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Proof Committee Hansard

JOINT STANDING COMMITTEE ON TREATIES

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JOINT COMMITTEE ON TREATIES

Friday, 3 November 2000

Members: Mr Andrew Thomson *(Chair)*, Senator Cooney *(Deputy Chair)*, Senators Bartlett, Coonan, Ludwig, Mason, Schacht and Tchen and Mr Adams, Mr Baird, Mr Bartlett, Mr Byrne, Mrs Elson, Mr Hardgrave, Mrs De-Anne Kelly and Mr Wilkie

Senators and members in attendance: Senators Cooney, Mason and Tchen and Mrs De-Anne Kelly, Mr Andrew Thomson and Mr Wilkie

Terms of reference for the inquiry:

- The implications for Australia of proceeding or not proceeding to ratify the Kyoto Protocol and meeting its target emissions levels by 2008 with regard to anticipated and/or predicted economic, environmental and social outcomes both nationally and in specific regional areas.
- The veracity of conflicting current scientific theories on global warming and any solutions proposed for it.
- What definitions and criteria Australia should develop and actively pursue in its national interest with regard to:

- grandfathering,
- trading credits,
- carbon credits,
- sequestration,
- revegetation,
- land management, and
- definitions (eg "forest").

- The economic, environmental and social implications of a punitive approach to any domestic regulation of industry including such proposals as a carbon tax and an incentive-based approach.

WITNESSES

Committee met at 9.10 a.m.

O'BRIEN, Dr Brian John (Private capacity)

CHAIR—I declare open this hearing of the Joint Standing Committee on Treaties. Welcome witnesses, members of the public and others to the fourth hearing into the implications of the Kyoto Protocol. We are going to receive further evidence after the meeting in The Hague, which begins on 13 November. Today we are going to be hearing from various individuals and some organisations, who will represent a good spectrum of views regarding the protocol. The first witness I would like to call is Dr Brian O'Brien.

I formally advise you that these are legal proceedings of the parliament and they warrant the same respect as proceedings in the House of Representatives or the Senate. The giving of false or misleading evidence is a serious matter and may be regarded as a contempt of parliament. Would you make some introductory remarks, of pretty much whatever length you like, and then we will have some questions.

Dr O'Brien—I appreciate being here this morning, and I also want to acknowledge the great and cheerful assistance of your staff. You have got my submission of some months back recommending that Australia should not ratify the Kyoto Protocol. Attachment 1 of that lists 39 papers I have written about greenhouse in the past 10 years. If anybody wants to browse through them, they are there. Attachment 2 lists some of my relevant professional qualifications, and attachment 3 briefly analyses Dr Jim Hansen's recent change of mind about greenhouse.

My submission discusses only the science-policy reasons why there is no justification for Australia to ratify the Kyoto Protocol. The basic reason is that the Kyoto Protocol marched to the beat of the Toronto conference in 1988, and Australian policy marched to the beat of the Toronto target. My submission discredits both. It documents past debates I have had with CSIRO, so it seemed most useful to update my submission briefly this morning by starting with the executive summary of the CSIRO's submission to you which, regrettably, I had not had a chance to read before I gave my earlier submission. CSIRO said in their executive summary:

> Predictions of climate change made in the late 1980s and early 1990s are broadly consistent with changes now being observed.

When I read that, I thought they had gone back in a time warp and forgotten what has happened over the last 10 years.

Overhead transparencies were then shown—

Dr O'Brien—I now show, using only CSIRO publications—this is not O'Brien's science; this is CSIRO official science—why this claim is invalid. I sent you the primary references as well: compare reference B, which is CSIRO from 1988, with reference M, which is their latest submission. This is the inland temperature rise for Australia by the year 2030 forecast by CSIRO in 1988. They said it was between two and four degrees. You can see what they said in 1992, and you can see what they said in 1996. There is no way that that is consistent with the claim in the executive summary that the predictions of climate change made in the late 1980s

and early 1990s are broadly consistent with changes now being observed. Which prediction—1988 or 1992?—is consistent with them? If you take the mid-point for comparison, it is about three degrees in 1988 and it is only a little above one degree in 1992. So they have to make a choice: which one is consistent with the changes now being made? Again, I emphasise that this is CSIRO data; you have the primary data there.

Such errors by CSIRO convinced me to make public some historical exchanges I had with CSIRO during the 1990s, some of which have not been made public before. You have got a set of those now: supplementary references A to N.

To put the Kyoto Protocol into perspective, if all the annex B countries met their Toronto target, the net effect on the temperature would be roughly the thickness of that pencil. This is the scientific uncertainty. In 1998 they said it was three degrees, and in 1992 they said it was down here: one or so degrees. If all annex B countries met the Kyoto Protocol, the thickness of the pencil would be roughly the degree of cooling achieved. Scientific uncertainty is much greater than the outcome of the Kyoto Protocol. Alternatively, you could phrase it, 'Don't bother ratifying the Kyoto Protocol; wait for the scientists to achieve even more reduction in global warming.'

Before I go any further I want to ensure there is no misunderstanding of my criticisms of CSIRO past actions. My criticisms are about issues; they are not personal criticisms of CSIRO scientists. I have great professional admiration for much of the CSIRO's work, and I have enjoyed, continue to enjoy and expect to enjoy more professional dialogue and association with several senior scientists. But this latest incorrect claim in the submission to the Joint Standing Committee on Treaties further validates my submission. Australia has got into its present position with the Kyoto Protocol because of policies and climate forecasts that were driven and are still being driven by mindsets from 1988—the Toronto conference and the Toronto target. That slide concentrates on Australia.

Going to the next slide, from IPCC, these are some of the earlier forecasts of so-called sea level rises by the year 2030 versus the year in which the forecast was made. Nobody really believed the early forecast of a six-metre rise in sea level. The 1.4 metres forecast in 1985-88 is the Toronto Altbach target; it is also the CSIRO target. In 1998 CSIRO said that the sea level would rise between 20 and 140 centimetres. Of course, it is the 140 centimetres that people remember. It is not what the scientific forecast is; it is what people like Jim MacNeill, the Secretary General of the UN Brundtland Commission, said. In 1988, at CSIRO in Canberra, he said that scientists told him that the forecast rise in sea level by 2030-40 is five feet. He took the upper limit there. It is an important issue: the policy makers take the upper limit. They do not necessarily take the best scientific forecast. I have a long list of quotations—you have got a copy of that as well—from people who have picked the higher levels and made policy accordingly.

I initially stayed out of greenhouse issues in Australia because it was obviously a holy war by 1988. It was not a scientific issue. As I saw where Australia was heading, I became so alarmed that I published a paper in *Nature* in November 1990 talking about mindsets in IPCC, and I wrote a monograph, *Postponing greenhouse*, published in December 1990. Again, I made the points focused on the Toronto target and the Toronto mindsets. Basically the 1990 paper in *Nature* made two major claims: first, the policy of the Toronto target had no credibility or

scientific basis and, second, greenhouse forecasts were exaggerated. If they were exaggerated then the sense of urgency was overstated and there was more time for rational action. That drew editorial praise in the *Australian*—you have got reference E there, but it drew a critical review by CSIRO to the ministers. That is where I want to focus now and see what happened.

Remember that federal cabinet adopted the Toronto target, plus an economic caveat, on 11 October 1990. The coalition supported it; in fact, I am afraid to say, they thought they could do it faster. My book claimed that the Toronto target was plucked from the 1988 entrails of Toronto and that it had no significant credibility. CSIRO advised their minister—you have a copy of that, reference F—and criticised that claim. They claimed in rebuttal that Toronto is regarded as purely an achievable goal. As soon as Brian Tucker, the Chief of Division of Atmosphere Research sent me that—I had sent him a copy in advance as a matter of courtesy—when I got his letter of 13 December, the reference you have got, I faxed him back on 18 December and zapped him on the Toronto target. Reference H is a letter he sent on 20 December, in which he admitted:

... I agree that the 20% figure for CO_2 reduction seems to have been plucked out of thin air.

That is the Toronto target. The most remarkable thing I find in that letter is:

... but it must surely have been based on *something*!

You have got that letter there: reference H. There is an exclamation mark after 'something' and 'something' is italicised. This is the basis for scientific advice to the federal government.

The next year the CSIRO submission to the Industry Commission—reference J—said that the Toronto target was judged to be achievable. Australia took the Toronto target to the Rio Treaty and signed the Rio Treaty in June 1992—two years later. That story, it seems to me, is a most remarkable way to have official policies or even to sign the Rio Treaty, the Framework Convention on Climate Change, but it surely must have been based on something.

This has an important policy implication. Think of it another way. Earlier I showed you the forecast rise in sea level versus the year in which the forecast was made, and it was getting smaller and smaller. But there was a mindset that a one-metre sea level rise would occur; it was only a question of when it would occur. That shows the international forecast versus the year the forecast was made. You see here that now it is forecast to occur in the year 2200. It was formerly forecast—at the time of the Rio Convention—to occur in the year 2030. So there has been a postponement of that effect by 170 years, give or take.

What that means is that the whole thrust of urgency for action is gone. These are the official science figures; Richard will talk to you later about whether you should even believe these. But these are the official ones that guided the global and the Australian policy. It is a matter of record that Kyoto marched to the beat of Toronto. You can run it through all the way through. The Bonn Convention, for example, was issued five months before the 1995 IPCC reports. The CSIRO forecast of a reduction in global warming was issued five months after the Rio Convention was signed, in November 1992.

Let me finish with a final slide that is really a recap of what I said earlier: that since 1988 and the 1992 treaty, both CSIRO and the international scientists have decreased the predicted impacts of global warming, or at least the promoted impacts—the ones promoted by Jim MacNeill and so on—by a far greater proportion than even the draconian form a Kyoto Protocol could achieve. If all nations in annex B met the Kyoto Protocol, they would get the thickness of a pencil response. But the science has reduced it by far more since the treaty was signed.

I will be happy to answer any questions, but I hope, Chairman, that you and your committee agree with me that the lessons of the past decade, which I have summarised, must be understood as you go forward into the future. I hope that your committee will recommend against ratification of the Kyoto Protocol, not just based on economic or employment arguments or national integrity but based on the fundamental driving force of the science. Science has already more than achieved the proposed reductions.

Finally, let me add a broad comment. In 1994 I recommended that, before any important treaties were ratified, there had to be an Australian impact statement with full public accountability and transparency. I regard the preparation of such a document as a matter of urgency. I am delighted that that 1994 recommendation has now been accepted. I commend to the committee some recommendation along the lines that an Australian impact statement should be prepared right now, even before your final report, as an issue of urgency and an issue of commonsense. It does not require your final report to say, 'We must know what the total impact on Australia is.' Thank you, Chairman. I have omitted many issues, but I will be happy to try to clarify any questions.

Mr WILKIE—Do you believe that there should be any attempt to try and reduce greenhouse gas emissions and, if so, to what extent?

Dr O'Brien—I will have to give you a slightly historical response. The reason I stayed out of the greenhouse debate in 1988 and 1989 is that the debate was achieving useful results, even though it had no scientific credibility. People were being more interested in resource management, in power efficiency, in tree planting, in research into climate change and in lots of good things. Getting directly to your question, I believe that there should be an intensive effort to improve energy efficiency and resource utilisation, the same as there was after the OPEC crisis, which was driven by economic issues, if you like. But it is just one more factor, as far as I am concerned. It is not the devil that people thought it was. The Hansen paper of last August shows that even the doomsayer himself now says that climate change from greenhouse is not nearly as fearful as he once believed. It is just one more factor.

The danger of it scientifically is that it can distort decision making and, because of the strong emotional aspect of it, it can be used as a false argument to buffer other zealous arguments in things like public versus private transport. People say, 'The major reason for public versus private transport is that you will decrease greenhouse,' and immediately that sends up the response, 'Oh yes. That is a good thing,' without people focusing on the details of the issue. That is where one of the real dangers of the zealous pursuit of greenhouse exists. If you have got a cabinet meeting or something and there is a decision which is level-pegging, it may go over in favour of greenhouse because it is such a popular cause—without people asking the hard questions. I would say that, on balance, it presents more of a threat to rational decision making at this stage in things like public versus private transport and all sorts of things. But if people

are accurately informed, that is a different thing. I have not mentioned that; I did in my submission. There has been a consistent pattern of misinformation about greenhouse by all governments.

Senator TCHEN—Am I right to say that, in your mind, science requires precision—not so much precision in the prediction but precision in saying what you know?

Dr O'Brien—Science should pursue precision. Are you leading up to the precautionary principle?

Senator TCHEN—No, I am just going to observe that I understand the science position. It is just that politics is not precise.

Dr O'Brien—Neither is science. Let me show you one of my favourite examples of misinformation. Science is fine so long as it tells the full story. There are two greenhouse effects. The green shows the natural greenhouse effect of about 33 degrees. If it was not the natural greenhouse the planet would be at a temperature of minus 18 degrees below zero. It is that 15 degrees above zero so we all agree that natural greenhouse is a good thing. But the little bit of red shows the enhanced greenhouse effect. The assumption made is that it is a bad thing. Everybody assumes, without articulating it, that the former is good and the latter is automatically bad because it is associated with humans. It is a nonsense. It makes no sense at all. Quite apart from the fact that I lived in Melbourne for a year and I think Melbourne could do with a good dose of global warming—

Senator COONEY—I was almost ready to believe your rubbish till you said that.

Dr O'Brien—The people from Melbourne who moved to Queensland evidently feel that way and, as Richard said last night, the people from eastern states in the United States who moved down to Florida believed that way.

This is where the public, the community at large, is not being fully informed. They are not being told of the unspoken assumption that the former is good but the latter is bad and we will sign some treaties to fix that. You will not ever see the slide showing that. I agree with you as far as science's position goes. I have been in politics long enough to know the Apollo program and nuclear explosions in space. The Internet was invented because of the explosion of the 1.4 megaton starfish bomb on 9 July 1962 which set off burglar alarms in Hawaii, 1,500 miles away. We discovered the electromagnetic pulse. The Pentagon got concerned about the Russians and, voila, there was the Internet.

Senator TCHEN—I thought they all just had no idea. The government's position, stated by both the Prime Minister and Minister Minchin, is that in responding to greenhouse warming policies Australia should take into account, firstly, our international competitiveness in our economy; secondly, the wellbeing of our national social and economic structure; and, thirdly, our international obligation on an equal footing, balanced consideration. Would you consider that as a proper approach?

Dr O'Brien—It is almost there but it is still—

Senator TCHEN—What are you looking for?

Dr O'Brien—It presupposes that the cleverest way for Australia to approach greenhouse is to reduce its national emissions. That is not necessarily so. In 1990 I said that the cleverest way to reduce global greenhouse emissions is for Australia to construct a couple of hundred million pot-belly stoves and sell them to the Chinese. That would make the Chinese burning of coal three times more efficient. Globally you would have much more effect on reducing greenhouse emissions but Australia's greenhouse emissions would go up. What has been talked at in national policy still has the unstated assumption that Australia cannot do it more cleverly. I agree on the various sorts of trade-off things in Kyoto but that is a mechanistic approach. It is still not a clever approach. I am not saying the pot-belly stoves are clever. They were a simple illustration which will chop the global greenhouse but increase Australia's greenhouse. So we are not thinking really in a total system way yet.

Senator COONEY—I was listening to the radio this morning. Tony Blair more or less said the problems in England were brought about by global warming and, when they get to the next meeting of the Kyoto group, he will be raising that issue. I think the problem Australia has is that it is a middle sized power in the midst of some very heavy people. For our representatives there to be saying this is all nonsense and that, therefore, we will do nothing is a very difficult political problem. It is a problem we will have to face in this.

What can the scientists of Australia do to get across to others that the situation is as you say? Can I just say something about that? I have looked at the list of papers you have done. I was going to say you have been 'campaigning' but you would not use that word and I think properly so. You have been pulling these things out for 10 years and it seems to me we are not getting terribly far.

Dr O'Brien—We are going backwards when you get a submission from CSIRO that says that.

Senator COONEY—Yes. I understand what you are putting there but what we really need is some mechanism by which what you say can be got across to the world and for the world to accept it. Have you got any thoughts about that?

Dr O'Brien—I do have. One of the things is that scientists should never just reveal anything particular. If a scientist just throws to Tony Blair a single set of forecasts that does not mean anything. You do not have a feel for that at all. You will just say that is the scary sort of greenhouse effect. Even if you throw that up, he will say that is a scary greenhouse effect. He has to be shown all three and be told this is when the community got frightened, this is when Jim McNeil got thrown, when the HIFAR thing came up. Consistently this sort of change is never shown by the scientists.

Senator COONEY—Sorry, I do not want to interrupt, but just to put you onto the line that I am talking about: when we go over there, we say we are not going to take part in the greenhouse agreement, which then puts pressure on Australia. There are all sorts of aspersions cast on the country. I suppose if we have to do it we cop those but it would be better if people could see where we are coming from and what we are doing. It seems to me that we are not getting a great way along the line of getting people to see we are reasonable.

We have been at this for a while. Do you have any ideas as to why the scientists are going on as apparently they are? I can follow what you say. They have only been shown half the story, but that is in a certain sense not the issue. The issue is: how can we create a situation where the President of the United States and the Prime Minister of England and all the various leaders of Europe who will otherwise knock us about are able to see what you are saying?

Dr O'Brien—Let me get back to the violent storms. The most provocative argument that was used in the early days was the drowning of coral islands—the Maldives and all the rest of them. That was forecasted up there. Now that the sea level rise is acknowledged to be much less, the scientists all agree that, at that rate of increase in sea level, coral islands will grow because that is what coral islands do. The Great Barrier Reef grew 7,000 or 8,000 years ago when the sea levels rose by three times what is now forecast for greenhouse. So you make that argument. You approach the President of the Maldives and say, 'Provided you have healthy islands, they'll get bigger at this rate. It is good for them.' With regard to increased violence of severe events, such as in England and Tony Blair and whatever, if you were a scientist and the estimates were progressively getting smaller and you wanted to continue to receive research funds, you would say, 'They will cause more severe events,' because you know that is almost impossible to prove or disprove.

Senator COONEY—I would like an assessment; but it is not a scientific assessment, so I do not ask it on that basis. Would it be your assessment that Australia is going to find it difficult to get this message across? Is there a way out? Should we send you and others around the world—I do not say this facetiously—to explain to scientists what is going on?

Dr O'Brien—I think there are two issues. First of all, you have got to look after the Australian electorate and their attitudes to this. The way to do that is certainly to fully inform them about the latest science. Show them that business about the good and bad greenhouse and so on. That is one issue. On the international issue, you will not argue it by science because it has now become trade and all sorts of other issues like the political wellbeing of developing countries and the rest of it. It was decoupled from science internationally in 1990. They showed their contempt for it by Bonn agreeing on the Kyoto leaving out exclusion of developing countries before the IPCC 1995 report was out. Science can buffer Australia's position, but Australia's position is really one of international trade and international politics. I think there must be an intensive program of Australians being told the facts, particularly because of the nature of variability of climate in Australia.

Senator COONEY—So you think that a considerable amount can be done in terms of explaining to Australia?

Dr O'Brien—Explaining to the community.

Senator COONEY—But you think internationally it is a bit of a problem still?

Dr O'Brien—It is, as is evidenced by the fact that the negotiating position of Australia went from 128 per cent to 118 per cent to 108 per cent in three weeks before Kyoto and there is no list of how they did those calculations. So something must have persuaded them and I have got no idea what influences DFAT.

Senator COONEY—Do you talk regularly to, say, scientists in England? Do you know if they ever approach people like Tony Blair?

Dr O'Brien—Robert may have done, as the Chief Scientist advising Blair on this. He happened to have been the year below me at Sydney University when we were doing our Honours. Bob's view and mine are very different. Bob is a biologist now, even though he graduated in physics. He and I technically disagree on a lot of these things, as I found out before Kyoto.

Senator COONEY—Besides him, have you got any idea of what the approach is of people in a similar position to his, advising heads of government?

Dr O'Brien—No, I cannot honestly speak for them as to greenhouse, but I do interact with numbers of them in other countries on things like forests and whatever. Australians have to appreciate the position that they are coming from. The United Kingdom's population grew by 2.3 per cent between 1970 and 1990; Australia's grew by 30 per cent; the Netherlands, I think, grew by three per cent; ours grew by 30 per cent; and Western Australia grew by 60 per cent over those two decades.

The dynamics of change are very different and France and all the rest of them can afford to take the position of stable populations. France have nuclear power. Put Germany to one side in the recent position, but France is getting 75 per cent of its power from nuclear fuel, which is verboten in Australia apparently. Britain is getting 25 per cent. Britain closed its coalmines down, as you know, with Thatcher, which is why 1990 was chosen as a baseline. Germany united in time as 1990 was a convenient base year and they could close down the heavily polluting East Germany things. There were all of these arguments which far dominated scientific arguments. I will get in there and give you the back-up stuff, but you are talking big bickies.

When in international negotiations people make the arguments about economics and international competitiveness and so on, they should be sufficiently informed to know that Australian scientists can cut the legs off anybody who tries to base their arguments on science. That is the real point. You can go in and fight the good fight for these other reasons, knowing that the science is really zip—there is no scientific base that can be used against you. That, I must admit, was what disappointed me—and, in fact, it annoyed me—about the CSIRO submission.

Senator MASON—I might just develop that point, Mr Chairman. I am usually not intimidated by facts in politics or opinions but it is difficult for someone of my background to assess the veracity of competing scientific evidence. That is not a criticism of you or anyone but it is often very difficult. You have put up on the board this morning those findings of the CSIRO and other official scientific evidence. I suppose you have illustrated the changing scientific consensus. Let me just get back to that because it is perhaps the key point. To keep my question short I wrote it down. With those official figures from the CSIRO, is the science now saying that the effects of greenhouse gas are not as great as we thought, or is the science simply far too uncertain to make any valid assessment? They are two different things.

Dr O'Brien—That is a good question. Those are the published figures from CSIRO. I have the original papers from which they are taken. In that supplementary package of references I gave you I think reference B is the 1988 one. Reference B is the red one and reference M is 1992 and 1996. These are straight from CSIRO and you can read the words and music with which they surround it all as to whether they are predictions or not and that sort of semantics. It is generally agreed that there are uncertainties and that is why there is a range there. The latest IPCC has expanded the ranges of scenarios. These were best estimates with the top being the combination of the worst warming for doubling carbon dioxide and so on and the bottom was the minimum force of 1.5 degrees.

They keep using slightly improved models. This year, for the first time that I can recall, CSIRO has stated, 'We have no confidence in our regional forecasts.' That is the first time they have admitted it. IPCC said in 1990, 'Don't have confidence in regional forecasts,' because if you do not know what is going on globally you cannot predict what is going on regionally. So, in a sense, getting back to your point, there is very high uncertainty about regional effects, and that will continue indefinitely for as far as I can see.

Senator MASON—Has that level of uncertainty about regional forecasts increased over the last, say, 12 years?

Dr O'Brien—No, it has decreased if anything, but it is still highly uncertain. What it means is that the scary scenarios on Shepparton fruit or the scary scenarios about increased hot days in the Pilbara and so on is rubbish. CSIRO now says that they have very low confidence in regional forecasts. But on a global basis they are tending to upper limits, I guess. The upper limits have come down. There is nothing for a Jim McNeil now to latch onto which is fearful. Jim McNeil, I remind you, is the Secretary-General of the Brundtland Commission. He is the one that talked about a five-foot rise here in 1988, because he took the upper limit of that, the 140-centimetre sea level rise, from Toronto. The policymakers no longer have such big limits, and that is the major advance in a sense, but that has not sunk in because the scientists have said coral islands will grow to keep pace with the sea level rise, if they are healthy coral islands, not if they are abused coral islands. That whole emotive issue has disappeared, that is for sure. They have replaced it now by saying that the oceans are getting so hot that the corals will bleach. The last time it was the El Nino effect that caused the five-degree ocean heating. Greenhouse does not cause anything like that, it cannot work that fast. So you are getting natural effects now being very muddied up with something that people would have called greenhouse effect. This is where Tony Blair comes in, coming back to your point. They have had storms in the past in Great Britain, and they will continue to have storms.

Senator MASON—Predictions were made in 1988 and, let us say, the year 2000. Are predictions made with the same degree of confidence today, or less?

Dr O'Brien—Better.

Senator MASON—There is a greater degree of confidence today?

Dr O'Brien—Yes, a greater degree in the upper limits, that it will not get worse than this. Jim Hansen says now that the cooling from burning fossil fuel will offset the warming. IPCC more or less agrees, regionally rather than globally. What you have to say is that the fearful

statistics of Toronto can no longer be justified, but the scientists have not convinced the policy makers, the other groups. You cannot go around talking about a 140-centimetre sea level rise any more. You cannot go around any more talking about a coral island drowning. So what happens? They switch to something that is much harder to disprove, namely, the occurrence of severe events. They say, 'Will I catch a big fish if I go there,' or, 'Did my daddy fish it out?' sort of thing?

Senator MASON—My post-modernist friends who usually vote Democrat tell me that scientific fact is simply consensus. Is there a sensible consensus on the effects of greenhouse gases on global warming?

Dr O'Brien—No, and there never has been. It is just that the media report the bad news consistently, and they also report that there has been a consensus. There is a web site that is referenced in my submission with 15,000 scientists, signatories, warning about Kyoto and so on. Five hundred, I think, signed the Heidelberg statement before Rio saying, 'Please don't go crazy at Rio.'

Senator MASON—So you would say there is no consensus?

Dr O'Brien—I would say there is no consensus about the likely warming, except that it is much less bad than we thought it would be. Jim Hansen is down in that group now—in fact, he says explicitly that. But you cannot get that in the media.

Senator MASON—You are right. I was speaking to the chairman before we started this morning and there is an article in today's *Australian* headed 'Make or break time for Kyoto', in which the Executive Secretary of the UN Climate Convention says:

Unless governments of developed countries take the hard decisions that lead to real and meaningful cuts in emissions, and to greater support to developing countries, global action on climate change will lose momentum.

Dr O'Brien—And he will lose his job.

Senator MASON—Indeed. I just raise that because the assumption underlying the statement that global action on climate change will lose momentum is all the things you have mentioned this morning. It is built into that statement.

Dr O'Brien—It is a mind-set which is still there. That is why it worried me to see that CSIRO mind-set suddenly appear again, when they know what has happened, what their forecasts have done.

Mrs DE-ANNE KELLY—Simply for the record, and I am not questioning them at all, in what fields do your qualifications lie?

Dr O'Brien—They are at appendix 2 of the submission. Briefly, I got a PhD in physics, then I went to the Antarctic, but that is not relevant.

CHAIR—Were you sent there?

Dr O'Brien—I went there because I was waiting for my fiancee to turn 21 so that we could get married.

Mrs DE-ANNE KELLY—That is very romantic.

Dr O'Brien—I was then an assistant, then an associate professor and then a professor of space science in Iowa—I got tenure there as professor of space science when I was 29. I have been principal investigator for nine rockets, doing atmospheric research for half a dozen satellites and for half a dozen experiments on the moon. Then I came back to Australia and became foundation chairman and director of the Environment Protection Authority for seven years. Since 1978 I have been a consultant on a wide range of issues concerning forestry and mining, about fifty-fifty government and industry.

To get to the heart of your question, it is like the old story: you do not need to be able to lay an egg to tell that it is bad. When you have my years of experience in science, particularly in broad range, and as Southern Hemisphere editor for the journal *Planetary and Space Science* for 10 years, and so on, you get to be able to analyse data irrespective of whether you could produce that sort of model. You get a real intuitive sense for analysing new papers and detecting internal inconsistencies. That has been why I have not pretended to develop global climate models myself. That is why I have taken the official figures all the time and shown that they are enough to cause concern about what Australia is doing to itself.

Mrs DE-ANNE KELLY—My query was just that it is the first time, other than the CSIRO, that we have had some sound scientific analysis of the scientific argument. Your view would be very much an independent view?

Dr O'Brien—Yes, and a very lonely view in the early days, but it has been surprising how many people have come out of the woodwork. It had to be a lonely view in the early days for the reasons I said at the dinner last night, that there was no point approaching government because government would fund only true believers and so on. It just so happened that my background was in atmospheric research, and I was senior enough and established enough with other consultancies to do this without being deprived of funding. Most of my work that has been done pro bono over the last 10 years. It has been fairly expensive.

Mrs DE-ANNE KELLY—I can imagine. Is there a dearth of independent analysis of greenhouse in Australia?

Dr O'Brien—I would have to say that until 1995, apart from myself, it was almost nonexistent. John Daly tried to do things. I say this with all due respect to John. I had experiments on the moon and satellites and an established international reputation in the field. In a sense, I could compete with whoever CSIRO threw at me, and we had many good debates with Graeme Pearman. There were the occasional nice bits of debate in the CSIRO division of marine research in Hobart in 1991. It was initially to have a satellite link-up between Stephen Schneider, who is one of the advocates for greenhouse in California, and Graeme Pearman in Melbourne. They said, 'No, let us have an outside independent.' We had a very useful satellite link-up and a very useful debate in which Stephen said, 'You will remember, Graeme, that at Toronto I said we had nobody there qualified to say whether 20 per cent was sensible or not.'

They kept on saying, 'Yes, Brian, yes, Brian', but it did not go beyond that to the policymakers. That is the trouble.

Mrs DE-ANNE KELLY—World wide who else would you respect, regardless of the side of the argument that they take, as being a truly independent scientific voice? I do not want a vast list.

Dr O'Brien—I would have to say that I really have not looked at it that way. I have not sought them in that sense.

Mrs DE-ANNE KELLY—It is obviously relevant to the committee's deliberations.

Dr O'Brien—It is surely. I would have to say that I am my own man in that sense. I have not sought to combine with anybody because there is a spectrum of opinions. Some people are opposed to the very notion of the official climate models, as you will hear. There is a spectrum within the climate modellers themselves, but I do not have the time to get involved in it to that extent. I did not make a submission to the Senate inquiry for various reasons. I decided to make this one to your committee because, quite frankly, I had greater hopes of your committee.

Mrs DE-ANNE KELLY—That is very flattering. The Hansen analysis is that cooling from aerosols from burning fossil fuels offsets warming from greenhouse gases. Without overwhelming our committee with science, Dr O'Brien, would you be kind enough to give us an overview of the argument there?

Dr O'Brien—Let us think first of burning fossil fuel. There are aerosols that make dust and sulfate and so on come up. They change the clouds and do various other things. The general tendency is to cause cooling, but there is some warming and there is black soot and various other things. In general, it is accepted that aerosols from burning fossil fuels will cause cooling whereas greenhouse gases will cause warming.

In 1995 IPCC said it is agreed that locally cooling by aerosols will be more than sufficient to offset warming by greenhouse gases. But they said that, because the aerosols only live for a few weeks and they are sort of localised, they will cool it and drop their warming by about 50 per cent, from three degrees in 2100 to two degrees in 2100, in part for that and in part for other reasons. Hansen has gone one step further and said that it is not just a regional effect; it is a global effect which is enough to offset the 1.4 watts per square metre of global warming from carbon dioxide. The big break has been from the regional local effect by IPCC in 1995 to Hansen saying it is a global offset. In 1990 IPCC knew about aerosols but did not include that in their calculations. In 1988 and 1992 CSIRO knew about aerosols but did not include that in their calculations.

Mrs DE-ANNE KELLY—I see.

Dr O'Brien—If you look up reference M, that letter from Barrie Pittock to me, it says that for the first time in 1996 they included aerosols. Hansen then says, 'Okay, on average we can tend to discount carbon dioxide as being a scary sort of thing, provided people do not make the cities too clean.' Right, you have got that old paradox, clean air. Then he said, 'So that makes methane and these other things proportionately more important,' but the rate of increase of

methane has been slowing down since the 1980s. He then said, 'Therefore, there is even less of a threat from the remaining things because of the concentrations.' They are not decreasing, but the rate of increase is slackening off. So the logical thing then is the same as this sort of thing, it is not an urgent issue. It is an important strategic issue for Australia because Australia's efforts to combat greenhouse are focused on carbon dioxide.

Mrs DE-ANNE KELLY—Why do the aerosols provide cooling? Do they reflect heat? How do they actually work?

Dr O'Brien—In part it is a straight backscatter, the visible sunlight bouncing back, and in part it is their influence on clouds, which also bounce back, or some clouds bounce back. Professor Lindzen might pursue that for you far more intelligently than I can.

Mrs DE-ANNE KELLY—If I could summarise the presentation you have given us, and it has been excellent, thank you, there is a global rise in temperature, as I understand it from your presentation, but it is not as bad as first believed. Is that correct?

Dr O'Brien—No, sorry, there are two different issues, what the world is doing, and what the scientists think the world might do as a result of doubling carbon dioxide.

Mrs DE-ANNE KELLY—We are asking about what is actually happening, not what—

Dr O'Brien—I do not think we know what is actually happening to a satisfactory extent. I will just show you another back-up slide, without getting into too much detail. They say there has been an average increase of half a degree this century, and that is probably close enough.

Slides were then shown—

Dr O'Brien—That is the official change in temperature since 1860, from minus 0.4 up to there. The orange or red line is the average increase in carbon dioxide. What IPCC is saying—and there are some people that say it is not correct—is that there was a burst of warming there, then it was more or less stable, and then there has recently been another burst of warming. Hansen also talks in terms of bursts of warming since there. That, of course, is when methane started, which is rather unfortunate.

There is no explanation for why the temperature stayed constant or even cooled over that period. Remember in 1970 or so there was a suggestion that we were approaching a new ice age. So we are really still within noise in that sense. If you go back to even the 1700s, you are into that little ice age when the Thames froze over. If you go back to the 900 to 1300 period you are into the hot period in which the Vikings had enough sea room with no ice that they could go out and have a ball in Greenland, or whatever.

Senator MASON—Graze cattle, or something.

Dr O'Brien—Whatever, and Europe was so rich because of the increased crops that they could afford to have the Crusades and build the giant cathedrals. So you had from 900 to 1300 a warming, 1400 to 1700-ish the little ice age, and we are coming out of that into that, and they were pre-industrial.

Mrs DE-ANNE KELLY—If there is a global rise in temperature—and you have indicated that there could be a half a degree rise, but that is open to question—in your opinion is that due to human activity, or do we have no idea what the cause might be?

Dr O'Brien—It is certainly not all due to human activity. It is within the noise of the system, as far as I am concerned. There are subtle ways in which you can start measuring the percentage of isotopes of carbon and talk about whether it is old carbon or new carbon. The CSIRO people can give you a far better answer than I can on that. There are traces that you can run through. I do not think it is terribly convincing, but they will take the precautionary principle and say 'just in case.'

I know I am running out of time, but I would like to make one final point. When the precautionary principle is thrown at you, that it is 'wise to take precautionary measures', please do not use the Australian definition of the precautionary principle. Use the definition that is in the Framework Convention on Climate Change. With all due respect to you here, the precautionary principle is defined in Australia without two magic words: 'cost effective'. In Australia, the Intergovernmental Agreement on the Environment endorsed in 1992 stated:

Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

In the Rio convention, in article 15, two little words were put in there, to talk about 'cost effective' measures, and in the Framework Convention on Climate Change, in article 3.3: 'cost effective' measures. In Australia, for some curious reason, we strike out 'cost effective.' In the big, 538-page Environment Protection and Biodiversity Conservation Bill the definition that is used does not include 'cost effective.' If somebody throws 'precautionary principle' at you, make certain in a debate like this that you use the one that is in the treaty, not the Australian one.

CHAIR—There is a possibility that, after we deliberate through the end of this year, before we actually draft a report, we might put some more questions to you in writing.

Dr O'Brien—I would be delighted to reply. I have great hopes of this committee, and I hope this rather blunt speaking has helped a little. Thank you very much.

CHAIR—Thank you.

[10.13 a.m.]

LINDZEN, Professor Richard Siegmund (Private capacity)

CHAIR—Welcome. Do you have any comments to make on the capacity in which you appear?

Prof. Lindzen—I am appearing here at the invitation of the Lavoisier Group. My normal position is Professor of Meteorology at MIT, the Massachusetts Institute of Technology.

CHAIR—I have got your written CV, which I am passing around to members. I have to advise you that these are legal proceedings of the parliament and they warrant the same respect as if they were taking place in the chamber. Hence, the giving of false or misleading evidence is a serious matter and may be regarded as a contempt of parliament. Please proceed to some remarks—if you would like to use the overhead projector, by all means do so—and when you feel you have made your presentation we will have some questions.

Prof. Lindzen—I will try to keep my remarks brief. There is the unfortunate contention about professors that they often confuse eternity with immortality—I will try to avoid that. I think that in Dr O'Brien's talk, and in the questions and answers, it became clear that much of the issue we are dealing with is not so much science as language. Part of the problem in communicating has been a certain slovenliness in interpreting words and the exploitation of the slovenliness by various groups. For instance, Brian made the point that when you present a range—which is common in science—the press reports the top. For instance, in the latest IPCC deliberations there apparently was a reduction of the low end of the predictions of warming. Advocates in the summary—and the summary was not by scientists; it was at the offices of the Environmental Defense Fund that it was prepared—insisted that, if you lower the bottom, you should raise the top. This has something to do with science; it is tit-for-tat. Then it was leaked to the press as only a top percentage. Only the top was mentioned because the advocacy groups are the ones that played the major role in the public dissemination of the information. So they were assigned the task of interpreting to the public what the scientists said. It allows a nasty situation.

Overhead transparencies were then shown—

Prof. Lindzen—Let me start with some overheads—and Brian has mentioned some of this as well. The use of language is such that you can make statements that mean one thing to a scientist, that have a discernible logical meaning, but somehow in the public arena mean something totally different. Here you have the most famous statement in the 1995 document. It was considered the smoking gun. Read it carefully because, if you do not read it carefully, you are a victim of marketing psychology. Remember how you see ads—I am sure you have these in Australia, just like we have in the United States—saying 'savings up to 40 per cent'. Anyone who analyses this—it does not have to be a scientist or a mathematician—will quickly see that the only thing you are promised is you may never save more than 40 per cent. They have not promised you they will not overcharge. But somehow it is designed to leave you with a different impression. Here is the statement:

The balance of evidence *suggests* a *discernible* human influence on global climate.

That statement says nothing at all. Science is not about 'suggesting'—you use that if it is not clear. 'Discernible' is the only arguable statement in that, but it does not set a magnitude—it is entirely consistent with the statement that they have discerned such a small change that it does not matter to policy. Yet this was constantly invoked as the reason for Kyoto. You do not need a scientist to tell you what that sentence means, but somehow you read it wrong. Sometimes the situation is more subtle. This one also appears in international documents:

There has been a 1% increase in annual rainfall in the US since the beginning of the century.

CSIRO repeats this. We cannot measure rainfall to this accuracy—we never have been able to, even cumulatively. Nobody working in arid lands management, civil engineering or hydrology would treat this as a serious statement. It gets quoted time and again. You do not realise that you measure rain with cans, and you sample a region very sparsely. Very often whole rain systems miss the can. Sometimes they focus on the can. It is very hard to distinguish anything. It is accepted that it is what you do—you get a crude answer out of it. You do not get one per cent.

The subtlety sometimes extends a bit further, and I think we had a little sample of that this morning. One thing that has constantly been confused is the difference between the two uses of the word 'warming'. The English language itself is not terribly good on this, because it uses the same word to mean 'change of temperature' and 'the agency of creating that change of temperature'. If you mean 'change in temperature' you are referring to these famous pictures of the temperature record of the globe or of one hemisphere or the other over the last 100-odd years—in this case, roughly 140—but that is not what we are discussing. The question is: is this due to what we are doing? If it is not, then it is just simply a statement that climate always changes. That is the norm. It would be very unusual to see climate staying stationary for long periods of time. Once one realises it is always changing, then it has only two choices: it goes up or down. Sometimes it goes down. It has been mostly going up in this period.

But, even with this, there are issues. You notice there are those bands surrounding the black line. Each width is what is called a standard error, a standard deviation. The normal practice in science is to consider the uncertainty to be three standard errors. The public hears that as 99 per cent confidence. They say, 'Wow, scientists are so cautious.' But experience tells us that, if you are not within three, it is very unlikely that it is meaningful. There are many reasons for this, and we can perhaps discuss it.. Here you see two, and already that puts a slightly different perspective on these claims of the last decade being the warmest on record, because it is still such that, marginally, 1940 could have been as warm as the 1900s.

The other thing that the public rarely looks at is the scale—and you have gone through this already today. The scale is in tenths of a degree, so we are still talking about very small numbers. One thing that I suppose you could argue is a disadvantage of urban modern life is that we lose a sense of what are meaningful magnitudes. We live in airconditioned homes, centrally heated homes and so on. Temperature does not mean the same to us. All I would point out is that it is not unusual when you stand at a street corner waiting for a traffic light to change for the temperature to change this much. It used to be the case that there were thermometers in banks and so on for public display. I do not know if you have them here, but just watch them. They change more than this while you are watching.

So we are talking about small. It has been pointed out that there is a kind of wiggle to it. There has been a lot of stuff in the literature. I was amused that I got a letter from Sir Ian Macfarlane also mentioning that he had observed this and tried to calculate it. But you notice it went up in the 1920s and 1930s, down during the 1940s, 1950s and 1960s, and then up recently. There has been argument about whether there is a 50- or 60-year oscillation. People have written a lot of studies on this. If there is, then it really becomes difficult to disentangle any trend from this. All I am pointing out is that part of the misinformation is to leave people without the aerobars, without a meaning for the magnitudes.

Why is this important to know? I will mention that briefly. Some years ago a friend of mine from Lawrence Livermore National Laboratory at the University of California simply plotted the temperature; he did not smooth it. It went up to only about 1990, but this is the picture and there is your scale in tenths of a degree.

He then said, 'What is the data that was used to extract this curve?' That is never published either. This is the data. Look at the scale, that is the point. Remember, it was tenths of a degree in the first two. Look at what it is now, two degrees, a factor of 10 difference. What is the meaning of this? The meaning of this is the data points come from places. Places undergo five to 10 times the variation in temperature that the globe as a whole does, and the only way that is possible is most changes you encounter cancel each other, which has the further implication that you know full well. Canberra has been cold this year, and some years it is warm. It is appreciably different, you can feel it, but you would have trouble feeling it with a half degree, and it is not related to the globe. So we as human beings living in a place rather than the globe will always feel climate change far larger than has been spoken of. We have always adapted to that; otherwise we could not exist as a species.

Here is a cute picture on the scale of those distributed points. Here is what global temperature change looks like. That gives you, again, a totally different perspective. It says on the scale of temperature change you experience it looks flat, but anyone could expand that scale until you say, 'Wow!' But you should not say, 'Wow!' until you look at the scale.

All of this has to lead you to a realisation that as representatives, as politicians, if scientists are using language like this, you may have to fall back on trying to figure out exactly what is being said in plain language, and you should do so. I think for most educated people you do not need to be a scientist to see things that have been left out or misleadingly stated. Last night I gave a quote from Orwell about language. He said, 'Our language becomes ugly and inaccurate because our thoughts are foolish, but the slovenliness of our language makes it easier for us to have foolish thoughts.' It remains an extremely true statement, and I think it is an extremely important thing for people in a democratic society who are representing constituents to try and fight this. This is the matter of understanding obscure science.

Senator COONEY—Is he any relation to Tony Blair?

Prof. Lindzen—I am as foreign to England as I am to Australia.

Senator COONEY—George Orwell was born with the name 'Eric Blair'.

Prof. Lindzen—In any event, you can also begin to see something that I think was addressed earlier. We are not totally speaking about science, although the nature of the questioning this morning quite legitimately was trying to get to the issue of what does science really say? It is equally clear that the public debate has been using science rather than explaining science. Stephen Schneider, who was earlier mentioned, wrote a book called *Laboratory Earth.* Basically, if you read that, you will see his current paradigm, and I think it is the environmental movement's paradigm, for the role of science.

Essentially, it is argued firstly that everything is connected. In America this is represented in the phrase 'earth system science'. By now, if you mention that in a university department, people hiss because it has become so meaningless. The second statement is that everything is uncertain. You will never find scientists who do not admit to that. But now science has done its part in the first two statements; its role is finished. After it has agreed to the first two, you can deduce the third one, that anything may cause anything. And the precautionary principle tells you that you had better do something about it. This is, in effect, the world you are functioning in, where you have the precautionary principle and you accept these notions. The real question that politicians as leaders have to address is: This is absurd. How does one function within it without doing things that are bad for your society, your country? Whenever you have representations like this, it does not bode well. You can see that at present: what needs to be done is inevitably the pursuit of an agenda that was arrived at independently of the science. Much of what you see now is the energy policy of 1973 being reintroduced by people who were frustrated by the fact that oil did not continue to increase in price at that time. You never hear about the risks involved in the pursuit of that agenda, and yet, as Mr Wilkie's point brought out rather clearly, if you build in a false constraint on your policy decisions, you are not going to achieve the best policy decision.

In the case of Kyoto, as has been pointed out very clearly, we have the further fact that adherence to the treaty will not significantly impact on the problem that has been claimed to justify it. This is a most unusual situation. Of course environmental advocates will say, 'We have to get this in place so we know how to do it, and we will do it 10 times over.' But most people, I think, are realising it will be expensive to do this. If this is two per cent of GDP, can you really give a hit of 20 per cent without people complaining? It is a different country from mine.

That brings me, finally, to a point which I will mention briefly. This is not new. You have a situation I regard as absurd, and yet it has been successful with the public in certain measure. What has happened time and again in this century is that science has been invoked as an authority. You mentioned 'scientific consensus'. People still respect science enough that, if they hear 'all scientists agree', they do not want to wrestle with it. I think that is true. It is worth pointing out, for example, that in 1988, when Jim Hansen gave his testimony to Congress on global warming—when most people in the relevant scientific communities had not really been worrying about policy—*Newsweek* magazine nevertheless immediately came out with the statement 'all scientists agree'. There had not been an IPCC, there had not been anything else. If you go back, you will see that statement made. It is a statement that you should always be suspicious of, because it is designed to frighten you from questioning anything.

In the case of the IPCC, as I mentioned last night, you have hundreds of scientists, each is working on a couple of pages, none is ever polled to assent to the summary and yet the summary is presented as the consensus of hundreds of scientists—or thousands, or millions:

who knows? It is not a true statement. One simply can go to any record of how it operates and see that, but it is used as a bludgeon to prevent questioning. This is fundamental to the difference between science as it is viewed in politics, and science as it is viewed in science. In politics, science is a source of authority for the promulgation of dogma in support of policy. That is not science. In science, science is a method for examining the world by questioning, analysing and testing hypotheses. At least it used to be, and I will come back to that in a moment because, in many ways, that has changed.

The question that probably deserves addressing is one which again has come up here. What are you to do if scientists seem to be happy with this situation? And if they are happy with it, why are they happy? The answer is obvious. It permits scientists to pursue their self-interest without compromising their virginity. Essentially, it is a world right now where all scientists have to do is agree—remember those first two items: everything is connected and everything is uncertain. Others will restate what they have said and make it sound dire and ominous. But the scientists, being interested in their own self-preservation, will permit that because it maintains an interest in the science.

A classic case in the US—Ray Evans once warned me it was not relevant to Australia; I hope it was not—was our immigration law in the 1920s. In 1924 we passed an immigration restriction act that remained on the books for over 40 years. The argument for it was clear: America had a lot of immigration and there were nativists who did not want it. But you cannot present that to the public; there will always be people who object to such a crass statement. So what was presented to the public? It was that America was having an epidemic of feeblemindedness, that the feeblemindedness was due to immigration from southern and eastern Europe, and that to preserve America's genetic stock one had to limit immigration. The role of the environmental advocates during this fight was taken by the eugenics movement, a much discredited movement that was nonetheless the environmental movement of the first third of this century, adhered to by all right-thinking people like George Bernard Shaw and so on. They beat the drums and said they wanted the passage of this—it was science in action. The scientists shut up. They knew this was not correct but they kept quiet, and many of them proudly said that they were pleased with the discussion of biology, that biology was now recognised as important to the affairs of man. It is a situation which I am sure will come up again and again. You have scientists wishing to be relevant, you have advocacy groups who want to show they have superior insights into society and to influence legislation, and you have legislators who are seeing that this sometimes fits in with other goals.

In any event, right now I think that societies have, in general, lost track of the intrinsic value of science. They want short-term relevance. You, as legislators, are responsible for making sure that science is accountable. It sounds good; it sounds right to me. But the unintended consequence of this is scientists desperately seeking somewhere to establish their relevance, and one of the easiest ways has been to emphasise threats to society. It is again something that thoughtful people will have to figure out how to get around, so as to retain science as a clearly important thing for society and, at the same time, not cause science to become in some sense a rogue process.

Politicians have had a strong role in something else—namely, a change in science. I mentioned to you that science is a methodology for examining, testing and analysing questions about nature. But if you look at most universities and laboratories today, in many disciplines,

theory—namely, a detailed understanding—has been replaced by models, and focused observations and experiments have been replaced by programs. Part of the reason for this is that it allows people in the public sphere to view science in the mould of other claimed activities. Science always looks a little foreign and making it look more like other things makes it more comfortable for people who are assessing funding and so on. Unfortunately, it corrupts scientific methodology, reduces the chances of discovery and also damages what I refer to here as the elan of science. It changes the scientist from a guy who is solving puzzles that are greatly attractive, and who gains recognition by his cleverness, into a team player on a massive program which has no focus. NASA is a great example of that in our country.

You can see this right now in the case of climate. In my department at MIT, we have distinguished history, meteorology and oceanography areas, and so on. In all these areas now, everyone has reinvented themselves as a climate scientist. It has essentially become a special pleading for government welfare. It will not benefit us in the long run, but it is something that has happened.

In connection with the topic of this hearing, Kyoto, the question is: what is to be done? I think it is inseparable from the issue of what one does to preserve vital scientific activity. My suggestions are as follows: I would say that it behoves us to kill Kyoto, not only because of its intrinsic defects but to break the perceived connection between these processes and the relevance of science. It is important to science, even though CSIRO might be encouraging it, because it keeps planet science on the front burner for attention. It is also preventing people from solving these wonderful problems of why we have ice ages; why we have cycles of climate; why we have major changes occurring, none of which models predict, none of which models even reproduce, and which are vital to, in a sense, our understanding of our world. I think it is equally important to devise means of supporting science that do not encourage reliance on scare tactics.

The question arose earlier: how can politicians oppose something that is said to represent a scientific consensus? What you have heard today—which is supported by the IPCC, by the way, in this respect—gives you ample opportunity. It is widely accepted that Kyoto will not do much for climate. It is widely accepted that climate is a long-term issue. There is absolutely nothing in the science that does not say it would be reasonable to set it aside for 20 years and, if need be, come back to it. The cost of doing that in terms of science will be very minimal. But make sure that those 20 years are used well.

The issue then comes back to science, and I would like to say a few words on that. I noticed in earlier testimony by Mr Foster and others that some of this has been gone over, but even the very description of the greenhouse effect has been designed to mislead the public. The excuse given is that the public cannot understand something that is so complicated, so you have to simplify it.

Every time you simplify it, there are choices made in how you simplify it and what are the impressions left. For instance, the picture of the greenhouse that is commonly presented is that the sun eradiates the earth. Some of it is reflected. The atmosphere absorbs the radiation and the earth tries to cool itself against this. As a result, it sends some back and thus the earth must warm more in order to achieve balance with the sun. This is misleading on a number of grounds

including primarily that the surface of the earth does not cool by radiation primarily. It cools by evaporation and so on.

On the other hand, there is something about this that has an impact. It seems simple. You can go away saying, 'I see what it's about.' Moreover, when somebody tells you that when you add some greenhouse gas the surface must inevitably warm, you say, 'Of course' and you can feel that you understand it. That is the political impact of a simplification. It makes you comfortable with the inevitability of the question. The reality is not like that. The reality is much less sexy. What happens is that you have these infra-red gases and what you measure them by is something called thickness. Thickness of gas that will absorb two-thirds of the radiation is called the single optical depth. I say two-thirds—it is really one over E; it is the sort of thing with one minus one over E.

In any event, if you take the infra-red gas and look at it from space and go in one optical depth, most of that point of radiation comes from that depth. If you go down further, it is too dense and space cannot see it. So you have a balance between the radiation emerging from here, which turns out to be about five kilometres, and space and incoming solar radiation. When you add greenhouse gas, you move this up. The temperature of the atmosphere is decreasing with height, so it is cooling less because the cooling goes as the fourth power of the temperature. So you have to warm this region to re-establish balance. The question of how that effects the surface is extremely complicated and unclear. It depends on the meteorology, the weather—all these motion systems and so on.

The crucial point—and I think Mr Foster made it in an earlier testimony—is that it does tell you one thing, that the atmosphere warms the surface in the greenhouse effect. That is interesting. That is a point which is never mentioned when people argue, 'Why is there a difference between the satellite data and the ground data?' The truth of the matter is, when the satellite data came out, people said, 'This is too short a record to talk about countertrends. And they were right. The same is true for the surface temperature record when they invoke the last decade as a change of trends—it is too short. One of the things this is telling you, at least in any simple sense, is that there is an absence of the signal in the atmosphere on the presence of the surface. This says that what is going on at the surface is unlikely to be greenhouse warming. At which point, for your purposes—who cares? It is just part of what you adapt to.

I will not dwell on this very much but there are some things you should know. I will finish in about two minutes. The issue in the science that should inform the practical issue of greenhouse modelling is the question of how sensitive the earth's climate is to increasing CO_2. We are talking not about an absolute issue, a tenth of a degree does not matter, even half a degree does not matter. But four degrees probably does. So you need to know what CO_2 would do. A common way of speaking with that is to refer to a doubling of CO_2. There are problems with this but let us skip that. The fact is, in the absence of what are called feedbacks, a doubling of CO_2 would increase the globe's temperature by about one degree centigrade—not a big deal.Current models, however, usually show a much greater sensitivity than this. The IPCC, at least in 1995, claimed the most likely sensitivity was two degrees Centigrade. But any of these numbers is more than CO_2 alone does—they all depend on nature amplifying whatever man does. I have been criticised publicly for making what is referred to as a metaphysical argument. I do not really present it as an argument. I am just pointing out that, according to the models in

the IPCC, we live in a very poorly engineered world. Good engineering puts in negative feedbacks that prevent things from going too far astray.

There is an interesting issue here. The feedbacks come from water vapour in clouds. I have a lot of figures here, even from the IPCC and the published literature, showing how seriously wrong these things are in the models. Yet it is on these things—the water vapour in clouds—that the answer to the sensitivity depends. Even the newest IPCC version will say, 'We freely admit we get our clouds completely wrong.' A curious thing—here I will go to one picture rather than dwelling on the errors—is looking at what nature looks like. This is a satellite microwave picture of water vapour. I will point out what is on this map: white is bone dry, it is relative humidity somewhere between six and eight kilometres in the atmosphere, which is important for the greenhouse; pinkish is getting to 10 per cent relative humidity; red is 20 per cent; and the blues are high relative humidity. What you are seeing, at least in the tropics, is that you are either bone dry or wet, and there is a very sharp transition between the two.

I will leave with you as a deposition the paper I have here which will appear in February in the bulletin of our professional society, the American Meteorological Society. One of the things that occurred to us is that the feedbacks which in the models simply involve changes in these regions might involve changes in the relative sizes of these regions. The data is from a Japanese satellite that is a bit to the east of Australia, and it shows that the regions which are low humidity expand when it is warmer and contract when it is colder. We referred to this as an iris effect. It is simply saying that when it gets warmer you open up the region which is cool so you cool more effectively; when it is cold you crank it down and prevent loss of heat.

That is curious, but there are two things particularly important about it. One is that the effect is not found in the models. Here is a typical case—we looked at a couple of months—where the data looks like this, and here you have temperature increasing and cloud cover decreasing. Here is a model with NASA: much more scattered, but the trend is the opposite. The second thing is the significance of the effect. If, for instance, you allowed for great uncertainty in the iris effect—let it be a quarter of what we measure, and let us assume that all the positive feedbacks amplified in the models are correct, and that is almost certainly untrue—nevertheless, the addition of this feedback would take models that predict the IPCC range of 1½ to four degrees and bring that down to 0.6 to 1½.

What is this telling you? It is telling you that models may eventually be useful for climate predictions, but making them useful will not be an internal task to the world of models. You will have to bring physics into them and actually put in stuff that they are missing at the moment. That is not trivial. I have been doing that for several months with a French group. We find that the so-called numerical technology of the models is so bad that you cannot fix them—at least not easily. But this notion that models improve on their own by just comparing one model with another is a widespread misunderstanding. One particular consequence of this is that one cannot determine the range of possibilities for the range of model results. But that is what you are being fed at the moment.

As I mentioned before, not only are you being fed this, but you are being fed it through a filter of environmental organisations, who always take the top and tell you that is what it is. That is the situation you are working with. It seems to me that at least one thing that Australia has in common with the US is that, as a democratic society, you have a responsibility, on behalf

of your constituents, to use your best available insights to respond to societal needs. That does not mean that you respond to propaganda. There is a situation here which is going to lead people astray, and the question is: how do people responsibly respond to it? I think that is the problem that you are faced with.

Mr WILKIE—Just out of curiosity, I notice there have been a few different comments from Bush and Gore about their approach to the Kyoto agreement. Where do you think the US is at in regard to ratification?

Prof. Lindzen—It is not an easy thing to predict. The US Senate has taken a kind of easy route. It is saying that they are not even going to consider the science at all, that anything that is imposed on us and not imposed on the developing world is meaningless, and they will not approve that. They are strong on that. The thing that is bad about that from my point of view is that, on the one hand, it does not point out that the science does not justify it; but on the other hand, from their point of view, it is getting them off the hook safely.

Another problem with that is with respect to the way our government and many other governments have gone over recent generations. They have gone from the traditional separation of powers in our country to a situation where our Congress enables regulatory bodies to enact law in lieu of Congress by means of statutory law—regulatory law. The EPA is freely admitting that it is going to implement Kyoto, whether the treaty is ratified or not. The usual response to that is you have a battle, and I do not know how that will go.

As far as the two presidential candidates are concerned, Gore has written his book, *Earth in the balance*, in which he has declared the automobile the equivalent of the Holocaust. His statements are, I think, strange; they realise that in the Democratic Party. But he is a politician; I do not know what it means in practice. He is complaining with the rest of them about high fuel prices. Bush has come out with a statement that is extremely sensible. He says that the science is too uncertain to undertake costly actions and that our best policy is to seriously study it further. This is anathema to the environmentalists. It is a good statement, but whether in office he will stick with it, how do I know?

Senator TCHEN—Professor Lindzen, you referred to a number of quotes, particularly Stephen Schneider.

Prof. Lindzen—Yes. He has come out with a book called *Laboratory Earth*. In *Laboratory Earth* he tries to argue that earth is system science, all things are connected and that we have huge uncertainty. He takes you on this path—that means that anything can cause anything, and we had better do something about it.

Senator TCHEN—So he is not an authority as such, but a promoter?

Prof. Lindzen—He has appeared here as an authority in the past. This field has produced some strange things.

Senator TCHEN—Are you saying that he actually presented this paradigm as something serious?

Prof. Lindzen—Yes. I reduced it to its simple elements and you could see it is crazy. But the book is serious and he is lionised by the environmental movement.

Senator TCHEN—I see.

Senator COONEY—I follow on from the question that Mr Wilkie asked. The United States, of course, is the most powerful country. I do not want to overplay this but it can accept or reject what the rest of the world does with some impunity. As you have probably gathered, we are a middle sized country and what happens internationally is very important to us because it impacts. From what the scientists said this morning, it would follow that Australia should not go along with the Kyoto agreement. That might well bring consequences. It would be very hard for us to send the government up there—it is not a government of my colour and I am from a different party—with the pressure that is going to be there.

What concerns me about all this is that the scientists, with great respect to yourself, seem to have brought us to this state. They have allowed this issue to grow to where it is. Is there any sort of discipline in the scientific world in the sense that, if people go over the top, the rest of the scientific community would do something about it?

Prof. Lindzen—The answer is yes.

Senator COONEY—What you are doing, and what Dr O'Brien did in a most excellent fashion, is to produce for us a very scientific explanation of what is happening. I am not a scientist. Politicians generally are not scientists so all they can do is get advice. I can understand the legal evidence we get a little better, but then lawyers tend to be much more honest and upright than scientists. That is from having some sort of relationship with the legal profession and admiring it for its ability to regulate and discipline itself and to give honest and straightforward advice. It comes as a bit of a shock to come amongst the scientific world where they seem to allow all sorts of rabbits to run and to allow Australia to get itself into a position at Kyoto without standing up and defending it. When I say 'you', I mean the generic you. Why has this been allowed to occur?

If an academic lawyer, for example, wrote a paper it would be refereed. It seems to me that the academic scientists let these sorts of things run without anything being done about it and the practising scientists do the same. You might not want to comment on that.

Prof. Lindzen—No.

Senator COONEY—I can understand why. Could you help us? It is done in the light of a situation where we will be sending our people over to wherever this next meeting is going to be held. It is going to be terribly hard.

Prof. Lindzen—I agree with what you are saying.

Senator COONEY—It is just going to be awfully hard for them to get up and say, 'We do not believe any of this,' when you have your Tony Blairs and maybe Al Gores and all these sorts of people saying that they do not like what we say. What is science going to do about that?

Prof. Lindzen—You have asked a multifaceted question, which calls on memory.

Senator TCHEN—You do not have to agree with the senator's assessment of scientists and lawyers. I do not agree with him.

Prof. Lindzen—No. Incidentally, I have occasionally made the statement, for instance in comparing doctors and lawyers, that I regard lawyers as intrinsically more honest. People get upset at that because lawyers are much maligned and hated. My only point is that, when you go to a lawyer and you ask for something, he knows what he can do for you and what he cannot. The doctor often does not admit to this. You may have an illness he can do nothing about, but he may not tell you. He certainly cannot give you help. That involves too many things. But the same is true of science, in some respects. You are asking a question of how you are to interact with science, why science permits things, and so on.

The first thing I would say is that science has a very extensive peer review system. Published papers rarely go, as you say, over the top. That is most unusual. What is going over the top is the public representation of what science 'means'. What you have run into, as I have tried to explain, is that scientists—to use the bad expression—cover their rear ends. They come out with qualified statements and vague statements and they say 'suggests' or, as CSIRO loves to say, 'broadly consistent with' whatever that means. They give you a range of 1½ to 4½. The IPCC had a wonderful debate on that. Lots of people said, 'We should really lower the lower end, because it is hard to justify anything more than that on the basis of the observed temperature change.' So the environmental advocates who play a role in IPCC said, 'If you are going to do that, we want you to increase the top end.' Instead of treating it as science, they treated it as political give and take: 'Okay, you give us a half degree on the low end and we will give you a half degree on the high end.' And, sure enough, it is leaked to the press with only the high end, because we are saying that 'could' happen. As Dr O'Brien mentioned, it is not what people are exactly saying but that is the way it is released.

Senator COONEY—I am sorry to interrupt: why do scientists allow that to be released?

Prof. Lindzen—I told you why. It keeps the topic in front of the public and helps you understand that it is relevant.

Senator COONEY—That is an awful thing to say, in lots of ways, about science.

Prof. Lindzen—But it has happened all the time. Do you insist that scientists who are seeking funding demonstrate they are relevant?

Senator COONEY—I insist that scientists be honest.

Prof. Lindzen—But do you also insist that what they do be relevant?

Senator COONEY—I know how you are putting the question. That is why I used the position of the lawyers. At least they state what they are saying and it is out front, there is transparency and it is patent. What you are telling me is that scientists are so conducting themselves that for whatever reason—to get more money or to get more fame and fortune—they doctor what is released.

Prof. Lindzen—No, they do not do anything of the sort.

Senator COONEY—They doctor what is released. That is why you—

Prof. Lindzen—No. They can rest assured that they can release something that is saying something not in the least questionable, and they can be assured that the greens will present it to you as a dire warning and the scientists can then say, 'I didn't say that.'

Senator COONEY—Sorry, Professor, but that means they are in conspiracy with the greens.

Prof. Lindzen—The conspiracy does not mean anyone has to sign a contract. It means that the scientist wakes up one day and says, 'What the greens are doing helps me appear relevant to the body and I won't say anything.' That has happened.

Senator COONEY—Exactly. And that is not nice.

Prof. Lindzen—It is not nice, and that is why I pose to you the question of how to make a system that does not encourage that.

Senator COONEY—This seems to me to be what scientists should be about. If you—again generic, not Professor Lindzen, because I have high respect for Professor Lindzen—or if the scientific system allows that to happen, then we have to worry about the scientific system. You do not have to worry about that in terms of the legal profession, for instance.

Prof. Lindzen—You are absolutely correct. You have to. The point there is that, when you speak of the scientific system, in every place in the world the government is part of that system.

Senator COONEY—But the scientists are in control of that.

Prof. Lindzen—Really?

Senator COONEY—Yes.

Prof. Lindzen—They do not know that.

Senator COONEY—I will tell you why. I could not argue with you on what you put there.

Prof. Lindzen—I know.

Senator COONEY—I am very basic on the scientific stuff; probably illiterate you would call me, compared with yourself in particular. Your profession is the one that is in control.

Prof. Lindzen—In a sense you are right, but the scientist, especially if he is an administrator rather than someone who works in the trenches, is saying, 'You are in control of my budget.'

Senator COONEY—I can follow that.

Prof. Lindzen—Very often, when you speak to Graeme Pearman, you are not speaking to Graeme Pearman the chemist who analyses ice cores, who in fact has very little experience with the models or the contentions he is defending, except that they are part of this outfit. They are not his personal scientific interest, and when he is speaking to you, he is defending his guys.

Senator COONEY—I can follow that statement. It is the same problem in this area that we, as a country, might face amongst big countries. As you say, people have got to defend their system, and so has the government of this country in a situation where the very powerful nations are saying, 'Look, we ought to be all joining up and signing this.'

Prof. Lindzen—Let me tell you what you must know better than I do. The risks for Australia, or even other smaller countries, in saying no in an international negotiation are, in fact, minimal. It is a game being played. We know what the English are doing, we know what the Germans are doing, we know what the French are doing and we know what the Russians are doing. Each of them is pursuing their own competitive advantage and hoping to come out ahead of somebody else if they convince them to go along with this.

Senator COONEY—But that is the big conspiracy theory.

Prof. Lindzen—That is not a conspiracy theory. Again, nobody has to negotiate with anyone for that. If you are an Englishman and you see you have an edge on some things and you have a defect on others, and this will benefit you, you go for it. The European Community did that with the euro until it fell apart. They thought it would give them an edge. Everyone does this and a country can say, 'Look, this is going to hurt me and it really is not justified by the science.' Reading what the IPCC says, it would behove you to get someone who helps you read through these ugly documents.

Presently, we have the issue of storms. One explicit statement in the IPCC policy maker's summary is they have no reason to believe that warming will create increased storminess. They say this outright. Does that matter to the green advocates? No. They all say, 'Global warming is associated with increased storminess.' So you can even have the scientists or administrative representatives saying the opposite and it does not matter.

Senator COONEY—Thank you very much.

Senator MASON—Professor, thank you very much. I enjoyed your presentation very much indeed. I think perhaps more the philosophy or, indeed, the intercourse between politics and science than I did the science itself, I must say. You see the corruption of language as sort of a handmaiden of dogma. I think that is great and as a politician I understood that much more than I did the science. There was one thing you mentioned in one of your slides, and you said—correct me if I am wrong—that greenhouse gases have no significant impact on global warming.

Prof. Lindzen—I did not say that.

Senator MASON—What did you say? What were the words relating to 'significant impact'?

Prof. Lindzen—The question that I am saying we are concerned with that is policy relevant is, 'Is the effect that greenhouse gases have on climate significant or not?' The issue is not whether or not there is any effect. There is.

Senator MASON—I was going to get to that next. In a sense, they are not mutually exclusive. You are saying from a policy perspective, they may not be significant, but they may still be discernible, to use the other word we had.

Prof. Lindzen—Exactly.

Senator MASON—All right, so, really, it comes down to that, doesn't it?

Prof. Lindzen—It is coming back to the use of language so that different people will read different things into it. But I am saying if the question is the sensitivity of the climate, I think there is ample evidence it is being exaggerated in the models and that the models are not simply the inclusion of all the physics we know. They are very primitive even in that respect.

Senator MASON—No, I understand that. That is where the politics and the science come together. Dr O'Brien said in his evidence that, in general, the upper limits were coming down. If that is correct that flies in the face of the idea that scientists are re-inventing themselves for the purposes of government welfare. If they want to get government welfare, shouldn't they still be saying the upper limits are way up there?

Prof. Lindzen—Up to a point, but it is a little like what we used to refer to as the dumb farmer paradigm. The notion was that a farmer is growing wheat and the temperature changes adversely for wheat and he gets poor. People said, 'That is stupid; farmers don't behave that way. The temperature changes will change his crops and he will try his best to do okay.' In a sense, scientists also are not that stupid. One of the problems that has always affected the IPCC is that the models are predicting about four degrees for doubling of CO_2. About half of an effective doubling has occurred already and you only see one half. They know there is a problem so they want to keep the numbers compatible with the observations and compatible with danger but not out of the range of believability.

Senator MASON—In summary, would it be true to say that scientists are finessing their political game, in essence?

Prof. Lindzen—Yes. The aerosol issue you were asking about is a beautiful case of that. We do not have data on aerosols before the 1950s or 1960s. You read that models now look much more like observations once they include aerosols. Before 1960 you are free to choose anything you want for the aerosols; it is an adjustable parameter.

Senator MASON—I have just a gratuitous comment about academics reinventing themselves. I taught for a while at a university. The entire faculty was made up of Vietnam generation socialists and there is not one left. They are all now postmodernists, feminists and multiculturalists. That was a gratuitous comment, Mr Chairman, but thank you.

CHAIR—Noted.

Senator COONEY—What did you lecture in?

Senator MASON—Criminology and law.

Mrs DE-ANNE KELLY—Professor, thank you for your very interesting presentation. We had a presentation from our Australian Greenhouse Office and the Ambassador for the Environment. Their only reference to the science was, 'We have accepted the science. Now let us talk about what we are going to do.' What would your response to them be?

Prof. Lindzen—Firstly, I was privileged to read the testimony. The science they referred to was the first statement I put up on the screen about a discernible influence. I leave it to you to understand how they concluded that a statement that syntactically meant nothing was the only justification they needed to proceed with what they were entrusted in. I would suggest, in my limited experience, that if you are a diplomat your job is negotiating and if you are in a regulatory or other office your job is doing whatever that office is assigned. You will use anything as a justification to proceed and that is what they did. Then they used the word 'science' to bludgeon you.

Mrs DE-ANNE KELLY—Thank you. You have put in your presentation a couple of media releases. In particular, the title of the third one says, 'Draft report shows world getting even warmer.' It all sounds extremely frightening.

Prof. Lindzen—Yes.

Mrs DE-ANNE KELLY—It goes on to say:

... the last decade was certainly the warmest in 1,000 years ... The new draft predicted a rise of anywhere between 1.5 and 6 C ... hundreds of scientists throughout the world ... Global warming was even more serious than had been believed, and many showed definitive links with human-produced chemicals such as carbon dioxide.

And so it goes on.

Prof. Lindzen—Where are you taking this from, by the way?

Mrs DE-ANNE KELLY—Your media release. Someone else has put this in; I am sorry. I thought it was part of your presentation; I beg your pardon.

Prof. Lindzen—This is from the media.

Secretary—These are media releases that I have taken off the Internet.

Prof. Lindzen—That is the point I made. They are perfect examples.

Mrs DE-ANNE KELLY—I should explain. These come from the United States sponsored Intergovernmental Panel on Climate Change, the US National Academy of Science and National Research Council.

Prof. Lindzen—Absolutely not.

Mrs DE-ANNE KELLY—No, it is not.

Prof. Lindzen—There are two things that have been referred to. I think I can help you out on where some of this comes from.

Mrs DE-ANNE KELLY—The National Centre for Atmospheric Research? Where do the media releases come from, Susan?

Secretary—They are from the Internet.

Mrs DE-ANNE KELLY—Yes, but who has put the media releases out?

Secretary—They are US media releases. The first one is by H. Josef Hebert.

Prof. Lindzen—Let me give you an example that I mentioned to you yesterday. The media help in disseminating that kind of issue. My favourite example is dioxin, where the EPA commissioned a report on dioxin after they found out that there was no real impact of the Serveso explosion exposing thousands of people in Italy to a heavy dose. The report came out and said that dioxin turns out to have been exaggerated in its negative effects. The Environmental Defence Fund got wind of such a report being released, and the day before, it held a press conference reported in the *New York Times*, where it revealed that the report was going to say that dioxin was even worse than had been supposed—that carried the day. You will notice the expanded range. Instead of the old 1½ to four Fahrenheit, it became 1.3 to 5 or 5½ or something like that. That had nothing to do with model results or anything. The press took it that the high end was now possible and that sounded ominous.

In trying to explain, you will inevitably run into this. Just like the eugenics movement in the first third of the century, the environmental movement today takes it upon itself to translate the science, sometimes even to the opposite of what is said, and that is what is in the media release. I cannot offer you a solution for this. We are a free society, so we do not have censorship and we do not want it. But somehow there has to be a way in which we break this chain of the exaggeration in the media, the interpretation of the science by advocates. I would argue that the scientists are telling the truth on paper in the reviewed literature in the text of the IPCC, but living with that exaggeration.

Senator COONEY—The scientists should have come out and said something, but they did not float it in public.

Prof. Lindzen—You are right. The furthest they have gone is to say, ‘Dioxin is not nearly as bad as we said’ or ‘There is no association of storminess with global warming that we have been able to discern.’ But when the advocates say the opposite, they do not say, ‘Stop there; that’s too far; we’ve said the opposite’, they do not and I do not know what one does about that.

Mrs DE-ANNE KELLY—You mention that everything is uncertain; that is one of the premises that you had up there. What do we know with certainty? Has there been a rise in average global temperature?

Prof. Lindzen—'Certainty' is the wrong word. When you put the aerobars on the picture I put there—which is from the referred literature and is the basis for the UN picture—it says that the temperature has, for instance, increased over the last 60 years by a little bit, only a few tenths of a degree, with a statistical confidence of about 75 per cent. In the world of statistics, that is considered relatively weak confidence but not zero. Nobody has gone further than that. It is only when you get into the world of public argumentation, when science becomes dogma, that it becomes, 'Do you agree that it has done that?' Science is not that way. If you said it is warmer today or any time since 1940 than it was in 1860, probably the confidence limits are closer to 95 per cent. So we are more confident.

Mrs DE-ANNE KELLY—Following on from that, if there is that few tenths of a degree increase over the last 60 years, with a statistical confidence of 60 per cent, what is that due to? Is it due to greenhouse gases, and are those greenhouse gases emanating from human activity?

Prof. Lindzen—The reason one does not answer that—in the UN or otherwise—is that, as I have mentioned before, the notion of cause in our climate system is not entirely appropriate in the sense being used. It is, like a lot of systems in nature, something that is never steady. Heat is rolling out of the ocean and into the ocean. It goes into the ocean and it is not available for the surface. It is a system where winds blow from east to west in the stratosphere for a year and then turn in the opposite direction the next year. It is a system constantly in motion. It needs no external forcing except the steady output of the sun to do this stuff. When we say we are not sure that it is due to any particular thing, we are saying the changes we have seen so far are still in the realm of natural variability.

Modellers have had great difficulty modelling natural variability. The IPCC has gone over to what I regard as a bizarre situation, where they accept that models define natural variability. It makes no sense, but there is such a thing. We do know, for instance—and you probably know this, too; I do not know the climatology of Australia particularly well—that New England had far more storms in the forties and the fifties, then it was very quiet in the sixties and seventies. It has become a little bit more variable in recent years. Decades are different from other decades. Younger people remember less of this than older people, but experience even in a human lifetime does not extend to the full range of variability from century to century. None of this can be attributed to sunspots or volcanoes or anything—it happens by itself. So the question is, has the influence from the gases we put in the atmosphere become competitive with these natural variations? The answer is that so far they do not seem to be.

Mrs DE-ANNE KELLY—Could you explain how the aerosols that you mentioned before actually work to cool?

Prof. Lindzen—As Dr O'Brien said, the aerosols essentially are solid particles, which are often condensed out of gas, and they reflect light. They act to cool by restricting the amount of incoming solar radiation. So you have a negative term in the incoming heat, so you refer to that as a net cooling. They have what is called the secondary effect—which everyone says we do not know at all, and I think that is true. The presence of some of the sulfuric acid and other things that make up these aerosols can change the nature of clouds. For instance, in the wake of a ship, the clouds often have higher reflectivity than they would if the ship wake did not pollute them. That also increases the reflection of sunlight and cools the system.

The question in science is always the magnitude. The article which first publicised aerosols as significant to climate said that they did not feel it likely that they had exaggerated the effect by more than a factor of 10. Nevertheless, it was obvious that they had exaggerated it. This is where the argument is: are aerosols important? Given that you have no data on it and you have no records or measures of it—and there is a factor of 10 to play with, plus the history of the emissions is unknown—you know that probably emissions change when you have industrial booms, depressions or wars, and so on. The records that were used—and I still do not understand it—to make the models look as close to the data as possible had things like very low emissions during the roaring twenties, high emissions during the Depression and very low emissions during World War II. It beats me how that was done.

Mrs DE-ANNE KELLY—Professor, you mentioned very briefly in your address that there have been perhaps 40- or 60-year cycles. Are there other very long-term cycles—over huge spans of time—that we may not be aware of?

Prof. Lindzen—When you say 'that we may not be aware of', I do not know what you mean because, if you are not aware of them, you are not aware of them. There are probably things that we are not aware of.

Mrs DE-ANNE KELLY—I mean that they are not generally explained.

Prof. Lindzen—I would say that one of the most enticing problems in climate is to explain the 100,000-year cycles in ice ages. Why did they begin 700,000 years ago and how do they work? We still do not have a good answer to that. The 100,000-year cycle depends on orbital changes—at least, that is what we think—and these involve 40,000 years and 20,000 years, but there are also other changes. When one says 'cycles', one has to be a little careful. Many of the things we call cycles are sort of rough vacillations, but they are not rigid oscillation. The El Nino southern oscillation is roughly four or five years, but sometimes they come one after another; sometimes they have hiatus—it is an average.

When you look at the North Atlantic, there is a kind of see-saw between the tropics and high latitudes that seems to be something of the order of 40 to 50 years in 200 years of records. Other people have noticed that this see-saw also occurs in the Pacific and the Antarctic. But we are not sure about it. It appears in the records. There seems to be some variation on this time scale. People are trying to explain it, but there is still no generally accepted explanation for that. One of the things that helped my career was explaining one of these oscillations, which was that oscillation in the stratosphere where the wind blows from east to west for one year and then turns around for another year. From the stratosphere, the average period is 26 months, not 12 or six months. It is an interesting thing to explain but very few of them are explained.

CHAIR—Regarding the iris effect, when did the experiments begin that produced—

Prof. Lindzen—They were not experiments.

CHAIR—Observations.

Prof. Lindzen—The data, essentially, is a couple of years in the late nineties.

CHAIR—Before that, is it fair to say that the iris effect was not known?

Prof. Lindzen—No. I would be the first to say that we were trying to drain everything we could from the geostationary data. It looks solid and we know that the models do not replicate this data.

CHAIR—Can I just take you through it—this being a discovery, in a sense, that is not in the models. So in the near or medium term future there may be more such discoveries that would affect it?

Prof. Lindzen—Sure.

CHAIR—So if we are to follow the precautionary principle, then we ought not to be making policy without knowing what might be discovered in the future?

Prof. Lindzen—Absolutely. This is where the absolute foolishness of saying 'models have replaced theory' comes from. It is foolish because you have lots of problems with models. Those of you in economics know full well how badly they can go astray. The problems are twofold in the crudest sense: they do not include all the known physics and not all the physics is known.

CHAIR—Yes, that is what I was getting at. I have one last question on stochastic events; that is, sudden seismic events. How do the models cope with the possibility of potential stochastic events that may affect climate?

Prof. Lindzen—They do not.

CHAIR—Can they?

Prof. Lindzen—It depends on whether you know them well enough. You were concerned about stochastic tectonic events and, if somebody adequately documents them, they can probably be put in models. The difficulty is that most models very poorly represent the lowest kilometre of the atmosphere. So there is a little bit of doubt there. There are other problems with models; namely, they represent the atmosphere by dividing it into cells for computational economy. They cannot afford to make these cells infinitesimal, so these cells are pretty big. They may be a couple of kilometres high or a hundred kilometres wide. This already reduces the accuracy of the calculation. In many cases the accuracy of the calculation is so poor that, even if you know the physics and put it in, the models cannot deal with it.

CHAIR—We had better pause there—for a few months, perhaps. Thank you very kindly for coming from Massachusetts. As with other witnesses, if we have any further queries in the future, we will put them to you by email and would be very grateful for your response.

[11.38 a.m.]

ABBA, Mr J. David, Chief Executive Officer, Sustainable Energy Industry Association (Australia) Ltd

PEARS, Professor Alan, Policy Adviser, Sustainable Energy Industry Association (Australia) Ltd; and Adjunct Professor, RMIT University

CHAIR—Welcome. These hearings are legal proceedings of the parliament and they warrant the same respect as if they were taking place in either chamber. The giving of any false or misleading evidence is a serious matter and may be regarded as a contempt of parliament. Would you make some introductory remarks and then we will ask some questions.

Mr Abba—Greenhouse will not go away. In fact, the imperative is building as the science becomes more certain. Whilst there are a few scientists who disagree—for whatever reason—the vast majority of the scientific world has stated that global warming is occurring.

Efforts to kill Kyoto may delay action for a year or two, but the most likely outcome then will be more aggressive and disruptive action in order to make up for lost time, combined with little regard for Australia's circumstances. Kyoto is just a first step, in our opinion. Australia's policy direction needs to focus on the long term. We have to begin building a low greenhouse impact society and economy. In this sense, we also need to recognise that Kyoto is an exercise in political realism. Just like the renewable energy legislation—which we have been watching struggle, but not yet pass, through parliament—it has strengths and weaknesses and potential distortions, but we have the flexibility to tailor our policies and programs to avoid short-term damage and to encourage action consistent with long-term global greenhouse objectives. The tax package, which included a range of adjustment and assistance mechanisms around the core of the GST, is a model for the approach we can apply.

The claims that greenhouse response will seriously damage Australia's economy are simply wrong. The attachment to our submission explains this. Yes, there will be some issues that must be managed, such as ensuring limitation of damage to rural economies, but that is what we elect parliament and government for. And there are great opportunities to be exploited. We recognise that if one believes that greenhouse response will seriously damage the economy one will be reluctant to pursue it, but we simply do not understand why the Australian government and businesses are reluctant to pursue opportunities to save money and expand new markets through greenhouse response action. The only explanation we can find is that the business views have been unduly influenced by distorted and limited economic modelling—it was interesting to hear comments on scientific modelling by the previous witness—and by loud protestations from a small number of industries that fear that they may suffer under a greenhouse response scenario. It is our observation that, as businesses look more closely at their own circumstances, these fears are dissipating and being replaced by a sense of excitement as the opportunities are discovered.

Further, in some cases it seems that businesses have been using the antigreenhouse campaigns as a smokescreen to fool their competitors while they were repositioning themselves and their businesses to profit from greenhouse response. Smart businesses in Australia are already well ahead of governments in repositioning themselves to be profitable in the future. While most

Australian business will experience little impact from greenhouse response, either positive or negative, a few will be big winners and many can become winners. Just as IBM made the transition from office machines to computers, BP—now known as 'Beyond Petroleum'—Shell, BHP and many others are repositioning themselves for a sustainable and profitable future.

Australia also needs to shake itself free of its image as an old economy. Greenhouse response provides a platform to do this, not by building risky dot.com businesses but by building all the elements of a sustainable economy, from sustainable energy and material supply through to sustainable tourism and exports. We have recently undertaken a survey, which has not been publicly released, which indicates a very substantial export industry from the sustainable area.

We were disappointed to see the emphasis on the word 'punitive' in your terms of reference regarding greenhouse response. We do not see any need for punitive action. People and businesses should take responsibility for the consequences of their actions, and to the extent that energy markets are distorted and imperfect that should be addressed. But it can be addressed constructively using a range of incentives, information, business development programs and so on. Indeed, the government has already made substantial progress in this direction. We have proposed a number of innovative programs that could further enhance cost-effective greenhouse response and we are working closely with government to implement these as well as existing programs. But much more commitment is needed, and this will only emerge when government provides clear and unambiguous signals that it is serious about greenhouse response. Ratification of the Kyoto Protocol in the context of the comprehensive national response would provide that signal.

There is a strong case for Australia to ratify the Kyoto Protocol and for government to pursue early action to reduce uncertainty for Australian business. A pragmatic and flexible approach, using a mix of economic instruments, regulation and financial incentives, is most likely to facilitate cost-effective greenhouse response. As many companies are now finding out, there is a business there too. On Wednesday we finished a two-day convention and exhibition at which there were over 60 stands, from many well-known businesses around Australia and some from overseas, and 300 delegates looking at these issues. That concludes our opening remarks.

CHAIR—Thank you.

Senator COONEY—Were you here listening to the previous evidence?

Mr Abba—I heard the end part, but I did not hear the opening remarks.

Senator COONEY—We heard evidence from Dr O'Brien and Professor Lindzen. They might be wrong in what they say, but my judgment was that they were people of integrity who were speaking from a position they truly believed in after having done a lot of research in this area. Professor Lindzen is an eminent academic. What do we make of all that?

Mr Abba—May I refer you to a recent press club luncheon where the head of CSIRO, the head of our meteorological bureau and the head of marine sciences—the three of them together—categorically stated that global warming was occurring. It is a fact that the vast majority of scientific opinion around the world believes that, due to greenhouse gases, global warming is occurring. There are people who, for whatever reasons—their own work perhaps—do not agree. We have to go by a majority of opinion, and the vast majority of opinion is that it

o not agree. We have to go by a majority of opinion, and the vast majority of opinion is that it is happening.

Senator COONEY—I am trying to get at whether there are any criteria where we could apply? I can understand the democratic system, that 50 plus one means that a particular policy carries on the day. But if you are talking about science, can you work on the basis of 50 plus one—or even 90? Isn't science at least supposed to be about something that is objective? Mr Abba, thank you very much for what you said—I am not trying in any way to denigrate it—but shouldn't science be about the truth? You cannot conduct it on the basis of 50 per cent plus one agreeing. I am looking for some sort of criteria whereby you can judge what is right in this area.

Prof. Pears—Science works towards truth as best it can, just as most moral professions do. As someone who has looked at greenhouse issues since 1978 and who has followed them fairly closely, my view is that the vast majority of international scientists who understand these issues do believe there is substantial warming going on. It is very important to recognise, too, that Professor Lindzen agreed that some warming will occur, all other things being equal, as the concentration of greenhouse gases increases. He accepted one degree when the models were saying two, I think.

Mrs DE-ANNE KELLY—On a point of order, Mr Chairman, that is not what he said. I wrote it down. What he said with certainty is that there is a temperature increase over the last 60 years of a few tenths of a degree, and there is a statistical confidence of 60 per cent. He did not relate that to greenhouse gases.

Prof. Pears—That was not the point when he said it. He was showing a slide in which he described the sensitivity—according to the IPCC, I think—at two degrees, and he had his suggestion of one degree.

CHAIR—We can go to the *Hansard* later.

Prof. Pears—The laws of physics, as I understand them, say that if you increase the concentrations of greenhouse gases they warm the earth. There is debate about how much they warm it and whether that is dangerous, and this is the issue of uncertainty.

The main point we are competent to talk about is that, if everyone believed that responding to greenhouse as an issue was profitable, we would not be here. Everyone would be out doing it. In a sense, what the sustainable energy industry is trying to communicate is that we believe there are many and large opportunities to profitably respond to global warming or the concern about global warming. This is where we come back to the issue of the precautionary principle which was mentioned earlier: where there is the possibility of risk, one should take reasonable actions to respond. We are simply arguing that, when we look at the limitations of the economic modelling rather than the scientific modelling and when we look at the track record we have so far in our understanding of the way people use energy, in particular, we are very confident that there are very large opportunities to get on with the job and to make money out of it.

As David has pointed out, the fact that BP, Shell, BHP and a whole lot of other companies are moving in this direction indicates two things. First of all, they recognise that the perception that global warming is an issue is sufficient for them to be seen to need to move. Second, they have

also identified opportunities for themselves that are profitable and they are rapidly pursuing those opportunities. That is what we are on about. We face a situation where, for example, the Sustainable Energy Development Authority in New South Wales runs the Energy Smart business program, and the average rate of return for activities pursued in that program is around 40 per cent per annum. SEDA's problem, like everyone else's, is that there are many investments which are capable of achieving 30, 25 and 20 per cent rates of return, which is still very good, but which we are not pursuing at all. In fact, organisations like ABARE and, in previous years, the Bureau of Industry Economics have done a lot of studies to show that mostly we do not pursue measures that have a pay-back period of more than one to three years, depending on who we are and what our circumstances are. The reality, if you think about a situation where a business might reasonably expect to get a return of 15 per cent per annum on any investment, is that any activity up to about a six-year pay-back has a negative cost per tonne of carbon avoided.

Senator COONEY—Thanks very much for that. My view is that we should have sustainable energy, and may I wish you all the best in what you pursue. It should be pursued. But can't we have sustainable energy and can't we pursue the businesses that you are pursuing in any event, without the issue of global warming? It just seems to me that they are two different issues, in a way. I can understand what you have been saying, that there is global warming brought about by the use of the fuels that create the greenhouse and then that creates the problems that we have been told about. But even if that was not happening, shouldn't we have sustainable energy? I can see there is some link, but it is not an absolute link.

Mr Abba—The answer is yes, we should, but the global warming acts as an industry development issue to move sustainable energy further and more quickly than it would under normal circumstances.

Senator COONEY—Yes, but this is the sort of thing that Dr O'Brien and Professor Lindzen were saying: a lot of this is driven because people have a desire to develop new ways of producing energy and this is why the Europeans have gone down this line. When I said that this suggested conspiracy theories were being followed, I was told that was not so. But isn't that, in effect, what is happening now? You are saying that it is good that we have these new industries, sustainable development—I would agree with that—and that the argument about global warming will give greater impetus to that. That would seem to suggest that global warming is being used almost as a marketing tool. I am not saying for one minute that that is what you are saying, but can you see that that perception might arise?

Mr Abba—Yes, but one could also look at the alternative to that, that opposition to what the vast majority of the world scientific community says is happening could be driven for commercial reasons too. You have to take the balance. We believe that global warming is occurring. All the best advice around the world convinces most governments that there is global warming occurring. Who are we to argue with that?

CHAIR—I must go soon but I would like to talk to you privately in the next few weeks about this, likewise with other witnesses this afternoon, so I am fully seized of all you say. I have a couple of issues to raise now. Rather than fighting a battle on all fronts in your advocacy, it is easier in a way to come down to your core issue, which is the benefit to the economy generally of allowing this industry—generically called sustainable energy—to grow very

quickly. You pointed out that perhaps opportunities are being neglected that could be achieved, without changes in policy, to confer benefits on the industry. That aside, what exactly is the industry? Is it solar or wind?

Mr Abba—It is a mixture.

CHAIR—That would give us a picture of where it might occur.

Mr Abba—It encompasses solar photovoltaic, solar thermal, which includes such things as solar hot water heating, and wind, hydro, tidal power and biomass. I have not missed any, have I?

Prof. Pears—Wave energy.

Mr Abba—I said tidal.

Prof. Pears—Waves are different from tidal.

Mr Abba—You could also add geothermal if you want to—there is some experimentation going on here in Australia with that. That is the encompassing side.

CHAIR—That is a good spectrum.

Prof. Pears—That is the supply side. There is the energy efficiency side.

CHAIR—That is, in a sense, the voluntary.

Prof. Pears—It is a very important complement. What we are very aware of is that the combination of energy efficiency and renewable energy gives you a much lower cost and a much more socially and environmentally desirable outcome.

CHAIR—The higher the cost of carbon, obviously the more attractive the internal rates of return will be in non-carbon. It is almost a linear graph: if the Y axis is the IRR of your industry and X axis is the IRR of traditional carbon energies, then the more we put the cost of carbon up—

Prof. Pears—It is related to the carbon content of the fuel.

CHAIR—What level with a carbon tax or, say, if you reduce it to a per tonne cost in Australian dollars, would we see? We must not use the word ‘modelling’ but do you have some kind of data to provide to us—you can do it later, by written submission—to show the relationship between the cost per tonne of carbon and your estimate of what the benefit to the economy would be of your industries growing? That is really what you have to convince us of.

Mr Abba—Providing it has been publicly launched by then, we will also provide you with a copy of the results of the national survey which has just been undertaken, which gives an idea of what the industry is in Australia, state by state as well as product by product and so on.

Prof. Pears—Can I stress that we are not running an argument for a higher and higher carbon tax or, indeed, for high prices for emission permits. The reality is that most of the things that we are advocating have either got a negative cost per tonne of CO_2 or a very low cost per tonne of CO_2. The issues are not so much about the absolute cost; they are about the market problems—and partly that relates to the remaining very strong biases within the electricity industry against new entrants and what we call demand side action—but, more importantly, the fact that many of the decisions that influence future energy use pay no regard to the price of energy, whether it is 5c or 10c a kilowatt hour.

For example, in my harsh experience with the building industry, if a builder has an extra $100,000 it will go onto upgrading the foyer of the building because that will bring him more attractive, higher paying tenants. So, regardless of the energy efficiency opportunities, he has very clear priorities. That is one reason why SEIA proposes that we need a mix of policy instruments, which include incentives, but not incentives that are necessarily just tied to energy, they have to be tied to manufacturers of appliances and cars so they will produce the best. We need that mix.

CHAIR—Mr Abba talked about a mixture of incentives in business development programs.

Prof. Pears—To the extent that we may need a small carbon levy, that is about generating sufficient revenue to provide the kinds of incentives that will overcome these initial barriers and get everything happening.

CHAIR—I appreciate that. I do not mean to be silly here, but if we decided to tax coffee because people are drinking lots of cappuccinos—in my electorate there is a lot of that—say we were going to levy $1 every cup of cappuccino and hypothecate it to the sustainable energy industry via the grants and so forth, that would produce the same effect. There would be growth in your industries because the grants and the business development programs and incentives would have the effect that you say, but at the same time we could still keep the traditional carbon based energy industries going as well as that.

Mr Abba—It would not improve the climate though, would it?

CHAIR—You are here about economics so I am trying to confine it.

Prof. Pears—In the context of the Kyoto agreement, it is real politic in the sense that it does include some limitations which are practical distortions and things like that. Likewise, it is true that many industries and businesses around Australia have made long lasting investments based on sets of assumptions in the past. Now, it is a question of how recently they should have been thinking about these issues. There are arguments in favour of adjustments, and that is where David in his introductory talk referred to the tax package as an example of where an innovation was introduced with a range of adjustments and so on that can deal with the issue. It is my view that we are not going to get the answers right straight away, the issue is to start heading in sensible directions and at the moment we are basically failing to take up opportunities. The difference that I would draw between your example of the coffee industry and our industry is that because—

CHAIR—I did not mean the coffee industry specifically, it was just an example.

Prof. Pears—The tax on coffee being used to—

CHAIR—It could have been tourists or anything.

Prof. Pears—An important difference there is that any action that is being driven to support the development of this industry is in almost all cases leading to people doing things which make economic sense for them, either immediately or over the period that we are looking out to. The issue is overcoming a whole lot of structural, historical, institutional and mindset problems to get onto this new path towards a sustainable energy future. In that sense we are not talking about subsidies, we are talking about investments. To give another example—

CHAIR—I know what you mean. We have had a lecture here about language this morning. If we talk about the difference between a subsidy and investment and a business development program we will be here for a long time, and we might even lapse into acrimony. So let's not go down that path. I urge you to produce some written material which is clear and cogent, and deals with this carbon relationship, because that is what the Kyoto Protocol is all about, and that is what we have to make a decision on. We are trying not to allow ourselves as a committee to get much beyond a decision about this treaty—yes or no. If we get too much into industry and economics we will really go outside our mandate. We have to be as precise as we can. Thank you. I will be in touch and we will talk later.

ACTING CHAIR (Senator Cooney)—Senator Mason, please go ahead.

Senator MASON—Thank you for your submission. I agree with much of it. I cannot debate the science with you; I am not a scientist. We heard evidence this morning about concerns, not so much about the science but about the policy implications that can be derived from the scientific consensus. I do not think we want to go into that.

When I was growing up, we had the first oil shock in 1974. People said that the world would run out of oil. My teachers said that we had to get solar energy. The political consensus at the time was that oil prices would continue to go up and that the world might even run out of oil. That was not the case, as we now know, although in recent times, once again, there has been that spectre, if not the reality. Similarly, and speaking from my personal experience, not as a politician but as a citizen, we have seen environmental spectres—haunting spectres—painted at times about the ice caps melting and the sea rising. Again, that has not happened. So many of these predictions have been tempered.

I find it very difficult, as someone not trained in science or economics, to make judgments on these issues, because the information we are given—and I am sure everyone on this committee feels this—is so contrary and the capacity of anyone to predict the future is so difficult that it is very hard to make any judgment at all. If we were sitting here 26 years ago, we would have been saying, 'The price of petrol is going to go up.' I remember they consistently talked about shale oil 25 years ago, and that still isn't economic. Yet all the pundits were saying, 'Here we go.' I find it, on today's hearing and the previous hearing, extremely difficult to make any sort of sensible assessment. Can you help me?

Prof. Pears—With regard to your list of examples of environmental furphies, shall we say—

Senator MASON—Exaggerations.

Prof. Pears—Yes, but you can also flag as many on the other side. That just reinforces your point that this is a very uncertain world and it is difficult to tell what to do here. The issue for us is that we see multiple reasons why it makes sense to get on with a really effective program promoting sustainable energy. For example, if you take your oil issue, if Australia had pursued an aggressive energy efficiency strategy in the transport sector since the late seventies, the impact on the Australian economy of the recent increase in the price of oil would have been much less.

Senator MASON—Yes, but for 25 years the price of petrol went down, and no-one predicted that.

Prof. Pears—I did not predict big increases. In a sense, it was a logical response because people actually did not realise the world economy could respond. For example, the enormous growth of natural gas has been part of that response. Most of the world was just unconscious of natural gas as an opportunity at that time. Again this is all reinforcing the uncertainties. To come back to some fundamental questions: if I want to have a lifestyle that is resilient to external forces in terms of oil shocks or electricity peak supply problems such as we have got in Victoria at the moment, or a whole lot of other things, then having smart, efficient systems and utilising a diverse range of energy sources makes good sense because it is resilient.

Senator MASON—That is motherhood. We all accept that. And 25 years ago they said that.

Prof. Pears—And we failed to deliver it. Now is the time to do it, because it is practical and it solves serious concerns about global warming being raised by what, at the minimum, is a very large number of reputable scientists. It helps rural areas because, under the competitive market structure, rural areas will pay much more for electricity, for example, over time. So there are emerging issues there which we can avoid. In terms of oil, if you look at ABARE's projections you see that they are predicting quite large increases in Australian oil imports, even though we export a lot. So there are balance of payment issues. There is a whole series of risks and there is a whole series of opportunities. All we are saying is, 'Let's stop treating global warming as a threat. Let's actually look at the opportunities of it.' When we do, then BP, BHP, Shell and a whole lot of other companies can start to make a real go out of it and get on with the future.

Mr Abba—Senator, may I add a comment to that?

Senator MASON—Yes, of course.

Mr Abba—Let us assume that the gentleman who preceded us is right in saying, 'We are not really sure that there is a problem. There may be, but we are not sure.'

Senator MASON—I do not know.

Mr Abba—Let us assume that, and let us assume that what you have just had to say, you are saying. If you are involved in risk management, you look at what the risks are, evaluate them and try to have some strategies in place in case those risks turn out to be real. I would have to put the Kyoto treaty as being a risk management exercise, at the worst. At the best, it could do

an enormous amount for not only our country but the rest of the world, and especially our South Pacific neighbours. If we did not sign that Kyoto treaty, I think we would have a lot of explanations to make to our immediate neighbours as to why not, because they are quite concerned about raising water levels.

Senator MASON—But, Mr Abba, we have got to sign this agreement if it is in Australia's national interest, not to be just a good international citizen.

Mr Abba—I think it is in Australia's interest to be—

Senator MASON—That is fine. If that is the case, we will do it.

Mr Abba—also a good international citizen.

Senator MASON—They are not always the same thing.

Mr Abba—True.

Senator MASON—I cannot really answer this because, as I say, it is not my area. I am not a scientist. But as a politician I can just see history repeating itself. The cost to Australia of developing these programs is significant. You have said in your submission that the economic costs are exaggerated. I am not sure that they are. But again, for two reasons—25 years ago it was petrol and now it is global warming, a different reason—we are going to have to spend all this money. It is hard to convince people. In my lifetime, this change has been the agenda. In 10 years time it could be another problem with oil. There could be a war in the Middle East and then it will be back to sustainable energy. It is very difficult for politicians to make judgments in these areas. It is enormously difficult.

Prof. Pears—I agree. But, as David says, the problem is that we keep going along without contingency strategies at all. It is an issue of resilience and focus on a positive future, as far as we see.

Mr Abba—If the professor we heard from previously is right and there is not going to be any problem, then he has basically said, 'Most of the scientific community is wrong.' If most of the scientific community says, 'We may have a big problem here, folks,' then good risk management strategy says, 'Let's do something and be prepared.' You are probably an old Boy Scout; I can remember that 'be prepared' was the motto.

Senator MASON—Yes, but it depends on the cost. This is all cost-benefit analysis.

Mr Abba—But we are already spending the money; other measures are already in the budget. It is already happening from a point of view of the expenditure. I do not think it is a question now of expenditure; it is a question of, 'Let's be prepared and take some insurance out.'

Senator MASON—They said this 25 years ago, and one thing I have learnt in my lifetime is that political, social, cultural and economic fashion changes so quickly. Here I go again: I was taught rubbish about politics when I was at school and university, and that has been totally

exorcised today. We were reliving, in a sense, left-wing economics, and that is now finished and no-one talks like that any more. Even the Australian Labor Party talks in terms of market economics. It has been a wholesale change in economic theory. You can see the frustration. It is an area outside my competence—I am the first to admit it. To make judgments in these areas is extremely difficult. I am reluctant to respond to the momentary fashion of, let us say, climate change.

Mr Abba—I do hope CSIRO are going to be testifying. I would be inclined to give your senior scientists here in Australia some weight, if I were looking at the situation. It always seems to be surprising that—when you have companies like GMH, Ford, BP, Shell and others who are all moving away from what they were doing into new areas which are to do with global warming—we would be having the argument.

Prof. Pears—The really big concern for me, as an engineer, is that a lot of our infrastructure—be it the cars, the buildings, the industrial facilities or the transport systems—have very long lives. If we are to start building in some contingency strategies, we are really losing time at a critical time. You talk about how rapidly political fashion can change, and I absolutely agree.

Senator MASON—Scientific fashion as well.

Prof. Pears—A new theory comes up and it does redefine. But when it comes down to it, getting that infrastructure in place, working it and improving it are things we cannot do quickly. It does take us 15 years to turn over the fridges in a house. It takes us 20 years or so to turn over the car fleet. It takes us 30 or 40 years to turn over the industrial base. We are really missing out badly on that.

Senator MASON—What cost insurance? Thank you.

Mrs DE-ANNE KELLY—I note that you go into great depth about emission reduction credits, which you estimated would cost in the order of $200 million per year. Firstly, all the suggestions about renewable energy alternatives are very sound and the committee is very pleased to receive those. Certainly, the state governments do implement programs to have people replace appliances with more energy efficient appliances, and that is a good move. But who is going to pay this $200 million per annum? Where does it come from?

Prof. Pears—Some kind of levy.

Mrs DE-ANNE KELLY—But on whom?

Prof. Pears—I think that is a choice for government.

Mrs DE-ANNE KELLY—Sorry, you are making the submission, with respect.

Prof. Pears—It is a choice for government. For example, in Victoria all electricity consumers are levied 0.20c or 0.25c per kilowatt hour to fund the aluminium smelter levy. That was a decision made by government. In a context where Australians spend about $35 billion a year on energy—and large industry is not an enormous part of that—a couple of hundred million dollars

is small in the context of that total pie. We flagged that we recognised that some industries may face more severe problems than others in responding and that governments may need to put together a carefully structured package to make sure that important things are not damaged in the short term and that the opportunities are promoted. A small levy on energy—taking into account the concerns about maintaining the economic success of the Australian economy—is as far as we feel we want to go, because it will be a political judgment. There will be lots of work done on it to work out exactly how it would be allocated. Our view is that, relative to the total amount being spent, it is very small; therefore, it will have a limited impact. If it is targeted appropriately, the people who are impacted on should be able to achieve savings which exceed the impact very quickly. It is an investment. It is a compulsory saving strategy—an investment strategy—rather than a cost.

Mrs DE-ANNE KELLY—I agree with your submission. The proposal of moving people towards more energy efficient appliances is very sound. I have some difficulties, though, with some parts of your submission. However, they do not detract from the worthy suggestions you have about renewable energy. For instance, you claim in your submission that ABARE has done some conservative modelling that 'showed that over 85 per cent of Australian business activity would either not be adversely affected or would benefit from application of carbon taxes, even at relatively high levels.' Firstly, ABARE made a submission to us a couple of weeks ago and they had not modelled the effects of Kyoto. We had asked them for that and they said they did not have it. Their model for the Allen Consulting Group was a modified Kyoto outcome. During their submission to us they were very unwilling to commit themselves. However, they did say that the very first outcome would be the complete closure of the aluminium industry in Australia: they would go offshore. That was quite a shock to the committee. They did not go much further than that, other than to say that other manufacturing would be affected to one degree or another—and that is without the application of a carbon tax. While your assumptions do not undermine the very worthy suggestion about renewable energy, I am somewhat confused about where ABARE would have done this study.

Prof. Pears—This work was done in the run-up to Kyoto and was published in June 1997 in their major report, and it was actually republished in the Department of Foreign Affairs and Trade's document later that year. It does actually show, sector by sector, the impacts on the Australian economy. In fact, the point that I made in the attachment that we have given you is that the graph is expressed in terms of percentage impact on each sector but it does not take into account the fact that, for example, the basic metal sector is two per cent of Australia's GDP. Even if it did close down—which I will come back to, and I do not believe that will be the case—then there would be a two per cent impact on GDP. The reality is that what ABARE's work showed is that the services sector had a negligible impact—and that was about 60 per cent of our economy. The Allen Consulting Group's work for the Victorian government has focused on a small number of industries that are believed to be losers and some industries that are believed to be winners. All the rest are essentially unaffected.

Mrs DE-ANNE KELLY—It is just unfortunate that those most affected by increases in unemployment of anywhere between six and 10 per cent happen to be in the electorates of people on the committee. Just a word to the wise: we are pretty concerned about it.

Prof. Pears—Absolutely, but that comes back to the next issue of how this modelling is done. The way the modelling is done is by applying a blanket, large increase to the price of

energy. That is done either as a carbon tax or as the cost of buying the carbon permits to add to the price for each unit of energy. This is where we come back to the point that we made earlier, which is that you do not have to charge a blanket charge right across the whole economy in that way. Governments have choice about how they allocate these things.

In fact, one of the worthy suggestions in the fine print of the Allan Consulting Group's report for the Victorian government was the suggestion to introduce a small levy to start with and allow exemptions under various conditions to industries concerned. For example, some of the European countries offer an exemption to their energy or carbon taxes, subject to your signing a binding agreement that you will pursue cost effective energy efficiency and emission reduction programs within your industry.

Again, this is in fact highlighting exactly why the economic modelling is frightening people unnecessarily. The reality of it is that it assumes every industry is hit by the same cost increase, and that is a choice that government has room to move on. The other aspect, with regard to the aluminium industry, is that they have actually acknowledged that they have a number of very cost effective strategies available to reduce emissions in their smelting.

Mrs DE-ANNE KELLY—Nonetheless, they have made a submission to us that, over time—plainly, it would not be a matter of packing up today, because that would not be feasible—investment in the aluminium industry would cease and, at the end of the effective economic life of plant, they would simply move offshore. I do not believe they said that in a scaremongering way. They said that, with the costs imposed upon them, it just would not be worth while in the long run to remain in Australia. That is a fairly thought-provoking situation.

Prof. Pears—It is an issue, and it is one to suggest that we should hasten in a careful manner and that we should not just whack on a blanket $50 a tonne charge—which we are not suggesting. But if we come back to the nature of the aluminium industry and the issue of the long term, if we accept that global warming is a reality—which I do and many others do not—then Kyoto is really just the first step towards much larger reductions in emissions. It is also the first step towards a globally integrated strategy which will mean that global world best practice greenhouse performers will be winners in the long run. In that context, I do not understand how the Australian alumina industry would see itself as disadvantaged because, on every criterion—access to low greenhouse impact fuel, high efficiency, mines that have very low overburden—they look good on a world basis.

Mrs DE-ANNE KELLY—Unfortunately—and I suggest that you read ABARE's submission—ABARE and the aluminium industry do not see it that way.

Prof. Pears—Okay, fair enough.

Mrs DE-ANNE KELLY—Perhaps you could say that the aluminium industry has a vested interest in presenting the case—although I am not suggesting that—but I do not think that ABARE would have a vested interest in making a statement that they thought was inaccurate. I simply present that to you. I have no further questions. I think part of your submission is very sound. I think your absolute assumption about greenhouse gases leading to global warming is very much in question, but that is a matter for the scientific community.

Mr Abba—We just go with the majority of scientists.

Mrs DE-ANNE KELLY—Let me say to you that I was reading a wonderful book about the view of the sky back in the 12th century, and the majority view was that the sky was carried on the back of a tortoise every day.

Mr Abba—I am aware of that.

Mrs DE-ANNE KELLY—It is a lovely fairy tale, but unfortunately it was not true. The majority view in every age is not always the accurate view—not to say that sometimes it is not, but not always.

Mr Abba—I would still place my bets on the risk issue.

Mrs DE-ANNE KELLY—You are entitled to do that and you are making the submission. The committee is trying to find out truth, although we have said that that is a bit difficult.

Senator MASON—Scientific consensus is not truth.

Mrs DE-ANNE KELLY—That is exactly right. However, thank you very much. You have certainly answered my questions.

ACTING CHAIR—Professor Pears, did we get you to state your qualifications?

Prof. Pears—I am an adjunct professor at RMIT University, in environment and planning.

ACTING CHAIR—And what other qualifications do you have?

Prof. Pears—I am a mechanical engineer by training.

ACTING CHAIR—How long have you been at RMIT?

Prof. Pears—A few months as adjunct professor.

Senator MASON—A great institution, Senator.

ACTING CHAIR—Whereabouts in RMIT are you? Are you near the City Baths?

Prof. Pears—At the city campus, in the famous building 8, in environment and planning.

ACTING CHAIR—We could ask somebody from Perth if he had a question. You have a chance to ask a famous professor from RMIT.

Mr WILKIE—I have not been here for most of your presentation, unfortunately, and I apologise for that. In relation to a comment you made that the biggest consensus amongst scientists is that this is what we need to do: certainly the presentations we have had to this committee have been quite the opposite. In fact, those scientists that believe there is a problem

cannot come to any agreement about a solution. Even our own people will not give us a definitive answer on whether we should ratify the protocol or not—which I find quite disturbing, because they are supposed to be the independent analysts of the overall program. So, when you are saying there is consensus, it is certainly not coming before us that that is the case.

Mr Abba—When you were out of the room I referred to the Press Club function a few weeks ago when the head of CSIRO and the heads of meteorology and marine science—the three senior scientific bureaucrats, if you like—publicly stated that there was global warming and there was a greenhouse gas problem.

Mr WILKIE—But they are not saying we should ratify the treaty.

Senator MASON—They are two different questions. Even the evidence this morning was not that there was no discernible effect from human beings—that was not the evidence. It is the question of whether, in fact, it is sufficiently significant to justify policy change. That is the question. There is consensus on the first point but not on the second.

Prof. Pears—That is right. That is why we are arguing that the fears about the downside of progressing with the Kyoto protocol and greenhouse response are much overstated. In a sense, as we stated earlier, if we all thought we were going to make lots of money, improve our society and all those sorts of things from greenhouse response, we would not be having an inquiry. We would be out there doing it.

Mrs DE-ANNE KELLY—What are the names of some of the companies your organisation represents?

Mr Abba—Woodside Energy, BP, Solahart, PricewaterhouseCoopers, Edwards Solar, Beasley, Origin—

Mrs DE-ANNE KELLY—There are 200 of them, I understand.

Mr Abba—More than 200.

Mrs DE-ANNE KELLY—I notice in your scheme that this rebate is to be paid to the manufacturers—presumably, your members. Is that not so? Would not a less charitable soul suppose that there is a vested interest in this?

Prof. Pears—The issue there is—well, actually—

Mrs DE-ANNE KELLY—Yes it does; it says 'The scheme will generally be targeted at manufacturers and the rebate should be paid.'

Prof. Pears—Yes. If I may explain: there are two reasons for that. Firstly, a lot of people who would benefit from that are not SEIA members.

Mrs DE-ANNE KELLY—But some of them would be.

Prof. Pears—Some certainly are. But the issue there is about effectiveness and efficiency in the sense that, if you apply a rebate at the point of manufacture, you avoid all of the mark-ups through the chain, so one dollar invested at the point of manufacture is worth more dollars in terms of impact on the price. The other issue is that one of the barriers to greenhouse response has been the cost of tooling up for manufacturers. We have cases where a manufacturer can say, 'I know how to make a more efficient product but I do not have a spare $3 million.' The idealistic reason for saying we should put that money at that point is that it actually allows all of the options that are needed to get the product built and get it out into the marketplace at a competitive price and with appropriate incentives.

Mrs DE-ANNE KELLY—Some would say to us, 'But that is welfare for big business.'

Prof. Pears—Indeed, they can say that.

Mr Abba—And you have, I guess.

Mrs DE-ANNE KELLY—I have.

Mr Abba—There are other members of ours that are in fact electricity generators that are looking at ways that they can move away from existing fossil fuel.

Mrs DE-ANNE KELLY—Indeed.

Mr Abba—So it is an across-the-board type situation.

ACTING CHAIR—Thanks very much, Professor Pears and Mr Abba. If you have any further thoughts or you want to add any more comments, feel free to do so.

[12.37 p.m.]

ABRAM, Ms Esther Marie, Director, Environment Victoria, Climate Action Network Australia

REYNOLDS, Ms Anna, Co-ordinator, Climate Action Network Australia

WISHART, Ms Felicity Jane, Co-ordinator, Queensland Conservation Council, Climate Action Network Australia

ACTING CHAIR—Welcome. I invite you to make some opening remarks and then we will move to questions.

Ms Reynolds—We have a presentation and some overhead transparencies that we would like to show you. I will start by telling you a little about the Climate Action Network, because it is a new organisation. Established in 1998, the Climate Action Network is a coalition largely of environment groups and also some research institutions and health organisations. It is the Australian branch of an international environment group that has been going for about 10 years with a focus on the international climate negotiation process.

CANA—Climate Action Network Australia—has about 30 member groups, based in many parts of Australia, including regional Australia. Our interest is in educating the public and decision makers about climate change and its impacts, both on human societies and the environment. We believe that there is a real threat from climate change. Our members also believe that climate change may in fact be occurring now. We are constantly in contact with the international scientific community through our international networks. For example, we were very disturbed a few days ago to hear that international coral reef scientists meeting in Bali, including the Australian Institute of Marine Sciences, have said that global warming is the greatest threat to coral reefs, greater even than overfishing or coral reef bombing, which is a problem.

ACTING CHAIR—While we are on that, can you each give your qualifications? We had some very powerful scientists here this morning. Are you scientists or advocates?

Ms Reynolds—No, we are advocates.

ACTING CHAIR— A very honourable profession.

Ms Reynolds—What we would like to do is not really focus on the science.

ACTING CHAIR—Just say that.

Ms Reynolds—We are here just to tell you that from our perspective, climate change is certainly a real and present threat. We certainly are informed by bodies such as the Intergovernmental Panel on Climate Change. We think that is a very respectable institution and we are a bit disturbed that there has been evidence received by this committee running down the IPCC. We certainly think it would be good for the committee to receive evidence from the IPCC

directly. I think that is possible via video link. But we also take our advice from the CSIRO and the Bureau of Meteorology.

ACTING CHAIR—Are you full-time or are you volunteers? What is your position? If you are advocate groups then these days you are on very slender funds.

Ms Reynolds—Felicity and Esther are coordinators of two of the member organisations of the Climate Action Network. Felicity is the coordinator of the Queensland Conservation Council, and Esther is the coordinator of Environment Victoria. They are the peak environment bodies for those two states. I am the paid employee of the Climate Action Network.

ACTING CHAIR—In Perth?

Ms Reynolds—Yes.

ACTING CHAIR—Okay, that establishes it. Do you want to do the overheads now?

Ms Reynolds—That would be great.

ACTING CHAIR—Okay.

Overhead transparencies were then shown—

Ms Reynolds—The first thing that we want to let you know about is our concern about Australia's greenhouse gas emissions. This is some research that we have had done looking at Australia's emissions. As you can see, between 1990 and 1998 Australia's emissions grew by 16.9 per cent. That is excluding land clearing. We will come to that a little bit later.

ACTING CHAIR—I should not interrupt here, but it might save a little time later on. Who is providing this information?

Ms Reynolds—This is the work of a consultant, Peter Kinrade. He works at the University of Melbourne and basically studies greenhouse inventories. But most of this is drawn either from the most recent greenhouse gas inventory, or OECD figures. Most of it is government inventory figures.

Energy related emissions grew by 21 per cent between 1990 and 1998. Emissions from most other sectors are actually falling, so it is our energy sector that is the real problem area where we are getting really big growth in emissions. Also, you can see that growth has occurred mainly in the second half of that 1990 to 1998 period. So it has been between 1994 and 1998 that we have had this big boost in energy related emissions that may be one of our problems.

Why is this happening? The evidence suggests, and other people have agreed with us on this, that the problem has been occurring because of a significant increase in the use of brown coal for electricity generation. There has been a 23 per cent increase in the two years to 1998. That is why we saw emissions from electricity generation increase by about 10.3 per cent in just one

year, 1998. It seems as though we might have one particular problem area that is leading to these really big increases in Australia's emissions.

Just to put some comparisons on this, the OECD average for energy use grew by 9.5 per cent between 1990 and 1997, whereas our growth in energy use in that period was 21 per cent. So you can see we are going well above the OECD average. Other countries did experience emissions growth, but nowhere near as large as Australia's. The other significant thing relates to per capita emissions. Again, compared to the OECD average, our energy related emissions are growing quite substantially. The average OECD per capita emissions was four per cent between 1990 and 1997 and Australia's was seven per cent. So, consistently we are seeing ourselves trending higher than the OECD average. We believe this is largely because of quite a simple factor, our electricity sector and the use of brown coal, which is a much higher greenhouse intense fuel.

Mr WILKIE—What is the range in the OECD countries from highest to lowest? I see they have a 9.5 average but what would be the highest and lowest?

Ms Reynolds—I might have to take that one on notice because I do not have that detail with me. I think the OECD is a useful benchmark because, if we are talking about the economic impact of becoming more energy efficient, it is pretty clear that there are some very big and very successful economies that are not growing their emissions as much as Australia is. So we do not necessarily have to link economic growth to emissions growth. We can have economic growth and not massive emissions growth.

ACTING CHAIR—That brown coal wouldn't be from Victoria, would it?

Ms Reynolds—Yes. It certainly seems as though the national electricity market has benefited from brown coal from Victoria ahead of other regions and other regions' energy sources.

ACTING CHAIR—It might not be a bad idea after all.

Senator TCHEN—No. Brown coal is very dirty.

Ms Reynolds—The main point of that is to let you know where we are at with emissions in Australia and, from my members' perspectives, they are not a good set of figures. All our trends are up and we are going above OECD averages. The other thing that we are not happy about is Australia's record compared to other countries.

This overhead shows material taken from the Pew Centre for Global Climate Change. That is an institution based in the United States that is funded by some large corporate companies, and they put out a lot of research material about climate change. Basically, what they did is look at 180 nations and their greenhouse gas levels, both total and per capita. These are the total emissions for 1995. We are in the middle ranking nations, in the hundreds of thousands. These are some of the other countries that have these kinds of emissions in the hundreds of thousands. The really big ones are the United States, China and Japan. Australia is in the middle ranking but, when you look at this in terms of the whole 180 nations, we are actually 18th. It surprised me that we were so high in terms of total emissions. You often hear some industries saying, 'We are only two per cent of the global emissions—why does it matter what we do?' But the thing

is, there are 180 nations participating in this Kyoto protocol process and it does not take many one and two per cents to actually add up to 100 per cent.

Senator MASON—Where are we in relation to emissions per capita?

Ms Reynolds—In this list that I have put together, we have very high emissions per capita. We are actually second to the United States. If you look at the total list—I have not put the total list up here, but I can submit it if the committee is interested—we are actually 9th per person. Some surprising communities, like Luxembourg, have actually got higher per capita emissions than we have. But yes, we are up there with some of the top per capita polluters of greenhouse gas emissions in the world. Again, when you look at some of the other countries, like the United Kingdom, they have substantially less emissions per capita than Australia. Germany has a bit less Australia. Places like Sweden and Switzerland have much lower—about a third lower—per capita emissions than Australia. These are not countries that you go to and you think, 'Gee, the lights are a bit dim' or 'This is an undeveloped country.' These are countries that are using their energy more efficiently and have worked out ways to keep their greenhouse gas emissions lower.

A really important point in this debate about Kyoto is the developing nations' contribution to greenhouse gas emissions. I have not, of course, put up all the many countries. As you can see, when we start getting into most of Asia, Africa, Central America and South America, the numbers in terms of total emissions per year are very low—and the South Pacific is tiny—but it is their per capita emissions that are significant. Even the big polluters, like China and India, are producing 16 or eight times less, than us per person in terms of greenhouse gas pollution.

While we are sitting here in Australia, that might not seem significant. But, in the context of global cooperation on this issue, this is why developing countries say, 'We might be producing a lot, but each person is not producing a lot. This atmosphere is a shared resource and we have all got to work out how not to overpollute it.' It just puts a little perspective on that.

ACTING CHAIR—You can conduct this as you will but, for the sake of completeness, could you put up the slide showing the 18 as a complete list? Do you remember that?

Ms Reynolds—I don't, but I have the actual figures here, so I can make a copy and leave that with the committee. I picked those out because they were an interesting mix of Africa, the Pacific and some of the main polluters.

ACTING CHAIR—Right. And you are leaving the rest with the committee, so the committee can see for itself.

Ms Reynolds—The second main point I would like to make, and then we will be ready for questions, is that the environment movement is actually not that happy with the Kyoto Protocol in the way it is currently being negotiated. This is probably for very different reasons from those of most of the people you have heard from. We believe that the Kyoto Protocol is not going to lead to the kinds of reductions that the community think it is.

There are two points I would like to make here: one is that the Kyoto Protocol is actually only a very small reduction of emissions. If it works, it will be about a five per cent reduction of

emissions from the developed world. Secondly, we are concerned about what are called loopholes in the rules of the Kyoto Protocol—and that is what our submission addressed—which will see countries like Australia actually playing a bit of an accounting game. While on paper it may look as though we have met our eight per cent target, emissions will have actually increased way above that. I have a table here that I would like to show you that illustrates that. It is a little detailed, so I will just take you through it slowly.

ACTING CHAIR—Where is this from?

Ms Reynolds—One lot of figures are from the 1998 Australian Greenhouse Office inventory and the others are from a range of sources. I will explain those as I get to them. The overhead transparency shows the main sources of greenhouse gas emissions in Australia. The Kyoto Protocol requires us to count our emissions in 1990 and not count them again until 2010. That is one thing we are not happy about, because we would actually like to see a more progressive requirement to reduce. Certainly in relation to land clearing, rather than waiting until 2010 to see a decrease, we would certainly like to see that tackled year by year.

Basically, the figures show the emissions in 1990. A key clause for Australia is what we have called the 'Australia clause', which is article 3.7 of the Kyoto Protocol. This actually allows us to include land clearing in our base line, our 1990 year, and in our reporting year. We agree that that is fine. We do not mind that land clearing is included in both years and we think it is a positive way for Australia to take advantage of efforts to slow land clearing. We certainly do not disagree with that. But, as you can see, the government figure is taken from an estimate of land clearing in 2010 by the Australian Greenhouse Office, and land clearing is actually projected in 2010 to be down. That is basically because we may have cleared so much that there will be less bush to clear, which is certainly not the outcome we want to see. But this figure is also, potentially, what we could do if we implemented policies to slow land clearing.

These are also estimates from the Australian Greenhouse Office about ways that Australia could use carbon sinks allowed for under the Kyoto Protocol to meet its target. Basically, when you add up both sides of the ledger, what we come out with is that Australia's total emissions in 2010 will be 544 million tonnes. If we were to meet our Kyoto target, which is eight per cent above 1990 levels, we would actually have to be at 560 million tonnes. That is if we were meeting our target—we would be going from there to there.

As you can see, we could come under our Kyoto target, so that we have well and truly met it—heroes of the world come under our Kyoto target—but we have actually seen an increase in energy sector emissions of 36 per cent above 1990 levels. That is the business as usual expectation from government bodies about what emissions will be. How we are getting there is because of falls in the amount of land clearing and the use of carbon sinks—not touching the energy sector at all. In fact, it is increasing emissions.

Senator MASON—Therefore, the economic impacts of the Kyoto Protocol that we have heard a lot of evidence about would be adverse. What you are suggesting is that, in fact, they are not necessarily adverse.

Ms Reynolds—We are coming to it from a different perspective. From our perspective, the Kyoto Protocol target for Australia is a bit of a joke. But it also shows that if we do want to

meet our target, what we can do is simply improve the performance from land clearing and reduce emissions from land clearing. Because land clearing was so great in 1990, if we actually took steps to reduce it—even if that was done in a careful way that took account of the needs of regional communities, particularly in Queensland—we could meet our Kyoto target largely through reductions in land clearing.

ACTING CHAIR—Are you saying that, if we did nothing, we would meet the target? Can you say something about that? If we just went on the way we are going, would we meet the target? Do you want to have a think about it?

Ms Reynolds—No, not necessarily. Felicity might be better to speak about this. Land clearing in Queensland in the last year or two has seen a bit of an increase. You would have to talk to the AGO a bit more about how they came to this figure of 42. This is their projection of where land clearing emissions will be at in 2010; it is not ours. But if land clearing continues to go up rather than the trend going down, this may not be the accounts for Australia.

Senator TCHEN—Ms Reynolds, you said these figures are from the Australian Greenhouse Office, but this table is not produced by the Australian Greenhouse Office?

Ms Reynolds—It is produced by us.

Senator TCHEN—You describe the energy emissions from 299 to 403 as business as usual, but that is the figure that was ticked off by the Kyoto conference. It is not a subsequent creation.

Ms Reynolds—No.

Senator TCHEN—Is that taking into account Australia's growing population as well?

Ms Reynolds—Yes.

Senator TCHEN—So it is not exactly business as usual.

Ms Reynolds—Business as usual figures are always controversial, but my understanding is that Australia's business as usual projections are similar to a 36 per cent increase. If you speak with ABARE or the Australian Greenhouse Office, they will tell you that it is around that figure. They have not revised up or down much since that year. They believe that, if we just left business as usual, Australia's emissions would increase by about that much.

Senator TCHEN—The other point that I would like to make is that—and I know you did not make the imputation, but in case people pick that up—Kyoto occurred in 1997 and the exceptionally high land clearance that occurred in 1990 was already history. So it was not a deliberate attempt by the Australian government to hoodwink the world and say, 'Right, we have built it up and now we can reduce it.'

Ms Reynolds—We do not dispute that Australia should have this right to put land clearing in. It was such a big sector of our emissions in 1990. We would like to see land clearing slowed because of the other environmental impacts. We have always said that, because of the

substantial nature of land clearing and the potential savings from slowing and stopping land clearing, Australia could have met a much bigger target. Knowing this we could have even said, 'We will cut emissions to about 15 per cent. We will make business as usual about 15 per cent rather 36 per cent. We will do things with the energy and transport sector.' We could have done that and made sure the land clearing decreases in time for 2010 and committed to a zero or a minus five per cent target. We know we have this. We know we also have eight per cent plus and then this allows us to increase our energy emissions quite substantially.

Senator TCHEN—I was on the Senate global warming inquiry. Someone on a group giving evidence was of a similar age to you. She gave basically a similar sort of argument. Of course, she was not as good an advocate as you are. You have been ticked off by Senator Cooney who is a very good advocate himself. If he says you are good I will take his word for it. It was basically the same line of argument. I asked her, 'If we say the ideal outcome would be to say everybody stops emitting any more carbon dioxide, greenhouse gas and let the earth settle down, the downside of stopping greenhouse emission is to stop development. That means you stop economic development and we lose jobs'. I said to her, 'Would that be a good solution?' I think she was not a very good advocate because she then spent about five minutes talking without answering my question. I have a chart here by Anna's consultant showing the employment impact in Victoria by regions. I hope I am not taking someone else's thunder from them but, if you look at this there is employment loss all the way through, including some regions like the La Trobe Valley down to a nine per cent loss.

Ms Reynolds—Yes.

Senator TCHEN—That is a substantial social impact. Is that a price we can afford to pay?

Ms Reynolds—We are trying to say through the presentation of these figures that we think that the kind of impacts that have been presented in economic studies are not very well-informed by looking at what Australia's Kyoto target means for it in the next 10 years. The rest of the world is going to work out that Australia's target allows for business as usual increases in emissions. After 2010, for the next treaty commitment, Australia plus all those big per capita polluters are going to be asked to take a bigger commitment. They probably will be asked to make a 20 per cent reduction below 1990 levels or something like that. The UK is already at 20 per cent below 1990 levels largely because since 1990 they have swapped to the use of a lot of gas. In the longer term Australia will need to make more structural adjustment. Some industries will win and some will lose. That happens with all sorts of economic reform like trade reform, for example. Our concern about the Kyoto target that Australia has at the moment is that it will not really drive much reform in the energy and transport sectors which is where we think Australia needs to do a lot of work because we are quite far behind. Because of these sorts of accounting gains we were lucky enough to get the right to include land clearing. From our perspective the Kyoto Protocol is a bit of a diddle for Australia.

We also have some concerns in our submission—and I will not go into them, because we probably do not have time—and we can provide more information later. We have some more global concerns with the Kyoto Protocol—for example, with some of the rules that may allow for nuclear developments to gain emission reduction credits. We have some concerns about how the sinks provisions might affect existing forests. So we, as environment groups, will be working at The Hague conference in the next few months to try to close some of these Kyoto

loopholes. But, regardless of whether the loopholes are closed, Australia will still have a lot of room to move if it can tackle land clearing.

I want to leave it at that, except to say that, while we do have concerns with the Kyoto Protocol, we still believe it is the first step in the global community coming to an agreement—it has been 10 years in the making; these are difficult things to put together—and, overall, we want to see it put in place. But we are still saying at this stage that we are very concerned about the direction of some of the rules, and we are waiting to see how it goes in The Hague.

Senator TCHEN—I accept that Senator Cooney was right.

Ms Abram—I want to make a follow-up response to your question—particularly the Latrobe Valley and the economic impacts on Victoria.

Senator TCHEN—No, it is not just Victoria; the other states as well.

Ms Abram—From the Victorian perspective, one of the concerns we have had with the modelling that has been done is that it is not actually showing the opportunities and where some of the growth will occur. What that does not actually tell you is that Victoria has some of the best sites for wind farms in the whole world. We have a wind farm industry that is actually dying to get in there and start putting in wind farms and creating employment in Victoria by doing that.

Some of the good things about wind farms are that they tend to be placed in regional areas. They can also be put on farming land and have grazing happening underneath, providing an additional source of income to farmers. They create jobs. If we can get into manufacturing them, that is a whole new realm of manufacturing industry that we can open up in Victoria. Because manufacturing has been one of Victoria's key industries, that is something about which there has been a lot of interest and enthusiasm.

So whilst there is this sense that there are going to be losers and we should focus on that, we also have to be aware that areas like the Latrobe Valley are not economically strong now. Even though they might be the centre of brown coal, they do not have a strong economy. If we can view this as an opportunity, if we can ratify the protocol and decide that we are going to start taking steps to reduce emissions and look at the economic advantages to be gained, we can perhaps start to fix some of those other really difficult problems that we have as well.

Senator TCHEN—Would you locate the wind turbines along the route of the Bass Link power line?

Ms Abram—Certainly in that region there are really good wind farm sites, and we would really like to see some more go in in Victoria.

Ms Wishart—I would like to refer to one of the most pressing environmental concerns we have in Queensland, which I am sure you are aware is the issue of vegetation clearing. While there is an overall trend predicted for a reduction in clearing over the next 10 years, in Queensland we are facing the opposite trend at the moment. I believe 80 per cent of greenhouse gas emissions linked to land clearing come from Queensland.

We have seen land clearing increase from 340,000 hectares per year in the 1995-97 figures to 440,000 hectares per year in the 1997-99 figures and an average of 350,000 hectares being cleared over the whole decade. So we are dealing with massive amounts of clearing in Queensland, and a significant proportion of that is in the Murray-Darling Basin and the brigalow belt. There is every possibility that, unchecked, this sort of activity could continue further west and further north in Queensland.

While it is important that veg clearing becomes a focus within the Kyoto Protocol, obviously it needs to be addressed in its own right because of the other implications. We would be very concerned if Australia as a whole used the excuse of being able to just put their efforts into land clearing as a way of not having to take action on other greenhouse gas emissions. Queensland is often the whipping boy for various states in Australia. On this occasion we feel that it is very important that greenhouse gas emissions, particularly through the energy sector, are addressed, that, as Esther has said, we look at this as an opportunity and that, to some extent, the vegetation clearing is perhaps seen as something we need to address because of the biodiversity issues—the long-term implications for salinity and for dislocation of rural communities that will go with that—not just as a greenhouse issue.

Mrs DE-ANNE KELLY—On the question of the loopholes that Ms Reynolds mentioned, why do you see them as loopholes?

Ms Reynolds—The simple answer to that is that they allow for an increase in greenhouse gas pollution. I have a picture here; it might be easier if I show you.

Overhead transparencies were then shown—

Ms Reynolds—The clean development mechanism is one of the programs under the Kyoto Protocol. This allows for developed nations like Australia to invest in developing country projects and get certificates from these investments. If we increase our emissions we simply use these certificates to say that we have done this. Some of these are loopholes because we do not think people should get credits for, for example, nuclear power developments—we do not think that is a sustainable technology at all. Some of them are loopholes because, for example, if company A invests in a carbon sink in the Solomons, in 2010 when they have to report what their emissions are they may say, 'We are over what we were meant to be but here is a CDM credit for a sink we developed in the Solomons.' Our concern is that that company's pollution is in the atmosphere for 100 years. What we are concerned about is that the sink may not be sitting there for 100 years. It might burn down; it might be chopped down in 50 years; it might be affected by climate change. Science suggests that there might be some impacts on forests from climate change. So it is allowing an overall increase in emissions; it is not decreasing emissions. It is allowing companies to continue emitting, and they simply present these credits as alternatives. In theory that could work. The problem is that some of the projects are either not sustainable, which is what we believe about nuclear power, or not particularly permanent and certainly will not last as long as the pollution does.

Mrs DE-ANNE KELLY—Surely that comes into the method of accounting, though. I presume you are talking about sinks in Australia, as well. Is that so?

Ms Reynolds—Yes.

Mrs DE-ANNE KELLY—Trees and so on.

Ms Reynolds—We have concern about sinks generally, because of their lack of permanence.

Mrs DE-ANNE KELLY—But that would be a matter that would have to be accounted for, wouldn't it—what was done with the wood if it were harvested?

Ms Reynolds—Some people believe you can set up an accounting system to deal with that impermanence. The Kyoto Protocol goes over 180 nations; it is not going to have a huge structure administering it. If company A in Germany invests in project B in Botswana for a sink, are we confident that in 50 years time when the sink burns down someone is going to go back to the company in Germany and say, 'Your carbon sink, which was meant to make up for your pollution, burnt down. What are you going to do about it?' We are not confident that the institutions can deal with that.

Mrs DE-ANNE KELLY—With respect, though, not every single one is going to burn down. Of course there are going to be accidents, misadventure, misfortune or whatever, as there always are—and that will happen in any sphere of business—but the reality is that, without some form of sink, there is going to be an enormous cost in Australia, is there not? If you are going to say that the coal industry in Queensland—where I come from—is going to have to pay an additional amount for coal, we are not going to be able to export unless we can offset that, so what is going to happen? You can't just say to people, 'There is no way of offsetting that, so the coal industry will have to close down'.

Ms Reynolds—Our perspective is that we are looking at the environmental effectiveness of the Kyoto Protocol.

Mrs DE-ANNE KELLY—I am sure you are but you are here to make a presentation and, with respect, we also have to think about people's total welfare—who is affected and to what extent. I do not think it is reasonable to say to people, 'This is for the good of the nation. Unfortunately for you, it is going to mean the end of your livelihood.' I do not think that is an acceptable outcome.

We have to bear in mind that the studies have shown in the coal producing areas, particularly in Fitzroy in Queensland, that the unemployment rate is anywhere between 10 per cent and 15 per cent, and that is with sinks as an offset. Without those in place, there is going to be a great deal of social dislocation. People who own homes there are not going to be able to sell their homes to anybody else. I wonder why you see this as a loophole. I understand the problem with the accounting, and that is a fair question. Nonetheless, those sinks do sequester a carbon, and surely the question is about how much carbon there is in the atmosphere. If somebody is emitting carbon but somebody else is removing it, then it is obtaining that balance, is it not?

Ms Wishart—You have raised a couple of different issues there.

Mrs DE-ANNE KELLY—The issue I am asking about is: if you are emitting carbon and at the same time contributing to removing carbon, are you not in a balance?

Ms Wishart—You are for the period that you have captured that carbon, say in a forest or in a plantation. The question is, how long is that carbon captured for? If, for example, you cut down that timber and you mill it, some of the timber will be turned into sawdust or sawmill waste which is likely to be burnt or to decompose and return to the atmosphere as carbon. The milled timber may well end up in a house, but even then it may be pulled down within 30 years and end up in landfill. The reality is that timber in trees in the ground is not necessarily going to last for 100 years which is about the amount of time that any carbon we emit today is going to last in the atmosphere. It could well be that we could say, 'Okay, over here we will continue to emit, and over here we will plant huge masses of trees' and yet within 50 years, at worse case scenario, all those trees could be back in the atmosphere and we have doubled—

Mrs DE-ANNE KELLY—Not all. I think what you are highlighting is an accounting problem, is it not?

Ms Wishart—It is not an accounting problem. It is an accounting reality insofar as there is a range of different models for how you may account for the carbon, but in each of them it is reliant on that carbon being captured in some semipermanent way and that is not guaranteed. I guess it is the guarantee that we are concerned about.

Mrs DE-ANNE KELLY—A realistic question is: what is the alternative for people who live in high energy producing regions where their livelihood is going to come to an end?

Ms Wishart—There are two parts to that. One of the things about any international agreement is that it is the world trying to say that we will all address this issue on an equal footing. So, if there are disadvantages, at least we are on a level playing field, so to speak. In that sense as coal producers, and in dealing with those countries that are buying coal, all of those countries buying coal are facing a similar challenge. To begin with, they are all looking at ways in which they can reduce their use of coal, as Anna has pointed out.

Mrs DE-ANNE KELLY—We do not buy coal; it is one of our major exports.

Ms Wishart—Our markets are very important to us and those markets are currently moving to look at alternative options. The UK has already done that. What that means is that we have to start moving now to diversify our interests. We have to start saying, 'Okay, those communities which are based on coal are not always going to be based on coal and we're going to have to start coming up with ways of helping them.' What is important is that we do that sooner rather than later. If we keep travelling in a sort of business as usual framework, we are going to run into much bigger changes and force a much more difficult time on those communities than if we start to diversify the economies of those rural and regional communities over time.

I am encouraged by companies like Stanwell Corporation in Queensland that have, for example, stepped in in Ravenshoe, where there was major structural adjustment required with the closure of the tropical timber logging industry. Many of the people that were previously involved with the logging are now engaged in the wind power generators that have been established by Stanwell in Ravenshoe. So it is a lovely example of where we can actually achieve something very positive in a greenhouse sense and help a community that was struggling.

Mrs DE-ANNE KELLY—You are concerned about clearing, so the suggestion is that land clearing not be included. Is that right?

Ms Wishart—No, we are not suggesting that. What we are really concerned about is that, while clearing in Queensland is growing, across Australia we expect that the amount of land clearing will eventually decrease over a 10 year period. That means that without doing anything between 1990 and 2010, we will actually have seen a reduction in the amount of emissions from land clearing such that we can essentially not take action in other areas such as energy. We feel that this is another way of playing with the figures.

Mrs DE-ANNE KELLY—Where do you get your land clearing figures from?

Ms Wishart—The current rates of clearing come from a recent report prepared by the Queensland government through the Queensland Herbarium which has been taking—

Mrs DE-ANNE KELLY—We had a submission from Dr Bill Burrows who worked with DPI for 35 years. It was really interesting; I do not know if you had a chance to read it.

Ms Wishart—No, I have not.

Mrs DE-ANNE KELLY—I know the brigalow belt in Queensland very well. The concern is that those figures, of course, also include brigalow regrowth. As you would know, regrowth recurs every five to seven years. So what you are counting is the same clearing every few years. So they are not as accurate as one might wish them to be.

I am glad you raised land clearing, because Dr Burrows did too, and he is pushing pretty much the same case that you are. The other point that he goes on to make is that if you include land clearing, as you suggest, there is 150 million tonnes of CO_2 per year, because he maintains that, going from a hunter-gatherer society to a grazed community, you in fact have more biomass in the vegetation than you did previously. He points out that in Queensland since the 1950s, there has been a 30 per cent increase in the woody vegetation, which—according to his figures—has a greater ability to absorb and contain carbon than the vegetation of 100 years ago.

Ms Wishart—I am no expert in the carbon area. My understanding—and it is a complex area, certainly—is that, for its size, some of the pastures, because they have a significant amount of root stock, will, on a per capita basis, contain more carbon perhaps than a shrub, but because the shrubs or the trees are much larger, the total amount of carbon is much greater.

Mrs DE-ANNE KELLY—No, he makes the point that since grazing has started—and he has been doing this for 35 years—which is a human activity, in Queensland alone the increase in carbon dioxide sequestration, the amount that is absorbed, is 150 million tonnes a year. He calls it thickening sinks. I would certainly recommend that you read his submission because it is fascinating. I find it is a little at odds with the concerns that you raise. We seem to find this on this committee a lot: somebody says something and somebody else comes along with scientific information that counteracts it.

Ms Wishart—At the end of the day, I think we have to go back to the inventory by the Australian Greenhouse Office—Anna put up the figures earlier—which are nonetheless telling us—

Mrs DE-ANNE KELLY—He said that they recognised his figures but they chose not to use them.

Ms Reynolds—The federal government does not really like that theory about vegetation thickening. It is not very well known in the scientific community, and it is very unlikely that Australia will be required to count this process under its obligations under the Kyoto Protocol.

Mrs DE-ANNE KELLY—The United States is pushing for it, as you would be aware.

Ms Reynolds—It is likely that, with all the issues that are likely to need to be settled at The Hague, this is going to be of bottom of the rung importance. A more likely scenario for Australia's emissions is the one presented in those figures, which is that Australia's emissions from land clearing in 1990 were quite high and, at some point, they will be lower to some extent in 2010. It might become an issue for Australia in the next commitment period, but for this commitment period I do not think that is going to be resolved in the scientific community to require Australia to count that. It is an area that is quite difficult to count; it is not a simple thing to count.

Mrs DE-ANNE KELLY—I just raised it because it is very interesting. He is seen as something of an expert in that area.

Senator MASON—Mrs Kelly's line of questioning was interesting, I think, because it illustrates a common problem in politics. Ms Reynolds, you spoke about accounting loopholes and that Australia in a sense can perhaps avoid some of its international obligations. It brings home, I think, one of the things that we often see in this committee; that is, that you are quite entitled as environmental advocates to take a view of the good international citizen and global responsibility. As Mrs Kelly illustrated, that is harder for us; our interests are more parochial, they are more electoral and they are more directly accountable.

Of course, while we do take on board global interests, national self-interest is the primary short- to medium-term goal. Make no mistake: what you see as accounting loopholes for Australia, we would see often as good negotiation. Why? Because every country in the OECD, et cetera, is looking after itself first. If they think they can get some trade advantage or some other economic advantage by way of the Kyoto Protocol, they will take it. This might sound terribly cynical, but it is the international reality. My question, with that preface, is: if the United States is not going to ratify the Kyoto Protocol, why should we?

Ms Reynolds—I think there are a number of reasons why we should. Australia—

Senator MASON—Is it in our national self-interest if the United States does not ratify it?

Ms Reynolds—Yes, there are a couple of reasons. The first one is that Australia does have an interest in global emissions declining. I do not know whether you have had evidence from the CSIRO, but their science does suggest that, because of where Australia is placed in the medium

temperate band in the Southern Hemisphere, we are actually likely to see more substantial climate impacts than other parts of the world.

We will become quite substantially drier, more arid, which for the driest nation on earth is a real problem. River systems are expected to suffer from higher temperatures, more evaporation and less rainfall. We believe the farming community and the regional community will suffer from climate impacts. Australia is a leader. Maybe we are not the biggest nation on earth, but in those international processes we do carry some weight because we led the way on ozone, Antarctica and those sorts of things. So Australia, by ratifying, certainly does help the international process move. If the Kyoto Protocol fails, then people's aim to get the developing world on board gets put off as well. Unless the Kyoto Protocol succeeds, it is going to take longer and longer to get the Chinas and Indias and other countries on board with a global treaty. If the Kyoto Protocol is implemented and if countries like Australia meet their targets, the developing world will politically have no weight to argue against making their own commitments. The Kyoto Protocol is only nine years away now; it is not a long time. We believe that getting that happening will see the global process improved.

Secondly, there is a chance, if Europe, Russia and Japan ratify, that the treaty can come into force and that mechanisms such as emissions trading, clean development mechanism, some of the things that we have some concerns about, will become profitable. Some business sectors will actually see economic opportunities in playing the emissions trading game and investing in things. They will not be available to people who have not ratified. Of the people knocking on your door and asking you to ratify the Kyoto Protocol, if it does come into force it will be us, but it may also be the business community saying, 'We want to participate in this emissions trading game. We can't until Australia ratifies, because it is only available to countries that ratify.' Some people believe that ultimately what will bring the US on board as well is that tension in the business community among people who want to participate in those Kyoto mechanisms.

Mr WILKIE—If we do go along with the theory that global warming is occurring, that we need to ratify the treaty in order to try and reduce emissions and that emissions actually make a difference, my concern is that unless the developing countries come on board it will not mean a crumpet. What will happen for Australia is that the industry that we have in the Latrobe Valley and other places will end up going offshore to the developing nations, where they do not have to comply with anything. So if we are looking at worldwide emissions we do not actually get any reduction at all. All we get is a loss of industry and a great deficit in our economy. That is probably the biggest concern that I have. I suppose that is why, if we ratify, we have to have the developing nations included in that. That is the Americans' position. I am curious to know what your view is on that.

Ms Reynolds—A lot of this comes down to the theory of carbon leakage, that companies will basically up and move operations.

Mr WILKIE—That is basically what they are telling us.

Ms Reynolds—We would like to see industry actually show us where that has happened before. A lot of carbon leakage is basically a matter of industry threats rather than the reality. Let us say, for example, the Kyoto Protocol has to be met by 2010. We have demonstrated by

our figures that Australia does not have a particularly difficult target. That means that Australia may not even tackle some of the large point source emitters in that nine-year period.

There is a lot of uncertainty for the business sector in deciding it is going to pack up an already operating plant and move to another country. This is all in the nine-year period before the next commitment period, and the next commitment period will probably require developing countries to meet reduction targets as well. You cannot keep running. The world will basically meet reduction targets into the future and there are not going to be any pollution havens—this is going to be a global response. The political nature of it is that this part of the treaty, the Kyoto Protocol, which only goes until 2010, is just for the developed world. That does not mean that that is going to go on forever. We think that business decisions will be a bit more sophisticated than just saying, 'Right, let's pack up a successful operation and move elsewhere,' as basically a quick response to Kyoto, when it is very likely the developing world will be taking targets into the future.

I should also say that countries like China are already implementing energy efficiency laws. They have a large co-generation sector, which is producing energy on site. They are actually requiring industries to make co-generation plants. China's emissions in the last two years have fallen. Compare that to Australia's emissions, which have increased 16 per cent in one year. In the last two years Japan's emissions have fallen. Not all developing countries are going straight into the same industries we have had here—they are looking at some of the new lighter industries, with lighter manufacturing and new technology industries as the path for their development forward. I think carbon leakage is something that US decision makers obviously want to consider, but I am saying: seek more information, do not just believe, on face value, that everyone is going to pack up and go elsewhere.

Mrs DE-ANNE KELLY—I do not know if you had an opportunity to read the other submissions. I understand what you are saying about packing up and going, but I do not think it would be as simple as that. What the aluminium industry, for instance, have said to us is that, if there were the emissions trading, as you suggested, and, for argument's sake, $30 a tonne on CO_2, their cost of aluminium to export would go from $2,500 a tonne to $3,300 a tonne. No-one is going to buy Australia's aluminium at $3,300 a tonne when they can buy it at $2,500 a tonne from our competitors in Europe. So it would not be a matter of packing up; it would simply be that nobody would buy our aluminium. There are 3,500 people employed in the aluminium business in Queensland. I realise that does not affect Western Australia. It certainly has an effect in Queensland. It is not as simple as saying that they just keep producing. If people do not buy your product you do not sell it, so you do not make it.

Ms Reynolds—So who are they saying will step in? Who will be producing aluminium more—

Mrs DE-ANNE KELLY—Their submission to us says, 'No, of course we wouldn't pack up and go, but we would stop any further investment in Australia.' Depending on who continued to buy their aluminium, eventually, once the economic life of the present plants had gone, they would have to move. So it would certainly stop any further investment. It is not a doomsday scenario, but ultimately it is a very difficult outcome for those areas. It raises the question: how do we continue to sell our exports—and minerals is a big one—with that sort of impost?

Ms Reynolds—Things like coal and other minerals do not actually generate emissions when they are being dug up. We are talking about a couple of sectors, perhaps like the aluminium sector, who, if our response to Kyoto involves higher energy prices—and that is a big if—and if other countries do not also have energy reform, perhaps will not do as well. There are a few 'ifs' in there before we can say definitely that the aluminium sector will suffer as a result of the Kyoto Protocol. We have to ask the question: do we drive our response to this issue based on one industry that is not going to do well?

Mrs DE-ANNE KELLY—I think that is typical of other industries that have high energy costs, put it that way. As Senator Mason has said—

Ms Reynolds—The aluminium industry is pretty atypical: they use more—

Mrs DE-ANNE KELLY—They certainly are big energy users, that is for sure.

Ms Wishart—They are particularly atypical. They are talking about not increasing further investment, but I think that is separate from maintaining their existing operations.

Mrs DE-ANNE KELLY—Ultimately, it is hard to sell your product at $600 a tonne more than your competitors. Ultimately, there comes a time—

Ms Wishart—If your competitors are not subject to the same additional costs, yes. Part of the reason why it is important for everyone to be involved in the Kyoto Protocol is that, essentially, whatever the barriers being faced by Australia, similar barriers will be faced by those industries in the other signatories. As we are suggesting, beyond the first commitment period we are expecting to eventually see all nations involved.

Mrs DE-ANNE KELLY—How much do we contribute to world greenhouse gas production?

Ms Reynolds—That was in the table I put up before.

Mrs DE-ANNE KELLY—Yes, but as a percentage overall, how much does Australia contribute?

Ms Reynolds—It is about two per cent, which is about the same as the whole of Indonesia or the whole of the African continent. The UK, which has many times our population, produces about three per cent of global emissions. It does not sound like a lot, but when you are talking about 180 nations, two per cent is substantial and certainly much more than most European nations. As I said, we are 18th out of 180, so we are way up there in the top 20 total producers of carbon dioxide.

Mrs DE-ANNE KELLY—The per capita rate certainly does make it look very high, but two per cent overall is not a hell of a lot, is it?

Ms Reynolds—I was not talking about per capita. I was saying that in total carbon dioxide emissions we are number 18 out of 180—that is total, not per capita.

Mrs DE-ANNE KELLY—I thought it was about 252 thousand tonnes—is that right?—compared with 5.2 million for the United States.

Ms Reynolds—Sure. The United States is not a good example—they are the worst in the world, there is no doubt about it. But Australia is in the top 20; we are number 18 out of 180. So we are significant.

ACTING CHAIR—Thank you, Ms Wishart, Ms Abram and Ms Reynolds. As you go out the door, if the great point which you have not yet got across suddenly strikes you, please write to us.

Proceedings suspended from 1.42 p.m. to 2.16 p.m.

NAGLE, Mr Bill, Chief Executive, Australian Gas Association

SHAW, Mr Peter, Environmental Policy Officer, Australian Gas Ltd

WOOD, Mrs Leith, Manager, Government and Environmental Affairs, Australian Gas Ltd

ACTING CHAIR—Welcome. Do you have any comments to make on the capacity in which you appear?

Mr Nagle—I am appearing today as a spokesman for the broader gas industry—gas being natural gas in this particular circumstance.

ACTING CHAIR—What state are you from?

Mr Nagle—I am based here in Canberra.

Mrs Wood—I am representing AGL's views here today, but I should add that AGL is a member of the Australian Gas Association as well.

Mr Shaw—I am here to support Leith in our submission today.

ACTING CHAIR—Who is going to be the spokesperson?

Mr Nagle—I will lead off with a short statement and then my colleagues from one of my major member companies, AGL, will fall in behind me. The Australian Gas Association encompasses all sectors of the Australian natural gas sector—distribution, transmission, retail, production and manufacturers of gas appliances. We are talking about natural gas here; we are not talking about LPG or whatever.

The Australian Gas Association shares the general community, industry and government concerns about the possible impacts of global warming from an enhanced greenhouse effect on the social, physical and economic environment. Therefore, we welcome the opportunity to speak to the Joint Standing Committee on Treaties on this very important issue of the Kyoto Protocol, particularly with the looming COP6 coming up in a few weeks time, which I will be attending as a delegate of our international gas union, which is the international body for the natural gas sector.

ACTING CHAIR—When will that occur? I ask that because we might think it would be a good idea to ask you to appear before us again.

Mr Nagle—We leave on 15 November and it finishes on about 25 November. So some time in December it might be useful for the committee to bring before it a number of people who were there. It would be a good idea and I certainly would be available.

There are a number of levels on which we can debate the Kyoto Protocol, such as the science, the conditions necessary for Australia to ratify the protocol or the details of what flows from such ratification and the nature of the adjustment process that will ensue here in Australia. We are particularly interested, from the point of view of the natural gas industry in Australia, in focusing mainly on the third point—the adjustment processes that may flow from the ratification of the protocol. We will also make some very brief comments on the science and the conditions that we believe are necessary for ratification.

On the science, the AGA has noted the findings on climate change to date by eminent bodies such as the CSIRO and the Intergovernmental Panel on Climate Change, the IPCC. These bodies have found, as you have been told a number of times, I am sure, that there is measurable climate change occurring that is attributable to human activity, particularly the burning of fossil fuels and deforestation, and that this change is likely to have adverse environmental, economic, social and regional effects.

I understand that the third report of the IPCC is due out in March or so. There are thousands of leaked copies floating around the world, but I have not had a chance to find one yet. The IPCC's third assessment report is even more emphatic in its findings on the existence of human-induced climate change.

From the Australian Gas Association's point of view, we do not quibble with the science. We accept the science findings from the CSIRO, the Bureau of Meteorology, the IPCC, and other sources such as that; we have not commissioned our own science. Our member companies—similar to member companies of many other industry associations which I have noticed have appeared before you—have also said that they accept the science. They are more interested in debating issues to do with the adjustment process or the conditions precedent for ratification of the protocol.

ACTING CHAIR—So the position of your association—correct me if I am wrong—is that you look at the preponderance of the scientific evidence and go ahead on that basis?

Mr Nagle—Correct, yes. Purely from a precautionary point of view, we believe—and it has been discussed around our board table in various committees and throughout the membership—that the preponderance of mainstream views on climate change is that there is climate change happening, it is human induced and it is going to lead to adverse circumstances. What we do about it and how are the issues that we as an industry have been addressing.

Just taking a step back and having a look at where we have got to with the Kyoto Protocol, which was negotiated and agreed after COP3 in Kyoto, Australia was able to get an agreement to a number of very beneficial aspects of that protocol that may have been lost in the presentations you have had before you up until now. The negotiated arrangements which will be before COP6 in a few weeks time are quite beneficial to Australia and we may actually have a better opportunity to ratify the protocol and move on without the adverse impacts that some people are suggesting. These beneficial impacts include the concept of differentiation in the treatment of different nations according to their particular circumstances. Senator Hill and the negotiating team, back in December 1997, were able to get an eight per cent increase in emissions growth to the first commitment period—an outcome which I think he was heavily

criticised for by a number of people. From an industry point of view, we thought that was a very well done job.

The other positive aspects of it are the inclusion of sinks—you have heard a bit about that this morning—and the consideration of a number of flexibility mechanisms which will be very helpful to industries such as ours in countries such as Australia. These benefits should be acknowledged. Certainly the AGA supports the government's position, and has supported it in the past. We also support the government's negotiating brief as far as we can determine what it is. I believe that cabinet may be meeting yet again before that is finalised—I could stand corrected on that. The understanding of the position at the moment is that ratification of the protocol and bringing it into force will depend on a number of issues such as acceptance of the flexibility mechanisms I referred to; the rules for such mechanisms; the extent to which sinks should contribute to meeting targets; what the compliance systems should apply; the consequences for non compliance; and, of course, the role of the developing countries under the protocol. We support the government's position on that.

We do not have a quibble with the science. As to the government's conditions for ratification of the protocol, we are supportive of that. One thing that we would like to put on the public record, which is something that I do not think has been put to you yet, is that, if the protocol is ratified, the gloom and doom about what it will mean for economic growth, regional impacts, employment or whatever is possibly overstated. The reason it is overstated is that people see the introduction of the Kyoto Protocol as a problem for the coal industry and a benefit for the renewable sector and they see that as an imbalance which is obviously going to have a negative impact on Australia.

As a representative of the natural gas industry, we strongly disagree with that view. The AGA can demonstrate that the increased use of natural gas is a substitute for high greenhouse gas emissions fuels, such as coal; and for future energy demand is part of the solution to the challenge of maintaining economic, regional and industrial development whilst, at the same time, curbing the growth of harmful greenhouse gas emissions. We have a number of scientific and engineering reports which we can make available to you to support that contention, and it is beyond dispute.

Greenhouse gas emissions worldwide can be reduced significantly through the increased utilisation of natural gas rather than coal and oil. Natural gas is the cleanest of all the fossil fuels: it produces the lowest greenhouse gas emissions per unit of energy produced of all the major fuels currently available. Successive life cycle assessment studies have demonstrated that fact. It is also a highly energy efficient and flexible fuel. So it can be used for any decline in the use of brown or black coal in power generation; it is abundantly available, and it is easy to move to market. In Australia, we have at least 90 years supply on current energy usage patterns. In fact, Western Australia, South Australia, the Northern Territory and, more recently, Queensland, are all leading the way in gas- fired power generation. The more populous states of Victoria and New South Wales are still very coal focused. We have seen, with the advent of the new electricity market, possibly perverse outcomes, in terms of greenhouse impacts at least, and that the energy market is driving a more greenhouse gas intensive outcome in our society, which is causing the government some concern.

The research that we have had prepared also shows that if there is a switch to natural gas consistent with the forecasts or projections that ABARE has made for the next 15 years of energy usage patterns, then natural gas will account for savings of about 20 million tonnes of CO_2 equivalent produced from our economy and therefore has a major contribution to make in terms of meeting our Kyoto targets.

There are a number of other matters on your terms of reference to deal with specific matters such as grandfathering, trading credits, carbon credits, revegetation and so forth. We have gone to some of those issues in our submission, but I will not detail them here. I will just say that these issues will become the core of the greenhouse debate if and when the ratification process occurs—the issues about the science and whether or not we should ratify will be that debate, and the future debate will be about how we actually approach the mechanisms that implement the Kyoto treaty. Then, I think, we will be having a richer and a more complex debate.

ACTING CHAIR—Did anybody else want to say anything?

Mrs Wood—I will briefly add some comments in support of Bill's statement. As a member of the gas association, we support our industry view. AGL's submission would go just a little step further in that we wanted to highlight some of the opportunities that we believe exist in greenhouse reform. As Bill mentioned, there is a lot of concentration on the supposed negative effects that may occur in the economy. Obviously, as a publicly listed company, the economy and the interests of our shareholders are uppermost in our mind.

But, for that reason, part of what prompted us to put this submission to the committee was the view that opportunities do exist that can also achieve everyone's overall objective of having economic growth, employment growth, et cetera. AGL's view is that you can still achieve that. But, if you look at fuels that have a lower emission factor, natural gas is one of those—and AGL is a diversified energy company but a large proportion of our business is in the provision of natural gas. Obviously, there are business opportunities there for us and the customers and, I suggest, for the communities to which we make gas available.

We are a little step ahead of our association in that we believe that there are some positive opportunities to come out of this reform. We would like to highlight those. I know that the greenhouse debate is difficult and views become very polarised: either greenhouse is rejected as a nonsense or it is suggested that we should completely stop all emissions right now. We are suggesting some middle ground and also addressing that transitionary phase over the next 10 or 20 years, whatever it may be, when we look to move from carbon intensive fuels to less carbon intensive fuels. We think that moving to clean fuels can bring advantages that possibly may have been overlooked thus far.

ACTING CHAIR—Does anyone want to ask any questions or clarify any issues?

Senator TCHEN—My questions will not be in any particular order; I just jotted down some notes while you were talking. Mr Nagle, you said that gas can act as a replacement fuel, as an energy source, for coal. That is not the long-term proposition, is it?

Mr Nagle—That is certainly a long-term proposition. We have about 90 years of natural gas available to us. The current pipeline grid system can take gas from all the various remote basins

into all the major energy consuming centres. Foreshadowed in the next three to five years are further major investments in pipeline systems from PNG: bringing Papua New Guinean gas down into Queensland and Timor Sea gas across into the Northern Territory and possibly down through the centre into south east Australia. There are other sources of gas being looked at around Bass Strait. The markets in Tasmania, Victoria, New South Wales, Queensland, Western Australia and South Australia are currently well served with gas supplies.

Within the next three to five years we will have even more gas supplies, which we believe will continue to drive the price of gas down and make it a much more attractive fuel for power generation. Historically, there has been a view that we are short of natural gas, that we are just about to run out, that it is a premium fuel that should not be used for producing power—it should be used only for warming your water or your house in winter. That is a view that is probably a bit of a relic from the energy scarcity debates in the 1960s and 1970s. There is a plentiful supply of cheap and reliable natural gas in the country.

Senator TCHEN—I know that the explorations are continuing and that new fields are being discovered. You said that there is a 90-year supply. Is that for the domestic market? Let me take you one step back: from what you have just described, are you suggesting that the limiting factor for supply is the gas pipeline grid rather than the reservoir?

Mr Nagle—Certainly there is no limiting supply from the reservoir. If there are markets for additional power, say, in Queensland for more gas-fired power stations or to the Comalco plant—and I think we spoke to representatives of the Comalco plant recently—a pipeline will be built to service that. They may not be there now but they can be built. There is no constraint on either the basin supply or the pipeline, given enough notice.

Senator TCHEN—Are the reservoir basins limitless?

Mr Nagle—No, they are clearly not limitless, absolutely not limitless. The figures we have, which are produced by the Australian Geological Survey Office, is that there is a 91-year supply at current usage. That is a conservative figure. If you have a look at the way AGSO produces the figures, they ask, 'What are the known and available supplies? The answer is 91 years. What are the possible supplies in basins yet to be fully firmed up? The answer is that that is possibly another 50 or 60 years.

Senator TCHEN—That is on domestic consumption. What about the $1 billion contract which Woodside is supposedly writing with China, Japan, Taiwan and all those places?

Mr Nagle—Woodside and its partners currently export about one-third of the natural gas produced in the country as liquefied natural gas to Japan, predominantly, and they have a number of other supply sources that they can tap. So increased LNG exports out of north-west Western Australia would not constrain the supply of natural gas available for power generation or other industrial uses even in Western Australia let alone anywhere else in the country. I am not saying it is a limitless supply. We have always said that natural gas, in terms of the greenhouse issue and Australia's energy security requirements, is a transitional fuel, and we have got at least 30 to 50 years. We do not have to go straight from a coal economy to a wind farm or solar panel economy, which is sometimes the simple proposition that you may have put

before you. There is a very large transitional alternative and that is natural gas which is available.

Senator TCHEN—Can you tell me in general terms what the cost differential is between generating one kilowatt from gas compared to coal? I suppose there are two types of coal as well.

Mr Nagle—There is a variety of prices. In Victoria, because of the super abundance of brown coal and the fact that the power stations sit on the brown coalfields and brown coal basically has a zero cost, the price of generating brown coal power is very low. But in, say, Western Australia, where you do not have coal, natural gas is the fuel of choice for power generation expansion. I do not have the exact figures—

Mr WILKIE—They have got coal at Collie and there has been a coal fired station there.

Mr Nagle—That is right. If you go into the history of power generation in Western Australia it is almost described as an embarrassment that they actually put a coal fired power station in Collie given the abundant supply of natural gas. Coal price figures vary as well—the gas price ones vary excessively—so terms of figures, in the Northern Territory, Western Australia and South Australia and parts of Queensland the price of generating power from natural gas is cheaper than generating power from brown or black coal. Brown coal exists only in Victoria, of course.

That is the issue as it currently stands. The issue is whether there should be an additional cost for the power generation market to reflect the price of carbon being generated. Is the cost of power generation based on coal fully factoring in the full cost of supply? At the moment it clearly is not because the cost of carbon is not factored into that. If the protocol is ratified and a form of emissions trading comes in, which seems to be the preferred method as a market-based run rather than carbon taxes or heavy-handed regulation to respond to it—and, certainly, the proposal we would support—you will find rapidly a price of carbon being factored into both gas and coal, but the price impact on coal would be twice that of gas. I think you will find that the price competitiveness of gas will be better than coal.

Senator TCHEN—So in a sense, the viability or the longevity of gas as an energy supply depends on how quickly renewables can become a practical proposition?

Mr Nagle—We do not see necessarily ourselves going ahead with renewables—

Senator TCHEN—Once you factor in the cost of carbon.

Mr Nagle—I think we would only ever see renewables as quite a small player in the power generation market. Really, I think the competitive pressures will be between coal and natural gas. At the moment natural gas is used in the power generation markets in a number of states for peak and shoulder load because the power stations run on natural gas can be started much quicker—you do not need your 24-hour start-ups of a brown or black coal power station. These can be turned on and off in a half hour—not quite as quick as hydro. So people who run gas-fired power stations can do it much more effectively and cost efficiently if they are targeting peak and shoulder.

Those people who run gas fired power stations can do it much more effectively and cost efficiently if they are targeting peak and shoulder. In those states where there is no coal or in a circumstance where coal will have a carbon cost imposed on it, you will rapidly see natural gas being used for baseload power generation. We are seeing that in Western Australia, Queensland now, South Australia and the Northern Territory. Hopefully, the Victorian government, as they contemplate their greenhouse strategy over the coming months, will accept the same sort of logic that Queensland has just accepted.

Senator TCHEN—These days, do all gas fired power stations use gas turbines or do they still boil the water first?

Mr Nagle—No, they use turbines. You can either have an open cycle or a combined cycle.

Mr Shaw—I am not much of an expert on coal fired power stations but you could either have boiler or turbine—it would depend. The efficiency changes, though.

Senator TCHEN—That is why I asked that question because technologically the boiler would be more traditional and simpler, but there is a conversion factor.

Mr Nagle—Yes. Most of the gas fired power stations now are what are called combined cycle gas turbines, which is basically the state-of-the-art technology for gas fired power stations.

Mr WILKIE—Why is gas so expensive in comparison to coal? When we visited the Latrobe Valley, for example, we were getting figures of $1 a tonne from the generators to produce electricity, whereas we are hearing figures on gas of around $35 a tonne, so it is dramatically more expensive.

Mr Nagle—I would not confirm those figures but let me say a couple of things: brown coal—you were in the Latrobe Valley so you are talking about brown coal—basically has no price. It cannot be used for anything else apart from use in the brown coal power stations. There is no export market for it, no-one trucks it to South Australia, Western Australia or New South Wales. The power stations are built on top of it, so there is no shadow price, there is no international price. Basically, the cost of the brown coal is the cost of physically digging it up and moving it to the stockpile before you put it into your boiler.

Black coal has also been impacted on heavily by the Asian economic downturn. The price of black coal has been very low over the last few years. All of this has occurred at the same time as we have had the introduction of the national electricity market. There was clearly a surplus power potential in both New South Wales and Victoria, with the new owners of those power stations gaming each other, seeking to operate their power stations and create an income stream for themselves to repatriate for profits.

The price of power generation based on black and brown coal has been very low, and it has been cheaper than gas, but we believe that that is a blip; it is not a permanent situation. As more gas supplies become available in the national market, and when we get Timor Sea gas, Papua New Guinea gas and additional Bass Strait gas into south-east Australia and Queensland, I think you will see the price differential changing. I think you are already seeing it in Queensland.

Comalco appeared in front of you a few days ago. They are looking at major gas usage for power generation, I believe, in their operations there, and there is coal around. We are fairly confident that gas will, in the short to medium term, be highly price competitive with coal.

Mr WILKIE—Do you also deal with the LPG market?

Mr Nagle—They are not members of my association but companies like AGL have LPG businesses as well. They might like to comment on that.

Mrs Wood—We are here today to represent the national gas interests.

Mr WILKIE—Vehicles also produce a lot of greenhouse gas emissions. There has been a very strong push in Western Australia to get vehicles converted to LPG. Both the government and the opposition are coming up with plans to do that. The only difficulty is that the cost of gas is ridiculously high at the moment and does not encourage people to go in for it.

Mrs Wood—Vehicles can run on natural gas as well. It is a very low emission fuel, whether it be greenhouse or particulates or NOx or those other factors that contribute to urban air pollution. As for the price of natural gas as vehicle fuel—I will leave LPG aside because we are not qualified to speak on that today—I think you will find that, certainly, in the eastern states it is very competitive. Sydney, for example, has the largest natural gas bus fleet in the Southern Hemisphere and there are many commercial vehicles that already run on natural gas. The costing of the fuel is not prohibitive but I think you might be alluding to the infrastructure. Some of the refuelling infrastructure can be an impediment and the federal government has kindly provided funding to address some of those problems. Originally it was through the Prime Minister's Vision for the Future statement some three years ago. So that is a little bit of an aside to greenhouse, but I just wanted to assure you that natural gas is a vehicle fuel and it is competitive.

Mr Nagle—Can I just add one very brief note on that? Natural gas, being a domestically produced and an abundantly available fuel, has the other very strong attraction to it in that it is not subject to international price shocks. We are seeing major international price shocks obviously now with oil and LPG—they are linked in terms of the pricing mechanism. Those sorts of shocks in terms of energy security concerns, if an energy security is something that we are talking about here, is something that also natural gas is quite positive for.

Mr WILKIE—I am digressing here a bit, but how does natural gas compare with LPG and petrol in terms of operating amounts? Does it use roughly the same amount in a vehicle?

Mrs Wood—Essentially it is very competitive and, also, when the gas itself is burned as an energy to propel the vehicle it is also very efficient. My company car is propelled by natural gas as a vehicle fuel so I speak from personal experience. It is the same as petrol but much cleaner and much quieter.

Mr WILKIE—Would it be possible to send us some information on that if you have it?

Mrs Wood—Yes, certainly.

Mr Nagle—Yes. We are just about to launch a report on natural gas run vehicles, particularly the bus fleets. That is being launched in Canberra in about a week or two, so we can get you one of those.

Mr WILKIE—Thank you.

Senator MASON—We will not ask any more questions about science. I think we have done that to death today and I cannot progress that issue any further. There has been other evidence today about the use of natural gas. I think the evidence was that natural gas had been used in the United Kingdom and that because of its considerable use greenhouse emissions had fallen in recent times. Senator Tchen touched on emissions trading, and I think that is part of the new debate we will get into if we get through the first question on the scientific issues. I want to ask resource based questions very simply. Where are the reserves of natural gas in Australia?

Mr Nagle—In our submission we have a table and we have a map at the back which is reproduced here. The major reserves—you are talking about untapped ones?

Senator MASON—Ones online.

Mr Nagle—The major ones are really the Carnarvon Basin, which you probably more commonly know as the North West Shelf off Karratha, Port Hedland and Dampier. That has got about 45 per cent of the confirmed reserves of natural gas. You have got a couple of big basins up in north-west Western Australia and off Darwin, and obviously those ones which are in the news at the moment in the Timor Sea—the Bonaparte Basin in the Timor Sea area.

You have got reserves further down the west coast of Western Australia, and you have got Bass Strait fields—Gippsland, Otway and Bass Strait itself—and very major fields inland, right in the dead centre. Basically, they are Cooper-Eromanga, Amadeus, Eromanga Basin through central Queensland, et cetera. They are conveniently spread to be as far away from major population centres as possible, which our pipeline building members absolutely love because that is their bread and butter. But we also have potential to import natural gas through a pipeline from PNG, which opens up a whole new set of possible fields.

Senator MASON—Who owns natural gas in Australia generally?

Mr Nagle—The producer companies: BHP, Exxon—Esso is now called Exxon—Chevron, Santos, Woodside, Origin, BP and a couple of Japanese companies. So there is a range of people. There are also a number of small players: Apache, Tap Oil, it goes on and on.

Senator MASON—We will increase our reliance on the natural gas equivalent of the Seven Sisters, will we, or something like that?

Mr Nagle—Possibly.

Senator MASON—What you are saying to me is that there is competition?

Mr Nagle—Absolutely.

Mrs Wood—The whole thrust of competitive reform in recent years has been driving that. The whole energy field, particularly the gas sector, has derived many benefits from competitive reform. I suppose the next wave of that is driving inter-basin competition, so that in a few years we could have the Cooper Basin competing with PNG, competing with Timor Sea, competing with Bass Strait.

Senator MASON—I only asked because I think Mr Wilkie's questions were directed partly towards that, in the sense that many of our constituents are concerned about oil companies, banks and the rise in LPG in recent times. As soon as the price of petrol goes up, the price of LGP goes up, there is a certain mentality within our constituency that there is some sort of cartel operating.

Mr WILKIE—That is right, and there are uncompetitive practice issues relating to LPG, particularly in Western Australia. Some of the suppliers are under investigation by the ACCC for that.

Mr Nagle—We are fortunate in the natural gas industry that we have avoided all of that. Because of the increasing competition between natural gas suppliers, I think one of the great outcomes of the government's energy reform strategies will be that we will have cheap, reliable and competitive natural gas. The classic case recently, as you may recall, is that there has been a pipeline built from Bass Strait into Sydney, up through Gippsland and past Canberra. If you go about 10 kilometres you will run into it. Bass Strait gas now competes directly with Central Australian gas in the Sydney market. I think the gas on the flame during the Olympics was, at least in an accounting sense, gas from Bass Strait.

ACTING CHAIR—Who prepared this map?

Mr Nagle—We prepared it, on the basis of information from our members and also AGSO.

ACTING CHAIR—I put it to you, Mr Nagle, that it is a very deficient map. I will tell you why: I was born on King Island.

Mr Nagle—King Island got swamped because of the light green blur there but it is a very honourable place to have come from. I have just read a book about King Island. But we will certainly, Senator Cooney, make sure that King Island's outline is etched in a bit more heavily. It is there, but it is actually blurred out by the Otway Basin.

Senator TCHEN—I would like to ask a quick question. We both touched on this, but I never actually got around to asking you to state your association's position. You made some reference to carbon trading, pricing carbon. By implication, I assume, you mean that your association would support the idea of at least a domestic carbon trading system.

Mr Nagle—Our association's view is that, if the Kyoto Protocol comes into being, adjustments would then need to be made, because obviously we would have ratified it and are therefore going to do something about it as a country. What is the best way to do that? There seems to me to be a number of ways. There are mandatory energy restrictions and requirements. There are carbon taxes. And there is a market based solution which we call carbon trading, which is actually a nascent market now anyway—companies are beginning to trade in carbon

amongst themselves. As a business association we believe a market based solution is far more efficient and effective than regulatory ones and therefore an emissions trading scheme would be the ideal way to go. That is a generally accepted view around the place.

The issue about whether or not we have a domestic one that is different from an international one is a question we will need to sort out, if and when the protocol is ratified. Generally, our association's view is that, because of the small size of the domestic market, if we have a domestic trading scheme running and there is not an international one, our market could face heavy predatory action by other players internationally. So we would prefer a domestic trading scheme in concert with an international one.

Senator TCHEN—You also mentioned the issue of supply. One of the supplies you referred to was the one from PNG. That would be a major supplier. What happens when PNG's economy gets out of its current state and it starts needing energy? It is the same with the Timor Sea supply. We will have competition for our supply, won't we? Will that drive the price up?

Mr Nagle—I would not imagine so. What we are seeing in the PNG Highlands with the fields which are being developed there is very much the tip of the iceberg of capacity. In the Timor Sea, out of the five or six major prospects there, only Greater Sunrise and Bayu-Undan are the fields being speculated about as being a supply for the Australian market, and they should be sufficient to serve northern Australian markets and also pick up export markets as well. Some of those are oil and gas fields. Ultimately there will be a supply constraint, in 90-plus years or whatever.

In terms of the response to the Kyoto Protocol and the need to have fuel switching away from high emissions fuel such as coal to low emissions fuel such as natural gas, in the next 30 or 40 years there is no question at all about the availability of natural gas. In 30 or 40 years we will probably be looking at another whole range of technologies—the hydrogen economy—and we might be sitting here as the incumbent field, with the hydrogen industry sitting next to us and having a go at us. But, if we ever get into that situation, that would be quite positive because we probably would have dealt quite effectively with the greenhouse challenge that looks like being imposed on Australia.

Senator TCHEN—From most of the things I have read about hydrogen engines, they are based on natural gas as well.

Mr Nagle—Strange that you should say that! They can also be based on splitting water and other things. Clearly, delivering hydrogen via natural gas pipelines is pretty efficient.

Senator TCHEN—What about coal gas—do you regard it as a form of natural gas?

Mr Nagle—Yes, we certainly do. We have a number of members with coal seam methane gas. In fact, AGL has recently signed contracts with some of those. AGL supplies natural gas to the Sydney market and elsewhere. Coal seam methane gas is methane, at the end of the day, and natural gas is 95 to 98 per cent methane with little bits of other things. Coal seam methane is a very good new source of gas. It tends to be close to the market, in Queensland and New South Wales, and has the additional advantage of removing some of the volatile gases out of coal seams for when miners go in there later.

Mr WILKIE—Can LPG be sent down the pipeline with natural gas? Is that how it comes down from North-West?

Mr Nagle—It can be. There are a number of sources of LPG.

Mr Shaw—You just have to put a pig in between the two gases. LPG is a liquid at fairly low temperatures and pressures.

Mr Nagle—Normally it comes in tankers, separately. But in Western Australia there is quite an innovative arrangement where in the North West Shelf they strip the LPG out to the natural gas. Wesfarmers have an LPG gas plant in the southern suburbs of Perth. They then remix the LPG into the natural gas and send it down the 1,600 kilometre long pipeline to the pipe and they strip it out again. But we are talking about very small percentages. Methane is 95 or 98 per cent natural gas. The industrial gas—the LPG gas coming down to the Wesfarmers plant—is only a couple of per cent. So in terms of the volatility and the impact it has on the pipes in terms of pressures and temperatures that Peter referred to, it is not a problem.

Mr WILKIE—Is it expensive to separate it out?

Mr Nagle—I really do not know; you would have to ask Wesfarmers that.

Mr Shaw—It is a refrigeration process.

Mr WILKIE—Right, and it just solidifies.

Mr Shaw—You just cool it down, and the LPG drops out. But I do not know the price.

Mrs Wood—I know reference was made earlier in the day to some concerns that greenhouse policy being activated may lead to high levels of unemployment in regional areas. I want to inject a more optimistic note from AGL's own business experience, and the gas industry broadly, in that the gas industry by its nature—with pipelines and distribution—traverses many regional sections of Australia. Over the last 20 years, AGL has taken natural gas to Canberra, Leeton, Griffith, Forbes, Parkes, Dubbo, Wollongong and all over the place—and hopefully it will go up to Tamworth—if you just look at New South Wales as an example. With that has come industry and growth in all those local areas as the network spreads out.

I would like to leave that as a thought in the minds of the committee members: greenhouse positive policies do not always necessarily equal unemployment. If there are other sources of energy—and gas is a perfect example—they bring employment to rural and regional areas. The PNG pipeline will traverse about 90 per cent of the Queensland coast; that is another case in point. I wanted to leave on a more optimistic note.

ACTING CHAIR—Thank you very much for that.

Mr Nagle—This is probably the reason why Senator Hill, in responding to the Alan study that has been presented to you and that I am sure has been heavily promoted to you, said that he thought it contained a dramatically overly pessimistic impact on GDP. I suspect some of the

positive outcomes that could flow from natural gas playing a bigger role in energy supply in a post-Kyoto world are the basis for future growth and a less pessimistic view.

ACTING CHAIR—Thank you very much. As I always say to everybody else, if you get out the door and think, 'There is a sensational point that we overlooked,' which I always used to do, we would be very pleased to have you drop us a line.

Mr Nagle—We may yet give you some information on natural gas vehicles. Thank you for the opportunity to give evidence.

[3.04 p.m.]

CURTIS, Ms Karen, Director, Industry Policy, Australian Chamber of Commerce and Industry

TYTHERLEIGH, Mr Andrew, Environment Adviser, Australian Chamber of Commerce and Industry

ACTING CHAIR—Welcome.

Ms Curtis—Thank you for the opportunity to speak to the committee. I have responsibility for industry policy, which includes the environment. My colleague Andrew Tytherleigh is our senior adviser on environment, and he has the day-to-day responsibility for environment for the chamber.

ACTING CHAIR—Are you located in Victoria?

Ms Curtis—Yes. We have two offices—one in Canberra and one in Melbourne. Andrew and I work closely together, even though we are not located together.

Senator TCHEN—I think it is a very commendable association, if your head office is located in Melbourne.

Ms Curtis—Our head office is located here, but there is an office in Melbourne.

Senator TCHEN—So long as you stay out of Sydney.

Ms Curtis—I would like to make a brief presentation to the committee and then Andrew and I would be happy to answer any questions that you may have. The Australian Chamber of Commerce and Industry is the peak industry association in Australia. We have 37 members, and through those members we represent about 350,000 Australian businesses, from the very largest to the very smallest, across all the states and territories and across all sectors. We can really say we are truly representative of Australian industry. We have developed a policy on greenhouse, which has been informed by our members and which guides our response to all the climate change issues, including the Kyoto Protocol.

We have eight key elements in our greenhouse policy, and I will run through them quickly. Firstly, although there are uncertainties in the science of climate change, we accept that there is sufficient reason to be concerned that increasing levels of greenhouse gases have led to changes in the world's climate system. We think Australia should contribute to global action to reduce greenhouse emissions. We need active participation in the Kyoto Protocol of developing countries so we can effectively address the global climate change problem and minimise distortions to world trade. We think we need a strategic whole of government approach to greenhouse to ensure that policies and measures are implemented in a way that lowers the cost of meeting our international obligations and distributes the cost burden equitably and in the national interest across the community.

We want future greenhouse policy to provide legal recognition for early action initiatives by business. Greenhouse policy should take account of the dynamic nature of the economy and investment opportunities. We want market based mechanisms because they usually provide a more efficient and less costly way of meeting any international commitments we make. Despite any uncertainty regarding the potential environmental consequences of climate change, we think that greater emphasis needs to be placed on the development of adaptation strategies. Finally, we think the government and the private sector have a responsibility to ensure that the whole Australian community fully understands the magnitude of the task we face in reducing greenhouse emissions and all of the issues and implications of greenhouse policies.

Within that framework, we want the negotiations on the Kyoto Protocol to achieve the following for Australia: Australian jobs should not be sacrificed; we want the competitiveness of efficient Australian industries maintained; we want Australia to assume a fair share of the burden to reduce greenhouse gas emissions; and we should not take any action that does not have the effect of reducing global emissions. Most importantly, we should not ratify the protocol until there is a process in place for including developing nations.

I will quickly touch on COP6 because there are some decisions to be taken there that I think are important in your overall brief. We want the Kyoto mechanisms to be efficient, transparent and not constrained by arbitrary caps or other direct or indirect restrictions that would prevent the protocol's commitments being met in the least cost way. We want any compliance and liability systems to facilitate parties to meet their commitments and we want them to be based on the integrity and laws of existing national governments rather than depend on a whole new range of international law developing. We want the sink definitions and implementation rules to be sound and take full account of different national circumstances. We insist on the acceptance of an approach based on sound science and our national circumstances. We support the right of other countries to adopt similar or different sound approaches based on their national circumstances.

We want the measurement methodologies, monitoring, reporting and review rules procedures to be based on sound science and technical principles and to take account of differences in national circumstances. We are opposed to any proposal to introduce levies to fund joint implementation or international emissions trading, because that is directly contrary to achieving the most cost-effective result.

In summary, ACCI believes that Australia is making significant attempts to reduce greenhouse emissions. Due to our unique circumstances, we have more challenging issues than many other countries. However, we should not be expected to shoulder more than our fair share and we believe the world must act together to achieve lasting reductions and outcomes for all of us.

ACTING CHAIR—Mr Tytherleigh, do you want to say anything?

Mr Tytherleigh—I am happy to talk to our submission and then answer any questions. The submission that we put in addressed three of the terms of reference. I think the third term of reference sought some definitions which we did not address.

Looking at what the implications are for Australia of proceeding or not proceeding to ratify, as Karen has pointed out, our understanding is that the COP6 negotiations will be extremely difficult. There are, within all the elements of the Kyoto Protocol, still a lot of unresolved issues. There are currently a lot of options on the table from the various blocks and countries to be resolved. Overlaid with that is the political interests of all the various blocks. As you are probably well aware, the G77 developing countries are playing an extremely hard game in terms of wanting to seek the best outcome for themselves.

Central to our belief about the Kyoto Protocol coming into effect is the need to develop or identify a pathway for developing nations to participate. Given that within the next decade they will produce about 50 per cent of the world's CO_2 emissions, compared with about 1½ per cent that Australia generates in total CO_2 equivalent emissions, it seems rather pointless to us for the axe to fall on developed nations without any way of identifying a pathway for the developing nations to start participating. Any actions we take will be a drop in the ocean.

Even before we get to Kyoto, we think that there are a number of preconditions—that all those sorts of issues need to be resolved, whether they will be or not. We understand from the latest briefing from Foreign Affairs and the AGO that there is a lot of pressure on countries to do a deal to try to get a Kyoto outcome. The involvement of ministers is going to be greater this time around, so they will be looking for political deals to achieve outcomes. There will be a lot of pressure on countries to come up with some form of a deal. That, we believe, places Australia in a vulnerable position.

Having said that, we think that, until those aspects of the Kyoto Protocol are clarified and the text is clearer in respect to what is going ahead, we should not act with undue haste. Our view has always been that we should move together in this process rather than step out in front. We support the negotiating strategy of the Australian government in their COP6 negotiations. The central points of those are that there should be maximum flexibility in all the mechanisms. There are a number of countries that are trying to propose a cap for these various mechanisms. We believe that we will need that all countries will need that flexibility to be able to achieve their targets.

We believe that Australia should be prepared to draw a line in the sand over, especially, the developing countries' participation and also the resolution of the flexibility mechanisms. We should be prepared to say, as the government has indicated to industry and the community, that we will not ratify the protocol unless these conditions are met. We support that position. There will be strong pressure on Australia; we recognise that. But I should add that there is strong recognition that Australia is performing extremely well domestically, that the programs that are in place—the money, the resources that have been provided by the government to implement domestic reduction and measures—are second to none around the world and that is well recognised internationally. The review of Australia's national communications recognises all those. All that being said, a number of measures have just recently come into place that it is anticipated will start to reduce those emissions within the next five years. Currently, as you would know, our emissions are running some 10 to 18 per cent over target. However, it is expected that they will start to come back.

It is hard to say what the impact would be on Australia if we did not ratify and other countries did, but I think we can always point to the fact that we have in place good domestic policies,

that we would maintain the commitment to improving our emissions domestically as a way of contributing on a global scale. I do not think you need particularly to ratify the Kyoto Protocol to achieve greenhouse gas reductions domestically.

The second term of reference concerns the veracity of conflicting scientific theories, and any solution proposed. The thrust of our submission on that was that we recognise that the science of greenhouse is still extremely uncertain. One thing is certain: CO_2 levels are rising in the atmosphere. Apart from that, there is still a great deal of debate about whether that has an impact on our climate. We acknowledge, however, that there is a lot of concern by the community globally, as well as domestically, for governments to take some action on that, and we have always supported prudent action where it is cost-effective.

We support the notion that there should be more scientific research, and we recognise Australia's contribution in this area, which has been extremely good. But, in terms of a debate about the science, we believe that the policy issues are far advanced. To some extent the research should go on about the science, but obviously the policy has moved on beyond that to a commitment to try and reduce greenhouse gas emissions.

On the fourth term of reference: as Karen indicated, we support market based mechanisms to achieve reductions. Legislation should only be used as a last resort. That is from our fundamental belief that legislative measures have tended to be less cost-effective and end up creating distortions. I would like to draw people's attention to a paper from the Parliamentary Library which contains a good discussion about the renewable energy bill, which is one legislative measure that will provide an opportunity for renewable energies to test the marketplace, to see how effective they can be and also to look at the various energy measures as between each other. But there will be a cost to consumers, and one of the key issues for industry is that the cost of electricity—power—is a relatively fixed cost, and business has to wear that cost. It is very hard to mitigate that. The approach to achieve greater generation under the renewable energy bill will mean that over the next 10 years the costs of electric power will rise vis-à-vis those of coal fired or fossil fuel based. That might be able to be done in such a way that it can be offset, but we would make the point that generation costs are a fixed cost for business.

We think it is important that the government does not try and pick winners in the renewable energy debate—that businesses should be able to have a go on their merits. As you would know, there are a number of competing sources out there. The other issue that we are obviously very concerned about is that, because Australia has been built on cheap energy—Australian industry has benefited from cheap energy—any price increase in the cost of energy will impact on Australia's international competitiveness. For many years now we have been an export focused market. We are competing against other countries that do not have the same commitments under Kyoto, and so anything that affects the cost of energy is going to affect that competitiveness issue for Australian industry—the carbon leakage issue— so we are obviously concerned about that.

In terms of where we think we should be going, we believe that in the short to medium term we should take advantage of the technology, combined with demand side management powers. The Greenhouse Challenge has demonstrated that there are a number of areas for cost-effective actions that Australian industry can take. A number of programs that we are currently involved

in include broadening that Greenhouse Challenge concept out to smaller producers and smaller manager users who can make some demand side management decisions that will reduce their power bills and reduce CO_2 emissions. We think that that is still an untapped market and that the focus of a lot of these policies comes back to maintaining a commitment to implementing cost-effective actions domestically.

In conclusion, the only other issue is that we should look at greenhouse as not being separate from the other land management issues that Australia faces. The land management issues in Australia—salinity, tree decline, water, loss of biodiversity and habitat—are all major issues for Australia and we support the integration of any greenhouse policies that also improve and have those benefits for the broader land management issues which we think are as critical. That is a brief synopsis of our submission.

Mr WILKIE—You mentioned that there are a number of programs in place to reduce greenhouse emissions. We have heard, even today, that we are doing very badly—in fact, we are 18th on the list of world producers of greenhouse gases. What programs and technological improvements are you aware of that are actually in place and happening now, particularly given that the main CO_2 producers are probably coal-fired power stations?

Mr Tytherleigh—It is 70 to 80 per cent, as I understand it. The government has introduced the performance indicators for power stations, and that is expected to deliver some substantial benefits.

Mr WILKIE—Over what period?

Mr Tytherleigh—Between now and the first commitment period. That will take some time to come in. Similarly, with the Greenhouse Challenge, I do not have the figures in front of me in terms of what has already been saved, but certainly there is a push on now to broaden the reach of that program to start encompassing the smaller and medium emitters. It has been particularly effective with the larger emitters, in that the majority of those have signed up but, obviously, there are a lot of medium to small companies around. I will give you an example. One bakery chain looked at their own premises and processes. They saved $1,000 a year—less than 1,000 tonnes—but for them, that was profitable. That is the sort of approach that we feel can and should be adopted.

Currently, our member state chambers are involved with the AGO as what is called third party recruiting: the chambers' members are signing up to the Greenhouse Challenge and they are being provided with assistance to identify energy saving measures. That has been in place in the Northern Territory for a bit over 12 months and is being implemented currently in Queensland and South Australia. It has started already delivering some benefits, certainly for the Northern Territory, where they use fairly large amounts of power, especially for such things as airconditioning. They have been able to identify some pretty good savings.

The other issue for us, however, is that this is not just a program that industry should be involved in. As you are probably aware, 20 per cent of the domestic emissions come from agriculture, and a lot of that is methane from stock and rice cultivation. We have always thought that, firstly, this is a global problem so it needs global solutions, but, secondly, domestically it covers all sectors of the Australian economy. We have always been of the view that it should not

just be business that is targeted with this. The commercial sector, the residential sector and the agriculture and transport sectors also have a real role to play. We are committed to doing our bit, but we believe that there is a range of other sectors in this country that also can do more.

Senator TCHEN—You mentioned that your association represents 37 members, with over 350,000 businesses nationwide. By my calculation, you represent something like half of the employed work force.

Ms Curtis—I have not cut it that way, so I cannot tell you. There are about a million small businesses in Australia.

Senator TCHEN—I am assuming you have in small business 15 to 30 people per business.

Ms Curtis—No. Small business is up to 20 people.

Senator TCHEN—Do all the businesses you represent agree with you that the Kyoto Protocol should not be ratified? Are there different views?

Ms Curtis—Of course, Senator, there are different views across the whole range of business. It is fair to say too that a lot of businesses have not focused on greenhouse as an issue yet, because they have not understood that it is going to affect them if policies are put in place that will affect their competitiveness. I would not suggest for one moment that the 350,000 businesses that we represent through our members all understand the ramifications of signing the Kyoto Protocol. A lot of them, obviously, would not know about the Kyoto Protocol.

Senator TCHEN—You are saying they do not understand it, therefore they may not oppose it. Would any of them actually understand it and not oppose it?

Ms Curtis—The way we develop policy positions within ACCI is through our members. We have what we call general council meetings; we take policy positions to that general council that have emerged through consultative processes, through a committee structure. There are lots of opportunities for businesses to feed their input into the industry associations that represent them, which are our members. I would say there is a lot of discussion and it is a consensus that is reached, and always with a consensus you do not have everyone in 100 per cent agreement.

Senator TCHEN—Obviously, there is a big range of business. Do you represent any commercial farmers and transport companies?

Ms Curtis—I am sure there are some farmers in the chamber networks around Australia, but we do not specifically deal with those issues. The National Farmers Federation tends to look after the farming interests.

Senator TCHEN—What about transport companies?

Ms Curtis—Yes, I am sure that our members would have transport companies as their members and, likewise, they have agreed. The position has been adopted by all of our major members, most definitely.

Senator TCHEN—Even those industries which might benefit from greenhouse emission policies?

Ms Curtis—That would benefit?

Senator TCHEN—Yes. Some industries are bound to receive some positive impact. It cannot all be negative.

Ms Curtis—No, and with any policy you adopt there are always negative and positive impacts for a range of different businesses. I think there is a general consensus, though, that it is an issue that the community is concerned about and business needs to take that concern seriously, and also that it makes good economic sense in terms of eco-efficiency, of making their businesses more environmentally efficient. So there is that aspect to it too.

Senator MASON—The evidence we have heard thus far can perhaps be summarised that those who think that the Australian government or executive should ratify the Kyoto Protocol think so on two grounds. One is that the environmental hazards are so great that it warrants Australia doing that and playing its part as a good global citizen, and the second is that the forecast dire economic consequences of ratification of the Kyoto Protocol are overstated. They are the primary two reasons. Even in your greenhouse policy, in the first dot point you concede that there are uncertainties in the science of climate change; there is sufficient reason to be concerned. Why shouldn't Australia play its part as a good global citizen and ratify this protocol?

Before you answer that: I did hear the argument before that developed nations are among the world's great polluting nations. That indeed is true, although their per capita polluting capacity is much lower than Australia's or that of the United States. Moreover, there might be another argument you could put, that in fact it has been the developed world that has polluted the world in the past and that, in a sense, we are living off the fat of that polluting capacity and we have no moral ground at all on which to tell the developed nations that their competitiveness should be stymied by our later recognition that pollution will wreck our competitiveness or, indeed, our quality of life.

Ms Curtis—Without doubt the issues are very, very complex, but the fact remains that Australia emits less than two per cent of the global greenhouse emissions. Anything that we do should aim to reduce the problem globally. We believe that there are options for bringing in the developing countries by saying that under the flexibility mechanisms, with joint implementation and clean development mechanisms, lots of projects can be undertaken that actually can help to reduce the greenhouse gases in those countries as well as in our own. So we think that those mechanisms are important. It is an inescapable fact that the developed nations have emitted, in the past, far more greenhouse gases than the developing nations, but we are going to address the problem now. If we have got the globe, and there is 100 per cent of whatever the number of greenhouses gases is that are emitted, we now have to start dealing with the problem and not look at what has happened in the past. The solution lies in the future, not in what has happened previously.

Senator MASON—If I were the leader of the People's Republic of China or somewhere like that, I would have a great deal of difficulty buying that. I think you would understand why.

Ms Curtis—Absolutely.

Senator MASON—It is very easy for the West to stand up and say, 'You can't do that.'

Mr Tytherleigh—I do not think we are saying, 'You can't do that.'

Ms Curtis—And we are looking at ways to collaboratively—

Senator MASON—In effect, you are, if our ratification of this protocol is conditional upon their coming on board as well. Let me ask a specific question. I might be playing devil's advocate here, so do not get too concerned. What would your view be if, for example, the United States said they would come on board but they would not demand that developing nations come on board as well. Would you then say we should sign up? Still not?

Ms Curtis—Still not. The principle is the same.

Senator MASON—With the history of the world over the last 200 years, you would say we should still ask developing nations to be compromised?

Ms Curtis—It is a world problem. All of us have to find the solution and work collaboratively.

Senator MASON—But we caused it.

Ms Curtis—It is irrelevant.

Senator MASON—Honestly, I do not know that I actually buy that. I buy many of your other arguments but I would find it difficult to come to terms with that. If I were the President of the People's Republic of China I would be thinking, 'It is all very bloody well for them. They caused the bloody problem.' And I would not blame them, quite frankly. The West has an extremely high standard of living and it really is becoming more and more difficult for the West to preach to the others about things like pollution.

Ms Curtis—But when you say the Western world—

Senator MASON—You have to give them something. You know that, don't you?

Mr Tytherleigh—Yes. We could give them clean coal, so they could stop—

Senator MASON—More than that: there would be wealth transfers and everything else.

Mr Tytherleigh—We could give them clean coal, we could give them the technology to improve their generator capacity, we could give them the ability to stop air pollution—we could certainly provide that level of skill and expertise. We could also export our liquefied natural gas to them.

Senator MASON—What are you going to do? What sort of technology transfers and wealth transfers are we going to give to these countries to make it worth while to them to sign up? If you were those countries, you would say, 'This is outrageous.'

Mr Tytherleigh—And that is what they are saying.

Senator MASON—I do not blame them, and I am in the Liberal Party.

Mr Tytherleigh—They are saying, 'We have the right to develop our economies to the level of the First World—the developed nations—that we are going to do that.'

Ms Curtis—And then they will have enormous problems when they become developed countries, trying to meet the targets.

Mr Tytherleigh—And then they might tackle the problem. 'Then,' they might say, 'we will turn around and reduce CO_2 emissions,' but by that stage who knows where we will be. Part of my presentation was that we are undertaking significant numbers of actions to try and reduce our greenhouse gas emissions. But, that being said, we should recognise the difficulty that we face as a country to reduce those emissions because of our energy profile, the distances involved and so on.

Senator MASON—I accept all that.

Mr Tytherleigh—Therefore, you have to ask yourself: to solve a problem, do we destroy our economy in the process, or do we find a way of enabling us to maintain some level of economic development as well as encouraging the economic development that is occurring in the developing nations, in such a way that they are able to implement these sorts of reductions without interfering with their economic development? That is what we are trying to look for.

We are not against the Kyoto Protocol. What we are saying is that there are so many unresolved issues and that, because of our special circumstances—the 108 per cent—we stand to lose a lot more than many other countries if we move too quickly on this. The negotiating has always been to move the whole thing forward as a package: the flexibility mechanisms, the emissions trading, the sinks issue—which is still unresolved. They are talking now about additional activities, which will place Australia at a further disadvantage because they will want to count natural wildfire as CO_2 emitting. You can imagine that, if we had a bad El Nino year, we would suddenly have to include all those natural CO_2 emissions in our inventory profile.

Senator MASON—I just want to bring this cultural issue again to the fore. We had the environmentalists before, and their view is always the good international citizen line. Yours is not.

Ms Curtis—We are. We want to be the best international citizen.

Senator MASON—But you will compromise being the good international citizen by national self-interest.

Ms Curtis—No. There is a distinction there. Anything we do as a nation must contribute to global gas emissions decreasing, otherwise why would we bother? Why would any person try? It does not make sense. It is illogical.

Senator MASON—Would you be willing to sacrifice your standard of living to ensure that that happened?

Mr Tytherleigh—Ask the Australian community that.

Senator MASON—That is exactly the point I am making.

Mr Tytherleigh—You ask everybody else if they are prepared to sacrifice their standard of living to give us a good world, so we can actually do our bit.

Ms Curtis—But the world will not be good. It will get worse, because if we are not—

Senator MASON—I think you can draw a cultural distinction here. We get people coming here telling us we have got to be good international citizens. I know, Ms Curtis, you are saying that the two can meld into one. Yes, but not initially. The fact is that the Australian community may be reluctant—and, as politicians, we are accountable to them—if they are being told they have to accept either loss of jobs, let us say, or lower standards of living that could result from the ratification of the Kyoto Protocol. That is the problem. However, I still think this issue about developing countries will be absolutely central in the end. Quite frankly, some of the points you mention this afternoon I agree with, and the committee may also. I cannot speak for the rest of the committee. But that point, if I were a developing nation, I would have all sorts of problems with.

Mr Tytherleigh—India have said they will never sign the Kyoto Protocol.

Senator MASON—Yes, and you cannot blame them one bit.

Mr Tytherleigh—No. We are looking for a pathway. We are not saying that we want them to sign up at COP6. We are looking for some sort of pathway, and I know from the briefing that we have been given that it is a central issue for the developing nations: how to start plotting a path for the involvement of drawing the developing nations in. Obviously, technology transfer, wealth transfer, is one way of providing them with our expertise that we have learned, to develop their economy in such a way that they can, effectively, start reducing emissions from the time that they start doing it. The other argument is that you bring their economies to First World status and then you worry about what to do about CO_2 emissions.

Ms Curtis—But, meanwhile, when that happens the level of CO_2 emissions has already grown dramatically.

Senator MASON—That is all very well for you to say, Ms Curtis, because you live in the First World. It is easy for us to say that.

ACTING CHAIR—I have a question arising out of what Senator Tchen asked. You put your position. Does that come from a particular industry group within your organisation? We have

got some evidence which would suggest that if we adopted the protocol, the Kyoto agreement, that would lead to an industry that was more high tech. There was the inference that, if we stayed where we are now, we would be going to stick with old industries. We have heard about new economies and old economies—it has not been put in that way by anybody yes, I don't think—and I thought Senator Tchen's question was a fairly vital one. I just wanted to know whether you had anything to say about that. Is the Australian Chamber of Commerce and Industry's mind set on saying, 'Let us leave things as they are in terms of new research and development?'

Ms Curtis—No. We think there are lots of opportunities for environmental industries to grow, and Australia does have some expertise in those areas. We push very strongly for an innovative culture to be adopted within the Australian community. We have been very involved in the government's Innovation Summit process. There are 24 recommendations in a report before the government at the moment, and we have argued continuously for the 150 per cent tax concession for R&D to be maintained. We believe that there is a lot of opportunity for Australia to invest in growth industries that will result from having an excellent science, engineering and technology base.

ACTING CHAIR—Thank you very much. Thank you for coming along, Ms Curtis and Mr Tytherleigh. As I said to everybody else, if you get the inspiration as you are on your way to the airport, certainly drop us a line.

Ms Curtis—Thank you very much.

[3.44 p.m.]

HAMILTON, Dr Clive Charles, Executive Director, The Australia Institute

ACTING CHAIR—Thank you, Dr Hamilton, for coming along. We apologise for having kept you waiting.

Dr Hamilton—I appreciate the opportunity from members and senators to address the committee, and also understand that we are somewhat time constrained this afternoon.

ACTING CHAIR—We understood that you wanted to make some points and you would be coming back.

Dr Hamilton—I did have a discussion with the chair of the committee this morning, and he indicated that perhaps there might be an opportunity on 4 or 11 December to come back and explore some of the issues in more detail.

ACTING CHAIR—Or even on some other dates.

Dr Hamilton—Whatever suits the committee. That would be after The Hague—I will be attending The Hague, so if there are any questions arising from that I would be happy to answer them. I would like to make a few comments at the outset, if I may.

ACTING CHAIR—Thank you very much, Dr Hamilton.

Dr Hamilton—My institute and I, as a researcher, have conducted a lot of work on climate change policy issues and the economic issues associated with climate change policies over the last six or seven years, including several papers that we have published. But, for those who have been following the climate debate for some time, it has become very clear that the world has changed rather dramatically since the Kyoto conference at the end of 1997. In the face of all the political manoeuvring in Australia and abroad, the most significant change that we have witnessed has been a shift in business attitudes globally. Major corporations in the USA, Japan and Europe now recognise that climate change is here to stay, that cuts in emissions are really inevitable and that it makes commercial sense for those corporations to be in the vanguard of that change rather than lagging behind it.

As you know, the Global Climate Coalition, the principal fossil fuel lobby group in the US, has suffered from so many high profile defections that it has pretty much collapsed. In Australia, we are witnessing something similar, with a fracturing of the business perspective. Quite frankly, the ACCI representatives here presented a very partial view of the Australian business perspective, and that reflects, I think, the continuing influence of the fossil fuel lobby in the peak organisations of business.

Despite that fracturing and shift in the business view, one of the more disturbing trends in recent times has been the re-emergence of an antigreenhouse fundamentalist stream of thought, best represented in Australia by the newly formed Lavoisier Group. Backed by Hugh Morgan of Western Mining Corporation—a company that pretends to be concerned about the environment—the Lavoisier Group was set up earlier this year ostensibly to bring rationality to

the debate, which it sees as being dominated by green extremism: many of the members of the Lavoisier Group now lump Senator Hill into that extremist category.

The Intergovernmental Panel on Climate Change—which, as you know, is the UN organisation that brings together 2,500 of the world's top climate scientists—is seen by this group and their colleagues as some sort of elaborate conspiracy in which hundreds of climate scientists around the world twist their results in order to support what they refer to as the climate change 'theory' in order to protect their research funding. The Lavoisier Group has a strange mixture of conspiracy and apocalypse, which was on full display at its inaugural conference this year. I am making these observations because I think it is important to understand the political background of how the debate has shifted in Australia in recent times. The former federal Labor minister, Peter Walsh, who now serves as the president of the Lavoisier Group, declared—

ACTING CHAIR—That softly spoken man who hasn't got very many opinions about things!

Dr Hamilton—He keeps them to himself, yes! He declared that 'the modern CSIRO is not based on science but politics'. Another supporter of the group described global warming as a form of 'political correctness' and said that the group might spread the message because 'the truth shall set us free'. The ultralibertarian trade specialist, Alan Oxley, told the conference that the Kyoto Protocol is 'a formula for impoverishment'—a claim that even the most pessimistic economic modelling backed by the fossil fuel lobby cannot sustain. One board member of the Lavoisier Group said that ABARE had been 'captured by environmentalists'. ABARE, as you know, is the same organisation that was so vigorously attacked for its alleged scaremongering in the lead-up to Kyoto through its modelling—and modelling funded largely by the fossil fuel lobby, something for which it was severely castigated by the Commonwealth Ombudsman in early 1998.

The Convener of the Lavoisier Group, Hugh Morgan, described the four discussion papers that the Australian Greenhouse Office had prepared on emissions trading as 'Mein Kampf declarations'. With evangelical fervour, the group is conducting a systematic campaign to muddy the waters on climate science and to stampede the federal government into a volte-face on its undertakings on Kyoto. This campaign, you would have noticed if you were reading the papers over the last couple of months, includes the ghostwriting and placing of feature articles for a series of major newspapers.

The Lavoisier Group's submission to this inquiry paints a picture of the imminent destruction of Australian sovereignty that would follow from ratification of the Kyoto Protocol, going so far as to compare it to the planned invasion of Australia by Japan:

> ... with the Kyoto Protocol we face the most serious challenge to our sovereignty since the Japanese Fleet entered the Coral Sea on 3 May, 1942.

In words that could perhaps have been penned by an ideologist of the Montana Militia, the submission talks of the Kyoto Protocol ushering in a 'new imperial order', of the 'termination' of our sovereignty as the nation, of 'imperialists ... in green clothing' and of 'the threat of invasion'. It conjures up fears of 'police powers' of an unaccountable Kyoto Secretariat based

in Bonn—'an international tribunal which ... will have the power to transfer, or destroy, wealth and income within Australia on a massive scale'. It claims that 'our sovereignty will be relocated from Canberra to Bonn' and fears that the WTO, subjugated and corrupted by the demands of the Kyoto Protocol, will become 'an instrument of imperial authority'. The submission further suggests, seriously:

> ... Australia will only be able to escape from entrapment in this new imperialism through immense political upheaval of the kind experienced by George Washington and his colleagues when they rebelled against the authority of the British Crown and established the United States.

Such is the tone of conspiracy and apocalypse in the Lavoisier submission that one could be forgiven for mistaking 'Lavoisier' for 'La Rouche'! As one reads the submission, one half expects the protocol to be characterised next as a conspiracy by Jewish bankers—perhaps the Protocols of the Elders of Kyoto!

So much for the Lavoisier Group's understanding of politics and history. What about its approach to the science? I will comment briefly on that. I am not a climate scientist, nor any sort of scientist, and so I am not qualified to make a considered judgment on the science of climate change. Like other amateurs, I have to decide who to believe. In this I think there is only one choice for the reasonable person, and that is the considered judgment of the IPCC. There are some contrary scientific opinions, and the views of those few with credibility should be noted—in fact, let us hope they are right. The long-awaited *Third assessment report* of the IPCC, due for publication next year, apparently deals exhaustively with the arguments of the sceptics—where they deserve serious attention. Newspaper reports of the leaked draft of the third report indicate that it will ring the alarm bells even more loudly than the second report did.

Despite my lack of scientific expertise, anyone with schoolboy science can recognise the gross distortions of the science in the Lavoisier Group's submission to this committee. Let me take just one glaring example of misrepresentation, and that is of the views of James Hansen, the director of NASA's Goddard Institute for Space Studies. The submission quotes a report that says that Hansen claims that:

> ... warming over the past century was not mostly driven by CO_2 from burning fossil fuels, but by other gases such as methane and chlorofluorocarbons (CFCs) so it should be more practical to slow global warming than is sometimes assumed.

The Lavoisier submission refers triumphantly to this as a 'clawback' by Hansen. It concludes:

> However, given James Hansen's crucial role in establishing the global warming industry, his recent paper does provide a symbolically potent instrument allowing the JSCOT to urge delay or, even better, withdrawal from the Kyoto entanglement.

The suggestion that Hansen's paper is in any sense a recantation, or even a significant shift in his view, is a gross misrepresentation. If one reads the paper in the *Proceedings of the National Academy of Sciences*, Hansen and his colleagues say something quite simple: they point out that burning fossil fuels results in the release of aerosols, such as sulfur and soot particles, as well as CO_2. Historically, aerosols have had a cooling effect that has offset and masked the warming effect of CO_2. As a result, there is a sense in which non-CO_2 gases, such as methane and nitrous oxide, can therefore be said to be responsible, since the aerosols released by burning fossil fuels offset the impact of CO_2. However, Hansen and his colleagues argue, as air quality pollution

controls—such as those introduced as a result of the GST package—start to take effect, then aerosol pollution will diminish and they will no longer mask the warming effect of CO_2. Hansen and his co-authors are quite clear about their conclusions. They say:

> This interpretation does not alter the desirability of limiting CO_2 emissions.

Hansen et al go on to advocate policies to improve energy efficiency and to promote what they call the 'decarbonisation' of energy sources. Hansen has recently written an open letter repudiating the 'misunderstandings about our paper' and he quotes approvingly an editorial in the *Washington Post* of August 28, which said of Hansen's paper:

> The new report does not challenge either the evidence that surface temperatures are going up or the growing consensus that human activities are contributing to the increase ... There is no suggestion that response to global warming should wait until the science is more certain.

For the Lavoisier Group to suggest that Hansen has in some sense recanted and that this provides grounds for withdrawing from the 'Kyoto entanglement' reflects the cavalier attitude to the evidence that is so characteristic of the sceptics.

More generally, one can find the following arguments in the various papers promoted by the Lavoisier Group: one, there is no evidence of global warming; two, if there is evidence of global warming, then warming is not due to human activity; three, if global warming is occurring and it is due to human activity, then it is not going to be damaging; and, four, if global warming is occurring, is due to human activity and is going to be damaging, then the costs of avoiding it will be too high, so we should do nothing. It is impossible to have a rational discussion with people like this, as they are immune to the evidence and the arguments.

To finish then, some members of the Lavoisier Group are well known for their predictions of the apocalypse that would follow attempts to protect the environment. Mr Hugh Morgan, Managing Director of WMC and the instigator of the group, is renowned for his feverish declarations of the national catastrophe that would follow if the greenies had their way. Committee members might remember that he campaigned vigorously against any attempt to prevent mining at Coronation Hill in Kakadu National Park in 1991. After the decision was made by the Hawke government to ban mining, Mr Morgan addressed the Adam Smith Club in the following terms:

> The decision on Coronation Hill is not merely bizarre, it is resonant with foreboding ... This decision will undermine the moral basis of our legitimacy as a nation, and lead to such divisiveness as to bring about political paralysis ... The implications of it will, inevitably, permeate through the entire body politic, and cause, imperceptibly, like some cancerous intrusion, a terminal disability ... Like the fall of Singapore in 1942, Coronation Hill was a shocking defeat.

To date, the ban on mining at Coronation Hill has not led to the erosion of the moral basis of our legitimacy as a nation, nor to political paralysis, nor to a terminal disability. In the same speech, Mr Morgan called for a counterattack on what he called the religious crazies and green antinomians 'who threaten our prosperity and eventually our survival'. I would suggest that perhaps the Lavoisier Group is the long-awaited counterattack. The end is nigh, Mr Morgan told us but we are still waiting for the apocalypse. Now Australia's answer to the Reverend Jim Jones has found another cause for our imminent demise: the Kyoto Protocol. Perhaps in order to escape the catastrophe, the entire membership of the Lavoisier Group should enter into a suicide pact. There I will leave my introductory comments.

ACTING CHAIR—I did not ask you to do this before, but could you qualify yourself? You know what I mean by that.

Dr Hamilton—Yes. I am by training an economist and I specialise in public policy and the economics of the environment.

ACTING CHAIR—Thank you very much. Are there any questions now? Dr Hamilton is coming back.

Dr Hamilton—I am coming back, yes. I am very happy to answer the questions, in particular, about the economic modelling and the estimates of economic costs.

Mr WILKIE—I know that the chairman has to catch a plane, so I will defer my questions until then.

Senator TCHEN—I am glad to hear that you are happy to answer questions on economic modelling. I thought you had found a bigger bogeyman than ABARE!

Dr Hamilton—Possibly.

Senator TCHEN—You say that you are an economist and that you accept the science. Do you understand the science?

Dr Hamilton—I have a layperson's understanding of the science—probably a layperson who has spent a little bit more time than average on looking at the science. But I would not claim any expertise.

Senator TCHEN—This morning we heard from two eminent scientists—they would have to be described that way—who threw some doubt on what they would consider was by now the conventional wisdom about greenhouse warming. One was Dr O'Brien, the other one was Professor Lindzen. Professor Lindzen did not actually talk to the committee about the science as such but about the interpretation of science. He said that the problem, basically, is not what scientists have said but what people think scientists have said—what they understand the scientists to have said.

When you said that you accept the science, what did you accept? For example, when I had a look at the Jim Hansen article that you talked about, I understood the most important emphasis that he has put on it was that he drew our attention again to warming gases other than carbon dioxide as a forcing agent. But in your interpretation of it you focus on something else that he says. The Lavoisier Group described it as a 'retraction'. To me, it is not a retraction; he modifies his position slightly and refocuses on other gases—whereas, when you were looking at his article, when you were interpreting it to us, you did not mention that element at all. So the question is, what interpretation of the science do you accept?

Dr Hamilton—I tried to read it the way I thought Hansen and his four or five colleagues meant it to be. Since I received, only yesterday, the open letter that Hansen has subsequently written in response to what he says is the misinterpretation of his paper, it confirmed my reading of the paper. I did not think there was any ambiguity in the paper. Personally, I thought it was a

naive paper. Essentially he and his colleagues were saying that to reduce climate change we need to reduce the forcings caused by the range of greenhouse gases; the burning of fossil fuels results in the release of other pollutants which offset to some extent the warming impact of carbon dioxide; and therefore we can possibly delay reductions in CO_2 and focus on other gases.

The point about that is that it may well be right, but it is a purely economic decision. It is a question of the cheapest way to reduce emissions in toto. It may be to concentrate on CO_2; it may be to concentrate on methane. I dare say it will be a mix of all of them. The point is that Hansen has no expertise in that whatsoever. At the end of his article he makes some rather gratuitous references to factor 4 and other bits and pieces that he has read to justify it. I am not challenging the science in the least—I am sure the science and the forcings and so on are quite right—but the judgment about whether you focus on CO_2 or CFCs or methane is a question of economic policy.

Senator TCHEN—Yes. You actually proved my point, because Professor Lindzen's point is that when people read what scientists wrote they take in what they think is what they said.

Dr Hamilton—I think in this case one can only judge the scientists on their word, in the sense that—as the IPCC did—the scientists were to sit down and say, 'What message do we want to communicate to non-scientists as a result of this massive amount of work that we have shifted through and reached judgments on?' It was through that process that they wrote the summary for policy makers. As far as I know, no-one in the IPCC has said, 'The summary for policy makers has been seriously misrepresented.' I think they set their message down quite clearly and everyone pretty much accepted it. So there certainly is debate about what Hansen meant, although Hansen is now clarifying it. I would suggest that what Hansen is now saying is confirming the interpretation that a reasonable person would put on his paper, although there are ambiguities in it. I think the IPCC works very hard to try and overcome misinterpretations of its results.

Senator MASON—Dr Hamilton, you said that the Lavoisier Group were, perhaps, the augurs of the apocalypse and so forth. It is true to say that the environmental movement itself has been guilty of that in the past as well, isn't it?

Dr Hamilton—Yes.

Senator MASON—There is not a lot of moral high ground in a lot of these issues, both with respect to environmental groups and those perhaps with differing views. Often the uncertainties of the case mean that predictions are overstated and conclusions are drawn which are actually overblown—from all sides. I just say that as a background statement.

Let me get to the heart of the matter. There are two main issues for this committee—for us as parliamentarians. One is the scientific evidence, and I will be quite honest: I am not qualified to talk about anything to do with science; I was an appalling science student. Even on methodology—and we have had some evidence today, as Senator Tchen mentioned, about it—it is very hard for me and, I suspect, for most of the committee members to discuss that, because we are given contradictory evidence.

I think Senator Tchen's point was this: people from either side of the debate take from that scientific analysis and that scientific debate what they think will support their cause. I accept that probably the scientific consensus is—in fact, nearly all scientists accept it, I think—that global warming is a fact and that greenhouse gases are part of that problem. The question for us is: how big is the problem, and what do we do? It is very difficult to know whether it is, in fact, worth doing anything.

The second part of our problem—moving from the science to the economics and the politics; on more comfortable ground, perhaps—is: why should Australia seek to ratify the Kyoto Protocol if, for example, the United States is holding back? The United States, as you know, is holding back because it argues that the developing nations will not be held to the Kyoto Protocol. If you add the United States and developing nations together in terms of their polluting capacity, that is an enormous part of world pollution and, indeed, greenhouse gas emissions. Why should we sign up before the United States and the developing nations do?

Dr Hamilton—There are two reasons.

Senator TCHEN—Before you answer that, seeing that you very kindly indicated that you are willing to come back, I was wondering whether you could take this question on notice, because we are about to lose our quorum. Or could you cover it in five minutes?

Dr Hamilton—Yes, indeed I can. I appreciate the opportunity, because this is, in many respects, the core issue. I do not think it should be the core issue.

Mr WILKIE—It is probably fair to say that it is one of them. It would not be the key issue, but it is an issue.

Dr Hamilton—Politically, it has turned out to be so. There are several answers to the question. One is to say that, from a purely pragmatic point of view, from the government's point of view, if it were thinking strategically, it would ratify the Kyoto Protocol tomorrow. I will tell you why. Australia's ratification will have very little impact on whether the protocol comes into force. On the other hand, Australia's diplomatic credibility as a result of the role we have played in the climate change debate is extremely low. There is tremendous hostility overseas to Australia for the role we played in the lead-up to, and at, Kyoto—and subsequently.

I could give you a whole lot of evidence to support that. I have written down the comments people have made about Australia. Therefore, if Senator Hill were to stride into the meeting in the The Hague with a series of demands to be negotiated, he would have a far better chance of achieving what he had negotiated if Australia had taken a moral stance and ratified the Kyoto Protocol in advance of all industrialised nations. It would have very little impact on whether the protocol comes into force, so why not ratify it? I cannot understand why, if the government were thinking strategically, it would not want to enormously increase its bargaining power on sinks, emissions trading and all the issues still to be resolved by ratifying before everyone else and winning back some of the diplomatic credibility which is in such short supply.

The second argument is the moral argument. We must recognise that this is partly an environmental issue, partly an economic issue but fundamentally an issue of justice and morality. The Australian government has never hesitated to use moral arguments. In fact, that

was the whole thrust of its position at Kyoto: it would be unfair, unjust, for Australia if we were required to reduce our emissions by as much as other countries, because of A, B and C. The question we need to explore is the moral arguments: the basis of justice in the climate change debate. There are two principles in the climate change debate, as in all environmental and other debates, that stand out. The moral principles that guide environmental policy are the 'polluter pays' principle and the 'ability to pay' principle. These can be found in any text on the morality of environmental policy. On those grounds, countries which are responsible for a higher level of per capita emissions and which are richer should do more to reduce their emissions, because they are more responsible and they are in a position to do so.

Australia has the highest per capita emissions in the world—higher than the US: 25 per cent higher than the US if you take into account land clearing—and we are a very rich country. Despite the bleating of industry about how damaging it will be, the fact is that we are enormously wealthy compared to your average Indian or Chinese. For us to say, 'Look, we caused this global environmental problem—indeed, we became rich as a result of burning fossil fuels which caused this global environmental problem—but, unfortunately, you in developing countries are going to suffer most of the consequences of this environmental damage (a) because, according to the climate scientists, the impact will be concentrated in the tropics, and (b) because you will be in a weaker economic position to protect yourself—to weatherproof your homes, for example, and build levy dikes against floods. Even though we caused the problem, you are going to suffer most of the consequences. Sorry, we are not going to do anything until you start cutting your emissions too,' makes me cringe as an Australian when I hear my government and representatives of Australian industry arguing that.

It sickens me, quite frankly. It is an absolute abrogation of our responsibility as citizens of Australia and of the world. It is quite right for G77 countries to become extremely annoyed when these sorts of proposals are put forward. It is the height of selfishness and is absolutely contrary to all the principles we pursue within Australia. One argument we heard wheeled out by the business lobby beforehand was when their representative said, 'Well, let's face facts. Australia only contributes less than two per cent of total global emissions.' What sort of principle is that? If we had 50 countries in the world that contributed two per cent of global emissions, no-one would ever do anything. On the other hand, if Kerry Packer said, 'Look, I only contribute 0.01 per cent of Australia's taxation revenue; therefore, it doesn't matter if I don't pay my taxes; it's trivial,' what would we say to that? We would say, 'Don't be absurd! If you don't pay as the person with the most capacity to pay in Australia, then no-one else should bother, either.' You see, it undermines the moral basis of the whole agreement. For Australians to make that argument—as I think you, Senator, indicated in your comments earlier—really is a recipe for incredible resentment in countries that are poorer than we are.

Senator MASON—I have a lot more questions, but perhaps I should leave them until next time.

Senator TCHEN—Thank you, Dr Hamilton. We especially appreciate your offer to come back again and we look forward to taking further evidence from you.

Resolved (on motion by **Senator Mason**, seconded by **Mr Wilkie**):

That this committee authorises publication of the evidence given before it at public hearing this day.

Committee adjourned at 4.14 p.m.