

DISCUSSION PAPER

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**Climate Change - A Risk
Management Challenge for
Institutional Investors**

by

**Mark Mansley
Andrew Dlugolecki**

Discussion Paper Number 1

About the Authors

Mark Mansley

Head of Claros Consulting, Mark Mansley has over 15 years experience of investment, including seven years experience of understanding how social and environmental issues can impact on investment and investment returns. He has worked at leading financial institutions such as Schrodgers, ANZ Merchant Bank, and Chase Manhattan, where he was chief analyst and a director of Chase Investment Bank.

Among other studies he is the author of 'Socially Responsible Investment – a guide for pension funds and institutional investors' (2000). He acted as Lead Author of the financing chapter of the IPCC Special Report on Technology Transfer. In 1994 he produced 'The Long Term Financial Risks to the Carbon Fuel Industry from Climate Change'.

Email: mark@claros.co.uk

Andrew Dlugolecki

Recently retired from the position of Director of General Insurance Development at CGNU plc, Dr Andrew Dlugolecki has worked on several major government climate projects, most recently as review editor of the chapter on Financial Services in the IPCC Third Assessment Report. He has also led two studies of climate change for the Chartered Insurance Institute.

He is a past president of the UNEP Insurance Industry Initiative, and is currently a Visiting Fellow at the Climate Research Unit, University of East Anglia.

Email: andlug@hotmail.com

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11th Floor, 1 Angel Court, London EC2R 7EQ

Contact: Dr Raj Thamotheram

Senior Adviser, Socially Responsible and Sustainable Investment

Tel: 020 7972 6397

Email: rthamotheram@uss.co.uk

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Climate Change:

**A Risk Management Challenge for
Institutional Investors**

A discussion paper by

**Mark Mansley
Andrew Dlugolecki**

Foreword

The London Investment Office of the Universities Superannuation Scheme (USS) Ltd intends to commission a series of discussion papers to examine the relationship between corporate performance on social, environmental, ethical and governance issues and implications for long term investors.

In common with a growing number of institutional investors, we are increasingly aware of the corporate social responsibility questions that we should be asking. The answers are, however, much less obvious. Our hope is that these papers will contribute to a process of joint learning and action.

It is hard to think of a bigger issue to address than climate change and this, in a nutshell, is why we are starting here. Whilst there may be different opinions about the ethics and some of the science of this issue, few would disagree with the statement that climate change has the potential to be a source of significant opportunity and risk for the corporate sector. A better understanding of the investment implications can only be of positive value for pension funds, other institutional investors, and their beneficiaries.

With such a fast moving and complex debate, any report can only represent ‘work in progress’. We are, for example, also hosting a high level seminar in July 2001 so that we and other institutional investors have a chance to challenge the ideas expounded in this paper and to explore a range of ways forward.

Whilst USS Ltd as an organisation, and you the reader, may not support every conclusion in this discussion paper, I am pleased to commend it for your active consideration. Given the authors’ detailed understanding of the issues, I feel certain that it will provide a constructive challenge to our current thinking and will, no doubt, inform our evolving strategy and practice.

Some of the action points suggested can be undertaken by investors acting alone. But there are strong reasons for thinking that joint action in certain areas will be more effective and less costly. I know our Senior Adviser on Socially Responsible and Sustainable Investment, Dr Raj Thamotheram, would like to hear your views on this. He can be contacted on +44 (0)20 7972 6397 or rthamotheram@uss.co.uk

Peter Moon
Chief Investment Officer, USS Ltd

Executive Summary

Climate change is a major emerging risk management challenge for institutional investors. Institutional investors, and pension funds in particular, aim to provide pensions and other benefits through long term investment. They can also be seen as ‘universal investors’ in that, due to their size, they commonly invest across the whole economy. If climate change threatens economic development, and especially if there are many or significant impacts, it will also therefore be likely to undermine the ability of pension funds and other institutional investors to fulfil their aims, so it is in their interests to see that risks associated with climate change are minimised. Whilst this responsibility is widely shared, institutional investors are uniquely suited to take particular actions. This paper proposes ten such action points, together with the rationale for this approach.

But is climate change happening, will it have serious impacts, and how good is the science? This report bases its understanding of the subject on the Intergovernmental Panel on Climate Change (IPCC), the most authoritative global source of information on the issues. The IPCC’s three sets of Assessment Reports, the latest published in 2001, point to a range of serious potential outcomes from climate change that could cause great economic and social disruption (see pages 12-14).

Climate change could lead to any or all of the following risks: direct impacts such as sea level rise, droughts and floods; the possibility of sudden, major climate events; social and political risks at the national and international levels; and the threat to business from policy failures and sudden policy change (pages 15-20).

As a risk management challenge, the optimal approach to climate change is one that takes significant action now to reduce the risks, as long as this does not involve disproportionate economic costs. A variety of evidence indicates that this is possible. There are a substantial number of options for emissions reduction at ‘negative cost’ in that they save money or generate above-average returns, and more will develop with research and development. Market-based measures are likely to be particularly effective means for mitigating climate change (pages 21-24).

Significant reductions of the emissions that are driving climate change can be achieved through increased energy efficiency of production and service delivery, but this will need to be complemented with: substitution of high carbon with low carbon sources of energy (from fossil fuels to renewable energy); storage of CO₂, such as ground storage near power stations or through planting forests; and substitution and lifestyle changes, such as reduction of travel through use of video conferencing (pages 24-25).

International action on climate change is desirable as the most effective way of reducing policy uncertainties and therefore business risks. While the Kyoto Protocol has weaknesses, it is the best near term prospect of an international agreement. Regrettably, US participation appears unlikely, although there may be ways to address US concerns without seriously weakening the protocol. Overall, it is in institutional investors’ interests to engage to see this international process survive (pages 25-28).

Longer term, further more significant cuts in emissions beyond those agreed at Kyoto will become necessary. The IPCC has recommended cuts of 60% or more in rich countries to minimise the risk of major climate disruption. This has led to the idea of contraction and convergence, where emission rights are effectively allocated on a per capita basis globally, and rich world per capita emissions *contract* in order to *converge* with those in poor countries. This idea has gained broad and authoritative support in the UK and internationally and is likely to become a major bargaining position adopted by poor countries at climate negotiations (pages 28-29).

Technology has a major role to play in reducing CO₂ emissions and developing cost-effective solutions. Despite uneven government support, progress in technology development has exceeded expectations. It will be most effective if governments, entrepreneurs, consumers and investors work together to achieve market transformation (pages 30-32).

Many businesses are increasingly recognising the importance of climate change, though the response has again been patchy. Some are developing a range of activities to address it. These include CO₂ measuring, reporting and benchmarking initiatives, the use of emissions trading, and the consideration of business strategy and product development (pages 33-34).

Institutional investors and climate change: action points

So what can institutional investors do to better manage the risks and opportunities associated with climate change? This paper identifies ten actions, from specific measures such as the management of directly held property, to broader governance and engagement activities and, at the strategic level, active and positive involvement in the development of responsible public policy on climate change (see overview pages 35-36). These are summarised here, along with the relevant action points.

Directly held property (pages 36-37). Although generally a small proportion of the portfolio, this is the area where institutional investors face the most immediate exposure to climate change risks, and also where they potentially have most direct control. Thus some actions can be taken immediately:

Action point 1. Review the portfolio's direct property investments for climate change risks and identify measures to mitigate risk exposures. These could include cost effective energy conservation strategies and procedures for assessing new developments or acquisitions, which might include considering the life cycle investment case for innovative climate-friendly buildings.

Governance and engagement (pages 37-39). For institutional investors, engagement with investee companies on their exposure to, and management of, climate change related risks is probably the most effective place to start addressing climate change risks in the equity portfolio:

Action point 2. Engage with investee companies, particularly on the need to report on their climate change exposures and the management's response. Establish procedures for: selecting companies to engage with; following up with companies; and handling weak performance.

In order to make the fund's position consistent and transparent to investee companies, investors should develop a statement of good practice on climate change:

Action point 3. Produce a statement of what the fund considers to be broad principles of good practice for managing climate change risks in investee companies, in terms of assessment of climate risk exposures, corporate strategy (including involvement in public policy and political decision-making), and reporting.

Valuation and stock selection (pages 40-42). Climate risks, in all probability, are not being captured by existing financial analysis: analytical improvements could therefore provide additional information not currently captured in a firm's valuation. Such information and analysis is essential, and brokers have the greatest capacity among financial institutions to carry out such research:

Action point 4. Institutional investors should request that sell-side brokers comment on a company's relative exposures to climate related risks (environmental, product-related and policy-related) and the management's capabilities and positioning on climate change.

Sectoral analysis and asset allocation (pages 43-46). There are marked differences in the climate risk exposures of, and also within, different sectors of the economy. As institutional investors increase the sophistication of their approach to the management of climate change risks, they will be in a position to:

Action point 5. Examine the asset allocation of the fund to see if there is a significant over-weighting towards stocks with high climate change risk exposures. Consider the scope for 'win-win' action such as specialised 'pro-climate' investment opportunities that meet investment objectives while also reducing climate change risk exposures.

Implications for investment decision-making (page 46). Institutional investors need to improve their capacity to think about and act on climate change risks in order to be able to implement the measures outlined in this document. They therefore need to:

Action point 6. Enhance their own management capabilities for dealing with climate change by undertaking a programme of internal awareness-raising and learning on climate change.

They also need to show high level commitment and set a framework which encourages systematic action, review and development. Closely aligned to action point 3, institutional investors should:

Action point 7. Adopt a statement on climate change, possibly as part of any statement on socially responsible investment. This could cover some or all of the measures outlined here.

Universal investors and climate change (pages 47-49). As 'universal investors', pension funds and others should see the climate threat to economic stability as a threat to their interests:

Action point 8. Institutional investors need to engage as a broad-based, long term voice in the development of policies and measures that seek to mitigate climate change.

Climate technology and its investors lack positive long term signals from governments:

Action point 9. Institutional investors should work with policy-makers on how to make climate-friendly investments, such as low carbon technologies and infrastructure, acceptable to investors.

A joint investors' initiative on climate change (pages 49-51). Institutional investors should seek to involve other investors and develop joint action on the points above:

Action point 10. They should investigate the potential for a multi-investor initiative, with a mandate to address climate change policy. This will increase effectiveness while reducing costs.

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Introduction

Climate change: a risk management challenge

The aim of this paper is to provide pension funds and other institutional investors with some understanding of the potential implications of climate change for long term investment, and to suggest possible actions to fund managers and pension fund trustees which could help reduce the risks they may face from climate change.

Our starting point has been that the principal goal of institutional investors is to provide benefits for members and customers through prudent long term investment. In particular, pension funds are averse to unpredictable or unjustified risk, and will seek to avoid major disruption and uncertainty that could impact on portfolio values or the ability to pay pensions.

In this light, climate change appears to be an area worthy of investigation. It is widely recognised as a major environmental issue, with potentially very serious impacts. Many of the sectors in which pension funds and many other institutional investors invest have an influence on climate change and may be affected by it. The timescales involved in climate change are long, over decades, but comparable to the timescales adopted by institutional investors.

Thus, we analyse in Part 1 the risks of climate change for investors, finding that climate change does have the potential for major impacts on people, the economy and investments. The risks come from the physical impacts of climate change itself, from measures to address climate change and from the potential political consequences of failure to tackle climate change adequately.

In Part 2 we consider the extent to which it is possible to take action to mitigate these risks. We find that the risks of climate change are not fixed and that the actions of governments, business, investors and others can play a part in reducing these risks, through a wide range of initiatives. A key consideration will be the costs involved, relative to the potential benefits and the state of knowledge at the time.

In Part 3 we consider the implications and opportunities for institutional investors themselves. The uncertainties around policy developments and the dynamic evolution of information make analysis an on-going challenge, but also suggest an opportunity for institutional investors. We consider how investors can move beyond being passive observers of climate change to take action to reduce any associated risks. This can be done directly through the way they manage their investments, indirectly through their governance activities with companies (where they could engage with companies to reduce their risk exposures), and finally strategically, by engaging more directly with the public policy processes that are developing responses to climate change.

Mankind is in the process of performing a gigantic experiment on the earth's climate. As yet it has hardly any control of this experiment and no idea of the impact. However, this experiment could have a dramatic effect on future conditions for human life on this planet. However possible it is to argue about ... climate change and its effects ... there are definite indications that the risk situation will deteriorate in the future.

Munich Re, 2000¹

Indeed it is possibly with the last of these that institutional investors could be most effective in reducing the risks of climate change. We will discuss how institutional investors can in many ways be usefully regarded as ‘universal investors’ in that they invest widely across the economy, and their success depends as much on the economy thriving as a whole as on any particular investment decision. They act on behalf of large numbers of people, investing assets on their behalf for the long term. This gives them perhaps unique potential to act as a bridge between public policy, corporate governance and the well-being of individuals (especially beneficiaries). Such action is likely to be most effective if taken jointly by many institutional investors.

Climate science – how good is it?

Understanding climate change is a major challenge for scientists and stretches the scientific community’s ability to understand and model complex phenomena to the limit. As such, investors need to come to an informed judgement of the credibility of the science and the implications of any uncertainties. Thus before looking at the various risks, we consider this question of the quality of climate science in more detail.

In this paper we base our understanding of the impacts of climate change on the IPCC assessment reports, as the most authoritative and substantial source of information³. The IPCC released its Third Assessment Report (TAR) in 2001. The work of the IPCC is essentially to draw together the vast body of scientific knowledge in an understandable way that can be used by policy-makers and others. It has much to recommend it:

- It is an inclusive process, with sceptical scientists and others able to take part.
- It is based on a review of the best available science.
- Its own work is subject to external review by experts and by governments.
- The summaries are subject to line by line approval by governments: nothing which cannot be justified is accepted.
- The way IPCC has evolved through three major iterations has enhanced its credibility: weaknesses have been addressed and many conclusions have been strengthened or refined. There has been no major reversal of earlier conclusions.
- Potential alternative explanations for climate change, such as ‘aerosol’ cooling, variations in solar radiation, historic climate data, potential ‘carbon fertilisation’ of plants, and difficulties in cloud modelling, have either been used to refine the models or are included in the consideration of uncertainty.

This is not to claim that the IPCC process is perfect: politics and personalities can play a part, particularly in the executive summaries; funding opportunities can influence research priorities and coverage; and so on. Nor is it to dismiss the various climate sceptics. Indeed, they have a valuable role to play in challenging the conclusions and ensuring robustness.⁴

Some people have unjustifiably sought to undermine the work of the IPCC, but governments should be left in no doubt that it offers the best source of expertise on climate change ... The IPCC’s scientists have embraced dissent about the science of climate change and acknowledged its uncertainties. Nevertheless they have clearly demonstrated that there is an overwhelming consensus about climate change and this provides a mandate for urgent action by us all.

**Sir Robert May
President, Royal Society
and former UK
Government Chief
Scientist²**

In June 2001, the work of the IPCC was robustly defended in a joint statement⁵ issued by seventeen National Academies of Science. Together, they recognised that the IPCC was the ‘world’s most reliable source of information on climate change and its sources’, and they added ‘it is evident that human activities are already contributing adversely to global climate change. Business as usual is no longer a viable option’. The work of the IPCC has also been further validated in a review carried out by the US National Academy of Sciences at the request of President Bush⁶.

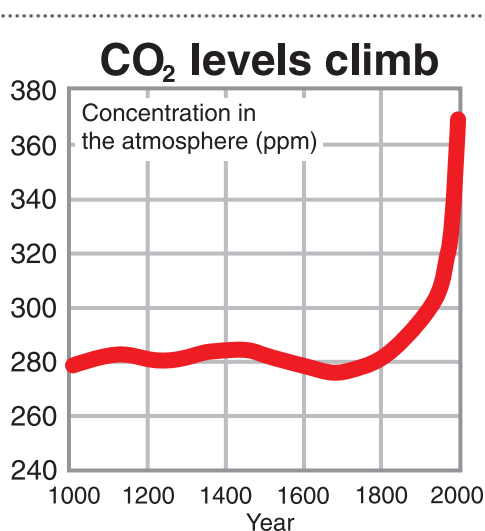
For those who are not climate experts, and particularly when making a risk assessment of climate change, the IPCC provides outsiders with an unparalleled summary of a very complex area of science. In particular, we note that **as a summary, encompassing a wide range of models and different perspectives, the IPCC reports are far more credible than any single paper or observation.** Indeed, if the IPCC did not exist, and the financial community wanted to get a broad and authoritative understanding of climate change, it would be necessary to create something very similar.

Finally, it should also be noted that, just as there are sceptics, there are those who argue that the IPCC is being too cautious both in its assessment of the risks and in its recommendations. For example, Munich Reinsurance is much more categorical than the IPCC in its assessment that climate change will lead to increased winter storm activity over Europe.⁸

The IPCC’s conclusion that most of the observed warming of the last 50 years is likely to have been due to the increase in greenhouse gas concentrations accurately reflects the current thinking of the scientific community on the subject...The full IPCC Working Group 1 report is an admirable summary of the research activities in climate science, and the full report is adequately summarized in the Technical Summary.

Report of the US National Academy of Sciences for President Bush⁷

Figure 1: atmospheric concentrations of CO₂



Source : © New Scientist.

Uncertainty is another aspect of climate science that needs to be addressed in any consideration of the risks of climate change. The science cannot be certain about the precise extent and specific impacts of climate change, and the policy responses, depending on the political process, are even harder to predict. But uncertainty should not be seen as a reason not to act: there is much that can be done now which will help to reduce risks and which makes sense on a precautionary basis. Indeed, investors are well used to acting in the face of uncertainty, and thus may be able to help assess appropriate courses of action.

Furthermore, uncertainty should not be equated with lack of credibility of the science, as is sometimes implied. Indeed, dealing with the levels of uncertainty has been a central feature of the work done on climate change: deciding which results are significant and which are not. This is comparable to fund management: just because a fund manager may not be able to tell you exactly where the market will be next year does not mean that they are not good fund managers.

Finally, it must be remembered that one of the major sources of uncertainty in projecting the future climate is the view of future economic activity: how strong and how large will the global economy become, and what climate change-related technologies and management approaches will be available? Inevitably, these kinds of uncertainties will never go away.

In conclusion, despite some uncertainties there is much that we can be certain or reasonably certain about. In particular, the following three points provide a powerful foundation for analysing climate change:

- **Climate change is a significant risk to the global economy¹⁰.**
- **Climate change will continue to have policy implications and political consequences over long time scales, and will therefore have impacts on investors, despite on-going uncertainties.**
- **Precautionary action to reduce the causes of climate change, notably emissions of greenhouse gases, will reduce the potential risks of climate change.**

Uncertainty does not mean that the world cannot position itself better to cope with the broad range of possible climate outcomes, or protect against potentially costly future outcomes.

Robert Watson
Chief Scientist,
World Bank and
Chairman, IPCC⁹

1 The risks of climate change

The risks of climate change fall into a number of different areas, all of them potentially relevant for investors. They are:

- The direct physical impacts of climate change over the next century.
- The possibility of potentially catastrophic climate change.
- The international political consequences of climate change.
- The business and economic risks of policy failures.

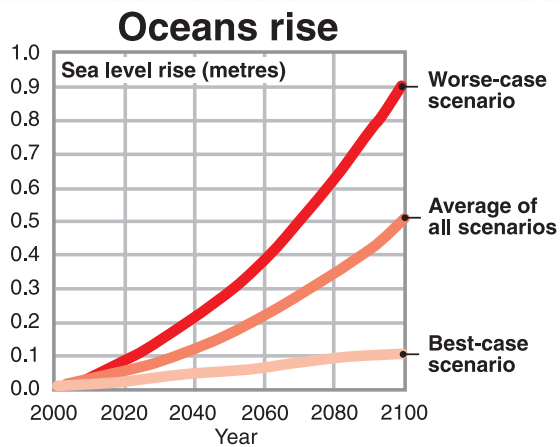
Direct impacts of climate change

The effects of climate change can already be seen in a variety of ways: higher temperatures, rising sea level, melting glaciers, changes in rainfall and more intense El Niño events. The recent IPCC report noted that there is already ‘emerging evidence’ of economic damage to human systems, through more frequent floods and droughts. The global toll of damage from natural events rose to \$100bn in 1999 alone, most of which was not insured, with the cost borne by the victims themselves or disaster relief.¹²

Without action to limit greenhouse gas emissions, the earth’s climate will change at a rate unprecedented in the last 10,000 years, with adverse consequences for society.

Robert Watson
Chief Scientist,
World Bank and
Chairman, IPCC¹¹

Figure 2: Scenarios for sea level rise



Source : © New Scientist.

The IPCC report projects that greenhouse gases are very likely to rise well above ‘safe’ levels this century. Climate change is still in its early stages because of the inertia both in the climate system, notably in the oceans, and in the emissions system (we cannot suddenly stop producing greenhouse gases). The climate system is like a supertanker: even if we stop the engines the ship has so much momentum that it will continue for many miles before stopping. This inertia is expected to cause the global temperature to rise by up to 5.8 °C during this century alone, as much as at the end of the last Ice Age but compressed into 100 years. Indeed, a key feature is the speed of change, which causes problems both

for ecosystems and for human activities: people will not change their settlement and lifestyle habits easily to accommodate the new risks.

Among the key predictions are that:

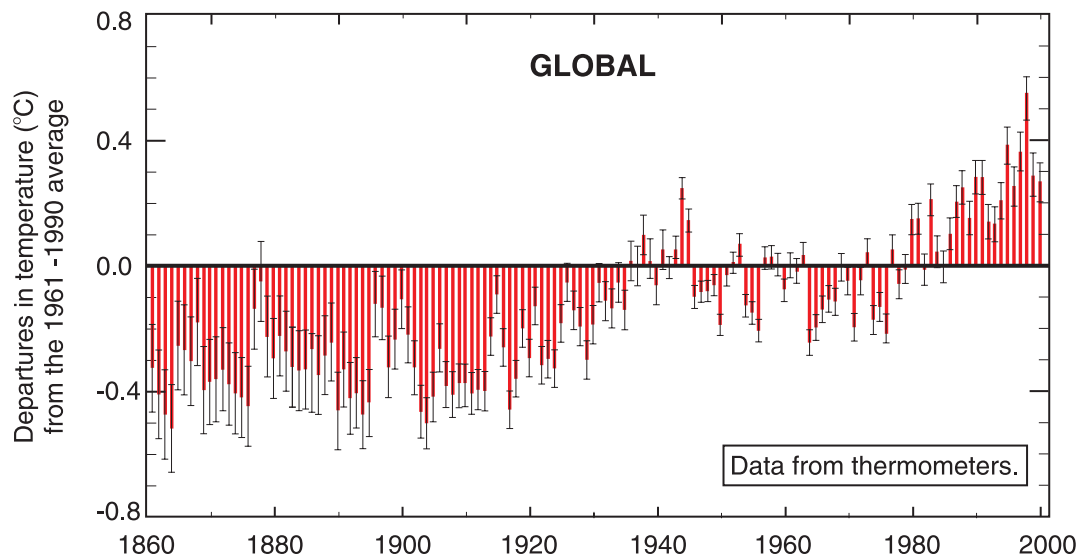
- Coastal regions and cities will be at serious risk from higher sea levels and storm surges.
- Alpine and arctic regions are likely to suffer subsidence as permafrost thaws.
- Extremes of rainfall are expected to become more common, leading to both flooding in some areas (e.g. Northern Europe) and droughts in the centre of continents and the Mediterranean region.
- Hurricanes and severe storms may increase in frequency and intensity. While the IPCC is not yet clear on this risk, some insurers are becoming concerned about the possibility.

The occurrence probabilities for extreme values of various meteorological events have already undergone or will undergo significant change.

Munich Re¹³

The forecasts of climate change are based on a range of different future emissions scenarios, which reflect alternative views of the future world economy. Notably, high emissions scenarios give a 2100 temperature rise prediction of 2.7 to 5.8°C; while lower emissions scenarios give a range of 1.4 to 3.8°C, indicating that adopting a lower carbon emissions trajectory does significantly reduce risks of extreme temperature rises, although the consequences could still be severe.

Figure 3: Global temperatures on the rise.



Used with permission of IPCC

The direct weather-related impacts of climate change on most *businesses* may be modest in the short term. But this is no reason to ignore the issue, especially in those sectors where there are likely to be some impacts. As well as insurance, mentioned above, those investing in long term infrastructure (including property) may well be affected. The most significant direct impacts are likely to fall on the water sector, as it contends with both floods and droughts. An example of the possible impact on infrastructure is provided by the Thames Barrier, which was built to cope with the gradual subsidence of land in south-east England, but not climate change. Already the Barrier has been used many more times than envisaged and it will have to be improved well before the end of its design life if London is to remain safe.

Some businesses are already starting to allow for the impact of climate change in infrastructure planning: as early as 1989 Shell modified an oil platform, in part to account for rising sea levels caused by climate change¹⁴. We consider the impacts on various sectors further in a later section.

The risk of climate catastrophe

The other grave risk of climate change is that it may reach a level at which fundamental, irreversible changes in the Earth's systems occur. Concern is expressed in the IPCC TAR over the potential risk that the Greenland icecap could start to melt and, linked to this, the Gulf Stream could fail. The first would result in a major sea level rise. The second could produce a sharply cooler climate over the whole North Atlantic region. While not considered likely before 2100, it is increasingly seen as a serious long term danger if greenhouse gas emissions continue to rise rapidly.

These consequences are of such a magnitude that many would argue that we should seek to minimise the possibility of their occurrence, even if the science is uncertain. This is the precautionary principle: efforts should be made to eliminate or at least reduce the possibility as far as practical, through measures to mitigate climate change now.

From the perspective of risk-averse investors, the more immediate significance is that if scientists were to become more convinced about the potential for climate catastrophe, there would almost certainly be a dramatic impact on governmental policy and on the credibility of calls for much tougher and more rapid action on climate change.

The international political risks of climate change

The economic effects of climate change are still uncertain, but for poor countries the estimates from the IPCC are that climate change is likely to result in a net loss. The scale of this loss is expected to increase with temperature. However, for rich countries the estimates are that modest climate change (up to 2°C) may

We can't ignore mounting scientific evidence on important issues such as climate change. The science may be provisional. All science is provisional. But if you see a risk you have to take precautionary action just as you would in any other aspect of business.

**Sir John Browne
Chief Executive
BP Amoco¹⁵**

result in a net gain, but more serious climate change could result in a net loss. Immediately this suggests the potential for international political tensions between those poor countries that suffer most from climate change and the rich countries that are seen as responsible for causing climate change through their higher levels of current and historic emissions.

While the economic effects may be modest for many rich countries in the foreseeable future, this does not tell the whole story. Insurers have become increasingly concerned about the enhanced risk of major climate catastrophes, and have warned that the loss potential exceeds global insurance capacity. Already, only 20% of weather-related economic damage is insured: insurers warn that further limitations on availability are likely¹⁷. Serious damage is likely to be done to the natural environment, particularly in areas such as mountains and coastal regions. This may not be reflected in economic statistics but will have implications for policy and for corporate reputations. Impacts on human health could be significant, with tropical diseases spreading into temperate climates and certain epidemics becoming more prevalent.

Climate change is expected to be bad news particularly for the poor and for many poor countries, who will be least able to avoid or manage health problems and natural disasters. Notably, in population terms, more people are projected to be harmed by climate change than benefit from it, even for temperature rises less than 2°C. There is a significant potential for catastrophes affecting coastal cities or settlements in poor countries, with major loss of life. These could generate political consequences such as:

- Mass population movements, and possibly dramatic increases in the number of refugees;
- Conflicts, such as over water resources. It is estimated that, in addition to already serious water shortages in Asia, the Middle East and the Mediterranean, a further 500 million people will face limited water resources as a result of climate change. With water scarcity likely to increase in many regions, tensions over shared water resources could reach breaking point.

Countries or organisations that feel exposed to climate change risks are therefore likely to feel aggrieved that those countries responsible for climate change are not taking action to reduce the risks, and may seek redress or find ways to put pressure on those countries to change policies. Climate change could start to impact international relations and multilateral policy in a wide variety of areas.

These risks have been brought into sharp focus by the decision of the Bush administration to withdraw support for the Kyoto agreement. In the aftermath of this decision, links were rapidly made by some opinion formers to competition policy and trade: a taste of what could come. For example, various leading figures such as former UK Environment Minister John Gummer, have advocated that Europe make clear in international negotiations that Kyoto is a priority if the

It is possible that global warming will become an increasing source of tension between industrialised countries, which are seen to be the primary source of the problem, and developing countries which bear the brunt of the effects

The Future Strategic Context for Defence, UK Ministry of Defence¹⁶

US wants concessions on other issues¹⁸. In addition, he recommended that consumers should ‘properly make a market decision’ and ‘exercise.... personal choice’ in the selection of fuel from oil companies who are for or against the Kyoto process. Margot Wallström, European Commissioner for the Environment, questioned: ‘Why should we put European business and European companies under such pressure and let American companies off the hook? Why should they play by other rules than European companies?’¹⁹.

Despite this, at present the EU does not look likely to threaten economic sanctions and risk a wider trade war. Nevertheless, for investors, the important points are that:

- The row about President Bush’s decision on Kyoto is complicating an already tense EU-US trading relationship, bringing further business uncertainties²⁰. It may also start to create more alignment between Europe and poor country interests.
- There are very real risks that the trade implications of the climate debate could become more severe. If, for instance, certain countries were to proceed with a limited climate change agreement and then seek to take measures to protect industries adversely affected through trade tariffs, countries outside the agreement could well challenge the validity of these tariffs, increasing trade tensions.
- In addition, climate change could provide a ready fuel for populist, anti-Western or anti-capitalist sentiment. While climate change is unlikely to be sufficient in itself to lead to changes of government or even conflict, it could be used as a convenient excuse by those wishing to take a more aggressive stance against the rich world or against corporations.

The business and economic risks of policy failures

As an added complication, further political and business risks arise from how governments respond to climate change. The most serious are likely to arise from: civil responses to government and business inaction; precipitate policy change; or from failing to achieve a broad policy consensus on climate change.

Even if politicians ‘agree to disagree’, by failing to take pragmatic steps they risk galvanising consumer and popular anger. This anger could, in a new climate of distrust about globalisation and disillusionment with political processes, be targeted at corporations in a chaotic manner. Climate-related boycotts against Exxon, shareholder resolutions against BP, and the launch of a boycott orientated website²¹, could be the start of a wider trend.

The threat of serious economic disruption from such events currently seems small, but this could change quickly. For example, the pharmaceutical sector has suddenly had to accept differential pricing on drugs in the developing world and is also on the defensive on patent protection more generally. This was unimaginable even a year ago for such a powerful sector with such established

What Mr. Bush did in trashing Kyoto was to leave serious environmental activists with nowhere else to turn but the market. The smart ones get it. You will be hearing from them soon – at a gas station near you.

**Thomas L. Friedman,
New York Times
June 1 2001**

political support in EU and US. Likewise, it is perhaps sensible to bear in mind the scale and speed of some consumer actions around environmental issues, for example the boycott of Shell in Germany over Brent Spar.

To further complicate matters, there will be a link between the physical impacts of climate change and the business and political risks. As climate change affects people's lives, particularly through extreme weather events, focus will inevitably shift onto what governments and business are doing about it. For example, France has recently emerged as one of the more aggressive countries on climate change mitigation, a position probably linked to recent storms and floods there.

These factors make the business and political dangers highly unpredictable, but certainly the risks will be greatly reduced if governments, business and the international community can show that they are indeed taking significant action. In these circumstances, the financial world would be acting in its legitimate self-interest if it could help convince EU and US policy makers to agree a credible and predictable approach, and be seen to be playing a leading role.

Executives should encourage a regulatory climate that will be stable and predictable – and therefore friendly to investment – over the long term.

Harvard Business Review²²

Yet another source of risk comes from the potential for legal liability, as those affected by climate change seek redress in the courts from those they view as responsible²³. Although at present unlikely, as the science firms up and the courts become increasingly willing to hear cases from overseas parties, the risks may increase. There is potential for companies to be dragged into interminable lawsuits similar to those that have affected the tobacco industry.

Furthermore, as implied earlier, failure to start to address climate change now means that more dramatic action to address climate change will become almost inevitable. These actions will involve both adapting to the consequences of climate change and taking belated actions to reduce emissions. Rapid policy change would be costly for businesses to implement and could have serious and unpredictable effects on asset values. It is widely agreed that the less costly option is to take more gradual action now within a clear long term policy framework. The longer the economy continues on a business-as-usual path, the greater the upheaval to reach a different course later.

From the perspective of institutional investors, who have an interest in ensuring that the global economic system takes the most productive and lowest-risk course over the long term, the optimum strategy would be one in which the world takes significant action without disproportionate cost, thus buying more time and reducing the risks of climate change.

We look at the potential for achieving this in the next section.

2 Responding to the climate change threat

In view of the risks just discussed, there is a real challenge for governments and others in how to respond to climate change. They can do this in two main ways: by taking steps to mitigate it (i.e. reduce or prevent the factors driving the risks) and, to a lesser extent, to adapt to it (i.e. manage the impacts). To reduce the risks, the central objective must be to slow down the rate of increase in the amount of greenhouse gases in the atmosphere, and ultimately stabilise their concentrations.

Because of the links between the energy use and greenhouse gases, addressing climate change could potentially have wide ranging impacts across many industrial sectors and could significantly affect the structure of the global economy. For policy-makers and those advising them, the goal is to find ways of reducing the risks without causing significant adverse impacts.

In this respect, addressing climate change is similar to investors seeking to implement a hedge strategy using options to protect their investment, but played on a global scale. The possibility is to pay a premium now in order to reduce the risks of major losses in the future. But institutional investors will want to ensure that the premium will not significantly reduce returns in the short term, and therefore that the risk reduction is worth striving for. If this balance can be found, then such a strategy is clearly prudent and responsible.

Scoping the issues

The question therefore becomes what is the optimal strategy to mitigate climate change, in terms of economic cost and effectiveness in reducing climate risk. The following are some of the key points in this debate:

- Emissions of CO₂ due to fossil fuel burning will be the dominant influence on greenhouse gas levels²⁴. Thus addressing climate change will fundamentally involve shifting to far less carbon intensive forms of energy.
- This will probably be a slow transition: few commentators are envisaging suddenly stopping using carbon fuels. Indeed, increases in global use of carbon fuels, for the next couple of decades at least, are expected even if action to curb climate change is taken. Viewed macro-economically, the transition involves improving the energy intensity of the economy so energy demand grows less strongly than growth, and reducing the carbon intensity of energy, so greenhouse gas emissions grow less strongly than energy use. Ultimately, this should make possible the ‘de-coupling’ of emissions from economic growth: emissions decreasing while growth continues²⁵. Action to accelerate these changes will buy time.

- There are substantive measures that reduce emissions at **no cost**: although they may require investment, the savings they generate represent an attractive return. For example, many energy efficiency measures are cost effective but fail to be implemented for other reasons including information gaps or structural problems²⁶. The marginal costs of abating emissions may start to rise for large emissions reductions, but R&D will also lead to further such "no-regrets" actions. It is important to avoid taking a 'static' view of costs, but instead realise that policy and investment can drive climate-related innovation in technology and management, bringing costs down.
- A vital factor will be therefore be the scale of support for the development of new technology and techniques that make possible further emissions reductions at lower cost. A particular challenge is often how to commercialise existing technologies, overcoming barriers to market entry and achieving the economies of scale which make the technology viable.
- Both of the above points reflect the fact that climate change is a dynamic problem: information on the risks will evolve with further research, while the costs of the policies, technologies and techniques will also change over time, in some cases upward and in others down. Decision-makers including investors need to organise themselves to deal with the on-going uncertainties that arise as a result.
- In the near term, measures such as carbon sequestration (storing carbon through forestry or technical measures) and action on other greenhouse gases can slow climate change and buy time, typically at modest cost.
- The Third Assessment Report of the IPCC considered the question of timing, and suggested that early action was preferable. While this means that there is a danger of adopting technologies and strategies before they have been perfected, there are significant advantages to moving early: it reduces the likelihood of extreme climate change and encourages the development of new technologies. Such action, however, should not be so rapid as to cause widespread asset write-offs or other major avoidable costs.
- A key linked issue is 'inertia' in the energy sector: much energy use is based around infrastructure with a long life span (power plants, pipelines, transport systems, buildings). Capital replacement is slow, so reducing emissions takes time. A particular challenge is infrastructure in the developing world: if they follow the same path as the rich countries they will face the same high emission future, but there is an opportunity for them to 'leapfrog' rich countries if they can access the necessary investment and technology.
- The issue of 'equity' – who pays, who takes action – particularly between poor and rich countries, is particularly challenging. Facing this challenge will be critical to reducing the political risks of climate change.

We all must begin right away with smaller, cost-effective steps, then accelerate our efforts as the existing capital stock turns over and new technologies become available.

**Eileen Claussen,
President
Pew Center²⁷**

Identifying the costs of action

For investors, the most important of the above points is probably the cost of action, and is an area of much debate. Clearly, given uncertainties surrounding potential losses, and the need to generate reasonable returns in the near term, it is necessary to balance the protection afforded with any economic costs of such measures. Thus questions about what sort of action to take to mitigate climate change, over what timeframe, and with what cost, are central to any response. It is a debate particularly relevant to investors because such measures are likely to affect the companies they invest in.

Some argue that taking action will involve substantial cost and severe economic dislocation, recommending instead a wait-and-see approach. In contrast, the latest IPCC report identifies substantial emissions reductions that could be achieved at reasonable cost (less than \$100/tC): by 2020 such emissions reductions could amount to some 3.5 to 5 billion tonnes of carbon, compared with 1990 emissions of 7 billion tonnes, and forecast emissions of some 12-16 billion tonnes for 2020. **Approximately half of these emissions reductions could be achieved at no cost.** Other studies, by the EU, the US Department of Energy, and the OECD show similar results: significant emissions reductions are possible at low cost, with many involving no cost.

However, the costs of mitigation remain a source of much controversy, and this is now probably the crucial point of disagreement in addressing climate change. As well as the 'bottom-up' studies mentioned above, a number of 'top-down' macro-economic studies have also sought to model the economic impacts of emissions reductions across the whole economy. These have produced widely varying results, ranging from significant costs to net benefits. In particular, US models have tended to focus on the costs of emissions reduction, producing more negative results. These have gained significant prominence and have helped lead to considerable opposition to the Kyoto Protocol.

In contrast, other models, particularly in the EU, have sought to re-allocate revenues efficiently and to include other secondary social and environmental benefits when possible. These secondary benefits come as a side benefit of measures aimed at reducing CO₂, and include health improvements which arise as a result of reductions in emissions of pollutants such as sulphur dioxide.

Comparing these two approaches, a forthcoming review of the various models finds that 'estimates of the costs of implementing the Kyoto Protocol are uncertain and most are based on assumptions that necessarily imply high costs. A selection of alternative (often more realistic) assumptions gives estimates that suggest net benefits rather than costs... Provided policies are expected, gradual and well-designed, the costs for the US of Kyoto are likely to be insignificant'²⁹. Institutional investors and their advisors, with their expertise in forecasting, are

We are not constrained from action by the threat to jobs, a dramatic prosperity penalty, or the logic of market economics. We are constrained only if politicians lack the will to use the market instruments to achieve the necessary small adjustment at acceptably small cost.

**Adair Turner
Vice Chairman,
Merrill Lynch and
former Director
General, CBI²⁸**

well placed to shed new light on these debates and to help advance understanding.

The experience of the UK is illustrative of this debate. Since 1992 the UK has succeeded in reducing CO₂ emissions, and is reasonably on course to meet its various emission reduction targets, which are ambitious by comparison to most countries (see Annex 1 for a list of the various elements in the UK climate change strategy). So far, there does not appear to be evident economic harm. Of course, it is always possible that growth might have been higher without such action, but certainly the impact has not been significant.

To some extent, this has been achieved through the economically sensible but politically difficult step of shifting from coal-fired power generation to gas, but even looking forward the costs do not appear significant. Further progress may be harder, and, for instance, there continues to be some concern among certain businesses over the impact of the Climate Change Levy. Nonetheless, studies by Cambridge Econometrics estimate that the cost of a 17% reduction in CO₂ emissions by 2010 (from 1990 levels) would be around 0.28% of GDP in 2010³⁰.

Making the transition

The aim of reducing the risks of serious climate change will only be achieved through serious changes in energy production and use. This section gives an overview of what is needed to make the transition away from a form of economic development that is threatening climate stability.

As far as CO₂ emissions and the energy markets are concerned, most commentators would agree as a starting point that it will generally be unacceptable to reduce energy dependent services (heating, lighting etc.). The public will be reluctant to accept less comfortable homes or a lower quality lifestyle. Thus the options must focus on how to provide the same services more effectively, and the basic choices are:

- Increased efficiency in delivering services from a given energy input, elimination of waste, more efficient products, and more efficient power generation and transmission.
- Substitution of high carbon forms of energy by low carbon sources, such as from coal to natural gas, and from gas to zero carbon sources such as renewable energy and possibly nuclear³².
- Storage of CO₂ either at source (e.g. underground storage of CO₂ from power stations) or by creation of sinks to absorb CO₂ (e.g. replanting forests).
- Substitution and lifestyle changes, from high energy to low energy services, assuming they have the same or better utility. For example, video-conferencing as a substitute for tiring and expensive business travel.

Addressing climate change will almost certainly involve all of the options above. Energy efficiency can be particularly cost effective, but suffers from the ‘rebound

It is estimated that, over the next 20 years, some \$15 trillion worth of investment is going to be made in energy infrastructure. This is a golden opportunity to make the world less dependent on fossil fuels and less vulnerable to the impacts of climate change.

Mark Radka
Co-ordinator, UNEP
Energy Programme³¹

effect', where money saved is spent on other goods and services, leading to further energy use.

There is a wide variety of different drivers that can help bring about these emission reduction measures. These include multinational action, national policies, business initiatives, technological development, and even consumer action. While these are inter-connected and potentially mutually reinforcing it is important to recognise that **addressing climate change does not depend on a single driver** or initiative. As a result, some action is virtually inevitable, although the effectiveness and efficiency of single methods are likely to be greatest if co-ordinated and agreed between governments, business, consumers and investors.

In terms of specific policies, there is now a strong preference among policy-makers for market-based instruments: tradable emission permits, carbon taxes, support for R&D, elimination of subsidies on unsustainable activities, product labelling, information dissemination, reporting and auditing initiatives. Such policies are generally more economically efficient than explicit regulation and are likely to be welcomed by financial institutions as the best way forward³⁴.

Furthermore, it is worth recognising that, while an increasingly important issue, climate change is not the only factor driving change in the energy markets. For example, in the power market, factors such as deregulation, demand for enhanced power reliability, energy diversity and security and local pollution control measures are also driving change. In the transportation sector, issues such as congestion, local pollution, diversity and integrity of fuel supply, and safety also play a role in its likely transformation. Many, but not all, of these issues offer potential for synergies with measures to control CO₂ emissions and indeed it is those areas where such synergies exist that action is most possible.

International initiatives: the Kyoto Protocol

In order to reduce policy uncertainty and consequent business risks, a key part of the solution would be a multilateral agreement signed by most major parties. This section outlines progress with efforts to finalise such an agreement, weaknesses of the current approach, and implications for investors including a review of the advantages of proceeding, even without full agreement.

In recognition of the need for a multilateral agreement to address the issue, governments established the United Nations Framework Convention on Climate Change at the Rio Earth Summit in 1992. This led to the signing of the Kyoto Protocol in 1997, which mandates a reduction in greenhouse gas emissions by rich countries of an average of 5% below 1990 levels by 2008-12. In addition, the Protocol provides for a range of 'flexible mechanisms' to increase the options available in implementing national targets (namely Joint Implementation, the Clean Development Mechanism, and international emissions trading).

In a wonderfully perfect world, which we don't have, voluntary would be marvelous. But this requires total trust. I think the role of governments is to protect the common good and one of the roles they do need to do is to set up a framework whereby all the participants can trust each other and must have a system which sets a target and has penalties and incentives.

Sir John Browne
Chief Executive
BP Amoco³³

However, efforts to broker the agreement are currently hampered principally by US objections, which are two-fold: a belief that costs of implementation will be high, and a lack of commitments from poor countries within the Protocol.

As we have already seen, the argument about costs depends heavily on the assumptions and methods adopted in the analysis. It also depends on the structure of individual economies. Political factors also play a part, as we shall see in the next section.

The second issue is how to bring poor countries into the process in a way that these countries find acceptable. To date, poor countries have opposed caps on their emissions, regarding it as essential that the rich world, which has already benefited from fossil fuel consumption, act first. One way forward might be through some relatively modest commitments now and having an indication of greater involvement in the future, after the first Kyoto compliance period of 2008-12.

When asked if Mr. Bush believed that Americans should change their lifestyles in the face of a power crisis, possibly using less energy as one solution:

That's a big no. The president believes that it's an American way of life, and it should be the goal of policy makers to protect the American way of life. The American way of life is a blessed one. And we have a bounty of resources in this country.

**Ari Fleischer
White House
spokesman³⁵**

These changes might make a reworked Kyoto acceptable to the US. However, the key question remains as to whether the US is prepared to begin the shift from a very carbon-intensive economic system to a lower carbon system. It is far from clear that the current administration accepts this given some unencouraging signs: the announcement of a strongly production-orientated energy plan combined with the fact that the plan appears to have been developed separately from a climate change strategy.

In summary, efforts to keep the Kyoto agreement on track have been weakened by US opposition to the agreement. It would be difficult to implement it without the US, but not impossible: the EU is committed to Kyoto; Russia may well be persuaded by financial considerations; and for Japan, to some degree, it is a matter of prestige. Since President Bush's statements in March, all three have in response restated their commitment to see Kyoto ratified. If sufficient numbers of countries ratify the agreement, the Protocol passes into international law.

Can Kyoto tackle climate change?

In terms of its ability to tackle climate change, the Kyoto Protocol is mixed. It has a number of positive features. First, it would reduce emissions; albeit modestly. More importantly, it sends a signal to businesses and consumers that carbon emissions matter, and may encourage them to start thinking about their emissions and ways to reduce them. Another feature, which has excited many, is that it will also establish a market and trading mechanisms in carbon emissions.

However, Kyoto also suffers from significant drawbacks. Kyoto is only the first step in the emissions reduction process: the reductions achieved will have a very modest direct impact on climate change. What matters more is the extent to which Kyoto is able to kick start the transition to a low carbon economy. This is

a reason why some countries have been reluctant to see the introduction of sinks and emissions trading mechanisms as they regard them as a way to avoid the more fundamental changes required. But Kyoto does not directly seek to measure or control the transition to a low carbon economy, and in many ways is poorly suited to the task. It could be strengthened by more explicit commitments on the research and commercialisation of new technology.

A second problem with Kyoto arises from its focus on emissions targets and emissions trading. These essentially fix the amount of carbon that can be emitted and let the market establish the price. This has substantial advantages, not least in that by creating a market for carbon, entrepreneurship and innovation in carbon reduction is encouraged. However, a key problem is that the economic cost of abatement is unknown and uncertain. In contrast, systems that fix the cost of emissions but allow the amount to vary (e.g. tax based) have the advantage that they provide more of a limit to the economic cost.

Ways forward might include the introduction of a cap on the price of carbon (e.g. by relaxing the emission targets if appropriate), thus setting an upper limit on the cost of implementing the agreement if emissions reductions should prove costly. Another option is to introduce taxes and emissions trading in parallel experimental iterations, so that taxes can help find the cost of abatement while emissions trading can help set the emissions ceiling.

Alternatively, a more relaxed attitude to sinks and international trading could be combined with some form of side agreement on supporting the transition to a low carbon energy system, which would cover areas such as technology development and commercialisation, and infrastructure development.

Such proposals could help address some of the US objections to Kyoto. But this still leaves open two key questions for institutional investors: first, what will happen if the US continues to oppose the Kyoto Protocol?; and second, what future for the Protocol best serves the interests of investors? While the Kyoto Protocol is not enough on its own, it is possible to improve it and take it forward.

The key argument now is between those who wish to work with the Protocol and those who wish to water it down or reject it altogether. Although a lack of US involvement would greatly weaken the agreement, proceeding without the US would at least ensure there was some momentum for change. In particular, it would have the following advantages:

- Businesses, including US companies, do not want to face different standards for handling carbon emissions or to be excluded from the new market in carbon. This would create some counterbalancing pressure in the US not to be left out.
- The Protocol will demonstrate to sceptics that many countries are serious about taking action, and that they regard this as possible without causing major economic damage.

The developed countries have been responsible for more than two-thirds of emissions over the last two hundred years, and it is morally right that they should lead the way towards meeting human energy needs while preserving environmental and natural resources for future generations.

**Sir Robert May,
President, Royal Society
and former UK
Government Chief
Scientist³⁶**

- It will establish a framework that the US could join when it decides to become involved (and that could be widened to incorporate poor countries).

Climate impasse and the responsibility of investors

It is widely acknowledged that the Bush Administration has strong links with the sectors that benefit from the present energy policy, namely the traditional energy producers and heavy energy users. Such links between an administration and the business community are not new: the term ‘pork barrel politics’ was coined to describe the wider issue of the influence of sectoral interests on politics in the US. Indeed, the energy policy and climate change issue is a powerful example of the relevance of the debate about campaign finance, which has become a major topic of public and political debate in the US following the last Presidential election, with the introduction of the (bipartisan) McCain-Feingold Bill to reform campaign finance.

The president's energy policy ... proposes to deliver a virtual wish list of deregulatory changes to the oil, gas and nuclear industries, which had far less influence in the prior administration.

Stephen Labaton
The New York Times³⁷

Neither is the issue restricted to the US: firms that are heavy energy users in the UK, for example, successfully lobbied for an 80% rebate on the UK Climate Change Levy introduced in 2001. However, the issue of influence in the energy/climate debate in the US was particularly evident in the development of the recent energy plan which is highly production-orientated and makes little attempt to address the challenges of climate change. Here, the concern expressed is that the influence of industrial lobbying may have crossed from merely refining government policy to helping to set an agenda that appears to be increasing climate change risks. This, and President Bush’s decision to reject the Kyoto Protocol, clearly has serious knock-on consequences for international climate change policy.

Most institutional investors are, as shareholders, indirectly involved in this process. Yet there has been little dialogue between investors and these companies on the latter’s lobbying activities and the reasons for them. Given the broader consequences of these activities, the question of whether they are genuinely in the best interests of pension scheme members or beneficial shareholders is likely to become a key corporate governance issue in the coming years.

Beyond Kyoto – contraction and convergence

It is important to recognise that any agreement can be only the first step in what will be a major journey. It is clear that even if the Kyoto targets are met, global emissions will continue to rise because of rapidly rising emissions in the developing world. Substantial further steps will have to be taken to curb emissions globally. Such cuts will inevitably begin to involve poor countries and at the same time rich countries are likely to have to commit to much more serious emission reductions themselves. As a result further emission reduction agreements are likely covering the period 2012-20 and beyond.

Indeed, the IPCC in its first assessment reports in 1990 recommended emissions cuts of at least 60% to stabilise CO₂ concentrations at 1990 levels and thereby be likely to avoid serious climate disruption. Its subsequent reports have not altered this position.

In the longer term, ‘Contraction and Convergence’ (C&C) is likely to become increasingly supported as a policy option. C&C was initially advocated by a small UK think tank, the Global Commons Institute³⁹, but has since gained widespread and authoritative support, including that of some poor country governments and also the recent Royal Commission on Environmental Pollution report⁴⁰ which recommended that ‘the government should press for a future global climate agreement based on the contraction and convergence approach’.

Under C&C, the right to emit greenhouse gases would be apportioned on a per capita basis from a given date. The total amount of emissions would be constrained and would fall steeply until it reached a level considered safe⁴¹. Since the majority of the world’s population lives in the developing world, while per capita emissions are much higher in the industrialised world, rich countries would need to find ways to reduce their emissions – **contraction** – by finding efficiencies or renewable energy sources in the next few decades, or pay handsomely for the privilege of continuing to use fossil fuels. In this way they could approach equal per capita emissions to those in other countries – **convergence**.

Ironically, while C&C offers a more robust framework than that outlined by Kyoto, and addresses the issue of equity, it also meets the fundamental objection of the US in that it also requires commitments from the developing world. As a global operational framework it also avoids many of the technical problems of Kyoto (such as defining baselines for emissions trading in countries not subject to an overall target, or the extent of international emissions trading that is permissible). However, much will depend on the detail. Done well, C&C could provide a framework for a genuine, equitable, long term solution to climate change, which reduces political risks and provides businesses and investors with the sort of predictable framework they prefer. But if agreement is hard to reach, C&C might serve to highlight injustices and end up exacerbating tensions. For example, some campaigners have argued for a third ‘C’: ‘compensation’ from the rich world for using up the climate’s absorptive capacity. Whilst this claim is understandable, such a development could well become an emotive issue that could make agreement far harder to reach.

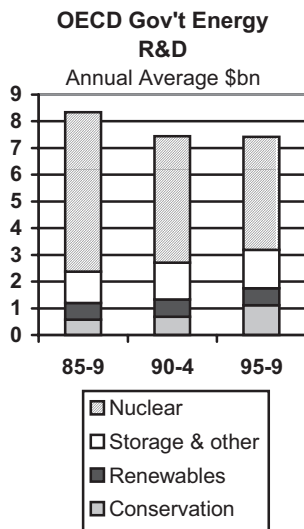
Let us start thinking about the post-Kyoto period without further ado...In order to move forward, France proposes that we set as our ultimate objective the convergence of per capita emissions. This principle would durably ensure the effectiveness, equity and solidarity of our efforts.

**Jacques Chirac,
President of France³⁸**

Technology

Technology has a significant role to play in the mitigation of climate change. Given this potential, there has been growing interest from governments and others in fostering the development of climate change mitigation technology. The IPCC found that significant progress in this area has been made in the last five years, and made faster than expected.

Nevertheless, these technologies still face a number of serious problems in reaching broad application, providing challenges but also opportunities for policy-makers and investors. This section outlines some of these. It is suggested that this is an area where investors and policy-makers could helpfully work together to identify effective ways forward.



There are many energy technologies that avoid greenhouse gas emissions already available. The main challenge is to make these technologies available at a sufficiently low cost. This would play an important role in enabling policy-makers to take the necessary preventative action on climate change without incurring major macro-economic costs.

Part of the problem is that backing from governments has been patchy and erratic. Many would argue that much of the support for renewable energy technology has been in relatively low cost supporting actions (e.g. information exchange), with the serious cash reserved for subsidies for more established technologies (see figures in the margin).

In some cases, getting costs down to acceptable levels may be largely a function of cumulative sales. The key issue for policy makers is to provide enough transitional support to enable volumes to reach a level whereby the technologies can compete with established energy sources, particularly if they wish to accelerate the uptake of the technologies. With other technologies there is still a need for more research and development to overcome price barriers and enable reduction in prices. Clean energy R&D is low in the UK compared to competitor countries⁴³.

Clean Energy R&D 1995-1999 \$m⁴²

United States	8,402
Japan	3,555
Italy	761
Germany	623
Netherlands	529
Switzerland	395
Finland	318
Canada	310
Sweden	244
United Kingdom	181
Denmark	174
Spain	155

Another key issue for those supporting many emerging technologies is the structural barriers these technologies often face. Infrastructure, markets and regulatory systems have evolved in a way that supports the status quo, so they present substantial obstacles to new technologies. In the UK, for example, issues such as planning and grid access are major barriers to the development of renewable power. In the transportation sector the use of radical alternatives (such as hydrogen) is made more difficult by the need to develop a new fuel delivery infrastructure. Addressing these hurdles could be an effective way for governments to support technology developments, but they will need to do so in partnership with the private sector and, by implication, investors. A range of policy measures are outlined in the following box.

Policy measures to support climate innovations

There are a number of steps that governments could take to support innovation that addresses climate change. A consultative exercise involving senior researchers and policy-makers from across government identified the following in its report⁴⁴:

- Use environmental and innovation policies in harness. Traditional environmental regulation needs to be combined with pro-innovation measures, combining many policies rather than relying on one or two. Governments need to align environmental policies with the grain of innovation, which is happening at a rapid rate. Innovation policies similarly need to have the reduction of environmental impacts as a key goal.
- Long range, outcome-based targets set beyond current best practice, such as the California Zero Emission Vehicle mandate. Such targets can be deliberately used to stimulate innovation.
- A government commitment to using those technologies that exhibit best environmental practice. This stimulates innovation by providing a market for new technologies.
- Other government purchasing, for example New York State's recent commitments on public purchasing of renewable energy⁴⁵.
- Prioritising climate R&D: as the GECP document noted, the UK 'lags far behind all major competitor countries on per capita spending on R&D in the energy and environment sectors'. Public sector R&D provides the building blocks and human capital required for private sector innovation. R&D funding therefore needs to at least match norms in other countries.
- Tax incentives and credits for climate innovation, possibly through the recycling of tax receipts from energy or climate taxes.
- The creation of a National Environment Facility to channel support for sustainable innovation, building on the work of bodies such as the Energy Savings Trust and the Carbon Trust.

Technology and investors

Despite these challenges, new low-carbon technologies have now progressed to the extent that they are starting to present interesting investment opportunities both for large companies and for mainstream investors, particular those able to take a long term perspective. This indicates the possibility for institutional investors to directly assist the technology development process in a number of ways.

- Institutional investors could engage with larger companies already held in the portfolio on whether they have seriously considered the benefits and costs of investment in clean energy R&D.
- Institutional investors could invest directly in some of these technologies, which are being developed by what may become the energy companies of the future. This can be achieved most directly through venture capital. Clearly the usual investment and governance considerations must apply, to avoid risks of over-inflated prices for such investments and ensuring business fundamentals are not ignored.
- Finally, and perhaps most importantly, institutional investors could engage in policy processes to ensure that governments support the emergence of these climate risk-reducing technologies. Technology development will be most effective if governments, entrepreneurs, consumers and consumer groups, and investors work together to achieve market transformation. Institutional investors are especially well-equipped to bring their long term vision and knowledge of investment prerogatives to this collaboration. We develop this theme in section 3.

Once a new technology becomes available at a competitive price, its take-up could be rapid, particularly as cost drivers will then start to move in its favour. This introduces an additional degree of uncertainty in predicting future energy use and CO₂ emissions.

The business response

Business organisations are actively involved in the climate change debate. Initially, business involvement tended to be reactive and led by large carbon-intensive companies whose priority was to play down or even dismiss climate change. In more recent years, and partially catalysed by the departure of BP from the industry lobby group the Global Climate Coalition⁴⁶, many businesses have started to take a more considered approach to climate change both in their internal activities and in their lobbying.

In February 2000, business leaders at the World Economic Forum voted climate change the most significant issue the planet faces⁴⁸. In part, the development of technology and growing interest in emissions trading has turned climate change from a business threat to a potentially significant opportunity, at least for some. One business initiative on climate change is the US based Pew Center on Climate Change, with 32 leading corporations as members (see Annex 2). It accepts the reality of climate change and seeks to add a constructive, business-friendly and pragmatic voice to the public debate on this important issue.

Many businesses now accept that climate change is an issue that they need to address, and some are finding that it represents a real business opportunity. For many, the starting point is to reduce their own greenhouse gas emissions, e.g. through energy efficiency. A number of companies have either made progress in this area or have set themselves targets to achieve emissions reductions.

In addition to these direct measures there is a range of supporting activities, which help to underpin these activities or reduce their costs. These include CO₂ measuring, reporting and benchmarking initiatives, the use of emissions trading instruments, investment in new technologies and initiatives, and adjusting business strategy and product development. Absence of such strategies is an indication to investors that climate change has not been recognised as a serious business issue, and might result in under-performance.

On reporting, a major initiative (based on work done by the socially responsible investment team at NPI, now part of Henderson Global Investors) has sought to develop standardised reporting indicators for CO₂ emissions. This has since been adopted by the (then) DETR and UNEP. The World Resources Institute and the World Business Council on Sustainable Development are extending this work further by attempting to standardise the measurement and reporting of greenhouse gas emissions⁴⁹. While many businesses are beginning to measure and monitor emissions more carefully, it is worth noting that the recent Business in the Environment survey of corporate environmental engagement commented that ‘the contribution of the corporate sector in general towards the reduction of global warming emissions is pitiful’⁵⁰.

With the exception of a few companies like Shell ... the fossil fuel industry has worked as hard as it can to obscure the scientific confirmations of climate change, to obstruct attempts at international agreements and to deny a problem of cosmic proportions.

Ross Gelbspan
Reporter and Author,
‘The Heat is On’⁴⁷

Businesses have generally sought to ensure that policies to limit climate change are cost efficient and business friendly. Notably, many businesses are keen on the idea of emissions trading as a tool to help curb emissions at least cost. This enables a business with high CO₂ reduction costs to buy emissions permits from one with low CO₂ reduction costs, leading to lower overall costs of emissions reductions. The environmental benefit – overall lower emissions – is achieved without placing an intolerable burden on individual companies. Emissions trading has been successfully implemented in the US, in areas such as SO₂ and nitrogen oxide emissions.

On climate change, BP Amoco has led the way with the creation of an internal market in CO₂. There is a nascent market in carbon credits and allowances, which is helping lead to the monetisation of carbon. Some investment bankers and other financiers have identified commercial opportunities in carbon offset, leading to the creation of specialised carbon funds and vehicles. In the US, a group of companies is studying the feasibility and implementation of the Chicago Climate Exchange, an emerging greenhouse gas emissions trading market⁵².

While many companies have made some progress in addressing their own emissions, a more challenging area is emissions in the supply chain and in the end use of their products. These often involve more complex decisions. For instance, issues of customer acceptability have to be addressed before making changes to products. In some cases, it may require a review of business strategy. However, some companies have considered core businesses and products in the light of climate change. ABB, notably, shifted its strategy for growth away from large power products to small scale power, including distributed and embedded generation and renewable energy. BP's acquisition of Amoco was driven partly by a desire to increase its exposure to gas, a lower carbon fuel source.

The motor industry is one that is becoming increasingly aware of the emissions of its products. At an industry level, European motor manufacturers have agreed targets with the EU for fleet-wide improvements in fuel economy. Many car companies have increased their investigation of automobile efficiency and alternative fuels and power systems. Ford's chairman recently predicted that the reign of the polluting internal combustion engine is coming to an end, to be replaced in motor vehicles by the hydrogen fuel cell, which emits no pollution (from the car), and also foresaw a world in which their business would be based on providing complete transport solutions rather than selling discrete cars⁵³.

Businesses like Ford are increasingly seeing climate change as an area which is important to customer values, so can affect corporate reputation. A sensible proactive stance on climate change can help enhance competitiveness and create opportunities for well-managed businesses.

Society's assessment may change in the future as the science develops, but the present risk is clear. The climate appears to be changing, the changes appear to be outside natural variation, and the likely consequences will be serious. From a business planning point of view, that issue is settled. Anyone who disagrees is, in my view, still in denial. We at Ford Motor Company have moved on.

**William Clay Ford Jr.
Chairman
Ford Motor Company⁵¹**

3 Investment and climate change

Overview

For investors seeking to maximise long term returns and minimise risk, climate change presents a broad and complex challenge. As a long term issue it can be difficult to identify its relevance to day-to-day decision-making. It will affect a wide range of sectors in different ways. Specific information can be difficult to come by. Many of the consequences of climate change are unpredictable in the short term, even if there is a measure of scientific agreement about trends and the seriousness of possible outcomes.

Yet institutional investors are perhaps unique in the degree to which it is in their interest to engage with an issue such as climate change. Commentators have recently argued that large institutional investors can be seen as ‘universal investors’, since they invest across the whole economy. Thus, successful fund management relies closely on the performance of the economy as a whole. **If climate change threatens the development of the economy and investee firms, it is in the direct interests of ‘universal investors’ and their beneficiaries to seek to avoid or reduce such threats.** This thinking provides the rationale for institutional investors to engage with both investee companies and the development of public policy around climate change. These themes are developed in this section.

Moreover, risk management challenges are not new to the investment community. Despite the uncertainties around climate change, there are some clear steps that can be taken now to reduce the risks of climate change. This section considers these measures. It is based on an analysis of, first, the climate exposures of the constituent parts of the investment portfolio of institutional investors and second, the wider management and strategic factors that need to be considered. Thus the discussion moves from the specific and tactical, to the strategic. Our analysis is that institutional investors need to consider how climate change might affect:

- The management and selection of **directly held property**, where institutional investors are directly exposed to risks from climate change impacts and mitigation policy.
- Opportunities for **governance and engagement** activities, which aim to both encourage good practice among investee firms to reduce the risks of climate change and to improve company reporting on climate change exposures.
- Implications for **valuation and stock selection** based on differentials in climate-related risk exposures at investee firms, which will become evident as information on climate change exposures at individual companies builds up. Sell-side brokers can help analyse the potential consequences here.
- Approaches to **sectoral analysis and asset allocation** within the portfolio as a whole, including portfolio-wide assessment of climate change exposures

Pressures will arise ...as governments, investors and other stakeholders begin to react to concerns about fossil fuel consumption. With their control of massive funds, insurers are exposed to such influences, and can also play a part in determining the speed of change. Very few insurers have taken this on board yet.

**‘Insurance and Climate Change’,
Chartered Insurance
Institute 2001**

compared with peers and benchmarks, and opportunities to balance risks through adjustments and targeted investments opportunities.

- Internal **investment decision-making**, such as investment policy and systems for assessing and raising awareness on climate change and other new sources of risk.
- The **strategic implications of the ‘universal investor’ concept** including involvement in the development of technology and engagement with the development of public policy.

Each of these is now addressed in turn. In particular we highlight in the text ten key action points for funds to consider. Note that institutional investors differ in structure and that the various action points may be relevant to different parts within these structures. Individual institutions should decide for themselves the most appropriate place to implement the measures.

Directly held property

Although generally a small proportion of the portfolio, property is the area where institutional investors face the most immediate exposure to climate change risks, and also where investors potentially have most direct control (the exception being, for example, pooled funds). Thus actions can be taken immediately to reduce risks. Risks can arise both from the direct impacts of climate change and from prospective climate-induced policy changes that could affect the property market.

To reduce the direct risks of climate change, funds should assess properties for their exposure to risk factors liable to increase under climate change, such as storm, flooding, ground movement, sea level rise and greater temperature variation. Special caution should be taken over developments on floodplains. The risks from policy changes arise because commercial buildings are significant users of energy and thus producers of CO₂ emissions, and this use is growing rapidly. Unit energy use also varies significantly between buildings.

Future government policies look likely to place obligations on landlords to conduct energy audits and other measures. As a result, energy use may also become a factor in property valuations. To reduce the risks from climate policy, institutional investors and developers should take a pre-emptive stance on reducing energy use. This involves assessing properties for their energy use and implementing a programme of energy efficiency. Many energy efficiency improvements are cost effective, although realising the financial benefits may involve working in co-operation with tenants.

A formal set of criteria should be developed with regard to new acquisitions and developments, as the greatest potential to avoid risks arises before major decisions are made. Some funds may wish to explore opportunities to

One might think that financial services is a clean industry with very little direct impact on climate change, but particularly insurance companies own huge physical assets e.g. about half a billion square feet of building space in the USA alone, which corresponds to an energy bill of US \$750 million a year.

**IPCC TAR WG II
chapter 8, quoting
Mills and Knoepfel**

demonstrate leadership, by the use of innovative energy efficient building design and even embedded renewable technologies (such as the use of photovoltaic solar technology as a building façade). Costs may be recoverable as lower long-term running costs may result in increased occupier demand for the buildings.

To date, most commercial property which sets new standards in terms of energy efficiency and sustainability has been developed by owner occupiers⁵⁴. Institutional property development has tended to be more cautious in order to mitigate development risk (for example, letting, construction, and sale). However, this could change if occupiers start to demand more climate-friendly building specifications, or if there are new charging arrangements based on performance and shared savings. These developments, which many consider likely in the coming decade, would mean that the application of energy and emissions reduction strategies in the procurement and management of buildings would become a definite and direct capital and operation cost benefit, not a cost burden.

Action Point 1: Review the portfolio's direct property investments for climate change risks, and identify measures to mitigate risk exposures. These could include cost effective energy conservation strategies and procedures for assessing new developments or acquisitions, which might include considering the life cycle investment case for innovative climate-friendly buildings.

These actions will show that institutional investors are bringing their own investments into alignment with their policies on socially responsible investment (SRI). This will be a useful learning experience and will lend credibility when engaging with investee companies.

Governance and engagement

For institutional investors, engagement with investee companies on their exposure to, and management of, climate change related risks is probably the most effective place to start addressing climate change risks in the equity portfolio. Given that climate change is a long term challenge, it can be difficult to integrate directly into investment decision-making without compromising day-to-day investment choices. This makes engagement a more acceptable alternative: it will not affect short term investment returns.

Engagement also encourages change and gives companies a chance internally to address the risks they face before any investment decisions are made. It can help address the information gap that currently exists.

Engagement is also very much compatible with various official initiatives in the UK, such as the Turnbull report⁵⁵, the Myners report⁵⁶ and the pension fund SRI

disclosure regulation⁵⁷, which are all encouraging investors to take a more proactive approach to governance, particularly in the area of risk reduction.

A particular focus for engagement is likely to be reporting on climate change exposures. This could be especially effective because it will help address two objectives. Firstly, by making companies report, they will have to think about the risks they face and whether action is appropriate. Secondly, the information itself will enable investors to assess the nature and extent of exposure of individual investee companies to climate change. This is a necessary precursor to any further action.

Furthermore, focusing on reporting addresses a real deficit. At present, information on corporate climate change exposure is patchy and lacks standardisation. Despite the initiatives mentioned under Business Responses in section 2, only a few companies are starting to provide such information, typically as part of their environmental report: according to a survey conducted by Business in the Environment, a business-led initiative to promote corporate environmental responsibility, four out of five leading UK companies are doing little or nothing to reduce climate change emissions⁵⁹.

Action Point 2: Engage with investee companies, particularly on the need to report on their climate change exposures and the management's response. Establish procedures for: selecting companies to engage with; following up with companies; and handling weak performance.

Engagement is potentially a time-consuming activity, so institutional investors will need to consider:

- How to prioritise and collaborate on their activities in this area.
- Whether to agree internal targets and monitoring procedures.
- How to follow up with companies, including what timetable to agree.
- What action to take in the case of serious unwillingness or management inability to engage, including for instance, the ultimate possibility of voting against the report and accounts.

Not all oil companies are eager to tackle global warming. Exxon/Mobil, the biggest, is also the world's most powerful climate change sceptic... The issue is not whether Exxon is right and everyone else wrong. It is rather that Exxon management has stigmatised its business as being confrontational and insensitive to public concern. Ultimately, this translates into the value placed on the company by the market. Exxon's mode of leadership creates the risk that in future it will face obstacles and friction in trying to enhance its cash flows.

**Robert Monks
Chairman,
Lens Investment
Management⁵⁸**

In order to make the fund's position transparent and consistent to investee companies, it would be sensible for an institutional investor to develop a policy statement of what the fund considers to be good corporate practice on climate change. This would be a useful prelude to any engagement activity as it will mean companies know what to expect and would ensure that engagement is seen to be fair.

Action Point 3: Produce a statement of what the fund considers to be broad principles of good practice for managing climate change risks in investee companies, in terms of assessment of climate risk exposures, corporate strategy (including involvement in public policy and political decision-making), and reporting.

An outline of a possible statement is provided in the box.

Before adoption however, institutional investors would benefit from issuing the statement for consultation to a variety of stakeholders, including those companies that are already demonstrating their ability to succeed in an increasingly carbon-constrained world.

Once a statement of good practice has been adopted, a fund can then proceed to direct engagement with companies.

Companies and climate change: Statement of good practice

In order to properly manage the risks from climate change, companies should:

- Conduct an assessment of climate change exposures. This should cover both the impacts of climate change and the need for greenhouse gas emissions reductions. It should consider internal emissions, the product lifecycle (e.g. CO₂ emissions attributable to raw materials and components, production, product use and disposal) and any strategic challenges the business faces from product substitution and development of public policy.
- Develop a strategy for addressing these exposures. This may include internal targets for emissions reduction, shifts in business or product exposure, development of new product ranges and public communications activities.
- Report on activities aimed at influencing public policy and political decision-making in connection with climate change: lobbying activities expose the core beliefs of a company⁶⁰.
- Report regularly on climate change exposures. This should include disclosure of internal emissions (using one of the standardised report outlines), progress on implementation of the climate change strategy (such as progress towards key targets), information on the climate impact of products, research and development programmes and recent lobbying activities.

The above protocol is in the first instance applicable to larger companies and to those in high risk sectors.

Valuation and stock selection

At present, investors do not have reasons for making major stock selections on the basis of climate change exposures. However, at the margin, making investment decisions based on climate change exposures may be useful: where two companies are regarded as broadly similar but have differing climate change exposures, then there is a clear case for choosing the stock with lower exposure or a better management approach, particularly in sectors where climate change exposures could become a major differentiator.

A full analysis of the impact of climate change on business risks, competitiveness and profitability is a complex exercise. However, there appear to be two key elements in any such assessment:

- Firstly, the current business position of the company, in terms of CO₂ emissions, business mix and asset base, and product performance, particularly relative to its peers. This is a relatively objective assessment, and much information will be available if there is suitable reporting. For example, an electricity utility based on coal-fired power stations has a much higher carbon exposure than one based on hydropower.
- Secondly, the capabilities of the management, particular in areas such as business strategy, internal and external communications and reputation management. Good management will be able to address many of the risks from climate change and even turn them into opportunities and competitive advantage. Measuring management capability is always subjective, but the table below from EcoSecurities provides a checklist covering ten key points that may indicate how management is addressing the climate change challenge.

In some sectors there will be much more significant differences in the current business exposure between companies than in others (see sectoral analysis, later), but in most sectors good management or fortunate positioning in relation to climate change will enable some companies to prosper relative to others.

It is likely that a climate risk analysis will provide useful extra information, particularly on management capability. This can often reinforce the existing view of the company. When the analysis conflicts with existing perceptions, it may be worth taking a further look at the company to check that nothing has been missed during previous analysis. Climate change analysis may be particularly useful when the investor's view of a company is changing. **Underlying all this is the key point that climate risks are, in all probability, not being captured by existing financial analysis and so can provide additional information not currently captured in a firm's valuation.**

The ability to think steadily and consistently about a topic as complicated as climate change is a tough test of management acumen. Some executives are meeting it head on. Those who are not should wonder why they aren't - and so should their shareholders.

Harvard Business Review⁶¹

Given the potential complexity of climate analysis, it is worth noting that brokers have the greatest capacity among financial institutions to carry out detailed research, particularly on individual companies and sectors, and could thus make fund managers' task of understanding climate change significantly easier. Of key importance are new issues, where investment banks should be encouraged to address climate change risks in the issue documentation when appropriate.

This leads to our next action point:

Action Point 4: Institutional investors should request that sell-side brokers comment on a company's relative exposure to climate related risks (environmental, product-related and policy-related) and the management's capabilities and positioning on climate change.

Given that most brokers do not currently have expertise in this area, it is worth noting that other sources of corporate climate analysis exist, and they may be worth considering.

For example, Innovest Strategic Value Advisors, based in New York, is building a Carbon Finance Practice⁶². This aims to help investors understand and quantify potential financial liabilities and possible effects on future earnings and shareholder value associated with carbon emissions, generated both through industrial processes and energy consumption, as well as examining carbon liabilities embedded in products and services. The firm also compares corporate emissions profiles, financial exposures and climate change strategies relative to regional and industry benchmarks. EcoSecurities, a UK-based consultancy⁶³, also provides analysis of companies' exposures to climate change. It developed the climate change checklist for analysing and benchmarking company management, reproduced in the following table.

EcoSecurities Climate Change Checklist

Question	Comments
Costs to the Business	
1 Has the organisation carried out policy risk analysis in the areas in which it operates, in order to anticipate regulatory changes and potential costs from taxation or restrictions on carbon emissions or energy use?	Voluntary and mandatory emissions trading systems are already emerging in several national jurisdictions. In some areas carbon-related taxes already or will soon exist. Each will have a cost to the business that needs effective management.
2 How much will potential increased costs as a result of carbon constraints affect the organisation relative to its competitors? Has the organisation benchmarked itself against competitors?	Within a particular market or sector those that emit more greenhouse gases in the production of their products will have increased costs. This is independent of the degree to which these can be absorbed or passed on to consumers, and will have an immediate bottom line effect.
Policy Development	
3 How active is the organisation in developing positive, effective and economically efficient national policy regimes in Annex 1 [industrialised world] nations?	In many nations, governments are keen to ensure that the effects of climate change mitigation on business is minimised through industry led initiatives. In contrast, negative lobbying may increase reputational risks.
Internal Response	
4 What is the corporate culture of the organisation with respect to responsiveness to change drivers?	Does the company travel light and move fast, or is it slow and unresponsive to stimuli? Those organisations reacting late to trends will see increased costs relative to those acting early.
5 Does the organisation have a formal emission reduction target?	This question leads to several other questions that the analyst should follow through with. For example, have all emissions been quantified? How has this informed the development of an internal marginal abatement cost curve? Is a strategy for reducing the organisation's own emissions footprint in place?
6 What measures does the organisation have in place to communicate any commitment internally and enable staff to play an active role in achieving organisational goals?	Internal communication and staff buy-in through education will play an important role in actually achieving corporate goals.
Products & Markets	
7 To what extent do new and renewable technologies factor in to any product-related carbon transition strategy the organisation may have in place?	Products and services with high carbon contents will be threatened by alternatives with lower carbon implications through both regulatory mechanisms and shifts in consumer demand patterns. This has important impacts on how organisations prioritise future product development.
Supply Chain Effects	
8 What would be the effect of carbon-related constraints on the supply side for its production processes, and what are the supply chain implications?	Alternatives for current supply chains may need to be sought, as these may themselves be constrained by emission reductions pressures. Has this been assessed? The organisation may need to take responsibility for the emissions arising (indirectly) from its suppliers, or from contracted out services.
Shareholder Demands	
9 How have the demands of shareholders been factored into future corporate strategy? Is there an adequate communication strategy in place?	Investors, institutional and individual alike, are becoming increasingly active in corporate governance processes. In addition, NGO activism is increasingly targeting shareholders, driving accountability of corporate entities.
Reputational Impacts	
10 How is the organisation planning to respond to any expected impact of public perception for its position and response to climate change on future market share?	Both reputation impacts and communication of the organisation's performance and response can be tested here. Those organisations likely to see minimal impact on their reputation are likely to both have a credible climate change response in place and also be able to communicate the message effectively.

Sectoral analysis and asset allocation

Ultimately, as institutional investors develop a more sophisticated approach to understanding the investment implications of climate change, they may wish to consider whether the portfolio needs more strategic adaptation to take account of climate change. As the sectoral analysis below indicates, there are marked differences in possible impact of climate change within different sectors. Climate change may also present a case for adjusting portfolio allocation between different asset classes.

However, to start with, it is probably sensible just to monitor the climate change risk exposures at a sectoral level across the portfolio and to compare them with benchmarks and other investors. Analysis of the risks and rewards of various strategies could be conducted, such as some form of portfolio tilting (away from high risk sectors, towards low risk sectors) or the use of alternative benchmarks. It may prove possible to identify opportunities that are in agreement with other asset allocation objectives, and thus provide ‘win-win’ opportunities for early action.

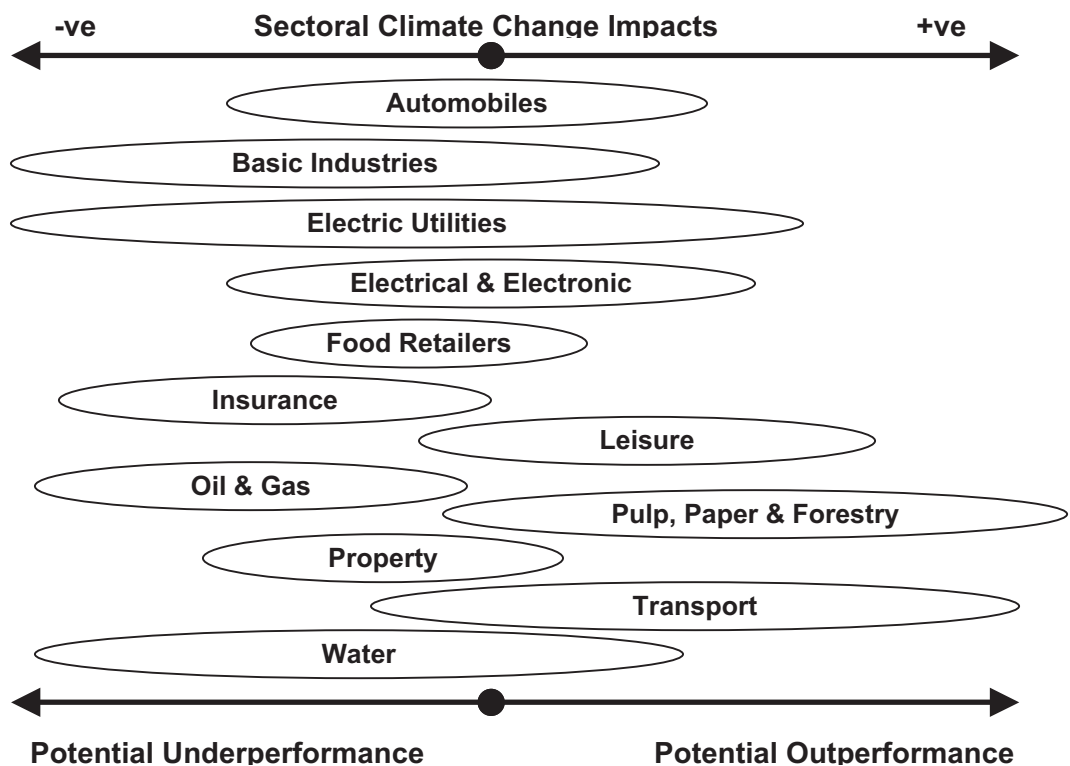
As an example, the UK index has a heavy weighting to the oil and gas sector, compared with the UK economy or world stock market. To compensate, one could look at the impacts of tilting the portfolio towards sectors likely to benefit from climate change, such as public transport, clean energy stocks and forestry, or the use of alternative indices such as the FT multinationals index.

As an alternative to shifts in the main portfolio, it may be worth considering the merits of a small investment which is highly geared in terms of positive exposure to opportunities presented by climate change. Many of these are of a somewhat unconventional nature, but may still offer good return prospects for reasonable risk. Clearly, conventional financial considerations remain paramount in such decisions. Examples include:

- A clean energy venture capital fund and other investments in low carbon technologies, such as renewable energy, energy efficiency and related industries. Supporting such technologies will help the long term transformation of the energy market.
- Investments in low carbon property and infrastructure (possible through a project finance fund). This might include highly energy efficient buildings, renewable energy projects, and other infrastructure that helps build a low carbon economy (e.g. public transport). If risk considerations permit, there is a particular opportunity for such investment in poor countries.

Sectoral analysis

While detailed sectoral analysis has to build on specific company information, it is possible to identify approximate sectoral impacts of climate change, using information contained in the IPCC's Third Assessment Reports and other sources. Such sources provide an overview of the possible impacts of climate change on equity investment and can be used to focus further research. This information is presented below in graphical form, followed by a table that profiles the various sectors. The analysis considers both the direct impacts of climate change and the implications of measures that might be taken up to reduce greenhouse gas emissions.



The assessment also aims to identify the impact on the bottom line and on stock market valuation rather than the general economic impact on the sector. In some cases, for example, the sector may be adversely affected as a whole, but much of the cost will be passed onto consumers. In others, as discussed earlier, the existing business mix will vary substantially and not all companies will be able to pass on the impacts. In most cases management competence will play a significant role.

Thus the sector assessment is presented as a range to indicate that in some sectors different companies will have widely varying risks (with consequences for stock selection), whereas in other sectors the risks will be more similar and the key decision becomes the appropriate exposure to the sector.

Sector	Possible consequences of climate change
Automobiles	Here it is product specification that will come under greatest pressure, as vehicles are a significant source of emissions. The focus will be on vehicle efficiency: substantial gains are possible through hybrid vehicles, fuel cells and other technological advances. Efficiency could be a source of competitive advantage for some companies but the effect is likely to be offset by the highly competitive nature of the industry that results in technical advances spreading rapidly. There may also be some negative impact on overall demand for vehicles.
Basic Industries (iron & steel, chemicals, cement)	For this sector the key focus will be on energy efficiency in the production process. Climate change mitigation measures could have significant impact on costs and thus on the bottom line. In many cases there may be substantial differences between similar companies in potential risk exposure and competitiveness both from production efficiency and from the carbon intensity of the energy source used. Some areas may also create strategic challenges as alternatives with lower CO ₂ emissions in production become more competitive (e.g. wood may be preferred to plastic). Certain chemicals could be particularly affected (e.g. Halocarbons)
Electric Utilities	Responsible for a substantial proportion of CO ₂ emissions. However, emission levels vary dramatically within the sector, from old coal power stations to near zero carbon emissions from hydropower, wind and other technologies. High CO ₂ emitters will face difficulty passing on all their costs and might even face pressure to retire assets early. A key challenge in addressing the carbon exposure is long investment lifecycles in the sector, which make changing exposure in the near term difficult. Potential to invest in low carbon power sources. Direct impacts of climate change may have some impact on demand and on overall power use, e.g. increased summer cooling needs.
Electrical and Electronics	Significant energy use both in production and product use. May face regulatory pressures to improve product efficiency (e.g. eco-labelling or product specifications). Could be some increased costs in production. Fundamental differences between companies are probably relatively modest, although management could make a difference.
Food Retailers	Indirectly responsible for a surprising quantity of emissions from food miles, i.e. transport involved in food distribution. These can exceed the emissions generated by the use of the family car. Also agricultural practices. Thus could face some cost risks. However, most retailers are in similar positions, so differentials will be modest. More significant are the potential reputation risks: the management challenge is to contain them.
Forestry, Pulp & Paper	Likely to benefit from increased yields (temperate forests). Also increased interest in products as a low carbon option (or even as a form of carbon storage). Climate change is creating the potential for revenues from carbon sequestration or biomass energy. Need to be aware of other environmental aspects: deforestation (i.e. unsustainable forestry) is seriously carbon negative.
Insurance	Considerably at risk from the impacts of climate change, especially from storm events or climate catastrophe in small/undiversified property insurers/reinsurers. Some scope to reduce the risk, by avoiding business in highly vulnerable areas, or through management (e.g. weather derivatives), but limited by competitive pressure and regulation.
Leisure	Among the most complex of impacts. Some aspects may suffer directly from climate change impacts – winter sports, coastal resorts. Some positive potential for others (e.g. recreation in Northern Europe). High energy use (aviation) with associated CO ₂ creates risks, particularly to longer haul sector. Impact on shareholder value will depend on asset portfolio, business flexibility and management capability.
Oil & Gas	This sector's core product is implicated in climate change, presenting a fundamental strategic challenge. Further challenge from the long investment time scales involved in oil exploration and production. A key determinate will be the impact of climate change mitigation measures on oil prices. Here the scale of emissions reductions is of a similar scale to OPEC production cuts, indicating the potential for significant impact. In comparing companies a key determinant will be the extent to which they are pursuing growth by reinvesting cash flow. There is some scope for companies to make a strategic shift to low carbon fuels and the supply of renewable energy systems.
Property	Significant but manageable risks. See comments under section on directly held property.
Transport	Many transport companies may benefit from climate change from increased support for most forms of public transport. In contrast, high carbon areas such as aviation could face increasing costs.
Water	Need for increased capital expenditure in many areas as a result of precipitation changes, to manage both floods and droughts (e.g. in south east England reservoirs may be needed to capture winter rain for summer droughts). Water also involves major energy use in pumping. Possibly some gains from energy production (hydro-power, sewage, gas) and for water rich utilities.

So for sectoral analysis and asset allocation, institutional investors need to:

Action Point 5: Examine the asset allocation of the fund to see if there is a significant over-weighting towards stocks with high climate change risk exposures. Consider the scope for ‘win-win’ action such as specialised ‘pro-climate’ investment opportunities that meet investment objectives while also reducing climate change risks.

What this report presents is inevitably a broad-brush approach. Next, a detailed sector by sector analysis is needed. There is merit in focusing initially on one or two sectors rather than trying to cover the whole market. Of particular interest are those sub-sectors that will benefit from climate change policies. Notable are a number of technology and engineering companies involved in areas such as renewable energy (wind, solar, biomass, geothermal, and ocean and wave energy), energy storage, conversion and distribution (fuel cells, battery technology, small heat and power systems) and energy efficiency (heating and lighting controls, high efficiency air conditioning).

Implications for institutional investors’ decision-making

In order to be able to carry out the other measures outlined in this document, institutional investors will need to consider their internal management and decision-making systems. In particular, they will need to enhance their own management capabilities for dealing with climate change, and will need to consider their strategic approach to the issue.

Action Point 6: Institutional investors need to enhance their own management capabilities for dealing with climate change by undertaking a programme of internal awareness-raising and learning on climate change, so as to become informed players in the debate.

Consideration could be given to accessing third party information sources such as those described earlier, or developing links with other participants. Prudent investment management can only be done on the basis of informed decision-making, so building up a reasonable level of knowledge is a necessary first step.

Institutional investors also need to demonstrate high level commitment and set a framework which encourages systematic action, review and development. Institutional investors should:

Action Point 7: Adopt a statement on climate change, possibly as part of any existing statement on socially responsible investment. Such a statement could cover some or all of the measures outlined in this document.

Such a statement may be particularly useful for externally managed pension funds in that it will provide guidance for fund managers. It will also provide a tool for benchmarking implementation of the policy and ensuring a consistent approach. It could be closely aligned to the document developed under action point 3 on good practice on climate change.

Universal investors and climate change

In addition to the more traditional risk management investment strategies outlined above, there is a case for institutional investors to adopt a more strategic approach to climate change risk. This is to intervene in the policy debate to encourage governments to take action to address climate change. As such it may offer one of the most effective ways of reducing climate risks. Such an approach would represent something of a departure for institutional investors: this section aims to set out the case that there is a significant rationale behind this approach.

As mentioned earlier, some commentators are increasingly arguing that many large institutional investors are best seen as ‘universal investors’. Such funds invest in most major listed companies across the whole economy, and only deviate relatively marginally from benchmarks. Thus, the factors that lead to successful institutional investment in the long run come as much from the overall performance of the economy as a whole as from individual stock selection and differences in portfolios. While this is particularly true of passive funds, it is nonetheless at least partially valid for many active funds.

It is possible to argue, based on this, that long term universal investors have a substantial degree of common interest and purpose with the good of the economy as a whole. This implies that it may be in the narrow interest of institutional investors to press for actions that support the common economic good. The idea essentially lies behind much of the increasing emphasis on corporate governance.

The idea of institutional investors taking this broader role is relatively new: in assessing its merits it is necessary to think through how it might lead to specific strategies. We set out to start this process in the rest of this section.

Engaging with policy as well as investee management

The idea of a universal investor implies going beyond engaging with individual investee companies, to considering whether there is merit in engaging more broadly in public policy development. **If universal investors can help public policy develop in a way that encourages or protects future economic development, it is clearly in the interests of the beneficiaries.** What is more, on many issues, individual companies can only be asked to go so far on their own before further actions cease to become viable in a business sense: these often require changes in the policy framework.

The particular strength of institutional investors engaging in the policy debate is that they do not have a narrow vested interest. They can take a genuinely broad, long term view. This should help offset any concerns about interfering in the democratic process: clearly it would be inappropriate for institutional investors to start setting agendas or determining policy goals. Furthermore, at present companies freely and actively engage in the policy development process, often with very specific views and aims, which may not always be in the public

The universal owner will recognise that certain public policy issues ... may have impacts on its portfolio that are more important than the impact of ... a particular firm. Consequently, the universal owner should ... when appropriate, formulate policies and take action...

The Rise of Fiduciary Capitalism
Hawley & Williams⁶⁴

interest. For example, while few businessmen would disagree that subsidies create distortion and economic inefficiency, most are loath to see their own subsidies eliminated! In these cases, companies are not necessarily acting in the best interests either of the economy or of universal investors such as pension funds.

Consider a case where a company is making short term profits through generating significant negative externalities⁶⁵, which are bad for the economy and the portfolio as a whole. The appropriate position from a fiduciary perspective might be to hold the stock, so as not to lose the short term gains, while at the same time pressing both the company and policy-makers to take action to correct the externality (and also possibly to encourage the company not to lobby to defend its short term position). However, it should be remembered that this approach might also have its own risks because the company's reputation might suffer at some point, with obvious financial penalties.

Climate change: a test case?

Climate change, as a long term, complex and economy-wide issue is perhaps an ideal issue for consideration by 'universal investors'. Taking the perspective of a universal investor reinforces the validity of raising climate change as a governance issue with individual companies **and as a reason to wish to contribute to the public policy debate.**

Indeed, institutional investors stand in an almost unique position among private sector organisations to contribute to the climate change debate. They can stand above short term and vested interests and could play a powerful role in supporting policy-makers to address climate change in the optimal economic and environmental way. Initial indications are that the involvement of institutional investors would be well received by national and international policy communities.

A key issue for policy makers on climate change is that the adverse affects of many policy measures may be felt most severely by relatively few companies, which make their views about the impacts clearly known. Indeed such is their motivation that they often seize the agenda at trade associations and so come to be seen as the voice of industry as a whole. For example, the Climate Change Levy in the UK, which introduced an energy tax on business from April 2001, is negative for companies using large amounts of energy, and they have been letting the government know.

Yet climate change policy measures may have net positive effects across much of the rest of the economy, for example if environmental tax revenues are recycled into reductions in tax elsewhere. With Climate Change Levy in the UK, the revenues from the energy tax are to be recycled into national insurance reductions for all employers. Economic research has shown that a significant programme of such tax changes could reduce emissions dramatically *and*

increase the number of jobs in the economy at little macro-economic cost⁶⁶. Indeed, in investment terms, such a move could be positive for the portfolio as a whole, for example if the companies that benefit, such as service companies, may be more highly rated than those that are not, although more analysis is needed before this can conclusively be shown.⁶⁷

Despite these benefits, support in favour of such policies may be muted because the benefits are diffuse, and insufficient for the companies who benefit to lobby for them. Furthermore, in many cases those benefiting may not even know in advance that they stand to gain.

Action point 8: As ‘universal investors’, adopt the view that the climate threat to economic stability is a threat to the interests of institutional investors. Engage as a neutral long term voice in the development of policies and measures that seek to mitigate climate change.

As well as macro-economic policy issues, universal investors might also consider ways they could contribute more directly to investment in climate change mitigation and adaptation. There is considerable discussion among policy-makers of the role of private sector investment in areas such as the development of new technology, investment in low carbon infrastructure (e.g. public transport), or in infrastructure needed to adapt to climate change risks (e.g. flood defences).

This micro-economic debate is largely conducted without direct input from investors, which means that it is often far less successful than it could be. Institutional investors could explain their requirements to policy-makers (and specialist fund managers/sponsors): clearly it is not acceptable to compromise on risk-adjusted return. The use of a variety of measures (see the technology section earlier) could also be explored to make potential investments viable. In addition, institutional investors would also learn about the opportunities involved, which should help reduce any artificial barriers caused by unfamiliarity.

Action Point 9: Work with policy makers on how to make climate-friendly investments, such as low carbon technologies and infrastructure, acceptable to institutional investors.

A joint investors’ climate initiative

Institutional investors would need to consider which is the most appropriate level to engage in the policy debate: nationally or internationally. While international intervention is more difficult, the importance of an international agreement in reducing risk, combined with the current problems in achieving agreement, suggest that this is an important level to consider. Annex 3 contains more information on what might be involved in engaging in the international climate change negotiations.

We are cognizant of a fiduciary responsibility on both a firm-by-firm and portfolio-wide basis. We have been focused mostly on the former, but the very nature of indexing may drive us toward portfolio-wide fiduciary concern as well.

**William Crist,
President, Board of
Administration,
CalPERS⁶⁸**

While one investor could endeavour to make an impact, success is much more likely if there is collaboration between a number of institutional investors and financial institutions, particularly if the activity is structured as a formal initiative. Such a network could also help deal with company-specific engagement activities. The specific merits of collaboration include:

- The potential to reduce the costs of the initiative to a level that would be acceptable to individual institutional investors and other financial institutions. This would also reduce the likelihood of ‘free riders’, who might benefit from the activity without contributing.
- Increased effectiveness, both in hard financial terms (i.e. representing more of the market and a larger pool of capital) and in terms of credibility and influence both with corporations and the public policy process.
- Improved management of the learning challenges and reputational risks of this new and potentially controversial area.

These benefits lead to the next recommendation:

Action Point 10: Institutional investors should seek to work with other investors to reduce climate change risks. In particular, they need to investigate the potential for a multi-investor climate initiative.

While collaboration in this way is fairly unusual amongst institutional investors, it is not unknown, particularly in the corporate governance area. The SRI forum, a group of UK institutional investors, is currently helping to encourage companies to improve environmental reporting through a multi-party process. On climate change, the Pew Center on Climate Change provides one model for the sort of initiative that institutional investors could develop (see Annex 2).

In particular, the UNEP Insurance Industry Initiative (UNEP III), a group of leading insurers, provides a precedent for financial institutions engaging with international discussions on climate change⁶⁹. Established in 1995, the UNEP III has advocated a precautionary approach to climate change as the industry faces potential risks from extreme weather conditions, which will be potentially aggravated by climate change. The banking industry has a similar initiative with UNEP, the Financial Institutions Initiative, which has been more active on general environmental issues than on climate change per se.

The potential therefore exists for a similar high level approach to be initiated amongst institutional investors and other universal investors: this would have a useful different and additional perspective to that of the UNEP III.

There are a number of other climate change related activities that a joint initiative could undertake as well as engaging in the international political process, jointly helping develop some of the action points discussed earlier. Thus for example it could:

- Develop a joint statement of good practice for companies on climate change, so that companies receive a consistent message from a broad range of investors.
- In particular, support the development of a system for reliable, consistent and credible reporting and benchmarking on greenhouse gas emissions. There is already some activity in this area, for example with the developing Carbon Disclosure Project⁷⁰.
- Help co-ordinate joint action on corporate governance, to avoid duplication of effort by investors, and unnecessary bothering of companies.
- Research asset allocation issues to assess whether there are significant climate change exposures in asset allocation and to identify appropriate remedies. Costs would be shared, and there would be a chance to see whether there is a consensus for change.
- Investigate the suitability of specialised investment opportunities, advising fund sponsors on investors' requirements and conducting an initial assessment for investors.
- Conduct or manage macro-economic research on optimal climate policy, to help support its policy interventions.

Conclusion

Climate change is a serious risk management challenge for the 21st century, for institutional investors as well as for governments and businesses. However, it is a challenge that can be managed by co-operative action. Institutional investors can play their part in this, to the advantage of their beneficiaries as well as to the benefit of the wider economy, society and the environment. By comparison, ignoring the problem has serious fiduciary risks.

This report has identified ten actions that institutional investors can take. These actions are relatively straightforward, entirely compatible with fiduciary duty, and have the potential to reduce the risk that climate change presents to them going forward. They range from incorporating climate change concerns into policy and better management of the property portfolio, through engagement with investee companies, to active participation in the political decision-making process. Forward-looking institutional investors can be expected to adopt such measures as best practice, and refine them through experience.

Annex 1: The UK Climate Change Programme⁷¹

The following provides an overview of the UK measures to mitigate climate change. Measures in italics indicate measures taken before the current programme was launched:

Business

- The Climate Change Levy is an energy tax which adds an average of 12% to industrial and commercial energy bills. The Levy is designed to be revenue neutral for the government, and is offset by a reduction in Employers' National Insurance Contributions. There are exemptions for high energy sectors, subject to their meeting energy efficiency targets. See <http://www.hmce.gov.uk/notices/cc11.htm> for details.
- Exemptions for high energy sectors, subject to their meeting energy efficiency targets
- A domestic emissions trading scheme, with £30m government support to kick start the scheme in 2003-4
- The establishment of the Carbon Trust, which will recycle £130m of climate change levy receipts to accelerate the uptake of cost effective, low carbon technologies.
- Energy labels, standards and other product-related measures designed to deliver market transformation in the energy efficiency of lighting, appliances etc. especially through the work of the Energy Savings Trust.
- Integrated Pollution Prevention and Control is designed to encourage continual improvement in environmental performance, including improvements in energy efficiency.

Energy supply

- *The shift from coal to gas, and improvements in generation efficiency.*
- Obligation to require electricity suppliers to source 10% from renewable sources by 2010, subject to acceptable cost.
- A target to double combined heat and power (CHP) capacity by 2010.
- Exemption of good quality CHP and renewable energy sources from the Climate Change Levy.
- Capital grants to support new offshore wind and energy crop projects.
- Action to improve access to electricity distribution networks for small and distributed generators.

Transport

- *The Fuel Duty escalator, now suspended.*
- European-level agreements to improve the average fuel efficiency on new cars by at least 25% by 2008-9.
- Changes to the Vehicle Excise Duty to reflect fuel consumption.
- Reform of company car taxation.
- 10 year plan to spend £180bn on transport to cut congestion and reduce pollution.
- Changes to the planning system to influence development patterns and reduce the need for travel.

Domestic Energy Efficiency

- A new commitment for gas and electricity suppliers to help their customers save energy and cut fuel bills.
- The new home energy efficiency scheme in England and similar schemes elsewhere.
- The promotion of new community heating systems, and upgrading of existing systems.
- Promotion of more efficient lighting, heating and other appliances.

Buildings

- Improvements to the energy efficiency requirements of new buildings.

Agriculture

- Better countryside management leading to lower emissions.

Public Sector

- Targets for improving energy management of public buildings.
- Green Travel Plans for public sector organisations.

Annex 2: The Pew Center on Global Climate Change⁷²

Business Environmental Leadership Council

Statement of Principles

Our country has a long and proud tradition of coming together to respond to challenges that affect our nation's economic security, health or quality of life. Today, as we approach the millennium, we believe that one of our most serious challenges at home and abroad will be addressing global climate change as we work to sustain a growing global economy.

Our companies recognize that the risks and complexities of climate change are so important that we must work together to meet this challenge. We support efforts to bring together the ingenuity and experience of all sectors of our society - private, public, and non-governmental organizations to address this issue in a constructive way. We also believe that the response must be cost effective, global, and equitable, and allow for economic growth based on free market principles.

It is in this context that each of our companies has decided to participate in a new initiative, the Pew Center on Global Climate Change, as members of its Business Environmental Leadership Council.

We begin this important effort united in several beliefs:

1. We accept the views of most scientists that enough is known about the science and environmental impacts of climate change for us to take actions to address its consequences.
2. Businesses can and should take concrete steps now in the U.S. and abroad to assess opportunities for emission reductions, establish and meet emission reduction objectives, and invest in new, more efficient products, practices and technologies.
3. The Kyoto agreement represents a first step in the international process, but more must be done both to implement the market-based mechanisms that were adopted in principle in Kyoto and to more fully involve the rest of the world in the solution.
4. We can make significant progress in addressing climate change and sustaining economic growth in the United States by adopting reasonable policies, programmes and transition strategies.

The Pew Center on Global Climate Change will add a constructive, positive and pragmatic voice to the public debate on this important issue. We look forward to working with the Center and everyone interested in a constructive dialogue on the issue of global climate change.

Members

ABB;
Air Products and Chemicals;
Alcoa;
American Electric Power;
Baxter International;
Boeing;
BP;
California Portland Cement Co.;
CH2M HILL;
Cummins Inc.;
DTE Energy;
DuPont;
Enron;
Energy;
Georgia-Pacific;
Holnam;
IBM;
Intel;
Interface Inc.;
Lockheed Martin;
Maytag;
Ontario Power Generation;
PG&E Corporation;
Rohm and Haas;
Royal Dutch/Shell;
RTZ;
Sunoco;
Toyota;
TransAlta Corp.;
United Technologies;
Weyerhaeuser;
Whirlpool;
Wisconsin Energy Corporation.

Annex 3: Developing a Collaborative Initiative

Initiating collaboration

Collaborative action among institutional investors on climate change appears desirable, but initiating such action is always a challenge. To assess whether such an organisation is viable it would be appropriate to undertake a feasibility study.

This would have to address a number of questions, including:

- Is there sufficient interest for such an action in the pension fund or asset management industry?
- Can a broad position paper be agreed?
- Would such an initiative be able to make a meaningful contribution?
- Where should it focus?
- What resources would be required?
- Where can funding be obtained? Are the members prepared to support it?
- Should it address policy issues, corporate governance issues or both?
- What geographical coverage should it have, both in terms of membership and in terms of targeting?

Existing financial industry initiatives: The UNEP Insurance Industry Initiative

Concern about concerted industrial downplaying of climate change risks in the early years of the IPCC led to the formation in 1995 of the UNEP Insurance Industry Initiative for Sustainable Development (UNEP III), in time for the first CoP. Although UNEP III has a broad remit to examine the whole gamut of environmental issues, it has been most outspoken in the area of climate change and in particular in its advocacy of the precautionary principle. The logic behind this was that insurers and reinsurers are exposed to substantial risk from extreme weather events, and that climate change will increase this risk. While its remit has covered asset management, it has focused primarily on the issue of underwriting.

The initiative had a substantial impact at first, and was very much welcomed by national delegations. However, the force of its arguments has been weakened somewhat over time by its lack of US members and of significant life/pension companies. Furthermore, in his book 'The Carbon War'⁷³, Jeremy Leggett made the point that UNEP III had lost some of its impact because of the very limited resources that it devoted to its lobbying campaign compared to such groups as Greenpeace or the Global Climate Coalition.

Space for a new initiative?

An initiative led by institutional investors would have a slightly different remit to the insurance industry initiative. It would be taking a rather broader view of climate change, looking across the whole economy and in particular the potential

to reduce a wider range of risks. Furthermore, much discussion at climate change negotiations centres around the need for investment because of the capital requirements of some of the initiatives to adapt to climate change (e.g. coastal defences) and to avoid further climate change (e.g. emissions trading, renewable energy R&D). Participation in the process by a group of leading long term investors would benefit the IPCC negotiators and other participants by providing them with direct advice on the investment practicalities of some of the proposed initiatives at an early stage.

In conclusion, the experience of the insurance industry is that an institutional investors' initiative on climate change could have an impact, but will require a focused effort to be credible, particularly over the long term.

Footnotes

- ¹ 'Topics 2000: Natural Catastrophes - The Current Position', p112, Munich Re.
- ² 'Royal Society backs international call for action on climate change', Press Release, Royal Society, 18th May 2001.
- ³ The IPCC web site, which has the executive summaries of the Third Assessment Reports, is at www.ipcc.ch
- ⁴ For one summary of the climate sceptic viewpoint, see 'Bush Is Right on Climate Change Policy', June 15 2001, by Robert Bradley, President of the Institute of Energy Research in Houston, Texas. See www.cato.org/dailys/06-15-01.html
- ⁵ The statement was published as the editorial in the prestigious journal Science on 17th May 2001. The National Academies of Science included those of the UK, Australia, Belgium, Brazil, Canada, the Caribbean, China, France, Germany, India, Indonesia, Ireland, Italy, Malaysia, New Zealand, Sweden, and Turkey.
- ⁶ More detailed information on the NAS report on climate change can be found at: www.nas.edu
- ⁷ NAS report as above.
- ⁸ Topics Annual Review: Natural Catastrophes 2000, Munich Re p22 and p45.
- ⁹ Presentation of Robert Watson, Chair IPCC, at the Sixth Conference of Parties to the UNFCCC, November 13 2000. Available at www.ipcc.ch/press/sp-cop6.htm
- ¹⁰ This is not to say that we are certain about the scale, size or precise nature of any impacts, but to recognise that given the seriousness of the potential outcomes, we cannot ignore the possibility of their occurrence.
- ¹¹ Presentation of Robert Watson, Chair IPCC, at the Sixth Conference of Parties to the UNFCCC, November 13 2000. Available at www.ipcc.ch/press/sp-cop6.htm
- ¹² Note that increasing urbanisation and other factors have played a part in increasing the vulnerability of human settlements. While these explain much of the increased losses, they also indicate increased risks if climate change accelerates.
- ¹³ 'Topics 2000: Natural Catastrophes - The Current Position', p110, Munich Re.
- ¹⁴ 'Climate Change Risks to Offshore Oil & Gas Structures', presentation by Hans Saetre, Norsk Shell at PREDICATE Workshop 'Climate Risks to 2020: Business Needs and Scientific Capabilities', March 2001, The Royal Society. See also 'Engineers to offset rise in sea level - Greenhouse effect lifts gas platform', Michael McCarthy, The Times 7 September 1999.
- ¹⁵ BBC Radio 4 Money Programme, 4th June 2001.
- ¹⁶ 'The Future Strategic Context for Defence', paragraph 12; Ministry of Defence; 2000. Available at www.mod.uk/index.php3?page=2451.
- ¹⁷ As noted by the IPCC in the Third Assessment Report.
- ¹⁸ Letters to the Editor, Environmental Finance June 2001. Page 8.
- ¹⁹ Quoted in The Independent; Mar 30, 2001.
- ²⁰ 'Beyond Kyoto: Critics of the US should start looking for alternative ways of tackling climate change' by Philip Gordon and James Lindsay, Senior Fellows, Brookings Institution, Financial Times, Jun 18, 2001: 'The intensity of the split [over Kyoto] could well match that of the dispute over the Iran-Libya Sanctions Act, a quarrel that, during the late 1990s, infected virtually every aspect of transatlantic relations'.
- ²¹ FAB is a campaign to encourage commitment by the US to cap and cut its greenhouse gas emissions and rejoin global action to save the climate by highlighting the differences between different companies/brands in their approach to climate change mitigation. FAB can be found at: www.fabclimate.org

²² 'What Every Executive Needs to Know About Global Warming', Harvard Business Review, July-August 2000, p134.

²³ See for example, H. Ward 'Governing Multinationals: The Role of Foreign Direct Liability', Royal Institute of International Affairs Briefing Paper, February 2001.

²⁴ Also contributing to climate change are CO₂ emissions from land use change (e.g. deforestation, but also potentially absorbing CO₂), methane (produced from a variety of human activities), halocarbons (CFCs and their replacements) and others. In some cases, their emissions are growing faster than CO₂.

²⁵ China has demonstrated this possibility of de-coupling growth from greenhouse gas emissions. Emission have fallen by over 10% despite economic growth of 36% through energy conservation, elimination of energy subsidies, and more efficient coal-fired power generation. See News Release by UNEP director Klaus Toepfer, 29 June 2001 at www.unep.org

²⁶ For example, in much commercial property the landlord is responsible for management, including investment, but the tenants have to pay the energy bill. The landlord gets no benefit from energy efficiency investment, while the tenants have little or no ability or incentive to make the investment.

²⁷ Quoted in 'Looking Ahead - Thoughts on what a future climate change regime might include.' Eileen Claussen, President, Pew Center, June 11, 2001. At www.pewclimate.org/policyguide/ahead_intro.cfm

²⁸ 'Kyoto is Good for Business'; Adair Turner, New Statesman, 7 May 2001.

²⁹ 'How High are the Costs of Kyoto for the US Economy?'; Terry Barker, University of Cambridge and Paul Ekins, Keele University, forthcoming. Factors which tend to increase cost estimates include the exclusion of emissions trading, the assumption of a rapid adjustment, the exclusion of averted non-climate change damages, and the assumption of 'lump sum' recycling of permit or tax revenues, rather than optimal use.

³⁰ 'Kyoto is Good for Business'; Adair Turner, New Statesman, 7 May 2001.

³¹ News release by UNEP director Klaus Toepfer, 29 June 2001. For the full news release see www.unep.org/Documents/Default.asp?DocumentID=204&ArticleID=2877

³² The use of nuclear power raises a number of other serious issues including environmental, safety, and security risks which are beyond the scope of the present paper.

³³ BBC Radio 4 Money Programme, 4th June 2001.

³⁴ Although market based options are generally the best option, there may be a need for some regulations to create the framework for the market, or where it remains the most efficient option – for example, energy efficiency standards for buildings may be more effective and simpler than relying on market alternatives such as labelling or even taxes.

³⁵ 'Many Utilities Call Conserving Good Business', Timothy Egan, New York Times, 11th May, 2001.

³⁶ 'Royal Society backs international call for action on climate change', Press Release, Royal Society, 18th May 2001.

³⁷ 'President Bush Plans Broad Deregulation Push', Stephen Labaton, The New York Times, May 23, 2001.

³⁸ See page 8 at www.gci.org.uk/refs/C&CUNEP3b.pdf

³⁹ For information on the Global Commons Institute, and a review of literature on C&C and endorsements for the idea, see www.gci.org.uk

⁴⁰ 'Energy – The changing climate', Royal Commission on Environmental Pollution, 22nd report, June 2000. London, HMSO pp 61 and 199.

⁴¹ Emissions would need to be reduced to a level where the atmospheric concentration of CO₂ was able to stabilize. The IPCC and RCEP have made various recommendations on this: CO₂ concentrations are already twice as high as pre-industrial levels.

⁴² Source IEA Energy Technology R&D Statistics, excludes nuclear energy and fossil fuel R&D. Estimated figures for 1999 for Italy, Netherlands, Switzerland (1998&9), Finland, Sweden.

⁴³ See 'Innovation and the Environment: challenges and policy options for the UK', Global Environmental Change Programme briefing, Imperial College, January 2001.

⁴⁴ See above report.

⁴⁵ A recent Executive Order requires State departments to purchase no less than 10% of their energy requirements from renewable sources by 2005 and 20% by 2010. Governor Pataki noted that 'with this new Executive Order, New York State is setting an example for the rest of the nation by promoting energy conservation and efficiency, reducing demands on our energy grid, and lowering greenhouse gas emissions'. Source: Edie news service <http://www.edie.net/index2.html>

⁴⁶ More information on the Global Climate Coalition is at: www.globalclimate.org

⁴⁷ 'The Heat is On', p185, by Ross Gelbspan; Addison-Wesley, 1997.

⁴⁸ World Economic Forum is at www.weforum.com

⁴⁹ See www.wbcsd.org/projects/pr_climenergy.htm and www.ghgprotocol.org

⁵⁰ Business in the Environment, 5th Index of Corporate Environmental Engagement. See www.business-in-environment.org.uk/index2.html

⁵¹ Speech made to the 5th Annual Greenpeace Business Conference in London, 5th October 2000.

⁵² See www.chicagoclimatex.com

⁵³ See interview in Green Futures, issue 24, Sept/Oct 2000.

⁵⁴ Such as Sainsbury's Greenwich Peninsula store, Wessex Water's new operations centre in Bath (described as the UK's greenest building), and the Foster-designed Commerzbank Headquarters in Frankfurt, with its 'gardens in the sky'.

⁵⁵ Turnbull report: 'Internal Control: Guidance for Directors on the Combined Code', The Institute of Chartered Accountants, 1999. See www.icaew.co.uk/internalcontrol

⁵⁶ Myners Report: 'Institutional investment in the UK: A review', HM Treasury, 2001. See www.hm-treasury.gov.uk/pdf/2001/myners_report.pdf

⁵⁷ From July 2000, all UK private sector pension funds have been legally obliged to consider socially responsible investment and voting rights as part of their overall investment policy. This has come about by a regulation issued under section 35 of the 1995 Pensions Act, which provides a statutory obligation for all pension funds to have a Statement of Investment Principles (SIP). These statements must cover the types of investment, the balance between investments, risk, return and realisations. The new regulation requires all trustees to add the following two considerations to their fund's SIP:

- a) 'The extent (if at all) to which social, environmental or ethical considerations are taken into account by trustees in the selection, retention, and realisation of investments; and
- b) The policy (if any) directing the exercise of the rights (including voting rights) attaching to investments'.

⁵⁸ Monks is considered by many to be the world's highest profile shareholder activist. Sunday Telegraph, June 24 2001. Monks is also the author of 'The New Global Investors', Robert A. G. Monks, 2001; John Wiley & Sons.

⁵⁹ Business in the Environment, 5th Index of Corporate Environmental Engagement. See www.business-in-environment.org.uk/index2.html

⁶⁰ While investors should support positive, constructive engagement in policy development, companies that seek to destabilise sensible climate change actions may not be acting in the best interests of beneficiaries, particularly when the broader implications are taken into account.

⁶¹ ‘What Every Executive Needs to Know About Global Warming’, Harvard Business Review, July-August 2000, p135.

⁶² See innovestgroup.com

⁶³ See ecosecurities.com

⁶⁴ ‘The Rise of Fiduciary Capitalism’ by James P. Hawley and Andrew T. Williams; 2000; University of Pennsylvania Press.

⁶⁵ Externalities are unintended side effects of economic activity. They can be both negative and positive, although the term is most often used to denote negative effects such as pollution and traffic congestion.

⁶⁶ See for example various submissions to government and parliamentary consultations on climate change from a leading group of researchers at www.gecko.ac.uk

⁶⁷ Note that although there is quite a large degree of synergy between the common good and the universal investor, they are not quite identical – for example universal investors are much more exposed to listed companies than the economy as a whole, and the sectoral balance of the All-Share does not match the economy. This could potentially lead to tensions between the policy stance which best meets the common good and that which suits the universal investor. If pensions funds should engage on policy issues, it is probably preferable to avoid such tensions as much as possible and focus on areas where there is indeed a synergy.

⁶⁸ ‘The Rise of Fiduciary Capitalism’, James Hawley and Andrew Williams, 2000; University of Pennsylvania Press.

⁶⁹ For more details, see the UNEPFI web site at: <http://unepfi.net/iii/index.htm>

⁷⁰ The Carbon Disclosure Project is aimed at improving reporting by using shareholder engagement (from large institutional investors) to encourage large companies to improve their carbon reporting. Contact: Paul@cdproject.net

⁷¹ Details of the UK climate change programme can be found at www.environment.detr.gov.uk/climatechange/cm4913/index.htm

⁷² Taken from www.pewclimate.org/belc/index.cfm; 11th June 2001

⁷¹ ‘The Carbon War: Global Warming and the End of the Oil Era’, Jeremy K. Leggett 2001, Routledge.

Further Resources

- The UK Met Office provides information and undertakes research on climate change, and provides consultancy services on the potential impacts of climatic conditions and weather related risk: www.metoffice.gov.uk/index.html
- The Framework Convention on Climate Change is at www.unfccc.int
- The OECD and the IEA both have substantial resources devoted to climate change, including statistics on energy use and demand. See www.oecd.org/env/ and www.iea.org
- The UNEP financial institutions initiative is at www.unepfi.net
- This New Scientist site on climate change provides a detailed review in an accessible form: www.newscientist.com/hottopics/environment/
- Useful directories of climate change related sites can be found at www.pacinst.org/ccresource.html and www.business.com/directory/energy_and_environment/environment/air_pollution_control/global_warming/web_sites/