

Climate Change & The Financial Services Industry

Module 2 – *A Blueprint For Action*

Prepared for the UNEP Finance Initiatives Climate Change Working Group
by

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Preface

This report constitutes the second part of a major two-phase study on the financial services sector and climate change commissioned by the United Nations Environment Programme Finance Initiatives (UNEP FI) Climate Change Working Group (CCWG).

The first phase of the study (Module 1, 'Threats and Opportunities Facing Financial Institutions) discusses the general relevance of climate change to the financial services industry, the need for long-term, 'beyond-Kyoto' market-based frameworks for fostering finance sector participation and the kind of threats and opportunities facing the financial services industry in the future.

Here, we present the findings of a more detailed examination of the possible future role of the finance sector in dealing with climate change, the prevailing attitudes of financial services companies in responding to the issue and the kinds of commercially-oriented adaptation and mitigation activities currently being implemented in response. The report identifies the key cognitive, political, analytical and market-related barriers to action, and provides practical recommendations to both policymakers and financial services providers on overcoming these barriers.

UNEP FI CCWG is a group of companies and other bodies associated with the UNEP FIs, which are particularly concerned about the issue of Climate Change. Its aim is to operationalise the principles enunciated in the various UNEP Financial Institutions and Insurance Industry Initiative position papers by research and good practice. Its membership comprises: Andlug Consulting, Aviva, CAF, Citigroup, Dresdner Bank, Gerling Group, LPC, Munich Re, Prudential, SAM Sustainability Group, Swiss Re and UBS.

Innovest Strategic Value Advisors is an internationally recognized investment research and advisory firm. Founded in 1998, the firm currently has over US \$1 billion under direct sub-advisory mandates and provides custom portfolio analysis and research to leading fund managers around the world. Innovest is headquartered in New York City with major offices in Toronto and London.

Dr Andrew Dlugolecki is a past chairman of the UNEP Insurance Industry Initiative. He has served the IPCC Assessment process as the chief author of the financial services chapter in the Second Report, and was review editor for that chapter in the Third Report. He has chaired two studies of Climate Change for the UK Chartered Insurance Institute. He retired from senior management in CGNU plc in 2000, and is now an independent consultant in climate change and financial services.

Much of the input to this study has come from direct discussions, correspondence and interviews with practitioners from the financial services industry, and the authors are indebted to them all. A complete list of all the contributing organizations is presented in Appendix 1. The authors would like to express particular thanks to MMC Enterprise Risk (part of the Marsh & McLennan Group) for detailed review input.

Executive Summary

Scientific and technical reports present compelling evidence that human-induced climate change is upon us, and that its consequences could be devastating. Worldwide economic losses due to natural disasters appear to be doubling every ten years, and have reached almost \$1 trillion over the past 15 years. If current trends persist, the annual loss amounts will, within the next decade, come close to US\$150 billion. At the same time, the greenhouse gas emissions regulations and emissions trading schemes that are close to becoming a reality in large parts of the world will have direct competitive consequences for large sections of the economy. That financial services companies will be faced with a range of threats and opportunities on account of climate change is, therefore, no longer a matter of conjecture.

What *is* undecided, however, is the manner in which companies should respond. As this report shows, there are radically differing opinions on the extent to which the industry could be affected by climate change, and what measures financial services companies could or should take now and in the future. With political momentum regaining pace, best practice in responding to climate change is likely to evolve rapidly in the near future.

Financial institutions perceive their role with respect to climate change to be more about the facilitation of transactions, market development and the pursuit of economic profitability than the attainment of particular political outcomes. With this in mind, universally applicable suggestions on how financial institutions can deliver market solutions to the climate change problem most effectively include:

- Helping to structure and monitor an efficient market system by working with securities and exchange regulators, actuaries, accountants and other agents of the financial markets.
- Engaging with other stakeholders (particularly along the business-to-business axis).
- Investing in and supporting the development of products and services that contribute towards adaptation and mitigation.

To date, progress has been slow and is concentrated in those organizations and entities with strategic interests in first mover advantages, i.e., those entities that see value in ‘sustainability’-oriented investing, or that are directly and obviously affected by climate change impacts or mitigation policies.

Beyond this, the view that climate change is of strategic importance is more prevalent within the **insurance and reinsurance** business than perhaps any other segment of the financial services industry. As yet, however, it has proved extremely difficult to explicitly factor climate change-related issues into underwriting costs due to problems in identifying and quantifying the incremental risks involved. Likewise, despite a growing awareness of the issue in **commercial banking**, the extent to which climate change and GHG mitigation regulations will affect lending decisions and the credit risk management policies that govern their behavior towards larger corporate clients remains largely unexplored. Both insurers and bankers appear to be more comfortable reacting to the manifestations of changing weather conditions than they are adopting proactive stances on the political issue of climate change *per se*.

With some exceptions, **asset managers** and the **analysts** that guide them appear to be largely ignorant of the extent to which climate change could affect their business. The potential of climate change and GHG regulations to destroy value in investment holdings, and impact

equity prices, corporate earnings and relative sector risk has yet to be seriously examined. **Credit rating agencies** are becoming better informed, in that analysts show greater understanding of the general issues, although the development of quantitative tools for factoring GHG risks into debt ratings is lacking.

At the **project finance** level, data from the World Bank's Prototype Carbon Fund indicate that returns can be enhanced by several percentage points, although other practitioners have to date fared less well. Making full use of carbon finance opportunities plus other sustainability benefits (which can increasingly be monetized) can only become more important in future. According to the G8 Renewable Energy Task Force, roughly \$10-15 billion has been committed to renewables over the next 2-5 years by major companies, and up to \$1.5 billion is being used to finance such projects in developing countries each year.

The **emissions trading markets** are clearly still under development. However, a clearer picture has emerged of the measures that need to be taken to stimulate greater trading activity, and the market will grow in the coming years, providing the political will to reduce emissions and assign carbon a value is there. Forecasts of the future GHG credit trading market project a rapid growth from \$10 billion by 2005 to over \$2 trillion per year by 2012.

Four factors prevent action on climate change issues in the financial services industry:

- **Cognitive barriers**, which relate to the low level of awareness, understanding and attention afforded to the climate change issue;
- **Political barriers**, associated with regulatory and policy issues, and governmental leadership;
- **Analytical barriers**, relating to the quality of information for understanding the impacts of climate change and GHG regulations for financial services companies;
- **Market barriers**, which surround the efficient functioning of transaction based markets for emissions credits, green certificates and such like.

Recommendations for overcoming these barriers, and for spurring greater involvement of financial institutions in climate change, are summarized in the table below. **In recognition of the fact that implementation of these recommendations will take time, the following three action steps are offered as a means of stimulating immediate progress on the issue.**

- (1) The formation of an 'awareness raising' task force of senior finance sector executives to inspire individual financial institutions, industry associations, financial regulators and other industry umbrella associations to support education and engagement on climate change using this study's reports as a blueprint for action.*
- (2) The formation of a team to develop a quantitative analytical methodology – the "Carbon Asset Pricing Model" -- for capturing the asset pricing and valuation implications of climate change and carbon regulations.*
- (3) The formation of a parallel project team to examine methods for capturing, monetizing and optimizing the full range of environmental aspects within project finance settings.*

SEGMENT	RECOMMENDATION
<i>All Companies & Governments</i>	Educate senior executives, decision makers on relevance of climate change
	Adopt a sustainability strategy for products and services; Manage own emissions; seek carbon neutrality
<i>Policymakers</i>	Commit to GHG reductions, coordinate with industry, foster emissions trading and provide clean technology incentives
	Promote greater transparency on GHG issues in financial markets
	Provide technology, know-how transfer, carbon 'rights', flexible mechanisms and financial support for LDCs
<i>Market Regulators</i>	Set a framework to improve the provision of investment-relevant information on climate change-related risks
<i>All Financial Institutions</i>	Become an active participant in creative stages of new GHG markets, products and services
<i>Insurance & Reinsurance</i>	Disseminate risk research findings; adjust products, services in light of climate change risks
	Adapt insurance products to aid development of GHG markets
	Develop Alternative Risk Transfer, microinsurance and other products to assist LDCs
<i>Commercial Banking</i>	Develop carbon risk management and benchmarking tools for lending
	Incorporate energy consumption into mortgage and other loans to generate emissions credits
	Provide microfinance services, know-how on carbon-efficient lending to LDCs
<i>Asset Management</i>	Reflect climate change risk factor in equity/sector valuation and asset allocation decisions
	Encourage greater corporate disclosure and strategic engagement with investee companies
	Extend scope of investing into clean technology development activities
<i>Project Finance</i>	Advise on, facilitate GHG market transactions
	Enhance project cash flow & returns via GHG/green market instruments; structured cash flow; credit bundling; credit strips; creation of carbon price index; and a credit clearing house
<i>Professional Services</i>	Develop standardized accounting tools to incorporate GHG emissions/ emissions reductions credits into balance sheet assets or liabilities
	Ensure that actuarial guidance considers all aspects of climate change.
	Develop robust, reproducible and transparent methodology for rating both carbon credits from emission reduction projects, and credit quality of counterparties to emissions trades
	Develop more quantitative tools for reflecting carbon risk into debt ratings.
<i>Industrial Sector</i>	Report on GHG emissions and climate change management strategy
	Adopt lead role in clean technology development
	Share knowledge on GHG trading, project carbon price sensitivity

Acronyms

ART – Alternative Risk Transfer

CAT – Catastrophe (Bonds)

CC – Climate Change

CDM – Clean Development Mechanism (one of the flexible mechanisms of the Kyoto Protocol)

ERUPT - Emissions Reduction Units Procurement Tender

GHG – Greenhouse Gas

IFC – International Finance Corporation

IIGCC - Institutional Investors Group on Climate Change

IPCC – Intergovernmental Panel on Climate Change

JI – Joint Implementation (one of the flexible mechanisms of the Kyoto Protocol)

LDC – Less Developed Country

NGO- Non-Governmental Organization

PCF – Prototype Carbon Fund

ROC – Renewables Obligation Certificate

SEC – Securities and Exchange Commission

SRI – Socially-Responsible Investing

UNEP – United Nations Environment Program

UNEP FI - United Nations Environment Program Finance Initiatives

UNFCCC – United Nations Framework Convention on Climate Change

VERs – Voluntary Emissions Reductions

1. Climate Change and the Role of the Financial Services Industry

“The first question, “Is the Earth’s climate changing?” has been answered with an unequivocal yes”

Richard Harvey
Group Chief Executive, Aviva plc

INTRODUCTION

Scientific and technical reports present compelling evidence that human-induced climate change is upon us, and that its consequences could be devastating (see Module 1 for more details). Worldwide economic losses due to natural disasters appear to be doubling every ten years, and have reached almost \$1 trillion over the past 15 years¹. If current trends persist, the annual loss amounts will, within the next decade, come close to US\$150 billion. Indeed, recent IPCC data indicate that even if GHG emissions were cut to zero overnight, global warming would still continue for at least another 100 years owing to past emissions effects².

At the same time, GHG-limiting regulation, and the ability to trade emissions ‘offsets’ or ‘credits’, is now (or will be very soon) a reality in large parts of the world. These actions will also have implications for the performance of companies, investments and loans. That financial services companies will be – are being – faced with a range of threats and opportunities on account of climate change is, therefore, no longer a matter of conjecture (see Figure 1).

What *is* undecided, however, is the manner in which companies should respond. As this report shows, there are radically differing opinions on the extent to which the industry could be affected by climate change, and what measures financial services companies could or should take now and in the future.

To date, some criticism has been directed at the financial services industry from outside parties over a perceived lack of interest or unwillingness to be more proactive. In our opinion, this is somewhat unfair, given the political hesitancy in dealing with the issue and the lack of wider support for many of the sector’s early GHG-related initiatives (the abandonment of several private sector carbon funds bears this out).

With political momentum now regaining pace, many companies are once again turning their attention to the issue out of strategic choice or regulatory requirement. Best practice in responding to climate change is likely to evolve rapidly in the near future.

¹ See accompanying report: *Climate Change and the Financial Services Industry, Module 1 – Threats and Opportunities*, UNEP Finance Initiatives Climate Change Working Group, 2002.

² IPCC Synthesis Report, 2001

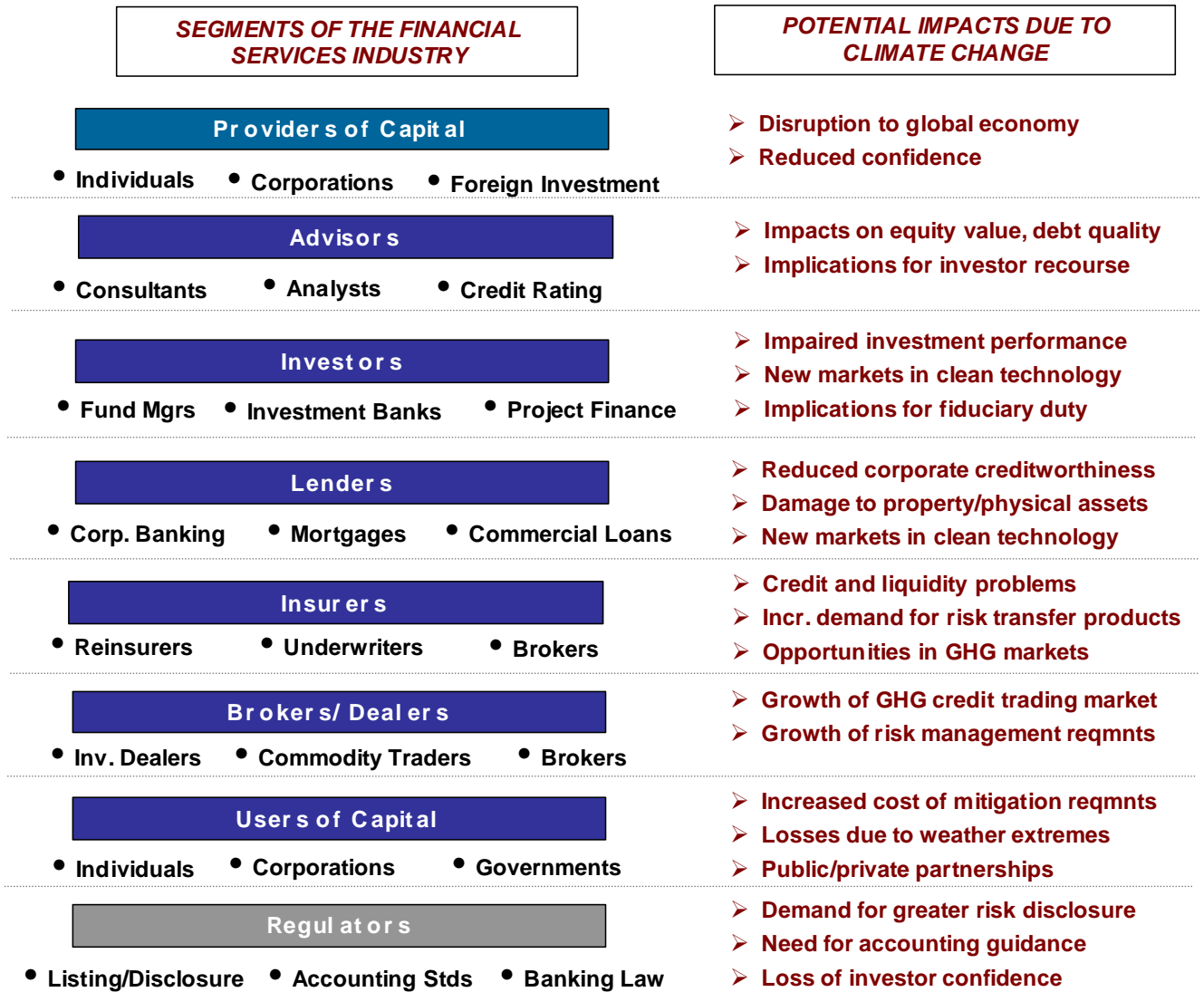


Figure 1 – Segments of the Finance Industry and Potential Relevance of Climate Change
 Source: Innovest

Before exploring some of these trends in greater detail, it is important to step back and first consider the *role* of the financial services industry with respect to climate change and some of the key motivating factors underpinning future action.

WHAT IS THE ROLE OF THE FINANCIAL SERVICES INDUSTRY?

History teaches us that for politically-driven market systems to function effectively, financial institutions must play a prominent role in the market evolution process. From the creation of initial demand for an underlying good or service (as in the U.S. SO₂ market in the 1990s), to the

promulgation of transaction regulations, the protection of property rights and enforceable legal ownership provisions, and the requirement for transparency and disclosure, the finance sector has a critical role to play in creating the right conditions for market-based, commodity-oriented solutions to thrive³. Valuable experience in creating markets around the energy sector has already been acquired, so that commentators believe that the process of developing a mature market for carbon may take as little as five years (see Figure 2).

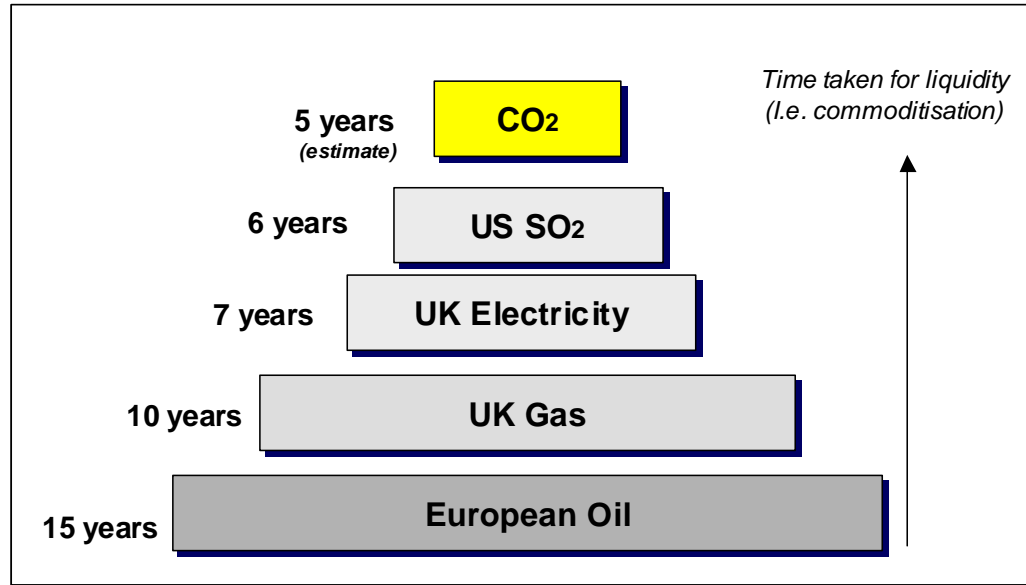


Figure 2 – Approximate Time Taken for Market Maturation
Source: Natsource

As Module I showed, policymakers are now united in their belief that **market solutions will play a pivotal role in whatever course of strategy national and regional lawmakers take**, whether this is the Kyoto Protocol; the voluntary carbon intensity method (as advanced by the U.S.); “Contraction and Convergence”. And **for market solutions to function effectively, financial institutions must play a full and active role in their development and operation** (see box insert).

³ Richard Sandor, ‘The Road To Price Discovery’, *Environmental Finance*, May 2002

From discussions with financial institutions and other GHG market specialists during the course of this study, the following suggestions can be made on how financial institutions can effectively deliver market solutions to the climate change problem:

- *Helping to structure and monitor an efficient market system by working with securities and exchange regulators, actuaries, accountants and other agents of the financial markets*
- *Meeting statutory responsibilities and voluntary commitments to look at social and environmental issues and in doing so focus greater attention on climate change as an analytical factor.*
- *Working to create other conditions crucial to the formation of an efficient emissions trading system i.e., a standardized “commodity”; standardized trade characteristics, organized exchanges, etc.*
- *Creating and providing products and services that contribute towards adaptation and mitigation efforts (such as weather derivatives and catastrophe bonds)*
- *Reexamining the extent to which fiduciary duties may necessitate examining potential sector and company risk relating to climate change, and factoring this into their proxy voting strategies.*
- *Managing their own property risks arising from extreme weather events and pursuing leadership in areas such as energy efficiency within their own property portfolio.*

Moreover, financial institutions have a key role to play in advising companies and investors on the potential market risks associated with climate change and government GHG regulation, in the raising of finance for GHG projects, in structuring deals for potential vendors and purchasers of emissions credits, and in developing solutions to manage financing risks. Indeed, banks and insurance companies are used to dealing with highly complex issues, and over the years have developed carefully conceived, proprietary quantitative risk management methodologies to help them characterize and value complex risk scenarios.

WHAT CAN FINANCIAL INSTITUTIONS *NOT* DO?

Our research indicates that financial institutions view themselves more as instruments of change rather than initiators⁴. Not surprisingly, therefore, most of the mainstream investment institutions contacted during the study refrain from an overt advocacy role on climate change. Aside from concerns that they lack the scientific and technical expertise to adopt such a stance, and a deliberate preference for party political neutrality, many respondents simply question the propriety of lobbying for outcomes on an issue they see as being more a matter for society and its elected representatives, and of little direct financial relevance anyway. Of course, where clear financial interests *are* evident, such as in the facilitation of transactions and other market development issues, financial institutions are not afraid to actively engage with policymakers. Dresdner Bank, for example, has been part of a group urging the German government to adopt a domestic emissions trading scheme ahead of the E.U. scheme.

In terms of collaborative efforts, several financial institutions believed that the industry as a whole would be very wary of taking collective action on a commercial level, for fear of being

⁴ Based on the interviews and written responses received during the Module 2 research process

accused of adopting non-competitive tactics. This, it is felt, tends to limit the level of intra industry cooperation on pervasive, industry-wide issues such as climate change.

It is also apparent that financial institutions cannot – and for fiduciary and competitive reasons should not – engage in prolonged, non-commercial, non-revenue generating activities of social or public interest. In some cases, research and development activity in new markets such as emissions trading may be more acceptable, however, institutions cannot afford to carry out trial runs of Clean Development Mechanism (CDM)-type projects indefinitely.

Finally, it is clear that insurers in particular cannot be expected to take on unbounded liabilities and unknown (or predominantly unquantified) risks. Put simply, it is not possible to insure what you can't attach a value to. European insurance companies unwillingness to provide coverage to companies on biodiversity damage is a case in point. The European Insurance Committee has said it would decline to provide coverage because “it was nearly impossible to quantify the value of biodiversity”⁵.

IMPERATIVES FOR ACTION

According to Carol Browner, the U.S. EPA Administrator under President Clinton, environmental issues enter into popular consciousness in one of two ways: a major ‘event’ that brings the reality of the situation home to society at large; or, an alignment of interests between separate constituencies who form broader coalitions to drive change⁶. Applying this logic to climate change, it seems clear that absent a sudden and rapid deterioration in climatological conditions, **the key to progress is greater cooperation and collaboration between all stakeholders based on, in this case, a shared interest in protecting and creating value.**

For the financial services industry, this means that climate change action must provide an attractive ‘return’. Ultimately, investment banks want fees for selling advice and arranging capital, fund managers want to increase assets under management and to achieve superior risk-adjusted returns for investors, and insurance companies seek payments in return for bearing others’ risk. Climate change issues will need to positively impact these core industry drivers to enhance the willingness of individuals and groups to take action in greater numbers.

Momentum in recognizing the climate threat and taking action to curb emissions is gathering pace globally (see box insert). However, **to drive the issue into mainstream consciousness within the financial services community** and onto the agendas of company directors, executives and institutional investors, it is necessary to **discover climate change and carbon as a determinant of value** within the industry’s respective functions.

⁵ *Environment Daily 1219, dated 22-05-2002*

⁶ *Speaking at the U.S. Environmental Law Institute, Washington D.C., May 2002*

MOMENTUM ON CLIMATE CHANGE ACTION IS GATHERING PACE.....

At the present time, a number of powerful external forces are converging to make climate change and carbon-related issues relevant to financial services companies. These include:

- *Strengthening scientific consensus on the impacts of climate change*
- *E.U. and Japanese ratification of the Kyoto Protocol.*
- *Political progress on GHG mitigation within the U.S., both in the White House and on Capitol Hill*
- *The launch of the Carbon Disclosure Project, a coalition of institutional investors (with collectively over \$5 trillion in assets under management) pressing major companies to disclose investment-relevant information concerning their greenhouse gas strategies and emissions.*
- *The success of the Dutch ERUPT program, in which the Dutch Government paid out nearly US\$40M to 5 successful project bids for 4 million metric tons of CO₂ allowances.*
- *The experiences of the World Bank's Prototype Carbon Fund, which is in the process of expand to support greater market interest, and which has led to the emergence of a series of similar 'spin-off' funds.*
- *The formation by Gensec Bank of the first weather hedging products in South Africa, and the intended expansion of this service to other emerging markets.*
- *The success of Australia's green energy certificates trading scheme.*
- *Increasing focus on climate change as a corporate governance and accounting issue for pension fund trustees and fiduciaries.*
- *The steady growth of the emissions trading market, where over 70 transactions have now been reported involving some 95 million tons CO₂eq.*
- *Growing willingness of respected mainstream financial institutions to stir debate over implications of climate change for the finance and insurance business.*

From the perspective of changing climate conditions, the derivation of value is relatively straightforward, at least in principle. Insurers, reinsurers, lenders and investors will need to adapt the way they conduct their business to account for climatological shifts or face the prospect of disproportionate financial loss or lower investment returns (or, where economic productivity is actually enhanced by climate change, missing out on new markets). However, in practice, actuarial data limitations and other analytical barriers mean that this process of change will be far from easy.

From a mitigation perspective, however, the value creation process is more complex (see Figure 3). The critical initial step, our research suggests, is the commitment by policymakers to emissions reductions. This, in turn, provides validation for both emissions trading (and the various GHG market support services), and the pursuit of low carbon intensive technology solutions. These market-based activities will lead to the establishment of a 'price' for carbon, which is a prerequisite for GHG assets and liabilities to be included on the balance sheet and for

strategic planners to estimate the financial value of carbon in project development and capital spending situations. At this point, carbon becomes recognized by the wider financial community as a factor that needs to be incorporated into all calculations of equity value, credit risk, corporate risk management and project viability. In other words, carbon becomes recognized as another determinant of financial value.

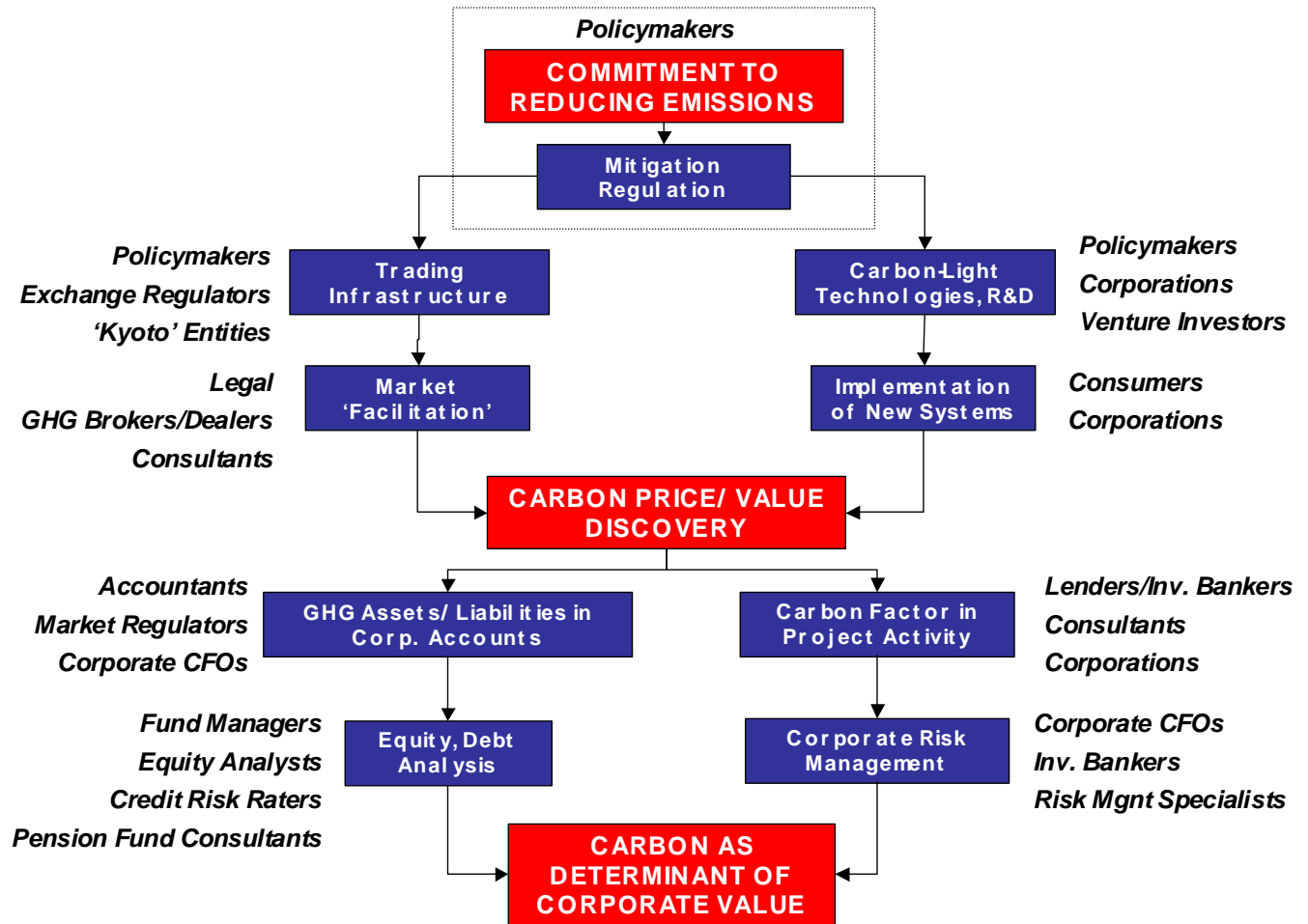


Figure 3 – Evolution of Carbon As A Driver of Financial Value

Source: Innovest

Of course, this process of value creation is necessary, but not sufficient, to achieve the transformation required. At present, the financial services industry as a whole is facing a period of considerable upheaval owing to

- U.S. corporate governance and accounting scandals;
- the convergence of banking and insurance;
- the expansion of the boundaries of what is considered legitimate fiduciary responsibility, some of it fueled by pension fund legislation;

- growing appreciation of the limitations of traditional financial performance metrics in capturing true company value;
- increasing concerns over the ability to fund burgeoning health and retirement programs;
- the realization within the insurance industry that underwriting and asset management are not independent activities;
- following the World Trade Center attacks in New York City and the subsequent bear market, the move by financial institutions to allocate capital away from creative structured 'risk' products towards core traditional products and short-term solutions.
- the realization within the insurance industry that it can no longer depend on a permanent bull stockmarket to compensate for neglect of technical underwriting competence; and
- recognition that the volatility of economic markets en masse may pose a greater threat than the exposure from any single business stream.

In the midst of all this activity, there is clearly a risk that the climate change issue will not garner the level of attention necessary for any serious action to take place. To overcome this problem, we recommend that a task force of senior executives from the finance and insurance sector be formed. This group would be charged with inspiring individual financial institutions, industry associations, financial regulators and finance sector institutions to support education and engagement on climate change using this study's reports as a blueprint for action.

2. What Are Financial Institutions Actually Doing?

Taking the wider financial services industry into account, it is possible at the present time to divide financial institutions into 4 distinct categories according to the extent to which actions have been taken to manage climate change in the broadest sense:

1. “*Unaware*”: Companies that give every indication of being generally unaware of the business relevance of the issue and have therefore done nothing.
2. “*Wait and See*”: Companies that are focused on becoming informed on the issue and on the development of basic policy (usually through the formation of a small advisory unit), but that have not yet implemented any operational or management changes on account of climate change.
3. “*Proactive*”: Companies that have begun to develop new products, new lines of business, or new strategies based on the threats and opportunities presented by climate change.
4. “*Leaders*”: Companies at an advanced stage of product development and thinking on the GHG markets and what climate change means to their business or those with entire business groups dedicated to servicing some particular aspect of the climate change issue.

Our research indicates that most mainstream financial institutions can be categorized as being *Unaware* of the climate change issue or as having adopted a *Wait and See* attitude. These firms are content to concede any first mover advantages in preference to learning from others’ experiences and becoming better educated in the meantime. **However, a small handful of companies are considered to be either *Proactive* or even as sector *Leaders*, depending on the extent to which they have developed and operationalized strategies based on climate change and the GHG markets.** These are mainly broker/dealers involved in GHG trading (Natsource, CO2e.com and the like), reinsurers most exposed to catastrophic weather events (such as Swiss Re and Munich Re) and asset management businesses with prominent socially-responsible investment groups or other resource-related investment interests (such as the Hancock Natural Resources Group).

Breaking down the findings according to the main functions of the financial services industry, we can make the following observations:

INSURANCE BROKING, UNDERWRITING AND REINSURANCE

- **The view that climate change is of strategic business importance is more prevalent within the insurance and reinsurance business than perhaps any other segment of the financial services industry.**

An increasing number of insurance professionals are reported to believe that man-made climate change is happening and that the rising toll of weather losses is due to altered weather patterns. In the 2001 Chartered Insurance Institute U.K. survey on climate

change, 77% of respondents believed there will be ‘significant’ or considerable effects for their market within 20 years. Coastal flood and severe windstorm were thought to be the most important effects of climate change, in terms of their cost to, and effect on, property insurance; expected responses from the insurance industry ranged from price increases and cover changes, to increased losses, more difficult reinsurance terms and withdrawal from high hazard areas.

- **Reinsurance firms tend to be more convinced that climate change is a reality and accordingly more committed to adjusting their management practices and product offerings.**

The continental Europe reinsurance companies Munich Re and Swiss Re both fall into the Leaders category identified above, the former in terms of its climate modeling work and the latter in terms of its commitment to the GHG emissions trading markets. Swiss Re sees a large market for GHG-related insurance products (or, more accurately, adaptations of existing product lines to the GHG issue) and financial risk management services within the mid-size industrial corporate sector.

- **The policies and strategies of insurance and reinsurance companies vary considerably according to geographic location and line of business.**

Many U.K. and Japanese insurance companies appear to have or be in the process of forming, a policy on climate change, some as part of a wider public commitment to sustainable development. By contrast, of the top 15 U.S. insurance and reinsurance companies, however, only one company explicitly identifies climate change within their corporate literature (The Chubb Corporation), and a further three (AIG, XL Re and ACE Tempest Reinsurance Limited) are sponsors of the “Risk Prediction Initiative” (a panel of a dozen global insurers and international scientists formed to explore the link between catastrophe exposures and the study of tropical cyclones and climate).

- **Insurers continue to adopt a ‘Wait and See’ attitude that is driven for the most part by on-going scientific uncertainties around the incidence of catastrophic climate events and their causes.**

P&C underwriters in particular indicated that they were less concerned about the climate change issue because:

- i) the issue is deemed to be manageable, unlike asbestos or contaminated land, where the danger stems from unanticipated claims arising from historic issues (i.e., they have a ‘long tail’). Climate change, they believe, will likely be progressive, so that risks can be written with the option of adjusting premiums as and when it becomes necessary to do so (assuming reinsurance is available)
- ii) reinsurers, who bear most of the risk for catastrophic events, will likely be hardest hit anyway, and
- iii) the scientific data is not yet clear enough on the issue of whether extreme weather events are demonstrably increasing in frequency and severity, nor how they will develop in future. Companies have focused closely on catastrophe modeling and short-range cyclone prediction.

How viable this position is remains to be seen, particularly in view of the apparent inconsistencies between the first point, that the issue is manageable, and following two.

- **Very few insurers have factored in climate change-related risks into underwriting premiums and deductibles, although reinsurers have initiated qualitative sector-level impact analyses.**

Whether this will happen soon depends on whether the incremental risk created by climate change can be identified and quantified, and the extent to which a 'climate change factor' can be inserted into insurance products. Precedents for such changes come from the U.K., where the previous uniform product structure for domestic property has been revised to recognize the inherently greater vulnerability of houses on clay soil (prone to drought damage) and flood plains and coasts (prone to flooding). However, these have been in reaction to observed weather events, rather than in anticipation of climate change, and most insurers feel that the science of climate change cause-and-effect is not presently fine grained enough to allow them to do this.

Increasingly insurers are taking note of the weather hazards that face individual properties, and whole industries. For example, Element Re uses the following checklist:

SECTOR	POTENTIAL IMPACT AREAS
AGRICULTURE	Crop yield, handling, storage, pests
CONSTRUCTION	Delays, incentive/disincentive clauses
ENERGY	Reduced/excessive demand
ENTERTAINMENT	Postponements, reduced attendance
GOVERNMENTS	Budget overruns
INSURANCE	Increased claims, premium diversification
MANUFACTURING	Reduced demand, increased raw material cost
OFFSHORE	Storm frequency, severity
RETAILING PRODUCTS	Reduced demand for weather-sensitive goods
TRANSPORTATION	Budget overruns, delays

Figure 4 – Potential Underwriting Implications of Climate Change

Source: Element Re

- **Insurers and reinsurers have not yet responded to calls for them to play a more prominent role in helping Less Developed Countries (LDCs) respond to climate threats.**

The UNFCCC has specifically called for workshops to be held in order to provide a forum for insurance companies to provide assistance to LDCs in meeting the climate change issue⁷. So far, the industry has shown little interest in this initiative. Partnerships between public and private sectors will be key to the application of analytical and predictive catastrophic risk modeling expertise within the insurance industry to higher risk areas, since corporations generally lack the necessary commercial

⁷ Articles 4.8 and 4.9 of the Kyoto Protocol, taken forward for action at COP-7 in Marrakech, 2001

incentives to apply this expertise within LDCs and LDC governments tend not to have access to the necessary technology and expertise.⁸

Innovation in providing disaster relief financing to LDCs is another critical issue. At the present time, developing country governments can cover the economic consequences of natural catastrophe damage via State funds, through donor relief or through insurance. Unfortunately, reinsurers have been reluctant to provide coverage because of an inability to adequately diversify this added risk using conventional insurance techniques. The emergence of new alternative risk transfer instruments such as CAT bonds and weather derivatives offer companies to chance to achieve this.

Looking ahead, important areas for future action by the insurance industry in addition to that in LDCs include research on future weather patterns, greater study of vulnerable areas, greater emphasis on risk management, an effective and rapid remediation capability, and closer co-operation with authorities on planning and construction. The Association of British Insurers (ABI), for example, would like to see the U.K. government take more positive steps towards strengthening the U.K. flood management capabilities before it will support its members' provision of universal flood coverage. Another possible line of business for insurance companies in this respect is the creation of optional lines of credit, secured by a much smaller up-front premium.⁹ Other groups have suggested the possibility of 'Electrofinancing' as an insurance product, whereby insurance companies bundle property-casualty insurance, retirement savings funds and electricity supply together to provide homeowners with an integrated services package¹⁰.

COMMERCIAL BANKING

- **Pockets of climate change expertise are widespread, however, senior executive awareness of climate change and support for actions to adjust bank policy accordingly appears to be low.**

Responsibility for developing bank policy and best practice on climate change matters tends to be situated within the corporate environmental risk management function, which may not wield much influence within the senior management circles where bank policy is decided. Currently, efforts within these environmental groups are predominantly focused on a process of education and internal awareness-building.

- **The key area of concern is the extent to which climate change and GHG mitigation regulations will affect lending decisions and the credit risk management policies.**

Environmental specialists within commercial banks showed a keen awareness that climate change may influence their behavior towards larger corporate clients considered to be most at risk. Secondary concerns were the bank's own reputation, which can be

⁸ *Christophe Courbage, Managing Catastrophic Risk, Or How to Deal with Mother Nature, Geneva Association papers, Risk Management No. 29, May 2001.*

⁹ *David Whiting, Guy Carpenter Reinsurance Brokers, personal communication.*

¹⁰ *J. Gordes & J. Leggett, 'Electrofinance: A New Insurance Product for a Restructured Electric Market', Issue Brief 13, Renewable Energy Policy Project (www.repp.org)*

tarnished if the bank becomes associated with climate-damaging activities, and the possibility of being held legally liable for meeting the GHG obligations of debtors (such as, the delivery of emissions reduction credits).

Nevertheless, the banking industry associations have failed to rouse much interest among their members on the issue of climate change because of a perceived lack of immediacy and the lack of more compelling evidence of its relevance to commercial banking. Most fall into the ‘unaware’ or ‘wait and see’ categories identified above. Like insurers, they are more comfortable reacting to the manifestations of changing weather conditions than they are adopting proactive stances on the political issue of climate change *per se*.

- **Quantitative risk management and credit-evaluation tools relating to climate change impacts have not yet been developed.**

Although commercial banks are naturally highly skilled in risk management and credit calculations, our research indicated that it is not yet clear where and how within these calculations the effects of climate change on loan targets should feature. As such, the authors are not aware of any banks that have developed tools to help quantify risk management implications associated with lending decisions – industry and company benchmarking techniques, for example – although the development of qualitative benchmarking schemes was reported to be under consideration in several institutions.

Perhaps the best examples of how progress on this issue could be made are the World Bank’s project lending guidelines, which have tightened on account of climate-related disasters, and the Provention initiative, which seeks to proactively build capacity and infrastructure to manage the effects of future catastrophic weather events.

- **The development of standardized ways to factor in climate change risks to lending decisions was considered to be unlikely.**

Although the adoption of universal principles may result in better general awareness of best practice, the reality is that banks will most likely pursue their own proprietary in-house methods for competitive reasons. Proprietary credit rating analyses are very important to banks and climate change-related initiatives are likely to be treated in the same way, all the more so if climate change effects become more serious.

- **Commercial banks and insurance providers have not yet begun to act in concert.**

Banks tend to be highly uncomfortable providing loans in cases where insurance companies are unable or unwilling to provide coverage for the underlying assets involved. Should climate effects impair the ability of companies to service debt and insurance is not available, then banks will –in principle at least - be reluctant to lend. Banks also felt that public private partnerships were crucial to avoiding major controversy or public incident over some of the effects of climate change, particularly the possibility of falling land values.

- **Opportunities are being pursued in GHG credit trading, ‘energy-efficient’ loans and similar areas.**

Limited efforts have been made to explore the opportunities through GHG emissions trading within diversified banking institutions with commodity trading functions.

Deutsche Bank, and Rabobank, which, through its asset management arm's involvement with the World Bank's Prototype Carbon Fund, has gained considerable experience in carbon finance matters and would be considered *leaders* in our taxonomy.

Another potential new product line in the early stages of development is 'green' home loans and mortgages, such as those available in Germany and the U.S.¹¹ The Energy Efficient mortgage developed by Fannie Mae in the U.S. rewards buyers of energy efficient homes, and encourages energy efficiency measures with more favourable mortgage terms¹². Under its Residential Emissions Trading Initiative, the organization is also exploring – with partner utility companies – the possibility of creating saleable pools of bundled greenhouse gas (GHG) and nitrous oxide (NOx) emissions credits created from the implementation of energy efficiency measures¹³. Proceeds of the sale will be reinvested back into the utilities' energy efficiency programs. This is reportedly the first program in U.S. to bundle emission reductions from residential energy efficiency and fuel switching programs.

ASSET MANAGEMENT

- **For the majority of mainstream asset managers, our research suggests that climate change is not presently understood as an investment risk issue.**

This is due in large part to the lack of any credible tools for capturing climate change related risks and opportunities in quantitative financial terms. With respect to deteriorating weather conditions, for example, fund managers believed that they would simply avoid areas where sustained losses might occur or simply acknowledge the risk and trade companies in light of it. Clearly, in light of the potential scope and severity of disruptions, and the speed at which they could occur, this may be a somewhat shortsighted viewpoint.

- **A handful of leading fund management specialists have demonstrated leadership in the development of new products and new areas of expertise relating to the GHG markets.**

Several European financial institutions have attempted to develop innovative carbon-related investment products. UBS Asset Management was one of the first fund management companies worldwide to give serious attention to the formation of a carbon fund for sale to its clients. Others have taken a leadership position in the process of education and communication on the issue. The U.K.'s Universities Superannuation Scheme (USS), for example, last year commissioned a ground-breaking study on the relevance of climate change to pension funds and asset managers, and is active in many industry fora on the issue.

- **Climate change *is* used as a screening criterion for many socially-responsible fund managers, although the screens used tend to be very crude.**

¹¹ Fannie Mae, operates in the Secondary Mortgage Market purchases mortgages originated by primary lenders.

¹² Residential properties use 30% of total US demand for energy and contributed 19% of US GHG emissions in 2000.

¹³ Bob Sahadi, Green Trading Summit: Emissions, Renewables & Negawatts 15 May 2002 New York City

The growth and evolution of the socially-responsible, or sustainability-oriented style of investment management, growing activism within the institutional investment world on climate change, concerns over corporate governance; and initiatives such as the London Principles¹⁴ (a voluntary code crafted specifically for financial institutions with the aim of promoting best practice in financing sustainable development) will continue to place more emphasis on carbon risk analysis with fund managers in this niche.

U.K. fund managers Friends, Ivory & Sime, for example, is working to develop 'carbon' risk screening tools for investment screening as part of their sustainability-oriented investment strategies. The increasing sophistication of these screens will strengthen the case for their transfer into the non-SRI arena.

- **For those asset managers and pension funds cognizant of climate change and its impacts, engagement was reported to be the preferred course of action.**

The growth of passive index investing means that larger pension funds find it difficult to divest poor performing companies, and there are clear indications that such engagement can alter investee performance (the examples of Y2K and accounting for share options in executive pay are used). Indeed, procedures for ranking sectors and companies within sectors qualitatively according to risks to both Y2K and governance issues may set useful precedents within the industry.

Pensions funds aware of climate change believed that they do have a role in encouraging investee companies to maximise potential returns and trade in carbon where appropriate (as most cost effective way of managing emissions). At least one large pension fund is known to be actively engaging with companies on the climate change issue, both to identify those firms which are managing the issue well, but particularly to enable the fund to identify where improvements would benefit both itself and the company concerned.

- **However, the low level of data available on GHG emissions and climate change strategy from portfolio companies was a key issue for concerned asset managers.**

A recent survey by Morley Fund Management, the fund management arm of Aviva, discovered that of the U.K.'s FTSE 100 companies, only 30% report comprehensive GHG data. Almost a half reports nothing at all, and many of these are companies from potentially high-risk sectors such as chemicals and construction. This general lack of good quality information on GHG emissions and climate change strategies undermines any serious attempt to incorporate climate change factors into stock evaluation.

The Carbon Disclosure Project may well provide a crucial spur towards better awareness and reporting of corporate GHG and climate strategy issues, and as of mid-summer 2002 had over 30 institutional signatories with some \$5 trillion in assets under management, The Institutional Investors Group on Climate Change (IIGCC) is also working to develop guidelines for best practice in engaging with companies on carbon management to encourage others in the financial sector to ask the most appropriate

¹⁴ *The London Principles of Sustainable Finance is a voluntary code crafted specifically for financial institutions with the aim of promoting best practice in financing sustainable development. The work was commissioned by the Corporation of London and carried out by Forum for the Future.*

questions. The IIGCC has 12 member pension funds and investment houses, covering approximately £300 billion of assets under management¹⁵.

- **Asset managers are exploring several ways to improve energy efficiency within their property portfolios.**

The property sector in the U.K. has already started to pay more attention to the relevance of carbon management and emissions trading to its activities - two of the country's largest property development and real estate groups, Land Securities and Lend Lease, are reported to be integrating renewable power technologies, energy efficiency initiatives and emissions trading strategies into their core property management interests¹⁶ - and there may be some ripe opportunities for U.K. banks to become more closely involved in similar initiatives.

- **Most institutional fund managers are not ready or willing to invest in GHG-related securities or clean technology firms, despite the potential size of these markets (although those with a strategic interest in sustainability or socially-responsible investing are more active).**

Due to a lack of expertise and a low tolerance for – or a legal inability to take on - 'high risk' investments, mainstream institutional investors are shying away from involvement in GHG credits. Investing in public or private clean technology companies is also beyond the purview of many pension funds for the same reason. Venture investing in low carbon technologies, renewables and such like is primarily reliant, for the present time at least, on strategic corporate investors.

However, opportunities *are* being realized in pooled and diversified clean technology fund products that possess the appropriate balance of risk and return (IMPAX Capital's environmental technology fund, which is being offered to pension funds and other investors, and UBS' fuel cell baskets and *Future Energy* equity funds, are examples of such). Studies on the potential size of the clean technology sector place the market in the range \$234 to \$625 billion by 2010 and \$1,900 billion by 2020. According to *Global Perspectives for Renewable Energy 2001-2010*, for example, investment in renewable energy sources will increase from \$8.4 billion to \$23.8 billion, growing the size of the market to over \$270 billion¹⁷.

Other fund managers have begun to develop new climate-relevant fund products due to their wider investment strategies. Friends, Ivory & Sime's environmental technology fund also resonates well with the firm's family of socially-responsible fund products, for example. Similarly, the Hancock Group, with its strong interest in the forest sector, is involved in several major transactions where carbon is a key value driver and has established a clear leadership position in this regard.

¹⁵ *The Institutional Investors Group on Climate Change consists of occupational pension funds, commercial fund managers and insurance companies: those involved include BP Investment Management Ltd., Central Finance Board of the Methodist Church, Co-operative Insurance Society, Environmental Agency Pension Fund, Friends Ivory & Sime, Hendersons Global Investors, Morley Asset Management, Local Authority Pension Fund Forum, London Pension Fund Authority, Schroders, Storebrand, and USS Ltd.*

¹⁶ *Building in Carbon Trading, Environmental Finance, May 2002*

¹⁷ *Study by energy analysts Douglas-Westwood Associates, as reported by The Royal Society of Chemistry, Oct. 2001 (Factiva)*

PROJECT FINANCE

- **Several project finance and venture capital funds have been announced or launched over the past 2 years focusing to one degree or another on clean technology or carbon-finance.**

The World Bank estimate that roughly \$2.5 to 4 billion resides in funds creating demand for carbon, and an additional \$1 billion in forestry funds. These are generally either:

- pure carbon funds, such as the World Bank Prototype Carbon Fund (PCF), which invest cash in projects in return for carbon credits which are then distributed (as cash or emissions credits) to fund partners;
- private equity/project funds where carbon finance features as an additional source of return for investors (such as FondElec's Latin American Clean Energy Services Fund and the Black Emerald Group's innovative lease financing approach for clean energy and energy efficiency technologies).

The PCF has enjoyed particular success. Originally capped at \$150-million, the PCF has been oversubscribed and is now expected to top \$200-million. Participants include roughly 25 private sector companies including Daimler-Chrysler, Hydro-Quebec, Sumitomo Corp., Mitsubishi, Rabobank and Royal Dutch/Shell, as well as six national governments. However, several other early carbon funds were abandoned or withdrawn, due largely to a lack of appetite among investors. UBS' carbon fund, for example, was dropped due to lack of investor interest, which was put down to high uncertainty in the GHG markets.

Despite these early setbacks, recent signs are more encouraging. According to the G8 Renewable Energy Task Force, roughly \$10-15 billion has been committed to renewable energy investments over the next 2-5 years by major companies, and up to \$1.5 billion is being used to finance renewable energy projects in developing countries each year. UNEP's Investment Advisory Facility is also active in this area, and has provided support to financiers (including, for example, UBS Asset Management and various regional development banks) in renewable energy/energy efficiency investments in many developing countries.

- **Imaginative solutions that seek out the benefits of strategic alliances between development banks, commercial/investment banks and project developers are being found.**

A good example of this is the World Bank PCF's partnership with a large multinational bank in which as purchasers of voluntary emissions reductions (VERs), the PCF channels payment for credits to the project proponents through its partner bank in order to minimize political and exchange rate risks, and in doing so provides the proponent with long-term loans that simply would not have been available under normal conditions.

Data from the PCF indicates that investment returns can be enhanced by several percentage points via carbon finance techniques. According to the PCF, "Even at \$3-4 per ton of CO₂ equivalent, renewable energy and efficiency projects can get done which

would have difficulty getting finance without carbon revenues”. Clearly, whether this is ‘sufficiently material’ or not is in the eye of the beholder.

- **The project economies of scale, complexity and ‘riskiness’ do not appeal to institutional investors focused primarily on financial aspects. The strategic corporate investor is the primary driving force at present.**

Large institutional investors in particular are not investing in project finance funds because they are considered to be too small and inefficient to generate adequate returns. Pooling capital to invest in projects, technologies, companies and VERs has been proposed as one solution to this problem.

Moreover, it is apparent that there are considerable additional risks associated with GHG projects compared with other energy-related projects; risks relating to changes in regulatory policy, ownership of credits, the technical performance of the project in generating and measuring credits, as well as trading risks, plus the management cost of routing the project through the flexible mechanisms¹⁸. Finally, the timescales involved in GHG projects are currently longer than conventional projects due to the additional bureaucracy involved.

For these reasons, the importance of involving GHG project specialists early in the project life cycle is widely acknowledged. The generic stages of a typical credit-generating project are shown in Figure 5 below.

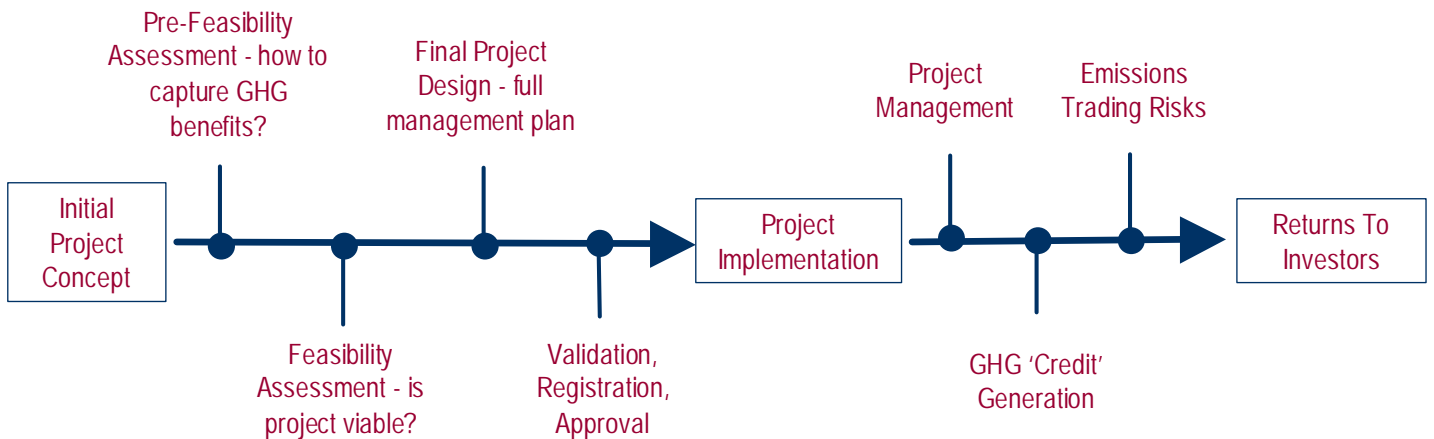


Figure 5 – Stages of ‘GHG’ Project Development and Execution
 Source: After *Ecosecurities*¹⁹

Industrial companies with a strategic interest in sustainable development or other business benefits are the primary proponents in venture capital and project finance at

¹⁸ C. Ebert, *Guidance for Developers of CDM Projects*, presented at the Environmental Finance Conference on Implementing JI and CDM, February 2001

¹⁹ M. Stuart, *Ecosecurities*, presented at Green Trading Summit, New York City

present, and many have shown a willingness to forego profits in the short term in order to learn. For most institutional investors, investing in developing countries is still too fraught, due to difficulties with on-the-ground monitoring of projects, political risk and the risk of reputational damage if things go wrong.

- **More attention is starting to be paid to monetizing the wider sustainability benefits of innovative project finance techniques.**

CO2e.com, a leading GHG broker, has drawn attention to the wider benefits of enhanced project sustainability by considering the social (health, employment and education), economic (technology transfer and community development) *and* environmental (resource preservation, local air conditions, sustainable use of resources) components of GHG project-based activity. This has helped package the notion of project-based credit generation in a more attractive way for companies wishing to meet corporate sustainability objectives.

Work is even beginning (by the Hancock Natural Resources Group, for example, to monetize these additional sustainability benefits, particularly in developing countries, where additional cash flows can materially improve project attractiveness and socio-environmental issues are most acute²⁰. For example, one CDM project in Brazil, in addition to providing a 27% return on equity (ROE) for investors, has been involved with the formation of a new computer school, a 10MW power plant, several schools and recycling programs, and a health care center, not to mention the certification of new tracts of forest land under the Forest Stewardship Council standards.

- **In mainstream project finance circles, awareness among investment bankers of the potential for carbon finance-related risks and opportunities to affect project economics is limited. Accordingly, the inclusion of relevant information in documentation used during the capital raising and loan syndication processes is also inadequate.**

Despite the progress described above, the mainstream project finance segment of the financial markets appears to be lagging in its appreciation of carbon finance issues. In the heavy industry sectors in particular, project financiers should be cognizant of the threat to energy commodity prices or market conditions arising from global GHG mitigation efforts, and the potential under the Kyoto Protocol to generate tradeable emissions reduction credits by pursuing less emissions-intensive design options²¹. Given the potential economic significance of GHG mitigation regulation and the monetary benefits promised by emissions trading, failure to fully appreciate the implications of carbon finance issues could not only put investors at a disadvantage, it may also result in potential legal exposure for investment advisers and financial agents.

²⁰ According to Lui Deshun, Professor at the Global Climate Change Institute in Beijing

²¹ For examples of typical project deals and developments, see Project Finance magazine, www.projectfinancemagazine.com.

EMISSIONS TRADING MARKETS

- **Financial institutions appear to be interested in Emissions Trading Schemes for two reasons: the chance to make money from trading GHG-related securities; and, the need to understand the implications of emissions trading for the companies that are their clients or in which they invest.**

Forecasts of the future GHG credit trading market project rapid growth from \$10 billion by 2005 to over \$2 trillion per year by 2012, the end of the Kyoto Protocol's first commitment period²². Leading companies undoubtedly recognize that the finance sector will play an important role in the operation of this international market. The UNEP FI, for example, supports emissions trading because it is an economically efficient market based instrument that encourages the transition to a more sustainable economy²³. The formation of regional emissions trading schemes (in the U.K., Denmark, Slovakia, Northeast U.S. and, of course, the pan E.U. system under development), and the various GHG exchanges (the Chicago Climate Exchange, for example) will soon make emissions trading a reality for all financial institutions.

Banks are also beginning to adopt *proactive* and *leading* positions on an individual basis. Deutsche Bank is known to have allocated resources to the GHG commodity trading business and corporate advisory work, and Dresdner Bank is participating in a pilot project to develop working procedures for GHG emissions trading in the German federal state of Hesse²⁴. Opportunities exist for advising both *purchasers* of emissions credits (typically, large G8 industrial companies) and *vendors* (including energy efficiency and renewable energy project developers in developing countries, Central and Eastern Europe and other economies in transition).

- **Notwithstanding this early optimism, the emissions trading markets are clearly still under development and their commercial appeal is not yet universal.**

This is exemplified by the experiences of one financial institution, which was reported to be saddened that they were not able to enter into the UK Carbon Trading Scheme, given the uncertainties and the onerous nature of the scheme as proposed. Their main concerns were that the scheme required their entire portfolio of activities to be included, which made it much more risky for them to participate. The costs of verification were felt to be likely to be substantial, negating many (if not most) of the benefits of the scheme. The scheme was also considered to be too complex, requiring costly and time-consuming legal advice. Finally, the uncertainties were felt to be too great. These included the level of incentive money that would actually be offered by Government and the extent to which any subsequent EU scheme would supersede the UK scheme and diminish the quality of any learning gained from UK experience. MMC Enterprise Risk confirmed some of these limitations during their December 2001 GHG Emissions Market Risk Mapping workshop²⁵.

²² See, for example, 'Greenhouse Gas Trading Warms Up', *Euromoney.com*, January 2002

²³ UNEPFI Position Paper on Emissions Trading, 2002.

²⁴ S. Lafeld, *Climate Change at Dresdner Bank, 2002* (personal communication)

²⁵ 'The GHG Emissions Market – Mapping The Risks', MMC Enterprise Risk, London, December 2001

■ **Buyers of credits are currently very scarce, although signs are encouraging.**

Aside from a few proactive industrial corporations (e.g., OPG and TransAlta, two Canadian energy companies), large buyers have still not entered the GHG marketplace with any force. Progress continues to be made in certain areas, however. EcoSecurities, specialists in environmental finance, have identified five categories of buyers/investors:

1. *Institutional Multilateral* – World Bank PCF, IFC, Asian Development Bank;
2. *Public Sector Unilateral* – Dutch ERUPT programme, UK Climate Challenge Fund, Australia GGAP GHG Tender, etc.
3. *Private Sector Funds* – Edison Electric Institute, Fondelec, Black Emerald;
4. *Bilateral transactions* – Mainly involving large industrial corporations (OPG, TransAlta, Shell);
5. *Green Certificate Buyers* – A very heterogeneous marketplace requiring heavily structured deals.

Within these groups, the signs are promising. The first ever transboundary swap of government underwritten GHG compliance tools was consummated recently, between Shell and Danish electricity company Elsam, building upon the first ever transatlantic emissions trade between TransAlta and Hamburg Electric back in 2000. DuPont (from the U.K.) and Mico (from Japan) also recently executed the first GHG transaction of government-sanctioned instrument in September 2001.

■ **A clearer picture has emerged of the measures that need to be taken to stimulate greater activity in the GHG markets.**

Establishing legal title to the value of credits created within project finance settings has been identified as a critical need²⁶. The issue of buyer and seller liability in the event that emissions credits are not delivered, or that the value of these credits is not realized, is also an important one. In established 'conventional' transactions, counterparties invariably have clear recourse to legal protection and/or insurance. This is not presently the case for the GHG markets.

Stripping emissions credits (or the cash flow resulting from their sale) from the underlying project from which they were generated, and selling them separately has also been proposed as another way to improve liquidity and flexibility within the marketplace.

Bringing future revenues from forward GHG contracts to the beginning of the project, rather than payments at the back end, is considered by Natsource, DZ Bank and other project/trading specialists to be key to getting lots of projects off the ground because of the ability to accelerate cash flow in projects where cash is required in the early stages.

²⁶ See, for example, EcoSecurities presentation at the Green Trading Summit in New York, May 2002; and the Swiss Re conference Emissions Trading: From Main Street to Wall Street, New York, July 2002.

The recently launched initiative by law firm Baker & McKenzie and the International Emissions Trading Agency (IETA) to help move towards standardized language and terms for carbon contracts (the ‘Carbon Contracts Cornerstones’ initiative) is another example of the kind of cost-reducing measures needed to stimulate GHG trading. The World Bank PCF uses the same document format and language as the Dutch ERUPT to foster greater standardization.

- **The market in Renewable Obligation Certificates (ROCs) is an important element in the development of clean energy technologies to tackle climate change.**

The success of the Australian ROC scheme, and the recent launch of the U.K.’s green certificates market bears witness to this but again, progress is being hampered by high transaction costs and a lack of standardization in trading agreements. The difficulties created by a lack of liquid, standardized products for trading are also in evidence in the weather derivatives market, where buyers and sellers stress the need for customised solutions which are less costly and more likely to lead to widespread market take-up.

PROFESSIONAL SERVICES

- **The role of actuaries is critical to the inclusion of climate change-related issues within the finance industry, although awareness within the actuarial community is low.**

Actuarial analysis is vital in the pensions, life and property/casualty insurance businesses, financial products often being structured around actuaries’ analysis and opinions. Within the P/C business, the critical issue with climate change is the lack of forward-looking analysis; the reliance of actuarial science on *past* data is clearly a major potential weak point, given that climate change represents a *future* threat. Given the scientific complexities involved, adjusting existing models to take into account future conditions will not be a straightforward task. More broadly, actuarial standards developers need to ensure that guidance considers all aspects of climate change.

- **Initial efforts are underway by accounting professionals to explore the development of standardized accounting tools to deal with GHG-related assets and liabilities. Accounting companies have also begun to inform and educate their corporate clients on potential carbon-related risks. However, these are currently limited fee-generating activities, and the level of senior level support appears to be patchy.**

Accountants determine how GHG assets and liabilities might be treated from a taxation perspective, where such entries should be made in the company books, and whether adequate steps have been taken to manage reasonable risks. Accounting issues are therefore crucial to the value discovery process for carbon.

Accountants familiar with the issue have noted that under emerging GHG emissions trading schemes internationally, there is no definitive guidance for the financial accounting and disclosure of GHG emission permits, corporate emission exposures or emissions transactions²⁷. In response to this, financial accountants including KPMG and Deloitte & Touche have teamed up with the International Emissions Trading Association

²⁷ Fiona Gadd, speaking at the Swiss Re Climate Change Conference in Ruschlikon, Switzerland, October 2001.

and the U.K. Emissions Trading Group to create guidance on accounting for GHG emissions, including tax planning and risk management.

- **Credit rating agencies exert a strong influence over the perceived financial well-being of companies but have not yet paid sufficient attention to the climate change factor.**

Our research indicates that industrial companies have already been contacting credit rating agencies proactively to ask whether their leadership on climate change will be reflected in the firm's debt rating. (This has also had the effect of spurring the agencies themselves into action on the issue, in order to determine a satisfactory answer!) Several agencies are examining climate change in respect of compliance needs around GHG intensive power projects, regional regulatory developments, and qualitative comparisons are being made between different companies to assess relative risk levels.

Credit raters were also found to be examining two opportunities for generating additional business out of the climate change issue:

- i) rating the credit quality of counterparties to emissions trades, many of which involve commitments over long periods of time, especially some of the smaller, private companies (or even rating a pool of these companies to create economies of scale and give larger buyers more comfort over the transactions);
- ii) helping firms express/reflect emissions trading liabilities or assets on the balance sheet. Large buyers such as TransAlta have already commented on the importance of the seller's credit rating and the fact that buyers would prefer to buy a slice of a diversified portfolio of projects rather than from a single project

3. Barriers to Action

From the account of current activities presented above, it is clear that climate change is an issue of *potential* concern for banking, investment and insurance industry participants, and that some companies are taking steps to better understand the issue. However, when it comes to implementing measures and strategies, the majority of companies still do not appear to be ready to act. Moreover, there is a pervasive lack of urgency over the speed at which any decisions on what to do should be taken. As the Economist puts it “Global warming effects are diffuse and long-term, and there is always something more pressing to deal with”.²⁸ Even for companies that for one reason or another have decided to go beyond simply watching and waiting, our research indicates that there remain substantial practical barriers to further action.

We have grouped the barriers to action into four separate categories, although there is clearly a good deal of overlap between them; **cognitive barriers**, which help explain the low level of awareness, understanding and attention afforded to climate change by financial institutions; **political barriers**, associated with regulatory and policy issues, and governmental leadership; **analytical barriers**, which relate to difficulties of determining the implications of altered climate conditions and GHG regulations for financial services, and the quality of information for decision-making; and **market barriers**, which surround the efficient functioning of transaction based markets for emissions credits, green certificates and such like.

COGNITIVE BARRIERS IN THE FINANCIAL SECTOR

- **Competition Among Issues.** The reality is that climate change is only one of many factors potentially affecting the value of a company, its expected performance, its credit rating or its insurability. Analysts and fund managers in particular need to deal with a multitude of competing issues during the course of a typical day, some of which are established and familiar (oil price and interest rate movements), some new and equally worrying (terrorist attacks; post-Enron corporate governance). Many investment banks have undergone dramatic changes in organizational structure in recent months, leaving analysts more concerned about their future employment prospects than the state of the Earth’s climate.
- **Culture Clash.** To most mainstream finance professionals, the words ‘climate change’ are more apt to be associated with NGO-led environmental sensationalism than financial risk. The prevalence of this mental model, which is anathema to the inherent fiscal fidelity and conservatism of most financial institutions, is a key barrier to greater awareness.
- **Lack of Perceived Materiality.** In many respects, climate change is simply one more specific manifestation (albeit a hugely important one) of the mainstream financial world’s long-standing conviction that companies’ environmental and social performance are at best irrelevant and at worst injurious to companies’ bottom-line financial

²⁸ *The Economist*, 28th April 2001.

performance. This view is remarkably persistent, despite considerable academic and empirical evidence to the contrary²⁹.

- **Narrow Interpretation of Fiduciary Responsibility.** This barrier is a direct consequence of the preceding one. Inasmuch as companies' environmental and social performance have historically been viewed as financially immaterial, it follows that they need not be – indeed, *cannot* be – a legitimate concern for fiduciaries. This narrow view of the proper ambit of fiduciary responsibility is slowly disappearing, hastened on its way by a growing body of European pension regulations requiring at least an explicit acknowledgement that investee companies' performance on social and environmental issues may be germane to their financial performance.
- **Characteristics of the Climate Threat.** Because climate change has the potential to cut across nearly all financial services' functions, it creates a sense of shared responsibility that deters any one group from taking the initiative. Moreover, unlike asbestos or genetically-modified food, climate change is not something one can feel or touch; nor can it be said to possess a definite 'onset' date, unlike, the Y2K threat for example. Finally, climate change is perceived as a 'long-term' issue, which clashes head on with the financial services industry's quarterly performance-driven short-termism.
- **Carbon is Value-Less.** The present lack of connection between climate change and financial risk, and the slow pace of price discovery for carbon, means that the financial services sector simply cannot see any value in climate action. The gradual spread of GHG regulation in Europe, Japan, Canada and the U.S., plus the steady growth of the still small GHG markets will clearly accelerate the value generation process. Financial institutions will only become serious about climate change if there is money to be made or value to be lost or created.

POLITICAL /REGULATORY BARRIERS

- **Lack of political leadership in tending to financial market concerns.** The overwhelming majority of respondents in this study believed that strong governmental leadership is pivotal to the successful utilization of market mechanisms in tackling climate change. Only governments, it was felt, can create the conditions under which carbon management and climate adaptation measures can be assigned a durable value by financial and insurance market participants. They can do this by various means (see box).

²⁹ See, for example, Bank Sarasin, *Sustainable Investments: an Analysis of Returns in Relation to Environmental and Social Criteria, 1999 and Environmental Shareholder Value 1998*; World Business Council for Sustainable Development, *Environmental Performance and Shareholder Value, 1997, and Financing Change, 1996, and European Federation of Financial Analysts, Sustainability and Financial Analysis: The Financial Analysts View, 1996*.

GOVERNMENTS CAN CATALYSE THE INVOLVEMENT OF FINANCIAL INSTITUTIONS BY:

- *regulating GHG emissions (so that efforts undertaken by industrial companies to manage emissions carry financial value);*
- *purchasing emissions reductions from the international marketplace to help meet national targets (thereby driving up demand);*
- *providing first movers with assurances that they will receive credit for early action on reducing GHG emissions;*
- *regulating the emissions trading markets so as to confer greater market efficiency (see below);*
- *requiring greater disclosure of potential climate- and carbon-finance related liabilities among publicly traded issues;*
- *encouraging flows of capital towards cleaner technology by relaxing restrictions on investment scope and strategy;*
- *in developing countries, removing restrictions on the extent to which foreign financial institutions can do business in the host country.*

The early input of financial and insurance expertise into these and other value-creating initiatives will help build confidence among financial institutions.

- **Uncertainty over the commitment of regulators to the consistent establishment and enforcement of long-term binding emissions reduction targets.** Skepticism within financial institutions about the seriousness with which governments will treat GHG regulations, lack of certainty around the private sector's requirement to cut emissions and concern that regulations may change and in doing so destroy the value of actions already taken are enough to convince many financial institutions of the merits of doing nothing. The lack of political clarity beyond 2012 (the end of the current term of the Kyoto Protocol) was seen as major problem within those financial services functions where long-term financial forecasting is important, notably, investment banking and project finance.
- **Low recognition of climate change risk factors by pension fund and securities and exchange regulators.** Fiduciaries are legally obligated to have the long-term interests of their beneficiaries as their sole objective, often termed the 'duty of care'. In practice, it has been the interpretation of the legislation rather than any specific prescriptions in the legislation itself which has determined what is and what is not "reasonable", "prudent" behavior by fiduciaries. The expansion of fiduciary duty to include environmental performance would lead inevitably to a much greater focus on climate change.

As regards exchange listing requirements, U.K. regulators stress that in determining what information should be included in listing particulars, regard must be paid to "all such information as investors...would reasonably require to make an informed

assessment of the prospects of the issuer”. The U.S. SEC has similar requirements but also states that ‘investors who...suffer losses have important recovery rights if they can prove that there was incomplete or inaccurate disclosure of important information”. As the links between climate change and corporate financial performance become clearer and more quantitative, the issue will increasingly fall under the ambit of these requirements.

- **Lack of certainty over the rules and regulations covering emissions trading systems.** Although there is much intuitive support for emissions trading, there is a great deal of concern over the true commercial viability of the specific emissions trading systems taking shape. The current UK Emissions Trading Scheme, for example, has been criticized as being heavily subsidized, voluntary and not widely adopted. For many financial market specialists, the nascent emissions trading market will only be a success if it is global in nature (or, at least, a patchwork of interlinked global systems), i.e., that it includes U.S. companies, and that commodities are fungible (transferable between different marketplaces)³⁰.
- **Insufficient flow of information relating to *forward-looking* climate modeling data.** The general lack of resolution on future weather impacts on account of climate change has led many financial and insurance companies to discount the issue as a priority. The present reactive stance, whereby actuarial calculations and event characterization are based on trends in past events, will be less and less useful with the onset of climate change. More reliable predictive capabilities should shore up confidence within the forward-looking banking and insurance underwriting industry that adequate adaptation measures can be managed.
- **Poor visibility of government in creating commercially attractive opportunities within the clean technology sector.** Frameworks set by Government and regulators can and do provide genuine financial incentives for investors in clean technology to come forward. Mechanisms to support renewable technologies and emissions trading within the U.K. the U.S. and Scandinavia are often cited as being critical in creating the commercially attractive opportunities needed by investors in these areas. A lack of clear targets for renewable energy supplies to encourage both the development and uptake of these technologies is a definite impediment to potential investors within this sector.
- **Lack of capacity within less-developed countries to initiate and develop good-quality GHG projects under the Kyoto Accord.** Many developing countries do not feel adequately prepared to compete for project-based opportunities for want of better capacity to identify, administer and accredit Clean Development Mechanism (CDM) projects. This reinforces the case for both increased focus on capacity building to handle these projects and transfer of technology and know-how.

³⁰ R. Rosenzweig, M. Varilek & J. Janssen, ‘The Emerging Greenhouse Gas Market’, Pew Centre on Global Climate Change, March 2002

ANALYTICAL BARRIERS

- **The dearth of quantitative or semi-quantitative analyses demonstrating the relationship between climate change, carbon regulations and value creation/erosion (as illustrated in Figure 3).** As we have seen, a crucial contact point for financial institutions is the extent to which climate change adaptation and mitigation measures create or destroy value. For asset managers, analysts, insurance underwriters and shareholders used to dealing with risk and opportunity in quantitative financial terms, the development of models capable of, for example, linking GHG regulations to corporate earnings, is almost a prerequisite to becoming more involved. An inability to calculate how expectations of future earnings might be affected by climate change and GHG regulations confounds fund managers' attempts to factor such issues into their calculations. This lack of quality analysis on equities risk is therefore a key functional issue within the entire securities industry.
- **Low understanding of the financial benefits of ancillary sustainability activities.** Clearly, private capital flows are critical to achieving the technology transfer and climate change mitigation aims of the Kyoto Protocol, and the financial incentives associated with these goals need to be optimized for this to happen effectively. Without greater analysis of the monetary value of other sustainability benefits, however, their implementation will be less enthusiastically pursued and optimization of both project returns *and* sustainability activities will be difficult to achieve.
- **Low awareness of climate change and carbon finance issues among key finance and insurance sector advisors.** The role of actuaries, pension fund advisors, auditors and accountants in examining the implications of climate change for underwriters and asset managers needs to be more clearly defined, particularly in view of the cognitive barriers identified previously. In many cases, these functions wield considerable influence over financial decision making, yet aside from a few notable exceptions, very little guidance or analysis has been forthcoming from the senior ranks of these professional advisory services.
- **Insufficient inclusion of carbon finance analyses into conventional investment banking activities.** The incorporation of carbon risk analysis (both the risk of extreme weather and the risk of liability for GHG emissions) or a potential 'cost of carbon' into securities pricing, asset allocation, mergers and acquisitions, and other investment decision-making, is much more likely to happen once carbon begins to get a value and analysts have the models to work with.
- **Poor data availability among industrial companies.** The lack of quality data on corporate climate change strategy and GHG emissions management is a key impediment to progress in successful engagement programs from institutional investors and makes the analysis of potential company risks very difficult.

MARKET OPERATIONAL BARRIERS

- **Many venture investors need stronger and clearer market signals in support of clean technologies.** Potential investors in the clean technology marketplace wish to see specific mechanisms – such as tax incentives, guaranteed prices/market shares, green

certificates trading schemes – giving the technology in question a clear commercial advantage in the marketplace. Larger institutional investors, in particular, need to feel much more confident about the long-term financial strength of clean technology-based companies before they will begin to channel investment funds into them. In some cases, they also need to be freed from regulations and other governance restrictions that limit where they can invest and what they can invest in, to order to assist capital flow into the global clean technologies sector.

If regulatory frameworks effectively “price in” the benefits of environmental technologies and encourage GHG trading mechanisms, the financial community can be expected to become increasingly active in these sectors and to provide the wide range of products and services that are found in other, more mature sectors of the economy.

- **“Built in” inefficiency in emissions trading and market characteristics is undermining its appeal.** Efficient markets rely upon
 - clarity on the nature and quality of traded goods
 - the establishment of legal title to those goods,
 - the construction of market systems that minimize transaction costs,
 - the effective, accurate and rapid pricing of commodities,
 - the ability to transfer risk to intermediaries
 - the standardization of contracts,
 - the need for full disclosure and transparency, and
 - the long-term stability of trading counterparties.

At present, none of these conditions exists for the GHG emissions trading with any degree of universal acceptance. According to the World Bank, small projects are particularly burdened by high transaction costs and cannot easily compete for private sector carbon finance.

- **Market overcomplexity is also a major deterrent.** Overly complex, inflexible and bureaucratic emissions trading systems are deterring many financial institutions from getting more involved in the GHG credit generation and trading system, the weather derivatives market, the ROCs market and CAT bonds. This was exemplified recently by fears that the complex nature of proposals for incorporating emissions reduction projects into the U.K.’s GHG emissions trading scheme will kill any potential projects³¹. Likewise, the U.K.’s March 2002 auction has also been criticized for being too complex and for putting many potential players off³². Internationally, concern has been expressed that the CDM has a potentially fatal level of bureaucracy, particularly regarding financial additionality, project verification, and high transaction costs.
- **Issues of scale.** Many CDM and JI projects, and many renewable energy and energy efficiency projects outside of the Kyoto framework, are very small in comparison to the scale of most medium-sized investment funds and therefore appear to have very high overhead and transaction costs.

³¹ ‘Developers Slam UK Project Proposals’, *Environmental Finance* May 2002

³² ‘UK Claims Carbon Auction Success’, *Environmental Finance*, April 2002

4. Recommendations

FOR ALL FINANCIAL SERVICES COMPANIES AND GOVERNMENTS

Too many senior executives and key financial decision-makers are still unaware about the relevance of Climate Change to their activities. There is a clear need, therefore, for awareness-building measures both across the industry as a whole, and internally within financial institutions themselves. As major property owners and consumers of large amounts of electricity, internal initiatives can simultaneously raise awareness and contribute to mitigation activities:

ACTION	SPECIFIC RECOMMENDATION
<i>Raise Awareness</i>	<ul style="list-style-type: none"> - Work with key institutions (the media, professional bodies, industry associations) to instill a deeper level of understanding and commitment to action. Efforts should be concentrated on the practical manifestations of climate change with which financial institutions are considerably more accustomed – e.g., profit impairment following abnormal weather, regulatory risk, market risk, commodity trading, hedging techniques.
<i>Lead By Example</i>	<ul style="list-style-type: none"> - Adopt a sustainability strategy for products and services in the public and private sectors, addressing environmental and social risks (e.g. carbon liabilities) and seizing new sustainability - related opportunities (e.g. GHG emissions trading). - Develop and implement energy efficiency measures and clean power applications throughout their operations. Institutions should examine the possibility of becoming Carbon Neutral in their operations.

FOR POLICYMAKERS

Above all, policymakers need to provide a basis for the development of credible strategies by financial institutions on the climate change issue. They can accomplish this by establishing and sticking to emissions mitigation obligations, by coordinating multi-industry collaboration, by establishing and supporting the growth of emissions trading schemes, by fostering the speedier commercialization of clean technologies and so on.

Policymakers also have a critical role to play in building investor confidence, which they can do by building greater investor assurance in the corporate governance process and by urging market regulators to examine the need for greater listing disclosure on carbon risks.

Finally, developed country governments can provide much-needed human, technical and financial resources to poorer countries to facilitate the latter's participation in the global adaptation and mitigation efforts.

ACTION	SPECIFIC RECOMMENDATION
<i>Provide Coherent Policy Framework for Private Sector Action</i>	<ul style="list-style-type: none"> - Commit to clear and binding GHG emissions reductions, and clarify how these reduction obligations will be met - Set an agenda that co-ordinates policy in key climate-related areas, e.g., agriculture, development, transport, energy.
<i>Take Concrete Steps to Develop Market-Based Solutions</i>	<ul style="list-style-type: none"> - Purchase international market-traded GHG emission reduction instruments to speed up the process of carbon price discovery and stimulate demand for GHG emissions credits - Deepen tax breaks & subsidies extended to low-carbon technologies, clean technology research and development costs - Expand renewable portfolio standards and encourage the international trading of renewable obligation certificates - Implement emissions trading systems that link with other regional systems, and involve financial market specialists in the design phase. - Simplify trading under Kyoto. Establish accepted, standardized emissions baselines applying to all projects associated with a particular technology type.
<i>Foster Improved Corporate Governance</i>	<ul style="list-style-type: none"> - Work with securities and exchange regulators on the need for greater transparency and disclosure on the implications of climate-related impacts on listed companies and public issues. - Elaborate tighter corporate governance requirements that encourage companies to prioritize longer-term objectives.
<i>Provide Greater Support for Less Developed Countries (LDCs)</i>	<ul style="list-style-type: none"> - Through the UNFCCC, allocate GHG rights to LDCs in order to give them entry to international emissions mitigation efforts over and above their involvement in CDM.

- Simplify the procedures for CDM activity and provide funding, expertise and other capacity-building measures to assist LDCs capitalize on this market.
- Assist with the planning for international climate change adaptation efforts through use of the Marrakech funds and other specialized bilateral and multilateral means.

FOR MARKET REGULATORS

Financial industry regulators need to ensure that listed companies and their financial advisors are providing investors with appropriate information on climate change-related risks, in the same way that other forward-looking market and regulatory factors are required to be disclosed. Efforts should therefore be made to provide guidance and/or develop regulation that ensures adequate attention is paid to climate change risks in stock market filings, prospectuses and other investment-relevant documentation

ACTION	SPECIFIC RECOMMENDATION
<i>Tighten Listing Requirements</i>	- Ensure that sufficient attention is paid to potential corporate climate change and GHG-related liabilities within exchange filings and other standard listing procedures.

FOR ALL FINANCIAL INSTITUTIONS

For market solutions to function effectively, financial institutions must play a full and active role in their development and operation. Likewise, it behooves financial institutions to become more involved in the early stages of these new markets, to build up the expertise necessary to fully benefit from them.

ACTION	SPECIFIC RECOMMENDATION
<i>Get More Involved</i>	- Become an active participant in the design and implementation stages of new GHG markets, products and services, in order to fully comprehend the potential business threats and opportunities that may arise.

FOR COMMERCIAL BANKS

By fully pricing climate change risks into loan terms and conditions, commercial banks can not only protect their own interests, they can exert positive influence on the actions of loan recipients. Linking loans promoting energy efficiency with the nascent emissions trading market, and providing more support for Less Developed Countries are key areas where imaginative, integrated solutions may be deployed.

ACTION	SPECIFIC RECOMMENDATION
<i>Incorporate Climate Change into Business Practice</i>	<ul style="list-style-type: none"> - Develop carbon risk management and benchmarking tools to better understand their potential exposure under different GHG regulatory and climate change scenarios at project, company, sector and regional levels. - Incorporate energy efficiency or fuel switching upgrades into mortgage and infrastructure loans to generate saleable emissions credits
<i>Support Less Developed Countries</i>	<ul style="list-style-type: none"> - Encourage specific, targeted climate change adaptation and mitigation activities in LDCs and emerging markets via new products (including ‘clean’ microfinance), and knowledge transfer.

FOR INSURANCE AND REINSURANCE UNDERWRITERS

Like commercial banks, insurers have the ability to directly influence the marketplace by reflecting the economic consequences of climate effects within the structure of insurance coverage. This can be done by modifying existing underwriting procedures, developing new risk transfer products, or, where classical risk transfer is not viable, via the joint creation of private-public sector solutions. Insurers also have critical roles to play as primary sources of expertise and information on the potential impacts of climate change and approaches for managing the concomitant risks, and in the creation of fully functioning, effective emissions trading systems.

ACTION	SPECIFIC RECOMMENDATION
<i>Recognize Climate Change Explicitly in Product Development</i>	<ul style="list-style-type: none"> - Take steps to reflect risk differentials in underwriting terms and conditions. - Enhance the appeal of new Alternative Risk Transfer instruments, such as CAT bonds and weather derivatives, through greater client education and more attention to customized solutions.

Adopt a More Collaborative Stance with the Public Sector

- Collaborate with public sector to strengthen regional risk management and remediation capabilities. Co-operate with authorities on planning and construction
- Strive to quantify the economic threat from altered climatic conditions around the world (e.g., floods, windstorms, heatwaves), and disseminate this knowledge to other stakeholders.

Support Flexible Mechanisms

- Adapt existing insurance products to the particular circumstances of the GHG emissions market and clean technology through, for example, engineering performance insurance (see Module 1 for other new product examples)
- Collaborate with the legal, project finance and accounting communities to develop integrated emissions trading risk management solutions.

Support Less Developed Countries

- Participate in adaptation workshops with LDCs, as described in Articles 4.8 and 4.9 of the Kyoto Protocol and taken forward for action at COP-7 in Marrakech, 2001.
- Explore the use of ART, micro-insurance and other risk-management solutions as a means to extend insurance and reinsurance coverage to less developed countries where the impacts of climate change may be felt the most.

FOR ASSET MANAGERS

The potential for climate change and GHG emissions regulations to destroy or create value in investment holdings, and the development of analytical tools to gauge these linkages, are the key issues of relevance to asset managers. Out of concern for fiduciary duty, pension funds in particular should examine whether to adapt their engagement policies and investment management practices to include climate change-related issues. Asset managers also have a vital role to play in directing capital towards clean technology markets and other ‘carbon fund’ products. Special attention therefore needs to be given to designing and developing fund products that meet the particular investment criteria employed by institutional investors.

ACTION	SPECIFIC RECOMMENDATION
<i>Include Climate Change Factors in Valuation and Asset Selection Procedures</i>	<ul style="list-style-type: none"> - Develop more robust, quantitative tools for pinning down the potential implications of climate change and GHG regulations on equity prices, corporate earnings and relative sector risk.

- Use these analytical tools to conduct portfolio-wide assessments of risk exposures owing to equity and debt holdings and asset allocation.

Engage Investee Companies

- Encourage investee companies towards greater disclosure of potential carbon assets and liabilities, using reasonable interpretations of both (either as part of the Carbon Disclosure Project or on an individual basis).

Support Clean Technology Innovation

- Search for reasonable and prudent ways to participate in the market for clean technologies and low GHG-intensity products and services. This may be through separate venture investment groups or through the development of tailored fund products.

FOR PROJECT FINANCE

For the project finance community, the primary issues are the need to incorporate the effects of GHG regulations and carbon price sensitivities into calculations of project economics, and the opportunities to enhance cash flow and generate advisory fees via the GHG emissions trading markets. To help bring these markets closer to fruition, the key tasks in hand are to build demand, boost buyer confidence in pricing, bring greater liquidity to the GHG and ROC marketplace in general, overcome the short-term cash flow problems currently plaguing many Clean Development Mechanism (CDM) projects, and create greater market economies of scale.

ACTION	SPECIFIC RECOMMENDATION
<i>Help Develop More Commercially Attractive GHG and 'Green' Markets</i>	<ul style="list-style-type: none"> - Structure deals in such a way as to bring future cash flows forward in time to provide much-needed capital resources 'up front' - Establish a 'credit' clearinghouse to bring greater market liquidity and provide buyers and sellers with greater assurances that market positions can be adjusted at short notice - Expedite the formation of an index of prices for carbon to help overcome the high transaction costs and slow price discovery attached to GHG credits - Lobby the CDM Executive Board for expedited project approval and credit transfer provisions, and for a liberal interpretation of financial additionality in the adjudication process.
<i>Optimize the Use of Innovative Environmental</i>	<ul style="list-style-type: none"> - Structure deals so as to provide the maximum of specialized service (something early market participants

Financing Techniques

stress as being of key importance) with the minimum of transaction cost.

- Seek out ways to pool buyers and sellers of credits; bundle emissions credits (or the cash flows arising from their sale); strip emissions credits from the underlying projects and sell them separately; syndicate project risks among insurers and investors.
- Develop methods for monetizing broader sustainability benefits (through, for example, the generation and sale of biodiversity credits, water extraction rights and such like).
- Take steps to incorporate a ‘cost of carbon’ into discounted cash flow analyses and return calculations for GHG-intensive projects.

FOR PROFESSIONAL SERVICES

Accountants, actuaries, independent analysts, credit rating agencies and other professional service providers within the finance and insurance businesses have the potential to exert considerable influence over the extent to which climate change and carbon finance issues are factored into mainstream investment decision-making and management strategy. The role of accountants is also crucial to the smooth functioning of the emissions trading markets. The challenge for these communities is to integrate climate change-related factors more deeply into their core activities, and to gather greater senior executive level support for the various initiatives already begun.

ACTION	SPECIFIC RECOMMENDATION
<i>The Need To Ensure Climate Change is Assessed in Valuation and Risk Assessment Applies to Accountants.....</i>	<ul style="list-style-type: none"> - Provide auditing and strategic advice to corporate clients on a systematic basis on the extent of potential GHG-related assets and liabilities, whether adequate steps have been taken to manage reasonable risks, and encourage appropriate disclosures in the event that such steps have not been taken - Speed up the value discovery process for carbon through the development of accounting tools to quantify GHG assets and liabilities and incorporate them into company accounts, and develop tax efficient mechanisms for dealing with emissions credits and such like. - Create more standardized accounting treatment for GHG factors by working more closely through accounting standards organizations such as FASB and IASB.

	<ul style="list-style-type: none"> - Develop a robust, reproducible and transparent methodology for rating carbon credits from emission reduction projects, based on the regulatory, technical, environmental and contractual features of the project in question.
<i>...Credit Rating Agencies ...</i>	<ul style="list-style-type: none"> - Develop a better understanding of how GHG-related assets and liabilities affects debt quality and adjust the ratings of industrial corporations and possibly even municipal/regional debt issuers with climate change factors in mind. - Expedite the emissions trading market by rating the credit quality of counterparties to emissions trades, or, alternatively, rating pools of potential buyers and sellers.
<i>...Research Providers...</i>	<ul style="list-style-type: none"> - Sell-side brokers and rating agencies should acquire and utilise climate-related information in order to gauge the threats and opportunities for industrial corporations, and to benchmark their performance, in relation to other parameters.
<i>.... and Actuaries.</i>	<ul style="list-style-type: none"> - Because the threat of climate change is a future one, actuarial standards developers need to ensure that actuarial guidance considers all aspects of climate change.

FOR NON-FINANCIAL CORPORATES

While financial institutions can promote and support action to mitigate climate change, develop clean technologies and ameliorate its impacts, the prime actors are industrial corporations. Industrial corporations have also taken a lead role thus far in structuring and executing emissions trades and in factoring carbon price sensitivities into strategic planning and capital spending decisions. With this in mind, the following are three critical actions that non-financial corporations could take to assist financial and insurance companies in responding to the threats and opportunities posed by climate change.

ACTION	SPECIFIC RECOMMENDATION
<i>Publish data on GHG Emissions and Climate Change Strategies</i>	<ul style="list-style-type: none"> - Provide investment-relevant information to the financial community and investors in general
<i>Take a Lead Role in Providing Effective Low Carbon Technical Solutions</i>	<ul style="list-style-type: none"> - Direct more venture capital towards 'sustainable' technologies in keeping with wider corporate objectives, utilizing the full range of green trading and GHG market opportunities to optimize commercial appeal

Bring Emissions Trading and Carbon Finance Expertise to the Table

- Work more closely with financial institutions and development banks to tap this crucial source of expertise in wider carbon finance and investment settings
- Work in closer partnership with financial institutions to demonstrate the economic benefits of in-house emissions reduction measures, and other projects and activities relating to the Kyoto Protocol

IMMEDIATE ACTION STEPS

To stimulate immediate action on the issue, we offer the following three recommendations:

- 1) *The formation of a task force of senior executives from the finance and insurance sector to promote UNEP FI CCWG recommendations and related activities in the key arenas which provide intellectual leadership on finance sector policy and practice.*
- 2) *The formation of a project team, drawn from the membership of the UNEP Finance Initiatives, to develop and popularize a quantitative analytical methodology, based on actual case studies, for capturing the asset pricing and valuation implications of climate change and carbon regulations. This methodology – the “Carbon Asset Pricing Model³³” -- will provide the basis for understanding the tangible effects of GHG-related issues on mainstream equities analysis and pricing, and examine the sensitivity of investment portfolios to carbon price movements.*
- 3) *The formation of a parallel project team to examine and popularize methods for capturing, monetizing and optimizing within project finance settings the full range of environmental aspects of a project, and to demonstrate the tangible financial benefits of including such aspects into the discounted cash flow calculations used within mainstream investment banking and project finance circles.*

³³ A term coined by Bob Massie, Executive Director of CERES, speaking at the CERES Annual General Meeting, Washington 2002

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APPENDIX 1

ORGANIZATIONS PROVIDING DIRECT INPUT INTO THE STUDY

The following organizations provided direct input into the Module 2 study:

Amaranth Advisors LLC	Hermes Pensions Management
ABN Amro	IBK Capital
Acuity Fund Management	ICF Consulting
Aon Environmental Solutions	IMPAX Capital
Aviva	International Emissions Trading Association (IETA)
Baker & McKenzie	Jones Day
Barclays	Marsh MMC Enterprise Risk
BG	Morley Fund Management
Black Emerald Group	Munich Re
Canadian Institute of Chartered Accountants	Natsource
Carbon Disclosure Project	Ontario Municipal Employees Retirement System
Citigroup	Partner Re
Claros Consulting	PricewaterhouseCoopers
Clerical Medical	Primer Capital
Co2e.com	Prudential
Connecticut State Pension Fund	Rabobank
Contemporary Information Analysis	Royal & SunAlliance
Co-operative Insurance	Royal Bank of Canada
Credit Suisse First Boston	Societe Generale
Deutsche Bank	Standard Life Investments
Dresdner Bank	Storebrand
Fitch Ratings	Swiss Re
Fondelec Group	Tokyo Mitsubishi Securities
Global Change Associates	UBS Warburg
Hancock Natural Resources Group	Universities Superannuation Scheme
Henderson/AMP	World Bank Prototype Carbon Fund