of geo-data in Europe. Since 15 May 2007, under the European Commission's Inspire Directive<sup>78</sup>, there are now a set of specifications for public data services. The aim is to set up a Europe-wide and uniform infrastructure for this geo-data.

The European insurance industry believes that the Inspire Directive has been effective, although it does not respond to all the crucial questions raised by suppliers and users of geo-data. For instance, the business community will only be encouraged to obtain this data if there are simple and uniform licensing rules that apply to all authorities. Also, there needs to be access to up-to-date data, which is guaranteed on a long-term basis, as well as legal certainty about data protection laws when using the geo-data.

At the moment, there are concerns that although public authorities will make great efforts to make geo-data available under Inspire, the business community will not access it because of fears that they will not be allowed to use it for legal reasons. There is an urgent need for legal certainty under data protection law for users of geo-data, so that the business community and research institutions may actively participate in increasing the knowledge base on climate change.

The CEA welcomes the European Commission's proposals to establish a clearing-house mechanism to improve the collection and dissemination of data and the sharing of expertise on the required forward-looking and multi-dimensional risk modelling. It is hoped that this will help the development of appropriate insurance solutions for climate change and adequate adaptation measures. The CEA believes that the clearing-house mechanism should have the following features:

- web-application, hosted by the European Commission's website, with an effective search engine (type of risk, location, scale, region, etc.);
- supervision by the European Commission's Impact and Adaptation Steering Group (IASG), with the participation of EU member states and relevant private sector organisations; and,
- comprehensive qualitative and quantitative information, with different access rights for sensitive information.

The information available should include data on:

- climate change risks and the expected severity of an impact in economic terms;
- adaptation measures, including the cost and expected benefits of specific adaptation measures, such as the reduction in the probability and/or the severity of a future event;
- the correlation between climate change risks, impacts and adaptation measures; and,
- metadata, describing the methodologies, shared references and geo-localisation functions (on a high-definition scale).

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<sup>78</sup> Directive 2007/2/EC, 14 March 2007, establishing an Infrastructure for Spatial Information in the European Community (INSPIRE)

### IV.3 Prevention

The insurance industry bases its policies for the protection of persons and material assets on legal provisions and advises its policyholders to take loss prevention measures in order to avoid and reduce risks. This makes risks insurable. Loss prevention is an essential and established part of risk management which reduces the consequences of loss and helps to restore normal conditions quickly following a claim.

Measures to reduce natural catastrophe damage should not be limited to individuals and businesses. There also has to be collective effort, requiring political support from the authorities. The potential effects of climate change require a political solution to ensure that risks related to climatic change are insurable in the future.

In particular, special attention should be paid to precautionary measures for land use. At its simplest, this means that new development areas must not be allowed in flood-prone regions and that natural flood-prevention barriers such as meadows and fluvial plains are preserved, protected and extended. It is mostly public institutions that decide on land-use planning (eg allowing or avoiding building in areas with a high risk exposure), adopt construction codes (eg to reduce damage caused by extreme weather) and are responsible for investment in general prevention measures such as coastal defences and river embankments.

Unfortunately, progress in adapting public infrastructure to cope with recurring natural events is slow or non-existent. This is particularly true for drainage and sewerage systems. Usually these are designed to cope with rainfall based on an historic 5-yearly cycle. However, it is becoming clear that drainage and sewerage systems are often no longer able to cope with the water masses occurring in the case of torrential rain. Climate change will aggravate this situation and yet, so far, there are no plans to update the technical specifications of drainage and sewerage systems. There is an urgent need for action.

### IV.4 Sharing the financial burden through public-private co-operation

If the conditions of insurability cannot be met, insurance coverage for natural hazards can be difficult to provide at an affordable price, for the reasons explained earlier. In such cases, the risk transfer to reinsurers or to the capital market is not sufficient or is too expensive to be economically viable. Insurers will have to transfer part of their risk to the state as insurers of last resort in order to be able to offer insurance policies that include coverage against natural hazards.

If insurance coverage can be provided by the insurance market, but only at prices that are unaffordable, then financial support from governments to subsidise the cost of premiums can be a useful way of increasing the number of individuals and businesses who buy cover. Ideally, the insurance premium paid by the policyholder should reflect the differences in risk exposure (risk-based premium). However, such financial support from governments should not be at the expense of a reduction of public investment in risk prevention measures.

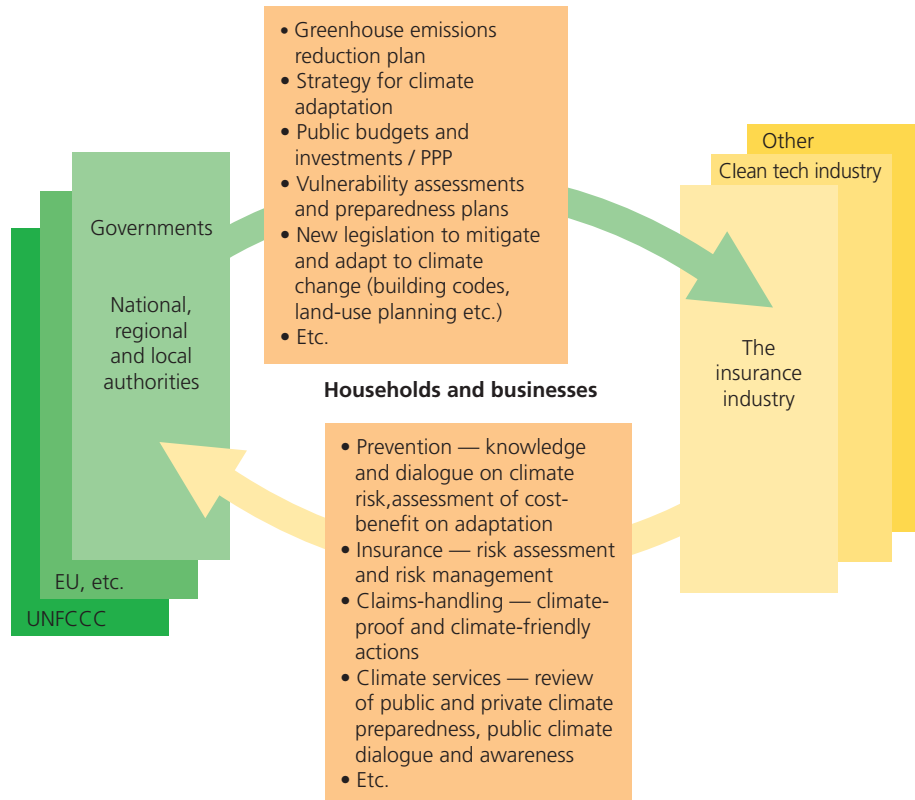
Public-private financed solutions should only be used as a measure of last resort

**Public authorities need to invest in prevention, such as the maintenance and construction of protective infrastructure**

**Combating climate change requires public-private partnerships**

and should aim to enlarge the pool of insureds by making premiums available at affordable prices in countries at very high risk of natural perils.

**Chart 14 | Climate partnerships between governments and the insurance industry**



Source: "The insurance industry and climate change — contribution to the global debate", The Geneva Reports — Risk and Insurance Research, The Geneva Association, July 2009

## IV.5 Political leadership

**Strong political leadership is needed to create the required long-term climate risk strategy framework**

Governments and political leaders need to respond forcefully to the current economic crisis. However, they need also to consider what implications their decisions will have in the long term. Risks related to underinvestment in infrastructure, such as the degradation of natural resources, and climate change may be low in the short-term, but these risks and associated losses increase over time<sup>79</sup>.

Early action against climate change is needed to provide greater certainty for business, long-term investment and technological change. Inconsistent policies or no policies at all simply deter investment<sup>80</sup>.

Strong leadership and involvement by public authorities is needed to create a long-term, strong and effective climate risk strategy framework. This framework would guarantee legal certainty for both insurers and their policyholders and enable them to draw up their business plans to meet the unprecedented challenges and exploit the opportunities created by climate change.

79 "Global risk 2009 — A global risk network report", World Economic Forum, January 2009, <http://www.weforum.org/pdf/globalrisk/2009.pdf>

80 "Climate change and the financial sector — an agenda for action", Allianz Group and WWF, 2005



This action needs to be divorced from short-term political considerations, the so-called “politician’s dilemma”<sup>81</sup>. Politicians can benefit from generous actions following a disaster. This can discourage elected representatives at local, state and federal levels from forcing people to adopt protection measures before the next disaster. Indeed, given short-term re-election considerations, a politician is more likely to vote for other measures that yield more political capital. Indeed, politicians tend to give little consideration to supporting mitigation measures prior to a disaster (*ex ante*). They know that their constituents are not worried about these events occurring because there will always be a groundswell of support for public sector assistance (*ex post*) to help victims recover their losses after a disaster. The one silver lining to this behaviour is that following a natural disaster, when residents and the media focus on the magnitude of the losses, politicians will respond by favouring stronger building codes and other loss reduction measures, but only when there is a consensus among their constituents that this is a good thing to do.

Early action on climate change is vital; infrastructure leaves a long legacy. Europe’s housing stock turns over at a rate of about 1% a year, commercial property at about 2%. Decisions today will still have an effect at the end of the 21<sup>st</sup> century. Similarly, transport patterns tend to persist long beyond their original projected life.

We therefore need to build houses now and protect them with flood defences in ways that meet the likely severe weather conditions of 2050 and beyond. In addition, building codes need to be amended to include resilience measures in new homes to take account of long-term climate predictions, since the lifespan of homes should be a minimum of 50 years.

The debate on climate change needs to be framed in terms of a comparison of the social, economic or environmental costs of not taking action with the costs of measures to reduce vulnerability to damage.

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<sup>81</sup> “Mitigating and financing catastrophic risks. Principles and action framework”, OECD — Insurance and Private Pensions Committee, June 2009

## V. Conclusions and recommendations

To fulfil its role in tackling climate change, the insurance sector needs strong political support and an appropriate policy framework that ensures the active involvement of public authorities and private stakeholders:

- The creation of a long-term, strong and effective climate risk-strategy framework. This would guarantee legal certainty to businesses and enable them to draw up appropriate business plans to meet the unprecedented challenges and exploit the opportunities created by climate change. This is to be achieved by:
  - a sound and integrated public authority risk management strategy that would include investment in, and maintenance of, protective infrastructure; binding policy measures such as land-use planning and building codes; and financial incentives for adaptation measures (such as insurance) that are guaranteed for the long term;
  - the favouring of *ex ante* financing mechanisms and market-driven insurance solutions; and,
  - public-private partnerships where necessary.
- The co-ordination of the dissemination of coherent data that can be easily interpreted and integrated into the decision-making process of public and private stakeholders, as well as be used by insurers to design appropriate insurance cover. This could be accomplished, for example, through the clearing-house mechanism at European level and by making risk and hazard maps and databases available for free to all stakeholders.
- The monitoring of the implementation of adaptation strategies and their effects on risk vulnerability in order to disseminate good practice and to take corrective measures where appropriate.
- The involvement of all key stakeholders, not just the European insurance industry, in developing an adaptation strategy. The active involvement of all stakeholders will help increase the awareness of those who might not yet recognise a need to take action.

The CEA is confident that, given these conditions, the insurance sector will be able to continue to make a vital contribution to the mitigation of and adaptation to climate change.

## Annex I. Examples of European insurance industry initiatives

### Germany — Project Climate Change

For several decades, the German insurance industry has been involved in storm, hail and natural hazards insurance and related loss prevention measures. Consequently, insurers have a considerable wealth of experience in this area.

This expertise is available to society, business and politicians. However, what is required is well-founded knowledge of the possible future development of natural risks and of new technologies for energy production. The German insurance association, the GDV, therefore launched its Project Climate Change in 2007.

The aim is to be able to make clear statements on what the insurance industry can contribute in the medium and long-term to help cope with the effects of climate change. To do this, the GDV has grouped the issues into five sub-projects.

The first sub-project is medium and long-term risk assessment. The insurance industry needs reliable data on the extent to which the extreme natural events that have occurred so far indicate a future trend. It needs to predict how the climate will change in the next 15 to 30 years and how insurance needs to change in the light of these developments.

The collected data serves as a basis for the evaluation and assessment of changes in loss frequency, claims expenditure, average claim amount, and of the possible increase in the number and intensity of extreme events. The insurance industry also needs to assess the solvency requirements that it might have to face in the future. To do this, the GDV has awarded a research contract to the Potsdam Institute for Climate Impact Research (PIK), the first results of which are expected soon. The PIK climate researchers are breaking new scientific ground with such loss assessments.

The second issue is how the insurance industry can actively support the climate change adaptation strategy of the German federal government and its integrated energy and climate programme. The products of the insurance industry have to support adaptation to climate change and so the GDV has launched a second research project with the PIK looking into the ecological, socio-economic and political consequences of climate change.

The third issue is the products, services and incentives the insurance industry needs to have ready for the changing conditions. How can the insurance industry support and reward climate-friendly behaviour by policyholders? The issues range from motor insurance rates based on CO<sub>2</sub> emissions and integrated insurance solutions for the use of renewable energy in private households to entirely new products aimed at covering the policyholder comprehensively and on a long-term basis with a view to adequately reacting to climate change. Furthermore, in this sub-project, the sector is looking into the question of what services the insurance industry may generate and offer to the market based on its comprehensive experience.

In the fourth sub-project, the GDV is examining the concept of prevention both from a political and a technical point of view. In the past, it became apparent that appropriate framework conditions and individual action made it possible to avoid or reduce damage. There is a political move to prevent new building development in known flood zones. At the same time, existing flood-relief measures must be protected and new ones created. Neither technical flood protection measures nor financial compensatory mechanisms will eliminate problems caused by poor town and country planning. Technical prevention measures which, for instance, make houses more resistant to climatic changes, may and have to accompany such demands. However, even with the best possible framework conditions and protective measures, large natural disasters involving considerable damage will be inevitable. Therefore, public authorities will have to continue to develop disaster prevention measures to minimise the consequences of such events.

In the fifth sub-project, the insurance industry raises the question of what its own contribution can be to global climate protection. Under the generic term of CO<sub>2</sub> neutrality, the GDV is looking at the energy consumption of the insurance industry and how to reduce it and possibly even become CO<sub>2</sub> neutral. A representative survey of the GDV's member companies showed that half are aiming for CO<sub>2</sub> neutrality for parts of their business activities.

It is already apparent that the range of issues behind the term "climate change" will occupy all parties intensively for the next few years. Adaptation is a dynamic process with no definitive or final solution. However, the GDV project should establish a solid foundation on which further measures may be built.

The German insurance industry, after evaluating the current data, believes there will be sufficient private-sector insurance capacity available in Germany for natural disaster claims in the future, assuming that adaptation strategies work successfully. However, if the worst-case scenarios of the IPCC, envisaging a rise in average global temperature of more than 5°C, should materialise, this conclusion would apply only to a limited extent.

### **ClimateWise**

In 2006, leading insurers set out to work together to respond to the myriad risks and opportunities of climate change, aiming to reduce the overall risks faced by economies and societies. The ClimateWise initiative was launched in 2007. Its international membership covers Europe, North America and Southern Africa. All members are committed to the ClimateWise principles, which are:

- lead in risk analysis;
- inform public policy-making;
- support climate awareness among customers;
- incorporate climate change into investment strategies;
- reduce the environmental impact of the business; and,
- report and be accountable.

*Lead in risk analysis*

- Support and undertake research on climate change to improve business strategies and help to protect customers' and other stakeholders' interests.
- Support more accurate national and regional forecasting of future weather and catastrophe patterns.
- Use research and improve data quality to match pricing, capital and reserves to changing risks.
- Evaluate the risks of new technologies so that new insurance products can be developed.
- Share research with scientists, society, business, governments and other relevant organisations.

*Inform public policy-making*

- Work with policymakers to help them develop and maintain an economy that is resilient to climate risk.
- Promote and engage in public debate on climate change and the need for action.
- Support work to set and achieve national and global emission reduction targets.
- Support government action, including regulation, that will enhance the resilience of infrastructure and communities and reduce the environmental impact on them.
- Work effectively with emergency services and others in the event of a major climate-related disaster.

*Support climate awareness among customers*

- Inform customers of climate risk and provide support and tools so that they can assess their own levels of risk.
- Encourage customers to adapt to climate change and reduce their greenhouse gas emissions.
- Increase the proportion of repairs that are carried out in a sustainable way through dialogue with suppliers and developers, and manage waste material appropriately.
- Consider how to use their expertise to assist the developing world to understand and respond to climate change.

*Incorporate climate change into investment strategies*

- Consider the implications of climate change on company performance and shareholder value, and incorporate this information into the investment decision-making process.
- Encourage appropriate disclosure on climate change by the companies in which they invest.
- Encourage improvements in the energy-efficiency and climate resilience of investment property portfolios.
- Communicate investment beliefs and strategy on climate change to customers and shareholders.
- Share their assessment of the impacts of climate change with their pension-fund trustees.

### *Reduce the environmental impact of the business*

- Encourage suppliers to improve the sustainability of their products and services.
- Measure and seek to reduce the environmental impact of the internal operations and physical assets under their control.
- Disclose direct emissions of greenhouse gases using a globally recognised standard.
- Engage employees in the commitment to address climate change. Help them to play their role in meeting this commitment in the workplace and encourage them to make climate-informed choices outside work.

### *Report and be accountable*

- Recognise at board level that climate risk has significant social and economic impacts and incorporate this into business strategy and planning.
- Publish a statement in the annual report detailing the actions that have been taken on these principles.

## **France — sustainable development charter**

The French insurance association, FFSA, together with the French association of mutual insurers, GEMA, has drafted a sustainable development charter, which illustrates the belief that insurance is a vital tool in the promotion of sustainable development in society. Its main objectives are to contribute to the preservation of the environment and to develop corporate social responsibility among members.

By signing the charter, (re)insurers have set themselves the following objectives:

### *To become responsible players in sustainable development*

- State their values, governance principles and codes of conduct.
- Affirm their role with all those involved (eg government authorities, non-governmental organisations, consumers, local and regional authorities, the European Commission).
- Recognise the extent of society's responsibility, at the highest level, and integrate such awareness into a development policy.
- Disseminate information about the actions they have taken.

### *To contribute to protecting the climate, combating the effects of climate change and preserving the environment*

- Support research into climate change and share the results with the public and political policymakers.
- Promote measures to mitigate the effects of climate change; develop insurance products with an added environmental value; encourage policyholders and other stakeholders to adopt positive ecological behaviour.
- Help society adapt to climate change by promoting measures for reducing vulnerability to the risks of natural disasters.

*To accompany economic development, help reduce society's vulnerability to natural disasters and contribute to lasting social protection*

- Monitor technological and scientific research and develop new products and services.
- Participate in reducing vulnerability and preventing exclusion by increasing access to insurance.
- Develop sustainable mechanisms of social protection (eg pensions and health insurance) in partnership with the public sector.
- Promote the adoption of responsible behaviour by making society aware of risks and by preventing risky behaviour.

*To foster a policy of responsible investments*

- Indicate if, and how social, environmental and governance-based criteria are taken into account in asset management.
- Encourage research into the connection between social, environmental and governance-based criteria and the long-term performance of both industry and governments.
- Develop and market a socially responsible investment (SRI) product line.
- Encourage economic development by financing small and medium-size enterprises (SMEs) and investing in infrastructure.

*To develop their operations within a responsible social and environmental framework*

- Assess and reduce their impact on the environment, in particular greenhouse gas emissions.
- Select suppliers and work with them to ensure sustainable development.
- Encourage the insurance supply chain to adopt a sustainable approach.
- Continue to improve equal opportunities.
- Encourage the insurance industry to adopt socially and environmentally responsible behaviour.

"Tackling climate change: the vital contribution of insurers" is available on the CEA's website:  
[www.cea.eu](http://www.cea.eu)

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