

# Alfred Deakin Lectures 2010: Brave New World? The Climate Change Challenge

*"Thirty of the Best Minds on Climate Change in the One Place at the One Time"*

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## Introduction

Climate change is a familiar issue. It is an issue where we can observe the ways societies and their leaders frame and respond to wicked problems. If we believe the predictions of the vast majority of qualified scientists the climate problem has the potential to devastate life on the planet and civilisation as we know it. The Alfred Deakin Lecture Series – held in Melbourne and Bendigo, Australia in June 2010 – provided deep consideration from a wide range of disciplines of the challenges and opportunities faced in tackling climate change.

This event report draws out material and perspectives from lectures and panel discussions of interest to the futures community. Further, the lectures should be considered an example of applied futures thinking, drawing on macro-historical perspectives, images of the future and systems thinking. The lectures are, thus, a model which could be replicated around the world to help promote futures thinking. First, an overview of perspectives provided in key lectures is provided, then Causal Layered Analysis (CLA) is used to analyse the different depths of the climate change discourse present in these lectures.

## Overview and Opening Address

The annual Alfred Deakin Lectures have, since 2001, celebrated Alfred Deakin's contribution to Australia, as a driving force behind Federation of Australia and three-time Prime Minister in the early 1900s. The lectures aim to:

- present a quality lecture series addressing critical and emergent issues;
- represent Victoria locally, nationally and globally as a centre of innovation and a vibrant democracy;
- stimulate continuing conversations in Victoria around key innovation issues;

- facilitate international connections and relationships; and
- reach new audiences and introduce new ways of engaging audiences.

The 2010 Lecture Series, curated by Tim Flannery (palaeontologist; author, *Future Eaters* (1994), *Weather Makers* (2005) and *Here on Earth: An Argument for Hope* (2010); and 2007 Australian of the Year), was designed to examine the responses and solutions to climate change. The series came just weeks after the Australian Government announced it would defer consideration of an emissions trading scheme until 2013. The Government's legislation had failed to be passed by the Senate three times in 2009 and 2010<sup>1</sup>.

Over 1300 people, many queuing in the rain on a cold Sunday afternoon, attended the opening address by Flannery. It was the first of 10 lectures (Table 1), all free to attend, which were mostly fully subscribed.

Table 1.  
*Deakin Lecture Series Program 6-12 June 2010*

Topic	Keynote Speaker(s)	Panel Discussion
Innovation in a Changing Climate	Tim Flannery- paleontologist, author (Aus)	
Future Energy Solutions	Grant King- CEO Origin Energy (Aus)	Y
Emissions Trading	Richard Folland- Climate Change Strategies (UK) Denny Ellerman- energy economist (USA)	Y
Greening Capitalism	David Blood- Generation Investment Management (UK) James Cameron- Climate Change Capital (UK)	Y
Prosperity without Growth	Tim Jackson- author <i>Prosperity without Growth</i> (UK)	
Innovating the Cities	David Owen- writer <i>The New Yorker</i> (USA)	Y
Carbon Down on the Farm	Johannes Lehmann- Cornell University (USA)	Y
The Ethics of Climate Change	Tim Soutphommasane- Monash University (Aus) Kartikeya Sarabhai- Centre for Environment Education (India) Peter Singer- Princeton University (USA), Melbourne University (Aus)	Y
Innovation, Energy and Climate Change in the Developing World	Tim Costello, CEO World Vision (Aus)	Y
Politics of Climate Change	Malcolm Turnbull, Liberal MP and former Opposition Leader (Aus) Mark Dreyfus -Labor MP (Aus) Nick McKim -Leader of the Tasmanian Greens (Aus) Valerie Amos - High Commissioner to Australia (UK)	

Flannery dismissed the pessimism underpinning much discussion about the future of the planet, instead seeing an alternative future where humanity would "reach an accommodation with our planet." Using a macro historical perspective on the challenge, Flannery argued if we define the world and our societies through the lens of

competition (as per survival of the fittest or neoclassical economics) then the logical conclusion is our own destruction. He believed there is much in human history demonstrating this "selfish destructive being", but it is tempered by cooperation. This is evidenced in the progression of human civilisation over the last 10,000 years towards larger, more interdependent societies. He envisioned the only possible future ahead of us is the "creation of a global human civilisation". Flannery further contended we are on the brink of realising this future, but could squander the opportunity unless we address climate change in the next decade.

### **The Need for Change**

Ben McNeil, author of *the Clean Industrial Revolution: Growing Australian Prosperity in a Greenhouse Age*, described Australia as "carbon obese", being the most coal dependent nation in the world.

During the 40 year period 1965-2005, the population of Australia increased by 80%, yet consumption of electricity increased by 650%<sup>2</sup>. This is symptomatic of this obesity. For Australia an abundance of easily accessible, low cost, but emission intensive coal has been the main source of power. As a consequence stationary energy, primarily electricity generation is responsible for 50% of Australia's greenhouse gas emissions.

The biggest mitigation challenge for Australia is decarbonising its electricity generation system. This issue was at the core of the lecture "Future Energy Solutions" by Grant King, CEO of Origin Energy an Australian energy retailer and generator using coal, gas and renewable sources. In King's view if we are to progress towards Australia's current emissions reduction target of five percent reduction on 2000 levels by 2020<sup>3</sup>, solutions are limited to technology options commercially available today. Why? Due to the industry lead times to build new generating capacity we have to start today to have any chance.

King cited lead times for green field coal or gas plants as ranging from four to seven years from proposal to completion. In a country where nuclear power is already in use at least 10 years is required for a new nuclear plant. Renewable energy projects have historically been slightly faster, wind farms taking three to four years but with community opposition, those times are only getting longer. Geothermal requires a source, for example a volcano nearby. In Australia hot rocks are the most promising geothermal energy source. The technology to exploit this source is still being developed, and proven technology was estimated to be three to five years away.

Geosequestration and carbon capture technology to store emissions from coal-fired plants underground has not been commercially proven and is unlikely to be deployable by 2020.

By King's estimate, renewable energy sources available for deployment at large scale, wind and solar, currently cost two to three times more than equivalent generation from conventional sources and are uneconomic without substantial subsidies. Mandated targets such as Australia's renewable energy target working in concert with an emissions trading scheme (ETS) to provide a price on carbon were the policy meas-

ures King promoted. Other speakers also advocated for feed-in-tariffs for commercial solar projects.

King believes reducing emissions at Australia's 20 to 30 power stations will have a greater impact and be more cost effective than trying to reduce energy use at millions of households across Australia. He cites analysis of household energy bills, which despite the introduction of energy efficient appliances and other measures household energy consumption has not declined. Clearly, as King illustrates, there are some points in the system providing greater leverage than others.

### **So Why the Lack of Action?**

Malcolm Turnbull, former leader of the federal opposition (Australian Liberal Party) suggests it is a failure of political courage and leadership.

Public fatigue with the issue and lack of informed debate about a complex issue hasn't helped. Martin Parkinson, Australia's Secretary of the Federal Department for Climate Change, characterised the debate over the last 12 years as "thought bubbles." Isolated, uninformed sound bites broadcast to confuse the debate, diminish the validity of the science and generally confuse people so they are unsure what action to take. Much of the debate in Australia illustrates this dilemma with little real understanding from either industry or the public of the ETS legislation introduced or the fact other countries have faced the same issues yet managed to successfully implement changes.

So what is the best mechanism to reduce emissions? Denny Ellerman, a leading energy economist who worked for the US government and was Director of MIT's Center for Energy and Environmental Policy Research, and Richard Folland, Managing Director of the UK's Climate Strategies, provided an international perspective on a range of approaches but concluded an ETS<sup>4</sup> is the best policy instrument available. They and other speakers argued it is a proven mechanism, more effective and efficient than a carbon tax or regulation in cutting emissions, and more likely to encourage innovation.

They cited a number of examples where ETS's have been successfully implemented, including in 1995 by the US to reduce sulphur dioxide emissions (acid rain). In 2005, the European Union introduced an ETS, and while not without challenges it is now widely considered to be effective. Many of the original fears expressed early in the debate about an ETS never materialised. This is an important fact, as Australia is stuck in the debate and fear has largely stopped the passage of ETS legislation.

Add to this lack of informed debate the basic elements of human nature, which were discussed by John Davies of the Melbourne based think tank, the Grattan Institute, and the results become fairly predictable. It is human nature for people to focus on the short-term – today's high energy bills are more important than lower energy bills in the future. There is a bias for loss avoidance valuing the current state over a future state where things might be different. Avoidance of risk is another tendency, people prefer what they understand and have today to some unknown in the future which is why the "threat" of recession, job losses, and public scare campaigns by industry are effective in maintaining the status quo. To really see through all of the hype and understand the issues requires time, the issue is painted as complex, and peo-

ple avoid complexity. That is how we end up with "thought bubbles", distorting the facts and leaving the public unsure what to believe.

Jon Barrett, from Melbourne University, noted that despite 154 policy announcements from across the globe on climate change since October 2009, the myth that "nothing is being done" persists. Those who seek to obfuscate the debate about climate change have been successful in creating confusion; always referring to the science as uncertain, speaking in complexities, framing the issue as a purely environmental issue largely impacting the poor, and perpetuating the myth the only way to make progress is through global consensus.

Fear of the economic impact is often cited, but Elaine Prior, an investment analyst at Citi Investment Research & Analysis, modelled the impact of climate change legislation on companies listed on the Australian Stock Exchange (ASX) and concluded there is no disaster looming from introducing ETS legislation. Prior reported normal business issues including fluctuations in the exchange rate and the price of oil have a greater impact on the valuation of a company than the introducing an ETS. The ETS would primarily impact the energy industry, liquefied natural gas producers, coal and heavy energy users including aluminium, steel and cement producers. The size of the impact is estimated to be negative one to four percent on the overall company valuation. Certainly not a reason to refrain from introducing an ETS.

Valarie Amos, UK High Commissioner to Australia, highlighted one of the critical underpinnings of the response to climate change in the UK was recognition transitioning to lower carbon output was not an economic threat. Over the period 1990-2005 the UK economy grew by more than 30 per cent while greenhouse gases decreased more than 12 per cent. Even in the recent economic downturn, the response to climate change was seen as helping the economy through boosting green jobs.

## Sources of Hope

Are there any reasons to be optimistic? Are there options out there and if so what? What would the world be like if we were to change the way we do things? The Deakin Lectures contained examples of different approaches being implemented and making a difference.

Capitalism was widely viewed as a solution, however not the current form of capitalism. The capitalist system has become very short-term, profit focused and this drives decisions which negatively impact our collective futures. How do we change the system to still leverage market mechanisms, which have proven highly efficient, but also drive different behaviours moving us toward our desired future?

David Blood, Senior Partner of Generation Investment Management, a funds management business focusing on long-term investment and sustainability research advocated "sustainable capitalism". Largely following the Triple Bottom Line reporting framework he advocated managing capital with a long-term perspective taking into account environmental, social and governance (or intergenerational) issues.

An ETS can be used to drive this behaviour, but it is not the only method. We can change incentive structures including how company valuations are derived. Many organisations make decisions based on short-term incentives which impact the share

price and market capitalisation of their business. In essence, investors drive this behaviour. There is evidence of change with large investment and pension funds taking a longer-term view when investing and rewarding companies placing a heavier emphasis on the long-term sustainability of their business and industry.

Why isn't there more of it? According to James Cameron, the Vice Chairman of Climate Change Capital, an investment banking group focusing on commercial opportunities created by a low-carbon economy, the issue is a lack of known success stories. In many cases the technology exists, yet we don't have an attitude of adopting new technologies. We can't visualise the future if we adopt them and we don't have stories exploring both what's possible or celebrating current successes. Until we have these stories we can't move people in the desired direction! Stories are very effective for making the complex easy to understand.

Cameron suggests two points to intervene in the system; financing the changes required and building institutional capacity to solve long-term problems. In the UK, the effort to move to a low-carbon economy is estimated at \$50-60 billion and one of the blockages is a source of long-term stable capital. Cameron suggests the use of bonds, citing the example of war bonds used to rebuild infrastructure after World War II. Is that so different from where we find ourselves today?

As for institutional capacity, we need leadership and leaders capable of working cooperatively, who don't require recognition for their efforts, are used to long-term payoffs, and able to solve long-term problems, including a commitment to sticking with it. His solution, look to working women! Women, especially those with children, find themselves in this situation today. What we need is more of them in positions where they can make a difference.

Cameron's advice is to work within the system to create change, eventually changing the system, which is one reason he believes capitalism maybe our best option to create the future we desire.

But perhaps we need to look beyond modified forms of capitalism still requiring growth and consumption. Tim Jackson, the author of *Prosperity without Growth*, spoke about a dilemma of growth. Presently we have an economic system requiring infinite expansion on a planet with finite resources.

Jackson explains the paradigm of growth as the mechanism preventing economic collapse. Pursuing productivity improvement requires fewer people to produce the same level of goods. As long as the economic growth offsets labour productivity there isn't a problem. But if the economy doesn't grow, there is downward pressure on employment. People lose jobs. With less money in the economy, output falls, public spending is curtailed and the ability to service public debt diminishes. A spiral of recession looms. Growth in this system prevents collapse.

This leads to a dilemma; growth is unsustainable, but no growth or contraction leads to instability.

Can we envision a future without ever increasing consumption? Presently one way humans measure themselves relative to others is through consumption, which Jackson terms "novelty", the ability to create identity through consumerism. As a society until we begin to think about participation in other terms – health, well-being, safety, even happiness and measure things contributing to the overall social good, we

are stuck in the current paradigm. Until societies can envision and measure prosperity through means other than economic growth this dilemma continues.

John Davies, of the Grattan Institute, spoke of the need for government policy to create incentives for investment and innovation. In Australia these are missing. This puts Australia at risk of falling behind other countries with these incentives. Over the long term Australia may find itself with a high-carbon economy in a low-carbon world. Without the technologies to be competitive, relying on others, and we will not have export markets for our high carbon fossil fuels<sup>5</sup>. In fact, Davies points out, non-democratic governments, without election cycles, are better at focusing on the long term possibly creating an economic advantage.

David Owen, author of *Green Metropolis*, shared his hope for the efficiencies of urban density. Using a number of measures of environmental sustainability, New York City is the greenest American community. He contrasted his family's energy and resource consumption when living in New York to living now in Connecticut, a move regarded as an 'ecological catastrophe.' His household electricity usage increased from 4,000 kWatt hours in New York to 30,000 kWatt, and the family went from zero to three cars in just a few years. So urbanisation might be more help than hindrance.

There is also hope in the rural landscape. Johannes Lehmann, in "Carbon Down on the Farm" highlighted the role of soil in drawing down carbon from the atmosphere, with soil containing more than 80% of all organic carbon on land. Over time the planet has lost 80 giga-tonnes of carbon from soil due to agriculture. Lehmann suggested if we restore soil carbon to historic levels, atmospheric carbon dioxide would fall to levels most scientists consider safe. Biochar is a possible solution delivering these benefits.

## The Developing World

Prasad Menon, Managing Director of Tata Power, India's largest privately owned power company and Kartikeya Sarabhai, from the Centre for Environment Education shared their views on the Indian perspective and Tim Costello, CEO of World Vision, gave a voice to impact of climate change on the global poor.

India did not allow private industry to generate power until 2003. Since the market opened a variety of partnerships have been established to support investment in energy generation including wind, solar, geothermal, coal and natural gas. Partnerships between non-government organisations (NGOs), government, private industry and finance providers focus on distributed energy generation providing solutions to many that previously lacked access.

Given the action in many developing countries Menon believes the developed world risks being left behind. One paradox is investment decisions are sometimes easy to make when legacy infrastructure is not a consideration, in some cases allowing developing countries to move forward quickly.

Menon indicated China's leadership in climate change and cleaner energy generation is because of its economic value. Korea and Scandinavia were developed economies mentioned as showing leadership, but the USA is missing. While the world can probably do it without the US, their involvement and indeed leadership, would get

us there faster. He believes with their global clout and innovation capability if they focus on the issue, the world would benefit.

Kartikeya Sarabhai approached the issue from a perspective of both development and sustainability. India's industrialisation largely copies the Western approach to development, an unsustainable long-term approach. India adds the total population of Australia (22 million) every 14 months. If each person required the amenities of the average Australian, the total infrastructure of Australia (which has taken centuries to build) needs to be added every 14 months!

However the argument everyone should be able to enjoy the same standard of living as those in Australia raises both moral and ethical issues. Sarabhai raised the question should a country be able to increase its population at whatever rate it wants and then argue for its fair share of global resources? If so where will this lead us?

Instead perhaps we can find answers in two areas education of woman and sustainability. A well-known fact of economic development is as women are educated the population growth rates decline. This is true in India, those areas with high female literacy, have low birth rates. It would seem a strong leverage point in the system.

Secondly, sustainable development is essential. In India the slogan, "save the tiger" is a metaphor for saving the whole ecosystem. In order to save the tiger you must save those things around the tiger as well, the deer, the grass, etc. This is also true of climate change – it can't be addressed in isolation.

India's constitution requires individuals to look after the environment. A recent High Court ruling made environment education compulsory. By 2011, it will be taught in 200,000 schools. That is a very powerful impact on the next generation.

Costello remarked on the unequal impact climate change has on the poor. Their contribution to the problem is negligible yet they bear the brunt of the consequences. Natural disasters are increasing in intensity and frequency and the poor are less able to respond and adapt. Three months of drought to a poor farmer has greater impact than three years of drought to an Australian farmer.

Perhaps when considering our actions we should consider the poor. Ghandi advocated policy should always consider "what does this policy do for the poorest person you know?" Considering this might make us rethink our inaction.

### **The Power of a Good Story**

The lack of good stories to both provide vision and inspire leadership was mentioned on numerous occasions. Throughout the climate change debate there is no central "image" people can point to, or a story easily shared conveying the magnitude of the challenge, the reasons for action, and focuses people on solutions without creating despair.

One of the reasons stories lend themselves well to creating the necessary attitudes and behaviours to tackle climate change is how people perceive time. Costello remarked on the different perceptions of what can be accomplished after a natural disaster. Many disasters happen in a very short period of time, and in the aftermath it galvanises people into action, yet when everything is okay, people perceive time as moving very slowly with little incentive to act quickly. A human's time on this earth is less

than a millisecond compared to the geological history of the earth. Yet we don't make decisions considering the impact on our children and grandchildren, never mind future generations.

Tom Soutphommasane, from Monash University, framed the debate about solutions to climate change as cosmopolitanism versus patriotism. Cosmopolitans are those with progressive views believing we should reach global agreement and make the world a better place. Patriots view it as more of an individual country issue.

It is easy for nation states to use the cosmopolitan perspective to justify inaction when a global agreement has not been reached. In the patriots view you can create a nation building narrative for climate change which generates a vision and galvanises people to action. Australia's current narrative is not one of climate change action, instead our narrative is one of a "sun burnt country" with nature as something to be conquered as we build a nation. While this narrative may have served Australia well, it's time for a new one. One which will drive action and create a place for us in a low carbon world, much like India's "save the tiger" metaphor.

## **The Layers of the Lectures**

The lectures, rich in content, and with high calibre speakers, presented much to think about. This article only skims the surface. But what do the lectures collectively reveal about the willingness to delve deeply into the societal level causes and solutions to climate change? Causal Layered Analysis (CLA) is used to explore this question. CLA suggests the way in which we frame the problem changes the policy response and the players responsible for the solution (Inayatullah, 2005).

CLA explores issues at four levels:

- Litany based on trend analysis and the public media discourse;
- Social Causes – the social, cultural dimensions, historical and technical understanding;
- Worldview/discourse – deep social, economic and linguistic structures; and
- Myth/Metaphor - deep stories, collective archetypes, the largely unconscious dimensions of the problem.

Three Australian politicians in the final panel session typify the litany level.<sup>6</sup> Political rhetoric punctuated by sound bites for public consumption. Nick McKim leader of the Tasmanian Greens "stop focusing on the nightmare and start focussing on the dream", Labor's Mark Dreyfus blaming the opposition and the Greens for failing to pass ETS legislation and Turnbull's view it's a failure of political courage and leadership exemplify this rhetoric. Martin Parkinson characterised the debate over the last twelve years as a series of "thought bubbles" suggesting the litany level of discourse. Jon Barrett similarly highlighted the ease opposition to action effectively and successfully use litany to confuse and obfuscate debate. Interestingly, in the UK it was only when they moved beyond this shallow litany level of discourse legislated targets, an ETS and other measures (solutions at the social level) were introduced to bring about change. This is an excellent example of changing the framing of a problem to reveal alternative solutions.

Within Australia, and other countries still struggling to take substantive action on climate change, the discourse is focused at the litany level, where fear and uncertainty maintain the status quo. Elaine Prior's economic analysis on the impact to industry is one attempt to move discussions beyond the level of litany.

Several other lectures moved us deeper into the discourse exploring social causes. Grant King's brought deep technical understanding of the issues and presented an energy sector perspective on the problem, introducing systems thinking highlighting where intervention could be effective. Similarly, Johannes Lehmann, Richard Folland and Denny Ellerman brought strong technical understanding of economics and science of various solutions. John Davies discussed how policy could be used to develop economic incentives and stimulate innovation.

David Owen was one of a number of speakers opening the audience's minds to different worldviews. Who would have thought that New York City might be a model for a more sustainable future? Given the rapid pace of urbanisation the development of sustainable cities is required for this promise to be realised. David Blood and James Cameron sought to shift the understanding of capitalism. Perhaps as Cameron and Kartikeya Sarabhai point out in different ways educated and capable women might be a critical part of the solution. Cosmopolitanism versus patriotism is an examination of worldviews representing contrasting approaches to climate change solutions.

Peter Singer, Tim Costello, Prasad Menon and Karikeya Sarabhai all championed the poor and the developing world exposing issues of equity and injustice. They reminded us the worldview of the developing world is different to Western countries and reframed the climate change problem linking it to other critical agendas including global and social equity, gender equality and education.

At the level of myth and metaphor, India's "save the tiger" is a powerful example. Tom Soutphommasane's contention of the need to challenge Australia's "sunburnt country" narrative to a new nation building narrative seeks a solution through changing our view of ourselves. Tim Jackson through the dilemma economic growth is unsustainable; but decreasing it is unstable, eloquently questioned the myth of never ending growth pursued by business and governments. Many speakers mentioned the need for new stories, new myths and metaphors to help change our worldviews and explore current social constructs. Unfortunately there are a lot of negative images of the future, which the litany feeds into, while we lack much needed positive images and stories.

Returning to Tim Flannery's opening keynote, which in its entirety spanned all four levels. As he explained evolution, competition, cooperation and civilisation's increasing levels of interdependency he bridged both social causes and worldviews. He believed we would reach an "accommodation with our planet" and envisioned the "creation of a global human civilisation" as a new image of the future.

From this platform of deeper understanding and a vision of an alternative future, Flannery presented a call to action, challenging governments to act and reminding the audience they had the power to bring about change through their political vote. Such statements sound like litany. From the depths of this keynote, Flannery brought the audience to practical and informed action at the surface.

So what then can futures researchers and futurists do to further community understanding and advance progress toward climate change solutions? What value are lectures such as these or other futures discourses if they don't lead action? Given the ability of futurists to create powerful, moving images of the future, perhaps this is where we can make the a powerful contribution which will both contribute to the solution but also provide sources of hope and inspiration for those looking for leadership and positive alternatives. Futurists also have the abilities and the skills to help the global community move beyond the level of litany and explore the deeper layers of the discourse. This can also help lead to action, which after all, is the point of futures work.

### **More information**

The article is based on the presentations at the Lectures, the video and audio from the series is can be found at <http://wheelercentre.com/videos/tag/deakins-2010>.

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### **Notes**

1. This article is not about the politics of climate change in Australia, but the political context frames a number of the presentations and audience reactions. The Federal Labor Government in part was elected in 2007 on a platform of strong action on climate change. For a variety of reasons it failed to meet its election commitments. Arguably the issue contributed to Prime Minister Kevin Rudd's loss of his leadership in late June 2010. The two major parties (Labor and Liberal/National) went the federal election in August 2010 without effective climate change polices, the election resulted in a substantial swing to the Greens Party. Australia now has a minority Labor government, governing with the support of the Greens and independents. Climate change is back on the political agenda but the political cost has been high.
2. This is probably similar in other parts of the Western world.
3. Australia's current unconditional commitment is an emissions reduction target of five percent on 2000 levels by 2020. It's proposed a range of five to 25 percent reduction with the final level determined by commitments of other nations.

4. An ETS, most commonly in the form of a "cap and trade" system, sets an overall cap on the amount of carbon, and then issues or sells carbon credits to companies. If they have credits beyond what they need, they can sell them to someone else, thus providing income to them for reducing their own carbon usage. This is a system that combines a firm cap on emissions and a market where permits up to the level of the cap can be purchased and traded. How well these programs work to reduce carbon depend on where the cap is set and what the price of carbon is: is there an economic incentive to use less and trade your credits.
5. Tim Costello stated Australia exports 750 mega tonnes of carbon a year. At projected export growth rates, this will soon overtake Saudi Arabia as the world's biggest exporter of carbon.
6. Note the short format of 10 minutes for each of the speakers may have contributed to the litany level response.

## References

- Flannery, Tim. (1994). *Future Eaters*. Reed Books, Australia
- Flannery, Tim. (2005). *Weather Makers*. The Text Publishing Company, Melbourne
- Flannery, Tim. (2010). *Here on Earth: An argument for hope*. Penguin Books Australia
- Inayatullah, Sohail. (2005). *Causal Layered Analysis: Post-structuralism as a method*. in Knowledge Base of Futures Studies Vol 2, Foresight International, Indooroopilly QLD
- Jackson, Tim (2009). *Prosperity without Growth*, Sustainable Development Commission, London UK. Retrieved August 21, 2010, from [http://www.sd-commission.org.uk/file\\_download.php?target=/publications/downloads/prosperity\\_without\\_growth\\_report.pdf](http://www.sd-commission.org.uk/file_download.php?target=/publications/downloads/prosperity_without_growth_report.pdf)
- McNeil, Ben. (2009). *The clean industrial revolution: Growing Australian prosperity in a greenhouse age*. Allen & Unwin, Crows Nest NSW.
- Owen, David. (2009). *Green metropolis*. Penguin Group, New York.
- Stern, Nicholas. (2006). *Stern review on the economics of climate change*. The Treasury, UK Government. Retrieved September 5, 2010, from [http://webarchive.nationalarchives.gov.uk/+http://www.hm-treasury.gov.uk/sternreview\\_index.htm](http://webarchive.nationalarchives.gov.uk/+http://www.hm-treasury.gov.uk/sternreview_index.htm)