

CARBON MARKETS IN AUSTRALIA AND OVERSEAS

A COMPARATIVE OVERVIEW OF CARBON MARKETS

2021

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1 OVERVIEW

In this report, we provide a comparative overview of carbon markets in Australia and overseas. Our analysis is intended to be useful for carbon market participants who wish to trade emissions allowances, implement carbon abatement activities or develop new and innovative financial products which monetise the value of emissions allowances and carbon abatement activities.

2 BACKGROUND

Over the past year, commitments from corporations and governments to reach net zero emissions have more than doubled. This has created considerable demand for Australian Carbon Credit Units (ACCUs) and other environmental credits as a means to meet these targets.

In response to this, the Clean Energy Regulator (CER), who issues ACCUs under the Emissions Reduction Fund (ERF), has issued an expression of interest for potential developers of an exchange traded market for emissions offsets (the **Australian Carbon Exchange**). Currently ACCUs are traded via brokers in the over-the-counter market. In contrast, trading on the Australian Carbon Exchange would involve trading via an online platform, which would be 'reconciled' at the end of each trading day. The CER expects the Australian Carbon Exchange will increase market transparency, reduce transaction costs and help increase the supply of ACCUs to support businesses in delivering against their voluntary emission reduction commitments at the lowest possible cost.

The expressions of interest closed on 20 June 2021, which showed strong interest worldwide. There were 160 expressions of interest from both established players including the ASX and ChiX, as well as relative newcomers, including the Financial and Energy Exchange group and CBL markets. The successful developer will be announced in March 2022 with the Australian Carbon Exchange not expected to begin operating until mid-2023.



3 THE GLOBAL CARBON MARKET AND ENVIRONMENTAL COMMITMENTS

Global efforts to reduce carbon emissions are not co-ordinated via a global carbon market or formal regulatory framework. Instead, international agreements such as the Kyoto Protocol and Paris Agreement, have been established to codify and coordinate global efforts to reduce emissions. The Kyoto Protocol was the predecessor to the Paris Agreement, and was the first international agreement to document mandated, specific emissions reduction targets for developed countries. In 2011, Kyoto Protocol signatories pledged to create a new, comprehensive climate treaty by 2015 requiring all large emitters not included in the Kyoto Protocol to reduce their greenhouse gas (GHG) emissions. In 2015, this treaty became the Paris Agreement which has now been ratified by 190 countries. These countries, including Australia (which ratified the Paris Agreement in 2016), have committed to reduce their GHG emissions to limit global temperature increases to below 2°C above pre-industrial levels, and to report regularly on their emissions and on their implementation efforts.

4 HOW IS AUSTRALIA MEETING ITS PARIS AGREEMENT COMMITMENT?

Although Australia's ratification of the Paris Agreement does not have the force of law in Australia, the Australian Government has publicly committed to implementing an economy-wide target to reduce its GHG emissions by 26 to 28 per cent below 2005 levels by 2030 in order to support its Paris Agreement commitments.

The Australian Government has introduced an array of policy measures to ensure it is on track to meet this target, including the implementation of emissions reduction strategies via the ERF, the National Hydrogen Strategy and the more recently announced Technology Investment Roadmap.

4.1 THE EMISSIONS REDUCTION FUND

The ERF was established in 2015 when amendments were made to the *Carbon Credits (Carbon Farming Initiative) Act 2011*. The ERF is administered by the CER and enables businesses, councils, state governments and land managers to earn ACCUs by running eligible activities to reduce emissions. Each ACCU represents one tonne of CO2 equivalent net abatement.

The ERF is discussed in greater detail below.

4.2 NATIONAL HYDROGEN STRATEGY

In November 2019, Australia published its National Hydrogen Strategy. The strategy sets a vision for a clean, innovative, safe and competitive hydrogen industry. The hydrogen strategy:

- + explores Australia's clean hydrogen potential;
- + considers future scenarios with wide ranging growth possibilities;
- + outlines an adaptive approach that equips Australia to scale up quickly;
- + includes showcases from each state and territory; and
- + details nationally coordinated actions involving governments, industry and communities.

4.3 INVESTMENT TECHNOLOGY ROADMAP

Australia's Technology Investment Roadmap, announced in early 2020, is a strategy to accelerate the development and commercialisation of new and emerging low emissions technologies. On 22 September 2020, the Australian Government published its first Low Emissions Technology Statement under the Roadmap (the 2020 Statement). The 2020 Statement has a strong focus on prioritising investments in new and emerging technologies that will not only help Australia meet its Paris Agreement commitments, but also support jobs and economic recovery.

The 2020 Statement focuses on five priority low emission technologies a long with 'specific' stretch goals for each priority:



Hydrogen:

delivering clean hydrogen under \$2 per kilogram;



Energy storage:

stored electricity for grid firming at under \$100 per Mega Watts per hour;



Low carbon metals production:

low emissions steel for under \$900 per tonne and low emissions aluminium for under \$2,700 per tonne;



Carbon capture and storage:

CO2 compression, transport and storage for under \$20 per tonne; and



Carbon soil sequestration:

soil carbon measurements of under \$3 per hectare per year.

The Roadmap currently channels A\$18 billion worth of funding into low emission technologies, utilising a private sector leverage model. Under this model, the Australian Government will seek, on average, \$3-\$5 from the private sector for each dollar it invests in low emissions technologies. With the expected \$18 billion of funding by the Commonwealth, the Roadmap could result in \$100 billion being invested in low emissions technologies between now and 2030.

5 THE AUSTRALIAN CARBON MARKET

Unlike the carbon market of many other countries, (detailed below) Australia's carbon market is largely voluntary and consists of:

- + a voluntary scheme to earn ACCUs under the ERF; and
- + a 'safeguard mechanism'.

5.1 THE ERF'S VOLUNTARY SCHEME

The ERF's voluntary scheme enables businesses, councils, state governments and land managers to earn ACCUs by voluntarily running eligible activities to reduce emissions.

For a project to be an eligible activity there are a number of requirements that must be met. These include:

- + the person responsible for the project must pass a 'fit and proper person test';
- + there must be an approved methodology for the project; and
- + the project has not yet begun to be implemented, it is not required to be carried out under law, and it would be unlikely to be carried out by a Government program (together known as the 'additionality requirements').

The person responsible for the project must report to the CER about the conduct of the project and the reduced emissions achieved. If the CER is satisfied that the project meets these requirements, the project will then be registered on the [ERF project register](#). The project can then apply to participate in an auction to enter into a carbon abatement contract with the CER to sell their ACCUs to the CER. If a business is successful in entering a carbon abatement contract, they will agree to provide a set number of ACCUs at a determined price for the contract's duration.

The ACCUs earned can also be sold onto the secondary market to those wishing to offset their emissions or to those who have exceeded their baseline levels under the Safeguard Mechanism.



5.2 THE SAFEGUARD MECHANISM

The Safeguard Mechanism places a legislated obligation on large industrial polluters (or facilities) to keep their net emissions below their business-as-usual (baseline) levels as set by the CER. The Safeguard Mechanism applies to facilities with direct scope 1 emissions of more than 100,000 tonnes of CO₂ equivalent each year. Scope 1 emissions are the release of GHG as a direct result of an activity or series of activities (including ancillary activities) that constitute the facility. Companies who exceed their baseline levels must purchase ACCUs to offset their excess emissions. They may also apply to have a multi-year monitoring approach. This allows a facility to average its net emissions over a two- or three-year period.

If a company exceeds their baseline level but fails to purchase extra ACCUs, the CER has numerous enforcement options to encourage compliance. These include infringement notices, enforceable undertakings and injunctions. The CER can also, as a last resort, seek civil penalties with a maximum of 100 penalty points per day (\$21,000), to a maximum of 10,000 penalty points (\$2,100,000).



5.3 HOW ARE ACCUS SOLD AND TRANSFERRED?

ACCUs are placed into The Australian National Registry of Emissions Units (**ANREU**) which is administered by the CER. The ANREU tracks the ownership and location of ACCUs issued under the ERF. Each participant must create an ANREU account which is the platform where they can acquire and surrender ACCUs.

An ACCU is issued to a person by the CER by making an entry for the unit in that person's ANREU account. A person must have made an online application to the CER for ACCUs. The CER then assesses the application and if approved, the ACCUs will be deposited into the applicant's ANREU account as soon as practicable. ACCUs may then be sold onto the secondary market.

When ACCUs are sold on the secondary market, the transferor of the ACCUs must instruct the CER to transfer the ACCUs from the transferor's ANREU account to an ANREU account kept by the buyer. A transfer of an ACCU is of no force and effect until the CER removes the entry for the ACCU in the transferor's ANREU account and makes an entry for the unit in the buyer's account.

5.4 THE CURRENT LANDSCAPE OF THE AUSTRALIAN CARBON MARKET

The value of ACCUs are determined by current and future markets and the forces of supply and demand. Each quarter, the CER publishes a carbon market report and its latest report showed promising signs for the potential growth of Australia's carbon market. For the latest carbon market report, please see [The Clean Energy Regulator's Quarterly Carbon Market Report](#).

ACCU supply reached a record in 2020 of 16 million, an increase of 8% from the 14.8 million in 2019. Supply is expected to continue to grow as 158 projects were registered in 2020 which is four times the amount to projects registered in 2019.

Quarter 4 2020 saw quarterly transaction number and volume reaching the highest in the year with 66 transactions accounting for over one million ACCUs. On average, 285,000 ACCUs were traded each quarter in 2020, down 21% on the volumes in 2019. The reduced level of market activity in 2020 was primarily due to the COVID-19 pandemic which impacted the market earlier in the year.

Certain ACCUs may also have 'co-benefits' associated with the project which sell for a premium. Co-benefits are the environmental, economic, social and cultural benefits achieved in addition to carbon abatement from a specific project. For example, savanna fire management projects have achieved more than 2.4 million tonnes of emissions reductions. Because these projects are carried out by Indigenous ranger groups, consisting of traditional custodians it also provides employment opportunities for Indigenous Australians. Businesses and investors are interested in the co-benefits of ACCUs because by purchasing credits, they are not only offsetting their own emissions, but are also contributing to social, cultural and economic outcomes which can help businesses meet their environmental, social and governance targets, United Nations Sustainable Development Goals and reconciliation action plans.

6 THE INTERNATIONAL CARBON MARKETS

A number of jurisdictions have implemented (or plan to implement) Emission Trading Schemes (**ETSs**) to reduce GHG emissions to meet their Paris Agreement commitments or independent domestic emissions reduction targets. These jurisdictions include the European Union (**EU**), the United Kingdom (**UK**), the United States (**U.S.**) and China. The ETS framework established for each of these jurisdictions is summarised below.



6.1 THE EUROPEAN UNION

The EU emissions trading system (**EU ETS**) was the world's first major carbon market and is based on a cap and trade principle. The EU ETS is overseen and governed by the European Commission whereby a cap is set on the total amount of certain GHGs that can be emitted by installations covered by the system. This is reduced over time ensuring that total emissions fall. The EU ETS has been divided into different phases. Phase IV commenced 1 January 2021 and will finish on 31 December 2030. Phase I was a trial phase, Phase II expanded the scheme's scope and Phase III reduced the number of freely allocated allowances. In Phase I, the total cap on emissions was 2298.5 million tonnes of CO₂, whereas the total emissions cap for 2020 is 1720 million tonnes of CO₂. In Phase IV (2021 – 2030), the emissions cap will be reduced by 2.2% annually. Within the cap, companies buy or receive emission allowances, which they can trade as needed with one allowance equal to one tonne of CO₂.

(a) Which entities are subject to the EU ETS?

Participation in the EU ETS is mandatory for companies who emit:

- + **CO₂** from:
 - power and heat generation;
 - energy-intensive industry sectors including oil refineries, steel works and production of iron, aluminium, metals, cement, lime, glass, ceramics, pulp, paper, cardboard, acids and bulk organic chemicals; and
 - commercial aviation between airports located in the European Economic Area;
- + **nitrous oxide** from the production of nitric, adipic and glyoxylic acids and glyoxal; and
- + **perfluorocarbons** from aluminium production.

(b) How are emission allowances auctioned and allocated?

Auctioning is the default method of allocating allowances within the EU ETS and is governed by the EU ETS [Auctioning Regulation and the EU ETS Directive](#) (EU ETS Directive). Each EU member state receives a proportion of allowances to be auctioned which is based on their overall ETS GHG emissions. Member states then auction these allowances to mandated companies. Pursuant to the EU ETS Directive, member states must use at least 50% of the revenues generated through auctions towards climate and energy related purposes. During 2013-2015, member states generated EUR 11.7 billion in revenues. Of this, approximately 85% was used for climate purposes, including the investment into renewable energy and technology to increase energy efficiency.

Twenty-eight countries have signed a Joint Procurement Agreement to auction their allowances on the common auction platform. Currently, the European Energy Exchange (EEX) in Leipzig is the common auction platform. Germany and Poland have opted-out of the common auctioning platform. Germany has nominated EEX as its opt-out platform, while Poland is making use of the common auction platform, EEX, to auction its allowances until further notice. The EEX holds weekly auctions and under the EU ETS Directive, those who are eligible to participate in the auctions are companies covered under the EU ETS, investment companies and credit institutions in possession of a permit and other intermediaries with approval to bid either on their own or their clients' behalf.

Certain sectors, particularly energy intensive industries, have been provided with relief to support their transition to the auction process. This relief involves the allocation of free allowances to companies in these industries, which enables these industries to transition to a low carbon economy at a lower cost. This in turn allows

them to maintain their competitiveness and minimises the risk of carbon leakage (i.e., the risk businesses transfer their production to other countries with laxer emission constraints). Additionally, free allocation incentivises firms to reduce their emissions so they can sell their excess allowances. Over time, the amount of free allocations are reduced, resulting in a gradual increase in the cost to emit which further incentivises firms to reduce their emissions, allowing the EU to meet its reduction targets. Over the 2013–2020 trading period, 57% of all allowances were auctioned, while the remaining were allocated freely.

In Phase IV, the system of free allocation will continue. However, its focus will be on sectors at the highest risk of relocating their production outside of the EU, to minimise carbon leakage. These sectors will receive 100% of their allocation for free. For less exposed sectors, free allocation is foreseen to be phased out after 2026 from a maximum of 30% to 0% at the end of Phase IV. The EU has not yet provided details of which sectors will be affected by these changes.

In Phase IV, several low-carbon funding mechanisms will be set up to help energy-intensive industrial sectors and the power sector meet the innovation and investment challenges of the transition to a low-carbon economy. These include two new funds:

- + The **Innovation Fund** will support the demonstration of innovative technologies and breakthrough innovation in industry. It will extend existing support under the NER300 programme. The amount of funding available will correspond to the market value of at least 450 million emission allowances; and
- + The **Modernisation Fund** will support investments in modernising the power sector and wider energy systems, boosting energy efficiency, and facilitating a just transition in carbon-dependent regions in 10 lower-income Member States.



(c) Tradable Units:

There are four types of tradable credits under the EU ETS scheme:

- + EU Allowances (**EUAs**);
- + EU Aviation Allowances (**EUAAs**);
- + Certified Emission Reduction (**CERs**); and
- + Emission Reduction Units (**ERUs**).

EUAs are the most common and permits the holder to emit one tonne of CO₂ or the equivalent amount of two more powerful GHGs; nitrous oxide and perfluorocarbons. EUAAs enable the holder to emit one tonne of CO₂ within a valid period and are specifically for the compliance of aircraft operators and can be surrendered only by aviation operators. CERs and ERUs are international credits generated through mechanisms established by the Kyoto Protocol. CERs are obtained through the Clean Development Mechanism (**CDM**). The CDM allows firms in industrialised countries to invest in projects that reduce emissions in developing countries as an alternative to more expensive emissions reductions in their own countries. ERUs are produced through the Joint Implementation (**JI**) mechanism, which allows industrialised countries to meet part of their required cuts in GHG emissions by paying for projects that reduce emissions in other industrialised countries. CERs and ERUs ceased to be accepted for EU ETS compliance after the commencement of Phase III, and from that time have been exchangeable for EUAs. However, the Paris Agreement established a new market mechanism to replace the CDM and JI after 31 December 2020. After this date, the EU does not plan on continuing the exchange of CERs or ERUs for EU ETS compliance.

(d) How are emission allowances traded?

Once allocated, emission allowances can be traded on the secondary market. The secondary market is comprised of an over-the-counter market and an exchange traded market, with the exchange traded market accounting for the majority of trading. Exchanges which trade EU emissions allowances include the Intercontinental Exchange (**ICE**) (as a result of Brexit, trading has migrated from ICE's London-based exchange to the Netherlands based ICE Exch platform), the European Energy Exchange, the New York Mercantile Exchange and the NASDAQ OMX. In 2013, the ICE had a 93.31% share of traded volume by exchange. The secondary market allows companies who are emitting less than their cap to sell their excess allowances to those who exceed their cap.

**6.2 UNITED KINGDOM**

After the UK ceased to be a member of the EU, on 1 January 2021 the UK launched its own emissions trading scheme (**UK ETS**) similar to the EU ETS. The UK ETS will be based on a cap and trade principle and implemented in phases. Phase I will run from 2021–2025 with the initial cap on allowances set for 155.7 million allowances, decreasing over time. Within this cap, participants will receive free allowances and/or buy emission allowances at auction or on the secondary market which they can trade with other participants as needed.

(a) Which entities are subject to the UK ETS?

The UK ETS will initially apply to energy intensive industries, the power generation sector and aviation. This will cover activities involving combustion of fuels in installations with a total rated thermal input exceeding 20MW and sectors like refining, heavy industry and manufacturing. The aviation routes include UK domestic flights, flights between the UK and Gibraltar, flights from the UK to EEA states.

(b) How are emission allowances traded?

Auctioning will be the primary means of introducing allowances into the UK ETS market. To maintain competitiveness in the UK ETS and reduce carbon leakage, a proportion of allowances will be freely allocated. Some free allowances will also be made available for new stationary entrants to the UK ETS as well as existing operators who increase their activity.

The UK government has not announced whether there will be a secondary market for the trading of allowances.



6.3 THE UNITED STATES

Currently, there is no U.S. federal emissions trading scheme. Instead, individual states can implement their own schemes on a voluntary basis. In the northeast of the U.S., New England states and a group of Mid-Atlantic states have created the Regional Greenhouse Gas Initiative (RGGI) which is a cap-and-trade regime that covers CO₂ emissions from power plants in those states. California has its own trading regime covering a wide range of GHG emissions from a variety of industries.

(a) The RGGI

The RGGI was the first mandatory market-based program in the U.S. and is a cooperative effort between the states of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont. The RGGI is a cap-and-trade program with the cap gradually declining over time.

Which entities are subject to the RGGI?

The RGGI scheme applies only to CO₂ emissions from fossil fuel-fired power plants with capacities to generate 25 megawatts or more in the nine RGGI states. Those covered are required to hold allowances equal to their CO₂ emissions over a three-year control period.

How are RGGI allowances traded?

RGGI allowances are offered through quarterly, regional allowance auctions. The auctions are run online and are sealed-bid, uniform price auctions, which are open to all qualified participants. They result in a single quarterly clearing price. Each allowance represents an authorisation for a regulated power plant to emit one tonne of CO₂. The RGGI CO₂ Allowance Tracking System (RGGI COATS) is the platform that records and tracks data for each State's CO₂ Budget Trading Program, including the transfer of CO₂ allowances that are offered for sale by the states and purchased by the winning qualified bidders in the quarterly auctions.

Entities are also able to trade allowances on secondary markets, via over-the-counter trades as well as exchanges such as ICE. The secondary market comprises the trading of physical allowances and financial derivatives, including futures and options contracts, on the over-the-counter and exchange traded markets. At the end of each quarter, Potomac Economics provides an independent report on the secondary market to monitor its competitiveness, performance and efficiency. The Q419 report found that trading volume of RGGI futures increased 93% percent from the previous quarter and the total volume of CO₂ allowance transfers between unaffiliated firms increased 244%.



(b) California

The California cap-and-trade program is part of a range of policies for California to achieve a 40% reduction in GHG emissions from 1990 levels by 2040. The program is overseen by the California Air Resources Board (**CARB**). The program's overall GHG emission cap declines annually. In 2015, the cap was 394.5 Mt CO₂e and from 2015 to 2020, the cap declined approximately 12 Mt CO₂e each year, reaching 334.2 Mt CO₂e. From 2021-2030 the cap will decline approximately 13.4 Mt CO₂e each year, planning to reach 200.5 Mt CO₂e in 2030.

Which entities are subject to the program?

Initially, the program covered the industrial and electricity sectors. In 2015, this expanded to transportation fuels and natural gas, bringing approximately 450 businesses responsible for 85% of state emissions within the cap.

How are program allowances traded?

Similar to the EU, some allowances are freely allocated while others must be purchased at auctions or on the secondary market. The auctions are run quarterly with the proceeds being placed into the Greenhouse Gas Reduction Fund which are then appropriated to programs which reduce GHG emissions.

The transportation sector does not receive any free allowances while the industrial sector currently receives roughly 90% of its allowances for free based on output and efficiency. The free allowances are allocated in a manner that ensures that a producer is not penalised for making more goods and a producer who can make more goods with fewer emissions is rewarded. The utility sector receives free allowances

but must sell them at auction and use the revenue to benefit its ratepayers, primarily through a climate credit on utility bills. The amount of free allocations declines over time. In 2018, 25% of allowances were allocated freely with the remainder sold at auction. The revenue generated from auction is placed in the Greenhouse Gas Reduction Fund which is used to invest in projects that lower GHG emissions.

In 2013, California entered into an agreement with Québec to link their cap-and-trade programs. The agreement provides for the equivalence and interchangeability of compliance instruments issued by each jurisdiction for the purpose of compliance with their respective programs and permits the transfer and exchange of compliance instruments between entities registered with the parties' respective programs using a common secure registry. The two programs hold joint quarterly allowance auctions to allow market participants to acquire GHG allowances. In 2019, the Trump administration sued California and various state officials over the Quebec agreement arguing that the system interfered with their ability to conduct foreign policy on GHG emissions. However, in March 2020 a federal judge dismissed the allegations holding that the agreement was entirely voluntary and did not amount to a treaty.

Allowances sold at auction must clear a price floor. If prices are lower on the secondary market, fewer allowances will be sold at auction. However, if any allowances are not sold at auction, they are held in a state reserve and cannot be sold until at least two subsequent quarterly auctions clear above the price floor. This constrains the supply to keep prices on the secondary market close to the price floor.





6.4 CHINA

In December 2017, China released its [initial framework](#) for the first phase of their ETS. China has previously launched several ETS pilot programs which according to the National Development and Reform Commission (NDRC) have provided the necessary data and experience that will be used to launch the national ETS under a cap and trade system. China's national ETS commenced operation on 1 January 2021.

(a) Which entities are subject to the ETS?

Initially, the ETS will only cover the thermal power industry, which accounted for 40% of China's total emissions in 2020. However, this sector alone will be close to double the size of the EU ETS. A total of 2,225 entities have been registered in the ETS.

The NDRC plans to expand the scheme over time to other industries with high energy consumption, high pollution and high resource intensity.

(b) How are emission allowances allocated?

Under the current regulations, allowances will be allocated for free. The allowances will be based on subsector benchmarks with ex-post adjustments for changes in actual production. The benchmark for conventional coal-fired plants above 300 MW has been set at 0.877. This means that relevant entities will receive 0.877 allowances for every megawatt hours or electricity generated.

However, it is unclear what approach will be taken for other industries.

No auction function has been introduced yet.

(c) How are allowances traded?

In the initial phase, a unified national carbon emission allowance trading system will be established by the Department of Development and Reform under the State Council who will formulate the administrative management measures and technical specifications of the trading system. Companies will be able to sell excess emission allowances (or buy emission allowances to meet shortfalls) on the market. The NDRC plans to expand the variety of tradeable products and trading methods, such as nationally certified voluntary emission reductions.

(d) Allowance pricing

Analysts with Refinitiv have calculated that around 8-8.5 billion allowances will be distributed to market participants for the first two years of China's ETS, making it by far the world's biggest carbon market in terms of coverage. Analysts, traders, and officials expect Chinese CO₂ permits to trade at around 35 to 50 yuan (US\$5.36 to US\$7.66) at the outset. This price level would be similar to the clearing prices at recent auctions for the Regional Greenhouse Gas Initiative, a program run by 11 states in the eastern United States that also covers only power plants. However, given a benchmark of 0.392, the prices would be less than the allowance prices in the California or EU programs.

(e) How is the ETS regulated?

The Development and Reform department under the State Council and other relevant departments will jointly implement supervision of the carbon market. This includes formulating the quota allocation plan, specification for verification technologies, and supervising implementation. The departments will supervise third-party verification agencies and trading institutions. Departments in charge of climate change at the provincial level and of municipalities with independent planning status will supervise data verification, quota allocation, and compliance by key emitting enterprises of their legal obligations under their respective jurisdictions.

There will also be a national trading and settlement system for the carbon emission allowances which will provide legal confirmation of the ownership of the allowances.

See the table below for a comparative summary of the carbon markets described above.

7 SUMMARY OF CARBON MARKETS

	Australia		The European Union (EU)	The United States		China	The United Kingdom
	The Emission Reduction Fund (ERF)	The Safeguard Mechanism		Regional Greenhouse Gas Initiative (RGGI)	California's cap-and-trade system		
Emissions Reduction Goal	Reduce emissions to 26-28% on 2005 levels by 2030.		Reduce GHG emissions by 40% from 1990 levels by 2030.	By 2020: at least 50% reduction of CO ₂ emissions from electricity generation from 2005 CO ₂ emissions. By 2030: a reduction of 30% compared to the 2020 CO ₂ emissions cap.	Reduce GHG emissions by 40% from 1990 levels by 2040.	Reduce carbon intensity to 60-65% below 2005 levels by 2030.	Achieve net zero GHG emissions by 2050.
Overview	The ERF enables entities to apply to the Clean Energy Regulator (CER) to earn Australian Carbon Credit Units (ACCU) by running eligible activities.	The safeguard mechanism builds on the ERF by providing a framework for Australia's largest emitters to measure, report and manage their emissions.	The EU Emissions Trading System (EU ETS) is based on a cap-and-trade principle. A cap is set on the total amount of certain GHGs that can be emitted by which is reduced over time ensuring that total emissions fall. Companies buy or receive emission allowances, which they can trade as needed.	The RGGI is a cap-and-trade program with the cap gradually declining over time.	California has a cap-and-trade system whereby the cap annually declines. In 2015, the cap was set at 394.5 Mt CO ₂ e and is set to reach 200.5 Mt CO ₂ e in 2030.	In December 2017, China released its initial framework for the first phase of their ETS. Previously, China had implemented several pilot ETS programs on specific jurisdictions which the first phase will be based off.	The UK intends to establish a UK Emissions Trading System (UK ETS) with Phase I running from 2021-2030. The UK ETS cap will initially be set 5% below the UK's notional share of the EU ETS cap for Phase IV of the EU ETS.
Status	In force		In force	In force	In force	In force	In force
Established	2015	2016	2005	2009	2013	2021	2021
Geographical Coverage	Economy-wide		All EU countries plus Iceland, Liechtenstein and Norway	Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont.	California	Economy-wide	Economy-wide

	Australia		The European Union (EU)	The United States		China	The United Kingdom
	The Emission Reduction Fund (ERF)	The Safeguard Mechanism		Regional Greenhouse Gas Initiative (RGGI)	California's cap-and-trade system		
Mandatory or Voluntary	Voluntary - allows businesses, councils, state governments and land managers to participate.	Mandatory for facilities with direct scope 1 emissions of more than 100,000 tonnes of CO2 equivalent each year. Regulated entities are required to keep their emissions levels at or below a baseline set by the CER.	Mandatory for companies emitting: CO2 from: power and heat generation; energy-intensive industry sectors; and commercial aviation between airports located in the European Economic Area. Nitrous oxide from the production of nitric, adipic and glyoxylic acids and glyoxal. Perfluorocarbons from aluminium production.	Mandatory only for entities generating CO2 emissions from fossil fuel-fired power plants with capacities to generate 25 megawatts or more in the nine RGGI states.	Mandatory for all entities generating GHG emissions from the industrial and electricity sectors, transportation fuels and natural gas. Such entities must purchase allowances in an amount equal to their emissions. Approximately 85% of state emissions are covered by the cap.	Initially, the ETS will only be mandatory for entities within the power sector with annual emissions above 26,000 tons of CO2 or equivalent. However, this alone will cover more than 3 billion tonnes of CO2 and will be close to double the size of the EU ETS. The scheme is planned to expand to other industries with high energy consumption, high pollution and high resource intensity.	Mandatory for those in energy intensive industries, the power generation sector and aviation. This will cover activities involving combustion of fuels in installations with a total rated thermal input exceeding 20MW and sectors like refining, heavy industry and manufacturing.
Allocation of allowances	An entity can participate in an auction to enter into a carbon abatement contract with the CER to sell their ACCUs to the CER. The contract is an agreement to provide a set number of ACCUs at a price determined for the contract's duration.	There are no freely allocated ACCUs When a company exceeds their baseline levels, the CER can issue infringement notices and enforceable undertakings and injunctions. The CER can also seek civil penalties with a maximum of 100 penalty points per day (\$21,000), to a maximum of 10,000 penalty points (\$2,100,000)	Most allowances are auctioned via the European Energy Exchange (EEX).	Allowances are offered through regional allowance auctions via the RGGI CO2 Allowance Tracking System (RGGI COATS).	Approximately 75% of allowances are purchased at auctions. The California Program is linked to the Québec Cap-and-Trade System. This enables the mutual acceptance of allowances issued by each jurisdiction to be used for compliance with each program and the trading of allowances between the two countries.	Allowances will be allocated to mandated companies. It is unclear whether this will occur via auction.	Allowances will be auctioned to those covered by the UK ETS.

	Australia		The European Union (EU)	The United States		China	The United Kingdom
	The Emission Reduction Fund (ERF)	The Safeguard Mechanism		Regional Greenhouse Gas Initiative (RGGI)	California's cap-and-trade system		
Free allocation	No	No, and those who exceed their emissions baseline must purchase ACCUs to offset excess emissions.	Some are allocated freely to those in energy intensive industries. However, the amount of free allocations is reduced yearly.	No	Yes, to certain sectors such as the industrial sector and utility sector.	It is expected that some companies will be freely allocated allowances based on subsector benchmarks with ex-post adjustments for changes in actual production. Power generation companies will be pre-allocated allowances based on 70% of their 2018 production levels multiplied by a benchmark factor. However, it is unclear what approach will be taken for other industries.	To begin with, some allowances will be allocated freely.
Frequency of Auctions	Bi-annually	Bi-annually	Weekly.	Quarterly.	N/A	N/A	N/A
Secondary Market	The secondary market for ACCUs is primarily conducted through over-the-counter transactions and broker activity. Those who emit less than their baseline to sell them to facilities who need to offset their own emissions. ACCUs can be bought by corporations to meet business goals including CSR initiatives, carbon neutrality and Reconciliation Action Plans.	Companies who emit less than their cap can trade their excess allowances on the secondary market to those who are exceeding their cap. This occurs via an over-the-counter market and an exchange traded market.	Entities can trade allowances on secondary markets, via over-the-counter trades as well as exchanges.	Regulated entities are also able to purchase and sell allowances on the secondary market.	A unified national carbon emission allowance trading system will be established. Companies will be able to sell excess emission allowances (or buy emission allowances to meet shortfalls) on the market. However, it is unclear whether this will involve a secondary market.	N/A	N/A

	Australia		The European Union (EU)	The United States		China	The United Kingdom
	The Emission Reduction Fund (ERF)	The Safeguard Mechanism		Regional Greenhouse Gas Initiative (RGGI)	California's cap-and-trade system		
Legal Treatment	<p>An ACCU is a 'financial product' under the <i>Corporations Act 2001</i> (Cth) and the <i>Australian Securities and Investment Commission Act 2001</i> (Cth). This means that people who provide financial services in relation to ACCUs and related financial products and services in Australia may require an AFSL.</p> <p>If a person carries on a business of providing advice; "dealing"; "making a market"; operating a registered scheme; or providing a custodial or depository service in relation to ACCUs, they will require an AFSL. However, carbon abatement contracts are exempt from the definition of 'derivative' and 'financial product' meaning that a person is not required to hold an AFSL to provide advice about, or enter into, a carbon abatement contract.</p>		<p>The legal nature of allowances is at the discretion of each state. However, emission allowances are categorised as a financial instrument. As such, the rules applicable to traditional financial markets also apply to all dealings in emissions allowances.</p>	<p>Each state has its own statutes and regulations to implement the RGGI, which is based on the RGGI Model Rule. The Model Rule explicitly states that an allowance is not a property right.</p>	<p>The California Air Resources Board implements and enforces the program under the <i>Global Warming Solutions Act of 2006</i>. Recently, the California Court of Appeals found that the costs of buying or selling emissions allowances are property rights that can be traded.</p>	<p>The Development and Reform department under the State Council and other relevant departments will jointly supervise the carbon market. This includes formulating the quota allocation plan, specification for verification technologies, and supervising implementation. There will also be a national trading and settlement system for the emission allowances which will provide legal confirmation of the owners of the allowances.</p>	N/A
Main criticism	<p>Since its implementation, GHG levels have risen year on year.</p>		<p>During phase I and II, there was a significant over-allocation of allowances which impacted the scheme's effectiveness to reduce emissions.</p>	<p>Since its implementation, there has not been a significant reduction in GHG emissions, primarily due to over-allocation.</p>	<p>When first implemented, California set the cap too high. This allowed companies to buy a surplus and hoard allowances for when the cap is more stringent in the future.</p>	<p>During its pilot programs, there was an over allocation of allowances reducing the need to invest in emissions abatement.</p>	<p>Since the UK ETS operates as a standalone system, UK businesses will be unable to trade their allowances with the EU market, disincentivising them to reduce their emissions since there will be less demand for their allowances.</p>

8 PRIVATE CERTIFICATION SCHEMES

Organisations wishing to offset their emissions can use a variety of credits generated by private certification schemes. While private certification schemes are not regulated by the Australian Government, if an Australian entity reduces its emissions in Australia through a private scheme this will also contribute to Australia's overall GHG emission reductions. A summary of three of the more established private certification schemes follows.

8.1 THE GOLD STANDARD

[The Gold Standard](#) is a Swiss-based, globally recognised regulatory framework for the deployment of capital into climate, environment and development projects. The Gold Standard was developed through collaboration between policy experts from governments, multilateral organisations and the private sector. It has developed the first independent benchmark for carbon offset projects and oversees the creation and issuance of Voluntary Emission Reductions (**VER**) units. Once certified, projects are issued VER units annually. These units can be purchased by governments, business, impact investors and individuals and provides on-going funding to project activities.

8.2 VERIFIED CARBON STANDARD

[The Verified Carbon Standard](#) is based in Washington DC and manages standards and frameworks for a range of international environmental and sustainable development projects. Projects are issued Verified Carbon Units (**VCUs**) which represents a certain reduction or removal of CO₂ from a project. VCUs are characterised by a number of [quality assurance principles](#) which are confirmed through the project [validation and verification](#) process and are issued to projects including the avoidance of deforestation and hydro-electric projects. VCUs can then be sold to companies who wish to offset their own emissions which in-turn fosters financing to clean, innovative businesses and technologies.

(a) Biodiverse Reforestation Carbon Offsets

[The Carbon Neutral Biodiverse Reforestation Carbon Offsets \(BRCO\)](#) is an Australian-based organisation that enables organisations to purchase offsets to counter the emissions that are generated through their business activities. Carbon Neutral then uses these funds to plant native trees in the Yarra Yarra Biodiversity Corridor. This creates greater biodiversity for endangered flora and fauna but also employment for local Indigenous people. BRCOs are independently verified using on-ground measurement to determine the amount of carbon stored from their planting.

9 INTEGRATING CARBON CREDITS INTO FINANCIAL PRODUCTS

There have been a number of transactions that have utilised carbon credits and other environmental credits to create innovative financial products.

9.1 INTERNATIONAL FINANCE CORPORATION'S \$152M FOREST BOND

In 2016, the International Finance Corporation (IFC) issued a \$152 million bond to prevent deforestation in developing countries. This was the first bond of its kind to offer investors the choice to have their coupons paid in cash or in carbon credits. To pay investors a carbon credit coupon, when the coupon is due, IFC buys carbon credits from the Kasigau Corridor project in Kenya. This is a project, verified under the Verified Carbon Standard to earn VCUs. The project follows the United Nations Reducing Emissions from Deforestation and Forest Degradation (REDD) scheme. A REDD project offers economic incentives to reduce deforestation and invest in low-carbon growth. The Kasigau Corridor project provides local residents with an alternative income stream rather than poaching wildlife and clear cutting the land. These jobs include protecting the wildlife as rangers and planting trees. The project is expected to offset 1 million tons of CO₂ emissions per year for the next 30 years. For those who opted for the carbon credit coupon, they can retire the credits to offset corporate GHG emissions or sell them on the carbon market. However, for the coupons paid in November 2018 and 2019, no noteholders selected the coupon in the form of carbon credits.



9.2 THE WORLD BANK'S CARBON-LINKED BONDS

Carbon-linked bonds use the capital raised from the proceeds of the bond issue to either invest in the development of projects generating carbon credits or purchase call options for carbon credits in different projects. The coupon to be paid to bond holders could come from the upside of future carbon prices until the bond matures and would be shared between the issuer and the buyers of the bonds.

In June 2008, Daiwa Securities Group and the World Bank launched the first CER Linked Bond with a principal of USD\$25m. The bond was USD denominated and offered investors 100% principal protection in USD. It had a fixed rate coupon of 3% for an initial period, and then a coupon linked to the future performance of CER market prices and the actual versus estimated delivery of CERs generated by a hydropower plant located in the Guizhou Province in China.

Shortly after in September 2008, the World Bank launched its second CER linked bond with a principal of USD\$6.5m. Mitsubishi UFJ Securities International PLC was the lead manager for the issue which was offered to sophisticated investors in Japan. Similarly, the bond paid a fixed rate coupon for an initial period and then a coupon linked to future CER market prices and the actual volume of CERs issued by a bio-energy project in Malaysia.

9.3 THE ALLAIN DUHANGAN RUN-OF-THE-RIVER HYDRO POWER PROJECT

On 24 August 2012, the United Nations Clean Development Mechanism Executive Board announced the Allain Duhangan Hydropower Project's first issuance of 169,798 CERs. The CERs were sold through a forward contract to the Italian Carbon Fund for which World Bank is the trustee. The proceeds from the sale of the CERs financed the completion of a power plant that was established to meet peak energy shortages in Northern India. The power plant will reduce GHG emissions by 400,000t per annum.

10 CONCLUSION

This report has explored the key carbon markets that are currently operating in Australia and offshore. As companies and governments increasingly commit to net zero emissions, we anticipate these markets will continue to grow and diversify in line with increasing demand for ACCUs and other carbon credits. With this will come more opportunities for innovation as investors and financiers find new ways to monetise carbon credits.

11 CONTACT



LOUISE MCCOACH

Special Counsel

T +61 2 9263 4626

M +61 477 400 363

E lmccoach@gtlaw.com.au

Louise is the lead Debt Capital Markets, Securitisation and Derivatives lawyer at G+T, and brings over 25 years of in-house counsel and private practice experience in the financial services sector. Louise and her team regularly act for banks, financial institutions and other listed corporations in their debt and equity capital markets transactions, with significant experience in both asset-backed and issuances into the domestic, US and Euro markets. She is also the recipient of a number of awards relating to her work in derivatives and debt capital markets. Louise is recognised for her skill and expertise by a number of publications and directories.

