zero carbon communities

### A blueprint for clean energy transitions

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Over 70 countries have pledged a net-zero emission target by 2050 under the United Nations Climate Ambition Alliance.[1] While much attention has focused on the role of corporate and state actors toward decarbonisation, some Australian communities are leading a bottom up net-zero emissions transition to become energy self-sufficient and spearhead the fight against climate change. The challenge, now, is how to scale and build capacity for a just and in time transition.

Communities taking a stand: Hepburn Wind 'Human sign for 1.5 degrees'.
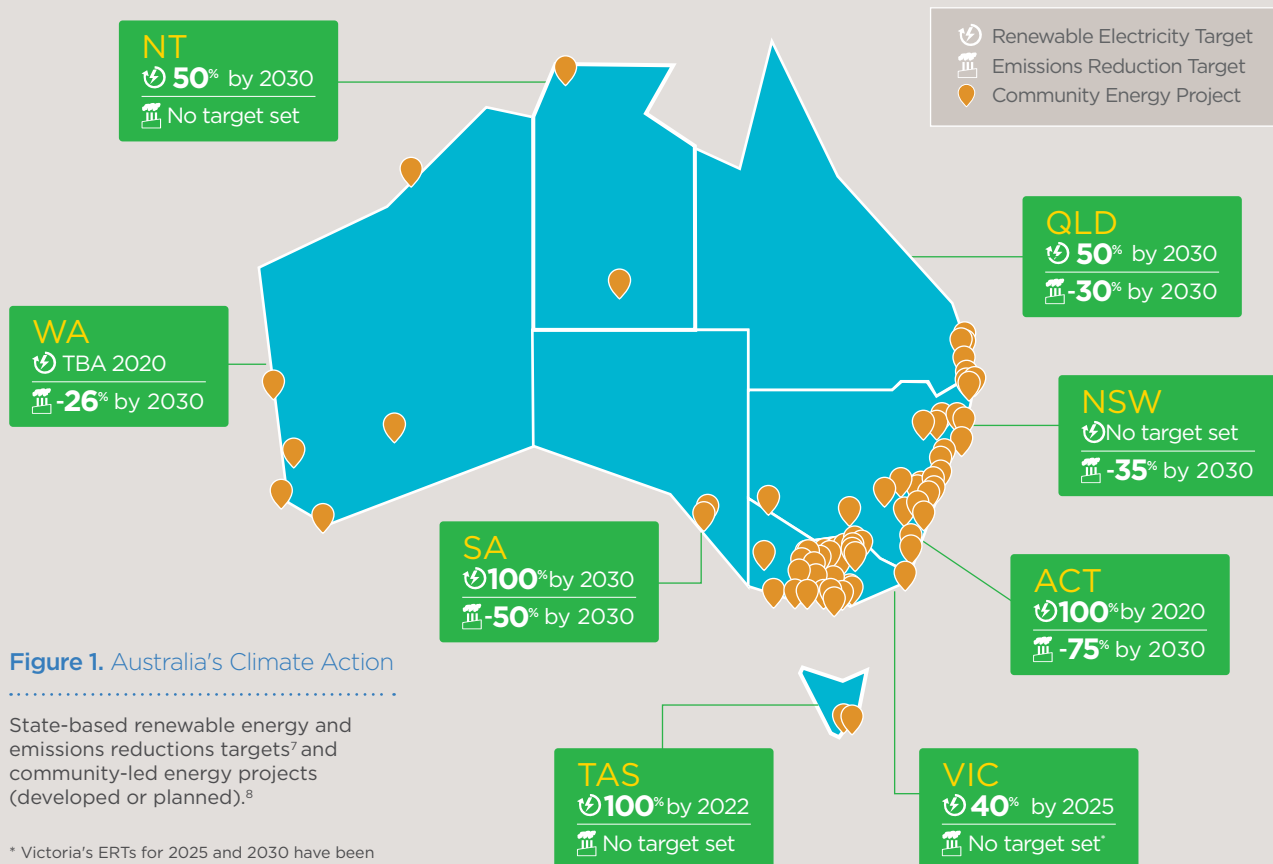
Photo by Flying Dragon 2020.
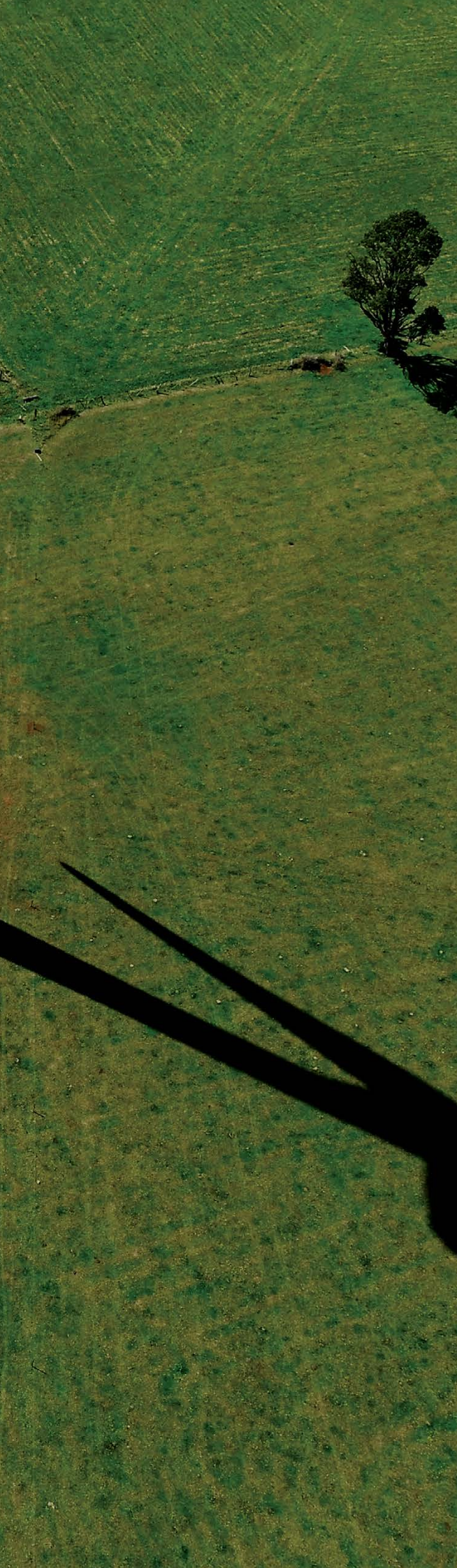
The Intergovernmental Panel on Climate Change (IPCC) warns that drastic efforts are needed to halve global emissions in the coming decade and to achieve zero net emissions by 2050, if we are to limit global warming to a 'safe' 1.5°C.[2] Even under this best case scenario, significant adaptation to the changing climate will be needed. The recent Australian ClimateWorks report, *Decarbonisation Futures*, states that a 1.5°C limit is "within reach", but only "if governments, businesses and individuals go 'all-in' by 2035."[3]

The Australian Government is a signatory of the Paris Agreement, which pledges countries to limit warming well below 2°C (ideally below 1.5°C), but has not yet committed to a target nor a plan for achieving it. In the absence of a federal policy, all state and territory governments have set targets or aspirational objectives in alignment with the 2050 target.[4] Emission Reduction Targets (ERTs) that lead to the 2050 goal—including interim targets within the next decade—are currently being developed on a state-by-state level in Australia (**Fig 1**). For instance, New South Wales has declared to reduce emissions by 35% by 2030, while Queensland has committed to reduce emissions by 30% by 2030 and achieve zero net emissions by 2050.[5] The Victorian ERTs are yet to be announced.[6]

Current strategies to achieve these ERTs rely heavily on transitioning electricity generation from fossil fuels to renewables. This year, the Australian Capital Territory reached its 100% renewable electricity target, while Tasmania aims for 100% by 2021, South Australia aims for 75% by 2025, and Victoria, Northern Territory and Queensland each aim for 50% by 2030. New South Wales and Western Australia are yet to declare renewable electricity targets (**Fig 1**). Despite progress for electricity, decarbonising the transport sector within the same timeframe remains a critical gap in existing energy transition strategies, requiring significant renewable energy infrastructure and investment.

In recent years, community-led transitions across Australia—coupled with the right policy support and stimulus measures that go beyond ad hoc funding—have emerged, demonstrating that communities can play a key role in achieving climate change ambitions.

The transition has already begun but needs to expand rapidly. The challenge, now, is to stimulate local leadership and build capacity in Australian communities to reduce emissions in a manner that is timely, socially just and results in a safer climate than the current trajectory.

Figure 1. Australia's Climate Action

State-based renewable energy and emissions reductions targets[7] and community-led energy projects (developed or planned).[8]

* Victoria's ERTs for 2025 and 2030 have been delayed due to COVID-19.

Legend:
- Renewable Electricity Target
- Emissions Reduction Target
- Community Energy Project

NT
50% by 2030
No target set

WA
TBA 2020
-26% by 2030

SA
100% by 2030
-50% by 2030

TAS
100% by 2022
No target set

QLD
50% by 2030
-30% by 2030

NSW
No target set
-35% by 2030

ACT
100% by 2020
-75% by 2030

VIC
40% by 2025
No target set*

Community energy projects are gaining momentum in Australia

Currently there are over 100 community energy groups around the country that are in various stages of developing and operating community energy projects (**Fig 1**).[9] Typically, these are household solar bulk buys, small-scale community solar farms (<100kW), or community wind farms like Hepburn Wind, and are led by social enterprises, co-operatives and not-for-profit organisations. These groups can provide a core pathway to mainstream zero-net emissions plans and actions across Australia, building on their existing work in community energy.

Responsive state government-led policies and programs, such as the Regional Community Energy Fund in New South Wales, and the Community Power Hub Pilot Program in Victoria,[10] have enabled communities to plan and develop their own energy projects through the formation of organisations and partnerships. These programs have unlocked a massive volunteer effort across the country that strengthens local economies, grows clean energy capacity and improves the social license of renewables. Many of these groups are tackling climate change beyond community energy and 100% renewable

electricity actions (electricity) and are looking at zero-net energy (transport and stationary energy) and zero-net emissions (transport, agriculture, land use, stationary energy, waste and waste water).

Local employment coupled with environmental volunteering is a core element of grassroots action on climate change and encompasses a broad range of environmental and sustainability activities. In Victoria alone, there are over 134,000 regular environmental volunteers contributing more than $50 million of time for the environment each year.[11] Further unlocking this potential is key to scaling a community-led transition, and there is a significant amount of choice and replicability already in the sector to stimulate scale up and make it mainstream.

Science-based zero-net emissions targets are being set for community programs including: Hepburn Z-NET in Victoria (2030), Zero Emissions Noosa in Queensland (2026), and Zero Emissions Byron in New South Wales (2025)—and the number of communities joining the movement is growing. What is common among these community-led transitions is the localised determination to remain within the emissions trajectory of a safe climate, notably decades earlier than the state and federal level of ambition.

Without support from all levels of government, however, it is unclear whether these ambitions can be achieved at either a local or national level. Although ad hoc grant funding schemes and support programs are being released under Sustainability Victoria, Victoria's Department of Environment, Land, Water and Planning and the NSW Office of Environment and Heritage, these programs are not significant enough to capitalise on community desire and momentum, or to be sustainable long term.

The COVID-19 crisis has demonstrated that politicians across all levels of government are able to act in a bipartisan manner to address the pandemic threat. The same concerted approach is needed to address climate change and, in fact, can provide a significant economic recovery pathway if designed and deployed appropriately.[12]

Lessons from other jurisdictions and options for treatability

Internationally and within the Australian context, there are many examples of the role of localised place-based solutions as well as broader regional approaches.

In 2017, I was awarded a Churchill Fellowship to investigate models of 100% renewable communities throughout Europe. As Manager of Hepburn Wind, my aims were to see how successful projects and programs were being deployed. I visited more than 20 villages, five cities and 70 renewable energy operating projects. Key lessons from my Churchill Fellowship travels to Austria, Denmark and Germany[13] show that clearly defined blueprints, targets, and activities are a prerequisite for success. Importantly, I found that the most impact came from individual villages, islands, cities and municipalities (equivalent to local government areas).

Whilst regional approaches were commonly deployed,[14] I learnt that they are relatively more complex to implement. This is especially relevant in terms of replicating success, as challenges can arise by bringing less engaged or less capable nearby communities 'on the journey'.

While there needs to be a degree of coordination and shared strategy across regions, it is equally important not to make the transition a top-down approach. In some examples, when what had worked in a village was attempted to be replicated more broadly, it lost community support because it wasn't coming from local people or designed for the local context. In the European Union (EU), there has been a push to prioritise so-called 'Lighthouse Communities', which are communities where there is high capacity for action and often a strong collaborative partnership with the municipality. Communities such as Samsø Island in Denmark, and Saerbeck and Wolfhagen in Germany have been treated as incubation areas for innovation and received ongoing funding in order to achieve their long term goals. And they have delivered on their ambition to become energy self-sufficient.

Community-level energy feed-in tariffs deployed across the European Union and the United Kingdom have been another critical driver for progress in localised plans at a village, municipality and island scale throughout Europe—first with energy self-sufficiency, and now with a trend towards fossil-free transport and emergent zero-net emissions strategies. Within the Australian context, there are many emergent zero-net energy and zero-net emissions models seeking to support community-wide transition such as through the Climate Emergency movement, Beyond Zero Emissions, Z-NET and Totally Renewable. Provision of community energy feed-in tariffs would greatly stimulate these community transitions.

Hepburn Wind. *Photo by Studio Aton, 2017.*

Case study: Hepburn Z-NET Community Transition Pilot (Hepburn, Victoria).

For the Hepburn Z-NET Community Transition Pilot deployed in 2018–2019, our team set out to develop a best practice approach to community-wide masterplans. The aim was to make the Hepburn Shire the first zero-net emission shire in Australia.[15] The Hepburn Pilot sought to scale up the masterplan approach first developed in Uralla, New South Wales, by expanding on their zero-net energy model for stationary heat and electricity toward reducing emissions from *all* sectors including transport, land use, agriculture and waste. A critical element was to ensure that all outputs would be open source so that other communities could follow suit.

The two core aims of the Hepburn Pilot were to:

1. Provide an expanded blueprint for rural communities to show they can satisfy all their own energy needs with renewables; and,

2. Create a masterplan, 'The Community Transition Plan', that outlines approaches for communities to reach zero-net emissions in all sectors.

Hepburn Wind 'Pioneering Communities'
Photo by Studio Aton, 2017

Co-developed with the local community and research, industry and technical stakeholders, the masterplan encompasses the full emissions spectrum and the associated opportunities of stationary energy, transportation, agriculture, waste and wastewater and land use change. It is estimated that a 35–1 leverage ($88,000 to $3.1 million) of state government funding has been achieved since the project began as it has provided the impetus, data and modelling to stimulate projects and programs in the community.

Principal options for Australian policymakers

Policy instruments to incentivise further community-led transitions are proposed as follows at the federal and/or state level of government:

1. Stimulus package for Zero Carbon Communities

Providing a stimulus package for approximately 15–20 'Zero Carbon Communities' would incentivise leading communities across Australia that are tackling climate change and/or bushfire impacted towns. These 15–20 leading communities around Australia could act as incubators of innovation to demonstrate how community-led transitions are achieved in practice, and provide guidance and encouragement for other communities to follow suit. A common thread of such an initiative would include the need to build multiple renewable energy projects within each community at different scales (e.g. household, commercial and community).

In lieu of federal government uptake, states and territories could establish their own Zero Carbon Communities program. Such a program could fund approximately five communities each year to develop masterplans, then support on the ground resourcing for implementation over three years. In addition, they could authorise a state-level mandate for local governments to work with their communities to deliver community-wide masterplans for reaching zero-net emissions and setting science based targets.

On a state-by-state basis, a Zero Carbon Communities program could support emerging communities to take a strategic approach to developing masterplans and then ensure they had funding available for coordinating the implementation. By mandating local governments to work with their communities to set targets and deliver plans, this could ensure that an over reliance on state level policies does not occur and local momentum is supported.

2. Community Energy Target with feed-in tariff

Establishing a Community Energy Target and feed-in tariff to stimulate mid-scale community energy projects is key to achieving zero carbon community ambitions. Community energy projects also act as important gatekeepers to social license for the broader renewables industry and are very well suited to mid-scale development (1–10MW). They are achievable projects for communities, both financially and from an asset management perspective, which takes time, people and capacity building. Using existing distribution networks for mid-scale community energy projects enables a more rapid transition without having to wait for new large scale transmission infrastructure to be built.

In lieu of federal government target setting, state governments can deliver this mandate. A feed-in tariff can provide long term income security to such projects and put them in the same economic position as rooftop solar.

3. Support from local governments

Although common for local governments to allocate staffing to lower the emissions for council operated infrastructure, it is less common to provide this support for community initiatives. The provision of resourcing and backbone support from local governments is vital to help deploy community programs and leverage necessary environmental volunteering efforts.

Stakeholder consultation

Stakeholder consultation occurred in 2017 in the European communities listed via my Churchill Fellowship. Preliminary consultation and literature reviews to further explore these options have included many organisations and publications. These include federal and state government departments, organisations including ClimateWorks, Friends of the Earth, Beyond Zero Emissions, and Coalition for Community Energy, communities leading zero carbon initiatives across Australia and Regional Greenhouse Alliances. It is noted this is not an exhaustive list and there are other important stakeholders that will be critical to deliberations.

Future consultation will need to occur with the relevant government agencies and associated organisations in the zero carbon movement.

Policy recommendations

Policy recommendations that could be developed to enable community-led transitions across Australia include:

Federal government

• Initiate a Zero Carbon Lighthouse Communities stimulus package from the federal government to support the 15 leading communities tackling climate change and/or bushfire impacted communities to reach zero-net emissions.

• Establish a Community Energy Target and feed-in tariff to stimulate mid-scale community energy.

State and territory governments

• Establish a Zero Carbon Communities program which would support five communities each year to develop a masterplan, and provide on-the-ground resourcing for implementation over three years (in lieu of federal government action).

• Authorise a state-level mandate for local governments to work with their communities to deliver community-wide masterplans for reaching zero-net emissions and to set science-based targets.

• Establish a Community Energy Target and feed-in tariff to stimulate mid-scale community energy (in lieu of federal government action).

Local governments

• Provide backbone support for community-wide activities on reducing emissions.

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