Phantom Forests and the Safeguard Mechanism: How Low-integrity Offsets are Obstructing Climate Action

Andrew Macintosh,[1] Don Butler,[1] Pablo Larraondo,[2] Debra Wilkinson,[3] Megan C. Evans,[4] Piero Morseletto,[5] Sophus O.S.E. zu Ermgassen[6] and David J. Eldridge[7]

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Affiliations: [1] The Australian National University, Centre for Environmental Markets; [2] Haizea Analytics Pty Ltd; [3] Centre for Environment & Integrity Pty Ltd; [4] University of New South Wales, Canberra; [5] Erasmus University, Rotterdam School of Management; [6] University of Oxford, Nature-positive Hub, Department of Biology; [7] University of New South Wales, Sydney.

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Corresponding authors:

Professor Andrew Macintosh
Co-director
ANU Centre for Environmental Markets
ANU College of Law, Governance and Policy
The Australian National University
Email: andrew.macintosh@anu.edu.au

Professor Don Butler
Co-director
ANU Centre for Environmental Markets
ANU College of Law, Governance and Policy
The Australian National University
Email: donald.butler@anu.edu.au

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The very high-resolution satellite imagery used to analyse HIR projects can be viewed at: https://carbonimagery.au/.

The VMAP Forest Extent and Woody Cover datasets are available via: https://vmap.au/.

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Executive summary

The Safeguard Mechanism (SGM) is a centrepiece of the Australian Government's climate policy. It is an intensity-based emissions trading scheme that applies to large industrial and mining facilities emitting over 100,000 tCO_2-e annually (collectively ~29% of national emissions). The SGM is currently failing to reduce emissions and drive decarbonisation in the industrial and mining sectors because of an overreliance on cheap, low integrity offsets, which do not represent real, additional and/or permanent emission reductions.

Under the SGM, covered facilities have carbon emission caps (called baselines) that decline through time. Facilities whose gross emissions are above their caps must surrender prescribed credits to cover the exceedances, reducing their *net* emissions to the baseline. Two types of credits can be used for these purposes: offset credits issued under the Australian Carbon Credit Unit (ACCU) scheme; and allowances, known as 'Safeguard Mechanism Credits' (SMCs), issued to covered SGM facilities whose net emissions are below their caps.

The ACCU scheme is an offset scheme, which provides for the registration of projects that avoid emissions that would otherwise occur and/or promote additional sequestration in natural carbon sinks like forests and soil. Registered projects that meet prescribed requirements are issued ACCUs, with each ACCU supposedly representing 1 tCO_2-e of additional emissions avoided or removed. Once issued, ACCUs can be sold to offset a liability to abate emissions under the SGM (or another policy mechanism) or to support a voluntary claim. Unlike most other carbon pricing schemes around the world, the SGM contains no restrictions on the number or type of ACCUs that can be used for compliance.

This report evaluates the extent to which low-integrity ACCUs pose a risk to the effectiveness of the SGM. It focuses on two issues:

(a) the extent of reliance on ACCUs in the SGM and the resulting impact on the SGM's efficacy in incentivising decarbonisation; and

(b) the depth of integrity problems in the ACCU scheme, which is explored through an evaluation of 50 Human-Induced Regeneration of Even-aged Native Forest (HIR) projects (the dominant project type in the ACCU market).

The results show that the effectiveness of the SGM in reducing emissions and driving decarbonisation is being materially undermined by low-integrity ACCUs. The Australian Government is administering the ACCU scheme in a way that results in a large supply of cheap, low integrity credits. This is artificially suppressing the carbon price faced by SGM facilities, including large gas and coal entities, which account for 55% of emissions covered by scheme.

The suppressed carbon price is stifling decarbonisation by prompting heavy reliance on low-integrity ACCUs. Because the majority of the ACCUs lack integrity, their use by SGM facilities is not driving emission reductions elsewhere in the economy. The result is higher emissions and negligible transformation in the industrial and mining sectors.

This pattern is clear from the data. Over the past decade, ACCU issuances have increased by 75%, rising from 13.2 million in 2016-17 to 23.1 million in 2025-26. Over the coming years, ACCU issuances are likely to exceed 25 million. Three quarters of the issued ACCUs have come from three project types: HIR (32%), landfill gas (LFG) (27%) and avoided deforestation (AD)

(17%). All three project types suffer acute integrity problems documented in the research literature.

The surge in ACCU issuances from low integrity projects has led to a build-up of 61 million ACCUs and 11 million SMCs in holding accounts, the overwhelming majority of which are held by businesses with facilities covered by the SGM. The flood of cheap, low integrity ACCUs has kept the ACCU price below AU$40 for most of the past eight years. At the time of writing, it was fluctuating around AU$38, approximately 40% of the minimum carbon price the World Bank High-Level Commission on Carbon Prices found was required to keeping global warming to 2°C above pre-industrial levels.

The artificially lowered ACCU price has stripped the SGM of its capacity to incentivise onsite abatement at covered facilities. Instead, the large-emitting facilities covered by the SGM are acting rationally and meeting scheme liabilities by surrendering cheap ACCUs and, to a lesser extent, SMCs. This is delaying the deployment of low-emissions technologies and enabling the development and expansion of coal and gas projects like the North West Shelf, Browse and Beetaloo gas developments and the Hunter Valley Operations (HVO), Narrabri, Boggabri and Ensham coal mine extension projects.

To illustrate the practical effects of the artificially suppressed carbon price, the report interrogates the drivers of the 2.9 $MtCO_2$-e decrease in covered emissions between 2023-24 and 2024-25. The data show that amongst facilities with continuity of coverage over this period, there were 104 facilities whose gross emissions dropped and 109 whose emissions increased. The cumulative reduction in emissions across the 104 facilities whose emissions fell amounted to -9.56 $MtCO_2$-e. Most (63%, 6 $MtCO_2$-e) of this decrease in emissions came from 13 facilities. Of these 13 facilities, there were only two at which the reduction in emissions could be traced to deliberate efforts to decarbonise through the deployment of low-emissions technologies. In the other 11 facilities, the emission reductions were primarily due to reductions in production stemming from site-specific issues, not deliberate decarbonisation efforts.

The extent of the integrity issues with the ACCU scheme is evident from the results of the analysis of HIR projects. These projects are supposed to be reforesting areas of land through the promotion of even-aged native forest regeneration. For land to be included in the credited areas of HIR projects, by law, it must be devoid of mature trees and shrubs at project commencement and have the capacity to regenerate and achieve forest cover. In all but the rarest of cases, land meeting these requirements will need to have previously contained a native forest that was comprehensively cleared.

As of 30 June 2026, there were 431 registered HIR projects covering an area of 38 million hectares (an area larger than Japan), 303 of which had reported and received ACCUs. The reported projects are claiming to regenerate native forests across approximately 7.4 million hectares (an area larger than the whole of Tasmania).

Most HIR projects are registered on land that does not meet the legal eligibility requirements. They are claiming to regenerate native forests on uncleared lands in Australia's outback; what are technically referred to as 'rangelands'. Almost all of these projects are claiming to regenerate these forests by reducing grazing pressure from livestock and feral animals. Decades of research on grazing impacts in rangeland ecosystems shows grazing generally does not

materially reduce tree and shrub cover in uncleared areas. Consequently, reducing grazing pressure will generally not lead to material increases in tree and shrub cover in these areas because the land will typically be at or near its maximum biomass potential.

To date, four peer-reviewed studies have been published on HIR projects, all of which have similar findings that align with the science on grazing impacts in rangelands: (i) there have been only small increases in woody cover in the credited areas of HIR projects since they were registered or claim to have commenced; (ii) the projects have had only a small (but statistically significant) additional positive effect on woody cover relative to trends on adjoining lands (both inside and outside the project boundaries); and (iii) most of the observed changes in woody cover are attributable to seasonal variability in rainfall. The research also shows the observed increases in woody cover are substantially below the expected levels based on ACCU issuances.

The Australian Government, including the Regulator and Department, and key players in the carbon industry, have tried to defend the legality and performance of HIR projects using a series of arguments that have subsequently been disproven by independent researchers. Their latest defence rests on claims that the Landsat-based datasets relied on in the existing peer-reviewed studies are not sufficiently accurate to assess regeneration, and that higher resolution imagery and data derived from field measurements shows HIR projects are regenerating forests in line with expectations.

To test the claims higher resolution imagery shows the projects are regenerating in line with expectations, we undertook an analysis of regeneration in 50 HIR projects using timeseries datasets for woody cover and forest extent derived from medium-resolution Sentinel-2 imagery (10m) and very high-resolution imagery (30-80cm). The findings are consistent with those from the previous peer-reviewed studies. Despite the wet conditions experienced over 2020-2025, there was only a small increase in forest cover and crown cover, with the overwhelming majority of the positive change occurring in projects whose credited areas contained a material amount of comprehensively cleared land.

Contrary to the Government's claims, Sentinel-2 and very high-resolution imagery do not show that HIR projects are regenerating in line with expectations. The Sentinel-2 derived datasets and very high-resolution imagery show most HIR projects are failing to regenerate native forests. Even in projects where regeneration is occurring, there is generally a large disparity between observed and expected regeneration, and a material proportion of the observed regeneration is attributable to non-project factors (i.e. rainfall).

To 30 June 2026, HIR projects had received almost 61 million ACCUs. In 2025-26, they received 9.3 million ACCUs, 40% of issuances in the financial year. If current policy continues, by 2030 they are likely to be responsible for around half of annual ACCU issuances. The total value of the ACCUs issued to HIR projects, accounting for credits still held in holding accounts, is likely to be in the order of AU$1.5-AU$2 billion. To date, the Commonwealth alone has spent ~AU$300 million on purchasing HIR ACCUs.

While the HIR method sunset in September 2023, HIR projects are set to continue to receive ACCUs until September 2048. Over the coming decades, several hundred million more ACCUs could be issued to these projects, unless steps are taken to terminate them.

Substantial reform of the SGM and the governance of the ACCU scheme are needed to ensure they perform their intended policy purposes. The SGM is supposed to drive decarbonisation of the industrial and mining sectors but is failing because of deficiencies in the administration of the ACCU scheme. The integrity issues in the ACCU scheme are extensive and difficult to explain without reference to serious maladministration. This poses a challenge for policy reform. Consideration may need to be given to excluding ACCUs from the SGM, at least as an interim measure. This could be done by instituting a standard cap price under the SGM, which would allow covered facilities to pay a set, transparent amount per tonne of emissions that exceed the facilities' baselines into a decarbonisation fund. The decarbonisation fund could then be used to finance emission reductions in hard-to-abate facilities and in the land, waste and agricultural sectors. This would provide SGM facilities with greater certainty about future carbon prices, thereby helping forward business planning and enabling a more orderly transition to a low-carbon economy.

1. Introduction

Climate change poses a profound threat to human wellbeing and the environment. The international community's response, reflected in the Paris Agreement, has been to commit to holding the increase in the global average surface temperatures to "well below 2°C above pre-industrial levels" and to pursue "efforts to limit the temperature increase to 1.5°C".[1] To contribute to these objectives, the Australian Government has committed to reducing Australia's net emissions by 43% relative to 2005 levels by 2030, by between 62% and 70% below 2005 by 2035, and to reach net zero by 2050.[2]

Achieving these emission reductions will require substantial structural and technological change. Traditionally, the Australian economy has been amongst the most emissions-intensive in the world, as measured in greenhouse gas emissions per capita (tonnes of carbon dioxide equivalent (tCO_2-e) per person).[3] This intensity is a product of several factors, including: the historical dominance of coal and natural gas in the country's electricity sector; Australia's large, export-oriented coal and gas industries; a high reliance on trucks to transport freight and on petrol and diesel vehicles in the road transport sector; and the fact Australia is a major red meat producer. Achieving Australia's mitigation targets requires the transformation of these industries, particularly those reliant on fossil fuels, through the rapid deployment of low and zero-emission technologies.

To decarbonise large industrial and mining facilities, the Australian Government is relying primarily on the Safeguard Mechanism (SGM). The SGM is an intensity-based emissions trading scheme that applies to large industrial and mining facilities emitting over 100,000 tCO_2-e annually (collectively ~29% of national emissions).[4] Under the SGM, covered facilities have emission caps (called baselines) that decline through time. Facilities whose gross emissions are above their caps must surrender emission reduction credits to cover the exceedances, reducing their *net* emissions to the baseline. Two types of credits can be used for these purposes: offset credits issued under the Australian carbon credit units (ACCU) scheme; and allowances, known as 'Safeguard Mechanism Credits' (SMCs), issued to covered SGM facilities whose net emissions are below their caps.

The ACCU scheme is an offset scheme, which provides for the registration of projects that avoid emissions that would otherwise occur and/or promote additional sequestration in carbon sinks like forests and soil.[5] Registered projects that meet prescribed requirements are issued ACCUs,

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[1] Paris Agreement [2016] ATS 24 (entered into force for Australia 10 December 2016), Article 2. Available at: https://www.austlii.edu.au/au/other/dfat/treaties/ATS/2016/24.pdf (12 August 2026).
[2] Department of Climate Change, Energy, the Environment and Water (DCCEEW) (2025) Australia's 2035 Nationally Determined Contribution. Commonwealth of Australia, Canberra. Available at: https://unfccc.int/sites/default/files/2025-09/Australias%20Second%20NDC.pdf (12 August 2026).
[3] Crippa, M. et al. (2025) GHG emissions of all world countries - 2025 Report. Office of the European Union, Luxembourg. Available at: https://edgar.jrc.ec.europa.eu/report_2025 (12 August 2026).
[4] *National Greenhouse and Energy Reporting Act 2007* (Cth); *National Greenhouse and Energy Reporting (Safeguard Mechanism) Rule 2015* (Cth); DCCEEW (2026) Safeguard Mechanism. Commonwealth of Australia, Canberra. Available at: https://www.dcceew.gov.au/climate-change/emissions-reporting/national-greenhouse-energy-reporting-scheme/safeguard-mechanism (12 August 2026); Department of Climate Change, Energy, the Environment and Water (DCCEEW) (2026) Australia's National Greenhouse Accounts: UNFCCC/Paris Agreement inventory. Commonwealth of Australia, Canberra. Available at: https://www.greenhouseaccounts.climatechange.gov.au/ (26 October 2026).
[5] *Carbon Credits (Carbon Farming Initiative) Act 2011* (Cth) (CFI Act); *Carbon Credits (Carbon Farming Initiative) Rule 2015* (CFI Rule).

with each ACCU supposedly representing 1 tCO_2-e of additional emissions avoided or removed. The financial incentive provided by the ability to earn and sell ACCUs is intended to prompt businesses in the agriculture, land and waste sectors to pursue relevant emission reduction and sequestration opportunities. ACCUs generated by these offset projects can then be sold to SGM facilities for use to meet their emission reduction obligations or on the voluntary market, where they are used to support voluntary abatement claims.

The Australian Government claims the SGM and other sectoral policies (such as the Renewable Energy Target (RET) scheme) has put Australia on track to meet its 2030 emission reduction target.[6] However, evidence suggests there is significant and increasing gap between ambition and reality, with the prospect that Australia could fall short of its 2030, 2035 and 2050 mitigation targets. While there are multiple causes of the shortfall, amongst the most significant is the ineffectiveness of the SGM in driving decarbonisation of the industrial and mining sectors and an integrity deficit in the ACCU scheme. These two issues are interrelated, with the integrity issues in the ACCU scheme undermining the effectiveness of the SGM.

The effectiveness of the SGM in driving decarbonisation is a function of three main factors:

- the stringency of the caps on emissions from covered facilities;
- the cost of cutting onsite emissions at these facilities; and
- the price of ACCUs and SMCs (i.e. the carbon price).

The caps determine facilities' exposure to the carbon price. The more stringent the caps, the greater the proportion of emissions from covered facilities that are exposed to the scheme's carbon price, meaning there is a greater incentive to decarbonise. Whether facilities reduce their own emissions or opt to rely on ACCUs or SMCs instead depends on the relative cost of cutting onsite emissions compared to the carbon price. When the carbon price remains below the marginal cost of cutting onsite emissions, businesses will logically choose to rely on ACCUs or SMCs.

Integrity issues in the ACCU scheme directly undermine the effectiveness of the SGM in reducing emissions and incentivising decarbonisation. Low integrity credits, where the credits do not represent genuine emission reductions, artificially lower the carbon price. This reduces the incentive for covered facilities to reduce their own emissions and prompts higher reliance on ACCUs and SMCs. Where the ACCUs that are used for these purposes lack integrity, it leads to higher emissions – the atmosphere receives the tonne of emissions from the SGM that was supposedly offset without equivalent corresponding emission reductions elsewhere. The other perverse impact of low integrity ACCU projects is that, by artificially lowering the carbon price, they make high integrity offset projects unviable. This creates a cycle whereby the ACCU market is at risk of being dominated by low integrity projects (a classic "market for lemons").[7]

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[6] DCCEEW (2025) Australia's emissions projections 2025. Commonwealth of Australia, Canberra. Available at: https://www.dcceew.gov.au/climate-change/publications/australias-emissions-projections-2025 (12 August 2026); DCCEEW, note 2, p 9.

[7] Akerlof, G. (1970) The Market for "Lemons": Quality Uncertainty and the Market Mechanism. Quarterly Journal of Economics 84(3), 488-500; Macintosh, A. et al. (2025) Carbon credits are failing to help with climate change — here's why. Nature 646, 543-546.

The ineffectiveness of the SGM in driving onsite emission reductions at industrial and mining facilities has been noted in the literature and public commentary, as have the integrity issues in the ACCU scheme.[8] Relatively limited attention has been paid to the linkages between the SGM and the ACCU scheme and how the integrity deficit in the ACCU scheme is undermining the effectiveness of the SGM.[9] The object of this report is to address this issue by evaluating the extent to which low integrity ACCUs pose a risk to the effective operation of the SGM. The report focuses on two issues:

(a) the extent of reliance on ACCUs in the SGM, which impacts the SGM's efficacy in incentivising decarbonisation of the industrial and mining sectors; and

(b) the depth of integrity problems in the ACCU scheme, which is explored through an analysis of the integrity of the ACCU schemes' largest project type, Human-induced Regeneration of Even-aged Native Forests (HIR projects).

The remainder of the report is set out as follows.

- Part 2 describes the ACCU scheme and its linkages to the SGM.
- Part 3 provides analysis of the effectiveness of the SGM in reducing emissions at covered facilities and on the extent of reliance on ACCUs to meet SGM obligations.
- Part 4 provides background on HIR projects, including how HIR projects came to be registered across outback areas despite inconsistencies with the method's eligibility requirements.
- Part 5 presents the analysis on the effectiveness of a sample of 50 projects in regenerating native forests using Sentinel-2 derived datasets and very high-resolution (30-80cm) imagery.
- Part 6 provides conclusions.
- Appendix A provides a history of the administration of the HIR method, Appendix B details the evolving defences used by the Government and carbon industry to defend HIR projects and Appendix C describes the method used to analyse forest regeneration in HIR projects.

[8] Schulz, V. et al. (2026) A review of Australia's Safeguard Mechanism: Lessons from the EU ETS and pathways for reform. Energy Policy 212, 115190; Brain, T., Harris, S., Kelly, B. (2026). Cap-and-trade frameworks for reducing fossil fuel emissions: insight from Australia's safeguard mechanism and its impact on the coal sector. Climate Policy, 1–12 (doi.org/10.1080/14693062.2026.2683087); Climate Council (2026) Safeguard Mechanism: Why is our industrial pollution law letting big polluters off the hook? Available at: https://www.climatecouncil.org.au/resources/safeguard-mechanism/ (12 August 2026); Grigg, A. et al. (2026) BHP has pledged to hit net zero emissions by 2050. Inside the mining giant there are doubts. ABC 4Corners, 26 May. Available at: https://www.abc.net.au/news/2026-05-26/bhp-net-zero-emissions-pledge-four-corners-leaked-documents/106720042 (12 August 2026); Tully, G. (2026) Safeguard Mechanism FY25: What the Data Reveals. Anthesis. Available at: https://www.anthesisgroup.com/au/insights/safeguard-mechanism-fy25-data-analysis/ (12 August 2026).

[9] For an exception, see: Green, F., Medlock, F. (2026) Safeguarding the Fossil Fuel Industry? How Carbon Offsetting Undermines the Safeguard Mechanism. The Australia Institute, Canberra. Available at: https://australiainstitute.org.au/wp-content/uploads/2026/06/P2030-Safeguarding-the-Fossil-Fuel-Industry.pdf (12 August 2026).

2. The ACCU scheme and its linkages to the SGM

The ACCU scheme was first created by the Gillard Labor Government in 2011.[10] The intent of the scheme was to supply offset credits to large-emitting facilities covered by its carbon pricing scheme, which commenced in July 2012. The offset credits in the scheme were derived from the agriculture, land and waste sectors.

When the Abbott Coalition Government subsequently abolished the carbon pricing scheme in July 2014, it retained the ACCU scheme under the name the "Emissions Reduction Fund". As part of these changes, the scope of the ACCU scheme was broadened: where it initially covered only the agriculture, waste and land sectors, the Coalition expanded its scope to all sectors in the economy (at least on paper).[11] However, the main difference with the Emissions Reduction Fund was that the Australian Government, rather than industry, provided the primary source of demand for ACCUs through twice-yearly reverse auctions.[12]

The reforms legislated in 2014 included establishment of the SGM, which formally commenced in July 2016.[13] In its first phase, the SGM included caps on the emissions of covered facilities but no SMCs. In their place, covered facilities could undertake ACCU projects and sell the ACCUs to the Australian Government, a process that equates to the government paying the facilities to reduce their emissions. The defining feature of the SGM's first phase was that the caps on net emissions from covered facilities were deliberately set so they would rarely bind and did not decline through time. The Government's intent was that the caps would limit increases but not drive decarbonisation.[14] The consequence was that SGM facilities had little need to purchase offsets. Consistent with this, over the calendar years 2018-2023, only 1.3 million ACCUs were surrendered under the SGM.[15] In comparison, 54.1 million ACCUs were delivered under Emissions Reduction Fund contracts and 6 million ACCUs were surrendered by parties outside of the SGM for voluntary and other purposes.[16]

In mid-2023, the Albanese Government overhauled the SGM, resetting the caps to levels based on historical average emission intensities at each covered site and then adjusting them downwards over time.[17] The declining caps are intended to drive decarbonisation in high-emitting facilities by gradually increasing their exposure to the carbon price. As the caps fall, a greater proportion of each facility's onsite emissions will sit above the cap, unless the facilities take steps to decarbonise. For each tonne of emissions above the cap, the facility must buy and

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[10] *Carbon Credits (Carbon Farming Initiative) Act 2011* (Cth) (CFI Act).
[11] This change had limited practical effect. The ACCU scheme was and remained dominated by the agriculture, waste and land sectors.
[12] A reverse auction describes an auction where there is one buyer and several sellers.
[13] *Carbon Farming Initiative Amendment Act 2014* (Cth); *National Greenhouse and Energy Reporting (Safeguard Mechanism) Rule 2015* (F2015L01637), s 2.
[14] Australian Government (2014) Emissions Reduction Fund White Paper. Commonwealth of Australia, Canberra. Available at: https://www.dcceew.gov.au/sites/default/files/documents/erf-white-paper.pdf (12 August 2026).
[15] Clean Energy Regulator (2026) Safeguard data. Commonwealth of Australia, Canberra. Available at: https://cer.gov.au/markets/reports-and-data/safeguard-data (5 August 2026).
[16] Clean Energy Regulator (2026) Voluntary cancellations register. Commonwealth of Australia, Canberra. Available at: https://cer.gov.au/markets/reports-and-data/voluntary-cancellations-register (12 August 2026); Clean Energy Regulator (2026) Carbon abatement contract register. Commonwealth of Australia, Canberra. Available at: https://cer.gov.au/markets/reports-and-data/accu-project-and-contract-register (12 August 2026).
[17] The SGM baseline transitions occur on two fronts. Facilities are transitioned from site-specific baselines to industry averages over the 7-year period to 2029-30. Over the same period, the baselines are reduced by between 1% and 4.9% per year.

surrender an ACCU or SMC. Provided the price of these credits is sufficiently high, the policy should prompt the facilities to decarbonise and thereby help Australia meet its international emission reduction commitments.

A notable aspect of the SGM is that, unlike most other carbon pricing schemes around the world, it contains no restrictions on the number or type of ACCUs used for compliance.[18] This policy can be justified in theory, based on the premise that allowing unlimited offsets reduces mitigation costs, both for the facilities and society at large. However, the theory is flawed. A large and growing body of research shows that most carbon offsets lack integrity,[19] meaning they do not reflect real, additional and/or permanent abatement.[20] The failings are not confined to any particular project type, scheme or country. The literature suggests low integrity is a common feature of all carbon offset schemes and seemingly arises from the governance dynamics that develop in and around them.[21]

The ACCU scheme is no different, with evidence arising of material integrity issues since the mid-2010s.[22] Scrutiny of the scheme intensified in 2021 and 2022 after concerns about the governance and integrity of the scheme were raised by the Australian Conservation Foundation (ACF) and others, including several of the authors of this report.[23] Since then, additional research has revealed further integrity issues with the ACCU scheme.[24]

The Australian Government and relevant government agencies have disputed the criticisms of the ACCU scheme. The main actors are the Clean Energy Regulator (Regulator), which is

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[18] World Bank (2026) Carbon Pricing Dashboard – Compliance Carbon Pricing Instruments Around the World, 2026. World Bank, Washington DC. Available at: https://carbonpricingdashboard.worldbank.org/dashboard (14 August 2026).

[19] Probst, B. et al. (2024) Systematic assessment of the achieved emission reductions of carbon crediting projects. Nature Communications 15, 9562; Anderegg, W. et al. (2025) Towards more effective nature-based climate solutions in global forests. Nature 643, 1214-1222; Macintosh, A. et al. (2025) Carbon credits are failing to help with climate change — here's why. Nature 646, 543-546; Swinfield, T. et al. (2026) Learning lessons from over-crediting to ensure additionality in forest carbon credits. Nature Communications 17, 3944; West, T. et al. (2023) Action needed to make carbon offsets from forest conservation work for climate change mitigation. Science 381, 873–877; Tang, Y. et al. (2025) Tropical forest carbon offsets deliver partial gains amid persistent over-crediting. Science 390, 182-187; Calel, R. et al. (2025) Do Carbon Offsets Offset Carbon? American Economic Journal: Applied Economics 17(1), 1–40.

[20] Credited abatement is "real" when it reflects actual reductions in emissions or increases in sequestration. Credited abatement is "additional" when it would not occur without the incentive provided by the scheme. Where projects involve carbon sequestration in natural sinks, the credited sequestration must be "permanent" – it must not be subsequently released back into the atmosphere. Macintosh, A., Butler, D. et al. (2024) Australian human-induced native forest regeneration carbon offset projects have limited impact on changes in woody vegetation cover and carbon removals. Communications Earth & Environment 5, 149.

[21] Probst, B. et al. (2024) Systematic assessment of the achieved emission reductions of carbon crediting projects. Nature Communications 15, 9562.

[22] Burke, P.J. (2016) Undermined by Adverse Selection: Australia's Direct Action Abatement Subsidies. Economic Papers 35(3), 216–229; Baxter, T., Gilligan, G. (2017) Verification and Australia's emissions reduction fund: integrity undermined through the landfill gas method? Australian Journal of Environmental Law 4, 1–29.

[23] Merzian, R., Hemming, P., Schoo, A. (2021) Questionable integrity: Non-additionality in the Emissions Reduction Fund's Avoided Deforestation Method. Australian Conservation Foundation & The Australia Institute, Melbourne and Canberra. Available at: https://australiainstitute.org.au/report/questionable-integrity-non-additionality-in-the-emissions-reduction-funds-avoided-deforestation-method/ (12 August 2026).

[24] Macintosh, A., Butler, D. et al. (2024) Australian human-induced native forest regeneration carbon offset projects have limited impact on changes in woody vegetation cover and carbon removals. Communications Earth & Environment 5, 149; Macintosh, A., Evans, M.C. et al. (2024) Non-compliance and under-performance in Australian human-induced regeneration projects. The Rangeland Journal 46, RJ24024; Pannell, D. (2025) Soil Carbon Sequestration Policy in Australia: The Additionality Dilemma. Australian Journal of Agricultural & Resource Economics 70(3), 597-609; Mitchell, E. et al. (2024) Making soil carbon credits work for climate change mitigation. Carbon Management 15(1), 2430780.

responsible for the administration of the ACCU scheme, and the federal Department of Climate Change, Energy, the Environment and Water (Department). They maintain the scheme is world leading and well-governed. To support their position, they have released several commissioned reports that claim the scheme is operating as intended, that the offset projects are generating real and additional abatement, and that the Regulator's processes are robust.

The carbon offset industry's responses have been more mixed. When concerns were raised in 2021-2022, several of the carbon industry's biggest players publicly acknowledged there were legitimate integrity issues and a need for reform.[25] This more measured approach dissipated when it became clear the Government did not intend to concede there were problems that needed fixing. Since then, most of the industry has emphatically denied there are any substantive integrity issues with the ACCU scheme.

The response by the Government and industry has done little to allay concerns about the integrity issues in the ACCU scheme and offsets more generally. Researchers, businesses, environmental professionals and environment groups have continued to raise integrity issues with offsets and their impacts on decarbonisation.

Partially in recognition of the concerns, in July 2026, the Australian Government announced it was closing its Climate Active program. Since 2010, Climate Active has provided government certification for businesses wanting to make 'carbon neutral' claims based on offsets.[26] The decision was motivated, at least in part, by growing unease about the Government's involvement in certifying the veracity of offset-based climate claims. The Government's role in Climate Active could potentially expose it to civil action for making false and misleading statements in trade or commerce under Australian consumer law. This risk is acknowledged in the Government's consultation paper concerning the closure of the program, where it states:

> … there has been a rise in unclear and potentially misleading environmental marketing claims that has led the Australian Competition and Consumer Commission (ACCC) and the Australian Securities and Investments Commission (ASIC) to investigate sustainability claims as a compliance priority. … There is an increasing number of climate change litigation cases, both in Australia and internationally, including legal challenges against the marketing of 'carbon neutral' products. Public support for the term 'carbon neutral' has declined, especially where entities mainly rely on carbon

[25] GreenCollar (2022) Submission to the Independent Review of Australian Carbon Credit Units. Available at: https://consult.dcceew.gov.au/independent-review-of-accu/submission/list (14 August 2026); GreenCollar and ANU-UNSW ERF Research Team (2022) Joint Submission to the Independent Review of Australian Carbon Credit Units. Available at: https://consult.dcceew.gov.au/independent-review-of-accu/submission/list (14 August 2026); LMS Energy, Cleanaway Waste Management, Veolia and EDL Ltd (2022) The Emissions Reduction Fund Landfill Gas Method – Joint Letter to Senator David Pocock, 1 September 2022; [Landfill Gas Operator 1 – name withheld] and Macintosh, A. (2022) Independent Review of Australian Carbon Credit Units. Joint Letter to Professor Ian Chubb. 29 July 2022; and [Landfill Gas Operator 2 – name withheld] and Macintosh, A. (2022) Independent Review of Australian Carbon Credit Units. Joint Letter to Professor Ian Chubb. 4 August 2022; Slezak, M. (2022) Industry bosses making money from carbon credits say system needs to change. ABC News. Available at: https://www.abc.net.au/news/2022-09-06/companies-making-money-from-carbon-credits-speak-out/101400566 (14 August 2026).

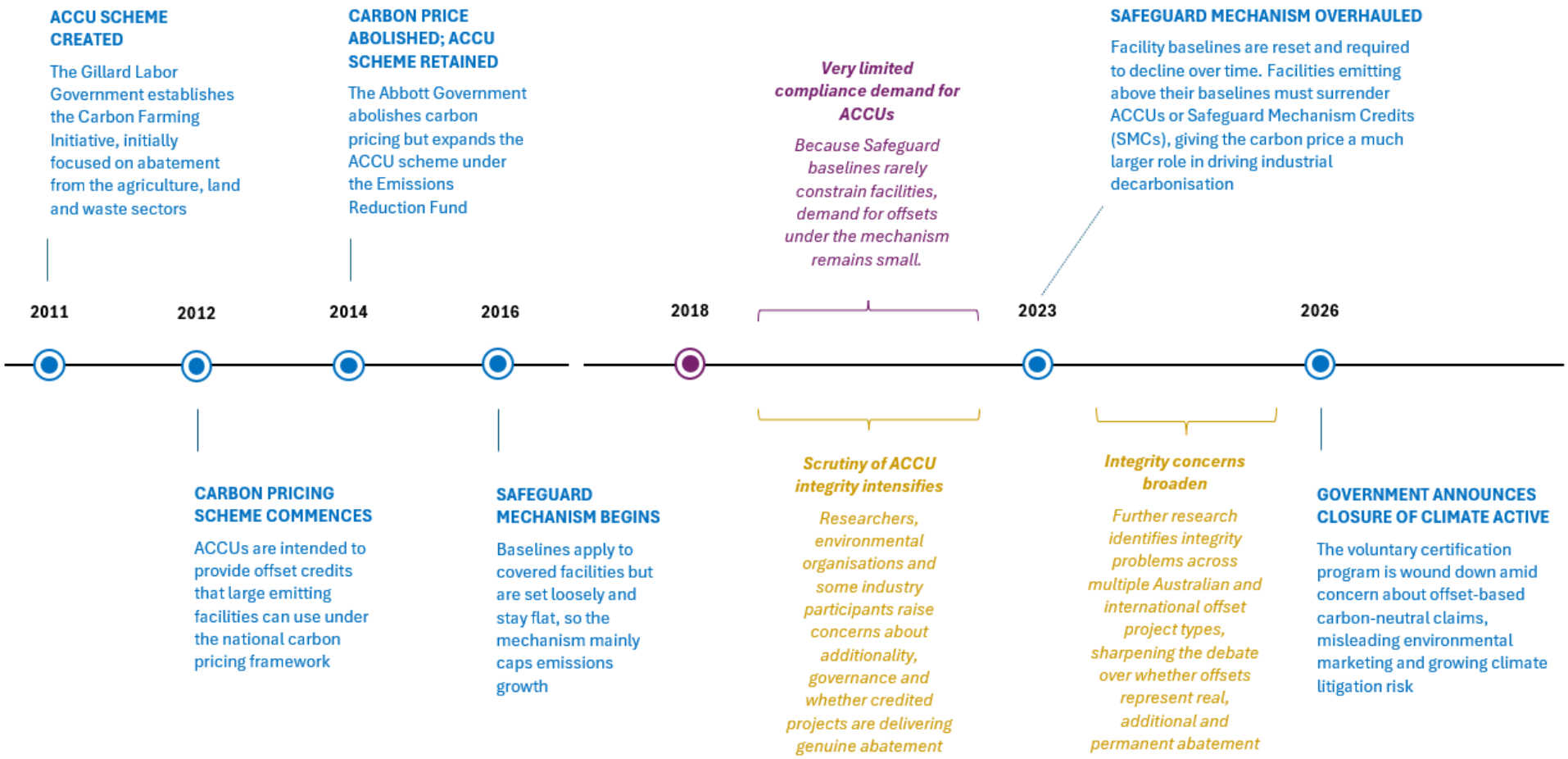
[26] Department of Climate Change, Energy, the Environment and Water (2026) Climate Active – Climate Active certification is ending. Commonwealth of Australia, Canberra. Available at: https://www.dcceew.gov.au/climate-change/climate-active (14 August 2026).

offsets rather than direct emissions reductions to support their 'carbon neutral' claims.[27]

The closure of Climate Active leaves Australian climate policy in a contradictory position. The Government is no longer willing to stand behind offset credits for companies wanting to voluntarily offset their emissions. However, it simultaneously is allowing offsets to provide the primary basis for large facilities to meet their mandatory emission reduction obligations under the SGM.

[27] Department of Climate Change, Energy, the Environment and Water (2026) Consultation on the Climate Active program: Consultation Paper. Commonwealth of Australia, Canberra, p 6. Available at: https://consult.dcceew.gov.au/climate-active-program-2026 (14 August 2026).

Figure 1. Timeline of the ACCU scheme and Safeguard Mechanism



3. Offsetting in the SGM

Key findings

- Gross emissions covered by the SGM have remained relatively stable since its commencement in 2016-17, fluctuating between 130 $MtCO_2$-e and 143 $MtCO_2$-e.
- The data show that, to date, the SGM has not prompted significant emission reductions at covered facilities.
- The small observed changes in gross covered emissions have been due to market and production factors rather than deliberate efforts to decarbonise.
- At present, where covered facilities have faced the prospect of their gross emissions exceeding their SGM caps, they have primarily opted to rely on ACCUs (82%) to meet their abatement obligations.
- The failure of the SGM to drive material onsite abatement at SGM facilities is largely a product of the low carbon price and lax emission caps (baselines).
- The ACCU price is too low to incentivise material onsite abatement by covered facilities. Consistent with this, the current ACCU price is only ~40% of the minimum carbon price that the World Bank High-Level Commission on Carbon Prices found was required to keeping global warming to 2°C above pre-industrial levels.
- In addition to the low carbon price, facility baselines are currently too high. As a result, in 2024-25, only 10% of emissions from covered facilities were exposed to the carbon price.
- While the SGM emission caps are set to decline, under current policy settings it is unlikely that the real ACCU price will increase to the levels needed to drive substantial decarbonisation efforts at covered facilities.
- The Australian Government is administering the ACCU scheme in a way that produces a large supply of cheap, low integrity credits. This is artificially suppressing the carbon price faced by big polluters, including large gas and coal operators, which account for 55% of emissions covered by the SGM.
- The effects of the Government's approach to the administration of the ACCU scheme are reflected in: (i) ACCU issuances, which increased by 75% over the past decade, rising from 13.2 million in 2016-17 to 23.1 million in 2025-26; (ii) ACCU holdings, which have gone from 6.3 million credits in the first quarter of 2020 to over 61 million credits in the second quarter of 2026; and (iii) the suppressed ACCU price, which at the time of writing was only $38 per ACCU.

There are two dominant trends in the SGM that point to problems with its efficacy in driving decarbonisation:

- relatively static (rather than declining) gross emissions from covered facilities, particularly when market and site-specific factors that affect production are accounted for; and

- high reliance on ACCUs by covered facilities to meet their emission reduction obligations since the baselines were re-set with the 2023 SGM reforms.

3.1 Relatively static covered emissions

The SGM has failed to drive material onsite abatement at almost all covered facilities. Gross emissions covered by the SGM have remained between 130 $MtCO_2$-e and 143 $MtCO_2$-e since the SGMs commencement in 2016-17 (Figure 2). The small changes in gross covered emissions that have occurred are attributable to three main factors:

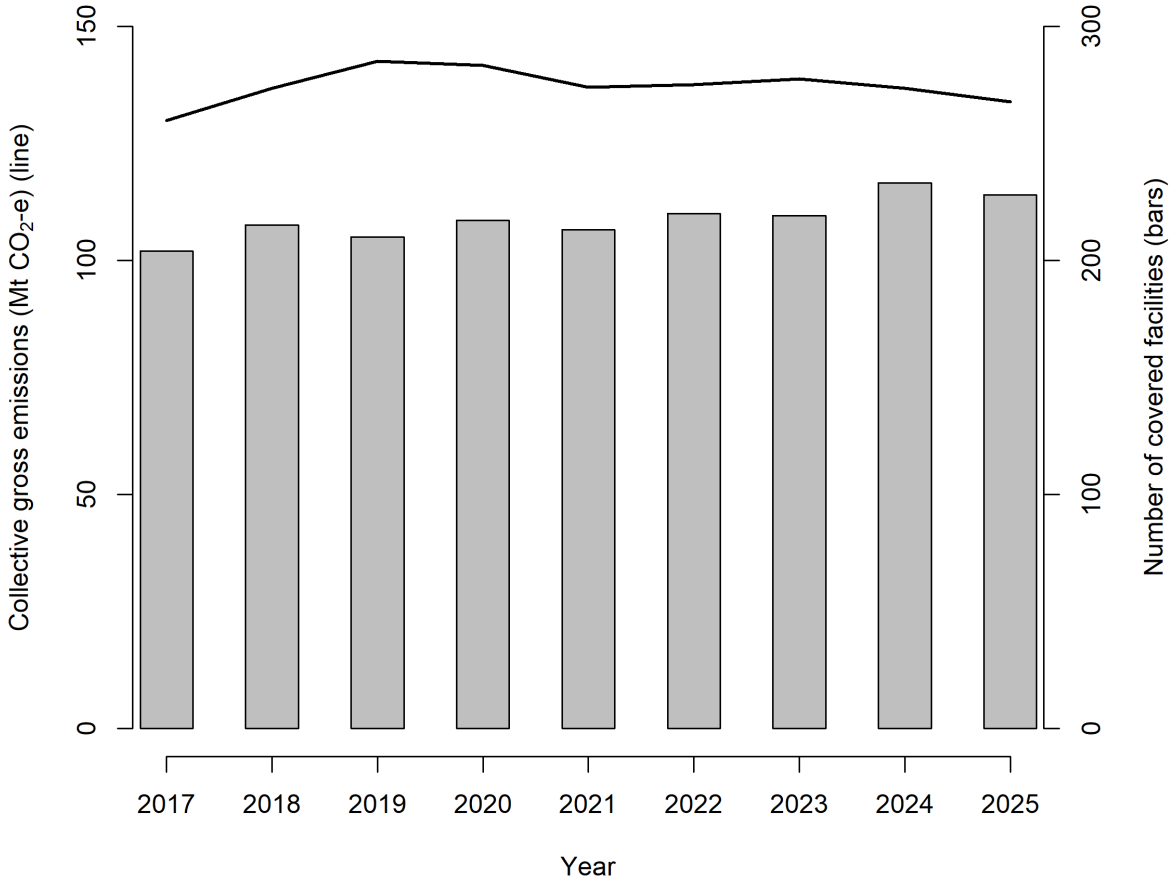
(a) the effects of facilities coming in and out of coverage, depending on whether they exceed the 100,000 $MtCO_2$-e eligibility threshold;

(b) market factors that influence production at the covered facilities; and

(c) site-specific issues like production disruptions and ramp ups in production in new facilities.

In the first year of its operation, 204 facilities were covered by the SGM (Figure 2). This number trended upwards over the following seven years, reaching 233 in 2023-24, before falling to 228 in 2024-25. The fluctuation in the number of covered facilities is partly explained by mergers and demergers, which move facilities in and out of coverage. The other main drivers are the opening of new facilities, closure of old facilities, or facilities operating near the 100,000 tCO_2-e threshold, with operational factors taking them above and below the cut-off in any given year. The resulting changes in emissions covered by the SGM that are caused by these operational and accounting issues can be material. For example, in the 2024-25 reporting year, there were 17 facilities that dropped out of coverage, with prior year aggregate emissions of 1.9 $MtCO_2$-e. In the same year, there were 15 facilities who reported in 2024-25 that did not report in 2023-24, with aggregate emissions in 2024-25 of 2.05 $MtCO_2$-e.

Figure 2. Gross emissions from facilities covered by the SGM, 2016-17 to 2024-25, million tonnes of carbon dioxide equivalent ($MtCO_2$-e)



Source: Clean Energy Regulator (2026) 'Baselines and emissions data'. Commonwealth of Australia, Canberra. Available at: https://cer.gov.au/markets/reports-and-data/safeguard-data (30 July 2026).

The influence of market and site-specific factors on gross emissions from covered facilities is illustrated in the 2.9 $MtCO_2$-e decline in covered emissions between 2023-24 and 2024-25. Amongst facilities with continuity of coverage over 2023-24 and 2024-25, there were 104 facilities whose gross emissions fell and 109 whose emissions increased over the same period. The cumulative reduction in emissions across the 104 facilities whose emissions fell amounted to 9.56 $MtCO_2$-e. Most (63%, 6 $MtCO_2$-e) of these emission reductions came from 13 facilities, listed in Table 1. As the details in Table 1 indicate, most of the emission reductions at these facilities were not a product of deliberate efforts to decarbonise through the deployment of low-emissions technologies. The drivers were mostly related to production disruptions, accounting changes and market-induced production reductions and closures. The two exceptions were the Moomba Gas Plant and the Yarwun Nitrates Facility.

Gross emissions from the Moomba Gas Plant fell by 1.1 $MtCO_2$-e between 2023-24 and 2024-25 due to the commencement of the Moomba Carbon Capture and Storage (CCS) Project. The Moomba CCS project received a $15 million grant from the Australian Government to support its construction and it is also registered under the ACCU scheme's CCS method.[28] In 2025-26,

[28] Santos (2021) Moomba CCS project boosted by A$15 million grant from Carbon Capture Use and Storage Development Fund. Media release, 8 June. Available at: https://www.santos.com/wp-

the Moomba CCS project received 1.4 million ACCUs, the largest single ACCU issuance to a project in the history of the ACCU scheme.[29]

Orica Australia's Yarwun Nitrates Facility in Gladstone reduced emissions by 296,431 tCO_2-e between 2023-24 and 2024-25. This reduction was primarily due to the commencement of the Orica Yarwun Nitrates Decarbonisation Project, which is registered under the ACCU scheme's Industrial and Commercial Emissions Reduction method.[30] The project reduces N_2O emissions from the production of nitric acid through the installation of tertiary abatement reactors (catalysts) that break the N_2O into nitrogen and oxygen.[31] The project was registered under the ACCU scheme in March 2022, two months before the 2022 federal election. The first reactor was installed in March 2024 and the second in September 2024.[32] The project received 217,734 ACCUs in 2025-26 for abatement achieved since the first reactor became operational in April 2024.[33] Orica Australia has installed similar abatement technology at its Kooragang Island Nitrates Facility, with financial support from the NSW Government's Net Zero Industry and Innovation Program and Clean Energy Finance Corporation, as well as ~500,000 ACCUs per year under the ACCU scheme.[34]

Table 1. SGM facilities that experienced material reductions in gross emissions in 2024-25

Facility	Emission reduction 2023-24 to 2024-25	Details
Moomba Gas Plant	-1,118,698	Moomba Carbon Capture and Storage (CCS) Project commenced in September 2024, with credited sequestration of approximately 1.2 million for the year to September 2025.[35] The project was issued 1.4 million ACCUs in the 2025-26 financial year, for abatement generated over the period from September 2024. Commencement of CCS Project was the primary driver of the reported emission reductions.
Grosvenor Mine	-1,069,626	The reduction in emissions from Anglo Coal's Grosvenor Mine was due to reduced production. A fire occurred at the mine in June 2024 that

content/uploads/2021/06/210608-Release-Moomba-CCS-project-boosted-by-A15-million-grant-from-Carbon-Capture-Use-and-Storage-Development-Fund.pdf (10 August 2026).

[29] Clean Energy Regulator (2026) ACCU project and contract register. Commonwealth of Australia, Canberra. Available at: https://cer.gov.au/markets/reports-and-data/accu-project-and-contract-register (30 July 2026).

[30] *Carbon Credits (Carbon Farming Initiative-Industrial and Commercial Emissions Reduction) Methodology Determination 2021*.

[31] Clean Energy Regulator (2026) Orica Yarwun Nitrates Decarbonisation Project. Commonwealth of Australia, Canberra. Available at: https://cer.gov.au/schemes/australian-carbon-credit-unit-scheme/accu-project-and-contract-register/project/ERF172930 (5 August 2026).

[32] Orica Australia (2025) Summary Plan Yarwun Nitrates. Clean Energy Regulator, Canberra. Available at: https://cer.gov.au/document/2023-24-to-2024-25-mymp-summary-plan-yarwun-nitrates (5 August 2026).

[33] Clean Energy Regulator (2026) ACCU project and contract register. Commonwealth of Australia, Canberra. Available at: https://cer.gov.au/markets/reports-and-data/accu-project-and-contract-register (30 July 2026).

[34] Clean Energy Finance Corporation (2025) Orica slashes emissions with world-leading tech: case study. Available at: https://www.cefc.com.au/case-studies/orica-slashes-emissions-with-world-leading-tech/ (12 August 2026); Clean Energy Regulator (2026) ACCU project and contract register. Commonwealth of Australia, Canberra. Available at: https://cer.gov.au/markets/reports-and-data/accu-project-and-contract-register (30 July 2026).

[35] Santos Ltd (2026) ASX/Media Release – Santos Investor Briefing Day 2026. Santos Ltd, Adelaide. Available at: https://www.santos.com/wp-content/uploads/2026/05/Santos-2026-Investor-Briefing-Day_ASX.pdf?utm_source=chatgpt.com (4 August 2026).

		resulted in the suspension of production for the full 2024-25 reporting year.[36]
Kwinana Alumina Refinery	-775,240	The reduction in emissions from Alcoa's Kwinana alumina refinery was due to reduced production. Alcoa announced it would stop production at Kwinana in January 2024,[37] a decision that took effect in June 2024. In September 2025, the refinery was permanently closed.[38]
Ichthys LNG Project	-443,626	The reduction in emissions from Impex's Ichthys LNG Project was mainly due to reduced production. Production was disrupted between August and November 2024 due to a flaw in the heat exchangers in the project's second train (the project has two liquefaction trains). The first train remained operational while the second was being repaired, but the outage cut production by ~50%.[39] The disruption contributed to a drop in calendar year LNG shipments from 129 in 2023 to 116 in 2024.[40]
Hail Creek Mine	-393,359	The reduction in emissions from the Hail Creek Mine in 2024-25 appears to mainly be attributable to the method used to estimate emissions from the mine and natural variability in production-related emissions. Under the *National Greenhouse and Energy Reporting (Measurement) Determination 2008*, fugitive emissions from open-cut coal mines can estimate emissions using one of three methods (Method 1, 2 or 3).[41] Glencore, the owner of the mine, previously used Method 1 at the mine. Method 1 is a simple method, where emissions are estimated by multiplying the quantity of coal extracted from the mine by an emission factor for the state in which the mine is located. For the 2023-24 reporting year, Glencore changed to Method 2, where emissions are estimated based on sampling of the amount of gas in gas bearing strata under the extraction area of the mine.[42] This resulted in a 160% increase in reported emissions in 2023-24 relative to 2022-23. In 2024-25, emissions dropped by 28% year-on-year in response to

[36] Anglo American (2024) Anglo American suspends production at Grosvenor steelmaking coal mine. Press Release. Available: https://www.angloamerican.com/media/press-releases/2024/30-06-2024 (30 July 2026); NSW Resources (2024) Consolidated report. Coal mines - uncontrolled gas or dust explosion review. Department of Primary Industries and Regional Development, Sydney. Available at: https://www.resources.nsw.gov.au/sites/default/files/2024-09/consolidated-report-uncontrolled-gas-or-explosion-july-august-2024.pdf (30 July 2026); Baxter, T. (2026) Reflections on the operation of the Safeguard Mechanism after two years of public data. Naru Research, Victoria. Available at: https://naruresearch.com.au/2025-safeguard-data/ (30 July 2026).

[37] Alcoa Corporation (2024) Alcoa announces curtailment of Kwinana Alumina Refinery in Western Australia. 8 January 2024. Alcoa Corporation. Available at: https://news.alcoa.com/press-releases/press-release-details/2024/Alcoa-announces-curtailment-of-Kwinana-Alumina-Refinery-in-Western-Australia/default.aspx (3 August 2026).

[38] Alcoa Corporation (2025) Alcoa Announces Closure of Kwinana Refinery, Also Updates Third Quarter 2025 Outlook. Alcoa Corporation. Available at: https://news.alcoa.com/press-releases/press-release-details/2025/Alcoa-Announces-Closure-of-Kwinana-Refinery-Also-Updates-Third-Quarter-2025-Outlook/default.aspx#:~:text=PITTSBURGH--(BUSINESS%20WIRE)--,the%20refinery%20in%20June%202024 (3 August 2026).

[39] Kumagai, T. (2024) Australia's Ichthys LNG to resume full runs in Oct after restarting Train 2: INPEX. S&P Global, 27 August 2024. Available st: https://www.spglobal.com/energy/en/news-research/latest-news/lng/082724-australias-ichthys-lng-to-resume-full-runs-in-oct-after-restarting-train-2-inpex?utm_source=chatgpt.com (3 August 2026); Inpex Corporation (2025) Financial Results for the year ended December 31, 2024. Inpex Corporation. Available at: https://www.inpex.com/english/ir/library/pdf/result/Presentation20250213-a.pdf (3 August 2026).

[40] Inpex Corporation (2025) Financial Results for the year ended December 31, 2024. Inpex Corporation. Available at: https://www.inpex.com/english/ir/library/pdf/result/Presentation20250213-a.pdf (3 August 2026).

[41] *National Greenhouse and Energy Reporting (Measurement) Determination 2008*, Part 3.2, Division 3.2.3.

[42] Glencore (2026) Hail Creek Open Cut mine greenhouse gas emissions reporting and management. Glencore. Available at: https://www.glencore.com.au/.rest/api/v1/documents/cc1db6b45396c31271dfaf77fe661b3d/GLN+3605C+Hail+Creek+Extension+GHG+Fact+Sheet.pdf (3 August 2026);

		changes in the nature of the strata being mined. Glencore has opted not to drain methane from the mine (the primary emissions mitigation option), suggesting it will undertake a gas drainage feasibility study if a mine extension is approved.[43]
North West Shelf Project	-347,205	The reduction in emissions from Woodside's North West Shelf operations was primarily due to reduced production. Woodside's share of production declined from 38.1 million barrels of oil equivalent (MMboe) in the 2024 calendar year to 31.2 MMboe in 2025. Woodside attributed the reduction to "gradual reservoir decline".[44] Consistent with this, Woodside Energy's half year report in 2025, covering the period 1 January to 30 June 2025, noted that Woodside's share of production was down 23% (to 15.1 MMboe) relative to the same period in 2024 "due to reservoir decline, planned maintenance at the Goodwyn Alpha platform, and cyclone activity".[45] Reduced production means less gas consumed in compressors, generators and refrigeration turbines, leading to fewer emissions.
Tahmoor Coal Mine	-327,106	The reduction in emissions at the mine was primarily due to reduced production. Production was forecast to decrease in 2025 relative to 2024 (from 2,998,583 tonnes to 2,550,000 tonnes).[46] Financial difficulties at GFG Alliance (the group owner) then led to further production reductions. In February 2025, 400 workers were stood down and production was curtailed.[47] Tahmoor Coal Pty Ltd subsequently went into voluntary administration in February 2026.[48] The magnitude of the emission reductions in 2024-25 was also partly due to the fact there were elevated emissions in the 2023-24 year due to increased production and a higher concentration of CH_4 in ventilated gas emissions.[49]
Yarwun Nitrates Facility	-296,431	The reduction in emissions was primarily due to the commencement of the Orica Yarwun Nitrates Decarbonisation Project at the Yarwun Nitrates plant (Gladstone, Queensland). The project reduces N_2O emissions from the production of nitric acid through the installation of

[43] Gorringe, A. (2026) Hail Creek coalmine extension an unmitigated risk. Institute for Energy Economics and Financial Analysis. Available at: https://ieefa.org/resources/hail-creek-coalmine-extension-unmitigated-risk (3 August 2026).
[44] Woodside Energy Group Ltd (2026) 2025 Annual Report. Woodside Energy Group Ltd, Perth, p 26. Available at: https://www.woodside.com/docs/default-source/investor-documents/major-reports-%28static-pdfs%29/2025-annual-report/annual-report-2025.pdf?sfvrsn=a6344a90_5&utm_source=chatgpt.com (3 August 2026).
[45] Woodside Energy Group Ltd (2026) Half-year Report for Period Ended 30 June 2025. Woodside Energy Group Ltd, Perth, p 6. Available at: https://announcements.asx.com.au/asxpdf/20250819/pdf/06n0svynbljym7.pdf?utm_source=chatgpt.com (4 August 2026).
[46] Brumby, N. et al. (2025) Tahmoor Coal Pty Ltd. 2024 Annual Review and Annual Environmental Management Report. September 2025. SIMEC Mining. Available at: https://www.tahmoorcolliery.com.au/wp-content/uploads/sites/8/2025/11/Tahmoor-Coal-2024-Annual-Review-and-AEMR-Final_Redacted-V2.pdf (4 August 2026).
[47] England, C. (2025) Tahmoor Coal workers stood down as Sanjeev Gupta's cashflow woes infect another operation. The Australian, 9 February. Available at: https://archive.md/XHcZE#selection-651.0-651.89 (4 August 2026); Fernandez, T. (2025) Tahmoor mine stands down workers after owner GFG Alliance fails to pay suppliers. ABC News. Available at: https://www.abc.net.au/news/2025-02-07/workers-at-tahmoor-mine-stood-down-as-owner-dodges-creditors/104904214 (3 August2026).
[48] Fuller, K. (2026) Tahmoor Coal placed into administration as court hears creditor winding-up bid. ABC News. Available at: https://www.abc.net.au/news/2026-02-10/tahmoor-coal-mine-placed-into-voluntary-administration/106326534 (3 August 2026).
[49] Brumby, N. et al. (2025) Tahmoor Coal Pty Ltd. 2024 Annual Review and Annual Environmental Management Report. September 2025. SIMEC Mining, pp 30-31. Available at: https://www.tahmoorcolliery.com.au/wp-content/uploads/sites/8/2025/11/Tahmoor-Coal-2024-Annual-Review-and-AEMR-Final_Redacted-V2.pdf (4 August 2026).

		tertiary abatement reactors (catalysts) that break the N_2O into nitrogen and oxygen.[50] The project was registered under the ACCU scheme in March 2022, two months before the 2022 federal election. The first reactor was installed in March 2024 and the second in September 2024.[51] The project was issued 217,734 ACCUs in 2025-26 for abatement achieved since the first reactor became operational in April 2024.
Sino Iron Project (Cape Preston)	-274,739	The reduction in emissions from the mine was primarily due to reduced production. In February 2024, CITIC Pacific Mining announced that production would reduce from 21 million wet metric tonnes (wmt) for the 2023 calendar year to 14 wmt for the 2024 calendar year because it had reached the boundary of the approved mine pit footprint.[52] Under the applicable WA mining agreement, proposals to increase the operating footprint of the mine had to be submitted by Mineralogy (controlled by Clive Palmer), which Mineralogy had refused to do. Mineralogy agreed to jointly submit the proposal for approval in May 2025.
Fisherman's Landing Clinker and Cement Facility	-244,165	The reduction in emissions at the facility was primarily due to a decision to separate the site into two facilities for reporting purposes under the SGM and NGERS. The clinker and cement operations now report as the Fisherman's Landing facility, while the lime manufacturing operations at the site report as Fisherman's Landing – Lime. The reporting change resulted in 191,984 tCO_2-e being assigned to Fisherman's Landing – Lime, where it previously would have constituted part of the integrated reporting entity.[53]
Integra Underground Mine	-242,824	The reduction in emissions at Glencore's Integra Underground Coal Mine was primarily due to reduced production. In October 2020, Glencore announced it would cease production at the mine in 2022.[54] Despite this, operations continued until 4 June 2024, when underground mining was stopped. Mine closure works were undertaken following the cessation of mining.[55]
Telfer Gold Mine	-234,122	The reduction in emissions at the Telfer Gold Mine was primarily due to reduced production. The mine faced processing difficulties during 2024, with operations suspended on 14 April 2024 to allow for the remediation of the tailings storage facility.[56] Processing resumed on 23

[50] Clean Energy Regulator (2026) Orica Yarwun Nitrates Decarbonisation Project. Commonwealth of Australia, Canberra. Available at: https://cer.gov.au/schemes/australian-carbon-credit-unit-scheme/accu-project-and-contract-register/project/ERF172930 (5 August 2026).
[51] Orica Australia (2025) Summary Plan Yarwun Nitrates. Clean Energy Regulator, Canberra. Available at: https://cer.gov.au/document/2023-24-to-2024-25-mymp-summary-plan-yarwun-nitrates (5 August 2026).
[52] CITIC Pacific Mining (2024) News: Annual Production Target at Sino Iron Reduced, Legal Action Launched to Support Mine Continuation. Available at: https://citicpacificmining.com/news/68-annual-production-target-at-sino-iron-reduced-legal-action-launched-to-support-mine-continuation (3 August 2026).
[53] Clean Energy Regulator (2026) Safeguard data. Commonwealth of Australia, Canberra. Available at: https://cer.gov.au/markets/reports-and-data/safeguard-data (5 August 2026).
[54] Glencore (2020) Glencore's Integra Underground Mine to cease operations in 2022. Available at: https://www.glencore.com.au/operations-and-projects/coal/media-and-insights/news/glencores-integra-underground-mine-to-cease-operations-in-2022 (5 August 2026).
[55] Glencore (2025) Integra Underground Annual Review: 1 January to 31 December. Available at: https://www.glencore.com.au/.rest/api/v1/documents/0ef38840ac97312eb578472365ac342d/Integra+Annual+Review+2024.pdf (3 August 2026).
[56] Newmont (2024) Newmont reports second quarter 2024 results. Available: https://www.newmont.com/investors/news-release/news-details/2024/Newmont-Reports-Second-Quarter-2024-Results/default.aspx (3 August 2026)

		September 2024.[57] However, prior to the resumption of operations, on 10 September 2024, the then owner of the mine (Newmont) agreed to sell it to Greatland.[58] As part of the transaction, Newmont agreed to run only one of Telfer's processing trains from 27 October 2024 until completion.[59] This was to preserve Telfer's stockpiles and ore for Greatland to process after it took control of the facility.[60] Completion occurred on 4 December 2024.[61]
Darwin LNG Plant	-231,475	The reduction in emissions at Santos' Darwin LNG Plant was due to reduced production. The Darwin LNG Plant historically processed gas from the Bayu-Undan gas field.[62] In November 2023, Santos ceased producing LNG at the plant due to declining reserves.[63] After producing 409,000 tonnes of LNG in the 2023 calendar year, it produced none in both 2024 and 2025, while Santos undertook the Darwin LNG Life Extension Project.[64] The Barossa field will supply the plant going forward and production recommenced in December 2025.[65]

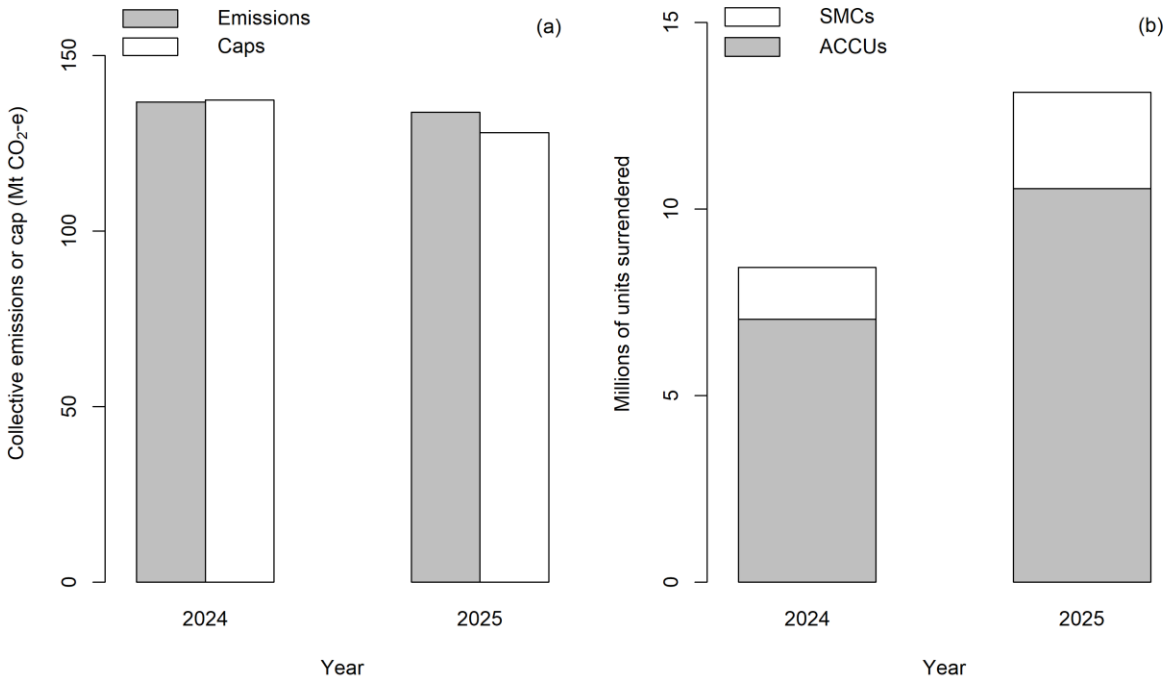
Source: Clean Energy Regulator (2026) 'Baselines and emissions data'. Commonwealth of Australia, Canberra. Available at: https://cer.gov.au/markets/reports-and-data/safeguard-data (30 July 2026).

3.2 High ACCU reliance

As section 3.1 demonstrates, the SGM has not yet prompted significant onsite abatement efforts at covered facilities. Instead, where covered facilities have faced the prospect of their gross emissions exceeding their SGM caps, they have primarily opted to rely on ACCUs, and to a lesser extent on SMCs, to meet their abatement obligations. This pattern is evident in the data on the operation of the SGM over the 2023-24 and 2024-25 reporting years (Figure 3).

[57] Greatland (2024) Creating a new Australian Gold-Copper Producer –Macquarie Western Australia Forum Presentation. 6 November 2024. Available at: https://www.greatland.com.au/wp-content/uploads/2025/03/Greatland-Corporate-Presentation-Macquarie-6-Nov-24.pdf (5 August 2026).
[58] Greatland (2024) AIM Admission Document 10 September 2024. Available: https://www.greatland.com.au/wp-content/uploads/2025/03/AIM-Admission-Document-10-Sep-2024-1.pdf (3 August 2026).
[59] Greatland (2024) AIM Admission Document 10 September 2024. Page 42. Available: https://www.greatland.com.au/wp-content/uploads/2025/03/AIM-Admission-Document-10-Sep-2024-1.pdf (3 August 2026); Greatland (2025) Unaudited Preliminary FY2025 Final Report. Page 44. Available at: https://announcements.asx.com.au/asxpdf/20250828/pdf/06ngym2mkwrl40.pdf?utm_source=chatgpt.com (5 August 2026).
[60] Greatland (2024) AIM Admission Document 10 September 2024. Available: https://www.greatland.com.au/wp-content/uploads/2025/03/AIM-Admission-Document-10-Sep-2024-1.pdf (3 August 2026).
[61] Greatland (2025) Unaudited Preliminary FY2025 Final Report. Page 44. Available at: https://announcements.asx.com.au/asxpdf/20250828/pdf/06ngym2mkwrl40.pdf?utm_source=chatgpt.com (5 August 2026).
[62] Santos (2025) Darwin LNG Annual Environmental Monitoring Report 1 January 2024 – 31 December 2024. Available at: https://ntepa.nt.gov.au/_media/waste-and-pollution/register/epl/gas/conoco-phillips/dlng-annual-environmental-monitoring-report-2024-rev-1.pdf (5 August 2026).
[63] Santos (2025) Darwin LNG Annual Environmental Monitoring Report 1 January 2024 – 31 December 2024. Available at: https://ntepa.nt.gov.au/_media/waste-and-pollution/register/epl/gas/conoco-phillips/dlng-annual-environmental-monitoring-report-2024-rev-1.pdf (5 August 2026).
[64] Santos (2025) Fourth Quarter Report: For period ending 31 December 2024. Available at: https://www.santos.com/wp-content/uploads/2025/01/2024_Fourth-Quarter-Report.pdf (5 August 2026); Santos (2026) Fourth Quarter Report: For period ending 31 December 2024. Available at: https://www.santos.com/wp-content/uploads/2026/01/2025-Santos-Fourth-Quarter-Report.pdf (5 August 2026).
[65] Inpex Corporation (2026) Darwin LNG Project. Available at: https://www.inpex.com/english/business/project/darwin.html (5 August 2026): Santos (2026) Second Quarter Report: For period ending 30 June 2026. Available at: https://www.santos.com/wp-content/uploads/2026/07/2026-Santos-Second-Quarter-Report.pdf (5 August 2026).

Figure 3. Emissions, emission caps and ACCU and SMC surrenders under the SGM, 2023-24 and 2024-25*



Source: Clean Energy Regulator (2026) 'Baselines and emissions data'. Commonwealth of Australia, Canberra. Available at: https://cer.gov.au/markets/reports-and-data/safeguard-data (30 July 2026).
* ACCU surrenders include deemed surrenders, where the facility sells the ACCUs to the Clean Energy Regulator under an Emissions Reduction Fund contract.

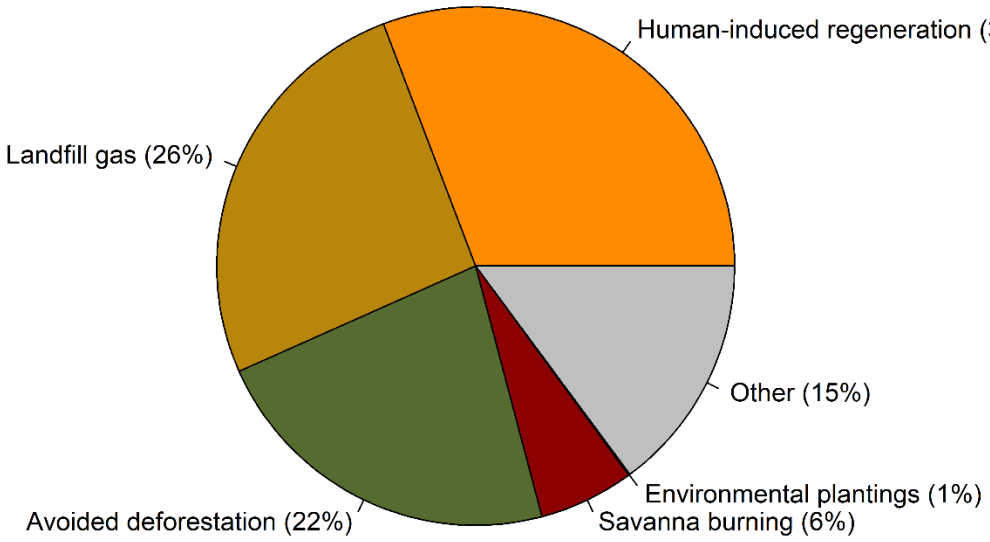
As Figure 3(a) shows, the Albanese Government's reforms of 2023 re-set the SGM baselines so that, in the aggregate, the cap on emissions was close to gross emissions for the 2023-24 reporting year – the 2023-24 cumulative baseline was 0.4% above total gross emissions for the year. Despite total gross emissions being almost the same as the total caps in 2023-24, 139 facilities had exceedances, totalling 8.4 $MtCO_2$-e. On the other side of the ledger, gross emissions at 63 facilities were below their caps, resulting in the issuance of 8.3 million SMCs. Most of the exceedances in 2023-24 were covered through the surrender of ACCUs (84% or 7.1 $MtCO_2$-e), with the remaining 16% (1.4 $MtCO_2$-e) met through the surrender of SMCs (Figure 3(b)).

In 2024-25, the cumulative cap on emissions fell from 137 $MtCO_2$-e to 128 $MtCO_2$-e. Due to the absence of material onsite abatement, the reduction in the cap simply resulted in more emissions being above the SGM baselines. Similar to 2023-24, gross emissions at 139 facilities were above their caps. However, in 2024-25, cumulative exceedances rose to 13.1 $MtCO_2$-e. Again, most of these exceedances were met through the surrender of ACCUs: 81% ACCUs versus 19% SMCs (10.8 million ACCUs and 2.6 million SMCs) (Figure 3(b)). Emissions at fifty-four (54) facilities were below their caps, resulting in the issuance of 6.7 million SMCs.

Over the 2023-24 and 2024-25 reporting years, ACCU surrenders have been mostly comprised by credits sourced from three project types: human-induced regeneration of even-aged native forests (HIR), landfill gas (LFG) and avoided deforestation (AD). Combined, these three project types accounted for 79% of the ACCU surrenders under the SGM over the 2023-24 and 2024-25 reporting years (14 million ACCUs) (Figure 4). The high reliance on ACCUs from these three

project types means the SGM's effectiveness in reducing emissions is dependent on the integrity of projects registered under these methods. If the ACCUs issued to these projects do not represent real, additional and permanent abatement, then the SGM will have achieved little in terms of reducing emissions.

Figure 4. ACCU surrenders under the SGM over 2023-24 and 2024-25 reporting years, by project type*



Source: Clean Energy Regulator (2026) 'Baselines and emissions data'. Commonwealth of Australia, Canberra. Available at: https://cer.gov.au/markets/reports-and-data/safeguard-data (30 July 2026).
* Projects in the 'Other' category include Alternative Waste Treatment, Source Separated Organic Waste, Coal Mine Waste Gas, Industrial Electricity and Fuel Efficiency, Commercial and Public Lighting, Land and Sea Transport, Beef Cattle Herd Management, Animal Effluent Management, Avoided Clearing of Native Regrowth, Native Forest from Managed Regrowth, and Plantation Forestry.

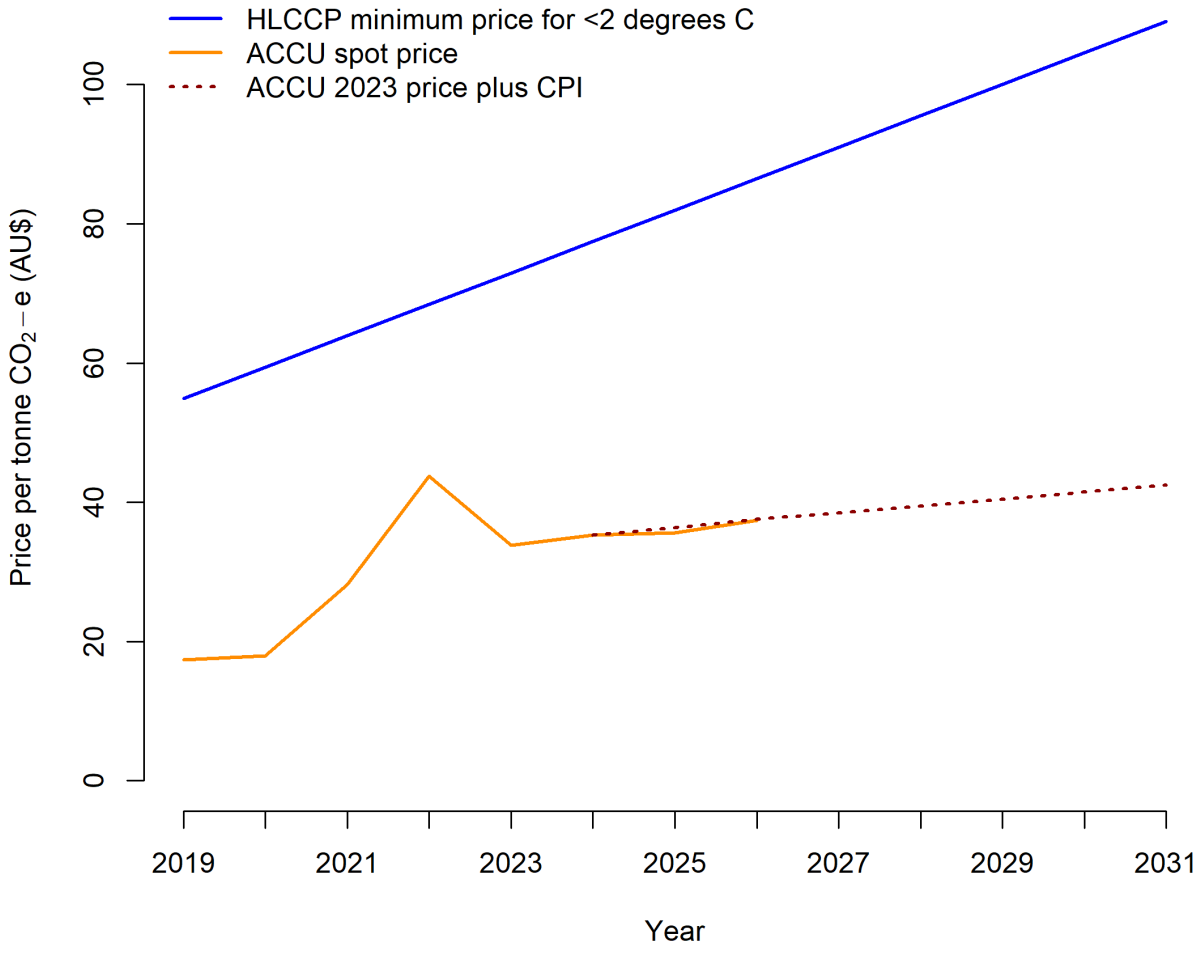
3.3 Impact of ACCUs on the carbon price faced by SGM facilities

The failure of the SGM to drive material onsite abatement at SGM facilities is largely a product of the low carbon price and lax emission caps (baselines). The spot price of ACCUs since 2019 is shown in Figure 5. The ACCU price is too low to incentivise material onsite abatement by covered facilities. The current ACCU price is only ~40% of the minimum carbon price that the World Bank High-Level Commission on Carbon Prices (HLCCP) found was required to keeping global warming to 2°C above pre-industrial levels.[66]

In addition to the low carbon price, the SGM emission caps are currently too high. As a result, in 2024-25, only 10% of emissions from covered facilities were exposed to the carbon price. As the caps decline over time, a greater proportion of emissions will be subject to the carbon price, increasing the incentive for decarbonisation. By extension, the declining caps will also increase the demand for ACCUs and SMCs, putting upward pressure on the carbon price. However, the extent to which the resulting increase in demand spurs higher prices is contingent on ACCU supply. An ongoing supply of cheap, low integrity credits will keep the carbon price low, thereby reducing the incentive for covered facilities to decarbonise.

[66] Carbon Pricing Leadership Coalition (2017) Report of the High-Level Commission on Carbon Prices. World Bank, Washington DC. Available at: https://openknowledge.worldbank.org/entities/publication/f1439afb-82a8-5a92-b95f-0f224da85169 (12 August 2026).

Figure 5. Carbon price faced by SGM facilities vs carbon price consistent with sub-2°C global outcome



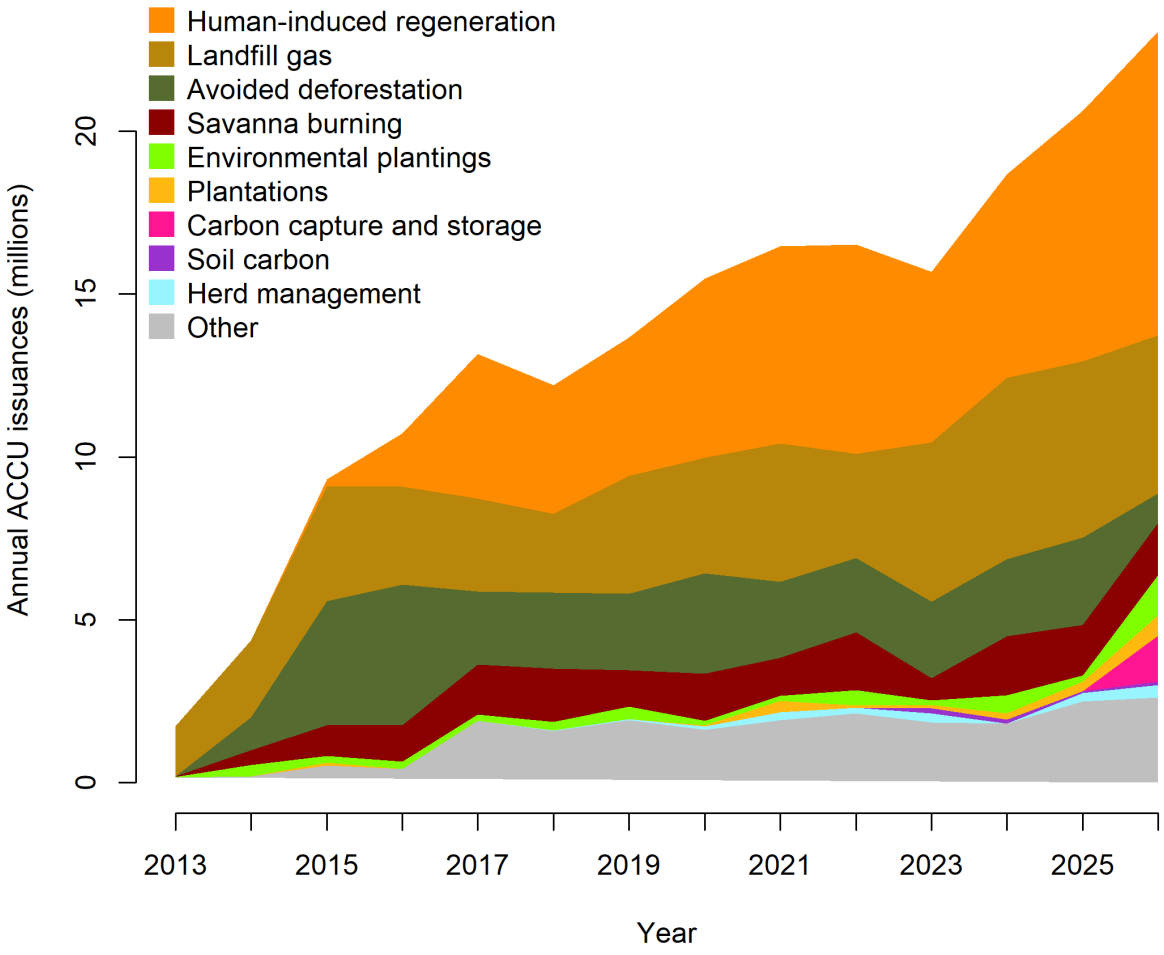
Source: Clean Energy Regulator (2026) ACCU project and contract register. Commonwealth of Australia, Canberra. Available at: https://cer.gov.au/markets/reports-and-data/accu-project-and-contract-register (30 July 2026); Carbon Pricing Leadership Coalition (2017) Report of the High-Level Commission on Carbon Prices. World Bank, Washington DC. Available at: https://openknowledge.worldbank.org/entities/publication/f1439afb-82a8-5a92-b95f-0f224da85169 (12 August 2026).

To date, the way the Australian Government has administered the ACCU scheme has resulted in a large supply of cheap, low integrity credits. During the Abbott, Turnbull and Morrison Coalition administrations, there was an incentive for the Government to issue large numbers of cheap credits to inflate the outcomes of the Emissions Reduction Fund auctions. Since taking office in 2022, the Albanese Labor Government's actions in issuing substantial numbers of cheap, low integrity ACCUs have had the effect of suppressing the carbon price faced by big polluters covered by the SGM, particularly large gas and coal operators, which account for 55% of emissions covered by scheme.

The effects of the way the ACCU scheme has been administered are evident in annual ACCU issuances, which increased by 75% over the past decade, rising from 13.2 million in 2016-17 to 23.1 million in 2025-26 (Figure 6). 74% of the credits over this period came from just three project types – human-induced regeneration of even-aged native forests (HIR), landfill gas (LFG) and avoided deforestation (AD) – all of which have material integrity flaws that have been

documented in the literature.[67] The surge in ACCU supply has suppressed the ACCU price (Figure 5) and allowed market participants to bank large numbers of ACCUs in holding accounts.

Figure 6. ACCU issuances by project type, 1 July 2012 to 30 June 2026 (FY ending)



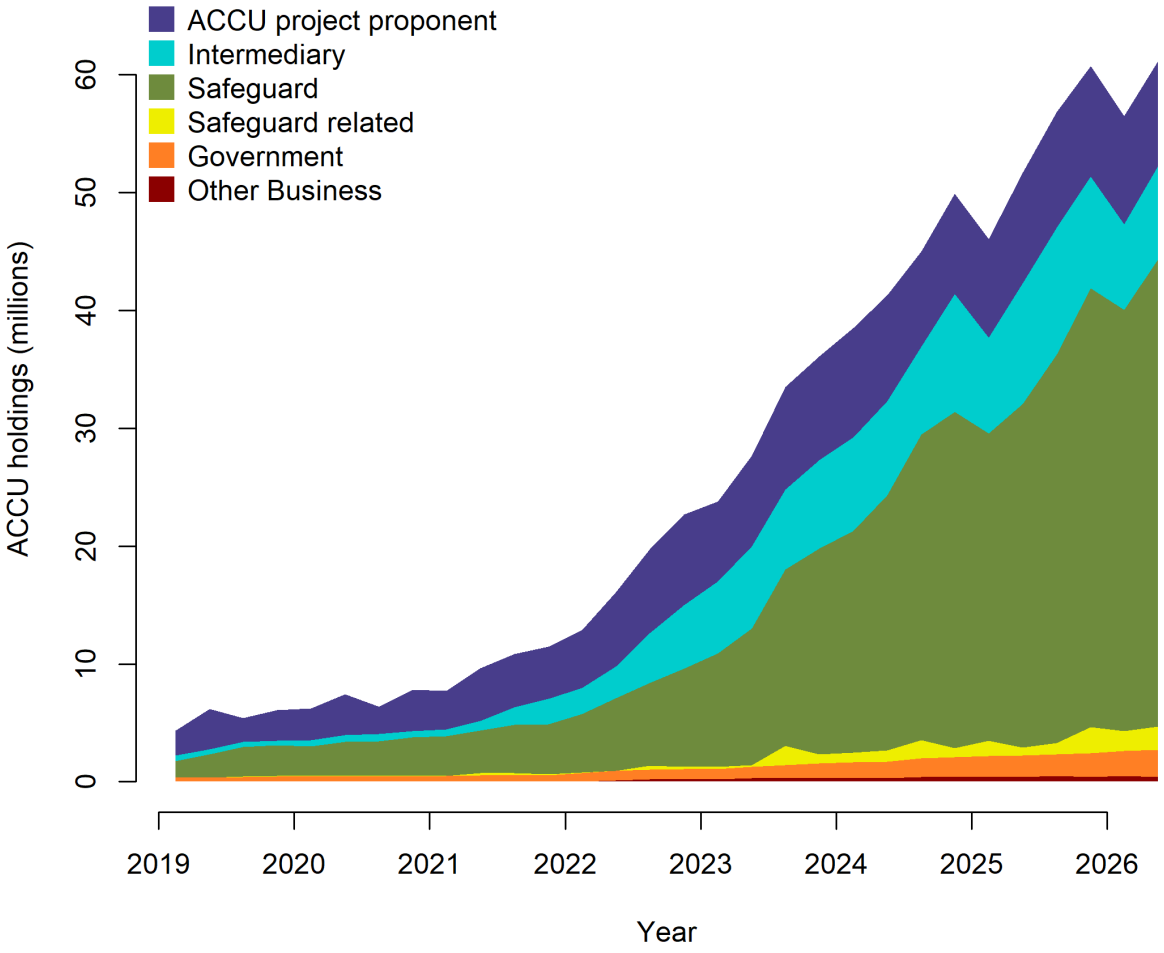
Clean Energy Regulator (2026) 'ACCU project and contract register'. Commonwealth of Australia, Canberra. Available at: https://cer.gov.au/markets/reports-and-data/accu-project-and-contract-register (30 July 2026).

As shown in Figure 7, ACCU holdings have gone from 6.3 million credits in the first quarter of 2020 to over 61 million credits in the second quarter of 2026. Businesses with facilities covered

[67] Burke, P.J. (2016) Undermined by Adverse Selection: Australia's Direct Action Abatement Subsidies. Economic Papers 35(3), 216–229; Baxter, T., Gilligan, G. (2017) Verification and Australia's emissions reduction fund: integrity undermined through the landfill gas method? Australian Journal of Environmental Law 4, 1–29; Merzian, R., Hemming, P., Schoo, A. (2021) Questionable integrity: Non-additionality in the Emissions Reduction Fund's Avoided Deforestation Method. Australian Conservation Foundation & The Australia Institute, Melbourne and Canberra. Available at: https://australiainstitute.org.au/report/questionable-integrity-non-additionality-in-the-emissions-reduction-funds-avoided-deforestation-method/ (12 August 2026); Beare, S., Chambers, R. (2021) Human induced regeneration: A spatiotemporal study. AnalytEcon Pty Ltd, Berry, NSW; Macintosh, A., Butler, D. et al. (2024) Australian human-induced native forest regeneration carbon offset projects have limited impact on changes in woody vegetation cover and carbon removals. Communications Earth & Environment 5, 149; Macintosh, A., Evans, M.C. et al. (2024) Non-compliance and under-performance in Australian human-induced regeneration projects. The Rangeland Journal 46, RJ24024; Orton, T.G., Bryant, K., Allen, D.E. (2025) A pixel-twinning approach for assessing additionality: a case study of human-induced regeneration projects. Ecological Informatics 92, 103505.

by the SGM now have almost 40 million ACCUs in holding accounts, with offset project proponents, intermediaries and SGM related businesses holding a further 18.8 million. Over the same period, 14.98 million SMCs were issued and, as of 30 June 2026, there were 11 million SMCs in holding accounts, 9.8 million of which were held by SGM businesses.

Figure 7. Build-up of ACCUs in holding accounts, Q1 2019 to Q2 2026



Clean Energy Regulator (2026) 'Quarterly Carbon Market Reports'. Commonwealth of Australia, Canberra. Available at: https://cer.gov.au/markets/reports-and-data/quarterly-carbon-market-reports (30 July 2026).

The surge in ACCU issuances and build up in ACCU holdings suggests that, despite declining SGM baselines, the carbon price is likely to remain relatively subdued for the short- to medium-term. As Figure 5 shows, since 2023, the ACCU price has largely increased in line with inflation. For the SGM to work effectively, the carbon price faced by covered facilities needs to be substantially higher and increase at rates significantly above inflation. However, modelling undertaken by Ernst & Young Australia for the Investor Group on Climate Change suggests the real (inflation adjusted) ACCU price is likely to remain relatively flat through to the end of the

decade, after which the price trajectory becomes increasingly uncertain due to the extent to which it depends on government policy, particularly the rate of decline in SGM baselines.[68]

The Australian Government's approach to the administration of the ACCU scheme is best illustrated with the scheme's largest source of ACCUs: human-induced regeneration of even-aged native forests (HIR) projects. The remainder of this report focuses on HIR projects, providing an analysis of their legality and effectiveness in regenerating forests and sequestering carbon.

[68] Muskovic, F., Richards, B. (2026) Futureproofing Industry: Investor Priorities for a Reformed Safeguard Mechanism. Investor Group on Climate Change. Available at: https://igcc.org.au/wp-content/uploads/2026/08/EY-IGCC-Safeguard-Mechanism-Reforms_Combined.pdf (25 August 2026).

4. The evolution of outback HIR projects

4.1 Background on HIR projects

HIR projects are the ACCU scheme's largest project type, both by affected land area and credit issuances. As of 30 June 2026, there were 431 ongoing registered projects that covered 38 million hectares: an area roughly the same size as Japan. The "credited area" of reported projects, where the new forests are supposed to be regenerating, currently covers approximately 7.4 million hectares. If projects that have not yet reported are included, and their credited areas are estimated based on the ratio between project areas and credited areas from reported projects, the total credited area for all HIR projects is ultimately likely to cover ~15 million hectares (more than twice the size of Tasmania).[69] To 30 June 2026, HIR projects had received 61 million ACCUs; 32% of total ACCU issuances. In 2025-26, they received more than 9.3 million ACCUs, 40% of issuances in the financial year. If current policy continues, by 2030 they are likely to be responsible for around half of annual ACCU issuances. In colloquial terms, they are the backbone of the ACCU scheme.

HIR projects are supposed to involve the regeneration of even-aged native forests across the entirety of their 'credited areas' (formally known as 'carbon estimation areas' (CEAs)).[70] They do not involve tree planting via the planting of seedlings or seeds. The projects must regenerate native forests from *in situ* seed, rootstock, lignotubers and/or seedings through changes in land management. As the independent technical review of the method noted in 2012:

> [t]he methodology encompasses two regeneration establishment techniques achieved by implementing changed land-use management practices encouraging:
>
> - Existing soil seed sources (including rootstock and lignotubers to regenerate); or
> - Regeneration of cleared land relying on seed from adjacent native vegetation.[71]

The eligible activities that project proponents can undertake to induced forest regeneration are confined to weed control, stopping the clearing of regeneration, and the management of grazing pressure from livestock and feral animals.[72] Out of these options, most projects rely exclusively or predominantly on the management of grazing pressure. These projects claim that grazing from livestock and feral animals previously suppressed regeneration and that, by reducing grazing pressure, the projects will induce the regeneration of even-aged native forests.

Unlike most other reforestation-based carbon offset methods globally, HIR projects do not directly measure trees to estimate sequestration. Instead, carbon sequestration in HIR projects is modelled using the Australian Government's Full Carbon Accounting Model ('FullCAM').

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[69] The current credited area to project area ratio is 0.44. This suggests the credited area is likely to be 17 Mha and is very unlikely to be less than 15 Mha.

[70] The credited areas (or carbon estimation areas) are the land areas within the project boundary where the proponent claims to be undertaking the project activities – in this case, inducing even-aged forest regeneration.

[71] Department of Climate Change and Energy Efficiency (2012) 'Technical Assessment of Methodology Proposal: 2012RF029 Human-induced Regeneration of a Permanent Even-aged Native Forest Version 1.0'. Department of Climate Change and Energy Efficiency, Canberra. FOI LEX 83686, Document 1 (pp 4-5).

[72] Grazing management formally includes exclusion of livestock, management of the timing and extent of grazing, and the management of feral animals.

FullCAM is effectively an enhanced calculator that, in this context, models sequestration in regenerating forests. The model calibration used in the HIR method assumes that:

- the land being modelled starts with no or negligible initial woody biomass (i.e. no mature trees and shrubs); and
- an even-age native forest regenerates across the entirety of the modelled area after the selection of what should be an empirically informed regeneration commencement date.[73]

The model has no link to any empirical data on whether trees are growing (or not growing) on the land. Instead, based on the biophysical characteristics of the site, FullCAM provides an estimate of the amount of carbon that would be likely to accumulate in a regenerating even-aged native forest *if it was growing* on the land and progressing towards the site's maximum woody biomass potential under native vegetation.

When the HIR method was originally made in January 2013, the use of a modelled approach was justified on the basis that the method rules require the credited areas to consist only of land that reflects the basis on which FullCAM was calibrated. Table 2 summarises the eligibility rules that were designed to achieve this objective.

The essential elements of the land eligibility rules are that the land included in the credited areas of HIR projects must be devoid of mature trees and shrubs at project commencement and have the capacity to regenerate and achieve forest cover. In all but the rarest of cases, land meeting these requirements will need to have previously contained a native forest that was comprehensively cleared and still has the capacity to regenerate from in situ seed, lignotubers or root stock.

[73] Pasut, C. et al. (2025) Aboveground biomass relationship with canopy cover and vegetation to improve carbon change monitoring in rangelands. Ecosphere 16:e70231, p 9; Paul, K., Roxburgh, S. (2020) Predicting carbon sequestration of woody biomass following land restoration Forest Ecology & Management 460, 117838; Forrester, D. et al. (2024) Modelling Carbon Flows from Live Biomass to Soils Using the Full Carbon Accounting Model (FullCAM). Environmental Modelling & Software 177, 106064.

Table 2. Eligibility rules for inclusion of land in HIR credited area

No.	Requirement	Rule content
1	Forest potential rule[74]	Land must have 'forest potential', defined as land ≥0.2 ha with trees that, having regard to the location and characteristics of the land, are reasonably likely to reach ≥2 m in height and provide crown cover of ≥20%.
2	Suppression rule[75]	Land must have been prevented from achieving forest cover over the preceding 10-years (baseline period) by relevant 'suppressors' (clearing, grazing by livestock or feral animals, or weeds).
3	Project activity rule[76]	Credited area must consist only of land on which the project activity is being undertaken, defined as inducing the establishment of a native forest from in situ seed, lignotubers or root stock (coppice) sources by undertaking one or more human-assisted regeneration activities.
4	Even-aged regeneration rule[77]	Credited areas must consist only of land that first exhibited regeneration at or around the same time.
5	Credited area boundary rule[78]	The boundary of a credited area must be no more than 2 metres from: • the stems of the regeneration or the edge of the crown cover of the regeneration; or • the stems of the outer-most trees that regenerate as a result of the project mechanism
6	Regeneration occurrence rule[79]	Credited areas must consist of land with even-aged regeneration – land that fails to regenerate after undertaking the project mechanisms must be excluded from credited areas.
7	Regeneration additionality rule[80]	Regeneration on the land must be a direct result of the project activities or, when the project started, it must have been reasonable to expect it would be necessary to undertake one or more of the project activities on the land for it to attain forest cover.

Source: HIR 2013; HIR2015; HIR2016; HIR2018.[81]

[74] HIR2013, ss 1.3 & 3.5; HIR2015, ss 1.3 & 3.5; HIR2016, ss 3 & 16(2)(c)(iii); HIR2018, ss 3 & 16(2)(c)(iii).
[75] HIR2013, ss 1.3, 1.4(a) & 2.3(1); HIR2015, ss 1.3, 1.4(a) & 2.3(1); HIR2016, s 4.1; HIR2018, s 4(1).
[76] HIR2013, ss 1.3, 1.4(c), 2.3(1)(c), 2.5, 3.4(2) & 3.5(1)(c); HIR2015, ss 1.3, 1.4(c), 2.3(2), 2.5, 3.4(3) & 3.5(1)(c); HIR2016, ss 3, 7, 12, 15(2)(a), 16(2)(c)(ii); HIR2018, ss 3, 7, 12, 15(2)(a), 16(2)(c)(ii).
[77] HIR2013, ss 3.3(2)(c) & 3.4(1)(b); HIR2015, ss 3.3(1)(c) & 3.4(2)(b); HIR2016, ss 16(4)(a) & (b); HIR2016, ss 16(4)(a) & (b).
[78] HIR2015, s 3.6(4); HIR2016, s 17(2); HIR2018, s 17(2).
[79] HIR2013, s 3.3(2)(c), 3.4(1)(b) & 3.5(1)(d); HIR2015, ss 3.3(1)(c), 3.4(2)(b) & 3.5(1)(d); HIR2016, ss 15(2)(b) & 16(4)(a); HIR2018, ss 15(2)(b) & 16(4)(a).
[80] HIR2013, s 1.4(d); HIR2015, s 1.4(d); HIR2016, s 4(1)(c); HIR2018, s 4(1)(c).
[81] Carbon Credits (Carbon Farming Initiative) (Human Induced Regeneration of a Permanent Even-Aged Native Forest) Methodology Determination 2013. Federal Register of Legislative Instruments F2013L00162 (HIR2013); Carbon Credits (Carbon Farming Initiative) (Human Induced Regeneration of a Permanent Even-Aged Native Forest) Methodology Determination 2013 – 1.1. Federal Register of Legislative Instruments F2015C00576 (HIR2015); Carbon Credits (Carbon Farming Initiative) (Human Induced Regeneration of a Permanent Even-Aged Native Forest) Methodology Determination 2013 – 1.1. Federal Register of Legislative Instruments F2016C00281 (HIR2016); Carbon Credits (Carbon Farming Initiative) (Human Induced Regeneration of a Permanent Even-Aged Native Forest) Methodology Determination 2013 – 1.1. Federal Register of Legislative Instruments F2018C00125 (HIR2018). HIR2013 and HIR2015 allowed project commencement dates to be backdated to 1 July 2007 and defined the baseline period as the 10-year period prior to project commencement. HIR2016 and HIR2018 did not allow project commencement dates to be backdated and define the baseline period as the 10-year period prior to the date of the application for project registration.

Any ambiguity regarding whether this is the correct interpretation of the eligibility requirements are eliminated by the Explanatory Statement to the HIR method, which is the official legal guide to its interpretation.[82] The Explanatory Statement states:

> The Determination applies to projects in which **land has been cleared of native vegetation** and where regrowth has been suppressed for at least 10 years.[83] [Emphasis added]

To eliminate doubt, the Explanatory Statement says the same thing in two other places, including in the section concerning the eligibility of land:

> The activity **must occur on areas of cleared land** on which regrowth has been regularly suppressed but has the potential to grow if suppression activities ceased, or on cleared areas that abut existing vegetation.[84] [Emphasis added]

Consistent with this interpretation, the Department's Fact Sheet on the HIR method, published in January 2014, states:

> The activity **must occur on areas of cleared land** on which regrowth has been regularly suppressed (but which has the potential to grow if suppression activities ceased), or on cleared areas alongside existing native vegetation.[85] [Emphasis added]

Similarly, the Regulator's guidance on the method, published on its website over 2013 and 2014 stated:

> The determination applies to projects where **land has been cleared of native vegetation** and where regrowth has been suppressed for at least 10 years.[86] [Emphasis added]

Finally, the ACCU scheme's project register includes a "Project Description" field, which contains the following text for every HIR project:

> This project establishes permanent native forests through assisted regeneration from in-situ seed sources (including rootstock and lignotubers) on **land that was cleared of**

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[82] *Acts Interpretation Act 1901* (Cth), s 15AB.
[83] Parliamentary Secretary for Climate Change and Energy Efficiency (2013) Carbon Credits (Carbon Farming Initiative) (Human Induced Regeneration of a Permanent Even-Aged Native Forest) Methodology Determination 2013: Explanatory Statement. Commonwealth of Australia, Canberra, p 1. Available at: https://www.legislation.gov.au/F2013L00162/asmade/downloads (25 August 2026).
[84] Parliamentary Secretary for Climate Change and Energy Efficiency (2013) Carbon Credits (Carbon Farming Initiative) (Human Induced Regeneration of a Permanent Even-Aged Native Forest) Methodology Determination 2013: Explanatory Statement. Commonwealth of Australia, Canberra, p 7 (see also p 6). Available at: https://www.legislation.gov.au/F2013L00162/asmade/downloads (25 August 2026).
[85] Department of the Environment (2014) CFI Vegetation Methodology: Human-induced Regeneration. Commonwealth of Australia, Canberra. Available at: https://webarchive.nla.gov.au/awa/20140801043904/http://www.climatechange.gov.au/reducing-carbon/carbon-farming-initiative/fact-sheets/human-induced-regeneration (3 July 2026).
[86] Clean Energy Regulator (2013-2014) 'Sequestration methodology: Human induced regeneration of a permanent even-aged native forest'. Available at: https://webarchive.nla.gov.au/awa/20140212052816/https://www.cleanenergyregulator.gov.au/Carbon-Farming-Initiative/methodology-determinations/Pages/Sequestration-methodology-Human-induced-regeneration-of-a-permanent-even-aged-native-forest.aspx (3 July 2026).

vegetation and where regrowth was suppressed for at least 10 years prior to the project having commenced.[87]

The effect of these legal requirements means that, while the method applies to cleared land Australia wide, the overwhelming majority of HIR projects should be located in moderate rainfall areas. This is because regenerating forests and woodlands in arid and semi-arid areas is made difficult by the relative absence of water and variability in rainfall. As the independent technical review for the method noted in 2012, "projects established in very dry, low rainfall areas" are likely to be an "extreme circumstance".[88]

4.2 Registration of projects in uncleared rangelands

Over the term of the method (2013 to 2023), the Regulator registered 529 HIR projects covering an area greater than 42 million hectares. The vast majority lie in Australia's arid and semi-arid rangelands, known colloquially as 'the outback'. Despite the clarity of the legal requirements, most are on land that already supports native vegetation and, in the vast majority of cases, has never been comprehensively cleared (Figure 8).

The concentration of HIR projects on uncleared lands is legally problematic and scientifically illogical. It is legally problematic because the majority of these uncleared lands support well-established native vegetation with mature trees.[89] Land containing mature trees cannot meet the method's eligibility requirements. Most obviously:

(a) land containing mature trees cannot have been suppressed in the prior 10-years, as required by the suppression rule;

(b) it is generally not possible to induce regeneration of trees under the crowns or stems of existing mature trees, as required by the project activity rule;

(c) land containing mature trees will generally not lie within 2 metres of the stems of regeneration or the crowns of regeneration, which means they must be excluded from credited areas under the credited area boundary rule;

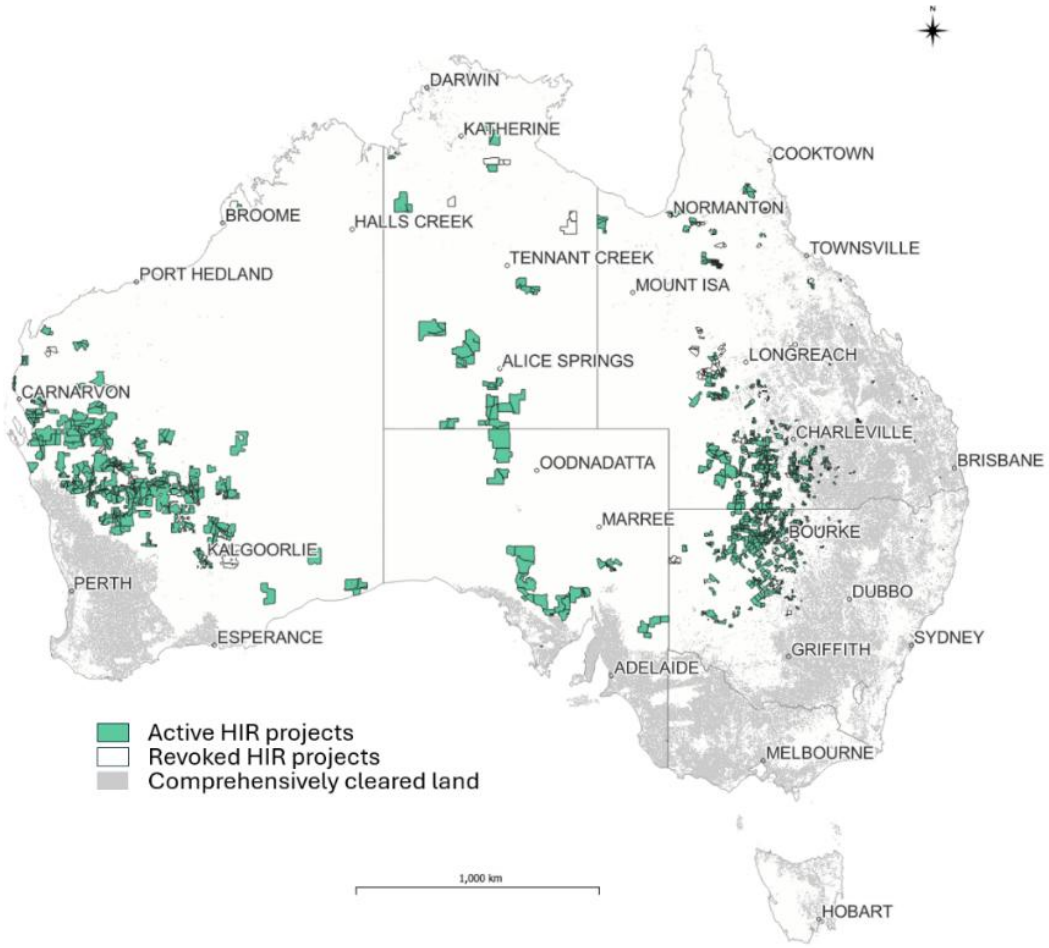
(d) if land contains a mix of mature trees and young regeneration, by definition it cannot meet the even-aged regeneration rule;[90] and

(e) in all but the rarest of cases, it is not possible to regenerate even-aged native forests on uncleared lands through grazing control, as required by the regeneration additionality rule.

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[87] Clean Energy Regulator (2013-2026) ACCU scheme project register. Commonwealth of Australia, Canberra. Available at: https://cer.gov.au/markets/reports-and-data/accu-project-and-contract-register (30 July 2026).
[88] Department of Climate Change and Energy Efficiency (2012) Technical Assessment of Methodology Proposal: 2012RF029 Human-induced Regeneration of a Permanent Even-aged Native Forest Version 1.0. Department of Climate Change and Energy Efficiency, Canberra, p 14 (FOI LEX 83686, Document 1).
[89] Trees are defined broadly under the method as any "perennial plant that has primary supporting structures consisting of secondary xylem". Carbon Credits (Carbon Farming Initiative) (Human Induced Regeneration of a Permanent Even-Aged Native Forest) Methodology Determination 2013 – 1.1. Federal Register of Legislative Instruments F2018C00125 (HIR2018), s 3. On legal non-compliance, see: Macintosh, A., Evans, M.C. et al. (2024) Non-compliance and under-performance in Australian human-induced regeneration projects. The Rangeland Journal 46, RJ24024.
[90] The exclusion of lands containing mature trees and shrubs is logical because, if they are included in credited areas, projects would be credited for regenerating trees that are already there.

Figure 8. Extent of registered HIR projects and cleared land across Australia, 30 June 2026 (n=431)



Source: Clean Energy Regulator (2026) Area-based Australian Carbon Credit Unit (ACCU) Scheme projects. Commonwealth of Australia, Canberra. Available at: https://www.data.gov.au/data/dataset/accu_project_mapping (30 July 2026); Department of Climate Change, Energy, the Environment and Water (DCCEEW) (2023) National Vegetation Information System, version 6. NVIS6_0_AUST_EXT. Commonwealth of Australia, Canberra; NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW) (2020) NSW State Vegetation Type Map – SVTM. NSW Government, Sydney. Available at: https://datasets.seed.nsw.gov.au/dataset/nsw-state-vegetation-type-map (10 August 2026).

From a scientific perspective, there is generally little prospect of materially increasing tree cover (or woody biomass) on uncleared rangelands through reducing grazing pressure, let alone regenerating even-aged native forests. More than 50 years of research on grazing impacts in rangeland ecosystems has demonstrated the following.[91]

[91] Lett, M., Knapp, A. (2005) Woody plant encroachment and removal in Mesic grassland: production and composition responses of herbaceous vegetation. The American Midland Naturalist 153(2), 217-231; Eldridge, D.J., Bowker, M.A., Maestre, F.T., Roger, E., Reynolds, J.F., Whitford, W.G. (2011) Impacts of shrub encroachment on ecosystem structure and functioning: towards a global synthesis. Ecology Letters 14, 709-722; Eldridge, D.J., Sala, O. (2023) Australia's carbon plan disregards evidence. Science 382, 894; Fensham, R., Powell, O., Horne, J. (2011) Rail survey plans to remote sensing: vegetation change in the Mulga Lands of eastern Australia and its implications for land-use. Rangeland Journal 33, 229-238; Anadón, J.D., Sala, O.E., Turner, B.L., Bennett, E.M. (2014) Effect of woody-plant encroachment on livestock production in North and South America. Proceedings of the National Academy of Sciences 111(35), 12948-12953; Archer, S., Predick, K. (2014) An ecosystem services perspective on brush management: research priorities for competing land-use objectives. Journal of Ecology 102, 1394-1407; Archer, S.R., Andersen, E.M., Predick, K.I., Schwinning, S., Steidl, R.J., Woods, S.R. (2017) Woody Plant Encroachment: Causes

- In extensively grazed rangelands that have not been comprehensively cleared, grazing typically does not have a material negative effect on woody biomass.[92] Because grazing generally does not materially reduce woody cover, the amount of woody biomass on uncleared grazed rangelands will typically be at or near its maximum potential. Where ecosystems are at or near their maximum biomass potential, by definition, there is little or no scope to increase tree and shrub biomass through changes in land management. It is the equivalent of trying to hold more water in a glass when the glass is already full (or near full). This is not to suggest that the amount of woody biomass on uncleared rangelands is static. There is a dynamic equilibrium in woody biomass that arises from the interaction between vegetation and its environment, with the levels fluctuating in response to multidecadal variations in rainfall, temperature and disturbances such as droughts and fire. When natural disturbances occur, without clearing, previously forested areas will generally tend to recover and ultimately reach a quasi-equilibrium state that is at or near the land's maximum biomass potential. As a result of these dynamics, grazing control in these areas is generally incapable of significantly increasing biomass-related carbon sequestration.
- Grazing in uncleared rangeland areas can materially *increase* tree and shrub biomass by suppressing fire and reducing competition from grasses and low shrubs. This means that, in some instances, projects involving grazing control could actually *reduce* carbon stocks in trees and shrubs rather than increase them.
- Instances where grazing has a material negative effect on tree and shrub biomass are rare and typically require a particular sequence of events, namely: (i) a tree death event caused by drought or wildfire, which frees resources for new plant growth; (ii) a seedling recruitment event being triggered by a multi-year period of above average rainfall; (iii) relatively heavy stocking of sheep or goats that suppress regeneration during the recruitment event; and (iv) the maintenance of the heavy grazing pressure over multiple decades to prevent subsequent recruitment. In most cases, it is not possible to confidently identify and verify land areas that have been subject to this type of sequence of events, and which are likely to successfully regenerate in response to grazing control on relevant timescales.

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and Consequences. In: Briske, D. (eds) Rangeland Systems. Springer Series on Environmental Management. Springer, pp 25–84; McKeon, G. et al. (eds) (2004) Pasture Degradation and Recovery in Australia's Rangelands. Queensland Department of Natural Resources, Mines and Energy, Brisbane; Fensham, R., Fairfax, R., Archer, S. (2005) Rainfall, land use and woody vegetation cover change in semi-arid Australian savanna. Journal of Ecology 93, 596–606; Noble, J. C. (1997) The Delicate and Noxious Scrub: CSIRO Studies on Native Tree and Shrub Proliferation in the Semi-Arid Woodlands of Eastern Australia. CSIRO Publishing, Melbourne; Fensham, R. et al. (2012) Potential aboveground biomass in drought-prone forest used for rangeland pastoralism. Ecological Applications 22, 894–908; Landsberg, J. et al. (2003) Abundance and composition of plant species along grazing gradients in Australian rangelands. Journal of Applied Ecology 40, 1008–1024; Friedel, M. H. (1997) Discontinuous change in arid woodland and grassland vegetation along gradients of cattle grazing in central Australia. Journal of Arid Environments 37, 145–164; Forrester, D. et al. (2025) Does grazing exclusion in Australia's rangelands affect biomass and debris carbon stocks? The Rangeland Journal 47, RJ24028; Biancari, L. et al. (2024) Drivers of woody dominance across global drylands. Science Advances 10, eadn6007.

[92] Grazing can affect groundcover, can reduce small (low) shrub cover and can slow the growth of juvenile trees and taller shrubs when they are in reach of grazers. However, it generally does not materially affect tree and taller shrub cover, which accounts for the majority of onsite woody biomass.

- Where grazing control increases seedling survival in recruitment events, competition with pre-existing trees and shrubs means it will not necessarily result in sustained increases in tree and shrub biomass. The increased number of seedlings can draw resources away from the pre-existing vegetation, slowing its growth. The higher stem densities can also lead to greater tree mortality in droughts.
- In cases where grazing control could have a material positive affect on tree and shrub biomass, the positive effects will often not persist because of the vulnerability of biomass carbon stocks in rangeland areas to natural disturbance, particularly droughts.

These findings are supported by an extensive literature and are not in serious debate in the scientific community (Appendix A provides further details on the evolution of the literature on the impacts of grazing control in rangelands).[93]

4.3 Existing research on performance of HIR projects

There have now been four peer-reviewed studies into the effects of HIR projects on woody cover.[94] All four had similar findings that align with the science on the impacts of grazing on woody vegetation in rangelands:

- there have been only small increases in woody cover in the credited areas of HIR projects since they were registered or claim to have commenced;
- the projects have had only a small (but statistically significant) additional positive effect on woody cover relative to trends on adjoining lands (both inside and outside the project boundaries); and
- most of the observed changes in woody cover in credited areas can be attributed to seasonal variability in rainfall.

Two of the four studies also found the observed increases in woody cover are substantially below the expected levels based on credited sequestration,[95] a finding confirmed in a fifth paper published in 2025.[96]

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[93] Eldridge, D.J., Sala, O. (2023) Australia's carbon plan disregards evidence. Science 382, 894; Macintosh, A., Butler, D., Henry, B. (2025) Statement on inclusion of human-induced regeneration of native forests and woodlands on uncleared lands in ACCU Integrated Farm & Land Management (IFLM) method. The Australian National University, Canberra. Available at: https://digitalcollections.anu.edu.au/entities/publication/8e6fd305-dc9d-46d3-a3e1-5d362bdae2f3 (3 August 2026).

[94] Beare, S., Chambers, R. (2021) Human induced regeneration: A spatiotemporal study. AnalytEcon Pty Ltd, Berry, NSW; Macintosh, A., Butler, D. et al. (2024) Australian human-induced native forest regeneration carbon offset projects have limited impact on changes in woody vegetation cover and carbon removals. Communications Earth & Environment 5, 149; Macintosh, A., Evans, M.C. et al. (2024) Non-compliance and under-performance in Australian human-induced regeneration projects. The Rangeland Journal 46, RJ24024; Orton, T.G., Bryant, K., Allen, D.E. (2025) A pixel-twinning approach for assessing additionality: a case study of human-induced regeneration projects. Ecological Informatics 92, 103505.

[95] Macintosh, A., Butler, D. et al. (2024) Australian human-induced native forest regeneration carbon offset projects have limited impact on changes in woody vegetation cover and carbon removals. Communications Earth & Environment 5, 149; Macintosh, A., Evans, M.C. et al. (2024) Non-compliance and under-performance in Australian human-induced regeneration projects. The Rangeland Journal 46, RJ24024.

[96] Macintosh, A., Evans, M.C., Butler, D. et al. (2025) Reply to: National-scale datasets underestimate vegetation recovery in Australian human-induced native forest regeneration carbon sequestration projects. Communications Earth & Environment 6, 803. Available at: https://www.nature.com/articles/s43247-025-02726-y (25 September 2026).

The most recent of the four papers on the performance of HIR projects, by scientists at the Qld Department of the Environment, Tourism, Science and Innovation (DETSI), is of particular note because it analysed the project effects on cleared and uncleared lands separately.[97] The study found the projects had a significant effect on persistent green cover[98] when the credited areas had previously been comprehensively cleared, but that they did not have a statically significant effect on cover on uncleared lands.

Overall, the evidence suggests:

- most HIR projects have been unlawfully registered on uncleared lands in arid and semi-arid rangelands (i.e. the outback);[99]
- to 30 June 2026, HIR projects had received 61 million ACCUs (32% of total ACCU issuances) and, in the absence of policy change, are likely to account for ~50% of annual ACCU issuances by 2030; and
- HIR projects on uncleared lands have resulted in little additional regeneration.

That so many HIR projects have been registered apparently in contradiction of eligibility requirements on uncleared lands and then been issued more than 60 million ACCUs (to date) despite the evidence concerning the absence of additional regeneration raises questions concerning how and why this occurred. Appendix A provides a detailed history on this issue.

4.4 Arguments mounted in defence of HIR

In response to the integrity issues raised about HIR projects, the Government and key carbon industry players have mounted a series of unsustainable and often inconsistent arguments to justify the continued crediting of these projects. Details of the seven main arguments that have been advanced and contradicted by subsequent research to date are provided below (further details of these arguments are provided in Appendix B).

1. The Regulator initially claimed “typical” HIR projects are located on cleared land. Subsequent analysis showed this was untrue. Only approximately 5%-6% of the

[97] Orton, T.G., Bryant, K., Allen, D.E. (2025) A pixel-twinning approach for assessing additionality: a case study of human-induced regeneration projects. Ecological Informatics 92, 103505.

[98] Persistent green cover refers to the portion of vegetation that does not completely senesce within a year. The TERN Seasonal Persistent Green (PG) dataset used in the analysis (see: https://portal.tern.org.au/metadata/TERN%2Fdd359b61-3ce2-4cd5-bc63-d54d2d0e2509 (17 August 2026)) was derived from the Landsat version of the TERN Seasonal Fractional Cover (SFC) dataset. The Landsat SFC dataset is a 30-meter resolution national-scale dataset that divides each 30m pixel into three distinct cover fractions, representing the proportions of bare ground, green vegetation (photosynthetic), and non-green vegetation (dry/dead material) for every three-month calendar season from 1989 (see: https://portal.tern.org.au/metadata/0997cb3c-e2e2-45be-ac82-f5e13d24331c (17 August 2026)). The PG dataset is derived by fitting a multi-iteration minimum weighted smoothing spline through the green (photosynthetic) fraction of the SFC time series. The persistent green cover generally consists of woody vegetation (trees and shrubs) but, in some cases, can include non-woody vegetation that remains green all year round. Gill, T. et al. (2015) Persistent Green Vegetation Fraction. In A. Held et al. (eds.), AusCover Good Practice Guidelines: A Technical Handbook Supporting Calibration and Validation Activities of Remotely Sensed Data Product. TERN AusCover, pp 134–154.

[99] Macintosh, A., Evans, M.C. et al. (2024) Non-compliance and under-performance in Australian human-induced regeneration projects. The Rangeland Journal 46, RJ24024.

credited areas of reported projects is mapped as land that has been comprehensively cleared.[100]

2. The Regulator, Department and Emissions Reduction Assurance Committee (ERAC) argued early research showing HIR projects were underperforming was unreliable because it was not peer reviewed.[101] Subsequent publication of peer-reviewed papers showing HIR projects were largely failing made no difference to their position – they continue to deny the existence of integrity issues with HIR projects.
3. The Regulator, Department and ERAC argued that early research showing HIR projects were underperforming was unreliable because it was based on analysis of trends in woody cover in the project areas rather than solely the credited areas.[102] When the credited area boundaries were subsequently published, research showed the use of credited areas rather than project areas made little difference to the conclusion that the projects were failing; there was still a marked absence of additional regeneration across the credited areas.
4. The Regulator, Department and ERAC argued "[t]here is no requirement in the HIR method, nor other legislation, for projects to be preceded by land clearing".[103] As detailed above, this statement is misleading.[104] While the method does not explicitly require proof the land included in credited areas was previously cleared, the eligibility requirements dictate that the land must be devoid of mature trees and shrubs at project commencement and have the capacity to regenerate and achieve forest cover. In all but the rarest of cases, these conditions can only be satisfied if the land previously contained a native forest that was comprehensively cleared.
5. The Regulator and Department argued the "[s]cientific literature supports the view that grazing animals can stop trees reaching a forest, such as a study by Eldridge et al. (2016), which found that that overall 'ecosystem structure, function, and composition in

[100] Department of Climate Change, Energy, the Environment and Water (DCCEEW) (2023) National Vegetation Information System, version 6. NVIS6_0_AUST_EXT. Commonwealth of Australia, Canberra; NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW) (2020) NSW State Vegetation Type Map – SVTM. NSW Government, Sydney. Available at: https://datasets.seed.nsw.gov.au/dataset/nsw-state-vegetation-type-map (10 August 2026).
[101] Emissions Reduction Assurance Committee (2022) Emissions Reduction Assurance Committee findings on the Emissions Reduction Fund's Human Induced Regeneration method. Commonwealth of Australia, Canberra, pp 6 & 21. Available at: https://www.dcceew.gov.au/sites/default/files/documents/erac-findings-human-induced-regeneration-method.pdf (17 August 2026).
[102] Emissions Reduction Assurance Committee (2022) Emissions Reduction Assurance Committee findings on the Emissions Reduction Fund's Human Induced Regeneration method. Clean Energy Regulator, Canberra. Available at: https://www.dcceew.gov.au/sites/default/files/documents/erac-findings-human-induced-regeneration-method.pdf (3 August 2026); Chubb, I. (2023) Carbon Farming: let's get real and let's get on with it. Department of Climate Change, Energy, the Environment and Water, Canberra. Available at: https://www.dcceew.gov.au/sites/default/files/documents/prof-ian-chubb-2023-carbon-farming-statement.docx (3 August 2026).
[103] Clean Energy Regulator and Department of Climate Change, Energy, the Environment and Water (2023) Joint CER/DCCEEW response to ANU papers on Human Induced Regeneration. Commonwealth of Australia, Canberra. Available at: https://cer.gov.au/news-and-media/news/2023/june/joint-cerdcceew-response-to-anu-papers-human-induced-regeneration (3 August 2026).
[104] Macintosh, A., Evans, M.C. et al. (2024) Non-compliance and under-performance in Australian human-induced regeneration projects. The Rangeland Journal 46, RJ24024.

rangelands are negatively affected by livestock grazing'".[105] As detailed above and in Appendix A, this statement is untrue. When the statement was published in June 2023, it prompted the lead author from the main cited article (Professor David Eldridge) to publicly rebuke the Regulator for misrepresenting his research.[106] He later published an article in *Science* reiterating that the scientific literature does not support the assertion that reducing grazing in uncleared rangelands increases woody biomass.[107]

6. From November 2021 until the present, the Regulator and ERAC have claimed a report commissioned by the ERAC (Beare & Chambers report) that relied on the Australian Government's National Forest & Sparse Woody Vegetation (NFSW) dataset (a national dataset derived from Landsat imagery with 25m resolution) showed the "projects demonstrably increased the amount of vegetation regenerating"[108] and that the projects were "exceeding expectations".[109] However, the report found the projects had a statistically significant but small positive effect on 'woody cover' (forest plus sparse woody cover) relative to 'quasi-control' areas located on adjacent lands not in the credited areas. The report also found 23% of the assessed projects had no, negative or almost no impact on woody cover relative to the trends in the quasi-control areas. The use of the results in the Beare & Chambers report to support Government, ERAC and industry's claims HIR projects were performing as expected was later discredited by a study in the *Nature*-stable journal *Communications Earth and Environment* (Macintosh, Butler et al. (2024)).[110] The study analysed 182 HIR projects using the same NFSW dataset and found limited evidence of regeneration and that the projects had had a statistically significant but small effect on forest cover.

7. Faced with the results from Macintosh, Butler et al. (2024), the Regulator and Department responded by claiming that analysis they had commissioned from ANU Enterprises, undertaken by Dr Cris Brack and published in December 2023,[111] provided confidence projects were performing as expected. Brack (2023) analysed 25 HIR projects against the Regulator's "gateway rules" (see Appendix A). For these purposes,

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[105] Clean Energy Regulator and Department of Climate Change, Energy, the Environment and Water (2023) Joint CER/DCCEEW response to ANU papers on Human Induced Regeneration. Commonwealth of Australia, Canberra. Available at: https://cer.gov.au/news-and-media/news/2023/june/joint-cerdcceew-response-to-anu-papers-human-induced-regeneration (3 August 2026). See also: Clean Energy Regulator (2022) Additional Literature – impacts of grazing animals on regenerating vegetation. Clean Energy Regulator, Canberra.

[106] Eldridge, D. (2023) Statement by Professor David Eldridge on misuse of research: July 2023. Vimeo. Available at: https://vimeo.com/847854818?share=copy&fl=cl&fe=ci (3 August 2026).

[107] Eldridge, D.J., Sala, O. (2023) Australia's carbon plan disregards evidence. *Science* 382, 894.

[108] Emissions Reduction Assurance Committee (2022) Emissions Reduction Assurance Committee findings on the Emissions Reduction Fund's Human Induced Regeneration method. Commonwealth of Australia, Canberra, p 2. Available at: https://www.dcceew.gov.au/sites/default/files/documents/erac-findings-human-induced-regeneration-method.pdf (17 August 2026).

[109] Clean Energy Regulator (2022) CER response to claims by Professor Andrew MacIntosh. Commonwealth of Australia, Canberra. Available at: https://parlinfo.aph.gov.au/parlInfo/search/display/display.w3p;query=Id%3A%22media%2Fpressrel%2F8505308%22;src1=sm1 (20 August 2026).

[110] Macintosh, A., Butler, D. et al. (2024) Australian human-induced native forest regeneration carbon offset projects have limited impact on changes in woody vegetation cover and carbon removals. Communications Earth & Environment 5, 149.

[111] Brack, C. (2023) Gateway Regeneration Checks for Human Induced Regeneration projects. Phase 2. Clean Energy Regulator, Canberra. Available at: https://cer.gov.au/document/gateway-regeneration-checks-human-induced-regeneration-projects (3 August 2026).

he relied primarily on the Woody Cover Fraction (WCF) database, a national database derived from Landsat data with 25m resolution, which monitors changes in foliage projective cover (FPC) from woody vegetation ≥2 metres in height across the continent.[112] Based on analysis of WCF data, Brack (2023) found that "the [credited areas] appear to be regenerating well in the project areas, especially since 2020 and on average are significantly (p=0.05) above the 7.5% canopy cover threshold".[113] Drawing on these findings, and his review of the data and processes relied on by the Regulator to assess and ensure compliance, Brack (2023) concluded:

> The independent audit reports and the [Regulator] reviews provide strong assurance that projects are being managed as per the legislative requirements and that appropriate methods have been used by the proponents or their agents in classifying the [carbon estimation areas] and identifying changes in regeneration canopy cover.[114]

This claim was subsequently discredited by Macintosh, Evans et al. (2024), who analysed 116 HIR projects against the gateway rules using the same WCF dataset and found extremely high levels of non-compliance and that the projects had a statistically significant but small effect on woody cover.[115]

With the NFSW and WCF defences undermined by subsequent research, the Government, Regulator and key players in the carbon industry changed direction again. They now claim that "all national scale" datasets of woody cover —NFSW, WCF and TERN Persistent Green (which was relied on in Orton et al. (2025))—are ill-suited for use in analysing HIR projects and that the only reliable way of analysing project performance is using field data collected by proponents and their agents (which is not published) and higher resolution remote sensed data (i.e. resolution ≤10m).[116] The Government and Regulator have based this argument on gateway check reports prepared by Brack (2024a, 2024b, 2025a, 2025b, 2026).[117] After relying primarily

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[112] Liao, Z. et al. (2020) Woody vegetation cover, height and biomass at 25-m resolution across Australia derived from multiple site, airborne and satellite observations. International Journal of Applied Earth Observation and Geoinformation 93, 102209. FPC refers to the proportion of ground area covered by the vertical projection of the foliage of tree crowns.

[113] Brack, C. (2023) Gateway Regeneration Checks for Human Induced Regeneration projects. Phase 2. Clean Energy Regulator, Canberra, p 9. Available at: https://cer.gov.au/document/gateway-regeneration-checks-human-induced-regeneration-projects (3 August 2026).

[114] Brack, C. (2023) Gateway Regeneration Checks for Human Induced Regeneration projects. Phase 2. Clean Energy Regulator, Canberra, p 11. Available at: https://cer.gov.au/document/gateway-regeneration-checks-human-induced-regeneration-projects (3 August 2026).

[115] Macintosh, A., Evans, M.C. et al. (2024) Non-compliance and under-performance in Australian human-induced regeneration projects. The Rangeland Journal 46, RJ24024.

[116] Moore, T. et al. (2025) National-scale datasets underestimate vegetation recovery in Australian human-induced native forest regeneration carbon sequestration projects. Communications Earth & Environment 6, 802. For reply, see: Macintosh, A., Evans, M.C. et al. (2025) Reply to: National-scale datasets underestimate vegetation recovery in Australian human-induced native forest regeneration carbon sequestration projects. Communications Earth & Environment 6, 803.

[117] Brack, C. (2024a) Gateway Regeneration Checks for Human Induced Regeneration projects (2024/1). ANUE Project #1-1035 (Phase 3). Clean Energy Regulator, Canberra; Brack, C. (2024b) Gateway Regeneration Checks for Human Induced Regeneration projects. ANUE Project #1-1035 (Phase 3 part 2 for 2024). Clean Energy Regulator, Canberra; Brack, C. (2025a) Gateway Regeneration Checks for Human Induced Regeneration projects. ANUE Project #1-1035 (Phase 4 part 1 for 2025). Clean Energy Regulator, Canberra; Brack, C. (2025b) Gateway Regeneration Checks for Human Induced Regeneration projects. ANUE Project #1-1035 (Phase 5). Clean Energy Regulator, Canberra; Brack, C. (2026) Gateway Regeneration Checks for Human Induced Regeneration projects. ANUE Project #1-1035 (Phase 5).

on WCF in 2023, in his later reports, Brack has contended that all of the Landsat-based national scale models are imprecise, inconsistent and tend to significantly underestimate canopy cover of the sparsely wooded areas.[118] Brack also claims high-resolution imagery (50cm to 2m resolution) from ESRI Wayback (an online digital tool) is used to check that regeneration is occurring in accordance with the Regulator's gateway rules and that, in the majority of cases he analysed, the Wayback imagery "provided evidence of positive regeneration".[119]

5. Assessing forest regeneration in a sample of HIR projects

The Government, Regulator and carbon industry's latest defence of the performance of HIR projects rests on two claims:

(a) Landsat-based datasets of woody vegetation cover are not sufficiently accurate to assess regeneration in the rangeland areas with HIR projects; and

(b) higher resolution imagery and data derived from field measurements shows HIR projects are regenerating in line with expectations.

To test these claims, we undertook analysis of forest regeneration in a sample of 50 HIR projects.

Consistent with the approaches used by the Regulator and endorsed by Brack (2024a, 2024b, 2025a, 2025b, 2026), the analysis of forest regeneration was undertaken using timeseries datasets for crown cover and forest extent derived from medium-resolution Sentinel-2 imagery (10m) and very high-resolution imagery (30-80cm). Three approaches were used for these purposes.

(a) Forest cover in the credited areas and comparison areas was analysed in 2020 and 2025 using the Vegetation Monitoring & Assessment Program (VMAP) Forest Extent dataset. In this context, 'forest cover' refers to areas ≥0.2 ha with trees ≥2m in height that provide crown cover of ≥20%. The VMAP Forest Extent dataset estimates forest cover across the continent using 10m resolution Sentinel-2 imagery. Changes in forest cover were analysed in the credited areas of the projects. To facilitate analysis of the impacts of the projects, 2000 x 10 ha 'comparison area' cells were randomly selected from a 3km buffer around the projects, excluding areas included in other projects. Trends in forest cover in the comparison areas were compared to those in the corresponding credited areas to provide insights on the extent to which any observed changes in the credited areas were 'additional' to what is likely to have occurred in the absence of the projects.

(b) Changes in crown cover from 2017 to 2025 were assessed in the credited areas and their comparison areas using the VMAP Woody Cover dataset. 'Crown cover' refers to the proportion of ground area covered by the vertical projection of tree crowns. The VMAP

Clean Energy Regulator, Canberra. All available at: https://cer.gov.au/schemes/australian-carbon-credit-unit-scheme/managing-risk-and-integrity-accu-scheme#independent-reviews-of-the-accu-scheme (26 August 2026).

[118] Brack, C. (2026) Gateway Regeneration Checks for Human Induced Regeneration projects. ANUE Project #1-1035 (Phase 5). Clean Energy Regulator, Canberra, pp 6-10.

[119] Brack, C. (2025a) Gateway Regeneration Checks for Human Induced Regeneration projects. ANUE Project #1-1035 (Phase 4 part 1 for 2025). Clean Energy Regulator, Canberra, p 12. See also Brack, C. (2024a) Gateway Regeneration Checks for Human Induced Regeneration projects (2024/1). ANUE Project #1-1035 (Phase 3). Clean Energy Regulator, Canberra, p 9; Brack, C. (2024b) Gateway Regeneration Checks for Human Induced Regeneration projects. ANUE Project #1-1035 (Phase 3 part 2 for 2024). Clean Energy Regulator, Canberra, p 7.

Woody Cover dataset estimates crown cover from woody vegetation ≥2 metres tall in each cell of a 10m x 10m grid across the continent, using 10m resolution Sentinel-2 imagery. The purpose of this analysis was to assess: (i) whether crown cover has increased since 2017; (ii) whether any observed increase is commensurate with the expected increase in crown cover based on ACCU issuances; and (iii) the extent to which the projects have increased crown cover beyond changes observed in the comparison areas, where the project activities have not been implemented.

(c) Changes in crown cover since project commencement in the credited areas were assessed using very high-resolution imagery (30-50cm, with one image at 80cm) obtained from Vantor via Terrabit and the European Space Agency. For each project, two images for one 2,500 ha area of interest was obtained: one from around the time the project claimed to have commenced and the most recent image available for the area. The images were divided into 230 x 10.9 ha cells. The 60 cells with the highest proportion of credited area were selected for assessment. The two images of the credited areas in each of the 60 cells was visually assessed by two separate research groups (2 researchers in Research Group 1[120] and 3 researchers in Research Group 2)[121] to determine whether there was evidence of regeneration using the Likert-scale presented in Table 3. The researchers in Research Group 1 knew the names and details of the projects, the location of the cells, the date the imagery was captured and the context of the assessment. The researchers in Research Group 2 had no context about the nature and purpose of the visual assessment and no details of the cells or the date of the imagery. They were provided access only to the imagery and conducted a blind assessment of the difference in crown cover between the images without additional context.

Table 3. Visual assessment scale

Category	Test
Substantial negative change	Reduction in canopy cover ≥20%
Moderate negative change	Reduction in canopy cover between 5% & 19%
Slight negative change	Reduction in canopy cover between 1% & 4%
No change	Change in canopy cover >-1% & <1%
Slight positive change	Increase in canopy cover between 1% & 4%
Moderate positive change	Increase in canopy cover between 5% & 19%
Substantial positive change	Increase in canopy cover ≥20%

To facilitate analysis of differences in performance, the sample was divided into four groups based on the proportion of credited area mapped as extant native vegetation.

- **Group A:** projects whose credited area was mapped as ≥90% extant native vegetation (i.e. <10% comprehensively cleared) (n=38, aggregate credited area of 345,942 ha – 79% of total credited area in sample).

[120] Authors 1 and 2 of this report.
[121] All three researchers were from Australia Spatial Analytics Ltd, who were contracted by The Australian National University to undertake the assessment.

- **Group B:** projects whose credited area was mapped as 71%-90% extant native vegetation (i.e. 10-29% comprehensively cleared) (n=6, aggregate credited area of 40,603 ha – 9% of total credited area in sample).
- **Group C:** projects whose credited area was mapped as 41%-70% extant native vegetation (i.e. 30-59% comprehensively cleared) (n=2, aggregate credited area of 11,430 ha – 3% of total credited area in sample).
- **Group D:** projects whose credited area was mapped as 0%-40% extant native vegetation (i.e. 60-100% comprehensively cleared) (n=4, aggregate credited area of 39,990 ha – 9% of total credited area in sample).

Further details on the method and project sample are provided in Appendix C.

5.1 Results

5.1.1 Forest cover

Key findings

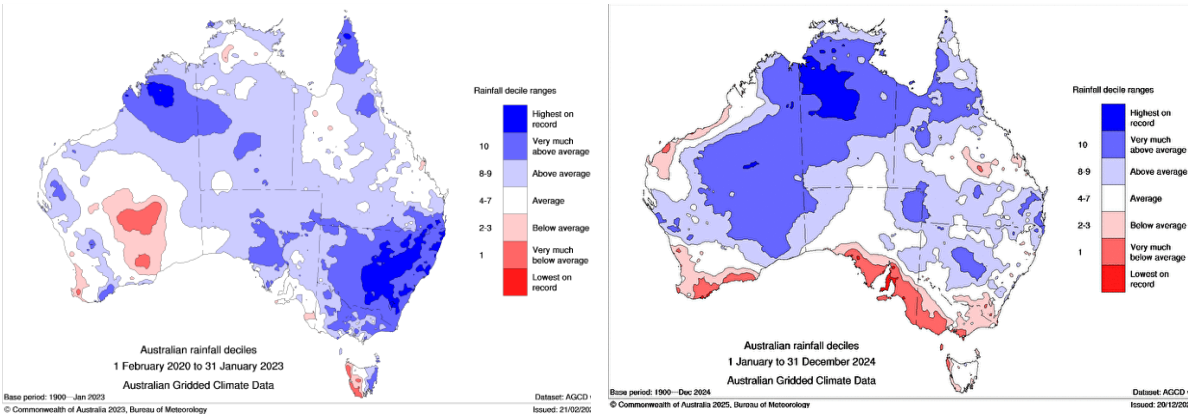
- By late 2025, based on ACCU issuances, all of the projects in the sample should have had 100% forest cover across their credited areas from new regeneration alone (i.e. disregarding cover from pre-existing mature trees and shrubs).
- Despite a historic wet period since 2020 across the regions with HIR projects, in 2025, only 37% of the aggregate credited area of the 50 projects had forest cover, just 6% above the level in 2020.
- Due to the science on grazing impacts on woody vegetation in uncleared rangelands, it is expected that forest cover increases would be more pronounced in projects whose credited areas have more cleared land. The results accord with this expectation (Table 4).
- Forest cover increased by only 1.4% in the credited area of Group A projects (least cleared/highest level of extant native vegetation), which account for almost 80% of the combined credited area of the 50 projects in the sample. In comparison, forest cover increased by 16%, 22% and 31% in the credited areas of Group B, C and D projects respectively.
- In aggregate, forest cover increased by 5.9% in the credited areas versus 2.8% in the comparison areas, suggesting around half of the observed increase in forest cover in the credited areas was attributable to non-project factors (e.g. rainfall).

Table 4. Forest cover and forest cover change, 2020 to 2025, by project group

Group	No. of projects	Credited area (ha) [% of total]	Forest cover in 2020	Forest cover in 2025	Change in forest cover (2020 to 2025)	
					Credited area	Comparison area
A	38	345,942 [79%]	28%	30%	1%	1%
B	6	40,603 [9%]	27%	42%	16%	8%
C	2	11,430 [3%]	60%	83%	22%	15%
D	4	39,990 [9%]	45%	76%	31%	12%
Total	**50**	**437,965**	**31%**	**37%**	**6%**	**3%**

Based on ACCU issuances, by late 2025, 100% of the aggregate credited area of the 50 projects in the sample should have had forest cover from new regeneration alone. The expectation of a marked increase in forest cover across the credited area of the projects is heightened by the rainfall experienced since 2020, which was conducive to vegetation growth. Over the period 2020 to 2023, there was a rare triple-dip La Niña event that brought above average rainfall across most of the region in which the sampled HIR projects are located (Figure 9(a)). The Southern Annular Mode (SAM) shifted to a positive phase in late 2023/early 2024, which contributed to the 2024 calendar year being another period of above average rainfall for most of the relevant HIR regions (Figure 9(b)). Despite 2020-2025 being a historically wet period, only 37% of the aggregate credited area had forest cover in 2025, 6% above the level in 2020 (Figure 10).

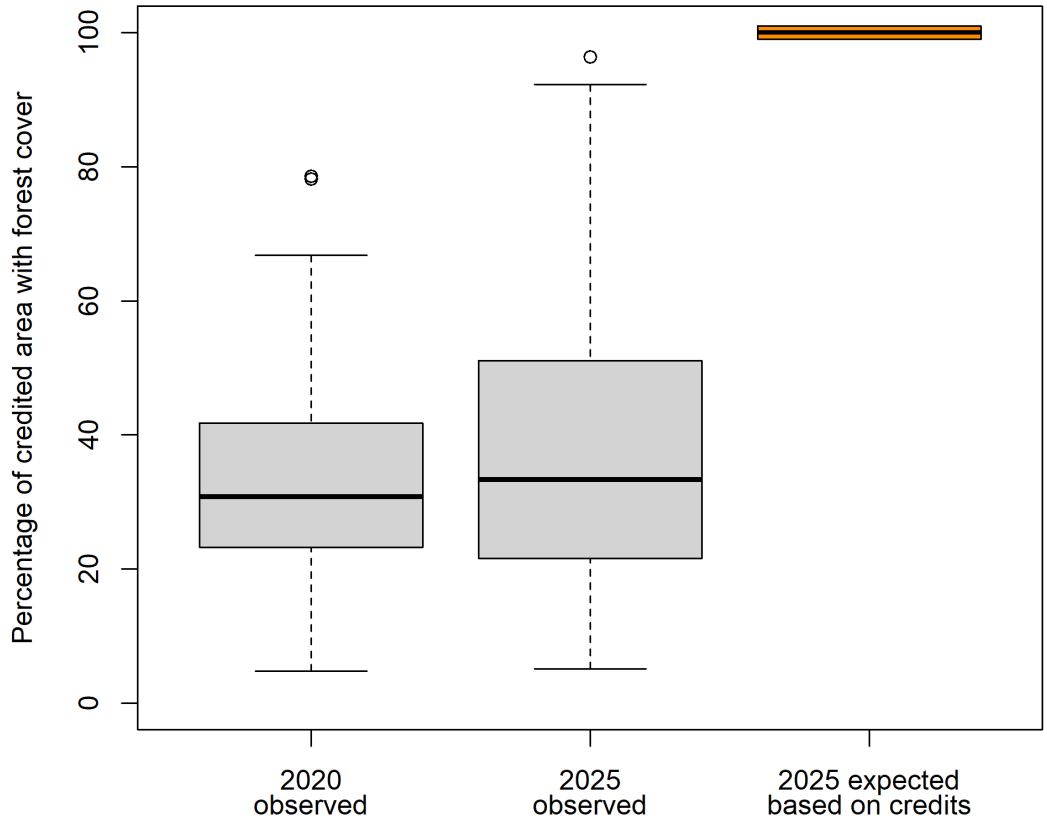
Figure 9. Australian rainfall deciles, 1 February 2020 to 31 January 2023 & 1 January to 31 December 2024



(a) 1 February 2020 to 31 January 2023 (b) 1 November 2023 to 31 March 2024

Source: Bureau of Meteorology (2026) Australian rainfall since 1900. Available at: https://www.bom.gov.au/climate/history/rainfall/ (10 August 2026); Saunders, T. (2023) La Niña's three-year reign across Australia finally ends, promising drier, hotter weather. ABC News. Available at: https://www.abc.net.au/news/2023-03-10/la-nina-ends-australia-after-three-years/102077766 (12 August 2026).

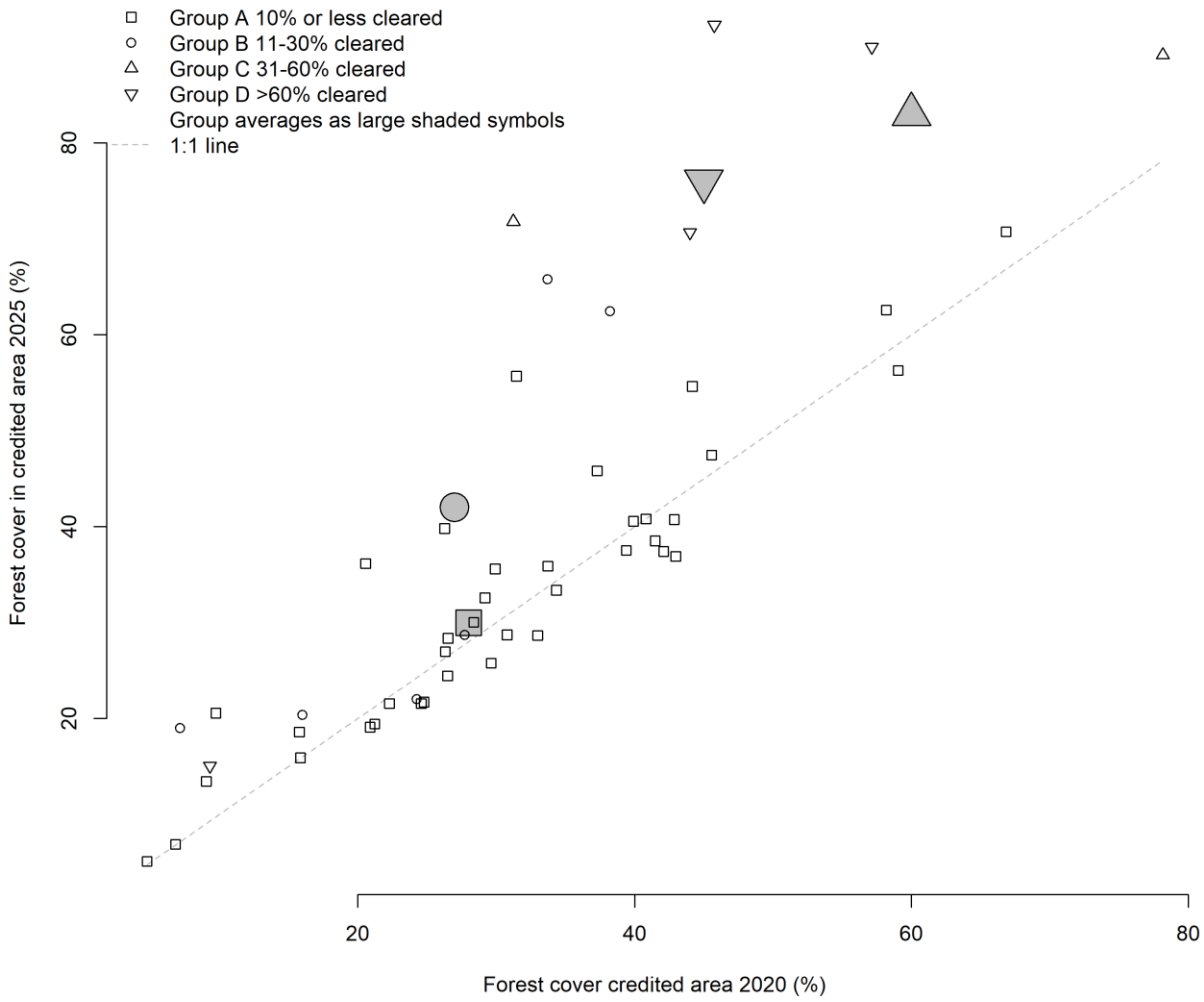
Figure 10. Aggregate credited area of HIR projects in sample (n=50) – actual forest cover in 2020 and 2025 vs expected forest cover in 2025



The estimated forest cover for projects in Groups A, B, C and D largely align with the hypothesised results, based on the science on grazing effects in uncleared rangelands (Figure

11). The credited areas of projects in Group A (n=38) had low levels of forest cover in 2025 (29.8%) and experienced negligible change between 2020 and 2025 (1.4% increase); indicated by the fact that the individual project points are clustered around the dashed line in Figure 11. Forest cover across the aggregate credited area of Group B projects (n=6) was 42% in 2025, up from 27% in 2020. Forest cover across the aggregate credited area of projects in Group C (n=2) and D (n=4) was substantially higher (83% and 76% respectively) and experienced a greater increase between 2020 and 2025 (22% and 31% respectively).

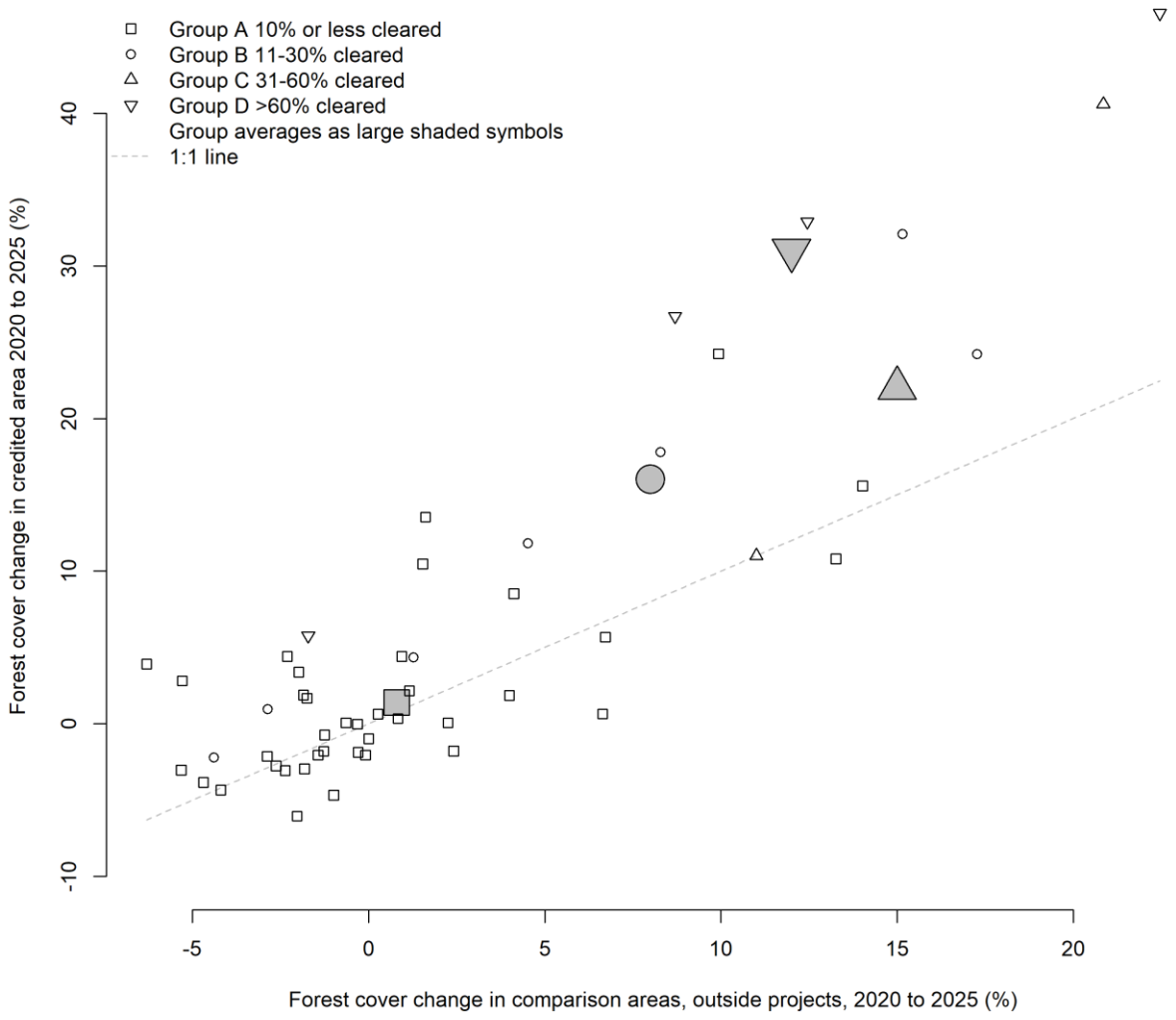
Figure 11. Forest cover in 2020 and 2025 – project Groups A, B, C and D



To explore the effects of non-project factors (e.g. rainfall) on the observed change in forest cover, we compared the change in forest cover in the credited area of the projects to the change in forest cover in their comparison areas. As shown in Figure 12, between 2020 and 2025, forest cover increased in both the credited areas and comparison areas for most projects, though note the cluster of projects with declines in cover in the bottom left of Figure 12. Projects above the dashed line in Figure 12 are those where the credited areas experienced larger increases than their surrounding lands, which was true on average for all of the project groups. The difference in the increase between the credited areas and comparison areas was smallest in Group A (only 0.6%, shown by the large, shaded square in Figure 12) and largest in Group D (19.1%, large shaded upside-down triangle). The increase in forest cover in credited areas and comparison

areas is expected, given the run of wet years since 2020. Further, consistent with the science on grazing impacts, the observed increase in forest cover progressively increased from Group A (highest proportion of extent native vegetation/least cleared area, where forest cover in the credited area increased by 1.4%) to Group D (lowest proportion of extent native vegetation/most cleared area, where forest cover in the credited area increased by 31%) (Table 4).

Figure 12. Increase in forest cover in credited areas vs comparison areas, 2020 to 2025 – project Groups A, B, C and D



5.1.2 Crown cover

Key findings

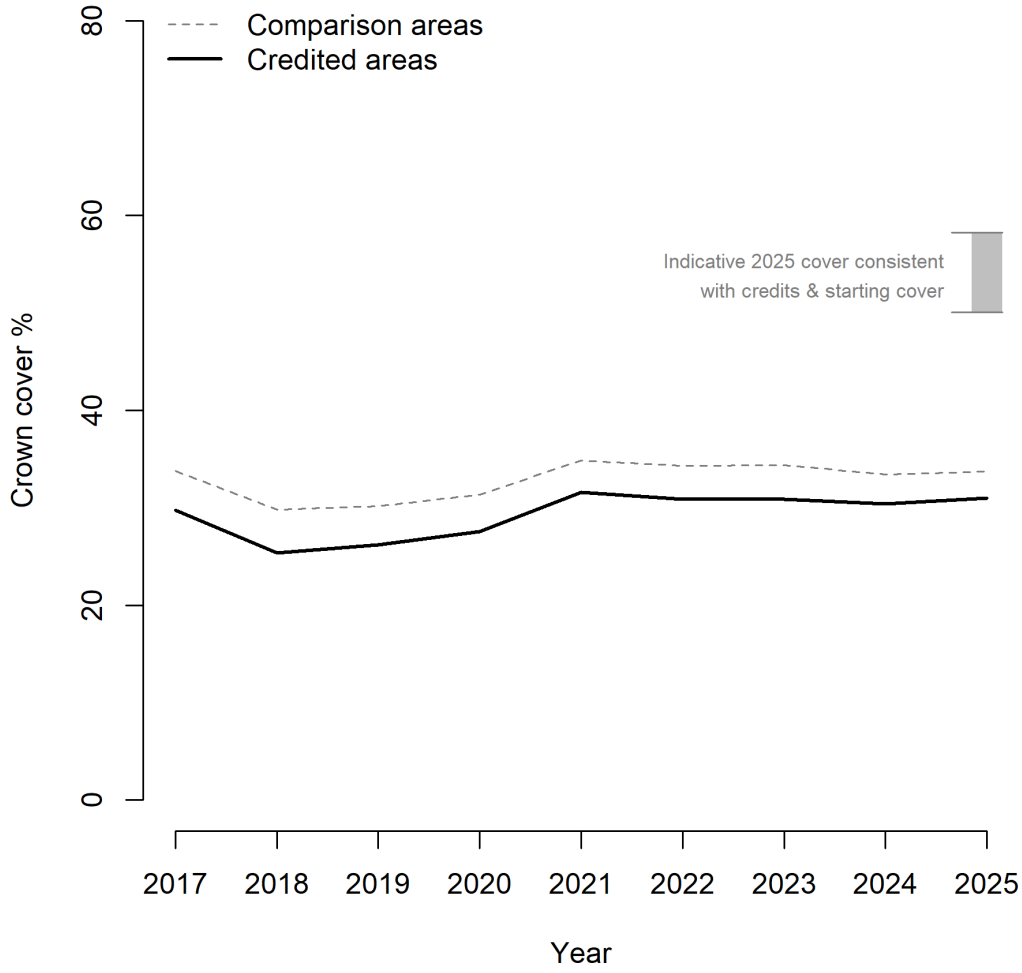
- Average crown cover across the credited area of the 50 projects showed negligible change between 2017 and 2025 – it was 29% in 2017 and 30% in 2025.
- Trends in average crown cover across the aggregate credited area and comparison area of the projects were strongly correlated over the period 2017-2025 (r^2=0.94, ***p<0.001). The difference in average crown cover between the two areas (credit area vs comparison area) decreased by only 1.6% over the period. The results suggest that, in the aggregate, the projects have had negligible additional impact on crown cover.
- There is a large disparity between observed and expected crown cover. In 2025, average crown cover was 30%, while (based on issued credits) it was expected to be between 50% and 58%.
- There were material differences in the observed trends in crown cover between the four project groups. In Group A (least cleared/highest level of extant native vegetation, n=38), average crown cover decreased slightly between 2017 and 2025 (by 0.7%) and was substantially below the expected levels (27.4% vs 50%-57%). The trends in crown cover in the credited areas of Group A projects also mirrored those in the relevant comparison areas (r^2=0.97, ***p<0.001, with the difference in average crown cover between the two areas decreasing by only 0.7% over the period).
- Trends in average crown cover were more positive in Groups B, C and D (n=12). All three groups experienced increases in crown cover over the period 2017 to 2025, with the magnitude of the positive changes being progressively larger as the proportion of extant native vegetation in the credited areas declined (i.e. smallest in Group B and largest in Group D).

Across the aggregate credited area of the 50 projects (437,965 ha), there was negligible change in average crown cover over the period 2017 to 2025 (Figure 13). In 2017, average crown cover was 29%, it then declined through the 2017-2019 drought before recovering to 30% during the wet period since 2020.

The trends in average crown cover in the aggregate credited area and comparison area of the projects were strongly correlated over the period 2017-2025 (r^2=0.94, ***p<0.001) (Figure 13). The difference in average crown cover between the two areas (credit area vs comparison area) decreased by only 1.6% over the period, suggesting that, in the aggregate, the projects have had negligible additional impact on crown cover.

The average crown cover across the aggregate credited area of the projects in 2025 was substantially below the expected levels, based on credited sequestration and accounting for the cover provided by pre-existing vegetation (Figure 13). Average expected crown cover in 2025 was between 50% and 58%, with the range reflecting uncertainty regarding crown cover at project commencement. In comparison, estimated average crown cover in 2025 was only 30%.

Figure 13. Trends in crown cover in aggregate credited area across all projects in sample vs comparison area, 2017 to 2025 (n=50, aggregate credited area 437,965 ha)



Consistent with the results for forest cover, there were material differences in the observed trends in crown cover between the four project groups. In Group A (least cleared/highest level of extant native vegetation, n=38), average crown cover actually decreased slightly between 2017 and 2025 (by 0.7%) (Figure 14). It declined during the 2017-20 drought, reaching a low of 24.7% in 2018, before rebounding to a high of 30.5% in 2021 before declining again to 27.4% in 2025. The trends in crown cover in the credited areas mirrored those in the aggregate comparison area of Group A projects (r^2=0.97, ***p<0.001, with the difference in average crown cover between the two areas decreasing by only 0.7% over the period). Average crown cover across Group A projects was again substantially below the expected levels: 27.4% vs 50%-57% (Figure 14).

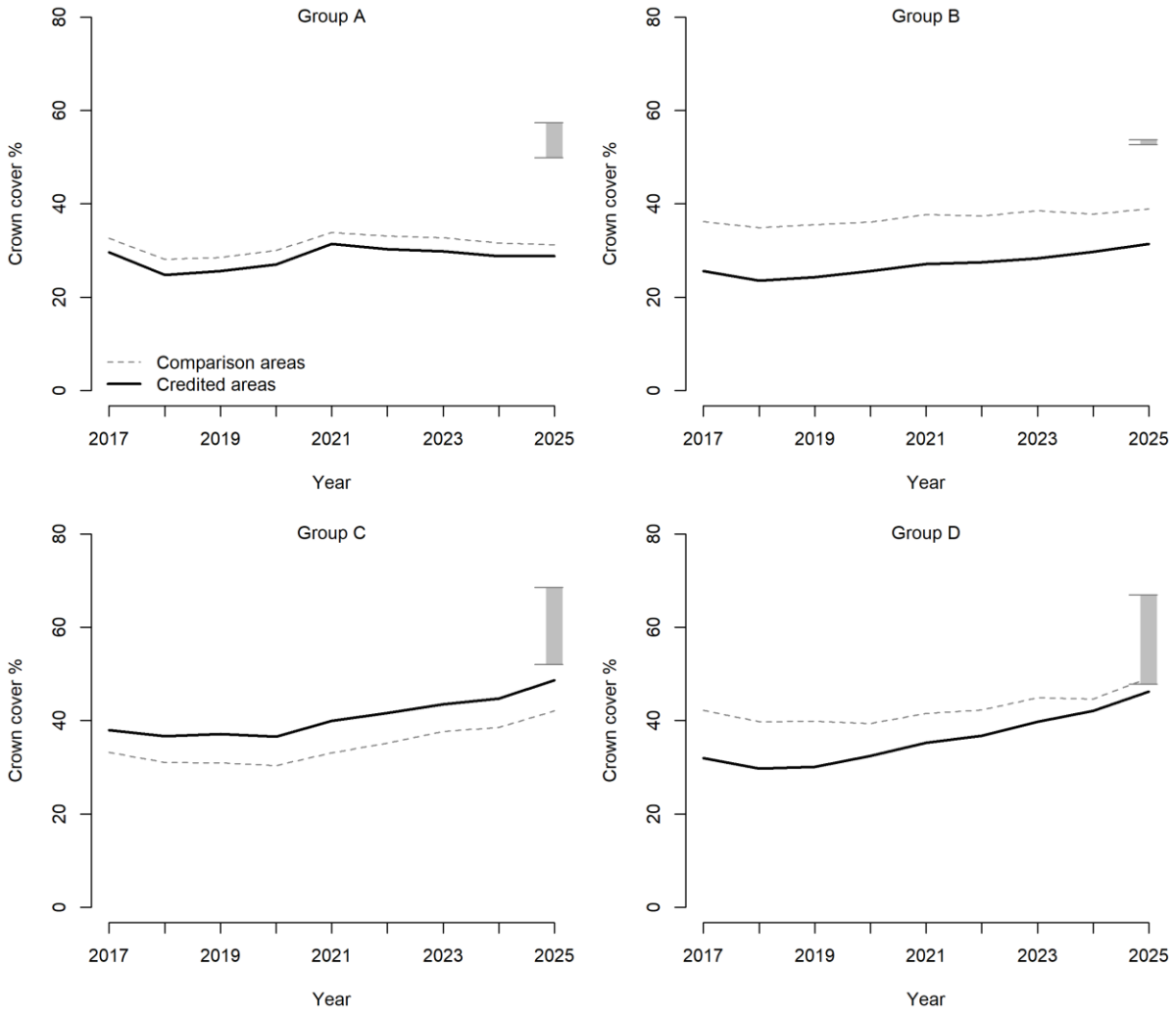
The trends in average crown cover were more positive in Groups B, C and D (n=12) (Figure 14). All three groups experienced increases in crown cover over the period 2017 to 2025, with the magnitude of the positive changes being progressively larger as the proportion of extant native vegetation in the credited areas declined (i.e. smallest in Group B and largest in Group D).

While Group B projects (n=6) experienced an increase in average cover, the increase was small (5.7%) and estimated crown cover in 2025 was materially below expectations based on credited sequestration (31% vs 52%-55%). Group C and D projects experienced larger increases in crown cover (11% and 14% respectively) and, in 2025, crown cover was reasonably close to—

though still short of—the lower bound estimate of expected cover (49% vs 52% for Group C and 46% vs 48% for Group D).

Across Groups B, C and D, the trends in crown cover in the credited areas were strongly correlated with those in their comparison area (Group B r^2=0.88, Group C r^2=0.98, Group D r^2=0.89, all ***p<0.001). The difference in average crown cover between the credited areas and comparison areas narrowed by 3.1% in Group B projects and by 7.3% in Group D projects, suggesting the projects had a notable impact on cover. Similarly, for Group C projects, where canopy cover in the credited areas started above the levels in comparison areas, the difference in average crown cover increased over the period 2017 to 2025 (by 1.9%), again, consistent with the projects having a material impact on cover.

Figure 14. Trends in crown cover in aggregate credited area across projects in Groups A, B, C and D



5.1.3 Visual assessment

Key findings

- 3,000 x 10.9 ha cells from the 50 projects (60 cells per project) were independently visually assessed by two research groups, with two researchers in Research Group 1 (6,000 cell assessments) and three researchers in Research Group 2 (9,000 cell assessments).
- Of the 6,000 cell assessments conducted by Research Group 1, 78% found the cells experienced no, negative or only slight positive change between when the project commenced and the most recent image available. 16% found the cells experienced moderate positive change (5-19% increase in canopy cover). 6% found the cells experienced substantial positive change (≥20% increase in canopy cover) (i.e. the level expected based on issued credits).
- Of the 9,000 cell assessments conducted by Research Group 2, 87.6% found the cells experienced no, negative or only slight positive change. 11.7% found the cells experienced moderate positive change (5-19% increase in canopy cover). 0.7% found the cells experienced substantial positive change (≥20% increase in canopy cover) (i.e. the level expected based on issued credits).
- There were material differences across the project groups. The visual assessment shows projects in Group A are substantially underperforming. More positive results were found in Group B and D projects. However, a considerable number of projects, and a material proportion of cells within most projects, were still found to be underperforming (no, negative or only slight positive change).
- The underperformance in some of the Group B, C and D projects, particularly those in Groups C and D, appears to be due to the effects of the 2017-2020 drought (tree death and stagnation of regeneration), which was not appropriately reflected in credit issuances over the period.

The results of the visual assessment accord with the forest and crown cover analysis undertaken with the VMAP datasets. Of the 6,000 cell assessments conducted by Research Group 1:

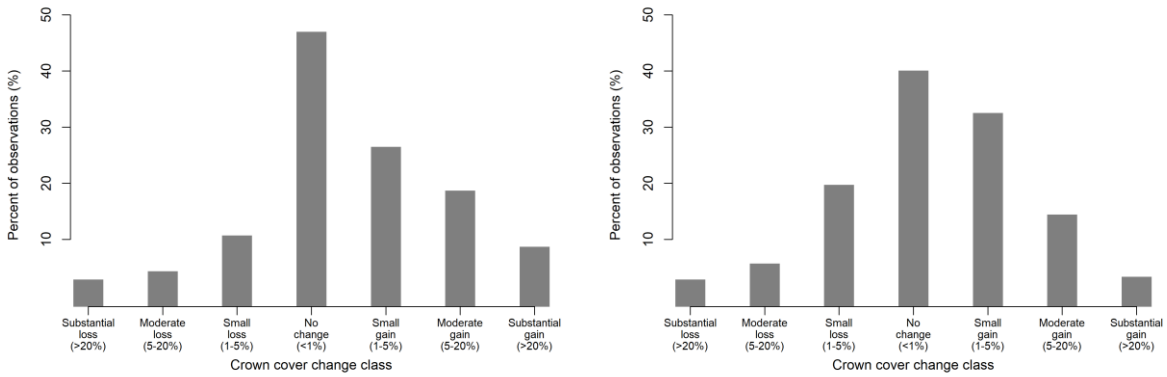
- 78% found the cells experienced no, negative or only slight positive change between when the project commenced and the most recent image available;
- 16% found the cells experienced moderate positive change (5-19% increase in canopy cover); and
- 6% found the cells experienced substantial positive change (≥20% increase in canopy cover) (i.e. the level expected based on issued credits).

Similarly, of the 9,000 cell assessments conducted by Research Group 2:

- 87.6% found the cells experienced no, negative or only slight positive change;
- 11.7% found the cells experienced moderate positive change (5-19% increase in canopy cover); and
- 0.7% found the cells experienced substantial positive change (≥20% increase in canopy cover) (i.e. the level expected based on issued credits).

Figure 15. Visual assessment of cells – all projects, percentage of observations in each category (n=6,000)

(a) Research Group 1 **(b) Research Group 2**



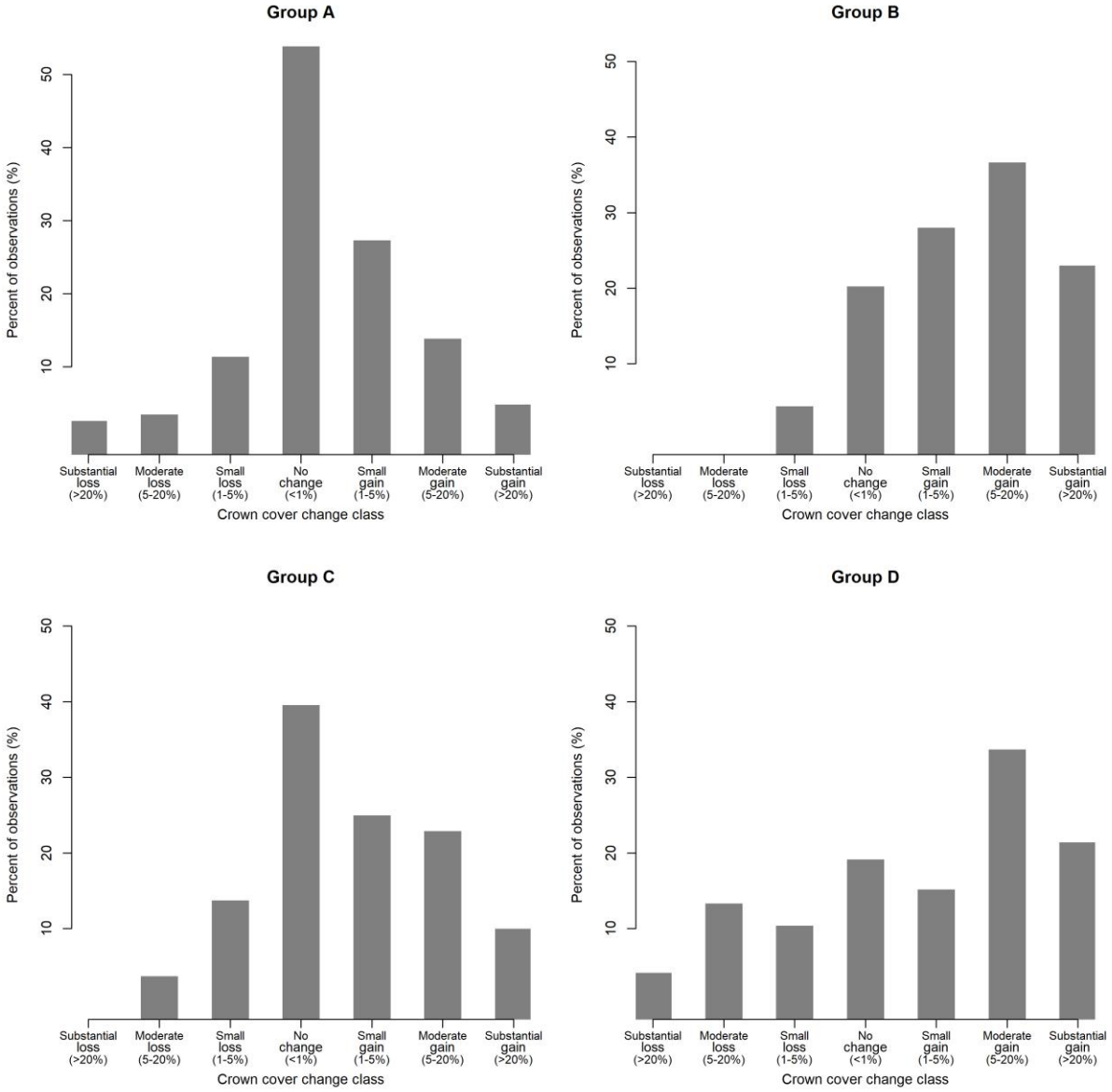
Again, there were material differences across the project groups. Results from both research groups show that the overwhelming majority of projects in Group A are substantially underperforming, based on changes in canopy cover in their assessed cells. Projects in Groups B, C and D showed more positive results, although there was still a considerable number of projects, and a material proportion of cells within most projects, that were found to be underperforming (Figure 16).

- Observations of cells from Group A projects (4560 from Research Group 1 [2 researchers x 2,280 cells] and 6840 from research group 2), found that the vast majority of cells showed no, negative or only slight positive change (86% for Research Group 1 and 92% for Research Group 2). Only a small fraction of cells demonstrated moderate positive change (5-19% increase in canopy cover – 11% of observations from Research Group 1 and 8% from Research Group 2) or substantial positive change (≥20% increase in canopy cover – 2% and 0.3% of cell assessments by Research Groups 1 and 2 respectively). Notably, almost half of the observations of substantial positive change came from two projects (ERF101269 and ERF101280), located adjacent to each other in the western Cobar Peneplain in New South Wales. This raises questions about the extent to which the changes are attributable to rainfall rather than the project activities.
- For cells from Group B projects (360 cells), a more significant fraction of observations found the cells experienced moderate or substantial positive change (55% from Research Group 1 and 34% from Research Group 2), with the remainder experiencing no, negative or only slight positive change. There were material differences in the extent of observed regeneration amongst the six projects in the group. Four projects (EOP100275, ERF101319, ERF101706 and ERF101865) contributed the majority of observations of moderate or substantial positive change in this group. Of the observations of the cells from the other two projects (ERF101630 and EOP101140), very few (8% from Research Group 1 and 9% from Research Group 2) found they experienced moderate or substantial positive change. The remaining observations found the cells from these two projects experienced no, negative or only slight positive change.

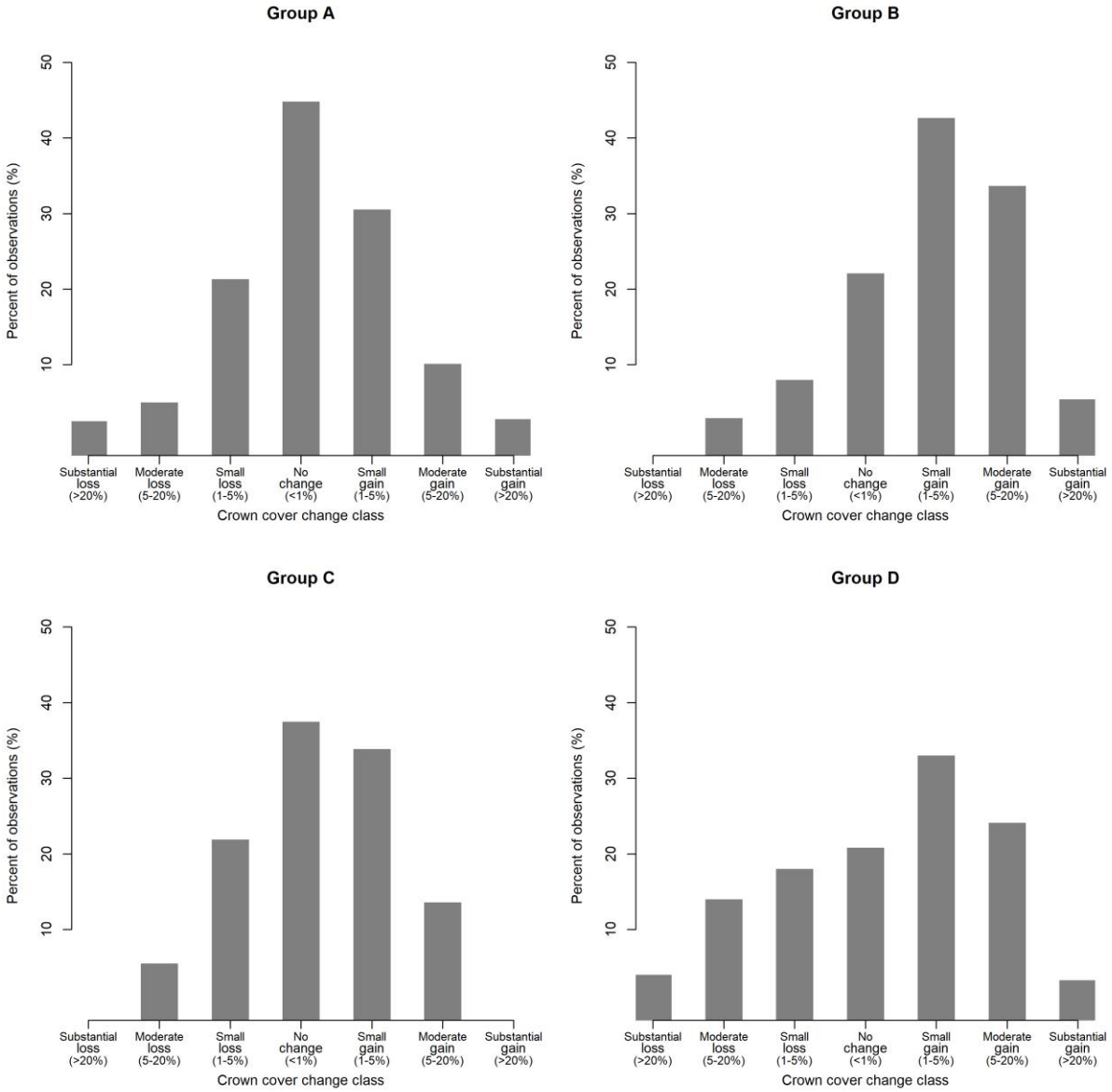
- The overall results for the two Group C projects were similar to those from Group A. For Research Group 1, 72% of their 240 observations found that cells had experienced no, negative or only slight positive change, with 28% experiencing moderate or substantial positive change. The results for Research Group 2 were similar, with 89% of observations showing negative to small positive changes, and just 11% showing moderate or substantial increases in crown cover. However, the assessed performance of the two projects in this group was materially different. Most of the observations of cells experiencing moderate or substantial positive change across the two Group C projects came from ERF101788 (88% for Research Group 1 and 78% for Research Group 2). Both research groups found the vast majority of cells from ERF101525 had experienced no, negative or only slight positive change (93% and 95% for Research Groups 1 and 2 respectively).
- The four projects in Group D (most evidence of past comprehensive clearing) had a substantial portion of cell observations suggesting moderate or substantial positive change (50% from Research Group 1 and 25% from Research Group 2). However, these projects also yielded a relatively high proportion of observations of negative change, with 20% of observations from Research Group 1 and 29% from Research Group 2 showing slight to substantial loses of cover, the most of all the project groups. This pattern is best explained by the fact that three of the four projects are located in western Queensland (ERF101557, ERF101634, ERF101647), which experienced material tree death in the 2017-2020 drought. These effects are most pronounced in ERF101557 and ERF101634. In ERF101557, 58% of the observations from Research Group 1 and 71% from Research Group 2 found the cells experienced negative change (slight through to substantial). In ERF101634, 24% of the observations from Research Group 1 and 42% from Research Group 2 found the cells experienced negative change.

Figure 16. Visual assessment of cells – percentage of observations in each category, by project group

(a) Research Group 1



(b) Research Group 2



5.2 Discussion

The results of this analysis of the 50 projects are consistent with those in the four previous peer-reviewed studies on the performance of HIR projects and the science on the impacts of grazing on woody vegetation in uncleared rangelands.[122] Despite the wet conditions experienced over 2020-2025, there was only a small increase in forest cover and crown cover, with the overwhelming majority of the positive change occurring in projects whose credited areas contained a material amount of comprehensively cleared land.

[122] Beare, S., Chambers, R. (2021) Human induced regeneration: A spatiotemporal study. AnalytEcon Pty Ltd, Berry, NSW; Macintosh, A., Butler, D. et al. (2024) Australian human-induced native forest regeneration carbon offset projects have limited impact on changes in woody vegetation cover and carbon removals. Communications Earth & Environment 5, 149; Macintosh, A., Evans, M.C. et al. (2024) Non-compliance and under-performance in Australian human-induced regeneration projects. The Rangeland Journal 46, RJ24024; Orton, T.G., Bryant, K., Allen, D.E. (2025) A pixel-twinning approach for assessing additionality: a case study of human-induced regeneration projects. Ecological Informatics 92, 103505.

Between 2020 and 2025, forest cover – as assessed with the VMAP Forest Extent dataset – across the aggregate credited area of the projects in the sample increased by only 6%. Additionally, in 2025, forest cover was substantially below expected levels based on credit issuances (37% vs 100%). Similarly, average crown cover – as assessed with the VMAP Woody Cover dataset – across the aggregate credited area increased by only 1.5% between 2017 and 2025 and remained well below expected levels (30% vs 50% to 58%). The results of the visual assessment of the very high-resolution imagery were consistent with the VMAP analysis. Five observers assessing change in 3000 cells (15000 individual assessments) found in 84% of cases that cells experienced no, negative or only slight positive change. Only 3% of the combined observations found substantial positive change (≥20% increase in canopy cover) (i.e. the level expected based on issued credits).

The analysis revealed significant differences in regeneration performance between projects that are predominantly on uncleared lands (Group A projects) versus those with more cleared land in their credited areas (Group B, C and D projects). The results suggest there has been negligible (if any) regeneration across the overwhelming majority of the credited area of Group A projects, where ≥90% of the credited areas consisted of extant native vegetation (<10% comprehensively cleared land). The results were more positive in the other project groups, which contain more cleared land in their credited areas. However, even amongst these projects, many of them were found to be underperforming, both in absolute terms and relative to where they should be based on issued ACCUs.

The results demonstrate that there is no merit to the claims made by the Government, Regulator and key players in the carbon industry concerning the performance of HIR projects. Contrary to their assertions, medium-resolution imagery from Sentinel-2 and very high-resolution imagery do not show that HIR projects are regenerating in line with expectations. The results in this report are consistent with previous analyses undertaken using woody vegetation datasets derived from lower resolution (30m) Landsat datasets. The results show that the overwhelming majority of HIR projects are failing to regenerate native forests. Even in projects where regeneration is occurring, there is generally a large disparity between observed and expected regeneration, and a material proportion of the observed regeneration is attributable to non-project factors (i.e. rainfall).

In summary, in projects in largely uncleared rangeland areas, forest and tree crown cover has barely changed since the projects started. Where there have been increases, they have been very small, both in absolute terms and relative to expected levels based on credited sequestration. The vast majority of the credited areas of these projects will not achieve forest cover. Where uncleared lands in the credited areas of these projects have forest cover, it is highly likely that most of them had forest cover when the projects started. For projects that did not start with forest cover, changes in cover that have taken them over the forest thresholds are likely unrelated to the project activities and, consequently, the increases in tree cover are unlikely to persist. The inclusion of most of these uncleared lands in the credited areas of HIR projects is unlawful because they do not meet the applicable eligibility requirements.[123] Accordingly, the issuance of ACCUs for regeneration on these lands should be stopped and the

[123] Macintosh, A., Evans, M.C. et al. (2024) Non-compliance and under-performance in Australian human-induced regeneration projects. The Rangeland Journal 46, RJ24024.

proponents should be required to surrender credits equal to the number they have received to date.

The HIR projects in the sample that include material amounts of previously cleared lands (non-native vegetation) are more mixed, both legally and from a performance perspective. There are substantial areas of regeneration in many of these projects, where the observed increases in forest cover and crown cover are likely to be attributable to the project activities (stopping re-clearing and reducing grazing pressure, as necessary). However, despite this outcome, most of these projects also include substantial areas of land where regeneration is either not occurring or is due to factors other than the project activities, or where the lands do not meet the eligibility requirements (e.g. because regenerating is not occurring or was not being suppressed during the baseline period). These projects should be properly assessed and re-stratified in accordance with the law.

There are a further 380 projects that were not assessed in this study. The overwhelming majority of these projects are located in arid (desert) regions dominated by extant native vegetation, where only a tiny proportion of the lands have previously been comprehensively cleared. There is no prospect that native forests will be able to be regenerated on most of these lands through the conduct of the project activities. There could be some minor exceptions, where some regeneration might be possible. However, if it does occur, it is unlikely to persist – it will be lost in future droughts, worsened by climate change. Like most of the projects in the sample, both the inclusion of uncleared lands in the credited areas and the issuance of ACCUs in relation to these lands is unlawful.[124]

It is important to stress that there are some good HIR projects, although they are few in number and account for a very small proportion of the aggregate credited area. Some low integrity HIR projects also include some patches of lawful land, where regeneration is either possible or actually occurring. However, the lawful, positive aspects of the portfolio of HIR projects is small.

The findings from this analysis are of no surprise. They confirm the findings from the four previous detailed studies on HIR projects. The use of the Sentinel-2 derived datasets and very high-resolution imagery put the findings beyond doubt.

To 30 June 2026, almost 61 million ACCUs had been issued to HIR projects. The Commonwealth alone had spent ~$300 million on purchasing ACCUs from these projects.[125] The total value of the ACCUs issued to HIR projects, accounting for credits still held in holding accounts, is likely to be in the order of $1.5-$2 billion.[126] While the HIR method sunsetted in September 2023, existing HIR projects are set to continue to receive ACCUs until September 2048 (Figure 17).

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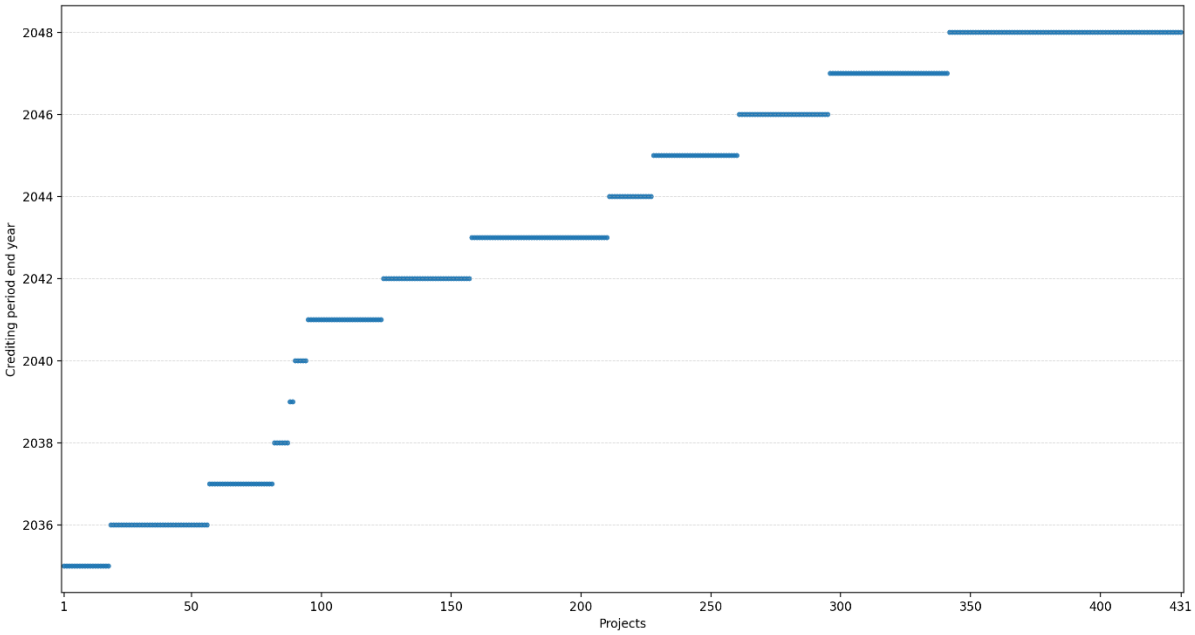
[124] Macintosh, A., Evans, M.C. et al. (2024) Non-compliance and under-performance in Australian human-induced regeneration projects. The Rangeland Journal 46, RJ24024.

[125] Calculated using reported ACCU sales to the Commonwealth under Carbon Abatement Contracts and average ACCU prices from ERF auctions. Clean Energy Regulator (2026) Carbon abatement contract register. Commonwealth of Australia, Canberra. Available at: https://cer.gov.au/markets/reports-and-data/accu-project-and-contract-register (31 July 2026).

[126] To 30 June 2026, the Commonwealth had spent $285 million on purchasing ACCUs from HIR projects (calculated using average ACCU prices from ERF auctions). The minimum value of ACCUs not sold to the Commonwealth was estimated based on the year of issuance and the average spot price from the year of issuance. This provided a total minimum estimate of $1.54 billion. A range of up to $2 billion was included to account for the significant number of ACCUs that are likely to be in holding accounts.

Based on the location and patterns in crediting, over the coming 22 years, several hundred million more ACCUs could be issued to these projects, unless steps are taken to terminate them.

Figure 17. End year of the crediting period of HIR projects (n-=431)



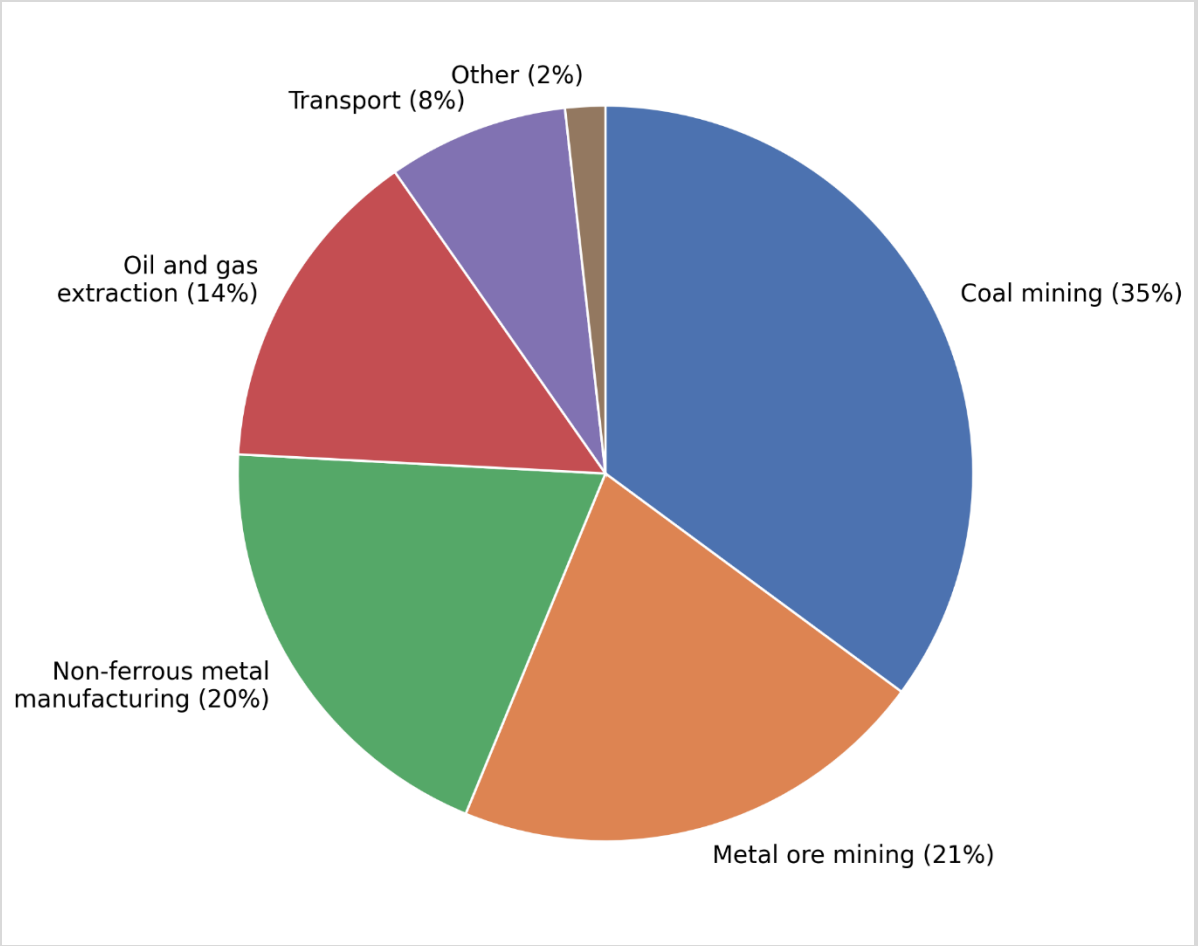
Source: Clean Energy Regulator (2026) ACCU scheme project register. Commonwealth of Australia, Canberra. Data as at 30 June 2026. Available at: https://cer.gov.au/markets/reports-and-data/accu-project-and-contract-register (30 July 2026).

The experience with HIR projects shows how successive Australian Governments have administered the ACCU scheme in a way that has resulted in the issuance of large numbers of cheap, low integrity credits. By law, each ACCU is supposed to represent 1 tonne of genuine abatement that would not have occurred without the incentive provided by the scheme. In practice, this legal requirement has failed to uphold the integrity of the scheme. Indeed, even the legislatively prescribed method requirements do not appear to have been adhered to. The effect of what has occurred has been to artificially suppress the carbon price faced by high emitters covered by the SMG. The resulting low carbon price is prompting SGM facilities to rely more heavily on offsets to meet emission reduction obligations that they otherwise would and to use low integrity credits for these purposes. As Box 1 shows, the companies relying on HIR credits to meet SGM liabilities include some of Australia's largest businesses. The system incentivises the reliance on cheap and largely scientifically discredited credits, because the SGM is intended to motivate financially rational and self-interested decision-making, where facilities are incentivised to pursue the cheapest form of "abatement" available, regardless of its integrity.

Box 1. Reliance on HIR credits in the Safeguard Mechanism (SGM)

Over the first two years since the Albanese Government's reforms, HIR credits accounted for 31% (5.5 million) of the 17.8 million ACCUs surrendered by SGM facilities. Reflecting its dominance in the ACCU market, HIR projects account for the highest proportion of SGM ACCU surrenders of any project type – almost 900,000 more than the second largest project type (landfill gas) and 1.5 million more than the third largest (avoided deforestation). Over the coming years, HIR's dominance of SGM surrenders is set to grow because of increased crediting to HIR projects (as the 128 uncredited HIR projects begin to be credited) and reductions in issuances to landfill gas and avoided deforestation projects, particularly the latter.

Figure B1. HIR surrenders under SGM, aggregate over 2023-24 and 2024-25, by industry sector



Source: Clean Energy Regulator (2026) 'Baselines and emissions data'. Commonwealth of Australia, Canberra. Available at: https://cer.gov.au/markets/reports-and-data/safeguard-data (30 July 2026).

Five companies accounted for 3.9 million (72%) of the almost 5.5 million HIR credits surrendered by SGM facilities over the 2023-24 and 2024-25 financial years. SGM facilities were counted toward a company where the relevant company owns ≥50% of the facility.

Company	HIR credits surrendered	% of HIR surrenders
Rio Tinto	1,599,378	29%
Yancoal	824,955	15%
BHP	768,977	14%
Woodside	472,137	9%
Qantas	273,399	5%

As this list indicates, the companies relying on HIR credits to meet SGM liabilities are large, sophisticated businesses that have the capacity to evaluate ACCU integrity, either by undertaking their own analysis of offset projects or contracting in external experts. It is not known whether these companies undertake analysis of this nature. However, the heavy reliance on credits from HIR projects is consistent with their credit choices being motivated primarily by price; they purchase and surrender the cheapest ACCUs available, regardless of actual or perceived integrity issues. This outcome aligns with the logic and incentives provided by the SGM. There is little chance businesses with SGM facilities will "self-correct" by seeking out high integrity credits, when cheap, low-integrity credits are available. This is a product of three main factors.

- SGM facilities are incentivised to surrender the cheapest credits available. The SGM is based on the assumption that businesses are rational and financially self-interested. SGM facilities are not expected or incentivised to act altruistically.
- The SGM rules do not require the disclosure of the provenance of the credits surrendered. The only information required to be disclosed about ACCU surrenders is the methods from which the credits were generated, not the actual projects. There is no incentive for businesses to seek out and rely on high integrity credits because there is no way of being exposed for using junk credits.
- The fact the ACCU market has few high integrity projects means that, even if SGM facilities wanted to rely on high integrity credits, there are so few of them that they would struggle to access sufficient credits to meet their liabilities. In many respects, some businesses with SGM facilities (i.e. those with few economic abatement options) are forced purchasers of low integrity ACCUs.

6. Conclusion

This report adds to the literature on the SGM by evaluating the extent to which low-integrity ACCUs pose a risk to its effectiveness in driving decarbonisation. The report focuses on two issues:

(a) the extent of reliance on ACCUs in the SGM and the resulting impact on the SGM's efficacy in driving decarbonisation of the industrial and mining sectors; and

(b) the depth of integrity problems in the ACCU scheme, which is explored an evaluation of 50 HIR projects (the dominant project type in the ACCU market).

The results show that the effectiveness of the SGM in reducing emissions and driving decarbonisation is being materially undermined by low-integrity ACCUs. The Australian Government is administering the ACCU scheme in a way that results in a large supply of cheap, low integrity credits. This is artificially suppressing the carbon price faced by SGM facilities, including large gas and coal entities, which account for 55% of emissions covered by scheme.

The suppressed carbon price is stifling decarbonisation by prompting heavy reliance on low-integrity ACCUs. Because the majority of the ACCUs lack integrity, their use by SGM facilities is not driving emission reductions elsewhere in the economy. The result is higher emissions and negligible transformation in the industrial and mining sectors.

This pattern is clear from the data. Over the past decade, ACCU issuances have increased by 75%, rising from 13.2 million in 2016-17 to 23.1 million in 2025-26. Over the coming years, ACCU issuances are likely to exceed 25 million. Three quarters of the issued ACCUs have come from three project types: HIR (32%), landfill gas (LFG) (27%) and avoided deforestation (AD) (17%). All three project types suffer acute integrity problems documented in the research literature.

The surge in ACCU issuances from low integrity projects has led to a build-up of 61 million ACCUs and 11 million SMCs in holding accounts, the overwhelming majority of which are held by businesses with facilities covered by the SGM. The flood of cheap, low integrity ACCUs has kept the ACCU price below AU$40 for most of the past eight years. At the time of writing, it was fluctuating around AU$38, approximately 40% of the minimum carbon price the World Bank High-Level Commission on Carbon Prices found was required to keeping global warming to 2°C above pre-industrial levels.

The artificially lowered ACCU price has stripped the SGM of its capacity to incentivise onsite abatement at covered facilities. Instead, the large-emitting facilities covered by the SGM are acting rationally and meeting scheme liabilities by surrendering cheap ACCUs and, to a lesser extent, SMCs. This is delaying the deployment of low-emissions technologies and enabling the development and expansion of coal and gas projects like the North West Shelf, Browse and Beetaloo gas developments and the Hunter Valley Operations (HVO), Narrabri, Boggabri and Ensham coal mine extension projects.

To illustrate the practical effects of the artificially suppressed carbon price, the report interrogates the drivers of the 2.9 $MtCO_2$-e decrease in covered emissions between 2023-24 and 2024-25. The data show that amongst facilities with continuity of coverage over this period, there were 104 facilities whose gross emissions dropped and 109 whose emissions increased.

The cumulative reduction in emissions across the 104 facilities whose emissions fell amounted to -9.56 $MtCO_2$-e. Most (63%, 6 $MtCO_2$-e) of this decrease in emissions came from 13 facilities. Of these 13 facilities, there were only two at which the reduction in emissions could be traced to deliberate efforts to decarbonise through the deployment of low-emissions technologies. In the other 11 facilities, the emission reductions were primarily due to reductions in production stemming from site-specific issues, not deliberate decarbonisation efforts.

The extent of the integrity issues with the ACCU scheme is evident from the results of the analysis of HIR projects. These projects are supposed to be reforesting areas of land through the promotion of even-aged native forest regeneration. For land to be included in the credited areas of HIR projects, by law, it must be devoid of mature trees and shrubs at project commencement and have the capacity to regenerate and achieve forest cover. In all but the rarest of cases, land meeting these requirements will need to have previously contained a native forest that was comprehensively cleared.

As of 30 June 2026, there were 431 registered HIR projects covering an area of 38 million hectares (an area larger than Japan), 303 of which had reported and received ACCUs. The reported projects are claiming to regenerate native forests across approximately 7.4 million hectares (an area larger than the whole of Tasmania).

Most HIR projects are registered on land that does not meet the legal eligibility requirements. They are claiming to regenerate native forests on uncleared lands in Australia's outback; what are technically referred to as 'rangelands'. Almost all of these projects are claiming to regenerate these forests by reducing grazing pressure from livestock and feral animals. Decades of research on grazing impacts in rangeland ecosystems shows grazing generally does not materially reduce tree and shrub cover in uncleared areas. Consequently, reducing grazing pressure will generally not lead to material increases in tree and shrub cover in these areas because the land will typically be at or near its maximum biomass potential.

To date, four peer-reviewed studies have been published on HIR projects, all of which have similar findings that align with the science on grazing impacts in rangelands: (i) there have been only small increases in woody cover in the credited areas of HIR projects since they were registered or claim to have commenced; (ii) the projects have had only a small (but statistically significant) additional positive effect on woody cover relative to trends on adjoining lands (both inside and outside the project boundaries); and (iii) most of the observed changes in woody cover are attributable to seasonal variability in rainfall. The research also shows the observed increases in woody cover are substantially below the expected levels based on ACCU issuances.

The Australian Government, including the Regulator and Department, and key players in the carbon industry, have tried to defend the legality and performance of HIR projects using a series of arguments that have subsequently been disproven by independent researchers. Their latest defence rests on claims that the Landsat-based datasets relied on in the existing peer-reviewed studies are not sufficiently accurate to assess regeneration, and that higher resolution imagery and data derived from field measurements shows HIR projects are regenerating forests in line with expectations.

To test the claims higher resolution imagery shows the projects are regenerating in line with expectations, we undertook an analysis of regeneration in 50 HIR projects using timeseries datasets for woody cover and forest extent derived from medium-resolution Sentinel-2 imagery (10m) and very high-resolution imagery (30-80cm). The findings are consistent with those from the previous peer-reviewed studies. Despite the wet conditions experienced over 2020-2025, there was only a small increase in forest cover and crown cover, with the overwhelming majority of the positive change occurring in projects whose credited areas contained a material amount of comprehensively cleared land.

Contrary to the Government's claims, Sentinel-2 and very high-resolution imagery do not show that HIR projects are regenerating in line with expectations. The Sentinel-2 derived datasets and very high-resolution imagery show most HIR projects are failing to regenerate native forests. Even in projects where regeneration is occurring, there is generally a large disparity between observed and expected regeneration, and a material proportion of the observed regeneration is attributable to non-project factors (i.e. rainfall).

To 30 June 2026, HIR projects had received almost 61 million ACCUs. In 2025-26, they received 9.3 million ACCUs, 40% of issuances in the financial year. If current policy continues, by 2030 they are likely to be responsible for around half of annual ACCU issuances. The total value of the ACCUs issued to HIR projects, accounting for credits still held in holding accounts, is likely to be in the order of AU$1.5-AU$2 billion. To date, the Commonwealth alone has spent ~AU$300 million on purchasing HIR ACCUs.

While the HIR method sunset in September 2023, HIR projects are set to continue to receive ACCUs until September 2048. Over the coming decades, several hundred million more ACCUs could be issued to these projects, unless steps are taken to terminate them.

Substantial reform of the SGM and the governance of the ACCU scheme are needed to ensure they perform their intended policy purposes. The SGM is supposed to drive decarbonisation of the industrial and mining sectors but is failing because of deficiencies in the administration of the ACCU scheme. The integrity issues in the ACCU scheme are extensive and difficult to explain without reference to serious maladministration. This poses a challenge for policy reform. Consideration may need to be given to excluding ACCUs from the SGM, at least as an interim measure. This could be done by instituting a standard cap price under the SGM, which would allow covered facilities to pay a set, transparent amount per tonne of emissions that exceed the facilities' baselines into a decarbonisation fund. The decarbonisation fund could then be used to finance emission reductions in hard-to-abate facilities and in the land, waste and agricultural sectors. This would provide SGM facilities with greater certainty about future carbon prices, thereby helping forward business planning and enabling a more orderly transition to a low-carbon economy.