

# Titans or Titanics?

Understanding the business response  
to climate change and resource scarcity



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# Preface

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Since the industrial revolution private enterprise has completely reshaped the world in which we live. Large businesses bring together the productive capacity and access to financial capital which can transform the world at scale and at speed.

Businesses have proven to be highly effective at meeting the needs and wishes of a growing and increasingly affluent global population. However, as a result, our society now faces critical challenges from climate change and resource scarcity.

Businesses will shape and be shaped by the needs and impacts of a sustainable, low carbon future. Will these corporate titans capture commercial opportunities, allowing them to survive and thrive in a changing climate?

Or much like the Titanic, do the unsinkable ships of the business world only see the tip of the iceberg, and are they running full steam ahead into dangerous waters?

This report seeks to understand and explain how large businesses are responding to climate change and resource scarcity today, incorporating insights from qualitative interviews with industry experts, alongside independent market research into the views of global corporate leaders. It also details the Carbon Trust's practical framework for assessing and quantifying the long term opportunity and risks related to climate change and resource scarcity.

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# Key findings

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- **Businesses' action on environmental sustainability today is significantly short of what is required to address the serious challenges of climate change and resource scarcity.** But businesses appear to be acting rationally on this issue, as current market signals from consumers, governments and investors are not sufficiently strong.
- **There is common consensus around what will be required by businesses to address climate change and resource scarcity.** 70% of global business leaders surveyed are confident that action taken by consumers, governments, and investors will force the change to an environmentally sustainable future.
- **Climate change and resource scarcity will require businesses to make changes.** 76% of executives see bottom line risks from direct impacts of climate change, and 84% see business opportunity in an environmentally sustainable future. Half believed they would have to fundamentally change their products, services, or business models if drivers for environmental sustainability become strong.
- **Businesses are optimistic they can achieve the transition to an environmental sustainable future, which may suggest overconfidence.** Of those that see the need to change, 81% are confident in their abilities to succeed. And amongst those that claim to be aware of how they compare with competitors on environmental sustainability, 99% believe they are at least average for their sector, with half seeing themselves as leaders.

- **Businesses are living in two realities: although they recognise and accept there will be risks and opportunities that will impact company value, they continue to focus on the short term.** Despite a recognition of the likely need to change, businesses lack a clear vision of how this transition will be achieved beyond the business planning horizon.
- **There is a failure of governance from corporate boards, who need to better address uncertainty around the future risks and opportunities from environmental sustainability.** There is also a lack of available frameworks or tools to help boards and senior executives to effectively assess and quantify value at stake. The Carbon Trust has developed a methodology to assist with this process.

“The report highlights the dichotomy of the two realities acknowledged by most businesses – the needs which must be met today, while beginning on what is often still a relatively modest process of change, and the very much more radical changes needed if we are to meet what can sometimes seem still distant challenges. This gap in perceived realities has closed only modestly over the last twenty years. Closing it at the required speed will regard unprecedented alignment and combined action by business, investors, governments and consumers. No one group can achieve progress without the support of the others.”

Sir Mark Moody-Stuart, Chairman of the Foundation  
for the UN Global Compact



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# Contents

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Key findings.....	2
1.1 A global challenge on an unprecedented scale.....	6
1.2 A difficult question about the future of business.....	8
2.1 Business: a problem and a solution.....	9
2.2 Understanding business behaviour.....	10
2.3 Businesses accept the need to address sustainability issues.....	12
2.4 Businesses believe that change is coming.....	16
2.5 Business perceptions are at odds with reality.....	19
2.6 Businesses recognise two realities.....	23
2.7 The role of company boards.....	24
3.1 A framework to assess and quantify business value at stake.....	26
3.2 Suggested questions to assess company value at stake.....	29

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# 1.1 A global challenge on an unprecedented scale

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The environmental and development challenges the world faces from climate change and resource scarcity are real and growing. Addressing them successfully will require sustained, proactive effort across all parts of the economy. The alternative is for society to adapt to the heaviest, unmitigated, direct impacts of climate change, although this approach is likely to be far costlier than proactive mitigation and adaptation.

To avoid dangerous climate change, there is global scientific and political agreement that temperature rises should be limited to no more than 2°C above pre-industrial levels. Beyond 2°C the chances of feedback loops increase significantly, which would take warming beyond our influence and lead to extremely unpredictable and cascading risks in the future.

To avoid this the carbon intensity of the global economy will need to decrease by around 6.2% each year through to 2100. Between 2000 and 2014, however, global carbon intensity fell by an annual average of less than 1%. In other words, there is a huge gap between what needs to happen and what is actually happening.

**“[B]usiness-as-usual trajectories of greenhouse gas emissions give rise to potentially large impacts on growth and prosperity in the future, especially after 2100. Indeed, these impacts are large enough to feed back into future emissions via reduced activity but the feedback is too small and too late for the system to self-regulate. Thus, [the case for] optimal emissions control is strong and strongly increasing.”**

Dietz & Stern, 2014

“We agree that deep cuts in global emissions are required according to science, and as documented by the IPCC Fourth Assessment Report with a view to reduce global emissions so as to hold the increase in global temperature below 2 degrees Celsius, and take action to meet this objective consistent with science and on the basis of equity.”

Copenhagen Accord, 2009

The cost between 2010 and 2050 of adapting to an approximately 2°C warmer world by 2050 is in the range of **\$70 billion** to **\$100 billion** a year.  
World Bank, 2010

The cost of reactively adapting to these direct impacts in the future is expected to be significantly higher than the cost of taking proactive mitigation steps today. On a global level the benefits of strong, early action on climate change considerably outweigh the costs. Unmitigated climate change could cost the world between 5-20% of GDP each year by 2050, whilst the cost of reducing emissions could be limited to around 1% of global GDP a year.

But climate change is not the only challenge to business-as-usual. As the global population grows and becomes more affluent, the current rates of consumption and depletion of finite energy and natural resources are in many cases unsustainable. This doesn't just impact on economic development, it also means that we are starting to reach or surpass the safe boundaries of local and planetary ecosystems.

Perhaps the greatest challenge exists in freshwater availability, where there are rapidly increasing and competing demand from communities, industry and agriculture.

According to the World Economic Forum's Water Resources Group there may be a 40% gap between anticipated demand and the safe and available supply by 2030, under a business-as-usual scenario.

"We estimate that in a plausible worst case for climate damage the value at risk in 2030 may be equivalent to a permanent reduction of between **5%** and **20%** in portfolio value compared to what it would have been without warming. This risk can be substantially lowered by a rapid energy transition to reduce greenhouse gas emissions."  
Covington & Thamotheram, 2015

**"The unprecedented pace and scale of economic development in emerging markets means demand for resources is surging, and prices for most resources have risen since the turn of the century. Resource price inflation—and volatility—could increase as new supplies of some resources become more expensive to extract, resource prices become more linked, and environmental spillover effects impact crop yields and the availability of water. These trends could fuel protectionism and political unrest."**  
McKinsey Global Institute, 2011



## 1.2 A difficult question about the future of business

If business-as-usual cannot continue then what does that mean for businesses? How will they have to change and what role will they have to play in a future economy? In this report, the Carbon Trust seeks to answer these questions. It examines the business response to climate change and resource scarcity and how this may change over time.

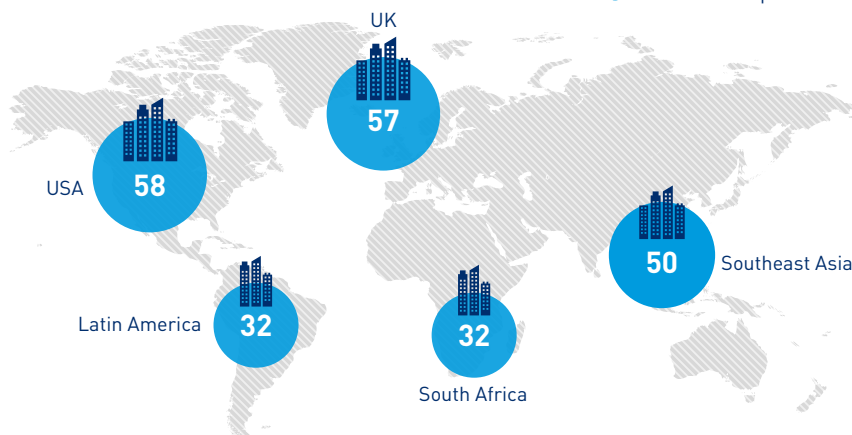
To inform this report an initial series of in-depth interviews and roundtable sessions were carried out over a six month period with a range of experts from business, finance, government, academia and civil society. This was supported by independent market research conducted by Future Thinking in February 2015, surveying 229 business leaders across the UK, USA, South Africa, Southeast Asia and Latin America.

Respondents were board-level executive decision makers from large companies. Approximately two-thirds of companies surveyed had over 1,000 employees and an annual pre-tax turnover of £100 million or more.

Finally a period of engagement was undertaken with a further set of experts, testing preliminary conclusions, as well as a framework developed by the Carbon Trust to assess and quantify business value at stake from climate change and resource scarcity.

Insights from research are set out below, followed by an overview of the methodology behind the framework, and a suggested list of questions that can be used to begin the practical process of understanding issues that might impact upon company value.

● Number of respondents



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## 2.1 Business: a problem and a solution

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Economic growth, built on abundant and cheap natural resources, has put our society on a dangerous trajectory. But with the right incentives and market conditions, business can play the central role in building a sustainable, low carbon future.

The case for collective action to address societal risk on climate change and resource scarcity is strong. At a global level the quantified benefits of strong action considerably outweigh the costs.

For individual businesses however the case for action may not be so compelling. And risks can appear to be greater than the opportunities.

Business has a crucial role to address this environmental challenge. Indeed, only business can bring together the productive capacity, technical capabilities and financial capacity to build a sustainable, low carbon economy within the required timeframe. However, while businesses are making measurable progress in improving their sustainability, the majority are still not doing enough.

“Effective mitigation will not be achieved if individual agents advance their own interests independently.”  
IPCC AR5 WG3 Summary for Policymakers, 2014

**A 2013 analysis published in the journal Climatic Change identified that more than 40% of all cumulative worldwide emissions of industrial CO<sub>2</sub> and methane between 1751 and 2010 can be attributed to just 50 investor-owned entities and nine state-owned enterprises.**

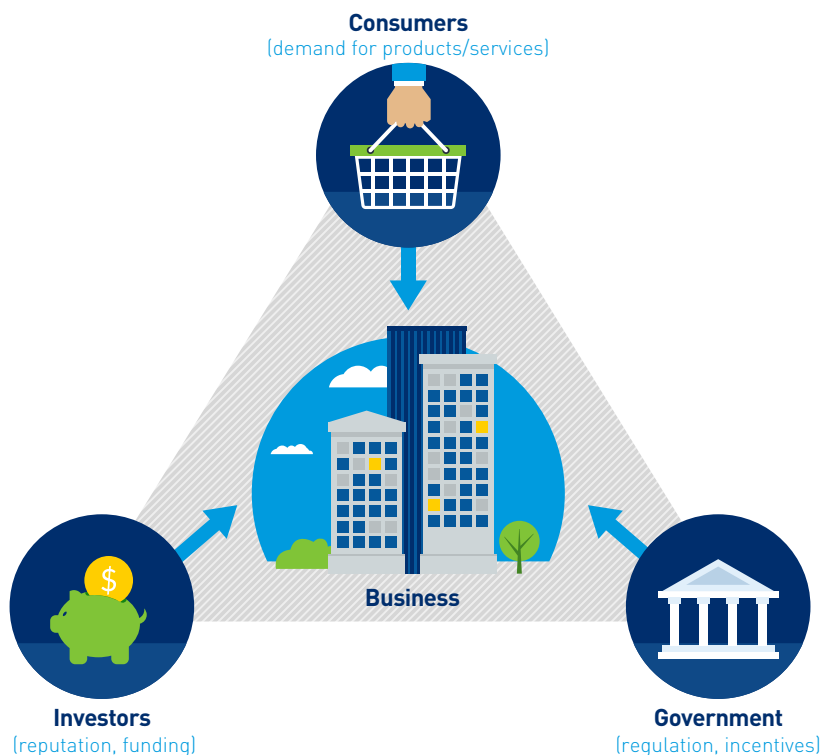
## 2.2 Understanding business behaviour

Whilst many companies realise that they will be impacted by unsustainable behaviour in the long term, and will need to face the costs of adapting to the direct environmental impacts and regulatory and market changes that result from this, few appear to be taking strong action today.

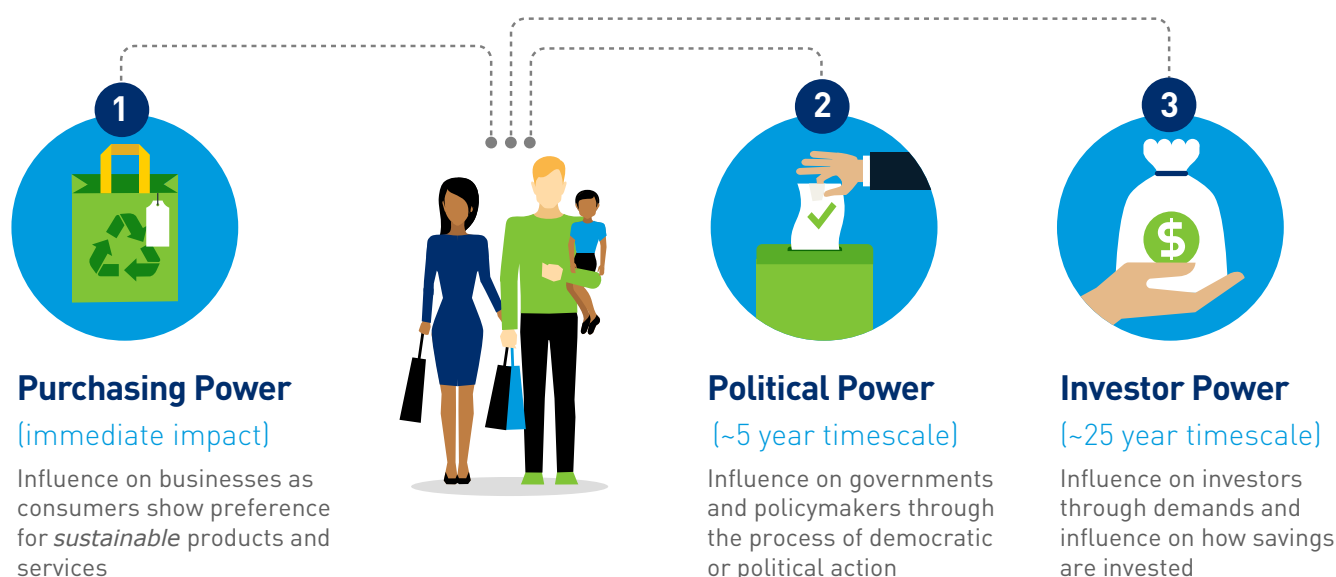
The Carbon Trust's research has helped to explain why this is the case. Qualitative interviews focused on understanding what lies behind business decision making on climate change and resource scarcity.

The overwhelming majority of businesses were seen to operate as rational entities with the purpose of maximising shareholder value. If market signals are strong, businesses mobilise accordingly to exploit opportunities and mitigate risks. This suggests that if businesses are not taking strong action today, the market signals cannot be sufficient.

So what are these market signals? At the highest level, strategic decision making within a company looks at how to take advantage of opportunities and mitigate risk, taking into account the likely requirements of three key constituencies: government, investors and consumers.



## Three Dimensions of Consumer Power



Of the three constituencies, consumers have the greatest potential impact, since they do more than just directly influence businesses today through their purchasing decisions. They also directly and indirectly influence government and investors, setting the context and providing the mandates for their decision making over longer timescales.

Governments set market parameters to create a framework for sustainable businesses through policies, regulations, standards and incentives.

Investors allocate capital to maximise expected returns over set time periods, influencing businesses by altering the available capital flows for different types of project. In doing so, they will consider the influence of governments and consumers as prime drivers of business performance.

Whilst some drivers will be more important than others – and their relative importance will vary depending on external circumstances – together they largely determine the success of a business. With weak demand, limited capital and an unfavourable regulatory landscape then a business will fail. And it appears today that consumers, governments and investors together do not provide sufficient incentive for businesses to take the necessary action to address climate change and resource scarcity.

In order to understand the efforts and motivations of businesses today, the Carbon Trust's independently-conducted market research asked how corporate leaders perceive the current drivers for action on sustainability.

## 2.3 Businesses accept the need to address sustainability issues

The first question in the market research tested whether there was common definition amongst corporate leaders on the meaning of environmental sustainability within a business context. This found a surprisingly strong consensus on what an environmentally sustainable business should be doing today, and how it will change over the longer term.

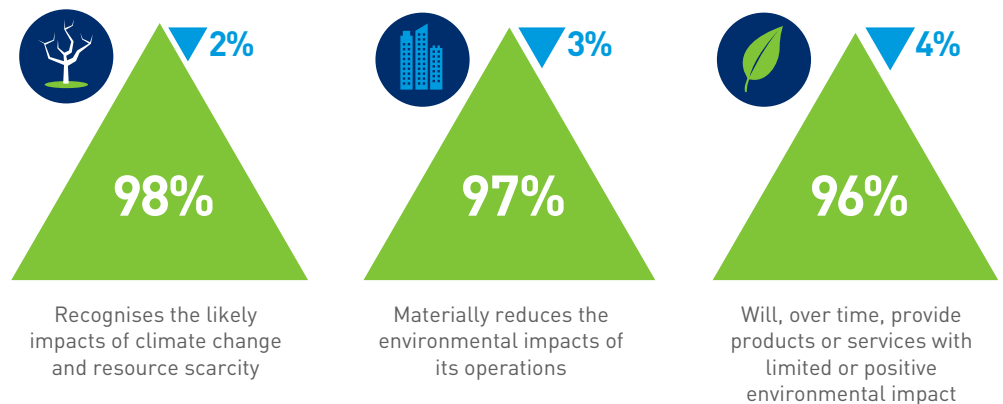
This is in line with other studies and surveys of business leaders which demonstrate that the vast majority accept the reality of the science behind the challenges.<sup>1</sup>

There is also a general perception that risks from climate change pose a direct

threat to the bottom line for business, either today or in the future. It is notable that two regions that have both recently suffered direct impacts of extreme weather events – the USA and Southeast Asia – have different perspectives on the issue.

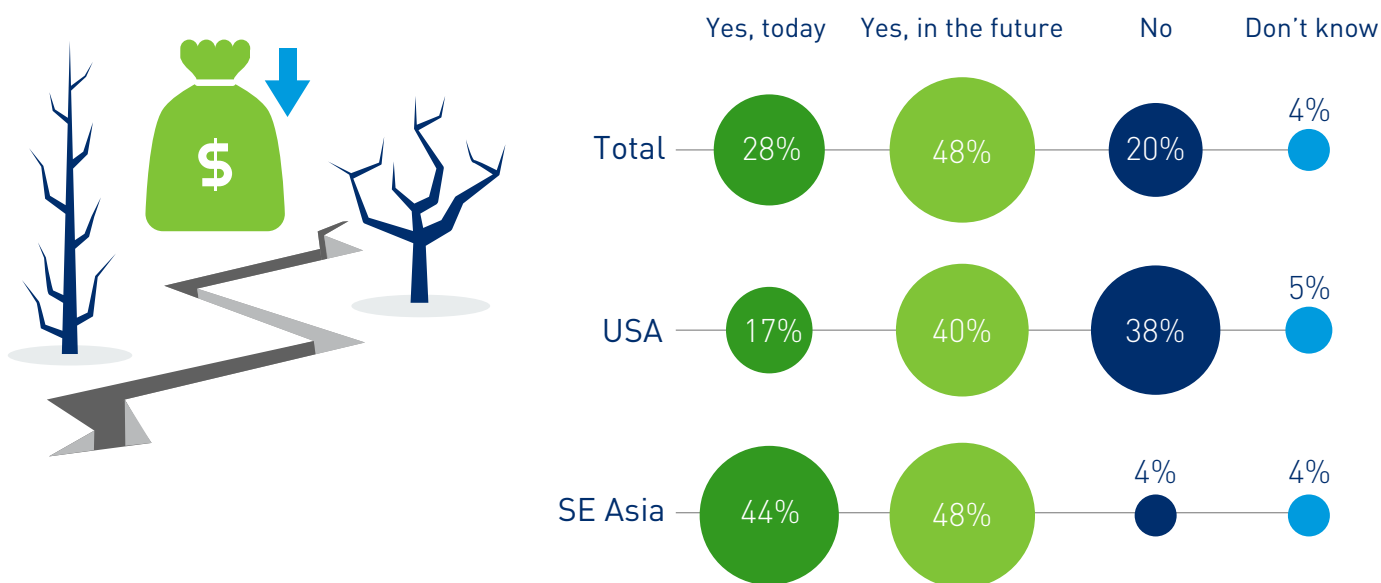
Do you agree or disagree that an environmentally sustainable business...?

● Agree ● Disagree



<sup>1</sup> See, for example, the *UN Global Compact-Accenture CEO Survey*, *BSR/GlobeScan State of Sustainable Business Survey*, *McKinsey Global Survey* on sustainability, and the *Sustainability & Innovation Global Executive Study* from the MIT Sloan Management Review, The Boston Consulting Group, and the UN Global Compact.

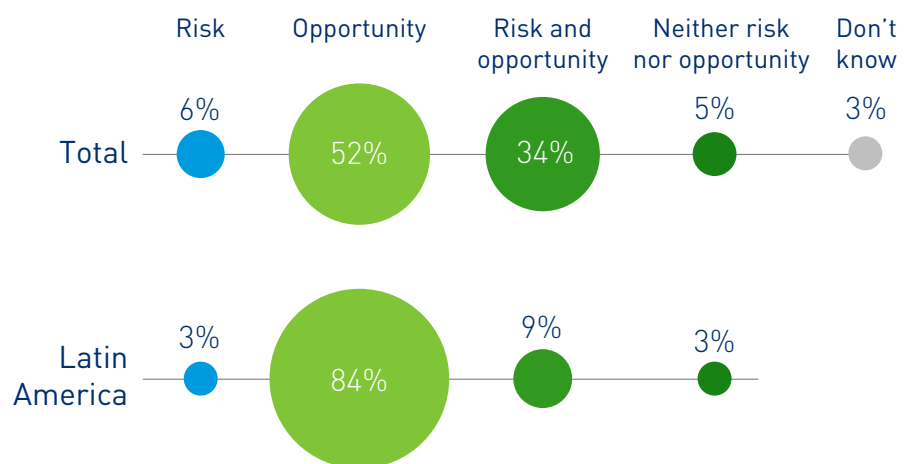
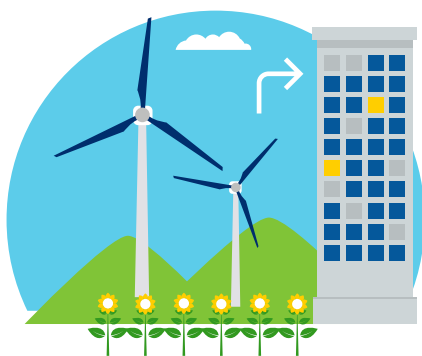
Do you see bottom line risks to your business from the direct effects of climate change (e.g. extreme weather, water stress, etc...)?



The recognition of risk is uncontroversial and unsurprising. There are many examples of supply chain issues that have resulted from extreme weather events or the depletion of resources. These can often be difficult to predict, but companies are working hard to understand where risks exist and to build resilience into their supply chains and business models.

For instance, flooding in Thailand in 2010 resulted in rubber prices reaching a record high, impacting across number of industries – from rubber gloves to tyres. Flooding in the same country in 2011 disrupted hard drive disk production globally, which in turn had a knock-on effect on large numbers of electronic equipment manufacturers. And around the world there are high levels of political or social concern about issues such as deforestation, or the local impacts of water abstraction, that have cost companies their license to operate.

Overall, would the move to an environmentally sustainable future be a risk or an opportunity for your business?



But although businesses recognise the threats, they demonstrate a sense of shared optimism in their capacity to take advantage of changing circumstances. The move to environmental sustainability is seen as more of an overall opportunity than a risk. This is especially true in Latin America, which was the most positive region surveyed on this issue.

There does however appear to be some inconsistency between the shared belief in what needs to be done by business more broadly, and what individual businesses believe they need to do themselves. Many businesses simply do not accept that they need to change. The market research revealed that amongst those who are aware of how they compared with their competitors, 99% considered themselves to be at least average, and half saw themselves as leaders in their sector.

Many businesses simply do not accept that they need to change: comments from businesses surveyed





## 2.4 Businesses believe that change is coming

The Carbon Trust's market research found that over half of business leaders perceive drivers of sustainability to be strong already within their own sectors.

Current consumer demand for sustainable products and services was seen as strong or very strong by 65% of respondents, with similar findings for investors (57%) and governments (52%).

There is also agreement that these external drivers are going to become significantly stronger between 2020 and 2030. Nine out of ten businesses expect demand for sustainable products and services to significantly strengthen, and eight out of ten businesses think that government regulations and investor interest will do the same.

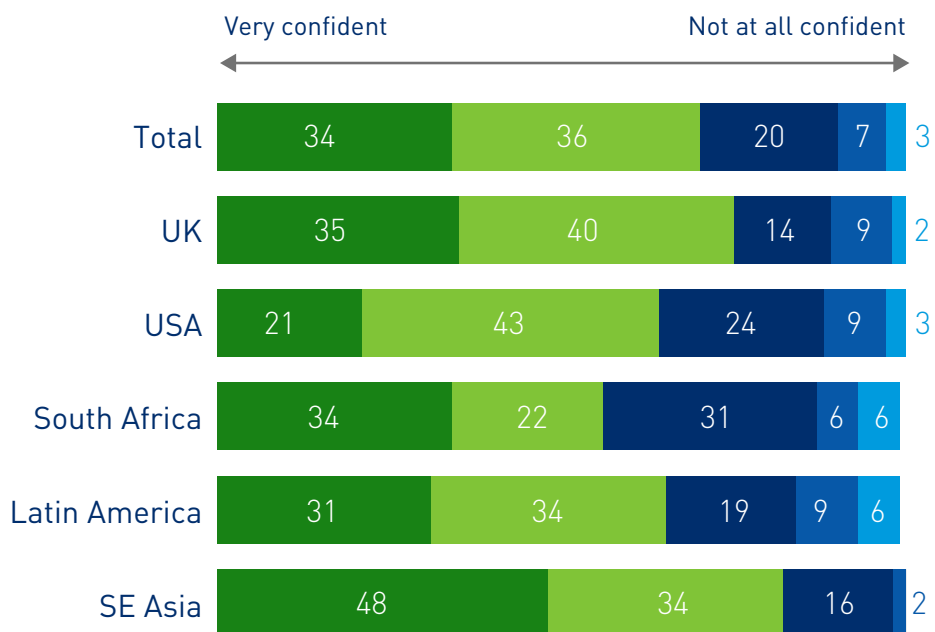
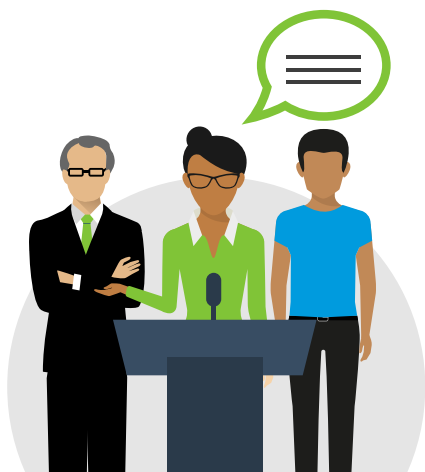
This suggests that most companies think that the conditions for change either exist today or will do so in the near future. The majority of businesses see the momentum becoming irresistible within a 15-year timeframe. However, although this appears just the other side of the business planning horizon, it is important to bear in mind a number of predictions over the last three decades suggesting that a tipping point is just around the corner, only for it never to materialise.

In the CDP Global 500 Report 2013, assessing the performance of the world's 500 largest companies on climate change, 'Reputation' was the most commonly reported risk by the 403 companies that responded. It was also the second most commonly reported opportunity.

A survey of company leaders by McKinsey in 2014 found that the top three reasons that businesses addressed sustainability issues were:

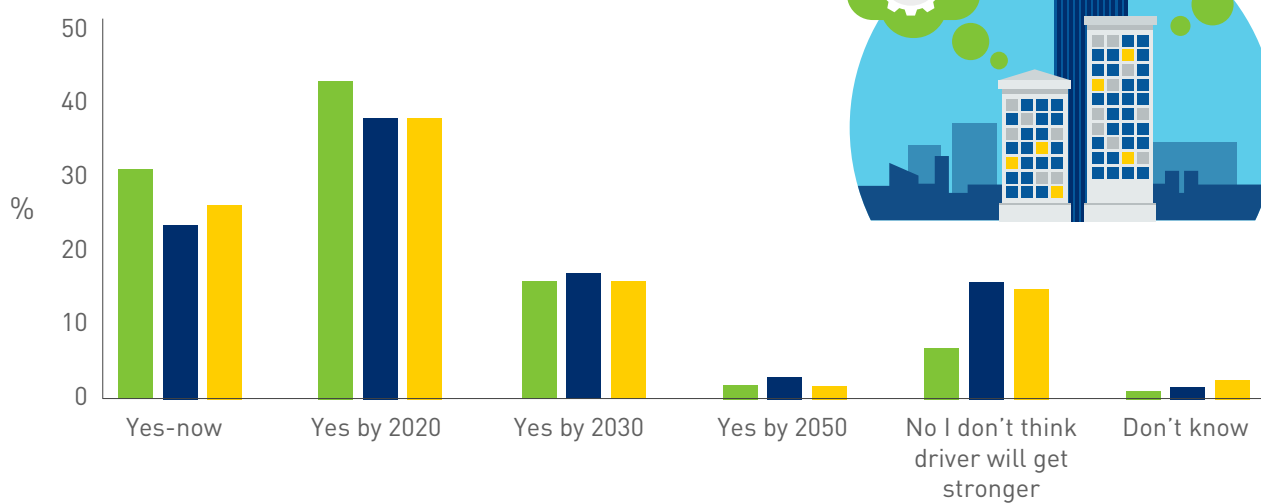
1. **Alignment with the company's business goals, mission, or values**
2. **Build, maintain, or improve corporate reputation**
3. **Improve operational efficiency and lower costs**

How confident are you that action taken globally by consumers, governments and investors will force the change to an environmentally sustainable future?



Business perception for whether drivers will become much stronger (all countries)

● Consumer ● Government ● Investor



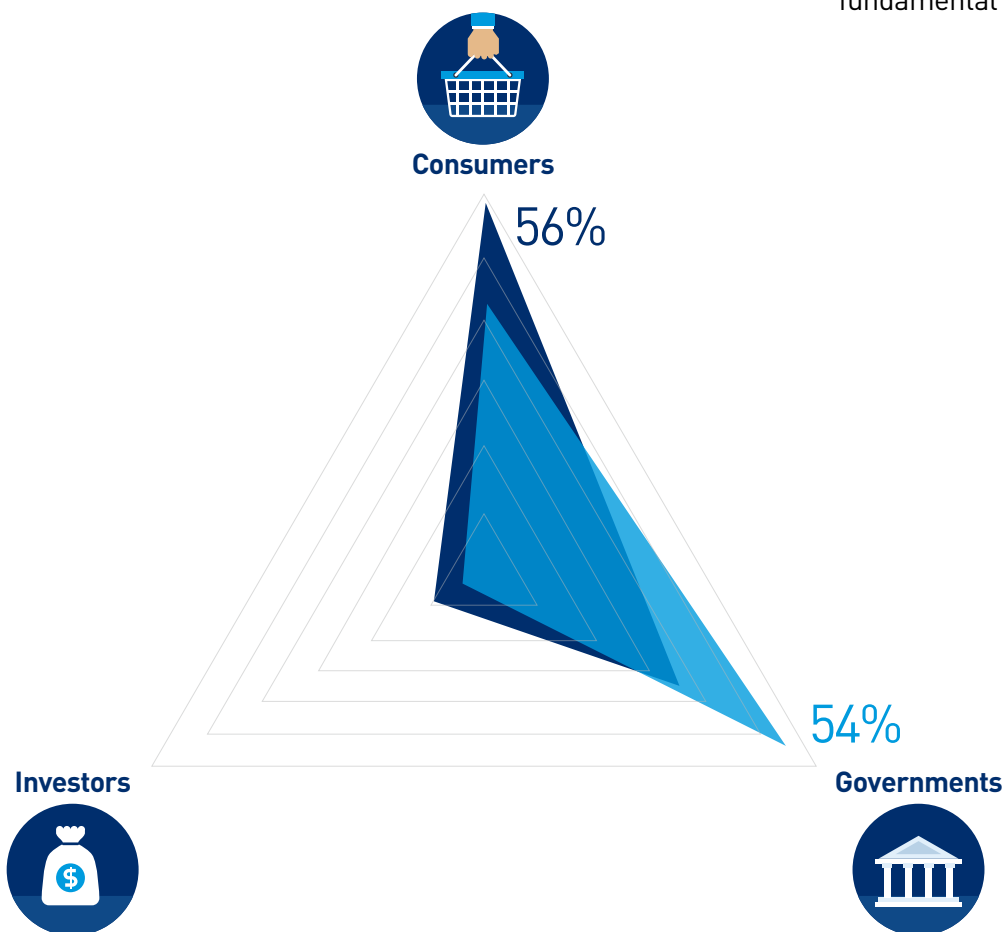
Of the three external business drivers, consumers were generally seen as most important in driving a step-change in environmental sustainability, followed by governments, with investors some way behind. One notable regional difference was in Southeast Asia, where governments are seen as being more important than consumers.

Despite agreement that external business drivers are strong and getting stronger, it appears that very few businesses are fully engaged in addressing these issues. The results show quite how far off track the world is from meeting the scale of the challenge.

Most action today tends to focus on areas where there is a direct cost saving or reputational benefit for a company. Only a small number of leaders have set time-bound targets consistent with avoiding the worst consequences of climate change, embracing the possibility of fundamental change in their businesses.

Q. Which of the following groups do you think are most important in terms of driving a step change in environmental sustainability?

● Total ● Southeast Asia



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## 2.5 Business perceptions are at odds with reality

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If businesses honestly believe that there are strong drivers for sustainability today, then it is important to consider why they have come to this conclusion.

It could be a simple semantic issue. As drivers are becoming notably stronger than they have been in the past, businesses could simply be referring to them as *'strong'* to reflect this difference, even though they are still insufficiently strong to drive meaningful action.

Alternatively, business leaders really may not fully grasp what needs to be done, or to what extent company value is at stake in a sustainable future.

Looking objectively at the world today, it is necessary to conclude that market signals are not strong. In fact they are comparatively weak.

The environmental preferences of consumers are still practically unimportant in most actual purchasing decisions. Across a range of studies in different sectors and geographies, the sustainability credentials of a product or company consistently rank far below concerns such as price and quality in importance. Although sustainability can increase purchasing preference with

certain groups, especially in situations where other factors are in balance, it does not have a major impact. When prompted consumers will say that they care about the environment, but the reality is that it is not a priority for most.

Although it does vary by region, government action is also much weaker than it could be. For example, governments are yet to agree on a meaningful carbon price that could force transformative change, or set in place regulations and incentive structures that necessitate sustainable business behaviour.

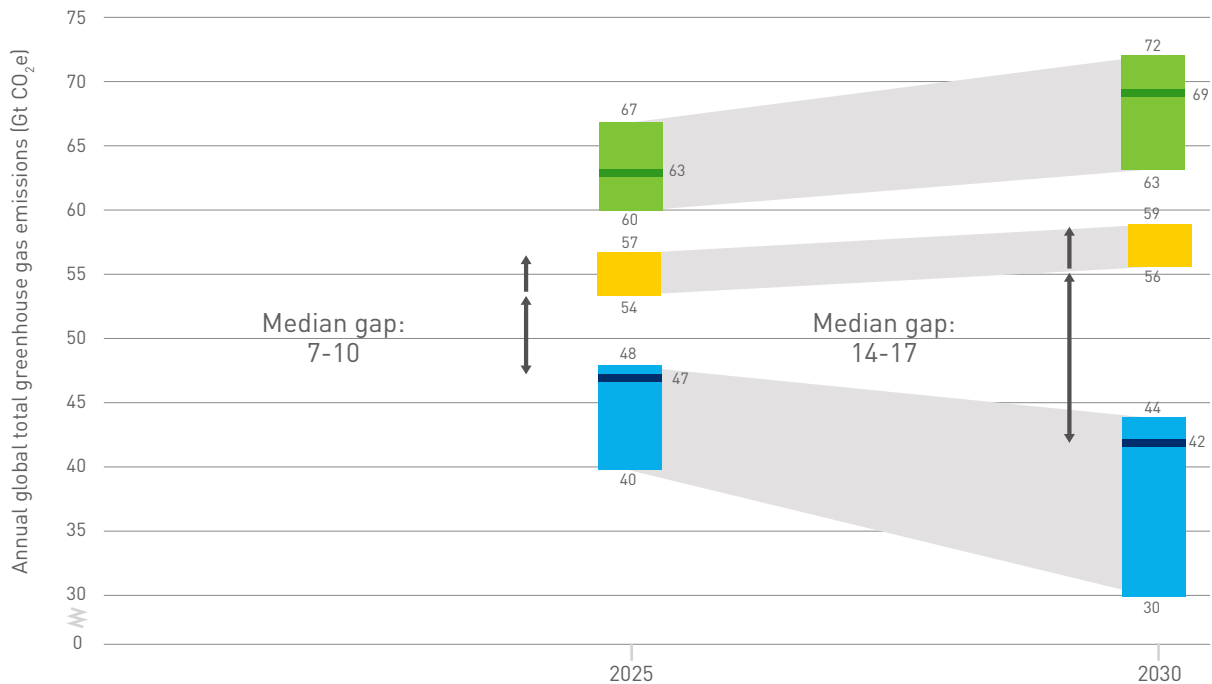
**“Only credible and coherent policy action by government will allow business to make its full contribution.”**

Angel Gurría, Secretary-General, OECD

On an international level, global agreements have so far resulted only in weak government pledges, leading to a current situation where even achieving all the pledged targets of national governments would not keep global temperature rises below 2°C. This is illustrated by the UN Environment Programme’s 2014 *Emissions Gap Report*, quantifying the sum total of government pledges against what the science suggests is required by 2030.

It is also necessary to conclude that the overall response from investors

is weak. There has been movement in some areas, such as raising awareness of a carbon bubble that could be created by stranded assets, high profile fossil fuel divestment campaigns and improved investor information such as CDP and the Dow Jones Sustainability Index. However the impact of these campaigns is still limited and focused on a small number of sectors. In short, investors still see returns in investments that are not environmentally sustainable, and there is no shortage of capital available for these purposes.



- Business-as-usual emission levels
- Emission levels consistent with range of pledge cases 1-5
- Emission levels consistent with 2°C temperature target (starting from 2020 Copenhagen pledge levels)

Results for the business-as-usual emission levels and emission levels consistent with 2°C temperature targets are expressed as median, 20th and 80th percentiles

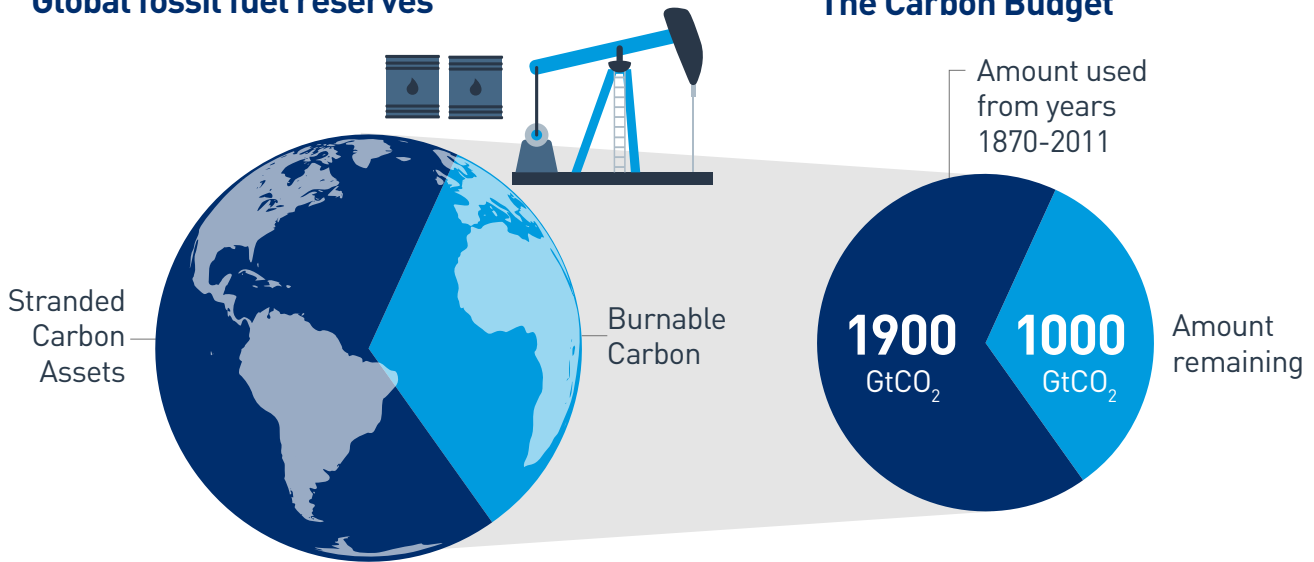
\* Copenhagen Pledges in these scenarios were assumed to result in a range of 52 (50-53) Gt CO<sub>2</sub>e total greenhouse gas emissions by 2020. This is lower than the current pledge assessment for 2020.

2/3rds of proven fossil fuel reserves will be stranded carbon assets...

... 2/3rds of carbon budget compatible with a 2°C goal has already been used

### Global fossil fuel reserves

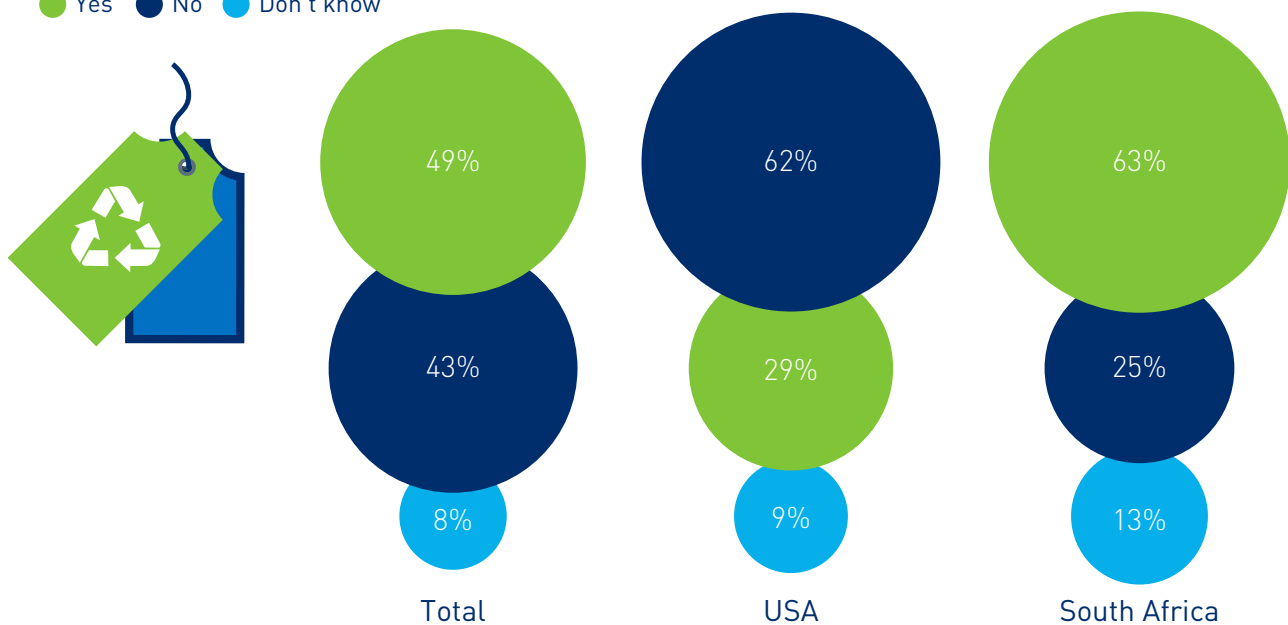
### The Carbon Budget



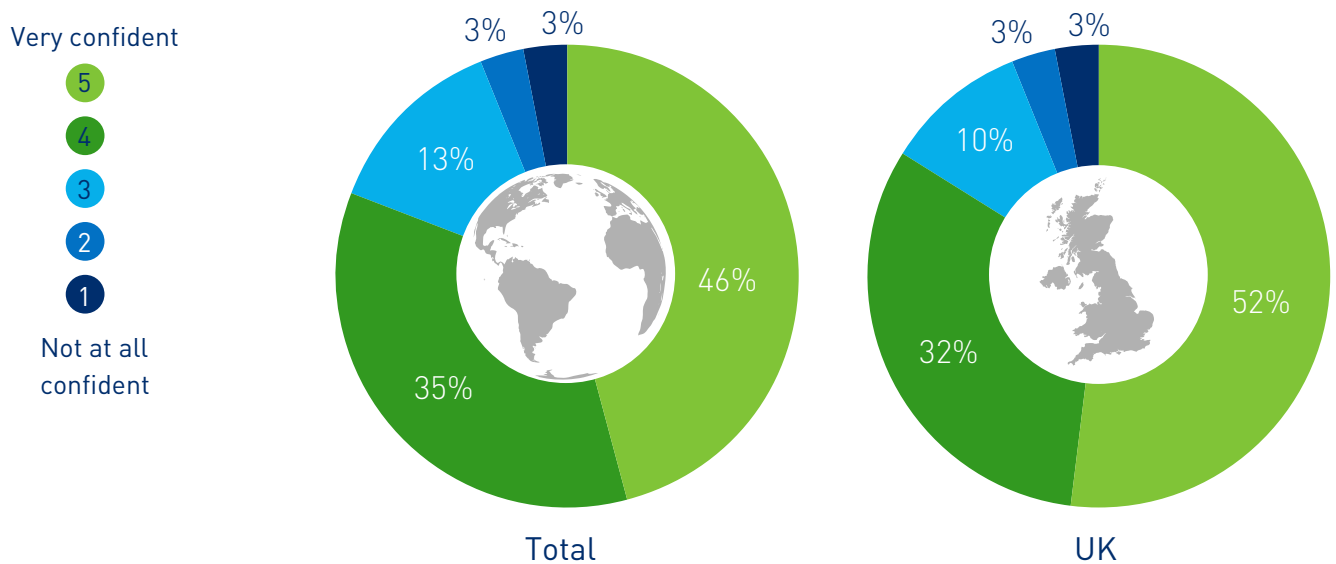
Source: International Energy Agency, World Energy Outlook (2012); IPCC, "IPCC Fifth Assessment Report," Lima Climate Action High Level Session (2014); analysis by The Generation Foundation. Based on Generation Foundation, *Allocating Capital for Long-Term Returns*, 2015

If drivers of environmentally sustainable business practice were to become strong, would you have to fundamentally change your products, services or business model?

● Yes ● No ● Don't know



How confident are you that your business could make this change?



Insight on what strong market signals would actually mean to a business came out of a question on the need for fundamental change to products, services or business model. Half of the respondents thought that they would in fact have to change their business fundamentally in a situation where drivers become stronger.

If the need for change is recognised and sufficient action is not being taken, this suggests that drivers are not in fact strong. Businesses are therefore behaving rationally today, acting to improve and protect their bottom line by adapting to the strength of consumer, government and investor drivers. And businesses are not responding adequately to issues of climate change and resource scarcity, because these drivers are not pushing them hard enough to force the transformative changes needed to avoid dangerous impacts.

So how is it possible to reconcile the fact that businesses understand and accept the long term need for sustainability, are behaving rationally and are still not doing nowhere near enough?

Many businesses appear to believe that a linear or incremental improvement approach is sufficient at present. And those that think they will need to change are remarkably confident in their ability to fundamentally transform their products, services or business model when the market signals tell them to do so.

Is this confidence justifiable? By putting strong action off into the future, business may be taking on substantial risk and missing material opportunities for profit. In particular, history tells us that incumbents can struggle to foresee disruption to the status quo, therefore failing to adequately assess and quantify the company value at stake and to adjust their course accordingly.

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## 2.6 Businesses recognise two realities

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The Carbon Trust's research concluded that many businesses are simultaneously living in two realities: today they need to drive short term performance and meet the goals of the business plan; but they also recognise an unspecified and uncertain future, where they will need to address sustainability challenges and respond to stronger drivers from consumers, investors and governments. What they do not see or understand is the pathway to move from one to the other.

Qualitative interviews confirmed that the main focus for almost every part of a company is on driving short term performance within the business planning horizon. Only the largest and most capital-intensive businesses undertake a planning exercise extending beyond 10 years, and even then plans are heavily discounted when allocating resources.

This short term focus results in an underinvestment or insufficient resourcing in building options for the future, even if the need for it is understood.

Only two business functions commonly take a view beyond the business plan horizon: R&D teams and the board of directors. Both of these can change the course of a company. But betting on radical innovation is by no means a certainty, and of the two it is only boards that are empowered to change a company's overall direction.



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## 2.7 The role of company boards

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Few companies assess the foreseeable opportunities and risks from climate change and resource scarcity and their potential impacts.

This is a governance issue: boards have a fiduciary duty to act as the guardians of a company's future prosperity, taking the long view. Evidence suggests that they are not doing this systematically looking beyond the business planning horizon. This can leave a business exposed to changes in regulation, shifts in demand, or technology breakthroughs.

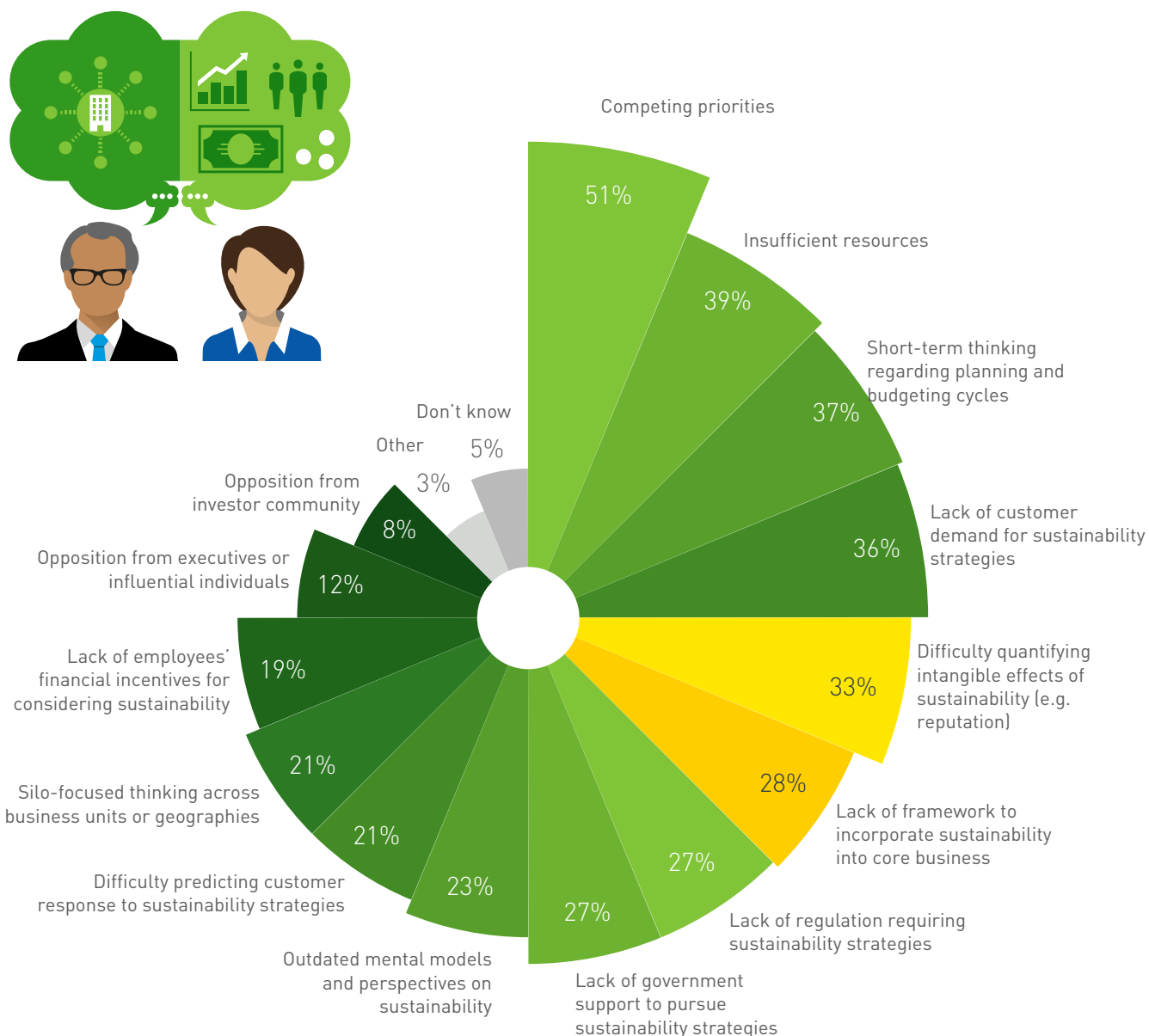
A study published in the *International Journal of Business Administration* in 2010, following 30 confidential in-depth interviews with non-executive directors of FTSE100 companies, found that just **79%** of board members are not involved in the deepest level of strategy setting, and **35%** only ask *appropriate* questions and avoid encroaching on the *territory of management*.

Company boards face competing priorities and are themselves under pressure to focus on the business planning horizon. But they also lack an approach, or a set of practical tools, for assessing and quantifying risks and opportunities from the move to environmental sustainability. Without systematically quantifying a business's full exposure, it is hard to see how a business would fare if drivers of sustainability become much stronger.

In response, the Carbon Trust has developed a methodology which can be used to assess and quantify company value at stake, helping identify which options need to be developed now for potential deployment beyond the horizon of today's business planning.

### What are the main obstacles to addressing sustainability issues more robustly?

Respondents were allowed to choose multiple responses



Based on data from MIT Sloan Management Review, January 2015

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## 3.1 A framework to assess and quantify business value at stake

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There is a need for practical tools that can be used by company boards or leadership teams to assess and quantify the long term opportunities and risk to company value from climate change and resource scarcity. By asking the right questions it is possible to materially reduce uncertainties about the future, enabling better business decision making.

A transparent and clear quantification of business risk and opportunity from sustainability issues can give company boards more confidence to take timely action. In doing so, they can increase the likelihood of their business benefitting from the transition to a more resource efficient, lower carbon global economy; or in adapting to the direct impacts of climate change and resource scarcity.

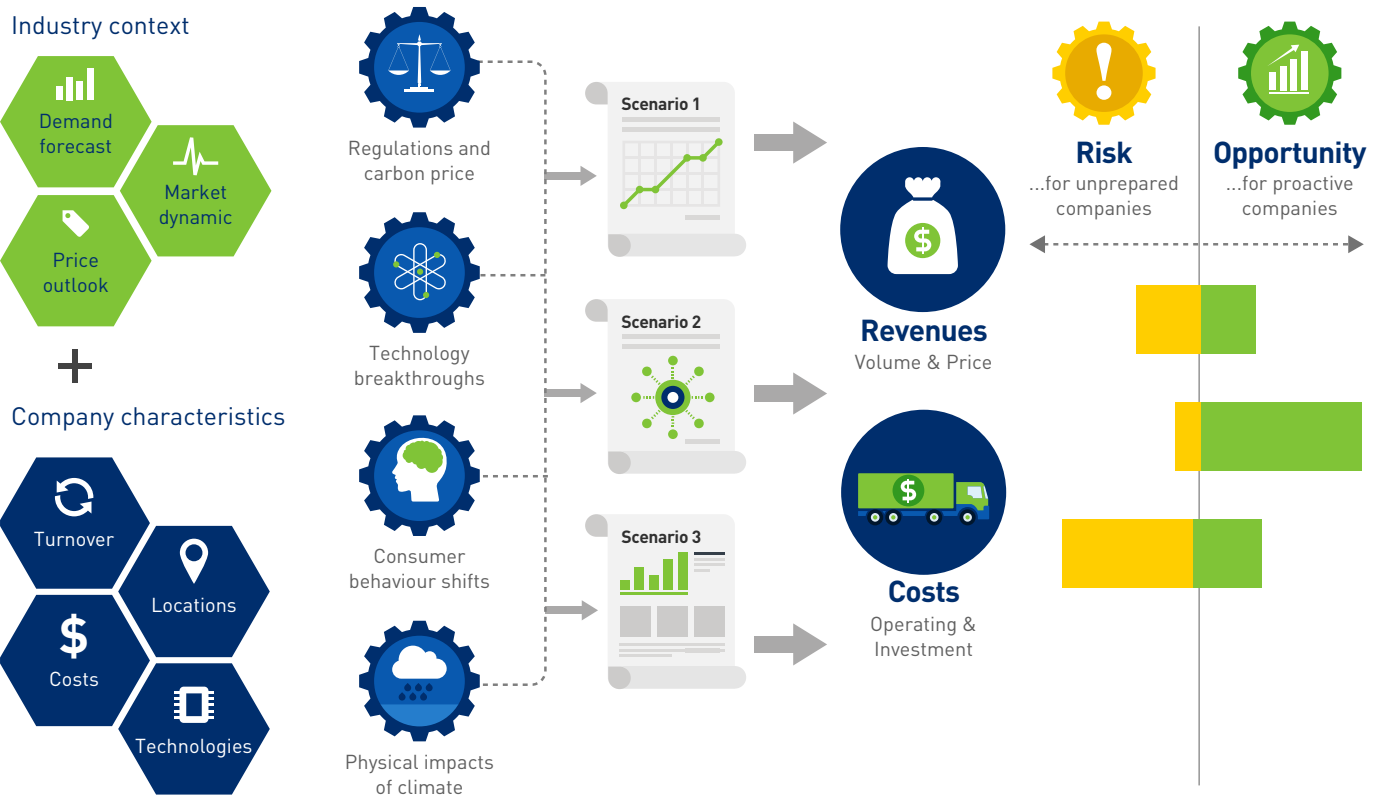
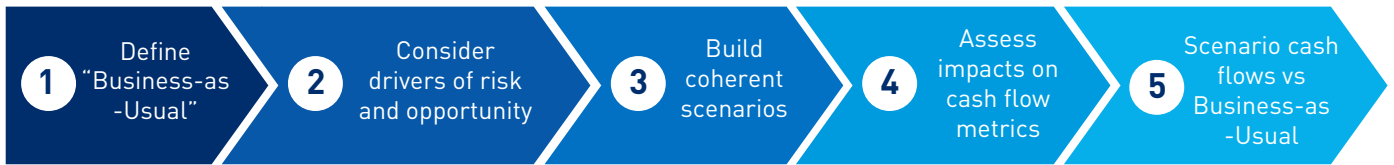
The Carbon Trust has developed a methodology that can be applied to industry sectors, individual companies or business units. The methodology can also be used by policy makers to test the impact of regulation; and by investors to quantify the exposure of their investments to these risks and opportunities.

The Carbon Trust's approach comprises five key steps, as illustrated on the following page.

The process starts by defining the base characteristics (such as forecast volumes, locations, production processes, etc.) of the sectors, businesses or business areas considered. This makes the subsequent analysis simpler, more transparent and more relevant, and allows the '*Business-as-Usual*' Scenario to be developed.

The analysis then continues with the identification of the drivers most likely to impact the business. Key drivers to consider will be: regulation and carbon markets, technology breakthroughs, changes in consumer preferences and physical climate impacts.

Our approach comprises five key steps

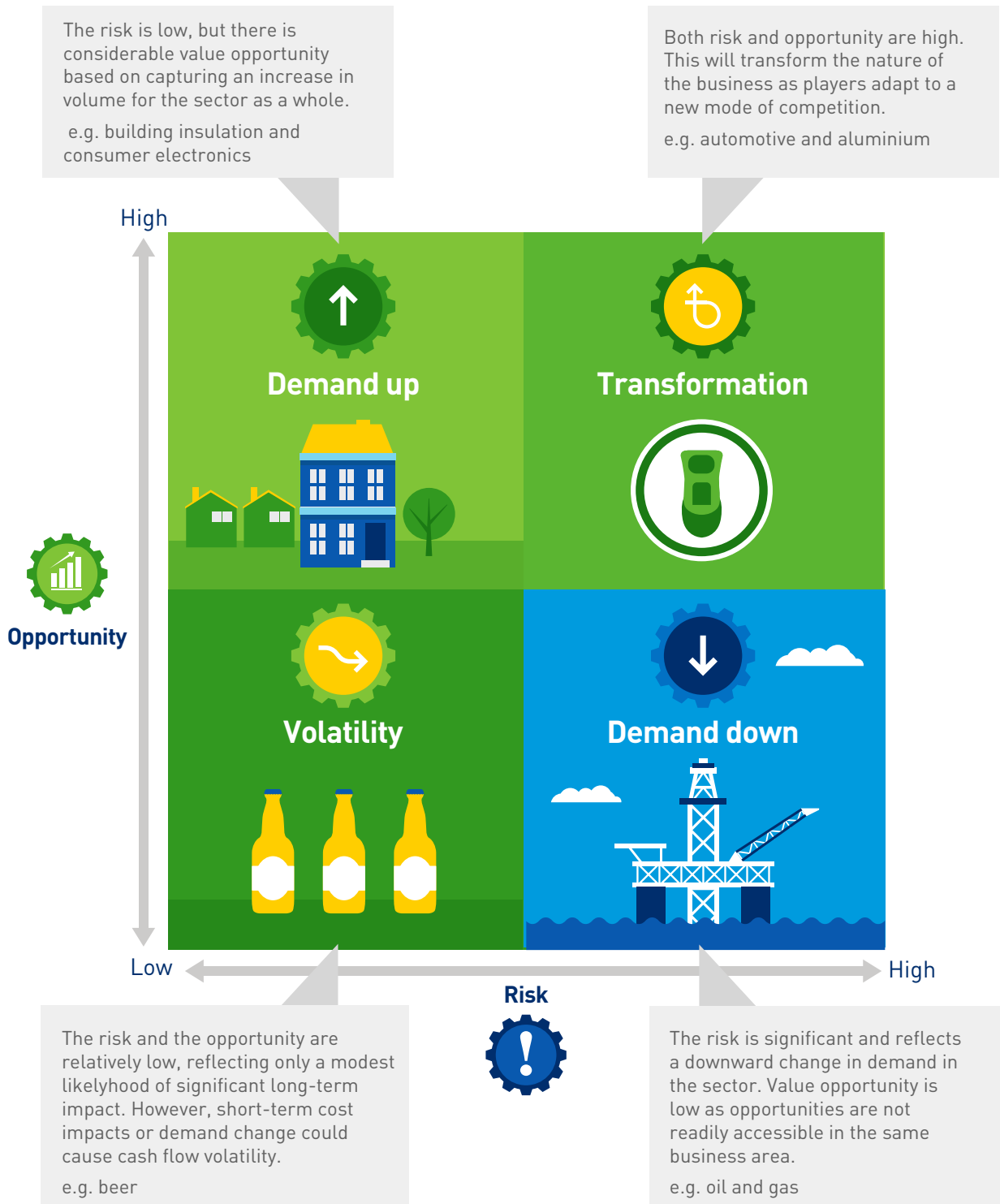


Given the uncertainty of how strongly and when each of the potential drivers are going to feature in the transition to a lower carbon future, the approach is centred around the development of plausible scenarios to test the range of value impacts. Each scenario consists of different assumptions on how each of the drivers will feature.

The last step estimates the potential impacts of each scenario by considering the effect on revenues (volumes and prices) and costs (operating and

investment), and hence cash flows out to 2050. To estimate the opportunity for increased value, cash flow is estimated out to 2050 under the given scenario assuming the company prepares for the changes, and this is compared to the 'Business-as-Usual' case. To estimate the extent of the risk to value, cash flow is estimated under the given scenario assuming the company does not prepare for the changes, and this is compared to the 'Business-as-Usual' case.

Industry sectors classified according to opportunity and risk in a low carbon transition



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## 3.2 Suggested questions to assess company value at stake

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### Consumers

**(1) Direct demand:** Will awareness of the risks of climate change or other sustainability issues be likely to cause consumers to shift their intrinsic demand up or down depending on the environmental credentials of products and, if so, how much value will be lost/gained due to falling/rising demand compared to overall demand?

**(2) Indirect demand:** Are there any likely catalysers of a shift in consumer behaviour like moral leadership or campaign groups or government policy seeking to stimulate consumers and, if so, how much value will be lost/gained due to falling/rising demand compared to overall demand?

### Regulation

**(3) Tech subsidies:** Are there any new technology deployment subsidies available for sustainable technologies that apply to your sector and how large are they compared to the likely cost of development minus the potential profits?

**(4) Direct taxes:** Are there any taxes (or likely taxes) which would impact your business operations and how large are they (or are they likely to be) compared to the cost of avoiding them plus any knock-on benefits?

**(5) Minimum quotas:** Are there any (or are there likely to be) any minimum quotas on the use of low carbon energy or other more sustainable products (e.g. biofuels use) and, if so, how much will it cost you to comply with these quotas relative to your overall operating costs?

**(6) Minimum standards:** Are there any (or are likely to be any) minimum product standards imposed (e.g. minimum efficiency performance) and, if so, how much value will be lost from obsolescent products and how much will it cost to reform your production to meet these standards relative to your overall operating costs?

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## Regulation (contd.)

**(7) Prohibitions:** Are there any (or are there likely to be) absolute prohibition on sale or use of certain types of product (e.g. no incandescent light bulbs) and, if so, how value will be lost from obsolescent products and how much will it cost to replace them relative to your overall operating costs?

**(8) Reporting:** Are there any mandatory information requirements (e.g. product labelling) and, if so, how much will it cost to comply and what will the effect be on demand relative to overall demand?

**(9) Related sectors:** Is an adjacent industry regulated (or likely to be regulated) by one of the above measures which could in turn cause an effect on your business and, if so, what will be the likely value cost?

## Investors

**(10) Direct investment patterns:** Could your sustainability record impact investment decisions in your company and, if so, how much share value could potentially be lost/gained this way relative to your overall share price?

**(11) Indirect investment patterns:** Is an adjacent industry exposed to investment scrutiny over its sustainability record (e.g. energy provider) and, if so, how would a reduction of investment in this industry affect your own share price?

## Technology

**(12) Existing technology:** Will prospects of a low carbon or sustainable economy stimulate increased deployment of existing but more sustainable technology and, if so, are any of these technologies applicable to your business, either by directly reducing costs (etc.) or indirectly by lowering policy costs or consumer stimulating demands (etc.)?

**(13) Novel technology:** Will prospects of a low carbon or sustainable economy stimulate further innovation of new sustainable technologies and, if so, are any of these technologies potentially applicable to your business, either by directly reducing costs (etc.) or indirectly by lowering policy costs or consumer stimulating demands (etc.)?

## Direct impacts

**(14) Asset risk:** Could the direct effects of environmental issues (e.g. extreme weather events or water-stress) impact your assets and, if so, what potential proportion of your assets are at risk and what is their value compared to the overall value of the company?

**(15) Supply chain risk:** Could the direct effects of environmental issues impact any of your supply chain and, if so, what potential proportion of your supply chain is at risk and what is the total value at risk compared to the overall value of the company?



## Acknowledgements

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## About the Carbon Trust

The Carbon Trust is an independent company with a mission to accelerate the move to a sustainable, low carbon economy. The Carbon Trust:

- > advises businesses, governments and the public sector on opportunities in a sustainable, low carbon world;
- > measures and certifies the environmental footprint of organisations, products and services;
- > helps develop and deploy low carbon technologies and solutions, from energy efficiency to renewable power.

The company has approximately 180 staff with over 30 nationalities, based in the UK, China, Mexico, South Africa and the USA. The Carbon Trust's experts come from a diverse range of professional backgrounds, including engineering, policy, academia, and business management.

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