Broadening Horizons: Business Engagement with Climate Change in 2007 and Today

3C/SEI final report

Annika Varnäs, Gregor Vulturius, Magnus Benzie, Marcus Carson and Marion Davis
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1 INTRODUCTION

In 2007, climate change was in the spotlight around the world. The Stern Review on the economics of climate change had been released in the UK, and former U.S. vice president Al Gore’s awareness-raising film, *An Inconvenient Truth*, had been seen by millions globally. That July, Live Earth concerts were held several cities, and the Intergovernmental Panel on Climate Change (IPCC) released its *Fourth Assessment Report* and, in December, went on to share the Nobel Peace Prize with Gore.

The media were reporting about climate change and the expected effects like never before, and businesses launched several climate-related initiatives. One of these was Combat Climate Change (3C) business initiative, founded by Lars Josefsson, then CEO of the Swedish power company Vattenfall. Around 70 companies joined 3C over time, all committing themselves to work to decrease emissions in their own companies and promote a global agreement on climate change.

As part of this effort, 3C co-sponsored a World Business Summit on Climate Change in the lead-up to the United Nations Climate Change Conference (COP15) in Copenhagen in 2009. Disappointed with the results of the COP, 3C leaders decided in early 2010 to take a new approach and entered into a two-year partnership with the Stockholm Environment Institute (SEI) to support research at the intersection of climate policy and business. This report, written at the close of that partnership, charts the changes in the world of climate change and business since 3C began.

A great deal has happened in the last five years – most notably the global financial crisis. Businesses face a number of critical short-term uncertainties about the future and economic strength of the EU and other developed economies, the impact of austerity on demand and the global economy, and other factors. The global financial crisis serves as a powerful reminder that climate change will not occur against a static or smooth baseline of “business as usual”: uncertainty and risk are not exclusive to climate change.

Global climate governance under the United Nations Framework Convention on Climate Change (UNFCCC) has made only slow progress, with multiple setbacks. Political and economic constraints have led several industrialized countries to weaken their climate commitments; for example, Russia, Canada and Japan announced they would not accept new Kyoto commitments, and Canada pulled out altogether. Emerging economies such as China, India, Brazil and South Africa have resisted pressure to make significant commitments of their own, sometimes coming into conflict with other developing countries.

Global cooperation on other fronts has also faltered. The Doha round of trade talks is stalled, and the UN Conference on Sustainable Development (Rio+20) showed how difficult it is to reach any agreement at this point through intergovernmental processes. (Businesses engaged in the Rio process, however, were praised for their constructive role in Rio.)

Yet the urgency of climate change has not diminished; if anything, recent science has heightened concerns – for example, surpassing 400 ppm of atmospheric carbon dioxide (CO₂) in May of this year has heightened concerns about the dangers of a potential 4°C of warming. Current-day climate change impacts are also becoming more evident, with growing natural-disaster costs and significant crop losses, such as from this year’s drought in the U.S. Businesses, too, have become more aware of climate change, and many are actively addressing risks and seizing opportunities to contribute to a low-carbon, more sustainable future.

In this report, we consider and offer perspectives from business on the major developments in climate science, policy and activity from 2007 to 2012, the period during which 3C was active. We seek to capture how companies’ climate-related views and activities have evolved, and try to map out what companies see as the most important environmental issues for the future. Our analysis is based on a survey of 3C members; a review of corporate social responsibility (CSR) reports by Global 500 companies included in the Carbon Disclosure Project’s 2011 Carbon Disclosure Leadership Index (CDP 2011); a literature review, and interviews with representatives of selected companies.
2  WHY CLIMATE CHANGE MATTERS TO BUSINESS

The *Stern Review of the Economics of Climate Change* (Stern 2006), prepared by the UK Treasury, greatly increased public attention to climate change and by making a compelling economic case for strong, early action, contending that the costs of inaction would be far greater. *An Inconvenient Truth*, also released in 2006, grossed more than $24 million USD¹ and won an Academy Award for best documentary film. The following year, the IPCC published its *Fourth Assessment Report* (IPCC 2007), providing a wealth of information that bolstered the scientific case for action. All these factors together led to a crescendo of global interest, which was also reflected in increased media coverage. An analysis of global newspaper coverage by Maxwell T. Boykoff and his team at the University of Colorado shows a surge of articles around the release of the IPCC report, then an even sharper increase around COP15 in Copenhagen in 2009 and the “Climategate” controversy. Since then, media coverage of climate change has waned, with spikes around extreme-weather events and disasters, and around the annual UNFCCC conferences – but nothing to match Copenhagen or even the 2007 surge (see Figure 1).

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¹ See http://boxofficemojo.com/genres/chart/?id=documentary.htm.

Figure 1: Number of articles addressing climate change, 2004-2012


Media coverage is both a cause and effect of public awareness, which, in turn, has implications for business: a decline in public attention to climate change could mean changing consumer priorities and preferences. Indeed, while in 2007, several business initiatives on climate change were launched – including 3C, the EU Corporate Leaders Group, and the U.S. Climate Action Partnership – since then, few new business initiatives on climate have emerged.

Yet climate change continues to be a priority for many companies. The purpose of our study was to gauge the level and nature of interest that remains, understand how businesses’ views of climate change may be evolving, and get a sense of how the private sector might engage in future efforts to address this urgent issue. Our analysis joins several others produced by business groups and academia, and in this report, we often compare our findings with theirs, for extra perspective. We also draw on insights from recent and ongoing SEI research on business-relevant topics such as resource scarcity, lowering emissions from overseas production, and supply-chain risks.
THE STUDY

The core of this project was a survey with questions about companies’ views on climate change; the perceived importance of climate change and other sustainability issues to the company itself; climate- and sustainability-related activities; perceived challenges in the work with climate change; drivers behind the work with climate change; and what sustainability areas companies see as most important for the future. In all cases, respondents were asked to draw comparisons to their views and activities in 2007. Unfortunately, several of our contacts had moved on, and several companies that had been active with 3C at some point no longer were. Thus, we did not deem this to be a large enough sample from which to make meaningful generalizations.

To supplement the survey, we reviewed the CSR reports of 21 Global 500 corporations that were included on the Carbon Disclosure Project’s 2011 Carbon Disclosure Leadership Index (CDP 2011) and had published CSR reports for both 2011 and 2006 (there is typically a time lag – the report for one year is published the following year). A qualitative assessment was made of the environmental issues discussed in the reports, and how the companies seemed to be dealing with climate change in particular. Eight interviews with respondents from major companies and business initiatives, as well as a small workshop discussion with business initiatives on climate change, further informed the study.

Almost half (10) of the companies that responded to the survey said climate change is as important to them now as in 2007, while one-third (7) consider it more important now, and the rest (4) consider it less important.

Our review of CSR reports did not lend itself as well to quantification, but we compared how companies described climate change in their 2006 and 2011 reports – whether it was included in their mission statements or among their core objectives, how often it was mentioned within the CSR, and how many climate-related activities were described. Based on an analysis of these statements, we concluded that 62% prioritized climate change roughly as much as before, 29% prioritized it more now, and the rest considered it less important than five years ago.

Some interviewees described the business community as a consistent voice and leader in climate action, in the absence of wider political or public support:

*By the time of the Stern report, it [company attention to climate change] increased a lot, and it has not decreased, even if it has decreased in the debate.*

*We have this contradiction: in the public debate, climate change is lacking traction because of the failure of Copenhagen, the financial situation... many aspects, but in the meantime, climate change is more and more internalized by businesses.*

It is difficult to gauge to what extent this characterization is accurate – though clearly, some businesses have been strong advocates for climate action and have led by example. Recent events have also driven more businesses to action: A 2012 survey of major corporations by the Carbon Disclosure Project found that in the wake of several extreme-weather events that disrupted business operations and supply chains around the world, companies were giving higher priority to climate change, and 78% had integrated climate into their business strategies, up from 68% in 2011 (CDP 2012a).
3 DRIVERS OF BUSINESS ENGAGEMENT WITH CLIMATE CHANGE

What are then the main drivers behind companies’ work on climate change? Studies have found a wide range of factors: cutting energy costs; new revenue opportunities; changing customer demands; pressure from investors; a desire for strategic advantage over competitors; expectations from employees; and, as noted above, concern about climate change impacts on their business (CDP 2012a; Ernst & Young 2010). The cumulative effect of those drivers may increase the likelihood of a meaningful response.

Our research also found a similar range of factors at play. Figure 2 shows the relative importance of each factor, in 2007 and in 2012, as rated by respondents to our survey. Cost savings were and remain the biggest motivation; new business opportunities, consumer preferences and client requests are also powerful drivers – increasingly so. Investor pressure, previously the weakest driver of climate action, is still far from the strongest driver, but its perceived importance increased the most.

COST SAVINGS, NEW REVENUES AND CUSTOMER PREFERENCES

To a great extent, what companies say is driving their actions on climate is that it’s good for business. As we noted, cost reduction was identified in our survey as the most powerful driver, and even more in 2012 than in 2007; other studies have found the same, especially in the context of volatile energy prices (see, e.g., CDP 2012a). But while cost savings are a good incentive, some research suggests, they may not lead to a strong commitment to climate action if they’re the main motivation. A recent study based on survey of 319 Canadian manufacturers (Botral et al. 2012) found a positive relationship between firms’ emission-reduction commitment and their financial performance, but it also found that companies driven primarily by economic factors did less overall to curb emissions.

In that sense, pleasing customers and exploiting new revenue opportunities may be more powerful incentives than cost reductions. As one interviewee pointed out, although cost reductions are important, they may not necessarily lead companies to act on climate change; “selling more” is often more appealing for many company managers than “reducing costs”.

Other surveys of companies show the rising importance of brand reputation, access to capital and increased shareholder value as drivers of climate action (e.g., KPMG International 2011). As would be expected, reputation is a more important driver for consumer-focused companies, especially large ones. Being seen as climate-conscious is also likelier to give a competitive advantage to the industries that are most

Figure 2: Perceived importance of reasons to act on climate change, 2007 and 2012
confronted with the climate issue (e.g., Kolk and Pinkse 2008), such as energy-intensive and energy service companies. This was reflected in our interviews:

*Climate change is closely connected to our business strategy. We sell many solutions designed to decrease use of energy. To then prove that we also take this issue seriously then becomes very important.*

Yet, as one interviewee noted, climate change seems also to have become more important for a broader number of companies:

....initially, it was mainly what we call upstream companies that were involved in climate change work – you know mining, energy utilities, materials industries – while now, we see a lot of consumer goods industries or economic players, such as retailers [...] which are now starting to have very specific policies related to climate change, asking their suppliers to have greener products and trying to match this part of the demand which is really interested by greener products...

One of our interviewees noted that consumer preferences have been particularly strong drivers of climate action by businesses in the U.S., where the legal and regulatory requirements are weaker:

*Even if climate change is in strong denial in the U.S., probably in the demand side, [the] U.S. is stronger than any other country in the world. Generally, more sustainable products are demanded more. .... More scientifically labelled products are demanded and it is astonishing to see how this is developing in a way much faster than in Europe.*

**INVESTOR PRESSURE ON THE RISE**

Our survey suggests that investor pressure is increasingly driving businesses to take action on climate change. As one respondent said:

*There is a whole range of performance indices, where also issues like CO₂ play a role. People are looking at this and ask questions. We need to be prepared and be able to answer questions from investors. Not every investor is interested – some just look at profit or loss. But there are also investors that are very interested in climate change.*

A 2012 Bloomberg Global Poll shows how divided investors are: 38% of investors surveyed said climate change was a major threat to the environment, down from 48% in 2009.² The poll also found that only 37% of investors thought government policies to address climate change would hurt corporate profitability, with 48% of U.S. respondents saying this, vs. 31% in Europe and 29% in Asia.

The Carbon Disclosure Project is a prime example of investor pressure to act on climate change. It began life as a small NGO and now represents 655 investors with $78 billion USD in assets (CDP 2012a) under management. It has become a prominent reporting system for corporations around the world to disclose their GHG emissions and to publicly state the physical risks, regulatory and other risks that climate change poses to their profitability, as well as the strategies and actions that they have in place to manage and reduce those risks.

Laws and regulations can help raise awareness of climate issues among investors. For example, the U.S. Securities and Exchange Commission issued revised guidance in 2010 requiring companies to include information on “material risks” related to climate change in their financial reports, including both mitigation and adaptation aspects. The UK’s Climate Change Act 2008, meanwhile, requires companies that are licensed to undertake statutory functions on behalf of the government, such as infrastructure operators (e.g. airports, ports, rail network, etc.) and some infrastructure-service providers (e.g., water and energy utilities), to submit climate risk assessments and adaptation reports to the government.

**PUBLIC POLICY AS A DRIVER: VARYING VIEWS**

Public policy clearly has a major role to play in driving climate action by businesses, but as numerous studies and reports have argued, the strength and clarity of policies is crucial (see, e.g., CDP 2012a; Moarif and Rastogi 2012; EBRD 2011). If in cap-and-trade systems, for example, the caps are too high and permit prices too low, they won’t make enough of a difference in businesses’ economic calculus to motivate mitigation efforts.

Thus, in our interviews, the troubled EU Emissions Trading System (EU ETS) got mixed reviews. Some called it an important driver of mitigation action, but others noted that the price induced by EU ETS – which has dropped to record lows in the months since

² See http://www.bloomberg.com/news/2012-09-07/com...
the interviews were conducted – is not high enough to significantly affect company activities. Several interviewees also pointed out that this has made EU ETS a less important driver than compared to five years ago:

The price is much smaller than it was in 2008 and in 2009 and ... this is obviously not a strong incentive. Companies are very pragmatic... if there is no price, there is no price.

Regulatory uncertainty is also often cited as a disincentive to climate action by businesses. The Carbon Disclosure Project, for example, reports that the “lack of clarity” about climate policy after the last several UN climate conferences has been “a real barrier to action”, and “uncertainty about when or how politicians will intervene hinders investment in emissions reductions” (CDP 2012a). That message came through in our interviews as well; as one European interviewee put it:

The problem that we currently have is that we do not have a clear line. It's good if you know where we are heading to, even if I know that it will be of disadvantage for me. I can adjust myself to it and align my investments and strategy accordingly. Currently this is made extremely difficult, because we are faced with the situation that the entire emissions trading will be either ceased or continued. I can’t invest based on this situation which is half-finished. We can’t progress in this situation. Either we say we want to have this goal in 2020, 2030 and 2050, which is in line with the Roadmap 2050. If I know that I can prepare myself as a company. Under the current conditions, this preparation is not really possible.

Kolk and Mulder (2011) note that many studies have stressed the negative impact of regulatory uncertainty, and in fact, such arguments are part of a larger debate dating back to the 1980s. Yet in their view, acting voluntarily, despite the uncertainty, can give an advantage to companies that seize low-carbon and mitigation-related business opportunities.

Indeed, after climate legislation failed in the U.S., Ernst & Young (2010) found many companies planned to pursue climate action anyway because they thought it was good for business. Some see it as a matter of being proactive – as if it’s a matter of when, not whether, climate policies will be implemented. As one North American interviewee put it:

We believe that there will eventually be climate change policies, so we try to prepare for that, rather than investing in something that can be used only for five years.

Voluntary actions will only go so far, however, if strong climate policies are not forthcoming. Lederer (2012), for example, argues that voluntary offset markets have essentially operated “in the shadow of public regulation”, generating credits with the expectation that they will also be sold in compliance markets – which is one reason why the Chicago Climate Exchange (CCX) shut down at the end of 2010, after U.S. climate legislation failed. Almost all the business representatives we interviewed said regulation would be the most important driver for companies to act on climate change.

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4 WHAT BUSINESSES ARE DOING ABOUT CLIMATE CHANGE

The corporate lobby is a powerful force around the world, and from the UNFCCC to the local level, those working to advance climate policy have sought allies in the business community. Yet businesses’ record on the policy front is mixed at best. Yes, some companies have supported climate policies, but often, they have done so with a specific agenda: to steer policy-makers towards options they consider less burdensome; for example, Meckling (2011) notes, corporations such as Duke Energy and General Electric backed mandatory emissions trading, which was seen as a lower-cost alternative to non-market mechanisms.

Other companies, meanwhile, have lobbied hard against strong climate policies, and engaged their powerful marketing machines to rally public opposition as well (Greenberg et al. 2011). This is especially true at the national and sub-national levels, as companies that compete in global markets have often feared that the cost of complying with climate policies would put them at a disadvantage compared with companies that faced no such requirements. Thus, businesses argue that the climate solution must be global, so there’s an “level playing field”, and they warn that unilateral measures will only shift production to other, less-regulated parts of the world, causing so-called “carbon leakage”. One interviewee summarized what this has meant for climate policy:

Companies have played a role with a lot of ambiguity. On one hand, they have been promoting a global agreement and the establishment of a global playing field, and pushing in this direction. On the other hand, they have been opposing any move at national level because [they fear it could] have effects on competitiveness or trade effects. All in all ... the result is that the international framework is not in a good shape today.

In our survey of 3C members, companies said they have increased their efforts to influence national and regional policies in the last five years – in fact, it was the most widely reported activity in response to climate change (cited by 18 of the 21 companies; disclosure and communications tied for second, at 17 of 21; see Figure 3 for the full results).

Looking ahead, however, slightly fewer (16) said they would seek to influence national and regional policy; for comparison, 12 of the companies reported seeking to influence the global policy debate now, and 13 said they would seek to influence it in the future.

VOLUNTARY ACTIONS

Working to influence policy is only one aspect of companies’ actions to address climate change, of course. Figure 3 shows the full range of activities that businesses reported in our survey; as noted above, disclosure – of emissions and of climate risks – has also been widely embraced; many also report participating in conferences and other forums, supplying information to customers, networking with other businesses, and various communications-related activities. Companies also report taking direct action to reduce their emissions, by improving production processes, considering climate impacts in the design of their products, and through other measures.

One striking result is that companies are increasingly asking their suppliers to decrease their emissions; only four companies reported doing this in 2007, but 10 did so in 2012, and 17 said they intend to do so in the future. One interviewee said this is a response to consumer demand. We also see this as an outgrowth of corporate sustainability and emissions reporting: Once companies have found a way to systematically measure and report their emissions, if they find their supply chains are hurting their performance, a natural next step is to ask their suppliers to work to decrease their emissions. The Global Reporting Initiative (GRI), for example, has increasingly emphasized supply-chain emissions as it has updated its guidelines.

A MORE FAVOURABLE OUTLOOK FOR CLIMATE ACTIVITIES

When asked about the challenges of working on climate issues, company representatives reported that on almost every front, they face fewer hurdles than they did in 2007. There were two very striking changes: both measuring emissions and securing support from top-level decision-makers, which were considered somewhat difficult five years ago, are

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now considered easy. The latter is critical because top-level support and oversight are widely seen as key elements for the success of corporate climate strategies (see, e.g., CDP 2012a).

Figure 3: Corporate climate change activities: 2007, 2012 and going forward

Figure 4 shows how the outlook has improved on multiple fronts; the notable exception is that companies seem to view the complex interactions between different environmental issues as having become more challenging.

Figure 4: Challenges in companies’ work on climate change
5 HOW BUSINESSES VIEW CLIMATE SCIENCE

The IPCC’s *Fifth Assessment Report* will only be published in late 2013 and 2014, so while climate science has continued to advance, nothing has matched the influence of the *Fourth Assessment Report* published in 2007. The most notable scientific report on climate change with direct relevance to business is the IPCC’s Special Report, *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation* (2012), which highlighted the growing toll of climate-related disasters, both in human and in financial terms. The report, known as SREX, also linked human-caused climate change to those heightened risks (some with more confidence than others) – while also stressing that development choices can greatly increase or reduce vulnerability.

There has also been a considerable body of research showing that without prompt and aggressive action to curb carbon emissions, global warming could reach or exceed 4°C – an insight that led the World Bank to issue an urgent call to action in the lead-up to COP18 in Doha (The World Bank 2012).

Asked whether they trust climate science, 88% of respondents to our survey said they do; 63% said that was already the case in 2007, while 25% said they used to be sceptical, but trust climate science more now; 6% used to trust science but became more sceptical, and 6% were and remain sceptical.

Perhaps more significantly, 15% of respondents said trust in climate science appeared to have declined among other companies in their industry, and 15% reported a negative trend among customers. However, another 15% of respondents said trust in climate science has improved within their industry, and 35% said it has improved among their customers. One interviewee said there is “less and less denial” of climate science among businesses, though it does still exist, especially in the U.S.

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7 See, for example, the January 2011 special issue of the *Philosophical Transactions of the Royal Society A*. ‘Four degrees and beyond: the potential for a global temperature increase of four degrees and its implications.’ http://rsta.royalsocietypublishing.org/content/369/1934.toc.
The business world has begun to witness the impacts of a changing climate. Companies have always been aware of the potential for weather to disrupt operations and add costs, but experiences around the world in the past few years – from crippling snowstorms and floods in Europe, to mega-storms, landslides and floods in the tropics, to droughts, wildfires and hurricanes in the U.S. – have made them keenly aware of the vulnerability of their operations to extreme weather and disasters. Thus, the Carbon Disclosure Project's latest survey of Global 500 companies found 37% now see physical climate risks as a current rather than future concern, up from 10% in 2010 (CDP 2012a). The World Economic Forum’s Global Risks 2013 report, meanwhile (WEF 2013), found that business leaders now consider GHG emissions the third-biggest risk to the global economy, after severe income disparities and chronic fiscal imbalances – and it identified the failure of climate change adaptation as the environmental risk with the most knock-on effects for the next decade.

THE YEAR 2012 IN THE U.S. – A CASE STUDY

Last summer was filled with climate hazards that not only hit the U.S. hard, but also had global consequences. Storms took out the power supplies to more than a million customers – including large and small businesses – in the middle of an intense heat wave. Some of Amazon’s cloud computing services were temporarily lost, and Instagram was left without power, exposing the vulnerability of the information-technology sector.

At the same time, the U.S. struggled with its worst drought in half a century, with 80% of the country’s agricultural land affected (USDA Economic Research Service 2013), including 70-75% of maize and soybean production and 67% of cattle production. Total 2012 maize production was estimated at 10.7 billion bushels, about 28% below early-season projections. Soybean prices soared to record highs. Domestically, the impact of the drought on food prices is expected to be modest, both because prices have roughly kept up with costs over the years, and because of high farm productivity (up 50% since 1982) and high crop insurance participation (U.S. BLS 2012). But global commodities markets were certainly disrupted, with soy markets, for example, volatile for much of the year, also affected by droughts in South America. Major importing countries, including China, and sectors reliant on soy products had to quickly adapt to price volatility by finding substitutes or adjusting their own forecasts and operations.

In October – after our survey had been completed – Hurricane Sandy delivered arguably the biggest wake-up call of the year to businesses, not only causing major damage in multiple states, but leaving a large part of New York City – including the financial district – flooded and without power. Insured losses alone were estimated at $25 billion USD, but the storm’s greatest legacy will arguably be the sense of vulnerability that came from having no electricity and no public transit for days in a major economic hub.

Altogether, the U.S. suffered 67% of the total $160 billion USD in natural disaster-related losses in 2012, according to Munich Re. Another Munich Re analysis, based on loss data for 1980-2011, found weather-related loss events in North America nearly quintupled in that period, while they increased by a factor of 4 in Asia, 2.5 in Africa, 2 in Europe and 1.5 in South America. The cumulative effect of these shocks has visibly affected public opinion – including business leaders – has also raised the political profile of climate action, with President Barack Obama now calling it one of his priorities.

RISK TO REALITY: BUSINESS RISKS BECOME REAL-WORLD IMPACTS FROM CLIMATE CHANGE

The 3C initiative began soon after the world’s costliest natural disaster to date, Hurricane Katrina, which caused $62 billion USD in insured losses and $125...
billion in overall losses, according to Munich Re.\textsuperscript{12} While no single event has matched Katrina since then, earthquakes in Japan and New Zealand, severe floods in Thailand, and multiple other major disasters around the world pushed total losses from natural disasters to a new record in 2011, $400 billion USD.\textsuperscript{13} This underlines a major trend of increased economic vulnerability to natural disasters around the world.

Physical climate change can affect companies in a number of ways. The UK Climate Impacts Programme built a tool to help businesses and other stakeholders to identify and adapt to climate risks, the Business Areas Climate Assessment Tool (BACLIAT). It identifies six major categories of business risks from climate change: markets, logistics, process, people, premises and finance.\textsuperscript{14}

The Carbon Disclosure Project used this categorization in a report for Defra in 2012 on UK businesses and adaptation, and it found that companies are more likely to identify risks to premises, logistics and finance, whereas awareness and reporting on risks to markets, people and processes were less prevalent (CDP 2012b). A survey of businesses conducted for the UK government by the Economist Intelligence Unit found that around nine out of ten companies have suffered from impacts attributable to climate change in the past three years, with half reporting an increase during this period. Around 20% have suffered damage to buildings or equipment and others report losses from supply chain disruption and travel disruption (UK Trade & Investment 2011).

There is considerable variation between sectors in terms of the risks posed by climate change. Several sectors rely on natural resources, including agricultural products, which are particularly sensitive to changes in climate, creating significant risks. Any sector that relies on water – as an ingredient or more commonly in industrial, manufacturing, cleaning or cooling processes – will face business risks from drought and the increasing cost of water. Exposure to physical damage from flooding, sea level rise, storms and even extreme heat will affect all sectors that rely on infrastructure such as transport, energy and information and communications technology (ICT) – which includes almost all companies, to

<table>
<thead>
<tr>
<th>Category of business risk</th>
<th>Definition</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Markets</td>
<td>Changes in demand for certain goods and services</td>
<td>Climate sensitive markets, e.g., tourism\textsuperscript{15}</td>
</tr>
<tr>
<td>Logistics</td>
<td>Disruption to supply chains, utilities, transport, ICT and other critical infrastructures.</td>
<td>Businesses rely on infrastructure that fails during extreme weather events</td>
</tr>
<tr>
<td>Process</td>
<td>Climate affects on industrial, manufacturing, agricultural or other business processes and service delivery</td>
<td>The effects of drought on process water for mining companies</td>
</tr>
<tr>
<td>People</td>
<td>Changing conditions for employees, customers and lifestyles</td>
<td>Health, safety and skills implications for employees</td>
</tr>
<tr>
<td>Premises</td>
<td>Direct impacts from extreme weather and slow onset climate change on built infrastructure and other assets, including facilities management and maintenance</td>
<td>Vodafone premises in Ikitelli, Turkey, were flooded in September 2009, threatening the data of over 3.8 million customers</td>
</tr>
<tr>
<td>Finance</td>
<td>Changing conditions for insurance, investments, financial reporting, cost of borrowing, stakeholder reputation, etc.</td>
<td>The Investor Network on Climate Risk takes a keen look at companies’ assessment of climate risks and opportunities</td>
</tr>
</tbody>
</table>


\textsuperscript{12} See footnote 20.

\textsuperscript{13} See footnote 18. Obviously the earthquakes are not climate-related, but we mention them here as another disaster risk.

\textsuperscript{14} See http://www.ukcip.org.uk/bacliat/.

\textsuperscript{15} See, for example, Gössling et al. (2011), on climate and tourism in OECD countries.

\textsuperscript{16} See, for example, UNDP (2011).

\textsuperscript{17} See Acclimatise (2010).

\textsuperscript{18} See, for example, Trades Union Congress (2009).


\textsuperscript{20} See Ceres (2012).
Table 2: Key climate risks and opportunities for different sectors

<table>
<thead>
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<th>Sector</th>
<th>Key risks and opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extractive industries (incl.</td>
<td>Key risks: Physical risks to assets and operations; water shortages</td>
</tr>
<tr>
<td>mining, oil and gas)</td>
<td>Opportunities: Cost savings from efficiencies</td>
</tr>
<tr>
<td>Utilities (incl. water, energy, waste)</td>
<td>Key risks: Supply risks from water shortages and distribution risks from extreme weather impacts on infrastructure; new demand patterns threaten supply security</td>
</tr>
<tr>
<td></td>
<td>Opportunities: Changing weather patterns provide opportunities for new forms of energy production, water capture and processing efficiencies</td>
</tr>
<tr>
<td>ICT (incl. telecoms, data and computing)</td>
<td>Key risks: Criticality of vulnerable nodes within overall system (e.g. servers); sensitivity to extreme heat</td>
</tr>
<tr>
<td></td>
<td>Opportunities: Networked systems are inherently more resilient, ICT provides adaptation solutions to many sectors</td>
</tr>
<tr>
<td>Food and beverage</td>
<td>Key risks: Price fluctuations and security of supply for agricultural products</td>
</tr>
<tr>
<td></td>
<td>Opportunities: Some short term positive impacts on agriculture; new consumer preferences</td>
</tr>
<tr>
<td>Financial</td>
<td>Key risks: Undisclosed and unidentified climate risks within insured/ invested companies</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>Key risks: Extreme weather disrupts logistics and global supply chains; industrial processes sensitive to climate conditions (e.g. heat waves)</td>
</tr>
<tr>
<td></td>
<td>Opportunities: Competitive advantage for firms that are most resilient</td>
</tr>
<tr>
<td>Pharmaceuticals</td>
<td>Key risks: Water shortages and temperature impacts to sensitive processes and storage</td>
</tr>
</tbody>
</table>

Source: Authors’ analysis.

Since Thailand is a popular production site among multinational companies, the economic consequences of the flood were felt around the world. The hardest-hit sectors were electronics, automobiles and medical equipment. Some of the notable companies who were forced to halt production included Toyota, Honda, Mazda, Nissan, Mitsubishi, Sony, and Nikon (Impact Forecasting 2012). Disruption caused by flood waters forced nine Japanese car producers to cease operations, resulting in a production loss of 6,000 cars a day (Munich RE 2012).

Business Attitudes Towards Climate Risks

Partly as a result of the different risks faced, business leaders show different attitudes to climate risks. Whilst the costs of climate change are projected to far outweigh the benefits at the societal and global level, it is interesting to note that business leaders often claim their companies see more opportunities than risks (UK Trade & Investment 2011).

Our research indicates that while most companies consider action on mitigation to be good to publicize, awareness and internal action on adaptation is sometimes kept hidden out of a reluctance to advertise the risks that those companies face. Many companies therefore say little publicly when it comes to the subject of climate impacts and risk,

 varying degrees. Table 2 identifies key climate risks and opportunities for different sectors, based on the aut and analysis of relevant literature.

THE 2011 BANGKOK FLOODS – A CASE STUDY

In October 2011, Thailand’s capital, Bangkok, was hit by severe flooding. Thai authorities reported that more than 7,510 industrial and manufacturing plants were damaged by floods in 40 separate provinces (Impact Forecasting 2012). Total economic losses as of Dec. 1, 2011, were estimated at $46 billion USD, according to the World Bank; the manufacturing sector was hit the hardest, with roughly $32 billion USD in losses. The World Bank also estimated that the public and private sectors would need to spend more than $25 billion USD for recovery and reconstruction and to reduce future flood risks. In order to make Bangkok more resilient, Thai officials were encouraged to invest in flood protection, improved drainage, flood barriers, improved retention areas and prevention, and to use land-use planning effectively.

even when they are well aware of the issues and are taking steps internally to manage their response.

However, some companies are increasingly sharing their experiences of climate impacts and advertising their approach to adaptation, not least to reassure their shareholders and potential new investors. As one interviewee put it, up to five years ago, and especially in the lead-up to COP15 in Copenhagen, “mitigation was at the centre” of business discussion of climate change. Since then, however, adaptation and “business resilience” have risen in prominence, and companies are taking a much more balanced approach.
7 BEYOND CLIMATE CHANGE

Climate change clearly poses great risks to many businesses, but it is not the only environmental challenge that companies face. Some respondents to our survey said they had been working on sustainability issues since the 1980s, while others started much more recently. For several companies, 2006 and 2007 were important years in terms of stepping up their efforts, both on climate change and more broadly on sustainability. As one respondent said:

Before 2007, there wasn’t even any work on climate change or sustainability at all at our company. ...Now at the group level we have action plans and each committee has its chief sustainability officer. It is primarily carbon footprint that we have been working on, but also water, energy efficiency, recycling.

Our interviews revealed that increasing attention to climate change has catalyzed a growing interest and activity on non-climate environmental and sustainability issues. As some companies’ knowledge of these issues has matured, their approach has changed. One interviewee described it thus: “We have gone from a climate change-driven approach to a sustainability driven approach.”

WATER AND OTHER RESOURCE SCARCITY

When we asked companies how important various environmental issues were for them, climate change was, not surprisingly for this group, the top concern, followed by pollution/emissions. However, concerns about water and, to a lesser extent, biodiversity have noticeably increased, as shown in Figure 5.

Water scarcity is an important business risk for an increasingly broad range of companies; no longer is this just an issue for heavy users such as extractive industries and those that require industrial cooling processes, but also for light manufacturers and others who used to count on a readily available supply of cheap water. A mixture of factors including increased domestic and industrial demand, degrading water resources, ageing supply infrastructure and climate change are creating new risk patterns. Global demand for freshwater is expected to exceed supply by 40% by 2030, and one-third of the world’s population, mostly in developing countries, will live in basins with deficits of 50% or more (2030 Water Resources Group 2009, p.40).

Our interviewees stressed that water scarcity is a growing business risk:

All environmental issues have become more important. Waste management, water usage, chemicals, biodiversity... but the biggest change is probably water.

Our CSR report review found similar concerns, along with increasing worries about fossil-fuel scarcity, as shown in Figure 6.

Businesses and strategically minded policy-makers are keenly aware that rapid global development is increasing pressure on a range of resources, and that scarcity of some critical resources will start to affect...
and limit commercial activity and consumption. For example, around 83 billion tonnes of minerals, metals and biomass will be extracted from the earth in 2030 – 55% more than in 2010 (KPMG International 2012).

SEI focussed on this topic in a series of reports for 3C partners, Resource Scarcity, Climate Change and Business in a Finite World, using scenario modelling to assess the implications of constraints on metals, biomass and water scarcity for a low-carbon economy. Building a “green” economy – with a special focus on energy – is seen as a key strategy to reduce GHG emissions and prevent dangerous climate change. SEI’s studies looked at how scarcity of key metals used for technologies such as photovoltaics, wind turbines, and electric and hybrid cars might hamper growth in those industries. The biomass study explored the potential for building a “bio-based” economy, starting with advanced bioenergy development, in the context of fast-rising food demand and degrading ecosystems. The water study looked at how the expansion of low-carbon electricity generation technologies might be limited by water scarcity, and might also exacerbate water scarcity. The key lesson from the three studies was that the future of the low-carbon economy depends on the ability of businesses and policy-makers to recognize these real constraints and respond appropriately.

Our survey and interviews also revealed that wider resource scarcity is beginning to be seen as a business risk, although awareness is lower than for other issues. It seems that mainstream businesses have yet to fully grasp the medium-term implications of global development on the current scale and the impact this will have resource availability and business resilience. There is also only a slowly developing awareness among businesses of how interconnected resource scarcities are.

**BIODIVERSITY LOSS AS AN INCREASING BUSINESS RISK**

Awareness of biodiversity as a business issue has increased significantly among our survey correspondents, as shown in Figures 5 and 6. Many businesses depend on products and services provided by the natural environment and more generally on the healthy diversity of natural systems. This includes all companies that use or develop food, fuel and fibre, as well as those that benefit from the stability provided by ecosystem services, which include the regulation of air, soil, water and climate. However, business activity can lead to the loss of biodiversity, and these externalities are generally not captured through regular market prices. Climate change also adds to the pressure on biodiversity.

Market and policy innovations are now being explored to involve businesses in the protection of biodiversity. Banks in particular have begun to discuss with scientists and policy-makers how to measure and
value biodiversity and natural capital so that payment mechanisms and market services can be deployed to protect these resources to the ultimate benefit of the economy and business, as well as biodiversity (see, for example, UNEP Finance Initiative 2008). The implication is that businesses might increasingly have to pay for ecosystem services. This means new costs, but also opportunities for innovation, reputational benefits and efficiency improvements that make companies more resilient and competitive.

Most companies are taking action on the issues they report as being most important, which is both predictable and reassuring. However, some companies, especially in our interviews, said that it is not always clear what companies can or should do about issues such as fossil fuel scarcity and biodiversity, especially where they see no way out of the status quo. As one interviewee put it: “With biodiversity, we think that it is important, but we don’t quite know how it relates to our organization.”

**INTERACTION BETWEEN THE DIFFERENT SUSTAINABILITY AREAS INCREASES COMPLEXITY**

Climate change is a direct source of risk for businesses, but it is also a driver of a number of related business risks, including water scarcity, resource scarcity and biodiversity loss, among others. As well as driving the risks, climate change can also provide a route for businesses to become educated about these wider sustainability issues.

What further complicates matters is that there are complex interactions between several of the environmental issues. For example, a 2012 KPMG International report identified climate change as one of 10 “sustainability megaforces” that will significantly affect corporate growth globally over the next two decades, and noted that climate acts as a driver or risk magnifier on most, if not all, of the other megaforces, including resource and water scarcity, food security and ecosystem decline (KPMG International 2012). Climate impacts also present direct risks to urbanization, wealth creation and energy systems, as a growing population is exposed to additional hazards. In this context, mitigating climate change and building a low-carbon economy are also profoundly challenging, as there are many needs to be met simultaneously.

It is clear that climate change affects a number of “non-climate” business areas and cannot be easily separated from other types of sustainability challenges. One helpful framework to understand connections between climate change and water, energy and food security – and between those three issues as well – is the “nexus” approach developed by SEI and multiple partners (Hoff 2011). The goal of our nexus research is to improve the understanding of the interdependency between water resources, energy production and agriculture, and in the process, increase efficiency, reduce trade-offs, build synergies and improve governance across sectors to spur development towards a green economy.

To support nexus-focused analyses, SEI has linked its LEAP (Long-range Energy Alternatives Planning) and WEAP (Water Evaluation and Planning) tools, allowing for integrated water and energy planning in the context of climate change. While this work is geared to policy-makers and planners, it can very much inform businesses as well, especially in the water, energy and agriculture sectors (for an overview, see Purkey et al. 2012).

Decreasing emissions from energy could also have implications for development. An SEI report prepared for the Rio+20 conference in 2012 addressed the combined challenge of securing energy access to billions of people who currently lack energy access, while at the same time decreasing emissions (Nilsson et al. 2012). Achieving this will require a transformation of global energy systems, which poses enormous challenges but also opens up enormous opportunities for innovation and new business ventures.
This report, which marks the end of a partnership programme between 3C and SEI, has offered a snapshot of evolving business perspectives on climate change and sustainability. Awareness of climate change has increased during this time, and businesses in particular have become more aware of how extreme weather, natural disasters and other climate-related risks could affect their operations. While many companies are not actively involved in climate issues, many of those that are have become more sophisticated, knowledgeable and engaged, as is clear not only from our research, but from recent work by the Carbon Disclosure Project, the World Economic Forum, and others. Corporate GHG emissions reporting has become quite widespread, and companies are increasingly asking their suppliers to decrease their emissions.

Companies’ actions and attitudes towards climate change are influenced by several drivers, and our survey found that customers and, increasingly, investors are pushing businesses to do more – not only to reduce their emissions, but also to identify, measure and work to reduce climate risks. While climate change adaptation is a relatively new concept in the corporate world, we expect it to gain traction over the next several years, with more and more companies recognizing and trying to address vulnerabilities in their own operations and across their supply chains, distribution systems and key markets. Future research, including new projects that have been launched within SEI, could contribute to businesses’ understanding of these issues and also inform policy-makers and regulators working with those companies.

As we noted in the previous section, businesses also increasingly see climate change as one of a broader set of sustainability issues that they must address, both on ethical grounds, and to ensure that their operations are resilient. Figure 7 shows the environmental issues that they identified as most important for the future.

This links to another issue identified in our research: that businesses face considerable uncertainty, both in terms of what will happen to policy and markets, and in terms of how the severity of future climate change and other environmental impacts that may affect their operations. Companies are still struggling to get a grip on these complex issues and determine how to best address them.

Another branch of uncertainty concerns societies’ expectations of business and the evolving, potentially

![Figure 7: Most important environmental issues for the future, as identified in our survey](Note: Each company was allowed to identify up to three issues.)
more powerful and influential roles that some major corporations could play in the governance of natural resources. As scarcities become more widespread and more severe, businesses are more likely to come into conflict with other resource users, including local populations, local governments and other businesses. As owners of several resource stocks and as managers of important – potentially critical – supply chains, businesses have an increasing stake in how resources are managed and in identifying solutions to sustainability challenges. The role of the private sector has never been more important in addressing climate change and wider sustainability issues.

Uncertainty is becoming the “new normal”. Companies that are well placed to deal with uncertainty, and even capitalize and feed off the opportunities that this uncertainty presents, are likelier to succeed. Acting on this insight can be difficult, but it will be an important task for businesses in the next few years. As they do so, we expect that they will increasingly realize that sustainability cannot be treated as an “add-on”, in the way that many companies have treated it – and CSR – in the past. Companies need to take a holistic view and treat sustainability – including climate change – as a core business issue in order to turn risks into opportunities.

Whilst the risks facing businesses clearly extend beyond climate change itself, the solutions are often complementary to one another: water efficiency, resource efficiency, energy efficiency; paying for and protecting ecosystem services, resilient supply chains, efficient supply chains. The benefits of sustainability are often the same, irrespective of the particular issue at hand: cost savings, lower insurance premiums, business resilience, compliance, competitiveness, customer and employee loyalty and satisfaction.

Finally, it is important to note a broader shift in businesses’ approach to climate change. While high-profile discussion and action on climate has dwindled since COP15 in Copenhagen, our study indicates that climate concerns are gradually being institutionalized within companies (at least those we sampled). This, in turn, significantly strengthens businesses’ internal capacity to act meaningfully in response to climate change and related challenges.

This institutionalization process is visible in the establishment of metrics and monitoring systems, the hiring of new related kinds of competence, and the establishment of new departments. It also becomes apparent in the matrix of relationships in which more and more companies in various supply chains are concerned with GHG emissions, with climate vulnerabilities and with other sustainability issues. This is a promising trend that will be interesting to watch going forward.
REFERENCES


The Stockholm Environment Institute

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