ANZ Research

NZ Insight: The NZ carbon market

29 July 2021

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Carbon markets 101: pricing climate change solutions

Summary

- This note provides an overview of how the carbon market works in New Zealand, recent developments, and the scheme's strengths and weaknesses.
- The price of carbon has lifted significantly recently, which strengthens incentives to change behaviours but may have unfortunate side effects. In particular, current regulations potentially over-incentivise forestry planting, whilst not providing a sufficiently strong signal for many sectors to make the changes required to reduce emissions.
- Emissions trading schemes are an important tool in addressing climate change, but cannot solve the problem on their own.

The carbon market

The Emissions Trading Scheme (ETS) is a market-based policy tool designed to reduce greenhouse gas (GHG) emissions by putting a price on pollution. Participants are required to buy units to offset their emissions.

The emissions units are known as New Zealand Units (NZUs), but are commonly referred to as 'carbon credits'. Each NZU equates to 1 tonne of carbon dioxide, or the equivalent warming impact of any other greenhouse gas.

NZUs have specific vintages that relate to emissions in a particular year. Units are initially allocated to the market by the Government, either through its auction mechanism or free allocation. Units are then able to be on-traded in the secondary market.

Emissions budget

The Government has agreed a provisional emissions budget for the period 2021-2025 of 354 million tonnes of carbon dioxide equivalent (Mt CO_2-e).

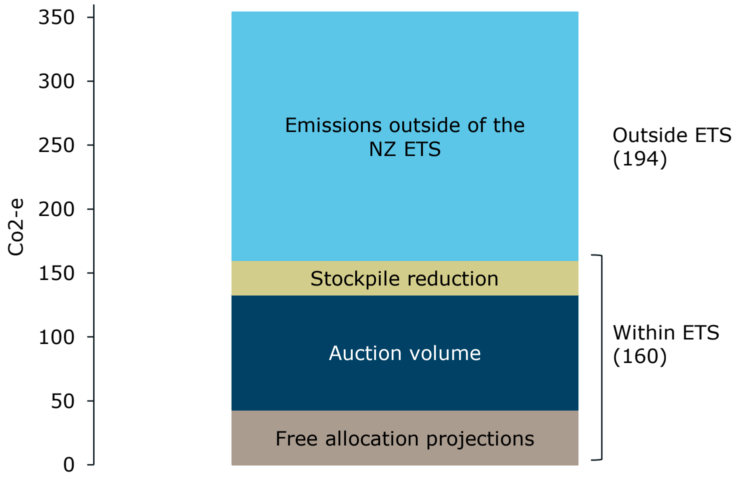
This budget is broken down into several categories, but less than half of our emissions are currently included in the ETS.

Agriculture is the main industry that is not currently included in the ETS. The GHG produced by the agricultural sector is primarily methane, a shorter-lived gas than carbon dioxide (CO_2). However, for the purposes of measuring GHG emissions all gases are converted to a CO_2-equivalent basis (CO_2-e).
Agricultural will either join the ETS or manage its emissions through a separate accounting system by 2025.

A partnership known as 'He Waka Eke Noa' has been formed between the Government and industry to decide how best to reduce agricultural emissions. A draft of their proposed framework is expected to be released in November. At this stage it seems unlikely that agriculture will be directly included in the ETS, but this does not mean the sector will not be paying for its emissions.

If a workable solution for the agricultural sector can't be achieved at the farm level, the Government has reserved the right to require emissions to be accounted for at the processor level. The preference within the agricultural sector is for farm level accountability, as this is more likely to foster solutions to reduce emissions.

Figure 1. Emission budget 2021-2025



Source: MfE

Of the 160 Mt of CO2-e units available within the ETS, 27 Mt CO2-e will be withheld to reduce the volume of units banked, ie units already held in private accounts. A further 43 Mt CO2-e units are expected to be freely allocated to some companies. This leaves 90 Mt CO2-e available for auctioning.

By the end of 2021 there must be a current emissions budget in place that covers 2022-2025. This will replace the provisional emissions budget that is currently in place. Additionally, there must be two prospective budgets in place for the time periods from 2026-2030 and 2031-2035. These budgets will generally be based on the advice provided by the Climate Change Commission (CCC). While the Minister is not bound to follow the CCC's advice, it must respond to the advice and explain reasons for any policy not aligned with their advice.

Market participants

Participation in the ETS is mandatory for certain industries but voluntary for others. Some industries generate credits that they are able to trade, whilst other industries will need to buy credits to offset their emissions.

Industries that are required to participate in the ETS are generally those which produce, mine or import fuels or produce metals such as iron, steel, aluminium, gold, or are involved in waste disposal, (i.e. those that are deemed to produce, and therefore need to offset their GHG emissions).

Horticulture is exempt from the ETS, but growers of certain products are entitled to free units as they are considered to be disadvantaged by potentially higher energy costs that can't be passed onto consumers due to competition from imports.

So far, the agricultural sector has been required to report emissions (at the processing level) but has not had to pay for them. This is set to change in 2025, when the sector will start paying for its emissions.

The forestry sector is the other main participant in the ETS. Trees capture and store carbon in a process known as sequestration. Forests are thus able to earn NZUs, which can then be traded. Sequestration rates depend on how quickly the tree grows. Varieties such as *pinus radiata* grow very quickly and therefore have high sequestration rates compared to slower-growing species such as natives.

Allocation of New Zealand Units (NZU)

NZUs are created by the Government and allocated through three main methods.

1. **Earning units:** Companies who can prove they have sequestered CO2 will receive NZUs. These units are typically earned by landowners or companies who have planted trees.
2. **Free allocation:** Some industries are eligible for a free allocation of units. Growers and manufacturers of products that are considered to be 'emission intensive and trade exposed' are able to apply for free units. Eligible activities include growing tomatoes, cucumbers, capsicums and cut roses, manufacturing food and feed products such as whey powder, lactose, protein meal and gelatine, and industrial production including iron, steel, aluminium, and wool panels.[1] These industries are considered disadvantaged by the ETS as they are expected to face increased costs of production (due to increased energy costs) but are not able to pass these costs onto consumers due to international competition. When the ETS was initially set up, some owners of fishing quota were also able to apply for a one-off allocation of free units, but this is no longer available.
3. **Buying units:** Companies who emit GHG and are from industries that are included in the ETS are required to purchase units to offset their emissions. They can either buy units directly from the Government or in the secondary market.

Carbon trading markets

NZUs can be purchased directly from the Government, via auctions that are held each quarter, or purchased on the secondary market. Any individual or organisation is able to own NZUs. There is no requirement to be part of the ETS in order to own units.

A specific number of units are allocated for sale each quarter, currently set at 4.75 million units. Buyers bid for these units over the course of the auction, which runs for three hours. The highest-priced bids are assigned the available units and must pay the price that was offered by the lowest successful bidder. Therefore all of the units are allocated at the same price.

There is an undisclosed reserve price, which ensures the market is not able to be manipulated. The market also has a price floor (currently $20) and a price ceiling (currently ($50). If the price ceiling is breached, this triggers more units to be released through what is referred to as a 'cost containment reserve'.

Table 1. NZ ETS Carbon Auctions 2021

Auction date	Volume of NZUs available*	NZU floor price	NZU ceiling price	Clearing price	Participants	Successful participants
17 Mar 21	4.75m	$20	$50	$36.00	40	30
23 Jun 21	4.75m	$20	$50	$41.70	37	16
1 Sep 21	4.75m	$20	$50			
1 Dec 21	4.75m	$20	$50			

*In addition to the allocated units there is also 7 million units in the cost containment reserve which will become available if demand pushes the price above the ceiling price. If any of the reserve units are allocated then this will reduce the size of the cost containment reserve in future auctions.

Source: MfE, NZX

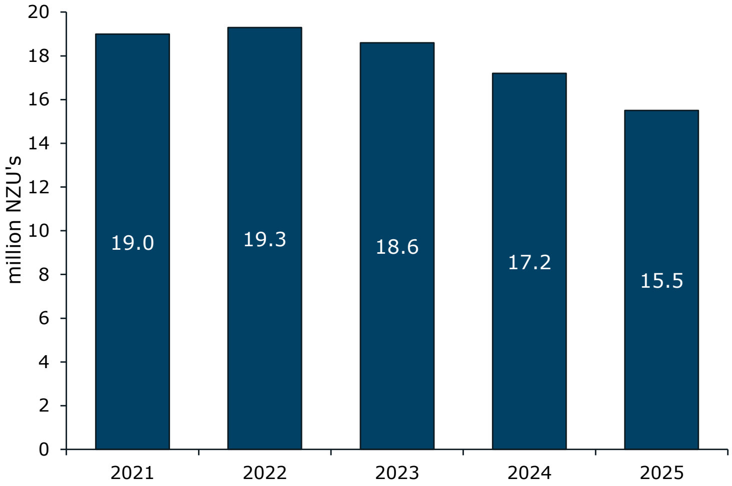
[1] For a full list of eligible industries please go to: https://www.epa.govt.nz/industry-areas/emissions-trading-scheme/industrial-allocations/eligibility/

The quarterly auction system was launched in March 2021. At the initial auction units were priced at $36/NZU. At the second auction held in June the clearing price increased to $41.70/NZU. Like the first auction, there was 4.75 million units available. There are a further 7 million units in the cost containment reserve, but so far this reserve is untouched as the price trigger has not exceeded the $50 ceiling.

The auction system is run by NZX in conjunction with the European Energy Exchange (EEX), on behalf of the NZ Government.

This year 19 million NZUs will be auctioned, split evenly over four auctions. Over time the volume of units available for auction will gradually be reduced.

Figure 2. NZU annual auction volumes



Source: MfE

Prior to the auction system being developed, emitters were able to pay their emission obligations by using the Governments fixed price offer. This price was initially $25/t CO2-e, and then increased to $35 for emissions relating to the 2020 year. This fixed price option was available up until May 2021, which effectively capped the price of NZUs up to that time.[2]

Secondary markets

In addition to the quarterly auctions, there is a secondary market for NZUs. In this market NZUs are traded either over-the-counter (ie directly between companies) or via a trading platform.

The secondary market is well developed in New Zealand, with numerous brokers involved. Trading can either be on a spot basis (for immediate delivery) or a forward contract, where businesses agree to trade units at a specific price in the future.

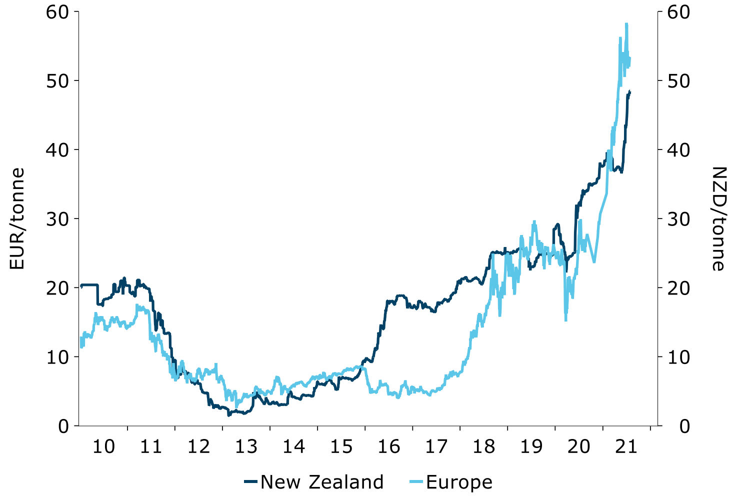
The secondary market provides a constant source of pricing information for NZUs, which is most commonly referred to as “the carbon price”.

[2] There were limitations on how these units could be used, including only being used to offset emissions that occurred up to 2020. Pricing in the secondary market therefore did sometimes exceed the $35 fixed price.

What impacts the carbon price?

New Zealand carbon prices lifted sharply in June (figure 3).

Figure 3. New Zealand and EU carbon prices



Source: Bloomberg, Macrobond, ANZ Research

The price of carbon is influenced by factors that impact the current and expected supply and demand of NZUs.

A number of factors have caused prices to lift, but the most important reason was the structural changes in the ETS to meet obligations made under the Paris Accord. This resulted in the elimination of the fixed price option – where emitters can buy units directly from the Government – to a system when the number of units is capped and supply is allocated via an auction system.

This year, the fixed price option was only available for emissions that occurred in 2020. But as ETS returns are not due until March the following year and payments are not required to be made until May, emissions were able to be funded via the fixed price option up until May 2021.

The second factor that influenced pricing was the release of the Climate Change Commission (CCC) final advice to Government, which was made public in June. This report suggested that for the ETS to work efficiently a wider price corridor was required in the auction system, with both higher price floors and ceilings, and for these prices to be lifted more quickly in the future.

The CCC also reported the price its models suggested carbon would need to lift to $140 by 2030 and $250 by 2050, in order to see a significant reduction in emissions. Whilst it was at pains to point out that these were not forecast prices, it was inevitable that the market would take some guidance regarding future prices from these modelled prices.

In recent months there has also been a sharp lift in the European carbon price, driven primarily by a spike in European electricity demand. While this market is not directly linked to the NZ market, and therefore the prices are non-fungible, some market participants view this as a lead indicator as to the general direction of travel for our own carbon prices.

How are units accounted for?

The Emissions Trading Register records the ownership of the various NZUs. Anyone who wants to buy, sell or hold NZUs must hold an account with the Register (you don't need to be an ETS participant).

An account is used to hold and trade units within the ETS. An account may be held by a variety of entities (eg individuals, companies, trusts, etc) for the purposes of receiving entitlements from the Government, surrendering emission units to meet an obligation under the ETS, or to facilitate the private trading of emission units.

Various companies and individuals trade NZUs simply for the purpose of making a profit. These type of traders are known as speculators.

How does the ETS reduce climate change?

The ETS is designed to reduce GHG emissions by placing a cost on pollution. This provides an incentive to reduce emissions, and rewards practices that offset emissions, such as planting trees.

The ETS is now a 'cap and trade' system. Over time the quantity of units available will reduce and the cost of units is expected to rise. The cap on emissions is expected to be decreased in line with the emissions budgets proposed by the Climate Change Commission.

By 2025 just 15.5 million NZUs are forecast to be offered via the auction platform. Both the price floor and price ceiling will increase by 2% per annum, which will lift the price floor to $21.65 and the ceiling to $54.12 by 2026.

The CCC sees a need to lift the floor and cap price more quickly. They would like to see the floor price initially raised to $30 then raised by 5% (plus inflation) per annum, while the cap should lift to $70 and then increase by 10% per annum (after inflation).

Table 2. Price floor for government auctions

Year	2021	2022	2023	2024	2025	2026
Current settings	20.00	20.40	20.81	21.22	21.65	22.08
CCC draft advice		30.00	32.10	34.35	36.75	39.32

Table 3. CCR trigger price (ceiling price) for government auctions

Year	2021	2022	2023	2024	2025	2026
Current settings	50.00	51.00	52.02	53.06	54.12	55.20
CCC draft advice		70.00	78.40	87.81	98.34	110.15

**Assumes 2% annual inflation*

Source: CCC, Belly Gully

Free allocation of units to specific industries will also gradually decrease each year. At this stage these are expected to be reduced by 1% per annum until 2030, 2% per annum from 2031-2040 and 3% per annum from 2041-2050.

Unintended consequences of high carbon prices

A sharp lift in carbon prices should in theory incentivise a quicker reduction in GHG emissions. However, it will also encourage more trees to be planted to offset emissions. While this will help New Zealand met its immediate emissions targets, it may not help us achieve our long-term goals. For this reason, both the CCC and the Government are wary about letting the carbon price skyrocket, as this could potentially cause unintended consequences. One of their concerns is that a high carbon price would incentive too much land change to forestry.

Excessive planting of *pinus radiata* in particular is not considered sustainable, as it provides only a temporary offset to emissions. Land planted today in pines won't generate any offsets by 2050. If there has not been a significant reduction in emissions by that time, will result in the economic burden of climate change simply being passed down to the next generation.

The CCC itself has raised concerns that the ETS over-incentivises forestry offsets and doesn't do enough to encourage actual reductions in emissions. The Commission stated the "current NZ ETS settings may incentivise more large-scale pine plantations than is desired to meet 2050 targets and could lead to forestry displacing gross emissions reductions".

It then went on to warn "this approach is not sustainable and would leave the next generation with the task of reducing gross emissions at the same time as they will need to be adapting to escalating climate change impact."

Some change in the ETS settings is expected in order to mitigate this risk, but at this stage it is not clear what changes will be made. There is a general view that any changes should address the incentive imbalance that currently exists between planting faster-growing exotics compared to slower-growing natives.

International markets

New Zealand is not the only market to have a trading system for carbon. Many different emissions trading schemes have been set up, each covering a specific geographical region. There is potential to link schemes together – previously the NZ and EU schemes were linked, but it undermined the scheme when the EU scheme was flooded with low-quality credits. Most of the schemes are specific to set regions and aim to help reduce emissions in that region based on goals set by commitments to the Paris Accord.

As each market is quite different to the next, the price of CO2-e also varies considerably. At present, the price of CO2-e is highest in the European market.

The ICAP[3] estimates approximately 15% of the world's GHG emissions are now covered by emissions trading schemes. Economies with an ETS in place produce more than 50% of global GDP and are home to almost a third of the global population.

Europe

The EU set up the world's first emissions trading scheme in 2005. It is a cap and trade system that now covers all of the EU countries as well as Iceland, Liechtenstein, and Norway. Switzerland has its own ETX but it is linked. NZ's ETS is largely modelled on the EU ETS.

The EU aims to be carbon neutral by 2050 and reduce GHG emissions by 55% by 2030. This target was recently revised up from the previous target of 40% reduction by 2030. Similar to NZ, the EU ETS only covers about 40% of its GHG emissions.

The UK launched its own ETS after it dropped out of the EU at the beginning of 2021. Its system is very similar to the ETS operated in the EU.

Asia

China launched the world's largest emissions trading program in July. It aims to be carbon neutral by 2060. China's ETS provides emitters (such as electricity producers and manufacturers) with a set number of credits, which can then be traded. The ETS will initially apply to just its 2,225 power companies, but these companies alone are estimated to produce one-seventh of global emissions. Over the next five years additional industries such as cement, aluminium, steel, aviation, chemicals etc will also be included in China's ETS.

On the close of its first day of trading China's carbon price was ¥51.23/t CO2-e, which equates to about NZ$11.40. This relatively low price for emissions, combined with low penalties for non-compliance, means there are concerns about how effective the scheme will be.

South Korea launched its national ETS at the beginning of 2015, known as K-ETS. It is the world's third-largest trading scheme behind China and the EU, and was the first mandatory scheme to be launched in East Asia. Its scheme covers about 74% of emissions. Like NZ's system the K-ETS is a cap-and-trade system that also operates a reserve mechanism to help provide market stability. In April 2021, a minimum price floor was set due to concerns about falling prices.

Japan does not have a national ETS but the Tokyo Metropolitan Government launched an ETS in 2010, which targets energy-related CO2 emissions. The scheme was initially voluntary but is now compulsory. This scheme also targets

[3] Emissions Trading Worldwide, International Carbon Action Partnership (ICAP) Status Report 2018.

emissions from offices as well as industrial production. Additionally, the Saitama Prefecture has a scheme that is linked to the Tokyo scheme but not have penalties for non-compliance.

The Kazakhstan Emissions Trading Scheme started with a pilot phase in 2013, which covered numerous sectors including energy, mining, chemicals, cement and the power production.

North America

The US doesn't currently have a national emissions trading scheme. There are some regional and some voluntary schemes in place but at this stage no national initiatives.

The Regional Greenhouse Gas Initiative (RGGI) is a carbon market cooperative effort between the states of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont. It came into force on January 1, 2009 and covers only CO2 emissions from electricity generation.

The Western Climate Initiative (WCI) is an initiative of US states and Canadian provinces to jointly develop climate change policies. California and Quebec are involved in this scheme, which commenced in 2013.

The Canadian province of Nova Scotia also has a cap-and-trade ETS, which covers 80% of its GHG emissions.

As yet there are no ETS's in place in South America but several countries are utilising carbon taxes.

Australia

Australia doesn't currently have an ETS, but it does have a carbon market that is largely voluntary. Units can be earned through the Emissions Reduction Fund.

There is also a safeguard mechanism in place, which places a legal obligation on large industrial polluters to keep their net emissions below baseline levels as set by the government regulator. The Safeguard Mechanism applies to facilities that directly produce emissions of more than 100,000 tonnes of CO2-e each year.

Can carbon trading make a difference?

Yes, harnessing the power of capitalism to help address climate change challenges is a great idea, but it has its limitations. The ETS currently only applies to less than half our emissions and many participants receive a hefty free allocation. The ETS has always been considered a cap and trade system, but only recently has a cap actually been applied. Since the number of units were capped the price has lifted as market forces start to work.

One of the challenges is that this market is highly influenced by changes in Government policy. These changes are not always well signalled and therefore can undermine confidence amongst market participants. Another challenge is that the carbon price point required to change behaviour differs considerably between industries. Some industries can make a much larger contribution to reducing emissions that other industries can, and some industries can do this more easily and cheaply than others as well.

Another potential unfortunate unintended consequence is that if relatively clean-producing countries account properly for the cost of their emissions and weakly regulated – perhaps high-polluting – ones don't, then one can guess where the production will tend to go! But any regulation is prone to that kind of issue, and the free allocation of units is an attempt to account for it. We all have a responsibility to minimise pollution and the ETS is a useful tool in helping us achieve our emissions reduction goals.

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Last updated: 9 April 2021

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