University of Wollongong
Research Online

Faculty of Arts - Papers (Archive)

Faculty of Law, Humanities and the Arts

2012

The role of beyond zero emissions in the Australian climate debate

Adam Robert Lucas
University of Wollongong, alucas@uow.edu.au

Publication Details

Lucas, A. Robert. 2012, 'The role of beyond zero emissions in the Australian climate debate', Journal of Australian Political Economy, no. 69, pp. 134-148.

Research Online is the open access institutional repository for the University of Wollongong. For further information contact the UOW Library: research-pubs@uow.edu.au

THE ROLE OF BEYOND ZERO EMISSIONS IN THE AUSTRALIAN CLIMATE DEBATE

Adam Lucas

Early in 2011, the *Journal of Australian Political Economy* (JAPE) published a special issue titled, 'Challenging Climate Change'. It brought together a number of papers by climate change researchers and activists who had been invited during 2009 to contribute their perspectives to a one-day forum covering four different aspects of the climate change debate: carbon markets and the regulation of renewable energy; technological pathways toward sustainability versus a low-tech, eco-sufficiency future; climate justice; and the experiences of a variety of environmental NGOs in campaigning for policy reform (Goodman & Rosewarne, 2011: 7). The aim of the forum and those who organized it was to stimulate a more robust debate about climate change policy in Australia and the international negotiations focused on reducing atmospheric concentrations of greenhouse gas (GHG) emissions (Goodman & Rosewarne, 2011: 5).

Contributors to the Special Issue represented a relatively broad spectrum of environmental perspectives, from those promoting reformist, social democratic principles, to those favouring resistance to market-based policies based on eco-socialist, eco-feminist and anarchist principles. Perhaps unsurprisingly, a notable feature of the Special Issue is an unresolved tension between authors focusing on the reform of policies governing electricity generation, transmission and distribution as a means of stimulating investment in renewable energy infrastructure and driving rapid emissions reductions (Buckman, 2011; Diesendorf, 2011), and those critiquing the tendency of the Australian climate movement to embrace ecological modernisation discourse over the last ten to fifteen years in developing its core strategies and policies: a form of discourse arguably favoured by the first two authors (Salleh, 2011; Goodman, 2011; Pearse, 2011).

The main thrust of the criticisms made by the second group of authors is that the kinds of climate solutions being supported and promoted by a number of Australian NGOs and peak bodies are primarily technological solutions informed by the same kind of technological optimism characteristic of earlier forms of modernity premised on an infinite growth paradigm. They argue, furthermore, that these approaches do not incorporate notions of ecological limits or sufficiency and are therefore inadequate to the task of transforming societies to overcome the root cause of the problem: the capitalist domination of nature. All three authors single out one particular environmental NGO, Beyond Zero Emissions, as an exemplar of the kinds of problems which they see in the Australian environmental movement's policy recommendations around anthropogenic climate change.

In the spirit of the forum which inspired the Special Issue, and in the interests of stimulating further debate, I feel I have a responsibility to respond to these criticisms, both as the former Sydney Convenor of Beyond Zero Emissions, and as a contributor to the organization's ongoing research and public education agenda. Before I do so, however, I should very briefly outline the history of BZE, as well as its aims and strategy.

Beyond Zero Emissions Incorporated (BZE) is a not-for-profit research and education organisation which focuses on developing detailed plans for implementing solutions to anthropogenic climate change. BZE's focus is the transformation of Australian society, from an economy based primarily on the exploitation of fossil fuels and the unsustainable use of natural resources to one which is primarily geared toward the sustainable use of human and natural resources, powered solely by renewable energy. Its Zero Carbon Australia 2020 research project is aimed at developing climate change policy solutions that are consistent with the latest climate science. As one of the highest polluting nations per capita and a major exporter of fossil fuels, the science clearly indicates that Australia needs to rapidly reduce its greenhouse gas emissions to zero. BZE draws on the work of scores of dedicated volunteers with professional expertise in engineering, the physical and social sciences, the arts and humanities, and media and journalism, many of whom have worked or are still working in the corporate sector.

A small executive team on a flat pay structure coordinates the activities of a large group of volunteers. It also partners with a small group of

university researchers, most of whom are based in the Energy Research Institute at the University of Melbourne. The organization is non-partisan and receives no government funding, relying on donations from the public and sales of its publications to fund its activities. It hosts a website (*www.beyondzeroemissions.org*) and a weekly radio show on 3CR in Melbourne. It is also active in the national and international media, and in training members to promote its activities through public speaking events and other fora.

BZE was founded in Melbourne in 2006 by Matthew Wright and Adrian Whitehead. Wright was a former IT specialist for Reuters, while Whitehead was an experienced forest activist. The pair founded the organization because they felt at that point that the mainstream environmental movement was not advocating the level of climate action required by the science. From very modest beginnings in Kindness House, Fitzroy, BZE now has offices in Melbourne, Sydney and Brisbane, as well as active volunteers in and around Canberra, Newcastle, Adelaide, Perth, Cairns and Townsville with several thousand people on its mailing list and around 600 active volunteers.

BZE's ongoing Zero Carbon Australia 2020 research project is aimed at developing fully costed transition plans for moving Australia to zero emissions within ten years using commercially available technology. The project covers the six portfolio areas of energy, buildings, transport, land use, industrial processes and coal exports. BZE's *Zero Carbon Australia Stationary Energy Plan* was the first of six publications to be completed in June 2010 (Wright & Hearps, 2010). The buildings, transport and land use plans are currently close to completion and should be ready for publication within the next six months.

Because the stationary energy sector is by far the largest contributor to Australia's GHG emissions, BZE's primary focus over the last few years has been to determine the right mix of energy efficiency measures and commercially proven renewable energy technology which will enable Australia to build a zero emission energy sector within ten years. The *Zero Carbon Australia Stationary Energy Plan* (the Plan) is the fruit of that research.

The Plan is a significant publication for a number of reasons. It is the first fully costed, technically specified plan for moving a developed country to 100% renewable energy within ten years using commercially available technology (Wright & Hearps, 2010). It was produced through

the cooperation of more than forty volunteer researchers at a fraction of the cost which would be incurred by a government department or corporation pursuing similar research, and has received endorsements from scientists, academics, policy-makers, politicians and business people from across the political spectrum.

The Plan clearly demonstrates that Australia can meet the vast majority of its energy needs using renewable energy technologies that are already proven in the field and which are currently commercially available. At an estimated cost of $370 billion over ten years, the Plan details how a mix of geographically dispersed windpower and concentrated solar thermal power with salt storage (i.e., 'baseload renewable energy'), combined with stringent but achievable energy efficiency measures, can meet the needs of a growing population and totally replace fossil fuel use (mainly oil for transport, and gas and coal for industrial uses and electricity generation). Costing for the Plan was assessed and verified by Jack Actuarial Consultants, while the technical specifications were checked and endorsed by the international energy consultancy, Sinclair Knight Merz.

Given the scale and audacity of its claims, it is not surprising that criticisms of the *Zero Carbon Australia* plan have been frequent and vociferous since its publication. For example, the pro-nuclear advocates involved in producing the website, Brave New Climate, have criticized it for radically underestimating the cost of constructing the proposed infrastructure, and have queried a number of the technical assumptions involved (Nicholson & Lang, 2010). The zero growth proponent, Ted Trainer, has likewise argued that it will be far too expensive to convert Australia's (and the world's) energy-intensive society to renewables, and that the intermittency of solar and wind power are currently insurmountable problems (Trainer, 2011). Staffers in the office of the Federal Minister for Climate Change, Greg Combet, have told constituents that 'the Government does not consider the proposal set out in the BZE plan as achievable or cost effective. The best way to address climate change and reduce Australia's carbon pollution is to put a price on pollution – a carbon price' (Catley, 2011). Responses to Trainer's and Brave New Climate's substantive criticisms can be found on BZE's website under 'Frequently Asked Questions'. Minister Combet's office is yet to provide any evidence in support of its position.

Although the aforementioned criticisms share the view that implementation of the Plan will be far more expensive than BZE has calculated, none have been able to substantiate this view, nor have any of them raised any credible points about its technical details. However, Ariel Salleh, James Goodman and Rebecca Pearse marshal quite different arguments in support of their critique. What unites them is the charge that BZE is 'an exemplar of ecological modernisation' (Salleh, 2011: 125).

Salleh opens her critique with the observations that the Plan was endorsed by a number of individuals and international organizations with questionable records on social and environmental issues, and that the Sydney launch featured 'ten men in suits'. In response to the first of these observations, BZE deliberately sought endorsements from prominent scientists, environmentalists, politicians, policy-makers and business people from across the political spectrum as a means of undercutting criticism from some on the Right, who we anticipated would argue that the plan is an impractical and unachievable example of leftist central planning, as well as some on the Left, who we anticipated would argue that the Plan is another example of technocratic social engineering that will further contribute to environmental degradation. Although this strategy did lend the Plan credibility in some circles, it did not prevent critics from questioning the nature of the endorsements and/or the motivations of some of the parties who endorsed the plan. Nor did it undercut any of the anticipated counter-arguments and criticisms.

In response to Salleh's second observation, it is true that the Sydney launch of the Plan in August 2010 featured 'ten men in suits' on stage at Sydney Town Hall. As one of the organizers for this event, I should point out that considerable efforts were made to secure the participation of several women speakers, including Senator Christine Milne and Lord Mayor Clover Moore. However, due to prior commitments, none of the invited women speakers could participate. Time constraints related to organizing and promoting the event meant that an all-male panel was the best we could manage in the circumstances, although none of us were particularly pleased with this outcome. Nevertheless, with minimal publicity or media support, we managed to almost fill Sydney Town Hall on a cold, wintry night: a clear indication of widespread public interest in BZE's positive message. I should also note that the initial launch of the plan in Canberra on 22 June 2010 was undertaken by Senators Christine

Milne, Judith Troeth and Nick Xenophon, and subsequent launches in Brisbane, Adelaide, Hobart and Perth were gender balanced.

A third criticism which Salleh makes of the Plan is that BZE envisages a public-private joint venture company rolling out the proposed energy infrastructure, even though no mention was made of this at the Sydney launch and such a proposal is not discussed anywhere in the Plan. In fact, BZE has deliberately remained agnostic about how the Plan might be financed and implemented because we believe that this is a decision that needs to be properly debated and discussed by the Australian public.

Perhaps the most substantive criticism levelled at the Plan by Salleh is her assertion that 'the Zero plan may cut carbon emissions from energy generation facilities but it will do nothing to stop the extractive assault on the society-nature metabolism' (*ibid*.: 126). Putting aside for one moment the issue of whether the second part of this assertion is credible, the primary aim of the Plan is to radically reduce Australia's GHG emissions from stationary energy and transport, which constitute half of the country's total emissions (Australian Government, n.d.). If it achieves that aim (and most members of BZE are under no illusions that doing so will require extraordinary commitment and perseverance), BZE will have been at least partially successful and therefore vindicated in its approach.

With respect to the claim that the Plan 'will do nothing to stop the extractive assault on the society-nature metabolism', I am not aware of any existing proposal for climate change mitigation that does not involve some significant additional use of resources to build the requisite low carbon infrastructure. And while it is true that the construction of the proposed infrastructure does require the mining, manufacturing and recycling of considerable quantities of steel, glass, salt and cement, all of these resource requirements have been calculated and contextualized within Australia's current production levels. Were the Plan to be implemented, the environmental impact of producing these and other materials in Australia would be considerably reduced, as the case studies on zero carbon steel and aluminium manufacturing in the Plan clearly indicate (Wright & Hearps, 2010: 72-4, 152-3). BZE argues that Australia's development of this expertise could also be exported to similarly reduce such impacts in other parts of the world.

With respect to minimizing resource extraction more generally, BZE supports the creation and maintenance of closed loop production cycles along the lines of those proposed by McDonough and Braungart (2002).

However, we recognize that in a 21st century economy, some raw commodities cannot be sourced from post-consumer waste streams and will therefore require some continuation of mining activities. In those circumstances, BZE supports world's best-practice mine management and site remediation, as well as continued research and development on alternatives to non-renewable resource extraction. Given BZE's position on these issues, it is difficult to envisage on what basis it can be argued that implementation of the Plan will do nothing to reduce natural resource extraction in Australia or elsewhere.

Salleh also charges BZE with overlooking how 'everything is connected to everything else' like other '[e]cological modernisers grounded in the economic paradigm' (Salleh, 2011: 126). However, the fact that BZE continues to develop zero carbon plans for buildings, transport, land use and manufacturing at the very least indicates an holistic awareness that virtually every aspect of Australian society will need to be transformed to radically reduce the country's ecological footprint. Her observation that BZE is 'grounded in the economic paradigm' suggests that the organization's research is premised on neoclassical/neoliberal economic principles, although this is not a reasonable assessment of BZE's thinking on economic matters, and is not based on any assessment of its published research or public statements on this topic. Indeed, as I will argue at greater length in a separate essay currently in preparation, such observations are based on an illegitimate conflation of neoliberal market fundamentalism with a broad spectrum of reformist positions which are premised on radically reducing resource and energy consumption and the production of toxic materials and wastes.

On several other points, Salleh takes BZE to task on technical issues which are simply not valid. She argues, for example, that the concentrated solar thermal (CST) component of the Plan 'entails a radical transformation of the landscape by tree clearing, drainage, and levelling' (Salleh, 2011: 126). However, all of the sites envisaged for solar thermal plant construction involve degraded or salinated farm land which has already been cleared, in areas of very low rainfall with little remaining ecological or heritage value, and minimal requirements for site works. If the topography of suitable sites was found to be irregular, the 'Big Dish' solar mirror technology developed by the Australian National University could be deployed to avoid any need to level it. Salleh also claims that '[a]n accumulation of mirrors across a large field is likely to function as a massive radiant "hot plate", impacting on the surrounding

atmosphere and affecting the stability of local weather' (*ibid*.). This claim is purely speculative and based on no empirical evidence. No such effects have been noted in any of the solar power towers that have been constructed around the world to date. In fact, the heliostat field focuses the sun's energy on the receiver at the top of the power tower and will do little or nothing to heat the surrounding atmosphere.

Another resource-based criticism of the Plan made by Salleh relates to the water requirements for operating the proposed CST plants. Although she acknowledges that they will 'use less water than power generation by fossil fuels', she argues that the rivers from which it is envisaged this water will be taken will increasingly be regarded as more valuable for food production (*ibid*.). What she does not mention is that all the water requirements for the dry-cooled CST plants have been fully costed and calculated based on the proposed locations: most of the required water would be used for washing the plants' mirrors, and each plant would use less than 10% of the water required for a coal-fired power station with equivalent generating capacity (Wright & Hearps, 2010: 148-151). Considering that Australia is the driest continent on earth, any means of generating energy that uses 90% less water than the existing coal-fired technology should arguably be receiving far more serious attention than Salleh appears prepared to contemplate.

James Goodman is similarly critical of BZE and what he calls 'eco-modernisation', although his contribution to 'Challenging Climate Change' does recognize a diversity of approaches to ecological modernisation, ranging from 'weaker' to 'stronger' versions (Goodman, 2011: 144-8; 149-52). He opens his argument by stating that it was a widespread acceptance of the authority of climate scientists as represented by the IPCC that not only led to the international consensus concerning the reality of human-induced climate change, but also to the (supposed) 'near-consensus that technological change, and in particular, renewable energy, offers the required solution' to it. Although he rightly questions a tendency amongst some in the movement to see the transformation of technology as being a sufficient response to the problem, he conflates 'the headline demand' of participants for 100% renewable energy at the March 2009 Climate Summit in Canberra with this kind of technocratic (and reductionist) outlook (*ibid*.: 144-5).

Presumably because he sees the *Zero Carbon Australia* plan as providing a focal point and rationale for such a technocratic outlook, Goodman

questions whether the Plan is in any way sustainable. He points to its acceptance of a projected 40% increase in electricity demand between 2008 and 2020 as emblematic of its acceptance of an unlimited growth economy (Goodman, 2011: 146), because it argues 'this could be more-than accommodated by a fifty per cent increase [in] efficiency measures that would come with a shift to 100% renewables' (*ibid*.). There was, in fact, a very good strategic reason for modelling the plan to incorporate a 40% increase in electricity usage by 2020. Both official population projections and electricity usage figures indicated that an increase of this magnitude was highly likely, although recent reductions in electricity demand make those projections appear less likely (Parkinson, 2012). BZE therefore used these figures as a means of establishing the credibility of the Plan within government, business and industry circles, because we believe that we need to convince as many people as possible within these sectors that the proposal is technologically feasible, economically affordable and logistically possible. This has been, and will remain, BZE's aim, regardless of whether we agree with official projections: they are useful tools of persuasion for those with more conservative mindsets.

Nevertheless, Goodman's primary concern about BZE's strategy appears to be that it is 'embracing technology as the answer to climate change' (*ibid*.), in much the same way as other 'eco-modernisers', even though this is not a fair characterization of BZE's position. BZE is under no illusions that technological change is going to 'fix' anthropogenic climate change. We all know that cultural and political changes are also necessary. The founders of the organization made a pragmatic decision when they first formed BZE to focus on the kinds of technology and infrastructure changes that would need to be made in order for us to achieve a zero emission society in Australia, to prove to critics and sceptics that such changes are, as previously stated, technologically feasible, economically affordable and logistically possible. This was primarily because no-one else (including those in government) had ever tried to do this in any kind of rigorous fashion. BZE's support of, and participation in, the broader social and cultural strategies being developed by the NGOs which endorsed the Transition Decade was to complement that broader agenda with facts and figures that could be deployed against those who repeatedly tell us that it is simply not possible for a modern, industrialized economy to make a rapid transition to zero emissions.

Rebecca Pearse draws on similar arguments to those of Salleh and Goodman in her critique of BZE's stationary energy plan. Although she admits '[t]he plethora of NGO published reports meticulously detailing potential energy scenarios are important means of making the normative case for decarbonisation' (there are, in fact, only a handful of such detailed reports), she argues that 'establishing the existence of technical capabilities often begs bigger political questions concerning the nature and extent of reform sought after' (Pearse, 2011: 182). She cites recent reports by Saddler, Diesendorf and Denniss (2004), Teske and Vincent (2008), and the *Zero Carbon Australia* plan (Wright & Hearps, 2010) in support of her claim.

One interpretation of this criticism is that none of the authors of these reports are concerned with, or actively engaged in, seeking reform of the current socio-economic system. If this is what Pearse intended to mean, it should be noted that all of the authors of these reports are seasoned campaigners who have been seeking to achieve political reforms in Australia for many years, and in some cases, for decades. While 'the nature and extent of reform sought after' by these various individuals may not be consistent with Pearse's vision of reform, there is ample evidence that they have been so engaged.

An alternative interpretation of this criticism is that these detailed energy scenarios deliberately avoid entering into discussions of 'the nature and extent of reform sought after'. While I cannot speak for the first two groups of authors, the authors of the *Zero Carbon Australia* plan did indeed deliberately avoid discussing larger political issues relating to socio-economic reform. This was because BZE made a pragmatic decision some time ago that the only way it was going to achieve widespread public support for the Plan was to present the case for a transition to a zero carbon society by focusing on the technical, economic and resource requirements for making that transition without proscribing the kinds of policies or political changes that would be needed to achieve it. In other words, no matter whether the reader is a conservative, liberal, libertarian, social democrat, socialist or anarchist, they can read the Plan, make their own judgement about the practicality of its technical, economic and resource requirements, and decide for themselves whether they support it. If sufficient numbers of Australians can be persuaded that the Plan has merit, the practicalities and politics of implementation would then become the basis for public debate and discussion.

Although Pearse asserts that BZE's 'reasoning is explicitly geared toward the technical problem as they see it, assuming the political agenda will flow from there' (Pearse, 2011: 183), BZE has never believed that its members would not have to make considerable efforts to raise Australians' awareness about the possibilities which the *Zero Carbon Australia* plan represents. Most of its activities are focused on gaining more popular support for its research and education agenda through regular media coverage, speaker presentation training, policy briefings for decision-makers, and public presentations of its research, all of which have been successful to date. Our public presentations of the Stationary Energy Plan, for example, have now reached more than 80,000 people. These many and varied activities are documented in detail on BZE's website.

Because Pearse appears to have relied solely on the Plan for her assessment of BZE's activities and political positions, it is perhaps unsurprising to read her claim that '[BZE's] silence in reference to the market agenda is deafening' (*ibid*.). While the Plan, as previously stated, makes no observations about the policies BZE believes should be implemented to support it, the organisation has been quite explicit in its public statements on this issue over the last eighteen months or so.

For the record, BZE does not support emissions trading in any form, and only supports a price on carbon on the basis that it provides a platform upon which to build awareness of the economically externalized costs of GHG pollution. However, BZE argues that the currently agreed price on carbon will not drive investment into a zero emission economy because the level at which it has been set is simply too low, and is unlikely for political reasons to reach the levels required to drive sufficient investment in energy efficiency and renewable energy infrastructure within the required timeframe (Beyond Zero Emissions, 2011). BZE supports far more direct regulatory interventions which have been proven to work in other jurisdictions, such as feed-in tariffs and government loan guarantees for renewable energy investment, although it is yet to publish any research on these issues. Some members would like to see re-nationalization of the country's electricity infrastructure with government investment driving the transformation, while others see strictly regulated private sector investment, or financially transparent public-private partnerships, as acceptable means of achieving the same goals.

Pearse relies on a *Sydney Morning Herald* report by journalist Paddy Manning to support her observation that BZE 'is neither anti-growth nor anti-business', and that this is clearly another sign that 'the logic of ecological modernisation' is at work (*ibid*.: 182-3). While BZE is certainly not 'anti-business', it is highly sceptical about the need for a continuous growth economy, as is evidenced by ZCA2020's aspiration to achieve 'an indefinite cap on total electricity consumption', as Goodman correctly notes (Goodman, 2011: 146).

The task which the Transition Decade, BZE and the various groups and NGOs affiliated with them have set themselves is to map out what needs to be done by Australia (and the developed world more generally) in order to avert the worst possible outcomes from anthropogenic climate change. None of those who participate in this task believe that it is easy, or even particularly rewarding. It is therefore rather perplexing to be placed in the dock by scholars with an ideological axe to grind, especially when it is quite clear that those who choose to place us there share many of the same motivations and ideals.

It is also clear that the critical skills of radicals in the movement would be better directed at more worthy adversaries, such as the fossil fuel and mining industries, or the senior bureaucrats and politicians occupying positions of power and authority in the energy, transport, agriculture, natural resource, infrastructure and planning portfolios and their associated institutions. Many of these players have proven extremely effective in combating any significant structural reforms for well over two decades. But despite (or perhaps because of) the difficulties in confronting these individuals, groups and institutions, some on the radical Left seem far more comfortable debating abstractions and maintaining their ideological purity than directly engaging with the problems at hand.

Calls for technological transformation such as those articulated by BZE are not necessarily technocratic in focus, nor do they necessarily undercut more radical goals. Only the most radical of environmentalists argue against the proposition that the quickest and most effective strategy for reducing GHG emissions and averting catastrophic climate change involves some form of technological transformation, which must of necessity be at the front and centre of any public debate about the relevant issues. A focused critique of ecological modernisation theory and related approaches can help clarify the terms of the debate,

especially with regard to the technological development pathways to which we collectively commit over the next few decades. Indeed, such a critique is already well-progressed in Europe (see, e.g., Seyfang & Smith, 2007; Smith, *et al*., 2010) but it is yet to even begin in Australia. Nevertheless, few would deny that if the world's population is to come to some form of agreement about how best to tackle anthropogenic climate change, those individuals and organizations who acknowledge the urgency for decisive action should arguably be doing their best to find common ground and working together. Building a shared sense of purpose and cooperative strategies across as broad a range of environmental NGOs as possible is far more likely to result in positive outcomes which leverage popular support than is ideological trench warfare.

We already know from many studies that in order to enter into a sustainable long-term development phase, most Westerners would have to consume between one-seventh and one-quarter of the resources that we currently consume. Most of the poor in the developed world already meet this criterion. It is therefore clear that current levels of resource consumption in the developed world and of the growing middle classes in the newly industrialized nations simply cannot be allowed to continue if human civilization is to survive the 21st century. It is also clear that even if these arguments cannot be made with sufficient force to limit consumption substantially before we reach the natural resource constraints identified by the authors of *The Limits to Growth* and *Mankind at the Turning Point* in the early 1970s, they will almost certainly be forced on us over the next few decades as the result of the peaking of world oil production and human-induced climate change.

Given that our best scientific assessments strongly indicate that catastrophic changes to the biosphere will occur before we reach most of the natural resource constraints first identified in detail by the Club of Rome, concerted and urgent efforts must be made to completely transform industrial societies' habitual modes of practice over the next few decades. Consequently, the questions we must inevitably ask ourselves are:

- Is any kind of industrial society actually compatible with the creation of an ecologically sustainable future for humanity?

- If so, what kind of industrial society would it be, how would it function, and what are the developmental pathways we would have to follow to get there?
- If not, what kind of society should we be trying to create, how practical would it be for us to create it, and what are the implications for current modes of practice and living, and the populations that are dependent on them?

I am convinced that if we enter into a genuine debate about these questions and put aside our ideological preconceptions, we can come to some kind of broad agreement about an appropriate way forward and begin working together to achieve it.

Adam Lucas is a lecturer in the Science and Technology Studies Program at the University of Wollongong, and was recently the Sydney Convenor of Beyond Zero Emissions. His current research is in energy policy, with a focus on the economics of the Australian coal industry and drivers of renewable energy development. *The author wishes to thank Philip Sutton and the journal's anonymous reviewers for their patient and thoughtful suggestions in revising this paper.*

alucas@uow.edu.au

References

Australian Conservation Foundation, *et al*. (2009) *Joint Statement: Towards a Green New Deal* (accessed 1 September 2011): *www.acfonline.au.org*

Australian Government (n.d.) *Australian Greenhouse Emissions Information System*. Canberra: Department of Climate Change (accessed 26 August 2011), *www.climatechange.gov.au/government/initiatives/ageis.aspx*

Beyond Zero Emissions (2011) 'Beyond Zero Emissions Carbon Price Recommendations – measures that directly drive investment in renewables are more important than a high carbon price', Melbourne, 8 March 2011 (accessed 14 September 2011), *www.green-innovations.asn.au/BZE-Carbon-Price-Recommendations-20110308-v1.0.pdf*

Buckman, G. (2011) 'Weaknesses and Reform of Australia's Renewable Electricity Support', *Journal of Australian Political Economy: Special Issue – Challenging Climate Change*, 66: 71-97.

Catley, Y. (2011) 'Correspondence from Greg Combet AM MP to Petra Liverani', 6 July 2011.

Diesendorf, M. (2011) 'Strategies for Radical Climate Change Mitigation', *Journal of Australian Political Economy: Special Issue – Challenging Climate Change*, 66: 98-117.

Goodman, D. (2011) ‘Responding to Climate Crisis: Modernisation, Limits and Socialism’, *Journal of Australian Political Economy: Special Issue – Challenging Climate Change*, 66: 144-165.

Goodman, D. & Rosewarne, S. (2011) ‘Special Issue: Introduction’, *Journal of Australian Political Economy: Special Issue – Challenging Climate Change*, 66: 5-16.

McDonough, W. & Braungart, M. (2002) *Cradle to cradle: remaking the way we make things*. New York: North Point Press.

Nicholson, M. & Lang, P. (2010) ‘Zero Carbon Australia – Stationary Energy Plan – Critique’ (accessed 5 March 2012), http://bravenewclimate.com/2010/08/12/zca2020-critique/

Parkinson, G. (2011) ‘Why Australia needs no new coal or gas baseload’, *Renew Economy*, 29 February 2012 (accessed 29 February 2012), *http://reneweconomy.com.au/2012/why-australia-needs-no-new-coal-or-gas-baseload-15623*

Pearse, R. (2011) ‘Making a Market? Contestation and Climate Change’, *Journal of Australian Political Economy: Special Issue – Challenging Climate Change*, 66: 166-198.

Saddler, H., Diesendorf, M. & Denniss, R. (2004) *A Clean Energy Future for Australia*. Sydney: World Wildlife Fund for Nature (Clean Energy Future Group).

Salleh, A. (2011) ‘Making the Choice Between Ecological Modernisation or Living Well’, *Journal of Australian Political Economy: Special Issue – Challenging Climate Change*, 66: 118-143.

Seyfang, G. & Smith, A. (2007) ‘Grassroots Innovations for Sustainable Development: Towards a New Research and Policy Agenda’, *Environmental Politics*, 16 (4): 584-603.

Smith, A., Voss, J-P. & Grin, J. (2010) ‘Innovation studies and sustainability transitions: The allure of the multi-level perspective and its challenges’, *Research Policy*, 39: 435-448.

Teske, S. & Vincent, J. (2008) *Energy [R]evolution Scenario: Australia*. Sydney: Greenpeace Australia Pacific.

Trainer, T. (2011) ‘Comments on *Zero Carbon Australia*, M. Wright and Hearps, Univ. of Melbourne, Energy Institute, August 2010’ (accessed 5 March 2012), *http://theenergycollective.com/barrybrook/43114/another-zero-carbon-australia-2020-critique-%E2%80%93-will-they-respond*

Wright, M. & Hearps, P. (2010) *Zero Carbon Australia Stationary Energy Plan*. Melbourne: Beyond Zero Emissions/University of Melbourne Energy Research Centre.

Copyright of Full Text rests with the original copyright owner and, except as permitted under the Copyright Act 1968, copying this copyright material is prohibited without the permission of the owner or its exclusive licensee or agent or by way of a license from Copyright Agency Limited. For information about such licences contact Copyright Agency Limited on (02) 93947600 (ph) or (02) 93947601 (fax)