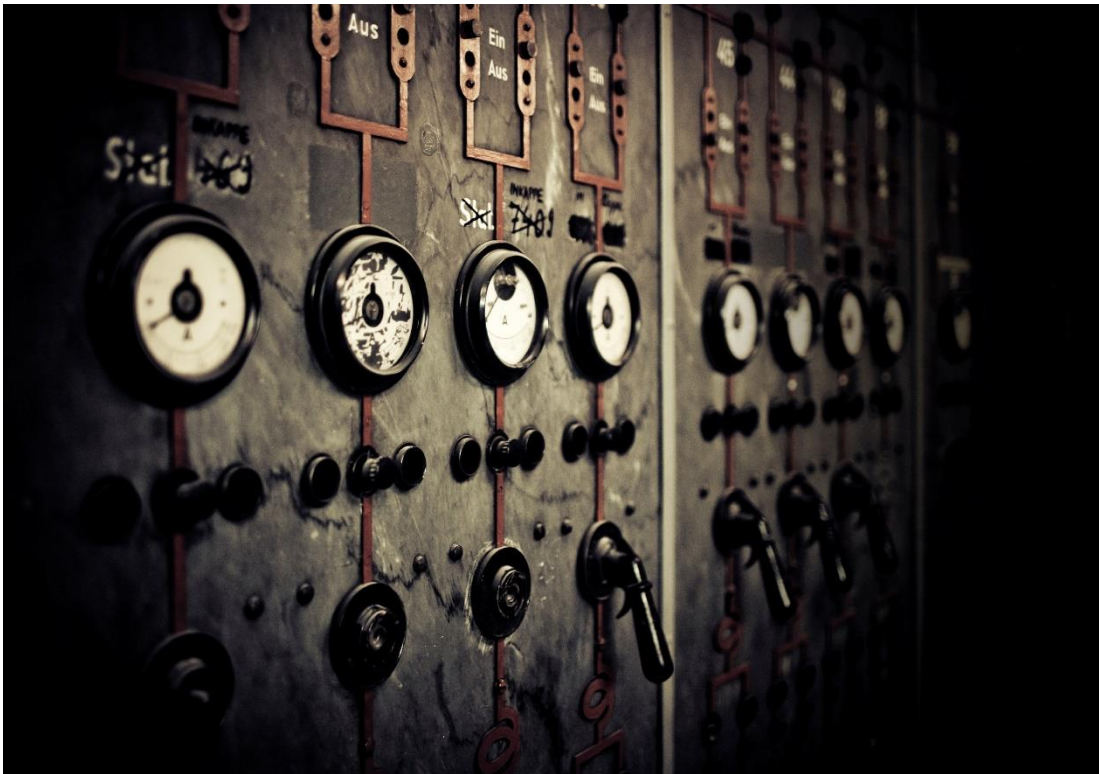


Resource Economics



ETS Price Control Mechanisms: *a Review of Issues*

July 2022

Report for the Climate Change Commission

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1 Introduction

1.1 Background

The cost containment reserve (CCR) and the auction reserve price (ARP) are price control mechanisms in the emissions trading scheme (ETS) that have been in operation since the first quarterly auction in March 2021. This note discusses the settings of those mechanisms, taking account of new information since their introduction, including significant changes in prices of New Zealand Units (NZUs) and recent events in which the CCR has been triggered. It updates a previous note produced for the Ministry for the Environment (MfE) prior to the deployment of the CCR.

The CCR is a store of New Zealand Units (NZUs) which can be released to the market when a trigger price is breached at a quarterly NZU auction. The resulting increase in supply has the objective of reducing price below what it would have been otherwise. It was initially envisaged that the trigger price would be significantly above the market price, such that the CCR would be called upon infrequently. However, at three out of six quarterly auctions held to date, auction prices have exceeded the trigger price and the full allocation of NZUs has been released from the CCR in both 2021 and 2022. This has raised concerns it is not operating as first envisaged. In this note we discuss several issues raised, including:

- the underlying purpose of the CCR;
- how it is triggered;
- the interactions with the stockpile of NZUs; and
- potential market manipulation.

The ARP sets a floor price for auctioned units. Decisions on the level at which this is set may need to be revisited following recent changes to NZU prices and price expectations.

1.2 Market Context

As with all competitive markets, the main factor influencing price in the ETS is the balance between demand and supply. The Government influences demand by decisions on which sources are included and by defining the surrender obligation (since 2019 this has been one NZU for one tonne of CO₂-e emissions). It controls supply through:

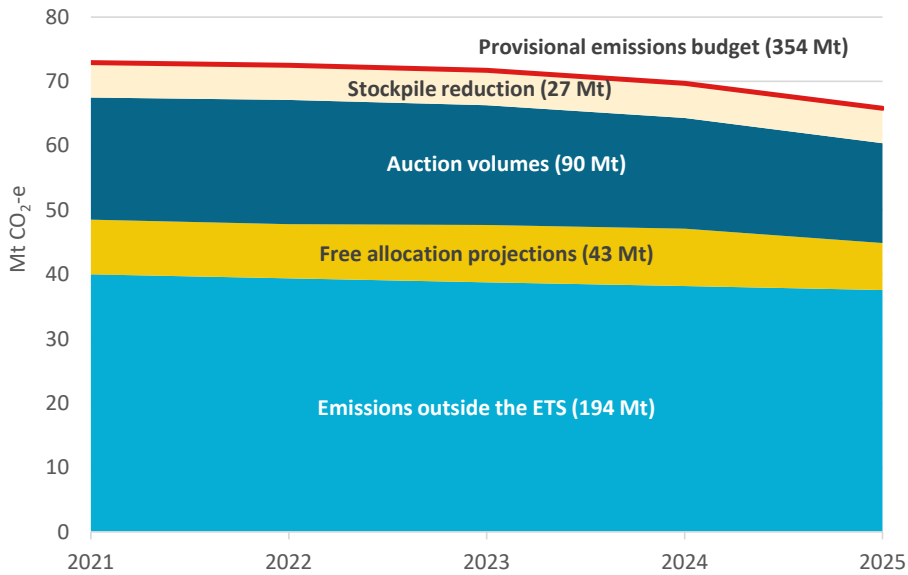
- annual allocations to energy-intensive and trade-exposed (EITE) industries;
- the number of NZUs released in quarterly NZU auctions; and
- rules around absorption activities which can add additional NZUs.

In addition, because there is no expiry date for NZUs, total potential supply is affected significantly by the number of units that were added to the market historically when there was access to low-cost international units (before mid-2015) and when participants could use the fixed price option rather than surrender NZUs (until 2020). A relatively large 'stockpile' of NZUs has resulted. It includes holdings for those with future obligations (eg foresters and providers of futures contracts) and for investment. The stockpile is now several times larger than annual NZU demand.

Without the price control mechanisms, the Government's main way to influence price on a regular basis is via the number of units put up for sale in quarterly auctions. The auctioned

quantity is based on the total emissions budget for the period, minus the expected emissions from sources outside the ETS, those allocated via other means, eg industrial allocation and a shortfall that is assumed to result in NZUs being withdrawn from the stockpile to meet demand (Figure 1-1).

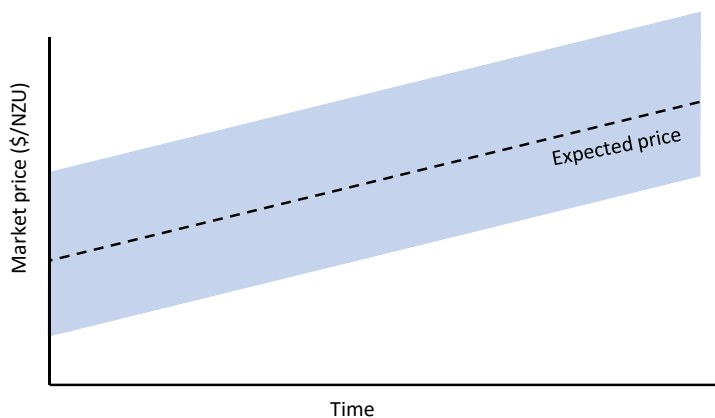
Figure 1-1 Breakdown of the provisional emissions budget volume and NZ ETS limit



Source: Adapted from <https://environment.govt.nz/what-government-is-doing/areas-of-work/climate-change/ets/nz-ets-market/setting-unit-limits-in-the-nz-ets/>

When emission budgets are defined, account is taken of the expected costs of emission reductions, including on vulnerable groups. Emission reduction costs in individual sectors are estimated using a model that can be used to derive an expected NZU price path, with error margins reflecting the considerable uncertainties (see Figure 1-2). Decisions on emission budgets reflect Government decisions on acceptable ranges of emission prices on the path to zero net emissions in 2050, amongst other things.

Figure 1-2 Expected price

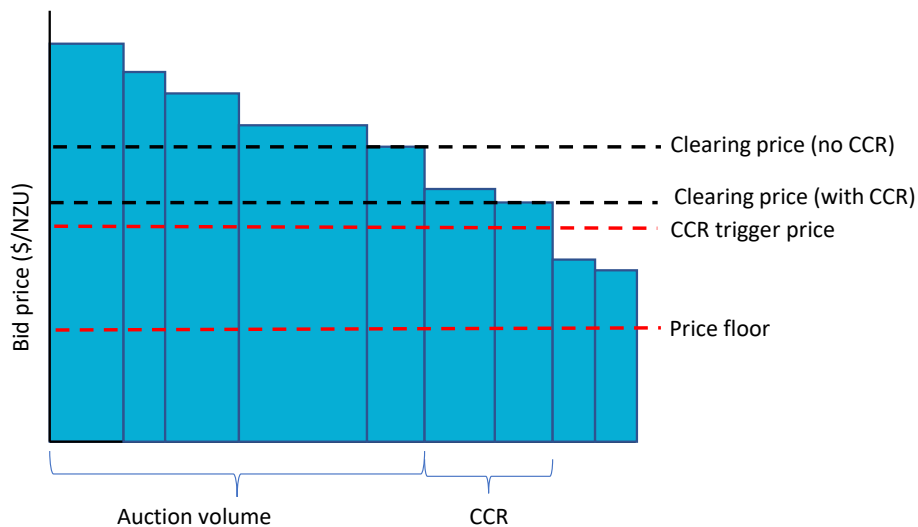


2 The Cost Containment Reserve

2.1 How it Works

The CCR operates as shown in Figure 2-1. Bids are taken in ETS auctions¹ and the clearing price is the highest bid price at which the market would clear (all the volumes available would sell). Figure 2-1 gives an example where the clearing price would be above the trigger price set for the CCR. This results in additional volumes being added to the auction and the clearing price falling to the highest bid price that would clear the market; this price is slightly above the CCR trigger price, which was the experience at recent auctions.

Figure 2-1 Auction bids and the CCR



In this example, because demand for NZUs exceeds supply at the trigger price (including the supply volumes in the CCR), the CCR does not provide a complete price ceiling. However, it reduces the extent of any price increase above the trigger price.

2.2 Balancing Reductions Elsewhere

Whether the volumes released from the CCR need to be “backed” by reductions elsewhere is somewhat ambiguous.² However, the NZUs in the CCR are additional to those estimated to be consistent with the achievement of domestic emission budgets, including the reduction of units in the stockpile (Figure 1-1). If budgets are still to be met, one of the following would need to occur to stay in balance:

- emission reductions would need to occur elsewhere, eg reductions in sectors outside the ETS;
- auction volumes would need to be reduced; or
- NZUs would need to be retained in the stockpile because prices were low.

For its international commitments, the Government has suggested that, although it intends to meet most of its Nationally Determined Contribution (NDC) targets domestically, it may supplement this with units from “international carbon markets with environmental

¹ Auction participants may offer multiple bids of different volumes and prices.

² Ministry for the Environment (2021b)

integrity.”³ In this context, the CCR could be regarded as an adjustment to the balance between domestic and international emission reductions in response to emerging price information.

2.3 CCR Volumes and Experience to Date

Table 2-1 summarises the quantities of NZUs available in the CCR, alongside the current and previous (2021) auction reserve price and the CCR trigger price. The CCR volumes available are annual quantities, so that if some (or all) of the CCR is released and sold at an auction, the reserve is reduced by that amount for subsequent auctions that year.

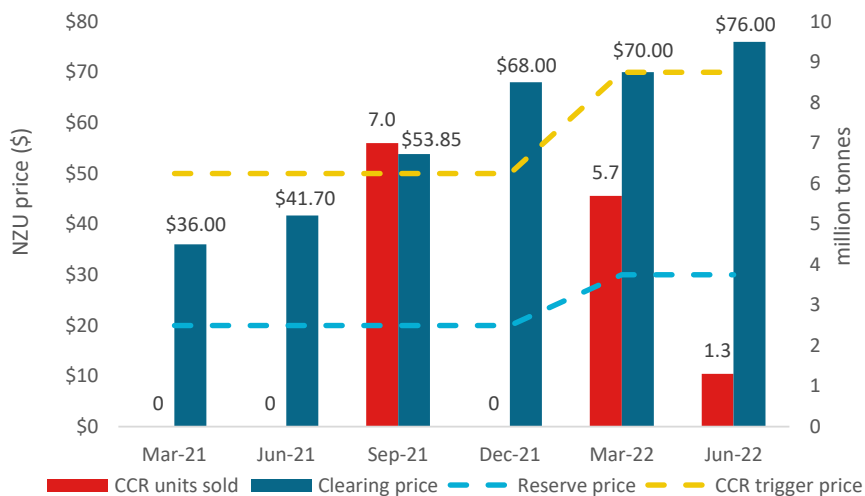
Table 2-1 Price control settings (2021 and 2022)

Calendar year	Auction reserve price (\$)		CCR trigger price (\$)		CCR amount (millions)	
	2021	2022	2021	2022	2021	2022
2021	\$ 20.00		\$ 50.00		7.0	
2022	\$ 20.40	\$ 30.00	\$ 51.00	\$ 70.00	7.0	7.0
2023	\$ 20.81	\$ 32.10	\$ 52.02	\$ 87.40	7.0	7.0
2024	\$ 21.22	\$ 34.35	\$ 53.06	\$ 87.81	7.0	7.0
2025	\$ 21.65	\$ 36.75	\$ 54.12	\$ 98.34	6.9	6.8
2026		\$ 39.32		\$ 110.15		6.7

Source: Climate Change (Auctions, Limits, and Price Controls for Units) Regulations 2020; Climate Change (Auctions, Limits, and Price Controls for Units) Amendment Regulations 2021

The initial CCR trigger price was established at \$50/t (in 2021) but was increased to \$70 for 2022 following the initial triggering of the CCR at the quarterly auction in September 2021. The trigger price was exceeded again in December 2021 but the seven million tonnes in the CCR for 2021 had been sold already so no additional volumes were made available. The updated trigger price (\$70) was subsequently breached in March 2022 with 5.7 million CCR units sold and again in June 2022 when the remainder of the year’s reserve (1.3 million) was sold. Figure 2-2 shows the auction reserve and CCR trigger prices (dashed lines), the auction clearing prices and the CCR units sold. Figure 2-3 shows the CCR trigger prices (at the dates triggered) along with the monthly average spot market price.

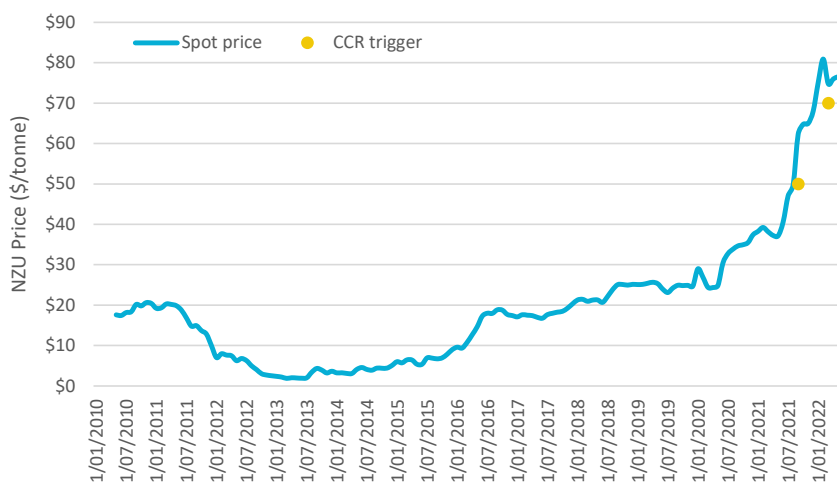
Figure 2-2 Auction clearing prices compared with reserve and CCR trigger prices



Source: Auction results at https://www.etsauctions.govt.nz/public/auction_noticeboard

³ New Zealand Government (2021)

Figure 2-3 NZU monthly average spot market prices and CCR trigger prices



Source: <https://github.com/theecanmole/nzu>; www.etsauctions.govt.nz/public/auction_noticeboard

The trigger events appear to have been associated with a market correction, rather than a short-run price spike. This correction has occurred following the removal (at 31 December 2020) of the unlimited fixed price option which set a maximum price of \$25/t, increasing to \$35/t for calendar year 2020. The NZU price increases were also influenced by increased information in the market, including the release of the Climate Change Commission’s shadow emissions price paths under different scenarios.⁴ Because spot prices are now above the CCR trigger price, it is difficult to know what influence the CCR has had on prices.

2.4 CCR Impacts on Price

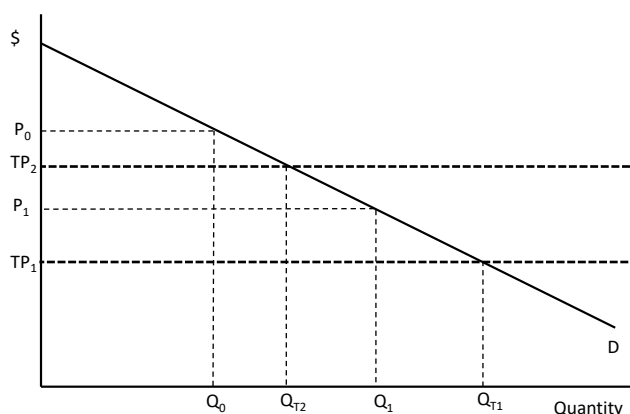
2.4.1 Theoretical Impacts

The CCR affects price via the trigger price and the increase in total supply. These effects can be seen in Figure 2-4; market demand is represented by line D which is a simple representation of the descending bid prices depicted in Figure 2-1. It shows:

- With no price controls and a quantity (Q_0) of NZUs released to the market, price would rise to P_0 .
- If a CCR is introduced with trigger price TP_1 and an unlimited number of units in the reserve, consumption of units would rise to Q_{T1} . This is the same as with the fixed price option.
- If the CCR is limited in number (increasing total supply to Q_1), price would rise above TP_1 to P_1 . The quantity released is setting price rather than the trigger price. This is what happened at the auctions in September 2021 and June 2022.
- If the trigger price is increased (to TP_2 which is above P_1), the quantity demanded at the new trigger price is less than the full CCR quantity (Q_1) and total consumption of units (auction sales) falls to Q_{T2} .

⁴ Climate Change Commission (2021b)

Figure 2-4 Price quantity interaction



We might have expected prices in the December 2021 auction to be higher than those in March 2022. As there were no CCR units available (supply was limited to Q_0)⁵ prices would have been expected to rise to P_0 . However, they may have been limited by the expectation of further volumes available in the next quarter.

The CCR settings are, ideally, based on an understanding of the market dynamics, ie the price elasticity of demand, and not just the maximum price.

2.4.2 ETS Price: Compliance and Investment Value

Pricing in the ETS reflects the balance between supply and demand in the short and long run. Market participants with compliance obligations must surrender NZUs annually equal to their emissions, and their demand for units affects prices in the current year. However, because NZUs do not expire they can be held to meet future surrender obligations, including by investors holding them to sell later.

The current investment value is the discounted expected future price (DEFP). For example, if the expected price of NZUs is \$100 in 2030 and the cost of capital (discount rate) is 5%, then the willingness to pay for an NZU now would be close to \$68; at an expected 2030 price of \$150/t it would be \$102 (Table 2-2).

Table 2-2 Possible stockpile release prices at different 2030 expected values (5% discount rate)⁶

	Low	Medium	High
2022	\$68	\$85	\$102
2023	\$71	\$89	\$107
2024	\$75	\$93	\$112
2025	\$78	\$98	\$118
2030	\$100	\$125	\$150

If we knew the market weighted average discount rate, current price information might be used to derive future prices. In practice, individual participants will have their own future price expectations and discount rate.

⁵ A slightly greater amount was released: 4.825 million units rather than 4.75 million.

⁶ The formula is: $Price = \frac{FV}{(1+r)^t}$ where FV = future (2030) value; r = the discount rate; and t = years to 2030

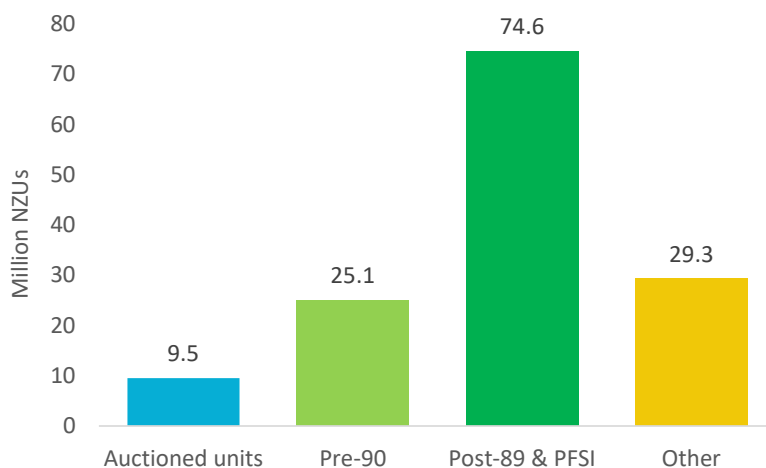
The release of units from the CCR has some impact on price as it is a significant percentage of the annual auction volume, eg 37% of the 19 million tonnes auctioned in 2021. However, it is small in the context of the total supply and demand over the long run, including the volumes in the stockpile. The impact on price needs to be set against the influence of the DEFP.

2.4.3 The Relationship between the CCR and the Stockpile

The stockpile is the quantity of NZUs in private accounts, some of which are not required for compliance surrender. Private account holdings totalled 158 million NZUs at 31 December 2021,⁷ but this is expected to reduce following surrenders to the end of May 2022. The total volume in private accounts was 138 million at the end of June 2021 and this is likely to be closer to the size of the stockpile of units.

The stockpile is sourced from auctioned NZUs, units allocated to pre-1990 forests, those earned from post-1989 forests and other sources including allocations to EITE industries (Figure 2-5).

Figure 2-5 NZUs in private accounts at 30 June 2021



Source: www.epa.govt.nz/industry-areas/emissions-trading-scheme/market-information/privately-held-units/

It contains holdings of those with potential future surrender responsibilities and those without. Those with future surrender responsibilities include:

- forestry participants holding NZUs against future harvest or deforestation liabilities;
- obligated parties with future surrender liabilities; and
- other parties, including financial institutions which have sold NZU futures.

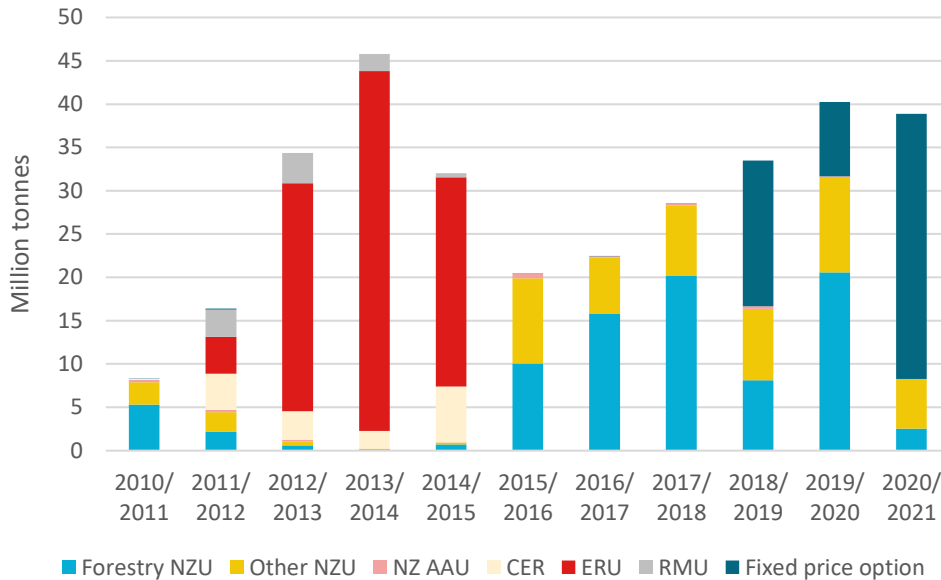
NZUs would be expected to be removed from the stockpile to meet a shortfall between auctioned quantities and anticipated demand, although the number available (the surplus) is not certain because of existing commitments. However, if a significant number is not held against future commitments, the stockpile can function as a price control measure.

The stockpile exists partly because, historically, units were available for prices less than the DEFP. Alternative sources of low-cost units, most of which, in contrast to NZUs, had a limited life span, provided incentives to use these for surrender purposes while retaining

⁷ <https://www.epa.govt.nz/industry-areas/emissions-trading-scheme/market-information/privately-held-units/>

NZUs for investment. For example, in 2020/21, close to 80% of unit surrenders used the fixed price option rather than units added to the market via auction and allocation (Figure 2-6).

Figure 2-6 Unit surrenders in the NZ ETS: 2010/2011 to 2020/2021



Note: NZ AAU = NZ Assigned Amount Units were allocated to participants in Projects to Reduce Emissions and in the Permanent Forest Sinks Initiative; CER & ERU = international units (Certified Emission Reductions and Emission Reduction Units); RMU = removal units (available until 2015)
 Source: Environmental Protection Authority (2022)

These low-cost options are no longer available, such that NZU market prices are understood to now reflect the balance of supply and demand in short and long terms, ie market prices should (in theory) be equal to the DEFP. If the current supply-demand balance leads to prices less than the DEFP, NZUs would be added to the stockpile until current prices equal the DEFP, and conversely, if there was a shortfall between annual demand and annual supply, NZUs would be supplied from the stockpile until market prices fell to the DEFP.

If the current market price is at or close to the DEFP, there would be no regrets in releasing units from the stockpile as:

- units (presumably) could be purchased again at the DEFP; and/or
- the revenue raised from unit sales could be invested in some other market to obtain an equivalent rate of return.

The reasons why this would not be the case might be because:

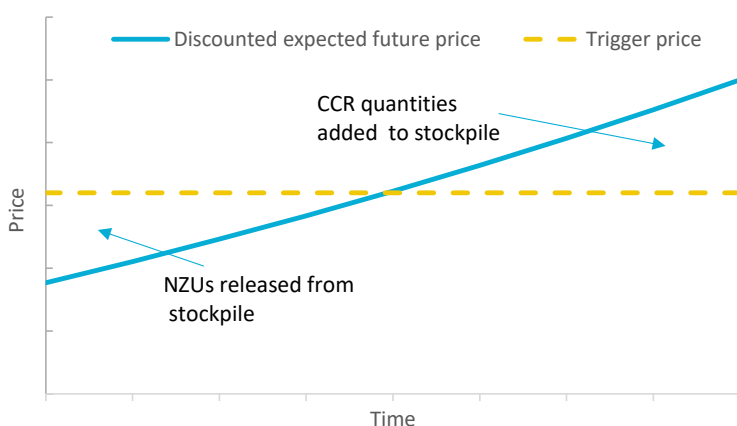
- the market is not fully liquid, ie a seller into the market from the stockpile might not be confident that they could repurchase in the future if they wished to do so; and/or
- an endowment bias in which the price a potential seller is willing to accept for a resource they own is greater than they (or another market participant) is willing to

pay for a resource they do not currently own. This is observed in other markets,⁸ although it may simply be an example of a liquidity problem.

The price dynamics with the stockpile are relevant to the CCR also, as illustrated in Figure 2-7.

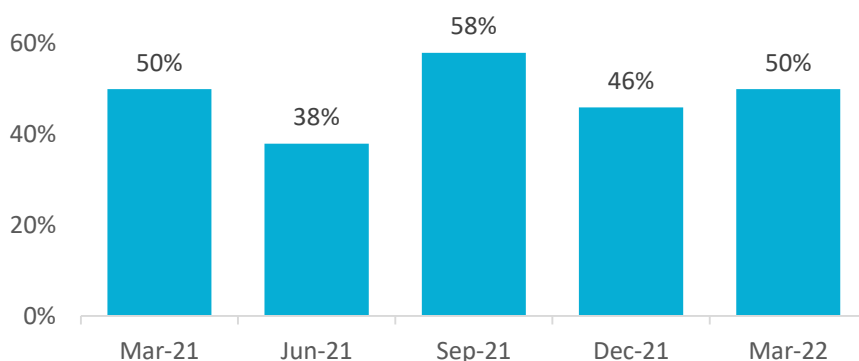
- If the DEFP is less than the CCR trigger price, the CCR would not be triggered and the stockpile would be reduced to meet supply shortfalls.
- If the DEFP is higher than the CCR trigger price, units released from the CRR might add to the stockpile rather than leading to a price reduction. Effectively, the DEFP defines the equilibrium market price and additions to, or sales from, the stockpile are the means by which this price is achieved over time.

Figure 2-7 Interaction of Stockpile and CRR



To date only approximately 50% of auction market participants have been those with compliance obligations (Figure 2-8). This might suggest that some at least of the auctioned quantities may be adding to the stockpile, although it might also reflect units obtained by banks and other institutions that sell units to compliance participants. And it is also worth noting that compliance participants also stockpile units.

Figure 2-8 Proportion of participants with mandatory compliance obligations



Source: Ministry for the Environment (2022)

⁸ Kahneman *et al* (2008); Kahneman (2011)

Differences in Expectation

The above discussion assumes a single expected future price. In practice, individual participants owning NZUs in the stockpile will differ in their expectations. There will thus not be a single tipping point at which units are released from the stockpile. However, in broad terms, more units will be released as market prices rise and the stockpile will have an important role in setting price (on the basis of future price expectations), which will dampen the potential impacts of CCR releases.

2.4.4 Relative Size of the CCR

The CCR does not include unlimited volumes of units as might be required to ensure against significant price rises in the whole market (auction and secondary markets). This was the role of the previous fixed price option in the ETS for which there was no limit. In contrast, the CCR has been limited to a maximum of seven million tonnes per annum to 2024. This is quite large as a percentage of:

- the auctioned amount. It was 37% of the 19 million tonnes auctioned in 2021, as noted above; and
- as a percentage (18%) of the approximately 39 million tonnes of NZUs surrendered in the year to June 2021.⁹

From this perspective it might be assumed to have a significant impact on short-run prices. However, it is relatively small as a percentage of:

- the current stockpile (5% of the 138 mt total in Figure 2-5), although larger as a percentage of the stockpile 'surplus' that is not set aside for future compliance; and
- of the total sum of units in the future period that sets the market DEFP.

It would be expected to have an immediate dampening effect on prices. However, it will limit the extent to which it can be used to address significant and sustained price increases above the expected range. If these are a concern, they might be better addressed via revisiting the budgets themselves.

2.5 Future Rationale for the CCR

2.5.1 The Options

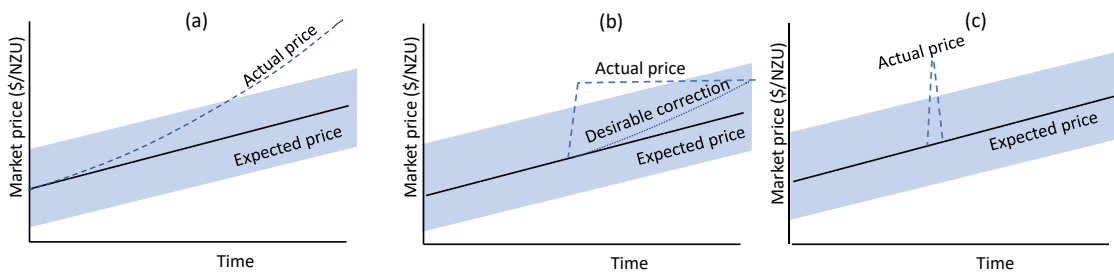
In this section we take a forward-looking perspective on the CCR, building on the experience to date and suggesting how it might be used to address potential future events.

The CCR is called upon when prices are different from expectations. Figure 2-9 shows three potential ways in which the trigger price might be breached, although when the trigger price is breached which of these events is occurring is unlikely to be clear. The options illustrated are:

⁹ Environmental Protection Authority (2021)

- (a) NZU prices rise faster or higher than expected;
- (b) NZU prices rising quickly to higher levels not expected until a future time period (and ideally this would have been via a smoother path); or
- (c) There is a short run price spike.

Figure 2-9 Potential breaches of the trigger price



2.5.2 Existing Government Guidance

Existing Government guidance on the reasons for the CCR is not unambiguous. It includes reductions in undesirably high prices, price certainty and limiting short run price spikes.

Reductions in Undesirably High Prices

The legislation is not clear on the reasons for the CCR. Section 30GC of the Climate Change Response Act suggests that the limits (on NZU quantities) and price control settings “*need not strictly accord with the budgets or contributions as long as the Minister is satisfied that the discrepancy is justified, after considering the other matters*” (30GC(3)). The “*other matters*” include expected achievement of targets, the costs of achievement, the impact of emissions prices on households and the economy, the level and trajectory of international emissions prices (including price controls in linked markets), inflation and other matters. This suggests the achievement of budgets or contributions under the Paris Agreement might be compromised where achieving them is regarded as too costly or where prices in New Zealand are higher than those elsewhere.

The public discussion paper released before the CCR was originally introduced suggests the reasons for the CCR are that high NZU prices might indicate, in retrospect, that emission budget settings are inappropriate, and that the path to 2050 should be taken more slowly with emission reductions delayed. For example, this might be to ensure investment in new technologies is delayed until the end of life of existing plant and machinery.¹⁰ This suggests the concern is largely that illustrated in option Figure 2-9 (b).

Price Certainty

MfE guidance on its website is that the CCR and ARP are providing information to business on the expected minimum and maximum costs of compliance.¹¹ The emissions reduction plan makes a similar point, suggesting that price controls:¹² “*signal the bounds of*

¹⁰ Ministry for the Environment (2019), p53

¹¹ <https://environment.govt.nz/what-government-is-doing/areas-of-work/climate-change/ets/a-tool-for-climate-change/the-role-of-price-controls-in-the-nz-ets/#the-cost-containment-reserve>

¹² New Zealand Government (2022), p102

acceptable NZU prices at auction and act as a safety valve if an auction's clearing price deviates outside these bounds. They also provide some certainty to businesses and investors on the future trajectory of NZU prices to aid the forecasting of emissions obligations, or to help with investment planning."

Using the CCR trigger price as a guide to the maximum cost of ETS compliance might imply that the concern is with average prices rather than short-run price volatility that could be hedged, noting that options for reducing exposure to price spikes include offtake agreements with foresters, forward and option contracts.¹³ This suggests the aim might be (a) or (b). However, the recent experience is that the CCR does not prevent prices exceeding the trigger price either in the secondary market (see below) or the auction itself (Figure 2-1).

Limiting Price Spikes

An additional perspective is that the ETS should be left to function as a market aiming to achieve the emissions cap, and with prices (no matter how high) reflecting supply and demand. Here the CCR might aim only to guard against extreme price spikes caused by uncompetitive market conditions, but that it should not be viewed as a tool to suppress sustained high average prices, if those prices are in line with what is needed to meet emissions budgets. This is consistent with (c) in Figure 2-9, although as noted above, whether a trigger exceedance is a type (a), (b) or (c) event will not be clear when it occurs.

Below we explore the practical use of the CCR to address high average prices (Section 2.6) and price spikes (Section 2.7).

2.6 Limiting High Average Prices

Market prices might differ from price expectations because of factors that include:

- different contributions of absorption units;¹⁴ and
- marginal emission reduction costs being different from expectations.

In this context, a trigger price defined as a price that is "too high" might be based on affordability, business certainty or international comparison criteria.

An **affordability** basis for a trigger price would be a level above which there would be high adverse impacts on industry or households. However, what is too high is not easily defined as there will be a continuum of effects across companies and households; even if the impacts could be fully understood, it would require the application of a threshold where none is likely to be obvious. In addition, a cost that has an adverse impact on some industries might produce a desirable shift in economic structure, while a cost that has an adverse impact on vulnerable households might be better addressed via complementary measures, including adjustments to tax or benefit payments.

Adverse impacts on **business certainty** (price predictability for business) might occur when prices diverge from expected price trends. This basis for intervention might have appeared more justifiable prior to recent market price changes as illustrated in Figure 2-10. It shows

¹³ Denne *et al* (2017)

¹⁴ And noting the recent discussion document about possible restrictions on permanent exotic forestry (Ministry for Primary Industries 2022)

spot prices and price trends that could have been expected from the 2016-2020 prices (expected price (1)) and a revised expected price (2) that might have been estimated from price trends in 2020-21. The lower price expectations were reflected in the previous (2021) settings for the CCR trigger price (Table 2-1).

Figure 2-10 Price vs expected price

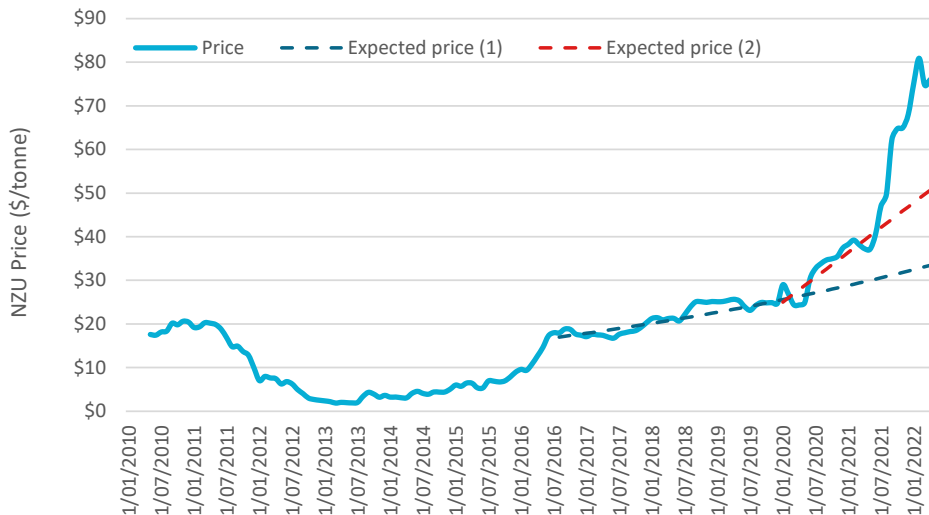
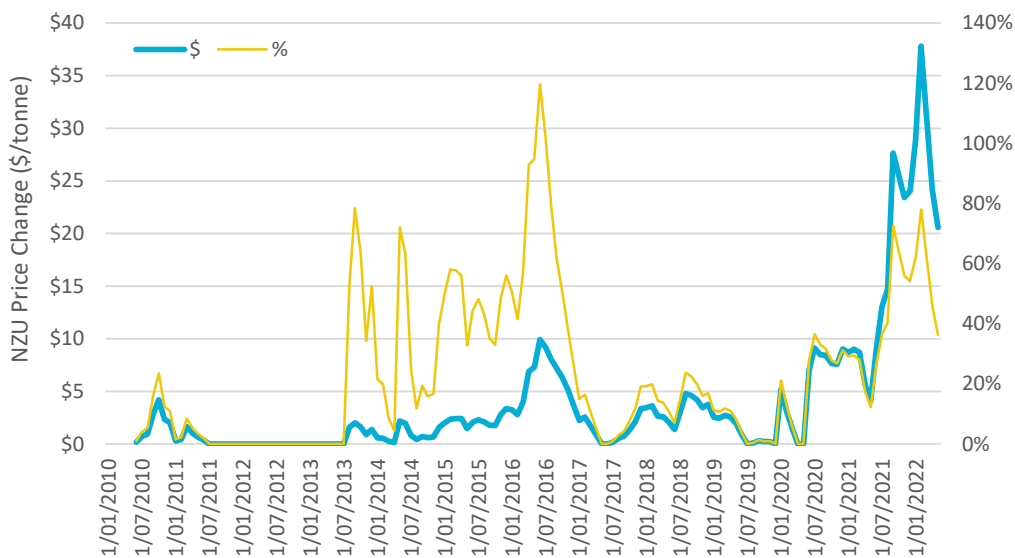


Figure 2-11 shows the difference between the maximum price in a month and the average price over the previous year. Responding to this divergence is effectively what has happened in the recent trigger events.

The Government reaction is notable; although divergences from these trends resulted in the release of volumes from the CCR, it also led to changes to the trigger price (including in response to Commission advice). This suggests the CCR is being used, at most, to provide a short-term correction for the difference between actual and expected prices, but is not providing long-run correction, ie it may be assisting industry adjust to new expectations, helping to provide a smoother transition as shown in Figure 2-9 (b).

Figure 2-11 Price difference from expectation: difference (as \$/t and %) between maximum price in month and average annual price



International comparisons would acknowledge New Zealand’s contribution within a global response, but as with business certainty, the CCR has a limited ability to address significant long-run divergences.

Across these three criteria the CCR has limited ability to address any significant and long-run diversions from expected prices.

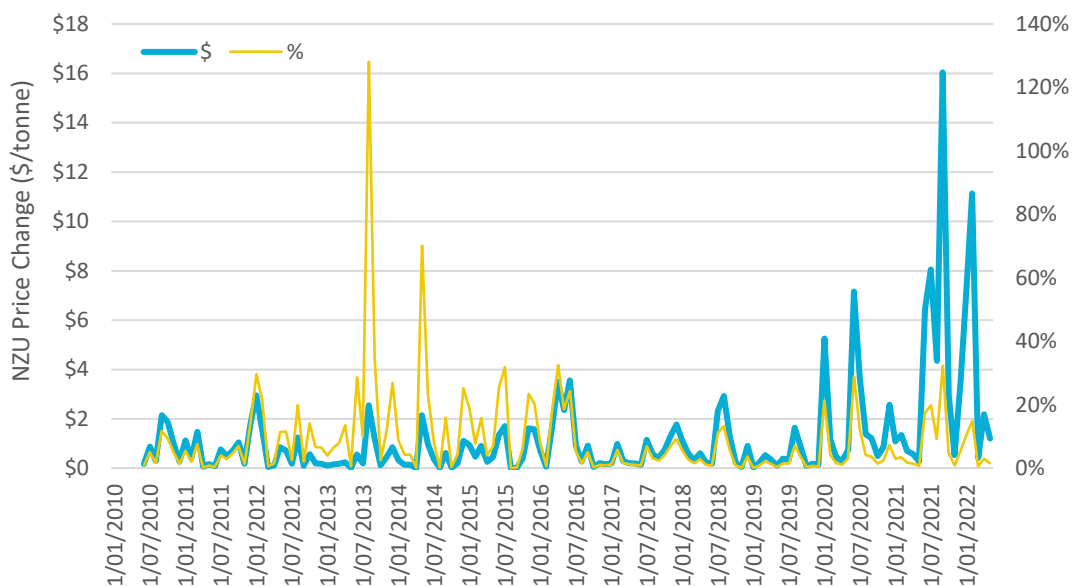
2.7 Limiting Price Spikes

The other potential rationale for the CCR trigger price is to manage price spikes.

2.7.1 NZU Market Volatility

Figure 2-12 shows NZU price volatility as the difference between the maximum price in a month and the average for the previous month (in \$/t and % terms). It suggests recent months have been more volatile than 2013/14 (when the market was exposed to international prices) in absolute terms but not in percentage terms. The largest percentage change was when the price rose to \$4.55/t in August 2013 compared to the average previous month’s price of \$2.00.

Figure 2-12 NZU price volatility: difference (as \$/t and %) between maximum and average monthly price



The NZU market is not subject to the impacts of weather events (as is the half-hour wholesale electricity market) or of unexpected supply disruptions (as in oil or gas markets). Sudden NZU price changes have been associated with policy changes, including the removal of the fixed price option and, historically, stopping access to international units, in addition to changes in market information. However, it is difficult to draw firm conclusions about the future risks of price spikes and the potential role of the stockpile in dampening them.

The contribution of the stockpile might be limited if significant numbers of units are retained against future obligations or for long-run investment purposes, eg as part of a mixed portfolio of assets. Unlike in highly liquid markets, current holders of units may not sell them when prices rise, or will not do so until prices rise to very high levels, even when rational expectations would suggest they would. Reasons might include uncertainty about

future price trends and illiquidity meaning there is less certainty that they could repurchase units if they wished to in the future. The mix of units in current private holdings (Figure 2-5) suggests many may be being held for future liabilities, but a survey of intentions might be useful.

The CCR as an additional source of supply can reduce or eliminate this risk by providing a more liquid source of supply to the market for those with short-run surrender obligations. However, to limit the potential fiscal risks, the objective is to design it in a way that it does not simply mirror the fixed-price option, eg by making large numbers of units available that could be added to the stockpile.

Market Hedges as an Alternative

Hedging strategies are another means for addressing volatility.¹⁵ Hedging is used in other markets such as wholesale electricity where spot prices can be highly volatile but participants with significant demand offset this volatility using contracts for differences (CFDs) or other price risk management contracts.¹⁶ CFDs involve buyers and sellers agreeing an expected (contracted) price; subsequently the buyer receives a payment from the seller if the spot price is higher than the contracted price and the seller receives a payment from the buyer if the spot price is lower than the contracted price. In both cases, these payments mean the final price is equal to the contracted price. Such arrangements can work in the ETS where there are buyers and sellers who face equal and opposite impacts of price volatility, eg foresters and emitters who sign offtake contracts.

For auctioned units, the Government is the seller and it faces the upside or downside of price volatility. The CCR is providing a means of limiting this volatility, without providing the certainty of a CFD. Other hedge options exist in the NZU market, including forward contracts available via brokers. It would be useful to investigate further whether the Government has a useful role in encouraging or developing hedge markets rather than using the CCR for this purpose.

2.8 Risk of Market Manipulation

Prior to the introduction of the CCR, some concern had been raised by officials over the risk of market manipulation in NZU auctions. These perceived risks included deliberate triggering to increase supply (and reduce price) and market cornering.

2.8.1 Deliberate Triggering

ETS auctions function by the auction manager taking price and volume bids, with the clearing price being the highest price at which all available units would sell (Figure 2-1). Market manipulation might occur if one or more market participants wanted to trigger the release of the CCR to increase NZU supply, because they want a market price lower than it would be otherwise. They would bid at a deliberately high price with the assumption that, even if the price was high for one auction, the additional supply would result in a lower post-auction market price. The question they would face is whether the cost of achieving

¹⁵ Denne *et al* (2017)

¹⁶ <https://www.ea.govt.nz/operations/wholesale/hedges/how-the-hedge-market-works/>

the trigger price at auction would be offset by the benefits of lower prices for all other purchases in the remainder of the year (or later).¹⁷

This type of deliberate action seems extremely unlikely, especially for a single participant, and even less so now that the experience has been of post-auction prices rising above CCR trigger prices (Figure 2-3). The reasons it is unlikely include the following.

- It would require a participant to understand the supply-demand relationship in the market so they could estimate the price impact of the additional supply. This is not straightforward given the many sectors, activities and technologies across the range of ETS participants, in addition to the uncertain role of the stockpile.
- They would need (or want) to know the quantity they would need to bid to trigger the CCR; this would be uncertain in a competitive auction. The incentive would be for this to be the minimum amount possible because of the additional cost.
- There are positive spillovers for all other market participants with surrender obligations which the “triggerer” cannot exclude them from. This is likely to be a significant reason for not trying to trigger the CCR, especially if the potential triggerer competes with these other firms.

Market manipulation is difficult if auctions are competitive. To date they have been relatively competitive with 26 to 43 participants in each, large numbers of bids and relatively high cover ratios (bid volumes: total volumes) (Table 2-3).

Table 2-3 ETS auction participation

Date	Bids	Participants	Successful participants	Cover ratio	Cover ratio (incl CCR)
March 2021	408	40	30	2.45	0.99
June 2021	583	37	16	2.29	0.92
September 2021	434	43	31	3.92	1.58
December 2021	309	26	18	1.94	1.94
March 2022	477	32	30	2.43	0.99
June 2022	316	26	17	2.08	1.64

Source: https://www.etsauctions.govt.nz/public/auction_noticeboard

Although the risks of a single participant triggering the CCR are very low, it might be triggered if many participants had the same idea and acted independently with the same intention as that discussed above, eg by all bidding at the trigger price. Information on bid prices (eg whether bids were received at the trigger price) has not been published.

The market results suggest, even if any market participant has attempted such behaviour, it has not been successful. Demand exceeds supply at the trigger price even with the additional volumes released. Any risk would be reduced by having more than one trigger price and attempts might be observed via bids at the trigger price.

¹⁷ Adding units to the stockpile allows participants to benefit in future years from sales of lower price units in an earlier year.

Such deliberate triggering might also be addressed by changes to market governance that included NZUs as a financial product under the Financial Markets Conduct (FMC) Act 2013 which prohibits market manipulation.¹⁸

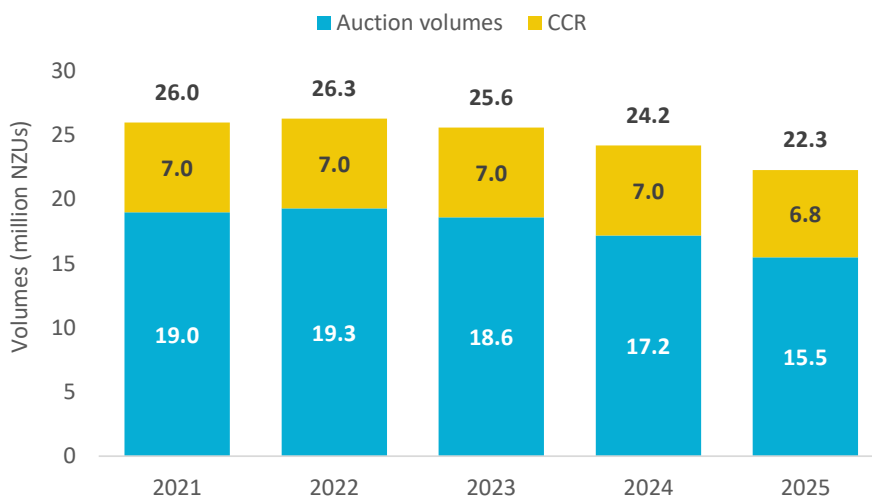
2.8.2 Market Cornering

A further risk raised by officials is that of market cornering, ie that the NZ ETS is at risk of an entity purchasing large numbers of NZUs deliberately to stifle activity in the NZ economy. As an additional source of supply, the CCR has a potential role in reducing this risk.

The ability to purchase units to reduce economic activity (or certain types of economic activity) is not an undesirable element of an ETS. For example, individuals or voluntary trading markets might purchase units so that NZ's total emissions will be lower. Market cornering is simply taking this to extremes.

To corner the market, a bidder would need to pay above the auction clearing price that otherwise would be expected and to do so at successive auctions. If the expected clearing price was \$75/NZU and they bid \$85, purchasing the full amount available would cost \$1.6 billion in 2022 (19.3 mt to be auctioned – see Figure 2-13) or \$2.2 billion including the CCR volumes. This is a significant amount of money and approximately 5% of the value of NZ primary product exports.¹⁹ The risk of purchase of significant quantities of the market is low but not zero.

Figure 2-13 Proposed and actual and actual ETS auction volumes



Source: <https://environment.govt.nz/what-government-is-doing/areas-of-work/climate-change/ets/nz-ets-market/unit-flow-forecasts/> and Table 2-1

Mechanisms that enable activity to continue in the absence of units eliminate these risks (or change the risk to a price risk). The CCR would reduce, but not eliminate, the risks; it would have a greater risk reduction role if the quantities available were larger, but this has the downside of introducing risk elsewhere, eg if other sectors are required to reduce emissions more to meet emission budgets. The stockpile provides additional risk reduction (including reducing the risk of market cornering attempts).

¹⁸ See Denne *et al* (2017); Ministry for the Environment (2021a)

¹⁹ The export value of NZ primary products was \$46 billion in 2021 (Stats NZ, Table ref: EXP076AA).

The issues for the Government are:

1. whether this low probability event needs to be specifically addressed through, for example, establishing a large CCR (including in multiple tranches);
2. if it counts as a *force majeure* event under which the obligations of participants to surrender allowances are suspended temporarily because they are unable to meet their obligations for reasons beyond their control; or
3. if these risks might be addressed by market governance changes, such as treating NZUs as financial products under the FMC Act (as above).

The second option is a legal question which goes beyond my area of expertise. But if not addressed via a suspension of contractual obligations, presumably there is nothing to prevent the Government intervening directly via emergency regulation (or whatever is required) to ensure significant economic impacts are avoided. The ETS is an artificial market established by the Government and it can change the rules. The argument against doing so is that such intervention reduces market confidence in NZUs as a commodity, with impacts on market participation and liquidity. But if market cornering prevented significant proportions of economic activity, intervening to address the issue is likely to provide greater market confidence than allowing the market to effectively stop functioning.

In the short run, while the stockpile is still a significant size and larger than the annual trading market, cornering the market would be extremely difficult or a high-risk intervention. It becomes more probable (but still a low probability event) if or when the stockpile reduces.

Designing the CCR to address such a low probability event is likely to be unnecessary and could result in inefficient design elements or potentially high fiscal risk from a larger CCR being available. A better option may be to simply address the issue if it arises via direct intervention to ensure the market can continue to function. That said, having a CCR per se, reduces the risks of market manipulation. CCR design elements, such as multiple tranches (see below) is a useful way to limit the risks, as would changes to market governance as discussed above.

2.9 CCR Design Issues – Multiple Price Ceilings

The Commission has asked me to consider the option of two or more price ceilings and two or more tiers of the CCR. For example, this might include a trigger price of \$100/t and another at \$150/t, both with CCR volumes to be released. Using this approach might be a way to make more significant numbers of units available (and thus addressing the risks discussed in the previous section) while limiting the fiscal risks to dealing with extreme cases only.

One suggested possibility is that a first tranche of CCR might be sufficiently small that it did not introduce a fiscal cost for the Government. This could be achieved by the CCR being no larger in volume than a targeted stockpile reduction volume (27 million tonnes is targeted

for 2021 to 2025 or 5.4 mt per annum on average)²⁰ to be achieved by reducing auction volumes; this is less than the current CCR (7 mt). This would be a sensible approach. It delays the reduction of the stockpile if the DEFP is above the trigger price, but avoids the fiscal cost of releasing more units. Additional quantities could then be available at higher prices.

If introducing CCR tranches means the (first) trigger price is lower than it would be otherwise, it is more likely to be triggered. But if the CCR volume released is smaller, the benefits of release will be smaller and the risks of deliberate triggering much reduced.

A multiple tranche approach with a first tranche of no more than the targeted stockpile reduction seems sensible to me.

²⁰ <https://environment.govt.nz/what-government-is-doing/areas-of-work/climate-change/ets/nz-ets-market/setting-unit-limits-in-the-nz-ets/>

3 The Auction Reserve Price

3.1 How it Works

The auction reserve price (ARP) sets the minimum price at which the Government would sell units in an auction. It does not provide a firm price floor in the whole NZU market, as prices in the secondary market can be lower.

The ARP (currently \$30 – Table 2-1) is currently well below prices seen in auctions (Figure 2-2) and NZU spot market prices (Figure 2-3). It thus has no obvious impact on the market. And as discussed above, effectively the DEFP sets a price floor in the market – if prices fall below that level, units are added to the stockpile. Previously prices have fallen to low levels. This was before there was an ARP and when the potential supply of low-cost units was effectively unlimited.

In the future, the ARP might have an impact only if supply levels were significantly above demand in the medium to long run, so that investment demand (via the stockpile) was not preventing price falls.

3.2 Previous Advice on ARP Settings

In its 2021 advice the Commission suggested the ARP should be closer to recent market prices “to ensure price continuity and to safeguard existing investments,” although its then recommended prices (\$30 rising at 5% per annum)²¹ are well below current market prices.

3.3 Should there be a Price Floor?

Many of the points given as the reason for price falls triggering the ARP could be regarded as desirable: if emission targets prove to be lower cost to meet than anticipated then this might be regarded as a good outcome. However, under the Paris Agreement, New Zealand has committed to set a NDC to reflect its highest possible ambition. This is an argument that we should do as much as we can for the cost deemed acceptable (including doing more domestically to meet NDC commitments rather than international purchases). This latter point is also consistent with the Commission recommendation to overachieve budgets, although this is partly about erring on the side of more reductions in the face of uncertainty over effectiveness.²²

A further argument for the use of the ARP is related to the use of the stockpile, ie if the stockpile starts to be used this is desirable but risks the budget being exceeded; the ARP can be used to make sure the stockpile replaces auction supplies. This provides a rationale for revising the price settings upwards and closer to recent market prices.

3.4 Suggested Setting

The previous Commission advice to set the ARP close to the current market price is consistent with maintaining the high ambition New Zealand has committed to. This requires an increase in the current ARP.

²¹ Recommendation 11 in Climate Change Commission (2021a)

²² Section 7.11 in Climate Change Commission (2021a)

4 Summary and Conclusions

4.1 Cost Containment Reserve

When introduced it was intended that the CCR would provide price risk management but be triggered infrequently. After the fixed price option was removed, market (and auction) prices have risen significantly such that the CCR has been triggered on three occasions, and twice after it was raised from the initial \$50 to \$70. With market prices above the CCR, it now appears to be providing little price risk reduction while introducing potential balancing costs for the Government or other sectors. Thus the trigger price needs to be raised.

The level to which it should be raised, and decisions on volumes, should be made with clarity over the rationale for use of the CCR and the potential role of the stockpile.

The CCR's rationale has not been completely clear to date and might include (a) NZU prices rising faster or higher than expected; (b) prices rising quickly to high levels not expected until a future time period; or (c) short run price spikes as illustrated in Figure 2-9 above. Although which event is occurring might not be clear at the time the CCR is triggered, the choice affects the volume that might be set aside. For example, a type (a) rationale would suggest the potential need for a large and ongoing additional level of supply, equivalent to changing the level of contribution of the ETS to budget achievement.

The CCR cannot be considered independently of the stockpile which is the volume of private holdings. It includes NZUs set aside to cover future liabilities, particularly for foresters, holdings of market participants providing futures contracts and volumes invested for the reward of future prices. As a large source of potential supply, the stockpile provides additional means of price risk reduction, but it can also be a source of demand for units put up for auction (including the CCR volumes) if auction prices are lower than the discounted expected future price (DEFP) of units.

Individual participants owning NZUs in the stockpile will differ in their expectations. There will thus not be a single tipping point at which units are released from, or added to, the stockpile. However, in broad terms, the stockpile is likely to play a more significant role in the market now that the fixed price option has been removed and market prices reflect the overall balance of supply and demand. It will dampen the potential impacts of CCR releases on the market price which is more likely to reflect DEFP.

The current ETS market, including the supply of units from auction, appears to be reasonably competitive as evident by the numbers of participants at auctions and the participation of both those with and without compliance obligations. Risks of price manipulation (eg bidding to deliberately trigger the CCR) or market cornering seem low. Evidence of the former might be observed via bids at the trigger price.

Including more than one trigger price and reserve quantity is a possible development in the CCR design. It reduces some of the (admittedly low) risks of market manipulation and the Government's fiscal risk. Set against this, any reduction in volume reduces the impact the CCR has on the market, noting that it is the volume of units released that has the major

price impact. One approach would be to set the first tranche equal to the targeted stockpile reduction volume.

4.2 Auction Reserve Price

The ARP is having little impact currently in the market and will not until supply exceeds demand at the ARP. Even then its influence is limited to the auction rather than the wider secondary market.

There are arguments for and against an ARP. The arguments for an ARP include the objective of:

- price continuity and protecting investments, as suggested by the Commission which would argue for a price closer to current market prices; and
- over-achievement of emission budgets, eg if the objective is to achieve as much as possible at an acceptable price.

The arguments against an ARP (and for allowing low prices) are that this might reflect lower costs of emission reductions and be seen as a good outcome. But New Zealand's international commitments are effectively to use low costs as a rationale for increasing ambition.

The previous Commission advice to raise the ARP closer to current market prices, which appear to be socially acceptable, appears sound.

5 References

- Climate Change Commission (2021a) *Ināia tonu nei: a low emissions future for Aotearoa*. Advice to the New Zealand Government on its first three emissions budgets and direction for its emissions reduction plan 2022 – 2025
- Climate Change Commission (2021b) *Scenarios dataset for the Commission's 2021 Draft Advice for Consultation (output from ENZ model)*. Accessed at: <https://www.climatecommission.govt.nz/get-involved/sharing-our-thinking/data-and-modelling/>
- Denne T, Campbell K and Wright L (2017) *Market Governance of the Emissions Trading Scheme: Options and Analysis*. Report to the Ministry for the Environment. Covec and Catalyst Advisory Partners.
- Environmental Protection Authority (2021) *ETS Participant Emissions*. October 2021.
- Environmental Protection Authority (2022) *ETS Units Movement Report*. <https://www.epa.govt.nz/industry-areas/emissions-trading-scheme/ets-reports/unit-movement/>
- Kahneman D (2011) *Thinking, Fast and Slow*. Penguin Books.
- Kahneman D, Knetsch J and Thaler R (2008) The Endowment Effect: Evidence of Losses Valued More Than Gains. *Handbook of Experimental Economics Results*, 1: 939-948.
- Ministry for Primary Industries (2022) Managing exotic afforestation incentives: A discussion document on proposals to change forestry settings in the New Zealand Emissions Trading Scheme. MPI Discussion Paper No: 2022/02.
- Ministry for the Environment (2019) Reforming the New Zealand Emissions Trading Scheme: Proposed settings. Consultation document.
- Ministry for the Environment (2020) New Zealand Emissions Trading Scheme auctions: Guidelines for participants.
- Ministry for the Environment (2021a) *Designing a governance framework for the New Zealand Emissions Trading Scheme: Consultation document*.
- Ministry for the Environment (2021b) *NZ ETS auctions: notes on the Cost Containment Reserve*. Briefing to the Minister of Climate Change. Accessed at: <https://environment.govt.nz/assets/publications/BRF-364-NZ-ETS-auctions-notes-on-the-Cost-Containment-Reserve.pdf>
- Ministry for the Environment (2022) New Zealand Emissions Trading Scheme interim auction monitor report: 16 March 2022 auction.
- New Zealand Government (2021) Submission under the Paris Agreement. New Zealand's first Nationally Determined Contribution. Updated 4 November 2021.
- New Zealand Government (2022) *Te hau mārohi ki anamata. Towards a productive, sustainable and inclusive economy*. Aotearoa New Zealand's First Emissions Reduction Plan.