



WHAT IS WRONG WITH THE IPCC?

Proposals for a Radical Reform

Ross McKittrick

Foreword by the Hon John Howard

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The Hon John Howard

John Howard was Prime Minister of Australia from 1996 to 2007. He served as Treasurer from 1977-83 and as Minister for Business and Consumer Affairs from 1975-77.

Foreword

I am an agnostic when it comes to global warming. That is why I had no difficulty in proposing in 2007, when I was Prime Minister of Australia, an emissions trading system, predicated on the rest of the world acting in a similar fashion, and designed to protect Australia's trade-exposed industries.

Since then two events have intervened to reinforce the caution which should be exercised by my country in this area. The collapse of the Copenhagen Summit means that actions by major emitting nations is, to say the least, highly unlikely. Moreover, the global financial plunge has highlighted the folly of any nation taking action which harms its own comparative economic advantage.

Professor McKittrick's report focuses on the reporting procedures of the Intergovernmental Panel on Climate Change (IPCC). The intellectual bullying, which has been a feature of the behaviour of some global warming zealots, makes this report necessary reading if there is to be an objective assessment of all of the arguments. The attempt of many to close down the debate is disgraceful, and must be resisted.

Ross McKittrick has written a well-researched and articulate critique of the IPCC's methods. It deserves careful study, especially by those who remain in an agnostic state on this issue.

John Howard

Summary

The name “Intergovernmental Panel on Climate Change” (IPCC) is used to describe both an administrative entity and an assessment report-writing process; the former is the technically-correct usage but the latter is common. The administrative entity consists of three layers. The top one is a plenary Panel comprising delegates from 195 member states. It oversees a 30-member Bureau (with accompanying Secretariat) that executes most of the operations of the IPCC. In particular, the Bureau oversees three Working Groups that produce assessment reports on climate change science and policy issues. When the assessment reports are accepted by the Panel they are deemed “IPCC Reports.”

The IPCC has collected many accolades over the years, but criticism has also grown over whether its assessment reports are as objective and comprehensive as they ought to be. Three concerns make it particularly timely to consider reforms to the IPCC process. First, while the IPCC has long had critics, their number is growing and their ranks include new members who have in the past been advocates on its side. Second, the IPCC plays a very influential role in the world, and it is imperative that its operations be unimpeachable. Yet the oversight mechanisms of the IPCC simply do not appear to be adequate to assure this. Third, there is a wide misunderstanding about the IPCC assessment process, such that it is often considered more formal and rigorous than it actually is.

This report reviews the IPCC procedures in detail and points out a number of weaknesses. Principally, the IPCC Bureau has a great deal of arbitrary power over the content and conclusions of the assessment reports. It faces little restraint in the review process due to weaknesses in the current rules. And the government delegates who comprise the plenary Panel provide what appears to be largely passive and ineffective oversight. The scientific assessment process is thus characterized by the following deficiencies:

a) An opaque process for selecting Lead Authors

The Bureau has, effectively, a free hand in picking Coordinating Lead Authors, Lead Authors and Contributing Authors of the report.

Past Lead Author selections have been criticized by other Lead Authors as being overly dominated by political considerations.

Coupled with the deficiencies in the peer review process, this opens up the possibility that the IPCC Bureau can pre-determine the conclusions of the report by its selection of Lead Authors.

b) The absence of any binding requirement for incorporating the full range of views

The language in IPCC procedures requiring comprehensiveness of the reports is vague and inadequate.

Recommendations for improving this aspect of IPCC procedures were shelved during the Task Group process created to deal with reform recommendations received from an outside agency in 2010.

c) Intellectual conflicts of interest

Lead Authors regularly review their own work and that of their critics, thereby operating in an intellectual conflict of interest.

A large number of Lead Authors, including ones connected to half the chapters in the Working Group I report and all the chapters in the Working Group II report, are employed by or serve as advisors to environmental activist organizations.

Since Lead Authors have the final say over the published text, the participation of adversarial reviewers partway through the assessment process does not mitigate the bias created by this situation.

d) Loopholes and gaps in the peer review sequence

Lead Authors can defeat the review process either by overruling reviewers or by waiting until after the close of expert review and then rewriting the text. Material changes to important sections of text have been made in this way in past assessment reports.

Reviewers are not assigned to specific sections of the report, hence there is no guarantee that a section will be subject to any independent scrutiny, let alone a level commensurate with its importance to the overall conclusions.

Government review is virtually non-existent. About 90 percent of countries in the IPCC did not submit any review comments on the last assessment report and, of the comments received, half were from only two countries. Likewise only a handful of countries provided written comments on the recent Task Group recommendations for reforms of IPCC procedures. The existence of a 195-member plenary Panel thus creates a false impression of extensive oversight activity.

A recent review of IPCC procedures was undertaken by the InterAcademy Council, a body jointly sponsored by national academic societies that conducted a review of IPCC procedures in 2010. It touched briefly on some of these issues, but none of the subsequent procedural reforms adopted by the IPCC addressed them. The procedural revisions made in response to the InterAcademy Council review largely ignored the real problems in the IPCC, especially those related to intellectual conflicts of interest. The process instead gave evidence of considerable indifference on the part of

the Panel regarding its supervision of the Bureau.

After going through a number of case studies to illustrate these problems, I present a series of recommendations to fix the IPCC assessment process.

Recommendation 1: An objective and transparent Lead Author selection procedure.

Recommendation 2: A transparent Contributing Author recruitment process.

Recommendation 3: Appointment of an Editorial Advisory Board and identification of potentially controversial sections.

Recommendation 4: Explicit assignment of both section authorship and reviewer positions.

Recommendation 5: Adoption of an iterative process to achieve a final text under the joint supervision of authors, reviewers and editors.

Recommendation 6: Adoption of a procedure for seeking technical input when necessary from outside the list of authors and reviewers during the assessment process.

Recommendation 7: Due diligence regarding key supporting papers and full disclosure of all data and methods used to produce original IPCC Figures and Tables.

Recommendation 8: Immediate online publication of the full report upon finalization, prior to production of summary.

Recommendation 9: Production of Summary by Ad Hoc group appointed by the Panel based on recommendations from the Editorial Advisory Board.

Recommendation 10: Release of all drafts, review comments, responses and author correspondence records within 3 months of online publication of the full report.

Recommendation 11: That the nations involved in the IPCC Panel begin these reforms at once, and if such a process cannot be initiated then those national governments that seek objective and sound advice on climate change issues should withdraw from the IPCC and begin the process of creating a new assessment body free of the deficiencies identified herein.

1. Introduction: The case for reform

1.1 Background

The Intergovernmental Panel on Climate Change (IPCC, www.ipcc.ch) was created in 1988 by the World Meteorological Organization (WMO) and the United Nations Environment Program (UNEP). Its governing principles¹ state that its role is "...to assess on a comprehensive, objective, open and transparent basis the scientific, technical and socio-economic information relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts and options for adaptation and mitigation." The IPCC also maintains that its reports should be "neutral with respect to policy," though specific topics it considers may be relevant to policy.

The term 'IPCC' gets applied both to the administrative entity and to the process it uses for producing reports. The main activity of the IPCC is to prepare assessment reports explaining the state of climate science and related subjects. Four such reports have been published to date (in 1990, 1996, 2001 and 2007); a fifth is due in 2014. In addition the IPCC has released several technical reports on topics such as renewable energy and carbon capture. As an administrative entity the IPCC has both a scientific and political structure. In its scientific capacity it recruits and coordinates contributions by several thousand scientists and authors around the world during the preparation of assessment reports. In its political capacity it is an intergovernmental forum in which delegates from the 195 member states hold plenary meetings to oversee and receive the findings of the assessment working groups, and to formulate and execute plans for IPCC activity.

The IPCC has received many accolades over the years, culminating in 2007 with the receipt of a Nobel Peace Prize, shared with Al Gore. At the same time, criticism has grown² regarding the practices and outputs of the IPCC, especially following the 3rd and 4th Assessment Reports, called respectively the TAR and the AR4. Questions have been raised about whether the IPCC is actually comprehensive, objective, open and transparent. Critics have alleged, *inter alia*, that the IPCC has blindspots, is biased, conflicted, secretive and opaque. This report will discuss some of the basis for these concerns and will propose procedural reforms to address them.

1.2 Climategate and the IAC Review

The criticisms became much more prominent and serious following the release of the so-called "Climategate" emails from the University of East Anglia in

¹ Available online at <http://www.ipcc.ch/pdf/ipcc-principles/ipcc-principles.pdf>.

² See, *inter alia*, Singer 1998, Michaels and Balling 2000, 2009, Essex and McKittrick 2002, Boehmer-Christensen and Kellow 2002, Lawson 2008, Plimer 2009, Montford 2010, Carter 2010, Laframboise 2011, Johnson 2012.

November 2009 (Montford 2010). Most of the emails consisted of exchanges among participants in the IPCC report-writing process, and many contained discussions about how to finesse or work around contradictory or uncertain evidence regarding modern and historical climatic warming. The behind-the-scenes discussions struck many observers as disturbing, leading to considerable public debate about the integrity of the IPCC process. Climatologist Hans von Storch wrote in the Wall Street Journal:³

"What we can now see is a concerted effort to emphasize scientific results that are useful to a political agenda by blocking papers in the purportedly independent review process and skewing the assessments of the U.N.'s Intergovernmental Panel on Climate Change (IPCC). The effort has not been so successful, but trying was bad enough."

Writing in the UK's Guardian, journalist George Monbiot wrote:⁴

"It is true that climate change deniers have made wild claims which the material can't possibly support (the end of global warming, the death of climate science). But it is also true that the emails are very damaging... No one has been as badly let down by the revelations in these emails as those of us who have championed the science. We should be the first to demand that it is unimpeachable, not the last."

Christopher Booker, writing in the UK's Daily Telegraph, said:⁵

"The reason why even the Guardian's George Monbiot has expressed total shock and dismay at the picture revealed by the documents is that their authors are not just any old bunch of academics. Their importance cannot be overestimated. What we are looking at here is the small group of scientists who have for years been more influential in driving the worldwide alarm over global warming than any others, not least through the role they play at the heart of the UN's Intergovernmental Panel on Climate Change (IPCC). ... It seems they are prepared to stop at nothing to stifle scientific debate in this way, not least by ensuring that no dissenting research should find its way into the pages of IPCC reports....Our hopelessly compromised scientific establishment cannot be allowed to get away with a whitewash of what has become the greatest scientific scandal of our age."

The leak of emails coincided with the exposure of some embarrassing errors in the AR4, most notably a claim that Himalayan glaciers would disappear by 2035, a claim that turned out to lack a scientifically valid basis.⁶

In response to the controversies and criticisms, in 2010 the IPCC requested an agency called the InterAcademy Council (IAC) to conduct a review of its procedures. The IAC is a subsidiary of the InterAcademy Panel on International

3 <http://online.wsj.com/article/SB10001424052748704238104574601443947078538.html>

4 <http://www.guardian.co.uk/environment/georgemonbiot/2009/nov/25/monbiot-climate-leak-crisis-response>

5 <http://www.telegraph.co.uk/comment/columnists/christopherbooker/6679082/Climate-change-this-is-the-worst-scientific-scandal-of-our-generation.html>

6 <http://www.timesonline.co.uk/tol/news/environment/article6991177.ece>

Issues (IAP), and was formed in 2000 to provide, in its words, “client-driven” reports on requested topics.⁷ At the time of its selection, the IAC did not have any track record in evaluation of agency procedures, nor was it credibly independent of the IPCC. Prior to the 2010 IPCC Review, its most recent report was a 2007 study promoting alternative energy, coauthored by a 15-member committee⁸ that included IPCC Chair Rajendra Pachauri, and IPCC Lead Authors Nebojsa Nakicenovic and Ged Davis.

The IAC Report did make some useful recommendations, and the IPCC has completed a process of considering them for potential adoption (see Part 4 below). The IAC report should not, however, be considered as the last word on the subject of reforming the IPCC; in many respects it should only be seen as the first word. Three factors make it imperative that IPCC reform receive ongoing attention.

- Continued extent of criticism. Criticism of the IPCC has come from so many places, and has sufficient depth and credibility, that it cannot be dismissed. The criticisms were extended recently in connection with the release of the IPCC’s Special Report on Renewable Energy Sources and Climate Change Mitigation (SRREN). A May 9 (2011) press release⁹ from the IPCC announced that “Close to 80 percent of the world’s energy supply could be met by renewables by mid-century if backed by the right enabling public policies a new report shows.” This claim was disseminated in news media around the world. Initially the source material behind the claim was not made available, but a month later the full report was released, and it revealed¹⁰ that the claim originated in a report jointly published by Greenpeace and a renewable energy industry lobby group, the author of which had subsequently been selected by the IPCC to be a Lead Author for the SRREN. The revelation that IPCC procedures permit such obvious conflicts of interest led to harsh public commentary not only by their traditional critics,¹¹ but by previously supportive journalists such as Mark Lynas, Oliver Wright and Andrew Revkin.¹² Fresh concerns about conflicts of interest have also arisen with recent revelations that a surprising number of participants in a lobbying campaign run by the World Wildlife Fund (WWF) also serve as IPCC Lead Authors, a situation that will be discussed in Section 2.3.
- Continued influence of the IPCC. The IPCC is the agency that provides canonical advice to governments around the world on one of the most important policy issues of the era. Therefore it is important that the IPCC be subject to strict, effective and independent oversight. Yet, as will be shown

7 <http://interacademycouncil.net/CMS/3239.aspx>

8 <http://interacademycouncil.net/?id=11846>

9 <http://srren.ipcc-wg3.de/press/content/potential-of-renewable-energy-outlined-report-by-the-intergovernmental-panel-on-climate-change>

10 See <http://climateaudit.org/2011/06/14/ipcc-wg3-and-the-greenpeace-karaoke/>

11 See, for example, <http://wattsupwiththat.com/2011/06/16/a-blunder-of-staggering-proportions-by-the-ipcc/>

12 See <http://www.marklynas.org/2011/06/questions-the-ipcc-must-now-urgently-answer/>, <http://blogs.independent.co.uk/2011/06/17/climategate-part-2-a-worrying-conflict-of-interest/> and <http://dotearth.blogs.nytimes.com/2011/06/15/a-deeper-look-at-an-energy-analysis-raises-big-questions/>

in Part 4, the recent process to reform IPCC procedures failed to address the core problems, and instead revealed how weak the plenary Panel is as an oversight body. Because so many governments are involved, no one person or agency is in a position to provide effective leadership. Since there are 195 member governments in charge of the IPCC, the oversight function may suffer a “tragedy of the commons”: even if all member states would benefit from its occurrence, no one state would benefit enough to justify unilaterally taking on the job. It is noteworthy in this regard that the IAC review did not occur at the instigation of a member of the Panel (that is, one of the national delegates). The IPCC’s administrative bureau requested the review and selected the IAC to carry it out, then the IAC reported directly back to the IPCC administration, and the IPCC administration managed the process of deciding how to respond. This is inadequate as a form of independent and objective oversight.

- Continued misunderstanding of the IPCC process. A number of misunderstandings have arisen about how the IPCC assessment process works, leading to common exaggerations about the strength of its peer review component. For instance, when the United States Environmental Protection Agency (EPA) released its Proposed Endangerment Finding on greenhouse gases in April 2009¹³ and its final Endangerment Finding in December 2010¹⁴ it took the unusual step of not conducting any internal evaluation of the science, instead relying on the IPCC assessment:

“However, the [EPA] Administrator is relying on the major assessments of the [US Global Change Research Program], IPCC, and [National Research Council] as the primary scientific and technical basis of her endangerment decision for a number of reasons. ...these assessment reports undergo a rigorous and exacting standard of peer review by the expert community, as well as rigorous levels of U.S. government review and acceptance. Individual studies that appear in scientific journals, even if peer reviewed, do not go through as many review stages, nor are they reviewed and commented on by as many scientists. The review processes of the IPCC, USGCRP, and NRC (explained in fuller detail in the TSD and the Response to Comments document, Volume 1) provide EPA with strong assurance that this material has been well vetted by both the climate change research community and by the U.S. government.” (US Federal Register 74 page 66510-66511).

This description is inaccurate as regards the IPCC. Lead Authors of Working Group reports have the authority both to force acceptance of their contributions even if reviewers oppose their claims, and to rewrite the text after the review process has closed. Consequently the review process is much weaker than that which occurs in normal academic journals, where neither of these practices are allowed. The reform recommendations that I will make at the end of this report will come down to the basic principle that

¹³ US Federal Register 74 FR 18886

¹⁴ http://www.epa.gov/climatechange/endangerment/downloads/Federal_Register-EPA-HQ-OAR-2009-0171-Dec.15-09.pdf

the IPCC review process ought to be reformed so that it is no less rigorous than that of a standard academic journal. The fact that public bodies like the US EPA believe it already is, yet procedural reforms to make it so will end up sounding somewhat radical, shows how far perception and reality have diverged.

2. IPCC Structures: Administrative and Procedural

2.1 The IPCC Administrative Structure

There are three administrative tiers in the IPCC.¹⁵

(i) At the top is the Panel itself, which consists of representatives of the 195 member states. They meet in periodic plenary sessions to make decisions and review ongoing work. The Panel is a visible subset of what can be considered an international milieu, namely the network of politicians, officials, bureaucrats and trusted outside experts and advocates who are connected with national environment ministries or departments. Delegates to the IPCC panel are drawn from this milieu. While the Panel is the ultimate locus of authority in the IPCC, I will show in Section 3.5 and Part 4 that it is largely dysfunctional as an oversight body. Panel members provide only cursory and superficial input into IPCC operations, and most members were apparently indifferent to and unengaged with the recent reform process. For all practical purposes, the IPCC is directed and controlled by the next administrative layer, namely the IPCC Bureau.

(ii) The IPCC Bureau (assisted by the 10-member IPCC Secretariat), is an administrative body elected by the Panel, consisting of a Chair (currently Rajendra Pachauri), Vice Chairs, the Working Group Co-Chairs, and other Bureau members. The current Bureau consists of 30 members elected at a meeting of the Panel in Geneva in September 2008.¹⁶ 28 members are attached to the three Working Groups and two are Co-Chairs of the Task Force on Greenhouse Gas Inventories, which has its own 14-member Bureau. The list of candidates for IPCC Bureau positions was supplied by government officials using whatever processes individual governments may choose, and is subject to a requirement for balance between developing and developed country members. The Bureau and Secretariat have significant influence over the flow of information to the Panel, by structuring and presiding over the plenary meetings and overseeing the production of reports.

(iii) The next group down is divided into three Working Groups and one Task

¹⁵ This is based on the IPCC organizational chart at http://www.ipcc.ch/organization/organization_structure.shtml.

¹⁶ See report at <http://www.ipcc.ch/meetings/session30/doc5.pdf>.

Force, where the work of preparing reports is conducted. The Working Groups are each asked to follow the IPCC process and produce a contribution to an assessment report. These contributions are what are commonly known as IPCC Reports, though they do not become official IPCC Reports until they are accepted by the Panel itself. The most prominent report is the contribution of Working Group I (WGI), which examines climate science and draws conclusions about the pace of global warming and the influence of greenhouse gases.

The Bureau has considerable influence on the Working Groups because it selects the Lead Authors (LAs). For those familiar with the research literature and the different schools of thought, the selection of LAs could, in principle, fully determine the outcome of the assessment report, unless there were sufficient checks and balances in place to guard against bias. It is a contention of this report that the review process does not provide adequate checks and balances, therefore the choice of LAs predetermines the contents of the report.

2.2 The IPCC Assessment Process

The sequence of events that yields an IPCC Assessment Report is as follows:¹⁷

1. Member governments compile lists of potential Coordinating Lead Authors (CLAs), LAs and Contributing Authors (CAs), Expert Reviewers, Review Editors and Government Focal Points.
2. The Bureau selects the CLAs and LAs.
3. The CLAs and LAs prepare a draft Report using their own contributions and those of CAs whom they recruit to provide text.
4. Review
 - a. First review (by experts) and revisions by CLAs and LAs.
 - b. Second review (by governments and experts).
5. CLAs and LAs write the final draft of the Report.
6. Member governments vote on acceptance of Report at a Session of the Working Group(s) or the Panel respectively.

Steps 3 and 4 are the points at which the “thousands” of experts are involved, either as contributors or reviewers.

¹⁷ See http://www.ipcc.ch/organization/organization_procedures.shtml and <http://www.ipcc.ch/pdf/ipcc-principles/ipcc-principles-appendix-a.pdf>.

2.3 Selection of authors and reviewers

Steps 1 and 2 give to the IPCC Bureau complete control over the selection of Coordinating Lead Authors and Lead Authors for the Working Groups. The CLAs and LAs then select Contributing Authors (CAs) to provide content to the chapters. While the Bureau recruits CLAs and LAs mainly from lists provided by member governments, it is not limited to the names on those lists. IPCC procedures are as follows (emphasis added):

Coordinating Lead Authors and Lead Authors are selected by the relevant Working Group/Task Force Bureau, under general guidance and review provided by the Session of the Working Group or, in case of reports prepared by the Task Force on National Greenhouse Gas Inventories, the Panel, from those experts cited in the lists provided by governments and participating organisations, **and other experts as appropriate**, known through their publications and works.

The Bureau makes its choices behind closed doors using an opaque process that was much-criticized during the IAC review. The author selection criteria have been revised slightly, without introducing any substantial changes, in response to the IAC review recommendations. The changes apply to future assessment reports and will be discussed in Part 4.

There is a requirement to ensure representation of a wide range of views, but it is worded so weakly that it is in effect a dead letter:

The composition of the group of Coordinating Lead Authors and Lead Authors for a section or chapter of a Report shall reflect the need to aim for a range of views, expertise and geographical representation.

In May 2011 the Panel responded to the IAC recommendation to tighten this requirement by changing the wording from "reflecting the need to aim for a range of views" to "aim to reflect a range of scientific, technical and socio-economic views,"¹⁸ which is clearly a trivial change.

The centralized nature of the author selection process, and the absence of a meaningful requirement to include proponents of the full range of scientific views, means that the IPCC Bureau can predetermine the content of the report by making the appropriate selection of CLAs and LAs. This is made easier by the existence of an environmental policy milieu at the international level, forming something of a self-selecting ring of insiders who populate the regulatory and governance processes, and who are able to exclude from it individuals who seriously question the assumptions and agenda within the milieu. David Henderson, former OECD Chief Economist and a close observer of the IPCC milieu, describes it as follows:

"...members of the IPCC Bureau, and more broadly of its directing circle, have from the outset shared the conviction that anthropogenic global

¹⁸ See http://www.ipcc.ch/meetings/session33/ipcc_p33_decisions_taken_procedures.pdf p. 2.

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 within the process."

(Henderson 2007). IPCC Chairman Rajendra Pachauri would, of course, deny that the author selection procedure is biased. In a 2007 interview he described the process in very idealized terms:

"These are people who have been chosen on the basis of their track record, on their record of publications, on the research that they have done. They have been nominated either by governments or major international organisations. There is a very careful process of selection. We had something like 2,000 such nominations and out of that less than 600 were selected. So it is not as though anybody can get in. They are people who are at the top of their profession as far as research is concerned in a particular aspect of climate change."¹⁹

But it is easy to find counterexamples that undermine this description. A recent case is Sven Teske, a climate campaigner for Greenpeace who was selected by the IPCC as a Lead Author for its recent report on renewable energy (SRREN), which led to the controversies noted above, when a non peer-reviewed Greenpeace report he coauthored became the basis for central claims in the report highlighted in the press release announcing its publication.

Another particularly notable case is Sari Kovats, who, far from being at the "top of her profession," was selected to serve as an IPCC Contributing Author in 1994 when she was 25 years old, had no Ph.D. and no academic publications, and was just starting a job as a research assistant at the London School of Hygiene and Tropical Medicine.²⁰ She began a part-time Ph.D. program in 2001, at which time she was promoted to a term as an IPCC Lead Author. The IPCC Bureau appointed her a third time as Lead or Contributing Author for a total of four chapters of the AR4, as well as expert reviewer. Her Ph.D. thesis wasn't completed until three years after the AR4 was published.²¹

These are apparently not isolated cases. Past IPCC authors made many submissions to the IAC Review panel,²² expressing concerns about the extent to which LAs are selected on political rather than scientific grounds. A common complaint was that the mandate to obtain geographic balance led to inclusion of many incompetent and untrained scientists, and political considerations often seemed to rank above scientific credentials.²³ Here are some excerpts from complaints filed by IPCC Lead Authors themselves about some of the people they were teamed with.

¹⁹ <http://www.rediff.com/news/2007/jun/05inter.htm>

²⁰ <http://www.webcitation.org/5xEHr8hDh>

²¹ See Donna Laframboise, <http://nofrackingconsensus.com/2011/03/16/the-strange-case-of-sari-kovats/> for a more detailed examination of the circumstances of this author's appointment.

²² Available online at <http://reviewipcc.interacademycouncil.net/Comments.pdf>.

²³ See Laframboise (2011) for more excerpts and discussion.

"There are far too many politically correct appointments, so that developing country scientists are appointed who have insufficient scientific competence to do anything useful. This is reasonable if it is regarded as a learning experience, but in my chapter in AR4 we had half of the [Lead Authors] who were not competent."

"The whole process... [is] flawed by an excessive concern for geographical balance. All decisions are political before being scientific."

"...it is clearly noticeable that the [author nomination] process occasionally brings authors with poor knowledge or poor motivation into [Lead Author] positions. "

"... I have experienced the addition of lead authors or [contributing] authors during the process who often seem to come with a political mandate – generally from developed countries and as such they can be very disruptive – let alone the dubious nature of the science they contribute!"

"The most important problem of the IPCC is the nomination and selection of authors and Bureau Members. Some experts are included or excluded because of their political allegiance rather than their academic quality. Sometimes, the "right" authors are put in key positions with generous government grants to support their IPCC work, while the "wrong" authors are sidelined to draft irrelevant chapters and sections without any support."

"Since I have been selected for several IPCC reports, I have no personal prejudice (or grouse) on the process. However, regarding the selection of Lead Authors, I am more worried since the distortions, opaqueness and arbitrariness that is lately creeping into the process seems alarming. It seems that knowledge and scientific contributions are increasingly at discount in selection of authors compared to the personal connections, affiliations and political accommodations."

"IPCC works hard for geographic diversity. This is one valuable criterion, but it is not sufficient to choose a lead author. The result is that some of the lead authors (generally although not always from developing countries) are clearly not qualified to be lead authors and are unable to contribute in a meaningful way to the writing of the chapter."

"The team members from the developing countries (including myself) were made to feel welcome and accepted as part of the team. In reality we were out of our intellectual depth as meaningful contributors to the process."

These comments, and many more like them, came from past IPCC Lead Authors themselves, indicating that Pachauri's description of the author selection process is not forthright. He also failed to point out the most significant loophole in the process, namely that CLAs and LAs have a free

hand in selecting CAs, who actually provide much of the text. The IPCC guidelines say only:²⁴

The Coordinating Lead Authors and Lead Authors selected by the Working Group/Task Force Bureau may enlist other experts as Contributing Authors to assist with the work.

There are no other requirements. So, for example, if a topic is assessed in which there are two clearly identifiable sides or points of view, a LA can invite an expert from one side but not the other to provide text for the chapter. I will show in Section 3.4 that this happens. This aspect of the process neutralizes the already weak requirements for balance, since no requirements for balance are imposed on the CA selection process—in fact no requirements of any kind are imposed on it. The IPCC does not even have to release the list of CAs during the report-writing process; the rules only stipulate that CAs should be named in the final, published report.

All these concerns notwithstanding, it might nevertheless be the case that the IPCC Bureau selects a group that, while containing a few unqualified individuals, is still on the whole balanced, competent and objective. Against this surmise, however, is the disturbing recent discovery by journalist Donna Laframboise that two-thirds of the chapters in the AR4 were authored by teams that included at least one member of an advisory panel to a lobbying campaign run by the World Wildlife Fund.²⁵ In 2004, the WWF launched the “Climate Witness Program” whose purpose was to collect anecdotes about alleged local impacts of climate change, which could then be used in a publicity campaign to “[increase] the sense of urgency and public support for effective climate solutions” and “assist us to inspire stronger action on climate change.”²⁶ To lend credibility to the campaign, the WWF began recruiting scientists who would be willing to provide comments on the anecdotes and to be listed as advisors. Since participation was voluntary (except for a vague possibility of future research and travel funding) the main incentive for participating was apparently the individual’s ideological sympathy with the WWF campaign and its overall political objectives, which were made clear in the recruiting material.

By 2008 the WWF reported having recruited 130 scientists to their Climate Witness campaign advisory panel.²⁷ By comparing the list of WWF campaign advisors with the lists of authors recruited by the IPCC, Laframboise made the following astonishing discoveries:

- WWF campaign advisors were involved in writing 28 out of 44 chapters in the AR4;

²⁴ See <http://www.ipcc.ch/pdf/ipcc-principles/ipcc-principles-appendix-a.pdf> section 4.2.2.

²⁵ See <http://nofrackingconsensus.com/2011/09/23/how-the-wwf-infiltrated-the-ipcc-%E2%80%93-part-1/> and ensuing linked articles.

²⁶ The principles are outlined at http://assets.panda.org/downloads/080205_wwf_climate_witness_sap_membership_guidelines.pdf

²⁷ The list is at http://wwf.panda.org/about_our_earth/aboutcc/problems/people_at_risk/personal_stories/about_cw/cwscientists/.

- WWF campaign advisors were involved in writing all 20 chapters of the Working Group II report and 6 of 11 chapters of the Working Group I report;
- WWF campaign advisors served as Coordinating Lead Authors for 15 of the 44 chapters in the AR4, and in three cases both the CLA's were WWF advisors;
- In one chapter, 8 authors were WWF advisors.

It strains credulity to suppose that this overlap is mere coincidence. A more credible explanation is that scientists who openly ally themselves with environmentalist organizations like Greenpeace and the WWF thereby increase their likelihood of being recruited to serve as IPCC Lead Authors. This is further evidence in support of David Henderson's observation, noted above, that the IPCC prefers to draw participants from an international milieu within which vocal support for a specific set of activist views on climate change is a prerequisite to participation and advancement.

2.4 Drafts and Reviews

The IPCC writing procedures involve preparing a series of versions of the report. A first version (the so-called Zero Order Draft) is prepared by the LAs and CLAs, drawing upon contributions from CAs. This is worked up into the First Order Draft which is then sent out for Expert Review.

After responding to comments and revising the draft, the Second Order Draft is released for another round of expert review and a round of government review. After these comments are received the report is rewritten again for submission to the IPCC Bureau. This final draft is not itself subject to expert review.

Drafts of chapter summaries and the overall Summary for Policymakers (SPM) are included in the versions sent for review, but the SPM is later subject to extensive negotiation and line-by-line final approval at a plenary meeting of the IPCC. According to Section 4.3 of the IPCC rules, once the Panel has accepted the SPM it can be released and it cannot thereafter be changed. However there is no requirement for the full report to be released at the same time as the SPM, and there have been occasions when the IPCC has held back the full report for a while, making it impossible for readers to check the details during the brief interval that the media attention is on the newly-published Summary. For example, the SPM of the Working Group I AR4 was released in February 2007, but the underlying report was not released until May of that year. The SPM of the Special Report on Renewable Resources was released in early May 2011 but the report itself did not appear until June 2011.

Selection of Expert Reviewers is generally quite open, and people can nominate themselves. Review comments are sent to the IPCC Secretariat, who

provides them to chapter authors. Review Editors are supposed to ensure that all comments are taken into account. However, IPCC Lead Authors have the final say on the chapter text and, as mentioned, may revise the report after the close of expert review.

A subsequent process is used to generate a Synthesis Report and Technical Summaries, but I will not review or comment on those steps.

2.5 Summary comments on IPCC structure and procedures

There are two main problems with the IPCC structure. First, the IPCC Bureau has complete control over the selection of Lead Authors and Coordinating Lead Authors, and it has demonstrated preferences for choosing authors with openly-declared sympathies toward environmental activist groups, thus giving them effective control over the contents of the report drafts. Second, the checks and balances of the review process are minimal because LAs can overrule critical reviewers and rewrite the text after the review process has closed. These problems interact, since biases arising from the selection of LAs are not kept in check by the weak review process. In the next part I illustrate these points using four case studies.

3. Case studies on the review process

3.1 Appearance and reality

Simple card tricks often work by adding in steps that seem to make the outcome impossible, but which in reality have no effect. For example, if the card that needs to be revealed is known to be at the top of the deck, it is a simple matter to shuffle the deck repeatedly without changing the position of the top card. While it looks like the entire deck has been randomized, in reality the shuffle was neutralized with respect to the one card that matters. Drawing attention to the number and speed of shuffles adds to the effect, but is irrelevant.

The analogy applies to the IPCC review process. At some stages the review process is open, rigorous and transparent, taking in a wide range of views. But there is a subsequent re-write under the control of a small group of Lead Authors that is not open and not subject to review. It is at this point that serious

manipulation of evidence has occurred. The existence of a post-review re-write stage renders ineffectual the constraints imposed by the open and objective review process.

In his 2007 interview, Pachauri described the IPCC review process in these terms:²⁸

“And then at each stage of the production of the report it goes through a process of reviews and all the comments we get are carefully logged, each one is taken into account. It is not necessary that everything will be accepted, but everything has to be considered... You know when we send out drafts or reviews, they go to everyone. They go to governments and governments can pass them out to all kinds of people. And if there are governments who have a cosy relationship with the naysayers, they would naturally send it to these people.

And we take every single comment into account. We have a person called a review editor whose job it is to ensure that each particular comment is taken into account. So you know there is a kind of a monitor that takes care of the process being followed accurately.”

What he says is mostly correct. At each of the three review stages the comments are carefully logged, and each one is “taken into account” in the sense that someone must read it and note down a response. And the drafts do, indeed, go to everyone, including skeptics and critics of the IPCC, who are some of the most prolific reviewers. The response from LAs often consist of nothing more than entering “Rejected” into the response form, but at least it is taken into account.

But there are two omissions from Pachauri's description. The first is that he did not mention the final re-write that occurs after the expert review process has closed. While bias is present at every stage, the IPCC can claim that the review process holds it in check, which is true to some extent. However, there is no balancing influence during the post-review re-write; this has led to distortions of the text, as I will show using some case studies. Second, there is no assignment of reviewers to sections. Reviewers read those parts of the report chapters they want to, and comment as they see fit. There is no guarantee that a particular chapter will be read by anybody at all, let alone anyone critical of the point of view of the authors. As a result there is no way for a reader of IPCC reports to know whether or how much any particular section was subject to independent review. This point will be illustrated in Section 3.5.

3.2 Case study I: Long Term Persistence

One of the IPCC's most important topics is the determination of whether temperature trends are statistically significant or not—that is, whether they are

²⁸ <http://www.rediff.com/news/2007/jun/05inter.htm>

too strong to be attributed to simple randomness. This is a difficult technical calculation, and during the AR4 review stage the IPCC included a strongly-worded caution that due to the particular features of data they were working with they might be overstating the significance of warming trends. The Second Order Draft of the Working Group I section of the AR4, in the discussion of Table 3.2, which presented data on observed temperature trends at the global and hemispheric level, discussed the issue on pages 3-9 as follows:

Table 3.2 provides trend estimates from a number of hemispheric and global temperature databases. Determining the statistical significance of a trend line in geophysical data is difficult, and many oversimplified techniques will tend to overstate the significance. Zheng and Basher (1999), Cohn and Lins (2005) and others have used time series methods to show that failure to properly treat the pervasive forms of long-term persistence and autocorrelation in trend residuals can make erroneous detection of trends a typical outcome in climatic data analysis.

This paragraph had been inserted into the Second Order Draft in response to technical comments received during the first round of expert review, and the point it makes is well-established in the expert literature. Reviewers apparently approved of its inclusion as there were no subsequent objections to it. A related statement was also included in the Appendix of the Second Order Draft (p. 3-116) cautioning that the method used by the IPCC authors to compute trends, called REML AR1, yields statistical significance levels that are "likely to be overestimated," meaning that the temperature trends they reported may be attributable to natural variability rather than being indications of a sustained warming pattern:

As some components of the climate system respond slowly to change, the climate system naturally contains persistence, so that the REML AR1-based linear trend statistical significances are likely to be overestimated (Zheng and Basher, 1999; Cohn and Lins, 2005). Nevertheless, the results depend on the statistical model used, and more complex models are not as transparent and often lack physical realism.

This was the wording in the final draft shown to reviewers. The draft of the IPCC Report that was sent out for government review on July 3 2006 (immediately after the close of expert review) still included these statements.²⁹ The Chapter Lead Authors were fully aware of the underlying problem, as a November 2005 email from UK Met Office scientist (and IPCC Author) David Parker to IPCC Coordinating Lead Author Phil Jones had made clear:³⁰

"Maybe the biggest problem is Ross McKittrick and David Stephenson's remarks on trends; we only use an AR-1 and they may be correct in advocating a more complex model. Our software for restricted maximum likelihood does not cope with ARMA (1,1) and I may have to get John

²⁹ This was confirmed by examination of attachments to emails from IPCC Review Editor Brian Hoskins that were released to Mr. David Holland in response to a Freedom of Information Act request, ICO decision notice FER0239225.

³⁰ This email is taken from a set of IPCC-related documents held by the University of Reading and released to UK resident Mr. David Holland in response to a Freedom of Information Act request, ICO decision notice FER0239225.

Kennedy to investigate new software using the cited references."

Yet the version of the IPCC report that was published in May 2007 still applied the AR-1 method. Worse, the text had been altered to make the opposite claims about the method's validity. The statement warning of erroneous trend detection had been deleted, and was replaced with the following (p. 242):

In Table 3.2, the effects of persistence on error bars are accommodated using a red noise approximation, which effectively captures the main influences. For more extensive discussion see Appendix 3.A.

The text in the Appendix 3.A had been changed to the following (p. 336):

As some components of the climate system respond slowly to change, the climate system naturally contains persistence. Hence, the statistical significances of REML AR1-based linear trends could be overestimated (Zheng and Basher, 1999; Cohn and Lins, 2005). Nevertheless, the results depend on the statistical model used, and more complex models are not as transparent and often lack physical realism. Indeed, long-term persistence models (Cohn and Lins, 2005) have not been shown to provide a better fit to the data than simpler models.

No supporting evidence was provided for the last sentence. Hence the changes made to the IPCC report after the close of peer review were as follows.

- A caution about the likelihood of erroneous detection of warming trends, that had been inserted in response to expert review, was deleted.
- An unsupported claim was inserted into the chapter (p. 242) claiming that the chapter authors' trend detection method (REML AR1) "effectively captures the main influences," despite the chapter authors having said the opposite in an earlier draft, namely that their method likely overestimated the significance of trends.
- A caution in the Appendix that "linear trend statistical significances are likely to be overestimated" was changed to say merely that they "could be" overestimated.
- A superfluous sentence was added to the Appendix disputing the validity of more modern methods, with no supporting citations.

In the final section of this report, I will propose that the remedy for this kind of manipulation is to modify the review process so that the text must be finalized while reviewers are still engaged, which is the standard procedure with academic journals. Once an author has responded to review comments to the satisfaction of the editor, the text is frozen and cannot be modified thereafter. If an author subsequently wishes to change the text, the editor will normally send the changes back to the reviewers for approval, or disallow them.

3.3 Case Study II: Surface Temperature Data

By the time the preparation of the AR4 had begun, evidence had been published by two independent teams (of which I was a coauthor on one) in good quality peer-reviewed journals³¹ showing statistically significant evidence that contamination in the surface temperature record due to industrialization and related land-use effects had not been adequately removed from climatic data sets, and that it added a clear warming bias.

One of the Climategate emails is from IPCC Author Phil Jones to his colleague Michael Mann on July 8 2004, in which Jones confides that he and IPCC coauthor (Kevin) Trenberth were determined to keep this evidence out of the IPCC Report:

"I can't see either of these papers being in the next IPCC report. Kevin [Trenberth] and I will keep them out somehow — even if we have to redefine what the peer-review literature is!"

Consistent with that intention, no mention of the studies was made in either of the drafts shown to reviewers, though reviewers responded to each by requesting that the evidence be addressed.

After the review process closed, a paragraph was inserted that would appear in the published version despite not having undergone review, dismissing the evidence outright on the basis of an empirical claim with no supporting evidence:³²

McKittrick and Michaels (2004) and De Laat and Maurellis (2006) attempted to demonstrate that geographical patterns of warming trends over land are strongly correlated with geographical patterns of industrial and socioeconomic development, implying that urbanisation and related land surface changes have caused much of the observed warming. **However, the locations of greatest socioeconomic development are also those that have been most warmed by atmospheric circulation changes (Sections 3.2.2.7 and 3.6.4), which exhibit large-scale coherence. Hence, the correlation of warming with industrial and socioeconomic development ceases to be statistically significant.** In addition, observed warming has been, and transient greenhouse-induced warming is expected to be, greater over land than over the oceans (Chapter 10), owing to the smaller thermal capacity of the land. [emphasis added]

The first highlighted sentence can easily be shown to be a falsehood simply by looking at the cited report sections. Neither one addresses the topic or provides any information on the spatial pattern of industrialization or its overlap with the warming record. The second highlighted sentence is a fabrication.

³¹ De Laat and Maurellis (2004, 2006), McKittrick and Michaels (2004).

³² IPCC 2007 Chapter 3 page 244.

Both papers reported statistically significant correlations between warming patterns and the spatial distribution of industrialization; neither one suggested that the results were attributable to natural atmospheric circulation changes, nor does the IPCC present any such evidence. It has subsequently been shown that atmospheric oscillation patterns do not affect the temperature-industrialization correlations (McKittrick 2010).

This case highlights the problem of intellectual conflicts of interest in the IPCC. The data sets that were being critiqued by the De Laat and Maurellis and McKittrick and Michaels studies are prepared and supplied to the IPCC by Professor Phil Jones of the Climatic Research Unit at the University of East Anglia. The IPCC appointed Jones to serve as the Lead Author of the section reviewing the quality of his own data and the arguments of his critics and took no precaution to prevent him from manipulating the text to his own advantage. Such intellectual conflicts of interest are easy to spot throughout the IPCC report. The next section presents another example. In Part 4 I will discuss the IPCC's response to IAC recommendations on this issue.

3.4 Case Study III: Climate sensitivity

The term "climate sensitivity" refers to the expected change in average temperature around the world in response to a change in atmospheric greenhouse gas (GHG) levels. Determining whether the climate is very sensitive, somewhat sensitive or largely insensitive to GHGs is right at the core of the scientific task of the IPCC. The topic is discussed in Chapter 9, Section 9.6.2, of the Fourth Assessment Report. In general that section emphasizes the difficulty of narrowing down the climate sensitivity estimate using historical observations, because it is difficult to match specific fluctuations with specific underlying causes. Climate models therefore are used to generate indexes of the "forcing" effect of GHGs over past intervals, so that by comparing the observed change with the model-generated index one can estimate the implied sensitivity. However, this method relies on the assumption that the climate model is correct. The variations in model behaviour mean that the range of implied climate sensitivity estimates is very wide, and has remained so despite many years of research.

An alternative way of measuring climate sensitivity is to examine recent observations on how the climate system responded to major volcanic eruptions, such as Mount Pinatubo in 1991, since the forcing can be more precisely characterized and the actual climate response can be directly observed in temperature data. Douglass and Knox (2005a) took this approach and concluded the climate had stronger dampening characteristics than typically shown in climate models, such that the implied sensitivity to GHGs was very low. A response to this paper was published by Tom Wigley, Caspar Ammann, Ben Santer and Karl Taylor (Wigley et al. 2005), all of whom are past IPCC authors, and two of whom (Ammann and Santer) were recruited

to be Contributing Authors of AR4 Chapter 9. Douglass and Knox published a rebuttal to the Wigley et al. paper (Douglass and Knox 2005b), but were not invited by the IPCC Bureau or the Lead Authors to be contributors to Chapter 9.

The Chapter 9 authors mentioned the findings of Douglass and Knox, then dismissed them on the basis of their own coauthored reply with no mention of the subsequent response from Douglass and Knox.

[An] analysis by Douglass and Knox [2005a] based on a box model suggests a very low climate sensitivity (under 1°C) and negative climate feedbacks based on the eruption of Mt. Pinatubo. Wigley et al. [2005] demonstrate that the analysis method of Douglass and Knox [2005a] severely underestimates (by a factor of three) climate sensitivity if applied to a model with known sensitivity. Furthermore, as pointed out by Frame et al. (2005), the effect of noise on the estimate of the climatic background level can lead to a substantial underestimate of uncertainties if not taken into account.

The Wigley et al. response to Douglass and Knox is treated as dispositive, making no mention of Douglass and Knox's rebuttal. Also, the Frame et al. paper is cited as if it rebuts Douglass and Knox, even though it makes no mention of their paper; three of the coauthors on the Frame et al. paper were contributors to IPCC Chapter 9.

It is not being argued here that Douglass and Knox are correct or that Wigley et al. are incorrect. The point is that the IPCC chapter authors are in an intellectual conflict of interest whenever they assess their own work and that of their critics, or when Lead Authors recruit Contributing Authors from one side of a dispute, to provide text that will be treated as dispositive. Such conflicts of interest are pervasive in the IPCC Reports, and inevitably yield text in which the IPCC authors conclude in their own favour. Such conflicts might not be as much of a concern if the IPCC review process imposed ironclad checks and balances. But as I have already shown, IPCC authors can (and do) circumvent the review process during the final re-write. As a result, the intellectual conflicts of interest must be considered a serious deficiency that undermines our ability to consider IPCC findings objective and reliable. In Section 4 I will discuss how the IAC flagged this issue, and the way the IPCC response failed to rectify the problem.

3.5 Case Study IV: Chapter 9 Review

Although hundreds of reviewers are involved in each Working Group, no one is assigned the role of reviewing any particular section or chapter. It is conceivable that parts of a report might not be reviewed by anyone: there

is nothing in the IPCC procedures that prevents this. Consequently, when a reader of the IPCC assessment relies on any particular section, he or she must do so without any assurance that the section underwent detailed review. Likewise when the IPCC calls attention to the Government Review process and the eventual acceptance of the report by nearly 200 member states, casual observers might assume that all of those member states actually read the report. In reality it is likely that most government delegates do not even read the drafts, since only a small fraction submit any review comments.

Although there are 195 governments in the IPCC, only 22 national governments submitted any review comments at all on the WGI Second Order Draft (governments did not review the First Order Draft). The European Commission also contributed comments on two chapters, bringing the total to 23 government entities (McLean 2009). Thus nearly 90 percent of member governments do not engage in the review process. Moreover, of the 2,010 comments submitted, over half were from only two countries: the United States and Australia. For an organization that lays such emphasis on the participation of developing countries, it is remarkable that so few bother to do so when given the opportunity. Not one African country submitted a comment, nor did any Middle Eastern or Arabic country, nor did Russia nor the former Soviet states. Brazil submitted comments on three chapters and Chile commented on one chapter; other than that there were no comments from any South American country. None of the small island states in the Pacific submitted comments. In eastern Europe, the Czech Republic commented on one chapter, and Hungary commented on three chapters; other than that there were no comments from any government in Eastern Europe.

On the whole, the evidence shows that, except for Australia and the US, government review was cursory or non-existent. Yet the fact that government review occurs, at the end of which all the member states make a great show of voting to “accept” the reports and their conclusions, is held up as evidence of the report’s reliability and authority.

As to the expert review stage, as shown by McLean (2009), there is a surprising lack of independence between IPCC authors and reviewers. For example, for WGI Chapter 9, which provides the basis for concluding that climate changes are attributable to greenhouse gases, there were 56 contributing authors and 62 reviewers. But of the reviewers, 7 were also authors, three were editors of the IPCC Report, one was an employee of the IPCC Technical Support Unit, and 26 were authors or coauthors of papers discussed in the chapter. Ten of the reviewers advocated on behalf of their own papers in their review comments. Only 31 reviewers—fewer than the number of authors—could be identified as truly independent. And of the 62 reviewers, more than half contributed only one or two comments, suggesting they did not even read the whole chapter.

The implication is that, despite the perception of “thousands” of scientists and hundreds of governments being involved in the review process, the scientific core of the report received relatively scant review, and it is not the case that

large numbers of experts, or governments, scrutinised the material prior to its publication. A solution to this problem is simply to assign reviewers to sections, something I will recommend in Section 5.

3.6 Case Study V: Hide the Decline

One of the most infamous emails in the Climategate archive is the one from 1999 in which Phil Jones tells his colleagues “I’ve just completed Mike’s Nature trick of adding in the real temps to each series for the last 20 years (ie from 1981 onwards) and from 1961 for Keith’s to hide the decline.” That email refers to the construction of a paleoclimate graph for a World Meteorological Organization (WMO) report. It is less well known that a contemporaneous diagram prepared for the IPCC Third Assessment Report also relied on deletion of declining data in order to create a false impression of a consistent warming record.

At issue is Figure 2.21 in the IPCC Third Assessment Report and the reappearance of the same data in Figure 6.10 in the Fourth Assessment Report. Unfortunately, despite the availability of voluminous online documentation on this topic, none of the inquiries convened thus far have dealt with the matter, so it is not possible to provide a citation to a published report that explains what was done. The University of East Anglia Science Appraisal Panel (Oxburgh 2010) confined itself to looking for obvious examples of dishonesty in a sample of journal articles and, in the words of Lord Oxburgh himself,³³ “The science was not the subject of our study,” thus they made no mention of this issue. The Muir Russell inquiry (Russell et al. 2010) devoted a chapter to the topic but, while they conceded the WMO graph was misleading (p. 60) they erred in their cursory inspection of the IPCC version. They stated (p. 59):

We do not find that the data described in IPCC AR4 and shown in Figure 6.10 is misleading... It presents all relevant published reconstructions we are aware of, i.e. there has been no exclusion of other published temperature reconstructions which would show a very different picture.

But the Figure does not show all the relevant reconstruction data, since the post-1960 portion of Briffa’s data was deleted, and its inclusion would have made a material difference to the graph, as was well understood by the IPCC Lead Authors at the time. Finally, the Penn State Inquiry into Michael Mann provided no information about the construction of IPCC graph and exonerated him of wrongdoing.

It should be noted that none of these inquiries interviewed critics of the IPCC authors, and none subjected the information provided by the IPCC authors to cross-examination. Nor did the Oxburgh team or the Penn State team issue calls for evidence or terms of reference. The mistakes and omissions from these

³³ See <http://climateaudit.org/2010/07/01/oxburgh-and-the-jones-admission/>.

reports could have been avoided by following proper inquiry procedures.

The best summary of the IPCC's hide-the-decline episode is at Stephen McIntyre's Climate Audit blog, in the posting "IPCC and the Trick" dated December 10, 2009.³⁴ It goes over the Climategate email record and shows the contemporaneous evolution of the IPCC Figure, namely the deletion of post-1960 proxy data to conceal its downward slope. From the email record of late 1999 it is clear that:

- Lead Authors Folland, Briffa, Jones, Mann and others were keen to have a proxy-based temperature reconstruction included in the SPM;
- There was pressure to make it a "nice tidy story" despite the fact that not all the reconstructions agreed on the historical warming and cooling trends;
- Keith Briffa's research, in particular, yielded a temperature graph that failed to show an unusual modern warming pattern;
- This was seen as a "distraction" and "detraction" from the "reasonably consensus [sic] viewpoint we'd like to show";
- Briffa himself believed the recent warmth was historically unexceptional, having "probably" been matched a thousand years ago;
- Another Lead Author acknowledged that they had no logical reason to exclude Briffa's data, yet he was concerned that skeptics would have a "field day" over the differences among the graphs, especially after 1960;
- A few weeks later the final version of the graph was prepared in which Briffa's data was included but the post-1960 portion was deleted without notice to the reader, and the modern warming was described as being historically exceptional in the past 1,000 years.

It is not possible in the confines of this report to provide a properly detailed explanation of the extent of manipulation of evidence that occurred in this case. Unfortunately the three inquiries that were supposed to do so made no effort to collect evidence and as a result either skipped the topic entirely or botched their examination and drew erroneous conclusions.

This episode has similarities to a more recent one documented by Nicolas Lewis at Judith Curry's weblog.³⁵ Figure 9.20 of the IPCC Fourth Assessment Report presents a set of graphs showing estimates of climate sensitivity to increased greenhouse gas levels. Most are model-based studies, and only one is from a purely empirical study, the so-called Forster-Gregory graph. The published Forster-Gregory graph implied a climate sensitivity at the low end of the ones derived using climate models. Lewis discovered that the IPCC

³⁴ See <http://climateaudit.org/2009/12/10/ipcc-and-the-trick/>

³⁵ See <http://judithcurry.com/2011/07/05/the-ipccs-alteration-of-forster-gregorys-model-independent-climate-sensitivity-results/>

published a version of the Forster-Gregory graph that was skewed upward so that it overlapped more with the model-based results. The data transformation was only subtly alluded to in the IPCC text and the manipulation would not have been apparent to readers.

The implication of these examples is that when the IPCC authors prepare graphs (or tables), readers should realize that the underlying data may have been subject to undisclosed manipulations or modifications. Some key graphs in IPCC reports are prepared by IPCC authors themselves, rather than being taken from the underlying peer-reviewed journals. In order to achieve transparency, all IPCC graphs, figures and tabulations should be subject to disclosure rules, such as:

- The sources of data must be cited, and the actual data used to produce the graph must be archived at the IPCC.
- If any data source has been manipulated, rescaled, truncated or modified in any way, the graph must be shown with and without the modification and an explanation should be provided to readers as to why the modification is proposed.
- Where the IPCC presents calculations, tabulations or figures that are not merely copied directly and without alteration from a published source, the methodology used must be fully disclosed, including all computer code, including any smoothing routines, data imputations, and statistical testing formulae. The disclosure must be sufficient to permit independent replication of any original calculations, tabulations or figures in the IPCC report.

The deletion of the post-1960 portion of Briffa's data in the 2001 report was not uncovered until 6 years later, by Stephen McIntyre, in a March 2007 posting at Climate Audit.³⁶ It was not clear at the time the extent to which it had been the result of deliberate behind-the-scenes efforts among some of the IPCC authors to conceal the differences among published results and present readers with a misleadingly "tidy" story. That aspect did not emerge until the Climategate emails were released in the autumn of 2009. The disturbing nature of that episode shows that transparency must also apply to the official correspondence and deliberations among IPCC authors. In other words, it should now be expected that written debates and deliberations among IPCC authors concerning the final form of the text constitute public records and will be released along with the drafts and reviews following publication of the report. Recent UK and European Freedom of Information rulings have already shown that expert correspondence related to production of the IPCC report are deemed public records (see reference in footnotes 26 and 27). It only remains to formalize the principle in IPCC rules. While such a requirement would obviously induce a change in behavior on the part of IPCC authors (namely less use of emails), it would ensure that any untoward communications that would strike a reasonable reader as scientifically

³⁶ See <http://climateaudit.org/2007/05/15/swindle-and-the-ipcc-tar-spaghetti-graph/>

dishonest would become public in a timely fashion, and this may help prevent such communication from ever occurring.

A related issue concerns the disclosure of data and methods in papers on which significant IPCC conclusions are based. While the responsibility for enforcing transparency rules rests with the scientific journals, it is nevertheless true that the IPCC makes an implied representation to policymakers that these findings are trustworthy. This representation must be backed up by some form of feasible due diligence. A specific recommendation on this point will be included in the list at the end.

4. The InterAcademy Council Review

Following the IAC report of August 2010, the IPCC commissioned Task Groups to prepare responses for the Panel to consider.³⁷ There were four such Groups, one on each of Governance and Management, Conflict of Interest Policy, Procedures, and Communications Strategy. At the 33rd session of the IPCC in Abu Dhabi in May 2011, the IPCC completed its internal reform process with a series of decisions in response to the Task Group recommendations.

One of the IAC's recommendations was for the IPCC to establish an Executive Committee to provide day-to-day administration between Panel sessions. This seems to have been motivated by the Himalayan glaciers' episode in which the Bureau seemed unable to act promptly to retract the flawed material without guidance from the next Panel plenary. Establishing an Executive Committee might speed up such responses. Unfortunately the proposed makeup of the Executive Council strongly overlaps with the membership of the IPCC Bureau, since it includes the IPCC Chair and Vice Chairs, and the Working Group Co-Chairs. There is a real danger this proposal will simply concentrate even more power into the hands of the IPCC Bureau, by giving it the capacity to act on behalf of the Panel itself.

The main challenge facing the IPCC is not the need to streamline and speed up the operations of the Panel, since the Panel does so little already. The real challenge is to fix the deficiencies in the assessment peer review process, in particular:

- The opaque process for selecting Lead Authors and the secret recruitment of Contributing Authors;
- The absence of any binding requirement for incorporating the full range of views;

³⁷ All documents summarizing the Task Groups' work and the Panel's responses are online at http://www.ipcc.ch/scripts/_session_template.php?page=_33ipcc.htm.

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- The loopholes and gaps in the peer review sequence; and
 - The intellectual conflicts of interest.

Unfortunately none of these problems were fully addressed by the IAC review or its aftermath.

4.1 Selection of IPCC Authors

The IAC called for the creation of formal criteria and processes for selecting LAs and CLAs. The IPCC's response to this was muted:

The Panel agreed with this recommendation. Formal criteria are included in the existing procedures. Enhanced implementation and transparency as well as potential additional criteria and procedures to be considered by the Task Group on Procedures with the view to make a decision at its next Session (IPCC-XXXIII) for future work.

The Task Group asked to examine this issue proposed the following remedy:

[The selection rule] should be amended by including the notion that gender balance, and a balance in the mixture of scientific experts with and without experience in the IPCC process should be taken into account.

Both additional criteria—gender and IPCC experience—are irrelevant to the problem, namely that political considerations can over-ride those based on scholarship, and the IPCC Bureau can cherry-pick contributors whose views they prefer.

National responses to the Task Group recommendations are available online.³⁸ Only 13 countries commented on the author selection issue. Once again, for an organization that repeatedly insists on opportunities for full participation by developing countries, it is notable that only two (India and Malaysia) bothered to do so, and Malaysia's response was simply to say the recommendations are "sufficient and acceptable." The other responses³⁹ were mixed. Belgium called for more emphasis on developing country participation. France, Norway, Sweden and the US all stated the recommendations were acceptable. Germany, India, Japan and Italy all insisted that the author selection process needs to become more transparent, the Italian delegate noting that he had requested a report from the IPCC Bureau on how the selections were made but had not received an answer. India suggested the selection criteria should be published in advance on the IPCC website which would then allow open tracking of nominations and selections based on a public process.

Canada, Hungary and the UK each submitted clear criticisms of the inadequacy of the Task Group recommendations. The UK delegation noted

³⁸ See http://www.ipcc.ch/meetings/session33/inf01_p33_review_report_tg_comments_gov.pdf pages 168—171.

³⁹ Received from Belgium, Canada, France, Germany, Hungary, Italy, Japan, Norway, Sweden, UK, USA.

somewhat acidly:

The mandate is to make this process fairer and more transparent. The TG recommendation is to amend the current procedure text to reflect what we believe is current practice. It doesn't suggest ways forward to ensure transparency.

Canada noted that the recommendations do not fully respond to the issues raised by the IAC, and called upon the Task Group to figure out how the Bureau made its selections for the current assessment process, including the subjective judgments and criteria they used, and then consider how these criteria should be developed, communicated and applied in the future. In effect they asked the Task Group to do what it was asked to do in the first place.

Hungary's criticisms were very pointed. Noting that author selection is a critical step, they warned that the repeated use of the same people over and over inevitably leads to, their word, "inbreeding." They called for a rule to be adopted requiring new names each time, which would help ensure that "all kinds of thoughts and approaches can be included.... and that it is avoided that some people or schools have too much influence on conclusions and statements."

These comments were clearly ignored by the plenary because the IPCC left the author selection guidelines virtually unchanged. The IPCC retains the right to select LAs from among the lists supplied by governments "and other experts as appropriate." And as noted above, instead of producing an author list that "reflects the need to aim for a range of views" the author list now must "aim to reflect a range of scientific, technical and socio-economic views."

4.2 Covering the full range of views

Regarding the issue of handling the full range of views, the IAC recommended:

Lead Authors should explicitly document that a range of scientific viewpoints has been considered, and Coordinating Lead Authors and Review Editors should satisfy themselves that due consideration was given to properly documented alternative views.

This is still mild wording in comparison to what is needed, but at least the IAC recognized that the current IPCC procedures are in need of reform on this point. The Panel's response to this was classically bureaucratic, claiming to agree with the recommendation, then proposing a subtly reworded course of action that would fail to achieve it:

The Panel agreed with this recommendation. The Panel emphasizes that

handling the full range of scientific views is a core principle of the IPCC. Its procedures clearly require the representation of differing scientific viewpoints and encourages rigorous adherence by the CLAs, LAs, and REs. The Panel urges the IPCC Chair, the Co-Chairs of the Working Groups and TFI⁴⁰ to take any necessary steps to ensure that this principle continues to be applied in the development of IPCC reports. Further implementation to be considered by the Task Group on Procedures with the view to make a decision at its next Session (IPCC-XXXIII).

The IAC recommended LAs “explicitly document” that a range of views has been considered and that “due consideration” be given to alternative views. The Panel rephrased that by saying that “handling” (as opposed to documenting) the full range of views is necessary, and then immediately rephrased it again by requiring “representation of differing scientific viewpoints.” Furthermore, by stating that they seek reassurance that the necessary principles will “continue to be applied,” the Panel implied that what they want to see happen is what is already taking place. Hence, by approving the recommendation, they were saying that no new rules are needed. The Task Group responded as follows:

The TG believes that the above decision taken by the Panel adequately reflects IAC recommendation for documenting the range of views including possible differences in opinion. However, the TG feels that the current language concerning the range of views in the procedures should be more precise. Replace ‘to aim for a range of views’ by ‘to consider the range of scientific views’.

Even though this issue goes to the very core of IPCC credibility and objectivity, namely the comprehensiveness and objectivity of the assessment process, only six out of 195 countries commented. Japan, Norway and Sweden supported the recommendation as worded, and Malaysia said it is “sufficient and acceptable.” Germany asked why the phrase “the range of views” does not say “the full range of views,” but only called for the phrase to be explained, not amended. Belgium was the one country that criticised the proposal, pointing out that it was a “very superficial” change in wording. They stated that LAs should be required to provide documentation in cases where controversial issues were assessed. It is notable that the Belgian delegation did not appear to be aware that this is already required under IPCC procedures, perhaps because the existing requirement is never followed.⁴¹ Where significant differences of opinion exist, Review Editors are supposed to ensure they are described in an Annex to the main report. However, I am unaware of any such Annexes ever having been published, and none are available on the IPCC website, despite the fact that many such differences of opinion have arisen during the preparation of past Working Group reports.

The IPCC ended up adopting the following wording:

40 [Task Force on Inventories]

41 <http://ipcc.ch/pdf/ipcc-principles/ipcc-principles-appendix-a.pdf>, Sct. 5.

[IPCC Lead Authors] are required to consider the range of scientific, technical and socio-economic views, expressed in balanced assessments. Authors should use calibrated uncertainty language that expresses the diversity of the scientifically and technically valid evidence, based mainly on the strength of the evidence and the level of agreement in the scientific, technical and socio-economic literature.

This constitutes less of a material improvement than at first glance, since it only requires IPCC authors to “consider” the range of views (as opposed to “documenting” or “presenting” it). In conjunction with the ability of the IPCC Bureau to select Lead Authors with known biases, the room for subjective assessment of what constitutes technically valid evidence creates an opening for bias, unless the review process is sufficiently rigorous to constrain it, which is not the case.

4.3 Conflict of interest

The IAC devoted a section of its report to conflict of interest (Col), defining it broadly as anything that significantly impairs an individual's objectivity (IAC Report, p. 45). While they noted that Cols are ordinarily thought of as financial in nature, there can be intellectual conflicts as well:

Questions about potential conflicts of interest, for example, have been raised about the IPCC Chair's service as an advisor to, and board member of, for-profit energy companies (Booker and North, 2009; Pielke, 2010b), and about the practice of scientists responsible for writing IPCC assessments reviewing their own work. The Committee did not investigate the basis of these claims, which is beyond the mandate of this review. However, the Committee believes that the nature of the IPCC's task (i.e., in presenting a series of expert judgments on issues of great societal relevance) demands that the IPCC pay special attention to issues of independence and bias to maintain the integrity of, and public confidence in, its results.

(IAC Report p. 46). The IAC recommended that the IPCC develop a Col policy, pointing for guidance to the structure used by the US National Research Council, which includes requirements to disclose financial interests as well as direct consideration of situations where “an author or Review Editor would be reviewing his or her own work, or that of his or her immediate employer.” (IAC Report, p. 47).

The Task Group examining this issue came up with a recommendation that defines Col along the broad lines suggested by the IAC, but which offered nothing concrete by way of a remedy. Their specific recommendation was that the IPCC require Editors, LAs and CLAs to fill out a form declaring any such interests, which would then be used by a new ‘Management of Interests Bureau’ (or similar subgroup within a Working Group) to manage the potential Col. The proposal lacked any specific guidance on how the interests would

be managed; instead the Task Group proposed deferring development of a Guidance Note to some time later.⁴²

Working Group I has issued an interim Guidance Note⁴³ aimed at addressing some forms of Col, chiefly institutional conflicts, such as if an IPCC LA is also on the board of an NGO that lobbies on climate policy, or serves as a journal editor and can influence whether submissions get accepted or not. The Guidance Note generally recommends resigning from institutional positions that create a conflict with the IPCC role, such as the NGO board.

This Guidance Note is a useful start, but does not address the key problem raised by the IAC (and noted throughout this report), namely the situation in which IPCC Lead Authors get to review their own work and that of their critics, and then conclude in their own favour. In addition, the disclosure form proposed by the Task Group does not address a situation where an author makes his or her living from an organization that, while not an active advocate of climate policy, is nonetheless a beneficiary of certain types of policies that will be directly affected by IPCC conclusions. For example, climate modeling labs are expensive to operate. They depend for their funding on governments continuing to be interested in climate change as a public threat, and continuing to believe that large-scale climate modeling is a useful way of researching it. Since climate modelers are involved in writing the chapters that evaluate model quality and the potential threats associated with climate change, they could be seen to have a conflict of interest if they always conclude that their type of research is useful and should continue to be funded. The Col form proposed by the Task Group would not flag this as a conflict as long as the lab has never issued an official position on climate change.

Government responses to the proposal of a Col policy were varied.⁴⁴ Many comments were received, including a few from developing countries. With regards to the general idea, India and China expressed concern that a Col policy may discourage participation of good scientists, and Russia stated it was too complex and largely unnecessary. The US recommended the policy focus on financial Col and the disclosure forms should be kept confidential, whereas Belgium called for them to be published. France, Madagascar, Morocco, Norway and Zambia declared themselves supportive; Malaysia, Netherlands and the UK said more information is needed, and Sweden's only comment was that it has no comment.

Regarding the detailed policy proposal, only 11 countries commented. Belgium, Canada and Norway requested that the policy be mandatory rather than voluntary, and Japan asked that compliance be enforced for senior IPCC leadership. The UK and India called for more explanation of the policy and Peru asked for explanation of the penalties. Belgium, Canada and France wanted to see the policy coverage broaden beyond what was proposed.

42 See http://www.ipcc.ch/meetings/session33/inf01_p33_review_report_tg_comments_gov.pdf pages 23–29.

43 See https://www.ipcc-wg1.unibe.ch/guidancepaper/WG1_GuidanceNote_Conflict-of-Interest.pdf

44 See http://www.ipcc.ch/meetings/session33/inf01_p33_review_report_tg_comments_gov.pdf pp. 231–245.

Only Canada drew attention to the failure of the proposal to address intellectual bias.⁴⁵

(1) Overall, the Policy does not present sufficient clarity on how the conflicts will be “managed.” The Policy proposes a “Management of Interests” panel, but does not provide guidance on how this panel would evaluate or enforce resolution of conflicts that arise. (2) The Policy also does not sufficiently reflect the importance of potential scientific conflicts of interest. There are scientific conflicts that could have significant impacts on the integrity of the IPCC’s work and that would require action to resolve (e.g., a Co-Chair or CLA serving in a chief editor role of a major journal where publication decisions and directions strongly influence the material available for the IPCC to assess). Canada suggests that the importance of scientific conflicts be reflected more prominently throughout this proposal, with a view to ensuring the integrity of the report production and review process.

China, by contrast, said “we should trust the moral quality of the scientists involved in the IPCC work, and therefore the principles for interest management and disclosure system should be voluntary and non-mandatory.”

In the end, the plenary session at Abu Dhabi appears, once again, to have ignored the critical comments and opted for a weak reform.⁴⁶ The policy defines a potential Col in very general terms, covering any circumstances that could cause a reasonable person to question an individual's objectivity as an IPCC author, or to believe an unfair advantage has been secured. But in the event such a Col is identified, the only requirement is that it be described on a form, and there is no information as to whom the disclosure form should be directed, what will be done with the information and whether it will even be published or not.

Moreover, despite having defined the extent of Col quite broadly, the key paragraph in the new policy (12, p. 3) proceeds to circumscribe rather narrowly the application of the rules, by placing intellectual conflicts of interest under the heading of “bias” and asserting that problems of bias should be alleviated by the provisions that ensure that the Lead Author team is balanced and diverse. Conflict of interest is then made specific to situations where one stands to get a “direct and material gain.”

12. Conflict of interest policies in scientific assessment bodies typically make a distinction between “conflict of interest” and “bias,” which refers to a point of view or perspective that is strongly held regarding a particular issue or set of issues. In the case of author and review teams, bias can and should be managed through the selection of a balance of perspectives. For example, it is expected that IPCC author teams will include individuals

⁴⁵ The US requested that the policy distinguish between ‘bias’ and Col, but elsewhere asks for the policy focus to be on managing Col and in particular, financial Col.

⁴⁶ http://www.ipcc.ch/meetings/session33/ipcc_p33_decisions_taken_conflict_of_interest.pdf

with different perspectives and affiliations. Those involved in selecting authors will need to strive for an author team composition that reflects a balance of expertise and perspectives, such that IPCC products are comprehensive, objective, and neutral with respect to policy. In selecting these individuals, care must be taken to ensure that biases can be balanced where they exist. In contrast, conflict of interest exists where an individual could secure a direct and material gain through outcomes in an IPCC product. Holding a view that one believes to be correct, but that one does not stand to gain from personally is not a conflict of interest.

Since, as noted in Section 4.1, the IPCC Bureau controls the author selection process and does not have a policy that ensures representation of the full range of views, the Col policy as adopted above leaves unamended the problem of intellectual conflicts of interest. The last sentence in particular allows future IPCC LAs to continue reviewing their own work and that of their critics, as long as they believe themselves to be correct.

4.4 The IAC Review and aftermath: a cautionary conclusion

Overall, the IAC recommendations, which were understated to begin with, were translated into even more superficial terms by the IPCC Task Groups, after which they received almost no critical scrutiny by the member countries on whom the responsibility of oversight rests, prior to being rubber-stamped at Abu Dhabi. While a superficial impression of reform may have been created, few countries appear to have studied the proposals to an extent sufficient to yield meaningful comments, and even fewer seem to recognize any serious need for reform at all. The whole reform process was unserious and ineffectual.

As an illustration of the haphazard nature of IPCC oversight, shortly after the conclusion of the Abu Dhabi meeting, the Chairman of the US House of Representatives Committee on Science, Space and Technology wrote a letter to UN Secretary-General Ban Ki-Moon⁴⁷ decrying the IPCC's failure to adopt rules that seriously address the conflict of interest problem, drawing specific attention to the situation of a LA reviewing his own work in the recent SRREN, and asking Mr. Ban to use his influence to get the IPCC to expedite the formation and adoption of more stringent policies. Yet, as I noted in Section 4.3, the US already had the opportunity to comment on the Task Group report on conflicts of interest and did not express any view that the proposals were inadequate. In fact the US urged that the Col proposal be narrowed down to focus on financial conflicts, and they asked that disclosure forms be kept confidential.⁴⁸ The US government's supposedly official response to the Task Group report expressed none of the concerns contained in the letter from the House Science Committee. To whom, then, is the IPCC Bureau supposed to respond?

⁴⁷ Available online at http://science.house.gov/sites/republicans.science.house.gov/files/061711_Broun%20Letter%20to%20UN%20re%20IPCC%20Conflict%20of%20Interest.pdf.

⁴⁸ See http://www.ipcc.ch/meetings/session33/inf01_p33_review_report_tg_comments_gov.pdf pp. 234-235.

The IPCC Bureau not only faces contradictory demands from within individual countries, but also among the 195 different countries. An oversight body that projects a cacophony of confused and inconsistent demands is easy to ignore or manipulate, by playing parties off against one another.

The problem arises from the fact that the IPCC consists of bureaucratic delegates from nearly 200 countries, most of whom are apparently uninterested or incapable of participating in a credible way, yet all of whom have an equal vote. The record shows that about ninety percent of bureaucrats in member countries did not bother doing the work necessary to contribute expert reviews in the last assessment process, yet deemed themselves sufficiently well-briefed to participate in voting on the report's "acceptance," and an even higher percentage made no responses to the Task Group proposals but then took part in votes on procedural reforms. The reform process that followed from the IAC report revealed widespread apathy among delegates and negligent oversight of the Bureau on the part of the Panel. It is not surprising, therefore, that it yielded reforms that left the actual flaws in the IPCC assessment process unamended.

In the next section I will propose reforms to the assessment report-writing procedure. But it should be prefaced with the observation that no reforms are possible as long as the Panel continues to exhibit so much indifference and negligence. On the face of it, the IPCC Bureau—one of the most influential advisory groups in the world—operates without any effective oversight from the Panel to which it is accountable. While I believe the biases in the report-writing process can be remedied if different assessment processes are adopted, I am doubtful that such reforms can get through the Panel unless a group of countries come to terms with the reality of the problems, agree among themselves to make a united and determined effort to push them through, and are not prepared to let the Bureau derail them. For that reason, all the recommendations I make in the next section are predicated on one additional, over-arching recommendation that will be stated more precisely at the end: that if fundamental deficiencies in the IPCC review process cannot be remedied by the Panel, the IPCC should be disqualified as an advisory body to world governments, and individual national governments should begin the process of withdrawing from their participation in it.

5. Recommendations for reform

The main principle to guide reform is that the IPCC review system should operate less like a voluntary public comment process and more like a structured journal peer review process. While journal peer review has flaws of

its own,⁴⁹ the basic idea herein is that the IPCC should have a review process no weaker than academic journals. This would imply adoption of changes to ensure:

- Text is finalized under reviewer oversight
- All text is assigned to at least two independent reviewers
- All analysis is transparent and reproducible
- The entire process is overseen by a neutral editorial entity.

The fact that the changes necessary to bring these things about will involve far-reaching structural reforms indicates how much weaker the IPCC review process is compared to academic journals, despite popular perceptions to the contrary.

Recommendation 1: An objective and transparent Lead Author selection procedure.

The IPCC Bureau would publish selection criteria for IPCC Working Group Chairs and Co-Chairs, Coordinating Lead Authors, Lead Authors, Contributing Authors and Review Editors, and put out a call for nominations. Rather than only accepting nominations from member states (since that restriction is not binding on the IPCC in current practice anyway), anyone would be able to submit nominations, which would have to include a curriculum vitae for the nominee. All nominations would be published on the internet. Interested parties would be invited to send comments to the IPCC Bureau on whether the list is sufficiently representative of the full range of qualified opinion and covers all relevant areas of expertise. Based on the comments, the Bureau could seek additional nominations if needed. The Bureau would then make the selections (including the preliminary list of Contributing Authors) from the final list of nominees. It would publish a report that demonstrates and certifies that it followed its selection criteria, that it ensured representation of the full range of views on the subject matters at hand, and that it responded to comments. The selection of authors would then be subject to final ratification by the Panel.

Recommendation 2: A transparent Contributing Author recruitment process.

When a Lead Author recruits a new CA to supply text for the IPCC report, the recruitment would immediately be announced on a web page of the IPCC, indicating the following: the name and affiliation of the contributing author; the name of the Lead Author(s) who recruited the contributing author; the subject matter of the contribution; and whether the contributing author would be assessing his or her own work in their contribution.

Recommendation 3: Appointment of an Editorial Advisory Board and

⁴⁹ See, for instance, McKittrick and McCullough (2009) for a review on the topic of non-reproducible research in academic journals.

identification of potentially controversial sections.

A 21-member Editorial Advisory Board (EAB) would be created to oversee each assessment. Because of the considerable range of academic disciplines involved in an assessment report, two-thirds would be from outside the fields of climate, meteorology and earth sciences. At least one member would be drawn from each of the fields of mathematics, statistics, physics, engineering, chemistry, economics, biology, medicine, computing, and five other areas. Individuals could apply or be nominated, and those that agree to stand would submit a CV to a website for public review. Then representatives of each field would be selected by a vote restricted to, for example, members of each discipline's major national academic associations. Membership on the EAB would be for a fixed 7-year term, staggered so that 3 members per year would be replaced.

Prior to the start of the review process, the EAB would identify those sections of the report most likely to be contentious and flag them as "Potentially Controversial Material." These would be subject to especially careful oversight.

Recommendation 4: Explicit assignment of both section authorship and reviewer positions.

CLAs would divide up the chapter into the major sections and assign two or more LAs to solicit contributions and produce a preliminary text. Review Editors would recruit 2-4 referees for each section. The names of chapter referees would be published prior to the start of the review process, without indicating which section each one is responsible for. At least one referee assigned to each section should be someone from outside the topic of that section, and no more than half the referees should be individuals whose work is being reviewed.

For sections identified by the EAB as Potentially Controversial, the EAB would be asked to approve the referee assignments.

Review Editors would be responsible for ensuring that the referees encompass the full range of views on the topic. If the list of referees is deemed to have excluded an important perspective, observers could submit a request to the EAB asking for a reconsideration of the section referee list, making a case why another person or persons should be added. Once the list of reviewers is complete and the section assignments are made, the CLAs would submit the section text to the referee group. Referee reports would be submitted to Review Editors for compilation and transmission to authors.

Referees would have the option of submitting comments on sections of the report other than those to which they are assigned, but these comments would be for information purposes only and would not be part of the iterative process described in Recommendation 5.

Recommendation 5: Adoption of an iterative process to achieve a final text

under the joint supervision of authors, reviewers and editors.

Upon receiving reviewer responses, the LAs would have the responsibility of preparing a revision and a reply to the referee comments. This process could iterate many times during the report preparation process. However, LAs and referees would be required to work to a reasonable time frame, such as 180 days. There would be no reason to work to arbitrary word count limits since the final report would be published on the internet, as long as the discussions are as concise and clear as possible.

The iterative process would continue until all LAs, CAs and referees assigned to a section agree to the text. In case of a serious or unresolvable dispute, the LA could propose a box or footnote be inserted recording a reviewer's dissent and citation of evidence for the dissent. If a deep disagreement arose whereby an author or referee was not satisfied with the text or proposed resolution, the matter would be referred to the EAB for guidance. The EAB would first make a non-binding recommendation and ask the LAs and referees to come to a voluntary agreement. If they are unable to do so, the EAB would have the option to impose a binding resolution in the form of final text.

The agreed-upon text would then go to the CLAs, who would read through the entire chapter and ensure the sections are coherent. Once all chapters are complete the CLAs would collectively read through them to ensure there are no inconsistencies among chapters. If there are incoherencies the relevant sections would be referred back to the LAs for resolution with minimal disruption to the text.

Any changes made by LAs would go back to the section referees for final approval. Disputes would be resolved as above.

Recommendation 6: Adoption of a procedure for seeking technical input when necessary from outside the list of authors and reviewers during the assessment process.

If, upon receipt of expert reviews, LAs are confronted with technical issues which they deem themselves and the CAs unable to address, they would not be permitted to engage in informal consultation with colleagues or to recruit additional CAs. Instead they would contact the EAB and describe the issue they need assistance on. The EAB would then develop a list of individuals to contact for advice, selected to ensure appropriate expertise is accessed, personal conflicts of interest avoided, and also preventing LAs or CAs recruiting partisans to their own cause to coach them on how to rebut reviewer comment they oppose.

Recommendation 7: Due diligence regarding key supporting papers and full disclosure of all data and methods used to produce original IPCC Figures and Tables.

With regard to underlying journal articles, a list of up to fifteen papers per

Working Group should be identified by the EAB as being especially influential on the conclusions of each WG's Assessment Report. This might be evidenced by citation of a paper's numeric or graphical evidence in a Chapter Summary or the SPM. For each study the Bureau shall check and certify that the data and methods (including computer code) were publicly disclosed in a manner sufficient to permit independent replication. Where such certification is not possible the paper will be disqualified for citation by the IPCC.

Regarding original Figures and Tables in IPCC reports, transparency rules should include:

- Where the IPCC presents calculations, tabulations or figures that are not merely copied directly and without alteration from a published source, the methodology used must be fully disclosed, including all computer code, smoothing routines, data imputations, and statistical testing formulae. The disclosure must be sufficient to permit independent replication of any original calculations, tabulations or figures in the IPCC report.
- The sources of data must be cited, and the actual data used to produce the graph must be archived at the IPCC.
- If any data source has been manipulated, rescaled, smoothed, truncated or modified in any way, the graph must be shown with and without the modification and an explanation should be provided as to why the modification is made.

Recommendation 8: Immediate online publication of the full report upon finalization, prior to production of summary.

Upon receipt of the final text by the CLAs, the report text would then be frozen, and no further changes would be allowed.

The report, once completed, would be immediately published on the Internet without a summary.

Recommendation 9: Production of Summary by Ad Hoc group appointed by the Panel based on recommendations from the Editorial Advisory Board.

Preparation of a Summary for Policy Makers would be done afterwards by a Summary-writing group appointed by the Panel based on recommendations by the EAB, including selected government delegates as well as LAs and referees at the Panel's discretion. The Summary group could adopt any procedure they prefer, but since they would be summarizing a report already available online they would be working within constraints imposed by the fact that understanding would already be growing about the report's contents, and summary statements would immediately be checked against source. Hence the Summary would have to agree with the main report, and could not appear months ahead of the main report, as is currently the case.

Recommendation 10: Release of all drafts, review comments, responses and author correspondence records within 3 months of online publication of the full report.

The IPCC procedures call for an 'open and transparent' process. The precedent was set with AR4 to release all drafts, reviewer comments and responses. Also, UK and European Freedom of Information laws have been deemed to cover expert correspondence related to production of the IPCC report. Since it is now clear that the material constitutes a public record, the only remaining task is to ensure the process is timely and effective. All persons engaged in the writing, reviewing and production of the IPCC Assessment Reports shall be issued email accounts on a dedicated IPCC domain and shall conduct all correspondence related to the Assessment process via this account. The email correspondence will constitute a part of the public record. All drafts, review comments, author responses and IPCC email correspondence will then be published no more than 3 months after the release of the full report.

Recommendation 11: That the nations involved in the IPCC Panel begin these reforms at once, and if such a process cannot be initiated then those national governments that seek objective and sound advice on climate change issues should withdraw from the IPCC and begin the process of creating a new assessment body free of the deficiencies identified herein.

The IPCC was created because world leaders need good information on which to base important decisions about a topic of major public concern. The evidence shows that procedural flaws now make it incapable of fulfilling that role in a sufficiently reliable way. Its continued existence in its present form is in no way justified by the importance of the underlying issue, which, to the contrary, only points to the imperative of fixing the problems. If reform is not possible then the IPCC should be abandoned and a replacement sought. In principle, however, reform is possible if the sponsoring governments decide it is worth pursuing.

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