Carbon and nature repair markets and mine rehabilitation

Rehabilitation Insights
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Background

A key objective of the work conducted by the Queensland Mine Rehabilitation Commissioner is to encourage more and better rehabilitation and to maximise the beneficial use of as much mined land as possible. Establishing viable uses for land after mining can help to facilitate the transition to future uses beyond mining. This Rehabilitation Insights document describes the opportunity for utilising mined land for projects to access carbon and nature repair markets after legal obligations to rehabilitate the land have been met.

Carbon markets provide landholders with an opportunity to contribute to carbon abatement projects while earning an additional income stream. Mining companies in Queensland have a legal obligation to rehabilitate mined land to a 'stable condition'[1], or to manage areas where a stable condition cannot be achieved until obligations under environmental approvals are met and approvals for the area are surrendered.

Where a miner's legal obligation to rehabilitate mined land has been met, there is an opportunity for these lands to access emerging carbon and nature repair markets and contribute to offsetting greenhouse gas emissions and improving nature positive outcomes. Mining companies may also have a role to support landholders in understanding the requirements to access these markets after mining.

The carbon and nature repair markets that may be accessed in Queensland include the Australian Carbon Credit Unit (ACCU) Scheme regulated under the Commonwealth Government *Carbon Credits (Carbon Farming Initiative) Act 2011* (CFI Act) and the Nature Repair Market (NRM) that funds projects to improve biodiversity under the *Nature Repair Act 2023* (NR Act). There are opportunities for proponents to 'stack' projects under both the ACCU Scheme and the NRM Scheme (Clean Energy Regulator 2025b). The Queensland Government's Land Restoration Fund (LRF) has also previously purchased ACCUs at added value placed on projects that generate environmental, socio-economic or First Nations co-benefits.

Carbon markets

ACCUs can be earned by projects that avoid or reduce the release of greenhouse gas emissions, or by removing and storing carbon from the atmosphere. Approved projects can earn an ACCU for every tonne of carbon dioxide equivalent (t CO_2-e) stored or emissions avoided. ACCUs can be sold to provide an additional income source for individuals and businesses running ACCU projects.

Based on 2024-2025 baselines and emissions data, Queensland hosts 45 mines subject to the Australian Government's Safeguard Mechanism (Clean Energy Regulator 2026). These mines are deemed to emit in excess of 100,000 tonnes of CO_2-e annually and must reduce emissions via direct reductions or acquisition and retirement of ACCUs or Safeguard Mechanism Credits. All facilities that trigger the safeguard mechanism must reduce net emissions as a stepped progression to net zero emissions in 2049-50 (Clean Energy Regulator 2024). Mines subject to the Safeguard Mechanism can potentially earn and subsequently retire ACCUs from carbon farming projects to help reduce overall emissions.

The ACCU Scheme is regulated by the Commonwealth Government under the CFI Act and is administered by the Clean Energy Regulator (CER). Projects need to be registered with the CER and meet eligibility criteria. There are different types of methods used to generate ACCUs but the most relevant to post-mining land management are likely to be 'agricultural' and 'vegetation' methods. Agricultural methods reduce farming and land emissions including through projects that recycle and reuse animal waste or store carbon in soil. Vegetation methods remove carbon dioxide from the air by protecting or re-growing forests through

[1] *stable condition* means (a) the land is safe and structurally stable; and (b) there is no environmental harm being caused by anything on or in the land; and (c) the land can sustain a PMLU (s111A EP Act).

projects that avoid re-clearing, promote reforestation, revegetation, and encouraging native regrowth or by managing safe burning practices.

Carbon projects are put in place for a set permanence period (either 25 or 100 years). This helps to ensure carbon removal and storage has a long-term impact. If a landholder nominates a 25-year permanence period, there is a 20% reduction in the number of ACCUs issued for that project in addition to the 5% risk of reversal buffer that applies to all projects.

There are many successful projects that generate ACCUs across Australia, with over 600 registered ACCU projects across Queensland (Clean Energy Regulator 2025a).

Land Restoration Fund

The LRF has purchased ACCUs for carbon farming projects with added value placed on environmental and social 'co-benefits' (Queensland Government 2021). Under the LRF, the ACCU price includes both the ACCU (i.e. the carbon abatement outcome) plus the benefits to the state that the project will deliver through co-benefits. Co-benefits can be achieved in several ways including from:

- environmental benefits such as improved biodiversity and habitat for threatened species, as well as from healthier soils
- socio-economic benefits such as improved resilience and strength of regional communities by supporting direct and indirect employment and skills and increasing economic opportunities
- benefits to First Nations people that provide on-country business opportunities and new service delivery businesses for First Nations people, as well as supporting cultural and customary connections.

Nature Repair Market

The CER is also responsible for managing the Nature Repair Market (NRM), established under the *Nature Repair Act 2023* (Cth). The NRM encourages land management practices that improve biodiversity. The initial method is 'replanting native forest and woodland ecosystem'. Future methods may include re-establishing vegetation along waterways or protecting and managing existing habitat or native vegetation. Like carbon markets, the permanence period can be nominated at 25 or 100 years, or other period as agreed. Targeting a particular ecosystem or species, these market instruments allow for opportunities to 'stack' biodiversity certificates and ACCUs.

Are the benefits of carbon and environmental markets material for mined lands?

While carbon farming is not new, no known vegetation or agriculture projects have been undertaken on retired mined land to date. In Queensland, mine rehabilitation requirements are set out in Progressive Rehabilitation and Closure plans (PRC plans) and corresponding schedules under the *Environmental Protection Act 1994* (Qld) (EP Act). To be eligible, carbon farming activities must be additional to legal requirements to rehabilitate land disturbed by mining in accordance with commitments made in PRC plans, conditions of environmental authorities or under the General Environmental Duty. Although carbon farming may not earn ACCUs where rehabilitation is already required, there is scope for carbon farming projects to be proposed once legal requirements for rehabilitation have been met. This proposition is yet to be tested with the CER.

To gain an initial insight into the potential scale of benefits linked to carbon market projects on rehabilitated mined land, a preliminary assessment was conducted across four mines in the Bowen and Surat Basins in Queensland. For each location, the Full Carbon Accounting Model (FullCAM) was applied using the methodology 'reforestation by environmental or mallee plantings'. While there is variation in the potential for rehabilitated land to sequester carbon, preliminary assessments indicate emission reductions (as CO_2-e sequestered) in the range of 25 – 96 t/ha across a 25-year period. The potential variation in spot and long-term market prices makes it difficult to reliably estimate future income. These locations were also considered to have potential co-benefits under the LRF.

Research into carbon storage on mine sites

The resources industry is investigating new approaches to capture carbon on mine sites that are not incorporated in existing market mechanisms. Examples include sequestration of carbon in tailings (mineral carbonation) and the biological sequestration of carbon in algae (which is contained in waterbodies or

products made from algae) (Wilson et al. 2014; BHP 2024; Mervine et al. 2018; Anglo American 2017; Li and Yao 2024; Dawkins 2025; CRC Time 2025). The suitability of these methods is highly dependent on the conditions at a given mine site (e.g. mineralogy for mineral carbonation and water quality for algae). Based on the hierarchy of greenhouse gas emission abatement strategies presented in DESI (2024), these emerging technologies may be used to meet carbon 'offset' obligations under the Safeguard Mechanism and could potentially be considered for ACCUs (if deemed eligible under an approved ACCU Scheme method), however, further research is needed to assess their viability and eligibility for such schemes.

Discussion

A core principle of carbon and nature repair markets is that actions required by law are ineligible. In this regard, obligations to rehabilitate mined land must first be fulfilled. The opportunity to earn ACCUs on land after mining and surrender processes can help encourage the transition of land from active mining to a productive and sustainable use into the long term, while providing an additional income stream for landholders. It is more likely that landholders, rather than mine operators, may be better suited to access these markets after environmental approvals for mining have been surrendered. There are a broad range of projects that could potentially be considered by landholders including reforestation or revegetation, soil carbon improvement and fire management.

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