

# A changing climate for business



## Acknowledgements

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We hope that this report will inspire you to pursue climate change impacts and adaptation work in your own organisation. Members of the UKCIP team will be pleased to discuss how to help you.

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## The chameleon

The chameleon is chosen for the cover illustration as it provides an excellent set of metaphors for adaptation to a changing environment. As the surrounding environment changes, the chameleon adapts its skin colour in three different but related ways:

- automatic response
- conscious controlled response
- chain reaction response to other parts of the body.

This reflects the ways in which human society, and the individuals and organisations which make up society, will also adapt to a changing climate.



# Introduction

The weather already significantly affects economic activity. As the climate changes, all sectors of UK business will be faced with preparing for a range of new threats and opportunities. This report presents an overview of climate change impacts and adaptation for business. It is aimed at business managers as well as those in business-facing organisations and is based on UKCIP's practical experience. Following the headline messages in Section 1, Sections 2 and 3 present the climate change projections and a summary of impacts. Section 4 then uses this information to build a business case for adaptation. Section 5 provides some advice for companies just starting out, as well as for those a bit further on. Real business case studies illustrate key points.

We hope that this report will inspire you to pursue climate change impacts and adaptation work in your own organisation. Members of the UKCIP team will be pleased to discuss how to help you.

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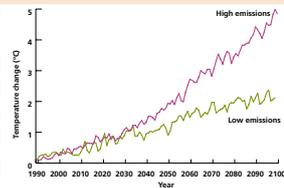
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# Section 1: Headlines for business

The climate is changing in the UK and in other countries around the world. A certain amount of change is unavoidable.



Some of the most powerful evidence of climate change is provided by nature: changing seasons, earlier blossom and buds on plants or the earlier arrival of migrating birds.

Lag times of greenhouse gases in the atmosphere mean that some climate change is unavoidable regardless of current or future emissions.

The changing climate could be an issue for your business and could well affect your bottom line.



Some industrial and agricultural processes are climate sensitive and some equipment has operating requirements that climate change could jeopardise.

Flooding, subsidence, excessive temperatures or stormy weather can cause damage to stock or equipment or loss of business continuity, therefore directly affecting the bottom line.

The weather has impacts across a range of business areas, not just the obvious ones, and not just 'environmental' ones.



Climate impacts on people: as customers for goods and services, and as members of a workforce for whom working conditions, both inside and out, could change beyond acceptable thresholds.

Nearly all businesses make use of premises and transport systems, both of which are vulnerable to weather-related events like floods, storms, and subsidence.

Businesses and business sectors are particularly vulnerable to climate change if they are currently affected by weather events or make long term investment, especially infrastructure.



Infrastructure for transport and utilities is particularly vulnerable, and therefore puts at risk transport and utilities companies and those businesses that use their systems.

There has been a steady rise in the costs of business claims for weather damage. In 2008, 29% of businesses reported disruption as a result of extreme weather (Chartered Management Industry Survey, 2009).

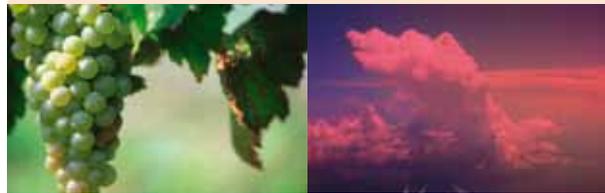
Climate change will bring commercial opportunities as well as threats.



Some markets will expand and there will be new market opportunities, such as outdoor leisure, summer food, drinks and clothes and flood defence technologies.

Some industrial and agricultural processes and activities could become easier or more economically viable and winter heating costs will be reduced.

Businesses that have global markets or suppliers could be affected by climate change in other countries.



Climate impacts on agriculture in other countries could result in market opportunities for UK food production.

Many UK-based companies rely on manufacturing operations in East and South East Asia, where impacts such as an increase in the frequency of tropical storms and water scarcity are expected.

Although the impacts of climate change are uncertain, they can be managed like any other business risk.



The way in which climate change will translate into business consequences is not certain. However, there are uncertainties relating to all aspects of business planning and this does not mean that inaction is the best option.

Risk is the combination of the likelihood of occurrence and the magnitude of the consequence of a hazard. It is a useful concept for dealing with an uncertain future.

Planning ahead is often more likely to lead to cost-effective adaptation than responding to changes as they happen.



Climate risk management needs to be incorporated into mainstream business management strategies and procedures.

Some adaptation will occur without long lead in times, but it takes time to recognise a change is happening and to put in place the right institutional arrangements.

# Section 2: Climate change projections for the 21st century

## Unavoidable climate change in the UK

In the UK climate change is expected to mean the following.

Changes to the long-term/seasonal averages:

- warmer, drier summers
- milder, wetter winters
- rising sea levels

Changes in extremes:

- more very hot days
- more intense downpours of rain
- fewer days with frost

The UK Climate Projections (UKCP09) present projections for a range of climate variables at a resolution of 25 km across the UK. Projections are made for three emissions scenarios (High, Medium and Low), which make different assumptions about future technologies and economic growth, and therefore the levels of greenhouse gas emissions we can expect. None of the scenarios include mitigation efforts. It allows users to look at seven overlapping 30-year periods starting with the one centred on the 2020s (2010–2039), going up to the 2080s (2070–2099).

## Dealing with uncertainty

There is a high level of certainty that climate change is happening and is being largely driven by greenhouse gas emissions. However, there are uncertainties relating to the future rates and geographical distribution of these changes. In order to help deal with this, the UKCP09 projections are probabilistic in nature, allowing users to identify the change associated with different levels of confidence. Although the new projections are more complicated, they start to quantify the uncertainties in the modelling, which were hidden in previous sets of projections like UKCIP02.

This page shows a small selection of information available from UKCP09 at the 10, 50 and 90% probability levels. In other words, the current evidence suggests that the change is very unlikely to be less than that indicated by

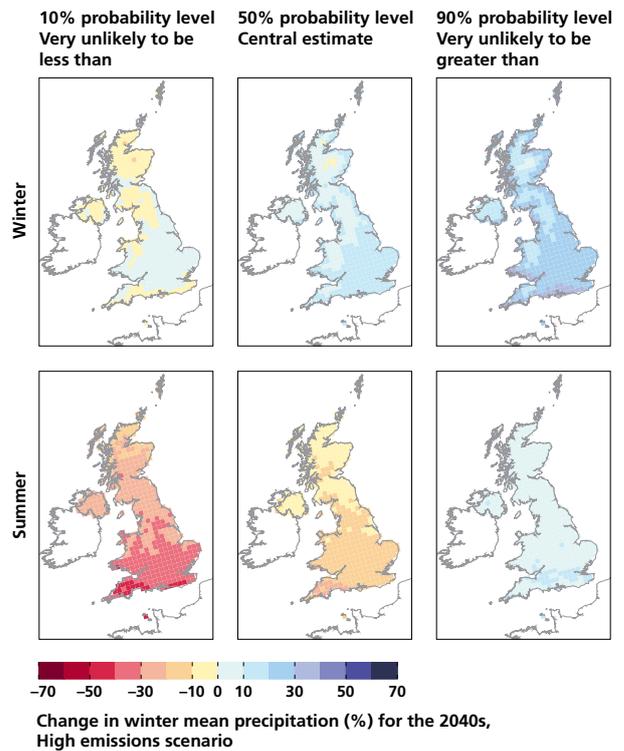


Figure 1: showing change in winter & summer precipitation for the 2040s (2030–2059) under the High emissions scenario. © UK Climate Projections 2009.

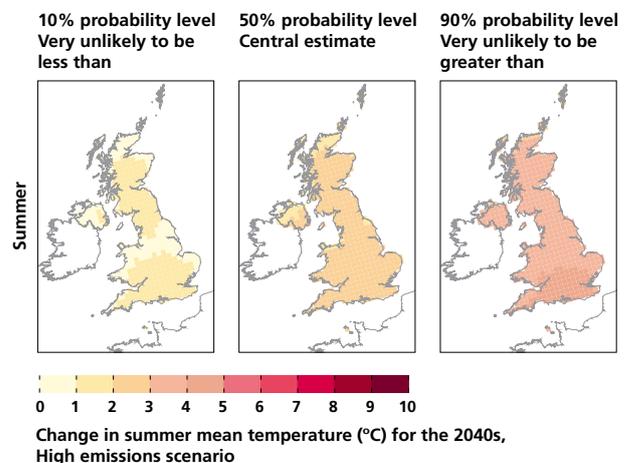


Figure 2: showing change in summer mean temperature for the 2040s (2030–2049) under the High emissions scenario. © UK Climate Projections 2009.

the 10% probability level, or more than indicated by the 90% probability level. To access the UKCP09 projections, go to <http://ukclimateprojections.defra.gov.uk>.

### Unavoidable climate change

Due to the inertia in the climate system, we are already committed to a certain amount of climate change as a result of the greenhouse gases emitted in the past; the time lag is around 30–40 years between emitting and the resulting temperature change. Figure 3 shows the effect on projected global temperature of past greenhouse gas emissions, which will influence our climate until around the mid-century. Our choices about reducing emissions now only start to make a difference from the 2040s onwards. Although it is important to reduce emissions now in order to avoid the dangerous climate change associated with the top of the red line, we also need to adapt to the changes that are unavoidable.

### What about extremes?

The maps opposite show seasonal averages. However, it is often the extremes of climate that are the main concern for business. The UKCP09 probabilistic projections and the Weather Generator (WG) allow users to explore changes in the frequency of some extreme events. Table 1 shows the sort of information that can be obtained using the Weather Generator. In this case, the expected increase in the annual number of *warm days* is shown for the 2040s under the High emissions scenario.

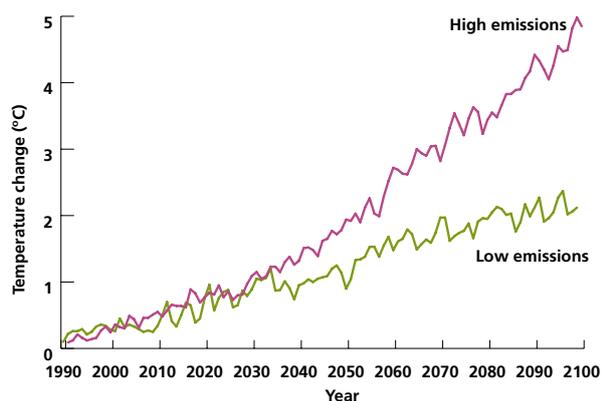


Figure 3: showing temperature change associated with High and Low emissions scenarios over the 21st century. © UK Climate Projections 2009.

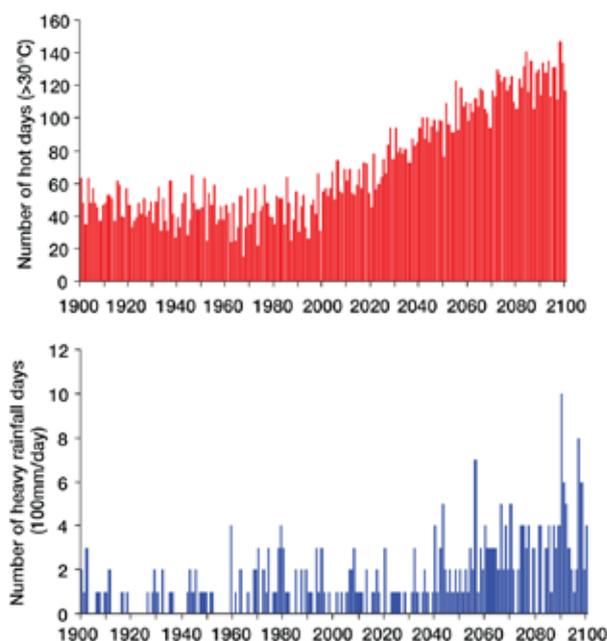
	Estimated number of days per year where the temperature exceeds 25°C (High emissions scenario, central estimate)	
Location	Baseline (1961–1990)	2040s
London	15	50
Derry	1	3
Plymouth	3	21

Table 1: Estimated annual number of warm days (temperature greater than 25°C) for the 2040s under the High emissions scenario.

### Global climate change

Increasingly, businesses operate in global markets and rely on global supply networks. Therefore, the way the climate is expected to change outside of the UK will have implications for businesses based here, as they make plans to adapt. The Intergovernmental Panel on Climate Change 4th Assessment Report contains some global climate projections. For example, in Asia, as well as increasing temperatures, we currently expect increasing precipitation across most of the continent, an increasing intensity of tropical cyclones, snow melt leading to floods and water shortages in areas that already suffer from water stress. Figure 4 shows the expected increase in hot days and heavy rainfall days in Asia.

Figure 4: Projected number of hot days (>30°C) and heavy rainfall (>100 mm/day) in Asia. Source IPCC 4th Assessment Report.



## Section 3: Impacts of weather & climate on business

### Weather already affects business

Twenty-nine per cent of UK businesses reported experiencing some kind of disruption as a result of extreme weather in 2008 (Chartered Management Institute survey, 2009). Many more will have experienced more subtle effects of weather on productivity or sales. This suggests that businesses are not even well adapted to the current climate. Therefore, even if the climate were not changing, it would be worth building resilience to extreme weather. This will help to protect business and jobs, reduce the costs of disruption and maximise any opportunities arising from weather and climate.

### The difference between weather and climate

'Weather' describes the rain or shine outside right now or in the near future while the 'climate' describes the weather at a locality averaged over 30 years.

"Climate is what you expect – weather is what you get" R.A. Heinlen, 1973

The weather is naturally very variable but it is the climate that is now also changing as a result of greenhouse gas emissions. Although weather events are not in themselves evidence of climate change, exploring the business consequences of extreme weather events (including snow events, which are expected to become less frequent) can help build an understanding of vulnerability to weather and climate. This is important in helping to inform efforts to adapt to future climate change.



### Floods result in loss of business continuity

Following the summer 2007 floods, many businesses were unable to operate normally. Flooded sales premises or loss of power and communications resulted in lost orders and enquiries. Where businesses were out of action for some time, there was a serious effect on trade – particularly small businesses. Delays were increased by paperwork which had been lost or damaged in the flooding, resulting in problems making insurance claims, tracing orders and filling in tax returns. *Pitt, M (2007) Learning lessons from the 2007 floods, Interim Report, Cabinet Office, London.*



### Weather affects retail

During the wet summer of 2008, shoppers turned towards so-called comfort foods in an effort to dispel the cold and wet summer weather. According to Asda, sales of mince, soup, custard and gravy showed significant increases *Talking Retail, 22 August 2008.*

In contrast, high street sales surged in June 2003 as shoppers stocked up on booze and barbecues amid soaring temperatures. Sales rose 3% on a like-for-like basis, and 5.7% in total from a year earlier, said the British Retail Consortium. The heatwave fuelled sales of ice cream, barbecue food and alcohol, with clothes and sandals also selling well (BBC News, 15 July 2003). Hot weather can also mean that people travel less and use local shops and services more. *Climate South East, 2008.*

## Looking to the future

The climate changes described on page 4 will bring a wide range of both positive and negative impacts on business.

The summary below is based on the six headings from UKCIP's Business Areas Climate Impacts Assessment Tool (BACLIAT), which is a workshop aid for scoping the impacts of climate change on a business or sector and is available from [www.ukcip.org.uk/bacliat](http://www.ukcip.org.uk/bacliat).

- Changing demand for goods and services and impacts on customer access will result in changing **markets**. This will create business opportunities, for example where the private sector is able to provide the knowledge, skills and technologies required to help society adapt. In some cases it could lead to reduced sales, such as of cold weather related products and services.
- Business **logistics** (supply chains, utilities and transport arrangements) can be disrupted by extreme weather events. This is likely to affect businesses across all sectors to some extent, threatening business continuity. Those that rely heavily on utilities, the transport network or who have inflexible supply networks will be particularly vulnerable. 'Just in time' and 'single source' supply systems, although efficient (under predictable conditions), increase this inflexibility.
- Business **premises** will be affected through impacts on building fabric, structure and the comfort conditions of the internal environment. This will have implications for the design, construction, maintenance and facilities management of both existing and new business premises. Designing buildings that are both low carbon and resilient to the future climate presents a significant challenge.
- **People** are affected by the weather. Heat has physiological effects, inclement weather can affect concentration and weather patterns influence behaviour and lifestyles. Businesses will therefore be affected by climate change as their employees and customers are affected and respond in different ways.
- Some industrial **processes** and business activities are temperature or climate sensitive. Therefore, productivity in some sectors will be affected. This could mean that new equipment or ways of doing things are required in order to maintain productivity and continuity. There may also be business

opportunities if a new process becomes economically viable in the new climate.

- Company **finances** will be affected by climate change through the cost of damage, disruption and lost sales driven by all of the above. There will also be financial impacts on business as the insurance industry seeks to spread the increasing risk and as investors increasingly take future climate risks into account. Access to finance may become a problem if banks start to refuse credit to companies that are not managing climate risk properly.

### Investors' response

Investors are beginning to recognise that they have a critical role to play in adaptation through: research to understand the risks; incorporation of climate risks into investment analysis and decision making, and; engagement and dialogue with companies and policy makers to encourage adaptation and policy development (Managing the unavoidable: Understanding the investment implications of adapting to climate change. Sullivan, Russell and Robins, 2008). For example, Barclays Environmental Risk Management and HSBC are both involved in research initiatives aimed at making more accurate assessments across investment portfolios. *Confederation of British Industry, 2009.*

### The hospitality industry

Climate change is expected to bring opportunities to the UK hospitality industry, particularly at the fringes of the season (e.g. March and October) and in more northern destinations. Also, those providing services close to outdoor leisure facilities, such as sports grounds, gardens and natural parks or beaches, could see a significant opportunity for improved business performance for longer periods of the year. *Hospitality magazine, November 2008.*



## Section 4: The business case for adaptation

The business case for adaptation can be made in terms of maximising profits, managing risks and making the most of strategic opportunities. Building a business case for adaptation requires more than making the scientific case for climate change. An understanding of the likely business risks and opportunities, and why a planned approach should be taken is also required (see Figure 5). Some companies will also be driven to adapt by regulatory and other requirements.

### Managing risks and exploiting opportunities

The climate impacts summarised on page 7 will directly affect sales, productivity, input costs and overheads and could translate to a range of new or increasing business risks (see Figure 5). The impacts of climate change could also present some strategic opportunities for business. For example, there may be business development opportunities arising from new or growing markets, new production possibilities, or opportunities arising from being better placed than competitors to deal with climate risks (first mover advantage).

### Regulatory and other requirements

The Climate Change Act 2008 creates a framework for building the UK's capacity to adapt. Under the Act, the UK Government has the power to require public authorities and some businesses such as utilities and transport operators to report how they are assessing and managing the risks of climate change. At present this only covers 90 companies, however, its influence could extend much further throughout the private sector through supply chains.

Other requirements that could drive business adaptation include:

- Planning policy.
- Thresholds contained within contracts or service level agreements, such as a facilities management company being required to guarantee they will not close the building for more than 3 days in a year.
- Requirements for contractors to local authorities that have adaptation as a local priority.

Potential future requirements include:

- Industry codes and standards will be updated to take account of the changing climate.
- The TUC is campaigning for a legal upper temperature limit for workplaces.
- Requirements of insurers or insurance products that take account of the climate risk.

### Why take a planned approach?

Climate change is an ongoing, long-term phenomenon with a degree of uncertainty attached to it and as such it is often difficult to see how its effects can be managed within the short planning horizons of a commercial organisation. Therefore, it is tempting to wait for changes to take effect and respond to them as they happen. Much adaptation will be passive or occur in a reactive way. However, this is inherently a more risky approach and a planned approach is more likely to lead to efficient adaptation. Four arguments for taking a planned approach to adaptation are outlined below.

1. **Difficulty in recognising the climate signal.** The weather is chaotic and the climate also varies naturally on several different timescales. These tend to mask the climate change signal, making it difficult to detect.
2. **Adaptive capacity needs to be built over time.** For example, information may be required in order to: determine the best adaptation option; understand synergies and conflicts in the broader context; re-write relevant policies, plans and procedures; and assign roles and responsibilities. All of this requires a certain amount of forward planning and time.
3. **Retrofitting is often more expensive.** Maintenance programmes, new buildings or the replacement of old equipment represent an opportunity to take account of the future climate even if no impacts are currently being felt. Although there may be costs associated with this, in many cases it is likely to be cheaper in the long run.
4. **Planning ahead is still possible in the face of uncertainty.** It is true that there is considerable uncertainty surrounding future climate impacts. A risk-based approach allows you to make decisions in the face of uncertainty and is more likely to lead to efficient adaptation.



Figure 5: Building the business case for adaptation.

## Section 5: Becoming a well-adapting business

This section provides some ideas and advice on how to progress towards becoming a well-adapting business, based on UKCIP's experience and backed up with business case studies. Some simple actions are suggested, including actions for those just getting started and for those who already have a good idea of their priority climate and weather risks. This is not designed to be a sequential process or checklist and the precise approach is likely to vary greatly between organisations. It is recommended that those formally working towards developing an adaptation strategy access additional tools and resources. There are many of these available to help organisations adapt, including UKCIP products, which are freely available from [www.ukcip.org.uk](http://www.ukcip.org.uk). Some of these are listed on pages 18-19.

### Existing decision points present opportunities

There will be points in time that represent opportunities for cost-effective adaptation, such as at the design stage of a new development, the planning stage of a new project or during review of policy or strategy. Missing these opportunities could lead to building in increased vulnerability to climate change.

### Actions for those just getting started

- Identify any upcoming new initiatives that could be weather- or climate-sensitive and make sure the current and future climate are taken into account at the outset.
- Where assets are exposed to weather and climate, flag up their renewal and maintenance as occasions for considering the climate risk.

### Actions for all

- Use your schedule for board/committee meetings to identify opportunities to introduce climate change impacts and adaptation to your colleagues.
- Consider whether and how adaptation could be mainstreamed at the review stage of relevant plans and management systems (see 'mainstreaming adaptation').

### Actions for those a bit further on

- At the review of management systems consider whether they could be an appropriate mechanism for mainstreaming your adaptation response.
- Identify adaptation measures that can be implemented in a cost-effective way when assets are up for renewal or during routine maintenance. Make sure this is written into your plans.

### Case study: Decision points – Network Rail

Network Rail has a schedule for enhancement and renewal of its assets. It recognises these points in time as an opportunity for cost effective consideration of climate change and resilience. In the South West two lines were closed for 2 days in 2005 due to flooding. They have estimated that this could increase to four lines for 9 days by 2085 if nothing is done. Network Rail have pledged £160m to improve drainage between 2009 and 2014 and are also working with the Met Office to increase the warning period for heavy rain.

*Source: Confederation of British Industry (2009) Future proof: preparing your business for a changing climate.*

*Photo courtesy of Network Rail*



## Building resilience to current weather variability

There is benefit to building resilience to weather, even in the absence of climate change. Therefore, action can be taken without the need to understand complex and uncertain future impacts. This approach, which doesn't seek to engage with the future climate, may be particularly appropriate for businesses that operate with short planning horizons.

### Actions for those just getting started

- Check the Environment Agency maps to see if you are in a flood risk area. If you are, take precautionary measures to reduce the risk of disruption in the event of a flood, such as keeping valuable items off the ground, putting in place a flood response plan or taking out business continuity insurance.
- Check whether your insurance policy will cover weather related damage and consider taking out business continuity insurance.

### Actions for all

- Collect information on how past weather events have affected your business, using for example, company records and people's recollections. This information may provide you with a case for action. It will also help you to understand the relationship between your business and the weather as a starting point to exploring your vulnerability to climate change and identifying potential adaptation measures.

### Actions for those a bit further on

- Calculate the cost of past weather events (damage, lost sales etc). Use this to make the case for taking action on cost/benefit grounds.



## Case study: Reactive measures – The Merchant's Fish Bar

The Merchant's Fish Bar in Bewdley is a well established and successful SME. In November 2000, heavy rains resulted in the worst flooding for over 50 years along the River Severn and the town was severely affected. Merchant's Fish Bar was flooded and the equipment in the chip shop damaged beyond repair. Unfortunately their insurance policy excluded flood cover, and the business suffered a significant uninsured loss. As a reaction to this experience, the owner worked to adapt the shop during the refit, to take account of the flood risk. New fryers have been set on a hydraulic system, enabling them to be raised above flood level and the fridges are now all made from stainless steel, with the motors set at the top rather than the bottom. All equipment (except for the fryers) can now be removed before flooding occurs. In addition, the ducting for the ventilation system has also been sealed to prevent water finding its way in, which will have benefits even in the absence of a flood.

*Source: Weathering the storm and saving money in a changing climate (2010) West Midlands Climate Change Adaptation Partnership.*

## Case study: Reactive measures – Lochaber power plant

On a larger scale, Rio Tinto's hydro-electric power plant at Lochaber implemented adaptation measures as a response not to a single weather event, but to gradual changes in rainfall patterns, which they had recorded. They have recorded an overall increase in catchment runoff of 12% since 1944 with winter rainfall increasing and summer rainfall decreasing. The new hydro power station – that will increase capacity to 80 MW – has incorporated these changing climatic aspects into its design. In addition, all strategy and water management models relating to the day-to-day operation of the plant have been revised to use more recent runoff data.

*Source: CBI (2009) Future proof: preparing your business for a changing climate.*

## Building adaptive capacity (BAC)

Adaptive capacity includes the knowledge, resources, support systems and legislative frameworks that encourage, allow or require organisations to deliver adaptation actions. Companies will need to take action to build their own adaptive capacity but organisations that represent, support or regulate business will also have an important role to play in this area. Figure 6 shows some examples of ways in which business and external organisations can build adaptive capacity.

### Actions for those just getting started

- Gather and present information to make the case for adaptation and obtain buy-in.
- If you are an organisation that supports, represents or regulates business, consider your capacity to encourage, enable or support adaptation in your sector (see the outer circle of Figure 6).

### Actions for all

- Find out what external organisations (trade associations, etc.) are doing to help build the adaptive capacity of your sector. There may be ways you can contribute to or influence these activities.

### Actions for those a bit further on

- Once there is a high level commitment to doing something around adaptation, consider what organisational structures need to be in place and what information is required.
- When you have decided which adaptation measures to implement, consider what institutions will be needed to support this action.

#### Case study: Building adaptive capacity through research – GSK

Ribena, which is produced by GSK, uses 95% of the UK's total blackcurrant crop. Weather conditions are crucial for the production of blackcurrants. One way to cope with difficult weather patterns is to develop different crop varieties and GSK is supporting work at the Scottish Crop Research Institute to develop more varieties of blackcurrant.

Source: GSK web site <http://www.gsk.com/infocus/purple.htm>.

#### Case study: Roles for business-facing organisations – OfWat

Under the Water Act (2003), OfWat have a statutory duty to contribute towards sustainable development. They see climate change adaptation as part of this and have been working towards building the adaptive capacity of the water industry. Measures have included: water efficiency and leakage targets, reviewing water management plans, encouraging companies to act on a range of climate impacts and developing an analytical framework for companies to assess the resilience of assets to flooding and the evaluation of intervention options.

Source: OfWat (2008) *Preparing for the Future-OfWat's Climate Change Policy Statement*.



#### Case study: Roles for business-facing organisations – the Chartered Institute of Building Services Engineers

The Chartered Institute of Building Services Engineers (CIBSE) is a professional institution that supports the science, art and practice of building services engineering. They recognise that the impacts of climate change (in particular in relation to overheating in buildings) are an issue that should be taken into consideration within their technical guidance and advice. They have therefore been working towards building the adaptive capacity of their members' profession with initiatives including: a research project on climate change and the indoor environment, collaboration on Knowledge Transfer Partnerships and incorporation of climate projections into CIBSE guidance.

Source: Personal communication.

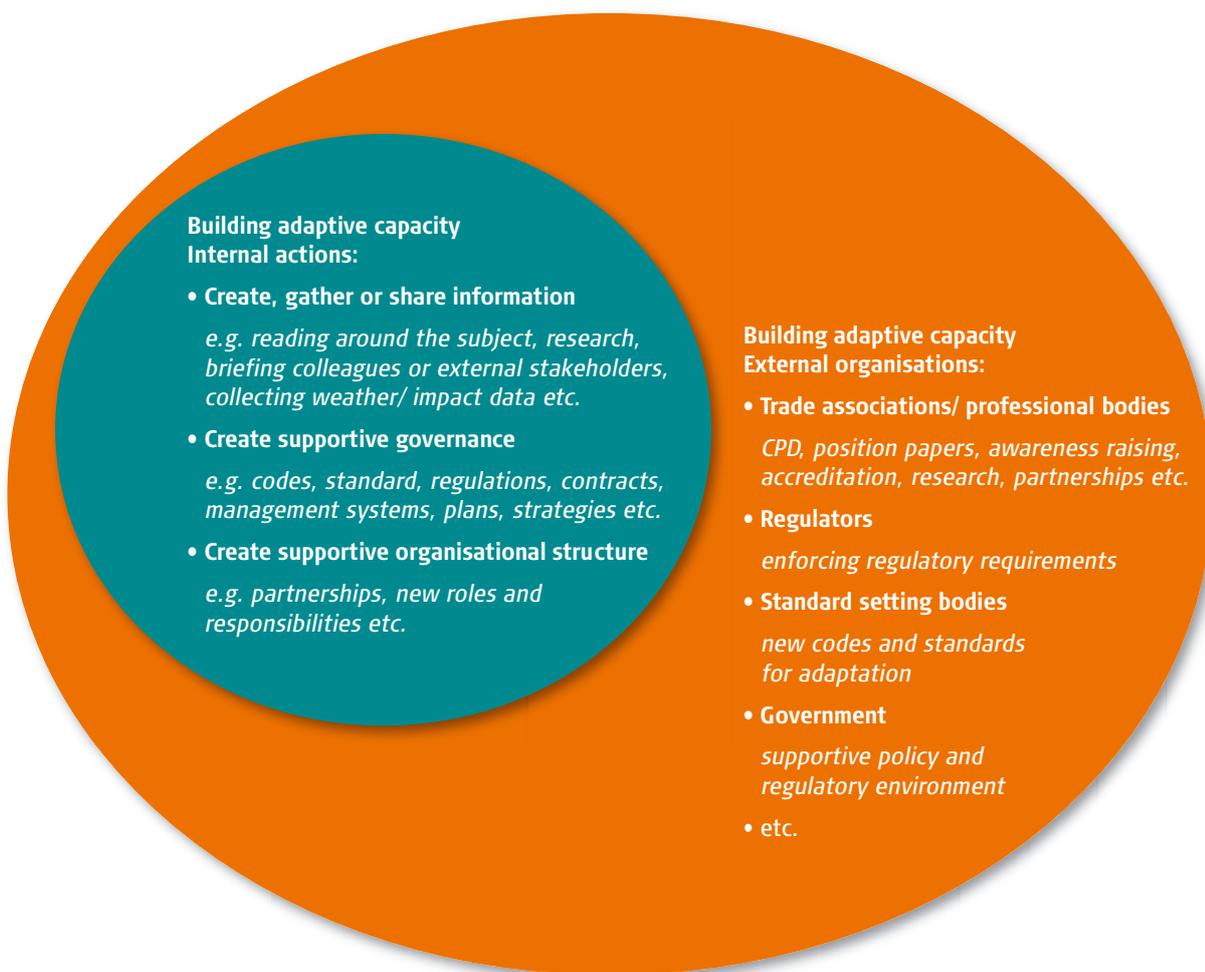
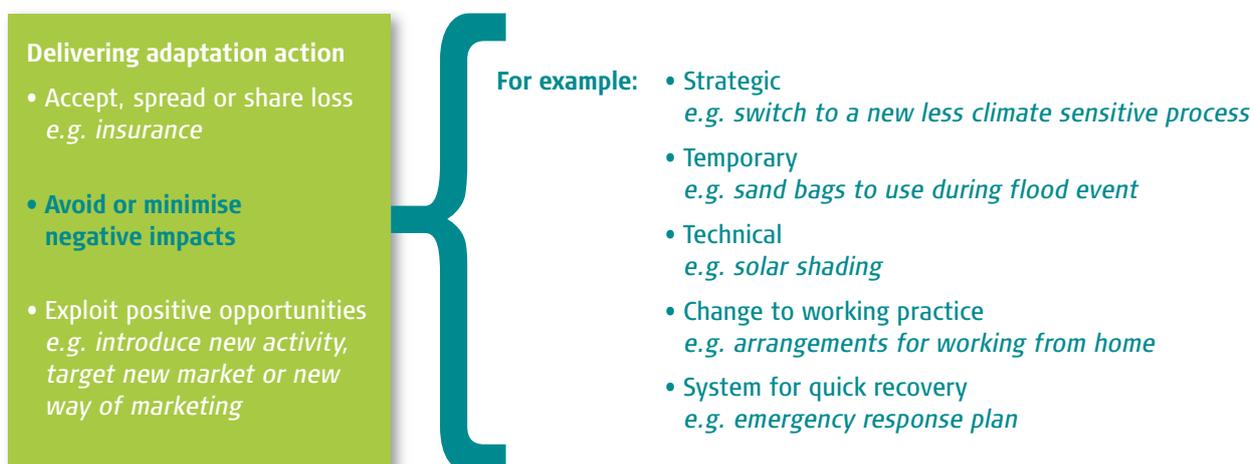


Figure 6: Examples of options for building adaptive capacity.

Figure 7: Examples of options for delivering adaptation actions.



### Delivering adaptation action (DAA)

Delivering adaptation action involves putting in place the physical structures or managerial arrangements that respond to the opportunities or threats presented by the changing climate. Adaptation options can range from large scale infrastructure projects to simple low-tech solutions and include managerial, technical and strategic actions. Figure 7 gives an overview of different types of DAA options with examples.

#### Actions for those a bit further on

- When priority climate risks have been identified, brainstorm a range of potential adaptation options, drawing for example on past experience and the experience of others as well as employing more creative thinking.
- Select preferred adaptation options using cost benefit or multicriteria techniques or more informal methods, such as looking for win-wins.

#### Case study: Learning from international experience – Pixley Berries

Pixley Berries comprises a fruit and hops farm and a fruit pressing station. They have their own range of superfruit cordials as well as selling about half of the fruit to GSK for Ribena. Following a devastating, and unexplained, crop failure in 1998, the farm began to explore the impact of climate change on the blackcurrant crop. The farmer visited farms abroad and investigated varieties that could cope with increasingly hot summers and warmer damper winters. As a result, a re-planting programme was begun, including the Pixley Black – a variety of blackcurrant that produces deep coloured, intensely flavoured juice.

*Source: Weathering the storm (2010) West Midlands Climate Change Adaptation Partnership.*



#### Case study: Adaptation/mitigation win-wins – Shepherd Neame Ltd

Kent brewer, Shepherd Neame, have built up significant environmental credentials through investment in energy and water efficiency and taking steps to reduce CO<sub>2</sub> emissions and effluent discharges. They operate to Environmental Management Standard ISO14001 and have substantially undershot the Government's Energy Efficient Quotient (EEQ). Their water efficiency measures, which will build resilience against future water shortages as well as saving energy, are an example of ways in which adaptation and mitigation measures can be synergistic. These include plans to modify its cleaning so that they recycle the final rinse, reducing water consumption by 10% and investigating equipment which will separate water from product waste and reuse it for washing and cooling.

*Source: SEEDA (2003) Sustainable Business Awards Case Study – Shepherd Neame.*



#### Case study: A mix of technical and strategic solutions – Slough Estates

Slough Estates builds and owns buildings for businesses located in prime business centres in the UK, continental Europe and North America. As part of their response to current and future climate risks, they now have a policy not to develop on flood plains and have fitted several of their properties with solar shading, filter funnel soakaways and water efficiency measures.

*SEEDA (2003) Sustainable Business Awards Case Study – Slough Estates plc.*

## Using a risk-based approach

A risk-based approach is a good way of responding to potential future climate impacts in the face of uncertainty and in the context of all the other business risks that companies face. Risk is the combination of the likelihood of an impact and magnitude of its consequence, and a risk assessment can be used to identify significant climate impacts. It can also be used to evaluate a range of adaptation options. Many businesses are familiar and comfortable with the concept. They are likely already to be managing a range of business risks, to which the climate risk can be added.

### Actions for those just getting started

- Use the language of risk when talking about the impacts of weather and climate to colleagues.
- Brainstorm with colleagues around the potential threats and opportunities from climate change (for example by using UKCIP's BACLIAT tool, [www.ukcip.org.uk/bacliat](http://www.ukcip.org.uk/bacliat)). Aim to generate as comprehensive a list as possible and then assess the risk of each in order to prioritise key ones.

### Actions for all

- Talk to whoever manages your company's risk register about the extent to which weather risks are already included and consider if and how climate change could be incorporated.

### Actions for those a bit further on

- Consider assessing the risks associated with a wide range of adaptation options including the 'do nothing' option.

#### Case study: Risk-based assessment – National Association of Cider Makers

The National Association of Cider Makers (NACM) carried out an industry-led adaptation study. After brainstorming a long list of potential future impacts, they prioritised the main climate risks for the industry by carrying out a risk assessment. Key to the success was that it was carried out in a workshop setting involving people with different but complementary expertise and experience, ranging from orchard farming to cider production and market trends. The report set out a selection of potential adaptation measures for tackling the priority risks, to help both cider-makers and farmers.

*Source: NACM (2008) A Changing Climate for Cider.*

## Taking account of planning horizons

When planning for the future climate it is important to recognise how far into the future you need to look. This will vary between companies and sectors, reflecting their different planning horizons. Some companies may even have different planning horizons for different decisions. Assets with long lifetimes will need to consider adaptation sooner and decisions with long-term consequences, such as the building of new infrastructure, will need to look further ahead than shorter term considerations, such as annual contracts.

### Actions for those just getting started

- If you have assets with long lifetimes or long planning horizons (greater than 20 years), it is vital that the future climate is factored in to decisions relating to these aspects of your business. Look at the climate projections (UKCP09) and consider what effect these changes could have.
- For businesses or business areas with short planning horizons it is less important to consider the future climate. Instead, focus on building resilience to current weather variability or looking for win-wins. For example, where an action that you want to take for another reason such as to reduce carbon emissions or to improve work/life balance will have an adaptation co-benefit.

### Actions for those a bit further on

- Throughout all your adaptation work, be explicit about the timescale that is appropriate, i.e. to which future climate each aspect of your business needs to adapt.

#### Case study: Planning horizons – IMechE

The Institution of Mechanical Engineers (IMechE) commissioned two studies into the impacts of climate change on UK engineering and what engineers need to do to adapt. Given that the majority of existing infrastructure will continue to be operational for at least another 100–200 years the IMechE decided to look further than most climate change scenarios. Their report therefore examines changes of the next 1000 years and considers how engineers might help the world to adapt over the next few centuries.

*Source: IMechE (2008) Adapting to the Inevitable.*

### Case study: Planning horizons – the Port of Felixstowe

The Port of Felixstowe used the UKCIP Adaptation Wizard to identify the key climate risks to their operations. Assets at the port have a design life of 35 years and a service life of up to 50–60 years, while contracts are managed on much shorter timescales. Therefore, they carried out a climate risk assessment under three separate timescales to make sure that the right adaptation decisions are made at appropriate times.

Source: UKCIP Adaptation Wizard Case Study, [www.ukcip.org.uk/wizard](http://www.ukcip.org.uk/wizard).



### Case study: Exploiting opportunities – Caribbean holiday providers

As well as new products and services, there may be new ways of marketing to increase sales in the face of a changing climate. For example, several Caribbean holiday providers (Sandals, Club Med, SuperClubs, TNT Vacations, and Apple Vacations) have collaborated on an initiative to market the positive aspects of the destination in the face of a changing climate. This includes highlighting measures that have been taken to adapt.

Source: Network for Business Sustainability (2009) *Case Studies and Tools: A systematic review of the literature on business adaptation to climate change*.

### Entrepreneurial approaches to adaptation

Although adaptation can be thought of as a risk management exercise, entrepreneurial companies will find that climate change presents many opportunities to grow, diversify and innovate. Some companies will therefore take on the adaptation challenge in a strategic way as part of business development processes rather than at the operational and managerial level.

#### Actions for those just starting out

- Think about the products and services that society will need more of as the climate changes and consider during your strategic planning whether your company is in a position to exploit any of these markets.
- Think about whether demand for your product or service or your production capabilities could increase under the new climate and make sure you have the resources to make the most of this opportunity.

#### Actions for those a bit further on

- If you have already identified your priority climate risks, think about ways in which you could respond that would result in a business opportunity. For example, to obtain first mover advantage or to try out or develop new products, processes, technologies or ways of working.

### Case study: Exploiting opportunities – Medical Photographic Service

Medical Photographic Services is an SME that also recognised a business opportunity from climate change in the form of medical photography service for melanoma early detection.

Source: *Emissions Strategy Solutions* <http://www.ems2.com/>



## Working in partnership

Successful adaptation seems often to involve working in partnership. Partnerships can be sectoral, geographical or link companies with their suppliers, customers, insurers, competitors or landlords. They are a good way of: optimising resource; learning from each others' experience where available information is scarce; developing a common industry position; and building shared institutions or joint adaptive capacity.

### Actions for all

- Identify where others have a stake in an aspect of your business that is vulnerable to weather and climate. Ask these organisations if they have considered adaptation and set up a meeting to explore a joint approach.
- Contact external organisations that exist to support or represent you as you adapt to climate change. These could include UKCIP, a trade association, Business Link or other business advisor, your insurer and the Environment Agency. You may decide that you need technical expertise in the form of a commercial consultant.

### Case study: Working in partnership – Anglian Water

Anglian Water have developed a comprehensive adaptation strategy and have taken several adaptation actions including: recruiting a climate specialist, awareness raising, leakage control, promoting sustainable urban drainage, forecasting the effects of sea-level rise and storms on coastal assets and customers, adapting water management plans to take account of climate change and designing new infrastructure to cope with future climate change. External partnerships both within and outside the industry have been very important in this work. This includes membership of formal water industry bodies, regional based groups or organisations with an interest in climate change such as the regional climate change partnership and also relevant national bodies, such as UKCIP. Personal links have also proved to be important, for example with the Met Office and the Tyndall Centre.

Source: <http://www.anglianwater.co.uk/corporate-responsibility/our-strategy/mitigate/> and personal contact with Anglian Water's Climate Change Scientist.

## Mainstreaming adaptation

It may be possible to integrate some aspects of adaptation into existing activities and business functions, such as business continuity, health and safety or risk management and strategic planning.

### Actions for all

- At the review stage of management systems, consider whether and how adaptation to climate change could be incorporated.

### Actions for those a bit further on

- Once you have identified priority climate risks, explore whether there are existing systems through which these could be managed.

### Case study: mainstreaming adaptation – Entergy

Entergy Corporation is an integrated energy company engaged primarily in electric power production and retail distribution operations in the US. As well as considering climate change in decisions about where to locate important business centres, Entergy have put together a business continuity group specifically to look at broader implications of climate in the context of other serious business threats, including terrorist acts and a potential flu pandemic.

Source: *Network for Business Sustainability (2009) Case Studies and Tools: A systematic review of the literature on business adaptation to climate change.*

### Case study: mainstreaming adaptation – a Midlands SME

An SME based in the Midlands made implementation of an emergency response plan part of their adaptation response. This followed a brainstorming session with risk management consultants as a response to the 2007 floods and was accompanied by physical measures including reinforcing retaining walls and improving drainage.

Source: *CBI (2009) Future proof: preparing your business for a changing climate.*

## Section 6: Tools, resources & support

UKCIP has a number of tools to help organisations assess their vulnerability to climate change and to devise appropriate ways to adapt to the changing climate. All UKCIP reports and resources are available free of charge.

Reports are available in a variety of formats, including hard copy, CD and as pdfs from the UKCIP website at [www.ukcip.org.uk](http://www.ukcip.org.uk). Hard copies and CD versions can be ordered online or by phone on 01865 285717.

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### BACLIAT (Business Areas Climate Impacts Assessment Tool)

BACLIAT is a simple tool aimed at helping organisations scope the impacts of climate change. It uses six headings representing generic business areas (markets, process, people, premises, logistics and finance) to encourage the identification of a comprehensive list of potential threats and opportunities from climate change. It is primarily aimed for use in a workshop setting but has also found application in research projects and the development of climate audits.

BACLIAT was developed in collaboration several of UKCIP's business stakeholders, representing a range of sectors.

[www.ukcip.org.uk/bacليات](http://www.ukcip.org.uk/bacليات)

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### UKCIP Adaptation Wizard

The UKCIP Adaptation Wizard is an online tool to help you adapt to climate change. It is based on the Environment Agency and UKCIP report: Willows R.I., Connell, R.K. (2003) *Climate adaptation: Risk, uncertainty and decision-making*. It will take you through a 5-step process that will help you to develop a climate change adaptation strategy.

[www.ukcip.org.uk/wizard](http://www.ukcip.org.uk/wizard)

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### UK Climate Projections (UKCP09)

The UK Climate Projections provides probabilistic information on expected changes in the UK's climate at a regional level throughout the 21st century. The UKCP09 package also includes a Weather Generator, which will enable users to estimate the increasing (or decreasing) frequency of specific weather types, such as heatwaves or heavy downpours of rain. It is available through an online facility enabling users to access the information at different levels of detail and customise it for their purposes.

<http://ukclimateprojections.defra.gov.uk>

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### UKCIP enews

UKCIP produces a monthly email newsletter, enews, to keep you up to date on latest developments in climate change impacts and adaptation. It includes information on research, news and events, with links to more detailed information sources. Subscription is via the UKCIP website, and is free of charge.

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### CLARA (Climate Adaptation Resource for Advisors)

A web-based resource aimed at those providing advice and support to SMEs. Advice is provided on making the business case and some practical tips for providing appropriate support, including delivery resources.

[www.ukcip.org.uk/clara](http://www.ukcip.org.uk/clara)

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### Climate change partnerships in the UK

The English regions and the devolved administrations all now have climate change impacts partnerships that bring together local stakeholders who share an interest in climate change issues. The partnerships share information and provide a focal point for action on climate change in their communities. Some focus only on climate change impacts and adaptation, while others also incorporate work on climate change mitigation. Links to these partnerships can be found on the Climate UK website.

Climate UK is the national network of climate change partnerships which exists in order to maximise the benefit of each partnership's work

[www.climateuk.net](http://www.climateuk.net)

### UKCIP programme of work with business

UKCIP has a rolling programme of initiatives that involve working with the business community. As well as working directly with companies, they engage with organisations that represent, support or regulate business. Advice and support is free on the understanding that where appropriate, findings and learning can feed back into publicly-available tools and resources. See the UKCIP website or telephone on 01865 285717 for more information on current business initiatives and how to get involved.

[www.ukcip.org.uk/business](http://www.ukcip.org.uk/business)

### Other sources of information

#### Environment Agency (EA)

The EA provides environmental protection and improvement in England and Wales. They work with businesses and other organisations to prevent damage to the environment by providing education and guidance.

[www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)

The Environment Agency also provide extensive information on flooding:

[www.environment-agency.gov.uk/homeandleisure/floods/](http://www.environment-agency.gov.uk/homeandleisure/floods/)

#### The Scottish Environment Protection Agency

SEPA is responsible for the protection of the environment in Scotland. Its task is to protect the land, air and water in partnership with others, and enabling Scotland to sustain a strong and diverse economy.

[www.sepa.org.uk](http://www.sepa.org.uk)

SEPA's information on flooding can be found here:

[www.sepa.org.uk/flooding](http://www.sepa.org.uk/flooding)

#### Business Link

Business Link is the primary access route for businesses seeking support. It provides information on a range of issues and provide a diagnostic and signposting function.

[www.businesslink.gov.uk](http://www.businesslink.gov.uk)

#### Business in the Community

Business in the Community (BitC) is a membership organisation that aims to mobilise business for good.

[www.bitc.org.uk](http://www.bitc.org.uk)

In the North East BitC has a Business Resilience and Climate Change Adaptation Programme:

[www.bitc.org.uk/north\\_east/programmes/business\\_resilience\\_and\\_climate\\_change\\_adaptation/](http://www.bitc.org.uk/north_east/programmes/business_resilience_and_climate_change_adaptation/)

#### Confederation of British Industry (CBI)

The CBI is the premier lobbying organisation for UK business on national and international issues. They work with the UK government, international legislators and policy-makers to help UK businesses compete effectively. They have a programme of work on climate change, which is driven by a dedicated climate change board.

<http://climatechange.cbi.org.uk>

#### Federation of Small Business (FSB)

The FSB is a campaigning pressure group promoting and protecting the interests of the self-employed and owners of small firms. As well as having a lobbying role, it delivers a wide range of services to business.

[www.fsb.org.uk](http://www.fsb.org.uk)

#### Scottish Enterprise

Scottish Enterprise is Scotland's main economic, enterprise, innovation and investment agency. They aim to stimulate the sustainable growth of Scotland's economy through a range of support services.

[www.scottish-enterprise.com](http://www.scottish-enterprise.com)

#### Department for Environment, Food and Rural Affairs

Defra takes the lead on adaptation to climate change in the UK. The Adapting to Climate Change team has a web site, which provides a useful overview of climate change adaptation and outlines the Government's approach for developing policy in this area. Note that adaptation is a devolved issue, and the devolved administrations are developing their own programmes.

[www.defra.gov.uk](http://www.defra.gov.uk)

[www.doeni.gov.uk](http://www.doeni.gov.uk)

[www.scotland.gov.uk](http://www.scotland.gov.uk)

[www.wales.gov.uk](http://www.wales.gov.uk)

#### Department for Energy and Climate Change

The Department was created in 2008, bringing together the Government's climate change and energy policy areas. It leads on work to reduce greenhouse gas emissions and also on international adaptation initiatives.

[www.decc.gov.uk](http://www.decc.gov.uk)

Your notes:





The UK Climate Impacts Programme (UKCIP) helps organisations assess how they might be affected by climate change, so they can prepare for its impacts.



- UKCIP has co-ordinated stakeholder-led studies on the climate change impacts for all regions of England and for Northern Ireland, Scotland and Wales, as well as studies in a number of sectors, including health and the built environment.
- It is principally funded by the Department for Environment, Food and Rural Affairs (Defra) on behalf of the UK government and devolved administrations as part of the Government's Adapting to Climate Change (ACC) programme. UKCIP is based at the Environmental Change Institute (ECI), University of Oxford.
- It promotes and co-ordinates stakeholder-led research on the impacts of climate change and adaptation, it facilitates stakeholder partnerships and capacity-building programmes, and it provides common tools and datasets, all of which are available free of charge.

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