



# The materiality of climate change

## *How finance copes with the ticking clock*

A 2009 report by the Asset Management Working Group of the United Nations Environment Programme Finance Initiative

The third iteration of the AMWG's 'Materiality Series'

## Executive summary

### I. A tipping point in the way we live and work

Information is critical to shaping beliefs. For investors, it can mean the creation of new market trends, in anticipation of real-world changes. In 2009, we are witnessing such a tipping point as evidence on the relevance of climate change pours in from every side. Politically, the G8 nations have committed themselves to a target of an 80% cut in their greenhouse gas emissions by 2050, which means a revolution in the way the future global economy will operate. Huge volumes of data are materialising on how climate change will affect the business world—from scientists on changes in the natural environment, from technologists on how to perform a fundamental 'engine change' to ensure that the flow of greenhouse gases is drastically curtailed, and from policymakers on the way they will shape behaviours and prices.

Responsible investors have been integrating climate change into their asset management for some time now, but *mainstream* investors still view the issue with some scepticism. This report brings together key reports from the investment world that demonstrate best practice on climate change, identifying the risks and opportunities, assessing how companies are dealing with them, and translating their performance and intentions into future financial returns. The emphasis is on corporate sector assets, but real estate is clearly an asset class sensitive to climate change and leading investors are active on this front as well.

### II. Key messages for investors

The major conclusions from this report are:

1. There is now sufficient evidence on the materiality of climate change that all investors should routinely include climate change as a factor in asset management practice. Making the change to climate-friendly growth will require an infusion of tens of billions of dollars of private sector capital.
2. Investors must start serious dialogue with policymakers to ensure *loud, long and clear* mitigation policies that will harness the power of the markets. Furthermore, climate-friendly policies reinforce energy security, which will underpin economic stability.



3. Investors want greater intervention from regulators too—they can promote greater transparency and disclosure of corporate information for investors, support mitigation technologies through public procurement practices, and mandate operating standards in every walk of life that accelerate climate-friendly technologies and resilience to climatic stresses.
4. A significant impediment to action is that, in general, corporate management has not yet grasped the immediacy of the issue. They do not plan for it and therefore do not report on it either.
5. A minority of firms have grasped the nettle, which will improve their prospects in what is sure to be a time of transformation. Brand advantage could be enormous for companies which do not simply indulge in ‘greenwash’ but instead develop consumer-appealing and effective solutions to climate change.
6. Vanguard investors have developed tools and techniques for assessing qualitative risks such as climate change. These can assist companies and investors to manage the risks and seize the opportunities.
7. Important areas where there is greater need for attention by investors include:
  - **The BRIC countries** → Understanding these economies is crucial, but climate-relevant data is sparse.
  - **Adaptation** → Risks and opportunities here have been ignored compared to the research on carbon cost.
  - **Supply chain** → The implications of carbon embedded in raw materials, transport and products in use.
8. It is in the general interest of investors to collaborate on researching these issues and gathering raw data. Scarce competitive skills can be best deployed in analysing the data once it exists. Equally, engagement with other stakeholders is most effective when it is done jointly.

### III. Evidence enough

Recent observations confirm that the worst-case scientific trajectories presented by the Intergovernmental Panel on Climate Change are being realised—or even exceeded—for some key parameters such as global temperature, sea level, ice sheet shrinkage, ocean acidification and extreme climatic events. There is a significant risk that many of the trends will accelerate, leading to an increasing risk of abrupt or irreversible climatic shifts.

Temperature rises above 2° C will be very difficult for contemporary societies to cope with and will increase the level of climate disruption through the rest of the century—yet we are on course for levels much higher than that.

There is no excuse for inaction. *The Stern Review on the Economics of Climate Change* pointed out that the two most effective strategies are reduced deforestation and better energy efficiency. These strategies do not require leaps of technology, simply acts of will. There will be many co-benefits such as job creation, clean air and vibrant ecosystems.

A preliminary survey commissioned from independent experts by the United Nations Framework Convention on Climate Change indicated that investment in the order of **USD 300-400 billion per year** will be required by 2030 to fund minimum requirements to reduce emissions and deal with the impacts of climate change. This amounts from 1% to 2% of anticipated global investment for all purposes, or less than 1% of global GDP at that date. This level of commitment is therefore doable, but the role of private sector investments is paramount as they comprise **86%** of the future investment and financial flows.

#### IV. Loud, long and clear policies on carbon

Given the uncertain governance that surrounds international agreements, and the historical reluctance of some administrations to participate in the Kyoto Protocol or to undertake stringent domestic actions, the intentions of the EU and the US are critical for confidence. The EU has consistently taken a lead position on how tough emissions targets should be, and has backed this up with many domestic actions, most famously its Emissions Trading Scheme, and is also setting the pace for intermediate 2020 emissions targets. The fact that the US is now on the verge of adopting meaningful emissions targets through the Waxman-Markey Bill, with a cap-and-trade system similar to the EU, is enormously confidence-building.

The recent declaration by the G8 of a target 80% reduction in emissions from that bloc by 2050 is encouraging, but it needs to be defined precisely, with targets for intermediate years.

Investors need:

- A global framework that avoids distortions between regions due to different regimes.
- Extension to all sectors with significant emissions including international transport and natural forests—the so-called Reduced Emissions from Deforestation and Degradation (REDD) in developing countries.
- Public sector funding of basic research & development in key technologies to bring them towards commercialisation, particularly carbon capture and storage, and solar and marine power.
- Public sector support for technology transfer and adaptation projects in developing countries.

It is vital that these measures establish a stable price trajectory for carbon emissions prices because this will guide investments in the direction of climate-friendly activities and assets. Investors should work together to advise policymakers on how best to achieve this. In two reports on the US, Goldman Sachs notes that there are many other interest groups trying to influence policy (*Energy carbonomics*, 2008) and EU (*2020 vision*, 2008). Deutsche Asset Management notes that aside from climate change being a mega-trend that will persist, the need for economic stimulus should help kick-start new technologies (*Investing in climate change*, 2009).

#### V. Regulation

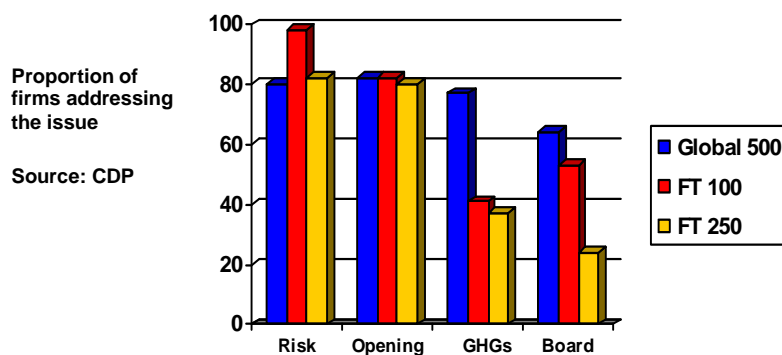
A recurring theme in current investor research into climate change is the need for higher operational standards in key areas like energy efficiency, resilience to weather events, and information for risk management. Voluntary initiatives like the Carbon Disclosure Project (CDP) have made an impact, but they can take many years to extend and will not pick up small-scale activities. In other cases, lack of awareness (e.g. where extreme events occur rarely or energy costs are a small fraction of production

costs) and multi-agent responsibility (e.g. for building usage) also make voluntary action impractical. A survey by the UNEP FI Climate Change Working Group noted that energy efficiency had not received the same attention as renewables from regulators, and was unlikely to accelerate without this (*Energy efficiency and the finance sector*, 2009). Finally, in the case of public goods such as infrastructure, there are competing demands for other non-climatic budgets.

It is important that investors collectively seek appropriate shifts in regulations and guidance through dialogue with the authorities concerned so that higher standards are introduced as soon as possible. At the tactical level, investors are alive to the impact that regulation can have, as shown in the report by CA Cheuvreux on windfall gains for utilities due to unused emissions permits in the recession (*Carbon impact*, 2009) and the work of WestLB on impending aviation regulations (*More headwinds through CO2 costs*, 2009).

## VI. Corporate management (un)awareness of climate change

Most firms see climate change as a part of corporate social responsibility, not a core business issue. Large firms are better at understanding its importance, but as the size of a company diminishes, the inattention becomes widespread. Figure 1 shows that most companies in the Global 500 and FT 350 recognise that climate change is a risk and an opportunity. However, less than half of the FT 350 has plans to deal with their greenhouse gas emissions, and a mere 23% of the FT 250 assign responsibility for it at Board level.



UBS observes that carbon constraints will alter the relativities between activities, products and regions significantly (*Reacting to climate change*, 2007). For example, the Carbon Trust points out that two thirds of the carbon involved in the recreation & leisure sector is indirect, which lead to surprising impacts when carbon prices rise (*The carbon emissions generated in all that we consume*, 2006). Goldman Sachs, in their 2008 report, *A warming investment climate*, reviews 500 companies and already finds that in heavy industry—those firms with higher levels of carbon intensity tend to trade at lower valuation multiples.

Specifically on adaptation, a review of the FT 350 by Acclimatise scored firms at 38 out of 100 on an adaptation index (*Building business resilience to inevitable climate change*, 2009). Eighty-seven percent of the firms acknowledge that their company is exposed to the impacts of a changing climate, but only 38% had undertaken a quantified risk analysis. It is notable that some sectors that are exposed to impacts because of their supplies (e.g. food), sales (e.g. retail), or assets (e.g. real estate) do not score well. Water is ahead due to pressures from regulators, cost, and key stakeholder groups.

## VII. Lead companies

For six years now, the CDP survey has revealed wide disparities in the way that individual companies address, or fail to address, climate change. For investors, it is notable that there are pacesetters in every area, which may be well-positioned to gain competitive advantage. In a multi-sector study, UBS concludes that what matters are not the actual risks and opportunities, but the individual company response—how are climate change reactions driving opportunity and risk? This theme emerges repeatedly in investor research. For example, Citigroup has covered this in Australia twice (*Carbon pollution reduction scheme: Impacts reviewed for ASX100 companies and more*, 2008; *Climate change and the ASX100: An assessment of risks and opportunities*, 2006). In developing countries, it may also be present at the country level—the Association for Sustainable and Responsible Investment in Asia found that companies in ‘Other Asia’ are much more aware and better prepared to cope with climate change issues than their opposite numbers in, say, China (*Carbon Disclosure Project: Other Asia*, 2008).

## VIII. Vanguard investors

Faced with the new phenomenon of climate change, certain investors have displayed innovative skill in identifying the fundamentals. Lehman Brothers translated much of the technical information into finance speak, and pointed out that since many companies are not financially strong, climate change could be the straw that breaks the camel’s back (*The business of climate change, Parts I and II*, 2007). Deutsche Asset Management states that climate change is such an important mega-trend that investors could create a new asset sector in this area to ensure their portfolios are well-diversified (*Investing in climate change*, 2009). Goldman Sachs also sees a rising interest in environmental issues in general, which will feed climate change as well (*A warming investment climate*, 2008). Société Générale sets out a three-pronged approach to assessing stocks through the prisms of financial cost-benefit, long-term growth, and risk management (*Back to basics*, 2008) and has applied this to the automotive sector in some depth (*Auto & pollution: Size does matter*, 2007; *Auto & pollution: Not that bad after all*, 2008; *CREAM-ing carbon risk*, 2008). Another in-depth study comes from Oddo Securities regarding carbon capture and storage (*Climate change: To store or not to store?* 2008), which faces many difficulties but seems an inevitable component of mitigation.

## IX. Gaps in the analysis

While the issue of carbon intensity or energy intensity in ‘Annex I’ countries has received considerable attention from investor research, there are other aspects of climate change that are still not well explored.

### 1. The situation in BRIC (Brazil, Russia, India, China)

These are increasingly important markets, yet there is little by way of research that answers investors’ needs, which is complicated by the language barrier. We carried out our own research to provide some basis for future work, mainly using reports by non-investment institutions.

- **Brazil** → It seems clear that the issue of preserving carbon in forests is important, and could be an important commercial consideration. Renewable energy also seems likely to be even bigger in the future, building on Brazil’s experience with bio-energy.



- **Russia** → We did not have time to investigate properly here. Potentially, climate change could be positive for the economy for the coming decades due to less severe winters.
- **India** → This is the easiest of the four BRIC countries in terms of information. HSBC reported on the good prospects for a number of Indian companies, particularly in the renewables sector (*Wide spectrum of choices: India's climate investment opportunities revealed*, 2008). Among the negatives is the fact that India is quite vulnerable to climatic impacts such as monsoon variability and the cessation of glacier-fed rivers. Also, the CDP found that corporate attention to climate change was low, which is not a good indication that companies are taking a strategic view (*Carbon Disclosure Project 2008: India 200*, 2008).
- **China** → The sparse information indicates that corporate management is inattentive to climatic risks in this country as well (*Carbon Disclosure Project 2008: China 100*, 2008). However, the stringent regulations aimed at improving energy efficiency and promoting renewables are well understood and are driving action on mitigation.

## 2. Adaptation

Coping with the impacts of climate change requires separate attention since the data is quite different from emissions. The impacts often fall on different sectors and locations compared to the ones affected under emission reductions.

- **Real estate** → Hermes carried out an exceptionally detailed study of the repercussions of climate change on real estate in the UK (*Climate change: The risks for property in the UK*, 2009). It sets the scene for work which we are sure will follow—more detailed technical research into physical responses, and equity analysis. The research identifies several critical problems that will become worse unless they are tackled in a determined way—heat stress for occupants, sewerage overflow, access problems in severe weather, and water shortages.
- **Managing the issue** → Acclimatise, in collaboration with IBM, has produced a useful checklist that directors (and investors) can use to assess corporate preparedness to deal with climatic impacts, grouped under the headings of risks, opportunities, and response (*Building business resilience to inevitable climate change*, 2009).

## 3. Supply chain

Understandably, the initial attention by financial analysts was targeted to the direct effects on companies of climatic events and carbon reduction policies, more so because the data even for that was lacking, whereas to investigate effects up and down the supply chain requires far more data. Research shows that such a simplistic approach is likely to lead to misjudgements by both companies and investors. The subject is fast gaining momentum, with the CDP's Supply Chain Initiative worthy of an honourable mention. Again, most of the activity involves carbon intensity, but climatic impacts are a significant risk too.

- **China** → There is growing reliance on China (and other developing countries) for manufacturing as well as raw materials. More than 90% of multinational companies say that China is important to their global strategies, with 52% calling it critical. There are serious threats from natural hazards, and potential logistical bottlenecks at ports, notes the Chartered Insurance Institute (*Coping with climate change*, 2009).



- **Carbon tariffs** → Countries with emissions targets might tax imports from other places. Trucost notes that such a move could have significant impacts on the bottom line for some multinationals (e.g. Alcoa) or steep increases in cost for their customers (*Manufacturers: Profits at risk from carbon costs*, 2008).
- **Indirect emissions** → For the recreation & leisure sector, the Carbon Trust reports that two-thirds of the carbon is embedded in the sector's inputs (*The carbon emissions generated in all that we consume*, 2006). Getting to grips with this needs a methodical approach, focusing on the high impact areas and first level suppliers. The CDP provides guidance and workshops to raise standards (*Shared value: Managing climate change in the supply chain*, 2009).

#### 4. Collaboration

Investors need to work together to tackle the issues involved in adaptation and mitigation for several reasons:

- Information is highly complex and may be expensive to obtain or generate. Cooperating to establish databases makes sense—the real skill comes in interpreting it. The CDP shows what can be done.
- Engagement with stakeholders is imperative but would be impractical for individual investors to perform individually (and multiple approaches would be unwelcome).
- As an industry, investors have been tardy in communicating with policymakers and regulators on climate change. Given the financial implications of the enormous changes which are now going to take place in energy use and climatic patterns, it is surely time for investors to enter this arena so that funds can be deployed efficiently and effectively.



## Methodology

### Background: The AMWG's 'Materiality Series'

Sustainable investment (SI), responsible investment (RI)—and sustainable and responsible investment ('the new SRI')—has gained so much recognition in the past few years that it is increasingly difficult to remember a time when financial analysts thought climate change was just a subject for tree huggers. Yet when the AMWG began to conceive its first materiality study<sup>1</sup> ('Materiality I') in 2002, sustainability concerns were far distant from the world of mainstream finance. Several institutions and many thoughtful people played roles in bringing sustainability into the world of finance, but the role of the AMWG was seminal.

*'A graph charting the number of pages discussing climate change in reports by investment analysts from traditional brokerages would resemble the renowned "hockey stick" graph of temperatures over the last 1,000 years. The graph would be essentially flat at zero until about three years ago, when the United Nations Environment Programme Finance Initiative (UNEP FI) request for analyst research on environmental, social, and governance (ESG) issues sparked a sudden spike in coverage.'* (SRI-adviser.com, 2007)<sup>2</sup>

Why? The AMWG was one of only a few financial initiatives then that had UN support, global membership and a commitment to using the tools of sustainability. The Carbon Disclosure Project was just beginning, and the UN-backed Principles for Responsible Investment (PRI) did not yet exist. With the exception of one or two specialists, there were no sell-side<sup>3</sup> investment analysts routinely (or even occasionally) covering environmental, social and governance (ESG) issues, though sell-side and investor interest had picked up considerably following the governance scandals of 2001 and 2002. The term ESG, which is now the preferred term for a style of investing that integrates the consideration of sustainability factors, was made far more prominent by the Materiality Series, and quickly supplanted the earlier term, Socially Responsible Investment ('the traditional SRI'). We are not certain whether the AMWG was actually the first to use the term ESG, but we have little doubt that the Materiality Series catalysed more rapid acceptance of it.

The evolution of the terms follows an evolution in thinking about sustainability that has broadened its appeal to many investors—retail, institutional, and individual. The distinction is clearer than much of the real-world practice, but SI, RI, the new SRI or ESG connotes the use of sustainability and governance variables as factors in portfolio construction, using the variables as indicators of

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<sup>1</sup> The first two materiality studies were:

Materiality I: *The Materiality of Social, Environmental, and Corporate Governance Issues to Equity Pricing* (2004), UNEP FI Asset Management Working Group  
[http://www.unepfi.org/fileadmin/documents/amwg\\_materiality\\_equity\\_pricing\\_report\\_2004.pdf](http://www.unepfi.org/fileadmin/documents/amwg_materiality_equity_pricing_report_2004.pdf)

Materiality II: *Show Me The Money: Linking Environmental, Social and Governance Issues to Company Value* (2006), UNEP FI Asset Management Working Group.  
[http://www.unepfi.org/fileadmin/documents/show\\_me\\_the\\_money.pdf](http://www.unepfi.org/fileadmin/documents/show_me_the_money.pdf)

<sup>2</sup> <http://www.sri-adviser.com/article.mpl?sfArticleId=2237>

<sup>3</sup> Sell-side refers to the activity of providing services to those who buy or hold assets, such as pension funds.



management quality. The traditional SRI, on the other hand, more often conveys the application of ethical criteria, often in the form of industry or sector exclusions, without reference to their financial implications. What the Materiality Series was so effective in doing was to hold the coming-out ball for the idea that ESG (particularly environmental and social) factors have financial relevance, and are as useful in constructing a synthesis of management quality as strictly financial factors.

The Materiality Series also helped lay the groundwork for the inclusion of ESG into sell-side analysis, spearheaded by the Enhanced Analytics Initiative, which subsequently joined forces with the PRI under the PRI banner. Prior to Materiality I, sell-side coverage of ESG factors was limited primarily to occasions when a corporation made a mistake large enough to cause or threaten a value collapse, or to occasions when new regulations imposed new requirements significant enough to change the competitive and financial landscapes—the best example is probably the entry into force of the EU Emissions Trading Scheme in 2005. Asset managers that take into account ESG factors, such as the members of the AMWG, had been aware that ESG-related disasters can often be foreseen by examining corporate policies and behaviour preceding the disaster, and that such examination could be an effective tool in avoiding risks that had not been widely recognised in financial markets. Most sell-side analysts took no notice of this, but after eleven institutions submitted ESG-themed analysis for Materiality I, many recognised that clients were interested in this research. The quality of the sell-side reports produced for Materiality II was significantly superior to that of most of the reports constructed for the first—a testament to the growing interest among asset managers and asset owners in sustainability.

It seems fairly obvious now that sell-side analysis had a pivotal role to play in broader financial market acceptance of ESG analysis, but that was far from plain when the AMWG conceived and produced Materiality I. ESG and sustainability are not yet routinely incorporated into mainstream finance, but we are well beyond the thin end of the wedge now—it is unusual to find sell-side reports covering competitiveness in sectors with high greenhouse gas emissions that do not take some account of the fast-changing climate regulatory regime, and governance factors are well accepted as part of any fundamental financial analysis.

### This report: Materiality III

The third iteration of the AMWG's Materiality Series focuses on climate change. The report takes the form of a review of key financial analyst research on climate change, supplemented with AMWG commentary in areas where these papers are lacking. All the views expressed in this report on specific security valuation, stock performance and market recommendations directly reflect the authors' views.

As far as possible, despite their different approaches, the case studies and main considerations are presented in a summarised format for ease of reference. The content of the research may be partially represented.

Please note that the studies presented in this report appeared over the period 2006 until early 2009. Consequently, some of the rationales, strategies, and governmental references may be outdated. Nonetheless, this report represents the approaches of leading financial institutions and governing bodies, and provides a basis for further research and discussion.

The flow of the report follows the logic of examining the principal factors involved in climate change, before displaying a wide spectrum of analyses by leading investment brokers in Section 11. Section 5 looks at the most recent science, the financial implications of climate change policies, and key messages for asset management, while Section 6 discusses developments in two influential political



blocs—the US and EU. Section 7 investigates the prospects for high-carbon industries, the potential for carbon capture and storage, and the barriers to more efficient use of energy. Next, Section 8 discusses the BRIC countries (Brazil, Russia, India, China) since they are increasingly important in the global economy and are key players in the climate change negotiations. Sections 9 and 10 briefly review the issues of adaptation and supply chain in the context of climate change—it is often wrongly assumed that in the corporate sector, climate change is just about reducing carbon in one’s own firm. Climatic impacts and the question of carbon intensity in one’s supply chain and product deployment are also vital.