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The role of ACCUs and renewable fuels in Australia's decarbonisation

This year could be a turning point for Australia's biofuels industry, with the country's reformed safeguard mechanism beginning to trigger demand incentives and the federal government announcing a long-awaited support package in September.

The year started with a significant change in Australia's compliance carbon market. The July 2023-June 2024 financial year marked the first year since the country's safeguard mechanism was reformed, triggering a nearly seven-fold increase in carbon unit surrenders. A total 138 facilities out of 219 covered under the scheme surrendered 7.05mn Australian Carbon Credit Units (ACCUs) and 1.38mn Safeguard Mechanism Credits (SMCs) — or the equivalent of around 8.4mn t of CO_2 equivalent (CO_2e) — to manage their excess emissions for the 2023-24 financial year, up sharply from 1.22mn units a year earlier.

Under the reformed mechanism, individual facilities that emit more than 100,000 t/yr CO_2e of Scope 1 emissions — direct emissions from their own operations — face declining baselines and need to surrender ACCUs or SMCs if their on-site abatement activities are not enough to keep emissions below thresholds.

The reform has sparked investment in activities to reduce direct emissions across the covered sectors — oil and gas, mining, manufacturing, transport and waste — including cutting higher-emitting fuel use and moving towards low-carbon alternatives. For example, Australian building materials firm Boral has upgraded the carbon-reduction technology at its Berrima cement plant in New South Wales and plans to use more by-products from steel manufacturing and industrial waste rejections and reduce limestone use.

But most emissions reductions were brought about through lower-cost abatement activities, with the safeguard mechanism not yet incentivising more expensive abatement. In particular, use of low-carbon liquid fuels (LCLF) is not incentivised at current ACCU prices and safeguard mechanism settings. This could change if the mechanism's settings are tightened following a scheduled review in 2026-27, coupled with Australia's recently announced A$1.1bn ($720mn) Cleaner Fuels Program.

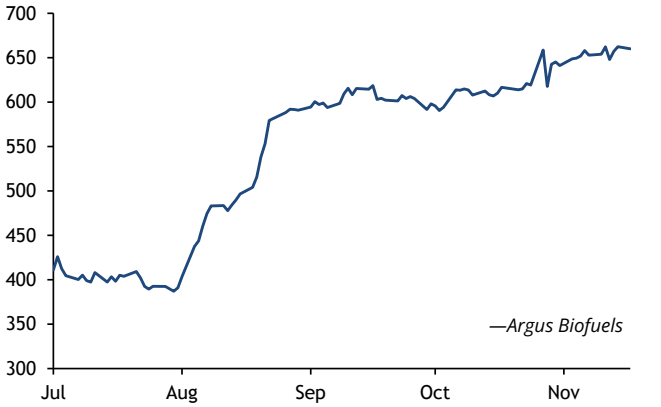
Bridging the ACCU-biofuels gap

Generic ACCU spot prices averaged A$35.57/t CO_2e over January-October, according to *Argus*' daily price assessments. Meanwhile, the price for abating 1t of CO2e by consuming Sustainable Aviation Fuel (SAF) produced through the Hydrotreated Esters and Fatty Acids production pathway (HEFA-SPK) instead of jet fuel jumped by more than $200/t on a Singapore basis over August-October (*see graph*). ACCU prices would need to rise steadily over the next few years and the cost of producing biofuels would need to fall, in order to incentivise LCLF use. But government support could help bridge that gap sooner rather than later.

The Australian government announced in September the launch of its Cleaner Fuels Program, which will incentivise biofuel production in Australia and aid emissions reduction in hard-to-abate sectors, such as mining and aviation, the government says.

ACCU generic spot prices *A$/tCO2e*

HEFA-SPK jet fuel CO2 abatement Singapore *$/t*



Small amounts of biodiesel and ethanol are produced in Australia already but the programme aims to increase this, with the first outputs of "drop in" biofuels supported by the scheme expected by 2029. This will support farmers, truck drivers, airlines and industry with options to reduce their emissions. A public consultation is under way and the programme is expected to launch in the middle of next year. Grants will be awarded through a competitive process.

The Cleaner Fuels Program will provide production-linked incentives over 10 years for LCLF projects that are advanced in development, progressing towards a final investment decision and aiming to begin production soon. It builds on the government's current support for LCLF through the SAF Funding Initiative, Future Made in Australia Innovation Fund and guarantee of origin scheme.

Australia exports about A$4bn/yr worth of feedstocks including canola seed and tallow to biofuel producers in Singapore, the EU and the US. An Australian low-carbon liquid fuel industry could be worth A$36bn by 2050, federal agency Clean Energy Finance (CEFC) says. Australia is one of only three countries in the G20 without a biofuels mandate, alongside Russia and Turkey.

Stakeholder feedback from previous consultations have indicated general support for Hydrotreated Vegetable Oil (HVO), also known as renewable diesel, and SAF as the highest priority for LCLF production incentives.

Local biodiesel output shunned

There are three domestic biodiesel production facilities on the east coast of Australia (*see table*). Each facility is currently underutilised and run well below capacity due to the lack of local demand.

Firming demand for biofuels in countries such as the US has lifted the price of Australian feedstocks such as tallow over the past 10 years, raising the cost of production for local biodiesel and making it much less price competitive compared with imported diesel.

When biodiesel was more price competitive, domestic diesel suppliers would blend locally produced biodiesel with diesel up to 5pc. Australia's Fuel Quality Standards Act authorises a B5 blend to be sold as compliant automative diesel, while higher blends such as B20 are required to be labelled as such. It is unclear what kind of support Australian biodiesel producers might receive.

Biodiesel plants		*litres /yr*
Name	**Location**	**Capacity**
Just Biodiesel	Barrnawatha, Victoria	60mn
Biodiesel Industries Australia	Newcastle, NSW	30mn
Ecotech Biodiesel	Brisbane, Queensland	20mn

—Argus Biofuels

The CEFC earlier this year said Australia could replace over 40pc of fuel demand with LCLF by 2050 by focusing on key industries, including transport and mining.

Encouraging companies to reduce Scope 1 emissions through changes to the safeguard mechanism and/or voluntary adoption would drive the development of an Australian LCLF market and free up ACCUs for use in sectors that cannot achieve on-site decarbonisation due to technical challenges, the CEFC said in a report authored by consultancy Deloitte.

Demand for ACCUs would be around 9.2mn t/yr CO_2e by 2050 under a base scenario, which assumes a market-led transition in which carbon prices remain low and LCLF demand is driven by a small group of customers willing to pay significant premiums to reduce their Scope 3, or end-use, emissions. But ACCU demand could be as low as 1.7mn t/yr CO_2e by 2050 under an accelerated scenario, which would involve EU-style mandates for LCLF.

A central case scenario involving constraining the use of carbon offsets could see a 7bn litres/yr LCLF market created by 2050, abating up to 12mn t CO_2e in 2040 and 20mn t CO_2e in 2050. Annual ACCU demand across six sectors covered by the report — mining, aviation, rail, heavy freight, maritime and construction — could be reduced by around 6.8mn t CO_2e to 2.4mn t CO_2e by 2050.

There is currently no limit to the number of ACCUs or SMCs that facilities can use to manage their excess emissions under the safeguard mechanism, but those that surrender carbon units equivalent to 30pc or more of their baselines need to publish a statement explaining why they have not undertaken more on-site abatement activities.

Support from Australia's 2035 and 2050 targets

Bridging the gap between LCLF production costs and ACCU prices is not expected to happen until the 2040s, industry stakeholders say. But recent policy signals indicate the government could accelerate that pathway.

Expanding clean fuel use is one of the federal government's five priorities to meet its recently released 2035 greenhouse gas emissions reduction targets, as well as its 2050 net zero target. To achieve this, Australia will need to produce more SAF, renewable diesel, methanol and ethanol blended fuels, among other products.

Fossil fuels such as gasoline, diesel, natural gas and aviation fuel comprise over half of Australia's energy consumption at present, and the emissions associated with their use account for about a third of the country's annual emissions, according to the government's Net Zero Plan. The mining industry is Australia's largest fuel consumer after road freight. The industry is pursuing electrification but not all

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electric mining equipment is commercially available, while renewable diesel can reduce emissions using existing equipment. The use of renewable fuels such as biodiesel and HVO in the mining sector is limited in Australia, with the sector opting to buy ACCUs instead of biofuels. For aviation, SAF is the only viable replacement for jet fuel.

Biofuels trials

Mining firm Rio Tinto completed a four-week trial of used cooking oil-based HVO earlier this year. The company used 10mn litres sourced from Finnish refiner Neste's Singapore biorefinery and shipped by Australian refiner Viva Energy to the Parker Point fuel terminal in Dampier, where it was blended with 80pc diesel for use in its Pilbara iron ore operations. The trial was the first for Rio Tinto in Australia, although it had already converted its Boron and Kennecott operations in the US to renewable diesel, replacing 11pc of its total global fossil diesel consumption.

Fellow Australian mining company BHP tested using HVO supplied by BP with blends of up to 50pc over three months to power mining equipment at its Yandi iron ore operations in Pilbara in early 2023. The amount of HVO used in the trial was not disclosed.

Other mining companies, such as iron ore producer Fortescue, have opted to decarbonise by using battery-electric trucks. Fortescue signed an agreement with Chinese producer XCMG to secure 150-200 zero-emission haul trucks over 2028-30, building on its deal with XCMG to procure 360 battery-electric trucks from Swiss-German producer Liebherr for $2.8bn.

Stricter settings could be defined next year

Meeting Australia's 2035 target to cut emissions by 62-70pc from a 2005 baseline means Australia will need to add at least 19 percentage points to the legislated 43pc reduction target for 2030. This will likely require stricter settings in the safeguard mechanism — due to be reviewed in 2026-27. Extending the 4.9pc/yr baseline decline rate until 2035 from 2030 at present could reduce emissions from industry and resources by almost a third, according to government body the Climate Change Authority.

Industry stakeholders have also called for the government to lower its emissions threshold from 100,000 t/yr CO_2e to as low as 25,000 t/yr CO_2e, to make the mechanism more effective in reducing emissions. The government could also add more sectors to the scheme.

New ACCU method could benefit biofuels

ACCUs not only disincentivise biofuel use because of its current low prices but they also create competition for some feedstocks, industry participants warn. New ACCU methods had until recently been led exclusively by the federal government, but this will change with the new proponent-led model, launched in 2024. A first round saw the government choosing four proposals that are now being developed by different proponents. And the government is expected to launch new rounds of expressions of interest or move to a continuous process as the proponent-led model moves from an interim to a permanent stage.

One of the proposals that could be prioritised in the future is the sequestration of carbon from oil seed trees, put forward by Rio Tinto. This involves planting perennial oil seed tree species and crediting the carbon sequestration associated with living biomass and potentially soil carbon. The proposal would use pongamia as an example species, with other oil seed species to be included over time. The oil seeds resulting from these plantations would be harvested and used in biofuel production. In this way, financial support from ACCUs could help incentivise production and use of biofuels at scale.

The pongamia trees will take approximately five years to mature and produce seeds, which can be harvested annually, leaving trees and soil intact to store carbon. Renewable diesel production could reach 10mn litres/yr.

Another proposal that was considered by the statutory body responsible for ensuring the integrity of Australia's carbon crediting framework, Erac, was one that could potentially introduce biochar carbon credits to the ACCU scheme. The Biochar Cross-industry Working Group's proposal to convert biomaterials for permanent CO_2 removal would quantify net CO_2 removals across a range of biochar production scenarios, feedstocks and product uses, across all scales of biochar output.

Conclusion

Most Australian companies covered by the safeguard mechanism are prioritising buying ACCUs instead of reducing emissions using renewable fuels. This choice is unlikely to change in the short term due to the price competitiveness of ACCUs compared with biofuels, but change could be on the horizon.

Apart from the safeguard mechanism and government programmes such as the Cleaner Fuels Program and the Sustainable Aviation Fuel Funding Initiative, biofuels adoption could also be supported by certification.

The Australian government formally launched its guarantee of origin scheme in early November. This is a voluntary framework to track emissions associated with products including biofuels as well as consumption of renewable electricity. Businesses can now register with the Clean Energy Regulator for two types of certificates, with the product guarantees of origin (PGOs) to account for emissions arising from the production, transport and storage of products. PGOs will start from green hydrogen and later expand to green metals, low-carbon liquid fuels and biomethane.

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