

CLIMATE CHANGE AND ITS EFFECTS ON SMALL BUSINESSES IN THE UK

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Chief Executive's Message

This report concentrates on the effects of insurance changes and climate change on small and medium size enterprises (SMEs) in Britain, the first time this topic has been addressed. It is an important one: SMEs are arguably the backbone of the UK economy, in terms of diversity, innovation and social cohesion, but they are also the most vulnerable section of the UK economy to climate change impacts. AXA is the second largest insurer of SMEs and the leading property insurer for small businesses in the UK.

Climate change has already impacted dramatically on British business and, as insurers, we have seen the average cost of business interruption soar, with costs having risen by almost 60% in just 4 years to £35,000, a sum which has a potentially devastating impact on SMEs.

This report shows that the already high costs borne by SMEs as a result of climate change (most clearly manifested in flooding) are set to rise dramatically. Projected scenarios detailed in this report, using modelling data from the Government, show that the cost is likely to rise in the order of 30 or 40 times by 2080. This would mean that flooding would cost the UK economy up to £42 billion, every year, in today's prices.

Attempts to mitigate greenhouse gases will result in higher energy costs and fuel poverty issues. But climate change impacts are also going to be costly for everyone in terms of not just property damage, but business interruption (as shown above) and impacts on future employment. These costs will particularly affect the poor, the elderly, and single parent families, often the very people most likely to live in flood risk areas where land is cheaper. The effects on society are hard to quantify but should not be underestimated. Repeated suffering on the part of this group of vulnerable people could open a gulf which could lead to a breakdown of social cohesion.

Despite their vulnerability to the impacts of climate change, SMEs are yet to take the threat posed by climate change seriously enough, and it is imperative that government and the insurance industry work in partnership to ensure that business is adequately prepared and supported. Our research, which is outlined in detail later in this report, shows that some 90% of businesses are currently under-insured and 70% of businesses in high risk areas are not concerned that flooding will affect them.

Small businesses such as the corner shop and the local builder help to cement this social cohesion, but they have to contend

with competition from big companies as well as climate change impacts. As our surveys have shown, small businesses get little help from the authorities when it comes to flooding, either in terms of flood warnings or assistance in recovery. They get the most help from their insurance companies. Perhaps this report may help to persuade others that small businesses form an important sector of our society which is particularly vulnerable to the challenges which climate change will bring.



Chief Executive Officer,
AXA Insurance



Author's Foreword

The research for this paper was conducted in July and August 2006 and consisted of the following elements:

- Analysis of insurance claims data supplied by AXA Insurance.
- A telephone survey of small businesses in flood hazard areas.
- Focus Groups in Carlisle and Elgin, areas subjected to recent severe flooding.

Details of the research, including many quotes from the focus groups are contained in a separate technical report which will be published on the internet¹. What follows is a condensed summary intended for policymakers. In this report, 1 billion = 1,000 million.

The study has been confined to flooding, and further limited to flooding in England and Scotland simply because those are the parts of the UK with the most recent widespread floods affecting large numbers of SMEs, not because Wales or N. Ireland are immune from flooding as residents in Trefriw and Llanrwst will no doubt confirm, after serious flooding there in 2004 and again in 2005.

There are of course many other impacts of climate change, such as heat wave, drought, changing storm tracks, mould, subsidence, insect infestation, and diseases etc. These are important topics for SMEs and some consideration of these is included in a separate new guidebook produced by AXA written for SMEs to help them to manage their risks.

¹ At www.axa4business.co.uk

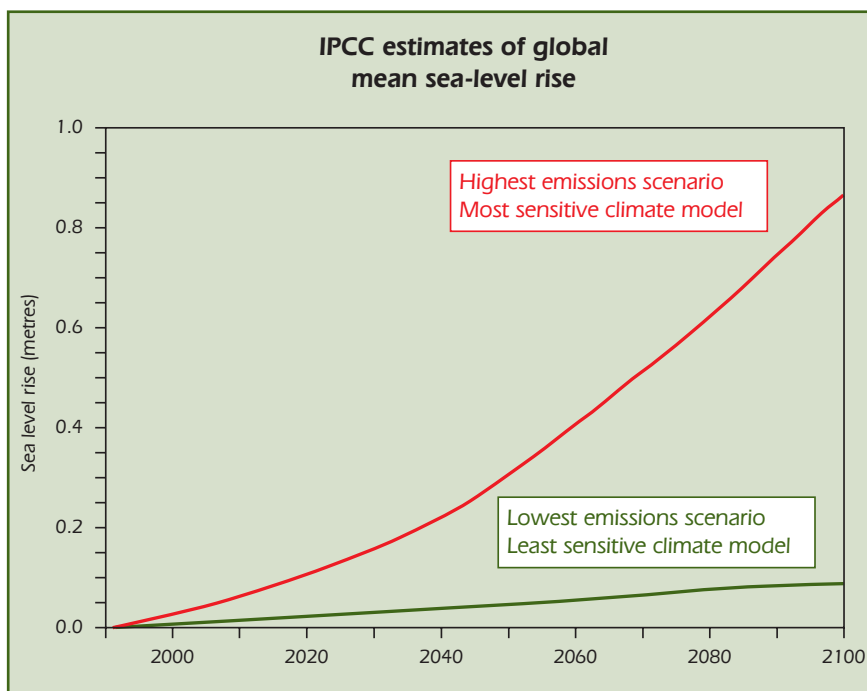


Executive Summary

The threat of climate change has taken on a new urgency during the last 12 months following the discovery last December of a 30% reduction in the thermohaline ocean circulation (which drives the Gulf Stream) and increased melting in the Greenland ice cap. New research reports are increasingly discussing “dangerous” climate change and so called “tipping points”. A tipping point is a point of no return where feedback effects

start to accelerate change resulting in an escalation of global warming, or sea level rise. This summer there were predictions from mainstream scientists in a new OECD report² that global sea levels could rise by as much as a metre in the next 100 years. The graphic below outlines potential global mean sea level rise from the IPCC (Intergovernmental Panel on Climate Change).

This is the first research to look specifically at the impact of climate change and insurance on small and medium size enterprises (SMEs) in the UK. It concentrates on flood risks, although climate change will produce many other threats for small businesses. It is based on insurance data from AXA Insurance, a major insurer of SMEs, combined with a survey of small businesses in recently flooded areas and comments from focus groups of the managers and owners of small companies which have survived recent major floods.



The potential effect on SMEs of increasing flood damage and reducing insurance availability could be serious for the economy as a whole, but our survey shows that while 85% of businesses are aware that climate change is a problem for the world:

- 46% of small businesses think that climate change is blown out of proportion and;
- only 26% think it is a real threat to them.

The Small Business Council’s Annual Report for 2005 barely mentions climate change as an issue³, despite government concern on the subject, but suggests it is something to look at in the future.

² Robert J. Nicholls, Susan E. Hanson, Jason A. Lowe, David A. Vaughan, Tim Lenton, Andrey Ganopolski, Richard S.J. Tol, and Athanasios T. Vafeidis. 25th June 2006. “Improving methodologies to assess the benefits of policies to address sea-level rise.” report to the OECD.

³ Small Business Council 2006. “Giving small business a voice” Annual Report for 2005. 68pp Small Business Council, London.

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This has to change: there are many things that SMEs can do to adapt to climate change impacts and to mitigate carbon emissions. The insurance industry must do much more to help and AXA Insurance has already published guidance on business continuity planning for small businesses.

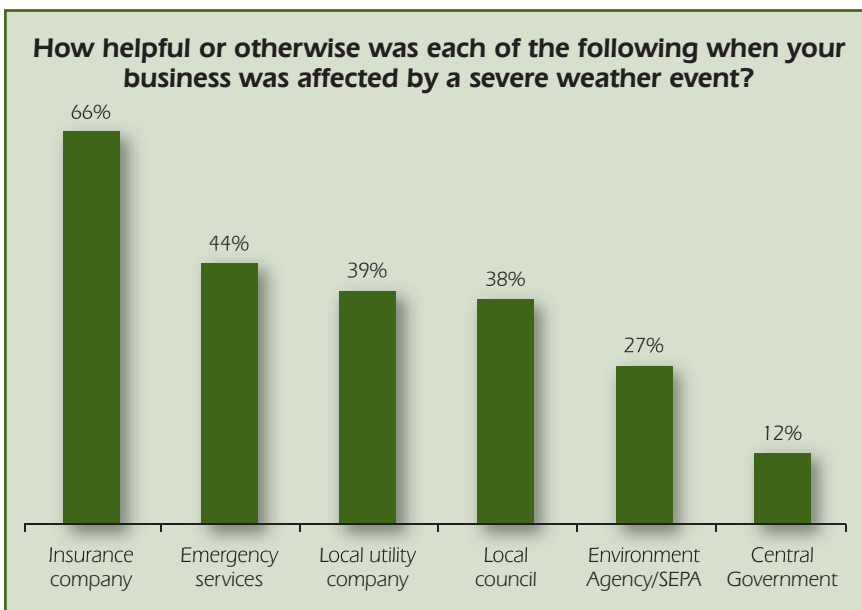
Our survey shows:

- Small businesses seem to be missing out. Most assistance is going to domestic households.
- Few small businesses receive flood warnings or help from the local council.
- The survey indicates that the most help for small businesses came from their insurance companies.

Part B of the study quotes from the Government's own research under the UK Climate Impacts Programme and the Foresight programme, and applies it to SMEs. It points out that Government research shows if nothing is done then within the lifetimes of our children or grandchildren flood damage economic costs could average between £5.5 billion and £42 billion every year. It would not take many bad flood years in a row, for England to face significant economic consequences.

Part C looks at some of the ways insurers could help and some of the work already done by insurers to help in Scotland. In the last ten years, detailed insurance advice has been requested by almost every local council and has been given freely and regularly in face to face meetings with council staff on land use planning, sustainable drainage and sustainable flood management measures.

In most of Scotland there is now virtually no new building in floodplains and flood problems are being tackled urgently. This is reflected by the attitudes of a number of insurers which treat risks more sympathetically in council areas where insurance advice is followed. Where advice is not followed, insurance availability can potentially become a problem. The Elgin case study examined in this report is a good example.



England is a much bigger problem: insurance advice to individual local authorities has not been requested by more than a handful of English councils. Local authority planners in many areas in England, often under pressure to meet central government targets, are still allowing new development in floodplains. The disastrous floods in Carlisle, where AXA's claims payments were £24.5m, are also the subject of a special study in this report.

This report concludes that government needs a more proactive engagement with the industry in order to seek sustainable solutions for the benefit of individuals and businesses.

SMEs and especially small businesses are vitally important in terms of the economy, social inclusion, local employment, innovation, and the local character of our communities. The research conducted for AXA Insurance will help to identify where the problems lie and what more the insurance industry can do.

- Insurers have their own “tipping point”. If firm action is not taken soon by government, insurance could become unsustainable in many parts of the UK where the flood hazard is growing rapidly.

- Insurers are experts at dealing with risk. They know how to control it and reduce it, yet many research reports ignore the major contribution insurers can make and are already making.

The insurance industry needs to move up a gear to face this challenge.

About the author

David Crichton is a Fellow of the Chartered Insurance Institute and the author of the Institute's “Flood Fact File” and several books and papers on climate change. Trained as an economist, he has 25 years experience in insurance underwriting and claims handling. For the last ten years he has specialised in climate change impacts on insurers and is a visiting professor at the Benfield Hazard Research Centre at University College London, a visiting professor at the Middlesex University Flood Hazard Research Centre and an Honorary Research Fellow at the University of Dundee. He has advised the UN, NATO, OECD and governments and insurers in four continents on flooding and climate change issues.

The author is grateful to AXA Insurance for their assistance and to all who responded to the surveys for this report, especially to those who took the time to come to the focus groups and talk about their experiences.



Introduction

The scope of this policymakers' summary report is limited to projected flooding impacts from climate change, particularly on small businesses. Attempts are made to quantify the future economic costs but also to describe the other costs faced by small businesses and to highlight their importance to society in terms of social inclusion and cohesiveness issues. There are many other direct and indirect impacts from climate change, such as windstorm, drought, subsidence, and freeze. These are described in a separate risk management guide written for SMEs which is available from AXA Insurance and are considered in more detail in a separate technical report which will be available shortly from the AXA Insurance web site.

This report is divided into three parts.

- Part A looks at the current problems in areas which have flooded.
- Part B attempts to assess the future scale of the problems on a national basis, and;
- Part C asks the question "What can the insurance industry do to help SMEs and society cope with climate change".

Insurers are very conscious that they might be accused of "scaremongering" or over-exaggerating problems. Perhaps this is why many of them have been relatively reticent until now about climate change impacts. After all, it is argued, society has successfully dealt with previous scare stories

about the ozone hole, acid rain, and pesticides, why not with climate change? Our survey showed for example that 46% of small businesses thought that the threat of climate change has been blown out of proportion and only 26% see it as a real threat to their own business.

But climate change is different. It is not something that can be reversed by banning CFCs or stopping burning coal in cities or banning the use of certain pesticides. Professor Sir David King, the UK's Chief Scientific Advisor has stated⁴ **"In my view, climate change is the most severe problem we are facing today – more serious even than that of terrorism"**.

Society is still too dependent on the burning of fossil fuels and as the vast emerging economies of China and India seek their share of economic growth, time is running out for the planet. Insurance is the biggest industry on the Earth and is the one which will suffer first from severe weather due to climate change.

The projections in this report are limited to those published in official research papers by reputable mainstream scientists. They are dramatic. The insurance industry has a duty to express its concerns about the implications. It may upset some vested interests, but at the end of the day, the biggest question is: - what sort

of legacy are we going to leave for our grandchildren?

It is now perhaps time to mobilise the risk management skills of the insurance industry as a whole and its power to use market forces to help society to deal with the impacts of climate change in the UK. This report sets out to show why and how.

4 King, D A, 2004. - "Climate Change Science: Adapt, mitigate or ignore" Science, Vol 303, January 2004.



Part A: The problem

The importance of SMEs to the UK economy⁵

SMEs are “Small and Medium sized Enterprises”. There were an estimated 4.3 million business enterprises in the UK at the start of 2005 with an estimated turnover of £2,400 billion. Of those, only 1.2m had employees, employing 22m people.

Almost all of these enterprises (99.3 per cent) were small (0 to 49 employees). Only 27,000 (0.6 per cent) were medium-sized (50 to 249 employees) and 6,000 (0.1 per cent) were large (250 or more employees).

- 3.1m businesses, mainly in the construction industry, are sole traders with no employees.
- SMEs together account for more than half of the employment (58.7 per cent) and turnover (51.1 per cent) in the UK.
- Small businesses alone (0 to 49 employees) accounted for 46.8 per cent of employment and 36.4 per cent of turnover.

SMEs are therefore critically important to the UK economy.

The number of SMEs overall is growing. In the 11 years from 1995 to the end of 2005, the number of SMEs registered for VAT has increased by 265,000.

The main growth areas for SMEs have been in the construction industry, leisure industries such as restaurants, bars and

catering, also in newer growth industries such as internet retail, post and courier services, real estate and property letting has also seen growth.

What is happening? And what does the future hold?

SMEs are the main drivers of job creation, innovation, diversity, and growth in the UK economy. They are also arguably the most vulnerable to impacts from climate change, terrorism and taxation.

- More than 30% of small businesses are unable to survive the first three years of operation⁶, and in London the figure rises to 35%.

In its latest annual report⁷ the Small Business Council makes no fewer than 32 recommendations for Government.

The Council say:

“We are also concerned at the impossibility of obtaining business insurance in the event of certain man-made or natural disasters. The Council urges the Government to consult the business community in order to explore the viability of establishing some form of emergency fund to assist businesses (to) recover from uninsurable events.”

What are these “uninsurable events?”

- The Insurance industry is increasingly seeing flooding, in a growing number of high risk areas, as uninsurable.
- In the last 6 years, weather damage claims have cost the UK insurance industry over £9 billion. Of this, £2.3 billion has been caused by claims from businesses, with a further £300m due to business interruption caused by weather damage⁸.
- Within Europe, the rate of climate change equates to the climate moving North at a rate of 6 miles each year⁹.
- 3 million people in Britain are now threatened directly by predicted sea level rise¹⁰, according to an OECD report. The report mentions that some concerns “over possible misuse (of the report) to raise public anxiety were raised particularly regarding the insurance industry.” This is a typical response from vested interests which would prefer insurers to keep quiet about the problems.
- Within 200 years, London, Edinburgh, Scunthorpe, Bristol, Norwich, Newcastle, Bournemouth, Peterborough could all be under water¹¹ as sea levels rise.

5 Department of Trade and Industry, August 2006. “Small and Medium-sized Enterprise (SME) Statistics for the UK 2005”.

6 DTI Small Business Service, February 2006.

7 Small Business Council June 2006. “Giving small business a voice” Annual Report for 2005. 68pp Small Business Council, London.

8 Association of British Insurers statistics bulletin.

9 Nordic Council, 2005. “Conservation of Nordic Nature in a changing climate”.

10 Robert J. Nicholls, Susan E. Hanson, Jason A. Lowe, David A. Vaughan, Tim Lenton, Andrey Ganopolski, Richard S.J. Tol, and Athanasios T. Vafeidis. 25th June 2006. “Improving methodologies to assess the benefits of policies to address sea-level rise.” report to the OECD 145 pages. Produced by researchers from the Tyndall Centre for Climate Change Research, University of Southampton, British Antarctic Survey, Hadley Centre, University of East Anglia, Potsdam Institute Germany, Hamburg University, Vrije University Amsterdam, Carnegie Mellon University, USA, University of the Aegean, Greece.

11 Benfield Hazard Research Centre, UCL, 2006. “Dangerous Climate Change: rising sea levels and ocean circulation changes.” Technical Report 05. UCL London.

Why is this happening? And why are we hearing about it now?

It is all a question of “tipping points”.

1. We are reaching a tipping point with climate change. Greenhouse gas emissions are now so high that soon “dangerous” climate change will be irreversible. Feedback mechanisms in the climate will accelerate the changes. This is already being seen with the melting of the Greenland ice sheets and sea level rise. A recent Scottish Executive report¹² on sea level rise, contains an ambitious target for an urgent programme of coastal flood defence construction to be completed by 2008.
2. Scientists say average global temperatures have varied by less than one degree since the dawn of human civilisation, but now they predict a global rise of between 1.4°C and 5.8°C by the year 2100. The so called “hockey stick” graph (see opposite) shows that temperatures are now growing so steeply that the heatwaves of 2003 and 2006 will soon be the norm. In the UK, 2003 was the hottest summer since records began; 2006 was the second hottest.
3. 2006 has also seen a “tipping point” within the mass media, where there has been an almost Damascene change. Sir David Attenborough, (voted “the most trusted celebrity in Britain”)

was quoted in The Independent, on 24th May 2006 as saying:

“I am no longer sceptical.

Now I do not have any doubt at all.

I think climate change is the major challenge facing the world.”

4. Another “tipping point” relates specifically to the availability of flood insurance in the UK. Continuing floodplain development in England without a corresponding investment in flood management means that since January 2006, the insurance industry no longer guarantees to be able to quote for flood cover in high risk flood areas, not only in England, but anywhere in the UK¹³. (Even though flood risks are being responsibly managed in most of Scotland, Wales and N. Ireland.) For the time being, insurers will usually maintain cover for loyal existing policyholders, but where the flood hazard is high, increasing levels of premium are being charged by the market with excesses that can be as high as £20,000.
5. We are also reaching a “tipping point” within the global insurance industry. Insurers have concluded that they can no longer accept a back seat in the debate. They will have to not only take part, but become leading players, using their expertise in risk management and

catastrophe modelling. After all, insurers are the biggest industry in the world and often in the front line when dealing with the effects of natural disasters.

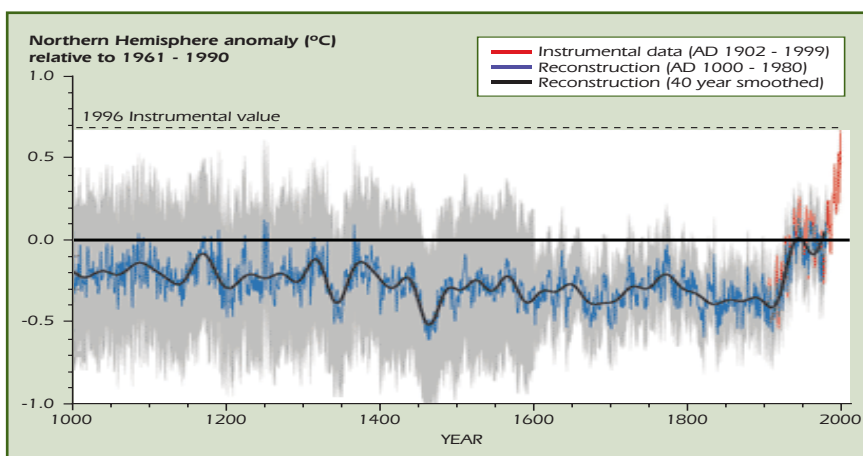
6. The Government itself will be instrumental in forcing insurers to take action, not only by continuing to allow building in the floodplain in England, but at the same time its insurance regulator is requiring higher standards of solvency requirements on insurers based on risk exposures¹⁴ in preparation for the EU Solvency II Framework Directive due to be adopted in 2007.
7. The European Commission’s proposed Directive on the assessment and management of flood risk in Europe¹⁵ was published on 18 January 2006 and will require new flood maps and risk assessments to be produced. France and Germany are already working on their maps and plan to make it illegal to build in flood hazard areas.

¹² Scottish Executive, 2005. “Seas the opportunity – a strategy for the long term sustainability of Scotland’s coasts and seas”.

¹³ the ABI statement of principles on the provision of flood insurance was issued on 11 November 2005.

¹⁴ Financial Services Authority (FSA), 2006. “Integrated Prudential Sourcebook” FSA London. Paragraph 1.2.22R requires that “... a firm must at all times maintain overall financial resources...to ensure that there is no significant risk that its liabilities cannot be met as they fall due.” Insurers are to identify and understand the risks in their business, identify an appropriate control environment to manage those risks and monitor the enforcement of the controls.

¹⁵ “Proposal for a Directive of the European Parliament and of The Council on the assessment and management of floods” {SEC(2006) 66} (presented by the Commission) Brussels, 18.01.2006 COM(2006) 15 final 2006/0005(COD).



Millennial Northern Hemisphere (NH) temperature reconstruction (blue – tree rings, corals, ice cores, historical records) and instrumental data (red) from AD 1000 to 1999. A smoother version (black), and two standard error limits (grey) are shown.

Source: IPCC Third Assessment Report

In June this year, two very significant statements were issued from different sections of the insurance industry:

- "... the sheer magnitude of climate change could in future impact a large number of industries to such an extent that sustainable insurability may ultimately be put into question."
- Chief Risk Officers of 14 of the biggest insurers¹⁶.
- "...We don't know exactly what impact climate change will have. But we do know that it presents society and the economy with an increasing level of

uncertainty as it seeks to manage its risk. We believe that it is time for the insurance industry to take a more leading role in understanding and managing the impact of climate change." – Lloyds of London¹⁷.

Are small businesses equally aware of the impacts of climate change?

To discover the answers to this, AXA commissioned a new survey of 400 owners or directors of small businesses (less than 50 employees) in areas recently devastated

by flooding (Carlisle, Boscastle, Lewes, Hawick, Thirsk, Elgin, Selby and Chichester.) The survey selected 100 business which had been directly affected by flooding and 300 which had not. The businesses predominantly had fewer than 4 employees and two thirds of the respondents were male.

AXA also commissioned focus groups in two of the areas most recently affected, Carlisle and Elgin. Some of the focus group comments are quoted below.

- AXA's survey (see page 19) showed that while 85% of small businesses see climate change as a problem for the world, most small businesses do not see climate change as a real threat to their own business and many are underinsured or not insured at all.
- We already know from insurance claims experience (see page 15) that small businesses can take up to two years to recover from a flood. Many do not have business interruption insurance. Some do not survive.
- Small businesses are essential to social cohesiveness: the corner shop, the village post office, the local plumber, provide more than just goods and services. They provide local employment, and help cement communities together. Climate change is a new risk factor which in some areas of the country will threaten the survival of many SMEs.

¹⁶ Markus Aichinger, Allianz, Eberhard Faust, Munich Re, Jean-Noël Guye, AXA, Pamela Heck, Swiss Re, Annabelle Hett, Swiss Re, Peter Höppe, Munich Re, Ivo Menzinger, Swiss Re, Ernst Rauch, Munich Re, Samuel Scherling, Swiss Re, Martin Weymann, Swiss Re, June 2006. Climate Change & Tropical Cyclones in the North Atlantic, Caribbean and Gulf of Mexico. Emerging Risk Initiative – Position Paper. CRO Forum, Geneva.

¹⁷ 360 Degree Risk Project 2006. "Climate change; adapt or bust" Lloyds of London, With the assistance of: Acclimatise., Insurance Information Institute, New York, Lighthill Risk Network, London., Lloyd's Market Association, London. June 2006.

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- Small businesses in the construction industry also suffer from the psychological impacts of a flood. While helping flood survivors to rebuild their lives they often share the anguish and anger of the families they are helping.

“Yes we were working day and night; it was quite stressful to be working in some of the people's houses - they'd be coming round every day, crying. Their bairns ... they were heartbroken. Most of them never went back to their houses.”

“The emphasis as far as the media was concerned was ... people's homes ... they didn't seem to be as interested in businesses.”

The AXA Survey

Previous surveys¹⁸ of AXA data have shown that:

- From a sample of 2,420 businesses some 90% are under insured. This equates to a total of £865m under insurance¹⁹.
- Excluding the self-employed, 1 in 3 of AXA's small business customers do not have Business Interruption cover²⁰ which could enable them to continue to pay wages when the business is closed and help them to recover more quickly.
- The length of business interruption has increased considerably in the last ten years as businesses become more complex, and more are damaged by flooding²¹. The average interruption period has increased from 8 months in 1996 to 14 months in 2005.
- The average cost of a business interruption claim²² from a flood has increased from £22,000 in 2001 to £35,000 in 2005.

It is very important that small businesses make sure they have adequate sums insured. For example, if a machine worth £100,000 is insured for only £50,000 and it incurs £20,000 of damage, the insurer will generally only pay £10,000, this being 50% of the claim as the business is regarded as 50% uninsured.

"One thing they don't tell you though if you haven't got enough insurance they will only pay out...is it half?"

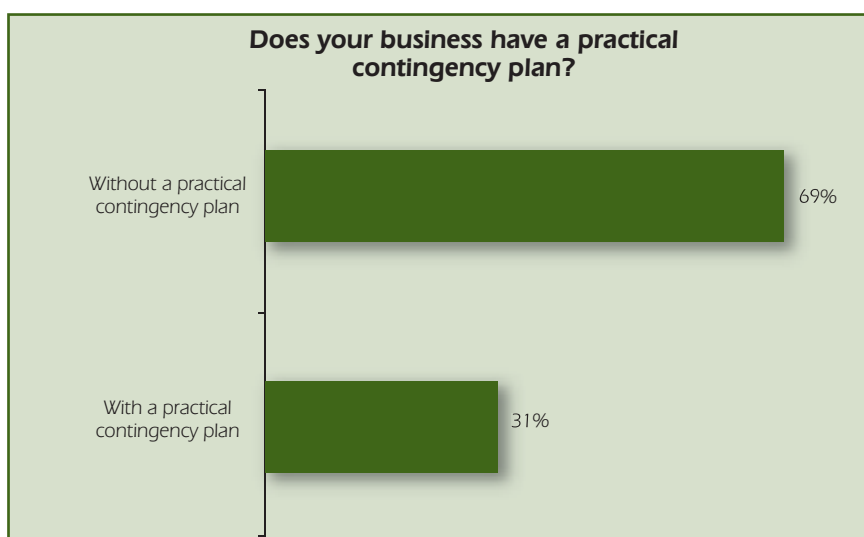
For the purposes of this report, AXA commissioned a new survey, specifically of businesses in areas which have recently suffered from severe flooding.

"Well I'm pretty much the same as everybody else really. We lost vehicles, stock, we lost our office stuff and everything else and emotionally it was really difficult to come to terms with losing 35 years of business."

While many small businesses in these areas were concerned about the risk of flooding

causing disruption to the business, the majority, (71%) were not concerned or not at all concerned. 69% had no form of business continuity plan²³, despite the statutory duties on local authorities to extend their civil protection duty beyond emergency planning to address risks to local businesses under The Civil Contingencies Act 2004.

Only 64% confirmed that they had insurance against business interruption or loss of earnings, – a third were uninsured for these risks. This confirms the previous AXA survey mentioned above.



18 These survey results are extracted from the AXA Presentation to HM Treasury Stern Review December 2005

19 AXA insurance data and the Building Valuation Service.

20 AXA Insurance Customer Base Analysis by the PH Group.

21 AXA Insurance Customer Base Analysis / GAB Robbins.

22 AXA Insurance Customer Base Analysis / GAB Robbins.

23 Guidance on preparing continuity plans for small businesses is available from <http://www.axa4business.co.uk/bc/guide.asp>.

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Which organisations were the most helpful?

Small businesses which had not been flooded said that if they were flooded they would expect most help would come from the emergency services (92%) followed by their insurance company (74%). Interestingly, for business established more than 20 years these figures rose to 95% and 86% respectively.

The Environment Agency / Scottish Environment Protection Agency (SEPA) was expected to be helpful by 61%, rising to 63% in the case of businesses established for more than 20 years.

The lowest score was for central government where help was expected from only 31% of respondents. This figure fell to 28% for long established businesses.

60% expected that the local council would be helpful if they were flooded.

However, very different answers came from businesses which had actually suffered recent flooding. All of them found that the amount of help they were given was less than those who had not been flooded would have expected.

- Here it was insurance companies which came top, with 66% finding them helpful.

There were a further 20% of "don't knows" which perhaps reflects the fact that for many, their claims were still outstanding, or perhaps they were uninsured. It is interesting that in a previous survey²⁴ of small businesses after the Autumn 2000 floods, it was also found that it was the insurance companies which provided the most help and the highest satisfaction levels. The highest dissatisfaction level was with the Environment Agency and local authorities.

Generally there were a high level of "don't knows" in this group, but even so there seems to be a highly significant difference between expectations of help and actual help given.

- The score for the emergency services dropped from 92% to only 44%.
- The Environment Agency / SEPA fell from 61% to 27%.
- Utilities companies fell from 67% to 39%.
- The local council fell from 60% down to 38% although council results varied from 25% to 55%, perhaps depending on the local council concerned.

"You certainly wouldn't go to the council for advice."

Those which had experienced flooding said that they had very little help from the authorities, the same result as the 2000

floods survey by the Federation of Small Businesses.

"What really disappointed me was going to (the) Council and saying 'What kind of help can I get?' and they turned round to me in no uncertain terms because you have no insurance 'You are on your own'."

"The council were no help at all, it was basically 'it's your problem get on with it'."

"Finding help after the floods was difficult, we phoned up the council because we had 7 fridges and freezers then when they wouldn't move them because they said we weren't residents. I said 'Well you know we pay our business tax just like council tax'."

These results perhaps need some explanation. In most developed countries, the government compensates flood survivors, or provides reinsurance cover for insurers, the main exceptions being the UK, Argentina and Israel.

In the absence of government compensation, one of the results is that there is a public perception that insurers have a "social duty" to provide cheap cover for everyone²⁵.

24 Barter, A., 2002 "Autumn 2000 Flood Survey" Federation of Small Businesses (South East). Polegate, England.

25 Clark, M., Priest, S. J., Treby, E. J., Crichton, D., 2002 "Insurance and UK Floods: a strategic reassessment." A Research Report for TSUNAMI. University of Southampton, Southampton.

In 1961, insurers agreed to respond to this demand and undertook to provide low cost flood insurance for all UK homes and shops regardless of the flood risks. This was extended in January 2003 to apply to all types of small businesses, so that for example, riverside pubs and hotels were now “guaranteed” to be able to get flood insurance for the first time.

Over the years there has been a growing “take up” rate of private insurance in the UK, both from private households and small businesses and by 2004, 93% of domestic owner-occupiers had contents insurance. This has meant that insurers have become financially strong and technically sophisticated in managing flood risks, but it has also enabled property developers to sell properties in flood hazard areas because buyers have been able to get insurance and mortgages.

This is one reason why the removal of the guarantee from January 2006, for new policies in high flood risk areas is so significant, especially at a time when the Government is hoping to increase the number of houses built in low lying parts of south east England.

Without government compensation, adequate insurance protection is essential, but some small businesses have had problems in obtaining insurance cover.

“The Environment Agency said it didn’t really matter because these floods were never going to happen. So if these floods won’t happen again why can’t I get insured?”

Responsibility

Small businesses or their landlords are responsible for protecting their own property against flooding, but

- 43% thought that apart from themselves, their local authority was mainly responsible for protecting businesses against flooding.
- 41% thought that the authorities were not doing enough to protect against flooding.

There is a difference between Scotland and England in this regard. While no local authorities are responsible for flooding, in Scotland the local authority does have responsibility to maintain watercourses and to report every two years on all flood incidents in their area and what action they have taken to prevent a recurrence²⁶. This means that insurance companies and flood survivors can and do regularly sue Scottish local authorities for any breach of this statutory duty which results in damage. This does not happen in England.

Many floods in England are “muddy” caused by earth washed away from fields onto roads. Scottish local authorities have powers to require farmers to prevent this²⁷. There are no similar powers in England.

Scottish local authorities also have permissive rights to construct flood defences for which they can obtain 80% grants from central government. This means that planners and councillors know that if they allow development in the floodplain, they are the ones with the extra work of having to also design and build flood defences. They cannot pass the problem (or the blame) to the Environment Agency.

Cost of lost working hours

There was a wide variation in the effects of the flooding on the number of working days lost and the costs to the business. Where the business had less than four employees, 53% said that all staff were able to work throughout. This dropped to 23% for firms with more than 10 employees. This does not necessarily mean that small businesses are more resilient, it could mean that they may be more driven by economic imperatives. On average, businesses lost over 50 working days to a flood event, but there was again a wide variation. This is no doubt largely due to the type of business and the type of flood and is an aspect where further research is needed.

26 Section 6 of the Flood Prevention and Land Drainage (Scotland) Act 1997.
27 Section 99 of the Roads (Scotland) Act 1984.

“There are a lot of businesses round about that are still closed. We had a garage across the road they are totally closed they are never going to open again.”

On average, small businesses lost around £15,000 from flooding. This depended very much on the size of the business:

Cost of lost working hours, damage to stock and premises and loss of custom

1 to 3 employees	£7,900
4 to 10 employees	£18,070
11 to 50 employees	£27,480

Flood warnings

Only 8% of businesses received any form of flood warning. Warning systems seem to be designed very much for domestic householders rather than small businesses.

Those who had received an adequate warning of the flood generally suffered lower losses, but with such a small number of businesses receiving a warning the samples were too small to draw conclusions from this. One would expect a warning to enable some steps to be taken, for example moving children and the elderly to a safe place, but in the UK,

flooding is often sudden and unexpected with little time to take further action.

“It was just an automated message my mobile phone went at the same time 10 past 5 in the morning and we were past our knees in water by then!”

“...they had a warning. Some people didn't care about moving their stuff, they didn't take it seriously.”

“the vulnerable and the elderly are in these bungalows.”

“they can't take their possessions upstairs.”

Recovery Time

By contrast, the length of time taken to recover from a flood can be many months or even years.

On average those who had not been flooded expected it would take them less than a month to recover from a flood. Those who had actually been flooded found on average it took more than two months to recover with some taking more than 3 months.

“It took 3 months with dehumidifiers – 3 going 24 hours 7 days a week and 3 heaters and blowers trying to dry the brick out first but even the new plaster downstairs is all cracked and it's all cracked upstairs in the flat.”

“...being a pub where people are going drinking all the time they go somewhere else and they get used to going somewhere else and you just can't get them back again. It's very difficult to get them back. It's very, very hard work.”

Measures to reduce flood damage costs

There are a number of measures which small businesses can take. They can reduce flood damage using resistance and resilience techniques.

“Sandbags are a waste of time.”

“Why do you think that then?”

“The water can just come through the air vents and up through the floor. The problem we have, there are so many holes in all the walls plus the water comes up through the drains, it would be virtually impossible to make it flood-proof.”

Insurers can advise SMEs on the latest developments in temporary flood protection and there is advice available on the internet²⁸. Of course they should also make sure that their insurance is adequate and up to date.

“That sum assured, if you are not insuring your property for the right sum assured, and let’s say they assess that you’re paying a premium on a sum assured that is 50 percent of the actual sum assured, then they only pay out 50 percent of the claim.”

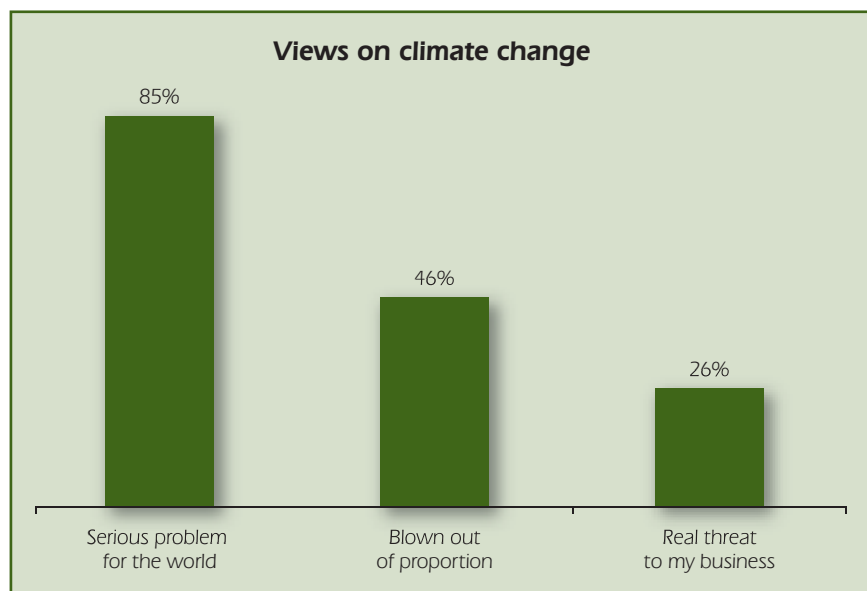
Climate change

The focus groups showed that there was a high perception of climate change threats, indicating that the efforts of government and research institutes are being effective in spreading the message. However a number thought that the threat of climate change has been blown out of proportion.

“I just think things go in cycles. It may have some affect but I don’t think you can write it all down to global warming.”

The survey found

- 46% thought that the issue of climate change has been blown out of proportion.
- 26 % thought that climate change is a real and serious threat to their business.
- 85 % thought that climate change is a serious problem for the world in general.



28 Crichton, D. 2004. “Temporary local flood protection in the United Kingdom. - An independent assessment.” A Benfield Hazard Research Centre technical report. Free download from: http://www.benfieldhrc.org/activities/misc_papers/Temporary_local_flood_protection.pdf

This is an important result and deserves further investigation. As was seen earlier in this report, with up to 35% of new small businesses unable to survive their first three years of operation, perhaps many businesses have more immediate threats in mind besides the longer term impacts of climate change. However while the survey showed that only 26% overall believed climate change was a serious threat to them, the variance was remarkably small and this figure is actually slightly higher at 29% for relatively new businesses and reached 30% for retailers and wholesalers.

It is interesting to note that while nearly three quarters of small businesses do not connect climate change with a threat to their business, this does not mean that they are not taking action to address the threat of extreme weather conditions. For example, here are some of the actions revealed by our survey:

Home working or flexible working	50%
Review commercial insurance	51%
Review 'weather proofing' and weather related risks to your premises	43%
Get more advice from government bodies	32%
Consider moving	25%
None of these	16%

Only 16% of respondents were taking no action which seems to indicate that the majority are taking the risks very seriously indeed.

Conclusions from the surveys

Government and researchers seem to have been successful in raising awareness about climate change amongst small businesses, but there is still a long way to go to impress on them the seriousness and urgency of the threat to their survival. SMEs are vital to the UK economy, but they are ill prepared and most do not take the threat of climate change impacts to themselves sufficiently seriously. Perhaps they are too concerned with short term issues to worry about decadal or longer term threats. Perhaps they are not aware of the problems of inadequate sums insured or the increasing length and cost of business interruption claims.

SMEs, and as a consequence the 12 million people they employ, are often the "poor relation" when it comes to assistance for flood survivors. The authorities and the media concentrate on domestic properties. SME expectations of assistance from emergency services, central government, local authorities and others are disappointed when a flood event actually occurs. As our survey has shown the greatest help in such cases comes from their insurance company.

The UK is unique in the world in the extent to which people depend on private insurance cover for flood risks. To support social inclusion, insurers have gone to great lengths to cover as many people as possible with schemes to enable tenants in the social rented sector to buy insurance with small payments on a weekly or fortnightly basis, either with rent, or separately for those with rent arrears. A pensioner in many areas can get full insurance cover for only £1 per week. Despite this, only 39% of social rented sector tenants in England and Wales had contents insurance in 2004. In Scotland, the figure is 57%. These schemes were administered for insurers by local authorities, but the take up rates are expected to reduce as housing associations take over control of social rented sector properties²⁹.

As already pointed out, the UK insurance industry is not only socially responsible, it is financially strong with considerable expertise in flood mapping and modelling. Its National Flood Insurance Claims Database is the biggest in the World and envied by many other countries. UK insurers are world leading experts when it comes to flood.

UK government at national, regional and local level needs to be encouraged to use the expertise of the insurance industry to better understand and address flood related and climate change issues.

²⁹ Demos and Toynbee Hall, 2005. "Widening the safety net – learning the lessons of insurance with rent schemes".





Part B

What does the future hold for the UK?

Demographic changes

Businesses are dependent on their customers, but customers are also dependent on local SMEs, especially customers who are elderly people living alone. Current projections are that more people will live alone and live longer.

- The proportion of people aged over 65 is projected to increase from 16 per cent in 2004 to 23 per cent by 2031.
- In 2004 there were 7.0 million people living alone in Great Britain, nearly four times as many as in 1961.
- Between 1971 and 1998, the overall proportion of one-person households almost doubled from 17% to 31%, and the proportion of households consisting of one person aged 16 to 59 tripled from 5% to 15%.

For old people living alone, small businesses such as the corner shop and the small contractor are important. As these people grow older and less mobile they will become vital.

Demographic changes mean that many more new homes are needed. The Government's Sustainable Communities Plan³⁰ sets out a strategy for the development of 200,000 new homes in the South-East by 2016. There is little land left in the south east except for flood plains which will become increasingly

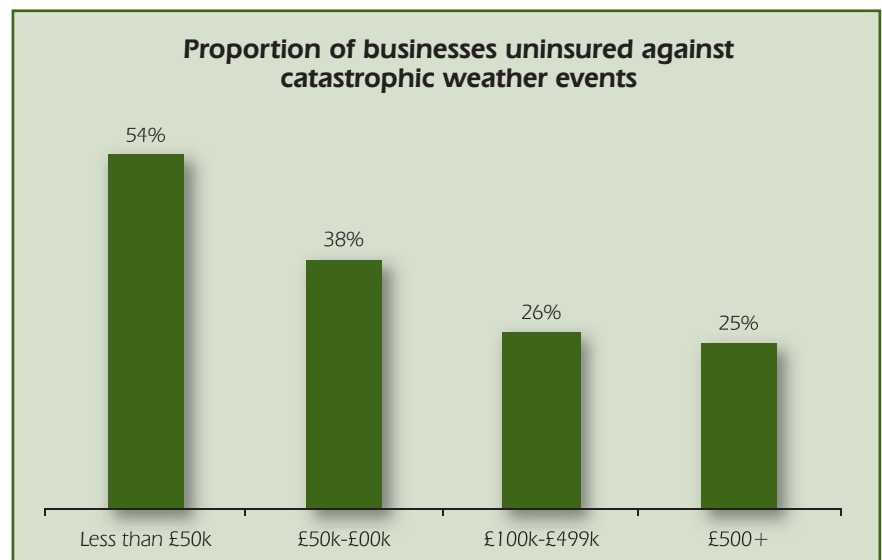
dangerous as the climate changes and sea levels rise.

- Based on current trends, the Government predict³¹ an increase in total households in England of 4.8 million in the 2003-2006 period (to a total of 25,713,000 by 2026) and the House Builders Federation is calling for more land for development³².
- Many of these properties would be in high flood risk areas: 60% are to be built in London, the East, the South East and the South West, and of the projected

annual growth rate of 209,000; 150,000 are expected to be one-person households.

The future impact of flooding on UK SMEs

If it is indeed the case that 90% of small businesses are underinsured and ill prepared, as the research above has shown, the effect of floods will hit small businesses particularly hard, and in turn the national economy.



30 Sustainable communities: building for the future, Office of the Deputy Prime Minister, February 2003.

31 New Projections of households for England and the Regions to 2026, ODPM Statistical Release 2006/0042, 14 March 2006.

32 House Builders Federation Press Release, 24 August 2006.

- Location is often critical for small businesses. As more people live in flood hazard areas, small businesses will have problems following them because of insurance difficulties.
- Insurance blight will force small businesses to relocate to low flood hazard areas if they are to keep insurance cover.

Nevertheless it is assumed that small businesses will be forced to follow housing into flood hazard areas, even if they cannot afford insurance.

In the last six years

- The average commercial weather damage insurance claims cost for all businesses has been £66m per quarter.
- In quarter 4 of 2000 they jumped to £289m due to the autumn 2000 floods.
- Without insurance those businesses would have suffered over £200m losses from just this one flood event.

As future flood events will be concentrated in coastal areas and low lying floodplain land, not all businesses will suffer, but those that do, some 130,000 businesses, according to one estimate³³, will suffer badly.

UK Climate Impacts Programme

The UK Climate Impacts Programme (UKCIP) has published scenarios for future climate change developed for the Government by the Hadley Centre which is part of the UK Met Office and the Tyndall Centre. They have estimated the range of likely climate conditions over the next 100 years for different levels of greenhouse gas emissions, namely High, Medium High, Medium Low and Low. In a guidance note issued by UKCIP³⁴, there is a strong emphasis on the importance of local authorities taking climate change into account in decisions with long term consequences such as the planning for new developments, and the need for adaptation. It contains no reference to a possible role for the insurance industry or the fact that many of the problems are created by the Government itself in insisting on targets for building new housing in areas at risk of flooding.

Foresight Scenarios

Foresight is a government backed technique for thinking about the future³⁵. A central aspect is the four scenarios of what the world might be like in 20 years; this provides the context for developing theories about the development of small businesses in the future. The scenarios are not prescriptive; they simply describe how the UK might look in the near future,

exploring alternative directions in which social, economic and technological changes may evolve. In a major project using some of the leading UK experts, work has been done to combine the Foresight scenarios with the UKCIP projections to produce detailed projections of different climate change flooding impacts depending on how the UK is governed in the future³⁶.

The Foresight scenarios consider only two dimensions of change, namely social values and governance systems.

Social Values Dimension

This takes account of patterns of economic activity, including consumption behaviour. At one end of the scale (CONSUMERISM) is a society dominated by consumerism, private consumption and short term satisfaction.

At the other end (COMMUNITY) there is a greater concern with long term social goals such as sustainable economic development, social cohesion, and equality.

In practice society is likely to be somewhere between the two extremes.

Governance System Dimension

At one end is GLOBALISATION, where governance is increasingly moved away

33 ABI statement of principles on the provision of flood insurance.

34 UK Climate Impacts Programme, Local Government Association, Improvement and Development Agency for Local Government, Defra, ODPM, CoSLA and the Welsh Local Government Association, 2003. "Climate Change and Local Communities – How prepared are you?" UK CIP, Oxford, July 2003.

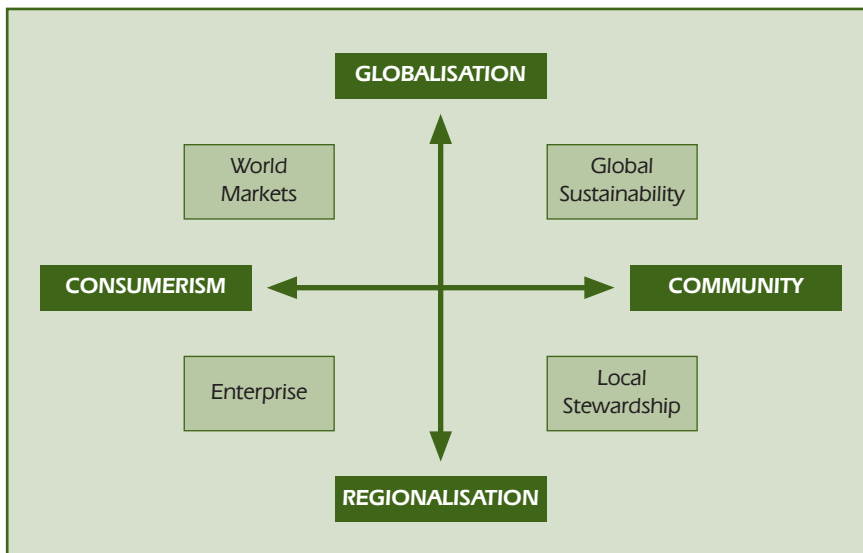
35 See www.foresight.gov.uk

36 Evans, E., Ashley, R., Hall, J., Penning-Roswell, E., Saul, A., Sayers, P., Thorne, C. and Watkinson, A. 2004. "Foresight. Future Flooding. Scientific Summary: Volume I Future risks and their drivers." Office of Science and Technology, London.

from the national level, with more devolved power to local organisations, and also more power to multinational organisations such as the EU and the World Trade Organisation.

At the other end is REGIONALISATION, with national sovereignty preserved or even strengthened at national level.

From these concepts, a grid can be produced as shown below:



Thus a combination of Consumerism and Globalisation brings a scenario called “World Markets”, and so on.

There will be big differences due to:

1. Varying amounts of increases in climate change impacts.
2. Different increases in the value of assets at risk, and;
3. Different increases in new development in flood hazard areas.

These differences will depend on which scenarios apply. The right hand side of the grid will have lower increases than the left hand side.

Here is a description of each of these four scenarios, as described by the Government with some comments from an insurance and small business perspective shown in italics. Bear in mind:

- Currently flood damage for the UK averages around £1.4billion per year.
- Current UK spending on flood defences averages around £800m per year.
- So the total cost of flood damage is currently £2.2bn per year.
- In England and Wales alone, 4m people and property worth £200bn are at risk already from flooding.

Current assumptions are that small businesses account for 7.5% of property values in flood hazard areas. If this is used

as a rough guide, it can be assumed that flood damage to small businesses is around 7.5% of the total flood losses³⁷. This would mean the current average annual cost for small businesses just from flooding is approximately £105m. The following scenarios assume existing policies on flood defence spending are maintained. They do not take into account recent cuts in flood defence spending announced by Defra. The research also indicates the number of people where the flood hazard exceeds the threshold announced by the insurance industry where insurance may no longer be available after January 2006.

World Markets: High economic growth and high greenhouse gas emissions

This is a world where the merger of businesses to form ever bigger groups will continue, until there are a few very big multinational players and SMEs are relegated to niche markets. UK Gross Domestic Product grows at 3% a year and the fastest growing sectors are leisure and financial services. Manufacturing and agriculture will decline. **More new building will take place in flood hazard areas, and as a result more SMEs will become uninsured and more vulnerable to insolvency from flood events.**

There may be an accelerated nuclear energy programme, but if not, global delay in any serious efforts to reduce greenhouse gas emissions means that climate change will

accelerate dramatically with many more flood events.

- **Annual flood damage will average £27billion by the 2080s, (0.19% of GDP) of which nearly £2 billion would be suffered by small businesses each year.**
- **3.5m people uninsurable**

Global Sustainability: Low economic growth and low emissions

This is where the big non governmental organisations like WWF become more powerful and forge partnerships with governments to influence policy. There is a role for trade associations such as the Association of British Insurers and the Federation of Small Businesses to have a greater say in policies which affect their members, and in particular to force climate change adaptation and mitigation measures.

Technology systems are likely to be harmonised across boundaries, in order to reduce uncertainty and improve efficiency.

UK GDP will grow at a slightly slower rate of around 2% pa, with the fastest growing sectors being renewable energy and electronic commerce. Fossil fuel based power systems, agriculture and manufacturing will decline. Index of Sustainable Economic Welfare will also grow at 2% pa.

There will be improvements in air quality and water quality, biodiversity will stabilise and there will be strong climate management, but with reduced standards of living, with local communities being dependent on intermittent sources of energy like solar and wind, which will make tele-working difficult.

- **Annual flood damage will average £7billion by the 2080s, (0.08% of GDP) of which around £500m would be suffered by small businesses each year.**
- **2.4m people uninsurable**

National Enterprise: Low economic growth, but medium high emissions

This is the world of the smaller, more flexible business, which can tailor its products to the many niche markets in this fragmented business economy where the consumer is "king". This situation is unlikely to be sustainable, however, as growing environmental and climate change related disasters will threaten the viability of such businesses.

UK GDP will grow at 1.5% pa, with the fastest growing sectors being private healthcare and education. There will be a decline in the financial services sector, and in high tech specialist services.

While GDP will grow, the Index of Sustainable Economic Welfare will fall

37 Werritty, A, Black, A, Duck, D, Finlinson, B, Thurston, N, Shackley, S and Crichton, D., 2002. "Climate change: flooding occurrences review". Report to the Scottish Executive Central Research Unit, Edinburgh.

dramatically at around –4% pa due to cuts in spending to offset social and environmental damage. For example in the UK, there will be demands to switch public spending from schools and hospitals into flood defences for property built in floodplains, new flood protection for London, and the repair of flood damaged infrastructure.

Air and water quality will decline rapidly, and biodiversity will deteriorate. Attempts to control climate change will collapse.

- **Annual flood damage will average £20billion by the 2080s (this will have the worst effect on GDP of the four scenarios at 0.41% due to slow economic growth) of which around £1,500m would be suffered by small businesses each year.**
- **3.5m people uninsurable.**

Local Stewardship: Low economic growth and medium low emissions

This is a world where stronger local and regional governments allow social and ecological values to be demonstrated to a greater degree at local level. Strict planning controls and sustainable flood management at a local level may reduce flood risks in some areas. Two of the authors of the Foresight report on flooding have pointed out that sustainable flood management will be much more cost effective than traditional engineering

solutions³⁸. For example, they have found that engineering solutions alone would cost £52 billion just to manage the additional risks from climate change. This compares with £22 billion when using engineering in concert with a range of non-engineering measures.

This will favour smaller local businesses rather than nationals.

UK GDP will grow at 1% pa, as will the Index of Sustainable Economic Welfare. The fastest growth sectors will be small scale intensive manufacturing, locally based financial and other services, and small scale agriculture, including growing bio fuels. Retailing and leisure may decline.

- **Annual flood damage will average £4billion by the 2080s (0.08% of GDP) of which around £300m would be suffered by small businesses each year.**
- **2.2m people uninsurable.**

General Points

- In all scenarios, Foresight research shows that some parts of England are particularly exposed. These are the Lancashire/Humber corridor, parts of the coast (particularly in the south-east) and major estuaries. To this list can be added more recent developments in the sub regional growth zones outlined in the next section.

- Many small businesses operate in the agricultural sector. In agriculture, fishing and forestry, 94% of employment is in small businesses.
- Under World Markets and Global Sustainability, more agricultural land will be used for housing, leading to loss of work for farmers and associated small businesses.
- Under Enterprise and Local Stewardship scenarios, agriculture has greater value as more farmland is devoted to flood storage and growing bio energy crops for the production of bio-diesel and bio-ethanol to reduce fossil fuel use. Rural development is based on self sufficiency in energy and food production and less dependence on vulnerable electricity transmission lines.

³⁸ Evans, E., and Hall, J., December 2004. "A new climate for flood planning" *Ingenia*, the Journal of the Royal Academy of Engineering, December 2004.

Urban Drainage

Our outdated and overloaded sewage and drainage systems will overflow much more often with climate change, leading to additional flooding costs. The additional annual average costs are shown in the table below;

Annual average costs of flooding by 2080 (£billion at 2004 prices)

Scenario	Drainage floods	River and coastal floods	Total
World Markets:	15	27	42
Global Sustainability:	3.9	7	10.9
National Enterprise:	10	20	30
Local Stewardship:	1.5	4	5.5

This does not include the costs of modifying drains. For example, gully traps may have to be removed as in France, to reduce disease risks.

Our research has shown that the floods in Carlisle were severely aggravated by overloaded sewers. Urban drainage systems and sewers will not be able to cope with the severity of sudden intense rainfall events

projected in climate change scenarios. Sewage flooding is a particularly unpleasant and expensive type of flooding, made worse by the increasing use of ground floor toilets required by government building standards even in flood hazard areas. Even areas with modern wastewater systems will not be immune. The newest and biggest system in the UK cost £120m and was completed in 2002. It was not designed to take climate change into account and provides only an 800mm pipe for much of its 35km length for the sewage and surface water drainage from a 270,000 population equivalent. It has already resulted in urban flooding at least four times since it was opened, the most recent being in August 2006. Drainage floods are important for insurers because they can happen anywhere in the country. Insurers can use the premium mechanism to discriminate against risks in flood plains and low lying coastal areas, but there is not enough data to discriminate against areas with overloaded drains.

There is an important exception to this: There will be different impacts in England and Scotland for legal reasons:

- In England and Wales, Section 106 of the Water Industry Act 1991 requires water companies to accept connections to their sewer systems from new buildings, even if the sewer system is already at full capacity. Sewage contaminated floods

from overloaded drains and sewers will be a particular and growing problem.

- This Act does not apply in Scotland where no new development is allowed unless the drainage and sewer system already has spare capacity.

Which scenario is the most likely?

Already, some clear distinctions are emerging between the different countries of the UK in other ways:

- England is moving towards the “World Markets” scenario where economic growth is the main objective and property developers are allowed to develop in flood hazard areas in the drive to increase the number of houses in the south east of England regardless of the consequences.
- Scotland is moving towards the “Local Stewardship” scenario, with its emphasis on sustainable development, renewable energy, sustainable flood management, and its strict control of property development where local planning strategies are drawn up in consultation with the insurance industry.

This means different consequences for small businesses which are more likely to thrive under a Local Stewardship scenario. Some of the implications are explored in more detail in the next section.

The foresight scenarios are a valuable way of looking into the future, and the results depend on which scenario is selected. Current estimates are that 130,000 businesses are located in areas at risk of river and coastal flood in the UK³⁹. 99.3% of these are small businesses employing fewer than five people. This means that if this number remains essentially unchanged the average costs of flood damage per small business each year by 2080 just for river and coastal floods would be

• World Markets:	£15,385
• Global sustainability:	£3,846
• Enterprise:	£11,538
• Local stewardship	£2,308

In addition, all urban properties especially in England and Wales will suffer from frequent localised flooding from overloaded drains and sewers. On average, SMEs have only five employees. Thus under the World Markets scenario river and coastal flood damages alone are projected to cost over £3,000 per employee per year by 2080.

This is not the whole story;

- Stress is a major factor which cannot be quantified easily in money terms, the damage to property, disruption of business, loss of profits and future sales are just one aspect. There is also the worry about future flooding, future insurance costs, and the prospect that the business may become insolvent.

These add to anxiety for SME managers and owners. Business continuity planning can help reduce this anxiety.

- Sole traders will be hardest hit, they may be less able to afford big increases in insurance costs or long term business disruption. They may be tied in to long term leases which make it hard to relocate.
- The damage will be concentrated on certain parts of the country such as coasts and floodplains.
- Urban areas will have particular problems as more land is covered in buildings and paved areas, rainfall run off will increase the risk of flood from drains and watercourses, especially if inadequately maintained or over loaded.
- Damaged infrastructure, especially transport systems will disrupt business activity.
- The impact of the Water Framework Directive⁴⁰ and other environmental regulation could prevent the modification of rivers and lakes to adapt to the increased rainfall that climate change will bring.
- Changing agricultural practices such as the use of winter cereal crops can result in an increased run off from farm land of muddy water into urban areas.
- Dependence on computers and other electronic equipment which is easily damaged in a flood increases vulnerability.

- Blight will become a serious problem as insurers withdraw from some areas altogether under pressure from the Government Regulator to manage their exposures to risk.
- Energy costs are already escalating and are likely to continue to do so, not only due to carbon taxes on fossil fuels but due to our increasing dependence on imported fuel.
- Greater wealth means greater losses.

The Foresight research indicates that if nothing is done, total average flood damage costs by 2080 could range from £5.5bn to \$42bn per year. Is the insurance industry expected to ignore such figures in case it is accused of "scaremongering"? Is it expected to sit quietly until losses become so inevitable for millions of residents and businesses in flood hazard areas that insurers would no longer be able to provide cover? Given a few bad flood years in a row, could there be significant economic consequences if nothing is done?

Arguably, England seems to be on track for the worst case scenario while Scotland is on track for the best case scenario.

It is in the interests of insurers to make insurance sustainable and to help small businesses to survive climate change.

³⁹ ABI statement of principles on the provision of flood insurance.

⁴⁰ Water Framework Directive, 2000. Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000. Official Journal (OJ L 327) on 22 December 2000.



Part C

How insurers could force change

Energy Use Scenarios

The only way to manage dangerous climate change is to switch to a low carbon economy as soon as possible. Some implications of four low carbon scenarios were set out by a Royal commission report (see panel).

Royal Commission low carbon Energy Scenarios

In June 2000, the Royal Commission Report on Environmental Pollution set out four low carbon energy scenarios for 2050. Here are extracts from their report with implications for small businesses added in bold:

Scenario 1 – Unprecedented investment in non fossil fuel energy

High cost of energy due to carbon taxes has cut demand to 1998 levels. Even so, to reduce carbon emissions by 60% needs

- A four fold increase in nuclear power, combined with:-
- 200 offshore wind farms, each with 100 turbines
- 10,000 wave power machines
- Several thousand micro hydro schemes
- Tidal barrages on rivers such as the Severn, Humber and Thames
- Solar panels on all south facing roofs
- Huge areas of agricultural land devoted to biomass crops

Such a big investment in renewable energy would change the face of the countryside, with large areas of land used for short rotation coppicing to provide biomass energy, and could regenerate the farming industry and agricultural insurance.

Scenario 2 – High energy costs/lower standards of living

Demand for energy has been reduced by 36% below 1998 levels through substantial increases in carbon taxes, with the revenue spent on energy efficiency. **The high costs of energy would drive many small businesses into bankruptcy, lower standards of living, and prevent economic growth.**

There would be opportunities for small business in supplying and servicing renewable energy systems if they can survive the high energy taxation costs themselves.

Scenario 3 – Nuclear

As for Scenario 2, but base load energy needs are supplied by a new generation of nuclear power stations, and by fossil fuel stations capable of recovering and disposing of carbon dioxide. Only about 2% of farmland would be devoted to biomass.

Scenario 4 – “Return to the caves”

In this scenario there has been a fall in energy demand of 47% over 1998 levels. Increased renewable energy will still be required, but its impact will be less. However the reduction in energy demand would be accompanied by a significant reduction in living standards.

The extent to which of the four energy scenarios shown in the panel are likely depends on the Foresight socio economic scenarios of the future. It could be argued that all the scenarios are unlikely as they all envisage a significant reduction in energy usage and living standards, in order to reduce carbon dioxide emissions. This would have a serious impact on the survival of SMEs. In any case, so long as other major countries are increasing their

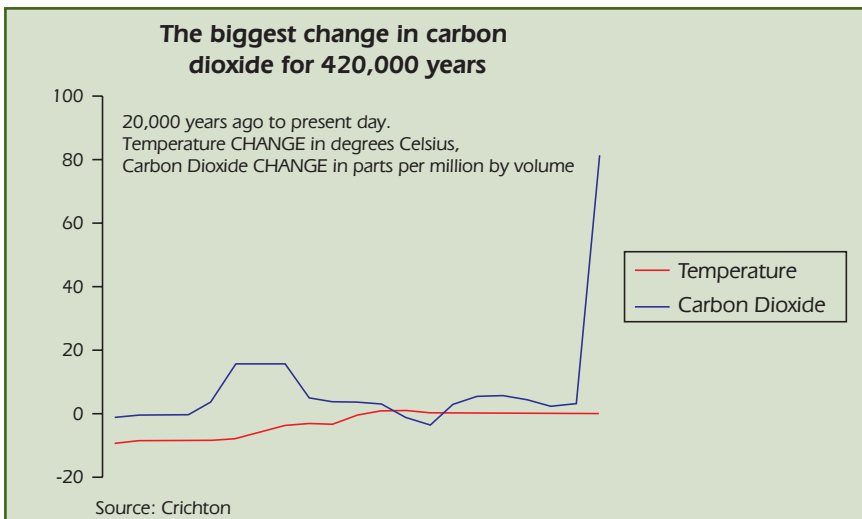
emissions, UK political parties will have an uphill struggle unless they are prepared to whole heartedly endorse reliable renewables such as tidal and bio energy solutions in order to maintain standards of living in a low carbon economy. Short term intermittent sources such as wind and solar will not be enough. Scientific evidence shows that the levels of carbon dioxide in the atmosphere are already increasing at an alarming rate.

SMEs can play an important part, but first they need to be convinced of the problem. Then they need clear direction from the Government as to which way they intend to go in the longer term. Then businesses can adapt their strategies accordingly in order to remain in business.

A positive approach is needed. We need not face a future of reducing our standard of living to compensate for the growth in pollution from other countries. There is an opportunity to look for new opportunities for growth, and an improved quality of living. Opportunities which do not involve burning irreplaceable fossil fuels.

For example:

- Tax incentives to switch to bio ethanol and bio diesel fuel for transport.
- Expansion of new mass transit systems such as high speed rail and urban light rail.
- Decentralised energy network with local areas becoming self sufficient in energy to reduce transmission and disruption costs.
- Encouragement of tele-working using new technology to allow more people to work from home or in communal village office centres away from flood risk areas.
- Rural development based on self sufficiency in energy and food production.
- A general movement of population centres away from flood hazard areas.



There should be a firm target of eliminating all dependence on fossil fuels (except for pharmaceutical purposes) by 2020 as they have done in Sweden. If they know that government means business, SMEs could play a major part in producing innovative solutions to help to achieve this.

In this way, Britain could show the benefits of a low carbon economy and show leadership in the international debate on bringing climate change under control.

As a start the Government could endorse the concept of "Contraction and Convergence" developed in the UK by Aubrey Meyer of the Global Commons Institute⁴¹. This is the best framework for greenhouse reduction so far and it has achieved widespread support around the world, because it seems to be the only equitable way to share out so called "rights to pollute" the environment. The European Parliament, the Church of England and local authorities in Norwich, Bristol, Camden and Oxford together with the Conservatives, Lib Dems, SNP, and Plaid Cymru now support Contraction and Convergence. The insurance industry should continue to press for an increased pace of change in Government policy

Sea levels will continue to rise, storms will become more severe and move further south, floods and droughts will increase. AXA is a sponsor of the Carbon Disclosure

Project which seeks to help to mitigate climate change by monitoring greenhouse gas emissions from big business. Mitigation of emissions is not enough, society must also adapt to the changes predicted for our climate.

- We have to adapt to a riskier world and we have to adapt now.

The insurance industry has a vital role to play in helping the SME sector to adapt through its expertise in risk management.

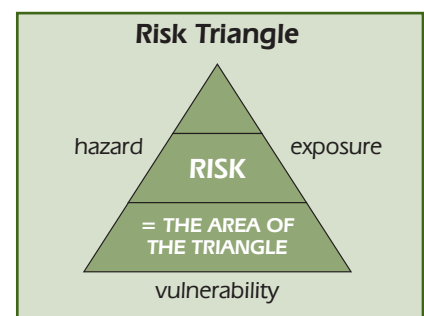
What is risk?

The insurance industry arguably has the greatest expertise in measuring, pricing and controlling risk. The best way to manage risk is to examine the three component parts, hazard, exposure, and vulnerability. This can be illustrated by the "risk triangle". The bigger the area of the triangle, the greater the risk. Each of the sides of the triangle should be addressed, looking for ways to reduce that side of the triangle. If one side can be eliminated altogether then risk is eliminated.

For example, flood risk can be reduced by

- Not building in high risk areas (to reduce exposure).
- Using flood resistant or resilient construction, or even stilts or other innovative building design (to reduce vulnerability).
- Building flood defences (to reduce hazard).

At present exposure and vulnerability are increasing rapidly, while spending on flood defences is reducing to the level of the annual profits of a single large property developer. What can insurers do?



If risk is measured by the area of the triangle, it can be reduced by addressing any one of the sides, looking for the easiest solutions. If one side can be eliminated altogether then there is no risk. For example moving property away from the flood plain eliminates exposure. The Risk Triangle is © Crichton, 1999.

Exposure

Last year the insurance industry warned the Government and planning authorities that from the beginning of 2006, they could no longer guarantee to quote for any properties located in areas where the flood hazard is greater than 1 in 75 years (a 1.3% probability) irrespective of whether flood

41 Meyer, A., and Crichton, D. January 2005. "Contraction and Convergence". Post Magazine Weather supplement, 29th January 2005. London.

defences are constructed⁴². This means that the owners of such properties will be less able to “shop around” for cheaper cover, and it will be harder to insure new properties in such areas.

This threshold could be changed at any time: insurers regard any risk higher than the 1 in 200 year probability as high hazard, and climate change is increasing the probability of flooding, especially near the coast.

Where insurance already exists for domestic properties and small businesses the intention is that the existing insurer will maintain flood insurance cover provided

- Premium “reflects the risk of flooding”. This means substantial increases in cost and excesses where the hazard is higher than 1 in 200 years.
- Improvements to reduce the risk to less than the 1 in 75 years (that is a 1.3% probability) are “scheduled for completion within the next five years” Current spending on flood defences in England is inadequate according to the Government’s own research and even spending on maintenance of existing defences is to be reduced.

For the time being in order to avoid a collapse of property prices in high risk areas, a special guarantee is provided by insurers for domestic properties but not for small businesses:

- For houses the current insurer will maintain cover if the property is sold.
- For small businesses the current insurer may maintain cover where they are sold. Subject to normal underwriting criteria.

Following insurance lobbying, Scotland, Wales, and N. Ireland have changed their planning policies to prevent future development where the flood risk exceeds the one in 200 year return period.

However in England:

- Government has designated new Sub Regional growth areas without insurance consultation. Areas such as Ashford in Kent, and parts of the Milton Keynes/South Midlands and London-Stansted-Cambridge-Peterborough corridors, are on river floodplains and thus exposed to inland flooding risk.
- Thames Gateway and Olympic Village are exposed to coastal flooding too, and in addition very high urban densities are proposed, up to 200 dwellings per hectare.
- Many other new homes in England are being built in flood risk locations, often against the advice of the Environment Agency. There are already 2 million properties currently at a high risk of flooding in the UK, of which 130,000 are businesses.

The demand for new housing is good news for property developers. The UK’s biggest

house builder claims to build over 16,000 homes a year on more than 400 sites. Its 2005 revenue was over £2billion and its profit before tax was nearly £500m.

- Just four UK property developers earned a total profit last year between them of more than £1.6billion.
- The Government plans to spend only £570m on flood defences in England this year and this spending plan was significantly cut this summer.

Steps that the insurance industry could take:

It could be argued that those who choose to live in a floodplain or low lying coastal area should be aware of the hazard.

In 1817, the Governor General of Australia⁴³ said:

“...when the too fatal Experience of Years has shewn the Sufferers the inevitable Consequence of their wilful and wayward Habit of placing their Residences and Stock Yards within the reach of the Floods... the Compassion excited by their misfortunes is mingled with Sentiments of Astonishment and Surprize that any People could be found so totally insensible to their true Interests, as the Settlers have in this instance proved themselves.”

42 ABI statement of principles on the provision of flood insurance, issued on 11 November 2005.

43 General Orders issued by the Governor General of Australia, Lachlan Macquarie, in 1817 after serious flooding of the Nepean and Hawkesbury rivers.

The inevitability of river or coastal flood damage in such areas is recognised by the insurance industry in both Australia and Canada, where it is impossible to obtain domestic flood insurance against river or coastal flood⁴⁴. Flood cover is limited to flooding from drains and sewers on the grounds that these could happen anywhere. Indeed in the province of Ontario, the government has made it illegal to buy or sell property in areas where the flood risk exceeds the 250 year return period. If you want to sell your home or business in such areas the Government will buy the property and demolish it⁴⁵. In the long run this has worked out to be a much cheaper solution than building flood defences. Almost immediately after the 1997 flood in Grand Forks, North Dakota, USA. The city identified the properties damaged by the flood, and began to purchase them and demolish them⁴⁶. Around 100 were demolished before the official purchase had been completed, in order to prevent them being re-occupied.

In England as more and more new properties are built in the floodplain, the "Ontario solution" or the "Grand Forks solution" will be harder to achieve, but restrictions on insurance cover everywhere in England to exclude river and coastal flood altogether will look increasingly attractive to the insurance industry. In the meantime, insurers could consider the following actions:

- Identify and publicise designated flood hazard areas for which no new insurance will be offered regardless of flood defences unless the buildings are constructed to special flood proof standards set out by the insurance industry. For example apartments where the ground floor is used only for car parking not habitation, and where the maximum density does not exceed 30 dwellings per hectare.
- Existing properties in such areas could be insured only on a "resilient reinstatement" basis at appropriate premium rates so that after a flood, the property is either bought by the insurer for demolition, or reinstated in a more resilient way, ready for the next flood.

Hazard

In the previous section there was discussion about the results of a government sponsored research project called "Foresight" which has found⁴⁷ that over the next 100 years, if current levels of expenditure and approaches to flood management remain unchanged:

- River and coastal flood risk could increase between two and 20 times.
- Risk of flooding from rainfall could increase between three and six times.
- Annual economic damage⁴⁸ could increase from £1bn to between £5.5bn and £42bn by the 2080s, if drainage floods are included, depending on the scenario, and;

- The number of people at high risk of river and coastal flooding could increase from 1.6 million today, to between 2.3 and 3.6 million by the 2080s.

If exposure is increasing, one possible way to reduce the risk is by managing the hazard. In England the approach is to build structural flood defences such as walls, relief rivers and reservoirs. Environmental regulations⁴⁹ in England, Wales and N. Ireland limit the adaptation of rivers and lakes to store the increased rainfall predicted with climate change.

More sustainable solutions are being used in other countries such as Japan, Canada and Scotland. Insurers have already given active support and advice on sustainable solutions in Scotland which is experimenting very successfully with "sustainable flood management" solutions⁵⁰.

- Under pressure from WWF and the insurance industry, the Scottish Parliament transposed EU environmental regulations subject to the over riding requirement to ensure sustainable flood management⁵¹.
- New "land management contracts" under the EU's common agricultural policy create the potential for farmers to be paid for storing flood water and some techniques are being demonstrated by the very successful River Devon project funded by WWF, with other projects in the offing.

44 Except in the Northern Territories of Australia where there is a government scheme to encourage settlers.

45 Brick, J., and Goldt, R., 2001 "City of London Flood Plain Management". Upper Thames River Conservation Authority, London, Ontario, Canada.

46 Pepper, A., Stonecipher, C., and Vein, K. A. (2002) "Flood management: lessons from a US city." Municipal Engineer, 151, pp 295-304.

47 Evans, E., Ashley, R., Hall, J., Penning-Rowsell, E., Saul, A., Sayers, P., Thorne, C. and Watkinson, A. 2004. "Foresight. Future Flooding. Scientific Summary: Volume I Future risks and their drivers." Office of Science and Technology, London.

48 Economic damage is not the same as the costs that insurers face. Domestic contents are usually insured on a "new for old" basis, for example. Data from the National Flood Insurance.

49 Statutory Instrument 2003 no. 3242 -The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003 and the Water Environment (Water Framework Directive 2000/60/EC) Regulations (Northern Ireland) 2003.

50 Werritty, A., August 2006. "Sustainable flood management: oxymoron or new paradigm?" Area (2006) 38.1, 16-23.

51 Water Environment and Water Services (Scotland) Act 2003.

Vulnerability

Much is being made of the move towards so called "Sustainable Building". In practice this often simply means better heat insulation, which can cause problems in drying out or repairing flooded or storm damaged buildings. Climate change will produce wetter winters and dryer summers. Drying out after a winter flood takes much longer. On an average July day in south Lancashire, 60 times as much moisture evaporates as on a typical January day⁵². Perhaps it is not surprising that a winter flood costs insurers double the cost of a summer flood⁵³ and recovery takes much longer. Where a building is well insulated it may have to be demolished altogether because the insulation may never dry out properly, for example in cavity walls or under the floor.

Sustainable buildings should be designed to better withstand storms and floods, in other words should be more resilient. There seems little point in insulating a house if it is going to be destroyed by windstorm or flood in the next few years.

- UK building regulations are amongst the weakest in Europe.
- Insurance statistics show that buildings constructed after 1971 are the most likely to be damaged in a windstorm⁵⁴, although more research is needed.

- Government needs to do more to ensure that buildings are more resilient.

Just as the planning community has a role to play in managing exposure, architects have a vital role to play in designing buildings which are not only well insulated, have high standards of thermal comfort in hot weather (without needing air conditioning), but above all, are resilient to floods and storms. These aspects are just not taught in architectural schools where form still reigns over performance and until recently⁵⁵ there were virtually no text books on the subject.

As house prices increase there will be more demand for 50 or 100 year or "intergenerational" interest only mortgages, but if new buildings are destined to last for only 30 or 40 years as building standards continue to ignore climate change, such mortgages will become high risk. There is a simple solution: insurers could work with other financial institutions to develop their own building standards as they have in Australia, where these tougher standards for some types of buildings are contained in a "Blue Book". If a new building does not comply with the Blue Book then insurers do not insure it and mortgage lenders do not grant mortgages on it⁵⁶. As a result, Australian builders now work to the Blue Book standards. Government still publish their own standards but

no one pays any attention to them. Repairs of flood and storm damage could also be made subject to blue book standards. There is not yet the will to do this in the UK, but a series of major windstorms in the South of England could change the position dramatically. The two 1990 windstorms in England produced 3 million claims and the three windstorms in France in December 1999 cost the insurance industry €4,500m.

Scotland

In Scotland the government strategy is the four "A"s, of **Awareness, Avoidance, Assistance and Alleviation**, with Alleviation being seen as very much a last resort.

Insurers could follow this example, by actively working to

- Raise **awareness**, especially amongst SMEs. AXA has already published guidance for small businesses on the need for continuity plans and is now publishing a new booklet on risk management for SMEs.
- Help SMEs to **avoid** the risk by encouraging them to arrange adequate levels of insurance, especially for business interruption and encouraging them to locate in safer areas through the insurance premium mechanism.
- **Assisting** SMEs with streamlined claims handling services and advice.

52 Eden, P., 2005 "Change in the Weather. Weather extremes and the British Climate" Continuum, London.

53 National Flood Insurance Claims Database.

54 Mootoosamy, V.K.S, and Baker, M.J., 1998 "Wind Damage to Buildings in the United Kingdom" University of Aberdeen, Department of Engineering. Published by the Loss Prevention Council, Paper LPR 8: 1998 Watford. (ISBN 0 902167 49-9).

55 Roaf, S. Crichton, D., and Nicol, F., 2005 "Adapting Buildings and Cities for Climate Change" Architectural Press, Oxford. ISBN 0 75065 9114.

56 Lwellyn, R.,(undated) "Structural upgrading for older houses.". (a copy of the "Blue Book" is reproduced in this series of handbooks produced by the Insurance Council of Australia and Standards Australia.)

- Encourage **Alleviation** in the form of flood management. This must be controlled by government or its agencies. However, insurers could encourage more sustainable flood management (as they already do in Scotland) by advising local authorities on best practice. Insurers could also encourage farmers and landowners to become involved in flood storage land management contracts.

One of the most positive achievements of the insurance industry has been the dialogue with many local councils since 1995. Officials from almost all Scottish local authorities have requested and benefited directly from free insurance industry advice, research, and information on best practice in areas such as planning, sustainable drainage, climate change, building standards, and sustainable flood management. The residents and businesses in these local authority areas that follow insurance advice receive sympathetic insurance treatment from some insurers that reflect the more responsible attitudes of their local authority. As time goes by it is hoped that more insurers will come to discover that some local authorities are acting more responsibly than others and will underwrite risks accordingly. In this way, prudent local authorities would be able to reduce the impact of insurance blight in their areas. It is to be hoped that if the insurance industry decides to apply

a general exclusion of river and coastal flood, that this will not apply to buildings in areas where the local authority has followed insurance advice.



Conclusions and Recommendations

Government needs to work in partnership with the insurance industry to manage risks associated with climate change.

- As investors, insurers can influence companies which do not control their carbon emissions sufficiently. They can also seek to support and strengthen the European Emission Trading Scheme in partnership with WWF.
- As insurers they could:
 - Advise government on areas designated for new development.
 - Encourage the development of sustainable flood management solutions, again in partnership with WWF.
 - Promote more sustainable buildings by producing their own building standards which could form a condition for providing cover.
 - Reward responsible local authorities by safeguarding them from insurance blight.

Insurers have the ability and indeed the duty to ensure that the Government selects a more sustainable path.



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