

Governments and Climate Change Issues

The case for rethinking

David Henderson

The UK Government is pursuing policies to combat climate change that are a less than fully considered response to a situation that is much more uncertain than acknowledged.

Sir Ian Byatt, in written evidence to the House of Lords Select Committee on Economic Affairs, 20 March 2005.

1. A flawed process

The Stern Review on the economics of climate change has given rise to a spirited professional debate. My purpose here is not so much to extend that debate as to comment on a related and wider topic, namely, the questionable treatment of climate change issues by governments across the world.

The Review is best seen in context, and part of that context now is the massive Fourth Assessment Report (AR4) of the Intergovernmental Panel on Climate Change (IPCC). Since the Review appeared in final form, much though not the whole of AR4 has seen the light of day; and in particular, all three Summaries for Policymakers (SPMs), one for each of the IPCC's three Working Groups, are now in the public domain. The whole of the Report is due to appear by November 2007. Altogether, AR4 may well run to 3,000 pages, and some 2,500 experts were apparently involved in preparing it: I refer to this array of persons as the *IPCC network*.

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A related document to be noted, since it formed the point of departure for AR4 as for its predecessor, is the Special Report on Emissions Scenarios (SRES), commissioned by Working Group III and published in 2000.

Both the Stern Review and AR4 form part of a much wider picture. They are recent and important contributions to a large-scale worldwide continuing process which goes back over 20 years. Within it, governments are informing themselves about issues relating to climate change, defining and reviewing possible courses of action to deal with it, and shaping policies accordingly.

I have come to believe that this official process is seriously flawed. There are grounds for concern about the way in which governments across the world, and more particularly the governments of OECD member countries, are viewing and handling climate change issues. The concerns relate both to the *basis* and rationale for current policies, and to their actual *content*. Under both headings, a new and more considered approach is called for—a new framework for policy.

My main emphasis here is on the former area—that is, on the considerations which have formed the basis for official beliefs, actions, and proposals for further action. These considerations, the arguments and evidence which have carried weight, have chiefly emerged from the established official process of inquiry and review which is conducted through the mechanism of the IPCC and results in the Assessment Reports. Up-to-date top-level official confirmation that this is so is contained in the Declaration issued after the G8 Summit meeting of June 2007 (para 49):

Taking into account the scientific knowledge as represented in the recent IPCC reports, global greenhouse emissions must stop rising, followed by substantial global emission reductions.

Hence it is the IPCC process in particular that has to be a primary focus of attention: I give reasons for questioning it, and suggest ways in which it could be both strengthened and supplemented.

To define the leading issue in this way does not at all imply a concern for procedures as opposed to substance. To the contrary: since the IPCC's assessments provide the basis and rationale for far-reaching conclusions, decisions and actions by governments everywhere, *the reliability and integrity of the IPCC process constitutes a key substantive issue.*

The climate change agenda is not new, and governments are not starting from scratch. Policies to deal with perceived problems are well established and in course of being taken further. In the section that now follows, I sketch in some relevant background. In Section 3, I comment on some aspects of both the Stern Review and AR4, and raise the question of how far the two documents convey the same central message. I note here, and comment on, the strong and growing official emphasis on the risks and dangers of global warming. Section 4 sets out my central thesis. I outline what I call the problem of *unwarranted trust* in the IPCC process of inquiry and review: I put in question both the role of the Panel, as the chief instrument of governments, and the working assumptions of the departments and agencies that it reports to. In the final sections, I turn from criticism to positive proposals, and sketch out a suggested alternative framework for policy. This alternative comprises two interrelated elements:

- measures to strengthen the basis for decisions, by providing for a more balanced treatment of the issues and the evidence (Section 5); and
- a more coherent and less presumptive approach to policy, together with a stronger emphasis on taxation, rather than regulation, as a means to curbing emissions (Section 6). In the Annex I comment on disturbing features of some scientific contributions to the current debate on climate change.

2. The situation of today

A 15-year official consensus

Climate change issues, and in particular the extent and possible consequences of anthropogenic global warming, have been on the official international agenda for 20 years or so; and it is now 15 years since governments decided, collectively and almost unanimously, that determined action was called for to deal with what they agreed to be a serious problem. It is therefore surprising to read, in Martin Weitzman's impressive review article on the Stern Review, that the Review is to be commended because it:

... supports very strongly *the politically-unpalatable idea, which no politician planning on remaining in office wants to hear*, that the world needs desperately *to start confronting* the expensive reality that burning carbon has a significant externality cost... [italics added]

There is a complete misapprehension here. So far from being ‘politically unpalatable’, and hence by implication kept unacknowledged, the ‘idea’ in question has been formally endorsed by virtually every government in the world, with significant consequences for policy. Nor has this been a recent development. The decisive collective commitment was made in 1992, through the United Nations Framework Convention on Climate Change (UNFCCC), which almost all countries have ratified and none has denounced or backed away from. The Convention specifies that its ‘ultimate objective’ is ‘to achieve ... stabilization of greenhouse gas emissions in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system’. Many countries have since acted, through what is now a wide range of measures and programmes, to curb emissions of ‘greenhouse gases’, while on the international scene, through the Kyoto Protocol, ‘Annex I’ countries have undertaken to meet specific targets for emissions reductions. It is true that these Kyoto-based commitments are viewed by many as relatively unambitious, or as a first step only, and that in almost all the countries concerned they seem unlikely to be met. But the accepted direction of policy remains clear and unquestioned. It was reaffirmed in the 2007 G8 Summit Declaration, where the leaders, in specifying the agreed objective of policy today, used precisely the language just quoted from the UN Framework Convention. There is general agreement among governments that anthropogenic global warming presents, or could well present, a serious threat: one might speak here of a *post-1992 official consensus*.

Further initiatives

Both nationally and internationally, new and far-reaching measures to curb emissions are under consideration or in prospect. For example, the EU member countries, while pressing for wider international action, have recently made ‘a firm independent commitment to achieve at least a 20% reduction of greenhouse gas emissions by 2020 compared with 1990’. In France, President Sarkozy said at the time of his election that ‘France will make this battle [against global warming] its primary battle’. In Britain, the government is proposing to give statutory force to a series of five-year emissions targets, with a 60 per cent reduction, again as compared with 1990, to be achieved by 2050; and it has recently announced, first, an array of regulatory measures, including ‘introducing Energy Performance

Certificates which will give every home an energy efficiency rating' and providing that within ten years 'all new homes will have to be zero-carbon', and second, the intention to build five new towns, each to comprise some 20,000 zero-carbon dwellings.

Politically, there is little sign of serious organised opposition to such initiatives, still less of pressures to reverse the agreed direction of policy or to question the now established post-1992 consensus. In most if not all of the OECD countries at any rate, climate change issues are not a matter of inter-party controversy: there is general agreement on the seriousness of the problem and the need for further action. Aside from the President of the Czech republic, Vaclav Klaus, I know of no political leader today in these countries, or indeed elsewhere, who openly dissents from the official consensus, while there are few if any who have shown by their behaviour that they believe proposals to deal with climate change would be vote-losing.

Since 'mitigation' policies to curb emissions are firmly in place, and are in course of being strengthened rather than weakened, they form a point of departure when reviewing future possibilities. Hence a 'business-as-usual' scenario, or working assumption, is not to be interpreted as ruling out such policies: to the contrary, they should be taken as given.

Against this background, it is wrong to commend the Stern Review as a timely curtain call for action as opposed to inaction—though the term 'inaction' is deployed, repeatedly and inappropriately, in an article by Sir Nicholas and others in the last issue of this journal.¹ Rather, the central message of the Review is that *much stronger action* than is now in prospect, sustained and worldwide, is called for as a matter of urgency. To quote again key excerpts from the Review:

- 'The scientific evidence is now overwhelming: climate change presents very serious global risks and it demands an urgent global response'
- There are 'risks of major disruption to economic and social activity, on a scale similar to those associated with the great wars and the economic depression of the first half of the 20th century ... the estimates of damage could rise to 20% of GDP or more'.

¹ 'Reflections on the Stern Review (1): A Robust Case for Strong Action to Reduce the Risks of Climate Change' (hereafter Reflections 1; there is also a Reflections 2, with Sir Nicholas Stern as a co-author of both papers).

Given that the Review paints such a dark and disturbing picture of future risks, which has been uncritically accepted by many commentators and leading figures, it is worth asking how far a similar picture now emerges from AR4.

3. Parallel assessments

A surprising feature of the Review is that it pays little explicit attention to the contents of AR4—even though successive complete draft texts of the Report were made available to member governments and participants in the IPCC process from about the time that the Review was commissioned. Journalists in Britain have made the point that in some respects the Report appears as less tilted towards alarming possibilities than the Review. In a BBC radio programme, the interviewer raised this question with Sir Nicholas. The following exchange took place (25 January 2007):

Stern: “We’ve drawn on the basic science. We have not tried to do new scientific research. We’re not scientists.”

Cox (BBC): “I just wonder why your figures are different if you’ve just drawn from the existing literature, why your figures would be different from the IPCC?”

Stern: “The IPCC is a good process, but it has to depend on consensus. It means that they have to be quite cautious in what they say.”

In contrast with this last informal remark, Stern and three co-authors, in *Reflections* 1, say (p. 128) that ‘Our conclusions on future climate change have, since publication, been affirmed by the [IPCC]’. The same argument is made in the paper by Mitchell *et al.* in the same issue of *World Economics*: referring to the SPM of the report from the IPCC’s Working Group I, they write (p. 222) that this document ‘corroborates the scientific basis of the Stern Review’.

This, however, is not the whole story. Although a full comparison would require both substantial space and a wide range of expertise, it is possible to identify some respects in which the treatment in AR4, as set out in the SPMs of the three Working Groups, appears as not identical with that in the Review.

Two messages or one?

One conspicuous difference lies in what is said in the Review about the choice of rates of interest for discounting possible future costs and benefits arising from climate change and from measures to deal with it. A notable feature of the Review is its advocacy of what appear as strikingly low discount rates; and this feature has been singled out by commentators—as for example by Beckerman and Hepburn, Dasgupta, Mendelsohn, Nordhaus, Tol and Yohe, and Weitzman, as well as in Part II of our Dual Critique of the Review (Byatt *et al.*, 2006) in this journal. By contrast, there is no similar recommendation in AR4. The SPM of Working Group III refers to the distinction between private and social discount rates, and reports on the results of studies in which—though this is not highlighted—illustrative social rates of discount entered into the analysis. But the Report does not take a position on how these rates should be determined or what they should be. While the two documents are not at odds, it cannot be said that the Report lends support to the strong position that the Review has taken on this issue.

While the discounting issue looms large, it is not the only distinctive feature of the Stern Review approach. In Reflections 1, the point is made (again) that ‘it is the physical impacts of climate change ... that form the core of our case for action’ (p. 125). Here the two main elements of risk which the Review has stressed are (1) that anthropogenic global warming could go significantly further than earlier ‘consensus’ projections would indicate, and (2) that various possibilities could then arise, with a higher probability than had been previously attached to them, of extreme and even catastrophic developments.

In relation to both categories of risk, the Review relies heavily on recently published work. It emphasises at many points what Sir Nicholas has referred to as ‘crucial advances in the science in the past few years’,² which are taken to have been made since the IPCC’s Third Assessment Report (TAR) appeared in 2001. The same theme recurs several times in Reflections 1, which concludes that since ‘our estimates are drawn from a comprehensive and up-to-date sweep of the literature’ (p. 122), and ‘we took on board the latest evidence’ (p. 127), earlier studies which arrived at different results are now out of date:

² *Financial Times*, 6 November 2006.

The positions of four or five years ago were taken before scientific evidence really gave us our first handle on probabilities, and they were derived using estimates of only a subset of all the climate impacts considered possible (p. 159).

In Reflections 2, it is actually argued (p. 169) that

... across the world, progress of understanding and developing the necessary policy response to climate change has been especially rapid *in the last few months* [italics added].

The Review's call for a worldwide redesign of policies, and a new urgency in programmes to curb emissions, thus rests on the argument that substantial *and conclusive* scientific advances, pointing clearly to greater risks of dangerous outcomes, have recently been made. Given the weight that is placed on a number of recent studies, the question arises of how far these studies are given the same prominence, and the same credence, in AR4. My layman's impression from reading the SPMs of the three AR4 Working Group reports is that, while numerous recent advances in knowledge are duly identified, it is not suggested that these are so far-reaching, and so firmly established, that they point to a revaluation of possible future threats, with radical implications for policy. There appears to be substantial continuity between AR4 and its predecessor.

One subject where Review authors and Report appear to diverge is that of prospects for the period up to 2030 or so. In Reflections 2, the confident statement is made (p. 184) that 'We are already locked into the next 20–30 years of climate change of between 1 to 2 degrees increase in average global temperatures'. By contrast, the SPM of AR4's Working Group I includes the much more modest assessment (p. 13) that

...even if all radiative forcing agents are held constant at year 2000 levels, a further warming trend would occur in the next two decades at a rate of 0.1°C per decade... About twice as much warming (0.2°C per decade) would be expected if emissions are within the range of the SRES scenarios.³

Another specific difference relates to atmospheric concentrations. The authors of Reflections 1 write (p. 125) that 'The concentration of GHGs in the atmosphere is now rising at a faster rate than ever before.' By contrast,

³ Related divergences between Review and Report are noted by the authors of Part I of our Dual Critique, in the further article of theirs which appears in this current issue (Carter *et al.*, 'Climate Science and the Stern Review').

the new WGI Report notes (p. 141) that, while the CO₂ accumulation rate has increased slightly over the past ten years or so, growth rates of other greenhouse gasses have fallen substantially. The total estimated increase in GHG concentrations between 1998 and 2005, as measured in terms of radiative forcing, was only 9 per cent. This is in fact the slowest rate of increase since at least the 1970s.

A general difference between Review and Report lies in their treatment of uncertainty. Although it emphasises the need to take full account of uncertainty, the Stern Review falls short in this respect. Within it, only one form of uncertainty is highlighted and insisted on. The Review's central theme is that, in a distant and admittedly unknown future with a wide range of possible outcomes, we cannot be at all certain that unchecked anthropogenic global warming will *not* give rise to one or more of various highly damaging or even catastrophic outcomes. 'Uncertainty' is taken to refer to the absence of assurance that disasters originating from this source will not materialise.⁴

In this vision of a distant future, more immediate sources of uncertainty are played down. In particular, and as emphasised in Part I of our Dual Critique, the Review fails to take due account of the profound uncertainties which still pervade climate science, and which will not soon be resolved. By contrast, some major remaining scientific uncertainties, for example in relation to aerosols and cloud formation, are duly noted in AR4 (Working Group I) as in its predecessor.

Symptomatic of the Stern Review's underplaying of key aspects of uncertainty is its persistently overconfident use of language. Here also there is a contrast with the IPCC approach. Generally speaking, the Panel has been careful to stress that the results it comes up with for future possible outcomes represent *projections* only, and not *predictions*. Such prudence is not characteristic of the Review where the term 'predictions' constantly occurs. In the same vein, the word 'will' is regularly deployed in relation to future possibilities, rather than 'may', 'might', 'could' or 'would'; and models that are drawn on are typically said to 'show' what is or will be the case, rather than to 'indicate' or 'suggest' possibilities.

Throughout the Review, the term 'climate change' is used to refer to changes arising from human activities and their effects on greenhouse gas

⁴ In addition to various specified damaging or disastrous possibilities, Reflections 1 goes so far as to bring in, as an extra worrying dimension of uncertainty, 'the risks of consequences yet to be discovered' (p. 139).

emissions, as though no other influences of any significance could be at work. This too is a departure from IPCC conventions (though not from UNFCCC usage), and a further illustration of the Review's lack of balance.⁵

A heightened milieu consensus

Given such differences between the two documents, the question arises whether the central policy message of AR4 is the same as that of the Review: how far does the Report lend support to the Review's advocacy of 'an urgent global response'? There is room for debate here, and in any case the principles governing the Panel's work lay down that 'IPCC reports should be neutral with respect to policy': in that respect, therefore, AR4 is indeed 'more cautious' than the Review. However, some clear and characteristic statements on policy implications were provided not long ago, in the context of the report of AR4's Working Group I, by high-level official persons who are members of what I call the *environmental policy milieu*.

- Dr Pachauri, the Chairman of the IPCC: 'I hope this report will shock people [and] governments into taking more serious action'
- Achim Steiner, the Director-General of the United Nations Environment Programme (UNEP, one of the two parent agencies of the IPCC): 'in the light of the report's findings, it would be "irresponsible" to resist or seek to delay actions on mandatory emissions cuts'⁶
- Yvo de Boer, Executive Secretary of the UNFCCC: 'the findings ... leave no doubt as to the dangers that mankind is facing and must be acted on without delay'
- Stavros Dimas, the European Union's Commissioner for the environment: 'a grim report'.

These are strong assertions, which serve to confirm and reinforce the activist message of the Stern Review. It should however be noted that in none of them was the wording taken directly from either the WGI Report or its SPM: these eminent persons were drawing from the Report their

⁵ On p. 23 of the Review, as the first of several 'key messages' of Chapter 2, the extraordinary statement is made that 'Climate change is a result of the externality associated with greenhouse gases'. There is, of course, a long history of climate changes that had no connection with this influence.

⁶ This and the following quotation are taken from a report (3 February 2007) in the *Financial Times*.

own confident and unqualified personal conclusions as to the lessons for policy. While they were fully entitled to form and air these opinions, such statements as those just quoted, though arising out of the Assessment Reports, are not just summaries of ‘the science’.

In relation to these and many similar pronouncements down the years, one can speak of an established *high-level milieu consensus*. This goes beyond the agreed reference to the dangers of anthropogenic global warming that is contained in the Framework Convention. It takes the threats to the climate system to be dire and imminent, and the need for far-reaching action as correspondingly urgent. It is a *heightened* consensus.

Stark warnings of the same kind have increasingly been put out by political leaders at the highest level. Here are some recent examples from OECD member countries:

- Tony Blair, then still Prime Minister of the UK, commenting on the Stern Review at the time of its appearance, said that ‘what is not in doubt is that the scientific evidence of global warming caused by greenhouse gas emissions is now overwhelming... [and] ... that if the science is right, the consequences for our planet are literally disastrous’
- Blair and the Dutch prime minister, in a joint letter of October 2006 to other EU leaders, wrote that ‘We have a window of only 10–15 years to take the steps we need to avoid crossing a catastrophic tipping point’
- Stephen Harper, Prime Minister of Canada, in a recent speech, described ‘climate change’ as ‘perhaps the biggest threat to confront the future of humanity today’
- President Sarkozy of France, in the remarks of May 2007 already quoted, declared that ‘what is at stake is the fate of humanity as a whole’.

Such assertions are bold extrapolations from the Assessment Reports, with a clear presumptive element. However, they are fully sanctioned by the environmental policy milieu and in tune with much public thinking—including, increasingly, that of large business enterprises across the world.

Given the existence of an established and heightened milieu consensus, and the high-level political endorsement that it has received, the argument could well be made that the case for prompt and much stronger policy action does not depend on the Stern Review, so that just how much weight should be placed on the Review is not a central issue. Even if (it

could be said) the Review represents a rather extreme position—which is of course debatable—and even if economists continue to wage their own inconclusive private wars, about discount rates for example, the need for ‘an urgent global response’ has been established, independently and authoritatively, through the past and current work of the IPCC. According to this widely-held belief, which is echoed in the Stern Review, the Panel’s reports have yielded highly disturbing results which can no longer be questioned by open-minded and reasonable persons.

I do not accept this plausible-sounding line of argument, because of the doubts that I have come to hold about the IPCC process and the official policy environment of which it forms an integral part.

4. Unwarranted trust

The IPCC process, and the massive Assessment Reports which are its main single product, are widely seen, by governments and public opinion alike, as thorough, balanced and authoritative. There is a common belief that the Panel has created a worldwide scientific consensus, based on an informed and objective professional review, which provides a sound basis for policy; and this belief has found support from eminent independent scientists and from scientific academies. Since its inception in 1988, the IPCC process has established itself, in the eyes of the great majority of its member governments, as *their sole authoritative and continuing source* of information, evidence, analysis, interpretation and advice on the whole range of issues relating to climate change.

In my view, there are good reasons to query the claims to authority and representative status that are made by and on behalf of the IPCC, and hence to question the unique status, one of virtual monopoly, that it now holds. The trust so widely placed, in Panel and process alike, is unwarranted; and this fact puts in doubt the accepted basis of official climate policies.

Process and actors

The main grounds for trust in the IPCC process were summarised a few years ago by Dr Pachauri, in a press statement responding to critics (of whom I was one). He said that the IPCC:

... mobilises the best experts from all over the world, who work diligently in bringing out the various reports of this body on a regular basis. The Third Assessment Report (TAR) of the IPCC was released in 2001 through the collective efforts of around 2000 experts from a diverse range of countries and disciplines. All of IPCC's reports go through a careful two stage review process by governments and experts and acceptance by the member governments composing the Panel.⁷

This is substantially correct (though one might want to say 'some of the best'), and Pachauri could also have made the point that in preparing its reports the IPCC relies, in principle and all but exclusively, on peer-reviewed publications. The Panel has indeed put in place ordered procedures for directing the work of a large number of expert groups and ensuring that the results are formally reviewed.

It is chiefly from this wide and structured expert participation, through and within the IPCC network, that the Panel derives its credibility in the eyes of outsiders. It is in the *network*, and the *reporting process* which brings its members together, that trust is placed: people visualise an array of technically competent persons whose knowledge and wisdom are effectively brought to bear through an independent, objective and thoroughly professional scientific inquiry. Indeed, many observers make no distinction between the network and the Panel itself, as though well-qualified and disinterested experts were the only people involved.⁸ The reality is both more complex and less reassuring.

To begin with, the IPCC process as a whole involves much more than the network: there are several further elements that have to be taken into account.

First among these is the *Panel* itself, which controls the process of preparing the Assessment Reports. It effectively comprises those individuals—chiefly officials—whom governments (and the two parent international agencies) choose to send to Panel meetings. These include scientists as well as laypersons. Working directly for the Panel is the IPCC *Secretariat*, though this is a small group whose functions are mainly of a routine administrative kind. A more influential body is the IPCC *Bureau*, comprising high-level experts in various disciplines from across the world,

⁷ As noted above, the stated number of participating experts was actually greater in AR4, at around 2,500.

⁸ Among leading scientists, one example is Robert Ehrlich, a professor at Yale. He describes the IPCC as 'a respected international group of hundreds of scientists' and as 'comprised of scientists from 99 countries' (Ehrlich, 2005, pp. 138 and 169). But the network, which he is referring to, is quite distinct from the Panel, and there is little or no overlap between the two.

chosen by the Panel: it acts in a managing and coordinating role under the Panel's broad direction.⁹ Last but far from least, there are the government departments and agencies which the Panel reports to: it is here, and not in the Panel itself, that the ultimate 'policymakers' are to be found. The relevant political leaders and senior officials within these departments and agencies largely make up what I call the *policy milieu*. In addition, leading members of the IPCC Bureau, past as well as current, can also be classed as members of the policy milieu; and together with the most influential members of the Panel, these persons make up what may be termed the informal *directing circle* of the IPCC. In turn, the directing circle, together with a substantial number of prominent and like-minded expert participants in the reporting process, can be seen as making up an informal *IPCC milieu*.

Policy commitment

Now while the IPCC as such has been instructed that (to repeat) its reports 'should be neutral with respect to policy', it seems clear that this instruction is intended to refer specifically and exclusively to the contribution made by the network through the reporting process. The official Panel members, together with the governmental policy milieu which they report to, are almost without exception far from neutral: they are committed, *inevitably and rightly*, to the objective of curbing emissions, as a means to combating climate change, which their governments agreed on when they ratified the Framework Convention; and in many cases they are likewise committed to the kinds of policies that their governments have adopted in pursuit of that objective. As officials, they are bound by what their governments have decided. This is the context within which the three successive IPCC Assessment Reports prepared since 1992 have been put together and reviewed by member governments. The clients and patrons of the expert network, with few exceptions, take it as given that anthropogenic global warming is a serious problem which demands, and has rightly been accorded, both national and international action.

It is against this background, of a policy milieu that is not at all neutral, that some basic features of the reporting process have to be borne in mind.

⁹ Membership of both the Secretariat and the Bureau is public knowledge. Reports of the sessions of the Bureau between 2002 and 2004 were placed on the IPCC website and remain available, but reports on the meetings that have been held from April 2005 on have not been published.

The choice of lead authors for the Assessment Reports largely rests with the already-committed member governments, since lists that they provide form the starting point for the selection process; complete draft texts of the Working Group reports go to these governments for review; and it is governments, as represented in the Panel, that sign off on the final versions of the Assessment Reports and amend the draft SPMs before they approve these also for publication. The fact is that departments and agencies which are not—and cannot be—uncommitted in relation to climate change issues are deeply involved, from start to finish, in the reporting process.

How far does this close involvement of committed IPCC member governments put in doubt the objectivity and integrity of the expert network and its reporting process, and hence the widespread public trust that is placed in both? This is not an easy question to answer, especially without inside knowledge of the history and institutions. My own outsider's view is as follows.

- It is not necessarily a fatal flaw in the IPCC process that governments and scientists are so closely linked within it, and the reporting aspect of that process is not to be held in question merely because of these links. A clear separation between Panel and network, such as has been suggested by some observers, would serve no purpose: more on this below
- Nonetheless, the existing and long-established forms of official involvement need to be reconsidered: the process and its constituent actors should no longer be taken as given. There are deep-seated problems of bias and lack of objectivity
- The present widespread trust in the IPCC process, including the reporting process within it, is not well founded. Despite the numbers of experts taking part, and the lengthy formal procedures involved, the preparation of the IPCC Assessment Reports is not a model of rigour, inclusiveness and impartiality.

Errors, omissions and bias

In this latter connection, there are several related aspects to be noted.

To begin with, the treatment of economic issues within the network and by the Panel has not been up to the mark. Writings that featured in the Third Assessment Report, and in particular the SRES, contained what many economists and economic statisticians would regard as basic errors,

showing a lack of awareness of relevant published sources; the same has been true of more recent IPCC-related writings, as also of material published by the UNEP; and similar weaknesses are to be found in AR4. In this area, the IPCC and its sponsors appear as neither representative nor fully competent.¹⁰

A conspicuous error, in the SRES and elsewhere, has been the use of invalid cross-country comparative figures for real GDP, derived from exchange rates rather than purchasing power parity (PPP) estimates: this has been linked to a failure to grasp the rationale of PPP comparisons. Not only has the SRES, despite its flaws,¹¹ been used as the point of departure for AR4, but from the SPM of the WGIII Report, as also in the Report itself, it is apparent that the same basic confusions still persist. For example, it is stated in Chapter 11 of the Report, on the authority of a study published by the International Energy Agency (IEA) in 2004, that ‘On average, oil importing developing countries use more than twice as much oil to produce a unit of output as do OECD countries.’ This assertion is incorrect. In the article referred to in the previous footnote, Castles and I showed that the IEA had wrongly used exchange rate-based estimates of GDP in its comparisons, thereby inflating the energy intensities of developing countries.¹²

More broadly, the built-in process of peer review, which the IPCC and member governments view and refer to as a guarantee of quality and reliability, does not adequately serve that purpose, for two reasons.

¹⁰ From late 2002 on, Ian Castles and I jointly put forward a critique of some leading aspects of the IPCC’s economic work, while authors involved in that work contested our criticisms. Following these exchanges, we published in 2005 a joint paper on international comparisons of GDP, and I reviewed and carried further the whole debate in a later article (Henderson, 2005). Neither of these latter pieces features either in the array of some 1,100 references listed in the Stern Review or in the 400 or so references appended to the relevant chapter of the AR4 report of WG III. However, the latter list includes the press statement of Dr Pachauri already quoted above, where Castles and I are said to have spread ‘disinformation’ and are described as ‘so-called “two independent commentators”’.

¹¹ The SRES had four contributing editors, 53 authors, and 89 expert reviewers. Between them, and drawing on the work of six modelling groups, they produced a document in which, among other things, the concept of GNP is misdefined; invalid cross-country comparisons of GDP are derived, one result being that energy intensities and emissions intensities are wrongly estimated; the rationale of PPP comparisons is misstated; series are described as PPP-based which do not have that character; and the 1993 inter-agency System of National Accounts, the officially-recognised guide to its subject matter, does not figure in the extensive list of references.

¹² As noted in Part II of our Dual Critique (p. 222, footnote 14), the same confusions in relation to cross-country GDP comparisons are also to be found in the Stern Review. Here as elsewhere, the points we made in the Critique are not responded to in the Reflections pieces, which largely comprise an extended restatement of the Review’s main arguments and conclusions.

- First, peer review is no safeguard against dubious assumptions, arguments and conclusions if the peers are largely drawn from the same restricted professional milieu
- Second, the peer review process *as such*, here as elsewhere, may be insufficiently rigorous. Its main purpose is to elicit expert advice on whether a paper is worth publishing in a particular journal. Because it does not normally go beyond this, peer review does not typically guarantee that data and methods are open to scrutiny or that results are reproducible. It does not guarantee *due disclosure*.

The issue of disclosure, and of the IPCC's handling of it, is symptomatic. It was taken up in Part I of our Dual Critique of the Stern Review, where the authors referred, in my opinion with good reason, to 'the scandal of non-disclosure and poor archiving' (p. 189). A leading instance is the celebrated 'hockey-stick' study, which was prominently displayed and drawn on in the Panel's Third Assessment Report and afterwards. The study formed the basis for a memorable and widely accepted claim that in the Northern Hemisphere the 1990s had been the warmest decade of the millennium, and 1998 the warmest single year. Probably no single piece of alleged evidence relating to climate change has been so frequently cited and influential. The authors concerned failed (and later declined, until strong pressures were eventually brought to bear) to make due disclosure, and neither the publishing journals nor the IPCC required them to do so.

Comprehensive exposure of the flaws of the hockey-stick study came from two Canadian authors, Stephen McIntyre and Ross McKittrick, in a notable series of papers and presentations none of which is listed in the Stern Review or mentioned in the Reflections pieces.¹³ Their work eventually prompted parallel initiatives by two committees of the US House of Representatives. Both committees set up high-level inquiries into the subject—one from an expert group appointed by the National Research Council, and the other from a committee chaired by a leading statistician, Edward Wegman. Both inquiries reported in July 2006.¹⁴ The outcome fully bears out the McIntyre–McKittrick critique, and the Wegman report

¹³ A detailed account of the whole episode, up to two years ago, is contained in a paper by McKittrick which forms Chapter 2 of Michaels (2005).

¹⁴ National Research Council (2006), and Wegman, Scott and Said (2006). A summary of the two reports is given in Henderson (2006b).

in particular is devastating. Neither report is mentioned in the Stern Review, or in the Reflections pieces, or in the article by Mitchell *et al.*

In the latter piece, responding to Part I of our Dual Critique, the authors say, briefly and dismissively (p. 221) that ‘the peer review process is fundamental to all academic endeavours and is no different for climate science than for any other branch of science’. This both misses the point and shows a lack of awareness. In economics, where similar issues of disclosure have arisen, leading journals now insist on more rigorous procedures than standard peer review provides. By way of illustration:

- The *American Economic Review* has now adopted an editorial policy which requires of articles submitted, as a precondition for publication, that data and computer code, in sufficient detail to permit replication by others, should be archived on the journal’s website
- ‘It is the policy of the *Journal of Political Economy* to publish papers only if the data used in the analysis are clearly and precisely documented and are readily available to any researcher for purposes of replication. Authors of accepted papers that contain empirical work, simulations, or experimental work must provide to the Journal, prior to publication, the data, programs, and other details of the computations sufficient to permit replication. These will be posted on the JPE Web site...’

Disclosure issues in the IPCC reporting process go beyond the ‘hockey-stick’ study and related published work. Similar doubts and questions have arisen in relation to other temperature series which the process has drawn on, including results derived from instrument-based data. In this connection, and as noted by Carter *et al.* in their article in this present issue, several requests are currently under way in Britain under the Freedom of Information Act. There is here a continuing saga, in which again exposure of the problem, and the pressures for due disclosure, have come exclusively from private individuals.

It is not just the failures of disclosure on the part of cited authors that betray a lack of professionalism in the IPCC process, but also, and still more, the failure of the IPCC directing circle to admit the existence of the problem, recognise it as serious, and take remedial action. So far as I know, no public statement from any of these persons, or for that matter from any of the IPCC’s sponsoring departments and agencies, has referred to the issue, admitted that too much credence and prominence may have been

given to questionable findings, or acknowledged the limitations of standard peer reviewing procedures. A similar evasive reticence is shown in AR4. The responsible persons and organisations have pursued here a strategy of evasion and disregard.

A notable instance of official disregard is the failure of the Stern Review even to mention the major report on the economics of climate change from the House of Lords Select Committee on Economic Affairs, which was published in July 2005 just before the Review was commissioned, and which among its other contributions raised pertinent questions about the IPCC process. The Review's omission is not made good in either of the Reflections pieces.

It is not only in the context of peer-reviewed work that a lack of milieu candour and objectivity is apparent, but also in relation to the everyday conduct of public debate. Across the world, the treatment of climate change issues by environmental and scientific journalists and commentators is overwhelmingly one-sided and sensationalist: studies and results that are unalarming are typically played down or disregarded, while the gaps in knowledge and the huge uncertainties which still loom large in climate science are passed over. A conspicuous recent case in point, both in itself and in its reception by the media, is the Al Gore film and book, *An Inconvenient Truth*. This pervasive bias on the part of so many commentators and media outlets is in itself worrying; but even more so, to my mind, is the fact that leading figures and organisations connected with the IPCC process, including government departments and international agencies, do little to ensure that a more balanced picture is presented. It is characteristic of the environmental policy milieu that proposals are in train to distribute *An Inconvenient Truth* to schools as an officially recommended and reliable source: the British government has already taken such action.¹⁵

How are these various professional lapses to be explained? I believe that a number of mutually reinforcing influences are at work.

¹⁵ A detailed commentary on *An Inconvenient Truth* is given in Lewis (2007). The author finds (p. 1) that 'most of Gore's claims regarding climate science and climate policy are either one-sided, misleading, exaggerated, speculative, or wrong'. In announcing the British government's decision to circulate it to schools, the then Secretary of State for Education and Skills, Alan Johnson, said that the film 'is a powerful message about the fragility of our planet'. The bias exemplified here is not new. A 10-year-old study (Aldrich-Moodie and Kwong, 1997) argued, with supporting evidence, that in both the US and Britain, 'children are being presented with biased information about the environment', focusing on 'doomsday scenarios and indoctrination'.

- In the case of some flawed studies referred to above, in both economics and climate science, the technical aspects may not have been fully grasped, since the relevant expertise has not been well represented within the network: this applies in particular to statistical expertise
- More broadly, there has been a tendency to close ranks, so as to shield professional colleagues and associates, and to safeguard what is seen and described as ‘scientific consensus’ doctrine, from outside criticism
- An influential factor is the increasingly widespread conviction that these so-called ‘consensus’ views are now virtually beyond question, so that critics and dissenters, even if admitted to be disinterested (and this is often questioned), do not deserve to be taken seriously: where they cannot just be ignored, they can be dealt with simply by a restatement of the official party line. This latter procedure is exemplified in the British government’s dismissive official response to the House of Lords Select Committee report, which does no credit to the department that produced it¹⁶
- Finally, there are concerns that nothing should be said or written, and no acknowledgement or concession should be made, which would put in doubt the fundamental proposition that anthropogenic global warming represents a serious potential threat. A belief that the future of the planet is at stake is apt to crowd out considerations of objectivity and balance.

From all this, the IPCC process *as a whole* emerges as flawed. Some commentators have argued that the role of the Panel in particular is problematic, in that the SPMs for which it is responsible have been more tilted towards alarm than the Working Group reports that they purported to summarise. But such a pattern did not emerge from the final stages of AR4, where publication of the full WGII Report has been seriously held up, apparently because of objections on the part of lead authors to the way in which the (already published) SPM had effectively toned down some of what was said in the final draft Report. More generally, it is wrong to cast the Panel members as the arch-villains of the piece, with the experts and the reporting process as victims of their guile and built-in official bias. For one thing, it is not from the carefully weighed and reader-unfriendly prose

¹⁶ I commented on this official response in Henderson (2006a).

of the SPMs that the stirring language of the heightened milieu consensus is drawn. For another, and has been seen above, the expert reporting process is itself flawed. It is true that the IPCC directing circle and milieu, as also the environmental policy milieu which they report to, are deeply biased; but their bias not only influences, but also characterises, the conduct and outcome of the reporting process. Hence ensuring a clear separation between Panel and network, even if practicable, is neither a necessary nor a sufficient condition for improving the IPCC process.

The influence of global salvationism

Some history is relevant here. Within the policy milieu, there is a generic bias which goes a long way back and extends well beyond issues relating to climate change. Over a period of 40 years or more, and increasingly over time, departments and agencies concerned both with the environment and with the economic problems of poor countries have typically adhered to the set of beliefs and presumptions which I have termed *global salvationism*.¹⁷ Here two elements are combined. One is an unrelentingly sombre picture of recent trends, the present state of the world (or ‘the planet’), and prospects for the future unless governments involve themselves more closely, and with immediate effect, in the management and control of economic events. Within this picture, environmental issues are treated almost exclusively in terms of problems, dangers, and potential or even imminent disasters, with the presumed harmful effects of economic growth as one reason for concern. The second element is a conviction that known effective remedies exist for the various ills and threats thus identified: ‘solutions’ are at hand, given wise collective resolves and prompt action by governments and ‘the international community’. Global salvationism thus combines dark visions and alarming diagnoses with confidently radical collectivist prescriptions for the world.¹⁸

During the 1980s, what had by then become a broad salvationist milieu consensus, firmly entrenched in a range of UN agencies as well as in national capitals, found expression in two widely read and influential reports, each produced by a specially convened international group of

¹⁷ The content, history and implications of global salvationism form the main theme of Chapter 4 of Henderson (2004).

¹⁸ A prominent feature of the dark salvationist picture of reality has been much-overstated measures of the gap between rich and poor countries, derived from invalid exchange-rate-based, rather than PPP-based, comparisons of GDP per head.

eminent persons. The first of these was the Brandt Report of 1980, and the second the Brundtland Report of 1987.¹⁹ Included in the latter was a section on the possible dangers from anthropogenic global warming, which was described (p. 34) as ‘a threat to life-support systems’; and from that time on a belief in the reality of such a threat came to be an integral part of global salvationist doctrine. The Brundtland Report led on to the December 1989 resolution of the UN General Assembly, which authorised what became the 1992 UN Conference on Environment and Development (the Rio ‘Earth Summit’). Meanwhile the IPCC was established by governments in 1988, and its First Assessment Report, published in 1990, provided the basis for the agreement, formalised in Rio, to create the UNFCCC.

Right at the start, therefore, the dangers from anthropogenic global warming entered as a new and important element into the already existing body of global salvationist thinking. The client environmental departments and agencies of the IPCC had long been committed to such beliefs, as they still are today.²⁰

Of course, this historical link can be seen as no more than coincidental: in itself, it does not put in doubt the findings of climate scientists or the competence and objectivity of the IPCC network and reporting process. Indeed, it is not difficult to find strong critics of global salvationist pessimism who nonetheless accept that anthropogenic global warming is a worrying phenomenon: two prominent examples are Bjørn Lomborg (2001 and 2004) and Dick (Lord) Taverne (2006). But the close relationship between the IPCC milieu and its sponsoring departments and agencies, together with the ingrained salvationist tendencies of the latter, have I think given rise to two related features of the IPCC process which put in question its objectivity and claims to authority.

First and foremost, members of the IPCC Bureau, and more broadly of its directing circle, have from the outset shared the conviction that anthropogenic global warming presents a threat which demands prompt and far-reaching action by governments; and had this not been evident, and known to be the case, *they would not have attained their leading positions*

¹⁹ At the time, I published a review article on the Brandt Report (Henderson, 1980), where my final assessment of the document as a whole was that ‘the view of the world on which it rests is false’.

²⁰ A good illustration of this continuing commitment is the most recent issue of the UNEP flagship document, *Global Environment Outlook 3* (2003).

within the process. To take only the examples of today, already mentioned and quoted above: Pachauri (as Chair of the IPCC), Steiner (as Director-General of UNEP), and de Boer (as Executive Secretary of the UNFCCC) would not have sought their respective posts, nor would they have been seen by UN agencies and member governments as eligible to hold them, had they not been identified as fully committed to ‘consensus’ views. The same has been true throughout of the Bureau and directing circle. The IPCC process is run today, as it has been from the start, by true believers. This accounts for the readiness of those concerned to make strong public pronouncements of the kind quoted above, which go beyond the more nuanced language of the Assessment Reports; to turn an unseeing eye to the disclosure failures and other weaknesses in the reporting process; and to view with equanimity or approval the lack of balance that characterises public debate.

Second, my impression is that over time the expert network, while growing in numbers (so that the stock of peer reviewers has expanded *pari passu*), has become increasingly dominated by subscribers to the milieu consensus. It has become more difficult for independent outsiders, who do not share accepted beliefs and presumptions of the IPCC milieu, and of the Panel’s parent bodies and sponsoring government departments and agencies which provide the overwhelming bulk of research funding in this area, to contribute usefully to the reporting process. For this and other reasons, some nonconforming experts have either declined to become involved with the process or have later withdrawn from it. The network has thus become more numerous but less representative. At the same time, it may have become harder for younger scientists, with careers still to make, not to fall in with received majority opinion which is both officially sponsored and strongly held. In evidence to the House of Lords Select Committee (Vol. II, p. 233), David Holland wrote, admittedly as an outsider: ‘If I were beginning my career I cannot imagine that I could make a living in climate science without accepting the current consensus’. In both scientific circles and the reporting process, therefore, dissenters have been gradually sidelined or eased out.

This is the background against which the professional lapses noted above are to be seen. They are symptomatic of a deeply ingrained bias which has characterised both the IPCC milieu and its clients from the outset, and which has intensified over time.

Unreliable defence witnesses

Admittedly, the IPCC and its official sponsors can quote some eminent independent witnesses in their defence. As noted, the Panel and its work have received unsolicited high-level endorsements from leading scientists and scientific bodies outside both the milieu and the official world. For some observers, this is a telling point. For example, Richard (Lord) Layard, speaking last year (14 July 2006) in a House of Lords debate, said that the ‘scientific consensus’, which ‘includes all but a very few climatologists’

... is supported by our own Royal Society and by the American Academy of Sciences. I do not really see how non-scientists can take a different view from those bodies unless we want to question their motivation. These bodies are not composed primarily of climatologists, who might want to exaggerate the importance of their subject, but of those best placed to appraise the work of climatologists...

But while the support is real—indeed, it has also come from other national academies of science, and from eminent individual scientists speaking on their own behalf—it should not be taken as decisive. In my view, this outside expert testimony is by no means above question. In that connection, some points to be noted are:

- It is not clear how far the statements and expressions of opinion that have been put out by academic bodies reflect the views of their members, or whether those members were consulted
- None of these eminent outside persons or bodies has to my knowledge faced or acknowledged the key issue of non-disclosure. This is a serious and revealing omission
- There is a long and still-continuing history of scientific adherence to global salvationist presumptions and beliefs. Much the same forms of ingrained bias exist within this milieu as in the IPCC’s client departments and agencies²¹
- Some of the high-level witnesses referred to have evinced a worrying combination of bias, inaccuracy and intolerance: some illustrative evidence here is presented in the Annex.

²¹ Recent publications that fit this alarm-oriented mould are Rees (2003), Lovelock (2006), and Diamond (2005) which was the subject of a detailed critique in Volume 16, Number 3/4 (2005) of *Energy and Environment*. Over 30 years ago, the general disposition towards alarm was the subject of comment by John Maddox in a perceptive book called *The Doomsday Syndrome*. A successor study is much needed.

Like the environmental policy milieu, elements within the international scientific establishment appear as strongly committed, rather than neutral and objective, in relation to climate change issues. These committed elements appear to include the two leading scientific journals, *Nature* and *Science*.²²

Monopoly, consensus and overpresumptive conclusions

To sum up: the IPCC process, which is widely taken to be thorough, objective, representative and authoritative, is in fact flawed. Contrary to what its member governments, along with many outsiders, typically believe or presume, it does not justify the confidence that is placed in it. The flaws in the process are the more worrying, because of the virtual monopoly which member governments have conferred on the Panel.

Grounds for concern exist in relation to both aspects of the IPCC process: they are in fact inseparable. First, the expert reporting process is subject to continuing professional weaknesses, which bear on the status and authority of the Assessment Reports. Second, the environmental policy milieu, of which the IPCC directing circle forms part, has been characterised from the outset by a pervasive bias. Under this latter heading, it is not just the IPCC process that is in question. The problem of unwarranted trust goes wider: it extends to the biased treatment of climate change issues by the responsible departments and agencies.

At the centre of the problem is a misleading representation of the extent of *consensus*. If the term is taken to mean an absence of serious and credible dissent, it can rightly be attached, as above, to the agreed intergovernmental position that is set out in the 1992 Framework Convention. Arguably, it can also be applied to what I have termed the heightened milieu consensus, in that there are virtually no dissenters from this alarm-oriented view of the world within the environmental policy milieu and it has found considerable high-level support from outside it. But contrary to what is widely asserted or presumed, and continually emphasised by subscribers to the heightened milieu consensus, *there is no scientific consensus* on fundamental issues. The truth is that there are many informed dissenters

²² As to *Nature*, two recent references are, first, the chapter by McKittrick mentioned in footnote 13 above, and second, an article by Barrett (2005). As to *Science*, a revealing episode is described in Peiser (2005). In a more recent piece, soon to be published, Peiser has reviewed the whole issue of 'editorial bias and the prediction of climate disaster'.

from the view that increases in concentrations of ‘greenhouse gases’, caused by current and likely future anthropogenic emissions, will lead to dangerous climate change. There is significant professional support for the position taken in the already-cited paper by Carter *et al.* in this issue, when they write (p. 162):

That human-caused climate change is real has never been in question; the point at issue is whether the global signal of human-caused change can be measured, and, if so, whether the resulting effect is likely to be dangerous. After the expenditure of many tens of billions of dollars on cognate research, the answer to these questions is that the global human signal cannot be isolated from the variation of the natural climate system itself, and that—speculative computer modelling aside—no good reason exists to presume that the human impact is dangerous.

It is not the case, then, that ‘the science’ is ‘settled’, so that it provides decisive support to the heightened consensus and establishes the need for ‘an urgent global response’. Indeed, given the huge complexity of the systems under review, the limits of present knowledge about many aspects of them, and the pervasive uncertainties that surround possible future economic and technological developments, it would be surprising, in fact disquieting, if a genuine and far-reaching scientific consensus had been established; and any such consensus would have to be viewed, in accordance with accepted scientific procedure, as contestable, and not as representing final truth.

The misleading assertion that ‘the scientific evidence is now overwhelming’ is not drawn directly from the IPCC Assessment Reports, and arguably it goes beyond them: it is an extrapolation. But the extrapolation would not have been possible, and could not have gained such widespread acceptance, were it not for the strong and continuing elements of bias that have characterised the IPCC process.

In relation to climate change issues, the OECD member governments in particular have locked themselves into a set of procedures, and an associated way of thinking—in short, a *framework*—which both reflects and yields over-presumptive conclusions which are biased towards alarm. These conclusions now form the basis of current policies and of proposals to take them further. They go well beyond the bounds of professional consensus; they take as their prime source the results of a flawed process; and they represent a dubious extension of those results.

An alternative framework has to be built round a different set of working assumptions, less presumptive and more attuned to the huge uncertainties that remain. Within such a framework, the IPCC's procedures, role and status, as also the heightened consensus beliefs which are now so firmly held by its sponsoring departments and agencies and by many leading political figures, would no longer go unquestioned.

In the light of what has been said above, there is a clear present need to build up a sounder basis than now exists for reviewing and assessing the issues. Governments should act accordingly. *Rather than presuming that 'the science' is 'settled', and building policies on that unwarranted presumption, they should take prompt steps to ensure that they and their citizens are more fully and more objectively informed and advised.*

5. Strengthening the basis for policy

Official action

Two broad lines of official action could be followed. One is to improve the IPCC process, by making it more professionally representative and watertight, while the other is to go beyond it. The more that can be done under the first heading, the less the need for action under the second. I believe that both are needed.

Since the IPCC process is well established, involves virtually every government in the world, and operates a consensus procedure, changing it formally is unlikely to be a straightforward affair. However, explicit worldwide consensus is not a necessary condition for all improvements: there is much that could be done by individual governments or like-minded groups of countries, both on their own account and through influencing intergovernmental proceedings.

One specific change that is called for ought not to be a matter of controversy. As has been seen, the time is long overdue for member governments to address the scandal of non-disclosure. They should insist on full and true disclosure of sources, data and statistical procedures, as a precondition for taking published work into account in preparing Assessment Reports; and a proviso to that effect should be written into the IPCC's terms of reference. It might be hoped that this change would win general if not universal consent.

A second area for reform within the process concerns the choice of participants. There is scope for ensuring broader *expert* involvement, for example by bringing historically minded economists and economic historians into the work on projecting output, energy use, and CO₂ emissions. More generally, a watchful eye should be kept on tendencies towards bias and unwarranted exclusion, first, in the selection of authors, reviewers and contributors, and second, in the treatment of dissenting views.

Alongside such changes, broader participation at the *official* level could contribute decisively to improving the IPCC process, and indeed, it may well be a necessary condition for improvement. Enlargement of the policy milieu is long overdue, and individual governments—as also the European Commission—have the power to act accordingly.

In particular, and to return to an earlier theme of mine, it is high time for the central economic departments of state—treasuries, finance and economics ministries, and, in the US, the Council of Economic Advisers—to become more involved, in ways that include but go beyond specifically economic aspects (which themselves need more attention). As a former official in HM Treasury, and much later an international civil servant whose chief clients comprised the central economic departments of OECD member countries, I have been surprised by the passivity, and the uncritical acceptance of an obviously flawed official process, which these departments have shown in relation to climate change issues. It is time for them to cross the Rubicon and extend the range of their concerns. Where so much may be at stake economically, it is just not good enough to accept without question that ‘the science’ is ‘settled’ and that the IPCC process, together with the heightened consensus which claims to be based on that process, is not to be challenged or even inquired into. *Any one* of these departments could take a more active inquiring role, at insignificant cost though admittedly with the strong probability of making interdepartmental waves. By way of specific examples:

- They could conduct their own reviews, drawing as necessary on independent outside experts, of the work of McIntyre and McKittrick and the reports from the NRC and Wegman inquiries. Such a review could extend to the implications of non-disclosure, and the reliability of the data bases which the IPCC has drawn on in the Assessment Reports

- A general issue, raised by some of us in evidence to the House of Lords Select Committee, is the extent to which it is necessary or prudent to base policies so heavily on the results of modelling exercises which extend into the distant future. Given a political green light, economic departments could arrange for a full independent technical review of the models on which considerable weight is placed in the IPCC process—the modelling work that enters into emissions projections, the carbon cycle models, the general circulation models of the climate system, and the integrated assessment models that explore the implications of possible climate changes
- More ambitiously and controversially, though very much in the public interest, these departments could, again with appropriate independent technical support, make their own examination of AR4 as a whole, with special but not exclusive reference to economic and statistical aspects.

OECD member governments could arrange for such review exercises to be undertaken under their collective auspices, within the Organisation and with the participation of the OECD Secretariat. The fact that both economic and environmental officials meet regularly at the OECD, each group with its own supporting Secretariat staff, could be turned to advantage: a whole range of issues could be examined in depth across departmental boundaries.

To mention such procedurally radical lines of action raises the further possibility of formally ending the IPCC's monopoly. The case for setting up an official rival alternative to the Panel has been made by Steven Hayward (2005). He argued that, since the IPCC is probably unreformable, individual governments, or like-minded groups of them, should think of establishing an authorised competing source of information and advice. An encouraging precedent here is the 'Team B' which was created in Washington in the 1970s to provide an alternative assessment—as it proved, more reliable—of developments and prospects in the Soviet Union. As of now, there seems little prospect that such an initiative would find support in any member government; but the possibility deserves to be kept in mind.

Unofficial channels

So far under this heading, I have focused exclusively on the role of governments. There is good reason for such an emphasis, since it is governments that fund major programmes and decide policies, while only they can reform the process which they have created and over which they have full control. But in the present situation, with the recent appearance of two major contributions in the Stern Review and AR4, and clear signs that both are being treated uncritically by governments, there is scope for timely unofficially-sponsored contributions which do not take as given current over-presumptive conclusions.

Such initiatives are by no means to be counted on. Despite what is sometimes alleged, there exists no array of commercial enterprises, with a stake in carbon-intensive products and processes, which have shown themselves ready and willing to pour money into projects and organisations that challenge current orthodoxy. To the contrary, big businesses including leading oil companies, and business organisations that they subscribe to, are with few exceptions firmly committed to the orthodox view. One leading illustration among many is the World Business Council for Sustainable Development, whose programme of work features support for 'the development of a global and efficient framework to combat climate change'. The Council's membership now comprises some 200 companies, among which on my count are 11 oil companies including Royal Dutch Shell, BP Amoco, Statoil and Chevron. So far from large firms financing unorthodox views, a more representative instance of current business trends is the recently-announced decision of HSBC, in 'the biggest charitable donation ever from a British business', to devote \$100m 'towards tackling climate change'.²³ Further, any private sponsors of potentially non-conforming studies, whether or not they were profit-oriented concerns, could expect to be the subject of hostile activist campaigns as well as official disapproval: the pressures to conform are strong and unrelenting. All the same, there is now a clear opportunity, while the costs of new independent studies would be minute in relation to the massive amounts now being spent within the present unbalanced framework—some by businesses and foundations, as well as governments and international agencies.

²³ *Financial Times*, 31 May 2007.

Simply in the interests of promoting balance and advancing knowledge, the case for initiating such independent studies is a strong one.

A fruitful way forward here could be for the House of Lords Select Committee on Economic Affairs to take the appearance of AR4 and the Stern Review as the occasion for a return to the subject of climate change. Another possibility would be for private sources—individuals, companies or foundations—to fund, either directly or through one or more think-tanks, a full-scale independent interdisciplinary review of AR4, preferably by a well qualified review team chosen from among a group of competing proposals. A promising first move in this direction has already been made, through the publication early this year by the Fraser Institute (of Canada) of an ‘independent summary for policymakers’—a rival to the SPM, which at that time was still not in final draft, of the AR4 report from Working Group I.²⁴ But a full and well publicised independent expert review and assessment of all the final AR4 documents is badly needed.

6. The orientation and focus of policy

The present orientation of policies is more *presumptive* than is justified, and this increases the risk that the focus and content of policy will be not only unnecessarily costly but also worryingly *intrusive*.

Point of departure: a less presumptive approach

Two leading unwarranted presumptions, already listed, are first, that ‘the science’ is settled, and second, that the IPCC process is professionally beyond reproach. A further related instance concerns the status of the post-1992 intergovernmental consensus. As noted above, a belief that the threat of ‘dangerous anthropogenic interference with the climate system’ is real, as reflected in the wording of the Framework Convention, remains the agreed point of departure for policy. On the basis of the three IPCC Assessment Reports that have been prepared since 1992, governments have certainly no reason to question that belief: quite the contrary. But since the Reports are the product of a process which does not live up to the claims that are made for it, and given the uncertainties that still

²⁴ This independent summary brought together ten contributing authors, while a further 43 experts are listed as having responded to a request for comments on the text. One of its main conclusions is that, in relation to the Earth’s climate, ‘there is no compelling evidence that dangerous or unprecedented changes are underway’ (p. 52).

remain, the reality of the threat should not be treated as beyond question. The language of the Framework Convention should be viewed, not as embodying established and unassailable truth, but rather as a set of working assumptions. As such, these should be subject to continuing test and review, and it should be a concern of policy to ensure that such testing takes place. Debate and inquiry should be provided for, not closed off. It is wrong to presume that this key issue has been settled for good, still less that the present heightened milieu consensus can be taken as final.

In relation to climate change, the current policy debate is beset by two widely held misconceptions. One is that a stark choice now has to be made between, on the one hand, the radical new initiatives implied by the heightened milieu consensus and, on the other, a refusal to consider action of any kind: such an impression is strongly conveyed by the language of the Stern Review. In fact, as noted above, the present situation is not at all one of 'inaction': a whole range of official measures has been taken with the aim of curbing and reducing emissions. For the many governments that have embarked on this course, 'inaction' is simply not seen as an option: the question is whether, how far and in what ways to extend the existing measures. There are many possible answers to this question: it is not a matter of all-or-nothing alternatives. Moreover, any answer, including the answer that on present evidence no action to curb emissions is warranted, has to take existing assumptions, agreements, commitments and policy actions into account. Governments (to repeat) are not starting from scratch.

A second and related misconception is that those who do not accept that 'the science' is settled—sometimes, falsely, described as being 'in denial'²⁵—are thereby committed to favouring no action. In fact, it is entirely possible to dissent from the heightened milieu consensus, and to consider the belief that anthropogenic global warming presents a serious threat as being still open to question, while at the same time favouring official action to curb emissions on precautionary grounds. Some dissenters do indeed hold that on present evidence there is no case for action, but that is not a necessary corollary of dissent. Others might consistently

²⁵ For example, Robert (Lord) May, in his 2005 presidential address to the Royal Society, referred (p. 8) to 'a climate change "denial lobby"', and (p. 17) to 'campaigns denying the reality of climate change'. So far as I know, no serious person denies that the climate is subject to change, nor that human activities are one of the possible influences on it.

favour, in some respects at any rate, stronger action than has so far been taken.

The case for a precautionary approach has long been formally accepted by governments. Article 3 of the Framework Convention lays down as a 'principle' that

The Parties should take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects. Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing such measures...

A leading issue of today, which the Stern Review has highlighted, is how far existing precautionary measures, which already go far beyond 'inaction', should now be greatly intensified, in the light, first, of the recent studies that the Review draws on, suggesting new or heightened 'threats of serious or irreversible damage', and second, of the arguments that it has presented about the appropriate rate for discounting the future. A related consequential issue that the Review has brought into the open is whether stronger mitigation targets and measures should be adopted as a matter of urgency because (as it argues) 'the benefits of strong early action outweigh the costs'.

These are indeed key issues, which the Review has treated in an innovative way. But it is not the case, as many have concluded, that since its appearance 'the economics' is now settled, as well as 'the science'. In Britain, both the government and the opposition parties, together with leading British business firms and organisations and a range of commentators, have joined forces in agreeing that the Review has shown the world both the dimensions of the problem posed by global warming and the policies that are required to deal with it. This is not so. The Stern Review does not 'show' anything. It puts forward arguments, offers conclusions, and makes strong recommendations. Under all these headings, what it says is open to serious question, and the debate on the economics of climate change remains open and unsettled. *It is not the case that a due concern for future risks entails an acceptance of the policy proposals of the Review.*

Where so much remains uncertain and unsettled, policies should be evolutionary and adaptive, rather than presumptive; and their evolution should be linked to a process of inquiry and review which is more thorough, balanced, open and objective than is now the case.

Policy focus: a less intrusive menu

Not only is there good reason to query the heightened milieu consensus, and the IPCC process which is linked to it, but many of the specific policy initiatives that have been taken by governments, or are now in course of adoption, are likewise open to question.

The main point here has been well made by Martin Wolf in his *Financial Times* column, where he recently wrote that (*italics added*):

...any workable policy system must be global; it must create stable incentives; it must be administratively simple; it must include investment in creation and dissemination of new technologies; and, *not least, it must allow people to get on with their lives with as much freedom as possible. Uniform prices on emissions—ideally, through taxation—will do most of this job. Almost everything else is unnecessary or counterproductive.*²⁶

Current official policies, actual and prospective, have many features that come under the heading of ‘unnecessary or counterproductive’. In Australia, for example, the Productivity Commission observes in an informative recent report (p. 34) that current climate change policies there

...are fragmented across sectors of the economy and across jurisdictions. Some of them are also poorly targeted, carry high administration and compliance costs, and impose intrusive restrictions on firms and individuals.

The Commission argues that the core of policy should be ‘a national emissions price signal’, whether through an emissions trading scheme or a carbon tax, and that, if such a signal ‘can do the heavy lifting, other directly substitutable measures should be discontinued...’

Although price-based mitigation measures, chiefly through various emissions trading schemes, enter into current official policies in many countries (and some subsidiary jurisdictions too), they are far from providing the ‘heavy lifting’ that the Commission and Wolf recommend. Everywhere, not just in Australia and not least in Britain, policies include a long and growing list of regulatory initiatives—grants, subsidies, tax remissions, targets, as for renewable energy and biofuel use, detailed specifications for vehicles, buildings and equipment, town planning restrictions—of a kind which Wolf justly describes, in the article already quoted, as ‘a host of interventionist gimmickry’.

²⁶ Martin Wolf, ‘Why emissions curbs must be simple’, *Financial Times*, 16 March 2007. *Italics added.*

Such packages give rise to obvious dangers. First, they may pay little regard to the cost-effectiveness of the measures concerned, so that emissions reductions are made costlier than they would be if the same results were secured through ‘uniform prices’: a range of different implicit carbon prices is created. Second, they create an array of opportunities for lobbying and rent-seeking—as also do emissions trading schemes, as currently operated.²⁷ Third, they involve, and open up the further probability of, a range of worrying intrusions on the freedom of people and enterprises. The American commentator Paul Driessen has with good reason made the point that such programmes

...would change life as we know it. They would give alarmist politicians, bureaucrats and activists a leading role in every housing, cooling, transportation, manufacturing, agricultural, business and consumer decision.

The risks of such intrusive interference are heightened by the biased and alarm-prone treatment of climate change which now prevails: it is widely taken as established beyond question that humankind is placing the planet under dire threat, that drastic immediate measures are called for, and that such measures should extend to the conduct of individual, family and business life through explicit and detailed codes of behaviour. There is a distinctly Orwellian flavour about the current trend of official thinking and action, as for instance in the British government’s proposal to distribute to all households a ‘green pledge card’ advising them on how to re-order their lives.²⁸ Nor is it just at the individual, household or enterprise level that prescriptive intervention of a costly and authoritarian kind may be in prospect: it could well be the case, as a recent newspaper article has suggested, that ‘the next new wave of utopian city-building is a response to the global warming crisis’.²⁹

Given past history and the current situation, I believe that at present there is a good case for a revenue-neutral carbon tax, on three distinct grounds: first, as a precautionary measure, given the extent of still-prevailing

²⁷ In another article (29 June 2007), Wolf has made the point that ‘The grant of valuable rights to polluters through systems known as “cap-and-trade” is a scandal’. He argues, and I agree, that ‘Simple taxes that apply across the board are what is needed’. (However, ‘emitters’ would have been a more accurate term than ‘polluters’).

²⁸ In connection with this proposal, an official close to the then responsible minister was quoted as saying: ‘We have a whole strategy about how we can change people’s behaviour on the environment’ (*Financial Times*, 8 April 2007).

²⁹ *Financial Times*, 30 June 2007. Predictably, the writer takes it for granted that there *is* a ‘global warming crisis’.

uncertainties and the widespread official and public conviction that action is called for; second, because there is something to be said for a tax that (as it appears) many people would actually view with favour; and last and not least, because its adoption might serve to weaken the case for costly and intrusive regulation: given a tax rate that was judged adequate to the situation, people and enterprises could be left to make their own decisions, without undue prescriptive interference.

As to the rate of tax that might be viewed as ‘adequate’ to different situations across the world, and the appropriate evolution of that rate over time, there is of course scope for wide differences of view.³⁰ A lot more work is needed on this question, as also to assess objectively the effects of current measures and programmes. Here as elsewhere, it is wrong to think of the issues as settled and the advisory process as fully up to the mark.

Conclusion

The moral of this whole story, to repeat, is that both the rationale and the content of official climate change policies—current and prospective, in Britain and elsewhere—are open to serious question. Governments everywhere should think again.

³⁰ Ross McKittrick has recently proposed (*Financial Post*, 12 June 2007) that a carbon tax should be based on ‘the mean tropical tropospheric temperature anomaly, assessed per tonne of carbon dioxide, updated annually’. The logic of this is that ‘if greenhouse gases are driving climate change, there will be a unique fingerprint in the form of a strong warming trend in the tropical troposphere ... Climate changes due to solar variability or other natural factors will not yield this pattern: only sustained greenhouse warming will do it’.

ANNEX

Anathema 2007: Misrepresenting the Science and Misleading the Public

On the trail of misrepresentation

In March 2007, a British television channel, Channel 4, showed a lengthy documentary film, made by a company called WAG TV, entitled 'The Great Global Warming Swindle'. The openly stated aim of the programme was to question the twin widely-held beliefs (1) that anthropogenic emissions of 'greenhouse gases' have been a dominant influence on recent climate changes, and (2) that unless the level of these emissions is effectively curbed, consequent future climate changes would give rise to serious consequences. There was no pretence of impartiality: the object was to present a case. The programme called on a range of expert witnesses with a view to demonstrating that 'the science' is far from being 'settled'.³¹

On 24 April 2007, an open letter was sent to the director of the film, Martin Durkin, signed by 37 scientists (hereafter the G37). The signatories wrote 'to object to plans by Wag TV to distribute DVD versions' of the programme. The grounds for the objection were that the programme contained 'seven major misrepresentations', in relation to which, as noted in the letter, one of the signatories had made a formal complaint not only to Channel 4 but also to the Office of Communications (Ofcom), the British regulator of the communications industries.

The signatories, while disclaiming any wish to exercise censorship or limit the free expression of opinions, and noting that 'the DVD versions of programmes are not covered by the Ofcom Broadcasting Code', ended by saying:

... we feel that it would be very much against the public interest to distribute the DVD without removing the major misrepresentations... distribution of the DVD of the programme without their removal amounts to nothing more than *an exercise in misleading the public* [italics added].

The emphasis here on 'misrepresentations' corresponds to the wording of para 5.12 of the Ofcom terms of reference, where it is laid down that in relation to controversial issues, including 'major matters relating to current public policy', 'views and facts must not be misrepresented'. As I interpret Section 5, it is no part

³¹ In my opinion, the title of the film was not well chosen. 'Global Warming: The False Consensus' would have better described its aim and contents.

of Ofcom's tasks to adjudicate between different views, or to pronounce on what is correct and what is not: it is not required to judge whether or not the public has been, or would be, misled. Where due balance is maintained between or across programmes, complaints against a particular programme, such as the one in question, would have to relate specifically to misrepresentation, as distinct from either alleged mistakes or lack of balance.

Not surprisingly, given its avowedly controversial character, the programme has been the subject of many complaints, to which Ofcom at the time of writing has not yet made its response. Besides the G37 signatory, other complainers include one of the expert witnesses who appeared on the programme: he has stated that had the purpose of the programme been made clear to him, he would not have agreed to take part in it.

The company has now prepared the DVD version. In it, the contribution of the complainer witness has been edited out, and the same arguments are now presented by a different expert. This takes care of one of the list of seven alleged misrepresentations. In addition, the company has corrected three mistakes in the original programme, one of them relating to a very minor point. As to other items on the list of seven, correspondence between the parties has not brought agreement, and the DVD does not depart from the arguments, opinions and conclusions that were contained in the original programme, all of which had expert support.

In referring to Ofcom, and in its insistence that 'misrepresentations' are in question, the G37 letter conforms to an established pattern. Those who are convinced that in relation to climate change 'the science' is 'settled', and that 'the debate is over', are prone to view contrary opinions as *ipso facto* constituting misrepresentation. This propensity was illustrated last year in the written rebuke that the Royal Society administered to Exxon Mobil, for its 'funding of lobby groups that seek to misrepresent the science of climate change'. In the same vein, the Society had referred, in its written evidence in 2005 to the House of Lords Select Committee on Economic Affairs (Volume II, p. 296), to 'some individuals and organisations, some of which are funded by the US oil industry, that seek to undermine the science of climate change and the work of the IPCC'. Quite recently, in a press release for a paper entitled *Climate Change Controversies: A Simple Guide*, the Society has returned to the linked themes of denial, misrepresentation and paid lobbying:

Those who seek to distort and undermine the science of climate change and deny the seriousness of the potential consequences of global warming put forward a range of arguments most of which misrepresent the existing research. It is vital that the scientific evidence on climate change is accurately represented.

Policymakers, industry and the public must make informed decisions about what actions to take rather than be misinformed by lobbyists for big business or programmes such as Channel 4's recent "Great Global Warming Swindle".

Scenting corruption

The Royal Society's idea that some 'underminers' are paid hirelings of corporations is a standard theme among some upholders of 'the science'. In a recent review article (May, 2007), Robert (Lord) May, former President of the Society, writes (p. 3) that, in relation to climate change and its 'manifold adverse consequences', 'there remains an active and well-funded "denial lobby"'; and he later (p. 4) refers to 'The distractions and misrepresentations of the well-funded denial industry'. As already noted above in Section 6, the use of 'denial' in this context itself involves misrepresentation; and here as elsewhere, May provides no evidence of the ample funding that he refers to or of specific recipients of it whose objectivity, and perhaps professional integrity, are therefore to be held in question.

Lord May is not alone among leading British scientists in bringing this charge. In his written evidence to the House of Lords Select Committee, Sir David King, Chief Scientific Adviser to Her Majesty's Government, referred to 'climate change sceptics' as falling into three groups: 'serious scientists', of whom there are 'very few'; 'a second small group of scientists' who 'are not seriously regarded'; and 'a very vocal group of professional lobbyists' who 'are articulate and clearly well-funded'.³² Again, no evidence or instances were cited.

It was because of such allegations that, in the introduction to our Dual Critique of the Stern Review, we authors thought it advisable to make the point that:

We represent no interests, and we have neither sought nor received any financial or institutional support for our work. We write as independent commentators.

The attitude and way of thinking that is revealed in the above and similar attempts to silence dissenting views by labelling them as 'misrepresentation', and to discredit personally those who advance them, brings to mind a term from George Orwell's novel *1984*. In relation to climate change issues, those who question 'the science' are now cast, by members of 'the scientific community' and the Royal Society itself, in the role of Thought Criminals. Their views are to be anathematised.

This is not the Royal Society's finest hour.

³² Select Committee Report, Volume II, p. 98.

Tilting the balance

The G37 letter to Durkin makes the point that ‘In view of the seriousness of climate change as an issue, it is crucial that public debate about it is balanced and well-informed’. While no one would quarrel with this sentiment, the group’s concern with balance would have been more in evidence, and put to better effect, if as well as questioning the *Swindle* programme they had at the same time made and published a companion assessment of the arguments and evidence put forward in Al Gore’s *An Inconvenient Truth*. Marlo Lewis, in the critique referred to in footnote 15 above, has listed no fewer than 99 statements by Gore which (as he thinks) are to be counted as ‘distortions’: he describes 25 as ‘one-sided’, 17 as ‘misleading’, 10 as ‘exaggerated’, 28 as ‘speculative’, and 19 as ‘wrong’. While Lewis is admittedly no friend of Gore, his extensive list, together with the arguments and evidence that he presents in connection with it, would seem to add up to something at least as worthy of consideration as the remaining unmet G37 criticisms of *Swindle*. In view of the fact that Gore himself has cheerfully admitted to offering a presentation which is designed to stir people up,³³ and given the huge popularity and potential influence of *An Inconvenient Truth*, some judicious qualifying observations on his film from informed persons, with suggestions for revision as in the case of *Swindle*, would not have come amiss: they would have helped to redress the balance of the debate, and indeed, perhaps, to chart the way for an amended and less one-sided version of *An Inconvenient Truth* to be distributed to schools by Her Majesty’s Government as suitable teaching material, rather than (as now) the original. In the present climate of received opinion, however, such even-handed treatment of different viewpoints is not to be expected. Gore is not to be put in question on any matter, still less cast as a Thought Criminal: he is One of Us.

Scientists in glass houses

If, as the G37 suggest, protecting the public against misleading statements should be a matter of special concern, then some of their own leading members would do well to reconsider positions that they have taken.

A subject which has given rise to disquiet on the part of eminent G37 signatories is the extent of inequality between rich and poor nations in the world economy of today. One of those involved is Professor Peter Raven. In his presidential address to the American Academy of Sciences in 2002, he spoke of ‘a world in which 20% of us control 80% of the resources, and 80% of us have to make do

³³ In a magazine interview, he said: ‘Nobody is interested in solutions if they don’t think there’s a problem. Given that starting point, I believe it is appropriate to have an over-representation of factual presentations on how dangerous it is, as a predicate for opening up the audience to listen to what the solutions are, and how hopeful it is that we are going to solve this crisis’.

with the rest.’ This form of words embodies two major misconceptions. First, the supposed 80–20 division between rich and poor, which at one time was given wide circulation, actually referred to shares of world GDP; and as such, it was (and remains) grossly misleading because the cross-country comparisons of GDP, from which these percentage shares were derived, were based on exchange rates and not on estimates of purchasing power parity (cf. Section 4 above). If we now take 2003 data as the basis for the calculation, the estimated share of the top 20 per cent of the world’s population comes to about 60 per cent, rather than 80 per cent, while correspondingly the share of world GDP of the bottom four-fifths comes out at 40 per cent.³⁴ Second, Raven has not grasped the point that what is in question here is not an inventory of ‘resources’, but a flow of output, of goods and services produced over a period. Rich countries are rich, not because they ‘control’ (or own, or pre-empt) an undue share of the world’s ‘resources’, but because the people and enterprises within their borders produce more per head of population.

In much the same vein as Raven, Sir John Houghton, a former Chairman of the IPCC’s Working Group I, maintains, absurdly, that ‘over eighty per cent of resources are consumed by twenty per cent of the world’s population’ (Houghton, 2003, p. 327). He also asserts (p. 326) that ‘The gap between the rich nations and the poor nations is becoming wider’, and that ‘The flow of wealth in the world is from the poorer nations to the richer ones’. No evidence is offered for either of these two latter statements, and it is hard to see what the second could mean.³⁵

A third instance is Lord May, in the review article just quoted. He writes (p. 3) that ‘the rich nations, comprising about one-eighth of the world’s population, currently own a bit more than half global GDP’; and this is one dimension of some prevailing inequalities that he describes as ‘inequitable’. Although the numbers quoted appear as not too far from the mark, here again the basic concept of GDP is wrongly interpreted. World GDP is not an item or inventory of property which countries or governments ‘own’, but (to repeat) a flow of goods and services currently produced.

³⁴ Here and below, these figures for 2003 are derived from tables contained in Maddison (2007). The units here are countries: no account is taken of the distribution of income within them.

³⁵ The current President of the Royal Society, Lord May’s successor in the role, is Martin (Lord) Rees. In the book referred to in footnote 21 above (Rees, 2003), he writes on the opening page that ‘inequalities in wealth and welfare get ever wider’. No evidence is given for this statement, nor is any source cited. As to equality of incomes in the world as a whole, a recent full and informed review is Sala-i-Martin, 2006. All the ‘indexes of income inequality’ derived in this study ‘show reductions in global inequality during the 1980s and 1990s’.

There may be room for doubt as to whether these various statements involve ‘misrepresentation’, and their authors are unlikely to be made the subject of letters of complaint to Ofcom. However, it would be hard to assemble, in a similarly short space, a set of propositions about the world economy that were more palpably misleading.

Misreporting AR4

In the same review article, May summarises the temperature projections that are one of the main results of the AR4 report from Working Group I. He says (p. 3) that the report ‘estimates that global warming will [*sic*] be in the range of 2.4°C to 6.4°C by 2100’. This is doubly incorrect. First, the figures are conditional projections only: the use of ‘will’ is misleading. Second, what the report actually presents, for each of six scenarios, is a range of possible temperature increases and an intermediate ‘best estimate’ figure. The range that May quotes is for the *highest* of these scenarios, which has no claim to greater plausibility than the other five. The lowest scenario, which could equally well have been singled out, yields a range of projections from 1.1°C to 2.9°C. The most reasonable range to quote from these six projections (they are shown as Table 3 on page 13 in the Summary for Policymakers) would be 1.8°C to 4.0°C, these being the respective ‘best estimate’ projected increases for the lowest and highest of them.

May says of the temperature projection for 2100 which he misleadingly cites that it ‘assumes that we will manage to stabilize greenhouse gas concentrations at around 450–550 ppm by that date’. This is not correct. On the basis of the A1FI high-emissions scenario that he singles out, the projected level of greenhouse gas concentrations in 2100 is put by IPCC authors at approximately 1550 parts per million (expressed in CO₂ equivalent). Projected concentrations in 2100 for the five other scenarios, again on a CO₂ equivalent basis, range from 600 to 1250 parts per million.³⁶

Lord May’s article is headed, in a free translation of the Royal Society’s Latin motto, ‘Respect the Facts’.

³⁶ These figures are taken from footnote 14 on page 12 of the AR4 Working Group I Summary for Policymakers. They are derived from a set of tables in the previous report from WGI that formed part of the IPCC’s Third Assessment Report.

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Climate change has emerged as the greatest danger of the 21st century. This danger is believed to be greater than the third world war or the collision of any asteroid with the Earth. Climate Change has been manifesting itself in the form of irregularities and disturbance in the climate cycle as fallout of increase in the temperature of the Earth due to the phenomena of global warming. In the last 150-200 years, climate change has happened so rapidly that the flora and fauna of the world are finding it difficult to reconcile with this change. Climate change has assumed the form of an international Combating climate change is an issue that needs awareness not only on the part of the environmentalists and others involved in keeping their living spaces clean and hygienic but also the general public who are mainly responsible for this problem. All of us need to understand one thing in particular that we do not think of thrift when it comes to consumption. With more environmental clearances it seems government is not willing to fight the climate change only project clearances is a priority at any cost. Some of these can be more disastrous than the JULY 2013 tragedy in Uttarakhand. Supreme Court resumes hearing on six hydropower projects in Uttarakhand (FYI these projects are located in Seismic activity zone IV and V). Global climate change is one of the most important international problems of the 21st century. The overall rapid increase in the dynamics of cataclysms, which have been observed in recent decades, is particularly alarming. Today, there is a big risk of misunderstanding and underestimation of all the factors and the scale of influence of various cosmic and geological processes on the global climate change on Earth. Just a while ago, at the end of the 20th century, some scientists put forward various hypotheses and theories about gradual climate change. But in practice everything turned out to be... Global climate change is already influencing health, living conditions, and sustenance of people on all the continents of the Earth.