

**Testimony by  
Dr Richard S.J. Tol  
to the hearing entitled  
*Examining the UN Intergovernmental Panel on Climate Change Process for the Fifth  
Assessment Report*  
Committee on Science, Space and Technology  
US House of Representatives  
Thursday, May 29, 2014**

**It is an honour and pleasure to be here. My name is Richard Tol. I am a professor of economics at the University of Sussex and the Vrije Universiteit Amsterdam. I am a research fellow at the Tinbergen Institute and CESifo. I am ranked among the Top 100 economists in the world by IDEAS/RePEc<sup>1</sup> and among the 25 most cited climate researchers according to Google Scholar<sup>2</sup>. I am an editor of Energy Economics, a top field journal. I was one of the first to statistically show that the observed global warming over the last one and a half century is caused by the accumulation of greenhouse gases in the atmosphere.<sup>3</sup> I used to advocate tradable permits, but having observed the EU ETS I now favour a carbon tax. I helped the UK government set its levy on methane from landfills, the Irish government design and set its carbon tax, and the US government set its carbon price. I have been involved in the Intergovernmental Panel on Climate Change since 1994, serving in various roles in all three working groups, most recently as a Convening Lead Author in the economics chapter of Working Group II.**

**An appropriate solution to any problem requires a good understanding of its mechanisms, its consequences, and the consequences of any countermeasure. The climate problem is so complex that at the moment only the USA can mount sufficient expertise to cover the entire issue. The EU cannot. Maybe China can in 20 years' time. Other countries than the USA need international collaboration on scientific and policy advice through a body like the Intergovernmental Panel on Climate Change. A common understanding of the issues is probably also helpful for the international climate negotiations although shared knowledge does not imply agreement on desirable outcomes. I therefore favour reform of the IPCC rather than its abolition.**

**I will focus my remarks on Working Group II of the IPCC because I know that one best. Working Group II is on the impacts of climate change, on vulnerability and adaptation. Researchers tend to study those impacts because they are concerned about climate change.**

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<sup>1</sup> <http://ideas.repec.org/top/top.person.all.html#pto90>

<sup>2</sup>

[http://scholar.google.co.uk/citations?view\\_op=search\\_authors&hl=en&mauthors=label:climate\\_change&af\\_ter\\_author=pOsLADa6\\_8J&astart=20](http://scholar.google.co.uk/citations?view_op=search_authors&hl=en&mauthors=label:climate_change&af_ter_author=pOsLADa6_8J&astart=20)

<sup>3</sup> Tol and de Vos (1993), *Theoretical and Applied Climatology*, **48**, 63-74.

**Academics who research climate change out of curiosity but find less than alarming things are ignored, unless they rise to prominence in which case they are harassed and smeared.** The hounding of Lennart Bengtsson is a recent example. Bengtsson is a gentle 79 year old. He has won many awards in a long and distinguished career in meteorology and climatology. He recently joined the advisory board of an educational charity and felt forced to resign two weeks later. As an advisor, he was never responsible for anything this charity did, let alone for the things it had done before he joined. For this, he was insulted by his peers. A Texas A&M professor even suggested he is senile.<sup>4</sup> Strangely, the climate “community” did not speak out when one of its own was elected for the Green Party<sup>5</sup>; nor does it protest against close ties between IPCC authors and the Environmental Defence Fund<sup>6</sup>, Friends of the Earth<sup>7</sup>, Greenpeace<sup>8</sup> or the World Wide Fund for Nature<sup>9</sup>. Other eminent meteorologists have been treated like Bengtsson was – Curry, Lindzen, Pielke Sr. Pielke Jr has been mistreated too, merely for sticking to the academic literature, as reflected by the IPCC, that there is no statistical evidence that the impact of natural disaster has increased because of climate change. I have had my share of abuse too. Staff of the London School of Economics<sup>10</sup> and the Guardian<sup>11</sup> now routinely tell lies about me and my work.

**People volunteer to work for the IPCC because they worry about climate change.** An old friend was an author for an IPCC special report. He was surprised that his co-authors were there for political reasons. In turn, they were surprised because he was there out of intellectual curiosity how electricity systems could possible function with a high penetration of non-dispatchable renewables.

**Governments nominate academics to the IPCC – but we should be clear that it is often the environment agencies that do the nominating.** Different countries have different arrangements, but it is rare that a government agency with a purely scientific agenda takes the lead on IPCC matters. As a result, certain researchers are promoted at the expense of more qualified colleagues. Other competent people are excluded because their views do not match those of their government. Some authors do not have the right skills or expertise, and are nominated on the strength of their connections only.

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<sup>4</sup> <https://twitter.com/AndrewDessler/statuses/467100118844321792>

<sup>5</sup> [http://www.greenparty.bc.ca/elected\\_mla](http://www.greenparty.bc.ca/elected_mla);

[http://www.europarl.europa.eu/meps/en/96725/BAS\\_EICKHOUT\\_home.html](http://www.europarl.europa.eu/meps/en/96725/BAS_EICKHOUT_home.html)

<sup>6</sup> <http://www.princeton.edu/step/people/faculty/michael-oppenheimer/>

<sup>7</sup> <http://www.up.ethz.ch/people/former/mmalte>

<sup>8</sup> <http://www.pik-potsdam.de/news/public-events/archiv/greencyclesii/programme/16.5.2011/hare/hare-cv>

<sup>9</sup> <http://www.biology.uq.edu.au/staff/hoegh-guldberg>

<sup>10</sup> <http://www.lse.ac.uk/GranthamInstitute/Media/Commentary/2014/April/A-flawed-conversation-about-the-Stern-Review.aspx>; <http://www.lse.ac.uk/GranthamInstitute/Media/Commentary/2014/March/Errors-in-estimates-of-the-aggregate-economic-impacts-of-climate-change.aspx>

<sup>11</sup> <http://www.theguardian.com/environment/climate-consensus-97-per-cent/2014/apr/30/economics-clear-need-climate-action>; <http://www.theguardian.com/sustainable-business/blog/environment-climate-change-denier-global-warming>; <http://www.theguardian.com/environment/earth-insight/2014/may/15/ipcc-un-climate-reports-diluted-protect-fossil-fuel-interests>; <http://www.theguardian.com/environment/planet-oz/2014/may/23/climate-mccarthyism-confected-outrage-checking-record-global-warming-policy-foundation>

**All this makes that the authors of the IPCC are selected on concern as well as competence.** In the wake of the Fourth Assessment Report, the InterAcademy Council recommended that the IPCC be more transparent on the characteristics of the authors.<sup>12</sup> Putting their CVs online would be a small effort. It would be useful to systematically compare the academic performance of those selected, those nominated and those who volunteered.

**This selection bias shows in the Fifth Assessment Report of Working Group II. The Summary for Policy Makers (SPM) talks about trends in crop yields, but omits the most important of them all – technological change – which has pushed up crop yields since times immemorial.<sup>13</sup> It shows the impacts of climate change on agriculture assuming that farmers will not adjust their practices in the face of changed circumstances – the far less dramatic impacts after adaptation are hidden in the main report. It shows that the most vulnerable country would pay some ten percent of its annual income towards coastal protection, but omits that the average country would pay less than one-tenth of a percent<sup>14</sup> – again, the lower, more relevant number is buried in the report. It emphasizes the health impacts of increased heat stress but downplays the health impacts of decreased cold stress – although the latter may well be numerically more important.<sup>15</sup>**

This alarmist bias made me take my name of the Summary for Policy Makers in September 2013. My views on the impacts of climate change are well known. I liked the first draft of the Summary, which had as one of its key findings that the worst impacts of climate change really are symptoms of mismanagement and underdevelopment. It was just not credible that I would put my name to the final draft of the Summary, which its overemphasis on risk. Unfortunately, news of me stepping down made headlines in March 2014, giving the press an excuse to focus on the people involved rather than on the structural deficits of the IPCC.

Problems are not limited to the Summary for Policy Makers. There is a large body of work in the peace research literature that agrees that climate change is a minor, contributory factor in violent conflict, if at all.<sup>16</sup> There is a small body of work in the environmental science literature that argues that climate change is a major cause of violent conflict.<sup>17</sup> The IPCC grants the two literatures parity of esteem.<sup>18</sup>

The SPM worries that climate change may trap more people in poverty. One chapter<sup>19</sup> argues that this cannot be supported by the literature: There are a few weak papers

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<sup>12</sup> <http://reviewipcc.interacademycouncil.net/>

<sup>13</sup> Ruttan (2002), *Journal of Economic Perspectives*, **16**, 161-184.

<sup>14</sup> Nicholls and Tol (2006), *Philosophical Transactions of the Royal Society*, **A361**, 1073-1095.

<sup>15</sup> McGeehin and Mirabelli (2002), *Environmental Health Perspectives*, **109**, 185-189. Ye et al. (2012), *Environmental Health Perspectives*, **120**, 19-28.

<sup>16</sup> Gleditsch (2012), *Journal of Peace Research*, **49**, 3-9.

<sup>17</sup> Hsiang et al. (2013), *Science*, **341**, 6151.

<sup>18</sup> IPCC WG2 AR5 Chapters 12 and 19.

<sup>19</sup> IPCC WG2 AR5 Chapter 10

reaching opposite conclusions. Another chapter<sup>20</sup> cites two papers<sup>21</sup> – neither of which is on poverty traps – and the SPM echoes its language on climate change and poverty traps.

There is section on emerging risks. The first paper on an issue is always dramatic. That is the only way to get something onto the scientific agenda. Follow-up papers then pooh-pooh the initial drama. This has been repeated pattern in the climate change impacts literature from the 1980s onwards. The first papers on sea level rise, agriculture, health, ocean currents, and ice caps were sharply at odds with later, much better informed research.<sup>22</sup> But the IPCC chose not to wait for those follow-up papers.

Working Group III is not without fault either. A little bit of emission reduction costs little. But as targets get more stringent, costs escalate. Not so according to WG3: The tables in the SPM and the underlying chapter suggest that very ambitious targets are only slightly more expensive than ambitious targets, even though ambitious targets are far more expensive than lenient targets. This surprising finding is a statistical fluke. Emission reduction is easy according to some studies, which duly explore very ambitious targets. Emission reduction is hard according to other studies; very ambitious targets are prohibitively expensive and results not reported. The surprisingly low cost of meeting very stringent emission reduction targets is the result of selection bias: as targets get more stringent, an increasing number of expensive models are excluded. Oddly, the IPCC made the same mistake in the Fourth Assessment Report, and was alerted to the error.<sup>23</sup>

I think that these mishaps reflect bias in the authors. **The IPCC should therefore investigate the attitudes of its authors and their academic performance and make sure that, in the future, they are more representative of their peers.**

**If similar-minded people come together, they often reinforce each others' prejudices.**

**The IPCC should deploy the methods developed in business management<sup>24</sup> and social psychology<sup>25</sup> to guard against group think.** These include a balanced composition of peer groups, changing the compositing of groups, appointing devil's advocates, and inviting outside challengers. This requires active support from the IPCC leadership. To the best of my knowledge, outside challengers are rare. Indeed, I know of only one occasion. Peter Dixon, an Australian economist, told a group of IPCC authors they got it all wrong: The cost savings due to induced technological change as reported by the IPCC<sup>26</sup> are an artefact of misspecified models. Sjak Smulders, a Dutch economist,

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<sup>20</sup> IPCC WG2 AR5 Chapter 13

<sup>21</sup> Ahmed et al. (2009), *Environmental Research Letters*, **3**, 034004; Hertel et al. (2010), *Global Environmental Change*, **20**, 577-585.

<sup>22</sup> Tol (2008), *Environmental Values*, **17**, 437-470.

<sup>23</sup> Tavoni and Tol (2010), *Climatic Change*, **100**, 769-778.

<sup>24</sup> Eisenhardt et al. (2001), *Harvard Business Review*, **75**, 77-85.

<sup>25</sup> Postmes et al. (2001), *Journal of Personality and Social Psychology*, **80**, 918-930.

<sup>26</sup> IPCC WG3 AR4 Chapter 11

said much the same at an IPCC workshop.<sup>27</sup> Their advice was ignored and one of the authors duly promoted to working group chair.

**Not all IPCC authors are equal. Some hold positions of power in key chapters, others subordinate positions in irrelevant chapters. The IPCC leadership has in the past been very adept at putting troublesome authors in positions where they cannot harm the cause.**

**That practice must end. This is best done by making sure that the leaders of the IPCC –chairs, vice-chairs, heads of technical support units – are balanced and open-minded.**

The funding model of the IPCC is partly at fault. Multilateral organizations depend on their sponsors, but most have their own budget. The IPCC relies mostly on contributions in kind, and this hampers the IPCC's ability to control the quality of the contributions.

The leaders of the IPCC steer its assessment reports, and dictate its media presence. Working Group I conclude, in its latest assessment report, that the climate sensitivity – the eventual warming for a given change in the atmospheric concentration of greenhouse gases – is lower than previously thought. This is great news for all those who worry about climate change, but it somehow did not make it into the press release.

**The IPCC releases a major report every six years or so. That is not frequent enough to keep abreast of a fast-moving literature.**

When preparations started for the Fifth Assessment Report, the world hadn't warmed for 13 years. That is a bit odd, if the climate models are correct, but does not warrant a lot of attention. By the time the report was finished, it hadn't warmed for 17 years. That is decidedly odd<sup>28</sup>, but hard to accommodate in a near-final draft that has been through three rounds of review. After the report was finalized, but before it was published, a number of papers appeared with hypotheses about the pause in warming.<sup>29</sup> The Fifth Assessment Report of Working Group I was out of date before it was released.

**A report that is rare should make a big splash – and an ambitious team wants to make a bigger splash than last time. It's worse than we thought. We're all gonna die an even more horrible death than we thought six years ago.**

**Launching a big report in one go also means that IPCC authors will compete with one another on whose chapter foresees the most terrible things.** IPCC reports are often two to three thousand pages long, but there are two or three main findings only. Authors who want to see their long IPCC hours recognized should thus present their impact as worse than the next one.

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<sup>27</sup> <https://www.ipcc.ch/pdf/supporting-material/expert-meeting-2005-01.pdf>

<sup>28</sup> Fyfe et al. (2013), *Nature Climate Change*, **3**, 767-769.

<sup>29</sup> <http://www.economist.com/news/science-and-technology/21598610-slowdown-rising-temperatures-over-past-15-years-goes-being>

**The IPCC should abandon its big reports and convert to journal-style assessments instead.** That would reduce the pressure for media attention. It would allow the IPCC to update its assessment as frequently as needed. It would also be easier to invite second opinions and minority reports.

**In learned journals, the editor guarantees that every paper is reviewed by experts. IPCC editors do not approach referees. Rather, they hope that the right reviewers will show up. Large parts of the IPCC reports are, therefore, not reviewed at all, or not reviewed by field experts.** In a journal, papers that are not good enough, are rejected. In a journal, a promising paper is sent back for further revision – regardless of deadlines. IPCC chapters are never turned down, and always finished on time. **The IPCC should move to journal style reviews and editors.**

**The IPCC is best seen as a natural monopoly.**<sup>30</sup> The IPCC cannot suppress supply to raise prices – as the typical monopolist would – but it reveals other signs of monopolistic behaviour. There is a lack of innovation – the First and Fifth Assessment Reports were prepared in much the same way, and cover similar ground. There is little regard for clients – the IPCC response to the scandals in the Third and Fourth Assessment Report was haughty. And the IPCC uses its monopoly power to muscle into other fields – most recently scholarships. **Monopolies should be broken up, but natural monopolies – where the costs of duplication are greater than the benefits of competition – should be tightly regulated.**

**The clients of the IPCC, the environment agencies of the world, are often also its regulators. It is time to end that cosy relationship.** Let the IPCC be run by the National Science Foundation and its counterparts in other countries and be overseen by the National Academy and its counterparts. These organizations are not without their faults, but at least their core mission is to do good science. **The climate problem is serious enough to deserve a serious international body to assess the state of knowledge.**

**After the Fourth Assessment Report, the InterAcademy Council suggested useful reforms:** More transparency in author selection, a registry of conflicts of interests, stronger review editors, open peer review.<sup>31</sup> Others suggested that the Bureau, which both runs and oversees the IPCC, should be split.<sup>32</sup> **These recommendations were by and large ignored because the recommendations came after preparations for the Fifth Assessment Report had started; and because few countries supported IPCC reform.** Conflicts of interests are now registered, but neither verified nor disclosed. **It should be said, though, that the Fifth Assessment Report of IPCC Working Group II is a lot better than the Fourth Assessment Report.** The IPCC should continue in this direction.

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<sup>30</sup> Tol (2011), *Climatic Change*, **108**, 827-839.

<sup>31</sup> <http://reviewipcc.interacademycouncil.net/>

<sup>32</sup> Tol (2011), *Climatic Change*, **108**, 827-839.

**The IPCC does useful things. The Fifth Assessment Report shows that the Stern Review<sup>33</sup> overestimated the impacts of climate change<sup>34</sup> and underestimated the impacts of climate policy<sup>35</sup>. This undermines the justification of the two degree target of the EU, UN and the current administration of the USA. The Fifth Assessment Report shows that double regulation – say subsidies next to tradable permits – increases costs without further reducing emissions.<sup>36</sup> This conclusion was inadvertently dropped from the German translation<sup>37</sup>, which is unfortunate as double regulation is widespread in Germany.**

**We need an organization that is not beholden to any government or any party to anchor climate policy in reality as we understand it. A reformed IPCC can play that role.**

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<sup>33</sup> [http://webarchive.nationalarchives.gov.uk/+/http://www.hm-treasury.gov.uk/sternreview\\_index.htm](http://webarchive.nationalarchives.gov.uk/+/http://www.hm-treasury.gov.uk/sternreview_index.htm)

<sup>34</sup> IPCC WG2 AR5 Chapter 10

<sup>35</sup> IPCC WG2 AR5 Chapter 6

<sup>36</sup> IPCC WG3 AR5 Chapter 15

<sup>37</sup> <http://www.welt.de/wirtschaft/article128124861/Die-dreiste-Berichtsfalschung-der-Klimatrickser.html>