



energetics

Global carbon offset markets analysis

Department of Environment and Heritage Protection

25 July 2017 | 124524



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- Be leaders. Develop and implement strategy
- Be informed. Make data-driven decisions
- Be efficient. Drive business improvement and realise savings
- Buy better. Leverage energy supply and carbon markets

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Document control

Description	Prepared by	Reviewed by	Approved by	Approval Date
Version 1	Hannah Palma, Sally Cook	Peter Holt	Peter Holt	17 July 2017
Version 2	Sally Cook	Peter Holt	Peter Holt	25 July 2017

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Executive summary

This report summarises drivers of price and demand for carbon offsets, with the view to understanding (as part of the next phase of this project) the potential value to the Queensland economy of generating offsets from the land sector.

Current and anticipated demand drivers include global climate change targets set under the Paris Agreement, Australian carbon policy, and demand for voluntary offsets by businesses.

Paris agreement

The Paris Agreement has established the most ambitious treaty on climate change to date. 148 parties representing 66% of global emissions have set targets with the objective of limiting warming to 2°C.

The use of offsets will be critical to these targets. While current international pricing schemes are fragmented and international trade is limited, the Paris Agreement is establishing rules to facilitate international trade through bilateral, multilateral and global agreements. It is now reasonable to consider when (not if) international trade will be widely used.

When this occurs, demand for offsets in international markets is expected to dwarf our domestic demand. The Climate Action Tracker Project estimates that based on current policies there will be a global shortfall of 5,000-8,000MtCO₂e¹ on Paris Agreement targets. High level estimates indicate that generating offsets to meet this shortfall could be worth around \$230 billion to the global economy in 2030².

To realise a share of this economic potential, policy advocacy will need to ensure that the rules established under the Paris Agreement support our domestic offset industry by establishing consistency in accounting and methods wherever possible. While a global trading mechanism emerges it would also be advantageous for Australia to establish bilateral or multilateral agreements for offset trading with our key partners, in particular China as the world's largest emitter.

Australian carbon policy

There is short term instability in the market for domestic offsets (Australian Carbon Credit Units (ACCUs)) due to lack of policy certainty about the future of the Emissions Reduction Fund which will soon exhaust its budget) and the Safeguard Mechanism (which is currently too generous and does not incentivise investment in emissions reductions). While it is widely accepted by business that the Safeguard Mechanism baselines will tighten, when and by how much is unknown.

Voluntary demand

Voluntary offsets are used by companies for their branding and reputation benefits and to meet voluntary emissions targets. Energetics' experience with clients shows that there is increasing

¹ Climate Action Tracker <http://climateactiontracker.org/global/173/CAT-Emissions-Gaps.html> accessed 7 July 2017

² See section 4

awareness and interest in the location of offsets, the types of projects, their co-benefits, alignment of those benefits to business strategy, and the quality of the offsets to be purchased.

From 2021 the aviation sector will pilot a market based mechanism which will require participating companies to offset their emissions when they exceed 2020 levels, effectively capping emissions from the sector. Potential exists for other transport sectors, such as shipping, to establish similar schemes.

View to 2030: analysing the benefits to Queensland

There are a number of potential scenarios which could emerge between now and 2030. Our forthcoming analysis will focus on three scenarios with the following high level assumptions.

- 1. Domestic only:** Efforts to pursue international trading are hampered and result in Australia having no linkages to international trading partners. ACCUs are only traded within Australia. Demand is driven by the safeguard mechanism, Australia's Paris Agreement target, and voluntary offsetting by businesses.
- 2. Multilateral agreements:** Some countries have partnered together to establish multilateral agreements for offset trade but these are fragmented and a truly global scheme has not been established. Australia has established links with its key trading partners. Trade is ad-hoc and over the counter with little visibility of price. Demand is driven by Australia's Paris Agreement target and the Paris Agreement targets of our key trading partners.
- 3. Global harmony:** International trading is established through the Paris Agreement rules and is accessible to all parties to the agreement. Trading volume is dictated by the global gap in NDCs relative to the global target. Prices quickly converge to an international parity.

1. Global agreements

History of global climate change agreements

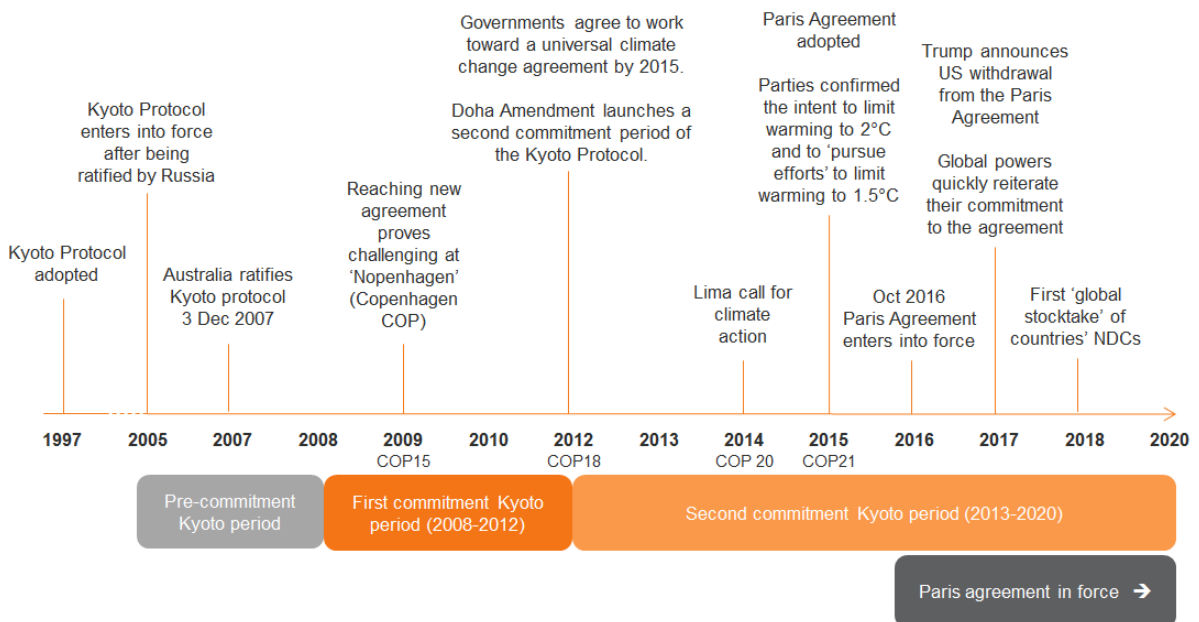
Climate change action at a global level is dictated by the UN Framework Convention on Climate Change (UNFCCC) which was formally established in 1992. In 1005 the Kyoto Protocol became the first treaty to set binding emissions targets for participating countries. It required developed countries (Annex 1 countries) to set targets over two commitment periods beginning in 2008.

To meet their targets under the Kyoto Protocol, Annex 1 countries could purchase offsets from two schemes (the Clean Development Mechanism and Joint Implementation) which were established specifically for the agreement. Developing countries (non-Annex 1 countries) did not have abatement targets but could participate in the scheme by generating and trading offsets with Annex 1 countries.

Success of the Kyoto Protocol was mixed. The US signed but never ratified the agreement and Canada, Japan and Russia all refused to set targets for the second period³. Australia did not ratify the agreement until 2008, but is on track to meet its target to reduce emissions by 5% below 2000 levels by 2020⁴.

At the 2012 Doha Conference of the Parties (COP), global governments agreed to work towards a new climate agreement. After more than a decade of negotiations, the Paris Agreement was adopted in 2015 and now forms the basis of global emissions reductions going forward.

Figure 1: History of global climate change action



³ <https://www.theguardian.com/environment/2011/dec/13/canada-pulls-out-kyoto-protocol>

⁴ Tracking to Australia's emissions reduction targets, Department of Environment and Energy https://www.google.com.au/url?sa=t&rct=j&q=&esrc=s&source=web&cd=7&cad=rja&uact=8&ved=0ahUKEwiOtJKw9fPUAhWCLpQKHx_jC0cQFghIMAY&url=https%3A%2F%2Fwww.environment.gov.au%2Fsystem%2Ffiles%2Fresources%2F9437fe27-64f4-4d16-b3f1-4e03c2f7b0d7%2Ffiles%2Ffact-sheet-tracking-emissions.docx&usq=AFQjCNEbOpZ2U70eJ9rSHt5x0Ngkb2FVxQ

The Paris Agreement

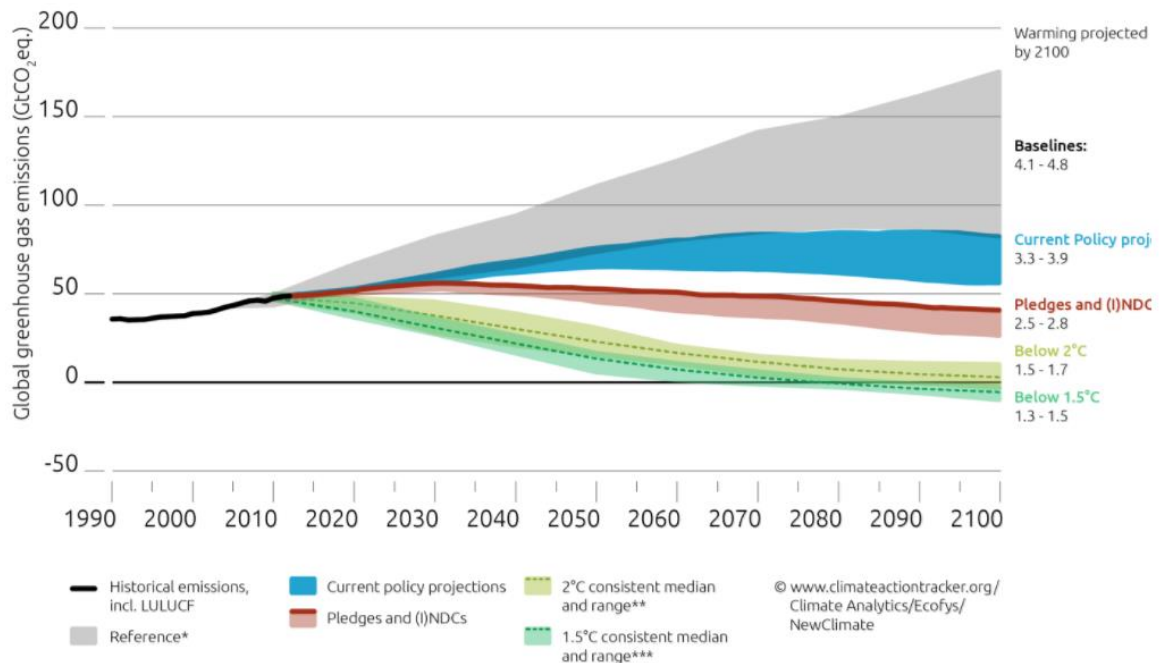
A clear market signal

In October 2016 the Paris Agreement became the fastest ever UN agreement to come into force. To date it has been ratified by 148 parties representing 66% of global emissions (excluding the US)⁵ which far exceeds the minimum threshold of 55 countries and 55% of emissions required for the agreement to enter into and remain in force⁶.

By signing the Paris Agreement, countries have committed to maintaining levels of warming to 2°C, and agreed in principle to aim to limit warming to 1.5°C above pre-industrial levels. Parties to the Agreement will need to set targets (Nationally Determined Contributions (NDCs)) which will undergo review every five years for ambition and consistency with the agreement's mitigation objectives⁷.

Australia has set an NDC to reduce emissions by 26-28% from 2005 levels by 2030⁸. Assessment of countries targets relative to the 2°C goal shows that our NDC is inadequate and insufficient to contribute to our fair share towards global mitigation efforts⁹. This is the case with many other parties to the agreement.

Figure 2: Paris Agreement pledges compared to 2°C warming trajectory⁹



⁵ World Resources Institute Paris Agreement Tracker <http://www.wri.org/faqs-about-how-paris-agreement-enters-force> accessed 6 July 2017

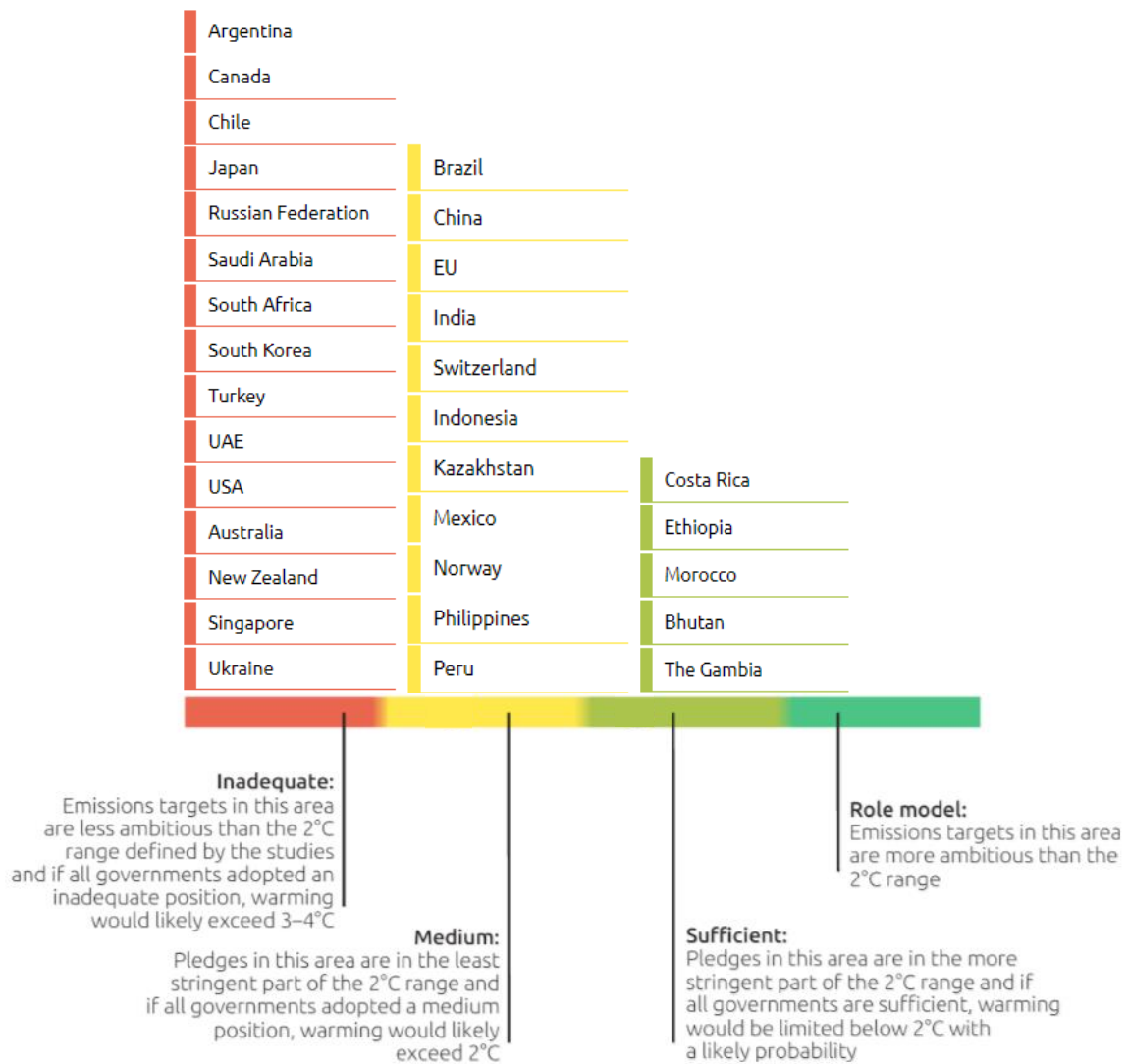
⁶ UNFCCC Landmark Climate Change Agreement to Enter into Force <http://newsroom.unfccc.int/unfccc-newsroom/landmark-climate-change-agreement-to-enter-into-force/>

⁷ UNFCCC http://unfccc.int/paris_agreement/items/9485.php

⁸ UNFCCC, "Australia's Intended Nationally Determined Contribution"

⁹ Climate action tracker <http://climateactiontracker.org/countries/australia.html> accessed 5 July 2017

Figure 3: Adequacy of Paris Agreement pledges by country



As a result Australia’s (and many other countries’) current emissions reduction commitments are seen as a ‘floor’ position and subject to expansion. The speed and extent of tightening of these targets is likely to be influenced by the success of the five yearly ‘global stocktake’ of NDCs governed by the UNFCCC, as well as political appetite for climate change action within each country.

Financial markets have responded

The global head of Blackrock, the world's largest investment group with more than \$US5 trillion of assets under management, recently asserted that "anyone who's looking to take beyond a 10-year view on coal is gambling very significantly¹⁰". As renewable energy becomes more price competitive and climate change increases the risk of stranded fossil fuel assets, global investment in renewables has grown to more than US\$300 billion per annum¹⁰.

The financial industry is also at the leading edge of voluntary disclosure and many initiatives exist, such as the Montreal Pledge and the Portfolio Decarbonisation Coalition, to assess, disclose and reduce the carbon exposure of investment portfolios.

US withdrawal from the Paris Agreement

In July 2017 President Trump announced that the US would withdraw from the Paris Agreement. This decision was met by a strengthening in the resolve of global governments towards the achievement of the 2°C goal:

"The Paris agreement is a milestone in the history of climate governance. We must ensure this endeavour is not derailed. All parties should work together to implement the Paris agreement. China will continue to take steps to tackle climate change and fully honour its obligations"

Chinese president Xi Jinping¹¹

We deem the momentum generated in Paris in December 2015 irreversible and we firmly believe that the Paris Agreement cannot be renegotiated, since it is a vital instrument for our planet, societies and economies. We therefore reaffirm our strongest commitment to swiftly implement the Paris Agreement, including its climate finance goals and we encourage all our partners to speed up their action to combat climate change"

Joint statement from the leaders of France, Germany and Italy¹²

Trump's decision is in direct contrast to the requests of many prominent US businesses. In May 2017, CEOs of 30 prominent companies (including 3M, Dow Chemical, Bank of America Corp, DuPont, Procter & Gamble Johnson & Johnson, Coca Cola and Unilever) were signatories to a letter to President Trump requesting that the US stay in the Paris agreement³. Since the announcement a number of prominent CEOs have also withdrawn from the US Government's business council including the CEOs of Tesla, Disney and Apple.

Despite the US withdrawal, the agreement continues to stand as long as it covers 55 countries with more than 55% of global emissions. This threshold is currently met comfortably and no other parties have stated the intent to withdraw.

¹⁰ <http://www.afr.com/business/mining/coal/blackrock-says-coal-is-dead-as-it-eyes-renewable-power-splurge-20170524-gwbuu6>

¹¹ The Guardian China's Xi Jinping says Paris climate deal must not be allowed to fail <https://www.theguardian.com/world/2017/jan/19/chinas-xi-jinping-says-world-must-implement-paris-climate-deal> accessed 5 July 2017

¹² Reuters France, Italy, Germany defend Paris Accord, say cannot be renegotiated <http://www.reuters.com/article/us-usa-climatechange-eu-idUSKBN18S6GN> accessed 5 July 2017

Article 6 – International trading

Significant international policy changes are also pending which could influence the future of Australian carbon markets. This includes the progression of Article 6 of the Paris Agreement, the market based mechanism designed to replace the Kyoto Protocol¹³. This Article supports the international trade of carbon units (referred to as internationally transferred mitigation outcomes (ITMOs)) between parties by agreement. Importantly, unlike the Kyoto Protocol, Article 6 does not restrict trade to certain types of approved units. Instead it is likely that the units traded will need to meet common standards and accounting practices, but will be able to be originated in a number of international markets.

In practice Article 6 may translate to:

- The trade of carbon units through a direct bilateral agreement between two countries permitting abatement in one country to be transferred to another country
- The establishment of “carbon market clubs”¹⁴ where linkages are formed by a multilateral agreement between participating countries to trade offsets at an international level
- The establishment of an international offset trading framework overseen by the Conference of the Parties (COP) which is accessible on a voluntary basis to all parties to the Paris Agreement
- The use of non-market approaches for abatement, the form of which is uncertain and has not been well articulated to date.

It is unclear at this stage whether a new, tradeable international unit will be established under this Article. However, sufficient provisions exist for trade to occur without the establishment of a new offset unit. This could allow international trading to commence relatively quickly once the rules, accounting, and transfer mechanisms supporting Article 6 are formally established.

Since the Paris COP interest in international offset trade has been gaining momentum. China, Korea and Japan are currently in discussions to develop a North-East Asian carbon market club. As a close neighbour and trading partner, there would be obvious synergies and benefits to Australia in participating in this club. It would provide the opportunity to sell offsets into China which, once fully established, will have the world’s largest carbon market. Our high standards for ACCU creation and audit may also make our offsets more attractive to Korea, Japan, and other developed countries.

Many other opportunities exist for us to collaborate with our key trading partners to establish bilateral or multilateral agreements. In their Intended Nationally Determined Contributions (INDCs), 97 countries supported the trade of international units or emphasised the importance access to international markets to achieve their commitments¹⁵ (see Table 1). Reuters estimates that commitments made under the Paris Agreement will translate to a significant increase in carbon prices: in the order of \$50-\$105/tCO₂e by 2020 and \$65-\$130/tCO₂e by 2030. This is relative to the current European carbon price of \$8/tCO₂e¹⁶.

¹³ United Nations Framework Convention on Climate Change (UNFCCC), “Adoption of the Paris Agreement”

¹⁴ Centre for European Policy Studies, “Carbon Market Provisions in the Paris Agreement (Article 6)”

¹⁵ IGES INDC and NDC Database v3.2 accessed 29 June 2017

¹⁶ Reuters “Global carbon prices must soar to meet Paris climate target: report” accessed 28 June 2017, prices in this article were converted from USD to AUD at current exchange rates

Table 1: Number of countries proposing to use market based mechanisms by market type¹⁷

	Oceania	Asia	North Africa & Middle East	Sub-Saharan Africa	Eastern Europe & Central Asia	Europe	Latin America & the Caribbean	Northern America	Total	% of INDCs
Use of all market mechanisms										
Countries intending to use market mechanisms stated in their INDC ¹⁸	6	13	7	35	9	6	20	1	97	51%
Countries that are using or considering the use of market mechanisms	8	17	8	35	8	34	21	2	133	70%
Type of market mechanism										
International Market Mechanisms	6	16	6	35	8	32	19	1	123	65%
Regional Market Mechanisms	2	3	1	2	1	31	3	2	45	24%
Bilateral Market Mechanisms	1	6	0	0	1	0	4	0	12	6%
National or sub-national Trading Scheme	2	5	1	1	1	1	4	2	17	9%
Clean Development Mechanism (CDM)	1	2	0	18	1	2	5	0	29	15%
Joint Crediting Mechanism (JCM)	1	9	1	2	0	0	3	0	16	8%

¹⁷ IGES INDC and NDC Database v3.2 accessed 29 June 2017

¹⁸ Use of INDC (Intended Nationally Determined Contributions) in this measure captures countries which have ratified the Paris Agreement as well as those which have signed but not yet ratified.

2. Global carbon markets

National and regional compliance markets

Many carbon trading schemes exist with a variation in design, emissions coverage, and price with only a few markets being internationally linked or accepting international offsets for compliance. As of February 2017, 19 market based carbon pricing mechanisms were implemented with a further four scheduled for implementation and 11 under consideration¹⁹. Included in those scheduled for implementation is China's national emissions trading scheme to be introduced in late 2017²⁰ utilising the experience from eight regional pilot schemes. A further six countries have carbon tax schemes in place or scheduled for implementation²¹.

While carbon pricing and tax schemes currently cover only 13.9% of global greenhouse gas emissions; China's national scheme is expected to increase this coverage to 20-25%. The World Bank estimates that carbon price and tax schemes generated approximately US\$22 billion in revenue for Governments in 2016 and US\$52 billion to global economies in 2017²¹ (almost AU\$29bn and \$68bn respectively).

Prices in global compliance markets currently range from less than US\$1/ tCO₂e up to US\$22/ tCO₂e (AU\$1-\$29/ tCO₂e), as illustrated in Figure 5. When voluntary markets are taken into account, average prices are in the range of US\$1/ tCO₂e to US\$5 / tCO₂e (Figure 4) (AU\$1-\$6/ tCO₂e).

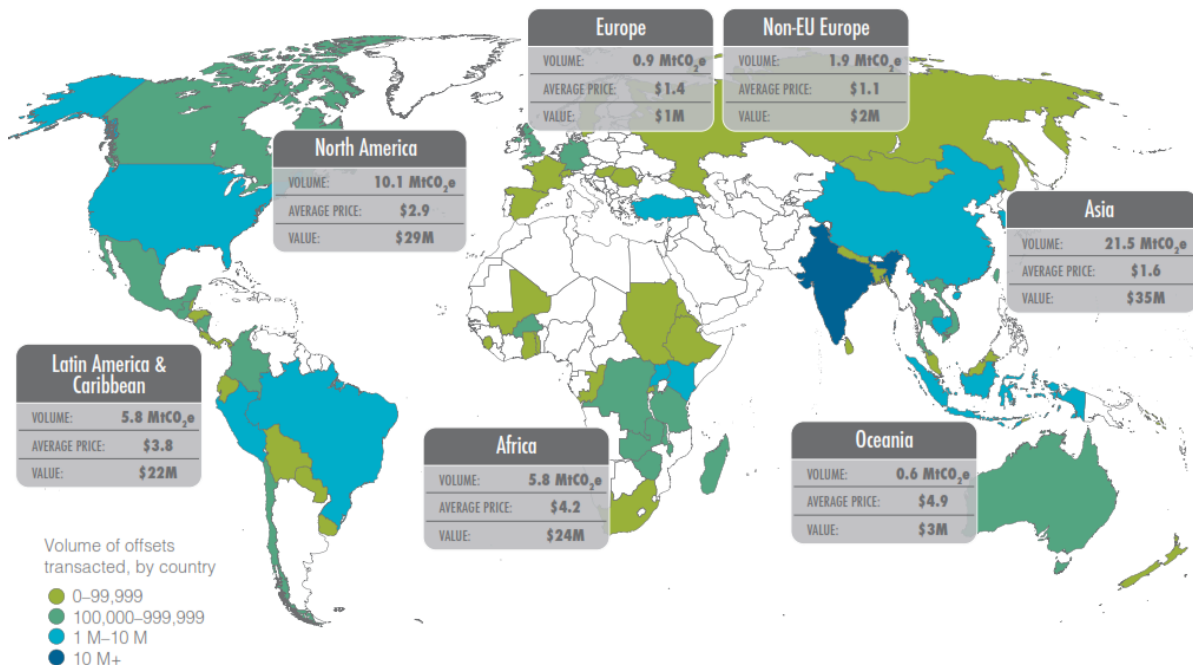


Figure 4: Trading volume and value (US\$) of global offset markets in 2016²²

¹⁹ International Carbon Action Partnership (ICAP) Status Report 2017

²⁰ <http://ets-china.org/news/>

²¹ World Bank and Ecofys. 2017 "Carbon Pricing Watch 2017"

²² Forest Trends Ecosystem Marketplace, Unlocking potential state of the voluntary carbon markets 2017

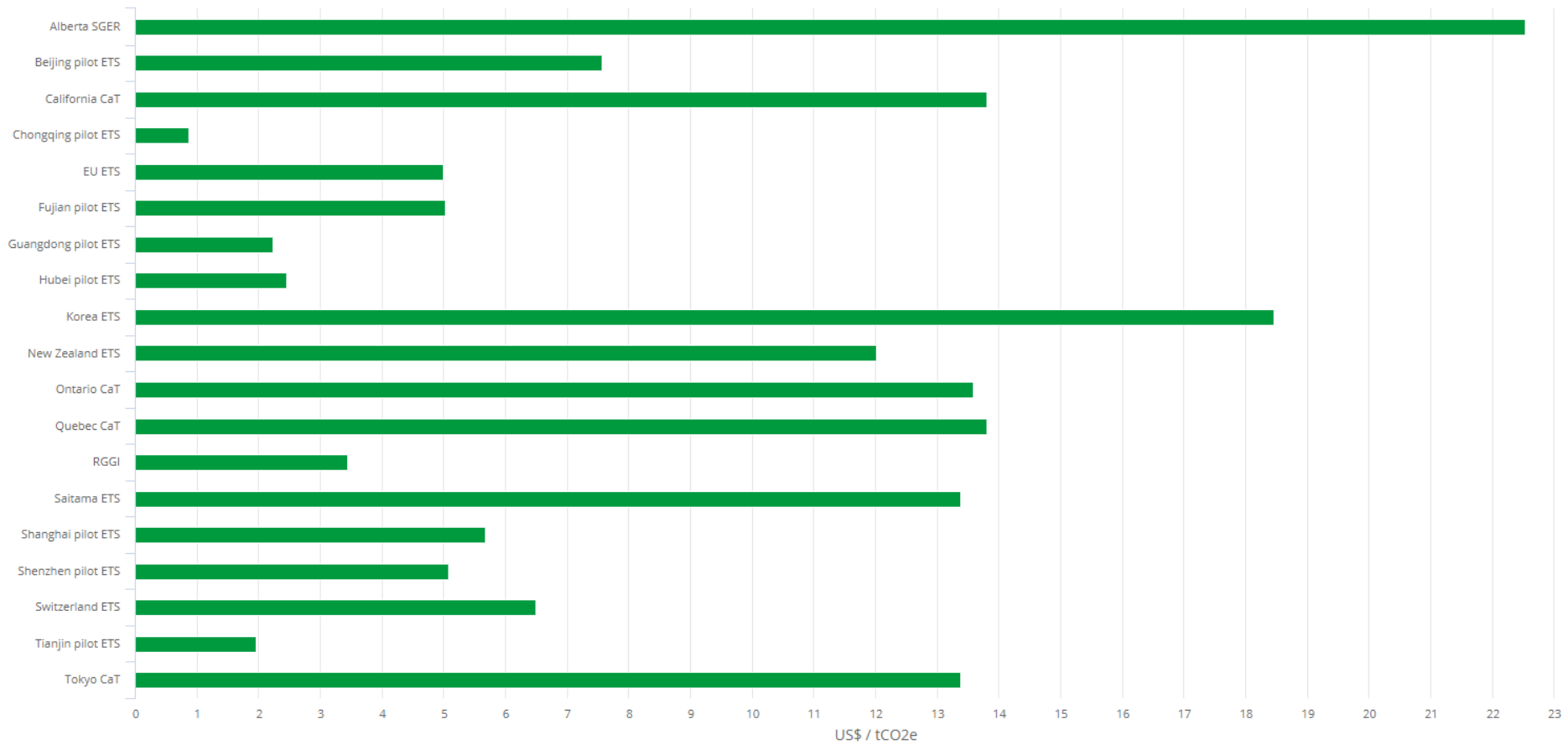


Figure 5: Prices in implemented emissions trading schemes (2017)²³

²³ World Bank carbon pricing dashboard http://carbonpricingdashboard.worldbank.org/map_data accessed 30 June 2017

The EU Emissions Trading Scheme (EU ETS) is the world's largest compliance market. The world's two largest emitters, China and the USA, are yet to set mandatory emissions reduction frameworks at a national level. As more countries and regions implement carbon markets demand for offsets is expected to strengthen.

However under current rules, very few countries and regions are accepting international offsets to meet mandatory compliance obligations (see Appendix A). Those that are accepting international permits have restrictions on the certification, project type, and quantity which can be surrendered. ACCUs from the land sector would not currently be eligible for use in any of these international schemes.

As of February 2017, 19 market based carbon pricing mechanisms were implemented with a further four scheduled for implementation and 11 under consideration. While current prices are low, forecast prices vary widely.

Table 2: Global carbon market current prices and forecast prices in 2030 (AU\$/tCO₂e)

Country/ region	Current price	Low estimate 2030	High estimate 2030	Average 2030
Japan ²⁴	\$3	\$3	\$3	\$3
China ²⁵	\$1-9	\$19	\$19	\$19
EU ²⁶	\$7	\$21	\$34	\$28
US ²⁷	\$4-18	\$26	\$45	\$36
South Korea ²⁸	\$18	\$11	\$110	\$61

The following section focuses on the carbon markets of five countries and regions including China, US, Japan, South Korea, and the EU based on their scale and the strength of Australia's existing trade relationships. According to the Carbon Markets Institute:

"Australia's energy-intensive, export oriented economy will become increasingly exposed to markets like China and Korea, where there is an explicit carbon price, a changing fossil fuel energy mix and a demand for innovation and technology solutions that augment the transition."²⁹

²⁴ Forecast corresponds to current price in the Japanese carbon tax and assumes this remains unchanged https://www.env.go.jp/en/policy/tax/20170130_greening.pdf accessed 3 July 2017

²⁵ Forecast from <http://carbon-pulse.com/12859/> accessed 3 July 2017

²⁶ Forecast from <http://blog.financial.thomsonreuters.com/eu-carbon-price-average-e23t-2021-2030-thomson-reuters-assess-future/> accessed 3 July 2017

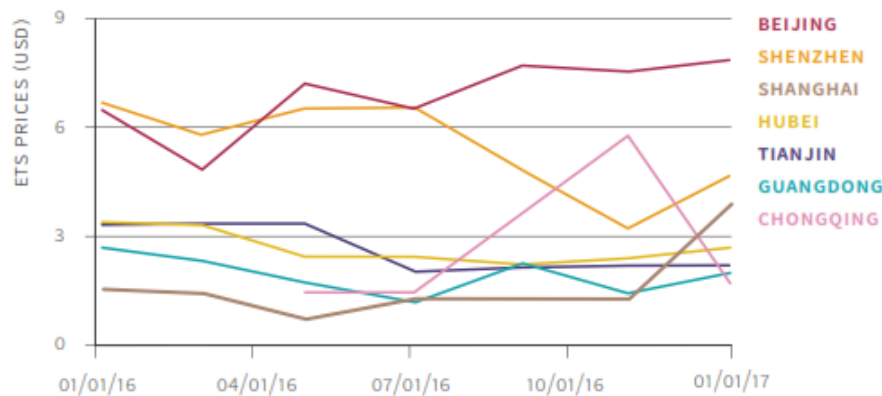
²⁷ Forecast uses mid case projections from <http://www.synapse-energy.com/sites/default/files/2015%20Carbon%20Dioxide%20Price%20Report.pdf> accessed 3 July 2017

²⁸ Upper range forecast price is higher than other countries and reflects the penalty price for non-compliance which would effectively act as a price ceiling http://www.ieta.org/resources/Resources/GHG_Report/2015/Articles/Building_a_Korean_ETS_for_the_future_SKim_HKim.pdf accessed 3 July 2017

²⁹ Carbon Markets Institute Despite the Trump decision, the Paris Agreement remains the mother of all market signals, 2 May 2017

China

Beginning in 2013 China established the first four of its eventual seven regional ETS pilots. Over the past four years these pilots have allowed China to trial different scheme designs to assist with the selection of a final design for their national ETS. Trading has been active with some regions beginning to offer forward contracts. Prices however have been low in comparison to other compliance schemes, ranging from around US\$1 to around US\$7 (Figure 6) (AU\$1-\$9).



Prices in the Chinese pilots represent secondary market prices. For Chongqing, regular trading only started in August, one trade at CNY 10 (USD 1.45) on 17 March 2016.

Figure 6: Recent prices in the Chinese ETS pilots³⁰

China's national scheme, scheduled for implementation in 2017, will be the largest in the world expecting to cover 3,000-5,000 MtCO₂e per annum³⁰. Phase one (2017-2019) will include a free allocation of units and is expected to allow trade of domestic offsets (China Certified Emission Reductions (CERs)) to meet compliance requirements. Given the free permit allocation international offsets are unlikely to be accepted in the early years of the scheme but the following phases should provide clarity on whether international offsets will be accepted in future. Discussions held by China, Japan and Korea indicate that even in the event that China does not accept international offsets for its domestic scheme that it may be open to international trade to meet its NDC.

United States

Two regional carbon pricing schemes are currently in operation in the US. The Regional Greenhouse Gas Initiative (RGGI) is a cap and trade system covering nine states (Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont). The scheme has a limited scope and only covers fossil fuel electricity generators with production greater than 25MW per annum (equating to 89MtCO₂e in 2015³¹). In the most recent auction (June 2017) emissions units traded at US\$2.53³² (AU\$3.30). Offsets can be used in the scheme, but only those generated via eligible projects within the participating states.

The California Cap and Trade Program is significantly larger than the RGGI covering 370MtCO₂e in 2015³¹. Formal linking has been established between the Californian and Québec schemes with

³⁰ International Carbon Action Partnership (ICAP) Status Report 2017

³¹ International Carbon Action Partnership (ICAP) Status Report 2017

³² RGGI auction results https://www.rggi.org/market/co2_auctions/results accessed 5 July 2017

linking under consideration with Ontario. Under the Californian scheme some free allocations are given with the remaining units sold via auction up to the set cap. In 2017 emissions units have been trading at just below US\$14³² (AU\$18). The scheme allows regulated entities to meet 8% of their obligations via the surrender domestic offsets from specific projects or international offsets originated in Québec.

The current administration's withdrawal from the Paris Agreement and declaration that it will not be pursuing its NDC means that any demand for offsets from the US in the short to medium term will be limited to businesses pursuing voluntary carbon reduction targets.

Japan

The Tokyo ETS covered 13.5MtCO₂e in 2015³¹ and has been in place since April 2010. It requires covered entities to reduce their emissions by a legislated percentage relative to a base year. The current compliance period (2015-2019) requires reduction in emissions of 15 to 17% depending on the type of entity. Prices in the Tokyo ETS have been trading around US\$13.50 in 2017³². A number of domestic credits can be used in the scheme, along with offsets from the linked Saitama ETS. The Saitama scheme utilises a very similar design, but is half the scale of the Tokyo ETS covering only 7MtCO₂e in 2015³².

Japan has a national tax for climate change mitigation of JPY289/tCO₂e³³ (AU\$3/ tCO₂e) and runs a voluntary ETS. This requires participating entities to adopt absolute emissions targets and allocates emissions units for compliance and trading purposes. A mandatory national ETS has been discussed at various times but has failed to receive sufficient support. Most recently a 2016 report prepared for Japan's Ministry of Environment proposed carbon pricing as a viable option for achieving the country's long term abatement targets. While a compulsory national scheme is unlikely in the short to medium term, Japan's participation in discussions with China and Korea indicate that it may be open to international trade to meet its NDC.

South Korea

The Korean ETS was established in 2015 and is running a first phase until 2017 during which time emissions allowances have been allocated for free. Free allocations will reduce to 97% in the second phase (2018-2020), and less than 90% in the third phase (2021-2025). Banking and borrowing of allowances is permitted (subject to some restrictions) to smooth surpluses and shortages of allowances.

Concurrently to the ETS an offset scheme has been established (Korean Offset Credits (KOCs)) which allows companies to undertake certified abatement projects which can be used to meet ETS compliance requirements. The use of Clean Development Mechanism (CDM) methodologies for offset projects also allows them to be traded in international markets. International offsets (likely to be those accredited under the CDM) will be able to be accepted to meet up to 5% of an entity's compliance obligations from 2021.

Korea have also shown willingness to collaborate internationally for knowledge sharing (with EU, China and Japan) and for the potential development of carbon clubs trade of offsets to meet NDCs (with China and Japan).

³³ https://www.env.go.jp/en/policy/tax/20170130_greening.pdf accessed 3 July 2017

EU ETS

The EU ETS is the world's largest carbon market, and as a result participating countries are currently the largest source of demand for carbon credit units in international markets.

The EU ETS has been marred by political and practical difficulties, in particular the over allocation of free EU Emissions Allowances (EUAs). This has resulted in a market which has historically failed to incentivise investments in emissions abatement and has experienced price volatility over time as interventions have attempted to resolve the over allocations (see Figure 7).



Figure 7: EUA historical closing prices³⁴

To date in phase 3 of the scheme (2013-2020) the market has undergone significant reforms in an attempt to prevent the crashes experienced in phases one and two, including a roll back of EU allowances under the Market Stability Reserve. Phase 4 (2021-2030) is currently under review with significant reform anticipated in an attempt to boost the scheme's effectiveness in incentivising low carbon investment. No international carbon units are expected to be able to be used to meet compliance obligations under the scheme from 2020 which should serve to increase demand and price in the domestic markets. There may also be downward price pressure on international offset markets in the lead up to 2020 as a result of reduced demand from EU countries.

If phase 4 reforms to the EU ETS are effective an increase in price from current levels would be expected. Thomas Reuters EUA forecast (Figure 8) predicts an increase in price from around €5 currently to around €18 in real terms by 2030 (AU\$7 and AU\$27 respectively). Their forecast assumes that, despite the passage of Brexit, the UK will remain a participant in the EU ETS. This

³⁴ EU carbon price falls below €4, Sandbag, <https://sandbag.org.uk/2016/09/02/eu-carbon-price-falls-below-e4-2/> accessed 30 June 2017

is uncertain. If the EU chooses to depart there will need to be an adjustment to the cap and net impact on the scheme is expected to be minor³⁵.

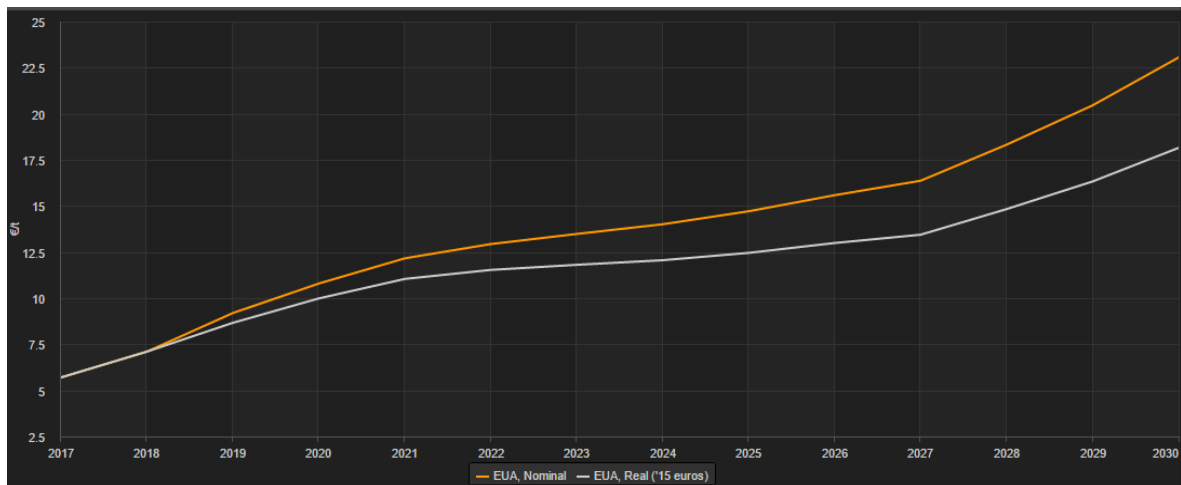


Figure 8: EEA price forecast³⁶

Offsets traded in international markets

There is a wide variety of offset types available which vary widely in trade volume, price and level of accreditation (see Figure 9).

Accreditation requirements increase the quality of offsets by holding them to standards for:

- Measurement – ensuring project types are eligible and the emissions avoided are accounted for accurately
- Additionality – ensuring emissions reductions wouldn't have occurred without that activity and are beyond business as usual
- Permanence – ensuring emissions reductions from projects will persist for an acceptable period, generally 100 years for forestry projects
- Leakage - ensuring that a reduction in emissions within the project boundary does not result in an increase in emissions elsewhere.

³⁵ Brexit & the EU ETS: Greater as the sum or in parts?, Sandbag, <https://sandbag.org.uk/project/brexit-eu-ets-greater-sum-parts/> accessed 30 June 2017

³⁶ Thomson Reuters Eikon accessed 26 May 2017

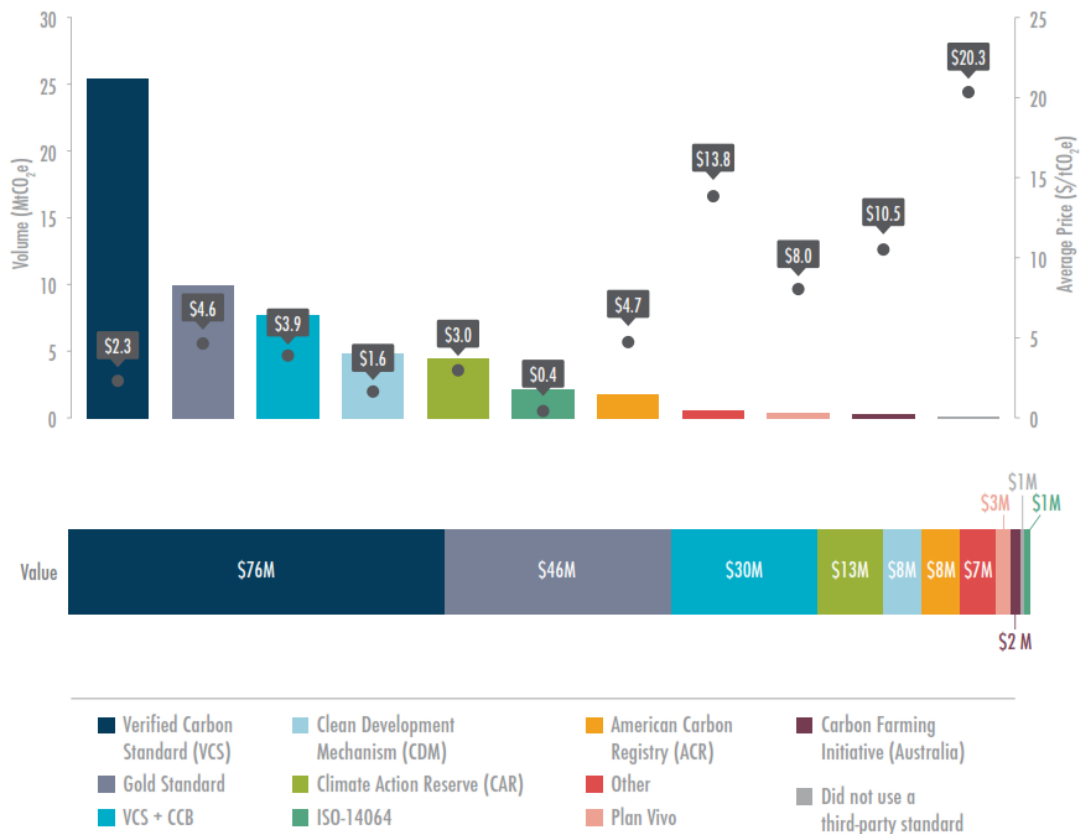


Figure 9: Volume, average price, and total value (USD) of offsets traded by standard 2016³⁷

The most popular offset types by trade volume (Verified carbon standards (VCS), Gold Standard, and VCS and Climate, Community Standards Board (CCS)) are examples of high quality, accredited offsets. All of these standards have the ability to incorporate co-benefits from offset generation with the VCS and CCB evaluating environmental and social co-benefits, and the Gold Standard currently being expanded to include valuation of a full suite of co-benefits which contribute to the achievement of the Sustainable Development Goals.

In addition to voluntary accreditation standards, the Kyoto Protocol established two types of offset programs which could be used to meet countries’ emissions targets:

- The **Joint implementation (JI)** program allows industrialised nations (called Annex 1 countries) to purchase offsets (Emissions Reduction Units (ERUs)) generated from emissions abatement projects located in other industrialised nations.
- The **Clean Development Mechanism (CDM)** program allows industrialised nations to purchase offsets (Certified Emissions Reductions (CERs)) generated from emissions abatement projects located in developing nations (non-Annex 1 countries) that have ratified the Kyoto Protocol.

These emissions units have seen declining trade and price in recent years (see Figure 10). With the end of the Kyoto Protocol in 2020 and the commencement of the Paris Agreement there is a potential that the JI and CDM offsets will have little value and may become obsolete.

³⁷ Forest Trends Ecosystem Marketplace, Unlocking potential state of the voluntary carbon markets 2017

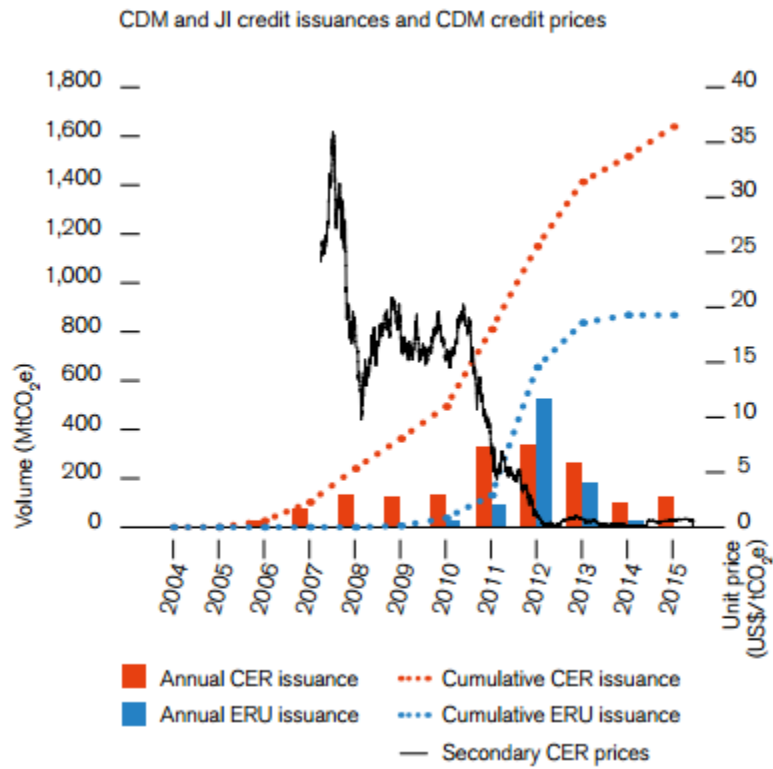


Figure 10: Historical offset prices in voluntary markets³⁸

³⁸ World Bank, Ecofys and Vivid Economics. 2016. State and Trends of Carbon Pricing 2016 (October)

Drivers of demand in voluntary markets

In addition to the offsets purchased for compliance purposes, voluntary offsets are purchased by companies, governments and entities in Australia and globally. Voluntary offsets are used for their branding and reputation benefits, achievement of co-benefits such as the support of sustainable development in countries in their value chain, or to meet voluntary climate targets. Innovative companies are also helping to stimulate voluntary offset demand. Through its Future Planet Program Qantas is offering other businesses the opportunity to purchase established, high quality offsets from a selection of projects nominated by Qantas. In return they provide marketing collateral on the offsets purchased and increased brand exposure to participating companies via promotion in their inflight programs and magazine. Energetics' experience with clients interested in voluntary offsetting shows that there is increasing awareness and interest in the location of offsets, the types of projects, their co-benefits and alignment of those benefits to business strategy, and the quality of the offsets to be purchased.

We are also seeing increased interest from companies in aligning with and supporting the achievement of the UN Sustainable Development Goals. While reducing GHG emissions offsets from land use change can also have co-benefits such as preserving native ecosystems, and supporting local livelihoods through access to new revenue streams. In some cases land use offsets can also improve the quality of local waterways through reducing run off from agricultural lands. Programs such as the Natural Capital Protocol are also encouraging businesses to improve the sophistication of their decision making by incorporating consideration of environmental costs and benefits.



Figure 11: Sustainable Development Goals³⁹

The aviation sector also is piloting a market based mechanism (MBM) which will commence on a voluntary basis from 2021. This scheme, known as the Carbon Offsetting and Reduction Scheme of International Aviation (CORSIA), will require participating businesses to offset their emissions from passenger transport when they exceed 2020 levels, effectively capping emissions from the

³⁹ UN Sustainable Development Goals to 2030

sector. It is not yet clear what types of offsets would be accepted under the CORSIA, however the increase in demand is likely to be beneficial to global offset markets as a whole. According to the Carbon Markets Institute:

'The aviation MBM could be the second largest source of demand for international units after the Paris Agreement and it could encourage other sectoral MBMs, including in the shipping sector. Presently, the international carbon price is at a historic low, however, the emergence of new net-buyers, such as the aviation sector, means that the opportunity to purchase high-quality, low-cost abatement – is likely to be a short term one.'

3. Australian carbon policy

Climate change is a politically divisive issue for Australia. Over the past decade numerous governments and Prime Ministers have put their stamp on climate change policy through cycles of development, repeal, and redevelopment. However, in the last election campaign climate change was not a point of focus. It was also the first election in recent history where climate change policy remained stable. There is increasing bipartisan support for the current policy, particularly given the potential for it to evolve into a baseline and credit trading scheme.

The key elements of the policy are:

- The Emissions Reduction Fund established by the federal government to purchase abatement from eligible offset projects
- The Safeguard Mechanism which requires entities exceeding their emissions baseline to purchase offsets, effectively capping their emissions over time.

Emissions reduction fund

The Carbon Farming Initiative (CFI) provides the legal framework for Australian Carbon Credit Units (ACCUs) to be generated for trade and surrender to meet compliance requirements. The Emissions Reduction Fund (ERF) provides a primary market for the sale of ACCUs to the Federal Government. ACCUs can be generated from projects meeting legislated eligibility criteria and accounting methods. For the land sector this includes projects for sequestration in soil, vegetation, and avoided emissions from controlled burning.

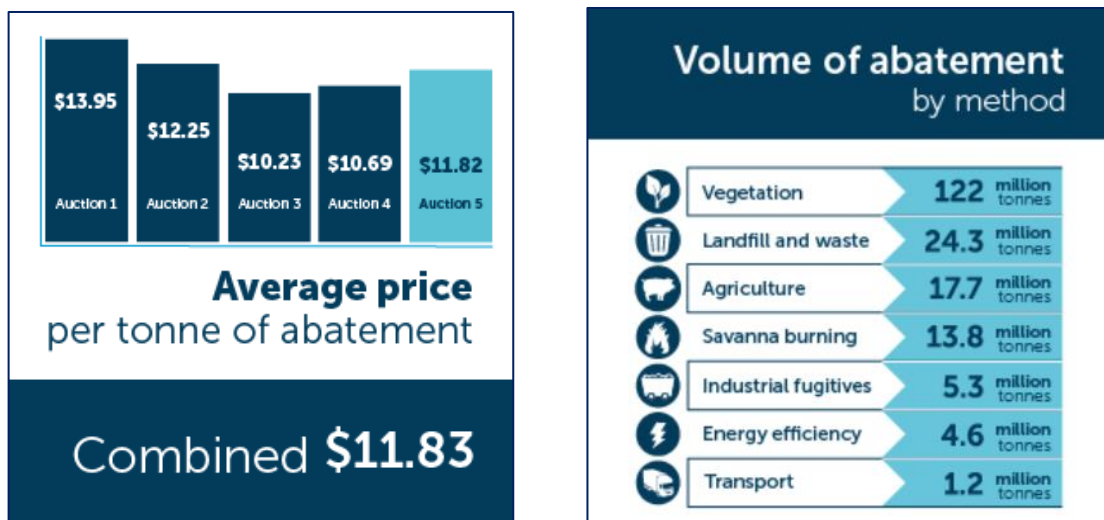


Figure 12: ERF action results average prices and volume⁴⁰

The value of abatement under ERF contracts is estimated the order of \$10-15 per t CO₂e (\$11.83 on average in April 2017) with land sector methods being widely adopted and producing the highest volume of abatement for sale to the government⁴⁰.

Almost 20% of the ACCUs issued to date have been for projects in Queensland. This includes 29% of savannah burning projects, 28% of agriculture projects and 16% of vegetation projects⁴¹.

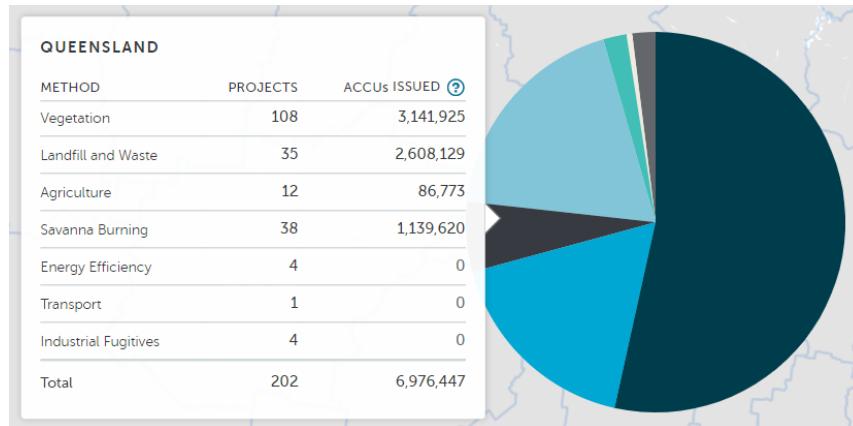


Figure 13: ACCUs issued to date for projects in Queensland⁴¹

Of the original \$2.55 billion allocated to the ERF only \$300 million remains. Based on previous contracting volumes this funding may be exhausted within the next one to two auctions. No funding was allocated in the 2017 budget to extend the ERF⁴²,

Industry has expressed concerns and emphasised the importance of maintaining a viable offset market:

If there is a shortage of domestic units, the cost for compliance will be higher than if there is adequate supply and liquid secondary market. Therefore ensuring the continued development of the domestic supply of carbon credits will be a critical factor in ensuring we meet the emissions reduction targets at lower cost to the economy... If further ERF funding is not confirmed before remaining ERF funds are all contracted, then there will be a reduction in new project development activity and a higher likelihood that registered projects will not proceed to investment and implementation⁴³.

Safeguard mechanism

The price levied on carbon emissions is via the safeguard mechanism and applies for large facilities exceeding legislated emissions thresholds. For the majority of established facilities safeguard baselines are very generous resulting in few facilities having a financial obligation. For those facilities, other options in the legislation are available to smooth their emissions over a three year period providing the potential to avoid financial obligations for temporary emissions spikes. In

⁴⁰ Clean Energy Regulator ERF auction results <http://www.cleanenergyregulator.gov.au/ERF/Auctions-results/april-2017> accessed 30 June 2017

⁴¹ Clean Energy Regulator interactive map accessed 7 July 2017

<http://www.cleanenergyregulator.gov.au/maps/Pages/erf-projects/index.html>

⁴² <http://www.afr.com/news/politics/no-topup-for-the-emissions-reduction-fund-in-may-budget-20170417-gvm4c3>

⁴³ Carbon Markets Institute response to discussion paper 2017 review of climate change policies

this legislative environment very few entities will have an obligation in the short term to purchase ACCUs to offset emissions over their baselines.

For large emitters there is a lack of certainty about the timing and extent of tightening of Safeguard Mechanism baselines, reducing their appetite to invest in their own CFI projects and reducing the demand for ACCUs in the secondary market. The lack of demand and policy certainty, as well as the reducing ERF funding pool, is also impacting the viability and attractiveness of new offset projects reducing the potential supply in this market. In the absence of decisive policy signals to influence demand and supply, a swift domestic policy change could result in insufficient supply of ACCUs to meet demand, particularly if safeguard baselines are tightened deeply and quickly.

At a recent Carbon Markets Institute working group, participants indicated an interest in purchasing ACCUs in the voluntary markets while the price is low as a hedge for future obligations. However they expressed difficulty making a business case to do so when the extent of future obligation is unclear. The Federal Government’s 2017 review of emissions policies has sought feedback on these issues but is yet to provide policy certainty to underpin the short term stability of the ACCU market.

State emissions targets

A number of states and capital cities have set ambitious emissions reduction targets to achieve net zero emissions by 2050 (including Queensland which recently set a target for net zero emissions by 2050). While it’s likely that these states will endeavour to achieve these targets through actions and offsets within their own geographical area, the ambition of these targets may mean that an increase in demand for ACCUs could result if their targets cannot be achieved.

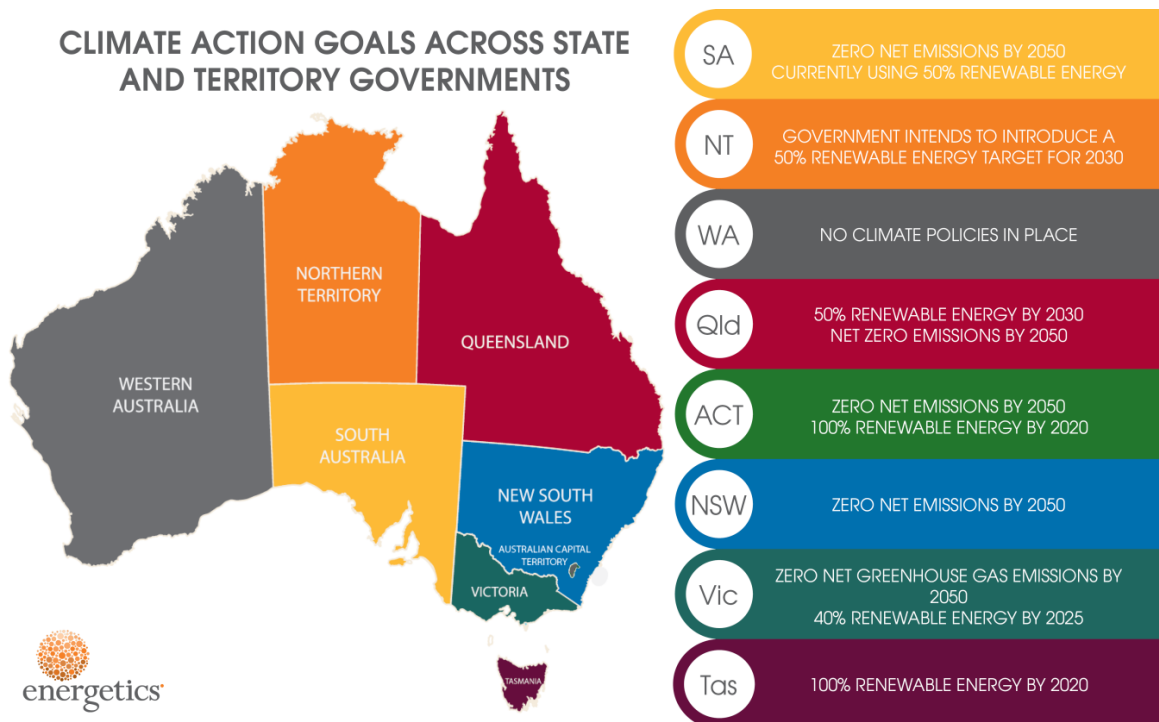


Figure 14: State emissions and energy targets

4. Implications for Queensland

Export opportunities

Currently there are a variety of international pricing schemes which are inconsistent in their design, pricing, coverage and acceptance of international offset units to meet compliance obligations. International markets are expected to continue to be fragmented, until such time that the Paris Agreement rules are finalised to enable international offset trade.

However, it is now reasonable to consider when (not if) international trade will occur to meet countries' Paris Agreements. Over time this is also expected to result in convergence in international compliance schemes and the opening of compliance markets to international trade.

When it occurs international trade will offer the largest source of economic potential to Queensland. Currently representing more than 66% of the world's emissions, countries with NDCs under the Paris Agreement are likely to be the largest source of demand for offsets. This demand is expected to increase towards 2030 when the majority of targets expire⁴⁴.

Estimates by the Climate Action Tracker Project show that, based on current policy projections and the low-end of target ranges, parties to the Paris Agreement are expected to fall short of their 2030 targets by 5,000-8,000MtCO₂e⁴⁵. Using an average offset price of \$29/tCO₂e (based on a selection of Australia's key trading partners, see Table 2) this could represent up to \$230 billion to the global offset industry.

Research also shows that countries targets are insufficient to meet the objective of limiting warming to 2°C and that these will need to be strengthened. Therefore we anticipate continued growth in offset markets beyond 2030 as new, more ambitious targets are set.

To realise this economic potential, policy advocacy will need to ensure that:

- Australia actively promotes the development of Article 6 to suit the domestic offset industry. This could include the support of rules to ensure high quality offsets are traded, including stringent rules for accounting and methods, which are consistent with the requirements of the CFI Act.
- Australia works to establish mutually beneficial bilateral or multilateral agreements for offset trading with our key partners, in particular China due to the scale of their emissions.

⁴⁴ IGES INDC and NDC Database v3.2 accessed 29 June 2017 based on those countries interested in utilising international markets

⁴⁵ Climate Action Tracker <http://climateactiontracker.org/global/173/CAT-Emissions-Gaps.html> accessed 7 July 2017

Domestic demand

In the short term, until there is policy certainty about the timing and extent of tightening of safeguard baselines ACCU prices in the secondary market are likely to be low. The ERF is also anticipated to be exhausted within the next few auctions at which time, unless further funding allocation is made, there will be no demand for offsets from Government. This provides little incentive for Queensland to encourage the creation of ACCUs from the land sector for short term domestic use.

However in the medium to long term it is likely that an increase in demand for offsets will occur driven by:

- Continuing interest in voluntary offsetting by Australian businesses
- The voluntary scheme for offsetting emissions from the aviation sector, commencing in 2021
- Australia's Paris Agreement target for 2030 and national targets that may follow, either through direct demand from Government or a tightening in safeguard baselines to shift the burden to large emitters.
- The States' net zero targets for 2050.

Based on current policies, Australia's emissions are expected to increase to approximately 540–583MtCO₂e by 2030⁴⁶. This could leave a gap of between 100-145MtCO₂e relative to our target⁴⁶: three to four times the magnitude of ACCUs issued in Australia to date⁴⁷. Based on the average carbon price under ERF contracts of \$11.83 this could represent up to \$1.7bn in value to the Australian offset industry.

This indicates a strengthening in domestic demand for ACCUs, potentially beginning around 2020 (subject to declining safeguard baselines) and continuing to build through to 2030 in the lead up to the expiry of our Paris target.

View to 2030

There are a number of potential scenarios which could emerge between now and 2030. Our forthcoming analysis will focus on three scenarios with the following demand side assumptions.

- 1. Domestic only:** Efforts to pursue international trading are hampered by political and/or practical barriers (either at the domestic or international level) which result in Australia having no linkages to international trading partners. There has been some tightening of the safeguard mechanism; however it does not accept international credits for compliance purposes. As a result ACCUs are only traded within Australia. Demand is driven from the safeguard mechanism, Australia's Paris Agreement target, and voluntary offsetting by businesses.

⁴⁶ Climate action tracker <http://climateactiontracker.org/countries/australia.html> accessed 7 July 2017, all figures are estimated exclusive of the land use, land use change and forestry sector (LULUCF)

⁴⁷ Clean Energy Regulator interactive map accessed 7 July 2017
<http://www.cleanenergyregulator.gov.au/maps/Pages/erf-projects/index.html>

- 2. Multilateral agreements:** Some countries have partnered together to establish multilateral agreements for offset trade but these are fragmented and a truly global scheme has not been established. Australia has established links with its key trading partners. ACCUs are not accepted in international compliance markets. Demand is driven by Australia's Paris Agreement target and the Paris Agreement targets of our key trading partners; however countries favour their domestic units over international units. Trade is ad-hoc and over the counter with little visibility of price. Prices converge somewhat but do not reach parity.
- 3. Global harmony:** International trading is established through the Paris Agreement rules and is accessible to all parties to the agreement. ACCUs can be surrendered for the equivalent internationally traded unit. Trading volume is dictated by the global gap in NDCs relative to the global target. Prices quickly converge to an international parity.

Appendix A – Overview of global emissions trading schemes

Location	Name	Emissions coverage (MtCO ₂ e)	Use of international offsets	Links to other schemes
Canada	Ontario cap and trade program	142	No: Regional offsets only	Links with Californian and Québec ETSS are being investigated
	Québec cap and trade system	61	No: Regional offsets and offsets from linked ETSS	Linked with Californian ETS. Link with Ontario ETS is being investigated
China	Beijing pilot system	46	No: Domestic offsets only	No linking
	Chongqing pilot system	100	No: Domestic offsets only	No linking
	Fujian pilot system	200	No: Domestic offsets only	No linking
	Guangdong pilot system	422	No: Domestic offsets only	No linking
	Hubei pilot system	253	No: Domestic offsets only	No linking
	Shanghai pilot system	155	No: Domestic offsets only	No linking
	Shenzhen pilot system	31	No: Domestic offsets only	No linking
	Tianjin pilot system	160-170	No: Domestic offsets only	No linking
	China ETS (proposed)	3000–5000 (estimated)	No: Domestic offsets only	No linking

Location	Name	Emissions coverage (MtCO ₂ e)	Use of international offsets	Links to other schemes
European Union	EU emissions trading system	1,939	Yes, with restrictions: International offsets are unlikely to be accepted after 2020. No land based offsets can be used.	Link with Swiss ETS is pending
Japan	Saitama target setting emissions trading system	7	No: Regional offsets only	Linked with Tokyo ETS
	Tokyo cap and trade program	14	No: Regional offsets only	Linked with Saitama ETS
Kazakhstan	Kazakhstan emissions trading system	153.7	Potentially: Domestic offsets only. International units may be permissible in future.	No linking
Korea	Korea emissions trading scheme	551	Pending: Domestic offsets only. International units will be able to be used from 2021 with a cap of 5% of the entity's emissions.	No linking
New Zealand	New Zealand emissions trading scheme (NZ ETS)	41	No: Domestic offsets only	No linking
Switzerland	Swiss emissions trading system	5	Yes, with restrictions: International offsets are eligible but must be from projects implemented prior to 2013.	Link with EU ETS is pending
USA	California cap and trade program	370.4	No: Regional offsets and offsets from linked ETSs	Linked with Québec ETS. Link with Ontario ETS is being investigated
	Regional greenhouse gas initiative (RGGI) ⁴⁸	89	No: Offsets from the participating States only	No linking

⁴⁸ Covers Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont

Energetics awards

2016

Winner of Financial Review Client Choice Awards

- > **Niche Firm Leader**

Finalist of Financial Review Client Choice Awards

- > **Best Consulting Engineering Firm with Revenue <\$50m**

2015

Winner

- > **Australian Business Award for Service Excellence**
- > **Australian Business Award for Marketing Excellence**

2014

Winner of BRW Client Choice Awards

- > **Best Professional Services Firm (revenue < \$50M)**
- > **Best Consulting Engineering Firm (revenue < \$50M)**
- > **Best Value**

Finalist of BRW Client Choice Awards in 3 categories

- > **Best Client Service**
- > **Most Friendly**
- > **Most Innovative**

2013

Finalist

- > **BRW Client Choice Award for Best Client Relationship Management**
- > **Leading in Sustainability Banksia Award**

2012

Winner

- > **Australian Business Award for Recommended Employer**
- > **Australian Business Award for Service Excellence**

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