Friends of the Earth submission to the Stern Review

December 2005

Friends of the Earth welcomes this Review. In part one of our response we set out our headline points and a summary of our submission, including some questions for the Review team. A longer list of possible questions we would like the Review to answer are included in part four (page 16).

In part two (page 4) we set out some overarching themes of our evidence. The stabilisation of the global climate must be the underlying goal of any analysis of climate economics; there is a need for steady reduction pathways and for annual, year on year emission reduction targets; and there is a need to set a national carbon budget as a way to regularly monitor progress and adjust climate policies accordingly through a top-down approach.

In part three (page 6) we provide in this section a detailed response to each of the four issues set out by the Review team.

1. Part One: Headline points & summary

1.1 Purpose of the review

Friends of the Earth assumes that the main question the Review seeks to answer is *how* and *when* do we tackle climate change, rather than *whether* or *to what extent* we should. Stabilising the climate is a fundamental non-negotiable requirement for humanity and its economies.

Scientific evidence suggests that we must limit global average temperature increases to a maximum of 2°C above pre-industrial levels. Beyond that the damage and chances of further catastrophic damage are too high. Action to reduce emissions needs to begin soon otherwise deeper cuts will be needed in the longer term.

With this ecological boundary in mind, the economic analysis to be carried out by the Stern review team should avoid a traditional cost-benefit analysis (for more on the drawbacks of this system, see below), and instead analyse:

- the most cost-effective options for achieving emission reductions that are likely achieve a 2°C goal.

- ways to minimise any potential negative localised or sector-specific economic impacts that do arise, ensuring continued economic growth, employment, etc and maximising economic benefits such as innovation, reduced energy imports, etc.
- an assessment of avoided economic, social and environmental damages of having avoided an increase in temperatures of 3º, 4º, 5º, 6º C or above.

Assessing the economic, environmental and social consequences of climate change is important, because:

- From a political perspective, these consequences and the likelihood of catastrophic changes are not widely known and need to be presented to firm up political support for action. The Review team has a major role here.
- Even a 2°C increase will have major costs. Sound analysis of where and who will be affected is needed to underpin what will need to be large-scale adaptation in many countries

Some central questions for the Review team are therefore:

- *Given scientific understanding of the global emission trajectories that will enable us to stay below 2°C, what is the role for the UK in staying on this global trajectory? What international economic frameworks are needed to put us on and keep us on this trajectory?*
- *What would be the best approaches for setting and operationalising a carbon budget across the UK economy as the key instrument for the UK to play its domestic part in keeping to a global trajectory for 2°C?*
- *How can a method of dealing with costs and benefits for future generations be openly identified and debated?*
- *What, if any, discount rates are appropriate for comparing costs and benefits that accrue in different years?*
- *How can the distribution of costs and benefits be appropriately dealt with?*
- *How is the Review going to take into account that great decreases in energy intensity are possible in the future, just as they have happened in the past, and that this can happen either through higher energy prices or through appropriate policies?*
- *How fast would renewable energy and energy efficiency develop if energy subsidies, including financing through multilateral banks, were gradually shifted from fossil fuels and nuclear power and promoted sustainable technologies instead?*

1.2 Costs and benefits, and discount rates

It is vital that the Review does not attempt to use conventional price-based cost benefit analysis (CBA) as the central approach for this strand of its work. It will never be possible to carry out a full cost-benefit appraisal of the impacts of climate change and to fully compare different strategies of mitigation with different strategies of adaptation.

The Review should also consider carefully the issue of discount rates and how they are used in climate policy. It seems difficult to justify using current interest rates to assess the costs and benefits of preventative action. We believe the Review should consider this in detail - and possibly commission research on the question.

The costs of action are largely dependent on the economic frameworks Governments put in place. Some actions on climate may be costly now – because of existing tax, spend and regulatory structures which have historically and currently favour fossil fuel use. There is an enormous market failure for environmental issues in existing economic frameworks. This situation cannot continue. As the economic frameworks change, the relative costs of action will change.

Frameworks should seek to strengthen the economy at the same time as delivering carbon cuts. This integrated approach is far more likely to be successful than the current frameworks which lead to continual and unnecessary perceived trade-offs between, for example environment and competitiveness. In addition, current assessments too often exaggerate the costs of action, and fail to take into account the adaptive capacity of businesses, and the effect of innovation.

We welcome initiatives for <u>better</u> regulation, but fear that this desire is being co-opted to mean <u>less</u> regulation. Regulation is an essential tool for protecting the environment and people, as a crucial part of the policy mix.

1.3 Role of the UK

The UK has a clear leadership role. Buy-in from developing countries will require leadership from the developed countries, who are historically and currently responsible for the vast majority of climate emissions.

The only effective way developed countries can show leadership is by action at home – by showing the economic changes needed to drive carbon emissions down while strengthening the economy.

Development of new technologies and a lower-energy-demand economy will act as a spur for similar action in developing countries. The UK should use its influence to persuade multilateral and bilateral banks to phase out fossil-fuel lending and increase spending on energy efficiency and renewables projects much faster than is currently the case.

By 2050, at an average of 2.5 per cent annual GDP growth, the carbon intensity of the UK economy will need to fall by a factor of 24. In effect this means that apart from a small number of sectors where some carbon use is unavoidable, the UK and other developed countries will need to be essentially zero-carbon. The UK should lead the way towards creating a strong, innovative, dynamic zero-carbon economy.

The developed world has run-up a colossal “ecological debt” to developing countries.

1.4 Action needed in the UK

There is completely inadequate integration of policy across Government on climate change, and insufficient leadership over domestic action. For example if one Department deems that action in one area is "too costly" that does not then trigger any review of the overall package of policies across Government to ensure that overall the UK stays on course.

The Review team should assess the best approaches for setting and operationalising a carbon budget across the UK economy. Meeting this budget would be the means by which the UK played its domestic part in keeping to a global trajectory for 2°C. This budget should be managed by the Treasury.

The Review team can play a role in changing the culture of policy making around climate change. Currently, many politicians believe that tackling climate change is a necessary evil, which will damage the economy, and which we will have to get round to doing sometime, but not now. This is entirely the wrong mind-set. The correct economic frameworks can guide the UK to a zero-carbon economy - not only staving off the colossal costs of run-away climate change, but driving a new wave of innovation in new businesses and technologies. Strong environmental policies are entirely compatible with a strong economy. The misguided belief that they are not is one of the largest barriers to action on climate change in all developed economies.

2. Part Two

2.1 Stabilisation of the climate is the underlying goal

Any economic analysis of climate change policy should have this as a starting point and as an underlying assumption: the ultimate objective of international community action on climate change is the stabilisation of the global climate. All 166 signatories (including the United States) of the United Nations Framework Convention on Climate Change are bound under article 2 to achieve:

"A stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner."

The European Union Council of Ministers is committed to ensuring that global average temperature increases do not exceed 2ºC above pre-industrial levels. The IPCC Third Assessment Report (TAR) from 2001 provides substantial information on the expected impacts from different levels of future warming. Warming above 1-2ºC is predicted to result in rapidly escalating damages, the extent of which is qualitatively different from lower temperatures.

An increase in global temperatures of of 2°C could mean an increase of up to 5-6°C in some parts of the world. Just 2-3°C of warming could mean up to 300 million more people will be at risk of malaria, three billion will face water shortages and 100

million people will be more at risk from coastal flooding. Global average temperatures are already 0.6°C higher than pre-industrial levels. To minimise the risks of warming above 2°C, global greenhouse gas emissions need to peak and decline within the next 10-15 years. Concentrations need to be stabilised at around 400-450 parts per million or below.[12] For more on this issue, see answer to Stern Review's Question 2, below.

With this ecological boundary in mind, the economic analysis to be carried out by the Stern review team should avoid a traditional cost-benefit analysis (for more on the drawbacks of this system, see below), and instead analyse**:**

- **the most cost-effective options for achieving emission reductions that are likely achieve a 2°C goal.**
- **ways to minimise any potential negative localised or sector-specific economic impacts that do arise, ensuring continued economic growth, employment, etc and maximising economic benefits such as innovation, reduced energy imports, etc.**
- **an assessment of avoided economic damages, to the extent they can be quantified, of having avoided an increase in temperatures of 3,4,5,6 ºC or above.**

2.2 Need for steady reduction pathways and national carbon budgets[3]

The amount of change we see in the climate will be determined by concentration levels of greenhouse gases in the atmosphere. Concentration levels are determined by the total volume of emissions over time and absorption in sinks. Because concentrations are determined by total volume over time, *when* we reduce emissions — i.e. the rate which we reduce over time — is as important as the emissions reductions target we aim for. And because carbon emissions remain in the atmosphere for approximately 100 years, every tonne emitted is a significant commitment to more warming. A successful climate abatement strategy must therefore seek to deliver steady incremental reductions over time.

The current tendency to delay action on climate into the future also represents a considerable danger. A recent study presented at the Hadley Center Conference in February 2005 said that a delay of global action by ten years results in a doubling of the necessary emission reduction rate.[4]

Governments should therefore aim to achieve steady annual reductions in emissions. Friends of the Earth is campaigning for a new law to set annual targets for emission reductions[5].

One of the most fundamental changes that must be made to UK climate policy is to adopt a more top-down approach to designing policies to achieve our emissions targets. The existing programme began with a business-as-usual projection and then built towards a given reduction target below this projection, using estimated amounts of carbon saved from various policies and measures that existed already, or were planned for introduction. We believe a new approach should be adopted that places more emphasis on actual emissions and trends relative to targets. **It would enable**

more effective targeting of policy and should result in more comprehensive and equal application of policies and measures across all sectors of the economy.

Once a reduction pathway to our targets has been identified **the concept of carbon budgeting can be developed.** One approach is to create a national carbon account that separates the property of carbon from the activities that produce emissions, such as energy production and industrial processes, and budgets it as a national asset and liability. Once a carbon budget is defined in this way, the Government can manage carbon as with any other precious commodity: with effective accounting and clearly specified activities to reduce liabilities or increase assets. This budget should be managed by the Treasury.

3. Part Three

3.1 Stern Review Issue One

"The implications for energy demand and emissions of the prospects for economic growth over the coming decades, including the composition and energy intensity of growth in developed and developing countries."

Don't 'predict and provide'

Energy demand growth is one of the most crucial trends that we need to influence if we want to succeed in reducing emissions to fight climate change, and its exponential growth must not be taken as a given that we have no power whatsoever to influence.

It is worth bearing in mind that predicting future demand growth is a very complicated exercise and projections of future demand growth must be used with care. The electricity industry, for example, may have a natural tendency to overestimate future demand growth as it often has more of an interest in promoting supply and infrastructure extension rather than demand reductions (this is even more true in liberalised electricity markets, although not solely[6]).

Studies carried out in Belgium about demand projections made at the time when the country was planning for the construction of new nuclear power stations have shown that energy forecasting scenarios carried out in those years invariably overestimated the growth in electricity consumption. This happened despite the fact that a panel of experts had pointed out that a lot of energy efficiency opportunities existed. Demand turned out to be lower, even without a particularly ambitious energy efficiency policy in place.[7] Other countries, such as Norway, have also been going through similar debates about future demand growth projections and the need to look at demand reduction options before new supply is now more widely accepted.

The International Energy Agency, in its World Energy Outlook 2005, states that in the absence of any policies, world energy demand will soar under the reference scenario by 50 per cent by 2030.This, the report states, "would raise several concerns". Firstly, this would cause very rapid growth in greenhouse gas emissions, which calls into question "the long-term sustainability of the global energy system". Secondly, the

import dependence of consumers on a small number of countries raises concerns about security of supply.

Because of these concerns, the International Energy Agency also highlights an "alternative policy scenario" which demonstrates that carbon-dioxide levels would be siginificantly lower if governments did more to promote energy efficiency and renewable energy. Investment in energy infrastructure would also be considerably lower compared to the reference scenario. However, by the IEA's own admission, even this alternative scenario remains inadequate and unsustainable from both an economic and an environmental or climate change perspective. **"Far more radical policy action and technology breakthroughs would be needed to reverse these trends,"** the report states in the Executive Summary[8].

In response to this concern, the IEA's energy technology collaboration division is working on further studies and scenario work that would look at a number of these "radical" policies and technology breakthroughs that are now needed. Preliminary scenarios will be published around March 2006. The idea is to take into account strong policy support for renewable energy and energy efficiency and other options such as carbon capture and storage, to take into account climate policy, price trends of fossil fuels, and security of supply concerns. The IEA also has considerable in-house expertise in doing comparative studies on energy conservation policies around the world, and **we invite the Stern Review team to take account of the huge potential for energy conservation that such studies highlight**.[9]

Action to reduce energy consumption through the use of existing technologies also has considerable economic benefits. Economies of the former Soviet block that are currently part of the European Union, for example, consume around twice as much energy per unit of GDP compared to the average EU country, simply because they use obsolete technologies. A deliberate policy to address this through a clever use of EU structural funds or climate policy instruments, could bring benefits to the European economy as a whole and would help to reduce energy imports from outside the Union.[10]

In the period 1973-1998 there has been a considerable drop in the energy/GDP ratio in OECD countries, especially in the first half of that period, because of the energy policies drawn up as a consequence of oil shocks. Compared to 1973, it takes 1/3 less energy to produce a unit of GDP in IEA economies.

Alarmingly, the rate of energy efficiency improvements slowed down in the 1990s because of lower energy prices and despite initial steps towards climate policy. Governments appear to have reduced their efforts to control demand, despite evidence that there is huge potential to do so. The IEA recommends therefore that countries accelerate the decoupling of energy use and CO_2 emissions from economic growth through energy efficiency policies, which often can be implemented at a negative cost to the economy.[11] So, while it is disappointing that the 1990s saw a slowdown of efficiency policies, **the great improvements in energy intensity reached after the oil shocks of the 1970s show that a lot can be done to make our economies more energy efficient.**

3.2 Stern Review Issue Two

"The economic, social and environmental consequences of climate change in both developed and developing countries, taking into account the risks of increased climate volatility and major irreversible impacts, and the climatic interaction with other air pollutants, as well as possible actions to adapt to the changing climate and the costs associated with them."

IPCC Third Assessment Report

The starting point for any consideration of these issues should be a major review of evidence carried out by the Intergovernmental Panel on Climate Change in 2001, especially the report of its Working Group II[12].

This concluded that:

- "natural systems are vulnerable to climate change and some will be irreversibly damaged". It found the evidence that "the geographical extent of the damage or loss, and the number of systems affected, will increase with the magnitude and rate of climate change" to be "well-established"[13].
- "many human systems are sensitive to climate change, and some are vulnerable". It listed various impacts, some negative, some positive, on mortality, crop yields, water availability, timber supply, exposure to disease, risk of flooding and energy demand[14].
- "projected changes in climate extremes could have major consequences" and that "the impacts of future changes in climate extremes are expected to fall disproportionately on the poor"[15].
- "the potential for large-scale and possibly irreversible impacts" such as the melting of continental ice-caps, the slowing of ocean circulation or accelerated warming due to positive feedbacks "poses risks that have yet to be reliably quantified". It found that the likelihood of many of these changes "is not well-known, but is probably very low" but that if these changes were to occur, "their impacts would be widespread and sustained". "Their likelihood is expected to increase with the rate, magnitude and duration of climate change"[16].

Finally, in terms of the distribution of impacts, IPCC found that "those with the least resources have the least capacity to adapt and are the most vulnerable"[17].

IPCC conceptualised risks regarding climate change to 2100 in terms of five reasons for concern: risks to unique and threatened systems, risks from extreme climate events, the distribution of impacts, the aggregate impacts and the risk from large-scale discontinuities. As IPCC saw it, all five **reasons for concern increase, as forecast rises in global temperature increase.**

For example, small increases in global temperatures risk damaging some natural systems and adversely affecting some regions. By contrast, large increases in temperature risk damaging many natural systems and adversely affecting all regions.

Further research since IPCC 2001

A considerable effort has been made, since 2001, to enhance our understanding of how the climate might change over the next 100 years and the impact this might have on natural systems and humanity. Research has also focussed on the changes in human behaviour that might be needed to prevent such changes and the costs associated with them.

Firstly, significant advances have been made to address the impact of uncertainties inherent in climate models. A more detailed investigation has been carried out, using multiple simulations, of the way the climate responds to changing greenhouse gas concentrations[18]. This found that most simulations led to increases in global average temperature within the bounds of existing IPCC projections (2-6°C by 2100). However, a number suggest higher increases are possible, up to 11°C.

Secondly, a considerable body of research has looked at the impacts of rising temperatures and attempted to define the level at which climate change becomes 'dangerous' for the purposes of Article 2 of the United Nations Framework Convention[19,20]. This has established that:

- some impacts of rising greenhouse gas concentrations (e.g. on ocean acidity) are independent of rises in global temperatures;
- temperatures continue to rise after greenhouse gas concentrations have stabilised;
- the severity of some impacts of rising temperatures may increase gradually (e.g. changes in Arctic Sea Ice);
- the severity of others (e.g. melting of continental ice sheets) appears to rise dramatically as temperatures reach certain thresholds;
- some of these impacts may continue to worsen (and may not be reversible) even if temperatures fall.

Many researchers have suggested that a temperature rise of 2°C above pre-industrial levels might be taken to represent the point at which climate change becomes 'dangerous'.

However, studies suggest that irreversible damage to ecosystems is likely well before global temperatures reach that level. For example, one study found that between 15 and 37 per cent of land species in the areas studied could be committed to extinction if average temperatures rise that far[21]. Furthermore, studies of recent freak weather events show evidence of considerable and rising economic damage now[22].

Thirdly, attempts have been made to refine our understanding of the cuts in emissions that will be needed to ensure temperature increases stay below dangerous levels[23,24]. These show that action to reduce emissions needs to start well before temperatures rise to the level considered dangerous. They also suggest that delaying action increases the level of reductions that need to be made. Finally, they provide strong evidence that previous calculations of the cuts in emissions needed to ensure temperatures don't rise above 2°C were over-optimistic. There is an outside chance that we are already committed to temperature increases above this level. Global emissions need to peak by 2015 and fall thereafter (by a half by 2050) if greenhouse gas concentrations are to stabilise at an equivalent of 400 ppm CO_2 and the chance of overshooting 2°C to be kept much below evens.

For the UK, like other industrialised countries, a stabilisation at 400 ppmv CO_2 means reductions of 25-50 per cent by 2020 and around 80-90 per cent by 2050. A stabilisation at 450 ppmv CO_2 would mean a reduction of 10-30 per cent by 2020 and 70-90 per cent by 2050.[25]

There remain uncertainties at all four links in the chain of reasoning that connects our behaviour with its consequences for the climate and our well-being:

- there are uncertainties over the costs of policy changes needed to reduce emissions, including their ancillary costs and benefits, and over their actual impact on emissions;
- there are uncertainties over the relationship between changing levels of emission and changing concentrations of greenhouse gases – especially in the future;
- there are uncertainties over the relationship between an increase in the concentration of greenhouse gases and a corresponding rise in average global temperatures;
- there are uncertainties over the impacts that average global temperature rises of a given magnitude will have – on other aspects of the global climate and on other natural systems and humanity. These include uncertainties over the costs to humanity of impacts on the natural systems on which human beings depend.

For these and other reasons, it is not and never will be possible to carry out a full cost-benefit appraisal of the impacts of climate change and to fully compare different strategies of mitigation with different strategies of adaptation.

Even attempts to specify the social cost of emissions are fraught with difficulty. For example, the UK Treasury currently uses a figure of £70 per tonne of Carbon, but with a lower and upper range of £35 and £140. Indeed, a very recent review for DEFRA[26] has concluded that while £35 is a reasonable lower estimate, it is not possible to put a figure to an upper estimate. The review concluded that uncertainty over impacts "precludes establishing a central estimate of the social cost of carbon with any confidence". It found that establishing an upper limit to the cost was "more difficult" but that "the risk of higher values for the social cost of carbon is significant".

However, several conclusions can be drawn on the basis of the evidence available.

- **The impacts of large scale discontinuities, such as the melting of continental ice sheets, the disruption of ocean currents and the accelerated warming due to positive feedbacks, are so great as to justify immediate precautionary, preventative action.**

- A consensus is emerging that an increase in global average temperatures of 2°C might be taken to represent the onset of "dangerous anthropogenic interference with the climate system" as regards Article 2 of the United Nations Framework Convention on Climate Change.

- Global emissions need to peak within ten years and then fall dramatically (by 50 per cent or more) if the chance of temperature increases being confined to 2°C is

to be better than evens. Given the need for developed countries to make faster and deeper cuts in order to allow developing countries a chance to develop (in part to help them adapt to climate change), emissions in developed countries such as the UK need to fall further – by up to 80-90 per cent by 2050.

- **Action to reduce emissions needs to begin soon otherwise deeper cuts will be needed in the longer term.**

- **The costs of mitigation are not so great, especially if action is taken internationally, if it is begun early and phased over a number of years**[27].

- An increase of 2°C is itself expected to lead to serious impacts on people and particularly serious damage to ecological systems. New and better evidence is emerging that **poor people in developing countries are particularly dependent on goods and services they take directly from natural habitats and are therefore likely to be especially adversely affected by climate change if it impacts on the flow of these goods and services**[28,29,30]. As many of these goods and services are consumed directly (without being traded), they are frequently ignored in conventional economic analyses. It is therefore vital that analyses of the impacts of climate change and the value of mitigation consider the effect on ecosystems and their benefits for poor people and the rest of humanity.

3.3 Stern Review Issue Three

"The costs and benefits of actions to reduce the net global balance of greenhouse gas emissions from energy use and other sources, including the role of land-use changes and forestry, taking into account the potential impact of technological advances on future costs"

Costs and benefits

It is vital that the Review does not attempt to use conventional price-based cost benefit analysis (CBA) as the central approach for this strand of its work. The uncertainties are simply too wild for CBA to be an effective policy making tool. We mentioned earlier the difficulties to calculating the social costs of carbon and the very wide range in estimates that are used. These differences are caused by a huge range of different uncertainties – ranging from what discount rate to use, how to treat equity, which impacts to include and how to value them.

Overall, the well-known problems with simple price-based cost-benefit analysis are each so significant in considering the economics of climate change that the approach is inappropriate. This is not to say that price-based evidence is not important but it is crucial that the assumptions made in producing such evidence are both scrutinised and made clear if it used to draw conclusions.

We are also concerned that conventional policy assessments can have inherent biases within them. These include well documented difficulties in valuing non-monetised effects – which routinely mean that these effects are under-valued or not valued at all in many current Government policy assessments.

In addition, cost assessments are limited by a number of factors ranging from inaccurate cost data, omission of certain types of cost data and the difficulties of predicting the response of the firm, industry or economy. **This review needs to be thorough and open in scrutinizing the validity of cost evidence as it can and does act as a drag on innovation, a barrier to environmental protection and ultimately a brake on economic progress.**

Discount rates

Conventional cost-based analyses use discount rates to compare costs and benefits that accrue in different years. The justification for this is one of opportunity cost. Spending money now to obtain a benefit later should always be compared against the benefit of leaving that money in the bank to earn interest. The inherent assumption of this approach is that the decision, on whether or not to spend now, has no effect on future interest rates.

Climate change has such large potential impacts as to jeopardise future interest rates. **As a result, it seems difficult to justify using current interest rates to assess the costs and benefits of preventative action. Zero or even negative interest rates may be needed. We believe the Review should consider this in detail - and possibly commission research on the question.**

Treatment of innovation

Innovation is central to economic progress. It is also central to tackling climate change. The pace and extent of economic and technological change is likely to increase. **Business responds to external realities including regulation by innovating. Yet unfortunately industry time and again pushes cost figures for taking action that ignore innovation.**

- It does so for the increased uptake of new but proven technologies. For example, the EU car industry predicted that catalytic converters would cost £400-£600 per vehicle – the real cost was £50, and the net societal health benefits in the UK alone will be £2 billion.[31]
- It does so when policies demand innovation. For example, when California was setting Low Emissions Vehicle Standards in 1994, the industry estimate of additional cost would be $788; regulators estimated the cost would be $120, while the actual cost was $83.[32]

A recent review of the studies of costs of regulations for new car CO_2 emissions found that manufacturers often treat the costs of CO_2 reduction measures as if they did not change over time. This is due to modelling requirements and in order to have numbers that are on the conservative side. However, in the past there have been considerable cost-reductions CO_2-saving technologies.[33]

Overall, building in the positive impact of stimulating innovation to cut greenhouse gas emissions has a significant impact on projected costs, as a study by Imperial College/Fabian Society showed.[34] Whilst most studies put the costs of stabilising CO_2 emissions over the long term in the range of 0.5 to 4 per cent of Gross World Product, once the impact of innovation and 'learning by doing' is included the costs range from

minus 3 to plus 1 per cent. So there may actually be GDP gains from measures to reduce CO_2 emissions.

Narrow Sector focus

Costs are also often calculated with a narrow sector focus. The impact on the whole economy is often positive. In a recent global review of competitiveness Professor's Esty and Porter from Yale University and Harvard Business School found that:

"a growing body of research suggests that economic competitiveness and environmental performance are compatible if not mutually reinforcing. Low pollution and efficient energy use are a sign of the highly productive use of resources. Policies that stimulate improvements in environmental quality, then, may actually foster improvements in competitiveness that underpin a rising standard of living in the long run"[35].

On the trade-off between green and competitive, the two authors found: *"no evidence that improving environmental quality compromises economic progress. In fact, strong environmental performance appears to be positively correlated with competitiveness".*

Costs of having to do it later ignored

Economic modelling of policies to reduce greenhouse gas emissions in Canada shows that delaying implementation may reduce costs in the short-term but that the cost of making the changes required are higher over the medium term.[36]

3.4 Stern Review Issue Four

"The impact and effectiveness of national and international policies and arrangements in reducing net emissions in a cost effective way and promoting a dynamic, equitable and sustainable global economy including distributional effects and impacts on incentives for investment in cleaner technologies."

Targets and timetables

We believe that targets and timetable provide an essential framework for action. Targets and timetables show political leadership and commitment, reduce uncertainty for investors in solutions over the medium-term, and provide a framework within which to find the right delivery policies. They allow lead in times and investment cycles to be considered without reducing pressure to act, and can integrate environmental limits.

Targets need to be based on following the 2^oC trajectory. Weaker targets can have other unintended effects. The Marshall Report to HM Treasury noted that when advocating the bare minimum now "one must take into account the possibility that change could be more costly and painful" in the future.[37] Not only do the economic implications of the environmental science demand swift action so do more conventional economic considerations – the risk that firms investing now may purchase capital equipment which does not meet their future needs.

On Kyoto, we believe that timetables and targets are an absolutely essential element, and that the UK must continue to drive this process. Legally binding targets will be essential for climate change – at both national and international levels - because of the long commitment required, going beyond any one term of Parliament. **However, targets - while essential - are only as good as the delivery policies that follow. There need to be clear penalties if they are not attained, and review processes along the line to ensure that any drop-offs in delivery are dealt with in time.**

Types of policy tool

The main types of policies to meet these targets -economic instruments, legal standards, subsidy and encouragement - each have strengths and weaknesses. Tax and trading schemes integrate the need for action into commercial decision-making (investment, innovation etc) and reward continuous improvement, but their effectiveness depends on the rate or cap. Legal standards provide clear requirements and a strong motivation to comply, but do not always provide motivation for continual improvement (unless they are made to be "dynamic" as should be the case for minimum energy efficiency standards for products[38]) and rely on good enforcement and adequate penalties.

Each policy tool will need to be used in a way that utilises its strengths. It will be important to consider the roles of these policies tools objectively. This will not always be easy given the pressure from vested interests for particular policy types (for example business pressure to use the voluntary approach) and political policy fashion, which has moved from standards to tax to trading over recent years.

In particular we are concerned that there is currently a damaging anti-regulation crusade being waged by certain lobby groups. **We welcome initiatives for <u>better</u> regulation, but fear that this desire is being co-opted to mean <u>less</u> regulation. Regulation is an essential tool for protecting the environment and people, as a crucial part of the policy mix.** Well designed regulation can also have benefits for innovation and the economy.[39]

Policy design

We believe there are two essential requirements for good policy design:

A. Clear and strong motivations

Businesses and corporations' actions will be essential in stopping dangerous climate change. As bottom-line considerations will remain the business sector's most important concern, it needs to be given strong motivations & incentives to invest and innovate. Governments need to provide long-term, continuing, dynamic incentives to reduce emissions. Paying less and staying legal are two of the best motivations for responding to policy measures. The amount of money saved and the chances of being caught and the size of sanctions, if caught, are crucial**. In practice, the interventions most likely to succeed are ones which make certain actions either cause a loss of money for businesses, or be breaking the law.**

At an international level this will be very difficult – and the areas of subsidy and trade are likely to be critical. Certainly, **the international lending practices of the multilateral and bilateral banks will be a major lever, in the first instance by**

phasing out funding of fossil fuel projects. This must be a clear priority goal for Governments, as international long-term agreements along the lines of Kyoto, although essential, may take time to negotiate.

B. Package approach

Each policy can play a useful role but none can deliver it all. In fact unless they are integrated, they will be considerably less cost-effective. For example, policies to increase the cost of motoring in the late nineties (the fuel tax escalator) failed to encourage a switch to greener modes because tax measures were not accompanied by spending measures or other economic incentives to adequately improve the quality and cost of public transport alternatives or the safety of walking and cycling. Indeed, the fall-out from this un-integrated approach has meant that it now seems as if it is politically impossible to even keep taxes on motoring in line with inflation.

Packages of policies and the integrated use of all policy tools are needed. A successful example of this approach has been the Market Transformation approach used for improving the efficiency of domestic appliances.[40] In addition, harmonised European Union legislation, for example on minimum efficiency standards and energy efficiency labelling for energy-using products, has been successful so far and should be promoted as the way forward. For political as well as economic success in tackling climate change, packages of policies are crucial.

Distributional effects

Packages of policies are also essential to deal with distributional effects. Badly designed environmental measures could exacerbate inequalities. **So policies to reduce emissions should be also prioritised according to the additional social benefits that may have.** For example, policies designed to promote a comprehensive insulation programme of UK homes would have added social benefits. Spending the same amount of public money on nuclear or carbon capture and storage would instead transfer wealth to industry.

Distributional issues are not just important within countries. The damage from climate change looks set to hit developing countries hardest, and these countries are least able to protect their people and economies, yet it is developed countries' economies who are overwhelmingly responsible for climate change. **The developed world has run-up a colossal "ecological debt" to developing countries.** A progressive effective programme on climate change for the UK Government will include:

- Transfer of technology
- Financial support for adaptation.
- Phasing out of fossil fuel lending by multilateral and bilateral banks and increased funding for energy efficiency and renewables.

4. Part Four

In this section, we have tried to compile a list of questions that the Review could try to answer. **Priority questions for Friends of the Earth are in bold.**

- **Given scientific understanding of the global emission trajectories that will enable us to stay below 2°C, what is the role for the UK in staying on this global trajectory? What UK and international economic frameworks are needed to put us on and keep us on this trajectory?**

- Given the UNFCCC requirement on differentiated responsibilities, is the UK's current 60 per cent by 2050 target sufficient to ensure the UK's share of necessary carbon cuts?

- **Given political commitment to reduce emissions to a level that will enable warming to stay below 2°C above pre-industrial temperatures, what are the most cost-effective and long-term options for doing so in a way that does not create other significant environmental or global security issues (e.g. nuclear proliferation, etc)?**

- If there are to be any significant economic impacts from climate policies. e.g. on employment in the traditional coal sector or elsewhere, how can these be minimised?

- **What would be the additional cost in terms of damages from climate change arising from a 3, 4, 5 and 6 degrees or higher increase in global temperatures compared to the damaged arising at a 2 degree increase? What would be the economic impact? How about damages that cannot easily be monetised, such as a loss of the Gulf Stream?**

- To what extent do existing studies of climate economics take into account the benefits of developing new technologies and the avoided costs from climate change damages? How can these facts be taken into account adequately, as well as non-monetary benefits from climate policy, such as the right for people around the world to a stable climate? How can assessments of climate policies incorporate measurements of benefits and costs that are not or cannot be monetarised?

- **How is the Review going to take into account that great decreases in energy intensity are possible in the future, just as they have happened in the past, and that this can happen either through higher energy prices or through appropriate policies?**

- How will the Review take into account the fact that energy demand growth projections are matters for debate and that the current rate of energy demand growth can be influenced though policies rather than just taken as a given?

- How is the Review going to take into account of the potential for oil consuming countries to act jointly on the demand side (e.g an agreement between the EU and China + India on minimum energy efficiency standards for energy using products) in order to control price increases, rather than calling for increased oil production?

- **How fast would renewable energy and energy efficiency develop if energy subsidies, including financing through multilateral banks, were gradually shifted from fossil fuels and nuclear power and promoted sustainable technologies instead?**

- **What would be the best approaches for setting and operationalising a carbon budget across the UK economy as the key instrument for the UK to play its domestic part in keeping to a global trajectory for $2^{o}C$?**

- To what extent will the WTO reduce the ability for national Governments to use legal standards or economic instruments to drive improvements on climate change? (for example, there are currently challenges before the WTO under NAMA to remove differential tax rates for green versus polluting cars)

- How can a method of dealing with costs and benefits for future generations be openly identified and debated?

- **What, if any, discount rates are appropriate for comparing costs and benefits that accrue in different years?**

- **How can the distribution of costs and benefits be appropriately dealt with?**

- What broader and more accessible assessments methods be used to prevent debate becoming obscured with technicalities?

Ends.

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