

# Climate Change Authority Modelling Submission: Imperfect information

***Avoiding the worst impacts of climate change demands urgent action. This urgency ought to be driven by fulsome and transparent information. Current economic modelling by the CCA could be an important contribution to this task, if done properly and shared with all***

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## INTRODUCTION

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The Australia Institute welcomes the opportunity to provide input into the Climate Change Authority's (CCA) consultation on Economic Modelling. Considering that Australia's current Nationally Determined Contribution (NDC) toward the Paris Climate Agreement is "insufficient" against our fair share for a 1.5°C or 2°C warmed world, research supporting an ambitious 2035 NDC is hugely important.<sup>1</sup>

We are concerned, however, that the modelling project as outlined in the consultation paper *Economic modelling of potential Australian emissions reduction pathways* is too narrow. The consultation paper lays out that the Authority "does not propose to use this modelling exercise to assess the economic effects of physical climate change impacts, or the benefits (avoided economic costs) of greater reductions in global emissions." By looking only at the costs of emissions reductions in line with a 1.5°C or 2°C warmed-world, this modelling project will struggle to contextualise those costs, limiting the utility of this modelling for policy makers and debate.

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<sup>1</sup> Climate Action Tracker (2022) *Australia*, <https://climateactiontracker.org/countries/australia/>

We are also concerned that the proposed methodology appears to bury the most important policy question of how Australia meets its existing abatement commitments into the reference case, undermining the modelling exercise, especially in light of current emissions trends.

Also, it is important to emphasise that this kind of long-term modelling is extremely sensitive to assumptions and inputs. As such, it is crucial that the modelling is presented transparently, with full access to the models, data and methods employed. Without transparency the results of any modelling will be much less robust and fail to contribute to an informed policy discussion.

Below we respond to specific consultation questions, to detail these concerns.

## CONSULTATION QUESTIONS

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### **“What are your views on the two modelling questions? Are there other questions the authority should explore through economic modelling to inform its advice?”**

Our view is that the two modelling questions are too narrow, and do not provide enough context to facilitate policy making and debate. The Australia Institute recommends modelling negative physical impacts of various warming scenarios. Without this crucial context, the pathways modelled by the CCA have much lower utility.

For decades, Australian climate policy debates have been hamstrung by a fixation on the projected costs of climate action, with limited or no attention to the costs of inaction. A welcome recent contribution to this conversation is the *2023 Intergenerational Report (IGR)*, which attempted to quantify some limited impacts of different climate change scenarios on the Australian economy. Specifically, it quantified lost output due to the impact of heat stress on productivity; losses from the agricultural sector; lower levels of tourism arrivals due to rising temperatures; and costs due to increased frequency of natural disasters.<sup>2</sup> Of these areas, only costs from lost labour productivity and Government funding for disaster recovery are explicitly quantified – up to \$423 billion for the former, and \$130 billion for the latter.

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<sup>2</sup> Treasury (2023) *Intergenerational Report 2023: Australia's future to 2063*, <https://treasury.gov.au/sites/default/files/2023-08/p2023-435150.pdf>, pp. 96-107.

The IGR does, however, acknowledge that there is much more work to be done here:

“There is a wide range of additional channels, including biodiversity loss, storm surge, sea level rise and health impacts, through which global temperature increases could impact the Australian economy over the next 40 years and beyond. These could present significant other costs, beyond those discussed above, for people, communities, businesses and the broader economy, especially under higher temperature increase scenarios.”<sup>3</sup>

The IGR is a start, but the Australian Government still has no clear advice regarding the quantum of the economic impacts expected under different warming scenarios. Deloitte has attempted a similar costing, commissioned by the Business Council of Australia, which found the cost of climate inaction and inadequate ambition to be AU\$3.4 trillion. This analysis is useful, but not transparent, and now out of date. The CCA ought to be filling this critical information gap.<sup>4</sup>

It is our view that the CCA ought to reconsider its aim of not modelling the economic effects of physical climate change and pursue a far more comprehensive approach to quantifying impacts under different warming scenarios. Without this, the modelling exercise as proposed by the *Consultation Paper* will lack crucial context, to compare models and scenarios against.

Specifically, the different pathways to 1.5°C and 2°C ought to be contextualized by the significantly greater risks associated with 2°C. Different physical impacts have been modelled elsewhere at 10cm difference in sea level rise, and a 7% reduction in wheat production (9% vs 16%), to name just a few impacts.<sup>5</sup> The IPCC also firmly emphasizes the differences between these two pathways, and any policy decisions which eschew 1.5°C as the primary target need to be justified against these striking arguments.<sup>6</sup>

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<sup>3</sup> Ibid., pp. 104-5

<sup>4</sup> Deloitte (2020) *A new choice: Australia's climate for growth*, <https://www.deloitte.com/au/en/services/economics/perspectives/new-choice-climate-growth.html>, p. 5

<sup>5</sup> Schleussner et al (2016) Differential climate impacts for policy-relevant limits to global warming: the case of 1.5 °C and 2 °C, *Earth System Dynamics*, <https://esd.copernicus.org/articles/7/327/2016/esd-7-327-2016-discussion.html>

<sup>6</sup> IPCC (2018) Summary for Policymakers. In: *Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*, [https://www.ipcc.ch/site/assets/uploads/sites/2/2022/06/SPM\\_version\\_report\\_LR.pdf](https://www.ipcc.ch/site/assets/uploads/sites/2/2022/06/SPM_version_report_LR.pdf)

## **“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?”**

With regards to the Global Trade and Environment Model (GTEM) little can be ascertained about the strengths and weaknesses of the current incarnation of the model since the included reference in the consultation paper is a relatively old, and paywalled, journal article.

However, experienced modellers are well aware of the long history of GTEM, and similar *Global Trade Analysis Project* (GTAP) based global *Computable General Equilibrium* (CGE) models, being used for climate change modelling and answering the types of questions the CCA are attempting to ask. Furthermore, more recent information about GTEM is available from modelling undertaken by previous governments suggesting the model is a good choice to answer the CCA’s questions provided the modelling is done in an open and transparent manner.<sup>7</sup> The Institute would encourage the CCA to publish additional material on the features and recent developments of the GTEM model to better understand its strengths and weaknesses for this modelling exercise.

The Australia Institute has less experience with the other models discussed in the consultation paper, but we note that the link provided to the AusTIMES model appears to be broken, limiting our ability to comment.

An important consideration in interpreting and reporting the results of the various models is to be clear, transparent, and cognisant about how the various models are linked together. The usual process is for GTEM to provide the higher level macroeconomic and industry level results which are then feed into more detailed industry specific models<sup>8</sup>. The more detailed models typically disaggregate the GTEM results. However, the direction of the connection between the various models is usually, but not always, in one direction. It means the subsequent highly detailed results can be incompatible with the original GTEM results. Simply, it is relatively easy to feed GTEM prices *or* quantities, or supply *or* demand, into more detailed models,

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<sup>7</sup> DCCCEW (2021) *Australia’s Long-Term Emissions Reduction Plan*, <https://www.dcccew.gov.au/climate-change/publications/australias-long-term-emissions-reduction-plan>,

<sup>8</sup> Treasury (2008) *Australia’s Low Pollution Future – The Economics of Climate Change Mitigation, Summary*, [https://treasury.gov.au/sites/default/files/2019-03/Australias\\_Low\\_Pollution\\_Future\\_Summary.pdf](https://treasury.gov.au/sites/default/files/2019-03/Australias_Low_Pollution_Future_Summary.pdf), p.12-14

but much more difficult to do both. So, at the end of the process it is unclear which results are a true estimate of the outcomes. Therefore, the CCA should be transparent on the methods employed to link the models and the steps undertaken to ensure consistency across the models.

More generally, the interpretation and presentation of CGE modelling results is a complex task. The interpretation of policy scenario results relative to a reference case, itself evolving over time, at some point in the future is a surprising difficult concept for non-modellers, policy makers, and the media to understand. The usual 'trick' of aggregating results across time as a discounted net present value leads to its own set of problems including, the choice of a discount rate, and model results being presented as if they are enormous when in fact, when correctly interpreted, can be relatively small.

As such, the CCA should steer clear of such interpretation and presentation 'tricks' employed by some practitioners of CGE modelling and focus on presenting the results as deviations from the reference case with accompanying detailed explanations, and visuals, about how to carefully interpret the results in this manner. The Australia Institute has a long history of exploring some of the more devious methods employed by some climate change modelling teams and is hopeful the CCA's modelling will not follow a similar path.<sup>9 10 11</sup>

Finally, the strengths and limitations of all modelling frameworks is primarily a function of the model's inputs, model code and supporting databases. Without transparency on these issues the overall quality of modelling exercise is diminished.

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<sup>9</sup> Secombe (2021) *The Man Behind Scott Morrison's Climate Panic*, The Saturday Paper, <https://www.thesaturdaypaper.com.au/news/politics/2021/11/13/the-man-behind-scott-morrison-climate-panic/163672200012870>

<sup>10</sup> The Australia Institute (2019) *Let Us Assume*, <https://australiainstitute.org.au/report/let-us-assume/>

<sup>11</sup> Swann & Merzian (2019) *A Model Line-up Comparing economic models of high ambition emission reduction Targets*, <https://australiainstitute.org.au/report/a-model-line-up/>

**“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 selection of the 1.5°C and 2°C make sense as these are the scenarios that ought to be modelled to inform policy choices; anything less ambitious would be in breach of Australia’s international commitments under the Paris Agreement. But if the CCA undertakes efforts to quantify possible costs and physical impacts of climate change, then further scenarios ought to be added as well. Possibly here the CCA might follow the lead of the IGR, and model the costs of 3°C and 4°C.

To be clear, as the CCA will surely agree, these are unacceptable outcomes, and Australia must lead global ambition to limit warming to 1.5°C. But in the interests of a fully informed policy and political discussion, it is past time that the Australian public was given fuller information to appreciate the costs of inaction *and* continued fossil fuel exports.

As we mention throughout this submission, this entire modelling exercise demands full transparency around the assumptions and methods employed, as these kinds of long-term projections are incredibly sensitive to the inputs chosen. Indeed, we would draw CCA’s attention to research which shows stark disconnect between many of the assumptions common to environmental economics, and the understandings of likely economic impacts among climate scientists.<sup>12</sup> While this does not vitiate the entire modelling exercise, it does demand clarity around methods, and clear communication of the limitations of this approach.

On a technical level it is not clear which global action pathway would form the reference case or business-as-usual (BAU) scenario. The consultation paper seems to imply there will be two BAU scenarios by outlining the two global pathways. Presumably, against these alternate global pathways, different domestic emissions pathways will be compared. Whilst using two reference case scenarios is not necessarily a problem it could add to the complexity of presenting and interpreting the results especially across different domestic abatement scenarios.

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<sup>12</sup> Keen (2021) ‘The appallingly bad neoclassical economics of climate change’, *Globalizations*, 18(7).

More importantly, both global emissions pathways are very much not business-as-usual projections in that significant policy and economic changes will need to occur to meet either of those global targets. A more realistic BAU scenario would be a not meeting the targets and continuing with the extensive use of fossil fuels. With a proper BAU in place, the costs of *not* addressing climate change need to be modelled otherwise the modelled economic costs of just cutting emissions could be significant. But these costs are *certainly* significant only *if* they are not compared to the likely larger costs of not addressing climate change. As such, we call on the CCA to be clear on the choice of the BAU or reference case scenario and to consider a realistic reference case projection based on current trends and the lack of existing policy measures addressing climate change.

### **“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 Australia Institute encourages the CCA to carefully consider how it treats scope 3 emissions from our export fossil fuel sector – especially coal and LNG.

It would seem from the consultation paper that the modelling will consider questions of international demand, which in 1.5°C and 2°C scenarios must necessarily impact the demand for Australian fossil fuel exports. Presumably this will be reflected in the modelling of these pathways.

The Australia Institute would argue, however, that it is worth explicitly modelling a scenario where Australia phases out these industries – beginning with a moratorium on new coal and gas, and working toward a sunset date on these industries that is consistent with a 1.5°C world. This ought to be a policy scenario that the Australian Government seriously considers – both to provide international climate ambition leadership, and to give clear signals to direct private investment – and this modelling exercise is an opportunity to inform that pathway. Again, this kind of modelling ought to be contextualized against the costs of inaction and low ambition.

On a technical level, in contrast to the global pathways it is much clearer around what is being proposed as the reference case or BAU scenario for Australia. But similarly the wrong BAU has been proposed. With a lack of policies in place, Australia is not on track

to hit its emissions targets<sup>13</sup>. Significant policy changes are needed to achieve them. To believe that our current targets are a BAU projection scenario is an unrealistic starting point for the modelling exercise. Rather the BAU should be based on a current trends projections then with a policy scenario of the existing targets being achieved. Additional scenarios around different domestic targets can then be modelled. Again, this approach would lead to a technical necessity of modelling the costs of inaction otherwise the current targets could look like they lead to significant economic costs, without unrealistic productivity gains or heroic technology assumptions.

Most importantly, with a realistic reference case scenario a key modelling question becomes: how does Australia meet its current targets? What policy levers in the model are going to be employed to hit those targets relative to a more realistic reference case? What assumptions will be made around issues like the existence, tradability and integrity of carbon permits? The last round of modelling undertaken by the former Coalition government relied on voluntary carbon prices and unknown technologies.<sup>14</sup> Aside from the fact CGE models do not include voluntary carbon prices, the approach was widely ridiculed.<sup>15 16 17</sup> Further back, modelling undertaken by Treasury using GTEM under the Gillard and Rudd governments relied heavily on tradable permits to significantly lower the costs of abatement. In light of recent concerns about the quality of various carbon offset programs, relying on tradeable permits within a CGE framework to drive domestic abatement is now unrealistic, apart from a sensitivity scenario.

The key point is that burying the most important climate change policy question into the reference case significantly undermines entire modelling exercise.

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<sup>13</sup> Hemming (2023) *As Time Runs Out Australia's Emissions are Going in the Wrong Direction*, <https://australiainstitute.org.au/post/as-time-runs-out-australias-emissions-are-going-in-the-wrong-direction>

<sup>14</sup> DCCEEW (2021)

<sup>15</sup> The Australia Institute (2021) *Actions Speak Louder than Words': Net Zero by 2050 a Fraud Without Transition from Fossil Fuels*, <https://australiainstitute.org.au/post/actions-speak-louder-than-words-net-zero-by-2050-a-fraud-without-transition-from-fossil-fuels/>

<sup>16</sup> Greber (2021) *Morrison matches Labor's 2013 carbon price*, Australian Financial Review, <https://www.afr.com/politics/federal/morrison-s-dirty-secret-he-s-matched-labor-s-2013-carbon-price-20211115-p5990m>

<sup>17</sup> Kohler (2021) *Ignore the spin, Australia already has two carbon taxes*, The New Daily, <https://thenewdaily.com.au/finance/finance-news/2021/11/25/carbon-taxes-australia-kohler/>



## **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?**

The CCA can capture the potential benefits of stronger action by modelling the economic costs of inaction.

Unrealistic assumptions about unproven, or yet to be discovered technologies, and endogenous miracle productivity gains are the least good approaches to modelling the benefits of stronger actions.

## **“Are there any other issues the authority should consider as part of its modelling exercise?”**

In the event that the CCA does not make the modelling publicly available, it will be important for the CCA to provide a broad range of sensitivity scenarios to aid the policy analysis. If debatable assumptions are made in the key scenarios, especially around the availability of unproven technologies, without access to the modelling or appropriate sensitivity scenarios, the analysis and the policy debate will be hindered.

To the extent that policy formation and implementation is fundamentally about choices it is important for the CCA modelling to model these choices. Whilst it can be time consuming to model all realistic policy options, open source modelling frameworks allow others to explore those options and contribute meaningfully to the important climate change debate.

## **CONCLUSION**

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Finally, to reiterate some of the key points from this submission the Australia Institute is most concerned about the CCA's stated aim of not modelling the costs of inaction.

The submission has outlined both the conceptual and technical reasons for these concerns. Conceptually, by not modelling the costs of inaction the costs of action cannot be contextualised, and technically it means the reference case is incorrectly specified thereby burying the most important policy question of how to meet current targets. Moreso, since other GTAP-inspired modelling teams like DAE are successfully modelling the costs of inaction, as well as the IGR, the CCA should take the lead and model it better for the sake of proper and robust policy debate on climate action.