



# ACT Climate Change Council submission on ACTs Emissions Reduction Target Review

## Review of the ACT GHG emissions-reduction target

ACT Climate Change Council

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### Purpose

To review the ACT's Net Zero by 2045 greenhouse gas emission-reduction target.

### Background

The ACT has committed to achieving net zero emissions by 2045 along with interim targets and has a portfolio of policies to support this target. The recent ACT greenhouse gas (GHG) Inventory shows that a 47% reduction in emissions has already been achieved against 1990 levels. A strong element of this is the essentially once-off transition to an electricity grid powered by renewable sources. There is, however, a recognition that the next tranche of emission-reduction includes increasingly hard-to-abate sectors including heating of buildings, transport and waste.

When emission-reduction targets were last reviewed by the ACT Climate Change Council in 2017 and implemented by the ACT Government, the target (net zero by 2045) demonstrated leadership as most other jurisdictions globally were looking at net zero emissions by 2050 at best. Most, including the Australian national target, remain fixed on this date. At the time of the ACT's net-zero by 2045 announcement only a few jurisdictions, most notably California, had an equally ambitious target. These were leadership positions because the carbon emissions budget at the time indicated that net-zero by 2050 was scientifically broadly consistent with keeping global temperatures to 1.5°C above pre-industrial levels (the lower temperature bound of the Paris Agreement temperature goal). A statement from the ACT Government at the time highlighted this:

*'This target stands among the world's most progressive and demonstrates the Territory's commitment to delivering real climate action'*

The assumptions embedded in this briefing note are that the ACT Government 1) wants an emissions trajectory that is consistent with the science, 2) that is proportional to the issue, and 3) wishes to maintain a leadership position in relation to GHG emission-reduction.



As a result of the ACT target, policies and programs and via changes by individuals, businesses and other entities, the ACT's per capita emissions in 2021-2022 (3.6 tCO<sub>2</sub>-e) are just 19% of the national average of 18.9 tCO<sub>2</sub>-e for the same period. This is lower than all the other mainland states and the Northern Territory. These per capita emissions are similar to those of progressive European countries and half the OECD average. It is important to note that this refers to Scope 1 (direct emissions) and Scope 2 emissions (indirect emissions from energy consumption) but does not include Scope 3 emissions. Scope 3 are indirect emissions generated in the wider economy as a consequence of the activities of the ACT, but from sources outside the ACT (e.g. embodied emissions in consumed goods).

### **Changes in the decision-making environment**

In the several years since the above assessment was made and the Net Zero by 2045 policy implemented, there have been many changes in the environment influencing these issues.

As documented by the IPCC and other sources, the key indicators of climate change have all become worse:

- CO<sub>2</sub> and other GHG emissions continue to increase with the last two years being record CO<sub>2</sub> emissions and this year likely to be yet another record.
- CO<sub>2</sub> and other GHG concentrations in the atmosphere continue to increase with last year being a record year for the major gases.
- temperatures continue to increase with the last six years being amongst the hottest on record and this year now likely to break the previous record. The global temperature is likely to exceed 1.5°C in the mid-2030s or earlier with specific years likely to exceed 1.5°C in the next few years.
- extreme events hitting harder and more frequently and with this happening faster than the Global Climate Models predict.
- observable climate change impacts right across the globe.
- a growing understanding that our capacity to adapt to climate change impacts has been overstated.
- sea level rising at record rates and going up faster and faster over time.

This has reinforced the need for urgency including for rapid, large and sustained reduction in GHG emissions.

At the same time, the understanding has grown of the GHG emission trajectories and carbon budgets that are consistent with the Paris Agreement goals. A carbon budget is the accumulated global emissions of CO<sub>2</sub> that are consistent with a specific temperature outcome.

To be consistent with a 1.5°C-compatible trajectory, CO<sub>2</sub> emissions would need to be reduced by 48% by 2030 (against 2019 levels) and all GHG emissions by 43%. These reductions are respectively 99% and 84% by the year 2050 (Fig 1 and Table 1). The reason why overall GHG emissions have to fall less than CO<sub>2</sub> emissions is because specific gases like methane and nitrous

oxide do not have to fall to net-zero to be compatible with a 1.5°C goal because of their atmospheric lifetimes and other specific characteristics. Lower levels of emission-reduction are needed to be compatible with a 2°C outcome.

It is also important to note that these analyses were based on emissions up to the start of 2020. In the interim years, emissions have been at record levels (except for the COVID year which was about 5% lower) and the resulting emission reduction trajectories currently need to be more stringent than indicated in Fig 1.

The current emission-reduction policies globally (the NDCs) do not put us onto a pathway consistent with either 1.5°C or 2°C (Fig 1).

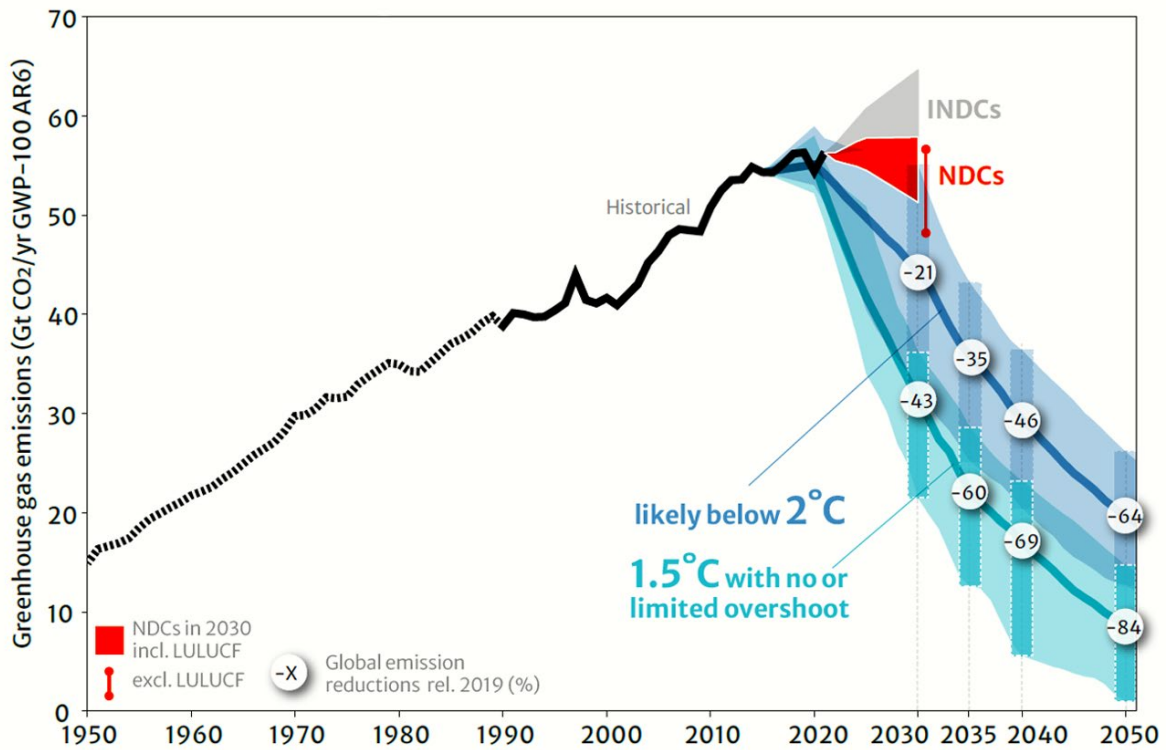


Fig 1 Historical global GHG emissions data (1950 to 2020) and projections of the impacts of current policies (NDCs) to 2030 and reduction scenarios consistent with keeping global temperatures to below 2°C or to 1.5°C (Global Stocktake Synthesis Report 2023).

	Reductions from 2019 emission levels (%)				
		2030	2035	2040	2050
Limit warming to 1.5°C (>50%) with no or limited overshoot	GHG	43 [34-60]	60 [49-77]	69 [58-90]	84 [73-98]
	CO <sub>2</sub>	48 [36-69]	65 [50-96]	80 [61-109]	99 [79-119]
Limit warming to 2°C (>67%)	GHG	21 [1-42]	35 [22-55]	46 [34-63]	64 [53-77]
	CO <sub>2</sub>	22 [1-44]	37 [21-59]	51 [36-70]	73 [55-90]

Table 1 Emissions-reductions at different dates of all GHGs and of CO<sub>2</sub> from 2019 levels to be consistent with keeping global temperatures to below 2°C or to 1.5°C (IPCC Synthesis Report 2023)

The rate and scale of these detailed, modelled emission reduction trajectories are broadly consistent with the results of the carbon budget approach. Because of the accumulative nature of CO<sub>2</sub> in the atmosphere, there is an almost linear relationship between accumulated CO<sub>2</sub> emissions and global temperature. This means that for a given temperature goal, the emissions compatible with that goal can be easily calculated. At current levels of CO<sub>2</sub> emissions (about 42 billion tonnes per year) we have only about 8-9 years before we have used up the complete remaining emissions budget compatible with a 50% chance of keeping warming to within 1.5°C (IPCC 2023).

This C-budget approach can be used to assess quickly the implications of different scenarios. For example if we assume that there is an immediate global start to emission reduction and that emissions are reduced in a straight-line way, then we need to go to net zero by about 2040 globally. This is similar to the result from Meinshausen and Nichols (2023) who calculate that currently net-zero by 2038 is needed. In a linear-reduction scenario like the above, every year we continue to emit at current or similar levels brings forward by about two years the date needed to hit net-zero. If an assumption is made that it will be around two years before the world starts to rapidly reduce GHG emissions, then a revised target of Net-Zero by 2036 would be consistent with a 1.5°C achievement and a leadership position would be net-zero by 2035.

As this discussion has demonstrated, the date to net-zero is not a single set-and-forget decision. It needs to be updated depending on the emissions in the meantime. The only constant is the ultimate goal – keeping global temperatures down to well-below 2°C and as close as possible to 1.5°C so as to avoid dangerous human-induced climate change.

**Evolution in assessment of GHG emission-reduction goals**

There are however, additional considerations that have emerged in recent years. In particular these relate to the concepts of a ‘fair share’ of emission reductions, in relation to Scope 3 emissions and also the different emission-reductions appropriate for different gases.

*Fair share*

The above assessment of emission-reduction trajectories was predicated on a simple numerical share of emissions (i.e. that the ACT emissions be reduced proportionally with those everywhere else on the globe). This is simply calculated as per analyses in Fig 1 and Table 1. This is however, different to a country's 'fair share'. A fair share considers that 1) developing countries have contributed few emissions to the total accumulated carbon dioxide that is impacting climate change today, 2) that a numerical share approach does not take into account population size and 3) that it 'rewards' past large emitters. There is no single, currently agreed approach to calculate a 'fair share' and given the politics around this it is unlikely that an approach will be found that is mutually-agreeable to all parties. But some indicative results are displayed in Fig 2.

In this case, the CO<sub>2</sub>-reduction trajectories are much steeper and hit net-zero earlier than the global estimates in Table 1 with the date of net zero being 2040 for the whole of the OECD and about 2030 for Australia.

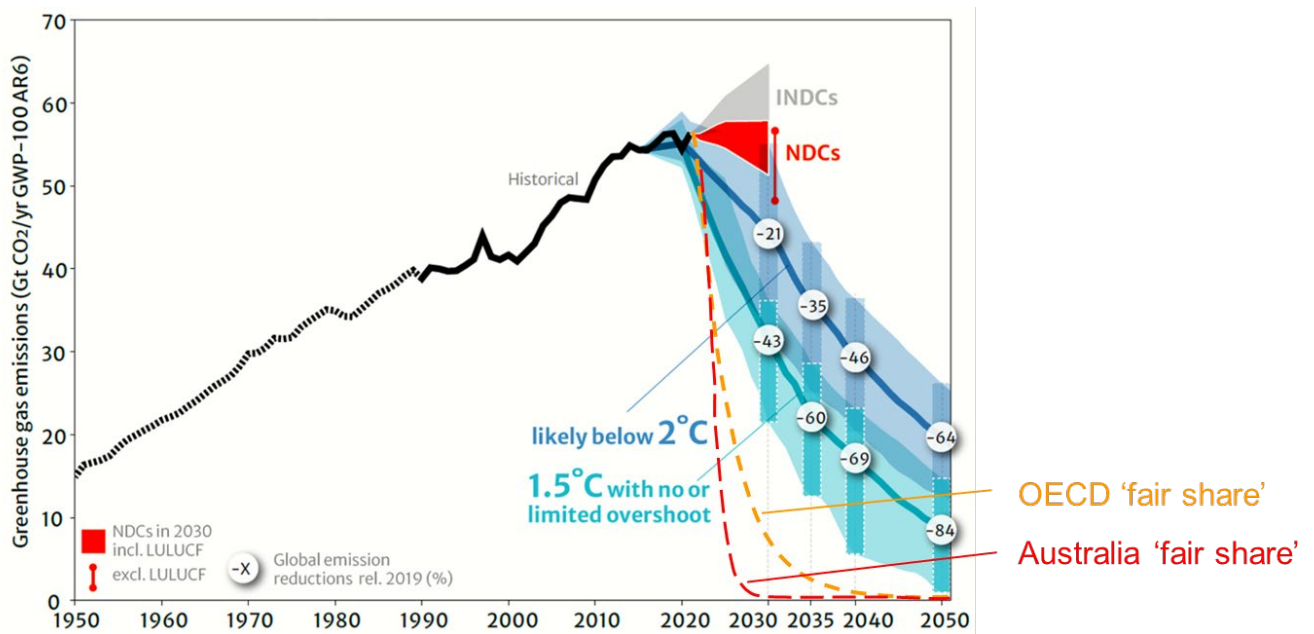


Fig 2 As in Fig 1 but includes the 'fair share' emission-reduction trajectories for the OECD as a group and also for Australia from Vogel and Hickel (2023). These apply to CO<sub>2</sub> emissions not to all GHGs.

### Scope 3

The current ACT emission-reduction net-zero target is only based on Scope 1 and Scope 2 emissions. Emissions produced by goods and services brought into the ACT (Scope 3 emissions) are not currently included. A recent report by the Office of the Commissioner for Sustainability



and the Environment has showed that the largest source of emissions generated by the ACT are Scope 3 emissions. They were estimated to be 93.6% of the total GHG footprint of the ACT.

There is a lot of activity globally as to how to operationally include Scope 3 into the GHG targets of both governments and business. Amongst other challenges, it is currently difficult to manage and measure Scope 3 emissions (e.g. we need to know the emissions of the supplier of the supplier of the supplier etc) although data and analytics are improving all the time. In a growing population and economy there are additional issues in setting an appropriate baseline and in integrating any Scope 3 targets with existing Scope 1 and 2 targets. To our knowledge, there is no major jurisdiction globally which has as yet tackled the challenge of establishing a clear target and pathway for Scope 3 emissions. The Council has discussed alternatives such as efficiency metrics (ie Scope 3 emissions per capita), emission-reductions compared with a baseline or adoption of a trajectory approach. We see the latter as the most immediately prospective approach but acknowledge that there is no single correct choice. Further analysis is warranted.

### *Offsets*

Net-zero as a concept is inclusive of the possibility of offsets via sequestration of carbon dioxide from the atmosphere into vegetation, soils or manufactured materials. The existence of hard-to-abate emissions in the ACT means that some offsets will be needed to reach net-zero. There has been much argument about land-based and waste-based carbon offsets and their validity and this and other considerations such as moral hazard may be deterring consideration of these in the ACT and subsequent action. However, it is clear that with existing understanding, data and technology there can be effective, high quality, sustainable and economically-beneficial offset programs and with appropriate investment these options could be expanded.

### *Non-CO<sub>2</sub> GHGs*

Lastly, there are additional layers of complexity associated with how to best include the different greenhouse gases.

The current ACT Net-Zero target bundles CO<sub>2</sub>, methane, nitrous oxide and other GHGs into a single measure based on Global Warming Potentials. This is normal practice. The separate GHGs are not reported individually in the public-facing material available (although this would be calculated in the process of establishing the inventory).

The nature of GHGs such as methane and nitrous oxide (e.g. the short atmospheric lifetime of methane) means that emissions of these gases does not have to be reduced to zero to be compatible with a 1.5°C trajectory (see IPCC reports). In the case of methane, an emissions reduction of about 50% by 2030 and 60% by 2050 is compatible with a 1.5°C trajectory whereas this reduction is about 30% for nitrous oxide.

Hence, whilst we need to achieve net-zero for CO<sub>2</sub> if we are to limit climate change, we do not have to achieve net-zero for these other gases. Consequently, an emissions-reduction target that



does not allow for this is more stringent than it needs to be. In the case of the ACT this is unlikely to be critical (e.g. compared with NZ) given relatively low emissions of these gases from the ACT.

### **Updating the previous ACT Net-Zero goal**

The above global information can be used to review the ACT emission-reduction targets.

The ACT's Net-Zero by 2045 target which was intended to be a leadership position doing more than the minimum to keep temperatures to 1.5°C has been outflanked by events. The continued high rates of global GHG emissions in the subsequent years mean that a similar outcome requires that the time to net-zero should be adjusted.

The exact degree to which the date may need to be adjusted is a matter for judgement. The detailed modelling on a simple numerical share basis (and taking into account post-2020 emissions) would indicate that a leadership position on the ACT reaching net-zero for CO<sub>2</sub> emissions should be in the first half of the 2040's. Using the carbon budget approach would indicate a leadership position would be net-zero by 2035. An active stance on offsets would push this date out by a few years and inclusion of differentiated targets between different GHGs would relax this slightly more (but these need to be quantified).

A revised position for the ACT to be Net-Zero by 2040 would be more consistent with the concept of a 'fair share' of emissions. In this case relating the emission-reduction trajectory to the OECD average as the OECD average emission profile per capita is much more closely aligned with the ACT's GHG profile than it is for the rest of mainland Australia.

Interim targets would need to be re-assessed but that can be done if and when any change in the ACT Net Zero target date is finalised. Some indicative numbers of percent reductions against 1990 levels for a Net-Zero by 2040 target would however be:

- 47% by 2022 (achieved)
- 53% by 2025
- 70% by 2030
- 85% by 2035
- 100% by 2040

The ACT Climate Change Council understands that the establishment of policies and programs is already challenging for a Net-Zero by 2045 target and that bringing forward that date will increase this challenge. The aim of this brief review is not however, to scope out such enhancements nor to assess their costs and trade-offs but to outline a science-based revision of the goal.





## Recommendations

- To consider revising the date for the ACT to move to Net-Zero for Scope 1 and 2 GHG emissions from 2045 to 2040. Revision of interim emission-reductions would need to occur but indicative dates are enclosed.
- To consider that the ACT commits to a trajectory where Scope 3 emissions are declining over time.
- To evaluate the implications of a more active stance by the ACT on offsets and to evaluate the implications of wrapping different emission-reduction trajectories for different GHGs into the overall emission-reduction goal.
- Develop the analytical and data systems needed to underpin these revisions and to monitor progress and to assist in assessing the socio-technical pathways required.
- To build the knowledge and capacity of ACT stakeholders about the revised emission-reduction goals, the rationale behind them and how to achieve them in cost-effective and sustainable ways.