



UK Climate  
Impacts Programme

# A changing climate for business

business planning  
for the impacts  
of climate change



Revised edition, January 2009

## 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.

It can be seen that this reflects the ways in which human society, and the individuals and organisations which make up society, will also adapt to a changing climate.



## The UK Climate Impacts Programme (UKCIP)

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

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

### Acknowledgements

This report was written and edited by Gerry Metcalf, Kay Jenkinson and Kay Johnstone of UKCIP. It is an update of the document of the same title, published by UKCIP in 2005

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.

# 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 guidance for business and business support organisations, based on UKCIP's experience of working with business. Section 1 provides key messages and suggestions for initial actions. The rest of the report provides more information about future climate and techniques for understanding and assessing likely threats and opportunities.

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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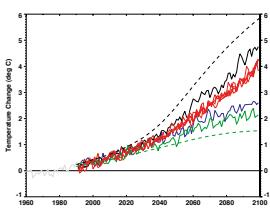
### Tools, resources & support

Pointers to UKCIP publications, partners, networks and other sources of support

# Headlines for business

## Key messages

The climate is changing in the UK and in other countries around the world  
Go to: Climate scenarios in the 21st Century



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. This is the subject matter of the science of phenology.

Above: Global temperature change associated with different emissions scenarios for the 21st century. Lag times 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

Go to: Weather impacts on business  
Assessing climate impacts



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

Go to: Weather impacts on business  
Assessing climate impacts



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
- make long term investment, especially infrastructure

Go to: Weather impacts on business



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

Image courtesy of Network Rail

There has been a steady rise in the costs of business claims for weather damage. In 2007, 28% of businesses reported disruption as a result of extreme weather (Chartered Management Industry Survey, 2008).

These are the key messages about climate change, its impacts on business and adaptation.

**Climate change will bring in commercial opportunities as well as threats**

**Go to:** Assessing climate impacts



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 will probably be affected by climate change in other countries**

**Go to:** Assessing climate impacts

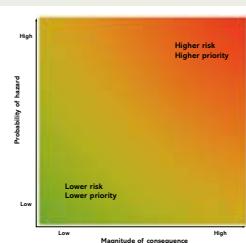


Climate impacts on agriculture in other countries could result in market opportunities for UK food production.

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**

**Go to:** Building capacity to adapt to climate risks



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**

**Go to:** Building capacity to adapt to climate risks



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.

# What to do next?

This section provides some suggested actions to get you started. They are divided into:

- 1. actions for business**
- 2. actions for organisations that support or represent business.**

These actions are the responsibility of most decision-makers, but especially:

- directors or senior managers of an individual business
- middle managers within an individual business
- advisors from a business support organisation
- members of a professional institute or trade association
- consultants who work with business on climate impacts and adaptation.

Actions for business	Relevant section of this report
<b>Make sure that someone has overall responsibility for this work</b> Consider appointing a 'climate risks champion' with clear authority and reporting lines.	Building capacity to adapt to climate risks
<b>Assemble evidence of the impacts on your business from recent (historic) weather-related events</b> This is useful to understand better the relationships between weather and your business, and to engage others.	Weather impacts on business
<b>Decide how to manage the work on impacts and adaptation</b> Will the work be mainstreamed from the start? Will it be managed as part of other business agendas (such as risk management, health & safety arrangements or business continuity planning)? Can it be included in an existing management system (e.g. ISO9001, ISO14001 or BS25999)?	Building capacity to adapt to climate risks
<b>Identify points in time that represent an opportunity to adapt your business</b> New initiatives, such as product development, moving to new premises or reviewing contractual arrangements, provide the potential to embed consideration of the future climate in a cost-effective way. Missing these opportunities could lead to building in increased vulnerability to climate change.	Building capacity to adapt to climate risks
<b>Identify who needs to be involved</b> Climate change has implications for a wide range of business functions. It is advisable to involve a range of employees in order to draw on a range of knowledge and experience and make sure those responsible for implementing adaptation measures are fully engaged.	Building capacity to adapt to climate risks
<b>Undertake an initial climate impacts assessment through an in-house workshop event</b> Use the Business Areas Climate Impacts Assessment Tool (BACLIAT) and involve senior staff from all parts of the business. You may wish to assess the risk of each impact, to identify which are significant in the face of uncertainty.	Assessing climate impacts

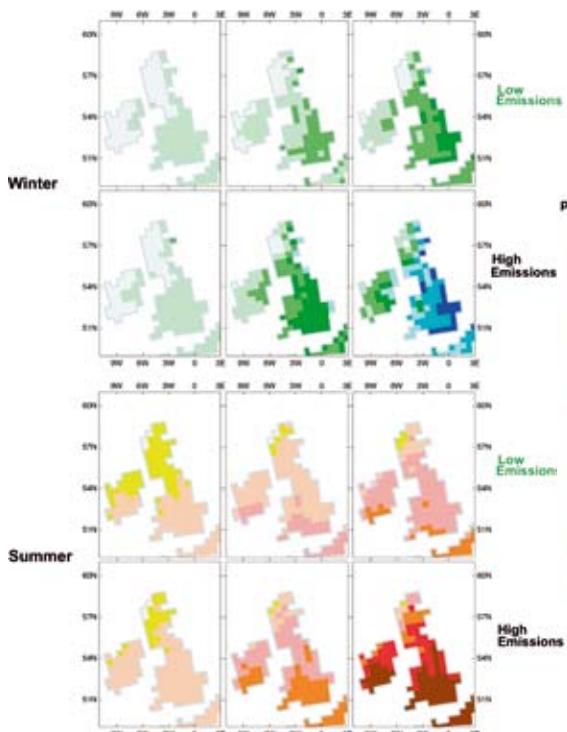
<b>Actions for business (continued)</b>	<b>Relevant section of this report</b>
<p><b>Obtain support and resource commitment from senior management</b> There is not much resource requirement to get started: just a few days (or even hours) of allocated staff time at first.</p>	Building capacity to adapt to climate risks
<p><b>Organise an in-house training event/programme or prepare an in-house publication on key impacts and possible adaptation strategies</b> It is important that all parts of a large organisation have some basic understanding of the issues and planned responses.</p>	Assessing climate impacts
<p><b>Make use of available tools, resources and support</b> UKCIP resources and support are available free of charge. Other business-facing organisations and trade associations will increasingly have support to offer in this area and there are already sector and region specific reports you could use as a starting point.</p>	Tools, resources & support
<p><b>Build positive relationships with third party organisations, such as suppliers, contractors, customers, competitors, regulators and trade associations</b> The institutions that govern the way you do business (such as industry codes and standards) may seem to be out of your control. However, engaging in the processes that shape these will increase your adaptive capacity. There may also be opportunities to share information and spread risk.</p>	Building capacity to adapt to climate risks
<b>Actions for organisations that support or represent business</b>	
<p><b>Raise awareness and share information</b> There is currently a lack of awareness of the impacts of climate change and the need for business to adapt. Articles in trade press, events, training and dissemination of published material can help tackle this.</p>	Building capacity to adapt to climate risks
<p><b>Carry out or commission a sector-based study</b> The technical implications of the impacts of climate change will be very different for different sectors. There is therefore a need for more sector-specific information.</p>	Building capacity to adapt to climate risks
<p><b>Review any codes, standards, guidance and accreditation that you have an input into</b> The changing climate may have implications for the effectiveness of some of these and it is unlikely that they were originally developed with the future climate in mind.</p>	Building capacity to adapt to climate risks
<p><b>Work with your business stakeholders on a pilot adaptation study or set up an advice service</b> Provide support on adaptation and share the findings with your wider networks.</p>	Tools, resources & support
<p><b>Ask UKCIP for advice or get involved in UKCIP projects</b> A key UKCIP strategy is to work in partnership with pivotal business-facing organisations, such as trade associations, professional bodies and the business support community.</p>	Tools, resources & support

# Climate scenarios for the 21st century

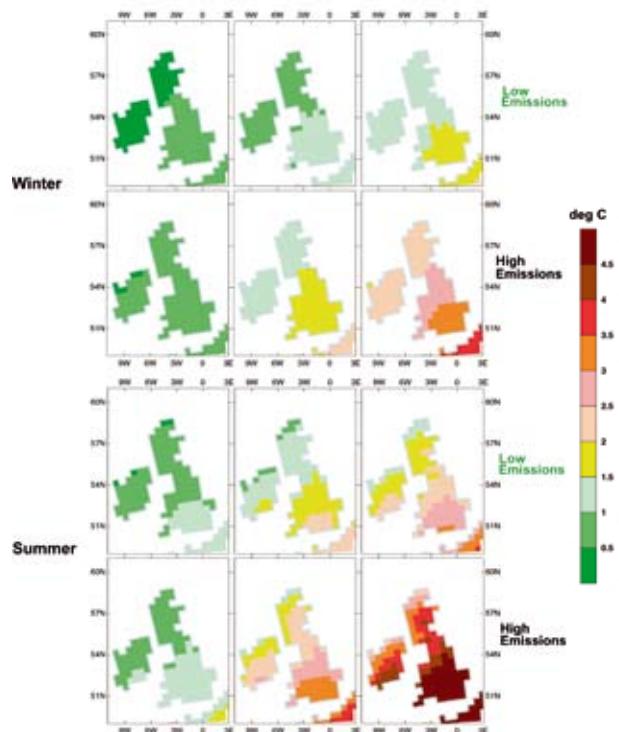
## Sources and reliability of data

The following maps and tables are based upon the UKCIP02 scenarios<sup>1</sup>, which describe how the climate of the UK may change during the course of this century. These scenarios are based on model results from the UK Met Office's Hadley Centre and were prepared by Tyndall researchers for the UK Climate Impacts Programme. The described range of plausible futures aims to raise awareness of regional climate change and assist in long-term planning. They provide the latest information for policy makers, those researching impacts of climate change, businesses and organisations, and the general public. The scenarios are explicitly linked to four greenhouse gas emissions scenarios described in the Intergovernmental Panel on Climate Change (IPCC<sup>2</sup>) Special Report on Emissions Scenarios (SRES). The IPCC was established to assess scientific, technical and socio-economic information relevant for the understanding of human induced climate change, its potential impacts and options for mitigation and adaptation.

**Summer / winter precipitation under 2020s, 2050s and 2080s low and high emissions scenarios**



**Summer / winter temperatures under 2020s, 2050s and 2080s low and high emissions scenarios**



How often will extremes occur?	Anomaly	2020s	2050s	2080s
<b>Mean temperature</b>				
A hot '1995-type' August	3.4°C warmer	1	20	63
A warm '1999-type' year	1.2°C warmer	28	73	100
<b>Precipitation</b>				
A dry '1995-type' summer	37 % drier	10	29	50
A wet '1994/95-type' winter	66 % wetter	1	3	7

The percentage of years experiencing various extreme seasonal anomalies across central England and Wales for the medium-high emissions scenario. The anomalies shown are the difference from the baseline of the average 1961–1990 climate.

<sup>1</sup>Hulme et al., (2002) Climate Change Scenarios for the United Kingdom: The UKCIP02 Scientific Report, Tyndall Centre for Climate Change Research, School of Environmental Sciences, University of East Anglia, Norwich, UK. <http://www.ukcip.org.uk/scenarios/>

<sup>2</sup>[www.ipcc.ch](http://www.ipcc.ch)

## Climate change is unavoidable

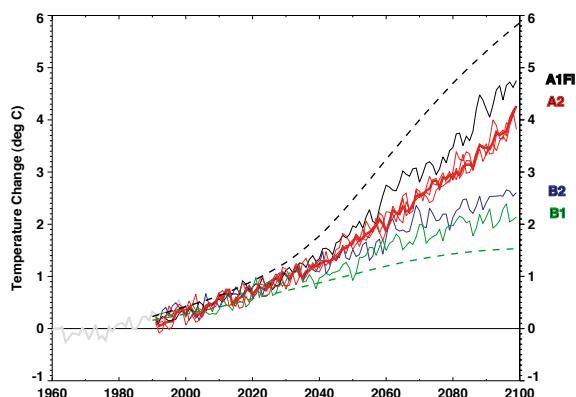
Due to the inertia in the climate system, we are already committed to a certain amount of climate change as a result of the emissions of the last century. This is illustrated in the figure below right, which shows the projected global temperature change associated with four emissions scenarios (B1, B2, A2 and A1F1), throughout the 21st century. Although it is important to reduce emissions now in order to avoid the dangerous and potentially life-threatening climate change associated with the top of the black line (A1F1), we also need to adapt to the unavoidable climate change which has already happened and will continue over the next few decades.

## Uncertainty

There is a high level of certainty that climate change is happening and is being driven by greenhouse gas emissions. For most climate variables, the direction of change is also known. However, there are some uncertainties relating to the rate of change, the geographical distribution of changes and how these will translate into business consequences.

Different aspects of the climate have different levels of uncertainty associated with them. So, climate scientists have high levels of confidence in changes in average temperature and precipitation, but less confidence in the future patterns of wind, storms or extreme events.

Uncertainty is not unique to climate change. In fact, all aspects of the future that businesses routinely take into account, such as the future interest rates or prices of raw materials, are subject to uncertainty. Uncertainty is therefore not an excuse for inaction.



Source: Met Office Hadley Centre

## A simple summary of climate change for the UK in the 21st century

### Long-term / seasonal averages

Warmer, drier summers

Milder, wetter winters

Rising sea levels

Significant decrease in soil moisture content (summer and autumn)

### Extremes

#### More very hot days

Extremes of temperature increase in intensity as well as frequency

#### More intense downpours of rain

Extremes of precipitation increase in intensity as well as frequency

#### Shorter return periods for high water levels at coast

Uncertain changes in storms and storm-tracks – a possible increase in winter storms

## Looking ahead

In 2009 UKCIP will publish another package of climate change projections for the UK – UK Climate Projections (UKCP09). This will take account of the latest developments in climate modelling and science, and be designed to meet the changing needs of a growing body of stakeholders. In particular, the next package of information will include probabilistic projections (allowing better quantification in risk assessment).

## What about The Gulf Stream?

The Gulf Stream is a warm water current that is partially responsible for keeping the UK much warmer than other countries on the same latitude. The latest climate modelling experiments from the Hadley Centre looked at the effect of increasing greenhouse gas concentrations on the Gulf Stream. These suggest that the Gulf Stream could slow down – by about 20% by the middle of the century – but it didn't completely switch off. This predicted reduction in the ocean circulation, and the resultant loss of heat to the UK from the Gulf Stream, are already included in the UKCP02 scenarios, all of which show a net increase in temperature.

# Weather impacts on business

## 110,000 calls in a day

Storms across northern Europe meant staff at Danish insurer TrygVesta faced a busy January 2005. The insurer said the violent storm resulted in 110,000 calls to its telephones in one day, almost as many as it had received in the entire previous month (Insurance Day, 25 April 2005).

## The cost of 2003's hot weather

The 2003 heatwave is estimated to have cost the UK £160 million. This included £41 million in health effects and £150 million in damage to buildings and roads. However, there were also gains in the tourist industry (£38 million), retail sector (£3.2 million) and reduced energy use, saving consumers £80 million ([www.guardian.co.uk](http://www.guardian.co.uk), 25 October 2006).

## Gales cause massive disruption

Severe gales, reaching 90 mph in late January 2002, left thousands of homes and businesses in the UK without electricity, caused disruption to transport services and damage to buildings, and cost the UK £150 million, according to research undertaken by the Met Office (Met Office, 3 April 2002).

## Trapped underground

On one day in July 2003, 4,000 passengers were trapped on London Underground in broken down trains for at least 90 mins, and subjected to combined temperatures and humidity approaching 40°C. Ten people were taken to hospital suffering from heat exhaustion and 627 were treated at the scene (The changing climate: impact on the Department for Transport, 2003).

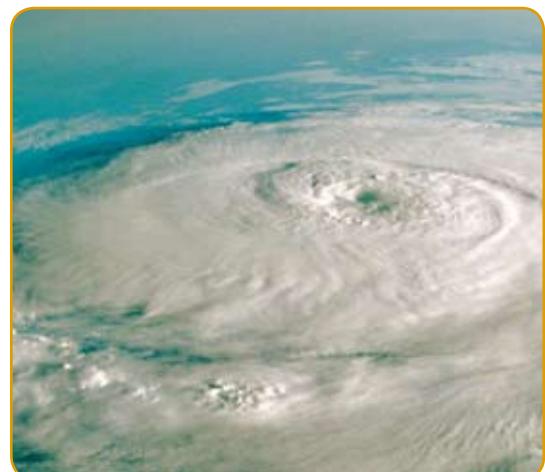
## British wine industry could thrive

Global warming could put a sparkle into the British wine industry, as southern England becomes the best place to grow champagne grapes, former Environment Minister Elliot Morley forecasted. "There is a theory that because of the change, the champagne grape is moving north and so the best climatic conditions for the champagne grape will move to the south of England and our wine sector is expanding and is likely to benefit," he said (The Journal [Newcastle], 10th February 2005).



## 28% of UK businesses affected by extreme weather in 2007

A survey by the Chartered Management Institute found that 28% of UK businesses were affected by extreme weather in some way during 2007. This was up from 9% in 2006. Proportionally, however, a higher percentage of businesses operating in Scotland, East Anglia, the East Midlands and Wales were affected than their northern and southern counterparts (CMI, 2008).



## The difference between weather and climate

Weather describes the rain or shine outside right now or in the near future. Climate is the average weather over a locality over a 30 year period.

"Climate is what you expect

- weather is what you get" R. A. Heinlen, 1973

Weather is naturally very variable but it is the climate which is changing as a result of greenhouse gas emissions.

These examples are not intended to demonstrate evidence of climate change, but they do show the vulnerability of business to weather events.

### Claims for flood damage double

A study undertaken by the Association of British Insurers found that claims for storm and flood damages in the UK have doubled to over £6bn over the period 1998–2003, compared with the previous 5 years, with the prospect of a further tripling by 2050. The report also warned that by 2050, in a year of extreme weather, massive inland flooding could cost £4.5bn a year, rising to as much as £40bn if London were hit (Investors Chronicle, 22 December 2004).



### 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, stripping out new stores, 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).

"Retailers were helped by buoyant Easter trading and unusually warm weather, which may have boosted sales in sectors like groceries and DIY" says Chairman of CBI distributive trades panel (Guardian, 2 May 2007).

### Melting roads

High temperatures in July 2006 caused 'sticky' conditions on 37 roads across Oxfordshire. Extensive road closures and diversion must have had a significant impact on local businesses (Oxfordshire Local Climate Impacts Profile, Oxfordshire County Council, 2007).

### 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).



Image courtesy of Carlisle News & Star

### Wet summer means poor harvest

The wet summer of 2008 left farmers with one of the worst harvests for 40 years. Many crops have been ruined and heavy harvest machines have struggled on sodden land ([www.guardian.co.uk](http://www.guardian.co.uk), 12 September 2008).



# Assessing climate impacts

## Business Areas Climate Impacts Assessment Tool (BACLIAT)

The UKCIP Business Areas Climate Impacts Assessment Tool (BACLIAT) provides a simple checklist for organisations to assess the potential impacts of climate change either on their business or on an entire business sector.

It recognises that a changing climate affects all business areas, and not just the more obvious ones of product design or service delivery. It encourages a comprehensive assessment, by inviting consideration of the opportunities as well as the threats from a changing climate, under the following headings:

- **Markets:** changing demand for goods and services.
- **Finance:** implications for investment, insurance and stakeholder reputation.
- **Logistics:** vulnerability of supply chain, utilities and transport arrangements.
- **Premises:** impacts on building design, construction, maintenance and facilities management.
- **People:** implications for workforce, customers and changing lifestyles.
- **Process:** impacts on production processes and service delivery.



The basis of all climate change impacts assessment is to consider the expected changes to the climate and ask the question "What will this do to my sector or business?". In speculating about future impacts, it is also useful to consider how weather currently affects your operations, and those of your suppliers, customers, competitors and sector.

BACLIAT can be used as either:

- a general awareness-raising workshop resource with a group from a wide range of business sectors including others responsible for advising and supporting business – in this case, you may wish to use a hypothetical company,

OR

- a scoping exercise with a group of employees from the same business or sector. This will not only introduce people to the subject, but could form the beginning of a risk-based approach to developing an adaptation strategy. In this case, people will be drawing on their own experience. See the Adaptation Wizard (Section 6 of this document) for advice on how BACLIAT fits into the wider process of developing an adaptation strategy.

Before you can begin your BACLIAT assessment you will need to define the context for your enquiry.

- **Time:** over what time period are you interested in the climate impacts?
- **Location:** where are you interested in finding out about climate change impacts?
- **Boundaries:** what is the scope of the assessment? Which parts of the sector will be included, and how far up the supply chain are you looking?

See the UKCIP website under 'Tools' for advice on facilitating a BACLIAT workshop.

The key priority impacts that require a response can then be selected from this long list, perhaps by carrying out a risk assessment. Further investigation may be required to estimate the likelihood and magnitude of climate impacts. Deciding on a response will require consideration of all alternatives and then making a judgement on which is the most appropriate based on the business objectives.

# Some threats and opportunities for business arising from a changing climate

The table below shows the outcomes of the BACLIAT checklist applied to all business sectors. These are just a few examples of typical impacts - they are not to be treated as definitive nor comprehensive assessments of the climate risks for business.

## Markets: changing demand for goods and services

Threats	Opportunities
<ul style="list-style-type: none"> <li>Decreased or disappearing demand for present range of goods and/or services</li> <li>Competitors' position enhanced by changing climate</li> <li>Quality issues relating to how products perform in the new climate e.g. in agriculture, overheating of grain</li> <li>Access of customers to products or services could be undermined by extreme weather</li> <li>Difficulties in marketing existing assets, e.g. buildings, that become increasingly unsuited to the climate</li> </ul>	<ul style="list-style-type: none"> <li>New products or modifications to existing products to respond to a changing market, e.g. flood management technologies, ventilation and cooling, consultancy, measuring and monitoring equipment, climate resilient building materials</li> <li>Advantages for early movers in response to changed markets and lifestyles</li> <li>Increased passing trade in some sectors during long hot summers, e.g. retail</li> <li>Increasing demand for some products and services</li> <li>More extreme events means opportunities, e.g. repair, maintenance and clean up services, domestic tourism, summer foods, sport, leisure, al-fresco eating facilities</li> </ul>

## Finance: implications for investments, insurance and stakeholder reputation

Threats	Opportunities
<ul style="list-style-type: none"> <li>Failure to adapt creates difficulties in securing investment and/or insurance cover at reasonable cost</li> <li>Potential liabilities are associated with previous actions which future changes in climate may reveal as vulnerable</li> <li>Potential liabilities if climate change is not factored into long-term decisions about the future</li> <li>Investment in equipment ties business into climate-sensitive process or activity</li> <li>Limit of global financial markets to absorb risk could be reached</li> </ul>	<ul style="list-style-type: none"> <li>Good risk management will appeal to financiers, insurers and other stakeholders, leading to security for investment and opportunity for reduced insurance premiums</li> <li>Potential risks reduced and liabilities diminished through pro-active risk assessment and implementation of climate change adaptation strategies</li> <li>Clients and customers attracted to businesses that can show they are resilient to climate change</li> </ul>

## Logistics: vulnerability of supply chain, utilities and transport arrangements

### Threats

- Global climate change could affect availability of some goods and services (e.g. raw materials, components) and commodity prices
- Disruption to utilities, especially electricity supply, water supply and sewerage, which can be affected by extreme weather
- Disruption of transport and delivery systems for goods and services in and out – just in time systems are especially vulnerable
- Businesses that rely on abstracting water could be faced with reduced supply or changing licence conditions during droughts, e.g. heavy industry and some agriculture

### Opportunities

- Competitive advantage for companies with redundancy or flexibility built into delivery systems and supply chains or those undertaking business continuity planning
- Supplying local markets creates an opportunity for marketing approach based on regional distinctiveness or reduced product miles

## Premises: impacts on building design, construction, maintenance and facilities management

### Threats

- Vulnerability due to proximity to potential river, coastal or urban flooding
- Existing buildings not designed with the future climate in mind. Building fabric and structure could be vulnerable to rain, storms and subsidence. Refurbishing to low carbon, climate-resilient standard represents a significant challenge
- Internal environment: challenge of coping with increased summer temperatures (without adding to greenhouse gases). Potential future regulation in this area
- Increased risk of flooding leading to clean up costs and loss of business continuity if premises are inaccessible to staff and customers
- Pest damage to buildings, e.g. termites over-wintering in mild winters

### Opportunities

- Maintaining thermal comfort in winter months is less of a challenge
- Opportunities for high thermal mass building solutions, which can reduce air-conditioning requirements
- Opportunities for those in built environment industries to develop expertise and reputation in climate-related building issues
- Opportunity to exploit external spaces to accommodate outdoor living

## People: implications for workforce, customers and changing lifestyles

### Threats

- Threat to working conditions and travel arrangements for staff from extreme weather
- Failure to attract or retain staff through reputation as poor employer (e.g. business not climate resilient, no training on impacts and adaptation)
- External workforce exposed to increased sunlight and temperatures in summer, e.g. agriculture, construction and forestry
- Internal environment uncomfortable as a result of increased summer temperature
- Training and skills implications e.g. for farming, engineering, building or insuring in the new climate

### Opportunities

- Greater comfort and lower fuel bills in winter
- Reputational opportunities of responding effectively as good employer increases recruitment and retention of high quality staff
- Opportunity to improve work/ life balance by responding to climate change risks with flexible working hours and increased home-working
- Opportunities for recruitment, housing and service provision in more northerly locations or areas away from urban centres, which could become more attractive as residential locations as the south gets hotter
- Generally more outdoor activity creates opportunities for some industries, e.g. tourism, leisure, urban design

## Process: impacts on production processes and service delivery

### Threats

- Reduced productivity or disruption to climate sensitive processes or activities. For example:
  - Manufacturing: temperature sensitive equipment compromised and increased need for cooling
  - Construction: difficult working conditions and damage during construction process from more torrential rain and storminess. More dust in dry summer conditions
  - Leisure: pitches, parks, golf links vulnerable to drought. Less snow for winter sports in Scotland
  - Engineering: greater temperature control required for sensitive materials, structures and processes. Current codes and standards may no longer be appropriate in the future climate
  - Agriculture: existing crops less viable in the new climate, such as those that rely on a frost. Summer drought reduces water quality. Livestock are affected by excessive temperatures

### Opportunities

- Some aspects of a production process or service delivery made easier as a result of changing climate. For example:
  - Agriculture: longer growing season and new species and varieties of plants can be grown e.g. vineyards, citrus trees meaning retailers and restaurants find it easier to find local sources of some products
  - Manufacturing: developing expertise in managing industrial processes and technologies in response to climate change
  - Financial services: new insurance products and services that spread the risk of climate change and incorporate sophisticated underwriting that takes account of climate change
  - Construction: fewer delays on site through frosts

# Building capacity to adapt to climate risks

## For all

### Raising awareness and addressing existing perceptions

The words 'climate change' can be a big turn off for many and tackling climate change is rarely considered a core business concern. As well as viewing it as peripheral, businesses are able to dismiss climate change as unimportant because it is a long-term phenomenon with impacts that are projected to occur much later in this century. Introducing these issues through a discussion of current 'weather-related risks' overcomes some of these perceptions. It invites businesses to consider their exposure and vulnerability to current weather events as a stepping-stone to consideration of future, potentially more severe, impacts as the climate changes. Using the language of risk also invites businesses to treat climate change alongside other business risks, through formal risk assessment.

Expressing climate change impacts in terms of business opportunities rather than focussing on the downside could be more engaging for some businesses. For example, positive opportunities arise out of changing markets or demand for new products and services, and being an 'early-mover' to deal with either threats or opportunities can yield significant commercial advantage.



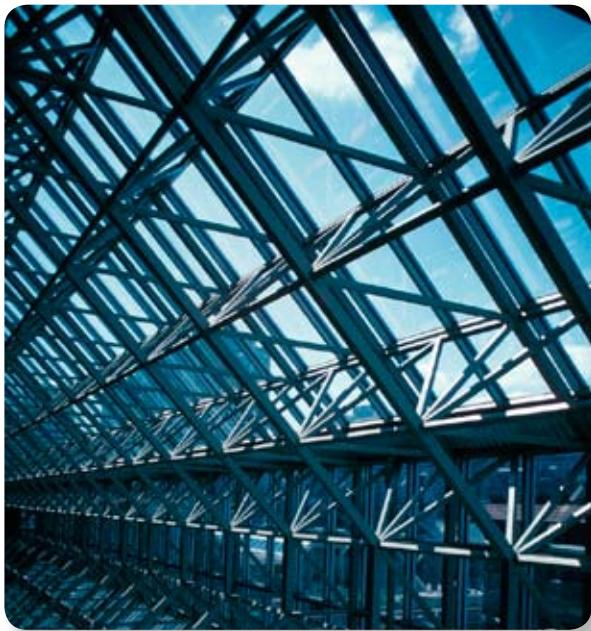
### 'Building adaptive capacity' and 'delivering adaptation action'

Building adaptive capacity is the putting in place all of the support systems, legislative and policy frameworks which will encourage, allow or require individual businesses to undertake adaptation. Measures will use both 'carrot' and 'stick' and will include activities such as: awareness raising; research; staff development and training; putting in place regulation, codes, standards, policies and fiscal incentives and investigating alternative adaptation options. Some of this activity will sit outside the business (e.g. with organisations that represent, support or regulate business), however there are mechanisms by which businesses can have an influence.

Delivering adaptation action involves putting in place physical or managerial arrangements that respond to the opportunities or threats presented by the changing climate. These might include such actions as: relocating a business to avoid the risk of flooding; establishing a siesta lunchtime break to avoid having to work through the excesses of summer temperatures; or planting new crops which can be grown in hotter, drier summers.

### Case study

Taylors Malmesbury Syrups produce premium flavoured syrups for coffees, cooking and milky frappes. They used a conventional marketing tool, together with some climate change information, to review the business and its position in the market place. As a result they realised that the market needs for their products, which were linked to cold weather, would disappear within the next 10 – 20 years. The product range was reviewed and they now provide syrups to be used with ice creams and frappes in the warmer months of the year. This has proved to be extremely successful with their food industry clients. Existing clients instantly expressed an interest in the product and they have also picked up some new clients as a result.



Some examples of adaptation actions are below.

- Scotts Miracle-Gro have developed new weedkillers, composts, mulches and plant feeds with climate change in mind.
- Casella Cel Ltd moved their server room to the second floor because of the flood risk.
- Northern Ireland Electricity have strengthened their infrastructure to be better able to deal with floods and storms.
- A farm in Devon used frozen lollies stuffed with carrots to help their pigs cope with the heat in 2006.

### 'Mainstreaming' climate change risks into normal business management and procedures

UKCIP believes that the most effective responses to a changing climate can be achieved where climate risks are managed as part of existing business functions. For example, business continuity planning, strategic planning, risk assessment and health and safety management are all areas where different types of climate risks could be managed. This should be a long-term aim for all businesses. However, in moving towards this goal it is usually necessary to identify and work on climate risks as a discrete activity in the first instance, until there is greater recognition and understanding of the issue within the organisation. For companies that already have systems in place for dealing with the effects of the weather, it may start life as a technical concern, whereas for others it is likely to be the responsibility for the environmental, quality or operations manager.

It may be possible to use an existing business management system, such as an environmental management system or a business continuity management system, as a framework for developing an adaptation strategy. The benefit of this is that as well as providing a systemic approach to managing climate risks, it also provides a mechanism for demonstrating efforts in this area to external stakeholders. UKCIP is developing a guidance document to help integrate adaptation into business management systems, to be published by BSI in 2009.

### Case study

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) is 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:

- They funded a research project on climate change and the indoor environment.
- They took part in UKCIP's A Changing Climate for Business partnership, which helped raise awareness and highlight a range of risk areas for the profession.
- They set up a Knowledge Transfer Partnership in collaboration with UKCIP. This created a post for a Knowledge Transfer Associate to look at how climate change adaptation and climate projections could be incorporated into CIBSE guidance.
- This individual is now fully employed by CIBSE to further develop the CIBSE guidance and resources. The issue of expertise in relation to climate change is now embedded within the organisation's strategic plan and they are in a better position to act as a well informed and trusted source of information and guidance to their members.

# 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.

## Adaptation Wizard

The 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: assess your vulnerability to current climate, identify key climate risks, identify and assess options to address those key climate risks, and help you develop a climate change adaptation strategy.

The Wizard is also a valuable awareness-raising and educational tool: all the tools and resources UKCIP offers to help you better understand, and prepare for, climate change and its impacts can be accessed here.

## UK Climate Projections (UKCP09)

The UK Climate Projections will provide 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. The information will be available through an online facility enabling users to access the information at different levels of detail and customise it for their purposes.

[www.ukcp09.org.uk](http://www.ukcp09.org.uk)

## UKCIP e-news

UKCIP produces a monthly email newsletter, e-news, 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.

## The BRAIN

A searchable, web-based database which combines databases on adaptation examples, impacts examples and research.

## 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)

## Climate change partnerships in the UK

The English regions and the devolved administrations all now have climate change impacts partnerships (details below) 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.

### Climate South East

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

### East of England Climate Change Partnership

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

### East Midlands Climate Change Steering Group

[www.emra.gov.uk/what-we-do/regional-communities-policy/sustainable-development/climate-change](http://www.emra.gov.uk/what-we-do/regional-communities-policy/sustainable-development/climate-change)

### London Climate Change Partnership

[www.london.gov.uk/lccp/](http://www.london.gov.uk/lccp/)

### North East Climate Change Partnership

[www.northeastassembly.gov.uk/page.asp?id=88](http://www.northeastassembly.gov.uk/page.asp?id=88)

### Northern Ireland Climate Change Impacts Partnership

[www.doeni.gov.uk/index/protect\\_the\\_environment/climate\\_change/climate\\_change\\_-impacts\\_adaptation.htm](http://www.doeni.gov.uk/index/protect_the_environment/climate_change/climate_change_-impacts_adaptation.htm)

### Northwest Climate Change Partnership

<http://www.climatechangenorthwest.co.uk/>

**Scottish Climate Change Impacts Partnership (SCCIP)**  
[www.sccip.org.uk/](http://www.sccip.org.uk/)

**South West Climate Change Impacts Partnership (SWCCIP)**  
[www.oursouthwest.com/climate/](http://www.oursouthwest.com/climate/)

**Welsh Assembly Government Climate Change Commission Adaptation Sub-group**  
[www.wales.gov.uk/topics/environmentcountryside/climate\\_change/tacklingchange/strategy/cccommission/](http://www.wales.gov.uk/topics/environmentcountryside/climate_change/tacklingchange/strategy/cccommission/)

**West Midlands Climate Change Partnership (WMCCP)**  
[www.sustainabilitywestmidlands.org.uk/wmccp](http://www.sustainabilitywestmidlands.org.uk/wmccp)

**Yorkshire & Humber Climate Change Partnership**  
[www.yourclimate.org/](http://www.yourclimate.org/)

### 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, we 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 web site or telephone us on 01865 285717 for more information on current business initiatives and how you could get involved.

### Other sources of information

#### Environment Agency

The Environment Agency (EA) provides high quality environmental protection and improvement in England and Wales. The EA works with businesses and other organisations to prevent damage to the environment by providing education and guidance.

#### 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.

#### Business Link

Business Link are to be the primary access route for businesses seeking support. They provide information on a range of issues and provide a diagnostic and signposting function.

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

#### 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.

[www.defra.gov.uk/Environment/climatechange/adapt/index.htm](http://www.defra.gov.uk/Environment/climatechange/adapt/index.htm)

#### 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/)

#### Scottish Government

The Scottish Government is the devolved government for Scotland. It is responsible for most of the issues of day-to-day concern to the people of Scotland. The Environment and Rural Affairs Department has responsibility for advising on climate change policy in Scotland.

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

#### Department of the Environment in Northern Ireland

The Environmental Policy Group within the Department of the Environment in Northern Ireland (DOENI) has responsibility for climate change policy issues.

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

#### Welsh Assembly Government

The Assembly has a duty under the Government of Wales Act 1998 to promote sustainable development. It is the only Government in Europe to have such a constitutional duty. The Assembly has, in particular, taken adaptation action in relation to flooding and land use planning issues.

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

### Reducing greenhouse gas emissions

#### The Carbon Trust

The Carbon Trust helps business and the public sector cut carbon emissions, and supports the development of low carbon technologies.

[www.carbontrust.co.uk](http://www.carbontrust.co.uk)

#### Envirowise

Envirowise offers UK businesses free, independent, confidential advice and support on practical ways to increase profits, minimise waste and reduce environmental impact.

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

The UK Climate Impacts Programme (UKCIP) helps organisations assess how they might be affected by climate change, so they can prepare for its impacts. Based at the University of Oxford, UKCIP was set up by the Government in 1997 and is principally funded by the Department for Environment, Food and Rural Affairs (Defra).



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.

In 2004, UKCIP began work with professional bodies and trade associations to develop ways to help the business sector to take account of the impacts of climate change in a pilot project - A Changing Climate for Business. This report develops the conclusions of that project.

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This report is intended for businesses and business support organisations as they start to consider the impacts of a changing climate. It should provide the information needed to explore the opportunities and threats which climate change presents:

- climate change issues for business and immediate actions
  - projected climate scenarios for the 21st century and guidance on how to use this data
  - some examples of weather-related impacts on UK business
  - a checklist for assessing potential impacts of climate change on a business or sector
  - generic lessons from checklist assessments
  - future work of UKCIP with business and how to be involved.
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