

# Business Opportunities in a Changing Climate

Managing Impacts and Market Opportunities

Report written for the  
Environment Agency by:



We are the Environment Agency.  
We protect and improve the environment and make it a better place for people and wildlife.

We operate at the place where environmental change has its greatest impact on people's lives. We reduce the risks to people and properties from flooding; make sure there is enough water for people and wildlife; protect and improve air, land and water quality and apply the environmental standards within which industry can operate. Acting to reduce climate change and helping people and wildlife adapt to its consequences are at the heart of all that we do.

We cannot do this alone. We work closely with a wide range of partners including government, business, local authorities, other agencies, civil society groups and the communities we serve.

This report is the result of research commissioned and funded by the Environment Agency.



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## Climate change is a real challenge. Is your business facing up to it?

As we publish this report, communities and businesses are recovering from the winter storms in December 2015. We saw record breaking weather; with UK mean temperatures in December over 4°C warmer than average, exceptionally high rainfall in the north and west and a new record set for the UK highest rainfall in 24 hours. The extreme and persistent rainfall caused devastating flooding and huge amounts of disruption, particularly in the north of the country.

This is the latest in a series of severe weather over the past few years, including drought in 2012, a storm surge on the east coast in 2013 and flooding in winter 2013/14. Businesses across the country have been counting the costs, experiencing direct impacts on their products, services and supply chains.

Because of these events, more businesses are recognising climate change as a major risk which could significantly affect them now, and in years to come.

The Environment Agency encourages businesses to increase their resilience to extreme weather by preparing for the challenges of climate change and managing the risks effectively and confidently.

This report is a 'call to action' to all UK businesses.

You will read about UK businesses who are already responding to climate risks and identifying and taking opportunities. You will see how building climate resilience doesn't necessarily require additional expenditure. In fact, taking action makes good business sense and can have immediate benefits.

Businesses who manage risk demonstrate how they are already reaping benefits, including costs savings, enhanced reputation, better financial resilience, investor attractiveness and finding potential to supply climate-related products and services.

Of course, climate change is a significant challenge. Responding is not an easy task, but businesses that do so with confidence are more likely to succeed.

We encourage businesses to act now to increase their climate resilience and prepare to exploit opportunities that our changing climate presents.

**Emma Howard Boyd**

Acting Chairman of the Environment Agency





# 1.

## BUSINESS RISKS IN A CHANGING CLIMATE

## Extreme weather and a changing climate

Our climate is changing and will continue to change into the future. Over the past few decades in the UK, temperatures have increased, sea levels have risen, and we have experienced more heavy winter rainfall.

The flooding and severe storms that struck the UK in the winter of 2013/14 left around 7,000 businesses flooded<sup>1</sup>. Insured losses to business property alone ran to almost £200 million<sup>2</sup>.

Climate projections show that these trends are set to continue into the future.

## Evidence sources for this report

The study is based on information that businesses themselves have reported on the actions they are taking to adapt to climate change.

Over recent years, an increasing number of companies are responding to corporate disclosure initiatives, such as the Carbon Disclosure Project (CDP)<sup>3</sup>. The CDP requests information on behalf of 822 institutional investors with US\$95 trillion in assets and includes questions around leadership and action in managing the risks from climate change, deforestation and water scarcity.

The primary evidence base for this report is the 2013 and 2014 CDP responses under their climate change programme.

The CDP data have been supplemented by published reports on the state of the UK businesses exposure and resilience to extreme weather and climate change, as well insights gained through the authors experience of working in this area for over a decade.

<sup>1</sup> www.cdp.net



## UK businesses are identifying climate risks

UK businesses report that climate risks are affecting all areas of business performance. Climate change is expected to increase the risk of interruption and financial loss to businesses<sup>3</sup>.

Businesses are recognising both direct physical and indirect risks to their operations (Figure 1).

### Direct risks

Stem from physical changes in extreme weather and climate<sup>1</sup> that impact assets, operations and supply chains

Affect production capacity, operational costs and ability to do business

Tend to be more obvious and readily identified by businesses

### Indirect risks

May result from changes in the regulatory environment, changing consumer behaviour, fluctuating socio-economic conditions and shifting stakeholder expectations (e.g. investors and local communities)<sup>2</sup>

Affect demand for goods and services, operational costs and market valuation

Typically harder to identify, so may be underestimated by businesses

<sup>1</sup>Including changes in mean (average) temperature and precipitation, temperature and precipitation extremes and droughts, sea level rise, snow and ice, storminess, and induced changes in natural resources, amongst others.

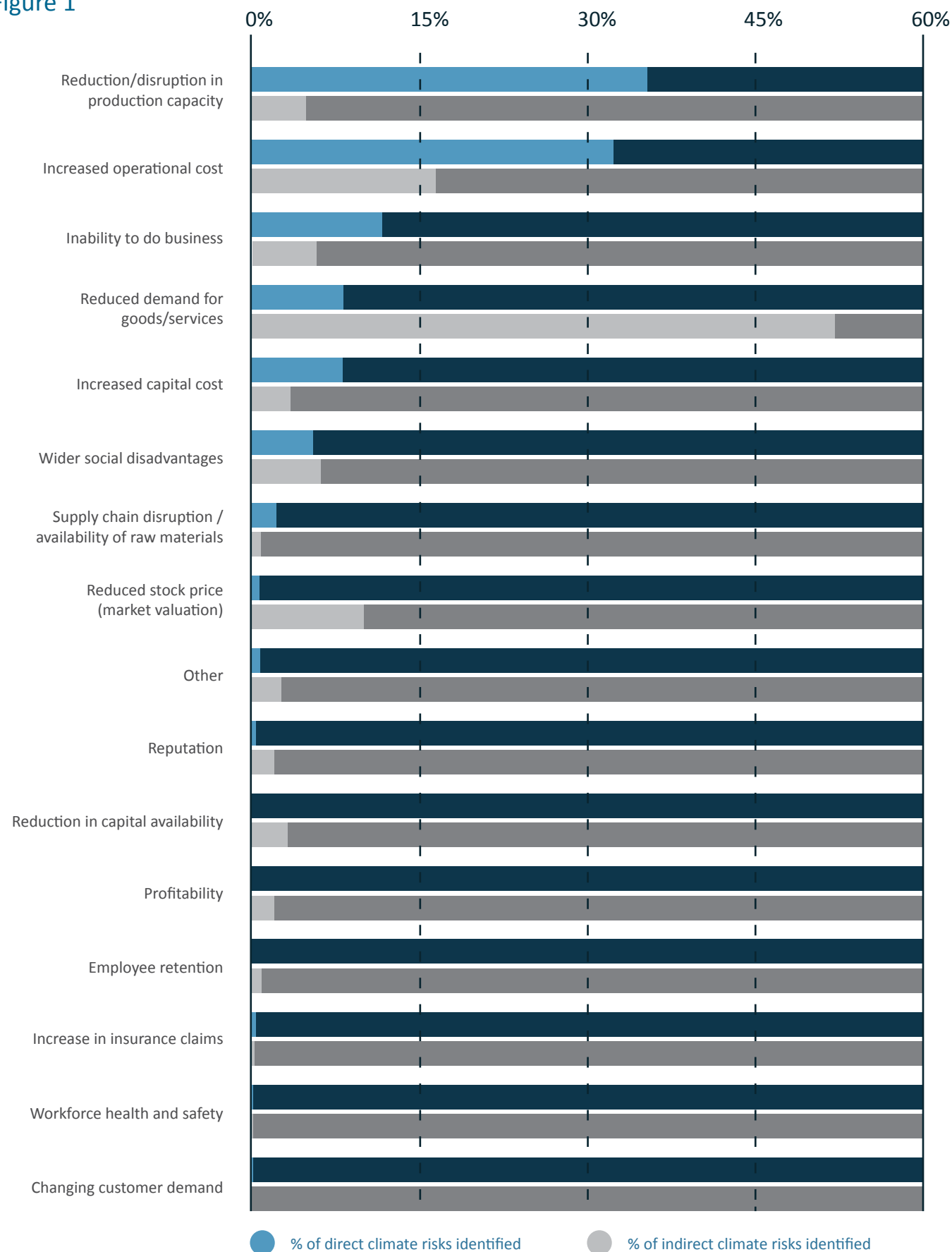
<sup>2</sup>CDP refer to these risks as being driven by climate-related development.

*Companies responding to CDP identified twice as many direct risks than indirect risks.*



# Breakdown of impact types across all sectors

Figure 1



Source: CDP 2014 data

## Case study

*M&S identify climate risks to their estate<sup>4/5</sup>*

In 2015, M&S launched a study to understand how it can protect its most valuable stores from the impact of extreme weather. The retailer recognises that higher temperatures and other extreme conditions associated with climate change represent a serious threat to sales and customer and staff experience.

Potential risks already identified include energy management (security and price), internal store environment (staff and customer comfort levels and hygiene conditions), water management (localised and large-scale flooding / summer droughts), as well as to building fabric (wind damage/ snow loading/ pipes freezing).

M&S also plans to review possible adaptations to climate change at their top 50 UK stores. They will then develop a plan in collaboration with their landlords to agree which adaptations will be implemented by 2020.

## Case study

*Potential climate impacts guide BHP Billiton's investment decisions to ensure their assets and operations are climate resilient<sup>6</sup>*

BHP Billiton is one of the world's largest mining companies, producing aluminium, copper, thermal coal, metallurgical coal, nickel, silver and uranium.

A near miss in 2011, when Cyclone Yasi hit north Queensland near its Hay Point Coal Port Facility, prompted BHP Billiton to assess the potential impacts of increasing storm intensity and storm surge levels on their asset and operations. The height of the trestle at the Hay Point port facility was raised as part of their expansion plans in 2012 to reduce its exposure.





Almost all businesses face some type of climate-related risk. However, levels of risk awareness varies according to size and sector. In 2014, 86% of companies responding to CDP identified one or more climate-related risks but for SME responders, this figure was 68%.

Levels of awareness are highest in those sectors operating large or long-lived fixed assets or buildings (e.g. water supply, mining and quarrying, accommodation services), reliant on climatically sensitive raw materials (e.g. food and beverage manufacturing) or those with complex supply chains (e.g. manufacturing of pharmaceutical products).

“ One of the most significant variables for the operation and development of new mining projects is the availability of water, as most mining processes require this critical resource. Decreased water availability in Chile may require the development of new sources to supply current and future operations (e.g. use of sea water) which could increase operational costs. ”

Example risks faced by companies with large and long-lived fixed assets, as described by Antofagasta

The international nature of many businesses operations and supply chains means that the most tricky climate risks facing companies may lie overseas.

## Case study

### *SABMiller's work on understanding key risks associated with their agri-supply chains*

SABMiller is a multinational brewing and beverage company. SABMiller's water consumption is a key consideration for its operations in over 80 countries. Realising that to reduce current and future water supply risk they needed to address the root causes of water scarcity, SABMiller initiated a series of water projects.

One such project, in Colombia, South America involved the setting up of a public/ private partnership between the local authority, a local water company, the US-based Nature Conservancy charity, and Bavaria (SABMiller's business in Colombia).

Partners pay into the fund to develop projects that help protect the ecosystem upstream of the city of Bogota, so that residents downstream get access to improved quality water.

The fund, in turn, pays for forest conservation along rivers, streams and lakes, to ensure that water resources are well managed now, and in the future.

## Which sectors are reporting the most severe impacts?

The water, accommodation and food service, and manufacturing sectors all report to CDP the greatest number of high severity (magnitude) impacts (Figure 2). Although no high risks were reported, agriculture reports a significant number of medium-high risks. Many innovative companies in these sectors are already starting to address climate risks.

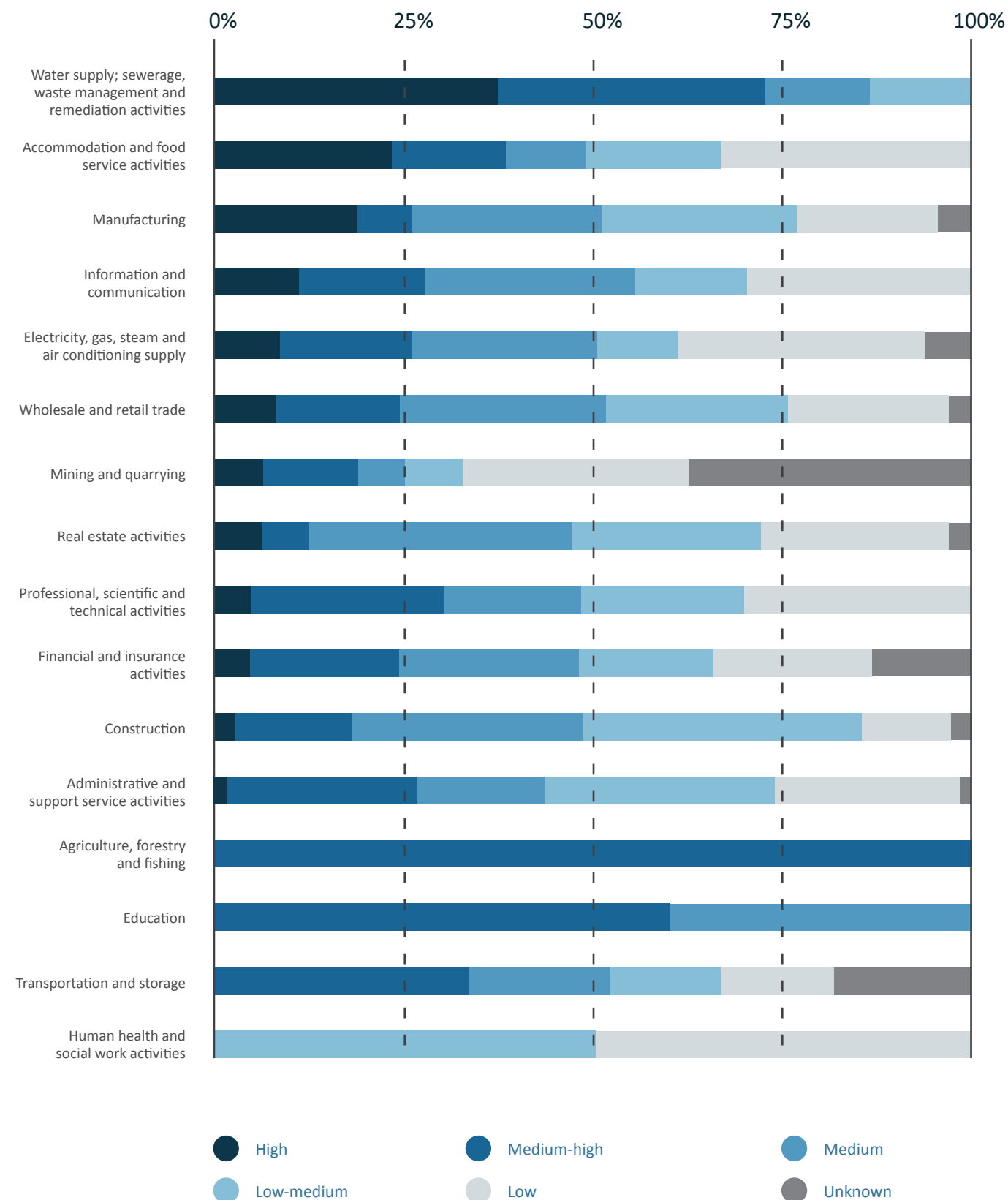
Sectors that have a strong public-facing customer-base, such as retail, appear to be particularly attuned to reputational impacts associated with climate change and view management of these risks as being key to maintaining a competitive advantage.

“ Increasing drought extremes will impact mid-continental areas such as the Mediterranean destinations. This may lead to conflicts over water equity between tourists and local people and a shortage of available water can lead to health problems and lower quality product. ”

Example of reputational risks companies may face, as described by Thomas Cook

# Sector by sector view of the magnitude of climate risks

Figure 2



Source: CDP 2014 data

## What are the potential financial impacts for business?

More and more businesses are estimating the costs associated with business impacts from climate change, despite the fact that this can be a challenging process.

**28%** of all the risks identified by CDP respondents had quantified financial implications to their business.

Where impact costs are known, they can be significant. For instance, the floods in 2007 were estimated to have cost businesses in England £740 million in clean-up costs and lost business<sup>7</sup>. Between 7,000 and 8,000 commercial buildings are estimated to have been affected<sup>8</sup>. On average, it took affected businesses 26 weeks to return to full capacity, with some businesses closing down permanently<sup>9</sup>. More recently, the floods in the winter of 2013/14 were estimated to cost small businesses £831 million<sup>10</sup>.

Disruptions to supply chains can also have significant negative financial impacts for businesses. Studies have found that share prices can fall by between 7% and 30% on average following failures in the supply chain, relative to benchmark companies<sup>11</sup>.

**Over a third (36%) of all risks scored by businesses responding to CDP were marked as having a “high cost” to their operations.\***

“ On December 5th 2013 strong winds at our Hull UK site ripped off a section of the roof which in turn damaged the air handling and extraction equipment. The gross cost of repair was £80,000. While the costs of one event are reasonably modest the cumulative impacts of such events, if they become more frequent, have the potential to be significant. Potential future losses due to severe weather related incidents [across Reckitt Benckiser’s operations in over 60 countries] could amount to up to 0.5% of our net revenue or approximately \$35–60 million per annum. ”

Example of the impacts of extreme weather on assets from Reckitt Benckiser

\* Direct and indirect impacts



## What actions are companies taking to manage their climate risks?

Companies are recognising that the risk landscape is changing. The rising costs of climate impacts and the cost effectiveness of adapting to climate change make a compelling case for business to take early action to adapt.

**85%** of the direct physical risks identified by companies had a corresponding risk management action in place.

Businesses are acting on climate risk in a number of ways (Figure 3). The most common action is integration of climate change within standard business processes (e.g. business continuity / risk management plans and processes), followed by monitoring of climate trends and impacts, and revising operating and maintenance procedures.

**47%** of the risk management methods identified involved no additional cost / negligible costs for the business.

### Case study

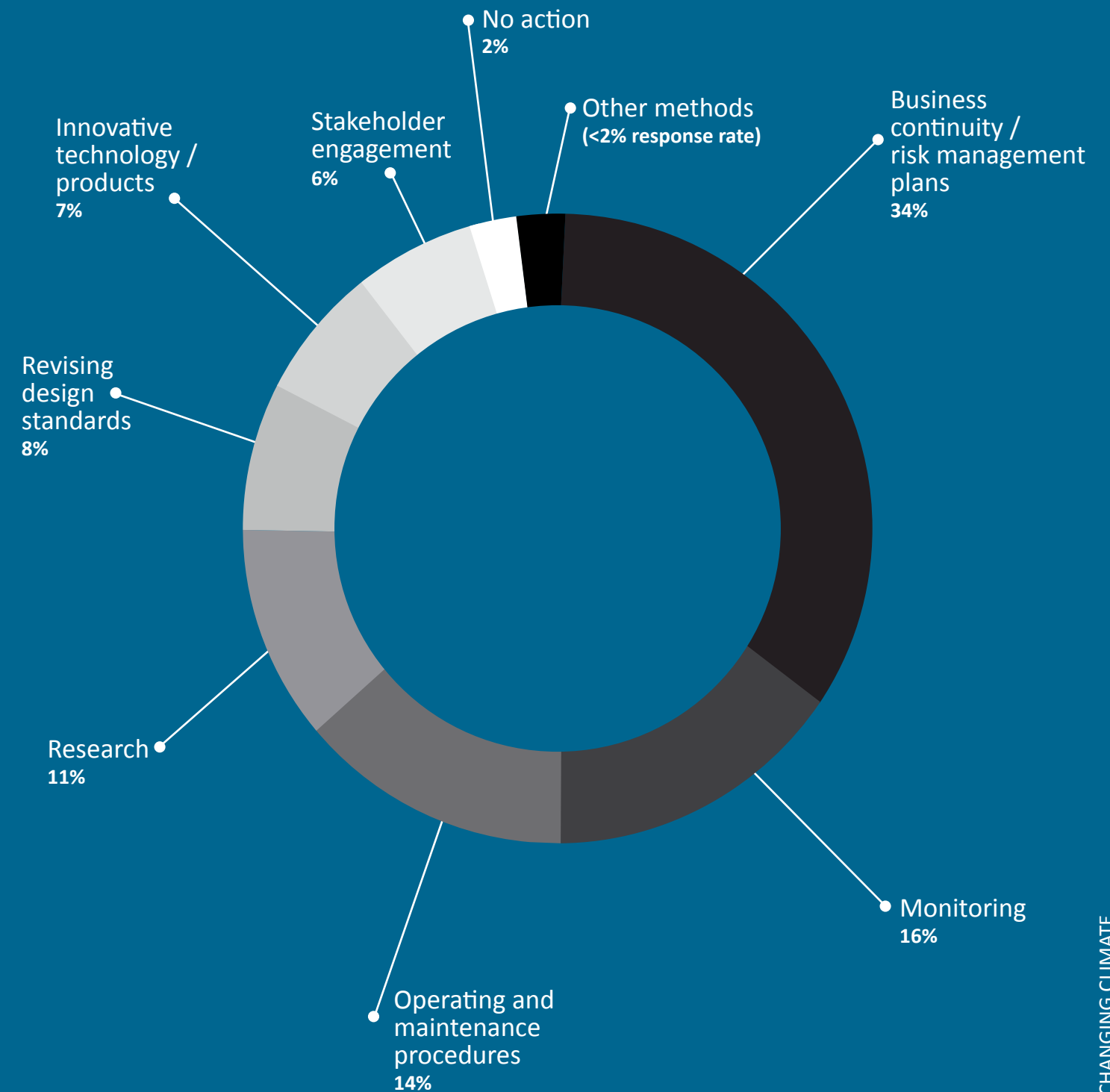
*British Land Company working to identify flood risks to their property portfolio*

The British Land Company is one of the largest property development and investment companies in the UK. For many years, British Land relied upon insurance to deal with its climate-related risks, principally flood risk. Recently, British Land Company changed all this by commissioning a full flood risk assessment for their property portfolio. The company has developed their own flood risk standards, which allow them to prioritise actions on a property-by-property level. They will repeat a portfolio-wide flood risk assessment every few years to update their corporate risk profile, and capture any important trends.

## Reported risk management methods

Direct climate risks

Figure 3



Source: CDP 2014 data



# 2.

## BUSINESS OPPORTUNITIES IN A CHANGING CLIMATE



## UK businesses are identifying opportunities to build climate resilience and to capitalise on expanding, evolving and emerging markets

Identifying climate-related opportunities is an emerging area for many businesses, yet those taking early action will gain first-mover advantage.

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*Amongst companies responding to CDP in 2014, approximately one opportunity was identified for every three risks reported.*

There is a major opportunity for UK businesses to gain competitive advantage by increasing their climate resilience. This will help protect core operations, reduce liabilities and avoid damage to the bottom line.

Capitalising on market trends is another significant opportunity. Those businesses with a keen eye to develop or extend existing products and services to help others adapt could significantly increase revenues.

Companies are already identifying numerous short-term opportunities



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**33%** of the total number of opportunities identified by CDP respondents are expected to materialise within the next 3 years.



## What are the benefits for companies taking action to build resilience?

### Key Benefit 1: Business continuity

Many companies are already addressing exposure to climate risks and improving business continuity. Identifying risks and adjusting risk management plans is an important step forward, as well as ensuring that internal policies, processes and systems consider a changing climate. Taking a longer-term, value chain based view of potential risks and opportunities are key to increasing resilience.

**34% of the climate risks identified by CDP respondents are being managed using this low-cost, business-as-usual approach.**

### Key Benefit 2: Cost saving

By understanding how climate risks impact operational performance, businesses can make better investment decisions that can manage or lower longer-term costs.

#### Money can be saved by

Incorporating climate resilience into asset design and specification from the outset

Modifying assets and equipment to improve operational performance and reduce raw material inputs

Adjusting operation and maintenance procedures at no / low cost to improve equipment efficiencies

*CDP respondents from a diverse range of sectors recognise the opportunities for cost saving, led by the manufacturing sector (50%) and followed by information and communication (14%) and financial and insurance activities (10%).*

Companies are investing in technologies and products to address climate risks. According to the CDP data, the highest proportion of investment is being used to address risks associated with higher temperatures, followed by investments to reduce water use and address flood risks (Figure 4).

### Case study

*Water-saving technology at Nottingham Zinc Group's factory delivers immediate cost saving and short payback periods<sup>12</sup>*

Nottingham Zinc Group Ltd is one of the largest independent alkaline zinc plating business in the UK, providing expertise to the automotive, construction and manufacturing sectors.

With guidance and support from WRAP,<sup>\*</sup> the company identified a number of water-saving opportunities. For example, they installed a semi-closed-loop system that re-uses around 50% of the rinse water from the coating plants prior to its final disposal. The system has reduced annual water consumption by 2,000m<sup>3</sup> and saved around £3,000/year. The capital investment for the installation of new pumps, holding tanks and associated pipework is expected to be paid back in around five years.

The potential for further savings has also encouraged the company to develop a new on-site facility to collect and filter rainwater. This will be used as process rinse water and is designed to reduce the company's requirement for mains water by 70%, with a payback period of just four years.

<sup>\*</sup> <http://www.wrap.org.uk/>

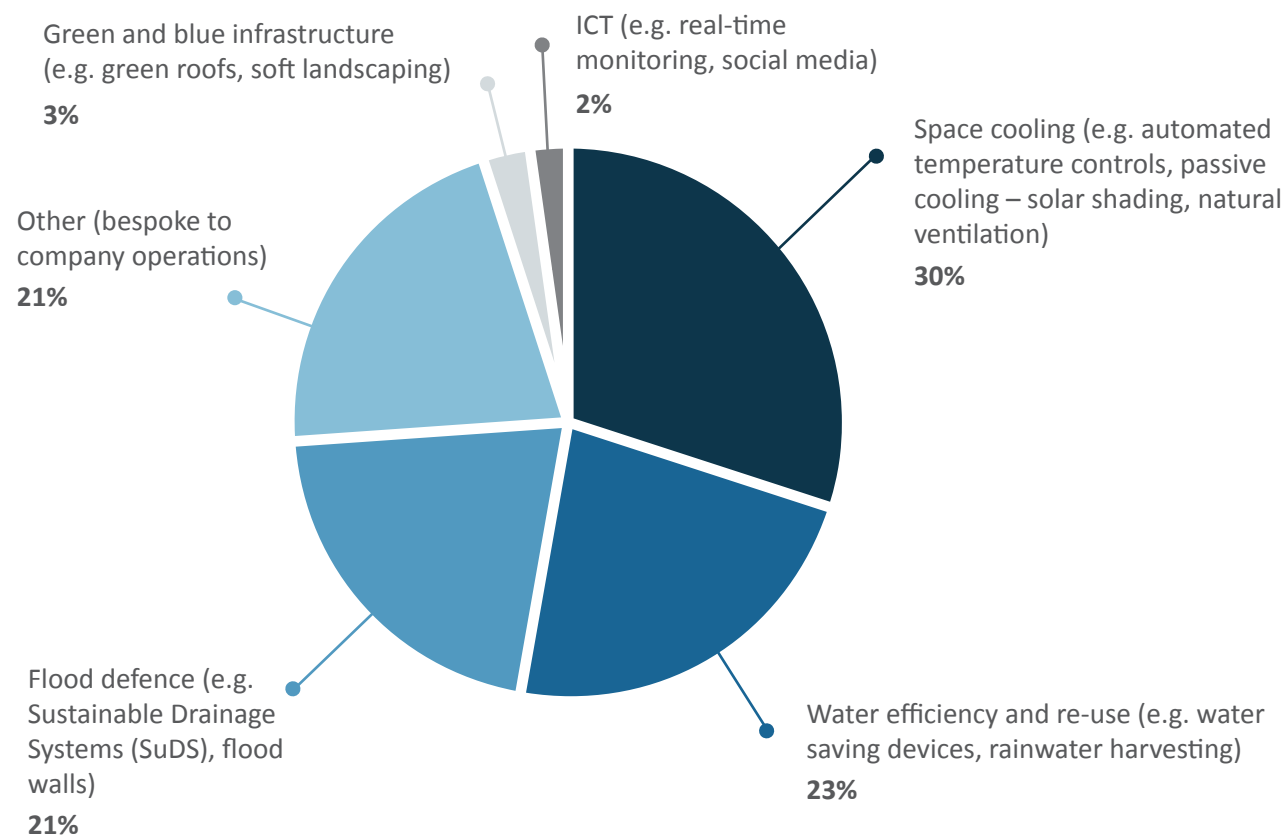


Many of these measures also offer wider benefits beyond purely cost saving; for instance with space cooling, one of the motivations frequently reported was creating a pleasant environment for workforces or property tenants.

## What technologies / products are businesses investing to address climate risks?

Figure 4

Source: CDP 2014 data



“ Climate change is already impacting on precipitation patterns, which has an impact on the availability and cost of water in our supply chain and to our operations. By managing our water use and identifying effective mitigation and adaptation activities, we may be able to reduce costs and gain a competitive advantage. ”

Example of action by Associated British Foods to reduce water use and the associated benefits

## Key Benefit 3: Reputational benefits

Many large multi-nationals have disclosed to CDP that they are observing an increase in shareholder interest on climate resilience and are responding accordingly. Demonstrating to shareholders that the impacts of climate change are being managed can provide reputational benefits.

Furthermore, some banks and other lenders are becoming increasingly interested in the potential impacts of climate change on their investment portfolios. For instance, 80 financial institutions are currently signatories to the Equator Principles,<sup>9</sup> which includes the specific requirement to manage climate change risks as part of their performance standards.

Some of the UK’s largest businesses, like SABMiller, Unilever and Marks & Spencer are working with overseas producers, NGOs, development partners, donors, and national and regional governments to build climate resilience and sustainability into their business and supply chains. They have made direct efforts to support growers, local communities, ecosystems and governments. These partnerships allow business to share the risks of working proactively on what is often a new area of focus for their risk, environmental or Corporate Social Responsibility staff.

<sup>9</sup> <http://www.equator-principles.com/index.php/members-reporting>

“ In the last few years, we have noticed an increase in the interest of investors about climate change and how the company is managing it. Their concern has not only to do with the impacts associated to climate change, but whether it is being considered as a risk by the company. Taking into consideration matters like climate change, which are not evident for all companies, sends a good signal to investors due that our risk management considers a broader spectrum of issues. ”

Example of shareholder interest in climate resilience, as described by Antofagasta

### Case study

*Diageo approach to develop a longer-term view of action on water management*

Diageo is a major beverage alcohol manufacturer, producing well-known spirits, beer and wine brands, such as Johnnie Walker, Smirnoff, Baileys and Guinness. They are a global company with global operations and products sold in more than 180 countries.

In 2014, Diageo developed new company targets to build resilience into their operations and supply chains to manage business risks that lie outside their direct control. They see great value in taking this approach, such as better security of water supplies for their factories, increased community support, better supply chain resilience and improved reputation.

Diageo also report that their resilience activities often do not create any additional costs. For example, their work with farmers to increase crop and water efficiency can be advanced within current business-as-usual budgets.

## Key Benefit 4: Competitive advantage

The ultimate prize for companies that are committed to building resilience is the opportunity to move ahead of their competitors. UK companies report that they are driven by opportunities to become more efficient, to reduce costs, and to provide greater value to customers.

Leading companies are preparing to capture the competitive advantages that accrue from more effectively managing climate risks and building internal capacity by developing skills, collecting information, and evaluating management options. These measures will position them to be able to learn, evolve and adapt in the long-term, and to thrive in the face of a changing climate.

## Where do the market opportunities lie?

An expanding and global market is developing for climate-related products and services, and forward-thinking companies are spotting this opportunity.

Market opportunities are not restricted or confined to any particular sector, suggesting a range of businesses could capitalise on the shifting market trends and gain first-mover advantage.

Some companies are already identifying tangible benefits.

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**62%** of  
the market  
opportunities  
identified by  
companies  
responding  
the CDP in  
2014 related  
to increased  
demand for  
existing and new  
products and  
services.

“ Planning of future proofing cities to ensure they can withstand global temperature variations is £10bn+ over 6 - 12 years (conservative estimation). Atkins has established a future proofing management team to pursue opportunities. ”

Financial estimate from Atkins of the market opportunity for consultancy services for resilient cities

“ Specialist advice will play an important role in developing appropriate mitigation and adaptation solutions for companies. The scale of the marketplace is vast. We have observed significant investment by individual companies, public sector bodies and trade organisations in terms of sustainability projects with fees ranging from tens of thousands to millions of pounds. ”

Financial estimate from KPMG UK of the market opportunity for climate-related services







## How big is the market for climate-related products and services?

Potential opportunities are considerable – in 2010/11, the global market was estimated to be £65.8 billion<sup>13</sup>. In 2011/12, UK companies are estimated to have generated £2.1 - £6.1 billion through sales of climate-related goods and services. This represents a growth in the market over recent years<sup>14</sup>.

In the UK, the public sector represents a large market for climate-related products and services<sup>15</sup>.

“ Interserve is one of the framework contractors on The Environment Agency’s current programme worth £500m over 4 years for flood defence, waterways and water resources work. With increasing risk of flooding due to climate change, there is an associated opportunity to build new flood alleviation schemes, extend existing schemes or innovate new models, e.g. service to provide regular construction of temporary flood defence. ”

Example of a company delivering climate-related services to the UK public sector (Interserve)

## Do UK businesses have the necessary skills?

Absolutely – UK businesses have considerable expertise in producing adaptation goods and services<sup>16</sup>. Building on their long-standing experience developing technologies and solutions in the domestic market, the skills and capabilities of UK businesses can be used to support a drive into global markets. Currently, the UK’s largest export market is Europe (50%), followed by the Americas (28%)<sup>17</sup>; these regions are likely to face similar climate issues to the UK, opening up the possibility of exporting highly transferable domestic solutions where strong trade connections already exist.

In parts of the world facing immediate climate challenges, for example water stress in sub-Saharan Africa and flood risks in Southeast Asia, opportunities exist for UK businesses to provide solutions to these critical challenges. Although most opportunities are in ‘hard’ engineering (e.g. technologies, construction and manufacturing), there has recently been an increase in the provision of ‘softer’ service solutions (e.g. consulting, asset management, governance and economic advice, and institutional capacity building)<sup>18</sup>.

However, it is important to recognise that the capacity of some countries to import products and services is limited. Many of the destinations for climate resilience exports are low-income countries that are exposed to climate change impacts. These countries also face other stresses, such as lack of finance, which could affect their capability to import<sup>19</sup>. This reinforces the message that ‘softer’ service solutions may gain more traction in these developing country contexts, until finance strategies for climate resilience are more mature.

## Case study

*Wealth of data available from the British Atmospheric Data Centre (BADC) for developers of innovative products and services*

Based in Didcot, Oxfordshire, the BADC helps UK researchers to locate, access and interpret atmospheric data. BADC is also the UK node for the Earth System Grid Federation – the repository for the world’s leading research and modelling on global climate change.

BADC see a significant future market for businesses, entrepreneurs and innovators to create ‘bridging’ tools. These include software that allows decision-makers to use and interpret BADC-held climate change projection datasets, and enabling them to plan for a changing climate.

## What actions are companies taking to capitalise on market opportunities?

Companies are taking a wide range of actions to take advantage of new climate-related opportunities (Figure 5). The top actions reported by companies to CDP are the adjustment of business plans and strategic focus to realign to new market demands. Creating innovative products is unsurprising also a frequently reported action. A high proportion of respondents recognised the need for stakeholder engagement, particularly with consumers. This suggests that companies are recognising the marketing and PR needs associated with climate-related opportunities.

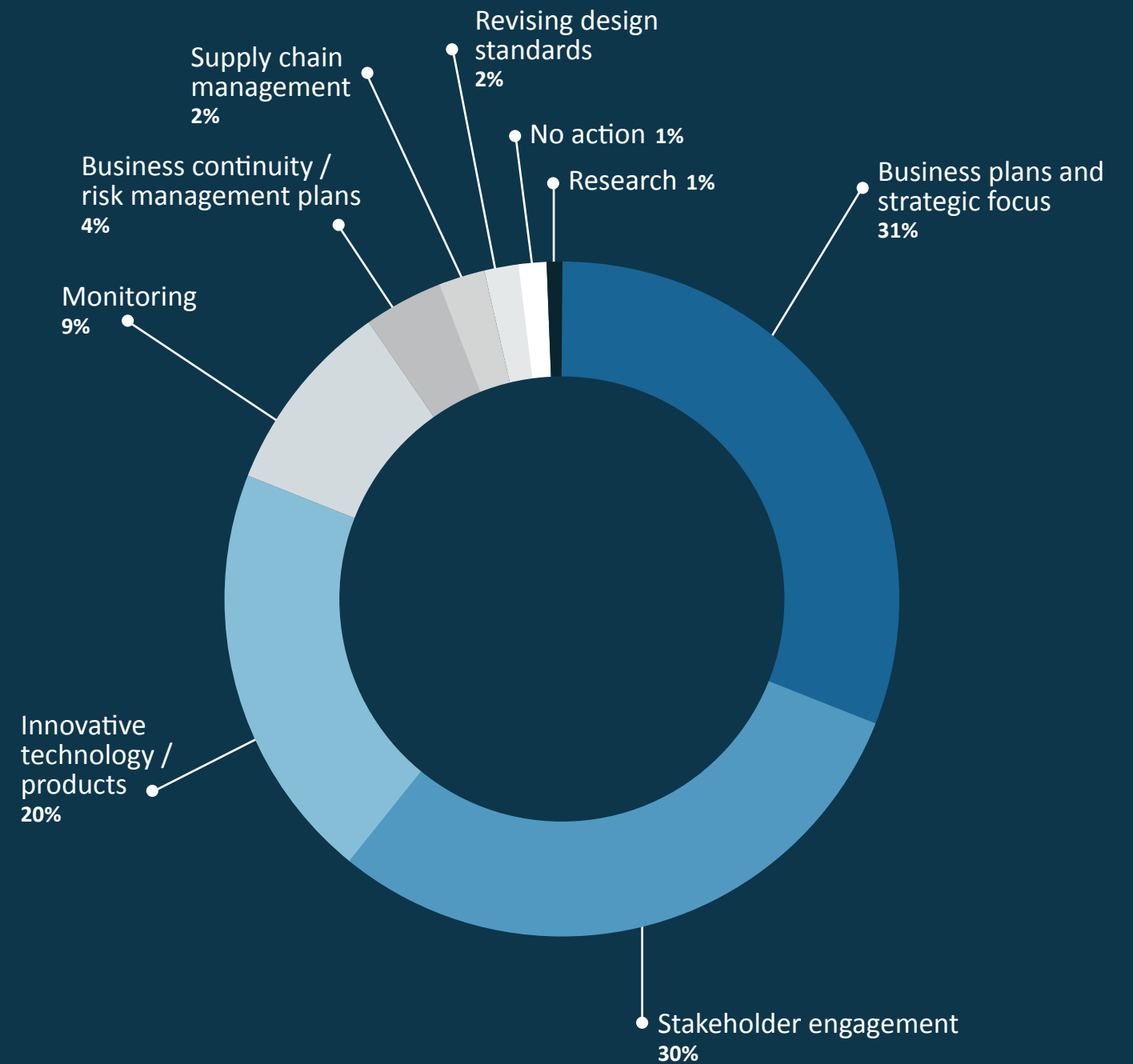
## Which companies are responding to market opportunities?

Businesses are spotting a range of market opportunities. They are not confined to any particular sector; however manufacturing, finance and insurance, construction, and professional, scientific and technical activities sectors are noticeably seizing the opportunities. An assessment of the growth potential for climate-related products and services across all sectors is provided in Table 1.

Amongst SMEs identifying market opportunities, the information and communications technology sector is leading the way in recognising a potential increased demand for existing and new products / services.

## Reported management methods to capitalise on market-related opportunities.

Figure 5



Source: CDP 2014 data



## MANUFACTURING

Manufacturers of products to support agriculture (e.g. agricultural fertilisers and pesticides), health care, and industry (e.g. process technology and specialist equipment) are identifying the most market opportunities within the sector.

“ Changes in mean temperatures would potentially provide opportunity for increasing sales in Croda’s Crop Care business: Changes in climate leading to increasing range of crop destructive insects and harder conditions would potentially lead to an increase in sales of insecticides, herbicides and fungicides. ”

Market opportunity for the manufacture of chemical products described by Croda

“ Extreme weather events could open up new markets for our fire protection and related products. This is anticipated in areas where climatic conditions become more extreme. For example, Australia, Africa and the Middle East. ”

Market opportunity for specialist equipment described by Morgan Advanced Materials

Innovation in manufacturing is being driven predominantly by an awareness of the threat of water scarcity.

The number of patents registered each year by UK companies for technologies used to manage the demand and supply of water increased by around 80% between 1990 and 2010<sup>20</sup>.

Water-related patents are being registered at a rate that exceeds the global average, highlighting how UK businesses already have a relative advantage in the development of these technologies<sup>21</sup>.



“ Water purification for industrial applications is a new business opportunity for Johnson Matthey. Driven by changes in rainfall patterns and reductions in underground water reserves, businesses that have high demand for water – particularly in the mining sector – are increasing requiring complex solutions for effluent treatment that will enable them to recycle water from their processes for re-use. ”

Market opportunity for water efficient products described by Johnson Matthey

### Case study

#### *Desolenator start-up tech innovator in potable water generation*

Desolenator is a start-up business that is responding to the immediate and long-term humanitarian need for potable water. Desolenator aims to provide water independence to 1 million people globally by 2020 using a patented water distillation method powered by integrated solar cells.

Climate-KIC funding and support has enabled Desolenator to flourish, and Desolenator believe London is one of the best places in Europe to develop climate services, given the quality of academic research, access to European funding and the potential to attract business investors.

## FINANCIAL AND INSURANCE

In 2013 and 2014, the proportion of market opportunities identified by the financial sector in their CDP responses increased from 12% to 18%. The opportunities identified included new products and services, investment opportunities, insurance premium price and increased market valuation. Many of the large multi-nationals responding to the CDP survey report year-on-year growth in revenue from their climate business streams.

The insurance industry can play a leading role in promoting and supporting adaptation to climate change. Climate-related insurance is a rapidly evolving and expanding global market. Insurance is an effective mechanism for businesses and individuals to pool and spread risks, and provides rapid access to post-disaster liquidity.

The insurance sector is taking action to develop internal capacity and skills to cater to the expanding market<sup>22</sup>. A leading industry programme, called 'ClimateWise',<sup>•</sup> has been established to promote good practice and sharpening the focus on climate risk management.

The other role the financial services sector plays is through direct investment in climate resilience. Although the main criteria for investment are a good rate of return, a number of these investments also deliver resilience co-benefits. The UK's financial services have the opportunity to innovate

<sup>•</sup> <http://www.climatewise.org.uk/>

to develop climate resilient financing mechanisms. These can help to increase access to commercial banks, bond finance, project finance and equity finance in developing countries<sup>23</sup>.

### Case study

#### *Environment Agency Pension Fund Climate Change*

The Environment Agency Pension Fund (EAPF) has over 40,000 members and assets of £2.9 billion. As part of "Good Money Week" in October 2015, the EAPF sent an important signal to the investment community regarding its intention to explicitly manage carbon- and climate-related risks and opportunities. This signal was a response to its fiduciary duty to act in the best long-term interest of its members and to deliver a truly sustainable and climate compatible pension fund.

An important set of new climate-specific principles were adopted by the fund, that has driven significant action. For example, the fund undertakes due diligence of investments in climate sensitive assets such as property, forestry and infrastructure; and on-going monitoring in emerging markets, where adverse and changing weather patterns pose significant risks to financial returns. The fund is also seeking to ensure that companies in which the fund invests (through the listed equity market) are managing their own resilience; particularly those that are dependent on extensive global supply chains.

For more information, see the EAPF website [www.eapf.org.uk](http://www.eapf.org.uk)

“ Insurance opportunities for HSBC include weather insurance, such as crop and forest protection, Alternative Risk Transfer – transferring climate risk through greater use of capital markets e.g. catastrophe bonds; climate related micro insurance, such as coverage for low-income populations without access to traditional insurance, or responding to food and water shortages in rural areas of South America, Africa and Asia. ”

Market opportunity for insurance products and services described by HSBC

“ Increased potential for flood risk through changing patterns of precipitation are affecting investment decision-making. The limited exposure of our portfolio to flood risk is a clear investment advantage. ”

Market opportunity for offering climate resilient investments described by Hammerson

“ Changes in precipitation will require the development of services and technologies that can cope with the impacts of this on the environment, society and the economy. This is likely to provide Impax with a greater number of potential investment opportunities, for example in the areas of water treatment, flood/drought control and irrigation technologies. ”

Market opportunity for direct investment in climate resilience described by Impax Environmental Markets





## CONSTRUCTION

In 2014, 10% of the total market opportunities identified in CDP responses came from companies in the construction sector, an increase of 4% from 2013.

Market growth in the sector stems from the increasing recognition that the built environment faces a variety of challenges from a changing climate, including overheating and flood risks.

Opportunities exist for climate resilience to be incorporated into new developments, both in the UK and overseas. In the UK, the Code for Sustainable Homes aims to increase the environmental performance of homes, above building regulation standards. Compliance will improve water efficiency, insulation and management of surface water run-off in new homes. The requirement for both public and commercial buildings to be zero carbon from 2018 and 2019 respectively will also enhance building resilience across all buildings<sup>24</sup>.

The increasing trend toward urbanisation, particularly in developing economies, means that cities and urban areas will need to be designed and engineered to cope with gradual changes in climate and more frequent extreme weather events. Adaptation engineering and construction skills and use of green infrastructure (i.e. networks of open space, parks, green roofs etc.) is predicted to be a growth area over the next 5-20 years<sup>25</sup>.

In the UK, the retrofit market provides large opportunities due to the sheer size of the existing building stock. There is significant potential for innovation in developing new materials, products and services to address aspects of climate change in buildings<sup>26</sup>. Retrofit solutions include insulation, ventilation, flood protection and water saving.

“ Changes in mean temperature are likely to affect material durability, increasing the corrosion of steel, increasing the carbonisation of concrete and accelerating the deterioration of timber. This is likely to increase the opportunities for infrastructure and building maintenance contracts. At the same time risk management measures will have to be incorporated into the design of new projects for future changes in mean temperature providing scope for increased revenues to be generated from future projects. ”

Market opportunity for climate resilient construction described by Balfour Beatty



## PROFESSIONAL, SCIENTIFIC AND TECHNICAL ACTIVITIES

Companies undertaking professional, scientific and technical activities display a high degree of awareness of market opportunities for climate-related products and services. Across both 2013 and 2014 CDP responses, opportunities identified by this sector constitute roughly 12% of the total number identified.

Architectural and engineering firms and management consultancies are the major players. The former group are strongly linked to the construction sector and face similar market opportunities, around design for new developments and retrofitting existing building stock.

### Case study

#### *NIRAS insight on the UK flood risk consulting market*

Since 2011, NIRAS, the Danish-headquartered engineering and environmental consulting firm, has had a presence in the UK, principally serving the offshore renewable energy industry.

NIRAS UK sees an opportunity to respond to an increasing demand from their customers to manage flood risks associated with the increased frequency of 'cloud burst' extreme rainfall events. 'Cloud burst' events can cause significant impacts through surface water flooding, often unconnected to rivers, lakes and coastlines. Climate change is increasing the intensity of these events in the UK<sup>27</sup>. NIRAS cites examples such as the 2014 surface water floods at Canvey Island in Essex, where sewers and surface water drainage systems were overwhelmed when over one million cubic metres of water fell within the space of four hours – creating almost enough water to fill Wembley Stadium<sup>28</sup>.

Beyond the UK, there is also a strong export market for companies offering technical advisory and engineering services abroad.

“ The built environment will need to adapt accordingly with the expected physical changes from climate change...Roads and railways in Africa and the Middle East may need to be redesigned or upgraded within the next 20 years to withstand higher temperatures. Buildings around the world may have to be redesigned to withstand more extreme weather events over the next 10 years. Atkins has a number of operating divisions primed to identify opportunities and provide support... ”

Market opportunity for climate resilient infrastructure both in the UK and overseas described by Atkins

Management consultancies are also seeing increased demand for their services, in terms of the provision of advice to private, public and third-sector clients on climate resilience. A number of such companies commented to CDP that they are also experiencing an increasing revenue stream from donor-funded organisations in recent years.

### Case study

#### *Reflections from Dan Dowling (Climate Specialist at PwC) on the domestic and international consulting market*

As a specialist advisory function, PwC see the international market for climate services as being of particularly important, as the UK is a net importer of climate change risks through international supply chains and global investments.

In addition to assisting the private sector, PwC recognise an important market in helping their public sector clients and cities to assess climate impacts and then prioritise and implement appropriate adaptation action.

Since 2010, PwC have been managing the Climate Development Knowledge Network (CDKN) on behalf of the UK Department for International Development. CDKN has commissioned and overseen hundreds climate change projects with a total expenditure of over £100 million.





# Assessment of growth potential for climate-related products and services by economic sector

Table 1 - Part I

Sectors	Example products and services	Example company	Level of expertise	Assessment of growth potential
Accommodation and food services	Increasingly popular tourism destinations and services (e.g. in the UK and northern Europe) Supplying food products and services that responds to a shifting customer demand for alfresco-orientated food experiences	Thomas Cook	●●●●●	Medium
Administrative and support services	Climate-related disaster and emergency response services Building and infrastructure management services ensuring climate resilience (e.g. water management, pest control)	G4S	●●●●●	Medium
Agriculture, forestry and fishing	Development of drought resistant seeds and opportunity to diversify into new crop varieties Advisory services to support growers in UK and internationally	Bayer	●●●●●	Medium
Construction	Climate resilient solutions for existing and new buildings / infrastructure, including insulation, ventilation, flood protection and water saving	Balfour Beatty	●●●●●	High
Education	Learning services to support increased awareness and knowledge of climate change, and management courses to train public and private sectors on how to respond to a changing climate	Ashbridge Business School	●●●●●	Low
Electricity, gas, steam and air conditioning supply	Opportunity to supply space cooling technologies, and particularly for domestic use Energy efficient heating and cooling	SSE	●●●●●	High
Financial and insurance activities	Climate-related disaster and emergency response services Building and infrastructure management services ensuring climate resilience (e.g. water management, pest control)	Catlin group	●●●●●	High

# Assessment of growth potential for climate-related products and services by economic sector

Table 1 - Part II

Sectors	Example products and services	Example company	Level of expertise	Assessment of growth potential
Information and communication	Complex data harvesting, management and information provision (e.g. tracking of climate trends and their impacts on business performance) Design and management of support networks and applications for on-premises and cloud-based computing	BT Group	●●●●●	Medium
Manufacturing	Water efficiency technology Chemical products (e.g. fertilisers and home products) Development of climate resistant materials	Johnson Matthey	●●●●●	High
Mining (including oil and gas)	Provision of raw materials and derived products to supply climate compatible developments (e.g. infrastructure projects)	Aggregate Industries Ltd	●●●●●	Low
Professional, scientific and technical activities	Architectural and engineering services around the design of new developments and retrofitting existing building stock Management consultancies providing advice to public, private and third-sector clients on climate resilience	Amec Foster Wheeler	●●●●●	High
Real estate activities	Real estate with higher “sustainability credentials” for climate conscious clients	Unite Students	●●●●●	Medium
Transportation and storage	Cold storage and increased provision of chill chain logistics	Dearman	●●●●●	Low
Water supply; sewerage, waste management and remediation activities	Provision of water saving technologies Water reuse and recycling technologies Trading agreements between water suppliers	United Utilities	●●●●●	High





# 3.

## CONCLUSIONS



## Flooding and heatwaves are set to become more common as the climate changes.

Businesses are counting the costs of today's extreme weather and identifying future climate risks. Sectors particularly exposed to climate risks include those operating large or long-lived fixed assets (e.g. water supply, mining and quarrying, infrastructure), reliant on climatically sensitive raw materials (e.g. food and beverage manufacturing) or with complex supply chains (e.g. manufacturing of pharmaceutical products).

## Companies recognising that the risk landscape is changing and are taking action to increase their business resilience.

85% of the direct physical risks identified had a corresponding risk management action in place. Those companies who do not recognise that the risk landscape is changing will face increasing exposure to weather- and climate-related disruption and damage.

## Planning now for the impacts of severe weather and a changing climate makes good business sense.

There are a range of benefits available to those companies building climate resilience, including improved business continuity, cost saving, reputational benefits and developing a competitive advantage. For instance, if businesses can keep trading during severe weather they will not only retain customers, they may have the chance to win new ones. Businesses are recognising that they can use many of their existing tools and practices to manage the potential for changing climate impacts; 34% of the risks identified by CDP respondents are being managed in this low-cost, business-as-usual approach.

## Businesses are managing the costs of severe weather like any other business risk.

Building climate resilience does not necessarily require additional expenditure; 47% of the risk management methods identified involved no additional cost / negligible costs for the business. Businesses that manage risk well, including the risks associated with a changing climate, are likely to be more financially resilient and more attractive to investors. Many of the large multi-nationals have reported to CDP that they are already observing an increase in shareholder interest on climate change, including issues of resilience, and are responding accordingly.





## Market opportunities are being recognised across a wide range of sectors and there are businesses who are gaining a competitive advantage.

62% of the market opportunities identified related to increased demand for existing and new products and services. From the CDP data, sectors identifying the highest number of market opportunities are manufacturing (e.g. water efficient products), financial and insurance (e.g. insurance and direct investment in climate resilience), construction, professional, scientific and technical activities (e.g. incorporating climate resilience into new developments and existing infrastructure) and information and communication (e.g. cloud-based computing to promote remote working).

## There is a significant export potential for UK businesses offering adaptation products and services.

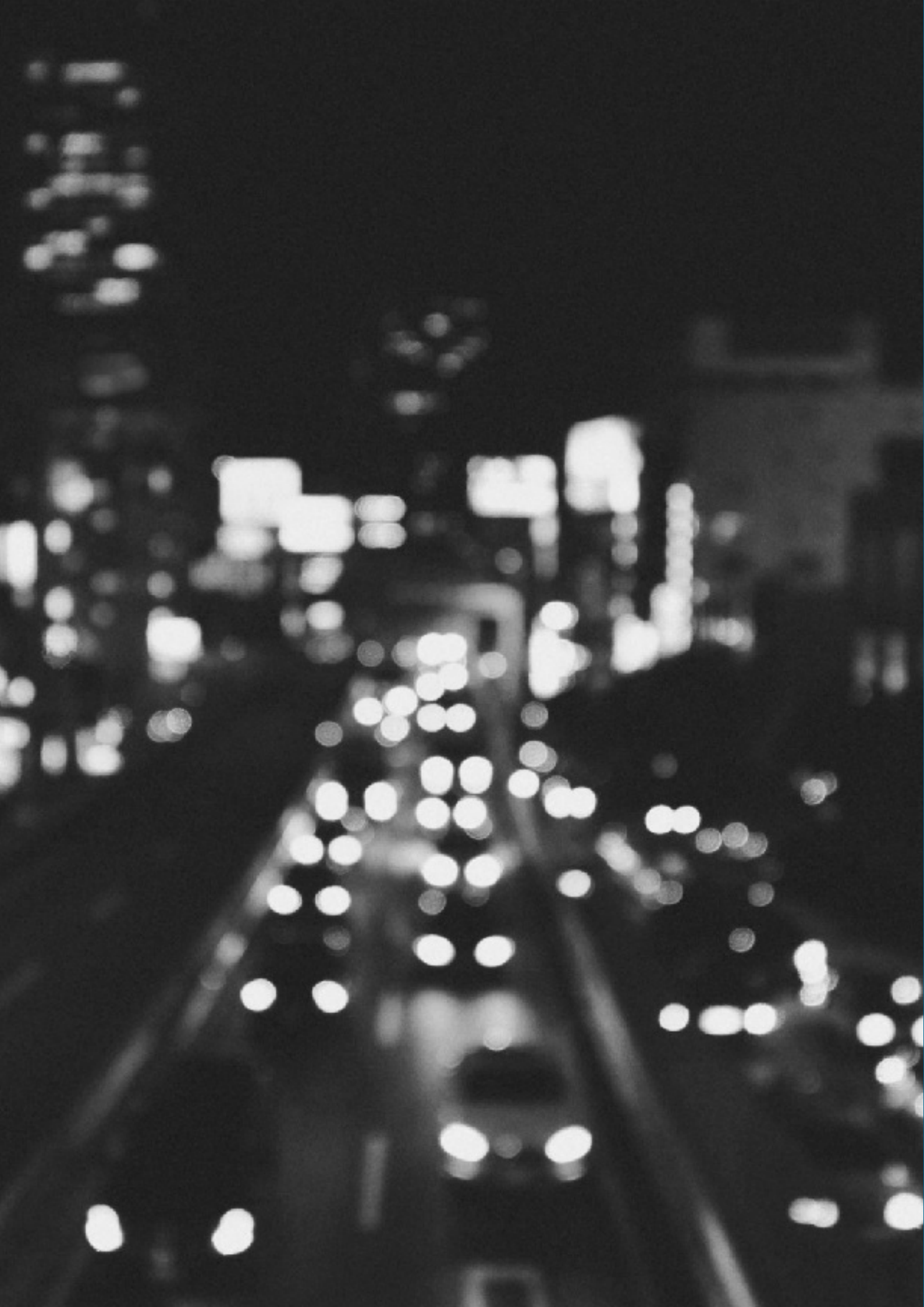
The CDP data highlights the fact that many of the companies operating in low carbon markets also offer adaptation-related technologies and services. As an example, studies have shown that the capital flows required to help developing countries alone adapt to climate change will be tens of billions of US dollars per year<sup>29</sup>, where advisory services and adaptation products and technologies will be in high demand.

## Support is available for businesses seeking to build resilience and take advantage of the opportunities from a changing climate.

UK firms can gain advantage in adaptation markets through good R&D infrastructure, a world class services sector, strong supply chain capabilities and an increasingly robust adaptation policy framework. Companies in the UK have access to a wealth of climate data and decision-support tools, through the Environment Agency Climate Ready Support Service, **Climate UK**, amongst others.

There is also a growing array of new funding opportunities for UK businesses and entrepreneurs to develop market opportunities in climate resilience. These funding windows include UK, European and multilateral public and private initiatives, as well as capital markets and philanthropists. Finally, there are an increasing number of business-focused groups and networks and capacity building programmes, so businesses are not alone in their journey to increased business resilience or development of their climate-related products and services offerings.





# 4.

## NEED FURTHER HELP?



## Information

The Environment Agency **Climate Ready Support Service** provides advice and support to businesses, the public sector and other organisations on adapting to a changing climate. The service aims to help organisations build their own capacity to adapt, incorporating climate risk management into their business decision making. Climate Ready provides tools and guidance that support businesses through the issues they need to consider to increase resilience to severe weather and a changing climate. This includes simple factsheets outlining practical things to do, and more sophisticated risk assessment methods for larger more complex aspects, such as supply chains.

### The Business Resilience Healthcheck

A tool designed to help businesses increase their resilience to a range of potential risks, including climate change and extreme weather. It helps identify the most vulnerable parts of a business and prompts action.

### Climate Change Adaptation: building the business case

Guidance developed by Institute of Environmental Management & Assessment (IEMA) specifically for environment and sustainability professionals needing to understand and build support for climate change adaptation in their business. It is based on direct experience of practitioners who have worked on adaptation and resilience to climate change and extreme weather.

### Adapting to climate change using a business continuity management (BCM) system

A practical guide to help business continuity professionals understand and manage severe weather risks as part of their existing BCM system. The guide sets out a series of tasks in requirement with ISO 22301; enabling organisations to improve their ability to deal with weather related disruptions. Developed by BSI in partnership with the CRSS.

### Adaptation Wizard

A 5-step process to help organisations assess their vulnerability to current climate and future climate change, identify options to address key climate risks, and help develop and implement a climate change adaptation strategy.

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

A workshop aide that will help companies to conduct a workshop to explore the implications of climate change for your business or sector. It can be used by any size of business or organisation, and considers opportunities as well as the threats posed by our changing climate.

### Supply chain guidance

This guidance explains the unique vulnerabilities facing supply chains and shows how businesses can set about increasing their resilience by making targeted changes in their supply chain operations.

### Sector specific guides

Guidance for regulated sectors of industry. Guides are available for the [paper and pulp](#) sector, the [food and drink](#) sector and [chemical](#) sector.

**Climate UK** and their network of Climate Change Partnerships (CCPs) provide local support to help businesses, councils, communities and other organisations adapt to a changing climate. Climate UK also hosts a range of useful online tools and resources.

The **UK Climate Projections (UKCP09) website** is the leading source of climate information for the UK and its regions. UKCP09 can be used to help organisations assess potential impacts of the projected future climate and to explore adaptation options to address those impacts. For information on physical impacts of climate change overseas, the **Met Office** has developed a series briefing notes for more than 20 countries.

In terms of specific hazards, the Environment Agency is responsible for managing the risk of flooding from main rivers, reservoirs, estuaries and the sea, and provides a series of informational services, including **flood maps** and **flood warning services**.

## Finance

Although to-date most private finance support for climate action has focused on mitigation/low carbon projects, there is a growing array of new funding opportunities for UK businesses and entrepreneurs to exploit market opportunities in investing in climate resilience/adaptation. These funding windows include UK, European and multilateral funded initiatives, as well as capital market and philanthropists.

## Networking

Recognising that an effective way of developing business resilience is through partnership working and networking, several cross-sectoral and sector-specific groups have developed, including the **World Business Council on Sustainable Development**, **Aldersgate Group**, **CBI Energy and Climate Change Network** and the Environment Agency guided **Infrastructure Operators Adaptation Forum**. These groups facilitate information sharing and engagement with policy-makers.



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Authored by:

Alastair Baglee, Anna Haworth and Richenda  
Connell, Acclimatise

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For further information

Email: [enquiries@environment-agency.gov.uk](mailto:enquiries@environment-agency.gov.uk)