**Professor David Karoly**

Thanks George, and it’s a pleasure to be back here at La Trobe University. I was here last year giving a talk I think, in the School of Biological Sciences, in the Botany Department and they’d asked me to give a talk. They’d organised a lecture theatre and there wasn’t enough space, so George has organised a much bigger lecture theatre, invited me back again, but I think it’s great that a student has organised this forum and in fact organised a tag team talking event, with me and with Robert and it’s a pleasure to be able to talk with Robert Manne. I get to talk about the easy stuff. I get to talk about the science. Robert gets to talk about the hard stuff, which is the politics and the societal responses. And what I'm going to try to do is to provide, if you like, a brief update on where we are in terms of scientific understanding of climate change, where we’re heading, what we as scientists understand is needed to minimise dangerous climate change, and talk about the choices that, if you like, human society as Goldilocks has, between an environment which is hot, an environment which is very hot, even hotter than today, and an environment which is very, very different to the world that human society has lived in for the last three to five thousand years. And we’re heading to probably hotter than the boiling bowl of porridge, and I'll talk about that as well in terms of where we’re going.

So, let me talk about what ... a little bit of what Robert is going to talk about, and that is that there are dramatically different perspectives about climate change. The person on the left hand side of this slide is not an aged English Viscount who has been travelling around Australia, but the views that this person represents are exactly the same as this aged English Viscount, says that global warming is a left-wing conspiracy, says that carbon dioxide will cripple the economy, and that we don’t actually have to worry about global warming because in fact the climate is cooling at present. And I'm definitely not the person on the right hand side of this cartoon. That person’s more like George’s age. But it’s not just that person but in fact almost all active climate scientists agree that the main cause of observed global warming is human activity and I get called a lot worse things than alarmist. But actually raising alarm about a concern is a perfectly sensible thing to do and I actually consider being called alarmist a very sensible thing, because as scientists, the evidence points to a very bad situation, that we’re heading towards, associated with continued greenhouse gas emissions.

And I'm going to show some of the evidence for that, but first of all I'm going to talk about some other views, from political leaders. Ban Ki-Moon probably would not consider himself a politician but he certainly is an international leader. He said in 2009 that climate change is the greatest threat facing humanity and it will undo substantial development work but it will impact the poor more than it will impact rich in society. Barack Obama only a month or so ago, in his inauguration address, said, we, the United States, will respond to the threat of climate change, knowing, in this case, that the failure to do so will betray our children and future generations, recognising that climate change is a long term threat.

And of course Kevin Rudd said that climate change is the greatest moral, economic and social challenge of our time, prior to his election, and then was unable to introduce a political solution, the carbon pollution reduction scheme, at the time.

So, given those political views, these are, if you like, some range of views. This is the temperature data from 1970 to 2012. And different perspectives on how you might link together that data, and a range of experts, like Andrew Bolt, will tell you that the climate is cooling because if you take the last ten years, or if you take a period from 1998 and only look at that period, you can draw nearly horizontal lines if you take into account of step functions, and so sceptics will say, well actually, there’s been no warming, but actually if you look at the longer record, yes, there is a lot of year to year natural variability in the global climate. 2011 and 2012 were a little bit cooler associated with the very strong La Niña event which led to more rainfall in Australia, but in fact if you look at the long term record, the climate system has warmed and continues to warm. The last ten years was significantly warmer than the previous ten years, which were significantly warmer than the previous ten years, which was significantly warmer than the previous ten years.

There is a lot of natural variability, but you can see a clear signal of warming, unless you’re Andrew Bolt, or Christopher Monckton, because they *only* look at shorter periods, like this graph shows of step functions over short periods. In fact, most of the heat that gets added to the climate system goes into warming up the oceans. It takes a lot of heat to warm up water. The units here on this graph are one followed by twenty-two zeros. That’s a lot of zeros. It’s a lot of heat going into the ocean. Because it takes a lot of heat to go into warming up the ocean, and this is actually ocean heat content only in the top 700 metres in the ocean. It’s going up steadily, associated with climate change. At this stage I'm only talking about what we’re observing. I'm not talking about the causes. But we will see those causes in a few minutes.

So let’s now look at the causes, no, let’s now look at other evidence for observed changes in the climate system, because people like Andrew Bolt, that well-known expert, says that the scientists take observations when they’re measuring global temperature close to cities. And typically Melbourne downtown is warmer than La Trobe University and in fact it’s cooler in the country areas. The well-known urban heat island influence. But in fact climate scientists are aware of that, exclude urban data when looking at estimates of global temperatures and when we prepare estimates of global average temperatures, rural data is primarily used and even if you look at long term changes for the last fifty years or last one hundred years, there is in fact little difference in the changes at the same locations between Melbourne and the surroundings. Yes, Melbourne is hotter on average, but it was actually already hotter in 1900, by a small amount, in Flagstaff Gardens or wherever else you want to take the temperatures.

But we don’t actually have to just rely on land temperatures. We can look at evidence from the oceans. And ocean temperatures have also gone up. As I showed before, temperatures below the surface of the ocean have gone up. But maybe the scientists are fudging the data. So we can look at other evidence, like independent observations of retreat of glaciers, in mountains, all around the world. They fluctuate from decade to decade, but if we look at the last one hundred years, all glaciers in the world have retreated over the last one hundred years, or disappeared completely.

We can look at sea ice and I'm going to talk about sea ice observations a little bit later. Sea ice in the Northern Hemisphere has declined substantially. We can look at a completely independent measure, water vapour in the atmosphere. If the temperature in the global atmosphere increases, it allows the atmosphere to hold more water vapour and yes, satellite observations and weather observations show increases in water vapour in the atmosphere. All of these would indicate that there is a consistent warming signal in global temperatures. But it doesn’t say what’s caused it.

Well, climate scientists have assessed the data and shown that there are a range of possible causes. Before I go to the possible causes, let me just look at Australian data. If we look just at Australian temperatures and rainfall variations, this bottom graph here shows the average temperatures in Australia over the last one hundred years, and they show a pronounced warming trend, in fact, mainly from 1950 to the present, and the magnitude’s about nine tenths of a degree. Roughly the same as the global temperature, actually slightly larger. And this is the pattern of that warming trend over the last fifty years. It tends to be larger warming in the inland areas, but there is one region where there’s actually been a small decrease in trend over the last fifty years. Not everywhere warms at the same rate and not everywhere may show absolute warming. And the reason that there’s a cooler temperature in the north west is exactly the same as the reason that there’s a cooler temperature for the last two years, or there was a cooler temperature in 2011 and 2012 in the average Australian temperatures. Most people in Victoria know that it was pretty wet in 2011 and 2012. When it’s wet, it’s cloudy, usually, and when it’s cloudy you get less sunshine and it tends to be cooler, on average. So there’s actually an inverse relationship. More rainfall means usually cooler temperatures in Australia. And sure enough, that’s exactly what’s happened up here in the far north west where there’s actually been a trend to increasing rainfall over the last fifty years. But in Victoria, even though it’s been very wet in Victoria over the last two years, there’s actually been a decline in average rainfall over the last fifty years. It’s got drier on average. And we switched very quickly in the last six months, from very wet conditions in 2011 and the first half of 2012, to very dry conditions for the last six months. And again, we’ve had a very hot summer. And it’s continuing to be hot, even today.

So now let’s start to talk about causes. And what I'm going to do, first of all, is look at what’s happened to changes in greenhouse gases. I'm going to assert that it’s the changes in greenhouse gases that are the main cause of the observed climate change. And this is in fact what’s happened to those changes in greenhouse gases. The main long lived greenhouse gases that are affecting the climate system are carbon dioxide, methane and nitrous oxide. If we look at this graph, it shows their variations from ice core data and then recent observations for the last thousand years. And the concentrations, if we look at these graphs, were very stable from about a thousand years ago to about two hundred years ago and then, following the Industrial Revolution, they’ve all grown very rapidly. Al Gore used this, and I think it was a cherry picker crane, to reach the top of the carbon dioxide curve. I'm not going to use a cherry picker. But we can look at the current concentrations of carbon dioxide, they’re now 390 parts per million. The previous concentrations, for the last thousand years, were about 280 parts per million. We can use this data from ice cores in Antarctica and Greenland, to show that in fact over the last 800,000 years, carbon dioxide concentrations have never been higher than 300 parts per million. That’s just here. And now they’re in fact more than twenty per cent higher than at any time. In fact, it’s very likely that for the last three million years, carbon dioxide concentrations have not been higher than at present. So either it’s a very, very unusual natural event, or something different is happening in the world.

The former head of the department that I'm in, Earth Sciences at the University of Melbourne, the former head was Ian Plimer. He has a specific view about the causes of these carbon dioxide increases and he says they’re due to underwater volcanoes. He said they’re underwater volcanoes, because, yes, volcanoes do emit a small amount of carbon dioxide. If this was due to volcanoes above ground, we would actually have to have seen hundreds and hundreds or thousands and thousands more volcanoes and if they’re above the ground, we’d see them. So that’s unlikely because we haven’t seen them, so he says well, they’re under water. Well, these have to be very special volcanoes because there is not a volcano in the world that also emits methane and nitrous oxide and they’ve also been going up. They also have to be very special volcanoes, because somehow the carbon dioxide’s getting from the volcano under the water in the ocean, through the ocean into the atmosphere without affecting the concentrations in the ocean, because the ocean concentrations are lower than the atmospheric concentrations of carbon dioxide. There are lots of other reasons why we know, with absolute certainty, that invisible underwater volcanoes are not causing these increases and I'm not going to go into that. But it turns out that those increases in carbon dioxide are exactly consistent with land clearing and the burning of fossil fuels, and there’s other evidence for human causes of those greenhouse gas increases, things like less oxygen in the air. If you burn something, you’re oxidising it. That means you’re using up oxygen, and the oxygen decreases in the atmosphere are exactly consistent with increases in carbon dioxide that we’ve observed over the last fifty and the last one hundred years.

So carbon dioxide is increasing, and it’s increasing due to human causes. But is that carbon dioxide increasing, or causing the increase in temperatures? Well, one thing that we have to do is look at, well, okay, are there other plausible causes, and is the magnitude of the observed warming consistent with the changes due to greenhouse gases or consistent with these other causes. And what we do is, we’re like detectives. We look for fingerprints, the spatial patterns of change. And the greenhouse gases, or the response to greenhouse gases in the climate system, has a specific pattern of temperature change. Warming in the lower atmosphere and cooling in the upper atmosphere. And that’s exactly what we observe. The upper atmosphere is cooling. Andrew Bolt and Christopher Monckton’s favourite cause, as well as Ian Plimer’s famous cause, is the cause of why it was so hot today. It was sunny, stupid, so it’s got to be the sun that’s causing the observed warming because we know on hot days it’s sunny.

Well, the really interesting thing is there have been observed variations in the intensity of the sun. It varies on an eleven year cycle but when the sunlight is stronger, it causes warming in the upper atmosphere, because there’s more ultra-violet radiation which warms up the ozone layer. We’ve observed cooling in the stratosphere, the upper atmosphere, so that would suggest there hasn’t been an increase in sunlight from the sun warming up the upper atmosphere.

There is remarkably little sunlight at night. That’s not a particularly profound statement. So, if there was stronger sunlight warming up the climate system, you’d expect the greater warming to occur when there was sunlight, rather than at night. But in fact we observe nights warming faster than days. The rate of warming is greater at night than in the daytime. It’s extremely hard to explain that from more sunlight in the daytime. It’s exactly what you would expect from increases in greenhouse gases. Same thing, more warming in winter than in summer, but in fact the sun is more directly overhead in the summer and you’d expect, if the sunlight was getting stronger, more sunlight in the summer.

So, all of those patterns, fingerprints of climate change are consistent with warming due to greenhouse gases, aren’t consistent with changes in sunlight from the sun. They lead to the conclusion that it’s beyond any reasonable doubt that the main cause of the observed warming in the climate system over the past fifty years, is the increase in greenhouse gases due to human activity.

There are a number of unreasonable doubters. I've named some of them already, who talk about other causes. The other thing we know and we can look at, is the magnitude of the warming, and we run climate models to compare the simulated response to changes in greenhouse gases and that’s what the solid black line and this grey band is – climate model simulations over the period, in fact they started in 1900. But they’ve been adjusted to give you the same average temperature in the period from 1980 to 2000 as the observations. There’s three sets of observations. The three coloured lines. They all show a very similar average global temperature, there’s a little bit of uncertainty. And it’s important to understand that the climate models were started in 1900, and apart from the changes in greenhouse gases and other industrial emissions, they have nothing else. The times, if you like, what happens except major volcanic eruptions. There was a major volcanic eruption in 1991, right here, major volcanic eruptions lead to particles getting into the upper atmosphere, reflect sunlight, cause wonderful sunsets, but they also cool the climate system. And in 1991 there was an observed cooling that the model simulated very well.

But all the other inter-annual variations are just natural chaotic variability in the climate system, and that natural chaotic variability is randomly simulated in the climate models and so you’ve got to look at the average, and what we know is in fact, it was cooler for the last couple of years because of this La Niña event, the ocean variability. But in general the black line, the average, is remarkably similar to the observed. So the models are actually simulating the observed variations on decade or time scales very well, the magnitude of the observed temperature changes is consistent with climate model responses to increase in greenhouse gases.

So it’s the global average temperature. What about the climate model simulations of changes in sea ice in the Arctic? The red curve here is in fact the reductions in sea ice in the Arctic, in the Northern Hemisphere early spring, in September, the period when the sea ice is at its minimum, and as I said, the red curve shows the rapid decreases in 2012, set a new record low, 2007 was the previous record low, Andrew Bolt said that 2008, just here, showed a remarkable recovery in the sea ice back to normal. He has an interesting definition of normal, but it is clear that there is a pronounced declining trend. Not only that, that declining trend is happening faster than any of the climate models predict. And that’s important, because more sea ice would lead to more reflection of sunlight in spring, summer and autumn, and that reflection of sunlight leads to a cooling of the climate system. If you have less sea ice, less sea ice means more ocean water exposed, the ocean water is darker, absorbs more sunlight, leads to an amplification of the warming. Less sea ice amplifies the warming, more sea ice minimises the warming. And the models are underestimating the loss of sea ice, which means they’re underestimating an important feedback in the climate system.

So, the last scientific assessment of climate change by the Intergovernmental Panel on Climate Change was released in 2007. The next one will be released later this year on the last weekend in September. So if you want to stay tuned, the next IPCC scientific report will be released the last weekend in September this year.

But it had a whole range of conclusions about changes in the climate system projected into the future. Like, it’s very likely that hot extremes, heatwaves and heavy precipitation events will continue to become more frequent. It sounds like they were describing this summer in Australia. Snow cover and sea ice is projected to shrink in both the Arctic and the Antarctic. This was 2007. Remember, sea ice continued to shrink to 2012. Storm tracts are projected to move poleward with changes in winds, rainfall and temperature patterns. Increasing carbon dioxide in the atmosphere leads to increasing acidification in the oceans, with adverse impacts on ecosystems. And the worst part is the part at the end.

The processes that remove carbon dioxide from the atmosphere, from the ocean, and from vegetation, take a very long time to store it away in long term storage, effectively in the deep ocean, or in soils. And so it will take more than a thousand years, even if there were no more emissions, to remove the carbon dioxide that’s been added into the atmosphere by human activity over the last one hundred years. So we’re talking about long term commitment to increases in carbon dioxide and warming.

And there are many adverse impacts. This just talks about climate change in Melbourne and it’s basically the same here on the La Trobe campus as it is in Melbourne. There are large uncertainties in some parts of climate change projections and high confidence in others. High confidence in the magnitude of the warming. With high greenhouse gas emissions, the warming is projected to be substantially larger. 2.8 degrees of warming in 2070 for Melbourne, more than 4 degrees of warming in 2100. That’s above present day. We’ve only had nine tenths of a degree warming already and we’re already getting increases in heatwaves, and wildfires.

The number of days above 35 Celsius is normally, or has been nine. A fifty per cent increase for low emissions are more than doubling for high emissions. Remember we’re talking about substantially more warming than that.

There are many other impacts and the most insidious impact, the long term impact, is the increase in sea level. Best estimates for the increase in sea level, 2100, is about 80 centimetres. 80 centimetres from the IPCC, but this is in fact another analysis done after the IPCC came out, that basically said, actually, we’re more likely to have up to one metre of sea level rise. One metre of sea level rise in 2100 would put more than ten per cent of the world’s population under threat of annual flooding, including substantial parts of Australia. Brisbane Airport would be under water and Sydney Airport would be under water a number of times every year from one metre of sea level rise.

There are a wide range of impacts, all around Australia, impacts on irrigation and water resources associated with reductions in wintertime rainfall. Impacts on alpine ecosystems, because warming reduces the long term snow cover, and in fact most alpine ecosystems that require permanent, well, not permanent, but wintertime snow cover, it won’t last. It’ll melt very quickly and almost all the alpine ecosystems in the Snowy Mountains will be doomed to extinction, because they can’t find cold enough environments. There are major impacts on the Great Barrier Reef associated both with warming and with acidification in the ocean. So that the Great Barrier Reef is doomed to extinction associated with projected high emissions of greenhouse gases.

The world recognised, in 1988, that climate change was likely to be a problem and agreed to the UN Framework Convention on Climate Change, a convention that sought to limit emissions of greenhouse gases to prevent dangerous human interference with the climate system. That’s now twenty-five years ago. And in the period since then, greenhouse gas emissions have grown by fifty per cent from 21 billion tons to 31 billion tons and they’re still increasing. In fact, the fastest rate of increase has been the most recent period. There has been no slowdown, at a time when the world is seeking to control or supposedly seeking to control and limit increases in greenhouse gas emissions.

So let’s look at the path that we’re heading on. Let’s look at the choices that Goldilocks and the world society have. We are heading on a specific path. That path is this red curve up here in terms of greenhouse gas emissions. It’s a projection under essentially business as usual conditions of the increases in greenhouse gas emissions, over the next one hundred years. And that leads to this projection and the uncertainty range for temperatures. Best estimate is for more than four degrees of warming above the pre-industrial levels, with possibly as much as seven degrees. And in Copenhagen and in Cancun and in Durban, and in Doha, the world reiterated that it wanted to limit greenhouse gas emissions so that temperatures didn’t rise above two degrees. That’s here. A relatively low probability, only 25% chance of exceeding two degrees of warming. That’s the emissions curve that’s consistent with that.

Zero emissions from greenhouse gases, a 100% reduction from burning fossil fuels by 2080. That seems like a long time in the future. The other important point is here. A peak of emissions this decade and then a fall in emissions from 2020. Note in fact that emission reduction curve, the one that minimises warming to below two degrees, already started to diverge from business as usual in 2010. In fact, the other thing we can look at, because of this long lifetime for removing carbon dioxide, is that it’s cumulative greenhouse gas emissions that are important. It’s not just emissions in 2100, or emissions in 2080, it’s actually the cumulative emissions, because it’s the total concentration of carbon dioxide that’s important, and if it takes a thousand years to get removed, it’s accumulating in the atmosphere.

Scientists have assessed that a trillion tons of carbon dioxide emitted into the atmosphere from burning fossil fuels and other sources, between 2000 and 2050 is the limit. That’s our global budget. A trillion tons. That’s a lot. World population is about 7 billion. We exceeded that last year. It’s not enormously complicated arithmetic to divide a trillion by 7 billion. It ends up being roughly 140 tons of carbon dioxide per person. That’s your personal CO2 emissions budget, if we assume that everyone has the same budget. Remember that’s your personal emission budget from 2050, and Australians have been emitting carbon dioxide every year at 19 tons per person. So Australians used up their CO2 personal budget in 2007 or 2008 and we’re now in debt to the rest of the global community, because we’re still emitting it at 19 tons per person.

There’s a lot of people who say, this is a fallacious argument but if you’re dividing up pizza at a party or chocolate cake, you give everyone the same share. It may be difficult, politically, to use this argument but it is certainly one view of a fair share in carbon dioxide emissions.

This is the conclusions. The messages from the Australian Climate Commission in their report a year and a half ago, called *The Critical Decade*, yes, there is no doubt the climate is warming. We already see social, economic and environmental impacts and it’s beyond a reasonable doubt that human activity is the main cause. If we wish to limit global warming, it’s decisions that we make this decade, between now and 2020, that will determine the magnitude of the warming, that not only we will experience but our children and our grandchildren will experience. Here is a clear decision, and that decision is being discussed in political areas. This is supposedly a cartoon on one of these international climate change negotiations, but it could represent discussions around the Labor Party or an Australian parliament. Both political parties have targets for greenhouse gas emission reductions for Australia, and no political party, except perhaps the Greens, has emission reduction targets that go anywhere near addressing the severity of anthropogenic climate change. Yes, the politicians say, we’d like to save the planet, but let’s wait. Let’s wait. Let’s do it when it’s easier. Let’s leave it to someone else to solve. Let’s wait until the technology is available.

The technology is available now. The politics is the difficulty and that’s why I'm leaving it to Robert Manne. Thank you very much.

**Rufaro George Kanjere**

Thanks very much David for that presentation. Now I'd like to introduce Professor Robert Manne of La Trobe University. Give him a hand.

**Professor Robert Manne**

I'd like to thank David for an absolutely exemplary thirty minute exposition of climate change and I would like to thank you all for coming. It’s great to see such a large audience at La Trobe and finally I'd like to thank George very much. It seems to me this is what a university ought to be about for a student, of his own initiative, to organise something like this, and I think to get just right the need to have half of this lecture with the science and half with the politics is again an absolutely right decision. I hope I don’t let you down. I'll give you a preview. I'm not going to solve the problem, but I am going to try and outline what to me has become almost the only political problem that should absorb us all.

I have no slides, as always. My students will know that. And I'm – unusually for me, at La Trobe, going to talk from a text because David wanted precision with graphs and so on, and I want precision with words.

What I'm talking about are the reasons why humankind has failed so far to rise to the challenge of global warming, which has been so brilliantly outlined just now. First, the evidence of the failure.

Approximately twenty-five years ago, scientists with an interest in the climate, were moving towards a consensual conclusion concerning the causes of global warming, essentially, as we know from the talk, now, greenhouse gases. This led to the creation of the Intergovernmental Panel on Climate Change. On the model of the Montreal Protocol that had gone a long way to solving the problem of the hole in the ozone layer, through voluntary international co-operation, by 1997 the nations of the earth had associated themselves with the Kyoto Protocol which was then eventually ratified by almost all nations of the advanced economies, with the exception of the United States.

Since the International Scientific Global Warming Consensus was arrived at, and since Kyoto, greenhouse gas emissions have risen by some fifty per cent, as David has said. The level of carbon dioxide in the atmosphere, again as David pointed out, 280 parts per million before the Industrial Revolution, is now approaching 400 parts per million and will continue to rise for the foreseeable future. The conference which was supposed to replace Kyoto with a more effective international agreement, drawing the less developed economies into a system of internationally organised greenhouse gas emission reduction, Copenhagen, 2009, was a comprehensive failure, as have been its successor conferences at Cancun, Durban and Doha.

Virtually no one who is rational any longer believes that temperature will be able to be contained to the internationally recognised tipping point of two degrees Celsius above the levels of the time of the Industrial Revolution. Scientists now fear a rise of four or five or seven degrees Celsius by century’s end. Why our predictions should terminate in 2100, a time when large members of the very young today will still be alive, is difficult to fathom.

Everyone rational knows that if we continue to use fossil fuels as the energy source for our industrial material consumption society, the condition of life on the earth for our own species and for other species, will be destroyed beyond repair. And yet, eyes wide shut, the nations of the earth are doing very little to avert the impending entirely foreseeable catastrophe. I'm trying this evening to look at some of the reasons why.

In the way it has evolved, the international system of nations is entirely unfitted to the kind of broad ranging international co-operation now required. Nations participate in the international system, predominantly to safeguard and advance their self-interest, the so-called national interest. Only when they think the national interest is served will they form alliances or involve themselves in broader schemes of international co-operation. The most important general international body, the United Nations, is powerless to compel co-operation. In the face of aggression by a sovereign state, action by the United Nations is paralysed if even one of the great powers at the time of its formation, decides upon a veto. Even in military alliances, national sovereignty is preserved. Very occasionally, as with the Montreal Protocol, international co-operation to solve a problem through economic self-denial, is successful, but such action is always merely on the margins of an economy, and in no way even a possible threat to the pursuit of national interest.

International action against global warming needs to be different. The action required involves a series of domestic economic revolutions, transferring the source of energy from fossil fuels to clean alternatives, in a relatively short time. This necessarily involves some sacrifice of national economic self-interest in the short and medium term. Immediate radical cuts in greenhouse gas emissions are expressions not of national interest, as commonly understood, but rather of what I will call national altruism. Acts of national altruism are of course not entirely unknown, for example, foreign aid to developing economies. But unlike the kind of action that is now required to curb greenhouse gas emissions, such acts of national altruism are generally economically marginal, and designed in ways sometimes to bolster, and never to undermine, national economic self-interest.

Yet the situation is more complex than this suggests. Because the problem of greenhouse gas emissions is fully global, actions by individual states can be characterised as futile if they are isolated to only a few states. High levels of foreign aid are unambiguously beneficial to the recipient, so long as the program is intelligently designed. They do not rely on the equal actions of other states. In the case of greenhouse gas emissions however, especially small or middle-sized nations, in the absence of a binding international agreement, are rightly aware that they can achieve little unless their acts have a snowball effect, stimulating many other nations to act in a similar way.

Without general action by the community of nations, something which cannot of course be compelled in the absence of any sovereign body higher than the nation state, unreciprocated acts of greenhouse gas emission reductions are easily characterisable as futile, and therefore foolish. This is especially so where there is no meaningful action by the two largest economies of the world, the United States and China. Here, with regard to China and the United States, humanity is cursed by history. The middle kingdom, China, has felt humiliated by a century and a half of weakness, since the mid 19th century. It is only escaped from this humiliation over the past quarter century. To put it mildly, China is now in no mood to imperil its recent emergence as a great economic power. China has a centralised and authoritarian political system that would allow it to cut greenhouse gas emissions radically if it had the will to do so. It also has an economic system still sufficiently centralised to allow it to invest heavily in clean energy industries for both domestic and export purposes, as to some extent, it is doing. Yet China is still, and will for a long time, remain heavily dependent for its energy needs on coal, of which it has vast reserves. In part because of its heavy reliance on coal, in recent times, China has become the world’s largest greenhouse gas emitter. In a choice between economic self-interest and national altruism, there is not I'm afraid the slightest doubt that with China, it is the pursuit of narrow national interest that will prevail.

For a different, the same can be said of its rival, the United States. Ever since its foundation, the United States has seen itself as a chosen, or exceptional nation. This is a present tragedy. American exceptional acts now as a threat to both the earth and to the future of humankind. No nation is more important in the struggle against global warming than the United States. However, because of its self-conception, no nation is less likely than the United States to subordinate itself to the international community, or less likely to agree to trim its independent decision-making in co-operation with other nations.

When it came to consideration of the only promising global warming international agreement thus far, the Kyoto Protocol, the United States Senate effectively decided against ratification in a vote of 95 to zero. Even though President Obama, as David showed, gets the climate change crisis, his actions are largely restricted to working with the Environmental Protection Agency. At present either a cap-and-trade system or a carbon tax, both of which require Congressional legislation, are simply unthinkable. Confronted by a wall to wall denialist Republican Party, and a largely indifferent public, Obama did not so much as mention climate change during the entire 2012 Presidential election campaign. This is one of the most tellingly tragic facts of contemporary times.

Nor is it only the two economic superpowers which are systematically resistant to the kind of subordination of national self-interest necessary for concerted action. As the problem of global warming is an historical product of the early industrial nations, it is certain to prove almost impossible to convince the largest newly-emerging and fast-growing economies, like India or Brazil or South Africa, that they have an obligation to act in the interests of the earth and not in the immediate short-term interests of their own people. Of course they have a strong argument. Historically the largest emissions come from the fossil fuel burnings of the developed world, since 1800 or so. What right have they now to demand that developing countries exercise greenhouse gas emissions restraints in their struggles to reach levels of prosperity approximately those of the already developed economies of the world. Unfortunately, although this is a very good argument, the atmosphere of the earth is indifferent to arguments of social justice.

Similarly, it has been, and will continue to prove impossible to convince the fossil fuel reliant economies like Russia and the oil-producing nations of the Middle East to sacrifice supposed national economic self-interest in favour of the wellbeing of human and other species. No Australian should be in any doubt on this point. Because of our vast coal reserves, we are one of the largest per capita carbon dioxide emitters, and one of the most important greenhouse gas exporters to the world. And yet, in Australia, the question of the development of the coal industry is now almost undiscussable among the political parties, even to some extent including among the Greens. At a time when the earth is facing a climate crisis, Australia is involved in a disgusting scramble to open up vast new coal developments, especially in the Hunter Valley and the Galilee Basin in Queensland.

The Australian example points to the ways in which the parliamentary democratic political systems determine the failure of the advanced economies of the West to rise to the challenge of global warming, based upon three or four year electoral cycles, and upon either bi-partisan or multi-party competition. Such political systems are peculiarly unfitted for the long term decisions to revolutionise their energy sources and the national sacrifices that are now required.

As everyone knows, the electoral cycles are systematically and increasingly biased towards political and policy short-termism. The fierce party political competition reduces the capacity for the creation of bi-partisanship or multi-party agreement on issues as contentious and costly as a revolution in the source of energy, and it increases the likelihood, as we see every day, of opportunistic populism. Imagine what would happen in Australia if one or other major political party went to an election on a platform promising to introduce a meaningful carbon tax or to prevent any further expansion of the coal industry.

There are also other formidable roadblocks to change. In Western democratic nation states with powerful fossil fuel industries like the United States, Canada and Australia, there are few legal impediments to the use of money for lobbying, and for buying interest in the political parties, so as to influence electoral outcomes. The best example was the threat the mining industry used to spend a hundred million dollars when Kevin Rudd suggested a mining tax.

Nor are there serious impediments to the direct or indirect purchase by fossil fuel companies of influence through advertising or indeed, outright ownership of the mass media, as Gina Rinehart rather ineffectively proposes.

For all these reasons the domestic political systems of the nation states, potentially of the greatest importance in the struggle against global warming, that is, the advanced Western democracies, the political systems tend to paralyse the possibility of necessary emergency action. The advanced democracies are well equipped for large scale emergency action only in one kind of situation, the real or supposed threat of an enemy. When Germany or Japan threatened in the 1940s, the democracies mobilised for the emergency. When their civilisation appeared to be threatened by the Soviet Union, or by Islamist terrorism, bi-partisanship or multi-party agreement for action did prove possible.

But global warming poses a far greater emergency than say Islamist terrorism, yet because it is a long term threat, with no galvanising event equivalent to Pearl Harbour or the Berlin blockade or 9/11, a Micawber-like policy of infinite delay in the hope that some solution will eventually just turn up, has proved attractive to politicians and to the citizens of the Western democracies.

Even in those democracies which accept the reality of the problem, and these nations are concentrated in Western Europe, the most usual solution to the acknowledged emergency, has been cautious greenhouse gas emission reduction targets in the short term, and heroic pledges over the long term, which later generations of political leaders are somehow expected to fulfil.

Australia is a moderately good example. Until Abbott wrecks everything, we are committed to a five per cent reduction by 2020 and an eighty per cent reduction by 2050. According to the logics of politics, delay makes sense. According to the logic of climate science, delay gravely compounds the difficulty we will eventually face. In the struggle between these logics, politics prevails. There is no reason not to believe that as the heroic long term targets move closer to the present, they will also begin to recede.

Yet the situation is even more alarming than this. In the countries of the Anglo sphere, the United States, Canada, Australia and the United Kingdom, one response to the looming catastrophe of global warming has been the emergence of a movement of opinion where the consensual position of the relevant scientists, that group on whose authority all contemporary societies routinely rely, except on global warming, has been comprehensively denied. Denialism is a complex phenomenon. In part, it is a straightforward movement of the material interests that are threatened, the fossil fuel corporations and their business allies. In part, it is an expression of the left-right culture wars that have been fought with great ferocity since the end of the Cold War, in which environmentalism has been a major front.

In part, denialism is a consequence of the rise of neo-liberalism, since about 1980, with its worship of the magic of the market and its ideological unwillingness to acknowledge that climate change represents, in the words of Nicholas Stern, the economist, the greatest instance of market failure in the history of humankind. In part, denialism represents the stubborn refusal of ageing white conservative males to recognise that man’s effort to master the nature, I use those words advisedly, has in this instance, produced an unpredicted, unpredictable and unintended impending catastrophe.

Most importantly, and disturbingly, denialism expresses the psychological unwillingness of the character type produced within the consumer society to recognise the necessity for material sacrifice and even the existence of limits.

Psychologists have long recognised the phenomenon of denial in the individual. More sociological work is now needed to outline the dynamics of patterns of denial that are society-wide. In tandem with political scientists, such work will need to investigate the explicitly denialist movements that have gained hold of opinion in the Anglo sphere during the past few years.

Perhaps even more challenging however, will be the investigation of the far more common and dangerous pattern, to which almost none of us is immune, namely denialism in everyday life, or the ways in which so many citizens, so many of us, knowing what we do, knowing what they do, manage somehow to live their lives in parallel universes. On one level of existence, accepting intellectually that the threat of catastrophic global warming exists, and on another, finding ways of living and thinking calmly and comfortably, as if nothing of great moment was happening that was placing the future of humankind and of other species, in gravest peril.

I've been surprised by the failure of the climate change catastrophe to ignite large scale or radical political resistance, even on the scale of the global Occupy Wall Street movement, following the historically far less momentous global financial crisis of 2008 and beyond. In part this reflects the contemporary weakness of the revolutionary anti-capitalist left, which has in my opinion been greatly wounded by the mistake it made in associating the Soviet Union and the communist movement with human liberation, a mistake from which it hasn’t yet emerged and which the Murdoch newspapers remind us every other day.

In part it reflects the long term nature of the global warming crisis, where the danger is looming but never quite pressing or imminent. In part too, the challenge of the global warming crisis represents something the left has never before faced – an injustice perpetrated not by one class or race or gender, or majority on another, but of one generation, ours, on all the generations of both humans and other species yet unborn. The radical left is used to fighting for justice for those presently living, on the basis of class or race or gender or membership of a threatened minority. It has no experience of calling upon their own generation to wage a struggle for justice and to undergo sacrifices, not for the present, but for future generations. Fighting for the lives of generations not yet born is both a historically novel situation and one more distant and abstract than the great emancipatory struggles of the past. It also must be said however that it is infinitely the most important struggle human beings have, in my view, ever faced. What is now at stake are the very conditions that will determine the future of human beings and of all life forms, the future of civilisation.

Even though the situation is dauntingly difficult, there is no alternative for our generation but struggle. It is worth recalling that there was once a time when the struggle against slavery or racism or sexual oppression also seemed hopeless and the big question somehow, it seems to me, is to be both rational and to retain hope.

It follows from what I have said that the main hope since the collapse of the Copenhagen conference rests now not with the prospect in the short or even perhaps middle term, of some comprehensive binding international agreement, but with dramatic, unanticipated and altruistic actions taken by individual nations, which will be noticed by other nations and thereby create what I call a benign domino effect.

The situation of particular nations determines in each individual case what the most pressing and symbolically significant action ought to be. Let us think about this country, Australia’s potential role.

Coal is in some ways the key to the future of human civilisation. While it is estimated that there are sufficient oil and gas reserves to last until the end of this century, there is enough coal, so experts tell me, or I read them, there is enough coal for three or four hundred years. Given this, the situation we face is very simple. If human beings do not leave most of this coal in the ground, the conditions of human civilisation will be destroyed. As I've argued this evening, Australia’s particular responsibility in the struggle to overcome the climate crisis, is now dominated by the way we handle the question of coal.

Almost three quarters of Australia’s present energy needs are supplied by coal. Even more importantly, Australia is the world’s largest or second largest coal exporter and the most important export source of high quality coking coal. A decision taken in Australia to prevent the further expansion of the coal industry and then to wind back present mines would have enormous global significance, both practical and symbolic.

This is the reason that two of the most important climate change action groups, Greenpeace Australia and the Australian Youth Climate Coalition, both of which I commend to you, particularly to the young people in the audience, have independently decided to focus their efforts at present on the struggle against the development of coal mining in this country, and the grotesque coal mining expansion presently, frenziedly taking place. I take it that many of you in this audience have come tonight because you understand the nature of the crisis humankind now faces. If so, I urge you to give your support to these two organisations or to others who are leading the fight for what can be described, without hyperbole, as the future of human civilisation.

Thank you.

**George Kanjere**

Thanks for that Robert. I'm going to invite them to sit down here and yes, we now have about twenty minutes for questions.

**Q:**

Well, hi, I've got the first question. Thank you both for fantastic talks. My question’s about geo-engineering. I'm not sure if I should address this to David or Robert Manne, but I was just reading recently and also I was in Sydney one day when I saw some smoke plumes go across the sky, and some people are very worried about geo-engineering as being a possible ... having a worse effect than carbon emissions in terms of putting all sorts of poisonous toxic gases into the atmosphere, and leading people on, thinking that we can actually control the weather. I just wondered what you thought about that.

**David Karoly**

So, as I was saying, geo-engineering is a term that’s used to mean lots of different things, but it’s just human modification of the earth’s system, often talked about in terms of trying to help solve climate change into global increases in greenhouse gases. There are two types – reducing or enhancing the uptake of carbon dioxide into the natural system, so that can be as simple as planting more trees. That’s an aspect of geo-engineering and that’s probably relatively benign, although it can have impacts on agricultural production. There are other things like introducing fertilisation of the ocean, iron filings into the ocean. That can also enhance carbon dioxide uptake in the ocean but it’s much less likely to be benign, because it will affect ocean ecosystems.

What you’re probably talking about is another type of geo-engineering, where you try to reflect sunlight back out to space by introducing, typically, particles, like they talked about in the volcanic eruptions, putting particles into the upper atmosphere to simulate volcanic eruptions, will cool the climate system. But they have many adverse impacts. They chance rainfall patterns. They don’t completely offset the carbon dioxide warming, so the carbon dioxide is still there, causing ocean acidification. It changes rainfall patterns, and also causes depletion of the ozone layer, which will cause increases in UV radiation and skin cancer.

So in principle, you could try to fix global warming by geo-engineering, through this factor, but you’d change the rainfall patterns, cause permanent drought in the ocean, sorry, permanent drought in the tropics, you’d kill people through increases in skin cancer, and you’d still destroy the ocean through acidification. That to me doesn’t sound like a sensible solution.

Robert Manne

Can I just say something? I just read a really good book on this by a friend of mine, Clive Hamilton, which is one of the first major books on geo-engineering. If I can just add a political angle. I think it’s pretty likely that geo-engineering of the sulphate kind will go ahead, in part because we can’t go on denying forever that something major is happening and it’s a lot easier than emissions reduction in that there is no law, international law, governing it. It can be lawfully done by a single government or even a single individual. And it doesn’t need international agreement and it’s also comparatively cheap. And I suspect, my guess is that as the paralysis that I've been describing in the political field towards the rational response, which is moving away from fossil fuels, hits home, the temptation to try geo-engineering, which seems to me just an extraordinary thing to try, is not unlikely, if I can put it like that.

**George Kanjere**

We have a next question here.

**Q:**

Yes, I'd like to also thank George and David and Robert for organising the evening tonight, and your presentations. I'd like to apologise for being an old white guy too. This is about the fourth time I've heard Robert bagging me and my brethren.

**Robert Manne**

I'm also white as a matter of fact.

**Q:**

Pardon me?

**Robert Manne**

I'm not young and I'm white too.

**Q:**

Yes, I was going to say. I'm not sure that you can talk. But, David, the chart at the beginning showed the global temperature anomaly, sneaking into the positive in the last fifty years. You also looked at CO2 proxies, going back a thousand years. Have you got a chart of global temperature anomalies going back a thousand years and has there been a period where the temperature anomaly in the past was higher than it is now?

**David Karoly**

So, we don’t have direct thermometer observations for temperatures a long time in the past. In fact, we only have direct thermometer observations for the last three hundred years in Europe and the last nearly two hundred years in Australia. In fact, there were thermometer observations in the First Fleet, from temperatures, but that’s only for Sydney.

We can get estimates for the Northern Hemisphere for the last thousand years, and global estimates, depending on how much data you want, for roughly the same period. The temperatures now are more than a degree warmer than for most of the last thousand years but Ian Plimer and many geologists will tell you, quite correctly, that we’re currently in a very cool period of the earth’s climate. In fact, for most of earth’s four billion year history, the earth has been warmer than at present. The earth’s also had a lot more carbon dioxide in the atmosphere than at present. And if we look back in history, there have been no periods over the last million years, for which temperatures have been warmer than we predict for the end of the 21st century, this century.

But in fact temperatures in the last Ice Age were warmer, sorry, in the last inter-glacial period, more than a hundred thousand years ago, were a little bit warmer than at present. But remember, the climate system is still adjusting, still warming, in response to the greenhouse gases we’ve got in the climate system that we’ve added over the last fifty and one hundred years. The climate system takes a long time to respond. But the last time temperatures were as warm as we’re predicting for 2100, about four degrees to five degrees above pre-industrial, was fifty million years ago, a period called the Paleocene Eocene thermal maximum, and greenhouse gases rapidly increased, sea level was much higher, likely because of massive volcanic eruptions or methane emissions.

If we go back to carbon dioxide concentrations that we’re talking about in 2100, we have to go back to the Jurassic and Cretaceous period. That’s when carbon dioxide concentrations were high, that’s when the fossil fuels were being laid down. Carbon dioxide was captured in plants laid down and buried deep in the soil and producing oil and coal deposits.

So we’re essentially re-introducing that by digging it up and burning it, putting it back into the atmosphere, and it’s possible that human society will develop exactly the way that the dinosaurs did, going into extinction. I don’t think that’s going to happen. Human society might be destroyed, but human civilisations and humans as a species, will cope, but maybe not all of them.

**Robert Manne**

Can I just, on the non-science, the white males ... I'm not just slurring white males. There’s very good political science work done on this and if anyone’s interested, one of the authors is a man called Riley Dunlap, if you wish to look into it. A very very clever study is made of attitudes and quite well educated ageing white males were by far the largest group of denialists in a very, very carefully done study.

**Q:**

While we’re on denial Robert, you didn’t mention the link between denial and religion. Because it seems to me that not just in terms of Christianity, that a lot of people think that talking about climate change is heretical and there seems to be quite a powerful force there, amongst religious people, to act in denial. I just wondered what you thought about that.

**David Karoly**

Can I answer that? Because in fact I've been involved in looking at a wide range of, if you like, positions of religious groups on climate change. The Catholic church, the Anglican church, the Uniting church, the Jewish church, many traditional or conservative Baptists, all say that ... accept the science, say climate change is happening, and encourage responses. So it’s only a small number of outspoken denialists of which one Catholic senior member in Sydney has a strong view, they’re very unusual and they’re not representative. In fact the last Pope had a very strong message on responding to climate change.

**Robert Manne**

That’s true. I would say the impression would be because, in the United States, a lot of fundamentalist Christian watch Fox News and get influenced by that, and so I think the ways in which the impression is left of religious denialism is much more because of the peculiar situation of the media in America and what some right wing Christians in America watch. But I agree with David’s analysis.

**David Karoly**

But it’s not even the vast majority of, if you like, fundamental conservative Christians in the United States. There are big polarisations because there is one group of fundamental Christians who follow, if you like, a philosophy that it is important for human society to tend God’s creation, and their view is, in fact it is important for humans to protect God’s creation, that in fact humans are not above it. Now I'm not a religious person, I'm just relaying perspectives and there is in fact a big divide in conservative Christian religions as to what you do. And it’s a very interesting dilemma.

**Q:**

I too would like to congratulate George on arranging this forum. It’s a great exercise. I'd like to draw your attention to three facts. Two are not in dispute at all. The first is that the CO2 levels are galloping faster than the most pessimistic predictions. The second is that there has been a seventeen year pause in global warming as acknowledged by Rajendra Pachauri of the IPCC and that the British Bureau of Meteorology models are predicting that this pause will continue until the year 2017, that’s a twenty year pause. And thirdly, there’s a leaked graph from the AR5 IPCC Report due out in September as you said, showing that actual temperatures are tracking below the lowest predictions of the previous IPCC Report. If we put those three facts together, don’t they blow this idiotic global warming scare right out of the water?

**David Karoly**

Thank you for your opinion, but those things that you quoted are in fact not facts, but are in fact misrepresentation. If you go to the UK Met Office website, they first of all show data sets for which there has been no pause in global warming, temperatures have continued to rise, the trend in global temperatures over the last seventeen years is positive. It is not zero. The Met Office forecast is a forecast of average temperatures, not an individual year, and the newspaper report and the blog site reports are inappropriately comparing a one-year temperature to a forecast of an average temperature. If you look at the extremes, they show a three tenths of a degree warming over that twenty year period in the Met Office forecast, which is entirely consistent with a typical rate of warming over the previous twenty years of about .15 degrees per decade. So that forecast shows warming continuing unabated.

The AR5 graph that you were talking about is exactly consistent with the graph that I showed, where warming in the climate models is entirely consistent with the observed temperatures and not outside as you suggest. So, I would suggest that you actually look at the data, not at websites. And I've seen ...

**Q:**

I have a graph here. Would you like to consult it?

**David Karoly**

I've seen that graph and it is a misrepresentation of the observed temperatures. You did not produce that graph. You pulled it off a website.

**Q:**

Can we draw any hope? You pointed to the United States as being a very important player. Can we draw any hope that several of the states in the United States take the greenhouse gas emissions seriously. It’s pretty clear that the President has no capacity to do anything. Can we draw any hope?

**Robert Manne**

Well, that’s true and it’s also true that everywhere in the world, there are forces that see what’s happening and understand what needs to be done. And of course, one has to acknowledge that and draw hope from it to some extent. I mean, what I'm saying is that nowhere so far has action on even remotely the scale needed or anything remotely like the transition from previous fossil fuel economies to clean energy economies has taken place. And to my shame really, I only became much interested in this around 2005, far too late. I feel ashamed of that. But I, like a lot of people, had great hope that Kyoto would turn into something major at Copenhagen, and I've been, and I think most people rational would have been struck by the paralysis of the international world and also the situation in general I think has got worse in the United States at the point of view of Congress. You have now one of the two major political parties in the United States which is now wall to wall denialist. Not one of the candidates for the Republican Presidency was able to say they believed global warming was a serious threat.

So of course the world is full of things and there are some parts of it from which one can draw some hope. But I think at the moment it is foolish to think that the trajectory is anything but negative, and the university ... I've been around this university a long time and I've been interested in universities for a long time, and the most important value we have is the pursuit of truth, and truthfulness. And my truthful opinion is that at the moment the situation from the political point of view, international relations point of view, doesn’t have much ground for hope. The only thing I'd say is that history is full of surprises and that’s my hope.

**Q:**

I wanted to ask about what percentage of carbon dioxide emissions are related to things like transport, power generation and so on, both for Australia and in general, and also you said in the talk that the technology exists. I wondered if you could specify what that is.

**David Karoly**

Sure, and I'm not going to remember the exact amounts to the nearest single digit in terms of percentages, but the largest source of, if you like, greenhouse gases globally and in Australia, is from what we call stationary energy production, which is essentially electricity production. It’s about 20% of the total emissions. No sorry, about 30% of the total emissions. Emissions from industrial processes is also a major source. Emissions from transport are particularly ... you know, cars, but also aviation and things like that is a major emission source, about 15% of the total. Agriculture is a major source. It’s not primarily of carbon dioxide, but of greenhouse gases like methane and nitrous oxide, and methane is very important, because molecule per molecule, it is much more effective in warming the climate system than carbon dioxide. So kilogram per kilogram, methane is 25 times more efficient at warming the climate system on a hundred year time scale, and on a twenty year time scale, it’s 80 times more effective than carbon dioxide.

So those numbers, transport about 15%, agriculture about 15%, 30% for stationary energy, electricity production.

And then there was another question in terms of the technologies. We want to eat, I think, agriculture is really tough using existing agricultural production to reduce emissions. The biggest way to reduce emissions from agriculture is to go vegetarian. Animal agriculture is a major source of emissions. But it’s unlikely that the whole world will transform to vegetarian diet in the foreseeable future.

However, there are existing technologies that can transition us to zero emissions for electricity generation, including wind power, particularly concentrated solar thermal power, photovoltaic generation and then other sources like wave power, and tidal power. Australia has the largest received solar energy of any country in the world. There’s lots of people who say we shouldn’t waste the coal that’s buried in the ground in Australia, but are happy to waste the solar energy that we receive every day of the year. It seems to me that there’s a contradiction there. The only reason we’re worried about wasting the coal, is because someone *owns* the mining rights. No one yet owns the sunshine that we receive but we can make not only a buck out of it, we can generate jobs. We can generate an Australian solar energy industry and we can generate zero carbon electricity from it as well as wind power and wave power and tidal power. So there are existing technologies, it’s just that there are a lot of vested interests who would rather us continue to use the fossil fuels.

**Q:**

Thank you for those who organised this and thank you for your presentations. I hope we’ve put all the knives away before we leave the room.

My concern is, I've been to this and many other presentations that we seem to always be singing to the choir, except for maybe one or two. You alluded to Greenpeace and ... I'm an old white guy so the other group didn’t matter to me. My concern is, do you see a time when we can get some cohesion in pulling together all the various groups? And, yeah, I mean, I see a lot of people who are concerned. I know a lot of Christians who are concerned. I know a lot of ... it always seems to come down to a left-right debate. Personally I'm a right wing person and I see that commerce can achieve some of the results. I look at things like what 3M have done for an example. I'd just like your opinion on some of that.

**Robert Manne**

There are a number of different things. I mean, one of the great mysteries is why this issue has become a left-right question. A lot of books have been written showing that environmentalism until the 1980s, insofar as it was a political issue, and the work I'm thinking about is in the United States. It was as much a Republican consideration as a Democrat one. But I don’t think one should underestimate the harm that’s been done by the culture wars that have been fought in the United States and in English speaking countries since the early 1980s, and environment was a part of that culture war.

But it shouldn’t be a left-right issue at all. And in fact if anything I would have said that before the question of global warming arose, it was more conservative groups that had a greater belief in the authority of science. And it was to some extent the post-modernist left which began deconstructing science and beginning to question its authority. So, it’s again strange that in one area of science, normally conservative citizens now treat the entire group that they usually find authority in, with suspicion, and even claims about them being corrupt and whatever. It’s amazing to me that this has happened.

I don’t know whether co-ordination is necessary between the groups. I know that support for the groups like Greenpeace and AYCC is important. And I do think ... I actually think one of the things that’s important is for the citizens who are concerned with it to be concerned with it, to put it at the centre of their politics and to be concerned with it all the time. I think public opinion polls aren’t very useful if they just say, I think this and that about global warming. I think what’s important is that it becomes the overwhelming preoccupation of people, and I think particularly of young people, because many of the younger people in this audience are going to be alive in sixty or seventy or eighty years even, and they’re going to be facing, as far as the scientists tell me, a terrible climate.

I don’t think co-ordination of the groups matters so much as the increase in consciousness amongst a large part of the citizenry. But always these questions are asked, what should we do now? And I don’t have a better answer than anyone else, to be honest.

**David Karoly**

Just to add to that. The left-right framing was completely irrelevant in Europe. The United Kingdom, action on climate change was led by Conservative Party politicians.

**Robert Manne**

And Margaret Thatcher.

**David Karoly**

Margaret Thatcher. The same in Germany. The current German Chancellor led action is from a conservative party. So the action on climate change in Europe has been led by the conservative parties and they see it as a critical part of conservative policy. In terms of, if you like, action, in Australia the climate action groups are in fact meeting in Melbourne later this month in something called the Annual Conference of the Climate Action Network Australia. I can’t tell you the exact dates but if you are interested, you can look on the web. I think it’s Melbourne University some time just after Easter. But I'm not absolutely sure. I think the important thing following on from what Robert said, is conversations on climate change shouldn’t happen just in these fora where you say, quite correctly, we’re preaching to the choir, or preaching to the people who already agree. These sorts of conversations should be taking place around the dinner table, or in the pub, or in the supermarket, or as you said, in the church groups or in community groups or things like that. This is an everyday conversation where, raised in the everyday context, it’s more likely to have the possibility of actually introducing it informally, as part of a discussion around everyday things.

**George Kanjere**

And I think at that point, we’ve run out of time. So I don’t want to keep everyone too far beyond 7.30. So if you’d like to join me in giving a hand to David and to [tape ends}