Carbon removals are essential to net zero

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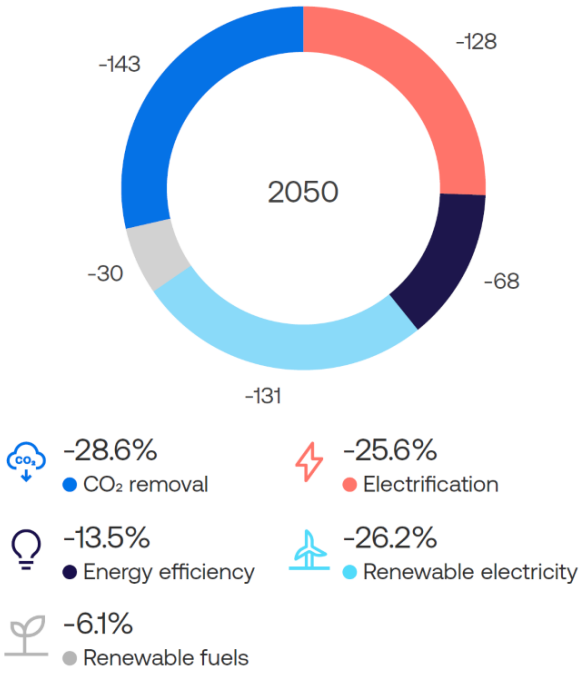
It's striking to see just how important carbon removals are to achieving net zero emissions by 2050 in Australia. For example, modelling commissioned by ANZ and the Energy Efficiency Council (EEC) in 2023[1] demonstrates that carbon removals could play an even greater role in emissions reduction than renewable electricity in a low-cost scenario.[2]

Australia's emissions reductions (Mt CO_2-e) to 2050 in a low-cost scenario



Source: Northmore Gordon 2023, Energy efficiency scenario modelling.

This modelling highlights the role of key decarbonisation technologies[3] in getting Australia to net zero by 2050, and what roles those individual technologies can play across different parts of the economy.

Carbon removals are key to decarbonising energy use in the manufacturing and transport sectors.

In fact, removals represent approximately a quarter of potential sectoral abatement for both sectors. However, they're far less important to decarbonising energy use in the built environment, where they play a negligible role. In the same low-cost

[1] The Northmore Gordon modelling was commissioned in support of ANZ and the EEC's *Forgotten Fuel series*.

[2] The low-cost scenario referred to within this article, and throughout the *Forgotten Fuel series*, is the enhanced energy efficiency scenario from the Northmore Gordon modelling; the analysis considers the enhanced energy efficiency scenario a low-cost scenario.

[3] The modelling defines the key decarbonisation technologies as **carbon removals**, **electrification**, **energy efficiency**, **renewable electricity** and **renewable fuels**.

scenario modelled by Northmore Gordon, non-energy related emissions, which currently account for approximately one quarter of Australia's emissions,[4] would be entirely mitigated by carbon removals.

Nature-based carbon removals are critical

In advance of the release of the Australian Government's sectoral decarbonisation plans, the analysis illustrates a potential pathway to achieving net zero emissions by 2050.

Importantly, the Northmore Gordon research also considers different types of carbon removals, recognising that activities are not identical with regard to cost, removal duration (or 'longevity'), scalability or technological maturity.

In the near-term, most carbon removals are likely to come from the land sector[5]

Indeed, the Intergovernmental Panel on Climate Change (IPCC) has noted that "all assessed modelled pathways that limit warming to 1.5°C or well below 2°C require land-based mitigation and land-use change".[6]

In Australia, the Climate Change Authority forecasts that just 10.5% of the carbon removals needed in 2050 is likely to come from technological or 'engineered removals', with the heavy lifting coming from the land sector.[7] It opines that "new, engineered technologies to remove carbon from the atmosphere are under development but are likely to remain expensive, energy- and water-intensive…".[8]

The benefits of nature-based carbon removals extend beyond emissions mitigation to biodiversity protection and the provision of ecosystem services, including improved water quality, and climate resilience.[9] Nature-based carbon removals can also help deliver "positive social, cultural, economic and environmental outcomes" for First Nations communities.[10]

Expect carbon removals activity to evolve

Yet the challenge of managing competing land use priorities continues to grow,[11] including as a result of increased uptake of land for the purposes of biofuel generation.[12] At the same time, research demonstrates there is "a gap between governments' expected reliance on land and the role that land can realistically play in climate mitigation."[13] This suggests that over time it may be necessary for the market to shift emphasis from nature-based sequestration towards engineered

[4] Australian Government Department of Climate Change, Energy, the Environment and Water (DCCEEW) 2025, National Greenhouse Gas Inventory Quarterly Update: December 2024, p. 10.

[5] Ganti, G et. al. 2024, 'Evaluating the near- and long-term role of carbon dioxide removal in meeting global climate objectives', *Communications Earth & Environment*, p. 1.

[6] Intergovernmental Panel on Climate Change (IPCC) 2019, 'Summary for policymakers', *Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems*, p. 24.

[7] Climate Change Authority (CCA) 2024, *Sector Pathways Review*, p. 9.

[8] Ibid.

[9] Ibid, p. 97.

[10] Ibid, p. 98.

[11] Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) 2018,'Summary for policymakers', *The assessment report on land degradation and restoration*, p. 10.

[12] IPCC 2022, 'Chapter 7', *Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, p. 818.

[13] Dooley, K et. al, 2024, 'Over-reliance on land for carbon dioxide removal in net-zero climate pledges', *Nature Communications*, p. 1.

removals as technologies mature. One such initiative is the development of the Northern Endurance Partnership (NEP) and the Net Zero Teesside Power (NZT Power) Project in the UK, which ANZ has supported.[14]

Ultimately, a balanced approach that leverages both nature-based solutions available today and emerging technological approaches – rolled out alongside other key decarbonisation technologies like renewables and a continued emphasis on energy efficiency – is key to reaching Australia's net zero goal.

ANZ at the 2025 AER Summit

Carbon removals are a fascinating and critical space for continued investment, innovation and open-minded discussion. These themes and more will be explored in detail at Carbon Market Institute's 2025 Australasian Emissions Reduction (AER) Summit later this month. ANZ is a Diamond Partner of the 2025 Australasian Emissions Reduction Summit.

[14] ANZ 2025, *ANZ supports UK transition towards a low-carbon future*.