

OLIVER WYMAN

Financial Services

**Climate Change:
Risks and opportunities for global financial services**



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This report is a product of Oliver Wyman working closely with our Senior Advisory Board members on ground-breaking content with strategic implications for financial services. We intend to continue such collaboration on issues of similar importance in the coming years.

The report at a glance

The multiple unknowns within climate change and the global response to it present a range of problems for financial institutions in terms of their growth strategies, risk management and brand positioning.

In general, the high mobility of capital and risk assessment expertise possessed by financial institutions position the industry well to respond to the volatilities that may come about, but leaders and managers will need to take steps to anticipate and address the changing business environment of the future.

Unforeseen levels of credit default and asset value decline as a result of carbon constraints represent significant risks in the short-to-medium term, but they are countered by growing opportunities in infrastructure and clean energy financing, new commodities trading, and new hedging requirements.

However, the possible drag on economic output from global temperature rises and a widespread commitment to greenhouse gas abatement measures will gradually outstrip the opportunities, and could cost the industry up to \$530 BN in lost revenues by 2030.

Corporate and institutional banking and asset management may see the strongest upsides from climate change over the next 20 years, while the insurance sector faces the greatest threats, and could suffer up to \$150 BN of annual losses from extreme weather events by 2030. The retail market for “green” banking products is currently tiny, but “green” issues could increasingly influence consumer choice of service provider over time.

For many firms climate change remains below the strategic radar, although some of the largest institutions have put in place measures that cover their strategic positioning, product development, operational processes, and stakeholder relations.

As an immediate priority financial institutions should stress-test their portfolios, strengthen their green credentials, and develop new products to anticipate changing customer demand.

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Executive Summary

Climate change may appear to be a slow burn issue for the financial sector, but firms would be wise to give it significant attention, as much for the emerging upsides of changing demand as for protecting themselves against the erosion of value in the long term.

Governments, regulators and business leaders are grappling with the uncertainties inherent in climate change for their economies, industries and firms. They need to address these issues in the context of many unknowns and a wide range of views and attitudes on the subject. This report does not take a view on climate change per se – it assumes the emerging scientific consensus, and maps the strategic and operational implications for financial institutions in the event of that playing out.

Climate change, and the range of reactions to it that are already under way, is creating new markets and new risks for financial services, as for all industries. What is different for financial institutions is that their capital mobility is very high and thus they are much better equipped to react than many other industries. The capacity of financial institutions to hedge themselves and their customers against a range of business risks, develop new products to cater for changing demand and invest in growing markets means the sector is inherently well placed to cope with most of the scenarios the future might bring.

However, the ability of firms to create value from the opportunities and threats depends critically on how their leaders and managers anticipate and address the changing business environment.

The positives – new markets

Measures by industries, governments and consumers to reduce their carbon emissions and protect themselves against climate uncertainties will progressively strengthen demand for existing and new financial products.

Financing and advisory

Firms in carbon-intensive sectors are already seeking finance to help them reduce greenhouse gas emissions. Clean technology and renewable energy firms represent attractive sectors for investment and, over the next decade, they may become sizeable markets, attracting \$225 BN of new investment a year by 2016. In the public sphere, large sums of capital (\$20 BN rising to \$200 BN a year) will be needed in the coming decades to develop, modify and renew key energy, transportation and flood defence infrastructure across the world.

Hedging and trading

Demand from industry is rising for a range of risk transfer mechanisms to protect firms against the rise in energy prices, changing weather patterns, and the possible failure of new technologies. The emergence of carbon as a tradable commodity has given rise to sophisticated products that are beginning to attract large financial institutions and enable a fuller exploitation of the asset.

Consumer revenues

Awareness of “green” issues is encouraging growth in socially responsible investment (SRI) by institutions and consumers alike and, although the retail market for loans, mortgages and insurance that reward low carbon behaviour is currently small, it could take off quite quickly. Likewise, greater awareness of flooding and windstorms has begun to increase the appetite of at risk customers for property and casualty insurance.

The negatives – greater risks

Credit quality and losses

Climate change will alter the quality of lenders’ and investors’ credit portfolios, increasing the chance of defaults, write-offs and asset value decline. The challenge for financial institutions will be to spot, in the absence of robust data, potential anomalies in achievable risk premium, and to establish those markets in which they should be competing aggressively and those in which they need to increase margin and collateral requirements. Moreover, insured losses from extreme weather events could, on current trends, rise to \$150 BN a year by 2030, which would threaten insurer profitability, particularly if necessary premium rises are depressed by regulatory bodies or high levels of competition.

Economic slowdown

The very factors that make the financial sector resilient to climate change – its global interconnectedness and the mobility of its capital – also mean it is susceptible to threats that cannot easily be mitigated. Over time the complexity and unpredictability of climate change, and its interdependence with other global risks, may reveal unprotected exposures and aggravate systemic vulnerabilities. The economic impact of global temperature rises and stringent greenhouse gas abatement measures will gradually outstrip the opportunities, and could lead to a loss of over \$530 BN in revenues for the industry by 2030, which would be largely shouldered by the top players.

Priorities for the near future

Some of the largest institutions have developed responses that cover their strategic positioning, product development, operational processes, and stakeholder relations, but for many firms climate change remains below the strategic radar. Western European firms have been the most broadly dynamic, on the back of a stronger regulatory environment for greenhouse gases. In the US there is a sharp distinction between the active investors in this area and those that have given the issue little attention. Interest from firms in emerging markets is often driven by emissions trading opportunities resulting from European regulation.

However, the combination of positives and negatives implies that climate change could over time drive a significant wedge in the relative performance of the most exposed institutions. From our analysis outperformance, demonstrated in the ability to anticipate shifting locations of value, will rely on five key factors.

1. Portfolio re-appraisal

Financial institutions need to reexamine their strategic positioning in terms of the likely impacts of climate change and societal responses to it. At the highest level this means reviewing the geographic spread of the firm, its geophysical context, and its business portfolio under particular global warming trajectories. This may lead to the reprioritisation of certain regional and national markets and business lines according to their likelihood of being net beneficiaries or casualties. As a result some portfolios might require further diversification. Similarly, firms should undertake a detailed exploration of their exposures to climate risk through loan books, investment assets and insurance portfolios, stress-testing them against particular physical, regulatory and market-based vulnerabilities where appropriate.

A focus on emerging data and trends will help institutions improve their understanding of the likely boundaries of risk/return and the best markets on which to focus their efforts. Firms should therefore develop a comprehensive dashboard of indicators that will help them monitor the issue as it evolves, quantify emerging risks, and guide decision-making. In particular, firms will need to understand the implications of different carbon scenarios for their capital requirements. As part of this they should also monitor the directions, details and implications of greenhouse gas (GHG) policy and regulation; emerging liability issues; the capacities of the market for technological change; and increasing public activism.

2. Innovation

Financial institutions should explore how they might use the likely volatilities generated by climate change to increase appetite for financial products, improve the match between risk managers and speculators, and exploit arbitrage opportunities between different markets. Substantial revenues can already be derived from specialist advisory, transactional and hedging services, while the consumer market remains largely untapped, and there is considerable scope for insurance innovation in emerging economies.

The unpredictability of climate change will place a greater premium on the pace of innovation at a product design level, and firms must develop a highly responsive capability in order to meet and anticipate new market conditions. The most agile firms will be able to react quickly to changes in demand, but also avoid committing resources too early or to markets that lack substance.

3. Brand

Firms should seek to develop and leverage a strong, credible brand to strengthen relationships with existing customers, and secure new ones. Consumers and new recruits will be attracted by a sense of shared values in markets where financial institutions are virtually indistinguishable by image, loyalty is low, and climate change concern is high. Industry will attach importance to the careful marketing of innovative thinking around climate risk, abatement and adaptation options and growth strategies. Governments, which will become increasingly significant as customers, will arguably seek partners who can demonstrate both aligned values and expertise.

Green credentials remain, for the moment at least, a way in which small providers can get themselves noticed and an issue that global institutions can work across business lines and geographies, with stakeholders of all types. There is still scope in many regions for firms to seize the role of the green financial institution. However, while firms who are slow to market their environmental awareness may come to suffer the consequences, firms will need to be alive to climate change fatigue and accusations of “green wash”, and recognise that it will not be long before green branding becomes a hygiene factor, and therefore of little value in terms of differentiation.






























4. Governance and execution

Financial institutions need to develop a coherent stance across the firm, which ensures a growing capability is both employed throughout the organisation and matched by the firm's own impact on the environment. In other words, firms should develop structures whereby climate risk and opportunities are reported on and used to inform strategy; environmental criteria might be rolled out across a range of products; and measures are taken to reduce emissions from infrastructure and travel.

5. Collaboration

The complexity and reach of climate change suggest that the largest, most global financial institutions should work with each other, governments, NGOs and customers in ways that strengthen not only the intelligence, customer relationships and therefore reputation of individual firms, but also that of the industry as a whole. Equally, industry leaders should work together to influence policy solutions to climate change that will best leverage the power of capital markets, and ensure that individual governments steer away from unilateral policies that are likely to create significant moral hazard and thereby latent costs for taxpayers.

Impact of climate change by financial services sector

| Sector | Upside Capturing the opportunity | Downside Managing the uncertainty | Impact | |
|--|---|--|--|---|
| Corporate and institutional banking |  Clean tech/ renewables <ul style="list-style-type: none"> Revenues from clean tech IPOs and investment assets Financing, valuation and advisory services for clean tech companies |  Defaults on corporate loans <ul style="list-style-type: none"> Increase in loan defaults driven by regulation, competition, or reputation |  Investment banking  Structured finance  Commercial lending  Commercial savings | |
| |  Emissions trading markets <ul style="list-style-type: none"> Trading of GHGs as a commodity Carbon-based securities and hedging instruments | | | |
| |  Hedging innovation <ul style="list-style-type: none"> Market-making and administration of derivatives and structured products, e.g. swaps, index-based swaps, ART New business models and market entrants, e.g. hedge funds as reinsurers | | | |
| Retail banking |  Greening consumers <ul style="list-style-type: none"> Currently small market for "green" retail products Potential new entrant opportunity for a "green" brand with a unique product offering |  Emerging markets slowdown <ul style="list-style-type: none"> Accelerated arrival of hard economic landings in areas at high risk of climate change impact |  Consumer lending  Consumer savings  Transactions | |
| |  Brand <ul style="list-style-type: none"> Benefits of "green" positioning far outweigh the costs | | |  Defaults on retail loans and mortgages <ul style="list-style-type: none"> Extreme weather events could threaten the likelihood of repayment and lower the value of collateral held by banks |
| Asset management |  Clean tech/renewables <ul style="list-style-type: none"> Clean tech funds and investment assets Index-based funds |  Security of long-term investments <ul style="list-style-type: none"> Impact of climate change and emissions regulation on asset valuation |  Traditional AM  Alternative AM  Broking | |
| |  Project and infrastructure finance <ul style="list-style-type: none"> Attractive yields, risk pricing, and inflation-linked earnings from infrastructure assets | | | |
| Insurance |  Protection against industry vulnerability <ul style="list-style-type: none"> Bespoke products with climate change specifications (e.g. litigation protection) |  Extreme weather <ul style="list-style-type: none"> Short-term increase in attritional and catastrophic losses... ...followed by increased demand for reinsurance, policy/regulation uncertainty, and increasing capital markets involvement in the medium term |  Primary insurance  Reinsurance  Broking | |
| |  Greening consumers <ul style="list-style-type: none"> Increasing consumer appetite for "green" insurance products at preferential rates | | |  Investment asset uncertainty <ul style="list-style-type: none"> Impact of temperature change and global instability on emerging markets investments |
| |  Relative size of importance | | | |

A checklist for boards of directors – Anticipating the shifting locations of value over time

| Subject/topic | Question | Impact area/response |
|----------------|---|--|
| Markets | <p>Can we quantify how global warming and the international response will:</p> <ul style="list-style-type: none"> ■ Affect economic growth in our key geographic markets? ■ Influence the capitalisation and composition of our different customer segments? ■ Generate additional revenues through responses to particular needs? | <ul style="list-style-type: none"> ■ Revenues ■ Growth strategies ■ Customer prioritisation |
| Demand changes | <p>Do we understand:</p> <ul style="list-style-type: none"> ■ How our customers view their own risks with respect to climate change? ■ How much and how fast their financial needs and preferences might alter? ■ What products will stimulate and meet changing demand for risk mitigation and investment? | <ul style="list-style-type: none"> ■ Innovation ■ Marketing strategy |
| Portfolio risk | <p>Can we quantify the risks presented by the exposure of our customers to:</p> <ul style="list-style-type: none"> ■ Extreme weather events and climate change? ■ GHG and energy efficiency obligations? ■ The changing preferences of their own customers? | <ul style="list-style-type: none"> ■ Reserves ■ Lending strategy ■ Portfolio diversification |
| Competition | <p>Do we know:</p> <ul style="list-style-type: none"> ■ How our main competitors are responding to climate risks and opportunities? ■ How the supply-side dynamics of financial services provision might be affected? ■ The strategic issues on which we should be collaborating with other financial institutions? | <ul style="list-style-type: none"> ■ Strategic positioning ■ Branding ■ Joint ventures ■ M&A |
| Stakeholders | <p>Do we understand:</p> <ul style="list-style-type: none"> ■ Our exposures to pressure from shareholder, employee and public activism on climate change? ■ The impact of tougher regulatory, legal and political positions on future revenues and strategic decisions? | <ul style="list-style-type: none"> ■ CSR positioning (including carbon footprint) ■ Policy engagement |
| Management | <p>Do we have in place:</p> <ul style="list-style-type: none"> ■ A dashboard of indicators that flags emerging concerns related to climate risk? ■ Forward-looking processes to anticipate changing levels of default risk? ■ Relevant data and expertise to develop bespoke climate-related products and services? ■ Reporting structures that inform strategic decisions around exposures and growth opportunities? ■ Channels that enable the sale of climate-related products across business lines? | <ul style="list-style-type: none"> ■ Governance ■ Marketing ■ Recruitment |

Introduction

Much has been written about climate change and financial services in the past few years. This Oliver Wyman report takes stock of the evidence and assesses how large an issue it really is for the industry.

In the light of increasing scientific evidence, inter-governmental determination and media coverage, chief executives of major corporations across the globe are grappling with what climate change and the international response to it means for their organisation and the industries in which they operate. Many place it high on their list of strategic concerns, although a significant minority consider it a distraction, one risk among many, with impacts that are difficult to predict. Some firms are already noticing bottom-line impacts; others anticipate significant shocks or value shifts over the coming decades. For some industries there are clear business opportunities; for others it is a matter of hedging against or adapting to a less favourable business environment in the future.

Growing household awareness, changing regulation, and the confluence of extreme weather events in recent years have persuaded a wide range of financial institutions, largely in Western Europe and the US, to engage with the agenda. Some firms have taken broad leadership positions and made extensive strategic commitments, while others have focused more particularly on developing products and instruments to cater for new demands, investing substantially in clean technology, and/or strengthening their capacity to cope with downside impacts associated with client risk.

Climate change is a complex business risk for a number of reasons. First, calculations as to how much and how fast the world's temperature will rise are themselves broad in range. Second, projections of the different physical manifestations (e.g. heat, drought, cold, flood, windstorm, sea level rise) are uncertain and variable in terms of their scope, scale, location, time frame and consequences. Third, estimates as to the interdependence between climate change and other global risks, and the extent to which the effects of the former may trigger, hasten or magnify the emergence of the latter, can only be speculative. Fourth, it is necessary to take into account not only the physical impacts of climate change and likely reactions to them, but also, crucially, pre-emptive responses by governments, societies, and industry.

Climate change is thus a phenomenon as much as a reality; and it is arguable that over the next 20 years, when global warming is expected to be broadly manageable, most of the developed world, at least, will be affected as much by societal anticipation of future catastrophic scenarios as by actual physical events and their consequences. The attitudinal dimension has two key implications for firms. On the one hand, the highly visible but slow burn nature of climate change risks the introduction of biases into risk assessment and strategy development processes. On the other, it is a reminder that the shape of future demand will be dictated not simply by the changing needs of customers but by their changing preferences too, which may become manifest through spikes of engagement rather than according to a predictable linear pattern.

This report focuses on the forms in which climate change will manifest itself to financial services, the size of the emerging threats and opportunities, and the ease with which they can be controlled and exploited. It examines both near-term trends and business issues, and longer-term macro-economic impacts. Its far horizon is 2030, admittedly beyond the planning time frame of even the largest financial institutions but, nonetheless, relevant in terms of understanding the implications of particular environmental, political and economic trajectories.

Needless to say, the scale of the issue for financial services will depend to a large degree on the pace of global warming, the intensity of its symptoms, and the character of the global response. Oliver Wyman has no pretensions to scientific expertise and, in forming our conclusions and recommendations, we have consciously chosen not to side with any one commentator's prediction of the future. Our starting point is the consensus scientific projections developed through the Intergovernmental Panel on Climate Change (IPCC), and current policy and investment trends, but our analysis acknowledges the possibility of different global business environments for financial services in the future.

Section 1 of the report examines the implications for customer demand of environmental change, policy measures and public interest in order to identify why financial services will be affected. Sections 2 and 3 seek to answer how much the industry will be affected, by breaking down the key issues and evaluating them. In the light of this analysis, section 4 proposes what financial institutions should do now, in order to protect their business, seize opportunities and develop competitive advantage.

Understanding the impacts of climate change

The financial services industry will be affected by both the macro-economic impacts of global warming and the specifics of changing customer vulnerabilities and demand.

This section of the report clarifies in the broadest terms why climate change is relevant to financial services and provides the context for future analyses. It starts with a high-level survey of the scientific conclusions about global warming in order to understand the projected environmental, social and economic impacts, and follows with an overview of the current international policy response. This enables us to establish how the concerns, requirements and aspirations of the different customer groups for financial services – industry, consumers, governments, and investors – might be affected. The section concludes by examining the implications for financial institutions themselves.

The direct economic impact of climate change is likely to increase over time, but the scale and direction remain uncertain, even over the next 20 years.

Environmental change

The IPCC has concluded that an acceleration in global warming over the past century can be ascribed to the rapid industrialisation of the world, which has led to a higher concentration of greenhouse gas (GHG) emissions in the atmosphere. Their studies indicate that an inflection in current trends resulting from increased energy demand, deforestation and other causes will result in a deterioration of the environmental fabric in many parts of the world which, before the end of this century, will have significant social and economic consequences for the world's population.

Projections for temperature rises form a fairly tight band for the next 20 years, but show considerable variation by the end of the century, as a result of the uncertain impacts of climate feedback and the possible variations in global socio-economic development.¹ Focusing on the time frame of interest to this report, in the near term the average global temperature is expected to rise by 0.2-0.3°C per decade, with some suggesting a total change of between 0.4°C and 2°C by 2030).²

¹ Climate feedback is the process through which developments in one part of the climate system impact on other parts to accelerate or delay global warming. With respect to human factors, the IPCC has identified three key drivers for the rise in GHG emissions: the rate of demographic change, the trajectory of socio-economic development, and the rate and direction of technological change. Key variants here result in its six main climate scenarios for 2100 (IPCC, *Emissions Scenarios*, 2000).

² IPCC, *Climate Change 2007: Impacts, Adaptation and Vulnerability* (2007) and Hadley Centre. 2°C: HM Treasury, *Stern Review on the Economics of Climate Change* (2006). Predictions for the end of the century range from +1.8°C to +4°C (best estimates from IPCC scenarios), with the broader IPCC range being +1.1°C to +6.4°C, and Stern suggesting up to +10°C, should no action to reduce emissions be undertaken.

Shorter, milder winters and warmer summers in northern Europe, Russia, Canada and the northern US states over the next few decades would be beneficial to those countries, leading to increased yields from agriculture and forestry, improved access to oil, gas and mineral resources, lower winter mortality, lower heating requirements, and a possible boost to tourism. Conversely the southern US states, southern Europe, Latin America, Africa, Australia and south Asian countries such as India look to experience increased water scarcity and a marked decline in agricultural yields, and a greater spread of tropical diseases, which in developing countries could result in significant levels of famine and mortality as well as economic crises.³ These changes mean that in 2030, according to point in time analyses, global GDP growth may be affected within the range of +2.5% and -3%, relative to the base case.⁴

Climate change is also likely to bring over time an increased incidence of extreme weather events (windstorms, floods, heat waves, droughts), which might cause loss of life and significant damage to buildings, transportation, energy supply and agricultural yields.⁵ Knock-on effects from this increase would include localised economic slowdown, unemployment and migration, commodity price spikes, and volatility in the property market.

The international policy response

World leaders have increasingly taken account of the scientific evidence for global warming and the likely impacts of climate change. In the first instance countries likely to be adversely affected have begun to assess how they might adapt to changing environmental conditions.⁶ At best this may include preparing existing infrastructure and crop selection to cope with high winds, flooding and prolonged water shortages; at worst it could mean large-scale population displacement. The capacity for timely adaptation is limited and uneven across and within societies, and in developed countries alone the costs of adaptation could amount to between 0.05% and 0.5% of GDP, the percentage rising over time between now and 2030.⁷

The sharpening public policy response is producing its own set of threats and opportunities for financial services.

³ IPCC, *Climate Change 2007: Impacts, Adaptation and Vulnerability* (2007).

⁴ +2.5%: Richard Tol, *Estimates of the Damage Costs of Climate Change* (2002). -3%: IPCC, *Working Group III: Mitigation of Climate Change* (2007). The impact on global GDP growth by 2100 is predicted to be between +2% (Tol) and -7.3% (Stern). These GDP figures may underestimate the impacts, for most analyses focus on a small number of market sectors, are limited in their consideration of non-market impacts (such as health, migration and geopolitical instability), and do not consider the impact of extreme climatic and weather events. Thus the analysis of Net Domestic Product may be a better indicator of economic impact.

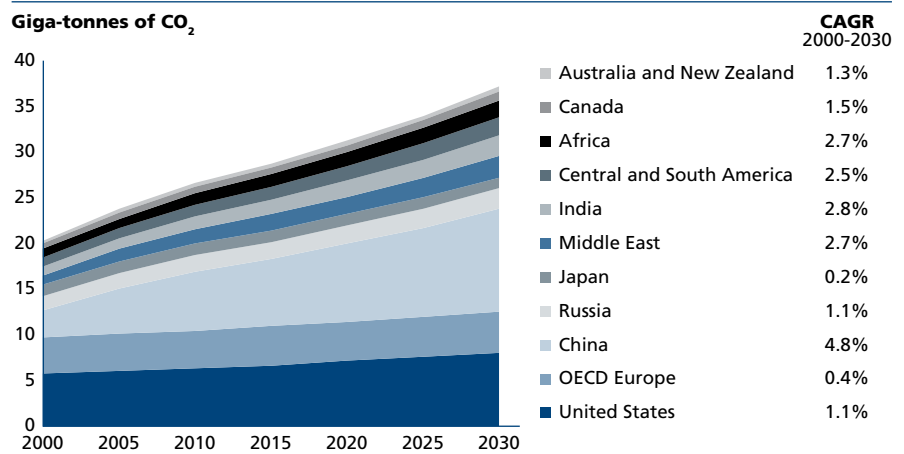
⁵ IPCC, *Climate Change 2007: Impacts, Adaptation and Vulnerability* (2007).

⁶ A note on definitions. Adaptation: adjusting to the impacts of climate change (e.g. strengthening flood defences). Abatement: reducing GHG emissions (e.g. through clean technology).

⁷ HM Treasury, *Stern Review on the Economics of Climate Change* (2006).

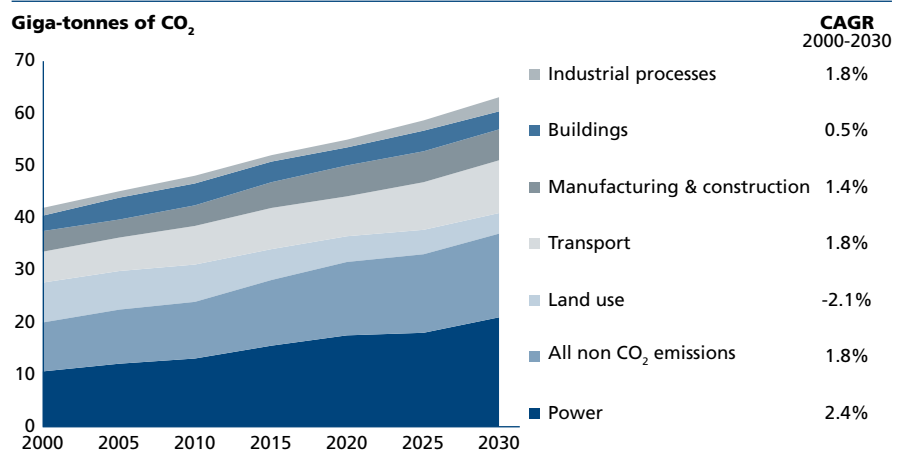
In the light of this, and in anticipation of rising energy consumption and emissions (Figures 1 and 2), the inter-governmental response has come to focus on the need to stabilise the concentration of GHG emissions in the atmosphere at a level that would not impact on the natural climate system.⁸ Should the tolerable average temperature increase for the world be between 2°C and 2.4°C above 2000 levels, CO₂ emissions would need to peak by 2015, and fall by roughly 15% from 2000 levels by 2030. If 3°C is considered the limit, emissions would need to peak at the latest by 2030, and fall by about 5% from 2000 levels by 2060. Delays in starting abatement efforts will make the achievement of any chosen targets that much more difficult and expensive.

Figure 1: Projected emissions growth by country and region 2000-2030⁹



Source: World Resource Institute, Global Banking Report (November 2006), Oliver Wyman analysis

Figure 2: Projected emissions growth by sector (2000-2030)



Source: HM Treasury & Stern, Stern Review on the Economics of Climate Change (October 2006)

⁸ Global energy demand is expected to grow at 1.6% a year until 2030, with 83% of that growth being served by fossil fuels and 75% of that extra demand coming from developing countries (International Energy Agency, *World Energy Outlook*, 2006). GHG emissions grew by 70% between 1970 and 2004 (IPCC, *Fourth Assessment Report*, 2007).

⁹ Countries or regions in this figure are US, OECD Europe, Japan, Canada, Australia and New Zealand.

In terms of costs, stabilising temperature at just 2-2.8°C above 2000 levels, using the least costly trajectories, could amount to a reduction of global GDP by 2030 by 3%, and up to a 0.12% drag on annual GDP growth. Aiming at 3.2-4°C would mean only a 0.06% reduction in annual GDP growth and a cost of between -0.6 and 1.2% of GDP overall in 2030.¹⁰ These are manageable consequences if action is taken in time.

Under the banner of the Kyoto Protocol, which came into effect in early 2005, developed countries (defined as Annex 1) agreed to reduce their emissions by a collective average of 5% below 1990 levels by 2012 (with the exception of the US and Australia). The treaty opened up three mechanisms for encouraging emissions reduction:

- Emissions trading in developed (or Annex 1) countries
- Joint Implementations (through which Annex 1 countries can gain credits from investing in emissions-reducing projects in other Annex 1 or transition economies)
- Clean Development Mechanisms (through which Annex 1 countries can obtain permits for having invested in emissions-reducing projects in non-Annex 1, or developing countries)

The latter two flexible mechanisms are designed to enable developed economies to reduce emissions at a lower cost, and to encourage developing and transition countries along the road to emissions reduction.

The initial European Union response has been shaped largely by national emissions targets for 2012 and the Emissions Trading Scheme (ETS). Phase 1 of the scheme (2005-2007) has focused on 12,000 installations in heavily polluting industry sectors such as power generation and chemical processes, which are responsible for 46% of EU GHG emissions. Phase 2 (2008-2012) will see tougher targets (a reduction in the number of allowances), greater geographical scope (four non-EU countries), new sectors (aviation) and new mechanisms (the inclusion of Joint Implementation credits).

A new European Energy Policy Action Plan (2007) legally binds member states, by 2020, to reducing CO₂ emissions by 20% compared to 1990 levels; reducing energy use by 20% compared to current projections; and obtaining 20% of their energy supply from renewable sources. It has been suggested that the plan might cost €1 TN to

¹⁰ IPCC, *Climate Change 2007: Impacts, Adaptation and Vulnerability* (2007). The Stern report has slightly higher costs over a longer timescale, suggesting that stabilising temperature at about 3°C would cost between -1% and +3.5% of GDP by 2050. Disputes over appropriate discounting procedures mean a consensus on future costs is unlikely

implement; nonetheless, the European Council has expressed a willingness to increase the CO₂ targets to 30%, should other leading OECD countries follow suit.

To date, the US has shown some resistance to international cooperation on emissions reduction on the grounds of potential harm to its economy, particularly given China's non-Annex 1 status. Recent trends on the domestic and international scene, however, suggest a stronger response from the US may be on the horizon. The eight northeastern states and California, which had already committed to reducing GHG emissions, were joined in November 2007 by 10 states in the industrial heartland of the Midwest. These states, in a separate agreement, have pledged to set emissions targets, introduce their own regional cap and trade system, and strengthen energy security through investing in the generation of energy from renewable sources. Additionally, in the summer of 2007 new climate change bills were presented to Congress; the mayors of nearly 700 cities signed an agreement to introduce the goals of the Kyoto Protocol into their communities; and the Supreme Court ruled that greenhouse gas was a pollutant and ordered federal officials to consider limiting emissions of the gases from cars and trucks.

As the fourth largest emitter of greenhouse gases, relying on imports for most of its primary energy supply, Japan has set stringent energy efficiency targets – 30% by 2030 – and is investing heavily in strengthening its nuclear supply, having little faith in the reliability of energy from renewable sources.¹¹ Australia is likely to establish emissions caps and begin carbon emissions trading at a national level by 2012, starting with a low pollution price, and imposing deeper emissions cuts over time.

China's vast population, rapid economic growth and reliance on home-produced coal has put it on a path to overtake the US as the world's largest emitter of greenhouse gases, if it has not already done so. However, building on existing regulatory standards, its new National Action Plan for Climate Change (2007) lays down that renewable energy will reach 10% by 2010 and 20% by 2020. In addition, the ratio of energy consumption to GDP is to decrease by 20% by 2010 and by 43% by 2020. India, like China, relies heavily on coal, and has been a strong recipient of Clean Development Mechanism finance under Kyoto. However, the country does not yet appear to have taken great steps to reduce emissions.

¹¹ *National Energy Strategy* (2006). Japan's emissions reduction target for 2012 is 6% – a significant challenge given the relative efficiency of its industries in 1990.

Performance in reducing emissions varies from country to country. Among the developed economies significant reductions in the 15 years to 2004 were made by Germany and the UK, while large increases are to be found in Canada, Australia, Spain and the US, although the US has seen a reduction in the past two years.¹²

The process for finding a successor to Kyoto has already begun, with a view to reaching an agreement at the UN summit in Copenhagen in 2009. Although the aspirations of the EU and Japan may be for an extension and intensification of the current arrangements, the need to persuade heavy polluters who are not currently participants to set strict short and medium-term targets means such an outcome is by no means guaranteed. The US remains to be convinced at federal level, while China and India are concerned about the impact on economic growth and industrialisation, and point out that in per capita terms their emissions lag those of developed economies by some distance.

The nature of the current and future international response has considerable implications for the growth strategies, resource allocation, risk profile and revenue expectations of financial institutions. These are explored more fully in sections 2 and 3.

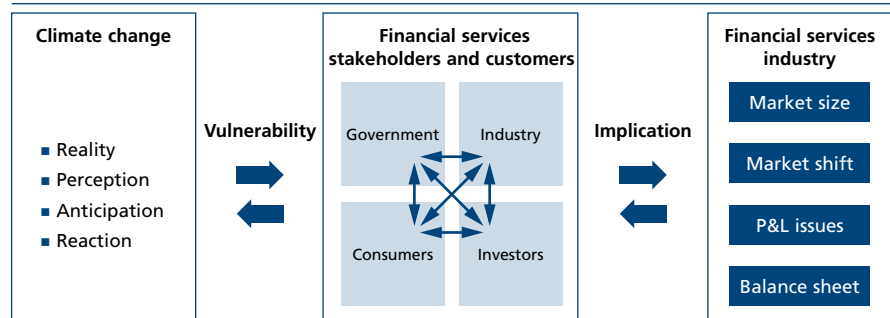
Changes in demand for financial services

The variation in the projected geographical impacts of climate change and national policy responses makes it hard to generalise about changing demand for financial services. Nonetheless, it is clear that industry, consumers, governments, and institutional investors each have different vulnerabilities to climate change. Moreover, these vulnerabilities will be intensified as a result of complex, multidirectional drivers between those different groups. We take each of these groups in turn, and consider the implications for the financial sector.

The shifting landscape brings with it new considerations for financial institutions and their customers.

¹² United Nations Framework Convention on Climate Change (UNFCCC), *Changes in GHG Emissions from 1990 to 2004 for Annex 1 Parties*, (undated). Energy Information Administration, *US Carbon Dioxide Emissions by Energy Sources 2006 Flash Estimate* (2007).

Figure 3: The impact on financial services through stakeholders and customers



Industry

Based on emerging expectations of climate change, some industries, such as mining, tourism, and real estate, will find themselves particularly exposed physically either to attritional changes in weather patterns or to unpredictable and potentially catastrophic weather events, which will increase supply chain and operating costs, reduce demand, and diminish asset values. GHG regulation will have an impact on profitability in other industries, such as power generation, chemicals, and basic industries, which are strong emitters of CO₂. Moreover, in terms of reputation, high polluting or blatantly insensitive industries and firms may suffer a blow to their brand value as a result of hostile customer reaction. The organisational and financial capacity of firms to adapt, diversify, capture new opportunities and not fall victim to increased costs, reduced demand and substitute products will determine changes to market share and capitalisation.

Financial institutions should therefore consider:

- The exposure of their loan books and investment portfolios to industries facing physical impacts, adaptive difficulties, changing customer preferences, price inelasticities, and investor concern etc.
- Their willingness and readiness to provide finance for abatement strategies and carbon risk hedging in industries impacted by GHG regulation
- The attractiveness of investing start-up and growth finance in firms developing clean technologies and energy from renewable sources
- The likelihood of increased attritional and peak insurance claims from climate-related events
- The opportunity for developing alternative risk transfer mechanisms through greater use of capital markets
- The impact of possible class action liability claims against GHG emitters on loan repayments, investments and insurance cover

Retail consumers

Consumers in high temperate latitudes should benefit from lower winter heating bills; conversely their property, and possibly their health, may be at risk from damage by temperature rise, extreme weather events, and consequent environmental changes. As emissions reduction becomes more widely targeted, consumers may be obliged to make homes and transportation more energy efficient or pay high penalties. In parallel, an increasing number of consumers may choose to make changes to their lifestyle in order to contribute to mitigating climate change, and/or pay for services that enable them to achieve this. Many, however, will suffer from increased prices for goods from those industries impacted by global warming and with low price elasticity of demand.

Financial institutions should therefore consider:

- The extent to which they are at risk from growing consumer interest in ethical issues and the climate agenda
- The potential for winning/retaining customers and developing new revenue streams through green products, such as loans and mortgages for environmental improvements, credit cards that enable consumers to offset the carbon impact of their purchases, and investment funds focused on “green” stocks
- The level and scope of property insurance held by existing mortgage customers against potential temperature and weather-related property damage
- How to tap into an increased need for property and casualty insurance, balancing the potential growth in underwriting revenue against the likelihood of greater claims, especially from peak events, with some locations possibly becoming uninsurable (or re-insurable)

Governments and policymakers

The goal of national governments with respect to climate change is likely to focus on ensuring the long-term security of their countries and the planet with minimal impact on social welfare, economic growth and political stability of their own countries in the short-to-medium term. Taking into account global variations, climate change and weather events may impact on the operating costs and output of state-owned industries, and also on public infrastructure such as flood defences and transport networks. Altered weather patterns may also impact on food security and public health. Regulation agreed at national and supranational levels will require efficiency improvements to, and at times wholesale renewal of, existing state infrastructure, particularly in the energy and utilities sectors. Regulation may, in addition, benefit developing countries through encouraging them to use clean technology solutions and enabling

them to sell carbon credits from emissions-reduction projects financed by developed countries. The pressure on high-polluting countries across the globe to reduce emissions will increase.

Financial institutions should therefore consider:

- Encouraging governments to invest in climate change defences to increase the insurability of at risk properties
- The opportunities for financing, or helping governments raise finance for, infrastructure renewal projects across the globe, as a result of both planned mitigation and disaster recovery
- The potential impact on local monetary policy of swings in commodity prices brought about by climate events
- The growth and stability of secondary emissions trading markets enabled by regulation
- How they may be affected by the strengthening of GHG emissions regulation

Institutional investors

Major institutional investors are increasingly concerned about the direct and indirect impacts of climate change on their investment portfolios which, of course, include securities of other financial institutions. The impact of increased instability and extreme weather events on underlying assets such as property and commodities can affect investor confidence and their willingness to buy, even though such volatility can offer opportunities for those trying to maximise returns. They must protect their own share price and their relationship with major investors

Financial institutions should therefore consider:

- Understanding and disclosing their own exposures to climate change, and setting out their strategies for dealing with opportunities and threats
- Reducing their own GHG emissions
- How best to anticipate and position themselves for trends and expectations in socially responsible investing
- The likely effect on traded instruments with underlying assets exposed to climate change, and the implications for investor appetite for certain asset classes, including new high-growth asset classes not yet on the radar for most investors

Evaluating the short-term implications for financial services

Credit defaults and asset value decline represent significant risks in the short-to medium-term as a result of carbon constraints, but they are countered by growing opportunities in infrastructure and clean energy financing, new commodities trading, and new hedging requirements. Losses from extreme weather events will increase in importance for insurers.

Section 1 has highlighted a number of ways in which climate change affects financial services. Sections 2 and 3 investigate those issues further, to understand their dimensions, potential growth, and more precise implications for the industry.

We have categorised the issues as follows (Figure 4):

- **Risks to address:** Matters that financial institutions need to address to safeguard themselves from climate risk
- **Transformations to finance:** Changes in demand that give rise to new revenue streams for financial institutions attuned to customers' different adaptational needs and aspirations
- **Markets to invest in:** New opportunities for trading and investment
- **Far-reaching uncertainties** that have broad, possibly systemic, implications for financial services

This section considers the more straightforward business matters, while section 3 explores the threats within more macro-economic uncertainties.

Figure 4: Climate change issues for financial services

| | | | |
|-----------------------------------|------------------------|-----------------------------|---------------------|
| Risks to address | Investor pressure | Industry vulnerabilities | Extreme weather |
| | Infrastructure renewal | Industry abatement | Greening consumers |
| Transformations to finance | Emissions trading | Clean technology/renewables | Hedging innovations |
| | International response | | Temperature change |

□ Response-driven ■ Both physical and response-driven ■ Physical-driven

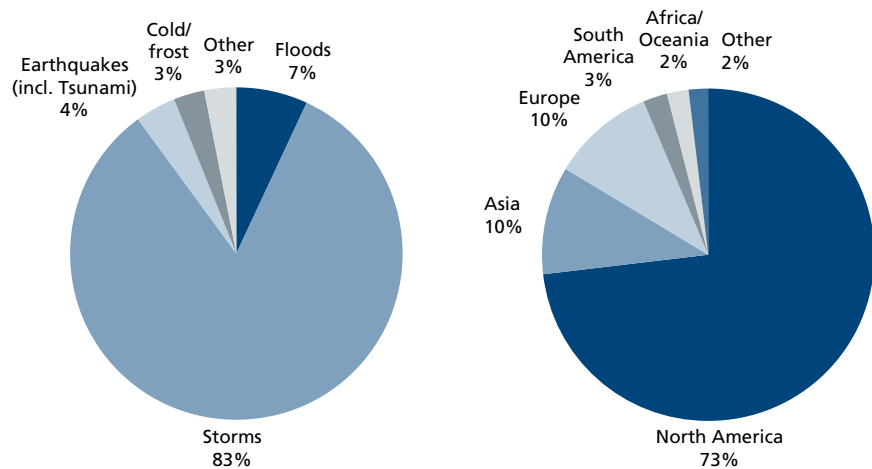
Risks to address

Extreme weather events

An increased incidence of extreme weather events could reduce the profitability of the insurance sector, should economic and political circumstances prevent prices from rising to reflect changing levels of risk.

Extreme weather events are responsible for a significant proportion of the losses suffered by the insurance industry. Natural disasters (which are not always climate-related) represent 40% of total insurance losses and, over the past five years at least, 85% of major property and casualty losses.¹³ In terms of event type, over the same time period windstorms have accounted for over four-fifths of losses, and floods less than a tenth, with North America accounting for nearly three-quarters of those costs (Figure 5).¹⁴ Moreover, the amount of insured loss is increasing – from roughly \$5 BN a year in the 1970s to roughly \$34 BN a year between 2002 and 2006.¹⁵

Figure 5: Insured natural catastrophe losses by event type and region (2002-2006)



Source: Public documents: Swiss Re/Sigma, Allianz, Oliver Wyman analysis

Losses have increased for two main reasons. First, recent decades have seen slight upward trends in the frequency and severity of extreme weather events in the key insurance markets – hurricanes in the US and Caribbean, cyclones in Japan, windstorms in Europe, and floods in all three major markets – with the past few years witnessing both levels of high incidence (10 Japanese typhoons in 2004) and intensity (e.g. Hurricane Katrina in 2005).¹⁶ Second, the value of assets at risk has risen significantly, due to increased general wealth and population rises in floodplains and windstorm-prone areas.

¹³ Allianz, *Climate Change and the Financial Sector: An Agenda for Action* (2005). Sigma/Swiss Re, *Annual Natural Catastrophes and Man-made Disasters* reports, Oliver Wyman analysis.

¹⁴ Sigma/Swiss Re, *Annual Natural Catastrophes and Man-made Disasters* reports, Oliver Wyman analysis. Longer-run data from 1970 shows floods accounting for up to 10% of insured losses (Association of British Insurers, *Financial Risks of Climate Change*, 2005).

¹⁵ Sigma/Swiss Re, *Annual Natural Catastrophes and Man-made Disasters* reports, Oliver Wyman analysis. The 1970s figures have been adjusted for inflation.

¹⁶ IPCC, *Climate Change 2007: Impacts, Adaptation and Vulnerability* (2007). Association of British Insurers (ABI), *Financial Risks of Climate Change* (2005)

However, although the most extreme weather events have occasionally driven local primary insurers to insolvency, revenues have usually been able to rise in response, and there has been little visible effect on the share price of large, diversified insurers. Bank exposures have proven to be similarly localised, despite the threats to mortgage and loan repayments and the decreased value of held collateral, which might result in more write-offs and provisions, and an increase in the cost of regulatory and economic capital.

Some facts from Hurricane Katrina (2005) relevant to financial services

- Total economic losses from the hurricane amounted to over \$125 BN¹⁷
- More than 75,000 people were left homeless by the hurricane and New Orleans experienced a 30% drop in employment¹⁸
 - 100% of Gulf oil (1.5 MM barrels a day) and 94% of gas (10 BN cubic feet a day) were out of production during the storm¹⁹
 - Only 3% of businesses in the area affected by Katrina had business interruption coverage²⁰
 - GDP growth in the US slowed by 0.4% and 0.9% (annual rates) in Q3 and Q4 of 2005²¹
- Insured losses amounted to \$40-66 BN, the higher figure including damage covered by the National Flood Insurance Program as well as private sector windstorm and flood exposures²²
 - Louisianians saw a hike in insurance premiums following Katrina of between 9 and 50%²³
 - No insurers went out of business as a result of the hurricane
 - Profits from exposed insurers (Allianz, Lloyds, Berkshire Hathaway, Allstate, Manulife, Swiss Re, XL Capital, IPC Holdings and AXA), who suffered \$11.6-14 BN of losses between them, rebounded to previous levels within a quarter, while annual revenues showed no sign of damage through the following year.²⁴ With the exception of IPC Holdings, Katrina had minimal effect on the share price of the firms listed above
- There was little discernible impact on the Dow Jones Industrial Average overall

Should the escalation in windstorms predicted by the IPCC come to pass, annual insured losses from extreme weather events could rise to \$150 BN by 2030 (three times the losses incurred through

17 Risk Management Solutions (RMS) press release (9 September 2005) and Swiss Re fact file (25 January 2007).

18 Swiss Re fact file (25 January 2007). UNEP Finance Initiative, *CEO Briefing 2006*

19 National Oceanic and Atmospheric Administration, *Economic Statistics* (2006).

20 UNEP Finance Initiative, *CEO Briefing 2006*

21 Congressional Budget Office Letter (September 2005).

22 Guy Carpenter, *Hurricane Katrina – Reinsurer Impact Update* (2005). Swiss Re fact file (25 January 2007).

23 New Orleans City Business, “Louisiana Department of Insurance OKs average premium rate increases” (April 2006).

24 Guy Carpenter – *Market Information Briefing* (October 2005), Bloomberg market data and Oliver Wyman analysis.

Katrina) before adjusting for increased property values.²⁵ Under such circumstances insurers and re-insurers would face higher overall losses, increased peak losses, a shorter time between peak losses, higher cost of capital, and possibly lower credit ratings. All other things being equal, this would raise the pressure for consolidation among the smaller, primary insurers in affected geographies; increase demand for reinsurance; and, to hedge against the largest events, encourage the greater involvement of capital/derivatives markets.

In the short term there is much insurers can do to manage their exposure, and many firms have been actively implementing a range of strategies and tactics that include strengthening their ability to model the impact of future catastrophes, rebalancing their portfolios with respect to high- and low-risk areas, and passing on risks to customers, governments and investors. They have done this by increasing premiums and deductibles; creating new exclusions; demanding greater public investment in flood defences; withdrawing from high-risk markets, and increasing their use of alternative risk transfer mechanisms.

But revenues and market share may be threatened by a hardening of political and regulatory pressures in reaction to price increases driven by recent losses and anticipation of rising exposures. While it may become necessary for the state to assume a greater share of the risk for catastrophic events, firms should work with regulators to ensure cover remains open and affordable, and thereby avoid triggering control of premium levels, or other regulatory interventions.

Property and casualty insurance in Florida

With private sector insurers raising premiums and shedding customers following hurricane-induced losses, the state-run Citizens Property Insurance has secured 1.3 MM customers and become by some margin the largest home-insurance provider in Florida. While homeowners are pleased to have cheap cover, many in the industry are concerned the measure is driving out the private sector, providing no disincentive to house-building in high-risk coastal areas, and risking a call on the public purse in the likelihood that a large natural catastrophe would swallow up the Florida Hurricane Catastrophe Fund that backs the intervention.

Industry vulnerabilities

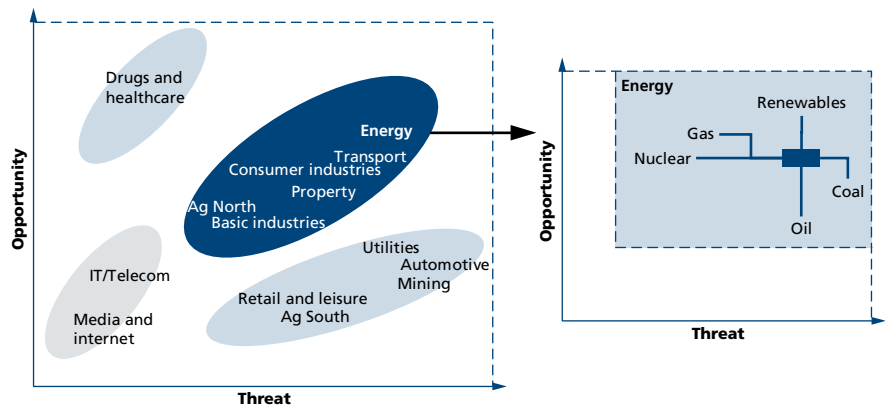
Climate change aside from extreme weather events will increase credit, investment and insurance risks.

Other aspects of climate change will have an uneven impact on business, with some industries facing significant changes to costs and market demand (Figure 6). In theory sectors that are energy-intensive

²⁵ Oliver Wyman analysis, based on UNFCCC projections, and using data from Munich Re, Swiss Re, ABI, and RMS. In a separate study, RMS has suggested that climate change is increasing losses by perhaps 2% a year, within an overall 6% annual increase in losses.

(e.g. transportation), or where industrial processes involve GHG release for other reasons (e.g. cement), will suffer from rising emissions costs and energy prices. Likewise, industries such as utilities, mining facilities and leisure enterprises in certain regions would be vulnerable to shifts in weather patterns.

Figure 6: Relative opportunities and threats to selected industries as a result of climate change



Note: Agriculture North (Ag North) and Agriculture South (Ag South), positioned separately on account of the different geographic impacts of climate change

Source: Industry reports, Oliver Wyman analysis

But a more nuanced risk analysis reveals other policy and individual firm-based factors. For example, the unequal application of GHG regulation between countries and regions could significantly alter the relative competitiveness of firms in affected markets.²⁶ On the other hand, certain approaches to allocating emissions allowances may differentially favour firms in some industries one might expect to be strongly impacted.²⁷

The consequences for individual firms will depend on the extent to which, and the speed with which, existing financial assumptions and business processes are disrupted by climate and related regulatory change. In part the impact will depend on the ability of firms to pass on increased costs to customers, without losing them to better placed rivals or to substitute products and services. But it will also relate to a firm's financial strength, its technology choices, its positioning within the value chain of its own and other affected industries, and its ability to innovate and adapt.

²⁶ The introduction of CO₂ emission targets and penalties for non-compliance for the automotive industry would lead to European carmakers having to digest between €1.4 BN and €3.3 BN in additional cost (Dresdner Kleinwort Equity Research, 2007).

²⁷ Phase 1 of the EU Emissions Trading Scheme enabled some power companies to make considerable profits out of the generous allocation of allowances.

Such factors suggest it may not just be the highest polluting industries that are at risk, but also those where profit margins are most vulnerable. Moreover, within particular industries, there will be considerable variation in terms of impact.

Just as the largest industrial firms are increasingly attempting to quantify the physical and regulatory influences of climate change on their operations and growth potential (with greater success in Europe owing to a clearer regulatory environment), so financial institutions need to take into account the potential negative consequences for their credit portfolios. While it is hard as yet to see the impact of carbon constraints on market valuation or solvency, wholesale lenders and asset managers should build climate risk into their sectoral and firm-based analyses, and stress-test their credit portfolios according to climate-based scenarios, recognising that the future may not be adequately captured in existing credit ratings and assessment models. However, the short-term nature of most loans (under three years for most industries, six years for utilities), suggests that lenders will be able to accommodate climate risk in their portfolio by adjusting their provisions based on revised assessments of default probability.

Enhanced Analytics Initiative

Created in 2004, the Enhanced Analytics Initiative (EAI) is a cooperative effort between financial institutions to research the extra-financial issues of investments. These are often qualitative, long-range externalities that are not well captured by market mechanisms, as typified by climate risk. The 23 member institutions, including BNP Paribas Asset Management, AXA, Investec and large pension funds such as ABP Investment and Hermes, have €1.8 TN in managed funds between them and commit a small percentage of their annual brokerage commissions towards this analysis.

Investor pressure

Interest in climate risk amongst major institutional investors is rising, even if it has not yet resulted in a significant reallocation of assets.

In the past few years institutional investors have collectively raised the awareness of the firms they invest in to the threats and opportunities that global warming poses to their business, and the need for them to help efforts to slow climate change. Growing recognition of the issue and the weight of 315 investors with assets of \$41 TN (up from 35 investors and US\$4.5 TN in 2003) have encouraged a growing number of firms, including financial institutions, to respond to the Carbon Disclosure Project questionnaire that asks for investment-relevant information about their exposures to the different dimensions of climate risk, their mitigation strategies, and success in reducing their own emissions.²⁸

²⁸ 73% of financial institutions in the FT500 responded to the 2007 questionnaire, and 58% in the S&P500.

With a similar focus, the US Investor Network on Climate Risk (INCR) has used its leverage to table an increasing number of climate change-related shareholder resolutions – 42 in the 2007 proxy season, 19 of which have led to positive actions, one of them at an insurance firm.²⁹ In 2005, leading investors sent letters to the top 30 insurance companies in North America, expressing concern about potential impacts of climate change on shareholder value and asking them to disclose what measures they were taking.

Shareholder pressure reflects strong growth in socially responsible investment which, by the end of 2005 reached €1 TN in Europe and \$2 TN in the US and now represents nearly 10% of investments under professional management in those regions.³⁰ While as yet investor concern about climate change has seldom manifested itself in stock selection, the aspirations of investors, the availability of complex screening mechanisms, and new legislation (in European countries) relating to the disclosure of pension funds' investing policies, suggest financial institutions should consider their current and future exposures to high-polluting industries from this angle as well.

Transformations to finance

Greening consumers

With the exception of ethical investments, the opportunity for financial institutions to help consumers go "green" is currently small, but could grow significantly over time.

Consumer awareness of climate change is rising, and survey data suggests that it is of concern to individuals in all parts of the globe, ranking highly amongst 75-85% of respondents.³¹ Apprehension is often highest in developing economies, but the largest increase in concern over the past 12 months perhaps lies in the US. Although most respondents overall consider the issue to be the responsibility of, first governments and then business, consumer willingness to take action is also escalating. On the other hand, survey responses also reveal a preference for minor lifestyle modifications that incur minimal or no extra costs, and a reluctance to reduce the amount of travel.

²⁹ The INCR is an alliance of US State and City Treasurers and Trustees, responsible for some of America's largest and most influential pension funds. It currently numbers 50 investors representing \$3.7 TN in assets, up from 10 investors with \$600 BN in 2003. Similar groups exist in the UK and Australia.

³⁰ Eurosif, European SRI Study (2006). Social Investment Forum, Report on Socially Responsible Investing trends in the United States (2006). SRI refers to an investment strategy that takes into account social, environmental, ethical and sometimes governance issues as well as financial returns, when selecting securities. The quoted data refers to Broad SRI (simple exclusions), rather than the more selective Core SRI (including positive screening), which amounts to around 10% of Broad SRI. Due to data unavailability the Eurosif figure excludes several Scandinavian funds, which would increase the European figure by €175 BN. Institutional investors represent 94% of the SRI market.

³¹ HSBC, Climate Confidence Index (2007). Global Market Insite, World Environment Review (2007). Chicago Council on Public Affairs and WorldOpinion.org survey (2007). Oxford University and Nielsen survey (2007). Yale Center of Environmental Law and Policy survey (2007). Stanford University and Associated Press, America's Report Card on the Environment (2007). MacIntyre Hudson and Guardian survey (2007).

The growth of markets such as organic and ethically sourced goods suggests relatively rapid cultural changes and market growth can be achieved if clear benefits can be identified and products are readily available. But the prospects for relatively intangible financial products are less obvious.³² The sums invested in pooled SRI funds may grow further, following a sixfold increase in assets under management in the UK to just over £6 BN in the decade to 2005.³³ But other green financial products are likely to remain niche in the near term.

The past year or two has seen the introduction of a range of products designed to target environmentally conscious consumers and benefit the environment, but the success of such products is likely to depend as much on their transparent competitiveness with non-green products, as on their environmental qualities. Given the rise in consumer defection levels in mature markets customer attraction and retention is critical for financial institutions. But the extent to which greenness will become a significant factor in choice in the future, rather than the current internet-based reasons – heightened product awareness, better price comparisons, and easier applications – remains to be seen. It is arguable, indeed, that the value of green products lies in their contribution to the overall brand identity of an institution rather than in the individual revenue streams they might produce.

Financial products for green consumers

The Canada Mortgage and Housing Corporation offers mortgages and home equity loans for homes that meet energy-efficient criteria; Citigroup also offers loans for the installation of renewable energy equipment, such as solar panels. Other examples within banking include Barclays, which has introduced the Breathe credit card with low borrowing rates for consumers buying green products and services. The bank subsequently gives 50% of the card's profits to fund emissions reduction projects worldwide. Within insurance, firms such as Tokio Marine & Nichido have begun to offer discounts on auto insurance for low pollution, low fuel consumption and low emission vehicles, while Aviva offers car insurance that bases premiums more precisely on mileage.

Industry abatement

A growing need by industry to curb GHG emissions will result in financing and advisory opportunities.

Investment in abatement is being driven by the expected price increases of carbon, the competitive advantage obtained by more efficient firms, and the damage to a firm's reputation that may lead to the loss of customers and even litigation. The impacted firms fall into

³² Consumer demand for organic and ethically sourced goods rose throughout the 1990s by more than 20% a year in Europe and the US. Forecasts of annual growth for organic sales over the next few years in the comparatively mature European markets range from 1.5% for Denmark to 11% for the United Kingdom, while US organic retail sales are predicted to grow 9-16 % through 2010.

³³ UK Social Investment Forum/ EIRIS Key Ethical/Socially Responsible Investment (SRI) statistics. <http://www.eiris.org/>

three categories: those in industries currently facing GHG regulation (including European firms engaged in power generation, ferrous metal production, and chemical processing); those in industries that are already or will be impacted by policy and consumer demand (such as building and construction firms, and those in automobile manufacture and aviation); and energy marketers and utilities, which need to manage a mix of renewables in their output (Figure 7).

Figure 7: Impact of climate change on value chain of a utility

| Impact of climate change | | Opportunities for financial institutions |
|------------------------------|--|--|
| Generation facilities | <ul style="list-style-type: none"> ■ Uncertainty regarding technology choice and profitability, given influence of policy and regulation ■ Uncertainty over energy volumes | |
| Transmission system | <ul style="list-style-type: none"> ■ Impact of new technologies (e.g. renewables) on transmission grid profitability ■ Security of supply ■ Grid infrastructure damage | |
| Trading arms | <ul style="list-style-type: none"> ■ Growth in emissions trading opportunities ■ Long-term impact of carbon price uncertainty on fundamental energy prices ■ Short-term market dislocations due to regulatory uncertainty | |
| Sales business | <ul style="list-style-type: none"> ■ Pricing the cost of carbon into contracts ■ Development of green retail energy products | |

- New generation facilities requiring project finance and new insurance
- Hedging innovation required to address needs arising from supply uncertainty
- Joint ventures of investment banks with utilities companies
- Emissions trading opportunities
- Index provision and products

Firms will most likely make use of their existing R&D budgets as far as possible as they strive for greater energy efficiency and switch to clean technologies, but may need corporate finance advice, loans and project finance. A number of banks already have specialised service divisions dedicated to the long-term financing of such projects.³⁴ Opportunities for abatement financing are likely to increase significantly if emissions regulation toughens and the price of carbon rises, making it more cost-efficient for companies to invest in improvements to their own facilities and processes. Moreover, irrespective of possible liability issues, the rising cost of raw materials may make it advantageous for large firms to invest in the reduction of carbon-related costs in their supply chain.

Savings from energy efficiency in the financial sector

Some financial institutions are reporting considerable savings from voluntary emissions reductions, even though energy usage amounts to less than 1% of operating costs for large firms. HBOS saved £16.5 MM over a six-year period on the back of £4 MM invested in energy efficiency measures while Westpac made \$7.5 MM net savings in the 12 years to 2005.³⁶

³⁴ Notably BNP Paribas, Fortis, and Rabobank.

Infrastructure renewal

Opportunities for infrastructure finance will rise, although the mix of public/private sector participation will vary across markets.

Over the coming decades anticipation and experience of climate change, as well as the drive to reduce emissions, will require significant additional infrastructure expenditure in all parts of the world. Buildings, energy transmission and telecommunications infrastructure will need to become more wind resistant. Coastal and riverbank defences will need to be strengthened against sea surges and inland flooding. Roads and bridges may need to be rerouted. Reservoir capabilities and network efficiencies may need to be improved to cope with prolonged water shortages. New power stations will need to be built and the transmission network altered to accommodate supply from distributed sources. Heating and cooling systems for buildings will need to be improved.

The costs of such adaptation (excluding energy generation) in developed countries is in the order of US\$10-150 BN a year until 2030, with the higher end of the admittedly wide range reflecting potentially greater impacts in the future; in developing countries the annual costs are projected to be between \$10 BN and \$40 BN a year.³⁵ The projected investment requirements for energy infrastructure over the same time period are estimated to be \$16-20 TN.³⁶

Assessing both the affordability of such investment and the distribution between public and private sector finance is difficult. However, climate change aside, infrastructure as an asset class has grown sevenfold in the past ten years to \$3.6 TN, and may grow fivefold again, given the pressures on public finances and efficiencies driven by private sector management.³⁷ Revenues from public sector structured finance are on the rise (through loan volumes and the arrangement of project finance), and a number of banks, private equity firms and asset managers have set up large funds to buy infrastructure assets, with most investors other than private equity firms looking for a competitive yield over perhaps twenty years.³⁸ Infrastructure is potentially attractive to institutional investors on account of the steady, predictable inflation-linked earnings in the gap between bonds and equities; the long-term nature of the assets,

³⁵ HM Treasury, Stern Review on the Economics of Climate Change (2006).

³⁶ International Energy Agency, World Energy Outlook (2006). IPCC, Synthesis of the Fourth Assessment Report (2007).

³⁷ Jon Fitch, Macquarie Bank, quoted in The Financial Times (30 July 2007). Currently only around 10% of infrastructure finance is deployed in emerging markets. In terms of understanding the scale of the asset class, the value of global commercial real estate in 2006 was estimated to be \$14.5 TN (Urban Land Institute, World Cities Forum, Columbia Business School, Global Demographics and their Real Estate Investment Implications, 2006).

³⁸ European financial services revenues from public sector structured finance are expected to be €600 MM in 2007-8, up from €400 MM in 2004-5 (Industry data, Oliver Wyman analysis).

which makes them a good match for pension funds; lower risk pricing compared to cyclical businesses; and a low correlation with other assets, thereby appealing to investors after diversification.

The opportunities enabled by climate change will be varied, with some projects significantly more attractive than others for investors. The developed world may offer the strongest suite of prospects, but investors will be wary of large-scale projects such as the development of nuclear energy facilities, in the absence of energy policy coherence and where liabilities and returns are subject to shifting public and political attitudes towards safety and waste. While public finance from development banks might be expected to provide a third of the investment needs for developing countries, the risks will be higher in those locations, owing to the existence of less stable regulatory environments, the uncertainties surrounding the governments and entities implementing projects, and a greater chance of disrupted project finance cash flows due to climate change.

Infrastructure investor

The Macquarie International Infrastructure Fund (MIIF) has a market cap of over \$1.5 BN, and focuses on energy, communications, and transport infrastructure in Asia, while the bank's Power and Infrastructure Income Fund (nearly \$500 MM), is focused strongly on renewable energy – two-thirds of the portfolio's installed energy capacity comes from biomass, wind, and hydropower investments.

Markets to invest in

Hedging innovations

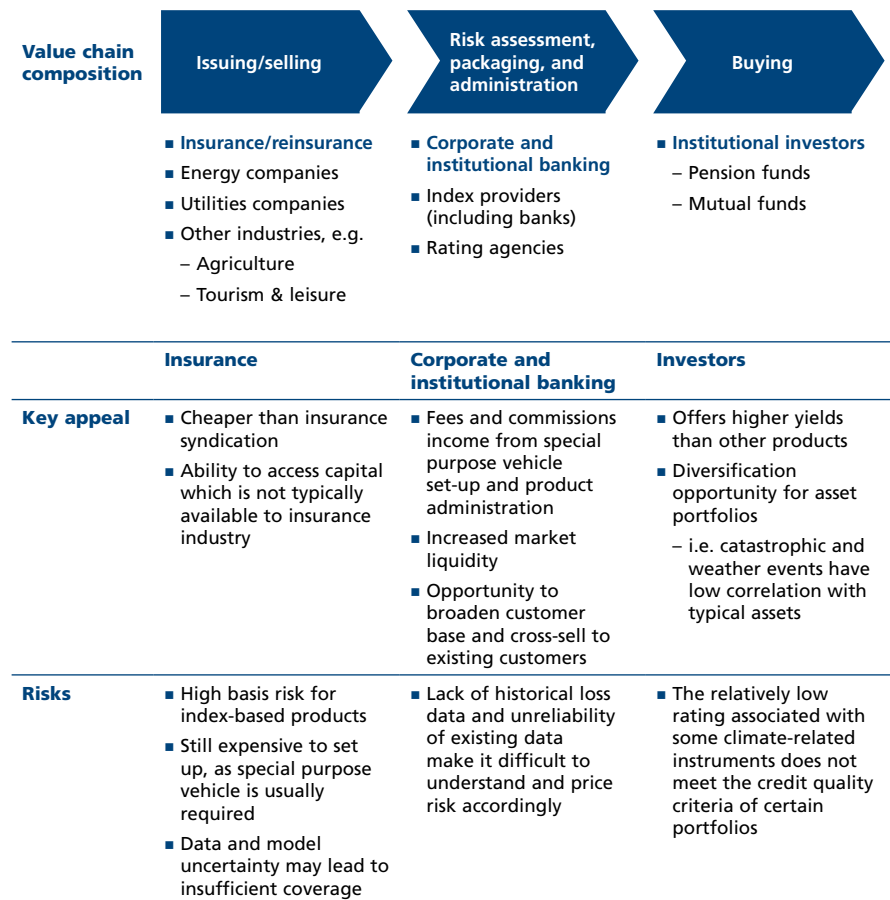
Variations from current weather patterns and the increased awareness (and frequency) of extreme events have encouraged firms in particular locations or reliant on particular climatic conditions to hedge against unfavourable outcomes affecting yield and demand. Similarly, tightening emissions regulation has strengthened demand for mechanisms that improve the ability of firms in a number of industries to manage their potential liabilities and strategic response. Traditional insurance solutions, such as increasing cover, can often be expensive; however, more bespoke and innovative solutions are increasingly becoming available through the capital markets.³⁹

Changing business needs will increase demand for alternative risk transfer mechanisms, provided set-up costs can be reduced and risks more accurately priced.

³⁹ For example, utility companies under contract to supply uninterruptible power sometimes acquire double or triple-trigger protection that pays out on the simultaneous onset of multiple unfavourable outcomes, whether these are fixed or variable in nature (business interruption and price of power respectively).

To date most climate-related risk hedging innovations have centred on catastrophe protection (bonds and swaps), weather derivatives (swaps, futures, options), and Industry Loss Warranties (ILWs), which allow insurers to reduce capital requirements and/or increase their ability to write new business. Owing to extensive research and development, and an improvement in ratings, the \$5 BN catastrophe bond issuance in 2006 was double the issuance in 2005, and the market to 2010 is expected to continue to show dramatic growth.⁴⁰ Likewise, the US market for Industry Loss Warranties (ILWs) has grown rapidly since 2005 and now stands at \$4 BN, although the European market remains less developed due to a lack of independent industry data.⁴¹ Swap structures, while easier and cheaper to implement, have not yet proven popular.

Figure 8: Alternative risk transfer mechanisms: the rationale for financial institutions



40 Asset Securitization Report, “European Cat Bonds: Banking on Disaster” (9 July 2007).

41 Swiss Re, Market Index for Europe (2007).

Weather derivatives, designed to cover annual fluctuations in temperature, precipitation, and wind speed, experienced an injection of interest in 1997/1998, as a result of El Niño. In 2002/2003, the weather derivatives market stood at \$10 BN notional, up from \$4.3 BN in 2001. Utilities have been the largest users of weather derivatives thus far, but use is expected to increase significantly in the agricultural sector as producers try to hedge against fluctuations in crop yield. Demand is also likely to increase from the tourist and aviation industries, to cover changes in seasonal temperatures and precipitation.

The introduction of other product structures has been less successful to date. Exchange-traded catastrophe options, based on broad regional indices, have failed to attract investor interest, mainly due to the high basis risk involved. Even existing product structures suffer from a lack of liquidity and investor interest, in part due to competition from alternative providers (hedge funds setting up reinsurance companies) and in part due to investor scepticism.

For the market to become more liquid it needs to become more accessible. While some of the components of a successful market are in place – participants with divergent views, sufficient volatility to attract speculators – product structures need to resolve information asymmetry issues, and examine how less costly products might be created that have a broad enough coverage to maximize participants, yet remain specific enough to meet individual requirements. Nonetheless, it is likely that, provided the products are attractively marketed and priced for institutional investors, alternative risk transfer mechanisms will form an increasingly large proportion of a growing market for hedging against climate-related uncertainty in the future.

Emissions trading

Emissions trading markets are giving rise to a wide range of opportunities and the potential for growth is significant.

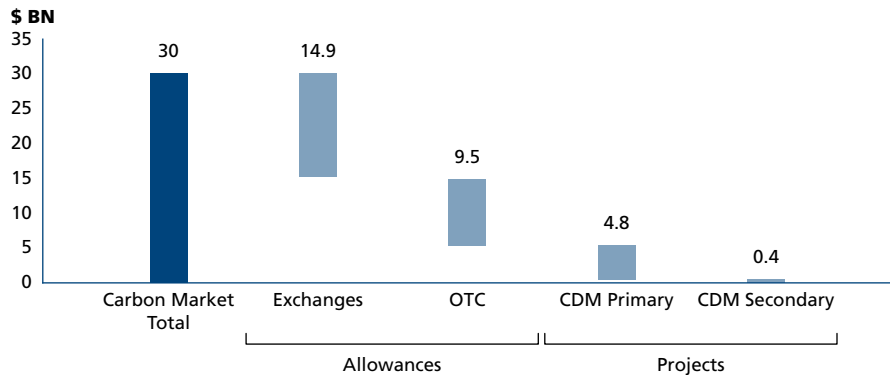
In 2006 the carbon market reached \$30 BN in traded value (Figure 9), three times the value of its first year, 2005.⁴² 2007 could see this rise to nearly \$50 BN. Covering both allowance-based and project-based transactions, the market is dominated by the EU Emissions Trading Scheme (ETS), where the sale and resale of allowances amounted to over \$24 BN in 2006, shared between OTC trading and exchanges.⁴³ Clean Development Mechanism (CDM) projects provided a further \$5 BN in Certified Emission Reductions, of which only 10% is attributable to a secondary market wherein financial institutions trade carbon with each other, often on behalf of firms with compliance obligations in Europe and Japan.⁴⁴

⁴² World Bank, State and Trends of the Carbon Market (2007).

⁴³ Outside Europe, the Australian market in New South Wales amounted to \$225 MM, and the Chicago Climate Exchange in the US traded \$38 MM.

⁴⁴ China accounts for 61% of CDM projects.

Figure 9: Global carbon market by traded values (2006)



Source: World Bank, State and Trends of the Carbon Market (May 2006), Oliver Wyman analysis

Financial institutions have become increasingly engaged in emissions trading, with large banks and hedge funds signalling their intention to follow up early speculation with larger amounts of capital, which will help transform carbon from a niche commodity to an established asset class – one especially attractive because of its different risk profile to other commodities.⁴⁵ Leading European and Japanese banks have shown considerable innovation in pursuing carbon’s potential as an asset. These opportunities have ranged from carbon trading (either on a proprietary basis or on behalf of clients) to providing corporate finance advisory services, and developing carbon-based securities and hedge instruments to offset the price of carbon against volatility in other commodity markets.⁴⁶ These banks are also providing equity, loans, and payments to acquire carbon credits from CDM projects and even buying stakes in project developers.

Future growth in the market will be driven by new countries participating in trading schemes, the incorporation of new industry sectors, stiffening national emissions allowances, and making firms responsible for all GHG emissions, not just carbon. The market would benefit from new trading products, and greater participation from financial institutions and traders, which might produce a greater turnover of credits, a more active futures market and the development of derivatives products based on carbon assets. On these grounds the market could reach \$130-150 BN of traded value over the next five years.⁴⁷

⁴⁵ IdeaCarbon, The Future of the Global Carbon Market post Stern (2007). By comparison, the credit derivatives market, which opened in 1993, showed similar growth to the carbon market in its first three years, but grew to \$1.2 TN after eight years of existence (British Bankers’ Association, Credit Derivatives Report, 2006).

⁴⁶ World Bank, State and Trends of the Carbon Market (2007).

⁴⁷ IdeaCarbon, The Future of the Global Carbon Market Post Stern (2007).

However, for financial institutions to commit larger sums of capital to the market, policymakers need to resolve the issues that have led to considerable price volatility and unintended causes of profit and loss in the first three years. One example of this was the over-allocation of allowances in Phase 1 of the ETS, which led to large polluters being able to sell surplus permits and a collapse of the price of carbon in April 2006. Others are the considerable price gap between EU Allowances and Certified Emission Reductions from CDM projects resulting from the differential cost of abatement across the world, and the tightening up of the certification process designed to ensure emissions reductions are actually achieved.

Financial institutions will only commit more capital to developing these markets once market information becomes more transparent and there is greater certainty about the future regulatory framework following the expiry of the Kyoto protocol in 2012. As the market matures and volumes pass the tipping point, one would expect that spreads would naturally compress and products pass into mainstream trading activity. However, the potential market fragmentation resulting from new trading schemes coming on-stream in the US and Australia will require arrangements to transfer assets across borders, common measurement and reporting mechanisms, and consistent penalties for fraud and non-compliance.

Clean technology and renewable energy

Clean technology and renewable energy firms represent an attractive opportunity to a broad spectrum of investors.

In 2006 new investment in renewable energy and low-carbon technology amounted to just over \$70 BN, with a further \$29 BN being exchanged through mergers and acquisitions, leveraged buy-outs and asset refinancing.⁴⁸ New investment in 2007 is expected to top \$90 BN, which represents a 225% increase on 2004 levels, and in ten years the figure is projected to reach \$225 BN.⁴⁹

The stringency of EU energy policy has made Europe the top place for investment in renewable energy, attracting nearly 40% of funds, against 32% for the US.⁵⁰ Asian markets, in particular China, are also recording strong growth, largely on the strength of Clean Development Mechanism projects.

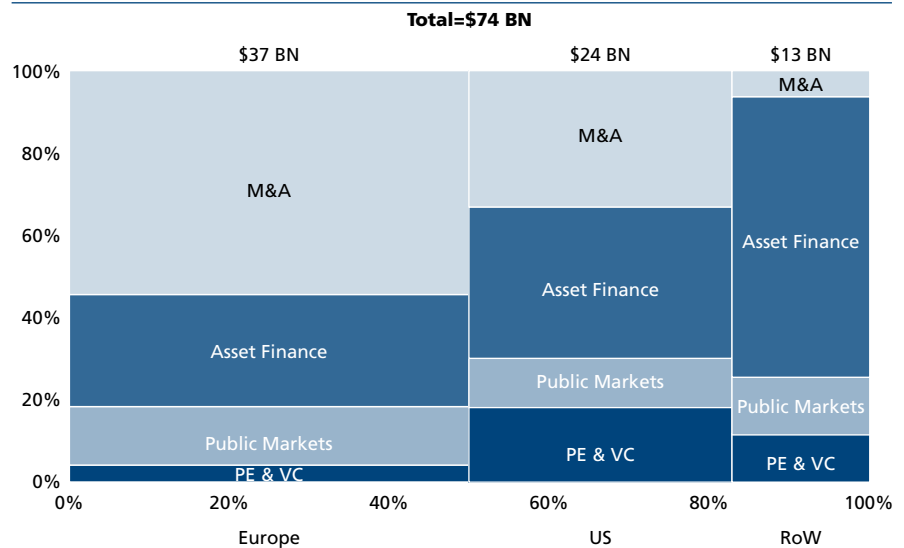
⁴⁸ New Energy Finance, Energy & Natural Resources on the Financing of Renewable Energy and Low-Carbon Technology (2007). A note on definitions: renewable energy in this section refers to energy produced from biomass, wind, solar, geothermal and tide and wave power. It does not include large hydro, unless explicitly mentioned.

⁴⁹ Clean Edge, Clean Energy Trends (2007).

⁵⁰ United Nations Environment Programme (UNEP) Finance Initiative, Global Trends in Sustainable Energy Investment (2007).

US firms accounted for 63% of private equity and venture capital investment in clean energy in 2006, and seven times European investment at the early stage, making this sector the third most popular recipient of VC finance after software and biotechnology.⁵¹ However, for the later stages of financing the positions are reversed, with clean energy firms raising twice as much via the European public markets (\$6 BN) as in the US, and a little more through asset finance, the largest category of new investment (Figure 10).

Figure 10: Financial services and clean energy (2006)⁵²



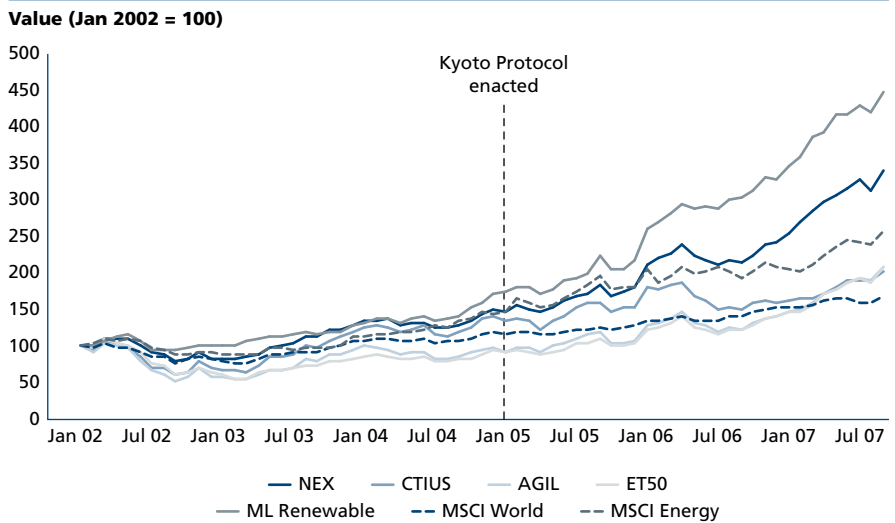
Source: New Energy Finance, Oliver Wyman analysis

Clean energy stocks have done well against global indices since the Kyoto protocol was enacted (Figure 11), against a backdrop of rising oil prices and a strong energy sector performance overall. While some currently view clean energy firms as overvalued (related to expectations on future oil prices), growing demand for their products is underpinning valuations.

51 New Energy Finance, Energy & Natural Resources on the Financing of Renewable Energy and Low-Carbon Technology (2007).

52 The \$74 BN total includes the value of mergers and acquisitions, but excludes the \$26 BN spent on small scale projects and government or corporate-funded RD&D. By comparison, in 2006 the pharmaceuticals sector saw \$13 BN in private equity deals, \$8 BN in IPOs, and \$209 BN on mergers and acquisitions, reflecting the greater maturity of the market (PwC, M&A Insights and Pharma 2020: the Vision, 2007)

Figure 11: Clean energy stocks against general equity performance (2002-2007)⁵³



Source: Bloomberg Market Data, Oliver Wyman analysis

Recent interest in renewable energy stocks is clearly driven by the increase in GHG regulation and state incentives such as the obligation on utilities to purchase a percentage of their energy from renewable sources. But it is bolstered by non-climate change factors, such as the increasing scarcity of fossil fuels and political instability in the producing countries, as well as a reluctance in some countries to renew nuclear power stations coming to the end of their lifespan, all against the backdrop of rising energy demand.

Thus, while the generation of electricity from renewable sources (excluding large hydro) represented just 2% of the world's total electricity generation in 2004, it may reach 10% by 2030, representing an eightfold increase in absolute terms, should global energy policy continue on the current path.⁵⁴ Likewise, biofuels could grow from 1% of transport fuel to 7% over the same period. In Europe solar might grow at 17% a year (owing to its very low base, unlimited potential, and flexibility with respect to on- or off-grid connections), and wind at 9% a year (its attractiveness restricted by site availability and planning issues), while the scope for large-scale hydro expansion is minimal.⁵⁵

But the market is not without risk, and its rapidly evolving and diverse nature provides for considerable uncertainty as to which approaches will take off. Second generation technologies may swiftly be superseded by more efficient third generation methodologies. Moreover, high start-

⁵³ CTIUS – Clean Tech Index US. NEX – Wilder Hill New Energy Global Innovation Index. AGIL – Ardour Global Index. ET50 – Impax ET50. ML Renewable – Merrill Lynch Renewable Energy Index. The indices each contain between 20 and 50 stocks that are leaders in the field of environmental technology

⁵⁴ International Energy Authority (IEA), Renewables in Global Energy Supply (2006) This Alternative Policy Scenario figure compares to the constant figure of 2% under the reference scenario. Including large hydro shows the percentage of renewables moving from 18% to 26% under the Alternative Policy Scenario, a doubling of market size in absolute terms.

⁵⁵ International Energy Authority, World Energy Outlook (2006).

up costs and the relative cheapness of fossil fuels mean suppliers of renewable energy will continue to be dependent on subsidies and policy measures for some years to come. Should these falter, take-up will be less and investments will not produce anticipated returns.

Arrangers of and investors in clean energy finance

The Royal Bank of Scotland is the largest financier of renewable energy and clean technology projects, with over \$2 BN committed in 2006 alone. Goldman Sachs has to date invested over \$1.5 billion in alternative energy projects in the US, Europe and Asia, while Citigroup has committed to investing \$31 BN in clean tech and alternative energy over 10 years.

The Consensus Business Group, the principal advisor to the Tchenguiz family trust, is exploiting its extensive investments in environmental assets in three ways. First, it is using its position as a major property investor to facilitate the transfer of new technologies to housebuilders faced with stiffer energy efficiency regulations. Second, it is acting as a principal investor in new power generation technologies such as solar energy that have predictable, securitisable income streams and exhibit high growth potential. Third, it is developing an innovative new platform to facilitate delivery of corporate offset obligations through the transfer of environment-related technologies and IP into target countries.

Supply-side trends

The analysis so far has led us to conclude that the more agile financial institutions with strong risk assessment skills and access to capital are potentially well positioned to adapt to new economic drivers and take advantage of growth markets. With some forethought they can accommodate the main threats, adjust their investment strategies, rebalance their credit portfolios, and actively manage their climate-related exposures.

Financial institutions should also be aware of other potential supply-side trends, other than those mentioned already:

- Commodities trading could be transformed by changing patterns of global demand, with the growth of biofuels creating a tension between energy and food markets, and the prospect of water becoming a tradable commodity in the near future
- The focus of GHG regulation on the power sector might strengthen the interdependence of energy and financial services, given the variety of financing and hedging needs of the power sector, and their increasingly active participation in financial markets
- An expected increase in extreme weather events might accelerate the participation of hedge funds in reinsurance and the gradual integration of insurance and capital markets in order to increase the liquification of risk

- The difficulty of providing affordable insurance cover in areas at high risk of extreme weather events could increase the prevalence of insurance provided by the public sector, particularly where state-run schemes, backed in the first instance by public catastrophe funds and ultimately by taxpayers, set out to compete with private firms on price
- Slowness by financial institutions in developing and rolling out green retail products, on the back of strong environmental brand equity, might encourage new entrants – firms from other industries (such as food retailers) – to tap into customer values and steal greater market share on the back of more tangible green credentials
- The climate agenda has already given rise to an increasing number of specialist providers – boutique investment banks, brokers, consultancies – who are developing highly innovative offerings around niche risks and opportunities. As in the case of other innovative trends they may in due course become good targets for acquisition as “green” becomes absorbed into mainstream business
- The early lead shown by Europe on GHG regulation suggests London may confirm itself as a hub for carbon trading, while the US may well become the centre of clean technology investment should the rapid growth in its venture capital and private equity investments translate into more IPOs and the market achieve greater maturity⁵⁶
- The opportunities within infrastructure finance suggest the potential for greater collaboration between commercial and development banks

Specialist providers

Climate Change Capital is a boutique investment bank that specialises in products and commercial opportunities that combat global warming. With over \$1.5 BN under management it has advised on and raised capital for projects including the development of renewable energy installations in the UK, the destruction of industrial gases in India and China, and acquisition and divestiture strategies for private equity funds.

Natsource is an emissions and renewable energy asset management boutique. Its three business units focus on asset management (led by a \$600 MM fund), advisory and research (which evaluates clean energy projects and the likely price of carbon commodities), and transactions (which has to date arranged emissions and renewable energy transactions with net market value of more than \$7 BN).

The European Climate Exchange (ECX), part of Climate Exchange plc, currently has 70-80% of the exchange-based emissions trading market in Europe, trading €9 BN of carbon in 2006.

⁵⁶ Currently 50% of all capital focused on carbon is managed in the UK (New Carbon Finance).

Evaluating the long-term implications for financial services

Over time, the greatest threats to financial services revenues may come from the macro-economic impacts of temperature change and international decisions about the future of GHG regulation.

Having analysed specific business issues in section 2, in section 3 we take a broader look at how climate change might affect the growth of financial services over the next 20 years. The section first examines the two far-reaching uncertainties identified in figure 4. It then identifies four possible business scenarios for 2030 and, in light of these, assesses the importance of the analysis so far for the different financial sectors.

Far-reaching uncertainties

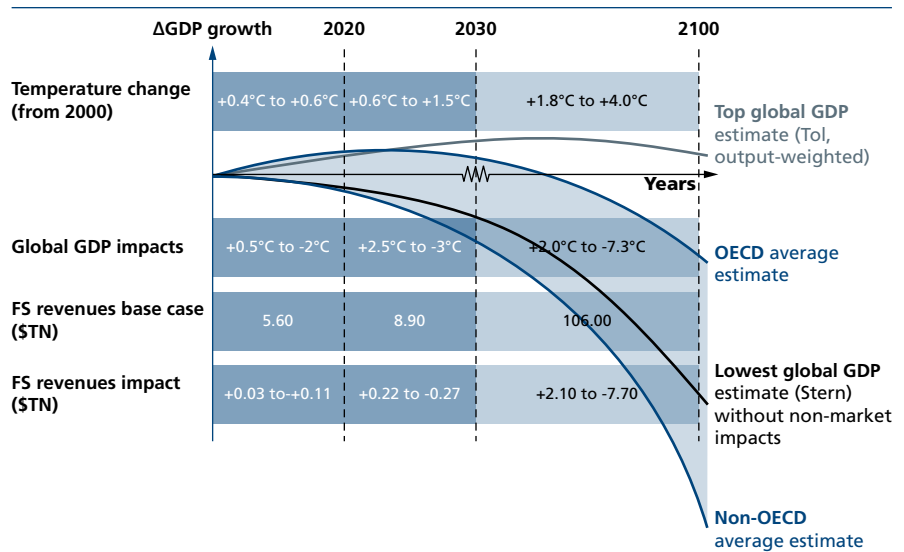
Temperature change

Over the next 20 years temperature rises alone may come to have a significant impact on a rapidly growing financial services industry.

Without climate change financial services revenues may grow to \$9 TN a year by 2030.⁵⁷ This represents not only a 260% increase on 2006 revenues, but also a growth in the industry's share of global GDP from 6.5% to 11%. On these assumptions, should GDP growth be affected within the range of +2.5% and -3% against the base case, as predicted by economists in point in time analyses, industry revenues might be approximately \$250 BN higher or lower than they might otherwise be (Figure 12).

⁵⁷ The estimates for future financial services revenues were calculated using the tool Oliver Wyman developed for its *Future of Financial Services* publications (2002-5). In brief it uses 13 years of historic data from different financial sectors and 44 different countries to make projections for future revenues, profits and values. It does so in the light of assumptions with respect to six growth factors: GDP and demographics, growth enablers such as education and health, market shifts, regulation, concentration and consolidation, and value chain evolution. With countries starting at different points on the curve, it acknowledges an s-curve relationship between financial service revenues and GDP over time. GDP projections to 2037 are taken from Global Insight, *World Overview* (2007)

Figure 12: Impact of temperature rise on GDP and financial services revenues



Sources: IPCC, Hadley Centre, CIG, European Commission, Tol, Stern, Oliver Wyman analysis

As noted earlier, global warming will produce an uneven spread of positive and negative impacts geographically. As a result, financial institutions need to factor the unfavourable prognoses for developing countries into their revenue projections when considering their current exposures to, or when placing sizeable, long-term bets in, emerging markets. While it would be excessive to suggest that in the next 20 years temperature change will present such a drag on rapidly growing economies as to make them unattractive for investment, it may nonetheless, given particular confluences of events, contribute to volatility and hard economic landings. Changes in the scale and location of disposable income would have particular consequences for the growth strategies of retail institutions interested in these markets.

International response

Financial services will be affected by the degree of co-operation or instability within evolving national responses. In the near term the Kyoto protocol forms the touchstone for most abatement activity, with adaptation being addressed by individual countries according to their needs and constraints. There is, however, considerable uncertainty about the scope of global GHG regulation after 2012 and, while current trends point towards an increase in both the scope and intensity of emissions regulation with variable international involvement (a protocol open to new adherents down the road), financial institutions need to acknowledge that in a fast-moving environment the future may not look like the past and several other outcomes are possible, each with their own implications for the industry.

The trajectory of the international response to climate change could have a significant impact on industry revenues and firm strategy.

Given the current situation it is arguable that “full” international cooperation would aim to stabilise temperature at a particular level and achieve this by setting a price on carbon, which would increasingly be adopted and standardised across the world. This would produce mixed fortunes for financial services for, while it would give greater confidence to plays in specific clean tech and emissions trading markets, the impact on industry revenues through GDP reduction could be significant. Measures to stabilise temperature at the tough target of 2-2.8°C up on 2000 levels would cost financial services up to \$270 BN in lost revenues in 2030. Aiming for 3.2-4°C, would cost the industry between \$54 BN and \$107 BN at the same point in time.⁵⁸

But it is quite possible, given current negotiating positions, that a number of different regimes will emerge, based around regional alliances, common economic situations, and shared climate change philosophy. Such an outcome would increase regulatory complexity for global institutions, although it might also create arbitrage opportunities between the different systems. Moreover, a lack of consistency in the global approach to abatement, with some countries refusing to set binding near and medium-term targets, would weaken opportunities for clean technology and renewable energy development owing to the continuing lower cost of energy from other sources. This could also alter the competitive dynamics for industry customers operating in multiple markets, thereby increasing the climate risk exposure of lenders and financiers.⁵⁹ Further disruption and investor uncertainty could also come from countries rowing back from agreed targets should the true cost of abatement be higher than expected, implementation prove more difficult than at first thought, and the knock-on consequences for different parts of the economy seem unacceptable.

Moreover, some policies might have unintended consequences. For example, reflecting on the soaring grain prices in 2007, incentives for planting biofuel crops could ultimately lead to interest rate rises, should the squeeze on land for food crops result, in a year of poor grain harvests, in a rapid escalation of commodity prices and therefore inflation.

⁵⁸ Based on the IPCC data presented in section 1.2. The 2-2.8°C target represents a 0.12% drag on annual GDP growth, while the 3.2-4°C target would mean a 0.06% impact.

⁵⁹ Moreover, it is not inconceivable that the current market-based approach to abatement will be jettisoned at some point in favour of a simpler taxation regime, which would provide greater certainty for firms evaluating long-term investment in abatement measures. Under such circumstances abatement finance and investment in clean technology and renewable energy would remain attractive, but the carbon market would likely dry up.

Financial institutions should also recognise that global warming may lead to more profound forms of geopolitical volatility that could disrupt their growth strategies. Climate change is already being identified as a threat multiplier in areas where there is existing economic and political instability on the one hand, and national strategic advantage to be obtained on the other.⁶⁰ The scale of water shortages, harvest failures, and resulting migration projected even for the next 20 years may well have broader economic ramifications, while the possibility of easier access to new mineral and energy resources in the Arctic may fuel territorial conflict and adjust the global balance of power, even as they offer new solutions (albeit fossil fuel) to dwindling energy resources elsewhere.^{61 62}

It is admittedly hard to ascertain the extent to which the instabilities generated, accelerated or amplified by climate change will impact on financial services, or the likelihood of more extreme consequences taking place. Nonetheless, given their global exposures, financial institutions, and investment banks in particular, should begin to build such eventualities into their inventories of high level risks. Unrest within major emerging market economies (e.g. China and India) could threaten the growth prospects of project investments, customer and network expansions, and the supply of a qualified workforce for outsourcing services. International conflict might act as a drain on the global economy, resulting in lower levels of production and increased volatility in financial markets and asset values. Lesser tensions might impact on cross-border trade and foreign currency exchange rates, the ability to repatriate funds, the attractiveness of joint ventures and partnerships.

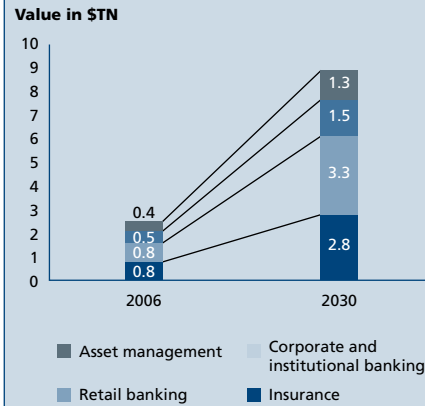
⁶⁰ CNA Corporation, *National Security and the Threat of Climate Change* (2007).

⁶¹ IPCC, *Climate Change 2007: Impacts, Adaptation and Vulnerability* (2007). China's population is expected to grow to 1.5 BN by 2030 (an increase of 200 MM on 2007). Over that time grain yields in the country are expected to fall by 5-10%. Moreover, urbanisation is reducing the quantity of arable land, which is already approaching the bottom-line target of 12 MM hectares for 2010. In order to ensure food security in this context the country would need to find an extra 10 MM hectares of arable land (Zhai Huqu, President of the Chinese Academy of Agricultural Sciences, in an interview to China Daily, 15 October 2007).

⁶² The correlation between particular geopolitical, economic, environmental, societal and technological risks, including climate change, is explored in the World Economic Forum's *Global Risks 2007* report.

Total impact of temperature rise and abatement measures on financial services through GDP in 2030

Growth in financial services revenues 2006-2030



Source: Oliver Wyman analysis

According to our *Future of Financial Services analysis*, financial services revenues will grow from \$2.5 TN to \$8.9 TN by 2030, with the highest CAGR being experienced by retail banking and insurance. In this context, taking the maximum and minimum figures for the impact on GDP of global temperature rise and serious attempts to curb emissions, financial services revenues will be affected within the range of +\$180 BN to -\$530 BN in 2030. This assumes a significant delay between the implementation of abatement measures and their impact on global temperature rises.

Moreover, from our understanding of how short-term shocks and long-term economic cycles impact on financial institutions of different sizes, we would venture that the revenues of the largest financial institutions would be most affected, given that they tend to experience general economic impacts (positive and negative) more sharply than the mid caps and small caps.

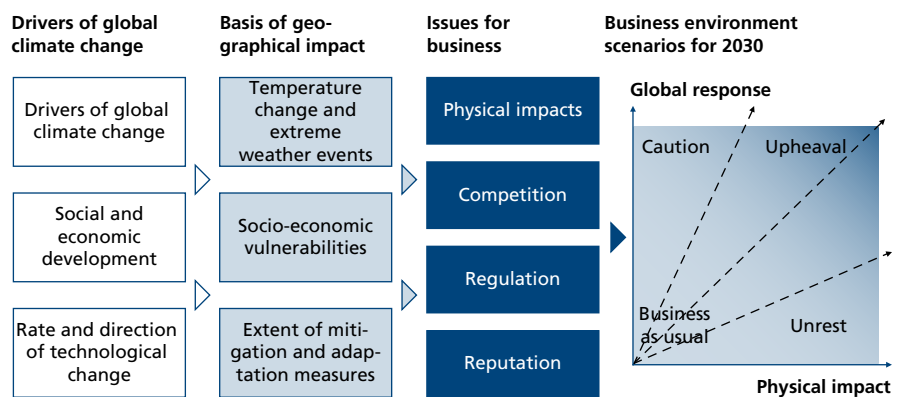
Firms' strategic choices need to be shaped by their views on the most likely business scenarios of the future.

Impacts by climate change trajectory

The multidimensional uncertainties within climate change and the global response to it suggest it would be rash to assume there was only one possible trajectory for the future, and that the rate of change could be determined. As a result, we have identified four different business environments for 2030, and reassessed the importance of the issues analysed in sections 2 and 3 in the light of each.

The main constituents of the four scenarios are derived from the drivers of climate change, global impacts, and business concerns (Figure 13). The results are set out on two axes, which are based around the intensity of physical impacts and the degree of global response.

Figure 13: Climate change drivers and future business environments



Business as usual

The long-term predictions for the planet's environmental well-being remain uncertain, but the physical impacts over the past 20 years have been less than the data suggested in the first decade of the century, and have been particularly manageable for OECD countries, which have seen no greater incidence in extreme weather events. In geopolitical terms the world is as stable as it was in 2007, and economic growth is as expected. The commitments made by governments in the first decade of the century for reducing GHG emissions will not be met, with little resolve shown by either the US or what in 2007 were emerging economies; consequently regulation has become only slightly stiffer in Europe. The failure to find a universally satisfactory replacement to the Kyoto protocol has led to a variety of watered-down non-aligned arrangements taking its place. As a result of faltering incentives, the rush towards clean tech investments in 2000-2010 has not paid off for investors as much as expected.

Unrest

An unexpected confluence of climate events (droughts, floods, storms) in recent years has dented optimism in many parts of the economy, notwithstanding higher agricultural yields and milder winters in northern climes. GDP is noticeably impacted and investment capital has become difficult to raise. Owing to the widespread failure to meet ambitious national targets set at the beginning of the century and the collapse of the international frameworks for cooperation as a result of foreign policy tensions, energy consumption is scarcely less fossil fuel-intensive, and the cost of stabilising carbon in the atmosphere at sensible levels is now much higher than it was in 2007. In the current political and economic climate there is little willingness to make the necessary commitments: national protectionism has increased, and consumers are focused on the short term. Resentment of the West in developing countries, where the impacts are felt sharpest, has given rise to considerable geopolitical instability and exacerbated existing foreign policy problems. Support from the richer countries for ongoing and escalating humanitarian crises is tokenistic and slow.

Caution

Global warming continues as predicted at the beginning of the century. Countries in temperate zones are seeing a small boost in GDP, although Africa, Latin America and India are beginning to suffer from regularly poor crop yields and increased water scarcity. The climate agenda, however, is top of everyone's concerns, and the commitment to adaptation and abatement by governments, consumers and industry across the world has escalated in a steady manner over the past 20 years. The most exposed industries have been shaken by the increasing intensity of regulation, but the firms that have invested wisely in adaptation and diversification have increased their market share at the expense of those that have not. Strong international policy commitment to the climate agenda has led to widespread participation in cap and trade systems; a greater R&D expenditure on clean technology; growing, increasingly competitive markets for renewable energy; and sustained investments in public infrastructure renewal, although some still hold the view that the benefits do not justify the costs and are a significant drag on economic growth.

Upheaval

Climate feedback mechanisms have hastened global warming more than was predicted in the first years of the century, with the result that sustained adverse effects are noticeable in OECD countries, and key emerging economies such as China and India are suffering in particular. There are grain shortages in many parts of the world; tropical diseases have infiltrated central Europe; and over 200 million people worldwide have been displaced. Sustained commitment by one and all to a low carbon world and the enforcement of abatement measures, including a reduction in fossil fuel-intensive energy supply, have yet to stabilise climate change and economic turbulence is on the rise. There are clear winners and losers within and between industries, but the widespread, sustained investment in new public infrastructure looks to have been a wise investment in view of the possible extreme weather events to come.

Each of the four scenarios presents both challenges and opportunities for financial services (Figure 14). “Business as usual” and “Caution” represent relatively favourable scenarios, where climate change has not impaired economic output in the major markets. In the former, financial institutions will need to be alert to the strength of public opinion, while in the latter regulation will be the most significant driver of changing locations of value.

“Unrest” and “Upheaval” represent unfavourable scenarios, as a reduction in global output resulting from the costs of climate change will likely spill over to some extent into the financial services sector. The ability to manage strategic and hazard risks, and to identify pockets of opportunity, will be that much more important.

Figure 14: Importance of issues for financial services by business scenario

| Category | Issue | Importance by scenario | | | |
|-----------------------------------|--------------------------|------------------------|---------|---------|----------|
| | | Business-as-usual | Caution | Turmoil | Upheaval |
| Risks to address | Investor pressure | □ | ■ | ■ | ■ |
| | Industry vulnerabilities | □ | ■ | ■ | ■ |
| | Extreme weather | ■ | ■ | ■ | ■ |
| Transformations to finance | Infrastructure renewal | □ | ■ | ■ | ■ |
| | Industry abatement | □ | ■ | ■ | ■ |
| | Greening customers | □ | ■ | □ | ■ |
| Markets to invest in | Emissions trading | ■ | ■ | ■ | ■ |
| | Clean tech/renewables | ■ | ■ | ■ | ■ |
| | Hedging innovations | □ | ■ | ■ | ■ |
| Far-reaching uncertainties | International response | ■ | ■ | ■ | ■ |
| | Temperature change | □ | □ | ■ | ■ |















□ Low ■ Medium ■ High


Impacts by financial sector

The impacts of climate change and the global response will fall unevenly across financial services.

According to our analysis of the separate issues, corporate and institutional banking (CIB), along with asset management will see the greatest upsides, while the issue looks broadly neutral for retail banking except for the impact through any GDP slowdown, and clearly presents threats for the insurance sector (Figure 15). These outcomes are similar according to the two least favourable scenarios, although CIB is perhaps most vulnerable to volatility in the international response and locally-based retail banks and insurers will be most at risk from regional environmental degradation and an increase in extreme weather.

Figure 15: Impact of climate change by financial services sector

| Sector | Upside Capturing the opportunity | Downside Managing the uncertainty | Impact |
|--|--|---|--|
| Corporate and institutional banking |  <ul style="list-style-type: none"> Clean tech/ renewables <ul style="list-style-type: none"> Revenues from clean tech IPOs and investment assets Financing, valuation and advisory services for clean tech companies |  <ul style="list-style-type: none"> Defaults on corporate loans <ul style="list-style-type: none"> Increase in loan defaults driven by regulation, competition, or reputation | <ul style="list-style-type: none"> ↑ Investment banking ↑ Structured finance ↑ Commercial lending ↔ Commercial savings |
| |  <ul style="list-style-type: none"> Emissions trading markets <ul style="list-style-type: none"> Trading of GHGs as a commodity Carbon-based securities and hedging instruments | | |
| |  <ul style="list-style-type: none"> Hedging innovation <ul style="list-style-type: none"> Market-making and administration of derivatives and structured products, e.g. swaps, index-based swaps, ART New business models and market entrants, e.g. hedge funds as reinsurers | | |
| Retail banking |  <ul style="list-style-type: none"> Greening consumers <ul style="list-style-type: none"> Currently small market for "green" retail products Potential new entrant opportunity for a "green" brand with a unique product offering |  <ul style="list-style-type: none"> Emerging markets slowdown <ul style="list-style-type: none"> Accelerated arrival of hard economic landings in areas at high risk of climate change impact | <ul style="list-style-type: none"> ↑ Consumer lending ↔ Consumer savings ↔ Transactions |
| |  <ul style="list-style-type: none"> Brand <ul style="list-style-type: none"> Benefits of "green" positioning far outweigh the costs | | |
| Asset management |  <ul style="list-style-type: none"> Clean tech/renewables <ul style="list-style-type: none"> Clean tech funds and investment assets Index-based funds |  <ul style="list-style-type: none"> Security of long-term investments <ul style="list-style-type: none"> Impact of climate change and emissions regulation on asset valuation | <ul style="list-style-type: none"> ↓ Traditional AM ↑ Alternative AM ↔ Broking |
| |  <ul style="list-style-type: none"> Project and infrastructure finance <ul style="list-style-type: none"> Attractive yields, risk pricing, and inflation-linked earnings from infrastructure assets | | |
| Insurance |  <ul style="list-style-type: none"> Protection against industry vulnerability <ul style="list-style-type: none"> Bespoke products with climate change specifications (e.g. litigation protection) |  <ul style="list-style-type: none"> Extreme weather <ul style="list-style-type: none"> Short-term increase in attritional and catastrophic losses... ...followed by increased demand for reinsurance, policy/regulation uncertainty, and increasing capital markets involvement in the medium term | <ul style="list-style-type: none"> ↓ Primary insurance ↑ Reinsurance ↑ Broking |
| |  <ul style="list-style-type: none"> Greening consumers <ul style="list-style-type: none"> Increasing consumer appetite for "green" insurance products at preferential rates | | |
| |  <ul style="list-style-type: none"> Investment asset uncertainty <ul style="list-style-type: none"> Impact of temperature change and global instability on emerging markets investments | | |

 Relative size of importance

Short-term priorities for financial services

As an immediate priority financial institutions should stress-test their portfolios, strengthen their green credentials, and develop new products and services to anticipate changing customer demand.

The financial sector is already engaged in a wide range of strategies, tactics and innovations. However, with a few exceptions, it is arguable that the application by many firms is patchy and their commitments do not amount to substantial investments.

Sections 2 and 3 have examined current demand-side trends and long-term macro-economic challenges. This section considers the nature and scope of activity in the industry at present, and thus identifies what steps firms should take now in order to protect their business, seize opportunities and develop competitive advantage.

Current activity by financial institutions

Given that many markets enabled by the global response to climate change are still in their early stages of development, most firms appear to be testing the temperature of the water. The market leaders on this issue are developing integrated approaches to global warming that cover their sphere of control (their own emissions), their sphere of influence (their customers, investments, and suppliers), and their sphere of concern (trade bodies and governments). Firms in a middle tier have pledged to reduce their emissions on the one hand, and expressed an interest in clean technology on the other, but climate change has not led them to reexamine their processes and build in new checks and balances. And for a good many others the subject remains below the strategic radar.

Few institutions have regarded their engagement as a wholesale branding opportunity. While insurers have an immediate interest in engaging with customers and policymakers with respect to particular defensive goals, the “green” announcements of banks are perhaps more focused on reputation enhancement, directed more at opinion formers than markets.

The range and scale of activity (Figure 16) varies considerably by geography. Unsurprisingly, Western European firms have been the most broadly dynamic in terms of offensive and defensive responses. There is a sharper distinction in the US between the commitment shown by some of the largest institutions and private equity firms on the one hand (largely around clean technology and catastrophe insurance), and those that have given the issue little attention. The situation in emerging markets shows a mixed picture. Much activity in China and India is on the back of Clean Development Mechanism projects and solar energy investments; Japanese, New Zealand and

Indonesian firms are strong on emissions trading; “green” themed funds are popular in South Korea and Singapore. Brazilian institutions are in the lead in Latin America.

Figure 16: Current responses by financial institutions

| | | Risk management | | |
|-------------------------|--------|---|---|---|
| | | Control/reduce impact | Actively manage impact | Capture business opportunities |
| Business transformation | Low | <ul style="list-style-type: none"> ■ Commitment to Equator Principles and emissions disclosure ■ Self-regulation of voluntary carbon offset market ■ Reduction of carbon footprint | <ul style="list-style-type: none"> ■ Portfolio review ■ Raising risk premiums and setting lower limits ■ Adding exclusions and non-renewal clauses ■ Setting higher deductibles | <ul style="list-style-type: none"> ■ “Green” retail products (mortgages, credit cards, personal loans, savings accounts) ■ Insurance for renewable energy projects, green buildings, pay-as-you-drive, and energy saving ■ Clean tech investment funds |
| | Medium | <ul style="list-style-type: none"> ■ Publications and conferences to raise client awareness ■ Sponsorship of climate change initiatives ■ Cooperation with NGOs | <ul style="list-style-type: none"> ■ Including carbon disclosure and mitigation in client review process ■ Catastrophe and scenario modelling ■ Sustainability criteria for investment assessments ■ Environmental criteria for lending | <ul style="list-style-type: none"> ■ Finance for clean tech firms ■ Emissions trading markets ■ Structured finance for projects and infrastructure (PFI/PPP) ■ Abatement finance ■ Securitisation and risk management for carbon credits |
| | High | <ul style="list-style-type: none"> ■ Active involvement in policy making ■ Scenario analysis of new investments ■ Using geographic tracking technology to identify high risk pockets | <ul style="list-style-type: none"> ■ Withdrawal from high-risk markets ■ Banks’ sale of insurance businesses ■ Increase in insurance use of capital markets to transfer risk ■ Risk diversification/ multiline portfolios | <ul style="list-style-type: none"> ■ Hedging innovation (catastrophe bonds, weather derivatives, ILWs) ■ Development of index-linked products (global warming, market loss, and GHG allowance) |

Priorities for the near future

Current market trends, and the shape of future risks and opportunities around climate change, suggest five immediate and interrelated priorities for financial institutions that will help position them for possible climate-related business environments of the future. The quality of their responses could drive a significant wedge in the relative performance of the most exposed institutions. Forward-thinking organisations are well advanced in these areas and will be ready to hedge against and take advantage of shifting locations of value.

1. Portfolio reappraisal

Financial institutions need to reexamine their strategic positioning in terms of the likely impacts of climate change and societal responses to it. At the highest level this means reviewing the geographic spread of the firm, its geophysical context, and its business portfolio under particular global warming trajectories. This may lead to the reprioritisation of certain regional and national markets and business lines according to their likelihood of being net beneficiaries or casualties. As a result some portfolios might require further diversification. Similarly, firms should undertake a detailed exploration of their exposures to climate risk through loan books, investment assets and insurance portfolios, stress-testing them against particular physical, regulatory and market-based vulnerabilities where appropriate.

A focus on emerging data and trends will help institutions improve their understanding of the likely boundaries of risk/return and the best markets on which to focus their efforts. Firms should therefore develop a comprehensive dashboard of indicators that will help them monitor the issue as it evolves, quantify emerging risks, and guide decision-making. In particular, firms will need to understand the implications of different carbon scenarios for their capital requirements. As part of this they should also monitor the directions, details and implications of GHG policy and regulation; emerging liability issues; the capacities of the market for technological change; and increasing public activism.

2. Innovation

Financial institutions should explore how they might use the likely volatilities generated by climate change to increase appetite for financial products, improve the match between risk managers and speculators, and exploit arbitrage opportunities between different markets. Substantial revenues can already be derived from specialist advisory, transactional and hedging services, while the consumer market remains largely untapped, and there is considerable scope for insurance innovation in emerging economies.

The unpredictability of climate change will place a greater premium on the pace of innovation at a product design level, and firms must develop a highly responsive capability in order to

meet and anticipate new market conditions. The most agile firms will be able to react quickly to changes in demand, but also avoid committing resources too early or to markets that lack substance.⁶³

3. Brand

Firms should seek to develop and leverage a strong, credible brand to strengthen relationships with existing customers, and secure new ones. Consumers and new recruits will be attracted by a sense of shared values in markets where financial institutions are virtually indistinguishable by image, loyalty is low, and climate change concern is high.⁶⁴ Industry will attach importance to the careful marketing of innovative thinking around climate risk, abatement and adaptation options, and growth strategies. Governments, which will become increasingly significant customers, will arguably seek partners who can demonstrate both aligned values and expertise.

The marketing of green credentials remains, for the moment at least, a way in which small providers can get themselves noticed and multinationals can work across business lines and geographies, with stakeholders of all types. The strongest advocates of the climate agenda are already reporting both generic benefits based around their firm's CSR positioning, and increased interest in bespoke solutions. There is still scope in many regions for firms to seize the role of the green financial institution. However, while firms who are slow to market their environmental awareness may come to suffer the consequences, firms will need to be alive to climate change fatigue and accusations of "green wash", and recognise that it will not be long before green branding becomes a hygiene factor, and therefore of little value in terms of differentiation.

4. Governance and execution

Financial institutions need to develop a coherent stance across the firm, which ensures a growing capability is both employed throughout the organisation and matched by the firm's own impact on the environment. In other words, firms should develop structures whereby climate risk and opportunities are reported on and used to inform strategy; environmental criteria might be rolled out across a range of products; and measures are taken to reduce emissions from infrastructure and travel.

⁶³ In the automotive industry early investment in hybrid models by Toyota (US\$1 BN) has allowed the company to extend its competitive advantage over its US competitors, which were initially reluctant to embrace hybrid technology. Benefiting from early entry and high-profile publicity, by mid-2006 Toyota's hybrid sales had exceeded 750,000 units, and the company now has around 80% of the US hybrid market share. The company expects hybrids to account for 20% of US sales by 2012, and believes all vehicles will be using some form of hybrid technology by 2030. In an attempt to catch up, Ford has licensed 21 Toyota patents related to its hybrid technology, and plans to produce 250,000 hybrids by 2010. GM has similar plans to introduce a "plug-in" hybrid model.

⁶⁴ Westpac reports that half of Australian graduates choose Westpac over other Australian banks explicitly on the grounds of its CSR approach (Carbon Down, Profits Up, 2006).

Climate change governance

The Environmental Committee at Standard Chartered Bank consists of senior managers from throughout the bank and is chaired by an executive board member. The committee meets monthly and reviews the bank's products, policies and exposures to define a strategy for responding to climate risk, which it then reports to the executive board and the Corporate Responsibility and Community Board Committee.

5. Collaboration

The complexity and reach of climate change suggest that the largest, most global financial institutions should work with each other, governments, NGOs and customers in ways that strengthen not only the intelligence, customer relationships and therefore reputation of individual firms, but also that of the industry as a whole.⁶⁵

Equally, industry leaders should work as a unified body to influence policy solutions to climate change that will best leverage the power of capital markets, and to ensure that individual governments steer away from unilateral policies that are likely to create significant moral hazard and thereby latent costs for taxpayers. This includes issues such as the nature and scale of incentives for the early-stage development of clean technology; modifications to emissions trading regulation; decisions around flood defence maintenance and infrastructure renewal; planning and building policies with respect to the location and resilience of new real estate development; the nature of liability regimes; and other significant state interventions that impact on predominantly private sector markets.

⁶⁵ A number of forums exist already for this type of activity, including the United Nations Environment Programme Finance Initiative, the Climate Group, the Global Roundtable on Climate Change, the United States Climate Action Partnership, the European Corporate Leaders Group on Climate Change, Climatewise, the Investor Network on Climate Risk, and the Investors Group on Climate Change.

Figure 17: A checklist for boards of directors – Anticipating the shifting locations of value over time

| Subject/topic | Question | Impact area/response |
|----------------------|---|--|
| Markets | <p>Can we quantify how global warming and the international response will:</p> <ul style="list-style-type: none"> ■ Affect economic growth in our key geographic markets? ■ Influence the capitalisation and composition of our different customer segments? ■ Generate additional revenues through responses to particular needs? | <ul style="list-style-type: none"> ■ Revenues ■ Growth strategies ■ Customer prioritisation |
| Demand changes | <p>Do we understand:</p> <ul style="list-style-type: none"> ■ How our customers view their own risks with respect to climate change? ■ How much and how fast their financial needs and preferences might alter? ■ What products will stimulate and meet changing demand for risk mitigation and investment? | <ul style="list-style-type: none"> ■ Innovation ■ Marketing strategy |
| Portfolio risk | <p>Can we quantify the risks presented by the exposure of our customers to:</p> <ul style="list-style-type: none"> ■ Extreme weather events and climate change? ■ GHG and energy efficiency obligations? ■ The changing preferences of their own customers? | <ul style="list-style-type: none"> ■ Reserves ■ Lending strategy ■ Portfolio diversification |
| Competition | <p>Do we know:</p> <ul style="list-style-type: none"> ■ How our main competitors are responding to climate risks and opportunities? ■ How the supply-side dynamics of financial services provision might be affected? ■ The strategic issues on which we should be collaborating with other financial institutions? | <ul style="list-style-type: none"> ■ Strategic positioning ■ Branding ■ Joint ventures ■ M&A |
| Stakeholders | <p>Do we understand:</p> <ul style="list-style-type: none"> ■ Our exposures to pressure from shareholder, employee and public activism on climate change? ■ The impact of tougher regulatory, legal and political positions on future revenues and strategic decisions? | <ul style="list-style-type: none"> ■ CSR positioning (including carbon footprint) ■ Policy engagement |
| Management | <p>Do we have in place:</p> <ul style="list-style-type: none"> ■ A dashboard of indicators that flags emerging concerns related to climate risk? ■ Forward-looking processes to anticipate changing levels of default risk? ■ Relevant data and expertise to develop bespoke climate-related products and services? ■ Reporting structures that inform strategic decisions around exposures and growth opportunities? ■ Channels that enable the sale of climate-related products across business lines? | <ul style="list-style-type: none"> ■ Governance ■ Marketing ■ Recruitment |

Final thoughts

Financial services are in a unique, privileged position with respect to climate change. The net winners from global warming will be those firms that best understand the risks and can take advantage of a changing business environment. Against this backdrop the capacity of financial institutions to hedge themselves and their customers against a range of business risks; develop new products and services to meet changing customer needs; and invest in growing markets means the sector is inherently well placed to cope with any of the scenarios that the future might bring.

The financial sector is not, however, immune to global warming and, while a degree of volatility may strengthen revenues, the very factors that make the industry resilient to climate change – its global interconnectedness and the mobility of its capital – also mean it is susceptible to broad-based threats that cannot easily be mitigated. Coinciding with an economic downturn and high levels of price-based competition, unanticipated climate-driven disturbances could lead to substantial losses and write-offs, and perhaps even revenue decline.

In this current, possibly transitional, phase in the move to a low carbon economy there may only be a small window of opportunity within which firms can obtain distinct competitive advantage by strengthening their green credentials and developing new products and services to meet changing customer demand. Nonetheless, a proactive approach on the lines indicated above can put all firms on a footing that will lead to social, reputational and financial rewards.

Moreover, by strategically engaging with the issue, the sector as a whole can exercise a degree of leadership that will minimise climate-related economic volatility and enable long-term bets in pursuit of environmental improvements and commercial returns. With national and international policies under review and consumer interest perhaps approaching a tipping point, the time for action is now.

Selected bibliography

- AON, Annual Global Climate and Catastrophe report (2006)
- Allianz, Climate Change and the Financial Sector: An Agenda for Action (June 2005)
- Association of British Insurers (ABI), Financial Risks of Climate Change (September 2005)
- Carbon Disclosure Project, Carbon Disclosure Project Report 2007 Global FT500 (2007).
- Carbon Disclosure Project, Carbon Disclosure Project Report 2007 USA S&P500 (2007).
- Carbon Trust, Brand Value at Risk from Climate Change (2005)
- Carbon Trust, Climate Change and Shareholder Value (2006)
- Carbon Trust, Accelerating Innovation in Low Carbon Technologies (2007)
- Carbon Trust, Climate Change and Equity Valuations (2007)
- CERES, From Risk to Opportunity: How Insurers can Proactively and Profitably Manage Climate Change (August 2006)
- Climate Group, Carbon Down, Profits Up (August 2004)
- Climate Group, In the Black: The Growth of the Low Carbon Economy (May 2007)
- ClimateWise, Reducing the Risk for Tomorrow (2007)
- Cleantech, Cleantech Venture Capital Report (2006)
- Citigroup, Investing in Solutions to Climate Change (June 2006)
- Energy Information Administration (EIA), US Energy Information Administration Report (2007)
- Energy Information Administration (EIA), International Energy Outlook 2007 (2007)
- Ernst & Young, Renewable Energy Country Attractiveness Indices (2007)
- Guy Carpenter, Hurricane Katrina – Reinsurer Impact Update (October 2005)
- HM Treasury, Stern Review on the Economics of Climate Change (October 2006)
- IDEAcarbon, The True State of the Carbon Market (May 2007)
- Intergovernmental Panel on Climate Change (IPCC), Fourth Assessment Report of the Intergovernmental Panel (January 2007)/Working Group I (February 2007)/Working Group II (April 2007) /Working Group III (May 2007)
- International Institute for Environment and Development (IIED), The Voluntary Carbon Market: Current & Future Market Status and Implications for Development Benefits (October 2006)
- International Energy Agency (IEA), Energy to 2050: Scenarios for Sustainable Growth (2003)
- International Energy Agency (IEA), World Energy Outlook 2006
- International Energy Agency (IEA), Renewables in the Global Energy Supply (January 2007)
- International Energy Agency (IEA), Climate Policy Uncertainty and Investment Risk (2007)

Lehman Brothers, The Business of Climate Change: Challenges and Opportunities (February 2007)

Lippincott Mercer Company, Serving the Climate Change Conscious Consumer – Insights from Qualitative Research (June 2006)

Lloyd's, 360 Risk Project (2006)

Marsh, Risk Alert: Climate Change - Business Risks and Solutions (2006)

New Carbon Finance, State of the Voluntary Carbon Market (July 2007)

New Energy Finance, Energy & Natural Resources on the Financing of Renewable Energy and Low-Carbon Technology (March 2007)

Oliver Wyman, The Future of Financial Services: Future Industry Scenarios (2005)

Sprott Asset Management, Investment Implications of an Abrupt Climate Change (May 2006)

Swiss Re, Opportunities and Risks of Climate Change (2002)

Swiss Re, Market Loss Index for Europe – Expanding Capital Market Capacity (2007)

Swiss Re, Influence of Global Warming on Tropical Cyclones, Hurricanes and Typhoons (October 2006)

Swiss Re/Sigma, Natural Catastrophes and Man-Made Disasters in 2006 (2007)

UBS, Reacting to Climate Change (June 2007)

United Nations Environment Programme Finance Initiative (UNEP FI), Global Climate Change: Risk to Bank Loans (2005)

United Nations Environment Programme Finance Initiative (UNEP FI), CEO Briefing 2006: Adaptation and Vulnerability to Climate Change: The Role of the Financial Sector (November 2006)

United Nations Environment Programme Finance Initiative (UNEP FI), The Future of Climate Policy (2006)

United Nations Environment Programme Finance Initiative (UNEP FI), Green Financial Products and Services (August 2007)

United Nations Framework Convention on Climate Change (UNFCCC), The Cost of Extreme Events in 2030 (July 2007)

United Nations Framework Convention on Climate Change (UNFCCC), Analysis of Existing and Planned Investment and Financial Flows Relevant to the Development of Effective and Appropriate International Response to Climate Change (July 2007)

World Bank, State and Trends of the Carbon Market (May 2006)

World Bank, Climate Change Impacts, Energy and Development (May 2006)

World Business Council for Sustainable Development, Facts and Trends to 2050: Energy and Climate Change (2004)

World Economic Forum (WEF), Global Risks 2007 (January 2007)

World Energy Council, Global Energy Scenarios to 2050 and Beyond (2007)

World Resource Institute (WRI), Global Banking Report (November 2006)

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