Australian ESG Equity Strategy - The Cost of Carbon

Key Points

- Of the Top 30 emitting companies in the ASX100, 83% are currently using, or plan to use offsets.
- Demand for offsets is growing as companies look to meet targets and regulatory requirements increase.
- Growing distinction between the types of projects given scrutiny on project quality and integrity.

Event

- **Demand for offsets is increasing**. Carbon offsets form a crucial part of corporate net zero ambitions, and we are seeing increasing offset use both from a voluntary perspective and through compliance mechanisms' such as the Safeguard. Post the 2022 Chubb review and given recent scrutiny on offsets we review the offset market and AU corporate offset use.

Impact

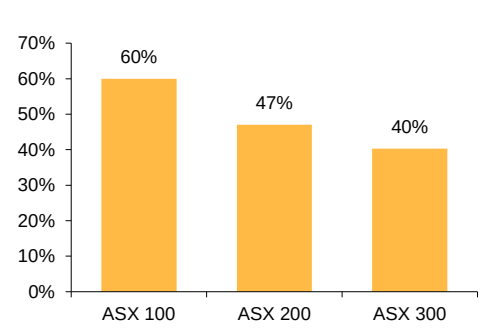
- **In the ASX100 60% of companies are using or have committed to using offsets.** When we drill down into the Top 30 emitting companies (who make up 98% of ASX100 scope 1 & 2 emissions), 83% are currently using or plan to use offsets. Our scenario analysis for the Top 30 emitters looks at the potential revenue impact from offsets, under a $50 carbon price (assuming 5% of emissions offset) we see revenue impacts of up to 0.5%. Important will be whether companies are able to pass on these costs.
- **Demand for offsets growing as companies look to meet targets and regulatory requirements increase**. RIO's announcement that they will not be able to meet their FY25 emissions targets without the use of offsets highlights the challenges of decarbonisation and the crucial role offsets will play. Heavy emitters may also face additional offset requirements in meeting their safeguard obligations, albeit we expect offset requirements to be minimal to start.
- **Wide range in offset prices - quality is key**. Given recent scrutiny around offsets, certain types of offsets are attracting a price premium. HIR, savanna burning and environmental planting credits trade above a generic ACCU given consideration of co-benefits. There is also significant price discrepancy between international vs. domestic offsets, with companies reliant on cheaper international offsets where allowed (i.e. outside of compliance regimes). From listed Climate Active participants 80% of offsets were international.
- **Evolving regulatory landscape**, with a growing number of countries introducing compliance schemes, globally there are 73 carbon pricing schemes in place, with 23% of global emissions covered (per World Bank). Country net zero targets cover 88% of emissions.

Outlook

- Companies that have challenging emissions' reduction targets as well as those under compliance regimes will likely face the highest offset burden, although the ability to pass on the cost of offsetting will be a differentiator.

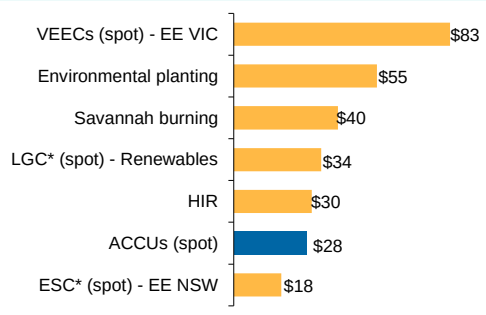
Strategy
Australia

Figure 1 - % of companies using offsets to reduce emissions



Source: Company data, Macquarie Research, August 2023

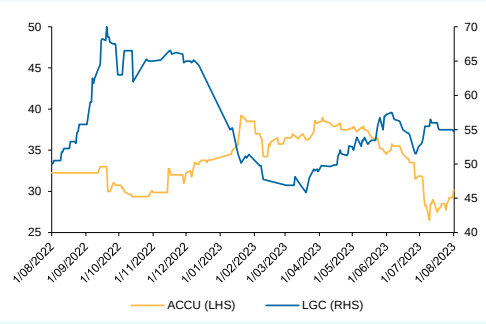
Figure 2 - Carbon offset pricing in Australia by type, per tCO2-e (AUD)



Source: Clean Energy Regulator, Northmore Gordon, Macquarie Research, August 2023

**Note: refer to Figure 12 for details on ESC and LGC price adjustment. Prices as at 20 July 2023.*

Figure 3 - ACCU Price (A$/tonne of carbon) and LGC Spot Price (AUD)



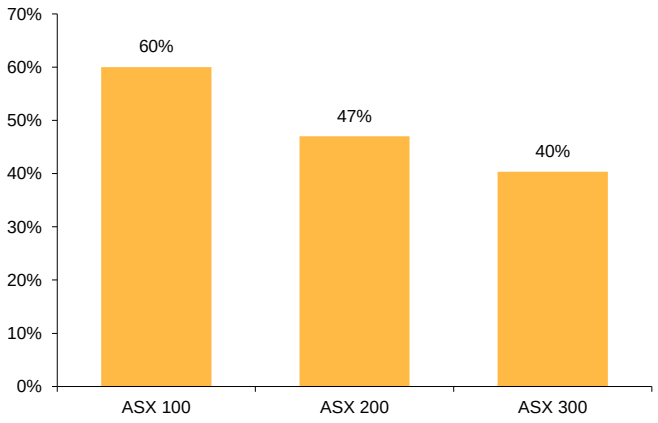
Source: Bloomberg, Macquarie Research, August 2023

Introduction

Carbon offsets are a crucial part of many companies net zero ambitions. Post the 2022 Chubb Review and given recent scrutiny over the integrity of carbon offsets, our report provides detail on offsets as well as how companies are using them.

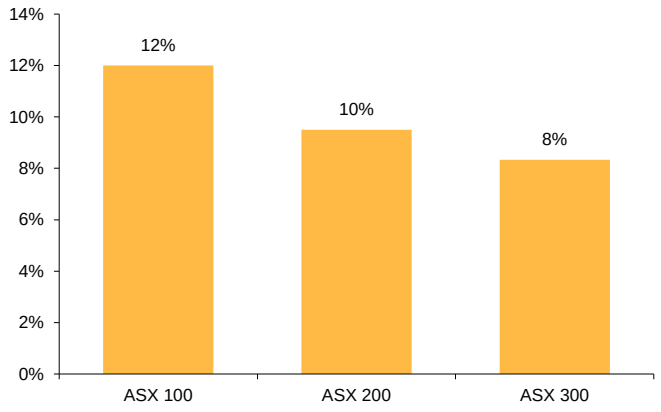
In the ASX100 60% of companies are using or have committed to use offsets to reduce their internal emissions while 12% are using offsets as a product or service.

Figure 4 - % of companies using offsets to reduce emissions



Source: Company data, Macquarie Research, August 2023

Figure 5 - % of companies with an offset product



Source: Company data, Macquarie Research, August 2023

Overview of Carbon Markets and ACCUs

There are two types of carbon markets in Australia - the compliance and voluntary market.

- **Compliance market** – government regulated-issuance of credits to incentivise emissions reductions. Units issued under regulation schemes typically represent the price of an allocation to an emissions budget. There is theoretically an unlimited, infinite supply of credits given they are not backed by physical sequestration projects in the same way as the voluntary market.

  ⇒ Government credibility very important due to theoretical infinite supply of credits.

- **Voluntary market** – for companies choosing to commit to net zero targets/ carbon neutrality, investing in credits where each credit is backed by a physical sequestration project or avoidance project. In Australia the voluntary carbon market is rapidly growing (see Figure 6). Note that there is a finite supply of credits in the voluntary market.

We note that companies generally prefer to stay out of compliance regimes in order to have more control over their decarbonisation pathway.

Australian Carbon Credit Demand

Sources of demand for Australian Carbon Credit Units (ACCUs) include the Federal government through the Emissions Reduction Fund (ERF), corporates under the compliance regime of the Safeguard Mechanism, as well as state and territory governments, state-owned corporations and voluntary corporate participants (including Climate Active National Carbon Offset Standard/Carbon Neutral Program).

- The corporate sector and government entities have seen growth in voluntary ACCU cancellations over the past few years given increasing climate ambition.

The Clean Energy Regulator typically analyses non-commonwealth ACCU cancellations as they give greater insight into progress towards reducing net scope 1 emissions or to meet state/territory regulatory requirements.

- Figure 6 highlights in 2022 non-commonwealth cancellation of ACCUs totalled 1.5 million, up 56% from 2021, with 58% of the volume voluntary, albeit compliance obligations were still a strong driver.

- In 1Q23 the volume of ACCU cancellations has dropped. However, this is likely due to seasonality with 1Q generally seeing softer demand. Note that the ACCU price is generally elevated in 3Q and 4Q from June to December as corporates commonly buy carbon offsets on a yearly basis around their financial year-end.

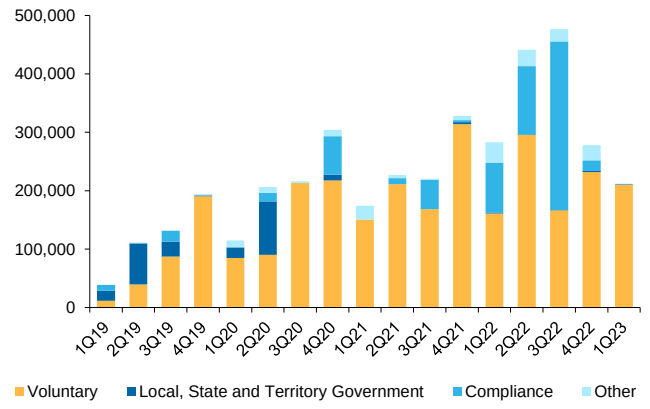
Australian Carbon Credit Supply

Based on the Australian National Registry of Emissions Units (ANREU), total ACCUs registered doubled in 2022 to 22.7 million which has increased to 24 million as at the end of 1Q 2023. The Clean Energy Regulator is expecting to issue >18 million ACCUs in 2023 (17.7 million ACCUs issued in 2022).

In 2022, 385 projects were registered, with a further 71 projects in 1Q 2023 bringing the total portfolio to 1,505. As at end of 2022, 593 projects were generating ACCUs. Note that the lead time between registration and crediting is generally between 2-3 years, and the scale of projects varies.

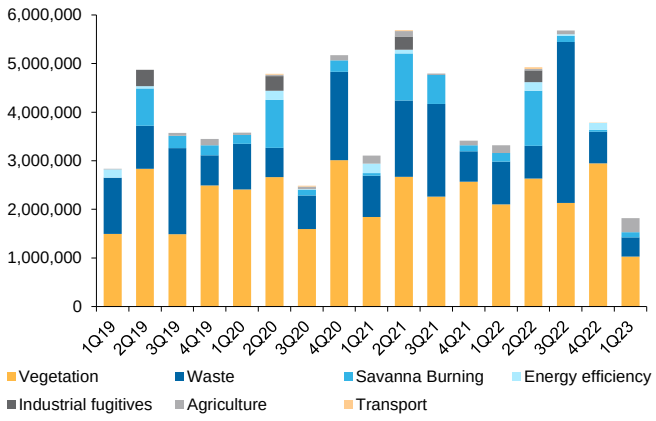
- We highlight that vegetation, waste and savanna burning projects continue to represent a large proportion of the project portfolio (~85% in 1Q 2023). This may be because these methods are relatively cheaper to implement. That said, as the carbon price increases, more projects and methods will become viable.
- A number of factors may influence the future supply of ACCUs including the phasing out of some methods, the cessation of crediting periods for some projects, and uncertainty around the introduction of new methods.

Figure 6 - Demand for ACCUs - cancellations by demand source (Non-Commonwealth)



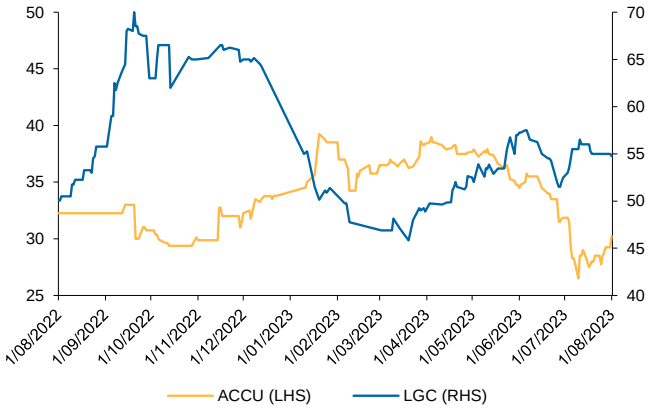
Source: Clean Energy Regulator, Macquarie Research, August 2023

Figure 7 - Supply of ACCUs - ACCUs issued by method type



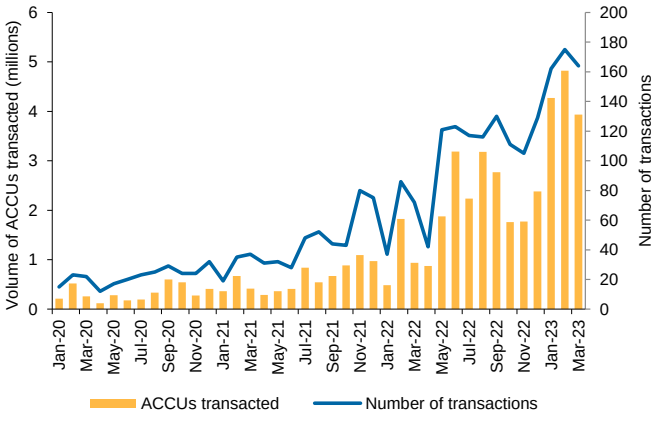
Source: Clean Energy Regulator, Macquarie Research, August 2023

Figure 8 - ACCU Price (A$/tonne of carbon) and LGC Spot Price (AUD)



Source: Bloomberg, Macquarie Research, August 2023

Figure 9 - ACCU market transactions



Source: Clean Energy Regulator, Macquarie Research, August 2023

Overview of Carbon Offsets

Carbon offset projects prevent, reduce or remove GHG emissions, and often also have a range of other environmental, social, cultural and economic benefits. Some examples of co-benefits are below.

- **Environmental benefits** include enhanced biodiversity, improved local air and water quality, and habitat protection for native animal and plant species.
- **Social and cultural benefits** include employment opportunities for local people, living and working on country, access to clean and affordable energy, and improved health and education.
- **Economic benefits** occur when the proceeds from the sale of a carbon credit flows to the community where the project is located. This often results in employment and community support, improved infrastructure, technology transfer, and increased economic activity.

A summary of a number of carbon offset methodologies can be found in the table below.

Figure 10 - Summary of common carbon offset project types

	Cost per tonne	Permanence (years of storage)	Emissions type	Co-benefits	Reputational Risks	Barriers
Energy efficiency	N/A	N/A	Avoided	Co-benefits include improved air quality, reduced deforestation, bolstered energy security and energy decentralisation.	Significant uncertainty regarding quantification and potential for over-crediting. May lack additionality.	Financing barriers, lack of awareness and understanding, regulatory and policy challenges, and split incentives problem.
Renewables	N/A	N/A	Avoided	Co-benefits include local economic value creation, new employment opportunities, cleaner air, access to affordable energy, and rural development.	May lack additionality, do not guarantee carbon avoidance, and potential for double counting.	Economics - given grid connection costs, and availability of capital given regulatory and policy uncertainty, and different levels of support required by different renewable technologies. May impact on other land use options and risk of habitat loss.
Biodiversity	N/A	N/A	Avoided	Co-benefits include improved water quality and soil quality, as well as regional economic impacts and indigenous cultural heritage benefits.	May lack of clarity on standardisation, how to design and implement them, and monitoring.	
Permanent plantings	$20-30	25-100	Negative	Co-benefits include improved biodiversity, soil health, reduced erosion, and climate resilience. Provides additional income stream to land holders.	May lack permanence and additionality. Overcrediting concerns.	Economics – high cost of implementation. Misalignment of incentives with costs of longevity. Availability of suitable land and potential conflicts over water use and competition with agricultural production. Significant expansion can change regional economies and employment. Climate change risk.
Plantation and farm forestry	$10-30	25-100	Negative	Co-benefits include improved biodiversity, soil health, reduced erosion, and climate resilience.	Risks to sequestration permanence, and may lack additionality and accurate monitoring. Overcrediting concerns.	Economics – high cost of implementation. Misalignment of incentives with costs of longevity. Availability of suitable land and potential conflicts over water use and competition with agricultural production. Significant expansion can change regional economies and employment. Cost/economics and availability of suitable land. Supply chain costs. Capital for processing plants. Climate change risk.
Human induced regeneration (HIR)	~$5	25-100	Negative	Biodiversity conservation outcomes, other environmental amenity, including improved soil health. Can increase farm profitability by providing alternative income stream.	May lack additionality and has overcrediting concerns.	Concern about sequestration rates and length of storage particularly risks with climate change. Changes to traditional land use.
Avoided clearing	$5-10	25-100	Avoided	Co-benefits can include improved biodiversity, soil health and climate resilience. Can provide an alternative income stream.	Concerns around additionality.	Competing land use opportunities and changes to traditional land use.
Savanna burning	$5	~25	Avoided or negative	Livelihoods, indigenous socio-economic benefits, appropriately managed biodiversity outcomes.	May lack sufficient monitoring.	Area of land suitable for activity limits the uptake. Possible reluctance to commit to maintaining for 25 years.
Soil carbon	$7-13	~25	Avoided or negative	Improved soil carbon has benefits ranging from improved soil health, farm productivity, improved biodiversity, and improved farm resilience.	May lack standardisation and monitoring.	Cost of measurement and the need to maintain the carbon stock into the future are key barriers. There is a risk of reversal with climate change. Upfront costs and slow returns over extended periods present a cash flow disincentive.
Blue carbon	$18-30	25-100	Avoided or negative	Multiple co-benefits, fisheries, pollutant removal, coastal protection, ecosystem services, indigenous values.	For certain blue carbon projects demonstrating additionality presents unique challenges, and may face monitoring barriers.	Complex land tenure arrangements and permitting process. Poor estimates of technical sequestration.
Biochar	$80-120	300-600	Negative	Can provide input source for secondary industries. Soil amendment and improved soil health.		Costly and complex logistics and supply chains. Competition for land and water resources. A need for social licence.
Geological storage	$14-35	1000+	Avoided or negative	Can provide input source for secondary industries; regional employment; small surface footprint means site can be shared by multiple users, grazing, etc.	Non-permanence risk - must use well-selected, designed and managed CCS sites.	Permitting and regulatory complexities. High upfront capital costs. Contested social contracts to de-risk upfront investment licence. Timeframes for development.
Bioenergy CCS	$100	1000+	Negative	Depends on the source of biomass.	Non-permanence risk - must use well-selected, designed and managed CCS sites.	Costs and economics of the technology.
DAC	$300-600		Enabling technology	Can provide input source for secondary industries. Soil amendment and improved soil health.	Non-permanence risk - must use well-selected, designed and managed CCS sites.	Costs, regulatory and policy environment, ability to assess uptake options from a socio-techno- economic perspective.
Mineral Carbonation	$28-300	1000+	Negative	Makes use of mine tailings as a value stream.		Cost /economics and availability of suitable land; supply of tailings of suitable geological character.

Source: CSIRO, Carbon Offset Research and Education (CORE) initiative, Macquarie Research, July 2023

Note: Geological storage is the process of transporting and injecting the CO2 into suitable reservoirs. While BECCS and DAC include the capture of CO2 as part of their processes.

Quality and Pricing of Carbon Offsets

There has been recent scrutiny around the quality and integrity of carbon offset projects, particularly certain methods. Higher quality projects typically trade at a premium. That said, carbon credit pricing can be influenced by a number of factors such as the type of project, the location, carbon trading, the availability of credits, and the credit's verifications.

The quality of a carbon offset project can be assessed by looking at the criteria below. Please refer to Figure 10 for details on a number of carbon project methodologies.

- **Additionality -** projects are considered additional if the emissions reductions would ***not*** have occurred in the absence of a market for offsets.
  - ⇒ The avoided deforestation method is an example where there have been concerns regarding additionality given challenges to establish intent to clear land. High quality avoided deforestation projects are able to demonstrate that they are stopping deforestation. In PNG, this is particularly visible with deforestation and logging being a source of income.
- **Vintage** - the older the vintage of a project, the more likely it is that there may be quality concerns and as such this is generally reflected through discounted pricing. Potential quality concerns could be raised if the credits have remained unsold for a long time or are being sold directly by the project developer, where appropriate procedures have not been followed.
- **Permanence -** the longer the permanence period, the higher the quality of the carbon offset. However, the biggest concern is around reversals which may occur in forest management projects or in CCS type projects if the carbon is stored in leaky reservoirs.
- **Co-benefits -** projects with social, environmental and economic co-benefits trade at a premium, depending on the type and quality of the co-benefits. We note that the Clean Energy Regulator called out that ACCUs from projects with First Nations People co-benefits have attracted the highest premiums.
  - ⇒ In 2022, human-induced regeneration (HIR) and savanna burning ACCUs first saw stratified pricing with buyers willing to pay a premium over generic ACCUs for the co-benefits.
    - **Savanna burning projects** - While the premium fluctuated through the year, savanna burning projects attracted premiums up to $23.50, albeit trade of these units are infrequent.
    - **Human-induced Regeneration (HIR) -** Attracted a premium of >$6 above generic ACCUs for the majority of 2022 and the volume of trading was also higher. That said, more recently there has been a convergence in price with HIR attracting a $1 to $2 premium. This may have been a result of increased demand in advance of Safeguard Mechanism changes.
  - ⇒ **Improved cook stove energy efficiency projects** are also favoured in the carbon market given the co-benefits, largely in developing countries, such as significant air quality and health benefits, new employment opportunities, as well as the reduction of deforestation and biodiversity loss of local woodland.
- **Reputational risks -** other reputational risks may include lack of standardisation and regular monitoring and auditing, as well as over-crediting.
  - ⇒ For example, savanna burning projects have faced scrutiny given it is difficult to monitor if proper practices are being implemented, and cook stove and forest management projects see risks for over-crediting due to a lack of accuracy in or standardisation of approaches to estimate reductions.
  - ⇒ There has been a lot of controversy around the REDD+ projects, particularly in the EU, due to concerns around the lack of standardised verification/validation processes by third parties, as well as no permanence safeguards (i.e. credit buffer pool to be used in case of adverse events like forest fires). For more information, refer to our Commodities Strategist's report here.

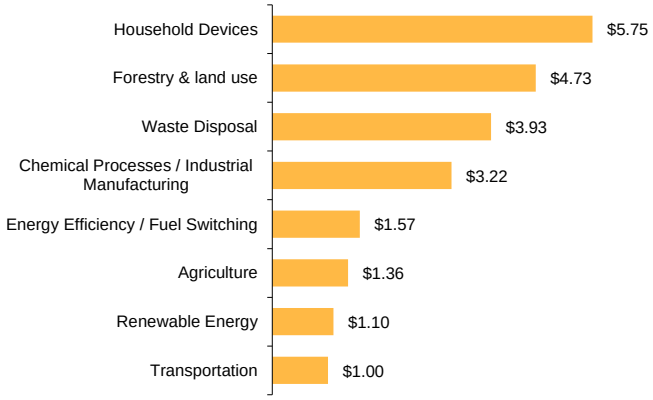
Further scrutiny over the quality and integrity of projects will likely accelerate ongoing improvements in best practices, clarity of claims, as well as monitoring, reporting, and verification.

Figure 11 looks at the price of voluntary carbon offsets by project type from a global perspective with cook stove and forest management trading favourably.

Figure 12 highlights the premium that HIR, savanna burning and environmental planting credits trade at above a generic ACCU given consideration of co-benefits (discussed above). We have also shown the pricing of a number of environmental certificates for Australian programs covering energy efficiency, renewable's and carbon projects. Each certificate price represents a saving of 1 tonne of CO2-e, albeit we flag that these are different schemes and as such are not directly comparable.

- **The energy efficiency schemes** in Victoria and NSW both focus on projects that include boilers, commercial lighting, displays, mid scale solar, measurement & verification, public lighting and refrigeration. The schemes aim to incentivise households and businesses in the respective states to install energy efficient equipment and appliances. Energy retailers such as AGL and ORG, who have a liability under the program can then purchase the certificates to surrender a certain number each year. It should be noted that the cost of these schemes can be passed through to consumers.
- **Large-scale generation certificates (LGCs)** are created per MWh of eligible electricity generated by large renewable power stations. Wholesale purchasers of electricity, largely electricity retailers, buy these certificates and surrender them to the Clean Energy Regulator to meet their renewable energy obligations (i.e. percentages set by regulation each year).

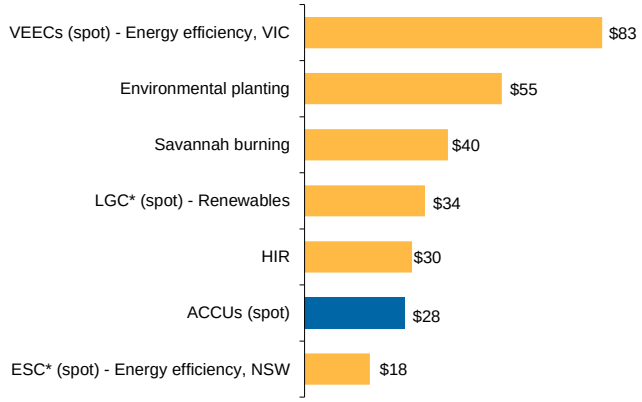
Figure 11 - Average price of voluntary carbon offset per tonne of CO2-e, by project type (USD)



Source: Ecosystem Marketplace, a Forest Trends Initiative, Macquarie Research, August 2023

Note: Data based on 2021

Figure 12 - Carbon offset pricing for different project types in Australia, per tonne CO2-e (AUD)

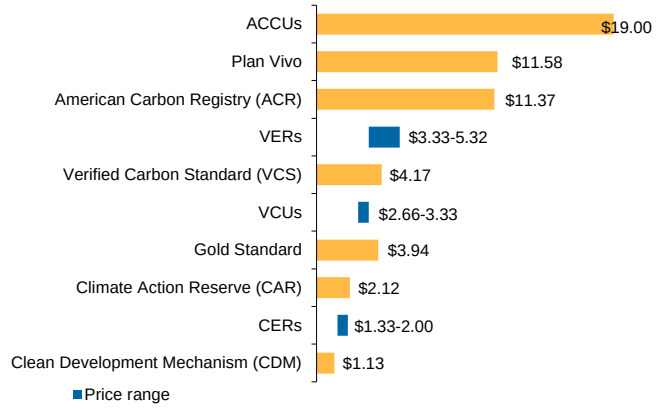


Source: Clean Energy Regulator, Northmore Gordon, Macquarie Research, August 2023

**Note: Each ESC and LGC represents a saving / generation of 1 MWh of energy which is equivalent to around 1.65 tonnes of CO2 in NSW and ~1.5 tonnes using the NEM intensity in 2023 YTD. At spot ESC and LGC are trading at ~$28 and ~$56 respectively, but we have adjusted to show price per tonne of CO2-e. Prices taken as at 20 July 2023.*

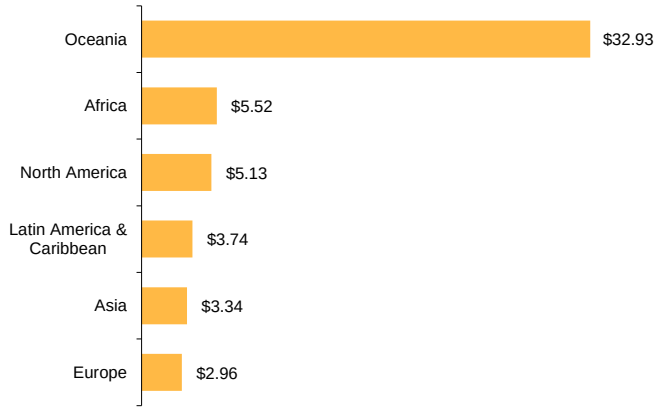
Figures 13 and 14, highlight the significant price differential between certified carbon credits in Australia vs. internationally. The international credits are significantly cheaper, albeit this does not necessarily imply that they are of lesser integrity than Australia's. Prices largely vary due to the size and economics of the project. The cost of implementing the project is often cheaper overseas in areas such India, and the projects with higher volumes of carbon credits often have a lower price.

Figure 13 - Average USD price of voluntary carbon offset per t CO2-e, by Standard (2021 data)



Source: Ecosystem Marketplace, a Forest Trends Initiative, Macquarie Research, August 2023

Figure 14 - Average USD price of voluntary carbon offset per tonne of CO2-e, by project region (2021 data)



Source: Ecosystem Marketplace, a Forest Trends Initiative, Macquarie Research, August 2023

High emitting companies and offsets

For our report we have done a deeper analysis on the top 30 highest emitting companies under research coverage and their use of offsets. Companies in our sample are: **AGL, ALD, AMC, AZJ, BHP, BSL, COL, CSL, CWY, DOW, EDV, EVN, FMG, ILU, IPL, JHX, NCM, NST, ORA, ORI, QAN, RIO, S32, STO, TLS, WDS, WES, WHC** and **WOW**.

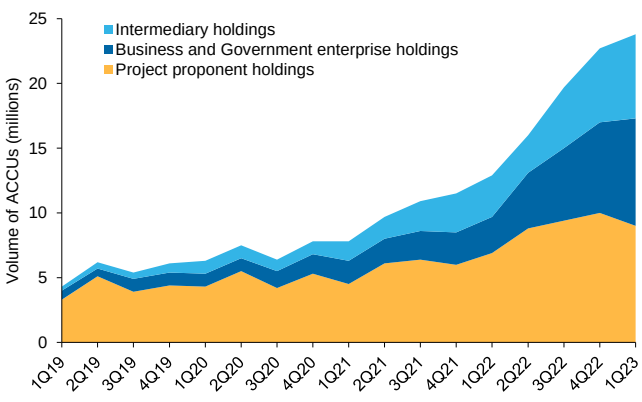
In FY22 these companies had scope 1 & 2 emissions of 174m tCO2e representing 98% of scope 1 and 2 emissions in the ASX100. Of the Top 30, 90% have a net zero target.

Of the top 30 emitters 40% are currently using offsets and an additional 43% flagged an intention to use offsets in the future, reinforcing our view offset demand will increase. Figure 15 below highlights growth in ACCU holdings by businesses while Figure 16 shows strong voluntary demand for LGC's.

TLS is the only one of these 30 companies that has committed to carbon neutrality with Climate Active certification, offsetting close to 1Mt CO2e in 2021 (see Figures 35 and 36 for more info on TLS).

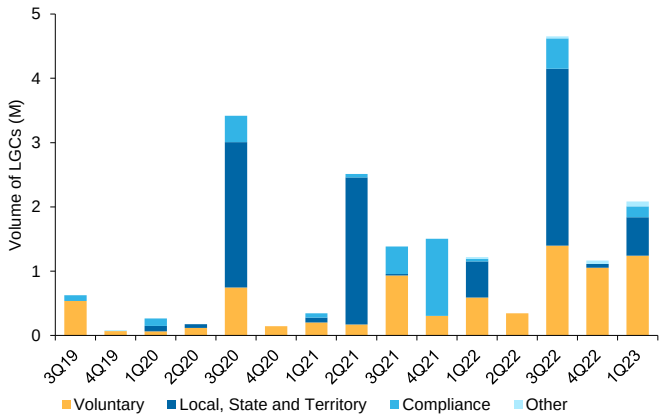
RIO flagged at their recent result that unless they use carbon offsets, they would not expect to achieve their targeted 15% reduction in Scope 1 & 2 emissions until after 2025. In order to meet the company's 2025 target, RIO needs to reduce Scope 1 & 2 emissions by 4.89Mt CO2-e, and as such we expect that a significant portion of this will be met via the use of carbon offsets. For other companies that have set ambitious targets we expected a greater reliance on offsets as well.

Figure 15 - ACCU holdings by market participation



Source: Clean Energy Regulator, Macquarie Research, July 2023

Figure 16 - LGC cancellations by demand source



Source: Clean Energy Regulator, Macquarie Research, August 2023

Company disclosure is mixed on details of their offset plans. The table below highlights comments that have been made by the Top30 on the use of offsets. Several companies provided estimates of what % of emissions offsets would be, with 5% being the average estimate. Companies that are already utilising offsets are using them for internal emissions reductions or as a product/service (i.e. QAN fly carbon-neutral program).

While companies have highlighted they expect to use offsets to meet residual scope 1 and 2 emissions, we expect to see more reliance on carbon offsets such as ACCU's to meet scope 1, while a preference for LGC's to meet scope 2.

Figure 17 - Top 30 ASX 100 emitting companies (Scope 1 & 2) - Overview of carbon offset use

Security	Company Name	Net Zero	Use of Offsets - current or future	FY22 scope 1	FY22 scope 2	FY22 scope 1 & 2	Offsets utilised	Internal/ product	Comment
AGL	AGL Energy	Y	Future	39,513,000	539,000	40,052,000	19,489	Product	AGL will be Net Zero for operated Scope 1 and 2 emissions following the closure of the coal-fired power stations. This may involve the use of offsets for residual Scope 1 and 2 emissions. These emissions make up less than 3% of AGL's total operated Scope 1 and 2 emissions as of FY22. AGL also uses offsets as a product.
ALD	Ampol	Y	Current	727,358	243,247	970,605	19,096	Product	For Lytton (87% of emissions) ALD is looking at decarbonisation initiatives to meet Safeguard requirements as well as the use of offsets. ALD also uses offsets as a product
AMC	Amcor	Y		520,069	1,363,312	1,883,381			No disclosure on offsets
AZJ	Aurizon Holdings	Y	Future	506,806	328,042	834,848			AZJ carbon abatement initiatives are centred around energy and fleet decarbonisation; however, AZJ acknowledges the role that high integrity carbon offsets will play in the medium term in helping to address hard-to-abate emissions. AZJ is focused on identifying high-integrity projects that deliver carbon sequestration and biodiversity improvement.
BHP	BHP Group	Y	Current	7,943,000	3,049,000	10,992,000	202,307	Internal	BHP did not retire any offsets to meet their climate targets in FY22, in FY21 0.3m were retired. BHP prioritises internal emissions reductions but may use offsets in a temporary or transitional capacity
BSL	BlueScope Steel	Y	Future	8,640,000	1,660,000	10,300,000			BSL recognises that carbon offsets may be needed to play a complementary role in meeting customer expectations for low embodied emission products, and for their net zero 2050 goal, where direct abatement is not technically or commercially feasible
COL	Coles Group	Y		275,854	1,259,762	1,535,616			Limited disclosure on offsets but has a $10m partnership with the Great Barrier Reef Foundation for the development of Blue Carbon
CSL	CSL	N		104,100	242,900	347,000			No disclosure on offsets although announced SBTi aligned targets
CWY	Cleanaway Waste Management	Y	Future	1,162,000	50,000	1,212,000			Carbon credits accepted under the CERT initiative, such as ACCUs, will be used to offset hard-to-abate emissions reductions that remain after businesses have taken measures to reduce direct emissions
DOW	Downer EDI	Y	Future	325,600	47,400	373,000			DOW notes there is likely to be limited dependence on offsetting residual emissions during the transition to net zero for emissions within the value chain that cannot be eliminated by 2050 (no more than 5-10 per cent of company emissions). To legitimately claim net zero, DOW may consider the purchase of carbon removal offsets once a 90 per cent reduction of its emissions is achieved.
EDV	Endeavour Group	Y		50,221	329,978	380,199			No disclosure on offsets
EVN	Evolution Mining	Y		221,168	463,753	684,921			No disclosure on offsets
FMG	Fortescue Metals Group	Y	Current	2,210,000	330,000	2,540,000	260,000	Internal	FMG has committed to reduce absolute emissions from their FY20 baseline and will use offsets to meet this commitment. In FY22 offset 0.26mt CO2e.
ILU	Iluka Resources	Y	Future	521,000	88,000	609,000			ILU is looking to develop carbon offset projects on owned land.
IPL	Incitec Pivot	Y	Future	3,550,961	338,223	3,889,184			IPL has highlighted in their emissions reduction pathway that 5% of reduction could be met with offsets
JHX	James Hardie Industries	N		370,185	292,542	662,727			No disclosure on offsets
NCM	Newcrest Mining	Y	Future	1,397,980	843,293	2,241,273			NCM intends to work with landowner partners to develop carbon offsets with social co-benefits. May source carbon offsets from carbon markets from time to time if necessary to maintain the carbon emissions profile in the roadmap.
NST	Northern Star Resources	Y	Future	710,273	479,780	1,190,053			NST's intent is to strive towards zero emissions and improve efficiencies wherever practicable, however there will likely remain a requirement to utilise offsets to achieve Net Zero by 2050. Where offsets are required, NST's preferred approach will be to generate the offsets such as carbon sequestration projects from within local communities and with stakeholder involvement, to benefit our stakeholders. To this end NST has earmarked three pastoral leases in the Goldfields with potential for such projects
ORA	Orora	Y	Future	249,000	101,000	350,000			No disclosure on offsets
ORG	Origin Energy	Y	Current	13,421,000	1,032,000	14,453,000	120,298	Both	ORG expect that carbon offsets will play a limited role in meeting their 2030 emissions reduction targets, and only for residual emissions that are hard to abate. In FY22 ORG retired 7,391 t CO2e associated with Beetaloo exploration and appraisal. ORG is also certified for its opt-in natural gas, electricity and LPG products for 2021; and its opt-in solar PV and demand response products for 2022
ORI	Orica	Y	Current	1,678,000	265,000	1,883,000	60,000	Internal	In FY22 ORI offset 60kt CO2e to meet forecast compliance obligations. As part o their decarbonisation pathway ORI has highlighted offsets as a lever.
QAN	Qantas Airwavs	Y	Current	4,734,407	64,894	4,799,301	122,009	Product	QAN has highlighted the role of offsets in meeting their emissions reduction targets
RIO	Rio Tinto	Y	Current	22,800,000	7,500,000	30,300,000	10,000	Internal	RIO noted that unless they use carbon offsets, they do not expect to achieve our targeted 15% reduction in Scope 1&2 emissions until after 2025
S32	South32	Y	Future	9,100,000	11,900,000	21,000,000			Carbon offsets are likely to be required for residual emissions to deliver S32 long-term net zero operational GHG emissions by 2050 goal. Use of carbon credits may be utilised in the near term to meet regulatory requirements in South Africa and Australia
STO	Santos	Y	Current	4,750,000	220,000	4,970,000			STO are continuing to progress with trials of direct air and post combustion capture technology and have taken steps to develop nature-based carbon solutions that will offset residual emissions and generate carbon credits. STO has achieved FID on their PNG biomass carbon abatement project
TLS	Telstra Corporation	Y	Current	31,868	1,092,011	1,123,879	1,010,798	Internal	TLS is the only one of the Top 30 emitters that is certified carbon neutral under the Climate Active program
WDS	Woodside Energy	Y	Current	9,565,000	8,200	9,573,200	754,000	Internal	WDS currently use a mix of avoidance, reduction and removal type carbon credits, however WDS plans to shift their portfolio balance towards removal type offsets. WDS originates their own projects as well as participates in carbon markets. An example of an origination projects is Woodside's Native Reforestation Project, which is expected to sequester approximately 1,100 kt CO2-e over 25 years
WES	Wesfarmers	Y	Future	not disclosed		1,370,088			WES may offset residual emissions to reach net zero by 2050 - 90% of emissions have abatement potential
WHC	Whitehaven Coal	N	Current	not disclosed		1,000,000	1,318	Internal	WHC are considering options for carbon offset generation across our land holdings, including through carbon farming initiatives. WHC also noted to reach net zero scope 1 significant abatement would be required based on current technology with offsets or DAC an option for 60% of scope 1 (fugitive and residual emissions).
WOW	Woolworths Group	Y	Future	not disclosed		2,010,037			Where direct reductions remain impractical, use of carbon offsets will be considered. Any use of offsets will be in line with SBTi guidelines and subject to an internal due diligence process to ensure adequate environmental, social, cultural and economic co-benefits are achieved.

Source: Company data, Climate Active, Macquarie Research, August 2023

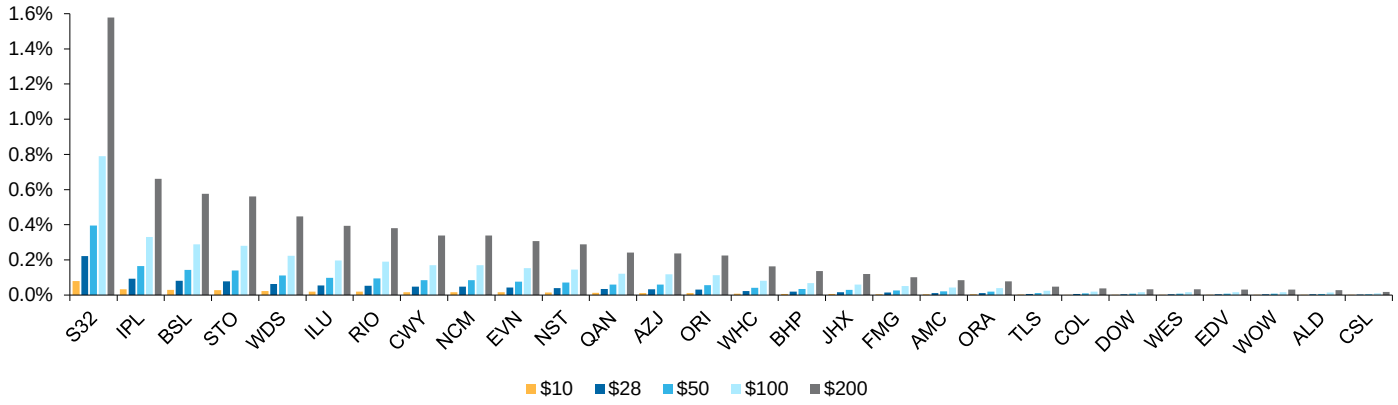
Our scenario analysis below highlights the theoretical impact to revenue under a range of offset prices. The analysis looks at the impact to revenue for between a $20-$200 carbon price assuming the company offsets 5% of their emissions. We note that:

- Some companies will have greater ability to pass through costs vs. others.
- Offsets will need to meet a greater % of emissions reductions for companies in hard-to-abate sectors.

Companies that would be most impacted under this scenario include S32, IPL, BSL, STO, WDS and ILU.

As highlighted earlier in our report the cost of offsets can vary give the type of project, location and perceived quality, a company that predominantly meets their offset requirements using international offsets will face a reduced offset expense vs. using 100% ACCU's. Companies that have requirements under compliance mechanisms such as the Safeguard do not have the option of using international offset currently however.

Figure 18 - Revenue impact for 5% offsets over variety of carbon prices

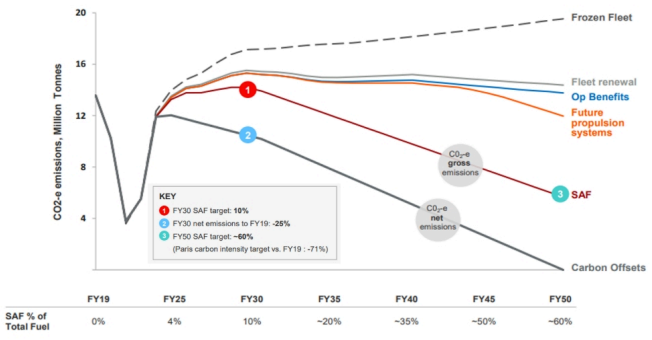


Source: Company data, Macquarie Research, August 2023

Note: we have excluded the electricity retailers from this analysis

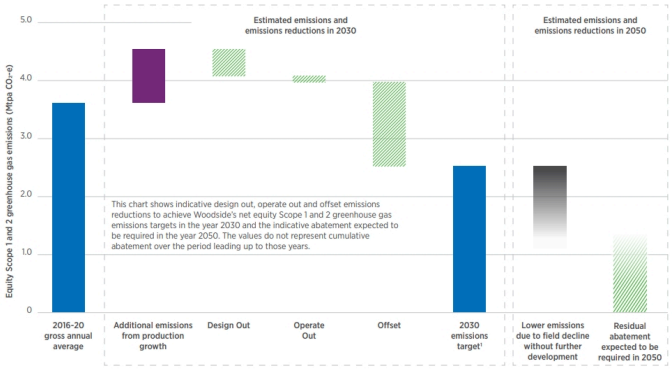
While some companies have not provided much disclosure on offsets, others, particularly those that are more reliant on offsets have provided more colour including QAN and WDS.

Figure 19 - QAN emissions pathway



Source: Qantas, August 2023

Figure 20 - WDS - Emissions reduction in 2030 and 2050 for the current producing and sanctioned portfolio



Source: Woodside Energy, August 2023

Note: This graph is from WDS's 2021 Climate Report

Climate Active Certified Companies

Climate Active is an ongoing partnership between the Australian Government and Australian companies to drive climate action by measuring, reducing, and offsetting carbon emissions.

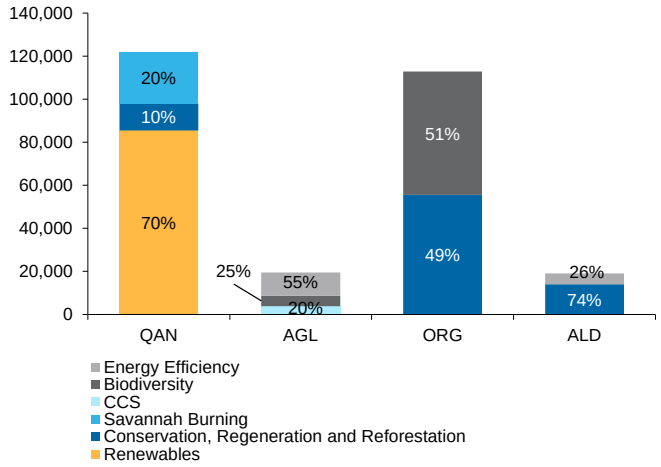
To be Climate Active certified, companies must credibly reach a state of carbon neutrality and if offsets are used, they must result in genuine emissions reduction. Climate Active has a rigorous assessment process, underpinned by carbon accounting and offsets integrity principles, and built upon international best-practice standards and GHG protocols.

- 26 AU listed companies are certified as carbon neutral by Climate Active including: **ANZ, BOQ, BEN, CAR, CBA, COE, DXI, DXS, GMG, GPT, HSN, MPL, MEL, NAB, NHF, PNI, QAL, REA, SEK, SGF, SUN, TNE, TLS, VUL, WBC,** and **XRO.**
- Note that **FPR, PNV** and **NXT** are pending certification.

Climate Active certification is also available for products, services, events, precincts and buildings. This means that the relevant emissions associated with producing a particular product or providing a service have no net negative impact on the climate.

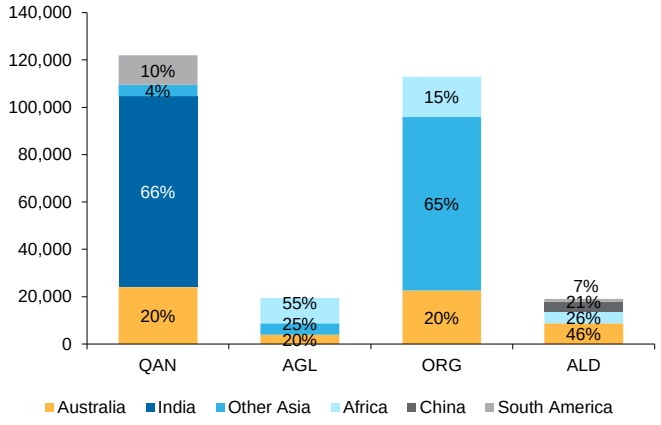
- 11 AU listed companies have Climate Active certified products including: **AGL, ALD, BKW, BLD, COL, COE, GMG, GPT, ORG, TLS**, and **VEA**. Examples of products include ORG's Go Zero electricity product.
- Only 2 AU listed companies have Climate Active certified services including: **LLC** and **SUN**. Note that **NXT**'s opt-in carbon neutral data centre service to Australian customers and **QAN**'s opt-in fly carbon neutral service are pending certification.

Figure 21 - Climate Active Products - Carbon offsets by project type



Source: Company data, Climate Active, Macquarie Research, August 2023

Figure 22 - Climate Active Products - Distribution of carbon offsets by geography



Source: Company data, Climate Active, Macquarie Research, August 2023

Looking at the 26 AU listed companies which have been Climate Active certified, renewable and forest management (i.e. conservation, regeneration and reforestation) projects are the most common (refer to Figure 23). That said, the forest management projects appear to generate less credits per project - largely concentrated in Australia - and there is a larger amount of savanna burning credits.

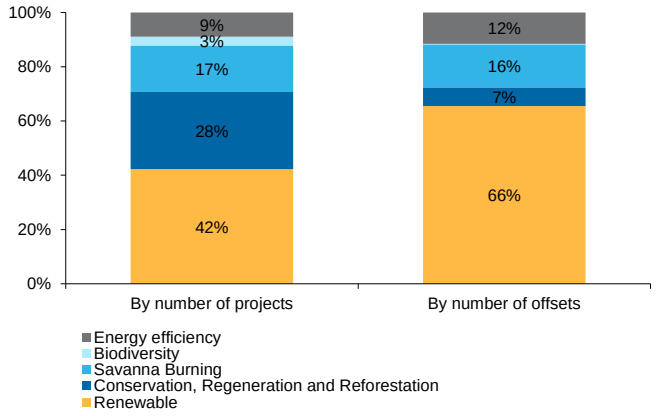
Given international offsets are often significantly less expensive than Australian offsets, Australian companies are very reliant on international offsets which, represent almost 80% of carbon offsets used under Climate Active. Note that 71% of the offsets are sourced from projects in India, making up majority of the energy efficiency, biodiversity and renewable carbon credits.

- Even though Australia and India have a relatively similar number of projects, the projects in India appear to generate a higher volume of credits.

There has been scrutiny around the use of international offsets when a company's operations are largely Australia based. The argument is that the company should purchase ACCUs such that the benefits go directly to the Australian communities and environment.

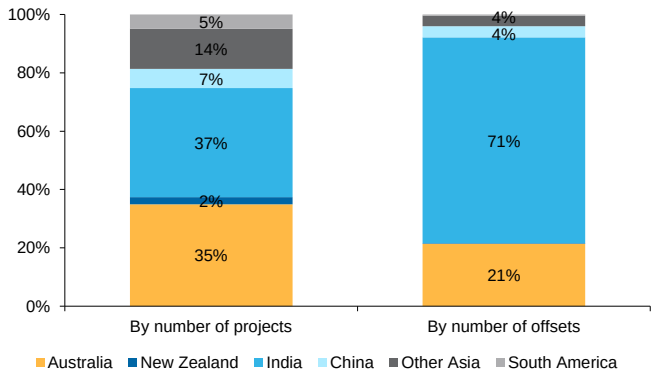
- The requirement for Climate Active participants to use minimum 20% ACCU's was reviewed by the Australian Government as part of the Chubb review, however it was recommended that this should not come into effect due to concerns that this would make Climate Active compliance cost-prohibitive for some organisations.

Figure 23 - Climate Active certified listed companies - Carbon offsets by project type



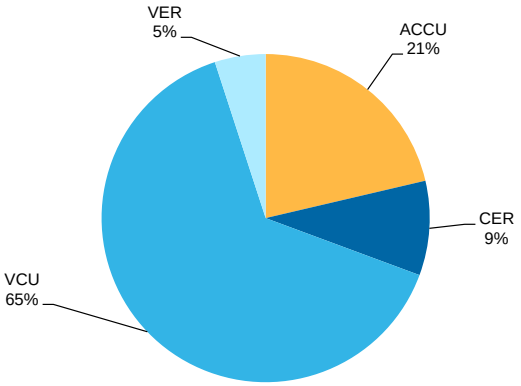
Source: Climate Active, Macquarie Research, July 2023

Figure 24 - Climate Active certified listed companies - Distribution of carbon offsets by geography



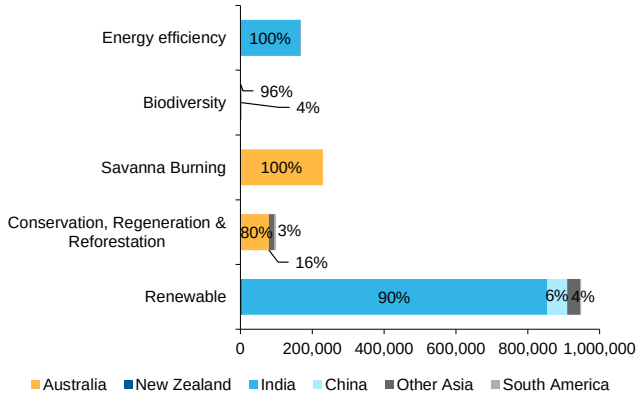
Source: Climate Active, Macquarie Research, July 2023

Figure 25 - Almost 80% of offsets used by AU listed companies under Climate Active are international offsets



Source: Climate Active, Macquarie Research, August 2023

Figure 26 - Climate Active certified listed companies - Offset type and location



Source: Climate Active, Macquarie Research, August 2023

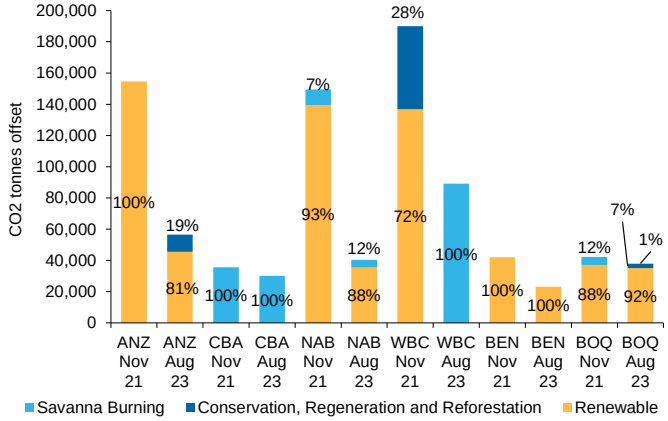
Note: Biodiversity: 96% India and 4% Other Asia. Conservation, Regeneration & Reforestation: 3% South America and 16% Other Asia.

The Climate Active data allows us to look at sector level trends.

In the **banking sector**, all the major banks, as well as BEN and BOQ are carbon neutral in their operations and provide disclosure of their offsets through Climate Active. The tables below highlight the distribution of offsets (for the most recent year disclosed) by geography and project type.

Since we last published the carbon offsets data for the banking sector in November 2021 (report link), there has been a notable shift towards more Australian based projects, with WBC moving from no ACCU's to 100%, as well as greater uptake of savanna burning projects.

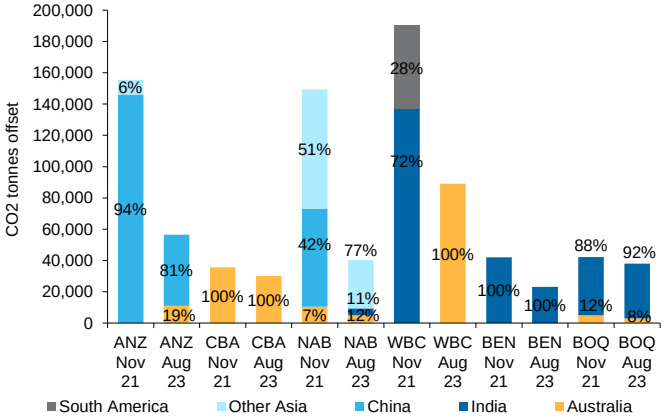
Figure 27 - Banking sector - Carbon offsets by project type



Source: Climate Active, Macquarie Research, August 2023

Note: Compares latest disclosure as at Nov 21 and latest disclosure as at Aug 23

Figure 28 - Banking sector - Distribution of carbon offsets by geography

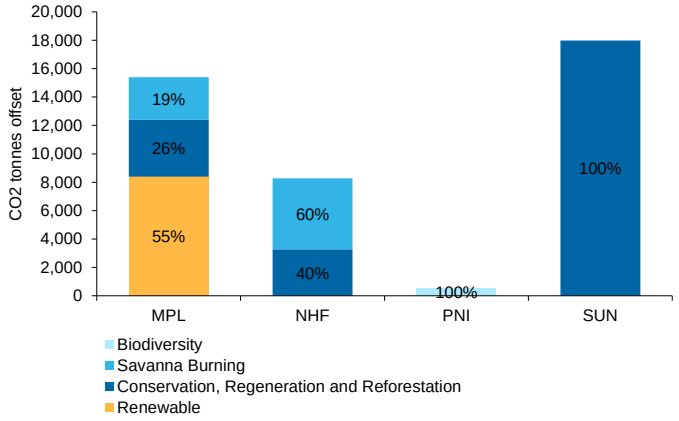


Source: Climate Active, Macquarie Research, August 2023

Note: Compares latest disclosure as at Nov 21 and latest disclosure as at Aug 23

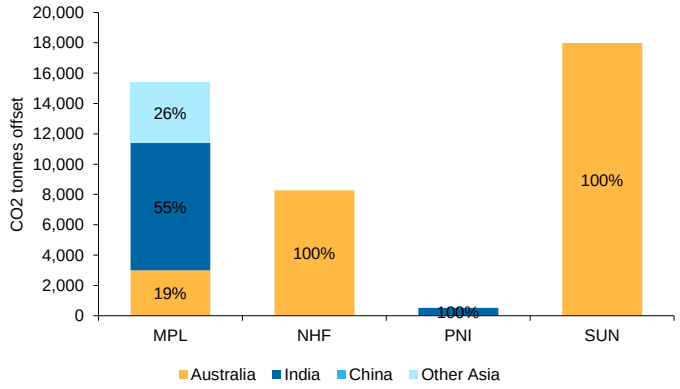
Across the **broader financials sector**, the majority of carbon offsets are from Australian based projects, followed by India. Forest Management projects are the most widely used.

Figure 29 - Broader Financials - Carbon offsets by project type



Source: Climate Active, Macquarie Research, August 2023

Figure 30 - Broader Financials - Distribution of carbon offsets by geography

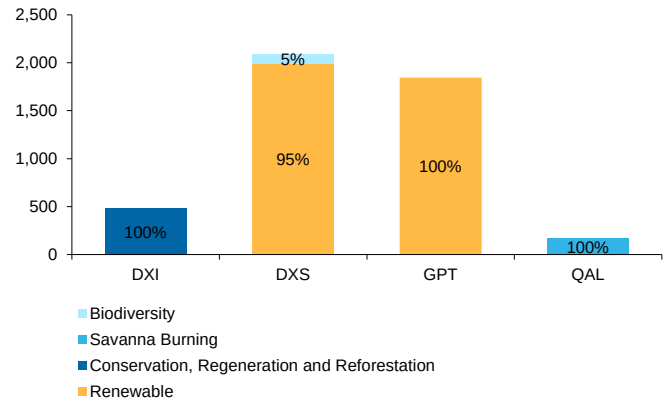


Source: Climate Active, Macquarie Research, August 2023

Looking at **real estate and the REITs**, each company has largely only used one type of carbon offset project with DXS and GPT both favouring renewable projects. Projects appear to be more focussed internationally, particularly in India.

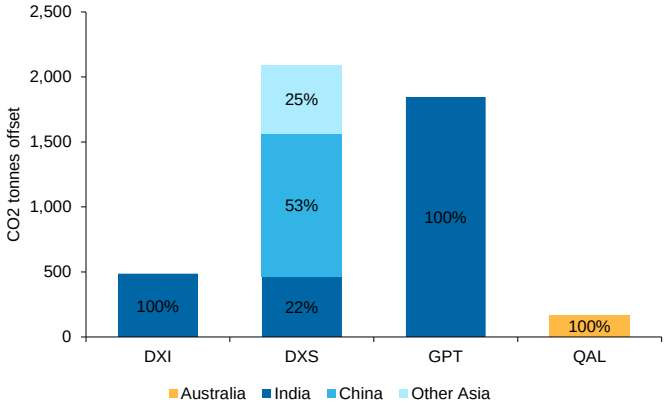
We highlight that GMG surrendered 55,251 carbon offsets in FY21 (most recent year of disclosure) which were 100% Australian based savanna burning projects.

Figure 31 - Real Estate & REITs - Carbon offsets by project type



Source: Climate Active, Macquarie Research, August 2023

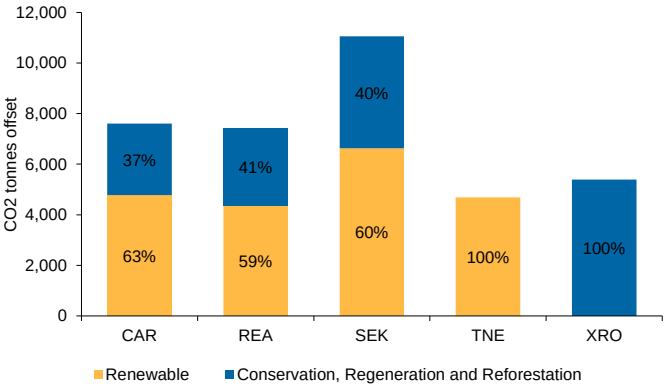
Figure 32 - Real Estate & REITS - Distribution of carbon offsets by geography



Source: Climate Active, Macquarie Research, August 2023

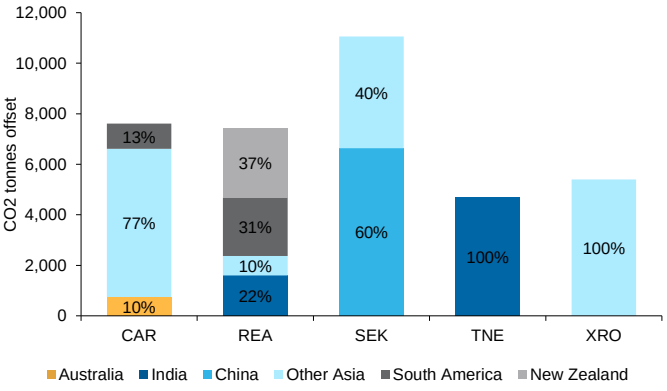
The **tech sector** appears to preference international renewable and forest management projects, with CAR the only company with projects based in Australia (~10%).

Figure 33 - Tech sector - Carbon offsets by project type



Source: Climate Active, Macquarie Research, August 2023

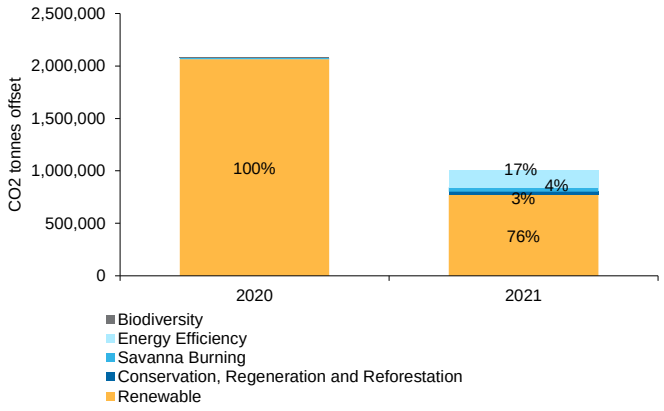
Figure 34 - Tech sector - Distribution of carbon offsets by geography



Source: Climate Active, Macquarie Research, August 2023

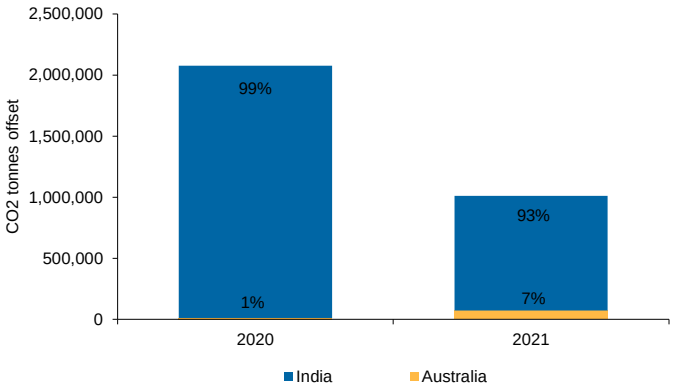
TLS is the largest listed buyer of carbon offsets in Australia under Climate Active with over 1,000,000 credits retired in 2021. As seen in Figure 34 and 35, TLS have more recently looked to diversify their carbon credit portfolio with the inclusion of a number of Australian projects and types beyond renewable. This reflects TLS's efforts to develop and mature markets for nature-based solutions.

Figure 35 - Telstra - Carbon offsets by project type



Source: Climate Active, Macquarie Research, August 2023

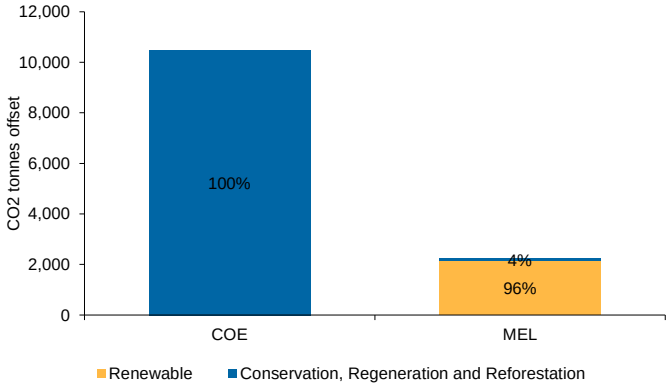
Figure 36 - Telstra - Distribution of carbon offsets by geography



Source: Climate Active, Macquarie Research, August 2023

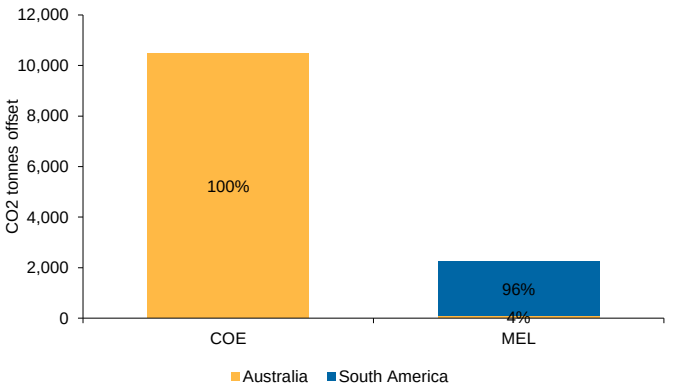
Within the **energy sector**, only COE and MEL are Climate Active certified and appear to focus on only one type of project in a single location. For COE, they have retired carbon credits from Australian forest management projects, while MEL has largely surrendered credits from renewable projects in South America.

Figure 37 - Energy - Carbon offsets by project type



Source: Climate Active, Macquarie Research, August 2023

Figure 38 - Energy - Distribution of carbon offsets by geography



Source: Climate Active, Macquarie Research, August 2023

Regulatory Overview

Following concerns around the integrity of the Australian Carbon Credit Unit market, the government commissioned the Chubb review and the findings were released in January 2023. Overall, the panel found that the ACCU scheme was sound, although made 16 recommendations to clarify governance, improve transparency, facilitate positive project outcomes and co-benefits, and enhance confidence in the integrity and effectiveness of the scheme. Key recommendations included:

- **Transparency could be improved**: The review noted that restrictions on data sharing and disclosure go further than required to protect privacy and more transparent data would enable communities and carbon markets stakeholders to better assess projects.
- **Avoided deforestation**: No new projects should be allowed under the current avoided deforestation method. Focus should move to incentivise maintenance of native forest.
- **Landfill gas methods should incorporate upward sloping baselines**: extension of projects should also see appropriate review and adjustment to baselines.

- **Carbon capture and storage (CCS)**: While CCS methodology was part of the terms of reference, the Chubb review only noted that it is considered to have an important contribution to limiting the pace and extent of climate change.
- **Requirement for Climate Active participants to use minimum 20% ACCU's should not come into effect**: the review has concerns that this will make Climate Active compliance cost-prohibitive for some organisations.
- **Free, prior and informed consent**: Consent should be received to operate on Native Title Lands prior to registration of ACCU projects. Currently conditional registration is allowed prior to receiving consent.

The Australian Government accepted all 16 recommendations in principle and published an Implementation Plan setting out its planning timing and approach to implementing reforms (see appendix for more detail).

Audit of Environmental Offsets

We flag that the Australian Government announced in late June 2023 an audit of environmental offsets which will investigate the compliance of over 1,000 offset sites approved under national environmental law over the last 20 years (media release). It will consider whether offset requirements have been met, and whether they are delivering the environmental benefits they said they would, noting that until recently there has been no reporting tracking this.

Policies and regulation around offsets

The policy and regulatory environment around offsets is rapidly evolving with moves by global bodies to bolster confidence in carbon markets through increased transparency and standards.

Global Governance bodies:

Science Based Targets initiative (SBTi), the Integrity Council for the Voluntary Carbon Market (ICVCM) and the Voluntary Carbon Markets Integrity Initiative (VCMI) play an important role in shaping the market. The IOSCO is also involved in the regulation of carbon markets.

Voluntary Carbon Markets Integrity Initiative (VCMI) New Claims Code:

As of June 2023, the VCMI implemented a new Claims Code to accelerate corporate participation in voluntary carbon markets (VCMs). The VCMI hopes to encourage more companies to incorporate VCMs into their respective net-zero pathways. The Claims Code of Practice will act as a 'rulebook' to follow for companies to ensure climate claims made are credible, in turn building market confidence towards engagement with VCMs. The Claims Code aims to help drive integrity across the market, ensuring carbon credits are generated by projects that go beyond 'business-as-usual', benefiting host communities and increasing greenhouse gas mitigation.

Participating businesses will now be able to claim silver, gold or platinum status for their voluntary carbon reductions, complying with stringent criteria:

- **Silver tier** - Most accessible. Requires purchase and retirement of high-quality credits in an amount equal to or greater than **20% and <60%** of the company's remaining emissions once it has demonstrated progress towards short term targets.
- **Gold tier** - Requires purchase and retirement of high-quality carbon credits in an amount greater than or equal to **60% and <100%** as per the conditions for silver.
- **Platinum tier** - Most aspirational. Requires purchase and retirement of high-quality carbon credits **equal to or greater than 100%** as per the aforementioned conditions.

ICVCM - The Integrity Council for the Voluntary Carbon Market

- Independent governance body consulting on the Core Carbon Principles (**CCP**), announced in March 2023.
- ICVCM standards aim to increase transparency across voluntary carbon market and improve matchmaking between buyers and sellers of credits. Hopefully, this will help meet the increase in demand for credits as a result of the continued developing nature of climate regulation.
- CCP includes a set of defined characteristics which participants can use to identify a "quality offset". Asymmetry of information and the heterogeneous nature of carbon offset remain the main issues preventing the market from "scaling up".

SBTi - Science Based Targets Initiative

The SBTi is a global partnership between the CDP, UN Global Compact, World Resources Institute and World Wide Fund for Nature driving corporate climate action and commitment to net zero. In June 2022, The SBTi updated its 2021 Progress Report which states its recommendations surrounding the corporate use of carbon offsets and emphasises bridging the credibility and reporting gap to avoid greenwashing.

- Science-based net-zero targets require a 90-95% reduction across all scopes before 2050. Only a very limited amount of residual emissions can be neutralised (i.e. no more than 5-10%).

IOSCO - International Organisation of Securities Commissions

- In November 2022, IOSCO published a discussion paper on voluntary carbon markets, raising concerns on integrity of credits, the soundness of the market and overall communication issues that could result in greenwashing.
- IOSCO more recently published its final report on the development of sound and well-functioning compliance carbon markets.

COP27 - Implementing Article 6 carbon market mechanisms

At COP27 in November 2022 (report link), implementing Article 6 carbon market mechanisms was noted as a priority area. Several countries had made progress since COP26: new taxes and markets in Canada, Indonesia, Russia and the US, reforms in Australia, higher tax rates in South Africa, roadmap launched in India and initial progress on Article 6.2 deals in Switzerland and Korea. At COP27, many of the outstanding points relate to the complex infrastructure to implement global carbon markets. Questions as to the types of activities and applicable methodologies also remain. Finally, the level of private sector participation remains to be seen.

Meanwhile, Article 6.4, which envisages a global carbon market in which credits can be traded by governments and private entities, is far from being a reality.

ISSB - global framework for climate-related financial disclosures (IFRS S2)

The recently issued global framework requires that an entity discloses the planned use of offsets to meet GHG emissions targets or under compliance regimes. Disclosure requirements include:

- the extent to which, and how, achieving any GHG emissions target relies on the use of carbon offsets;
- which third-party scheme(s) will verify or certify the carbon offsets;
- the type of carbon offset, including whether the underlying offset is achieved through carbon reduction or removal; and
- any other relevant factors to understand the credibility and integrity of the carbon offsets (e.g. assumptions on the permanence).

By region:

EU

The EU operates its own Emission Trading Scheme (**EU ETS**), the biggest major carbon market globally. Caps within the scheme are agreed upon by governments of EU member states.

The integrity of the European carbon market is examined by the European Securities and Markets Authority (**ESMA**) to ensure that the market functions in an orderly manner, comparable to that of other markets.

- In March 2022, **ESMA** published its final report on the EU carbon market. The report did not identify any major deficiencies in market functioning.

US

In California, the California Carbon Allowance (**CCA**) is their cap and trade program, covering ~75% of the State's greenhouse gas emissions. This is regulated by The California Air Resources Board (**CA ARB**).

In March 2023, CA ARB Chair confirmed that reforms to cap and trade schemes will be needed in order to achieve Californian climate ambitions.

To do so, broad timeline of:

- Discussion of cap and trade reforms over a series of workshops over the course of the year (2023).
- CA ARB to report on proposed legislation changes in December 2023.
- Proposed changes to be then voted on in 2024 with likely implementation from early 2025.

See Analyst note here.

UK

Within the UK, the UK Emissions Trading Scheme (**UK ETS**) has been established, responsible for enforcing compliance with ETS regulations such as operational functions i.e. issuing/ ensuring compliance with permits and emission plans.

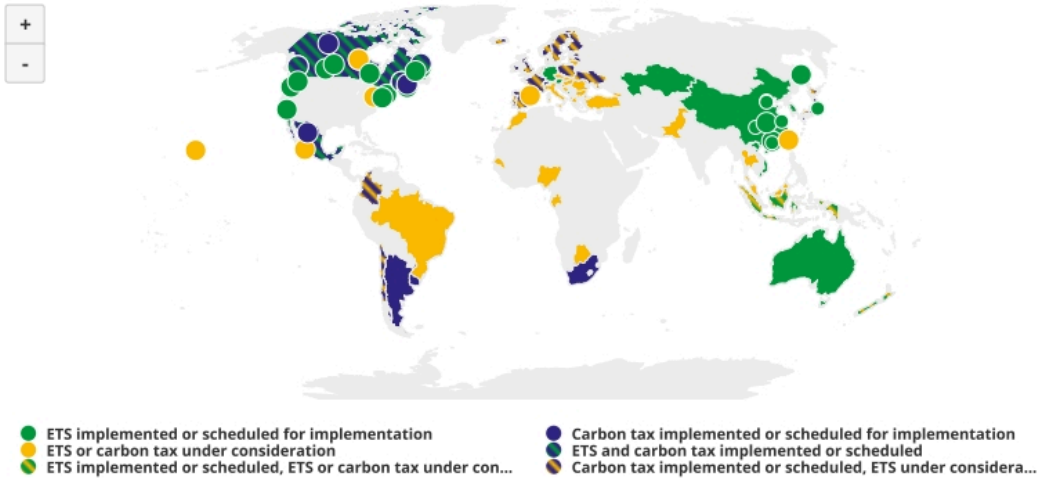
- Scheme follows cap and trade of UK Allowances (**UKA**) approach to reducing emissions. This is broken down by sector, similar to that of the EU, within which different sectors have different 'caps' on total greenhouse gas emissions.

  ⇒ The UK ETS applies to energy intensive industries, power generation sector and aviation industry.

- In July 2023, the UK ETS Authority published its final response to the market consultation with a range of key proposals to reform its Cap & Trade scheme to better align and progress towards the UK's Net Zero targets.

See Analyst note here.

Figure 39 - Summary map of regional, national and subnational carbon pricing initiatives



Source: The World Bank, Macquarie Research, August 2023

Note: Carbon pricing initiatives are considered "scheduled for implementation" once they have been formally adopted through legislation and have an official, planned start date.

Carbon pricing initiatives are considered "under consideration" if the government has announced its intention to work towards the implementation of a carbon pricing initiative and this has been formally confirmed by official government sources.

Appendix

Implementation Timeline of Chubb Review Recommendations

The Australian Government accepted all 16 recommendations in principle and published an Implementation Plan setting out its planning timing and approach to implementing reforms. A summary of the implementation plan is below.

1. *Immediate Implementation*

In terms of **methods**:

- In May 2023, guidance was issued for both existing and prospective Human Induced Regeneration (HIR) projects, which includes the establishment of a program of audits.

- Over February 2023, carbon credits associated with the Carbon Farming Initiative including avoided deforestation were revoked and no new projects under this method will be registered.

In terms of **capacity/capacity-building**:

- $20.3 million Carbon Farming Outreach Program implemented to run over the course of 4 years providing support to Australian farmers/land managers and encourage engagement.

In terms of **Climate Active**:

- Climate Active members will not be required to use a minimum of 20% ACCUs.

2. *June to November 2023*

The Australian Government has prioritised the early consultation over this period to plan and implement more complex recommendations set out from the Chubb review.

- Additional ACCU information will be made publicly available. ACCU scheme principles also to be implemented.
- The option to conditionally register ACCU projects on Native Title lands will be removed.

3. *November 2023 onwards*

- First Nation Australians to partake in determining the best approach to registering / regulating projects.
  - ⇒ Ensure the ACCU scheme aligns with broader reforms including: Uluru statement from the Heart and National Agreement on Closing the Gap, the Nature Positive Plan and the Nature Repair Market.
- An Australian Carbon Exchange will be launched from late 2023 to improve transparency and allow for the identification of co-benefits. Government will consider further work on co-benefits following this.

Important Disclosures

Recommendation definitions	Volatility index definition	Financial definitions
Macquarie – Asia and USA Outperform – expected return >10% Neutral – expected return from -10% to +10% Underperform – expected return <-10% **Macquarie – Australia/New Zealand** Outperform – expected return >10% Neutral – expected return from 0% to 10% Underperform – expected return <0% During periods of share price volatility, recommendations and target prices may occasionally and temporarily be inconsistent with the above definitions. **Recommendations** – 12 months **Note**: Quant recommendations may differ from Fundamental Analyst recommendations	This is calculated from the volatility of historical price movements. **Very high** – highest risk – Stock should be expected to move up or down 60–100% in a year – investors should be aware this stock is highly speculative. **High** – stock should be expected to move up or down at least 40–60% in a year – investors should be aware this stock could be speculative. **Medium** – stock should be expected to move up or down at least 25–40% in a year. **Low** – stock should be expected to move up or down at least 15–25% in a year. * Applicable to select stocks in Asia/Australia/NZ **Note:** expected return is reflective of a Medium Volatility stock and should be assumed to adjust proportionately with volatility risk	All "Adjusted" data items have had the following adjustments made: **Added back:** goodwill amortisation, provision for catastrophe reserves, IFRS derivatives & hedging, IFRS impairments & IFRS interest expense Excluded: non recurring items, asset revals, property revals, appraisal value uplift, preference dividends & minority interests **EPS** = adjusted net profit / efpowa* **ROA** = adjusted ebit / average total assets **ROA Banks/Insurance** = adjusted net profit /average total assets **ROE** = adjusted net profit / average shareholders funds **Gross cashflow** = adjusted net profit + depreciation *equivalent fully paid ordinary weighted average number of shares All Reported numbers for Australian/NZ listed stocks are modelled under IFRS (International Financial Reporting Standards).

Recommendation proportions for quarter ending 30 June 2023

	AU/NZ	Asia	USA	
Outperform	56.88%	63.90%	63.89%	(for global coverage by Macquarie, 2.58% of stocks followed are investment banking clients)
Neutral	36.88%	23.06%	33.33%	(for global coverage by Macquarie, 1.22% of stocks followed are investment banking clients)
Underperform	6.25%	13.04%	2.78%	(for global coverage by Macquarie, 0.00% of stocks followed are investment banking clients)

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