

### 3 Climate Change: Overview of Risks and Opportunities

“The far-reaching effects of climate change on business become clearer when you start to think about the different kinds of risk—most of which can be transformed into opportunities—and how they could affect the value of your company.”

- Harvard Business Review (2007)

The secondary risks and opportunities from climate change can be summarised within a number of categories. Despite their categorisation, each of the risks and opportunities share a common element: they are the result of social, economic and political responses designed to help address the climate challenge. In other words, the categories discussed below outline the implications of a worldwide concern over anthropogenic (man-made) climate change, and reflect attempts by society to reduce this threat to ecosystems and human livelihoods. It should be noted, however, that these responses are not necessarily without unintended consequences, and are often supported by other, non-climate, related objectives, an issue that is discussed in greater detail in the remainder of this document.

Each of the major secondary risk and opportunity categories from climate change are considered in turn below:

**Table 4: Secondary Risks from Climate Change**

Risk Categories	
Legal and Regulatory	<p>The most commonly cited climate risk is concerned with the introduction of regulations and legislation to address climate change. The scope of this regulatory change is wide-ranging and operates at various geographical levels:</p> <p><b>International / Regional Level</b></p> <ul style="list-style-type: none"> <li>▪ International emissions caps placed on specific countries, including developed countries and more advanced developing countries</li> <li>▪ The introduction of sector-based emission caps or intensity targets for carbon intensive sectors on a global basis. Relevant sectors affected include iron and steel, power generation and cement</li> <li>▪ The introduction of sector-based emission caps or intensity targets at a regional (e.g. European Union) level</li> <li>▪ Any other climate related regulation requiring countries or institutions to report or reduce their emissions</li> </ul> <p><b>National Level</b></p> <ul style="list-style-type: none"> <li>▪ Measures requiring institutions and firms to engage in mandatory reporting of emissions</li> <li>▪ The setting of national emission reduction targets with associated compliance requirements devolved to the industry and company level</li> <li>▪ Compliance mechanisms can include the use of economic instruments such as ‘cap and trade’ emissions trading schemes or carbon taxes, as a means for pricing carbon in the economy and</li> </ul>

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	<p>thereby promoting emission reductions</p> <ul style="list-style-type: none"> <li>▪ The introduction of sector-based emission caps or intensity targets at a national level</li> <li>▪ The implementation of additional regulatory measures relating to building codes, the mandatory introduction of low carbon technologies, the implementation of minimum efficiency standards for electrical equipment, vehicle emission standards, industry energy efficiency targets etc. Regulatory reform is an ongoing development in this category</li> <li>▪ Requirements to explicitly consider the climate change impacts of an infrastructure development as part of the Environmental Impact Assessment (EIA) process</li> <li>▪ Potentially reduced foreign direct investment or national investment due to regulatory measures or compliance costs introduced to address climate change. Other factors influencing investment such as labour costs and productivity, political stability and available infrastructure are also key in this regard</li> </ul> <p><b>Provincial / Local Level</b></p> <ul style="list-style-type: none"> <li>▪ The implementation of any of the above national measures in areas of provincial or municipal authority. Examples include within transportation, electrical and waste services</li> </ul> <p>It should be borne in mind that regulations enacted in one country or region can and often do have an important bearing on other countries. A good example of a regional regulation with global reach is the EU Directive on Aviation, a measure designed to address aviation emissions that affects all countries flying to EU based airports.</p> <p>Regulatory risk from climate change can increase energy and raw material prices, result in further reporting requirements, deter investment in certain technologies, raise operating costs and promote commercial concerns for energy and carbon intensive industries.</p>
<p><b>Trade and Market Access</b></p>	<p>Issues related to potential trade barriers and shifts in commercial markets from climate change are an evolving area of climate interest. Key risk areas include:</p> <ul style="list-style-type: none"> <li>▪ Changes in consumer preferences away from carbon intensive products and services, reducing the market for certain suppliers and industries. Changes in demand and pricing are critical in this respect</li> <li>▪ Reduced global demand for particular fossil fuel technologies and resources, including coal and oil energy supplies</li> <li>▪ The introduction of climate change specifications for goods imported into specific countries, including the imposition of taxation on imports through border tax adjustments (BTAs). This risk encompasses various trade related barriers that may be developed in response to climate concerns</li> <li>▪ The promotion of 'local' tourism, particularly within developed country markets, with the potential to impact on tourism demand in other countries. This risk applies particularly to developing countries that rely to a considerable extent on tourism based earnings</li> </ul>

Risk Categories	
	<ul style="list-style-type: none"> <li>▪ An increased cost for certain imported goods as a result of climate initiatives implemented in trading partner countries. This change in price is related to the carbon content of specific goods and has the ability to impact the trade balance and host companies directly</li> <li>▪ Continued exposure to high fuel costs, such as rising oil prices, in the absence of a concerted effort to reduce national energy and fuel demand. At risk are crude oil and/or refined petroleum product importers and sectors that rely heavily on such inputs</li> </ul>
Country Level Investment	<p>Country-level investment risk from climate change is reported here as a specific area of risk related to:</p> <ul style="list-style-type: none"> <li>▪ Insufficient national investment in skills and competencies to support low carbon industries and initiatives</li> <li>▪ Threats of NGO boycotts, protests and other civic action deterring investments in fossil fuel technologies and related infrastructure</li> <li>▪ Costs of Research and Development (R&amp;D) programmes into fossil fuel alternatives and related technology demonstration</li> <li>▪ The introduction of potentially costly financial commitments under a future carbon regulatory regime for long-lived capital assets. This applies particularly to fossil fuel infrastructure</li> </ul>
Supply Chain	<p>Supply chain issues are an important area of climate risk. Of key concern is that carbon related costs can be passed down by suppliers, increasing operational costs for particular sectors. Companies downstream of carbon intensive production are especially at risk.</p> <p>In addition, a number of companies across the globe are involved in activities to 'green' their supply chains in an effort to reduce their own carbon footprint. These efforts could have wide-ranging implications in terms of added costs to the companies themselves, as well as concerns for upstream and downstream industries, as discussed below:</p> <p><b>Upstream</b></p> <ul style="list-style-type: none"> <li>▪ Suppliers to companies may be required to report on their emissions, reduce their emissions, or indeed, fall out of favour with current or potential clients</li> <li>▪ Arguably the most widely publicised activity in this area concerns product 'food miles' or 'air miles'. Retailer or industry association led action (particularly within developed countries) to reduce emissions related to the transport and packaging of goods can have potentially significant impacts on certain industries and export led businesses located at distance from markets</li> </ul> <p><b>Downstream</b></p> <ul style="list-style-type: none"> <li>▪ Downstream sectors may be required by companies greening their supply chains to re-use, recover or recycle finished products as part of wider initiatives to reduce emissions in the life cycle of products. Companies greening their supply chains may also need to take an active and direct role in the reutilisation and effective disposal of their products</li> </ul> <p>It is important to note the geographical distribution of supply chains. Climate regulation in different countries and regions of the world can</p>

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	<p>have an important bearing on costs associated with goods imported by countries without any such legislation. In essence, the presence of global supply chains requires a global perspective on all facets of climate related risk.</p>
<b>Investor</b>	<p>A growing body of banks and investors are increasingly concerned about the climate change liabilities associated with companies' activities and investments. The most well-known initiative in this regard is the investor led Carbon Disclosure Project (CDP), which was launched in 2000. The CDP requests companies across the globe to report on their greenhouse gas (GHG) emissions and outline the measures they are adopting to address their carbon liabilities.</p> <p>Investor risk on climate change has become a more active area, made up of the following elements:</p> <p><b>For Companies:</b></p> <ul style="list-style-type: none"><li>▪ Increasing requirements to engage in non-financial reporting on climate change issues (e.g. the CDP)</li><li>▪ Challenges to organisations in terms of shareholder attitudes and the rise of shareholder activism on climate change. This includes the filing of shareholder resolutions demanding that specific actions be taken on climate change<sup>4</sup></li><li>▪ The discounting of share prices for companies poorly placed to compete in a carbon constrained economy, an activity that has already been undertaken by certain investors</li><li>▪ Changes in bank lending patterns. This includes the screening of potential projects for carbon related liabilities. The Carbon Principles, focused specifically on evaluating fossil fuel investment in the United States, and adopted by a number of leading multinational financing institutions, provides a good example of this type of activity</li><li>▪ The cost of capital associated within carbon intensive investments is an additional area of risk, and an area that could become more prominent in the future</li><li>▪ Sufficient attraction of investment for climate exposed companies or projects. Financial exposure from climate change could impact company cash flows, affecting their ability to raise capital, manage debt and impacting credit and investment ratings</li><li>▪ Capital investment requirements may also increase for companies implementing emission reduction projects, which could generate excessive wheeling concerns if investors are not effectively briefed</li></ul> <p><b>For Investors:</b></p> <ul style="list-style-type: none"><li>▪ Relative changes in share prices across and within different sectors as the cost of carbon is further priced into economies, and project evaluation processes, offering risks for companies and shareholders</li></ul>

<sup>4</sup> "More than two dozen climate-related resolutions were filed with companies in the 2004 to 2005 period, triple the number from 2000 to 2001." (Harvard Business Review, 2007 p3). In 2008, a record 54 climate resolutions were filed by shareholders (Pew Center, 2009).

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	<p>characterised by high carbon intensity</p> <ul style="list-style-type: none"> <li>▪ Risks to investors within carbon intensive projects and activities in the context of a changing market or regulatory environment</li> </ul>
Reputational	<p>An increasingly visible area of climate risk relates to heightened reputational (brand) risks for institutions that do not address, or are perceived to be taking insufficient action, to address climate change. This risk category encompasses the following:</p> <ul style="list-style-type: none"> <li>▪ Scrutiny can be placed over an organisation’s carbon footprint, as well as less direct activities through their supply chain or lending practices</li> <li>▪ Failure to address carbon liabilities can deter investors, reduce an organisation’s ability to attract skilled professionals, discourage consumers, result in negative brand effects and, in more extreme cases, lead to damaging public demonstrations, media coverage and activism campaigns. All of these effects can impact on a company’s market share and shareholder value</li> <li>▪ Reputational risks tend to be highest in environmentally and ethically sensitive markets, sectors in which brand loyalty is a key value-driver, and industries with a direct customer interface</li> </ul>
Litigation	<ul style="list-style-type: none"> <li>▪ An emerging area of climate risk lies in potential legal action against large emitting companies or entities that fail to adequately address their contribution to climate change</li> <li>▪ Spurred on by high profile cases within the United States, the potential for legal action is a concern in certain jurisdictions and can be expected to increase in severity in the medium to long-term. Areas of focus include energy utilities, aviation and the oil and gas sector, with litigation often viewed as a precursor to regulation of these sectors</li> <li>▪ This risk category includes potential claims brought forward by shareholders for gross climate related neglect on the part of companies and senior executives</li> </ul>

It is anticipated that the risks identified above will grow in severity and extent as the full effects of human induced climate change are played out. As important as the risks outlined above, however, will be the risks of inaction on climate change, which could leave a number of industries, sectors and countries exposed. This issue is considered in more depth in Section 5 below.

In addition to the risks discussed above, a number of opportunities are presented by the shift to a low carbon economy and society. Many of these opportunities are able to work in parallel with objectives related to economic growth, employment creation, energy security and social development. An outline of major opportunities is provided below:

**Table 5: Secondary Opportunities from Climate Change**

Opportunity Categories	
<b>New Markets &amp; Industries</b>	<ul style="list-style-type: none"> <li>▪ The rise of new low-carbon technologies, products, services and industries that have yet to be developed or commercialised</li> <li>▪ Includes the potential for certain countries and firms to act as market leaders in these technologies nationally and internationally</li> </ul>
<b>Growth of Existing Markets / Development of Labour Intensive Industries</b>	<ul style="list-style-type: none"> <li>▪ The development or maturation of existing markets in low-carbon technologies, products, services and industries</li> <li>▪ A host of products and industries ranging from energy efficient equipment, low-carbon packaging and renewable energy have seen significant growth in response to growing awareness of the global imperative to reduce GHG emissions. Other notable areas of opportunity include combined heat and power (cogeneration), clean coal technologies, low emission vehicles and green IT</li> <li>▪ Support for low carbon technologies also offers opportunities for labour intensive economic growth through enhanced manufacturing production in renewable energy and public transport technologies, the promotion of energy savings activities and through organic farming practices in agriculture, amongst others</li> <li>▪ In certain cases developing countries are also able to source financial support for the development of nascent low carbon industries. This includes grants provided by international donor organisations and soft loans supplied by financing institutions</li> <li>▪ Considerable scope for growth exists in the services sector, where organisations that offer low-carbon alternatives and solutions can also enjoy competitive advantage and increased market share</li> <li>▪ Taken as a whole, the major economic benefits incorporated under this opportunity category include opportunities in the manufacture, distribution, retail, export, financing and maintenance of low carbon goods and services</li> </ul>
<b>Carbon Markets</b>	<ul style="list-style-type: none"> <li>▪ Based on the establishment of tradable environmental commodities such as carbon credits and emission allowances, the value of the global carbon market has increased markedly in a short period of time, reaching \$136 Billion in 2009 (Point Carbon, 2009). In the financial services market, traded carbon volumes have grown faster than any other mainstream commodity</li> <li>▪ This market includes the sale and trade of carbon credits under the Kyoto Protocol as well the potential sale of emission reductions under the voluntary carbon market</li> <li>▪ The rise of the European Union Emissions Trading Scheme (EU ETS), the largest emissions trading scheme in the world, the maturation of the Clean Development Mechanism (CDM) and the emergence of new carbon trading schemes in North America, has generated substantial opportunities for countries and organisations to access new revenue streams and technologies in exchange for engaging in emission reduction projects</li> <li>▪ Global and regional carbon markets have established a new sub-</li> </ul>

## Opportunity Categories

sector in the financial services industry which encompasses carbon asset traders, clean energy conventional and venture capital funds and carbon brokerage services, in conjunction with emission reduction project developers

- Community based projects can also link into voluntary carbon markets. The production of carbon offsets has seen new sources of revenue linked to land restoration programmes, forestry conservation projects, community housing and the application of small-scale renewable energy technologies, providing opportunities for localised employment creation and income generation. Projects are based on the sequestration of carbon through land management programmes, or through the avoidance of emissions from fossil fuel combustion
- New mechanisms to leverage financing and support for emission reduction in energy intensive sectors across the global economy are currently under consideration within international climate change agreements. These new financing mechanisms include opportunities for particular sectors in developing countries to trade excess emissions reductions achieved below an agreed upon baseline level, and to engage in 'best practice' agreements. This approach supports the development of sector-based carbon markets, which are likely to gain momentum over the medium-term
- Opportunities also exist for particular sectors, industries, companies and traders to benefit from the introduction of a domestic emissions cap and trade scheme, including through the sale or trading of surplus credits. Under such a scenario, trading of credits with other emitters at a regional and global level could also potentially be implemented in the short to medium-term

### Trade and Market Access

The opportunities evident within this category include:

- The potential rendering of certain national exports as more competitive, as a result of lower production costs from a less carbon regulated domestic environment. This assumes, however, that corrective measures are not taken by trading partners to level the playing field (through, for example, the use of border tax adjustments) and that these exports are unaffected by other risks related to consumer preferences, retailer action, branding etc
- The promotion of low carbon tourism attractions, tours and accommodation to assist in capturing the growing 'experiential' and eco-tourism market. This includes opportunities to provide visitors the means to offset their emissions as part of travel packages
- Opportunities for product or service differentiation based on climate friendly approaches
- Reduced refined and crude oil requirements through enhanced vehicle efficiency measures, public transportation, rail-based freight and other energy demand measures in the transport sector
- Opportunities for companies to gain an early mover advantage through the early recognition and response to changes in markets for products and services

## Opportunity Categories

<p><b>Country Level Investment, Finance &amp; Technology Transfer</b></p>	<p>Climate related opportunities in this category include:</p> <ul style="list-style-type: none"> <li>▪ The promotion of energy intensive industries in less carbon regulated domestic environments. This is provided that key climate risk categories for these countries or industries are effectively navigated, as discussed above</li> <li>▪ Technology transfer can occur through the implementation of compliance based or voluntary carbon credit projects, international technology support mechanisms and bilateral agreements. Technology transfer is a key element of the multilateral climate change agreements, and opportunities could be realised under the Copenhagen Accord or subsequent agreement for developing countries to acquire this type of support</li> <li>▪ Financial assistance in the realisation of clean energy solutions and other forms of low carbon development are an important potential source of support for Nationally Appropriate Mitigation Actions (NAMAs) undertaken by developing countries</li> <li>▪ National R&amp;D programmes have the potential to result in the development of patents, licences, and other forms of intellectual property, as well as support product differentiation and enhanced industrial efficiencies</li> </ul>
<p><b>Professional Services</b></p>	<ul style="list-style-type: none"> <li>▪ This category relates to a range of environmental and professional services provided to all sectors of the economy. Areas of service rendering include in the facilitation, management, development and monitoring of low carbon solutions, including legal, technical, financial, tax-related and strategic assistance</li> </ul>
<p><b>Human Settlements, Spatial Planning and Urban Development</b></p>	<p>The development of low carbon cities has the potential to support a variety of additional socio-economic objectives, including:</p> <ul style="list-style-type: none"> <li>▪ The attraction of skilled professionals to cities characterised by enhanced transport systems, convenient and integrated mixed land use and an eco-friendly image</li> <li>▪ The establishment of improved public and non-motorised transport systems (bus and rail; pedestrian and bicycle) with benefits for eased traffic congestion, reductions in local air pollution, enhanced trip affordability and convenience for ordinary citizens, as well as improved tourist access. Substantial benefits can also be achieved in the trade balance of countries importing crude oil or refined petroleum products</li> <li>▪ Increased property values in areas supported by mixed land use and effective public transport systems</li> <li>▪ The promotion of green and low energy buildings with benefits for employee wellness and productivity</li> <li>▪ The development of efficient housing through the use of higher thermal mass construction and insulation, resulting in improved health and reductions in energy poverty for low-income households</li> </ul>
<p><b>Reputational</b></p>	<p>Reputational gains, enhanced brand image and market differentiation can be achieved for organisations through the:</p> <ul style="list-style-type: none"> <li>▪ Production or promotion of low or zero carbon products &amp; services</li> </ul>

Opportunity Categories	
	<ul style="list-style-type: none"> <li>Establishment, reporting and marketing of their climate change credentials</li> </ul> <p>Support towards the achievement of a company's' Corporate Social Responsibility (CSR) objectives can also be realised through such initiatives.</p>
Investor	<p>This category encompasses various facets, including:</p> <p><b>For Companies:</b></p> <ul style="list-style-type: none"> <li>Opportunities to improve access to capital, obtain capital at lower rates, or attract new investors based on a company's emission reduction initiatives or programmes. A range of investors from private equity to hedge funds are now active in the clean technology space, in addition to socially responsible investors<sup>5</sup></li> <li>Existing investor relations can also be enhanced through the open disclosure and management of carbon related liabilities with shareholders</li> </ul> <p><b>For Investors and Financial Services Providers:</b></p> <ul style="list-style-type: none"> <li>Opportunities exist for financial institutions to develop investment products that factor in climate change related risks in portfolio evaluations</li> <li>Investors that effectively foresee changes in asset prices under carbon regulation have the potential to derive benefit and advantage from climate change</li> </ul>
Risk Management, Efficiencies & Competitiveness	<p>Efforts to address climate change can result in a variety of additional benefits ranging from the local to national scale. These areas of potential improvement include:</p> <ul style="list-style-type: none"> <li>Enhanced commercial and industrial competitiveness through the introduction of efficiency measures, improved production methods, as well as lessened exposure to fuel and energy price fluctuations</li> <li>Improved power generation efficiencies resulting in reduced input requirements; this can be coupled with improvements in grid technologies and electrical infrastructure to reduce transmission losses and support the use of smart grids</li> <li>The use of climate concerns as an effective tool to support operational efficiencies in a manner that engages staff in positive action</li> <li>Enhanced risk and financial management practices, including improved evaluation of capital projects through consideration of carbon cost and risk factors</li> <li>Greenhouse gas emission abatement can also often support other environmental objectives including reduced local air pollution, lowered waste volumes and improved waste management, with benefits for local health and landfill services, and various forms of environmental compliance</li> </ul>

<sup>5</sup> "Clean technology, particularly energy-related, has become the fastest-growing sector in venture capital (VC) and private equity (PE), and is now the fifth-largest sector for VC in the United States" (Climate Group, 2007 p42).