

Comment on Scientific Issues in the Stern Review Papers

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The scientific sections of the Review's Discussion Paper (DP) and Technical Annex (TA), as well as Sir Nicholas Stern's Oxonia Lecture (OL), contain serious gaps and errors. "The science" of climate change prediction is still in its infancy, and the account of it given in these three documents is questionable, misleading and biased. The problems reflect the bureaucratisation and politicisation of this scientific issue, and the narrowness of the professional milieu that now represents it.

1. History of the global warming theory

The impression given in the documentation¹ is that the *physical basis for substantial warming* from increases in carbon dioxide was well understood in the 19th century and that estimates of the magnitude of the effect have only changed marginally since Arrhenius (1896).

This impression has carried over into the Oxonia Lecture, but it is seriously in error. Fourier's notions in his 1827 paper were confused and far from modern conceptions: he incorrectly believed that "solar heat accumulates in the interior of the earth".² His paper did not "work out what the temperature of the earth should be and [find] out it was a bit warmer than his calculations suggested"³: in fact, it stated that the temperature of the earth from solar radiation alone would be minus 50 degrees Celsius.

Similarly, Arrhenius' calculations in 1896 of a 5 or 6 degree warming from CO₂ doubling were not "remarkably close to the mark" and do not "[stand] up very well to the much more sophisticated modelling that has taken place subsequently".⁴ Arrhenius' calculations were in fact wild overestimates based on highly inaccurate radiation data.⁵

The *magnitude of warming from doubling CO₂ alone* was calculated by Plass in the 1950s at about 1 degree Celsius and subsequent estimates were lower still.⁶ All higher figures, including those produced by climate models, result from so-called "positive feedbacks" assumed to flow from warming caused by the CO₂ increase. The most important of these feedbacks is from increased water vapour, since water vapour itself is a greenhouse gas. The only reason Arrhenius' figures are roughly the same as the top end of today's model predictions is that the models assume large water vapour feedback, which makes up for some of Arrhenius' large overestimate of the effect based on his incorrect data on the infra-red emission spectrum of CO₂.

In fact, *the theory that CO₂ increases would lead to substantial warming was out of favour for most of the twentieth century*. As recently as the mid-1970s, the prevailing scientific view was that warming from a doubling of carbon dioxide would be small.⁷ Moreover, the minority of scientists who believed that increases in carbon dioxide would have a noticeable warming effect—starting with Arrhenius himself—thought that this would be a good thing, since it would slow the onset of the next Ice Age and open frozen land masses to agriculture.

2. Sources, sinks and concentrations of greenhouse gases

The Review documents present a partial and inadequate view of the *sources of greenhouse gases (GHGs)*. Figure 1.4 in the Discussion Paper reproduces a graphic from the World Resources Institute which purports to show these sources, with fossil fuel consumption contributing 61 per cent of “global emissions of greenhouse gases”. This is highly misleading. The graph relates only to anthropogenic emissions, and no hint is given that these are only a small fraction of the total.⁸ In the case of CO₂, natural emissions are about 95 per cent of the total, and natural emissions of methane and nitrous oxide are also very substantial.

The treatment of *sinks of GHGs* is inadequate and erroneous. No consideration is given to the implications of the fact that GHGs are being continuously reabsorbed or broken down. As just mentioned, natural emissions of CO₂ account for 95 per cent of annual emissions. As 97 per cent of total annual CO₂ emissions are then reabsorbed by the biosphere, only about 3 per cent are being added to the atmospheric concentration. Similarly, methane and nitrous oxide (both largely natural in origin), as well as man-made gases such as CFCs, are constantly reacting with other gases and being destroyed in the atmosphere.

The only mention of a carbon sink in the presentation is that “Dieback of the Amazon rainforest could turn the region from a sink for carbon to a source”.⁹ This is incorrect. Mature forests emit roughly as much carbon dioxide as they absorb, as measurements in the Amazon confirm.¹⁰

Changes in the *concentrations of GHGs* express the balance between sources and sinks. One would never guess from these documents that the rate of increase in greenhouse gases has fallen by nearly 40 per cent over the last 25 years.¹¹ The only graph presented (as an ad-

joined to the Oxonia Lecture) shows carbon dioxide concentrations since the year 1000. It appears to show a sharp increase, but this is mostly an artefact of “chartmanship”. The graph only starts at 240 ppm, not at zero, which gives the impression concentrations have tripled over the last 150 years, whereas they have only risen by ~30 per cent. As far as we know, the present level is slightly higher than in previous interglacial periods, but it is still low in terms of geological time. Over the life of the earth, CO₂ concentrations have varied between half what they are today, and 15 times what they are today.¹² The scale on the graph is also too long to show that over the last 30 years, the rate of increase has been virtually constant.¹³

No mention is made in the documents that the rise in the concentration of *methane* has been slowing for over 20 years, and is now approximately zero, or that *CFC* levels are falling, and that both of these gases, the most important GHGs after water vapour and carbon dioxide, are likely to diminish over coming decades, contrary to what is presented in IPCC scenarios and fed into climate models.¹⁴

Another fact known to every scientist in this field but omitted from these documents is that *temperature responds logarithmically to increments of GHGs*. This means that an exponential increase in GHGs is required to sustain a linear temperature rise, whereas total GHG accumulation rates are actually lower than they were 20 years ago.

The logarithmic response also has implications for calculating temperature sensitivity. Carbon dioxide has increased by a third over the past 150 years, and other greenhouse gases by an amount which comes to nearly as much in CO₂ terms. We have thus experienced a roughly two-thirds increase in equivalent-CO₂, which means we are three-quarters of the way to the

radiative effect of a CO₂ doubling.¹⁵ Thus the observed rise in temperature (which the papers give as 0.7 degrees—the figure may be on the high side¹⁶) is consistent with a warming from doubling of 1 degree C or less, as was

long believed to be the case. The much higher figures generated by models assume long delays (c.30–50 years) in the climate system’s response to increased CO₂, but these delays are not supported by empirical evidence.¹⁷

3. Reliability of climate models

The Discussion Paper and the Technical Annex give the impression that models have now developed to the stage that firm conclusions can be drawn about future climate. These models are “based on the laws of physics and chemistry”.¹⁸ They “now show with a very high degree of confidence that human-induced increases in carbon dioxide and other greenhouse gases are responsible for much of the warming we have observed”.¹⁹ Thus “[s]cientists are able to assess the range of warming for a given level of carbon dioxide” and “we are already locked in to some climate change due to inertia in the climate system”.²⁰

Again, this is a wholly misleading impression. Key elements in models still have to be “parameterised”, i.e., forced to conform with observations, and some processes with major effects on near-surface temperature, such as cloud formation, are still not well enough understood to be modelled properly.²¹ Most models leave out several climate forcings,²² and in any case, the level of scientific understanding of these forcings is low or very low.²³

The Technical Annex refers to an IPCC graphic supposedly showing that temperature variation over the past 140 years can only be explained by a combination of GHGs, aerosols, vulcanism and solar changes.²⁴ However, there are many problems with this graphic. The temperature record is dubious, particularly for the 19th century, where no signal registers for the huge cooling effect of Krakatoa in 1883. There are no reliable data on aerosols before the 1960s, so most of the input here is

guesswork. The IPCC’s combined uncertainty ranges for the effect of aerosols are greater than the entire forcing from all greenhouse gases combined.²⁵ Solar effects are complex, with at least four mechanisms having been suggested, and other scientific papers have achieved an excellent fit to temperature considering solar effects alone.²⁶ The bottom line is that the graphs are a curve-fitting exercise with four adjustable parameters.²⁷ As von Neumann is said to have remarked, “With four parameters, I can fit an elephant.”

The fact is that the output of climate models is not a reliable guide to future climate. This is *ignorance*, not a matter of *uncertainty*; it arises from large gaps in our knowledge of climate. The documents give the opposite impression. They reflect the view that models allow us to “understand”²⁸ future climate. Further, they treat so-called “uncertainty” in a biased fashion. No mention is made of the possibility (probability) that most disaster scenarios will never happen and that the climate may continue to fluctuate much as it has done for millennia. Instead, each mention of uncertainty is followed by some statement or hint that things may be even worse than the worst disaster scenarios already hypothesized. Thus “we will see climate surprises”, temperature rise could be double the upper limit in the last IPCC report, etc.

In reality, even the disaster scenarios mentioned in the paper are far-fetched model speculations for which there is no serious evidence in current climate trends. A couple of examples follow.

4. Apocalypse soon

Several candidates for impending climate catastrophes are advanced in the publications referred to in the documents. But empirical data do not support them.

The threat of the dieback of the *Amazon* rainforest from climate changes is advanced no fewer than six times in the documents.²⁹ It is purely a figment of the imagination of climate models: the result of simulations run for decades into the future based on inadequate understanding of global, let alone of regional and local climate, and unrealistic increases in greenhouse gases. Accurate satellite data on temperature over the Amazon show a trend of practically zero since the measurements began in 1978.³⁰

There is a paragraph on changes in the *Indian monsoon*. Again, these are purely speculative and the text even admits that the models go in all directions on the subject:

Most climate models suggest that the monsoon will change, although there is still uncertainty about exactly how. Nevertheless, small changes in the monsoon could have a huge impact. Today, a fluctuation of just 10% in either direction from average monsoon rainfall is known to cause either severe flooding or drought.³¹

Notice that nowhere is the possibility advanced that changes in the monsoon are just natural variations, and that contradictions among models about future trends might simply reflect the fact that none of them is yet adequate to give a reliable forecast. The whole subject ought to be something of an embarrassment to the promoters of climate scares. Until recently, the Chair of the IPCC himself was promoting the idea that “climate change” (i.e., greenhouse warming) was leading to a failure of the monsoon.³² It seems

that abundant monsoon rainfall in the last couple of years may have suggested it might be more prudent at this stage to “have a bob each way”. In any case, real world data on the Indian monsoon have been exhaustively studied back to the 19th century and “None of the computed trends is significant.”³³

Another spectre is “the start of the irreversible collapse of the *Greenland* ice sheet”, which is advanced four times.³⁴ True, a recent article in *Science* reported increases in model-estimated glacial runoff in Greenland in the last few years. But an article in the same journal last year reported that the actual mass of the Greenland ice sheet had increased³⁵ and a 2004 paper reported *falling* temperatures around the Greenland coast in recent years.³⁶

While the documents parade far-fetched catastrophes, they avoid specifically identifying any of the benefits of potential greenhouse warming, though many of these would be near-certainties. If it occurred, CO₂-induced warming would lengthen growing seasons, open permafrost areas to farming, reduce frosts and cold-related mortality, stimulate crop and forest growth through the “fertiliser effect” of CO₂ itself, reduce heating costs and energy use, and according to some experts, reduce extreme weather.³⁷

To sum up, the documents obscure or misstate key facts about climate change, and persistently overplay the role of greenhouse gases, the reliability of models, and the likelihood of substantial warming with catastrophic consequences. They avoid mentioning any specific benefits. This is even the case in the Technical Annex, which despite its name is an advocacy document promoting concern over the greenhouse issue, rather than a sober assessment of the science. The graphs and tables used in

that Annex are well-worn standards of the IPCC “line” on climate change, which have many flaws and in some cases (in particular, the “hockey-stick” graph of millennial temperatures) are now wholly discredited.

5. Bureaucratic oversimplification of scientific issues

Popularized presentations of science simplify issues, and skate over gaps in knowledge to present a coherent and compelling story. A good example is the tendency to exaggerate confidence that recent warming results from an enhanced greenhouse effect. The IPCC Summary for Policymakers, when it left the already politicised scientific stages of review, expressed this position on the question (our bolding):

From the body of evidence since IPCC (1996), we conclude that there has been a discernible human influence on global climate. Studies are **beginning** to separate the contributions to observed climate change attributable to individual external influences, both anthropogenic and natural. This work **suggests** that anthropogenic greenhouse gases are a **substantial contributor** to the observed warming, especially **over the past 30 years**. However, the accuracy of these estimates continues to be limited by **uncertainties in estimates of internal variability, natural and anthropogenic forcing, and the climate response to external forcing**.³⁸

Political representatives in the IPCC process then toughened this up to read as follows:

In the light of new evidence and taking into account the remaining uncertainties, **most** of the observed warming **over the last 50 years** is **likely** to have been due to the increase in greenhouse gas concentrations.

In the documents, all uncertainty vanishes:

The Technical Annex forms a point of departure for the Discussion Paper and the Oronia Lecture, yet its treatment of scientific arguments and evidence is biased and flawed. How is this to be explained?

Emissions of greenhouse gases **have been the key factor** in climate change for at least the past 50 years.³⁹

Such oversimplifications and distortions arise because, at each stage of the process, the scientific input declines and the policy-driven bureaucratic input increases. The approved policies for tackling the greenhouse “menace” are energy rationing and pollution control. These options were already well anchored before the greenhouse issue took off in the late 1980s. They were considered both “good things” in themselves and valid policy responses to earlier issues, including air and water pollution, oil shortages, the acid rain scare, “waste” in modern industrial society, etc. The bureaucratic and political machinery strongly promotes such policies, and ignores scientific findings in any field that appear to undermine their rationale.

The strength of global warming alarmism is boosted by the efforts of two international bodies, the IPCC and UNFCCC, to forge consensus on the issue. Such efforts involve political processes inimical to the free inquiry on which the improvement of scientific knowledge depends. In principle, the bodies have distinct roles: the IPCC is scientific and the UNFCCC political. But this distinction has never been properly observed. The same persons often represent their countries on both, and there is a large presence of environment bureaucrats and activists which undermines the scientific integrity of their reports, and slants summaries and public presentations to-

wards approved policies. Thus the UNFCCC now publishes dubious “advocacy science” about the dangers of the greenhouse effect,⁴⁰ while the head of the IPCC has publicly stated that he hopes the IPCC will provide a case for further emission caps.⁴¹ How can open scientific debate take place in a process explicitly designed to provide evidence to justify a pre-determined policy?

Official consensus on climate change has distorted scientific research, funding, and career progression, marginalizing front-rank independent scientists in the affected fields. There is a long list of internationally recognized experts who have eschewed, left, or been excluded from or ignored in nominally scientific studies of climate change. The most distinguished hurricane expert still participating in the IPCC resigned last year in protest against unscientific scare-mongering on the subject by a senior IPCC participant who was not an expert in the field.⁴² When a top expert in tropical diseases volunteered to be lead author of the relevant chapter of the next IPCC report (there had been a lamentable want of expertise on the previous one), the organisers shut him out and instead again selected persons with negligible qualifications.⁴³ A prominent expert on atmospheric physics resigned recently from a US panel because of unscientific bias in its functioning.⁴⁴ The list could be extended *ad lib*.⁴⁵ These are not normal scientific disputes, but clashes be-

tween the process and methods of science and bureaucratically entrenched positions.

There was a striking demonstration of this a few years ago when IPCC heavyweights complained to a journal about the conclusions of a paper on the ground that “In the current, post-Kyoto international political climate, scientific statements about the behavior of the terrestrial carbon cycle must be made with care”.⁴⁶ The science writer Mihkel Mathiesen justly retorted that:

Your letter on the need to temper scientific findings with political considerations, published in *Science* today, is a chilling testimonial to the current trend to limit objective reason in deference to political ambitions.... The open rebuke of a scientific, peer-reviewed paper on political grounds ... is unacceptable to the scientific community and serves only to tarnish the scientific reputation [of the signatories]. Your letter confirms ... the observation that a disturbing amount of politically correct research is being done with little care for scientific accuracy.⁴⁷

The truth is that climate change research is still in its infancy, and that consensus extends only to issues of little relevance to policy.⁴⁸ Climate change is poorly understood, and industrial emissions of greenhouse gases may be a small, even negligible, factor.

Endnotes

¹ Paragraph 14 of the DP and paragraph 4 of the TA.

² An English translation of Fourier’s text is available here: www.wmconnolley.org.uk/sci/fourier_1827/fourier_1827.html. Minus 40 degrees on the octesimal scale is minus 50 degrees Celsius.

³ OL, page 2.

⁴ OL, *ibid*.

⁵ Succinctly explained, with supporting extracts from Arrhenius’ original publications, at <http://members.lycos.nl/ErrenWijlens/CO2/arrhrev.htm>. The incorrect radiation data had been computed by Langley in 1890. Langley corrected his error in 1900, four years after

Arrhenius' paper (<http://members.lycos.nl/ErrenWijlens/CO2/langley.htm>), and in the same year Ångström directly refuted Arrhenius' calculations (Annalen der Physik, Bd. 3, pp. 720-732). Arrhenius at first resisted Ångström's demonstration, but backed down in 1903, without ever adjusting his warming estimates. These were 4 degrees C for doubled alone, plus water vapour feedback of 30 per cent. Current high-end climate models imply feedbacks of ~300 per cent.

6 Typical of estimates made in the 1960s and 1970s was that of S. I. Rasool and S. Schneider ("Atmospheric Carbon Dioxide and Aerosols—Effects of Large Increases on Global Climate", Science, vol.173, pp.138-141). They stated that even an eightfold increase in carbon dioxide would only lead to a warming of 2 degrees C, implying a 0.67 degree C warming for each doubling. For a summary of the history of this issue up to the early 90s, see R. Lindzen, "Global Warming—The Origin and Nature of the Alleged Scientific Consensus", available at <http://www.cato.org/pubs/regulation/reg15n2g.html>. S. Weart provides a more thorough, though less expert and somewhat credulous history of greenhouse science at www.aip.org/history/climate/co2.htm#L_M019.

7 A competing scientific scare of the time was that temperatures might fall towards a new ice age because industrial emissions, particularly sulphate aerosols, would block solar radiation. Rasool and Schneider, op. cit., stated that "the effect on surface temperature of an increase in the aerosol content of the atmosphere is found to be quite significant. An increase by a factor of 4 in the equilibrium dust concentration in the global atmosphere, which cannot be ruled out as a possibility within the next century, could decrease the mean surface temperature by as much as 3.5 deg. K. If sustained over a period of several years, such a temperature decrease could be sufficient to trigger an ice age." Other devotees of the global cooling theory included Crispin Tickell, later an advisor to Mrs Thatcher,

and popularisers such as Lowell Ponte. Schneider and Tickell later reversed themselves and became strong advocates of the global warming theory.

8 The IPCC has estimated natural annual CO₂ emissions at ~150 gigatonnes, compared with 7 Gt from industrial emissions: see sections 3.2.2.1 and 3.2.3.1 here of the relevant IPCC report here: www.grida.no/climate/ipcc_tar/wg1/095.htm. The whole IPCC paradigm of CO₂ causing warming, rather than warming releasing net CO₂, is still far from universally accepted among experts—see for example the comment by R. H. Essenhigh at: <http://pubs.acs.org/subscribe/journals/ci/31/special/may01-viewpoint.html>.

9 TA, paragraph 9.

10 J. Ritchie et al, "Outgassing from Amazonian rivers and wetlands as a large tropical source of atmospheric CO₂", Nature, 11 April 2002, available here: www.stroudcenter.org/about/aufdenkampe/pdf/richey02.pdf.

11 A clear presentation of the recent evolution of total greenhouse gas forcing is available here: www.gsfc.nasa.gov/gsfc/earth/pictures/hansen010302/figure1m.gif. Its original (NASA) source is here: www.pnas.org/cgi/content/full/98/26/14778.

12 IPCC, Third Assessment Report, Working Group 1 Technical Summary, page 40, chart f). Available at www.ipcc.ch/pub/wg1TARtechsum.pdf.

13 For a clear graph of this, see www.dar.csiro.au/capegrim/image/cg_CO2.png.

14 The case of methane shows the unreliability of IPCC projections of GHG concentrations. The rise in the concentration of methane started to slow in the early 1980s. An 11 per cent total rise over the decade of the 1970s slowed to 8 per cent in the 1980s and this was down to half a per cent a year by the early 1990s. Yet the central estimate of the Second Assessment Report (SAR), scheduled for 1995 but issued in 1996, predicted a 6.5 per cent increase for the 1990s. The actual figure was 3.5 per

cent. The Third Assessment Report (TAR) continued the overestimates. By the time it was issued in 2001, methane concentrations were virtually stable at their 1999 level, yet the TAR scenarios predicted a rise of between 3.2 per cent and 7.9 per cent by 2010. This is now clearly impossible. (IPCC projections at www.grida.no/climate/ipcc_tar/wg1/532.htm; latest measurements at www.cmdl.noaa.gov/ccgg/iadv/index.php). One of the leading non-IPCC proponents of the greenhouse issue, James Hansen of NASA, has pointed out that simple projection of existing trends is more reliable than the multistage IPCC procedure of estimating emissions, then fluxes, and then concentrations. He describes the higher end of IPCC projections for carbon dioxide concentrations as “unrealistic”. See, for example, http://naturalscience.com/ns/articles/01-16/ns_jeh6.html. For CFCs and other gas measurements, see www.dar.csiro.au/capegrim/gh-gasgraphs.html.

15 R. Lindzen, “Understanding Common Climate Claims”, pp. 3–4, available at http://ff.org/centers/csspp/library/co2weekly/20060126/20060126_13.pdf. Lindzen’s figures are consistent with the IPCC TAR, which estimated that GHG changes added a radiative forcing of 2.43 watts per square metre between 1750 and 2000, whereas a doubling of CO₂ would add 3.7 watts per square metre. (See www.grida.no/climate/ipcc_tar/wg1/251.htm#6131, Table 6.11 and http://www.grida.no/climate/ipcc_tar/wg1/219.htm.) Other calculations make substantial deduction for aerosol effects, but these are not reliably known, even in sign: cf. IPCC TAR Working Group 1, Summary for Policymakers, page 8, available at www.ipcc.ch/pub/spm22-01.pdf.

16 The 0.7 degree warming quoted in the papers is derived from aggregations of weather station records. Weather stations are designed to measure local conditions, which vary with changes in the local environment. For the vast majority of weather stations, especially in developing countries, the changes are not sufficiently well-

documented to allow accurate correction of the data for urbanisation and other factors. For discussion and references to numerous papers on this subject, see <http://climatesci.atmos.colostate.edu/category/climate-change-metrics/>.

17 For references, see Lindzen, “Understanding Common Climate Claims”, op.cit., page 14.

18 DP, paragraph 18.

19 TA, paragraph 3.

20 TA, paragraph 6.

21 For a better understanding of models, see the paper by D. Legates and especially the questions and answers that follow at “Climate Forecasts, Global Warming and the National Assessment”, Washington Roundtable on Science and Public Policy (2001) at <http://www.marshall.org/pdf/materials/61.pdf>. The objection to using them for prediction is concisely put in a recent note by H. Tennekes: “A Skeptical View of Climate Models” (2006) available at www.sepp.org/NewSEPP/Climate%20models-Tennekes.htm.

22 See the Technical Summary of the IPCC TAR Working Group 1, Box 3, available here: www.ipcc.ch/pub/wg1TARtechsum.pdf, pp. 48-9.

23 This is the IPCC assessment: see IPCC TAR Working Group 1, Figure 6.6, available here: http://www.grida.no/climate/ipcc_tar/wg1/figspm-3.htm.

24 TA, Figure A1.

25 IPCC TAR Working Group 1, Figure 6.6, available here: http://www.grida.no/climate/ipcc_tar/wg1/figspm-3.htm

26 See E. Friis-Christensen and K. Lassen, “Length of the solar cycle: An indicator of solar activity closely associated with climate”, *Science*, 254, 698-700, 1991, the key graphic from which is reproduced here: <http://www.tmgnow.com/repository/solar/lassen1.html>. More recently, O. Kärner, “On nonstationarity and antipersistency in global temperature series”, *Journal of Geophysical Research*, vol. 107 (2002;

available at <http://www.aai.ee/~olavi/2001JD002024u.pdf>), which concludes: “The result emphasizes a dominating role of the solar irradiance variability in variations of the tropospheric temperature and gives no support to the theory of anthropogenic climate change.”

27 IPCC notes to the graphics admit that: “These results show that the forcings included are sufficient to explain the observed changes, but do not exclude the possibility that other forcings may also have contributed.” (www.ipcc.ch/pub/spm22-01.pdf, page 11) and that “The changes in sulphate aerosol are calculated interactively, and changes in tropospheric ozone were calculated offline using a chemical transport model.” (www.grida.no/climate/ipcc_tar/wg1/450.htm). Lindzen (“Understanding Common Climate Claims”, op. cit., pp. 6-8) discusses problems with the graphics.

28 TA, paragraph 6.

29 DP, paragraphs 7, 17, 90; TA, paragraphs 9, Figures A6 and A7.

30 See map in J. Christy and R. Spencer, “Global Temperature Report, 1978-2003”, page 9, available at www.uah.edu/News/climate/25years.pdf.

31 DP, paragraph 29.

32 See “Global warming is behind rain failure: UN climate panel head”, Indian Express, 26 July 2002, available at www.indian-express.com/print.php?content_id=6620. More recently Dr Pachauri has asserted that “We could have excessive and frequent flooding as well as droughts more or less in the same locations.” See www.planetark.com/dailynewsstory.cfm/newsid/28326/newsDate/29-Nov-2004/story.htm. The variability and unpredictability of the monsoon were extensively and sensibly discussed in the Indian news magazine Frontline in its issue of 17-30 August 2002, available at www.hinduonnet.com/fine/fl1917/19170160.htm.

33 D. Shaefer, “Discussion of recent climate change in South Asia and possible Impacts on Agriculture”, page 3, available at www.

geo.uni-mainz.de/schaefer/pdf/schaefer_ISAM_3.pdf

34 DP, paragraph 90; TA, paragraphs 1, 10 and Figure A6.

35 O. Johannessen et al (2005) [Recent ice sheet growth in the interior of Greenland](http://www.sciencemag.org/content/310/5857/1013), Science 310: pp. 1013-1016.

36 P. Chylek, J. E. Box and G. Lesins, 2004, “Global warming and the Greenland ice sheet”, Climatic Change 63: pp. 201-221.

37 S. Fred Singer, former Director of the US National Weather Satellite Service, makes these points in several books, and summarises his views at www.sepp.org/books/gwunfbus.html, specifically claiming that “A global warming trend is calculated to reduce the latitudinal temperature gradient and therefore the driving force for storms and severe weather.” In testimony before the US Senate in 2001, Lindzen observed that “the most important energy source for extratropical storms is the temperature difference between the tropics and the poles which is predicted by computer models to decrease with global warming. This also implies reduced temperature variation associated with weather since such variations result from air moving from one latitude to another. Consistent with this, even the IPCC Policymakers Summary notes that no significant trends have been identified in tropical or extratropical storm intensity and frequency. Nor have trends been found in tornados, hail events or thunder days.” See www-eaps.mit.edu/faculty/lindzen/Testimony/Senate2001.pdf.

38 Written testimony of Professor Richard Lindzen to House of Lords Economic Affairs Committee, 25 January 2005, available at: www.publications.parliament.uk/pa/ld200506/ldselect/ldeconaf/12/5012506.htm.

39 DP, paragraph 20.

40 For example, http://unfccc.int/essential_background/feeling_the_heat/items/2904.php.

41 The BBC reported an interview with the

IPCC Chair as follows on 17 May 2002: “There was a need for a dialogue on what commitments nations should make in a second wave after Kyoto, he said. “I think that the science must provide a compelling reason and a logic to take those steps, and this is what I hope the IPCC will be able to do in the future,” he added.” <http://news.bbc.co.uk/2/hi/science/nature/1993832.stm>. The IPCC Chair makes several other policy pronouncements here: www.recep.org/index.cfm?articleid=648&ros=1.

⁴² Dr Chris Landsea of NOAA’s Hurricane Research Division. His resignation letter is at http://sciencepolicy.colorado.edu/prometheus/archives/science_policy_general/000318chris_landsea_leaves.html.

⁴³ Professor Paul Reiter of the Institut Pasteur; see <http://ff.org/centers/csspp/library/co2weekly/2005-09-01/paul.htm>, esp. paragraph 31f.

⁴⁴ Professor Roger Pielke Sr. of Colorado State University; see <http://climatesci.atmos.colostate.edu/index.php?s=resignation&submit=Search>.

⁴⁵ R. Lindzen, “Understanding Common Climate Claims”, (op. cit., page 17f.) gives examples of intimidation which he considers has “mostly, but not exclusively, been used against those questioning alarmism”. Lindzen observed in 2001 that “Even within climate science, most of the top researchers (at least in the US) avoid the IPCC because

it is extremely time consuming and non-productive. Somewhat ashamedly I must admit to being the only active participant in my department.” Lindzen himself has now also withdrawn from the process, after participating in all three previous IPCC reports. See his 2001 testimony to the US Senate, op. cit.

⁴⁶ Science, 17 September, 1999. The “heavy-weight” signatories were Bert Bolin, Ex-Chairman, IPCC, Sweden; Josep Canadell, Executive Officer, Global Change and Terrestrial Ecosystems, CSIRO Wildlife and Ecology, Australia; Berrien Moore III, Chairman, International Geosphere-Biosphere Programme (IGBP), USA; Ian Noble, Chair, Global Change and Terrestrial Ecosystems, Australian National University; and Will Steffen, Executive Director, International Geosphere-Biosphere Programme, Sweden.

⁴⁷ Mathiesen, a prominent Swedish engineering scientist, confided his response to British scientist Nigel Calder: copy here [under heading “Political Correctness in Climate Science”]: www.john-daly.com/press/press-99.htm. Daly incorrectly attributes the remark to Calder’s prime addressee, the then head of the ICSU, (Werner) Arber.

⁴⁸ R. Lindzen discusses the true extent of global warming consensus in his 2001 testimony to the US Senate, op. cit.



The Lavoisier Group Inc



The Lavoisier Group is named after the founder of modern chemistry, Antoine-Laurent Lavoisier, who discovered oxygen, identified carbon dioxide as the product of combustion of carbon in air, and who laid down the theoretical basis of modern chemistry. He was also an ingenious experimenter and instrument-maker who insisted on the highest possible accuracy when taking measurements. He was executed by the French Revolutionary Government in 1794.

The Lavoisier Group was incorporated in April 2000. At that time, the founders were concerned that the Australian Government might ratify the Kyoto Protocol without proper understanding of the scientific claims on which it was based, or of the economic implications of the decarbonisation regime which ratification would have required.

In June 2002, Prime Minister John Howard stated in the Parliament that Australia would not ratify Kyoto because it was 'not in Australia's interests to do so'. The Federal Labor Opposition has consistently adhered to a policy of ratification, but having lost the 2004 election, the possibility of Australia's ratification has been deferred until 2007.

Meanwhile the debate has moved on. The Kyoto Protocol is now almost dead; only two of its parties can possibly meet the 2012 emissions targets which were accepted in 1997, and no country is prepared to commit to post-2012 emission targets.

Nevertheless, there still exists a huge global network of institutions and scientists who have hitched their wagons to the global warming star. Although the science debate is now virtually over, the political debate will continue for years to come.

The Lavoisier Group provides a network and a Website which enables Australians who are concerned about this issue to keep abreast of developments here and overseas. Those who sympathise with our aims, and wish to join, can apply for membership through the Website: www.lavoisier.com.au

The Lavoisier Group's Board comprises President The Hon. Peter Walsh AO; Vice-President Ian Webber AO; Treasurer Harold Clough AO; Bruce Kean AM; Bob Foster; Tom Bostock; George Fox AM; and Secretary Ray Evans.