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**Submission on economic modelling of potential
Australian emissions reduction pathways
consultation paper – August 2023**

15 September 2023

Overview

The Energy Efficiency Council (EEC) welcomes the opportunity to make a submission to the Climate Change Authority's consultation on economic modelling of potential Australian emissions reduction pathways.

The EEC is the peak body for Australia's energy management sector. A not-for-profit membership association, the EEC works to:

- Drive world-leading policy on efficiency, electrification and demand flexibility;
- Ensure we have the skilled workforce to deliver Australia's energy transition; and
- Support businesses and households to rapidly decarbonise.

Overall, the EEC supports the CCA's modelling approach combining a CGE model with more detailed 'bottom up' models of sectoral emissions to model emissions reduction pathways for the entire economy. Economy-wide modelling exercises are complex and often require making compromises, particularly in relation to the level of detail modelled within each sector.

However, noting the limitations of this modelling framework to accurately assess the economic impacts, let alone the non-economic benefits of stronger action to improve energy management, the EEC strongly supports supplementing the modelling with other analyses to ensure policymakers fully grasp the benefits that will flow if Australia makes a concerted effort to improve its energy performance as part of its emissions reduction efforts.

The EEC also sees merit in conducting modelling that produces detailed technology deployment pathways. Such outputs could be useful, both for informing policy to stimulate deployment of priority technologies, and for setting tangible goals against which the CCA could measure progress in this critical decade for action.

Answers to specific questions

Q1: What are your views on the two modelling questions? Are there other questions the authority should explore through economic modelling to inform its advice?

The two modelling questions are appropriate. The EEC supports the CCA investigating both the economic impacts of Australia pursuing different emissions reduction pathways (Question 1) and the potential mixes of abatement across sectors to achieve Australia's emissions reduction goals (Question 2).

The EEC notes that question 1 asks about the economic effects of 'different emissions pathways' and not just the economic effects of acting versus not acting to reduce emissions. This is an important distinction: While Australian governments in the past sought to understand the economic impacts of acting versus not acting to reduce emissions, arguably this question is less important than it was in the 2000-2010 period, when Australia *would* have been a leader on climate action. At that point, governments may have had more legitimate concerns about the negative economic impacts of acting first.

Today, the context is different, with more than 70 countries having put in place net zero targets, covering 78% of global emissions.¹ In addition to targets, major economies have announced significant policy packages, including the United States' Inflation Reduction Act (IRA). Other countries and jurisdictions are actively examining placing tariffs on carbon-intensive imports through so called 'carbon border adjustment mechanisms.' In this context, the most important question may be:

'What are the economic costs of Australia acting *too slowly* reduce its emissions to net zero?'

The EEC notes that this question is covered in the wording of question 1.

The need for technology deployment modelling to support monitoring frameworks

This decade is widely regarded as the 'critical decade' for climate action, where governments must urgently move from setting targets to implementing policies that achieve measurable change. In this context, the CCA's role as an independent tracker of policy progress is crucial, and performing this role *effectively* requires establishing tangible metrics and milestones along the pathway to net zero – against which policy progress can be measured.

A good example of a body playing such a role is the UK's Climate Change Committee (CCC). The CCC has established a 'Mitigation Monitoring Framework'² comprising several hundred indicators across all sectors the UK economy. These

1 United Nations, 2023, *For a livable climate: Net-zero commitments must be backed by credible action*, <https://www.un.org/en/climatechange/net-zero-coalition>

2 UK Climate Change Committee, <https://www.theccc.org.uk/publication/ccc-monitoring-framework/#introduction>

indicators provide decisionmakers and the public with a precise measure of progress being made in the transition to net zero emissions.

Modelling of technology deployment pathways supports the use of such monitoring frameworks, by providing tangible goals for all sectors to achieve.

Therefore, in addition to the two questions asked, the following questions would be useful to inform policy and to track progress against Australia's targets:

- Which technologies and processes will be needed to get Australia to net zero?
- In what order should abatement technologies be deployed under these pathways?
- What timeframe is necessary to deploy key abatement technologies, given the remaining time available to reach net zero targets?

The last of these questions is critical for policy, given the long economic lives of certain assets and time needed to turn them over. For example, the design life of a building is 50-100 years, while key energy-using appliances within buildings such as space and water heaters are often in place for 15-20 years. Given there are only 26 years remaining to Financial Year 2050, modelling that indicates the likely timelines for stock turnover (in buildings, appliances industry and transport) would be highly valuable to policymakers and the Australian public.

Q2: What are the strengths or limitations of these models the authority should keep in mind when interpreting their outputs? Are there other models that would provide valuable insights into the questions the authority is trying to answer?

The modelling framework is mainly appropriate for answering the two proposed questions in the consultation paper. While the EEC understand AusTIMES provides high-level outputs for energy end uses (efficient appliances, lighting, etc), it may not provide sufficient detail about the precise technologies that might deliver emissions savings in each sector, to support the sort of monitoring described above.

Therefore, the EEC suggests additional models could be used in conjunction with GTEM and AusTIMES to provide a more detailed picture of the required technologies and processes to reach net zero, particularly on the energy demand side. For example, more detailed models of Australia's building stock than AusTIMES could be used to indicate precisely what changes are needed to Australia's building types (from standalone homes, to apartment blocks, to commercial buildings like supermarkets) to achieve the emissions reduction pathways modelled.

Macroeconomic models only provide a limited picture of economic impacts

As one of the primary aims of the exercise is to understand the economic impacts of different emissions reduction pathways it is appropriate to use a computable general equilibrium (CGE) model like GTEM. CGE models are useful for modelling the economic impacts of an exogenous 'shock' to the economy and are particularly good at accounting for the interactions between different sectors, capturing flows of capital, labour, etc *between* sectors.

That said, there are limitations on GTEM’s ability to capture second and third order economic effects of emissions reduction actions, like energy efficiency.

Numerous studies have found energy efficiency has multiple benefits beyond simple energy and emissions savings (Figure 1).³ For example, energy efficiency improves air quality, reducing respiratory illness for building occupants, which in turn reduces hospital visits and the costs to government of providing healthcare. GTEM is unable to model impacts such as these so risks under-selling the positive economic impacts of energy efficiency for Australia.

Figure 1 The multiple benefits of energy efficiency improvements



Source: IEA, 2014, Capturing the Multiple Benefits of Energy Efficiency, https://iea.blob.core.windows.net/assets/28f84ed8-4101-4e95-ae51-9536b6436f14/Multiple_Benefits_of_Energy_Efficiency-148x199.pdf.

For this reason, other jurisdictions have partnered macroeconomic models with other bottom-up models to capture such second and third order benefits of energy efficiency. For example, when the European Commission modelled Energy Efficiency Targets, it used a macroeconomic model partnered with several other studies and models, to better capture the flow-on benefits of improving energy efficiency⁴.

3 See for example, IEA, 2014, *Capturing the Multiple Benefits of Energy Efficiency*, https://iea.blob.core.windows.net/assets/28f84ed8-4101-4e95-ae51-9536b6436f14/Multiple_Benefits_of_Energy_Efficiency-148x199.pdf.

4 See Stenning, 2018, *Modelling macro-level and sectoral impacts of energy efficiency*, https://iea.blob.core.windows.net/assets/imports/events/211/Day2_21JS.pdf; and Pollitt et al., 2017, *The macro-level and sectoral impacts of Energy Efficiency policies: Final report*, https://energy.ec.europa.eu/system/files/2017-07/the_macro-level_and_sectoral_impacts_of_energy_efficiency_policies_0.pdf.

To fully answer question 1 regarding the economic effects of different emissions reduction pathways, it will be necessary to conduct additional work to properly represent the likely positive economic impacts of energy efficiency actions.

The EEC therefore strongly supports the CCA's proposal (on page 7 of the consultation paper) to complement its macroeconomic modelling with other quantitative and qualitative analysis that will explore additional benefits of greater action to reduce emissions.

Q3: Do you think the proposed global action pathways provide an appropriate context for assessing potential Australian emissions pathways? Are there alternatives you think are higher priority pathways to consider? Are the IPCC, IEA and GLOBIOM assumptions appropriate for the proposed scenarios?

The proposed global action pathways are consistent with the Paris Agreement and are therefore appropriate to model. The proposed IEA scenarios to which the models will be calibrated are also appropriately selected to align with a 1.5°C and below 2°C scenario.

Q4: What potential Australian emissions pathways or scenarios do you think would provide the most valuable modelling insights and inputs to support the authority's advice?

The EEC supports the proposed approach to model a reference case representing current policy settings and several more ambitious scenarios. The EEC agrees that there is no need to model a scenario with less ambition than current policy settings.

Q5: How do you think the authority should capture the potential benefits of stronger action to reduce national and global emissions in its modelling? Are some approaches better than others?

Refer to the answers to Q2.

The EEC would be happy to provide further suggestions on additional work that could be done to capture some of the other benefits that improved energy efficiency as part of a transition to net zero emissions could deliver for Australia.

Q6: Are there any other issues the authority should consider as part of its modelling exercise?

Models such as AusTIMES tend to be sensitive to certain inputs. For example, the following assumptions are likely to have a major bearing on the modelling results:

- The carbon budget allocated to Australia over the period;
- The starting costs for abatement technologies; and
- The rate at which abatement technology costs fall over time (and technology learning rates).

Given uncertainty about the future, it is useful to test how changes in these parameters, including combinations of these factors affect the results in sensitivity analyses. The EEC may be able to offer information on the estimated range of future demand-side technology costs to help support such sensitivity analyses.