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Dear Climate Change Policy team

**Submission on the ACT's Climate Strategy to a Net Zero Emissions Territory by the Australian National University Climate Change Institute and Energy Change Institute**

Please find below a submission by the Australian National University (ANU) Climate Change Institute and Energy Change Institute on the ACT's Climate Strategy to a Net Zero Emissions Territory.

The mission of the ANU Climate Change Institute (CCI) is to contribute to climate change solutions through innovative, interdisciplinary approaches to research and teaching, drawing on the wealth of expertise across the University, and to connect our work to governments, the private sector and civil society.

The ANU Energy Change Institute (ECI) combines leading research and teaching on the technologies, efficiency, policy, law, sociology and economics of moving to a sustainable and dominantly renewable energy future.

Together the CCI and ECI comprise more than 400 researchers on climate change and energy from throughout the ANU.

We would welcome the opportunity to meet with members of the Climate Change Policy Team to discuss our submission further.

Yours sincerely,

Professor Ken Baldwin  
Director, ANU Energy Change Institute

Professor Mark Howden,  
Director, ANU Climate Change Institute

## Introduction

The ANU Climate Change Institute and Energy Change Institutes represent over 400 researchers from throughout the university. The Climate Change Institute includes experts on the earth's systems, climate impacts and adaptation, climate change mitigation, institutional responses to climate change and transformational approaches. In the Energy Change Institute, our members' expertise encompasses science, engineering, economics, policy, regulation and sociology.

Given the wide-ranging nature of the Climate Strategy and the diversity of expert researchers at the ANU, we have chosen to structure our overall submission by including individual researcher's contributions one by one.

In parallel with this, we would also like to direct your attention to an individual submission made by Professor Andrew Blakers of the Research School of Engineering who is also a member of the ANU Energy Change Institute.

### ***ANU Climate Change Institute and Energy Change Institute response to the targets***

The ACT Government is currently considering the formal adoption of these interim targets (below) and welcomes community feedback.

- 50-60% by 2025
- 65-75% by 2030
- 90-95% by 2040

The ANU Climate Change Institute and Energy Change Institute strongly support the formal adoption of these interim targets.

### ***Prof Mark Howden, Director, ANU Climate Change Institute***

The ACT Government is currently considering the formal adoption of these interim targets (below) and welcomes community feedback.

- 50-60% by 2025
  - 65-75% by 2030
  - 90-95% by 2040
- The emission-reduction targets identified in the Discussion Paper are in accord with current understanding of global carbon budgets and their impact on climate change. The ACT Government should be congratulated for their leadership in taking these steps.

The ACT Government is considering adopting the recommendations regarding carbon offsets and the social cost of carbon and welcomes feedback from the community on these issues.

- The proposition on page 8 of applying an estimate of the social cost of carbon to any shortfalls in meeting emissions-reduction targets and directing this to emissions-reduction activities (vs the usual option of purchasing carbon credits) is an interesting and useful one. Earlier discussions with the ACT Government however, had an additional component: directing part of these funds towards research and development activities in the ACT. The benefits of establishing such innovation hubs dealing with energy and the environment have become very apparent in a large range of jurisdictions. The ACT Government may wish to include this aspect in the next steps.

### What is the role of government in the transition to zero emissions in the energy sector?

- There is a real opportunity to position the ACT as an R&D hub generating economic benefit for ACT – as a co-benefit of the net zero emissions strategy. This would draw off the competitive advantages the ACT has in having a strong tertiary education sector, a highly educated and engaged populace and access to both national and global policy and research communities. This is why we need a broader suite of options than just reverse auctions for electricity. Options for such R&D hubs could include:
  - approaches to enhance the security of land-based sequestration
  - negative emissions (ie below net zero) housing, infrastructure and suburbs
  - efficient retro-fitting (there are a number of barriers to this big task of upgrading the existing stock especially in relation to gas use and increasing energy efficiency as noted by others in this submission)
  - low emissions cooling/heating
  - low emissions, integrated transport (noting that various steps are progressing on this but some elements such as bicycle travel to work have stalled)
- Many of the challenges sit in the social, psychological, behavioural and governance domains often linking these effectively to technological innovation (see submission below from Dr Colvin). The ANU has world-class expertise in these areas that the ACT Government could draw on.

For further discussion on these points, please contact Prof Mark Howden at [mark.howden@anu.edu.au](mailto:mark.howden@anu.edu.au) or 6125 7266

#### ***Prof Ken Baldwin, Director, ANU Energy Change Institute***

### What is the role of government in the transition to zero emissions in the energy sector?

- The transition to 100% renewable electricity has been a great first step for ACT. However, given that the goal is to reach net zero emissions, other measures, over and above increasing renewable electricity sources, now need to be implemented. In 20 years, as penetrations of renewables increase in other states, an individual jurisdiction will be competing with others to access renewable energy at lowest cost, which makes it important to encourage measures to actively reduce emissions from other sectors rather than through using offsets.

### What improvements can be made to building and planning to reduce energy use and emissions?

- Enforcing building standards should be a major priority for ACT Government. Currently existing standards do not get enforced and this should be our primary goal in this area.

For further discussion on these points, please contact Prof Ken Baldwin at [Kenneth.baldwin@anu.edu.au](mailto:Kenneth.baldwin@anu.edu.au) or 6125 4702.

#### ***Honorary Assoc. Prof Hugh Saddler, Crawford School of Public Policy, ANU***

### What is the role of government in the transition to zero emissions in the energy sector?

### What are the challenges in the transition away from natural gas?

### What improvements can be made to building and planning to reduce energy use and emissions?

- The ACT government has the opportunity to put measures in place to help restructure the economy. Just switching to renewable electricity means business as usual (BAU) for many businesses, as there's no real change and the ACT can be doing far more than that.

- The challenge to moving further, to zero emissions from all energy use, means eliminating the direct use of fossil fuel combustion as the key source of energy for all forms of transport, for space and water heating, and for a variety of commercial and industrial processes. This will require completely replacing and/or transforming our stock of energy-using equipment away from direct combustion of thermal fuels. This is not a negligible problem in terms of ambition and it also affects nearly every house and business so it's huge in terms of numbers. Because of the long operational life of much of this non-transport equipment, achieving the 2050 zero emissions target could mean writing off a large amount of equipment unless an early start is made. This will involve both preventing the installation of new gas and petroleum product using equipment and preventing like-for-like replacement of existing equipment.
- In terms of framing, we need to return to a focus on energy productivity and efficiency (rather than energy conservation). There should be more attention given to lifetime investments in infrastructure, rather than simply low upfront, capital cost. There is a good economic rationale for this – it is still cost effective to focus on energy efficiency. There's enough cost in retail energy prices to pay for a lot more efficiency than we're getting at the moment. Currently there are strong economic benefits in achieving a 6-7 star energy rating for new residential buildings, although it is not necessarily economically viable to reach a 9 star energy rating. We also still have a huge retrofitting task.
- Because the ACT is a relatively small territory, it can be argued that, while a pioneer, it has also to some extent been a free-rider on reliability aspects of achieving higher renewable penetrations. This is a national, or, more precisely, a NEM-wide problem which can certainly be overcome, but it is not a negligible cost which will have to be added to the (steadily falling) cost of wind and solar generation to give the full cost of delivered electricity.

For further discussion on these points, please contact Hon Assoc Prof Hugh Saddler at [hugh.saddler@strategypolicyresearch.com.au](mailto:hugh.saddler@strategypolicyresearch.com.au).

***John Sullivan, Manager, ANU Sustainability Officer, ANU Facilities & Services, ANU***

What is the role of government in the transition to zero emissions in the energy sector?

What are the challenges in the transition away from natural gas?

What improvements can be made to building and planning to reduce energy use and emissions?

- For a major consumer, such as ANU, a transition from gas is an enormous challenge. Currently about 80% of winter period energy profile is gas, which is mainly used for heating. The ANU electrical infrastructure is already near capacity and would not allow a rapid transition without substantial work in the provision of upgraded or new electrical infrastructure. The cost of this work would be significant and it would need to be determined who would cover the cost, the network owner or the customer.
- During the carbon tax period The ANU had spent a considerable amount of money transitioning from electric hot water and heating in several of the accommodation areas to reduce the carbon intensity of its energy profile. This plant and equipment has an extended operational cycle and the shift back to electricity would have considerable cost.
- There is also a question about the availability and reliability of large scale commercial hot water generation, in particular Steam and high temperature water generation, the replacement of plant would require the ability to place the new equipment within the footprint of existing plant enclosures.

- The focus on 100% renewable electricity has in fact had a detrimental effect on capital works because we've lost focus on reducing energy efficiency, as we know that electricity doesn't contribute to emissions. The government now needs to increase the focus on energy efficiency, which we've lost momentum on. Strong, clear energy efficiency standards, which are not unachievable, will be really important. We need to return to looking at the triple bottom line impacts of building construction. Developments need to focus on technology for energy recovery and the application of central plants that serve a large number of buildings, the focus on reduction of energy consumption needs to be placed back on the top of the list as a priority. This also needs to consider a long term planning and development strategy that enables the alignment of high energy users with areas of high energy loss.
- This move away from energy efficiency is particularly apparent in new suburbs where you're seeing a whole lot of (HIA and MBA?) houses with black colour bond roofs, which are very thermally inefficient. The ACT Government could develop / mandate case studies for the life cycle of a well-built home in new suburbs such as Googong, demonstrating its life cycle emissions.
- Large scale investment in wind and solar, are an essential element of the carbon neutral energy mix, however other technology such as energy from waste needs to be placed on the list of technologies to be investigated and tested within the local region.

***Dr Matthew Stocks, Research School of Engineering, ANU***

What is the role of government in the transition to zero emissions in the energy sector?

What are the challenges in the transition away from natural gas?

Where should the emphasis be on reducing emissions ie technology or behaviour change?

- ACT has been a global leader in establishing the reverse auction system for purchasing renewable energy. Whilst this is changing culture and the way we transition to renewable energy in Australia, we now need to do more. In particular the ACT can lead by example by transitioning out of gas.
- But there are major challenges in deciding how the gas system is going to exit. Who is going to pay for the asset as gas use declines? There are also major regulatory, fairness and equity questions to be answered. The economics of the transition are not clear cut. The advantage of electricity over gas at a retail level are small and provide little incentive to switch given the capital outlay.
- In addition, low cost renewable technologies such as PV and wind are just the start in terms of the transition. Storage and transmission costs must also be considered. There is a major gap in understanding the extent that distribution network costs contribute to electricity bills and that the local network will just cope with whatever we throw at it at no additional cost.
- There is also a major behavioural change required that is not going to be solved by paying to reduce electricity emissions. This must not be overlooked in this process. Consumers transitioning away from gas will be challenging. Gas is deeply rooted in the Canberra mindset as cheap, comfortable heating. Households are still being encouraged to install gas heaters (e.g. <https://www.actewagl.com.au/gasupdate>) which will lock in gas due to the significant capital investment in switching.
- Partial replacement of natural gas with hydrogen (up to 15%) will make little difference to emission reductions in the long term. The transition would benefit from a clear target for eliminating the emissions from gas. The gas industry can then either identify sufficient sources of clean gas (synthetic methane, hydrogen, biogas) that is economically competitive with renewable electricity or the system will naturally retire. The ACT government has 50% ownership of the asset which should make this easier.

For further discussion on these points, please contact Dr Matt Stocks at [matthew.stocks@anu.edu.au](mailto:matthew.stocks@anu.edu.au).

***Dr Rebecca Colvin, Knowledge Exchange Specialist, ANU Climate Change Institute***

Where should the emphasis be on reducing emissions i.e. technology or behaviour change?

What are the challenges in the transition away from natural gas?

- Community engagement is absolutely vital in driving the transition to net zero emissions. Are there learnings the Government can gain from the process used in the Citizen's Jury on compulsory third party insurance?
- A challenge of community engagement, always, is to engage beyond the 'usual suspects'. The ACT Government's efforts at a broad range of engagement activities is impressive. Often the voices missing from engagement processes are those of non-affiliated individuals who lack the capacity (skills, confidence, time) to seek out a space for their own voice in processes. The means to engage these people are often time consuming, for instance door knocking. However the benefits are two fold – gaining the insights of a different group of people and raising awareness of the initiative.
- Whilst the switch to 100% renewable electricity in the ACT has been driven by policy, greater focus on energy efficiency must also be driven by behavioural change. We also need to take into account the "rebound effect", where people often do less personally to reduce emissions after they're told that someone else's actions, in this case the government's, are working well. So strong government action on climate change can actually limit behavioural change at an individual level, unless this is managed well.
- There is risk in the transition from gas, or other highly visible changes to Canberra energy and social practices, that the change becomes perceived or used as a proxy for other issues. For example, a perception that the transition to gas is driven by a Labor/Greens political agenda may make citizens who are suspicious of those parties' motives suspicious of the policy or program. It is conceivable that a transition away from gas, if it becomes politicised, could be positioned by opponents as an example of 'individual rights' being taken away by Labor and the Greens. In such a case, the transition from gas is not viewed as being about gas, but is instead a proxy for debates about the rights of the individual and the role of government. So it will be critical to consider the potential risks in terms of perceptions and politicisation, and take efforts to ensure the transition away from gas is depoliticised. For example, alliances with individuals or institutions who are aligned with parties and interests beyond those represented by Labor/Greens can help to demonstrate that such a change is not a threat to those interests.
- There are great opportunities for behaviour change through utilising existing and potential social networks. For instance, we know that people are likely to make a substantial behaviour change if it does not appear to be a major deviation away from social norms. We also know that through a small group making changes together (e.g. lowering energy consumption), that mutual accountability and feeling of togetherness can help to motivate long-term, rather than short-term, habitual changes. Pre-existing social networks that are built not around climate or energy interests may be a great way to gain mutual benefits for those groups as well as for promoting the behaviour change required by the climate targets. For instance, church, sports, and school groups may enjoy the opportunity to undertake a project or challenge together, such as energy consumption reductions or other sustainable behaviours, with support provided by institutions such as government and universities.

For further discussion on these points, please contact Dr Bec Colvin at [Rebecca.colvin@anu.edu.au](mailto:Rebecca.colvin@anu.edu.au).

***Prof Xuemei Bai, Fenner School of Environment & Society, ANU***

What is the role of government in the transition to zero emissions in the energy sector?

What improvements can be made to building and planning to reduce energy use and emissions?

- Whilst energy and transport make up the largest component of emissions in the ACT, we need to decide on the boundaries we're using to consider our carbon emissions. For the ACT, which is expanding quickly almost at the rate of a developing country, it is also important to look at the production of materials for the building sector and infrastructure building as they are all emitting carbon somewhere else. On a global scale, just by providing infrastructure in cities around the world to the level of current developed cities, we will be using up more than half of the remaining global carbon budget. We can't ignore the building sector and look at it later after we've achieved our goals for the energy sector. We must also consider the options for low carbon buildings and infrastructure. There are multiple new technologies that can be harnessed.
- The ACT can play a major role in enabling the broader transformation of cities around the world. Being a front runner is very important and this should not be underestimated. This issue deserves more attention. The ACT Government could include a strategy to enhance its "soft influence" and influencing others to achieve much larger emission reduction collectively.
- One way of having a broader impact is to ensure learnings are distilled and shared beyond immediate/direct contacts through including a research component (and associated investment) in all initiatives and to ensure that the ACT's progressive goals and experiences in achieving those are properly reflected in the research literature. In particular research on social transformation can have huge impact globally.

For further discussion on these points, please contact Prof Xuemei Bai at [Xuemei.bai@anu.edu.au](mailto:Xuemei.bai@anu.edu.au).

***Yuan Peng, PhD student, Fenner School of Environment & Society, ANU***

What are the main actions Government can take to reduce transport emissions?

What should Government do to see greater uptake of electric vehicles?

What incentives can be implemented to reduce private transport emissions, including greater use of public transport and active travel, and reduce personal car use?

Where do you see potential for community behaviour change?

- Reducing the use of cars with only one passenger and encouraging car pooling could be a priority for ACT Government, as it might be a feasible and cost-effective option. This requires some mechanism for introducing people who have similar destinations and travel times but don't know each other. The ACT Govt could encourage / develop some sort of platform, such as an app. There would need to be consideration of issues around trust and also implications for taxis and public transport. Developing and running an app could be a low carbon governance experiment, as it may involve various stakeholders and require detailed rules from the government's side to ensure that it is for a public good and takes account of safety issues for passengers. The Government could set standards for the app and put out a tender to the private sector to run. They may wish to consider what the incentives are for people to choose car pooling – for some people this might be helping others, for others helping the environment.

Others might need more – a small incentive to get them to participate. If this goes well in Canberra, it could be extended elsewhere, which might show the leading role of Canberra regarding low-carbon governance.

- The transition to electric vehicles is a long-term process and might require a well-planned strategy from the government side, as well as technology development of electric vehicles. The ACT Government could consider doing more to incentivise the transition to electric vehicles, but may need to understand it could be a long-term task. The Shanghai case study, in terms of incentivising hybrid cars and electric cars, shows that the rebate policy has been set to receive a boost in the market, but the technological barriers might still be a major challenge for the future transition.

For further discussion on these points, please contact Yuan Peng at [yuan.peng@anu.edu.au](mailto:yuan.peng@anu.edu.au).

**Clare de Castella, Communications Manager, ANU Climate Change Institute**

What are the main actions Government can take to reduce transport emissions?

Where should emphasis be placed on reducing emissions, i.e. technology or behaviour change?

Where do you see potential for community behaviour change?

- Switching to a net zero emissions economy will require behavioural changes, particularly in the transport sector. Much of our behaviour is heavily influenced by social norms and changing these norms can be a major challenge.
- Research tells us that people across the community consistently underestimate the proportion of people who believe that strong climate action is necessary. This means that even those who are committed to climate action can feel that they are outliers rather than in tune with social norms, which can disincentivise them to take further action.
- There is an opportunity for the ACT Government to bridge this perception gap. The ACT Government could highlight the results of existing global and Australian research to start to shift social norms around climate action. Alternatively, they could commission research in the ACT to investigate support for strong climate action and then ensure that the results of this research are highlighted in all communications. They could also develop case studies of how individual Canberrans and Canberran families have overcome the barriers to reducing emissions to inspire others to do the same, particularly in the transport sector. Changing behaviour and social norms around climate action will require a long-term, concerted effort across multiple channels but is essential, as the shift to net zero emissions cannot be achieved by technological change alone.

For further discussion on these points, please contact Clare de Castella at [clare.decastella@anu.edu.au](mailto:clare.decastella@anu.edu.au).