He Pou a Rangi
Climate Change Commission

Advice on
NZ ETS unit limits and price control settings for 2023-2027

July 2022

This advice is required under section 5ZOA of the Climate Change Response Act 2002

Disclosure statement

As anticipated by the appointment criteria, the Climate Change Commissioners come from varying fields such as adaptation, agriculture, economics, te ao Māori and the Māori-Crown relationship. While a number of board members continue to hold roles within these fields, our advice is independent and evidence-based. The Commission operates under its Interests Policy, which is derived from the Crown Entities Act. You can read more about our board members on the Climate Change Commission website. The Commission regularly updates and publishes on its website a register of relevant board interests.

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Chair's message

Emissions pricing can be a powerful tool for reducing emissions.

While it may appear complex, the idea behind Aotearoa New Zealand's Emissions Trading Scheme (NZ ETS) is simple – our emissions reduction targets are translated into a price signal that drives low emissions choices and investment decisions.

We need the NZ ETS to be as effective as possible to help the country transition to a low emissions economy and meet its first three emissions budgets, its strengthened Nationally Determined Contribution and the 2050 net zero target.

With these goals set, the Government now must deliver.

Confidence in the stability and predictability of the NZ ETS is key to making it effective. The NZ ETS needs to be kept up-to-date, so that it aligns with emissions reduction targets. If its settings do not line up with our emissions reduction goals, it will be harder and more costly to reach them.

This is He Pou a Rangi Climate Change Commission's first advice to the Minister of Climate Change on updating the NZ ETS unit limits and price control settings. It has been developed in line with the intent of the Government's emissions budgets and its emissions reduction plan, and taking into account evidence about the emissions prices needed to meet our targets.

Our advice outlines a seven-step process for determining unit limits. It also contains our analysis for the price control settings: the cost containment reserve (a reserve of units available for sale if the auction clearing price is at or above a specified trigger price); and the auction reserve price, the price at which the Government will not sell units at auction.

We will provide this advice every year as part of the annual regulations update process. This will support the predictable management of the NZ ETS by the Government, give market participants information they need to make sound decisions, and bring transparency to the settings process.

Beyond our recommendations on unit limits and price settings, there are wider issues that need to be addressed to make the NZ ETS as effective as possible. Most importantly, the Government needs to clarify the roles it sees for the NZ ETS in its overall transition strategy for the country.

The Government's emissions reduction plan acknowledges the need to reduce gross emissions to reach net zero long-lived gas emissions sustainably. However, it remains unclear how the Government will ensure the NZ ETS is fit to help deliver this outcome. For example, the NZ ETS's treatment of forestry sequestration and possible changes to the provision of free allocation are two key system design issues that are yet to be clarified; they are however outside the scope of this advice.

The NZ ETS currently does not distinguish between carbon removals by trees or reducing emissions. This creates an emerging risk that the NZ ETS will steer the country towards a path that does not do enough to drive down gross emissions. Unless this is addressed, it will ultimately put our economy at a competitive disadvantage relative to a decarbonised global economy and shift cost burdens onto future generations.

Another pressing issue is the need for the Government to clarify what role the NZ ETS will have, if any, in delivering the offshore mitigation that is needed to meet the NDC. It is essential that the Government secure access to sources of offshore mitigation as soon as possible, and decide how this will affect the NZ ETS. This matter cannot be left until later this decade.

As it addresses these issues, the Government must ensure its approach complies with Te Tiriti o Waitangi/the Treaty of Waitangi and does not compound historic grievances and further disadvantage Iwi/Māori. This approach is needed across all levels of government, along with an enabling policy direction that advances a partnership approach with Iwi/Māori to ensure an equitable transition to a low emissions society.

A fit-for-purpose NZ ETS is essential, but on its own is not sufficient to deliver the sustained, inclusive and equitable change at the pace and scale we need. A package of well-designed complementary policies is also needed to drive efficiency, foster a sustainable transition, and tackle the market failures blocking action.

We need a strong NZ ETS to incentivise the changes needed in consumer choices, investment and production to get us on the path to reducing gross emissions and contributing to the global effort on climate change.

This advice is a key part of what is needed for the NZ ETS to do its job.

Dr Rod Carr

Chair

Te Karere a Te Tumu

Ko ngā tukuwaro me ōna utu, ka noho hei tino taonga ki te whakaheke i ngā tukuwaro.

Ahakoa rā te āhua he matatini, ā, ko te whakaaro matua o tā te Kaupapa Hokohoko Tukunga o Aotearoa he māmā – ko ā mātou ahunga whakaheke tukuwaro he mea whakarite ki tētahi tohu-utu e kauneke ai ētahi kōwhiringa whakaiti tukuwaro me ngā whakataunga haumi.

Me anga mai a NZ ETS ki te whakahaere tika mō te hāpai hoki i tā te whakawhitianga atu o te motu ki tētahi ōhanga whakaiti tukuwaro me te tutuki i ana ahunga tukuwaro e toru ki ōna tahua, te takoha kua whakaritea e te motu me te ahunga tukuwaro kore 2050.

Nā ēnei ahunga, ā, mō nāianei te mahi nui a te Kāwanatanga.

Mā te mōhio ki te pūmautanga me te matapaenga o NZ ETS ka eke rā ki ngā taumata tiketike. Me whai take a NZ ETS ki ēnei wā, kia whai take hoki ki ngā ahunga whakaheke tukuwaro. Mehemea kāhore ōna whakaritenga i te hāngai ki ngā whāinga whakaheke tukuwaro, ka uaua rawa ki te tutuki, ā, ka nui hoki te utu ki ēnei whāinga.

Ko te tuatahi o ngā kupu akiaki ki te Minita Take Taiao a te komihana o He Pou a Rangi, e hāngai ana ki ngā herenga hokohoko NZ ETS me ngā ritenga taura-utu. Kua hāngai ki te ahunga nui o ngā tahua tukuwaro a te Kāwanatanga me tōna Mahere Whakaheke Tukuwaro, ka mutu, ko te whai whakaaro ki ngā kōrero taunaki ki ngā utu tukuwaro e tika ana kia tutuki i o tātou ahunga.

E rārangi nei ō mātou kupu akiaki ki te whakarite i ngā herenga hokohoko, ā, e whitu reanga te punaha. Kei roto hoki ko ā mātou aromatawai ki ngā ritenga taura-utu: Taumau Herenga Utu (he tāpui herenga utu ēnei, inā rā he taurite, he tau-tōnui rānei te noho o ngā tū-utu kei ngā utu mākete); ā, ko te Utu Mākete Tauraro hoki, te utu herenga hokohoko kua kore hoki e utu nei e te Kāwanatanga ki te mākete.

Ia tau, ka tukuna e mātou ētahi kupu akiaki ki ngā whakahou pūnaha ture ā-tau. He mea tautoko tēnei i ngā whakahaere tūponotanga i a NZ ETS a te Kāwanatanga, me te hoatu rā ki ngā kaitono i ētahi kōrero mō te whakatau tika me te whai māramatanga ki ngā whakaritenga pūnaha.

Atu i a mātou whakahau ki ngā herenga hokohoko me ngā whakarite hokohoko, he whānui nei ngā raruraru hei whakatika noa, ā, e nui ai te ekenga a NZ ETS ki ngā taumata tiketike. Ko te mea nui, me mārama te whiu a te Kāwanatanga, ā, he aha rawa ōna kawenga mā NZ ETS ki roto tonu iho i tōna rautaki nui mā te motu.

E kōrero ana te Mahere Whakaheke Tukuwaro a te Kāwanatanga me whai waahi nei te whakahekenga rehukino kia heke tika mai te kaupapa nei ki te ahunga-kore. Engari, kāhore i te mārama ngā mahi a te Kāwanatanga mō tāna whakaoreore i a NZ ETS mō te tutuki hoki i ēnei whāinga. Hei tauira, ko te mahi a NZ ETS me ngā tango-waro ki te ngahere me te āheinga o ētahi whakarerekētanga ki ngā tukunga utu kore ētahi tino take takirua kāhore tonu nei i te mārama; heoi anō, kei waho atu i te roherohenga o ēnei kupu akiaki.

I tēnei wā, kāhore i a NZ ETS i te whai kōrero e kitea ai te rerekētanga o ngā tango-waro ki ngā rākau me te whakaheke tukuwaro. I konei ka kitea te aranga o te tūraru mā NZ ETS me tōna ārahinga i te motu ki tētahi ara kāhore i te eke ki ngā taumata whakaheke rehukino. Ki te kore tēnei e tika, ka herea tā tātou ōhanga ki te whakataetae, me te kino hoki o tēnei momo ōhanga whakaiti tukuwaro ā te ao, ka mutu, ko te whakataimaha a ēnei utu ka taka ki runga i ngā tamariki mokopuna.

Ko tētahi atu tino take ko te hiahia kia whakamāramahia e te Kāwanatanga i te tūranga nei a NZ ETS, mēnā rā he tūranga. Arā, ko ngā hua ka puta i te whakamauru o tāwahi me whai nei e NDC. He mea nui te mahi a te Kāwanatanga ki te whai i ngā punaha whakamauru o tāwahi mō nāia tonu nei, ā, he aha rā tōna utu ka ngaua e

NZ ETS. Me kaua rawa e tārewa noa ki tēnei o ngā tuangahuru tau.

I a ia e whai whakautu ana ki ēnei take, me whakapūmau e te Kāwanatanga tōna aronga ki te Tiriti, ā, me kaua hoki e whakataimaha ake i ngā raupatu, ka mutu, kua hekea rawatia te mana a te Māori. Me pēnei rawa te aronga ki ngā reanga katoa kei te kāwanatanga, rawa atu hoki ko te whakatenatena i ngā tukanga e kitea ai tētahi hononga whai mana ki te iwi Māori, e kitea hoki te whakawhitianga nui ki tētahi hapori whakaheke tukuwaro.

Me tika te whakahere a NZ ETS, ā, ki te noho motuhake ka kore hoki e tutuki i ngā whāinga tautīnei, whāinga tapatahi, ā, whāinga tautika hoki e tika ana ki a tātou. Me whai waahi hoki te hanganga tika mai o tētahi rārangi tukunga e eke ai ngā taumata, e tautīnei ai te whakawhitianga, ka mutu, e ārai hoki i ngā hē o te mākete.

Me kaha hoki a NZ ETS ki te whakapoapoa i ngā rerekētanga kia tika ai ngā kōwhiringa ki ngā kaihoko, te utu ka whakawhiwhingia me ngā hua ka puta ki tēnei huarahi o te whakaheke tukunga rehukino, ka mutu, te whakaheke werawera o te ao ki te whakatika āhuarangi.

He kupu akiaki whai mana ēnei, ā, hei whāinga hoki mā NZ ETS ki te tutuki i ōna mahi.

Dr Rod Carr

Chair

Executive summary

As the Government rolls out its plans for meeting the country's emissions reduction goals, Aotearoa New Zealand's Emissions Trading Scheme (NZ ETS) is in a period of change.

The Government has now committed to its first three emissions reduction budgets, broadly in line with the Commission's advice, and published its first emissions reduction plan. The plan recognises the need to reduce gross emissions to reach net zero long-lived gas emissions sustainably. It also outlines a range of policies, in addition to the ETS, to help drive down emissions.

With these important steps, confidence in the Government's commitment to climate action has grown and the price of New Zealand Units (NZUs) has increased significantly. As of the time of writing, the price of an NZU was $76, up from $30 in June 2020.

Our advice on unit limits and price control settings has been developed in line with the intent of the Government's emissions budgets and emissions reduction plan, and taking into account this shift in the market. It has also been informed by our engagement with a range of market participants, intermediaries, and members of bodies with an interest in the NZ ETS, which has enabled us to test ideas and enhance our understanding of the market.

However, we are providing this advice at a point where the Government has not yet clarified some of its goals for the NZ ETS.

First, it remains unclear how the Government will ensure the NZ ETS is fit to help deliver the outcome of prioritising gross emissions reductions. Without policy change, we expect NZ ETS emissions prices to drive large-scale afforestation, displacing and delaying reductions in gross emissions.

Second, the Government has not yet clarified the role that it expects the NZ ETS to play in meeting its contribution to reducing global emissions under the Paris Agreement, its Nationally Determined Contribution (NDC). The absence of this information creates significant uncertainty for market participants and has been a constraint on our advice. Once this information is available, our advice in future could materially change.

The Government should engage and consult with Iwi/Māori to ensure any decisions made on these issues uphold the principles of the Te Tiriti/The Treaty and avoid compounding historic grievances or unintentionally disadvantaging Iwi/Māori.

We have based our advice on existing data, projections and modelling, and presented our advice to the nearest 0.1 million units. However, this should not be taken as an indication of certainty about the future. Markets are inherently uncertain, and we will update our advice annually as better information becomes available.

Unit limits

The Commission is required to advise the Government on three categories of unit limits for the NZ ETS: a limit on units available by auction; a limit on approved overseas units used; and an overall limit on units. The

purpose of these limits is to cap the emissions allowed by the scheme in accordance with Aotearoa New Zealand's emissions reduction targets – the emissions budgets, the 2050 target and the NDC.

The Commission has followed a seven-step process to develop the unit limits.

Key judgements in setting unit limits

Emissions budgets, the NDC and the 2050 target

We conclude that until approved overseas units are available, the unit limits should be set in line with the Government's emissions budgets as the stepping stones to the 2050 target and the intended domestic contribution to the NDC. This approach recognises that while approved overseas units remain unavailable, the offshore mitigation required to meet the NDC cannot be delivered by the NZ ETS.

Allocating the emissions budget

We refer to this step as allocating the emissions budget, as it involves determining the share of emissions budget volume that can be used up by emissions that are outside the NZ ETS and what share is therefore available for NZ ETS sectors.

We have concluded that the emissions budget volume should be allocated to NZ ETS and non-NZ ETS sectors based on the emissions reductions implied by the sector sub-targets in the Government's first emissions reduction plan.

This means that if sectors outside the NZ ETS reduce emissions more than expected, NZ ETS sectors would not be allowed to emit more, and vice-versa. A key reason for this approach is that we now have a specific target for biogenic methane, and 90% of biogenic methane emissions are outside the NZ ETS. Reductions in biogenic methane and reductions in other gases are not substitutable for each other.

Addressing the surplus of banked units

About 144 million NZUs are banked in private accounts[1]. Our best estimate of surplus units (the volume of units that present a significant risk to meeting emissions budgets) is 49 million. We propose that auction volumes be reduced consistent with reducing this surplus towards zero by 2030.

There is significant uncertainty in our estimate of the total unit surplus. We intend to take an adaptive management approach, monitoring it over time and potentially adjusting our future advice on unit limits if necessary.

Setting a limit on approved overseas units

The Government will need to secure access to offshore mitigation to achieve the NDC. As there are currently no approved overseas units in the NZ ETS, and no clarity as to when they will be available, we recommend that the limit on approved overseas units should be set to zero.

Proposed auction volumes

Our application of this seven-step process results in the following proposed annual auction volumes:

Million units	2023	2024	2025	2026	2027	Total
Planned NZU auction volumes	16.3	15.6	14.0	12.2	10.4	68.5

[1] As of 1 June 2022.

Price control settings

The price controls in the NZ ETS are the cost containment reserve and the auction reserve price. The purpose of these price controls is to manage the risk of the NZU price at auction being out of line with what is necessary to meet emissions budgets, and to signal the bounds of expected prices in the NZ ETS.

Cost containment reserve

The cost containment reserve is a reserve of NZUs available for sale if the auction clearing price is at or above a specified trigger price.

While the cost containment reserve is intended to be used only rarely, it has been triggered three times in the last six auctions. This implies a major shift in market expectations about future prices over the past year, meaning the cost containment reserve trigger price is now below participants' future price expectations.

We have concluded that the trigger prices, as well as the structure of the cost containment reserve, should be amended for all five years of 2023 – 2027. Based on the triggering of the cost containment reserve, new analysis of how uncertainties may affect the emissions prices needed to meet emissions budgets, as well as the level and trajectory of international emissions prices, we recommend that the trigger prices increase substantially.

We propose that the cost containment reserve should have two tiers. Two tiers of trigger prices and reserve volumes will help manage the risk of strongly increasing prices if the surplus units remain illiquid, while limiting the fiscal impacts and target risks relative to triggering a single tier cost containment reserve.

Auction reserve price

The auction reserve price is the price below which the Government will not sell units at auction.

Prices have traded well above the auction reserve price since its introduction and current settings are not known to have caused any issues to the functioning of the NZ ETS. However, it is likely the price is currently set too low to adequately address risks around potential market oversupply. We recommend the price be increased to align with the minimum NZU price path compatible with achieving emissions budgets.

Recommendations

Our recommendations for the unit limits and price control settings are:

Million units	**2023**	**2024**	**2025**	**2026**	**2027**
Limit on the New Zealand units available by auction[2]	24.4	23.3	21.1	18.7	16.3
Limit on the approved overseas units used	0.0	0.0	0.0	0.0	0.0
Overall limit[3]	30.8	29.6	27.4	24.9	22.4

[2] This includes cost containment reserve volumes.
[3] The overall limit includes the units available by auction, approved overseas units, and forecast industrial free allocation.

Cost containment reserve	2023	2024	2025	2026	2027
Tier 1					
Trigger price, including inflation	$171	$182	$193	$203	$214
Reserve volume, million NZUs	2.9	2.8	2.6	2.3	2.1
Tier 2					
Trigger price, including inflation	$214	$228	$241	$254	$268
Reserve volume, million NZUs	5.1	4.9	4.6	4.2	3.8
Total reserve volume	8.0	7.7	7.1	6.5	5.9

	2023	2024	2025	2026	2027
Auction reserve price	$60	$64	$68	$71	$75

These figures are rounded to one decimal place and columns may not sum due to rounding.

Impacts of emissions pricing

We have worked with Treasury to update modelling assessing the impacts of higher emission prices on households and the economy. This found that while the magnitude of the impacts appears moderate, they are not insignificant and will result in disproportionate impacts on lower income households and those least able to adjust.

A just transition requires that these domestic distributional impacts and other equity considerations in the transition be managed. The NZ ETS price control settings are not the appropriate tool for doing so, however. These distributional impacts can be best managed if the Government puts in place targeted policies alongside the NZ ETS to support those most disadvantaged and those least able to adjust.

Whānau Māori, in particular, will be disproportionately affected by higher emissions prices. We reiterate our recommendations from our first advice *Ināia Tonu Nei*, that the Government should:

- Support a Māori-led approach to understanding and addressing the impacts of the NZ ETS and other climate policies on the Māori economy and Iwi/Māori.
- Work in partnership with Iwi/Māori to advance a Māori-led approach to an equitable transition for Iwi/Māori and the Māori economy.

It is critical that the Government puts in place a suite of complementary policies to deliver on the commitment of a fair, inclusive and equitable transition, and to strengthen the capability of the country to adjust over time, while ensuring strong incentives to transition towards a low emissions economy.

Te Whakarākei Matua

Inā te whakahau a te kāwanatanga ōna rautaki, kia tutuki i ngā whāinga whakaheke tukuwaro, ko tā Kaupapa Hokohoko Tukunga o Aotearoa (NZ ETS) he ruku ki te panoni.

Kua tau te noho a te Kāwanatanga ki te tuatahi o ōna tahua whakaheke tukuwaro, ā, e hāngai ana ki ngā kupu akiaki a te Komihana, ka mutu, kua puta te tōna mahere whakaheke tukuwaro tuatahi (ERP). Kei tōna mahere te hiahia nui kia whakaheke i ngā rehukino e tautika ai te ahunga tukuwaro kore. E rārangi mai nei, ko te whānui o ngā tukanga, tūia ki te ETS, ko te whakaheke wawe mai i ngā tukuwaro.

I ēnei whāinga matua, kua tupu te takohanga a te Kāwanatanga mō te whakatika āhuarangi, māna, kua wawe te piki mai o ngā Tauhokohoko a Aotearoa (NZU). I āu e tuhi nei ko te utu NZU he $76, he pikinga tēnei mā te $30 I te Hune 2020.

Ko ngā kupu akiaki ki ngā herenga hokohoko me ngā ritenga herenga utu, he mea tuku iho i te aronga matua a te Kāwanatanga ki ōna tahua tukuwaro me te ERP. Tūia ki tēnei ko te koneke a te mākete. He mea tuku iho hoki i ngā mahi whakahoahoa ki ngā kaimākete, kaitakawaenga me ngā mema kei ngā tōpu e whai pānga ana ki a NZ ETS, i konā te whakamātauria o ngā whakaaro me te whai māramatanga ki te mākete.

Heoi anō, e tukuna ana ēnei kupu akiaki, inā rā te korenga o te Kāwanatanga ki te whakamārama ētahi o ōna ahunga mā NZ ETS.

Tuatahi ake, e kohukohu ana te āhua o tā te Kāwanatanga whakarite i a NZ ETS, ā, he aha hoki ōna herenga matua ki te whakaheke i ngā rehukohu. Ki te kore e panoni te tukanga, ka kite pea ngā utu tukuwaro a NZ ETS te whakatō rākau maha, māna, ko te korenga me te whakatārewa mai o ngā mahi whakaheke i ngā rehukohu.

Tuarua mai, kāhore tonu te Kāwanatanga kia āta whakamārama mai i te tūranga o NZ ETS, ā, he aha rā ia ōna takohanga-ā-āo ki te whakaheke i ngā tukuwaro ki tōna Kirimana Parī, ki tōna Whakaritenga Takoha (NDC). Inā rā te taenga mai o ēnei kōrero, ka rerekē hoki ā mātou kōrero akiaki ā taua wā.

Me tahuri te Kāwanatanga kia whakahoahoa, kia whakawhanaunga hoki te iwi Māori kia kitea rawatia te whakapūmau o ngā mātāpono kei te Tiriti o Waitangi, me te mea nei, he kaupare ake i ngā whiunga ka taka mai ki ngā iwi Māori me te whakataimaha i a rātou.

Ko te tūāpapa ngā kupu akiaki nei he here i ngā tatauranga, i ngā matapaenga me ngā momo-tauira, ā, nō matou tonu te whakawhāiti rawa ki te 0.1 miriona tauhokohoko. Engari, ehara i te mea he tika te ahunga o ēnei matapaenga. E kohukohu tonu nei te āhua o ngā Mākete, ā, mā mātou tonu e tuku āwhina ia tau, inā rā te taenga mai o nga kōrero hou.

Herenga Hokohoko

Kei te Komihana te mahi kia ākina te Kāwanatanga ōnā wāhanga e toru ki ngā herenga hokohoko mō NZ ETS: mā te taupokinga o ngā tauhokohoko ki te mākete: he tawhā ki ngā utu kua whakaaetia ki ngā tauhoko o tāwāhi; ka mutu ko te tawhā matua ki ngā tauhokohoko. Ko te tikanga o ēnei herenga he whakarite i te tawhā ki te kaupapa nei me te hāngai hoki ki ngā ahunga whakaheke tukuwaro.

Kua whāia e te Komihana tētahi huarahi whitu reanga te roa hei whakarite i ngā herenga hokohoko.

Ngā whakataunga whakarite herenga hokohoko

Tahua tukuwaro, NDC me te ahunga 2050

Hei whakakapi ake, kia whakaae mai i ngā tauhokohoko o tāwāhi, ka noho tonu ngā utu ki te tahua tukuwaro a te Kāwanatanga inā hoki te arawhata roa ki te ahunga 2050 me te takohanga ā rohe ki te NDC.

Te penapena tahua tukuwaro

Kei tēnei kōneke tonu te tohaina mai o ngā tahua tukuwari, inā hoki te whakatau iho i ngā hea ki te hohonutanga kei te tahua tukuwaro, e kitea rānei i te whakapaunga o ngā tukuwaro kei waho atu i te NZ ETS. Nā whai anō, he aha rā e wātea nei i ngā rāngai NZ ETS. Kua kīia nei e mātou, me whai waahi te hohonutanga o te tahua tukuwaro ki a NZ ETS, ā, mā ngā rāngai o waho atu i a NZ ETS me aro tika ki te mutunga iho o te hea, inā rā te aro ki ngā whakahekenga tukuwaro kua whakaaea e ngā ahunga whāiti a te Kāwanatanga i tōna ERP tuatahi.

Ko te kōrero o roto, inā hoki ngā rāngai kei waho i a NZ ETS ka nui rawa ake te whakaheke tukuwaro i matapaetia, kua kore e taea ngā rāngai NZ ETS te tukuwaro anō, ā, he pēnā anō ki tērā. Ko te tikanga matua o tēnei aronga he rangona ake i tētahi ahunga whai take ki te haumēwaro, ā, ko te 90% o ngā tukunga haumēwaro mō waho tonu i a NZ ETS. I konei ngā whakahekenga haumēwaro me te whakahekenga o ētahi atu rehukino kāhore i te whakaae kia tangohia tēnā haumēwaro ki tēnā rehukino.

Te urupare ki ngā toenga tauhokohoko

Kei te takiwā o te 145 miriona NZU ka tukuna ki ngā pēke tūmatawhāiti. Ko tā mātou e matapae nei i ngā toenga hokohoko (arā te nui nei o ngā tauhokohoko e kīia nei he tūraru nui, mō te tutuki i ngā tahua tukuwaro) he 49 miriona. E whakahautia ana e mātou kia whakahekea te nui o ngā mākete, ā, kia rite tonu ki te whakahekenga o ngā toenga ki te kore hei te 2030.

He nui rawa te kumukumu kei ā mātou matapaenga ki te katoa o ngā toenga tauhokohoko. Ko te whāinga mātua mā mātou ko te whakarerekē i ā mātou whakahaerenga, te aromatawai hoki me te whakarerekē hoki rā ā mātou kōrero akiaki ā ngā rā kei tua mēnā rā hoki me whakarite herenga tauhokohoko hou.

Te whakarite tawhā ki ngā tauhokohoko kei tāwāhi.

Me whai waahi atu te Kāwanatanga ki te whakarite mai he whakamauru tāwāhi hei tutuki ake i te NDC. Inā hoki te korenga o ngā tauhokohoko tāwāhi ki te NZ ETS, me te kore i mārama ki ngā wā ka whakaaetia, ko tā mātou whakahau me whakarite tawhā ki ngā tauhokohoko tāwahi ki te taukore.

Te whakahau

Tā mātou whakahau i ngā tukanga whitu reanga te nui, he whai hua ki ēnei tataunga ā tau.

Million units	2023	2024	2025	2026	2027	Total
Planned NZU auction volumes	16.3	15.6	14.0	12.2	10.4	68.5

Ritenga Hokohoko

Ko te tawhā o ngā utu kei a NZ ETS ko te Taumau Herenga Utu me te Utu Mākete Tauraro. Ko te tikanga o te whakataiapa rawa mai o ngā utu he kaupare ake i te tūraru utu NZU ki te mākete me te kino o tōna noho ki ngā tahua tukuwaro, ka mutu, he tohu ake i ngā tawhā e matapaetia nei ki te NZ ETS.

Taumau Herenga Utu

Ko te Taumau Herenga Utu te tauraro o ngā NZU, ka āhei tōna hoko ki te mākete mehemea kāhore te utu mākete tauwātea kei te taurite kei runga ake rānei i te utu tiketike.

Ahakoa nei te Taumau Herenga Utu i te kaha whāia, e toru ngā wā kua kitea ai ia ki ngā makete e ono kua horī. E tohu ana tēnei i te koneke nui ki ngā matapae nui mō te tauhokohoko e haere mai nei me ngā utu i tērā tau, ā, ko tāna he tohu mai kua heke te Taumau Herenga Utu

Ki ā mātou kōrero whakakapi, me rerekē te āhua o ngā tauhoko nui me te hanga o te Taumau Herenga Utu, mō te rima tau 2023-2027. Nā runga i te whakataunga o te Taumau Herenga Utu, kei roto i ngā aromatawai hou ki ngā utu tukuwaro, tērā pea me eke ki ngā tahua tukuwaro i te tuatahi, tuarua mai me eke hoki ki ngā utu tukuwaro o te ao. Ko tā mātou whakahau me piki rawa ngā tauhoko nui.

Ko tā mātou he tono kia reanga rua te āhua o te Tauhokohoko Herenga Utu. Mā te whakareanga mai i ngā utu whai mana me ngā utu tauraro he hāpai ake i te kauparetanga o ngā pikinga utu, inā rā ka utu kore ngā tauhokohoko, nā whai anō te whakarite tawhā ki ngā herenga utu me ngā tūraru ka kitea ki te reanga tahi CCR.

Utu Mākete Tauraro

Ko te Utu Mākete Tauraro te tatau iti rawa kua kore nei e utua e te Kāwanatanga ōna tauhokohoko ki te mākete.

Mai i tōna oroko, kua rangona te pikitanga o ngā tauhokohoko i te Utu Mākete Tauraro, ā, kāore he raruraru nui tā ēnei herenga me te whakararu i ngā ritenga a te NZ ETS. Heoi anō, e kore e kāhore he iti rawa te utu, ā, kua kore rā e whai take tēnei mea te kaupare tūraru ki te matapae ka nui kē ngā tauhokohoko ki te mākete. Ko tā mātou e whakahau nei, me piki te utu kia noho ki te utu tauraro NZU e hāngai ki ngā tutukinga tahua tukuwaro.

Ngā whakahau

Ā mātou whakahau ki ngā herenga hokohoko me ngā whakaritenga herenga utu:

Million units	**2023**	**2024**	**2025**	**2026**	**2027**
Limit on the New Zealand units available by auction (includes CCR volumes)	24.4	23.3	21.1	18.7	16.3
Limit on the approved overseas units used	0.0	0.0	0.0	0.0	0.0
Overall limit[4]	30.8	29.6	27.4	24.9	22.4

[4] Kei te utu matua ētahi herenga e wātea ana mā te mākete me ētahi herenga kua whakaaea e tāwahi, ā, kei roto hoki ko ngā matapaenga herenga pākihi kore.

Cost containment reserve	2023	2024	2025	2026	2027
Tier 1					
Trigger price, including inflation	$171	$182	$192	$202	$212
Reserve volume, million NZUs	2.9	2.8	2.6	2.3	2.1
Tier 2					
Trigger price, including inflation	$214	$228	$240	$253	$265
Reserve volume, million NZUs	5.1	4.9	4.6	4.2	3.8
Total reserve volume	8.0	7.7	7.1	6.5	5.9

	2023	2024	2025	2026	2027
Auction reserve price	$60	$64	$67	$71	$74

Kua tikarohia ki te tūranga iratahi, ā, kua kore pea e tika rawa ngā utu nei.

Te whiunga a te utu tukuwaro

Kua mahi tahi kē mātou me Te Tai Ōhanga ki te whakahou anō i ngā mahere e arotake nei i ngā whiunga o te utu tukuwaro teitei ka tau ki runga i ngā kāinga me te ōhanga. I konei ka kitea, kāhore i tino kino ngā whiunga nei, ā, kāhore e nui nei ōna whiunga. Engari ka rangona e ngā kāinga e iti nei ōna utu me ngā kāinga kāhore anō kia rite ki ēnei panoni te uauatanga a ngā whiunga nei.

Kei te whai nei te whakawhitianga ētahi whiunga ā rohe me ētahi atu whakahau taurite, ā, me tika tōna ritenga. Kei ngā whakarite herenga utu NZ ETS kāhore i te tika i konei. Engari inā rā kua whai tukanga hei noho tahi ki a NZTS mō te āwhina i te rawa kore me te hunga kua kore pea e panoni, ka kitea i tika o te whakahaere me te itinga o ngā whiu.

Ko ngā whānau Māori ake, ka kino tō rātou noho i ngā utu tukuwaro teitei rawa. E whakamana ana anō ā mātou whakahau i tō mātou kupu akiaki tuatahi ki Ināia Tonu Nei, arā kia whai waahi atu te Kāwanatanga:

- Kia tautoko noa i te aronga Māori e mārama ai, e kaupare ai ngā whiunga a NZ ETS me ētahi atu tukanga āhuarangi mō te ōhanga Māori me ngā iwi Māori.
- Kia mahi tahi ki te iwi Māori mō te kōneketanga o tētahi kaupapa Māori e kitea ai te tautika o te whakawhitianga mā te iwi Māori me te ōhanga Māori.

He tino take tēnei, kia whāia e te Kāwanatanga ētahi tukanga maha e eke ai tōna takohanga kia matatika, kia matatini, ā, kia whakawhiti tika hoki, ka mutu, ko te whakapakari i ngā pukenga huri i te motu mō te whakawhitianga nui, inā rā te whakapoapoa hoki te whakawhitianga nui ki tētahi ōhanga whakaheke tukuwaro.

Part 1: Introduction

1. About this advice

This report provides He Pou a Rangi Climate Change Commission's advice on New Zealand Emissions Trading Scheme (NZ ETS) unit limits and price control settings for the 2023–2027 period.

The Minister of Climate Change is required to update the NZ ETS unit limits and price control settings every year, to provide a five-year look-ahead period for the scheme. This helps keep the NZ ETS aligned to emissions reduction targets and gives market participants information they need to make sound decisions.

This is the first time the Commission is giving this advice as part of the annual process for revising regulations for these NZ ETS settings. We have taken on this new function under the Climate Change Response Act 2002 (the Act); our advice follows the Government's finalisation of the first three emissions budgets.

The NZ ETS acts across our economic system to reduce emissions, but its effectiveness depends on confidence in its operation. Our independent, expert advice aims to support the predictable management of the scheme, consistent with what is needed for Aotearoa New Zealand to transition to a low emissions economy, and meet its emissions budgets, nationally determined contribution (NDC) and 2050 target. We also endeavour to bring more transparency to the process for determining unit limits and price control settings.

1.1 About He Pou a Rangi Climate Change Commission

We are an independent Crown entity set up to provide expert, evidence-based advice to successive governments to help Aotearoa New Zealand transition to a thriving, climate-resilient and low emissions future.

We are dedicated to ensuring we can pass a better Aotearoa New Zealand on to future generations. We have a range of expertise, including economics, public policy, emissions trading, land and resource management, Māori sector, climate science, behavioural sciences, forestry, agriculture and energy.

We are supported by a board of eight Commissioners from different fields.

In developing our advice, we are guided by the overarching purposes of the Act, particularly for the NZ ETS to support Aotearoa New Zealand to meet its domestic and international emissions reduction targets and the need for clear and stable policies that contribute to the global effort to limit the global average temperature increase to 1.5°C. We are required by legislation to draw on the best available evidence, engage proactively with others who can inform our work, and think broadly about the implications for Aotearoa New Zealand over time.

The Commission considers it is important that our advice is consistent with the principles of Te Tiriti o Waitangi/The Treaty of Waitangi and the Act requires that we give specific consideration to impacts for Māori. As an organisation we endeavour to build meaningful and respectful relationships with Iwi/Māori.

1.2 About the NZ ETS

The NZ ETS is Aotearoa New Zealand's main emissions pricing tool. Established in 2008 under the Act, it has been central to our country's response to climate change so far. The Government's first emissions reduction plan, released in May 2022, makes clear that it expects the NZ ETS to continue to play an important role in helping Aotearoa New Zealand transition to a low emissions economy. The Government also recognises that complementary policies are essential for unlocking the full potential for emissions reductions and supporting an equitable transition.

The Government has set emissions reduction targets, including emissions budgets (that act as stepping stones to the 2050 target) and the NDC. The NZ ETS acts as a messenger between these targets and the economy by limiting the amount of New Zealand Units (NZUs) supplied into the market.

Businesses participating in the NZ ETS must surrender one NZU for every tonne of emissions. In this way, NZUs are permits to emit and the 'currency' of the NZ ETS. Their limited availability gives them a value, at which they are bought and sold among market participants. This price on emissions makes switching to lower emissions practices or technologies more attractive, as emitters who can avoid creating emissions will save on the cost of buying units. The NZ ETS therefore translates our emissions reduction targets into a price signal that drives low emissions choices and investment decisions.

The power of emissions pricing comes from the way it makes emitters feel the costs associated with the emissions their decisions create but gives them the freedom to decide how best to make reductions, based on their own circumstances. The broad coverage of the NZ ETS – it covers every sector in the economy except biological emissions from agriculture – means it affects a much wider range of decisions than is possible with more specific policies.

1.3 The NZ ETS unit limits and price control settings

The price signal in the NZ ETS is guided by the way the Government sets and reduces the number of units supplied into the scheme over time, and by price controls that apply to unit auctions. Reforms to the NZ ETS passed in 2020 provide the architecture for managing these settings in the scheme over a rolling five-year period.

The NZ ETS unit limits and price control settings are comprised of:

A. The recommended volume of units to be supplied by the Government into the market, made up of:

   i.) a limit on units available to be auctioned

   ii.) a limit on approved overseas units

   iii.) an overall limit, which includes the auctioned and overseas units, as well as units freely allocated to industry.

Together these unit limits serve to determine the amount of NZUs that can be auctioned into the market each year. They also give the NZ ETS market information about expected future unit supply from other sources such as industrial allocation.

B. The recommended price controls in the market, both

   i.) a cost containment reserve (CCR), which releases a reserve amount of units for sale at auction if a trigger price is reached or exceeded by bidding at auction. This is made up of:

- a reserve amount of NZUs for each trigger price, which may be a single reserve amount of zero, and
- one or more trigger prices, unless the reserve amount is zero.

ii.) an auction reserve price (ARP), which is a minimum price below which units will not be sold at auction.

These price controls only operate at government auctions and do not prevent the trading of units between participants on the secondary market above or below these prices.

A more detailed description of the design and operation of these unit limits and price controls can be found in parts 3 and 4 of this report.

These unit limits and price control settings are set in regulations for five years into the future. The regulations are updated annually to extend the settings by a further year, so that there is always five years of information about future unit supply.

This five-year rolling approach allows the Government some flexibility to make adjustments to these settings through a predictable process. This is designed to give market participants greater clarity and confidence in how the NZ ETS will be run, while recognising that the Government will need to manage the scheme in a way that responds to changing circumstances over time.

The NZ ETS unit limits and price control settings already in place can be reviewed through the annual regulation update process. However, rules in the legislation govern the circumstances under which the Government can make changes.

The settings for the first two years of the five-year period are fixed, unless there are special circumstances that justify a change. Settings for the following two years may be amended, and the fifth year must be added to extend the settings. This is illustrated by Figure 1 below, which shows how the unit limits are set for five years but must be extended and may be adjusted each year.

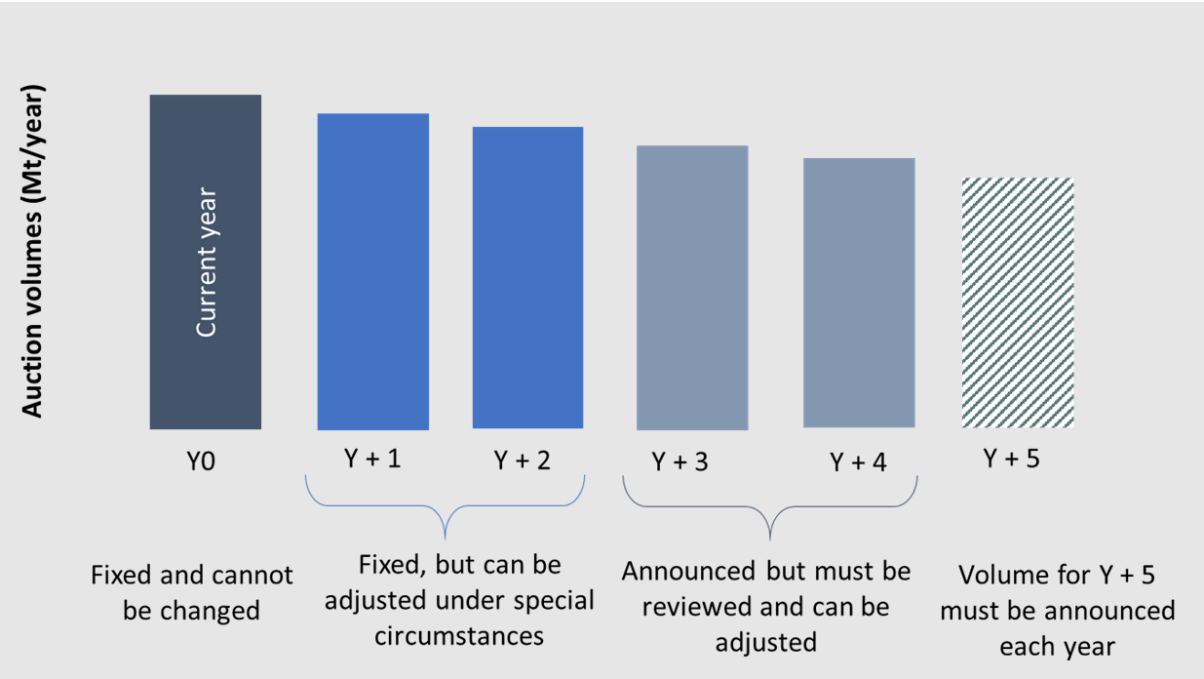


Figure 1 The five-year rolling process for unit limits and price control settings

The circumstances that allow existing NZ ETS unit limits and price control settings to be reviewed and potentially amended are:

- a change to the relevant emissions budget or NDC
- a change that has significantly affected any matter that was required to be considered when the settings were put in place
- the triggering of the price controls, such as the release of NZUs from the cost containment reserve
- a *force majeure* event.

1.4 Scope of the Commission's advice

Now the Minister has set the first emissions budget, the Commission must provide advice to the Minister each time the regulations are updated. The Act requires us to accord our recommendations with emissions budgets, the NDC and the 2050 target.

We must consider the same matters as the Minister in developing the advice, and those matters relevant when undertaking all our work.

Table 1 lists these considerations and where in the report they are addressed.

Our examination of these issues has been informed by engagement with relevant people and groups. We have undertaken over 30 engagement meetings, with companies and individuals from different sectors, including compliance participants, intermediaries, and members of bodies with an interest in the NZ ETS, including environmental organisations. This enabled us to seek insights, test ideas and enhance our understanding of the NZ ETS market and of market participants' and other stakeholders' concerns.

We have also drawn on the evidence we collected though analysis and engagement to prepare *Ināia tonu nei*. In addition to meeting kanohi kitea with Iwi/Māori as part of developing *Ināia tonu nei* we received written submissions and surveys from Māori through our 100 Coastie Voices campaign on the key proposals put forward in the consultation draft.

While there was overall support for addressing climate change challenges, Iwi/Māori submitters raised concerns that Māori would be disproportionately impacted by climate action if the Government does not uphold its commitments and obligations to Te Tiriti o Waitangi/The Treaty of Waitangi and the Crown-Māori partnership in its response to climate change.

Submitters talked about the need to recognise legacy issues, the potential to compound impacts, and the importance of ensuring Iwi/Māori are adequately resourced to participate in an equitable transition.

We wish to express our sincere gratitude to all of those who shared their perspectives, knowledge and expertise with us. This engagement provided us with invaluable insights that allowed us to improve our analysis.

Developing this advice would also have been impossible without input from expert consultants as well as data and information shared by government agencies such as the Ministry for the Environment; Ministry for Primary Industries; the Environmental Protection Authority; the Treasury; and the Ministry for Business, Innovation and Employment. We wish to thank these agencies and consultants for this cooperation.

Table 1 Requirements for our advice

Obligations in the Act	Where addressed
Section 30GC: Requirements for regulations about limits and price control settings for units	
(2) The Minister (and the Commission) must be satisfied that the limits and price control settings are in accordance with - (a) the emissions budget and the nationally determined contribution and (b) the 2050 target	Part 3 Step 1: Accord unit limits with emissions budgets, NDC and 2050 target Part 3 Step 2: Allocate the emissions budgets to NZ ETS and non-NZ ETS sectors
The Minister (and the Commission) must consider the following matters:	
(5)(a) Projected trends in greenhouse gas emissions, including both emissions covered by the NZ ETS and those that are not covered	Part 3 Step 2: Allocate the emissions budgets to NZ ETS and non-NZ ETS sectors Part 3 Step 3: Technical adjustments
(5)(b) The proper functioning of the NZ ETS	Throughout the advice, particularly parts 3 and 4.
(5)(c) International climate change obligations and contracts New Zealand may have for accessing offshore mitigation from other carbon markets	Part 3 Step 1: Accord unit limits with emissions budgets, NDC and 2050 target Part 3 Step 6: Set approved overseas unit limits
(5)(d) The forecast availability and costs of ways to reduce greenhouse gas emissions, that may be needed for New Zealand to meet its emissions reduction targets	Part 3 Step 1: Accord unit limits with emissions budgets, NDC and 2050 target Part 3 Step 2: Allocate the emissions budgets to NZ ETS and non-NZ ETS sectors Part 4 Price control settings
(6) In respect of the price control settings:	
(a) the impact of emissions prices on households and the economy	Part 4 Price control settings Part 5 Impacts of the emissions price
(b) the level and trajectory of international emissions prices	Part 4 Price control settings
(c) inflation	Part 4 Price control settings
Section 5ZOA Recommendations about limits and price control settings for units	
Any desirable emissions price path	Part 4 Price control settings
Section 5M: Matters the Commission must consider, where relevant	
(a) Current available scientific knowledge	Our analysis on emissions budgets in *Ināia Tonu Nei* considered this matter, and it was used as an input to this advice. We consider that there has not been significant change in this area since that advice to warrant material changes.
(b) Existing technology and anticipated technological developments, including the costs and benefits of early adoption of these in New Zealand	Our analysis on emissions budgets in *Ināia Tonu Nei* considered this matter, and it was used as an input to this advice. We consider that there has not been

	significant change in this area since that advice to warrant material changes.
(c) Likely economic effects	Part 3 Step 1: Accord unit limits with emissions budgets, NDC and 2050 target Part 3 Step 2: Allocate the emissions budgets to NZ ETS and non-NZ ETS sectors Part 5 Impacts of the emissions price
(d) Social, cultural, environmental, and ecological circumstances, including differences between sectors and regions	Part 3 Step 1: Accord unit limits with emissions budgets, NDC and 2050 target Part 3 Step 2: Allocate the emissions budgets to NZ ETS and non-NZ ETS sectors Part 5 Impacts of the emissions price
(e) Distribution of benefits, costs, and risks between generations	Our analysis on emissions budgets in *Ināia Tonu Nei* considered this matter, and it was used as an input to this advice. We consider that there has not been significant change in this area since that advice to warrant material changes. Part 5 Impacts of the emissions price
(f) The Crown-Māori relationship, te ao Māori, and specific effects on Iwi/Māori	Part 2 State and role of the NZ ETS Part 5 Impacts of the emissions price
(g) Responses to climate change taken or planned by parties to the Paris Agreement or to the Convention	Part 4 Price control settings

The Act prescribes the output of the Commission's advice – we are required to deliver a set of purely quantitative recommendations for the unit limits and price control settings. This report is focused on these statutory requirements. This report is supplemented by Technical Annexes which will be published on the Commission's website.

As well as advising on extending the unit limit and price control settings for the 2027 year, we also review and recommend amendments to the 2023 – 2026 settings. This is because the first three emissions budgets were notified in May 2022; the first NDC was updated in October 2021; and the cost containment reserve has been triggered. Any one of those circumstances enables the settings for the entire five-year period to be reviewed.

In preparing this advice, several other issues related to NZ ETS design and operation have been highlighted to us, either through engagement discussions with market participants and other interested parties, or through our own analysis. These matters are out of scope and so we are unable to examine them in detail or include recommendations on them in this advice.

We include, however, a section in this report (see part 6) acknowledging and commenting on these issues. We also note how and by whom they might be addressed in future.

Some of the issues we have identified were the subject of recommendations in *Ināia Tonu Nei* and are of particular relevance to the success of the NZ ETS. These recommendations were made in *Ināia Tonu Nei* after extensive engagement, including with Iwi/ Māori, and consultation. We discuss those issues in part 2. As they are outside the scope of this advice, we do not provide new recommendations, but take this opportunity to reiterate our prior recommendations.

1.5 Next steps in the process for updating NZ ETS settings regulations

Our advice is the first step in updating the NZ ETS unit limits and price control settings. This process is under the overall responsibility of the Minister of Climate Change (the Minister). Cabinet and government ministries are also involved, particularly the Ministry for the Environment (MfE) as the lead government agency for NZ ETS policy.

The Minister must consider our recommendations in making decisions about updating the regulations on the NZ ETS unit supply and price control settings. As part of this process, the Government must consult on proposed settings, consistent with the requirements of the Act. We understand that this consultation will be led by MfE on behalf of the Minister.

The results of consultation will feed into the Government's final decisions on the regulations, which must be updated by the end of December 2022. This deadline is later than normal in 2022 due to the late release of the emissions budgets (in May 2022). In future years, NZ ETS settings must be set in regulation by the end of September.

If the Government's decisions about volume limits or price controls differ from the Commission's recommendations, the Minister must publish and present to the House of Representatives a report that explains the reasons for the difference.

1.6 The Commission's future advice on the NZ ETS

The next advice by the Commission on the NZ ETS unit limits and price control settings will be due in the first quarter of 2023 and every year thereafter.

We also expect to consider aspects of the NZ ETS as part of our other advice. This includes advising on the direction of policy for the Government's second emissions reduction plan (covering the second emissions budget period of 2026-2030), and our monitoring of the Government's progress towards meeting emissions budgets and the adequacy of the emissions reduction plan, with the first statutory monitoring report due in 2024.

We also have a function to provide advice about decreased or increased phase out rates for industrial allocation. This advice is only provided at the request of the Minister, however, and no request for it has been received at this stage.

Part 2: State and role of the NZ ETS

Our advice on unit limits and price control settings is a key part of creating an effective NZ ETS, but other issues need to be addressed.

2.1 Recent developments in the NZ ETS

The NZ ETS was reformed in 2020 to transition away from focusing on controlling prices towards a capped, quantity-based scheme that could more effectively support Aotearoa New Zealand to meet its targets. Those reforms established the ability to limit units in accordance with targets, and a new set of price control measures.

The Commission's 2021 advice, *Ināia tonu nei*, provided a comprehensive analysis of the strategy Aotearoa New Zealand should take to its low emissions transition. This year, the Government adopted the first three emissions budgets (broadly in line with the Commission's advice), and its first emissions reduction plan.

Since then the NZU price has increased significantly. At the time of writing, the price of an NZU was about $76, up from $30 in June 2020.

We have developed this advice on NZ ETS unit limits and price control settings in line with the intent of the emissions budgets and emissions reduction plan, taking into account this shift in the market.

However, there are two key areas where the Government is yet to make clear decisions about the overall transition strategy for Aotearoa New Zealand and has not yet clarified its goals for the NZ ETS:

- the balance of emissions reductions and carbon removals for meeting emissions budgets, and the NZ ETS's role in delivering that balance
- how offshore mitigation for meeting New Zealand's nationally determined contribution (NDC) will be obtained, and the NZ ETS's role in that.

Without clarity on these questions, the NZ ETS cannot properly support the best outcomes. We made recommendations and comments on these questions in *Ināia tonu nei* following an extensive engagement and consultation process. Here we discuss these questions and their importance for the proper operation of the NZ ETS. In clarifying these goals, the Government should also ensure its approach upholds the principles of the Treaty and mitigates against compounding historic grievances that could further disadvantage Iwi/Māori.

2.2 The NZ ETS and forestry

The Government has signalled - through its sector sub-targets and the policy mix in its emissions reduction plan - that it wishes to meet the emissions budgets and 2050 emissions reduction target by prioritising gross emissions reductions. However, it remains unclear how the Government will ensure the NZ ETS can help deliver this outcome.

The NZ ETS currently does not distinguish between reductions in gross emissions and carbon removals by forests. This means it is likely to incentivise significant afforestation beyond the levels anticipated in the emissions reduction plan.

The current structure of the NZ ETS steers toward a pathway that would achieve the 2050 target primarily through exotic afforestation, with little reduction in gross emissions beyond business as usual. Such a pathway would require high ongoing levels of new planting to maintain net zero emissions, and push the work of decarbonising onto future generations. It would also leave us out of step with much of the world.

This trend is already emerging. Recent data indicate significantly more exotic afforestation is occurring than previously forecast, with more than 60,000 ha expected to be planted in 2022.[5] Meanwhile, government projections of native afforestation have been revised downward since *Ināia Tonu Nei* was published. Current emissions prices and forest owners' expectations that the price they receive for their units will continue to increase may also lead to a greater area of forests going unharvested. There has been a recent increase in applications to register forests in the NZ ETS (nearly 160,000 ha since September 2021).[6] This is supporting evidence that the emissions price is driving afforestation.

Maintaining a common emissions price for carbon removals by forests and gross emissions reductions risks a downwards correction back to an NZU price that would be insufficient to drive meaningful decarbonisation. This would undermine investments in reducing gross emissions, erode market participants' confidence, and severely damage the scheme's effectiveness. This could reduce the likelihood of sector sub-targets in the emissions reduction plan being met.

Figure 2 illustrates the impact that exotic afforestation continuing near current levels would have on gross emissions reductions needed to meet the emissions budgets. We compare this with our updated demonstration path,[7] in which exotic afforestation averages around 32,000 hectares per year between 2023 and 2030. Due to the lag between planting and tree growth, the effect of higher afforestation on carbon removals and unit supply in the NZ ETS would emerge after 2025. Without changes, future emissions budgets would likely deliver a far smaller reduction in gross emissions than currently planned by the Government in the emissions reduction plan.

[5] (Ministry for Primary Industries, 2021)

[6] (Ministry for Primary Industries, 2022)

[7] In *Ināia Tonu Nei*, we constructed the demonstration path as the central scenario underpinning our emissions budget recommendations. For this advice, we have updated our modelling of the demonstration path and other scenarios to reflect new data and information. This incorporates the latest greenhouse gas inventory, updated government projections for the agriculture and forestry sectors, announcements or decisions regarding large industrial closures, and other updates to data sources. The updated demonstration path accords with the final emissions budgets set by the Government and the sector sub-targets in the emissions reduction plan. Further information and data are provided in Technical Annex 2.

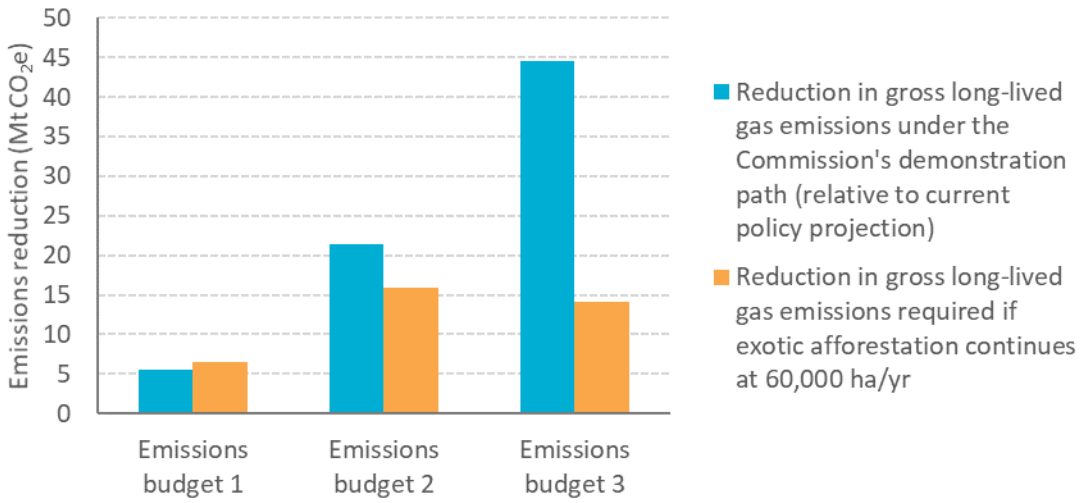


Figure 2 Continued high afforestation would undermine gross emissions reductions without corresponding changes to emissions budgets and NZ ETS settings

Our recommended settings are predicated on delivering reductions in gross emissions in line with the Commission's *Ināia Tonu Nei* advice and the emissions reduction plan's sector sub-targets. However, if this issue is not addressed, the increases to the price control settings could encourage even higher levels of afforestation.

How this issue is addressed is of particular interest to Iwi/Māori since they hold significant interests in land. In making decisions on the desired balance of emission reductions and carbon removals for meeting emissions budgets, and the NZ ETS's role in delivering that balance, the Government should engage and consult with Iwi/Māori to ensure impacts for Māori-collective landowners, and Iwi/Māori foresters are understood. The Government should ensure any decisions uphold the principles of the Te Tiriti o Waitangi/The Treaty of Waitangi and mitigate against compounding historic grievances or unintentionally disadvantaging Iwi/Māori. Policy changes that do not support Iwi/Māori to exercise rangatiratanga, kaitiakitanga and mana motuhake over their whenua, and other cultural assets, risk exacerbating inequity.

2.3 The NZ ETS and New Zealand's NDC

In 2021, the Government strengthened New Zealand's NDC over the 2021-2030 period to a target of a 50% reduction in net emissions from 2005 levels by 2030.

The Government reaffirmed that the NDC is to be met with a combination of reductions in net emissions in Aotearoa New Zealand and offshore mitigation. We estimate that approximately 99 Mt CO_2e of offshore mitigation will be needed, in addition to planned domestic reductions.

However, we understand the Government has not yet secured access to any offshore mitigation or made decisions about whether offshore mitigation will be delivered via the NZ ETS. The NZ ETS could be used to deliver part of this offshore mitigation if it were linked directly to another scheme or mechanism to allow direct purchases by participants. Or alternatively the Government could purchase offshore mitigation and auction it into the scheme.

Equally, offshore mitigation could be accessed by mechanisms other than the NZ ETS. It could be bought by the Government and paid for through general taxation. Or part of the cost could be shared by the agriculture sector through the coming agricultural pricing mechanism. There are multiple potential mechanisms and manners in which they could combine.

Without clear decisions about how offshore mitigation will be obtained, NZ ETS participants face significant uncertainty about the role of the NZ ETS, and the potential future impact of overseas units on the price of units in the NZ ETS.

Summary

Our 2022 advice for the NZ ETS settings is limited to providing recommendations on unit limits and price control settings under the Act for 2023-2027. There are wider issues with the functioning of the NZ ETS for the Government to address. We identify some of these in this advice, but these issues are outside the scope of our recommendations.

Since the development of our advice in *Ināia Tonu Nei*, there has been a significant shift upwards in NZ ETS market participants' price expectations.

The NZ ETS is an important element of the policy response to reduce greenhouse gas emissions, but it must be supported with a wider set of policies to deliver a just transition to a low emissions economy.

In *Ināia Tonu Nei* we advised that the 2050 net zero target for emissions (other than biogenic methane) should be met by prioritising gross emissions reductions rather than an overreliance on net carbon removals. The Government has reflected this advice in its emissions reduction plan, including through the use of near-term sector sub-targets. Without policy change, we expect NZ ETS emissions prices to drive large-scale afforestation, displacing and delaying reductions in gross emissions in Aotearoa New Zealand.

The Government has yet to clarify the role that it expects the NZ ETS to play in meeting the NDC. The absence of this information creates significant uncertainty for market participants and has been a constraint on our advice. Once this information is available it could materially change our future advice on NZ ETS settings.

As we also said in our previous advice, it will be critical for the Government's approach to emissions reductions and carbon removals to recognise the guarantee of rangatiratanga and kaitiakitanga for Iwi/Māori under Te Tiriti o Waitangi/The Treaty of Waitangi. The Government should engage and consult with Iwi/Māori to ensure any decisions made uphold the principles of the Te Tiriti/The Treaty and mitigate against compounding historic grievances or unintentionally disadvantaging Iwi/Māori.

Part 3: Unit limits

The NZ ETS unit limits set out the amount of new units that the Government can provide to the market each year.

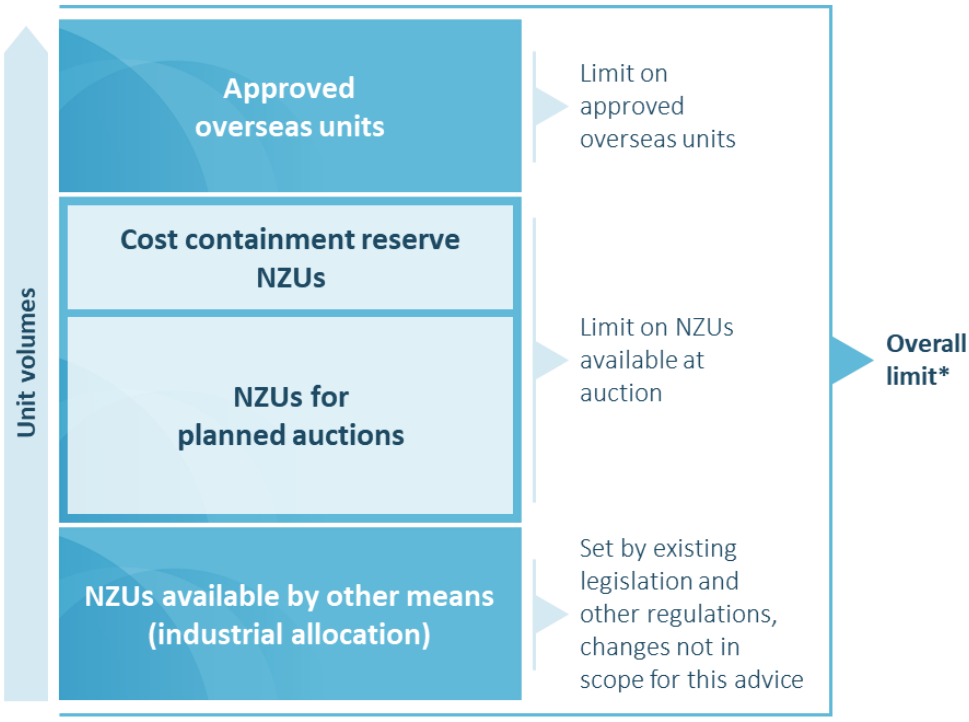
3.1 Context

The purpose of the NZ ETS unit limits is to cap the emissions allowed by the scheme in accordance with Aotearoa New Zealand's emissions reduction targets – the emissions budgets, the 2050 target and the NDC. Capping emissions in the scheme is crucial for enabling the NZ ETS to help to achieve these targets.

The architecture for the unit limits was introduced by the NZ ETS reforms passed in 2020. The Climate Change Response Act 2002 (the Act) requires annual updates to regulations to set three limits for the following five calendar years:

- a limit on the New Zealand units (NZUs) available by auction
- a limit on approved overseas units
- an overall limit on units.

The different unit limits and how they relate to each other are shown in Figure 3. The unit limits do not apply to the units that can be supplied for the carbon absorbed by forests or for other removal activities.



*The overall limit constrains auctioned units and international units, but industrial allocation can cause the overall limit to be breached – as industrial allocation is adjusted for production each year and must accord with the regulated rates. The overall limit also does not apply to forestry units.

Figure 3 NZ ETS unit limits and their components

3.2 Existing unit limit settings

The unit limits for 2022-2026 are specified in the Climate Change (Auctions, Limits, and Price Controls for Units) Regulations 2020, and are provide in Table 2. For the existing limits, the components of the total NZUs available by auction can be broken down as shown in Table 3.

Table 2 The existing unit limits in regulations for 2022-2026[8]

Units (millions)	2022	2023	2024	2025	2026
Approved overseas units	0	0	0	0	0
NZUs available by auction	26.3	25.6	25.0	23.3	21.7
Overall limit on units[9]	34.5	34.5	32.9	29.6	27.9

Table 3 Components of the limit on NZUs available by auction in the existing unit limit settings

Units (millions)	2022	2023	2024	2025	2026
Reserve amount of NZUs for the cost containment reserve	7.0	7.0	7.0	6.8	6.7
NZUs for planned auctions	19.3	18.6	18	16.5	15

3.3 Method for determining the unit limits

The unit limits in regulations must be updated by December 2022 to extend the unit limits to 2027, and potentially to amend the limits already in place for 2022-2026. It is possible to amend all years of these existing settings because new emissions budgets have been notified, the NDC has been updated, and the CCR has been triggered.

We have used a seven step method for determining the unit volumes,[10] as follows:

1. Accord with the domestic emissions budgets, the NDC and the 2050 target
2. Allocate the emissions budgets to NZ ETS and non-NZ ETS sectors
3. Make technical adjustments
4. Account for free NZU allocation volumes
5. Set reduction volume to address unit surplus
6. Set approved overseas unit limit
7. Calculate the auction volume and assess sensitivity and risks

The rest of part 3 sets out each of these steps, summarising the analysis undertaken and the Commission's conclusion or recommendation for each. These seven steps lead to the recommendation for the overseas unit

[8] These settings use Global Warming Potential (GWP) values from the Intergovernmental Panel on Climate Change's (IPCC) Fifth Assessment Report (AR5).

[9] The overall limit includes the units available by auction and approved overseas units above, and also includes forecast industrial free allocation.

[10] This builds on the six step method previously developed by the Ministry for the Environment. Step 1 has been added to better reflect the requirements of the Act.

limit as well as the volume of NZUs to be auctioned in each year over 2023-2027. The last component of the unit limits, the volume of NZUs in the CCR, is considered in part 4 on the price control settings. The consolidated recommendations for unit limits, including the overall limit, are presented in part 7.

3.4 Step 1: Accord unit limits with emissions budgets, the NDC and the 2050 target

3.4.1 Context

The Act requires that the NZ ETS limits and price control settings be set "in accordance with" the emissions budgets and the nationally determined contribution (NDC) that applies (both for the relevant period and subsequent periods), and the 2050 target. The Act sets out that settings do not need to strictly accord if, after taking account of matters specified in s30GC of the Act, a discrepancy is justified.

This means there are three different emissions reduction targets for the NZ ETS settings to accord with. It is not possible for the NZ ETS to align exactly with all these targets at the same time, due to the NZ ETS's partial coverage of emissions in Aotearoa New Zealand, as well as the different levels and natures of these targets.

The first step for advising on the unit supply volumes in the NZ ETS is therefore determining the most appropriate way to accord unit limits with emissions budgets, the NDC and the 2050 target. Once this is determined, the unit limit volumes can be calculated consistent with a pathway for achieving the targets.

The 2050 target

The Act specifies that the 2050 target is actually three targets.[11] The target is that:

- emissions of biogenic methane are to be 24-47% below 2017 levels by 2050
    - with at least a 10% reduction by 2030
- and all other emissions are to be net zero in 2050 and in each subsequent year.

Where we refer to the 2050 target, we mean all three targets unless we specify otherwise.

The emissions budgets

The Minister must set a series of emissions budgets with a view to meeting the 2050 target and contributing to the global 1.5°C effort. They must be set in a way that allows them to be met domestically with gross emissions reductions and carbon removals by forests in Aotearoa New Zealand.[12] These set the net quantity of greenhouse gas emissions allowed over a four- or five-year period.

The emissions budgets released by the Government are based on the Commission's recommended budgets which were developed as an emissions trajectory consistent with meeting the 2050 target. Therefore, we consider that if unit limit settings accord with emissions budgets, they will also accord with the 2050 target.

The NDC

The emissions budgets and the NDC are set at different levels. Emissions budgets are aimed toward meeting the legislated 2050 target. These set the net quantity of greenhouse gas emissions allowed over a four- or five-

[11] Section 5Q of the Climate Change Response Act 2002.
[12] Offshore mitigation can only be used for emissions budgets in limited circumstances, and cannot be planned to be used from the outset.

year period, to be met domestically with gross emissions reductions and carbon removals by forests in Aotearoa New Zealand.

The NDC is New Zealand's communicated 'highest possible ambition' in contributing to global efforts to mitigate climate change under the Paris Agreement, which includes all domestic emissions reductions and carbon removals, and additionally a significant component of offshore mitigation.

Emissions budgets and the NDC also apply over different time periods. The first emissions budget applies from 2022-2025 (four years), and the second emissions budget applies from 2026-2030 (five years). The NDC applies to the period 2021-2030 (ten years). The components of each are illustrated in Figure 4 below.

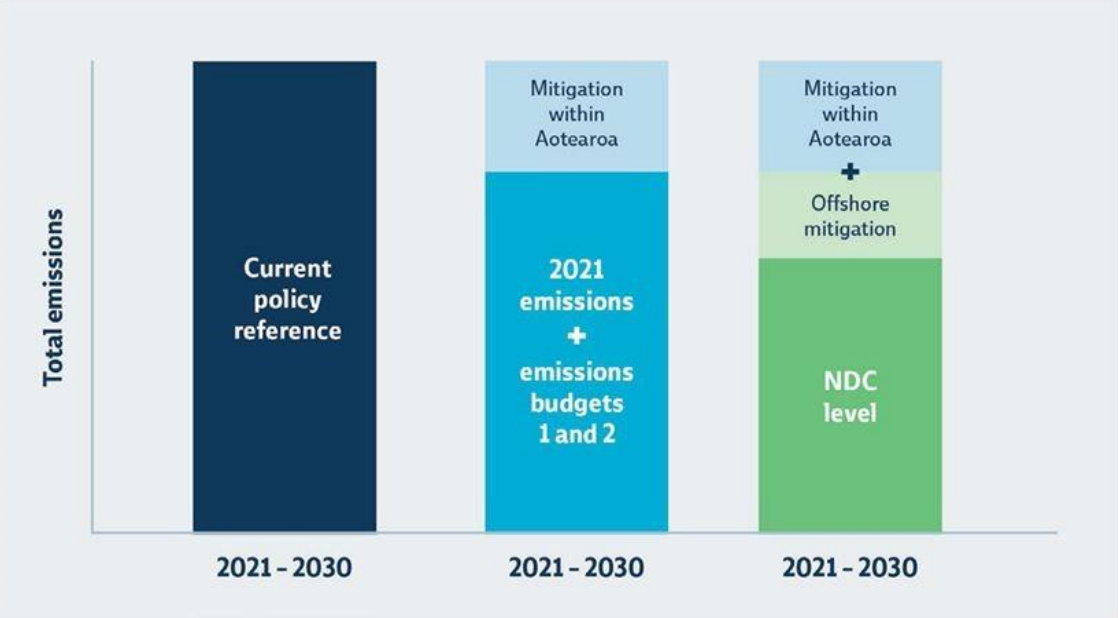


Figure 4 Illustration of the role of international mitigation in the NDC compared to emissions budgets

Based on the emissions budgets that have been set, and current forecasts of emissions for 2021, we estimate 99 Mt of offshore mitigation will be required to meet the NDC.

Table 4 Portion of the NDC to be met with offshore mitigation

Component	**Net emissions (Mt CO_2e)**[13]
Forecast net emissions for 2021	75
Emissions budget 1, 2022-2025	290
Emissions budget 2, 2026-2030	305
Total net emissions expected 2021-2030	**670**
Allowed net emissions within the NDC[14]	571
Required offshore mitigation for the NDC	**99**

[13] Emissions here are presented using GWP values from the IPCC's Fifth Assessment Report.

[14] Based on the Government's latest estimate of the provisional NDC budget, retrieved from https://environment.govt.nz/what-government-is-doing/areas-of-work/climate-change/nationally-determined-contribution/

Unit limits

If, in the future, approved overseas units become available in the NZ ETS, the framework of the Act will allow the NZ ETS unit limits to deliver offshore mitigation towards meeting the NDC. The limit on auctioned units will be able to be set based on what emissions remain within the emissions budget.

However, the limit on overseas units applies to government approved overseas units. As far as we understand, the Government has not yet established links to other carbon markets or overseas emissions reduction initiatives that would allow Aotearoa New Zealand to access offshore mitigation. It has therefore not approved any overseas units.

3.4.2 Analysis and findings

We identified two options for according unit limits with the emissions budgets and 2050 target, and the NDC:

- Option 1: The overall unit limit and the limit on units available by auction are set in line with the emissions budgets, as stepping stones to the 2050 target and the intended domestic contribution to the NDC. The overseas unit limit is set at zero, recognising that until approved overseas units are made available, the offshore mitigation required to meet the NDC cannot be delivered by the NZ ETS.
- Option 2: The overall unit limit and the limit on units available by auction are set in line with the NDC and the approved overseas unit limit is set to deliver offshore mitigation from a point in the future, anticipating approved overseas units becoming available.

We prefer Option 1 because:

- Taking Option 2 in effect pre-empts decisions that must be made by the Government, not the Commission, about how offshore mitigation will be obtained and who bears the costs of purchasing it.
- Pursuing Option 2 could force the Government into decisions around domestic emissions reductions that are inconsistent with its emissions reduction plan or our own advice. This could lead to unnecessarily severe economic and social outcomes.
- We are not able to anticipate when or if offshore mitigation might become available.
- The NZ ETS is currently a domestic only scheme.

We expand on these reasons below.

The NZ ETS is currently domestic only

The NZ ETS can currently only deliver domestic reductions and carbon removals. So Option 1 upholds the proper functioning of the NZ ETS, by setting up the scheme to support the delivery of the emissions budgets as the domestic component of the NDC, as part of the Government's emissions reduction plan.

Offshore mitigation and the NZ ETS

To our knowledge the Government has not made any decisions about how or when offshore mitigation will be obtained or funded.[15] [16] While it is possible that the NZ ETS could be used to fully or partially deliver the volume of offshore mitigation that is required to meet the NDC, it is not a given. There are many potential

[15] The Government has indicated publicly that it intends for offshore mitigation to contribute to meeting the NDC.
[16] Pre-empting decisions on offshore mitigation could also disrupt the Government's ability to adjust the settings in response if access does not eventuate. Since continuing to not have access may not meet the legal threshold of a significant change that allows settings to be adjusted.

mechanisms (and combinations of mechanisms) through which offshore mitigation could be obtained or funded, including direct acquisition by the Government from emissions reduction initiatives in other countries.

For the Commission to pursue Option 2, we would in effect pre-empt these decisions which the Government needs to take. This in turn could create uncertainty for NZ ETS participants and more broadly around the objectives of the NZ ETS, undermining the proper functioning of the NZ ETS and the intent of the Act around supporting "*clear and stable climate policies*" to contribute to the global effort to limit warming.

Meeting the NDC domestically

The Government has indicated it will use offshore mitigation to contribute to meeting the NDC. Chapter 22 of *Ināia Tonu Nei* discussed in depth why offshore mitigation will be needed to meet the NDC.[17] Specifically, we said:

> *The scale of emissions reductions needed to bridge the gap between emissions budgets and the NDC means that meeting the NDC domestically would likely lead to severe social and economic impacts on communities, people and businesses – far more than would be necessary to achieve the same amount of emissions reductions given more time.*

This was on the basis that any combination of actions to deliver so much mitigation in so short a time would:

- Require large scale cuts to economic output across Aotearoa New Zealand, which would have significant flow-on effects to jobs, broader society, and the economy.[18]
- Potentially undermine public support for the transition, and reduce Aotearoa New Zealand's resilience and ability to put in place solutions to make continual and lasting emissions reductions. Environmentally and socially sustainable jobs, a productive economy and the wellbeing of the people who live here are vital for future generations and sustainable prosperity over the long term.[19]
- From an intergenerational equity perspective, excessively fast cuts to emissions would have a legacy impact on the quality of life for younger generations as families are left without employment or essential services.[20]
- This pace of change would also disproportionately affect Iwi/Māori in terms of the Māori economy, given its large agricultural base, and Māori workforce who are disproportionately represented in agricultural and manufacturing industries.[21]

[17] See also *The NDC and further domestic action – Commission information note*, 22 October 2021, https://www.climatecommission.govt.nz/our-work/advice-to-government-topic/nationally-determined-contribution/
[18] (He Pou a Rangi, Climate Change Commission, 2021, pp. 75 and 364)
[19] (He Pou a Rangi, Climate Change Commission, 2021, p. 75)
[20] (He Pou a Rangi, Climate Change Commission, 2021, p. 364)
[21] (He Pou a Rangi, Climate Change Commission, 2021, p. 364)

If we were to pursue Option 2 and overseas units are not approved in time, we would in effect be advising that the Government requires the NZ ETS sectors to reduce emissions in line with meeting the NZ ETS's share of the NDC domestically. We consider that the severe social and economic risks of Option 2 described above would justify using Option 1 in any event.

Findings

We recommend that at present, until approved overseas units are available:

- The overall unit limit and the limit on units available by auction are set in line with the emissions budgets, as stepping stones to the 2050 target and the Government's intended domestic contribution to the NDC.
- The overseas unit limit is set at zero.

This approach recognises that until approved overseas units are available, the offshore mitigation required to meet the NDC cannot be delivered by the NZ ETS.

There is currently no clarity about when or how access to offshore mitigation will be obtained to meet the international component of the NDC, nor has the Government decided how the cost of offshore mitigation will be funded, or whether and how it will be allowed into the NZ ETS. It is essential that decisions are made on this quickly since delays constrain the ability of the NZ ETS to support achievement of the NDC while operating effectively.

3.4.3 Future developments

We have reached this conclusion on the assumption that the Government will obtain offshore mitigation to meet the international component of the NDC, as it has indicated publicly when it revised the NDC.[22]

When the Government obtains access to offshore mitigation and clarifies how it is to be delivered and paid for, we will likely revisit these settings.

3.5 Step 2: Allocate the emissions budget

3.5.1 Context

This step is about how Aotearoa New Zealand's emissions reduction goals are shared between NZ ETS and non-NZ ETS sectors. We refer to this as allocating the emissions budget, as it involves determining the share of emissions budget volume that can be used up by emissions that are outside the NZ ETS and what share is therefore available for NZ ETS sectors.

This can also be described as "setting the cap" for the NZ ETS, with the "cap" referring to the targeted level of emissions for sectors covered by the NZ ETS. This is illustrated in Figure 5.

The sectors not covered by the NZ ETS include:

- agriculture
- non-municipal waste
- fluorinated gases covered by the Synthetic Greenhouse Gas (SGG levy)

[22] (New Zealand Government, 2021)

- methane and nitrous oxide emissions from biomass combustion
- a small subset of industrial process and product use (IPPU) emissions
- post-1989 forests that are not registered in the NZ ETS.

3.5.2 Analysis and findings

We identified two main options for how the emissions budget can be allocated:

- Option 1: Allocating emissions budget volume to non-NZ ETS sectors based on emissions projections under current policy settings. The share available to the NZ ETS sectors would then change over time as these emissions projections change. This is the status quo approach previously used by the Government.
- Option 2: Allocating emissions budget volume to non-NZ ETS sectors based on specified shares of effort set by the Government's sector sub-targets from the emissions reduction plan. This would not change in response to changing emissions projections.

Option 1 requires NZ ETS sectors to deliver all the abatement beyond current policy projections to meet emissions budgets. Here, if non-NZ ETS emissions (mainly from agriculture) do not decline in line with the assumed pathway (and 2030 biogenic methane target), the reductions required of the NZ ETS sectors would change.

This approach treats emissions inside and outside the NZ ETS as interchangeable, under one overall constraint provided by the emissions budgets. It has the effect of making the NZ ETS an emissions reduction backstop for the rest of the economy.

Option 2 spreads the abatement effort needed to deliver emissions budgets across the NZ ETS and non-NZ ETS sectors respectively. Here, if non-NZ ETS emissions (mainly from agriculture) do not decline in line with the assumed pathway (and 2030 biogenic methane target), the reductions required of the NZ ETS sectors would not change.

This approach recognises the split-gas nature of the 2050 target: the biogenic methane components of that overall target can only be met by reductions in biogenic methane. It allocates the emissions budget volume by clearly delineating responsibility for the biogenic methane reductions to the non-NZ ETS sectors where most of those emissions occur.

The difference between these two options is around 7 Mt CO_2e over 2023-2027. Each option sends different signals about where abatement effort and risk must lie.

We prefer Option 2. 90% of biogenic methane emissions are outside the NZ ETS. The NZ ETS cannot achieve the 2030 biogenic methane target, nor can it compensate for insufficient reductions in agricultural biogenic methane.

Conversely, if non-NZ ETS sectors reduce emissions more than expected, it would not be appropriate to allow NZ ETS sectors to emit more.

This approach accords with biogenic methane not being interchangeable with other gases under the 2050 target, and with our previous advice that every sector needs to play its part in meeting emissions budgets, NDC and long-term emissions reduction targets.

To quantify the split in abatement effort in the sectors outside the NZ ETS, we have used an updated version of the Commission's modelled demonstration path, which accords with the sector targets for gross emissions set by the Government in the emissions reduction plan. Further detail on this approach is described in Technical Annex 1.

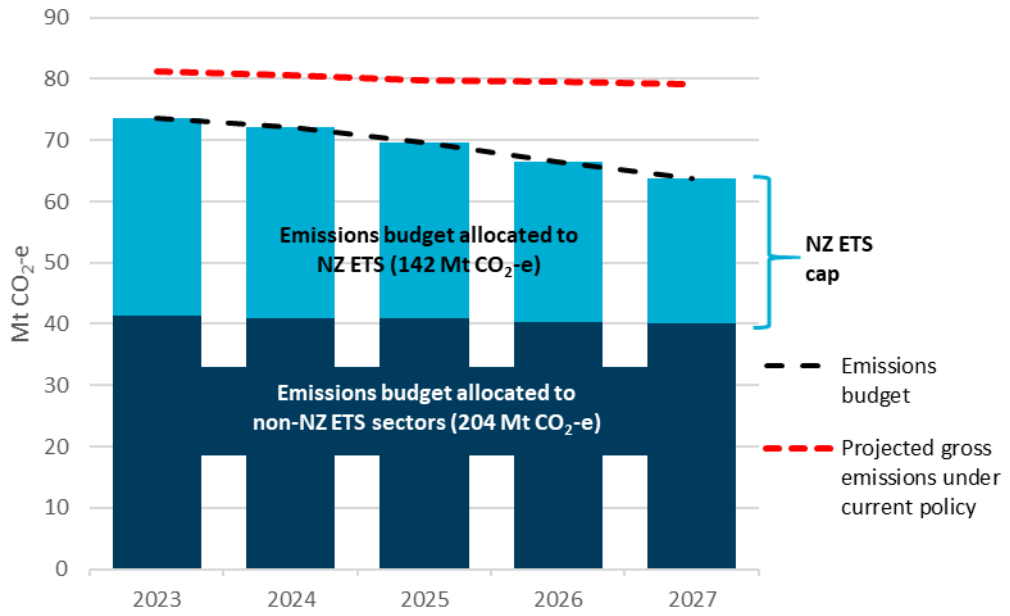


Figure 5 Breakdown of the emissions budget volume allocated to NZ ETS and non-NZ ETS sectors under our preferred option

Findings on allocating the emissions budget

We have concluded that emissions budgets should be allocated to NZ ETS and non-NZ ETS sectors on the basis of:

- allocating the emissions budgets between NZ ETS and non-ETS sectors on the basis of the sectoral gross emissions reductions implied by the sector targets laid out in the emissions reduction plan.
- Allocating carbon removals by post-1989 forests not registered in the NZ ETS to NZ ETS sectors.

Accordingly the NZ ETS share of the emissions budget is determined as follows:

Mt CO_2e	**2023**	**2024**	**2025**	**2026**	**2027**	**Total**
Non-NZ ETS gross emissions (A)	43.5	43.0	42.5	42.0	41.6	212.6
Unregistered post-1989 forest carbon removals (B)	-2.2	-2.0	-1.5	-1.7	-1.5	-8.8
Emissions budget volume allocated to non-NZ ETS sectors (C) = (A+B)	**41.3**	**41.0**	**41.0**	**40.3**	**40.2**	**203.9**
Total emissions budget (D)	73.6	72.1	69.7	66.5	63.9	345.9
Emissions budget volume allocated to NZ ETS (D-C)	**32.3**	**31.1**	**28.7**	**26.2**	**23.7**	**142.0**

3.6 Step 3: Technical adjustments

3.6.1 Context

In this step we identify any differences between emissions estimated in the NZ ETS compared to the national greenhouse gas inventory and Aotearoa New Zealand's target accounting, possible underlying causes, and whether these justify adjustments to unit volumes.

Although this is not a new step, the Government has not made any technical adjustments in the past.

3.6.2 Analysis and findings

We identified that NZ ETS reporting has underestimated emissions associated with liquid fossil fuels and coal, as compared to the greenhouse gas inventory:

- For liquid fossil fuels, the difference is persistent over 2010-2020 and steady at around 0.8 Mt CO_2e annually over 2018 – 2020.[23] Different emissions factors likely explain some of this difference, but there may also be other issues.
- For coal, including its use in steel production, alignment was reasonably close between 2012-2017 but differences have emerged since then. NZ ETS reported emissions were 0.9 – 1.0 Mt CO_2e (or around 16%) lower than the emissions reported in the national greenhouse gas inventory from 2019-2020.[24]

The proposed technical adjustments to NZ ETS volumes are provided in Table 2. They include:

- a fixed quantity adjustment for liquid fossil fuels (0.8 Mt CO_2e) and
- a fixed percentage adjustment for coal (16% of projected coal and steel emissions).

Table 5 Technical adjustments to NZ ETS volumes

Mt CO_2e	**2023**	**2024**	**2025**	**2026**	**2027**	**Total**
Emissions budget volume available to NZ ETS sectors	32.3	31.1	28.7	26.2	23.7	142.0
Technical volume adjustments						
Liquid fossil fuels	-0.8	-0.8	-0.8	-0.8	-0.8	-4.0
Coal and steel	-0.8	-0.7	-0.5	-0.5	-0.5	-3.0
Emissions budget volume available following technical adjustments	30.8	29.6	27.4	24.9	22.4	135.0

We did not find any other issues of a scale sufficient to justify further technical adjustments at this point. Technical Annex 1 provides a summary of the other areas investigated and our findings.

[23] Liquid fuel use in petroleum refining has been excluded in the comparison as this was exempt from the NZ ETS.

[24] This recent divergence is likely related to an increase in gross calorific values for coal reported to MBIE and used in the greenhouse gas inventory. There do not appear to have been significant changes in the gross calorific values reported under the NZ ETS.

3.6.3 Future developments

We have alerted government officials to the discrepancies identified for liquid fossil fuels and coal and shared our analysis. Once the causes are confirmed and addressed through changes either to the NZ ETS regulations or to the greenhouse gas inventory, we can revise these technical adjustments in future settings advice.

We will continue to monitor the need for technical adjustments in other areas in future settings advice.

3.7 Step 4: Account for free allocation volumes

3.7.1 Context

The Government provides some NZUs for free to firms undertaking activities (production processes) that are both emissions-intensive and trade-exposed (EITE). This is called industrial free allocation.

Industrial free allocation uses up part of the emissions budget available to the NZ ETS and reduces the amount of NZUs that the Government can sell at auction. The amount of NZUs given out each year via industrial free allocation is not determined as part of the annual process for setting unit limits. Instead, the rules governing industrial free allocation are in separate provisions of the Act and associated regulations.[25]

For this step, industrial free allocation volumes must be forecast, based on the existing rules and the likely production levels of eligible activities over the next five years.

3.7.2 Analysis and findings

We updated projections for industrial free allocation volumes, using the following key elements:

- the activity assumptions based on the Commission's emissions budgets analysis for *Ināia Tonu Nei*, but without assuming that any specific mitigation options are taken up
- announced plant closures, including the closure of Refining NZ, and the expected continuation of aluminium smelting at Tiwai Point past 2024
- the recent reduction in the aluminium smelter's electricity allocation factor (EAF)
- the legislated 1% annual phase-down of industrial allocation rates that applies over 2021-2030
- use of 2019 rather than 2020 as the base year for projecting base industrial allocation growth given the impact of COVID-19 on industrial activities in 2020.

A more detailed discussion of the method used and results can be found in Technical Annex 1.

Findings on free allocation volumes

Our forecast of industrial free allocation volumes per year for 2023-2027 is given in the table below.

Units (millions)	2023	2024	2025	2026	2027	Total
Industrial allocation forecast	6.4	6.3	6.3	6.2	6.1	31.3

[25] The framework for industrial free allocation is provided in Part 4, Subpart 2 of the Climate Change Response Act 2002 and the Climate Change (Eligible Industrial Activities) Regulations 2010.

3.7.3 Future developments

NZ ETS free allocation policy and volumes could change. We will update our projections over time if facilities eligible for industrial free allocation shut down or signal changes in production. In addition, policy changes could affect our forecasts in the future, in particular if:

- the Government decides to change the eligibility for or rates of allocation as a result of its review of industrial allocation[26]
- the Government makes decisions on whether all or some agricultural emissions should be brought into the NZ ETS[27]. As a default, the Act includes provisions for agricultural free allocation at a 95% rate of assistance, if NZ ETS surrender obligations apply
- the Minister changes the phase-out rate following a request for advice from the Commission about whether or not the phase-out rate should change. No such request has been made to-date.

3.8 Step 5: Set the unit surplus reduction volume

3.8.1 Context

NZ ETS account holders are able to bank NZUs in their accounts. This ability to bank is a valuable feature to help reduce price volatility, ensure the NZU price is forward-looking, and support participants to manage their future liabilities. For these reasons, all emissions trading schemes currently operating in the world allow banking.

A large quantity of units (the 'stockpile') has accumulated in private registry accounts. There are currently 144 million units held in the NZ ETS as of 1 June 2022. This is approximately four times as many units as were surrendered for emissions released in 2021.

Several factors have contributed to the build-up of the stockpile over time. These include arbitrage opportunities to exploit differences in the price of NZUs and international units when the latter were eligible in the NZ ETS, and the ability for participants to use a fixed price option instead of surrendering units until 2021. The release of cost containment reserve volume at auctions in 2021 and 2022 has also played a role.

The volume of units in the stockpile may present a risk to achieving emissions budgets. Where the volume of units in the stockpile is such that they may enable emissions to exceed emissions budgets, we consider this excess volume to be a 'surplus'.

We can help address the issue of the 'surplus' through the NZ ETS unit limit settings, by reducing auction volumes. The intention is to draw down units from the stockpile to meet a proportion of NZ ETS surrender obligations.

In this step, we estimate how many of these units are more likely to be available to the market and enable emissions exceeding emissions budgets (the 'surplus'), and how to address this risk over time.

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[26] The Government consulted in 2021. The Ministry for the Environment has stated that changes are likely to be progressed through an amendment to the Act introduced in 2022, with any actual changes to allocation or eligibility are unlikely to take effect until 2024. See MfE's website for further information: https://consult.environment.govt.nz/climate/reforming-industrial-allocation-in-the-nz-ets/

[27] The Government is considering how to price agricultural emissions, with decisions due by the end of 2022 to enable implementation by 2025.

3.8.2 Analysis and findings

Not all of the units in the stockpile are available to the market. Some will be held for specific purposes which means they are less likely to present risks to emissions budgets.

We have analysed three categories of units that may not be available to the market:

- units held for post-1989 forest harvest liabilities
- units held for hedging purposes by emitters
- pre-1990 forest allocation units held long term.

Units held for post-1989 forest harvest liabilities

Owners of forests planted after 1989 receive NZUs for the carbon stored in their forests. However, when the forest is harvested, they must surrender a large proportion of these units back to the Government.[28] This means that forestry participants need to hold a large number of units in advance of harvesting their forests.

Our central estimate is that 52 million units are being held for post-1989 harvest liabilities. A key uncertainty in this estimate is the proportion of post-1989 forest area that may go unharvested in response to high NZU prices, which would enable a greater share of units to be sold to emitters.

Units held for hedging by emitters

It is common practice for NZ ETS participants to hold NZUs to cover a proportion of their compliance obligation over a certain period in advance to manage their exposure to NZU price risk. This is a legitimate form of market risk management known as hedging, and is important for the stable operation of the market.

We have estimated the non-forest hedging needs in the NZ ETS at 30 million units.

Pre-1990 forest allocations held long term

Pre-1990 units were originally allocated to owners of forests planted before 1990 as partial compensation for the restriction the NZ ETS put on their ability to change land use. Based on past trends, and what we have heard through our engagement, a proportion of the remaining pre-1990 units are likely to be held for the long term and not come to market in the coming years.

We estimate that around 14% of pre-1990 forest allocation units currently in the accounts that originally received them will be sold over the period to 2030, meaning around 14 million units will be held for the long term. This is based on an extrapolation of registry data trends of the rate at which pre-1990 units have been sold out of the original recipients' accounts in recent years.

Determining the total surplus units

Bringing these factors together, we have determined that 49 million units within the stockpile are 'surplus' and present a higher risk of enabling emissions exceeding emissions budgets. This includes the volume released from the cost containment reserve in June 2022.[29]

[28] This harvesting does not contribute emissions towards our emissions budgets or targets so long as the forest is replanted.

[29] Previous releases of the cost containment reserve are included in the volume of units held in the registry post-2021 surrenders.

Table 6 Components of the stockpile of units held and total estimate of surplus units

Components of the stockpile	Units (m)
Units held in the registry post-2021 surrenders	144.1
Units held by post-89 forest participants for harvest liabilities	-52.2
Estimated hedging volume by non-forestry participants	-30.2
Pre-1990 units held long term	-13.8
Estimated surplus before CCR release	47.8
CCR release June 2022	+1.3
Estimated surplus	**49.1**

There is significant uncertainty in our estimate of the total surplus of units. Our estimated range of the possible surplus units is between 33 million units and 66 million units. For further information about our analysis of the unit stockpile, see Technical Annex 1 on supporting analysis for unit limits.

3.8.3 Reducing the surplus over time

Here we must determine over what timeframe the surplus should be reduced and how the surplus reduction should be spread out over time.

In selecting a timeframe and approach, we applied four criteria in order to evaluate how well each approach:

- manages risks that surplus units enable emissions exceeding emissions budgets
- manages risks to liquidity and market cornering due to lower auction volumes
- provides regulatory predictability
- provides resilience to uncertainty.

Previously the Government had aimed to reduce the surplus units between 2020 and 2030, and had planned to reduce auction volumes by an equal proportion of the surplus each year over ten years.

Timeframe

The first question is over what timeframe the surplus should be reduced.

We consider that reducing the surplus by 2030 is appropriate. The surplus units pose a risk to emissions budgets by potentially allowing excess emissions and suppressing unit prices. But is not a certainty that this will occur. The surplus has existed for the last 6-7 years, over which time the NZU price has risen significantly.

If auction volumes were sharply reduced with the aim of reducing the surplus quickly, this could impact liquidity, increase price volatility and increase the risks of market-gaming activity (like market cornering, where current unit holders gain excessive control over the market).

Determining annual surplus reduction volumes

The second question is how the surplus reduction should be spread out over the period to 2030.

We looked at multiple options for how the surplus reduction volume should be spread over time. Auction volumes could be reduced by an equal amount each year, in which case the volume removed would represent an increasing share of the NZ ETS cap. Alternatively, the surplus reduction could be front-loaded into earlier years to a greater or lesser degree.

Our preferred approach is to reduce auction volumes by an equal proportion of the NZ ETS cap each year between 2023 and 2030. This ensures that the surplus unit reduction remains the same proportion of the cap (25% per year), so the risk to liquidity does not increase as the NZ ETS cap tightens.

It also means that the surplus unit reduction is greater in early years when the cap is higher, and lower in later years, providing greater reassurance that the risk to emissions budgets will be addressed earlier than an equal reduction in all years would.

This approach ensures that the total surplus reduction over the next four years (29 million) is less than the low end of the range of our estimates of the possible surplus (33 million). This means that if we have overestimated the surplus, we will be able to alter the settings in future years before it is exhausted.

We will take an adaptive management approach, monitoring these issues and adjusting our future annual recommendations on unit limits if necessary.

Findings on the unit surplus reduction volume

We have concluded:

- That the NZ ETS currently has a surplus, which we define as units that are more likely to enable emissions exceeding emissions budgets because they are not held for specific purposes such as hedging and forestry units held for harvest liability
- Our best estimate of this surplus is 49 million units, as of June 2022, within a range of 33 million-66 million units
- That auction volumes should be set consistent with reducing the surplus towards zero at a rate that allows the market to function effectively
- That given our estimate of the surplus:
    - auction volumes should be reduced consistent with reducing the surplus to zero by 2030
    - reductions to auction volumes should be based on deducting a constant proportion of the NZ ETS cap, which currently equates to 25% per year.

Accordingly, the following annual volumes should be removed from auction volumes with the aim of reducing surplus units in the scheme:

Units (millions)	2023	2024	2025	2026	2027	Total
Surplus reduction	8.0	7.7	7.1	6.5	5.9	35.2

3.9 Step 6: Setting the approved overseas unit limit

3.9.1 Context

In this step, we must recommend a limit on the approved overseas units that can be used within the NZ ETS.

The Government has not yet established links to other carbon markets or overseas emissions reduction initiatives that would allow Aotearoa New Zealand to access offshore mitigation. It has therefore not approved any overseas units.

For Aotearoa New Zealand to meet its NDC, it will need to access offshore mitigation. We estimate that 99 Mt of offshore mitigation will be needed to meet the NDC, in addition to the domestic reductions needed to meet emissions budgets.[30]

It is unclear how or when the Government will obtain access to offshore mitigation, or which mechanism it will choose to deliver this when it does (eg through the NZ ETS or some other mechanism).

3.9.2 Analysis and findings

We have considered two main options:

- Option 1: set the approved overseas unit limit at zero, while there are no approved overseas units
- Option 2: set a higher approved overseas unit limit from a date in the future in anticipation of approved overseas units becoming available. The volume of units auctioned would drop by an equal amount.

As we described in our approach to step 1, we prefer Option 1 since there are considerable uncertainties about whether, when and how offshore mitigation will be obtained; and pursuing option 2 would pre-empt decisions that should properly be taken by the Government.

Option 1 accords the unit limits with the NZ ETS as it is now, and ensures that participants' obligations are in line with the emissions reductions sought in the emissions reduction plan and emission budgets. Option 1 leaves open the question of how offshore mitigation will be delivered to meet the NDC. However, as we discussed in step 1, that is a broader question for the Government. Once the Government makes decisions about how offshore mitigation will be obtained and paid for, the NZ ETS unit limit settings can accord with them.

Recommendations on the approved overseas unit limit

We recommend setting the limit on approved overseas units at zero for all years in the period 2023-2027.

3.9.3 Future developments

We have made these recommendations under considerable uncertainty about offshore mitigation.

Should access to offshore mitigation be secured, and should the Government decide to allow this offshore mitigation into the NZ ETS via approved overseas units, it would then be possible to set NZ ETS unit limits to deliver some of the offshore mitigation needed for the NDC.

Risks

If the Government wishes to use the NZ ETS to deliver a portion of the offshore mitigation to meet the NDC, it is imperative that it acquires access to this offshore mitigation quickly and defines clear rules for its use by NZ

[30] For details, see Table 4 in section 3.4.1

ETS market participants. The longer the Government takes to obtain access and clarify relevant rules, the lower the portion of offshore mitigation needed to meet the NDC that can be delivered by the NZ ETS.

The NZ ETS has the potential to deliver offshore mitigation by substituting it for auctioned units. Since the total offshore mitigation component of the NDC is larger than the expected auction volumes between now and 2030, it is not possible for the NZ ETS to deliver the entire international component of the NDC. Under any scenarios with approved overseas units in the NZ ETS, a portion of the offshore mitigation required to meet New Zealand's NDC would still have to be obtained outside the NZ ETS.

Furthermore, there could be implications for equity and for the proper functioning of the market if the government were to allow a high level of approved overseas units in the NZ ETS through direct participant purchasing compared to auctioning. First, this would reduce the auction proceeds that would otherwise be able to be redistributed by the Government to fund emission reductions, and NZ ETS participants rather than taxpayers would capture the gains if approved overseas units could be purchased below NZU prices. Second, approved overseas units banked by participants in the NZ ETS would not be valid for meeting future NDCs. They would become a taxpayer liability in future NDC periods unless banking these units was prohibited. Third, displacing a large amount of NZU auction volume would risk disabling the current price control mechanisms in the NZ ETS.

Across all scenarios for allowing approved overseas units in the NZ ETS, the Government would need to ensure that such units met high standards for environmental integrity, including corresponding adjustments under the Paris Agreement.

3.10 Step 7: Calculate the auction volume and assess risks

3.10.1 Context

This final step combines the outcomes of all the previous steps into a calculation to give the annual auction volumes for the 2023-2027 period. This step also involves assessing the sensitivity and risks associated with these volumes. Sensitivity testing helps us find out which decisions leading up to the final volumes have the most impact on the results.

The sensitivity analysis showed that decisions made in step 2, on allocating the emissions budget, and step 6, on estimating the amount of surplus units, both have significant impacts on the final outcome of annual auction volumes. More detail on this analysis can be found in Technical Annex 1.

We also consider the risks associated with the auction volumes, particularly related to the NZ ETS's ability to help deliver emissions budgets.

3.10.2 Analysis and findings

Findings on auction volumes

We have concluded that the following set of steps should be used to determine the unit limits within the NZ ETS:

1. Accord with the domestic emissions budgets, the NDC and the 2050 target
2. Allocate the emissions budgets to NZ ETS and non-NZ ETS sectors
3. Make technical adjustments
4. Account for free NZU allocation volumes
5. Make adjustments consistent with reducing the unit surplus
6. Set approved overseas unit limit
7. Calculate the auction volume and assess sensitivity and risks

For each of those steps we have determined that:

1. As long as the NZ ETS is domestic only, unit settings should align with emissions budgets as the domestic component of the NDC.
2. The emission budgets should be allocated between NZ ETS and non-NZ ETS sectors on the basis of the sectoral gross emissions reductions implied by the sector targets laid out in the emissions reduction plan.
3. Technical adjustments should be made for differences in how the greenhouse gas inventory and the NZ ETS estimate emissions associated with liquid fossil fuels and coal.
4. Free allocation volumes should be deducted in line with updated forecasts based on current policy.
5. The surplus of banked units is estimated at 49 m units, and auction volumes should be reduced consistent with the surplus reducing to zero by 2030. The reductions should be based on deducting a constant proportion of the NZ ETS cap.
6. As long as there are no approved overseas units, and no clarity as to when they will be available, the approved overseas unit limit should be set to zero.
7. **Taken together, these decisions result in the following annual auction volumes:**

Units (millions)	2023	2024	2025	2026	2027	Total
Step 1: accord with emissions budgets and NDC	73.6	72.1	69.7	66.5	63.9	345.9
Step 2: allocate the emissions budget	-41.3	-41.0	-41.0	-40.3	-40.2	-203.9
Step 3: technical adjustments	-1.6	-1.4	-1.3	-1.3	-1.3	-7.0
Step 4: free allocation	-6.4	-6.3	-6.3	-6.2	-6.1	-31.3
Step 5: surplus reduction	-8.0	-7.7	-7.1	-6.5	-5.9	-35.2
Step 6: international unit limit	0.0	0.0	0.0	0.0	0.0	0.0
Step 7: planned NZU auction volumes	**16.3**	**15.6**	**14.0**	**12.2**	**10.4**	**68.5**

Figure 6 below shows a summary of the volumes described in previous steps and the resulting auction volumes.

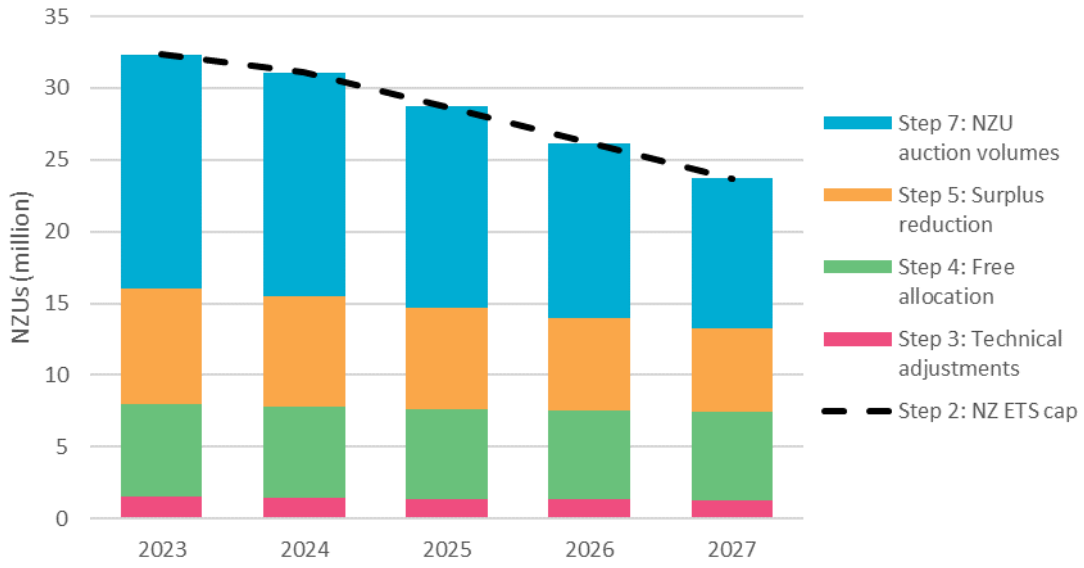

Figure 6 Proposed annual auction volumes within the NZ ETS cap

3.10.3 Risks

The NZ ETS cannot guarantee achievement of emissions budgets, particularly due to the current unit surplus and uncertainty about emissions outside the NZ ETS. Even without these specific issues, the NZ ETS cannot precisely control what emissions occur within any given year or time period. This is due to the participants' ability to bank units and manage their emissions over time in a way that suits their individual circumstances, features which play an important role in helping to reduce overall mitigation costs and price volatility.

It is possible that units from the 'surplus' portion of the stockpile could be surrendered, which could potentially allow emissions to exceed the emissions budgets. The reduction in auction volumes outlined in Step 5 is designed to mitigate this risk. However there is considerable uncertainty in our estimate of the surplus.

If the surplus is larger than our estimate of 49 million units, the settings may not adequately reduce it and it may still allow emissions above emissions budgets. If the surplus is smaller than we estimate, the settings will require faster emission reductions than we have modelled to be achievable, leading to more severe social and economic costs than the Government has planned for.

At present, any reduction in auction volume intended to give greater certainty around meeting emissions budgets would have the same effect as planning to reduce the surplus faster. Faster reductions in the surplus have been considered at Step 5 but are not recommended given risks this could create for liquidity and market functioning if our estimate of the size of the surplus turns out to be an overestimate.

The Government cannot reasonably rely on the NZ ETS to guarantee achievement of emissions budgets, particularly in the near term while the surplus is so large. This highlights the importance of other policies to drive emissions reductions both inside and outside the NZ ETS.

In light of the uncertainties involved in determining NZ ETS auction volumes, it will be critical to take an adaptive management approach. We will monitor trends and new information relating to these issues closely and can reassess assumptions and judgements in future settings advice if needed.

3.10.4 Future developments

Final auction volumes can be subject to change if there are any adjustments to previous steps in the process.

However, in future regulatory updates, legislation only allows unit limits to be changed for the next two calendar years in specific circumstances where a significant change has occurred. Adjustments to auction volumes for Years 3 and 4 must be considered every year when recommendations for the new settings for Year 5 are made.

Changes to recommended unit limits will be considered after all steps in the calculation are monitored and assessed. Currently, significant changes to industrial allocation forecasts or the rate of the surplus drawdown are likely to make the most significant impact on auction volumes. Any policy changes to forestry, agricultural pricing and access to international units would also result in a need to reassess suitable auction volumes.

Part 4: Price control settings

The price controls in the NZ ETS are the auction reserve price (ARP) and the cost containment reserve (CCR).

4.1 Context

The purpose of the ARP and CCR is to act as safety valves to manage the risk of the NZU price at auction being out of line with what is considered necessary to meet emissions budgets.[31] The price controls also serve to signal the bounds of expected and acceptable prices in the NZ ETS. However, they are not intended to be the key driver for the market price. When introduced into the NZ ETS by the 2020 reforms, it was stated that the price controls should rarely be triggered.[32]

These price measures operate at the quarterly auctions of New Zealand units (NZUs) by the Government. They do not prevent secondary market prices from going above or below the ARP or CCR trigger prices. Rather, they provide an automatic response mechanism to increase or reduce the amount of NZUs supplied by the Government into the NZ ETS, when the auction clearing price is above or below specified levels. In this way, these price controls can help arrest further increases or declines in the NZU price.

> *The Act prescribes the price control settings as consisting of:*
>
> - *an auction reserve price (ARP), a minimum price at which units may be sold by auction, which may be zero*
> - *a cost containment reserve (CCR), a reserve amount of NZUs that is to be released for sale at auction, if a trigger price is reached or exceeded by bidding at auction. This includes:*
>   - *a reserve amount of NZUs for each trigger price, which may be a single reserve amount of zero*
>   - *one or more trigger prices unless the reserve amount is zero*

The first price controls were set in regulation in September 2020, starting at $20 for the ARP and $50 for the CCR in 2021, both with a 2% inflation adjustment to those trigger price levels for each following year. The first NZ ETS unit auction took place in March 2021.

[31] (Ministry for the Environment, 2022)
[32] (Ministry for the Environment, 2021c, p. 24)

In August 2021, the Government announced its decision to increase the price control settings for 2022 in line with recommendations from the Commission's *Ināia Tonu Nei* advice on emissions budgets and the emissions reduction plan. This resulted in the settings currently in regulations, shown in Table 8 later in this section.

Shortly after this announcement, the CCR, then still at $50, was triggered for the first time at the 1 September 2021 auction. All 7 million NZUs in the reserve were sold. The NZU price continued to rise, with the CCR triggered at both the first and second quarterly auctions for 2022.

The CCR being triggered constitutes a special circumstance under the Climate Change Response Act 2002 (the Act). It is one of the reasons why all the price control settings currently in regulations can be reviewed and potentially amended.[33] Under normal circumstances, it would not be possible to review and amend the first two years of settings in the five-year period.

The frequency of the triggering of the CCR is also not in line with its stated purpose. It justifies an assessment to consider the operation of the market and review information about the appropriate level of the trigger price and whether it reflects an NZ ETS price corridor compatible with meeting emissions budgets.

This part of the report contains the Commission's analysis and recommendations for updating the price control settings for the 2023-2027 period. We first set out updated evidence related to both the CCR and the ARP, followed by our analysis and advice on each of those price control mechanisms in turn.

4.2 Summary of key considerations

In this section, we summarise our evidence and position on the following key considerations under the Act, which underpins our analysis of the appropriate settings for both the ARP and CCR:

- the forecast availability and cost of ways to reduce greenhouse gas emissions that may be needed to meet emissions reduction targets
- the level and trajectory of international emissions prices
- the impact of emissions prices on households and the economy
- inflation.

4.2.1 Modelling the range of NZU prices potentially required to meet emissions budgets

We have undertaken further analysis using the Energy and Emissions in New Zealand (ENZ) model to enhance the evidence available about the range of emissions prices that could be required to meet emissions budgets. This can be described as testing uncertainty around the emissions prices needed to deliver the intended gross emissions reductions for NZ ETS sectors.

The new modelling analysis builds on the scenarios and sensitivity analysis undertaken for *Ināia Tonu Nei*. It assesses potential NZ ETS price ranges in the context of the three sources of uncertainty – baseline activity, mitigation costs, and other policies affecting NZ ETS sectors. It looks out over all three emissions budgets to ensure the price paths considered are keeping the country on track for these and the 2050 target. We summarise the main results in Appendix 1, with further detailed information available in Technical Annex 2.

[33] In addition, the first three emissions budgets were notified in May 2022, and the first NDC was updated in October 2021.

The assessments undertaken give envelopes of emissions prices under a range of potential future scenarios considered.

At the low end – with either low baseline emissions and mitigation costs, or a scenario of strong mitigation from other policies – we find a very similar minimum price path to achieve the targeted level of emissions in the NZ ETS. This is around $75 in 2030 (in 2022 dollars). This price path uses a fixed rate of increase or discount rate of 3%.

At the high end, under high baseline emissions and mitigation costs, we find a maximum price path reaching around $270 in 2030, also using a 3% discount rate. Under a scenario of weak mitigation from other policies, the modelling suggests even higher prices would be needed.

We caution here that the ENZ model will very likely understate the mitigation response to much higher emissions prices; reasons for this are detailed in Technical Annex 2. Nonetheless, these results demonstrate that even extremely high prices may be insufficient to meet the third emissions budget in the absence of adequate complementary policies.

We consider that the results outlined above provide reasonable upper and lower bounds on the range of NZ ETS prices compatible with meeting emissions budgets. Note, this does not replace the emissions values from our *Ināia tonu nei* advice as our best estimate of the abatement costs associated with meeting emissions budgets. Rather, this new analysis gives greater insight as to what the range of emissions prices arising in the NZ ETS might be if the future plays out differently from the assumptions used in that analysis.

4.2.2 International emissions prices

The Act requires that we consider the level and trajectory of international emissions prices in our advice on price control settings. We see two reasons why these international emissions prices may be relevant:

- It is important that Aotearoa New Zealand contribute to the global effort to combat climate change, and international emissions prices give an indication of the level of effort needed to do this.
- Offshore mitigation is an option for meeting emissions reduction targets in addition to reducing emissions domestically, particularly where further domestic reductions are likely to lead to severe social and economic impacts.

We present information about current and future possible international emissions prices in Appendix 2.

Information about future international emissions prices is limited and subject to change. However, the material we have collated shows possible international emissions prices in 2030 ranging from $43 up to $319 per tonne; most fall within a narrower range of about $90-$200 per tonne.[34]

In addition, the Government has investigated options for access to offshore mitigation to help meet the international component of the nationally determined contribution (NDC). A recent Cabinet paper[35] suggests possible price ranges for mitigation available through ETS linking with a lower price range of $50-$100 by 2030, and a higher price range of $110-$170. There is both high uncertainty around the potential costs of offshore mitigation options, as well as around the means by which the Government could guarantee the environmental credibility of such options.

[34] It is important to be aware that international emissions prices do not necessarily reflect difference in mitigation ambition or cost across jurisdictions due to varying opportunities to reduce emissions and complementary policies.
[35] (Ministry for the Environment, 2021a)

4.2.3 Impacts of emissions prices on households and the economy

We have assessed a range of evidence on the impacts of the NZ ETS emissions price from previous analyses and from new modelling. The result of this work is presented in part 5. The overall conclusion from this analysis is that the potential impacts are moderate but not insignificant.

Having considered these impacts, as well as the nature of the NZ ETS as a market mechanism, our view is that these impacts should not be a primary determinant for the NZ ETS price control settings. In *Ināia Tonu Nei* we advised that the impacts of the transition need to be carefully managed with supporting policies.

Price control measures in an ETS are not well suited for addressing domestic distributional impacts or other equity considerations in the transition to a thriving, low emissions and climate-resilient economy. Managing the effect of sustained increased prices, if these are required for meeting emissions budgets, is also not the intended purpose of the CCR. Instead, distributional impacts resulting from a rising emissions price can best be managed if the Government puts in place policies outside the NZ ETS to support those most disadvantaged and those least able to adjust.

Over the long term, the cost impact of higher emissions prices should decrease. Households and businesses will increasingly be able to take advantage of low emissions alternatives. Improvements to housing quality and increased energy efficiency standards for appliances will also improve household energy related costs over time.

4.2.4 Inflation

We are required to consider inflation in developing the recommended price control settings.

We support the use of an inflation adjustment, to avoid the settings being eroded over time in real terms. The CCR trigger price must be set in nominal prices so any inflation adjustment must be set in advance.

The existing trigger prices for the CCR and ARP are both adjusted for inflation. The adjustment used was 2% per year, based on the inflation forecast in Treasury's Budget Economic and Fiscal Update 2021 (BEFU21).[36]

Over the past year there has been a significant increase in inflation. Inflation in 2021 was 5.9%,[37] and high inflation is expected to continue for at least two to three more years. The most recent forecast by Treasury, from its Budget Economic and Fiscal Update 2022 (BEFU22), is shown in Table 7.

As the forecast inflation rate varies significantly over time, we no longer consider it appropriate to apply an averaged inflation adjustment. Instead, we propose to apply the specific annual forecast rate to the relevant year of the settings. For 2027 when no forecast is available, we assume inflation stays constant at the level forecast by Treasury for the year to June 2026 of 2.2% pa.

Table 7 Treasury BEFU22 inflation forecast[38]

Inflation (June years)	**2022**	**2023**	**2024**	**2025**	**2026**
Treasury forecast BEFU22 %	6.7	5.2	3.6	2.7	2.2

[36] (Te Tai Ōhanga The Treasury, 2021) The forecast covered 5 years from June 2021, and averaged 2% per annum.
[37] (Stats NZ Tatauranga Aotearoa, 2022a)
[38] (Te Tai Ōhanga The Treasury, 2022a)

4.3 Cost containment reserve

4.3.1 Context

The cost containment reserve (CCR) is a reserve of NZUs available for sale if the auction clearing price is at or above a specified trigger price.

Table 8 shows current CCR settings. These current settings were based on the 2030 emissions price value in the demonstration path from our *Ināia Tonu Nei* advice ($140 in 2019 dollars), with a small amount of headroom added, and discounted back at 10% per year with a 2% annual inflation adjustment. The reserve volume is based on a surplus reduction volume of 5.4 million NZUs per year plus a volume equal to 5% of the NZ ETS cap.

Table 8 Current CCR trigger price and volumes

Year	2022	2023	2024	2025	2026
Trigger price	$70	$78.40	$87.81	$98.34	$110.15
Reserve amount (millions)	7.0	7.0	7.0	6.8	6.7

When it adopted the CCR, the Government framed its role as being a safety valve to reduce the risk of extremely high NZU prices in the NZ ETS that should be triggered rarely, if at all.

Despite this, the CCR has been triggered three times in the last six auctions. It has released an addition 14 m units to the market in 2021 and 2022, adding to the large number of banked units and increasing the risk that surplus banked units present to achieving emissions budgets.[39]

As of June 2022, the full CCR volume for 2022 has been released and the secondary market price is around $76, close to the 2023 trigger price of $78.40. This suggests there is a high risk that it will be triggered again if settings remain the same.

4.3.2 Assessing why the CCR has been triggered

We consider that the CCR has been triggered because there has been a major shift in market expectations about future prices since the 2020 NZ ETS reforms and the release of the Commission's advice in 2021. This has led to the CCR trigger price being below participants' future price expectations.

We have come to this view based on feedback from our engagement with market participants, combined with considering the analysis of the interaction between the CCR and the banked units in the NZ ETS market contained in the report *ETS Price Control Mechanisms: a Review of Issues*.[40]

Insights on market participants' expectations from targeted engagement

We wanted to develop a better understanding of different market participants' price expectations and behaviour in relation to holding or selling units. We met companies and individuals from different sectors, including compliance participants as well as consultants, intermediaries and members of bodies with an interest in the NZ ETS.

[39] As the CCR volume included a component of planned reduction in banked units, the actual increase in the number of banked units was smaller at around 3 m.
[40] (Denne, 2022)

We heard from multiple sources that there is an expectation that emissions prices will rise significantly over coming years. A range of factors appears to be influencing this view, although it is difficult to draw firm conclusions about the relative importance of each. Some themes included:

- Strong confidence in the Government's commitment to climate action and intent to increase policy stringency in future. The cost of decarbonising was more often cited than the cost of afforestation as a driver of expectations. Some cited the emissions values from *Ināia Tonu Nei* and/or the CCR price trigger levels and trajectory as providing a credible guide as to where the Government wants the NZU price to go.
- The increase in NZU price so far, as well as increases to prices in other ETS internationally, are potentially feeding into bullish sentiment and increases to speculative demand.
- Regulatory uncertainty, with changes to the NZ ETS being rolled out or revisited and lack of clarity over complementary policies and the emissions reduction plan. This increases the risk and therefore cost of investing in abatement.
- The NZ ETS is a relatively shallow, immature market with limited risk management tools. This may be contributing to risk-averse behaviour by some compliance participants.

It is possible that these expectations of strongly increasing NZU prices will not materialise, as circumstances could lead to moderate NZU price rises over time. For example, while the Government has consulted on options to implement restrictions on the ability of exotic permanent forests to register in the NZ ETS, there is still a large potential for relatively low cost afforestation in Aotearoa New Zealand that could displace gross emissions reductions. This risks a downwards correction back to an NZU price that would be insufficient to drive meaningful decarbonisation.

Furthermore, at current carbon prices it is economically more attractive to not harvest existing post-1989 production forests that are already in the NZ ETS on stock change accounting.[41] If foresters take up the option of not harvesting at scale, it could significantly increase the supply of NZUs into the market.[42]. We discuss this issue in part 2 on the current state and role of the NZ ETS, and in Step 5 of part 3 on unit limits on the surplus of units in the NZ ETS.

Our engagement discussions also indicated that the CCR trigger price and its steep trajectory (increasing at 10% plus inflation annually) may be having a relatively strong anchoring effect on some participants' price expectations. This is exacerbated by the limited availability of timely, relevant market information and analysis. This makes it difficult for participants to form judgements on the long-term value of NZUs based on supply and demand fundamentals. In the absence of the proper availability of such information, it appears that market participants may be relying on CCR trigger prices as the clearest signal available to them, although this is clearly not in line with the purpose of the CCR.

4.3.3 Analysis and recommendations

There are several components that make up the CCR settings. We have taken the approach of considering the full range of options available for the design of the CCR under the Act. We therefore break down our analysis into the following four decisions:

[41] (Manley, 2021)

[42] Under stock change accounting, landowners receive units as a forest grows, and have to repay a large portion of those units when the forest is harvested. If the forest is not harvested, these units do not need to be repaid, and are available to be sold.

- whether to disable the CCR, by setting the reserve amount at zero
- one or multiple trigger prices
- the trigger price level(s) and its trajectory over time
- determining the reserve volume.

In this section, we discuss each of these issues and determine preferred options in turn, before bringing them together into our recommendations for the CCR settings over 2023–2027.

We note that the analysis in this section has been informed by the report *ETS Price Control Mechanisms: a Review of Issues*,[43] in particular the CCR's interaction with surplus banked units as well as consideration of multiple trigger prices.

Disabling the CCR by setting the reserve at zero

The Act permits the reserve volume in the CCR to be set at zero, which would disable it. To recommend this option, we would have to be convinced that the purpose of the CCR is no longer relevant or necessary. In other words, that there is no risk of extreme prices for NZ ETS participants that needs to be mitigated.

We do not hold this view, for the following reasons:

- There is significant underlying uncertainty in carbon markets, particularly in the drivers of demand (e.g. weather, fossil fuel markets, global economy) and expectations. This gives rise to risks of emissions prices at levels that are inconsistent (either higher or lower) with long-term emissions reduction goals.
- This risk of excessive price variability is higher in a market like the NZ ETS which is small and immature with a somewhat shallow secondary market. Instruments to hedge price risk are relatively limited and short term.
- Extreme prices also increase the risk of ad hoc interventions by the Government. Without a rules-based mechanism in place to address such situations, politicians will come under strong pressure to intervene, for example by passing urgent legislation. Such interventions can be highly damaging to market confidence, in turn harming the scheme's ability to drive cost-effective emissions reductions.
- It is now common practice internationally for emissions trading schemes to include mechanisms to influence prices. These can help the emissions market operate more predictably and ensure prices are sufficiently high to support long-term decarbonisation but not so high as to result in excessive costs.
- If well designed and effectively implemented, mechanisms such as a CCR can reduce regulatory and price uncertainty by providing clarity about a regulator's response to shocks and unforeseen events. It can also help provide an upper bound on future price expectations that is useful for firms' planning.

Setting the reserve volume at zero is therefore not a preferred option.

Single or multiple tiers of trigger prices

The Act allows for the CCR design to include one or more trigger prices unless the reserve amount is zero. For example, there could be two or three trigger prices, each with a tranche of units to be released at that price.

Because the NZ ETS is a relatively small market, it may not be fully competitive, and its participants may not always make decisions about holding or selling units in a way that is driven by profit maximisation. This

[43] (Denne, 2022)

increases risks that the surplus units in the market will remain illiquid, even as prices rise and approach high or very high levels.

A tiered CCR design with multiple trigger prices could help manage this risk, while limiting the fiscal impacts and risk to achieving emissions budgets of CCR releases. It may also reduce the anchoring effect of the CCR triggers on market participants' price expectations.

Multiple reserves at increasing price levels could act as "speed bumps" to slow price increases during periods of increasing demand. Reducing the reserve volume within a single tier could minimise the impact of triggering the CCR as fewer units would be available to add to surplus units. A multi-stepped supply curve would be more responsive to shifts in demand and short-term shocks caused by temporary factors.

Assessment of options against criteria

We have defined assessment criteria based on the proper functioning of the NZ ETS as follows:

- simple and minimises complexity
- regulatory predictability
- resilience to uncertainty and balances risks between the government and participants.

The table below summarises our assessment of two options, a two-tier and the three-tier approach, against the status quo of one tier.

Table 9 Assessment of CCR tier options against criteria

	Assessment relative to status quo (Option A)	
Criteria	**B: Two tiers**	**C: Three tiers**
Simple and minimises complexity	**-** Increased complexity compared to single tier. Low administrative cost for the auction operator as simple to run an auction with multiple CCR tiers.	**- -** Further complexity and change.
Regulatory predictability	**-** Similarly rules-based and predictable. Changing the design only two years after it was first implemented could damage market confidence.	
Resilient to uncertainty and balances risks	++ Manages release of reserve units – while balancing the risks of strong price increases against the risk of increasing the NZU stockpile. May lessen anchoring effects of trigger price on participants' price expectations.	++ Same as two tiers, but more ability to manage release of reserve units.

Key:

++	much better than the status quo	-	worse than the status quo
+	better than the status quo	- -	much worse than the status quo
0	about the same as the status quo		

A multi-tiered approach brings additional complexity relative to the status quo. However, we consider that on balance this is outweighed by the additional benefit such an approach would bring in terms of balancing the risk of excessive price increases against the risk of CCR releases increasing the NZU stockpile and enabling domestic emissions to exceed emissions budgets.

While a three-tiered approach may bring marginal additional benefits in respect of resilience to uncertainty and balancing of risk, we consider that, on balance, this introduces additional complexity relative to a two-tiered scenario with correspondingly little additional benefit. Option B (a two-tier CCR), is therefore our preferred option.

CCR trigger price level and trajectory

To determine the CCR trigger price level and its trajectory to 2027, we have used a forward-looking approach, given the forward-looking nature of the market price.

This bases the trigger prices on emissions price values for 2030. We have selected 2030 as the benchmark year, rather than 2035, to strike a balance between short-sightedness and increasing uncertainty as we look further into the future. The 2030 trigger prices are then discounted back to 2023 to give the annual trigger price levels.

Options

We have considered three options, combining choices around the benchmark 2030 price and discount rates. All prices are presented in 2022 dollars, with final recommended settings to be inflation adjusted as discussed in section 4.2.4.

Table 10 Options for CCR price trigger levels

Option (in 2022 prices)	2023	2024	2025	2026	2027
A. $150 in 2030, discounted at 10% (status quo)	$77	$85	$93	$102	$113
B. $200 in 2030, discounted at 3%	$163	$167	$173	$178	$183
C. $250 in 2030, discounted at 3%	$203	$209	$216	$222	$229

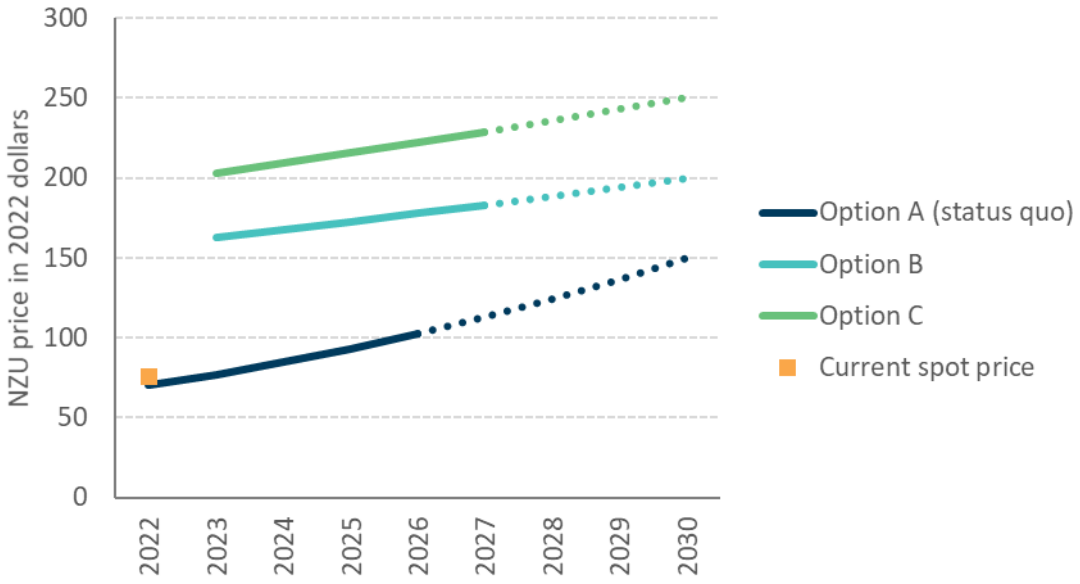

Figure 7: Options for CCR trigger price levels

In Figure 7, solid lines refer to the period regulations are in place (status quo) or are recommended (options B and C). Dotted lines extend the approach of each option beyond the current period to 2030 for illustration.

Option A is the status quo as described earlier.

Options B and C are informed by the new modelling analysis outlined in section 4.2.1, as well as possible international emissions prices and impacts on households and the economy. This modelling tested uncertainty around the NZU prices needed to deliver the intended gross emissions reductions to meet emissions budgets, for NZ ETS sectors. Uncertainty in the prices needed comes from uncertainty in baseline emissions, mitigation costs, and the contribution from non-NZ ETS policies.

Our modelling found upper price values in 2030 of around $270. It also found a higher price path could be necessary to meet the third emissions budget under a scenario with much weaker mitigation from other policies. However, this scenario would see significantly less mitigation from other policies compared with the impact range the Government has estimated in the emissions reduction plan and would in our view represent an excessive reliance on the NZ ETS. Acknowledging this, as well as limitations in the model's ability to capture the full likely effect of high emissions prices on mitigation actions,[44] we judge that $250 is an appropriate upper 2030 benchmark price for option C. A higher price would exceed prices expected in almost all international pricing systems and risk impacts becoming unmanageable. Option B ($200) was then selected based on the midpoint of option A and option C.

For options B and C, we applied a 3% discount rate to give the trajectory of the trigger prices over 2023-2027. This reflects a conservative assumption about the likely rate of interest or return available through other investments. This reduces likelihood of overlap with participants' expected future prices and dampens potential for speculative gain if the CCR were triggered. We also considered a 0% discount rate, to give a flat trajectory, but discarded this approach. A non-zero discount rate is still appropriate as mitigation costs are expected to rise over time as lower cost opportunities are taken up.

Overall, we consider that options B and C maintain consistency with the demonstration path for meeting emissions budgets, while allowing for uncertainty about the future.

Assessment of options against criteria

We consider that the relevant criteria for assessing these options are:

- Risk of overlap with NZU prices needed to meet emissions budgets
- Consistency with international emissions prices.

Our assessment is summarised in Table 11. Both options B and C are improvements against the status quo and consistent with the two criteria.

[44] The ENZ model is likely to understate the mitigation response to high NZU prices, as it only partially captures the impact of emissions prices on mitigation actions. Some assumptions, for example that emissions prices have no impact on energy and transport demand, are unlikely to hold true at much higher prices than seen to date.

Table 11 Assessment of CCR trigger price options against criteria[45]

	Assessment relative to status quo (Option A)	
Criteria	**B. $200 in 2030, discounted at 3%**	**C. $250 in 2030, discounted at 3%**
Risk of overlap with NZU prices needed to meet emissions budgets	+ Price level is sufficiently high to allow for uncertainty in NZU prices. Lower discount rate (3% compared with 10%) creates less risk of creating unintended speculative opportunities. Some risk of encouraging further price rises if CCR trigger has an anchoring effect.	++ Similar to Option B but with even greater headroom to allow for uncertainty in NZU prices.
Consistency with international emissions prices	++ In mid-to-high range of forecast international emissions prices (current trigger is low-mid). Comparable with peer countries' efforts rather than overtaking them. Above higher end of the Government's estimates of ETS linkage offshore mitigation costs (current trigger is within the range).	+ Similar to Option B, but at high end of forecasts of international emissions prices.

Given our proposed approach of a two tier CCR, we consider options B and C are appropriate bases for the trigger prices of the two tiers. Option B as the lower tier represents a reasonable estimate of consistency with international emissions prices and possible emissions budget-consistent NZU prices, with option C as the higher tier representing a more unlikely and extreme emissions price scenario.

Determining the reserve volumes

The volume of NZUs in the CCR affects its ability to affect emissions prices if it is released. The more units in the reserve, the more likely that when triggered, enough units will be available to meet demand without prices continuing to increase.

Overall reserve volume

The current, single tier CCR volume for the 2022-2026 settings in regulations is based on the stockpile adjustment volume plus a volume equivalent to 5% of the NZ ETS cap, as per Table 12.

Table 12 Current cost containment reserve volumes

Million NZUs	**2022**	**2023**	**2025**	**2026**	**2027**
Surplus reduction	5.4	5.4	5.4	5.4	5.4
5% of the cap	1.6	1.6	1.6	1.4	1.3
Total CCR volume	7	7	7	6.8	6.7

This approach means that all the reserve volume is available if the CCR is triggered and it has the potential to increase the amount of surplus units in the scheme.

[45] Same key as Table 9

We have judged the current level of surplus units in the NZ ETS to be around 49 million NZUs, and propose aiming to reduce that unit surplus to zero by 2030 (see section 3.8 on reducing surplus units). The resulting reduction in surplus units over 2023-2027 is provided in Table 13.

We propose to restrict the overall reserve volume in the CCR to no more than this surplus reduction volume. We consider it large enough to provide volume that can reduce the risk of excessive price increases, while avoiding adding further units to the surplus of NZUs banked in private accounts.

Table 13 Proposed surplus reduction volume over 2023-2027

Units (millions)	2023	2024	2025	2026	2027	Total (2023-2027)
Surplus reduction volumes	8.0	7.7	7.1	6.5	5.9	**35.2**

Volume in tiers 1 and 2

We need to consider how the total reserve volume is divided into the proposed two tiers to appropriately balance limiting price risks for participants with limiting target and fiscal risks for the Government.

The lower the volume in the first (lower) tier, the lower the risks to the Government if it is triggered. However, to be effective in containing prices, the first tier reserve must contain sufficient volume to meet demand.

To consider what this first tier reserve volume could be, we have looked at the demand gap between the NZ ETS cap and forecast emissions under current policies for sectors covered by the NZ ETS. If the first tier volume is related to this demand gap, it should substantially meet demand if it turns out to be more difficult than expected for NZ ETS participants to reduce emissions, as well as also avoiding authorising emissions above current forecasts. The forecast demand gap is displayed in Table 14.

Table 14 Demand gap between NZ ETS cap and projected emissions under current policy (BAU), Mt CO_2e

Demand gap between NZ ETS cap and current policy emissions projections, Mt CO_2e	2023	2024	2025	2026	2027
	1.0	1.7	2.5	3.1	3.7

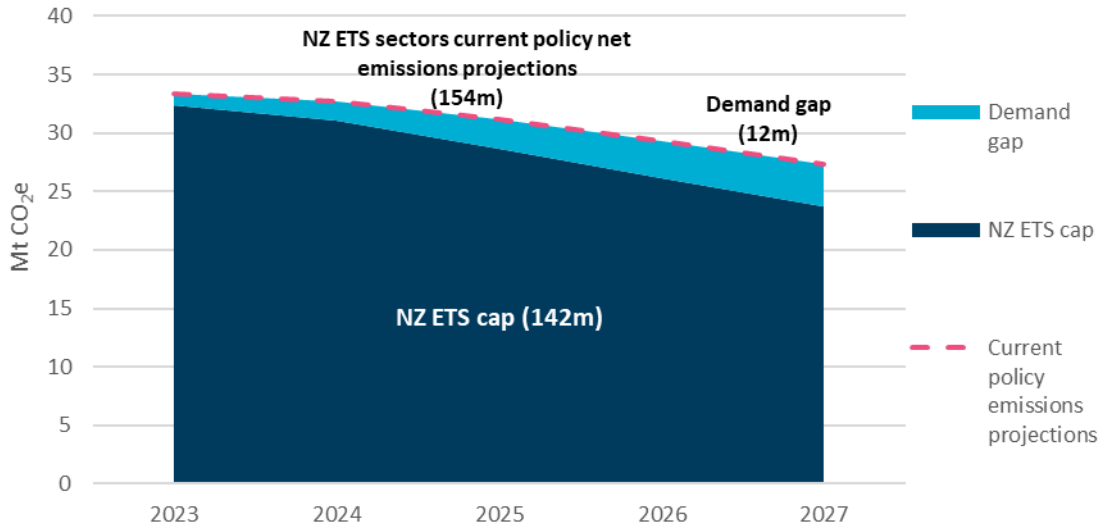

Figure 8 The demand gap between the NZ ETS cap and projected net emissions of NZ ETS sectors under current policy

This demand gap increases year-by-year, meaning that by 2027 it is larger than the stockpile reduction, reflecting the increasing stringency of the cap and emissions budgets over time. This is not helpful for limiting the risk of releasing large amounts of units, and is also inconsistent with the approach we have proposed for maintaining the surplus reduction as a constant proportion of the cap.

In addition, this year-by-year demand gap estimate will be revised every year as emissions forecasts are updated, so the gap estimate could change considerably over time. This instability means we do not think the year-by-year demand gap is an appropriate determinant of the annual reserve volume.

An alternative is to look at the aggregate demand gap over the 2023-27 period, 12 Mt CO_2e. This equates to around a third of the total surplus reduction volume we recommend over the same period. We have used this to inform the proposed first tier volume of the CCR. The volume in the first tier would then reflect the gap between net emissions projected under our current policy reference case and the emissions budget, to limit the extent to which its release would permit emissions above those projected under current policy. The second tier would then contain the remaining surplus reduction volume.[46]

This approach may have to change over time, depending both on how our unit surplus estimate changes and on how emissions projections are updated. We will have to monitor these issues and may adjust our approach as they evolve. In particular, if the surplus is reduced significantly, the basis for the reserve volumes would have to be wholly revisited.

Table 15 Propose volumes in CCR tier 1 and 2

Million NZUs	**2023**	**2024**	**2025**	**2026**	**2027**
Tier 1 volume	2.9	2.8	2.6	2.3	2.1
Tier 2 volume	5.1	4.9	4.6	4.2	3.8
Total CCR volume	8.0	7.7	7.1	6.5	5.9

If a release of reserve units causes emissions budgets to not be met, section 30IA of the Act will require the Minister to back those units as soon as possible after the end of an emissions budget. The approach we propose will reduce the risks of this requirement being triggered.

Recommendations on the cost containment reserve

We conclude that:

- The cost containment reserve should have two tiers. Two tiers of trigger prices and reserve volumes will help manage the risk of strongly increasing prices if the surplus units remain illiquid, while limiting the fiscal impacts and target risks relative to triggering a single tier CCR.
- The volume of the CCR for each year over 2023-2027 should be equal to the annual surplus reduction volume.
- The volume in the first (lower) tier should reflect the gap between net emissions projected under our current policy reference case and the emissions budget, to limit the extent to which its release would permit emissions above those projected under current policy. The second tier should contain the

[46] Note that this approach is not intended to exactly match to the demand gap, but rather uses it as an approximate guide to the first tier volume.

remaining surplus reduction volume.

- The trigger prices should be set based on prices of $200 and $250 (2022 dollars) in 2030, discounted back to 2023 at 3% per year.
- The trigger prices should be adjusted for expected inflation based on Treasury's Budget and Economic Fiscal Update 2022 forecast.

Accordingly our recommendations for the cost containment reserve settings are:

	2023	2024	2025	2026	2027
Tier 1					
Trigger price, including inflation	$171	$182	$193	$203	$214
Reserve volume, million NZUs	2.9	2.8	2.6	2.3	2.1
Tier 2					
Trigger price, including inflation	$214	$228	$241	$254	$268
Reserve volume, million NZUs	5.1	4.9	4.6	4.2	3.8

4.4 Auction reserve price

4.4.1 Context

The auction reserve price (ARP) is the price below which the Government will not sell units at auction.[47] Its stated purpose is to act as a safety valve that helps guard against NZU prices dropping below what is needed for meeting emissions budgets.

The ARP is not a hard price floor as secondary market prices can fall below it. Instead, it prevents the government from adding further NZUs into the market when prices are low, so it has a role in mitigating risks of unit oversupply. It also gives a signal of the low end of possible return on low carbon investments.

The auction reserve price is always expressed over the five years of the ETS settings period so we need to determine a basis for how it should change over time. The current auction reserve price is $30 in 2022, rising at 5% plus 2% inflation per year as shown in Table 16.[48]

Table 16 Current auction reserve prices for 2022-2026

	2022	2023	2024	2025	2026
Minimum auction reserve price	$30	$32.10	$34.35	$36.75	$39.32

[47] The Government has also implemented a confidential reserve price, which prevents NZUs from being sold at auction at a price significantly below the secondary market price. It is not within scope of this advice.
[48] The current auction reserve prices were set by the Government, on the basis of the Commission's advice. We advised in *Ināia Tonu Nei* to increase the ARP to $30, and that it should then increase by 5% plus inflation per year.

With the NZU price having traded well above the ARP since its introduction, current settings are not known to have caused any issues to the functioning of the NZ ETS. However, it is likely the ARP is currently set too low to adequately address risks around potential market oversupply. Moreover, the current settings are not as clearly linked to the ARP's purpose, of keeping prices at auction within the bounds of what is needed for meeting emissions budgets, as they ideally would be.

4.4.2 Analysis and recommendations

The core question to answer when considering both the price level of the ARP and the rate at which it increases year-on-year is this: at what price would it be appropriate for the Government to withhold units and reduce unit supply below the planned auction volume?

We have identified three possible options for ARP settings, combining choices around the price level and rate at which it increases year-on-year. We discuss this in three parts: the scenarios in which an ARP could be triggered, its signalling role, and the several benchmarks to inform possible ARP levels. We then bring this together in an assessment of options against criteria, to arrive at our recommendations for the ARP settings.

Options

The three options considered are listed below and shown in Figure 9. All prices are presented in 2022 dollars, with final recommended settings to be inflation adjusted as discussed in section 4.2.4.

Table 17 Options for auction reserve price settings

Option (in real 2022 prices)	2022	2023	2024	2025	2026	2027
A. $30 in 2022, rising at 5% (status quo)	$30	$32	$33	$35	$36	$38
B. $70 in 2030, discounted at 3%	-	$57	$59	$60	$62	$64
C. $100 in 2030, discounted at 5%	-	$71	$75	$78	$82	$86

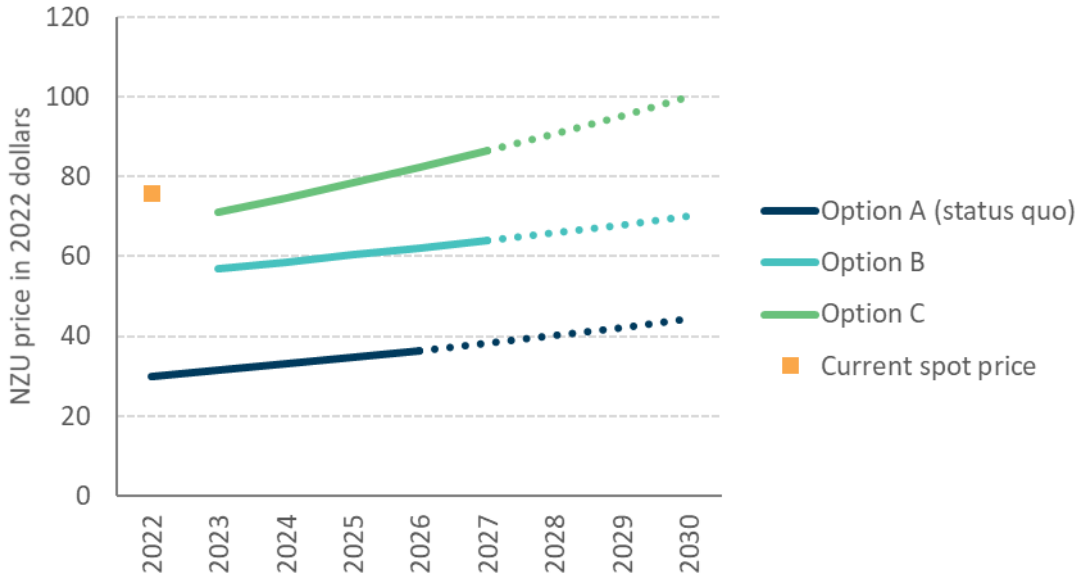

Figure 9 Proposed options for auction reserve price settings

Scenarios where the ARP could be triggered

The ARP could become relevant in situations where:

- emissions reductions are significantly easier to achieve than expected
- an influx of forestry units occurs, diluting the signal for gross emissions reductions
- a large portion of the surplus units come to market at once, reducing prices and allowing emissions above emissions budgets
- a downwards reset in price expectations occurs due to factors such as changing government signals about its decarbonisation path and policies.

The first two situations could be termed overachievement scenarios. If a fall in NZU price is due to high levels of carbon removals by forests or less costly than expected reductions in gross emissions, the ARP could reduce auction volume to drive overachievement of the emissions budgets. In other words, it is one way to counteract the 'waterbed effect'.[49]

Our view, consistent with *Ināia tonu nei* advice, is that Aotearoa New Zealand should aim to overachieve emissions budgets so long as the impacts are manageable. A relevant consideration here is New Zealand's NDC, which requires significant abatement beyond emissions budgets, to be met by purchasing offshore mitigation. If it were easier than expected to abate domestically, doing so would be in the national interest. Put another way, the Government auctioning NZUs at a lower price than the cost of procuring offshore mitigation would increase the fiscal and economic costs of meeting the NDC, clearly a perverse outcome.

The second two situations in the list could be considered underachievement scenarios, with risks of emissions budgets being exceeded due to low NZU prices. In these cases, the ARP could come into play as a stabiliser to arrest the decline in the emissions price.

Signalling

Even if the ARP is never triggered, it can still be relevant through the signals it sends to the market. To some extent the ARP price path will likely contribute to market participants' price expectations.

While it is not a firm price floor, the ARP will likely be interpreted by many in the market as a lower bound on where prices could go. From an investor perspective, any increase in the ARP is likely to be seen as reducing downside risk to investment, whether that is in reducing gross emissions, forestry, or purchasing NZUs.

An increase in investor confidence would be positive for delivering emissions reductions but could also distort the market if it encouraged speculation. For example, if the ARP were very close to the market price, this would indicate very low downside risk to buying and holding NZUs. This potential to stimulate speculative demand is a reason why it would not be helpful to set the ARP close to or above the current market price.

Quantitative benchmarks to inform ARP settings

We have summarised several benchmarks against which the ARP options can be compared in Table 18.

[49] The 'waterbed effect' refers to how an ETS with a fixed cap can neutralise mitigation effects from other policies. The NZ ETS cap however is flexible rather than fixed. We discussed this in more depth in section 11.3.1 of *Ināia tonu nei.*

Table 18 Quantitative benchmarks to inform ARP settings

Minimum NZU prices required to meet budgets	Our modelling testing uncertainty in NZU prices suggests a minimum NZU price path starting from around $60 and rising by 3% per year in real terms.
Costs of specific mitigation options	A higher ARP of at least $50 could better limit risks to investments in gross emissions reductions. This is the approximate threshold for boiler conversions in process heat to start to break even.
Current market prices	Since March 2022, trading prices on the secondary market have been steady at around $75.
International emissions prices	Regulated or forecast emissions prices in peer jurisdictions in 2030 range from $57 to $327. In terms of ETS price floors similar to the ARP, California's is set at $43 in 2030 (in real terms) and Germany's is set at $92 for 2026.
Potential costs of procuring offshore mitigation	A recent Cabinet paper suggests a lower price range of $50-$100 and a higher price range of $110-$170 by 2030 for mitigation available through ETS linkage.[50]

Assessment of options against criteria

We considered options B and C against criteria based on these benchmarks, and considered the overall effect of each option on the proper functioning of the NZ ETS. Our assessment of the three options is summarised in Table 19.

Table 19 Options assessment for the auction reserve price[51]

	Assessment relative to status quo (Option A)	
Consideration	**Option B ($70 in 2030, 3% discount rate)**	**Option C ($100 in 2030, 5% discount rate)**
Alignment with minimum NZU prices modelled to meet emissions budgets	+ Closely aligned.	++ Above. Higher likelihood of meeting or overachieving budgets.
Risks to mitigation investments	+ Reduces risk.	++ Least risk.
Consistency with international emissions prices	+ More in line with floor prices and low end of expected price ranges.	+ Higher than any floor prices planned in other ETSs but still towards low end of expected international prices.
Comparison to potential cost of offshore mitigation to meet NDC	+ Reduced risk, as within the Government's assumed low-end cost range.	++ Least risk.

[50] (Ministry for the Environment, 2021a)
[51] Same key for assessment as Table 9.

Proper functioning of the NZ ETS	+ Limited risk of fuelling speculative demand.	- - Risk of fuelling speculative demand due to proximity to current price and faster annual increase. Narrower corridor for price discovery.

While we consider option C may be equal to or superior to Option B across most criteria, we judge the significantly increased risk to the proper functioning of the ETS relative to Option B to outweigh these potential marginal gains, particularly the risks of encouraging speculation and undermining the intent of the ARP as a rarely triggered safety valve. For this reason, we assess Option B as our preferred option.

It would reduce risks of missing budgets and of domestic prices falling below international prices, while maintaining a sufficiently wide corridor for price discovery based on our modelling analysis.

Recommendations on the auction reserve price

We conclude that the ARP should align with the minimum NZU price path compatible with achieving emissions budgets while prioritising gross emissions reductions.

We conclude that the auction price reserve should be set at:

- $70 in 2030 in 2022 dollars
- Discounted back to 2023 at 3% per year
- Adjusted for inflation according to Treasury's forecasts.

Taken together, we recommend the following levels for the auction price reserve over 2023-2027:

	2023	2024	2025	2026	2027
Auction reserve price	$60	$64	$68	$71	$75

4.5 Desirable emissions price path

Section 5ZOA(2) of the Act states that the Commission must recommend limits and price control settings for units, including "any desirable emissions price path". This is the first time the Commission is giving advice under this section.

The price control measures provide upper and lower bounds of expected future prices. Within those bounds, any desirable emissions price path will depend on the level and scope of other policies to drive emissions reductions, and external factors that affect the cost of mitigation (such as energy prices and exchange rates). These factors are difficult to predict and market participants will determine the trading prices.

We have considered whether to recommend such a price path. We conclude that at this time we are not in a position to define "any desirable emissions price path", given the current context of the NZ ETS and the many uncertainties that will shape future prices.

We wish to emphasise that our recommended price control settings are deliberately outside the bounds we would currently expect price discovery to occur.

Figure 10 shows the trajectories of these recommended settings out to 2030 (in 2022 dollars). Overlaid on this is the path of emissions values in our updated demonstration path, which is consistent with meeting emissions budgets under our central assumptions on the various uncertain factors tested. This is not an NZ ETS price prediction or recommendation, but provides a better indication of the expected cost of mitigation than the recommended price control settings.

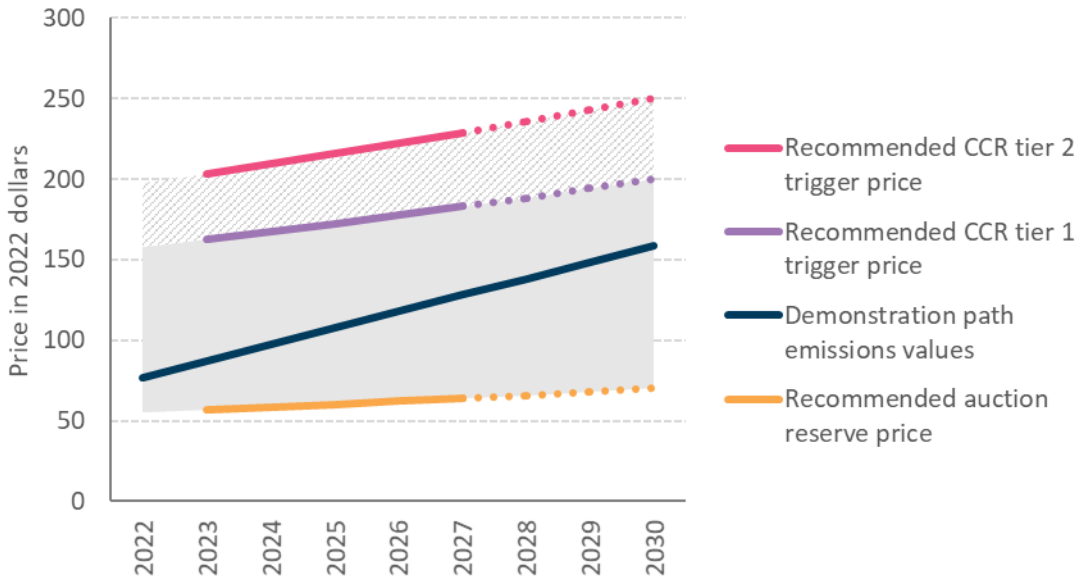

Figure 10 Recommended price control settings bracket the emissions values in the Commission's demonstration path

For the avoidance of doubt, we would like to state clearly that the recommended CCR trigger prices do not constitute "any desirable emissions price path". We have heard that market participants may potentially see the CCR trigger prices as a 'target' or anchor for price expectations in the absence of clearer signals being available. The CCR is intended to only be triggered in rare or exceptional circumstances, and our recommendations reflect this intent. We expect the increased trigger prices to add considerable headroom to allow for price discovery, rather than unduly influencing market price expectations.

Finally, we note that the notion of a desirable price path is problematic while the NZ ETS continues to provide a common price for carbon removals by forests and for gross emissions.

Findings on a desirable emissions price path

We have considered whether to recommend "any desirable emissions price path", per section 5ZOA of the Act.

We conclude that at this time we are not in a position to define any "desirable emissions price path", given the current context of the NZ ETS, its interaction with other climate policies many of which are not yet implemented, and external variables that affect the cost of abatement.

Part 5: Impacts

This section sets out the potential impacts of NZ ETS emissions prices on households and the economy. Identifying and understanding the distribution of emissions price impacts can help inform the design of measures to manage them.

5.1 Context

The recommended price settings in this advice broaden the corridor for emissions prices in the NZ ETS. It is important to understand the potential scale and distribution of impacts of different emissions prices within this corridor to design measures that manage them.

These impacts must be viewed within the broader context. This means considering both short-term and long-term impacts. It also means considering the NZ ETS as one policy of many that will collectively work to reduce emissions to meet emissions budgets and targets.

In this section we summarise the possible impacts in this broader context. More information about the short-term impacts can be found in the following sections.

5.1.1 Emissions price to incentivise shift to low emissions alternatives

The NZ ETS is designed to put a price on emissions in order to incentivise a shift to low emissions alternatives. The intended impact is that emissions-intensive goods become more expensive over time relative to less emissions-intensive alternatives. In effect, this 'levels the playing field' as the emissions externality is captured.

In turn, a price on emissions encourages emitters to change behaviour so they can avoid paying extra cost, to choose more efficient and less emissions intensive solutions when making investment decisions, and to innovate to find new lower emissions solutions.

Over time, we expect that the increase in cost of emissions intensive goods will be able to be managed by consumers and business by shifting to lower emission choices; for example, increasing the share of renewable electricity generation will over time reduce the projected impact of increased NZ ETS costs on the price of electricity.

5.1.2 Positive impacts in the long-term

Our analysis from *Ināia Tonu Nei* showed that the transition to a low emissions society can be economically achievable and socially acceptable. To achieve this, it must be well-paced, well-planned, well-signalled and co-designed.

It is important that the speed and nature of the transition is well-signalled to allow time to plan. That includes sending a clear price signal through the NZ ETS, supported by the predictable management of the NZ ETS by the Government.

In many cases the investments made now will more than pay for themselves in the long term. Such investments include those in energy efficiency, electric vehicles, renewable electricity generation, fuel switching, and improving on-farm efficiency. Delaying these investments would result in greater cost to the economy and society.

In *Ināia Tonu Nei*, our modelling showed that the economy would continue to grow under our recommended emissions budgets. However, we also found that the transition would be more costly if key measures were not successfully rolled out, like electric vehicles and improvements in the emissions efficiency of agricultural production.

A weak price signal in the near term risks inaction which pushes the burden of reducing emissions onto future generations. Aotearoa New Zealand would need to undertake faster and costlier action in the future to stay on track to meet climate change targets. Delayed action could limit choices in the long term.

Over the long term, the cost impact of higher emissions prices should decrease. Households and businesses will increasingly be able to take advantage of low emissions alternatives. Improvements to housing quality and increased energy efficiency standards for appliances will also improve household energy related costs over time. However, it is critical that the Government assess and put in place measures in the interim to support households and the economy during the transition to ensure all New Zealanders are brought along.

5.1.3 Targeted assistance for managing any increased costs in the short-term

Rising emissions prices in the short term will increase costs if there are no lower emissions alternatives. Businesses facing higher emissions prices will respond in a variety of ways but are likely to pass on any unavoidable costs to consumers where possible.

The potential for increasing costs show the importance of a price corridor in providing guard rails that allow the NZ ETS to work as intended without significant undue impact.

Some groups of society will be more negatively impacted than others by any increased costs in the short term. These negative impacts will best be managed by the Government putting in place policies alongside the NZ ETS to support those most disadvantaged and those least able to adjust. Targeted assistance would be needed to ensure that low income households can access low emissions technologies and are not disproportionately affected by the transition.

Policies are also needed to address the full range of barriers to reducing emissions – making it easier for consumers and businesses to make lower emissions choices. Examples of barriers include split incentives, difficulties accessing capital, lack of information, and lack of time and capacity to act. Complementary policies to overcome these blockages will unlock more cost effective emissions reduction opportunities and help avoid the NZ ETS imposing unnecessarily high costs.

The NZ ETS price control settings are not well suited for addressing domestic distributional impacts or other equity considerations in the transition to a thriving, low emissions and climate-resilient economy. Managing the effect of sustained increased prices, if these are required for meeting emissions budgets, is also not the intended purpose of the NZ ETS price controls.

5.2 Overall the economy will continue to grow

In *Ināia Tonu Nei*, our economic modelling indicated that the economy would continue to grow under the recommended emissions budgets. We assessed that the level of GDP could be around 0.5% lower in 2035 and 1.2% lower in 2050 than it would be otherwise.

Under a 2019 Current Policy Reference (2019 CPR) scenario, GDP was projected to grow to $388 billion by 2035 and $487 billion by 2050. Meeting our recommended emissions budgets through the demonstration path would result in GDP growing to about $386 billion by 2035 and would put Aotearoa New Zealand on track for GDP to grow to $481 billion by 2050.

However, we also assessed that meeting the 2050 targets at this cost to the economy relies on the successful roll out of electric vehicles and improving the emissions efficiency of agricultural production so that production can be largely maintained. The overall impact to GDP would be higher – potentially reducing GDP by up to 1% in 2035 – if these key measures are not successfully rolled out.

5.3 There may be direct impacts on energy prices

5.3.1 Electricity

Emissions prices are one of the factors that may affect the cost of electricity that consumers pay.

However, wholesale electricity prices vary due to a range of factors in addition to emissions prices. For example, fossil fuel prices and availability, demand growth, and the timing of renewable build can have significant impact on wholesale prices. Any government intervention in market structure, or push towards 100% renewable electricity, can also influence wholesale prices.

Exactly how wholesale electricity prices translate into costs for households and businesses also depends on multiple things, including pricing structures, transmission costs, and taxes.

Nevertheless, it is possible to look at the relative impact rising emissions prices will have on wholesale prices. This can give an indication of any cost consumers may face.

Wholesale electricity prices are sensitive to emissions prices whilst emitting generation remains

Rising emissions prices will increase wholesale electricity prices in the short term, but the impact will reduce as the proportion of renewable electricity generation increases. Emissions prices affect the operating costs of thermal (fossil gas and coal) and geothermal generation, and this influences how they run and what other generation is built.[52]

The Commission carried out new modelling to increase understanding of the effect of different emissions prices on wholesale electricity prices. Figure 11 shows electricity market modelling results for four scenarios with fixed electricity demand growth and varied emissions pricing. These scenarios test the impact of emissions pricing, isolated to the electricity system. Additional details on electricity market modelling can be found in Technical Annex 3.

This differs to the modelling we undertook for *Ināia Tonu Nei* where we sought to understand how wholesale prices might evolve under a demonstration path with a single emissions price trajectory. Modelling a range of emissions prices within the price corridor does not replace the emissions values from our *Ināia tonu nei* advice as our best estimate of the abatement costs associated with meeting emissions budgets. Rather, this new analysis gives greater insight as to what the impacts of different emissions prices arising in the NZ ETS might be if the future plays out differently from the assumptions used in that analysis.

[52] Emissions pricing increases the cost of thermal generation and affects how hydro generation is priced. Emissions pricing increases the prices at which this generation is offered into the market and the average wholesale price over the year. As fossil generation is displaced by renewables, this impact is reduced.

The impact of emissions prices on electricity prices reduces over time

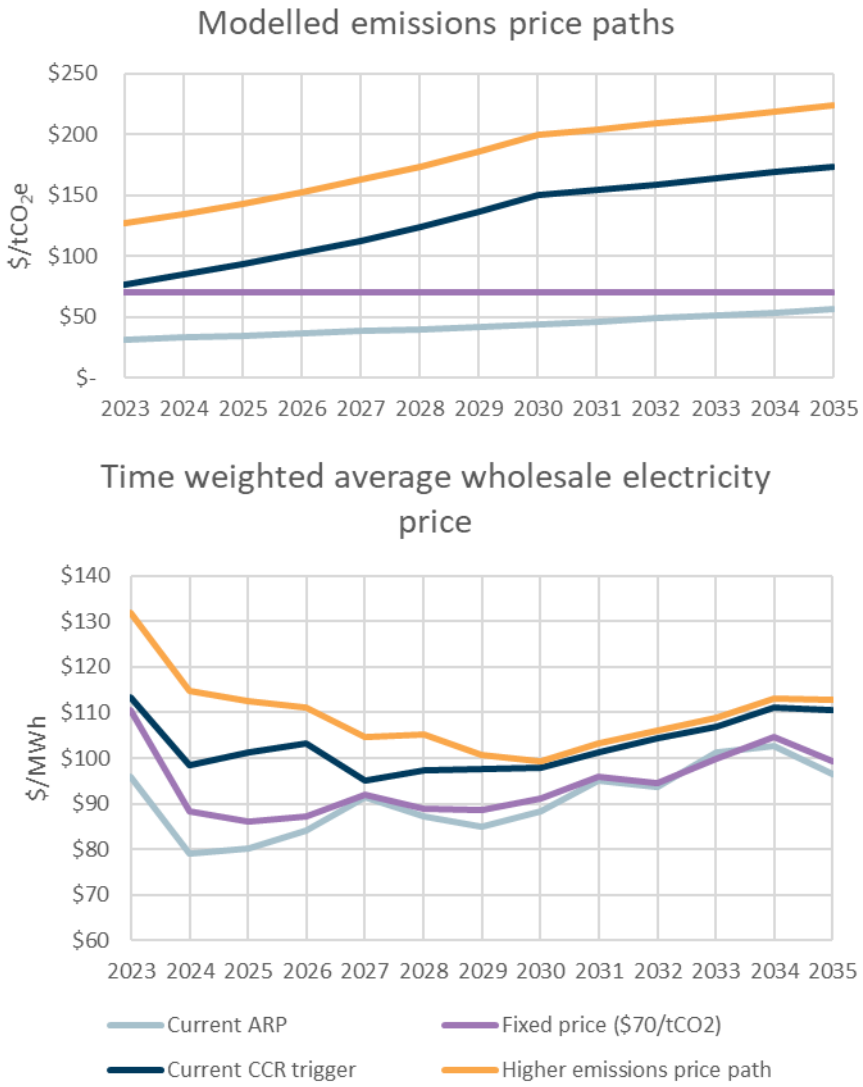

Figure 11 Modelled emissions price paths (top) and their impact on time-weighted average (TWA) wholesale electricity prices.[53]

The top graph in Figure 11 shows our assumed emissions price trajectories for each of the four scenarios. The bottom graph in Figure 11 shows the corresponding wholesale electricity price trajectory.

This modelling shows that scenarios with higher emissions prices have higher wholesale electricity prices compared to scenarios with lower emissions prices. However, this effect decreases over time, as the proportion of renewables increases. By around 2029, wholesale electricity prices begin to track the long run marginal cost of new entrant renewable generation.

Actual wholesale prices are highly sensitive to weather and could be expected to be higher or lower than the modelled averages presented here. The inflows into the lakes used for hydro generation can cause significant

[53] Prices are in 2022 dollars for the Haywards grid exit point (GXP) and the average (mean) across all simulated weather years.

variation in wholesale prices from year to year. Higher prices coincide with periods of low inflows. This weather dependence has been included in our modelling, but in Figure 11 above we present the average across the simulated weather years.

Wholesale electricity prices fall in absolute terms over the next few years

Our modelling shows that wholesale electricity prices fall in absolute terms over the next few years, despite a steadily increasing emissions price. This is due to the easing of current fossil gas supply shortage and the completion of renewable base load generation. This result is consistent with the modelled wholesale electricity price trajectories in *Ināia Tonu Nei,*

Over the longer-term, modelled wholesale prices follow a trajectory similar to that identified in *Ināia Tonu Nei.* Modelled prices are somewhat higher than those in *Ināia Tonu Nei* for a variety of reasons, including the updated NZ ETS assumptions (as set out above) and inflationary pressures including new generation projects with higher capital costs.

In 2021 the actual time weighted average (TWA) price was around $180/MWh. However, the price over the period since 2013 has averaged around $110/MWh (2022 prices). All of our modelled scenarios have wholesale prices which are similar to this long-term historical average.

We also modelled a scenario where the Tiwai Point aluminium smelter closes at the end of 2024 at the conclusion of its current main electricity supply contract. Wholesale electricity prices fall abruptly at the time of exit and renewable generation provides a greater proportion of supply. At this point, the emissions price should have little influence on average market prices.

How short-term changes in wholesale electricity prices will affect electricity bills is uncertain

If the emissions price rises, residential, commercial, and industrial consumers may see some impact on their electricity prices over time as some or all of this cost is passed on. However, exactly how electricity bills could change is highly uncertain and depends on the range of factors affecting electricity prices and household electricity demand. The analysis presented below singles out the potential impact of different emissions prices on electricity prices in isolation of the other effects.

The electricity price is only one component of a bill. The price that consumers pay for electricity covers the cost of generating the electricity, as well as the lines and infrastructure that distribute it. There are also taxes, retailing costs and other components which contribute to an electricity bill.

Most electricity consumers are not exposed to fluctuations in the wholesale electricity market. Households pay a flat rate for each unit of electricity they consume to protect them from wholesale price volatility – referred to here as the retail electricity price. The timescale on which any wholesale price increases are passed on may vary by customer segment. For example, it is unlikely that current residential retail prices fully reflect the impact of the rapid rise in the NZU price over the past 18 months as residential contracts are based on longer term trends.

We have estimated potential high and low retail price impacts based on different assumptions around how wholesale price impacts might be passed through to consumers. These are in given Table 20 below. The high impact assumes that the average of the modelled wholesale price impact over the period of 2023-2027 is passed through to consumers. The low impact assumes that consumer price increases are based on average wholesale price impact out to 2035.

Table 20 Current retail electricity prices and estimated emissions price impact from increasing emissions prices[54]

			Emissions component of price (c/kWh)				
			Emissions price ($/tCO2e)				
	Sector	**2021 price (c/kWh)**	*50*	*100*	*150*	*200*	*250*
High impact	Residential	30.6	1.9	3.8	5.7	7.6	9.5
	Commercial	18.5	1.7	3.3	5.0	6.6	8.3
	Industrial	17.1	1.6	3.1	4.7	6.2	7.8
Low impact	Residential	30.6	1.1	2.2	3.3	4.4	5.5
	Commercial	18.5	1.0	1.9	2.9	3.8	4.8
	Industrial	17.1	0.9	1.8	2.7	3.6	4.5

The 2021 price is presented in this tables to give a sense of scale. However, these estimated figures for the emissions component of electricity prices are only one of many other factors that will affect future electricity prices. It would not be appropriate to add our estimated emissions component of price to the 2021 price in order to infer a future estimated price.

This analysis does not factor in consumers and businesses adjusting their behaviour in response to a rising emissions price by shifting to higher efficiency technologies and practices and therefore do not reflect the costs actually felt by consumers. For example, energy efficiency improvements can enable consumers to use less energy, improve the level of comfort in their homes, and reduce peak electricity use. This could have an impact on overall consumer bills.

Consumer electricity prices also include a component to cover the cost of transmission and distribution networks. Regulation has recently been amended around transmission cost allocation, and for residential consumers, the low fixed charge tariff regulations are being phased out. Shifting or contributing new demand, such as EV charging, to off-peak times can also reduce average prices. Changes like these could have material impact on consumer prices and bills, but they are beyond the scope of this analysis. Exactly how consumer bills could change is highly uncertain and dependent on many factors.

The Government could support consumers in the transition through continued implementation of recommendations from the Electricity Price Review, timely implementation of updates to the Building Code, and by ensuring the regulatory regime can deliver abundant, affordable, and reliable low emissions electricity to support electrification of different parts of the economy. An increase in electricity prices could affect the economic feasibility of accelerating emissions reductions through the electrification of process heat, space and water heating, and transport.

[54] 2021 prices are based on MBIE reporting. All prices have been inflated to 2022 prices. Residential prices include GST. The 2021 price includes the estimated emissions cost component of a $50/tCO$_2$e emissions price.

5.3.2 Fossil fuels

We expect higher emissions prices to increase prices for fossil gas, diesel, petrol and coal for residential, commercial, and industrial consumers. The direct impact of emissions pricing on fossil fuel prices depends on the emissions intensity of the fuel. For example, emissions pricing has a larger impact on the price of coal than fossil gas as coal is a more emissions intensive fuel.

Residential, commercial, and industrial consumers will face different fossil fuel costs

Because fuel prices differ between consumer types, the relative price impact of emissions pricing is not consistent between residential, commercial and industrial consumers. Residential consumers pay a higher price for fossil gas largely because their service requires a distribution network. As a result, increases in the emissions component of the price affect industrial users proportionally more than residential users. In 2021 residential users paid on average 14.6c/kWh for fossil gas, compared with industrial users who paid 3.2c/kWh. An emissions price increase from \$50/tCO_2e to \$100/tCO_2e adds approximately 1c/kWh to the price of fossil gas which is an 8% increase for residential users, but a 31% increase for industrial users.

Shown in Table 21 below is the direct impact of emissions pricing on the price of fossil fuels by consumer segment, assuming 100% emissions price pass through to consumers including in the reference year of 2021. Given this assumption, these estimates are likely to overstate the potential impact. The 2021 price is presented in this tables to give a sense of scale. However, these estimated figures for the emissions component of fuel prices are only one of many other factors that will affect future fuel prices. It would not be appropriate to add our estimated emissions component of price to the 2021 price in order to infer a future estimated price.

Table 21 Estimated emissions price component of fossil fuels from increasing emissions prices[55]

			Emissions component on fuel price				
			Emissions price ($/tCO₂e)				
Fuel	**Sector**	**2021 price**	*50*	*100*	*150*	*200*	*250*
Fossil gas (c/kWh)	Residential	14.7	1.2	2.3	3.5	4.6	5.8
	Commercial	6.6	1.0	2.0	3.0	4.0	5.0
	Industrial	3.2	1.0	2.0	3.0	4.0	5.0
Diesel (c/l)	Retail	150.6	15.4	30.7	46.1	61.5	76.8
Petrol (c/l)	Retail	224.7	13.4	26.9	40.3	53.8	67.2
Coal ($/GJ)	Industrial	10.0	4.5	9.0	13.6	18.1	22.6

Targeted assistance to support a switch to alternatives

As with electricity prices, these estimated increases in prices do not reflect the actual costs faced by consumers. As consumers switch to lower emissions alternatives, they will reduce their exposure to the

[55] 2021 fossil gas and liquid fuel prices are from MBIE prices statistics (Q1 2022 release), coal price is an estimate. Prices have been adjusted to 2022 dollars. Residential prices include GST. The 2021 price includes the estimated emissions cost component of a \$50/tCO_2e emissions price.

emissions prices and reduce costs. However, for those who are unable to switch, reduced demand could lead to higher per-unit cost recovery for the fixed costs of fuel production and supply which could further increase prices that they are exposed to.

Government initiatives to support consumers in managing energy demand and switching away from fossil fuels can help mitigate the impact of rising fossil fuel prices. We welcome the expanded funding for the Energy Efficiency and Conservation Authority's programmes under Budget 2022 and the Climate Emergency Response Fund (CERF). However, as we highlighted in *Ināia tonu nei,* Government leadership and cross-sector collaboration will be important to support the development of robust low emissions fuel supply chains, and to ensure measures are put in place to develop the skills and capability required to identify and deliver these emissions reduction opportunities at pace.

5.4 Impacts on households will vary

5.4.1 Short-term impacts

A rising emissions price risks exacerbating inequities already experienced by many people in socioeconomically disadvantaged groups – including Māori and Pasifika communities, low income New Zealanders, women, and people with disabilities.

Individuals and households are also less likely to optimise for costs in the same way that industrial entities would in the face of a price signal. The ability for people to optimise for costs may also be hindered by lack of information, split incentives, fewer resources, existing infrastructure, or limited access to less emissions-intensive options.

Lower income households may be affected more in the short-term

We have estimated the potential direct short term financial impact on households across an emissions price range in line with our recommended price corridor.[56] As with the previous analysis, these estimates represent the maximum potential impact as they do not include technological or behavioural change. Such responses would be expected to reduce costs.

As noted earlier, modelling a range of emissions prices within the price corridor does not replace the emissions values from our *Ināia tonu nei* advice as our best estimate of the abatement costs associated with meeting emissions budgets. This new analysis gives greater insight as to what the impacts of different emissions prices arising in the NZ ETS might be if the future plays out differently from the assumptions used in that analysis.

Without any behavioural or technological change, increases in the emissions price will increase energy prices, leading to higher energy costs for food producers and retailers. If these a fully passed onto consumers, food prices could increase between 0.11% and 1.08% across our range of modelled emissions prices (relative to the year ending June 2019, when the emissions price was \$24.73/tCO_2e (nominal)).[57]

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[56] These results are not official statistics. They have been created for research purposes from the Integrated Data Infrastructure (IDI) which is carefully managed by Stats NZ. For more information about the IDI please visit https://www.stats.govt.nz/integrated-data/. The results are based in part on tax data supplied by Inland Revenue to Stats NZ under the Tax Administration Act 1994 for statistical purposes. Any discussion of data limitations or weaknesses is in the context of using the IDI for statistical purposes, and is not related to the data's ability to support Inland Revenue's core operational requirements.

[57] Table 22 sets out a range of impacts on households at different emissions prices. This shows as emissions prices rise, lower income households spend a greater percentage of their disposable income on fuel and food costs compared to higher income households. These figures show a highly conservative scenario as they do not factor in any measures to mitigate that impact and assume 100% emissions price pass-through simultaneously and instantaneously.

Table 22 sets out potential impacts on households with different incomes, based on different emissions prices assuming no behavioural or technological change. This includes potential impacts related to both food and energy prices.

This table shows as emissions prices rise, lower income households can be expected spend a greater percentage of their disposable income on fuel and food costs compared to higher income households. These figures show a highly conservative scenario as they do not factor in any measures to mitigate that impact and assume 100% emissions price pass-through simultaneously and instantaneously.

Table 22 Median change in household expenditure on fuel and food as a percentage of household disposable income assuming no behavioural or technological change, given increases in emissions prices[58]

Emissions price ($/tCO$_2$e)	Quintile 1 (low income households)	Quintile 2	Quintile 3 (middle income households)	Quintile 4	Quintile 5 (high income households)
27.5	0	0	0	0	0
50	0.25%	0.19%	0.16%	0.13%	0.08%
100	0.81%	0.61%	0.51%	0.42%	0.27%
150	1.36%	1.03%	0.86%	0.70%	0.45%
200	1.92%	1.45%	1.21%	0.99%	0.63%
250	2.48%	1.87%	1.57%	1.28%	0.82%

Many households in socioeconomically disadvantaged groups tend to spend a greater proportion of their income on emissions-intensive goods, even though the absolute level of such consumption tends to be lower and the absolute dollar effect less.[59]

Households in rural areas or on the outskirts of urban centres are likely to have greater dependence on private vehicle transport and may face emissions-related costs higher than the national average. Other factors, for example, geographic location, household composition, proximity to public transport, housing quality, home ownership status/agency over home appliances, or ability to purchase an electric vehicle will also play a role. Continued improvements in vehicle fuel efficiency, higher standard for energy efficient electric appliances, and shifts to lower emissions forms of transport may help to manage increases in costs from rising emissions prices.

Targeted assistance reduces the potential impact

This modelling gives us an indication on the relative distributional impact of emissions prices on household incomes. In reality, the actual impact is likely to be smaller. This is because the modelling does not account for household behaviour changes to reduce emissions, or what the Government is doing or planning to do to reduce potential costs. For example, the modelling does not include the temporary reductions in fuel excise duties, road user charges and public transport fares; or the effect of policies to support emissions reductions such as the Clean Car package or supports for home energy efficiency. The emissions price impacts could also

[58] Te Tai Ōhanga Treasury analysis (2022). Changes in expenditure are presented across all population groups and include households with zero expenditure. Prices have been inflated to real 2022 dollars.
[59] Te Tai Ōhanga Treasury analysis (2022).

be partially alleviated by indexation of benefits, superannuation, tax credits to inflation (CPI), and wage growth. Therefore, this modelling is likely to overstate the actual cost to all households.

While the magnitude of the impacts across households and the economy appear moderate, they are not insignificant or evenly distributed.

There are other short-term pressures on household costs

The emissions price is a comparatively small proportion of the total costs faced by households. For example, the emissions price accounts for approximately 7% of the price of one litre of petrol.[60] However, as the emissions price rises, direct and indirect costs will add to pressures currently faced by households and businesses.

Since the release of *Ināia Tonu Nei* , geopolitical conflict in eastern Europe and a global energy crisis have resulted in volatile fuel prices. The average price for one litre of 91 octane petrol peaked at $3.05 in the March 2022 quarter, up from $2.00 in the March 2021 quarter (including discounts). This is the largest annual increase since the June 1985 quarter.

This increase in petrol prices, alongside rising prices for construction and rentals for housing, have pushed up annual inflation to a 30-year high of 6.9%.[61] The Treasury has forecasted annual inflation to remain above the long-run stable assumption of 2% until 2027/28.[62]

Understanding the cumulative impacts of different policy measures on households is necessary to ensure a coordinated approach to supporting the transition to a low emissions economy. Robust distributional impacts assessment of climate policies across people, time and place is needed to inform policy design so that disadvantaged groups are not further disadvantaged, and, where possible, reduce existing inequities.

5.4.2 In the longer-term, households will be better off

The direct impacts outlined in the section above represent a short-term snapshot of potential household impacts under higher emissions prices with the assumption that behaviour does not change in response to price, low emissions alternatives are not taken up, no additional measures are introduced to manage the impacts, and that the economy remains the same.

While this provides useful insight about the potential magnitude of financial impacts from a higher emissions price, it does not account for longer term changes to the economy in the transition, or from measures such as improved housing quality, declining total cost of ownership for electric vehicles, and improvements in the energy efficiency of appliances. As a result, the long-term impact of emissions prices will be less than stated above, as households take up low carbon technologies and change their behaviour.

5.5 Businesses and industries

5.5.1 Emitting firms

Impacts across businesses and industries can be distinguished between those who are emissions intensive and trade exposed (EITE) and those who are not. For EITE industries, a rising emissions price could impact competitiveness and the risk of emissions leakage. This risk is currently managed through industrial allocation

[60] (Ministry of Business, Innovation, and Employment, 2022)
[61] (Stats NZ Tatauranga Aotearoa, 2022a)
[62] (Te Tai Ōhanga The Treasury, 2022b)

which substantially reduces the cost of the NZ ETS for these businesses, which we discussed in more detail in part 3.

The Government is currently reviewing industrial allocation policy as there is evidence that some activities are receiving more NZUs than is necessary to reduce the risk of production shifting overseas. Non-EITE activities and businesses without compliance obligations are expected to face far fewer direct cost impacts from a rising emissions price.

Impacts will vary across firms

Rising emissions prices are likely to affect large and small businesses differently. MBIE's 2021 Business Operations Survey[63] indicates that larger businesses are more likely to make climate change-related investments over the next five years. Larger firms typically have more resources and capability to respond to regulatory requirements and are in a better financial position to bear compliance costs, for example through hedging and other contractual arrangements.

Smaller firms are more likely than larger businesses to report that they lack the time, technical, and organisational resources to implement measures which might make them more resilient to climate change.[64] In Aotearoa New Zealand, 97% of all businesses are classified as small or medium enterprises.[65]

5.5.2 Electricity generators

Higher wholesale electricity prices and generation revenues cover the additional cost of carbon on fossil gas, coal and geothermal generation when it is operating. However, much existing generation is not subject to these emissions costs and the higher market prices could translate to increased earnings.

We have analysed EBITDA (Earnings Before Interest, Taxes, Depreciation, and Amortization)[66] at a generation plant, project, or hydro-scheme level for our modelled electricity market scenarios. This analysis shows that higher emissions prices translate to increases in EBITDA for existing renewable generation. In the scenario with emissions prices tracking the current CCR trigger prices, existing renewable generation EBITDA is $1.6 billion more over 2023-2027 than if prices held at $70/tCO2e as illustrated in the graph below.

[63] (Ministry of Business, Innovation and Employment, 2022)
[64] (Ministry of Business, Innovation and Employment, 2021)
[65] (Ministry of Business, Innovation and Employment, 2020)
[66] EBITDA is spot market revenue less fuel and emissions costs, and operation and maintenance costs.

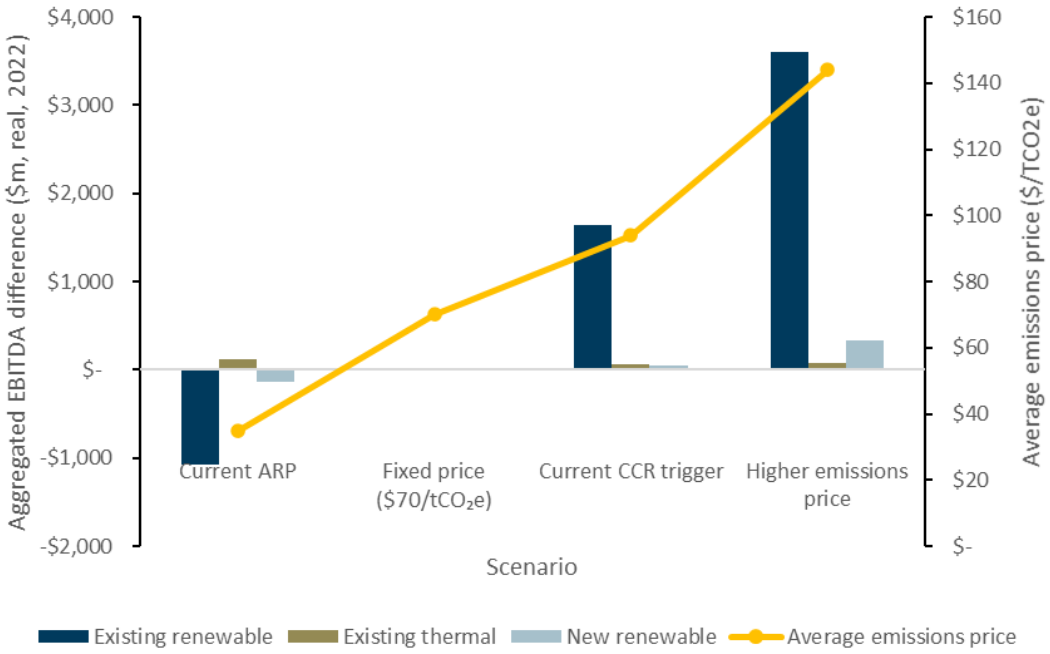

Figure 12 Difference in aggregated EBIDTA between scenarios by generation type. Values are totals across 2023-2027 and the average across simulated weather years

There are complexities in the electricity market which affect whether these modelled earnings increases will be realised by firms which generate electricity if emissions prices continue to rise. It will depend on how wholesale price increases are passed through to retail contracts and the hedging position of market participants. These dynamics have not been analysed. However, there is potential for substantial financial gains by electricity generators because of emissions price increases and this may warrant further investigation by the Government. The Government could also consider whether these earnings are needed for reinvesting into the energy system to ensure the grid is ready to meet future needs, or whether they should be passed through as savings to consumers.

5.6 Impacts on Iwi/Māori

5.6.1 Māori economy

There is limited evidence available about the distributional impacts and opportunities of the low emissions transition for the Māori economy, especially in connection with the NZ ETS.

As we concluded in *Ināia Tonu Nei,* regardless of the NZ ETS price control settings, addressing existing barriers resulting from historical injustices faced by Māori-collectives is essential for an equitable transition. The Government should work in partnership with Iwi/Māori to support Māori-led approaches to understanding impacts of NZ ETS settings on the Māori economy and to identify options that enable them to compete on a level playing field.

Historically, governments have advanced policies that have resulted in poor outcomes for Iwi/Māori including constraining development and productivity, limiting expansion of industries, disrupting local supply chains, and negatively impacting employment for Iwi/Māori. For example, Māori-collectives own a significant proportion

of assets in the primary sectors, including 40% of forestry in the country.[67] There is a considerable amount for pre-1990 forest on the whenua of Māori-collectives. We heard through our engagement on *Ināia Tonu Nei* that the NZ ETS effectively locks this whenua into commercial forestry due to NZ ETS liabilities coupled with limited ability to raise capital or put forward collateral. Iwi/Māori need to be able to exercise their rangatiratanga and mana motuhake to make decisions on how to use or develop their whenua to meet their collective and culturally driven aspirations and needs.

Māori-collectives already face access to capital barriers, independent of climate policy or a rising emissions price.[68] The transition towards a low emissions economy is likely to require significant capital expenditure to replace some assets with lower emissions alternatives.

There may be flow-on effects to the workforce as businesses and industries are faced with increasing cost pressures. Iwi/Māori account for a larger share of employment in high emissions intensity industries (23% of the workforce), such as metal product manufacturing and wood, pulp and paper manufacturing, than low emissions intensity industries (14% of the workforce).[69]

It is important that Crown initiatives, and Māori-led decision making and investments, give consideration to the opportunities new and emergent technologies will create, as well as the disproportionate representation of Māori in labouring jobs. The Government should put in place comprehensive education and labour market policies that support Iwi/Māori to develop relevant skills needed for the transition.

5.6.2 Emissions prices could disproportionately impact whānau Māori

Action to address climate change could have disproportionate impacts on whānau Māori. As we highlighted in *Ināia Tonu Nei*, average incomes for Māori are significantly less than for all New Zealanders. At 50 years of age, Māori on average earn nearly $15,000 less than non-Māori per year. There is also a major wealth disparity between Māori and all New Zealanders; the mean value of individual Māori net worth is $204,000 compared to $411,000 for all New Zealanders.[70]

These income and wealth gaps mean that it is likely to be more difficult for Māori in lower income bands to uptake low emissions technology if not given support to transition. The Government must ensure there are Māori-led solutions and initiatives to support the transition to higher paid, low emissions jobs which will have a flow-on effect on the ability for households to adopt low emissions technologies, reducing the impact of the emissions price. This must be accompanied by equitable access to education and skills development.

For example, for whānau Māori, the median impact of a higher emissions price on petrol will be greater compared to all New Zealanders. This difference is driven by the larger percentage of Māori households that have petrol expenditure (60%) compared to all households (54%).[71] When looking at only households with petrol expenditure, the impact is roughly the same. Other factors may include longer commutes to employment and education, less proximity to public transport, and potentially greater need for travel from urban areas to their marae tipuna in remote or rural communities.

[67] (Ministry of Foreign Affairs and Trade (MFAT), 2017)
[68] (McMillan et al., 2021)
[69] (Ministry of Business, Innovation and Employment, 2021)
[70] (BERL, 2017; BERL & Reserve Bank of New Zealand, 2018)
[71] Te Tai Ōhanga The Treasury analysis (2022) based on Household Economic Survey (2019) with expenditure

5.6.3 An equitable transition for Iwi/Māori

As emphasized in *Ināia Tonu Nei*, the Government needs to ensure that Iwi/Māori have the tools and resources they need to participate in the transition to low emissions. This includes addressing inequities in the evidence and information used to inform policies and programmes, and supporting Māori-collectives to work within their takiwā to develop their own tools and data sources. The establishment of a platform for Māori climate action to support a Māori-led approach to an equitable transition for Iwi/Māori and the Māori economy is a promising initial step by the Government.

The Treasury could undertake further modelling to better understand the impacts of higher emissions prices on Māori households. Analysis at a regional level or using an urban/rural split would provide more insight.

5.7 Sectors and regions

The impacts of the NZ ETS across regions will be strongly influenced by the make-up of the local economy and workforce. Some regions have a higher concentration of emissions intensive industries, particularly Southland, Taranaki, Gisborne and the West Coast. In contrast, in more urban areas employment is concentrated in low emissions intensity industries reflecting services sectors.

The size and structure of a region's economy also affects how able it is to adjust to changes in NZ ETS prices and the transition to a low emissions economy. Some regions will have a greater ability to adjust than others. Larger and wealthier regions are likely to have more resources to plan for the transition. Other regions may need more support.

In *Ināia Tonu Nei*, we noted that increasing the amount of native and exotic forest – afforestation – could play a role in helping achieve the country's emissions budgets and emissions reduction targets. The impacts of any afforestation will depend on the scale, pace, and species of trees that are grown, the purpose for which the trees are grown, the type of land that is afforested, and the land use that is displaced.

We also heard throughout our engagement and consultation for *Ināia Tonu Nei* about the concern that whole farms could be planted in exotic forests, either for production forestry or permanent carbon forestry. This could have negative impacts on rural communities and provincial centres that are reliant on the food and fibre industry for employment. This would include not only those working on the land, but also those involved in transporting and processing food and fibre products, and providing services to rural communities.

A changing emissions price has the potential to drive significant conversion of farmland to forestry, impacting rural communities. The scale of conversion and associated unit supply into the NZ ETS could be substantial and could affect the achievement of gross emissions reductions.

Production forestry and permanent forestry are very distinct business models and appeal to different entities. As the NZU price increases, the profitability of both types of forestry increase. At higher emissions prices, the relative affordability of land swings in favour of permanent forestry.[72]

The impact of the NZ ETS on land-use change can be material to the economy in some communities. Addressing this issue may require further changes to the design of the NZ ETS which are beyond the scope of this advice and may have implications for future NZ ETS settings advice.

[72] (Manley, 2021)

The Government has committed to supporting regions to manage the transition through the Regional Strategic Partnership Fund, Regional System Leadership framework, and the Just Transition Partnerships Programme. Regional support will be critical in supporting regions that face particular transition challenges.

5.8 Policies for a fair, inclusive and equitable transition

The Government has committed to a just transition.[73] Measures to deliver on this commitment need to form a part of the Government's emissions reduction plan, Economic Plan[74] and Just Transitions work programme. Transparent, inclusive and co-designed processes through active dialogue from all social groups and communities regarding the transition will be critical to ensuring the transition is durable and acceptable. Participation is critical to ensure an effective partnership that upholds the principles of Te Tiriti o Waitangi/The Treaty of Waitangi.

There are limits to the extent that climate change policies can address broader issues around cost of living, supporting the wellbeing of New Zealanders, business competitiveness, and improving broad environmental, social, and economic outcomes. Climate change policies on their own may not sufficiently address the challenges that socioeconomically disadvantaged groups face in the transition to a low emissions economy.

This will require coordination across the system to support long-term and large-scale transformational change across sectors, regions and communities. However, different parts of the system, led through different agencies, are often working towards differing outcomes under the broad banner of a just transition. For instance, some initiatives target regional economic productivity and innovation whereas others are targeted towards an equitable and inclusive transition for workers.

As part of the emissions reduction plan, the Government intends to develop an Equitable Transitions Strategy. The emissions reduction plan also recognises the need for a resilient welfare system to support workers and households.

The Government has committed to monitoring whether the level of support provided through income support payments are adequate should emissions reduction policies, including the NZ ETS, result in higher costs for households. There are multiple options for how such support could be provided.

As an example, the Climate Emergency Response Fund could support a 'carbon dividend' to households. If all 1.919 million households[75] received a payment to offset the median increase in fuel and food costs from a $150 emissions price, around 54% (or $1.3 billion) of annual NZ ETS revenue would be needed.

[73] As a signatory to the 'Supporting the Conditions for a Just Transition Internationally' declaration.
[74] (Ministry of Business, Innovation, and Employment, 2019) The Government's Economic Plan was produced in 2019 and identifies eight key shifts the economy needs to make to be more productive, sustainable and inclusive.
[75] (Stats NZ Tatauranga Aotearoa, 2022b)

Findings on impacts

In the absence of complementary policies, higher emissions prices will result in disproportionate impacts on lower income households and those least able to adjust. The NZ ETS price control settings are not the appropriate tool for addressing domestic distributional impacts or other equity considerations in the transition. These distributional impacts can be best managed if the Government puts in place targeted policies alongside the NZ ETS to support those most disadvantaged and those least able to adjust.

While the magnitude of the impacts across households and the economy appear moderate, they are not insignificant or evenly distributed. A rising emissions price is likely to increase direct and indirect costs in the near term that will add to the mounting pressure currently faced by households and businesses from rising inflation and other factors.

The impact of the NZ ETS on land-use change can be material to the economy in some communities. Addressing this issue may require further changes to the design of the NZ ETS which are beyond the scope of this advice and may have implications for future NZ ETS settings advice.

It is critical that the Government puts in place a suite of complementary policies to deliver on the commitment of a fair, inclusive and equitable transition, and to strengthen the capability of Aotearoa New Zealand to adjust over time, while ensuring strong incentives to transition towards a low emissions economy.

We reiterate our recommendations in *Ināia Tonu Nei* that the Government should:

- support a Māori-led approach to understanding and addressing the impacts of the NZ ETS and other climate policies on the Māori economy and Iwi/Māori.
- work in partnership with Iwi/Māori to advance a Māori-led approach to an equitable transition for Iwi/Māori and the Māori economy.

Part 6: Other NZ ETS issues

As noted in section 1.4, several issues related to NZ ETS design and operation came up in the development of this advice. These matters are out-of-scope, however it is important that they are addressed or considered in other advice or policy processes. The issues fall into two categories:

- wider NZ ETS market governance and system design issues
- alternative, out-of-scope approaches to NZ ETS unit limits and price control settings.

We have not undertaken a full analysis of these issues so are only able to provide initial commentary here.

6.1 Wider NZ ETS issues

6.1.1 Market governance

The Ministry for the Environment (MfE) consulted in 2021 on improving the market governance framework for the NZ ETS, but no proposals for change have been put forward.[76] As we recommended in *Ināia Tonu Nei,* establishing an effective market governance regime for the NZ ETS as soon as possible is important for mitigating risks to market function.

Market participants we spoke to had a range of views about whether the current market governance arrangements were appropriate. A number were concerned that increasing speculative activity could distort the market. This is an emerging issue in emissions trading schemes internationally, however it remains unclear whether this is a problem in the NZ ETS. Furthermore, the nature of the market governance in the scheme means that there is little data available to shed light on this issue.

6.1.2 Industrial allocation

MfE also consulted in 2021 on proposals for change to industrial allocation policy, citing evidence of overallocation to some activities.[77] We hope the Government is progressing this work as a priority and look forward to the learning the results of the policy development process on this issue. We note that the volume of industrial free allocation in the NZ ETS constrains the choices available to the Government for auctioning units, managing down the unit surplus in the NZ ETS, or using the NZ ETS to deliver offshore mitigation.

6.1.3 Market transparency and information

The limited and fractured nature of information about the NZ ETS market is a frustration for some participants and a barrier to more effective operation of the scheme. In our discussions with stakeholders, the lack of transparency in the market, as well as slow and ad hoc data availability, were raised a number of times.

We heard that information about forestry is lacking. There is scope for improvement in the data made available by government about forestry and the NZ ETS, for example information about the age class of forests registered in the NZ ETS could be more readily available.

[76] (Ministry for the Environment, 2021b)
[77] (Ministry for the Environment, 2021d)

6.1.4 The role of forestry in unit supply

Unlike emitters in the scheme who must purchase NZUs to meet their annual surrender obligations, foresters have no requirement to sell the NZUs that they earn. Combined with their long-term horizons, this creates risks that large amounts of forestry units will accumulate and not be sold or surrendered.

This is a challenge for the Government's management of the scheme. It makes understanding the scale of surplus units in the market difficult. It also makes it more likely that large amounts of units will be carried over into future target periods to potentially enable emissions in excess of emissions reduction targets. We also heard from market participants that the complexity of forestry and foresters' behaviour make it hard for them to understand supply and demand in the NZ ETS.

It remains to be seen whether the introduction of averaging accounting for post-1989 forests in the NZ ETS will lessen these risks.[78] In any case, the challenges associated with foresters' uncertain behaviour around holding or selling units deserve further consideration.

6.2 Alternative approaches to matters covered by this advice

6.2.1 Vintaging

A vintage is a time limit on the eligibility of a unit – either an expiry date after which it becomes invalid, or an activation date before which the unit can be traded but not used for compliance. Vintaging is a potential option to increase liquidity and discourage long-term banking of NZUs. Some stakeholders we spoke to were in favour of this option, while others were against it.

If NZUs expire by a certain date, participants would be encouraged to sell or surrender these units before the expiry to prevent further surplus units accumulating. Vintaging may be worth further consideration but we see some challenges that may limit its benefits.

Vintaging units already held in the market would create a high risk of legal challenges from NZ ETS participants, including Iwi, who may perceive that their rights have been infringed. Another option may be to vintage only new NZUs supplied into the market. One of the arguments against vintaging in the NZ ETS, that foresters need to manage harvest obligations over long time periods, will no longer be relevant from 2023 when averaging accounting becomes compulsory for all new post-1989 forest land registered into the scheme.

Vintages would add complexity to the NZ ETS. Units with no vintage or a more recent vintage would be valued higher than those with a near-term expiry date. This would create a range of different NZU types and prices, complicating market participants' decisions. As the expiry date approaches, vintaged NZUs could flood the market and lead to a price crash. A similar outcome was experienced in phase 1 of the EU ETS, when units could not be banked into phase 2. This would risk the NZ ETS price signal not being stable enough to promote investments in emission reductions.

6.2.2 Alternative price control designs

Some other emissions trading schemes internationally have price stability mechanisms that provide the regulator with discretion as to whether to intervene in the market. For example, if a trigger price or threshold

[78] Averaging accounting reduces the overall amount of NZUs foresters earn, to reflect the long-term average carbon stock of forests over multiple cycles of growth and harvest. It also means that foresters do not have to surrender NZUs at harvest as long as they replant.

is reached, the regulator could decide on whether take actions such as auctioning more units into the market or doing nothing. The Korean ETS and UK ETS have price stability mechanisms that allow such discretion.

Given the triggering of the NZ ETS cost containment reserve, this alternative approach may appear attractive to the Government. However, these approaches may undermine market confidence and could potentially open up the scheme to ad hoc interventions. In contrast, the rules-based approach of the cost containment reserve and auction reserve price in the NZ ETS provide clarity to market participants about how the price controls will operate.

Part 7: Recommendations and next steps

We present below our recommendations for NZ ETS unit limits and price control settings for the 2023-2027 period.

This brings together the unit volumes and limits, calculated as per methods in part 3, with the conclusions on price control settings in part 4 to give a consolidated set of recommended volumes and trigger prices.

The unit volume figures in these recommendations are rounded to one decimal place, with trigger price levels presented to the nearest dollar. These specific figures arise as they are the result of defined calculation methods. However, there are large uncertainties in some of the inputs to these calculations. There is a wide range around our estimate of surplus units in the NZ ETS, which is a key input to the calculation of the limit on units to be auctioned as well as the overall limit.

As explained earlier in this report, this means we intend to take an adaptive approach to reviewing and revising advice on these settings over time, as allowed by the five-year rolling process for updating NZ ETS unit limits and price control settings.

Recommended unit limits and price control settings

We recommend unit limits as follows:

Million units	2023	2024	2025	2026	2027	Total
Limit on NZUs available by auction[79]	24.4	23.3	21.1	18.7	16.3	103.7
Limit on approved overseas units	0.0	0.0	0.0	0.0	0.0	0.0
Overall limit[80]	30.8	29.6	27.4	24.9	22.4	135.0

We recommend cost containment reserve settings as follows:

Cost containment reserve	2023	2024	2025	2026	2027
Tier 1					
Trigger price, including inflation	$171	$182	$193	$203	$214
Reserve volume, million NZUs	2.9	2.8	2.6	2.3	2.1
Tier 2					

[79] Includes cost containment reserve volume.

[80] The overall limit includes the units available by auction and approved overseas units above, and also includes forecast industrial free allocation.

Trigger price, including inflation	$214	$228	$241	$254	$268
Reserve volume, million NZUs	5.1	4.9	4.6	4.2	3.8
Total reserve volume, million NZUs	8.0	7.7	7.1	6.5	5.9

We recommend auction reserve price levels as follows:

	2023	2024	2025	2026	2027
Auction reserve price	$60	$64	$68	$71	$75

All unit volume figures are rounded to one decimal place. Columns may not sum due to rounding.

7.1 Comparison to existing unit limit settings

The recommended settings represent a significant departure from the settings currently in regulations. Due to the multi-step process used to derive the unit volumes, we summarise below some of the key factors leading to these differences to aid understanding. A more detailed comparison of the proposed and existing settings can be found in Technical Annex 1.

Table 23 Comparison of auction volumes

Million units	2022	2023	2024	2025	2026	2027
Proposed update to auction volume		16.3	15.6	14	12.2	10.4
Existing auction volume	19.3	18.6	18	16.5	15	
Difference		- 2.3	- 2.4	- 2.5	- 2.8	

Over 2023-2026, the proposed auction volumes would result in 10 million fewer units entering the market compared to the status quo. The most important factors leading to this change include:

- The technical adjustments made at step 3 to address differences in between emissions reported in the national greenhouse gas inventory and the NZ ETS for coal and liquid fossil fuels. This results in 1.3-1.6 Mt less volume per year over 2023-2026.
- Larger surplus reduction volumes resulting from step 5, including due to frontloading the surplus reductions earlier in the five-year period covered by the settings.
- These reductions in volume available for auction are partially offset in 2023 and 2024 by lower forecasts of industrial allocation, due to plant closures, updates to production assumptions and the recent reduction in the electricity allocation factor for the New Zealand Aluminium Smelter.

In relation to the volume in the cost containment reserve, this is split across two tiers but is increased in 2023-2024. This is a result of the way the reserve is based on the annual surplus reduction volume.

Another key difference is that the proposed reserve no longer includes volume above the NZ ETS cap, unlike the existing reserve which is based on the surplus reduction plus an amount equivalent to 5% of the cap.

Table 24 Comparison of reserve volumes

Million units	2022	2023	2024	2025	2026	2027
Existing reserve volume	7.0	7.0	7.0	6.8	6.7	
Proposed update to reserve volume	Tier 1					
		2.9	2.8	2.6	2.3	2.1
	Tier 2					
		5.1	4.9	4.6	4.2	3.8
Proposed total reserve volume		8.0	7.7	7.1	6.5	5.9

7.2 Comparison to existing trigger prices

We provide below summary tables showing how the proposed trigger prices for the auction reserve price and the cost containment reserve differ from current settings.

Table 25 Comparison of CCR trigger prices

Million units	2022	2023	2024	2025	2026	2027
Existing CCR trigger price	$ 70.00	$ 78.40	$ 87.81	$ 98.34	$110.15	
Proposed update to CCR trigger price	Tier 1					
		$171	$182	$193	$203	$214
	Tier 2					
		$214	$228	$241	$254	$268

Table 26 Comparison of auction reserve prices

Million units	2022	2023	2024	2025	2026	2027
Existing auction reserve price	$30.00	$32.10	$34.35	$36.75	$39.32	
Proposed update to auction reserve price		$60	$64	$68	$71	$75

7.3 Next steps

Providing our advice is one step within a wider process for updating the NZ ETS unit limits and price control settings regulations. This advice will be considered by the Government who will run a public consultation on proposals. We understand this will be led by the Ministry for the Environment on behalf of the Minister, in the third quarter of 2022.

The Government must make decisions in time for the regulations to be updated by the end of December 2022, so they can come into force on 1 January 2023.

We expect to provide our next advice on this topic, relating to 2024-2028, in the first quarter of 2023.

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Appendices

Appendix 1: Modelling the range of NZU prices needed to meet emissions budgets

The current trigger prices for the auction reserve price (ARP) and cost containment reserve (CCR) were informed by the emissions values used in the Commission's *Ināia Tonu Nei* emissions budget modelling analysis. The emissions value of around $140 per tonne of CO_2e in 2030 (in 2019 dollars) was important in determining the level and trajectory of the current CCR trigger price settings.

In the analysis for *Ināia Tonu Nei*, these emissions values were applied to the energy and transport sectors in modelling emissions reduction pathways to meet the 2050 target. The specific emissions values associated with the demonstration path, on which the recommended emissions budgets were based, should generally be interpreted as a shadow emissions price – a price which could reflect many hypothetical policies, rather than necessarily an explicit price in the NZ ETS.

We have now undertaken further analysis using the Energy and Emissions in New Zealand (ENZ) model to enhance the evidence available about the range of emissions prices that could be required to meet emissions budgets. This tested uncertainty around the emissions prices needed to deliver the intended gross emissions reductions for NZ ETS sectors. We consider that the range of emissions values arising from this analysis gives a reasonable guide to the range of prices that may arise in the NZ ETS under differing circumstances.

The NZ ETS price ranges potentially required to meet emissions budgets is subject to multiple sources of uncertainty, including:

- baseline activity, such as changes in energy and transport demand, influenced by factors such as population and economic growth
- mitigation costs, influenced by factors such as energy prices and resource availability
- other policies affecting NZ ETS sectors, such as those influencing transport choices or supply of electric vehicles
- the level of carbon removals by forests, influenced by NZ ETS design and other factors
- the level of emissions outside the NZ ETS.

The new modelling analysis builds on the scenarios and sensitivity analysis undertaken for *Ināia Tonu Nei*. It assesses potential NZ ETS price ranges in the context of the first three sources of uncertainty listed above (baseline activity, mitigation costs, and other policies affecting NZ ETS sectors).[81] It looks out over all three emissions budgets to ensure the price paths considered are keeping the country on track for these and the 2050 target. We summarise the main results here, with further detailed information available in Technical Annex 2.

Testing uncertainty in the emissions baseline and mitigation costs

We assessed the impact of changes to the projected emissions baseline and mitigation cost assumptions on the required emissions prices in the ENZ model.

[81] Regarding the level of carbon removals by forests, this analysis reflects the sector sub-targets in the Government's emissions reduction plan, which are in line with the Commission's demonstration path. It assumes this balance of gross emissions reductions and carbon removals is followed. Regarding the level of emissions outside the NZ ETS, this analysis assumes a specified share of the emissions budget is allocated based on the demonstration path, in line with our recommendations in Step 2.

For this analysis, we took a subset of the sensitivity factors tested in the *Ināia Tonu Nei* analysis.[82] We varied these all in the same direction of emissions impact – either making the budgets easier or harder to achieve – while keeping all other assumptions the same as in the demonstration path. We call these scenario variants "High/Low baseline and mitigation costs". We then tested for higher or lower emissions price paths that achieve the overall level of gross emissions reductions targeted from NZ ETS sectors over the three budget periods. We chose to use a fixed rate of increase (or discount rate) of 3% in the price paths, which results in a step change in 2023.[83]

Figure 13 below shows the resulting emissions price paths, alongside the values in our updated demonstration path.

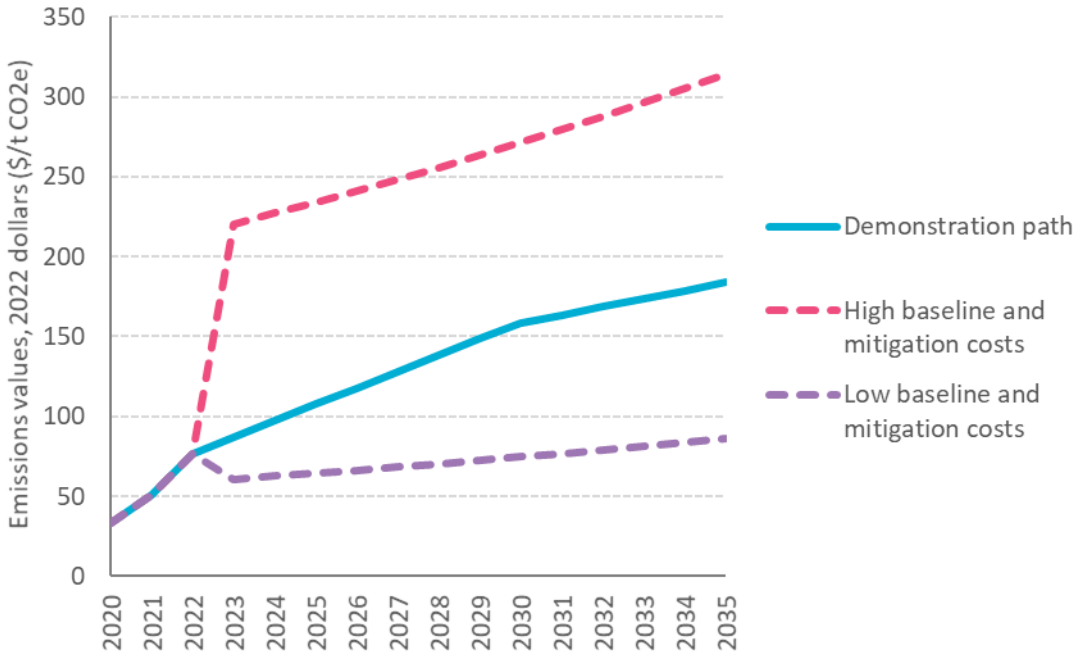

Figure 13: Price paths required to meet targeted gross emissions reductions from NZ ETS sectors under high and low baseline and mitigation cost assumptions

Testing uncertainty in other policies affecting NZ ETS sectors

A key message of *Ināia Tonu Nei* was that a comprehensive policy package is required to deliver emissions budgets. The Government's emissions reduction plan includes plans for implementing complementary policies alongside the NZ ETS. However, there is uncertainty about the final policy package that will be implemented and its effectiveness. We have therefore looked at the NZ ETS price that could be necessary to deliver emissions budgets if other policies are stronger or weaker than expected based on our demonstration path.

[82] See section 7.10 in *Ināia Tonu Nei*. The factors varied here were: population and GDP growth; oil price; costs of new renewable generation projects; biomass price and availability; costs of electric vehicles (EVs); and availability of used EVs. Factors involving large industrial closures were excluded in this analysis on the grounds that these may lead to an adjustment to emissions budgets and/or NZ ETS volume settings. Assumptions are detailed further in Technical Annex 2.

[83] This reflects a one-off equilibrium adjustment to the change in assumptions. The 3% discount rate is in line with a conservative cost of capital assumption used in the price control analysis. Also, as the ENZ model 'looks forward' at future emissions prices when determining whether abatement is cost-effective, using a higher discount rate risks understating the actual emissions prices required.

This analysis started with the Headwinds and Tailwinds scenarios developed in *Ināia Tonu Nei*. These scenarios feature higher/lower barriers to action and slower/faster uptake of mitigation technologies and behaviour changes, respectively.[84] As above, we then tested for higher or lower emissions price paths to achieve the overall level of emissions reductions targeted in the NZ ETS. The results give an indication of how much higher NZ ETS prices might need to go with weaker support or underperformance from other policies (Headwinds), and how much lower prices could be with stronger support from other policies (Tailwinds).

Figure 14 below shows the resulting price paths for each case. Even with the much higher emissions price path shown, emissions in the Headwinds scenario still exceed the targeted amount by around 4 Mt CO_2e (or 3%) in the third emissions budget period. However, lower emissions in the first two budget periods mean that cumulative emissions out to 2035 are in line with the demonstration path.

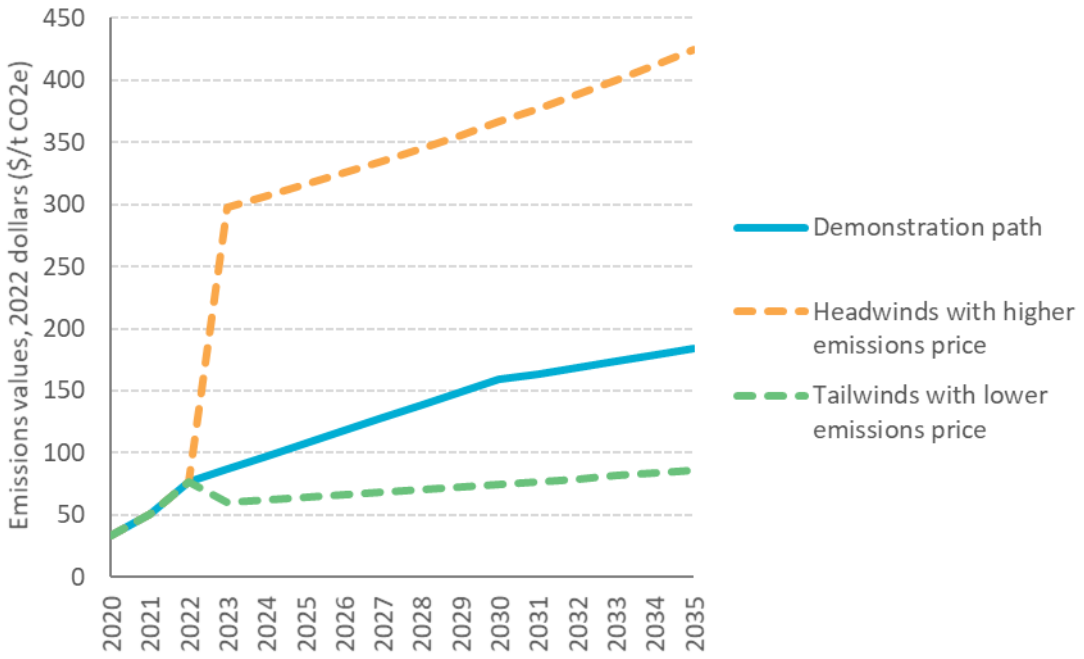

Figure 14: Price paths required to meet targeted gross emissions reductions from NZ ETS sectors under scenarios with different levels of non-price-driven abatement

Conclusions and discussion

The separate assessments above give envelopes of emissions prices under the range of potential future scenarios considered.

At the low end – with either low baseline emissions and mitigation costs, or strong mitigation from other policies – we find a very similar minimum price path to achieve the targeted level of emissions in the NZ ETS. This is around $75 in 2030 (in 2022 dollars) with the chosen 3% discount rate.

[84] Further information on these scenarios is provided in Chapter 12 of the *Ināia Tonu Nei* supporting evidence and a detailed assumptions spreadsheet is available on the Commission's website. Note there is some overlap between these scenarios and high/low baseline and mitigation cost scenarios: for example, Headwinds assumes more constrained EV uptake compared with the demonstration path.

At the high end, under high baseline emissions and mitigation costs we find a maximum price path reaching around $270 in 2030, also with the 3% discount rate. Under a scenario of weak mitigation from other policies (Headwinds), the modelling suggests even higher prices would be needed.

We caution here that the ENZ model will very likely understate the mitigation response to much higher emissions prices; reasons for this are detailed in Technical Annex 2. Nonetheless, these results demonstrate that even extremely high prices may be insufficient to meet the third emissions budget in the absence of adequate complementary policies.

We also note that the Headwinds scenario would see significantly less mitigation from other policies compared with the impact range the government has estimated in the emissions reduction plan. Further information on this comparison is provided in Technical Annex 2.

These modelling assessments do not span the full range of possible future scenarios. Scenarios could be devised that would require lower or higher emissions prices, or that would make meeting budgets practically impossible (for example, even weaker support from other policies plus high baseline emissions and mitigation costs). We consider that such scenarios are sufficiently extreme to be unlikely. If they did eventuate, they would reflect such a large departure from the expectations on which emissions budgets were set as to warrant reconsideration of either NZ ETS settings or the emissions budgets themselves.

We consider that the results outlined above provide reasonable upper and lower bounds on the range of NZ ETS prices compatible with meeting emissions budgets.

Appendix 2: International emissions prices

Recent international emissions prices

Figure 15 shows emissions price trends over the past three years in key ETS markets in countries or jurisdictions that could be considered peers of Aotearoa New Zealand. This shows significant increases in emissions prices over time, ramping up from around the beginning of 2021. This could be a result of increasing focus on emissions reductions called for by the Paris Agreement and NDCs.

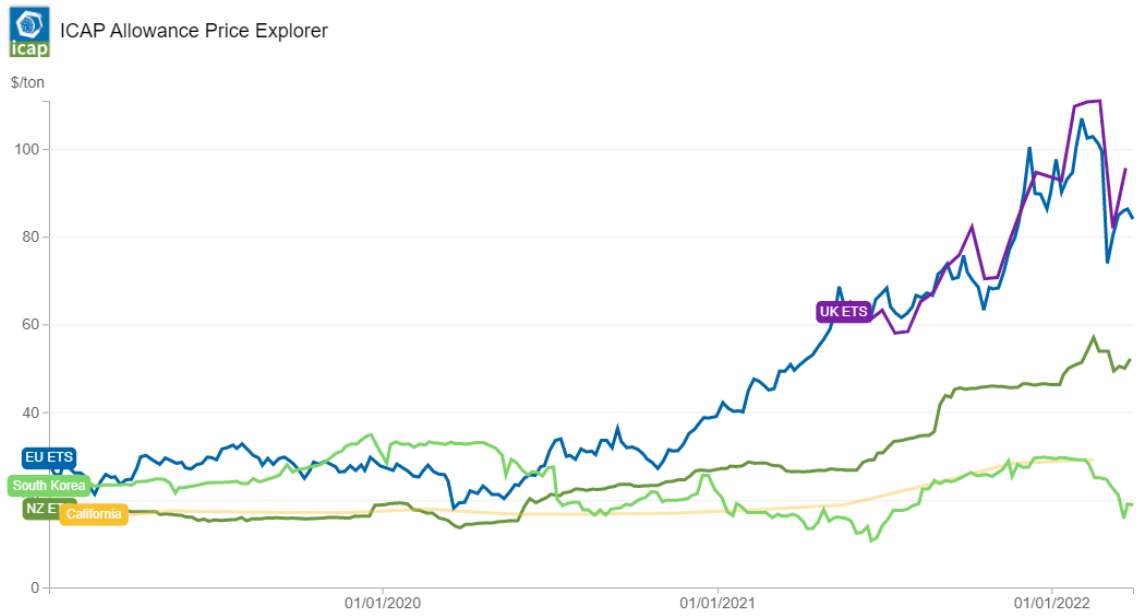

Figure 15 Price trends ($USD/tCO₂e) in selected ETS internationally (ICAP, 2022)[85]

Future international emissions prices and the cost of purchasing offshore mitigation

Information about the emissions prices in other jurisdictions that may apply in the future is incomplete and subject to change. We have, however, drawn on a range of sources to compile Table 27. It contains a mix of regulated prices from both emissions trading schemes and carbon taxes, and forecasts from modelling or surveys of market price expectations. Possible prices in 2030 range from $43 up to $319 per tonne, although most fall within a narrower range of about $90-$200 per tonne.

The Government has also investigated options for access to offshore mitigation to help meet the international component of the NDC. A recent Cabinet paper[86] suggests a lower price range of $50-$100 by 2030 for mitigation available through ETS linkage, and a higher price range of $110-$170. There is high uncertainty around the potential costs of credible offshore mitigation options.

[85] (ICAP, 2022)
[86] (Ministry for the Environment, 2021a)

Table 27 Regulated or forecast future international emissions prices

Country or region	Instrument	Price in 2030 (unless otherwise stated)		Type and source
		Currency	***NZD* in 2022***	
Global		USD 50-100 (2017)	**$95-$191**	Forecast consistent with limiting warming to 2°C. (Stiglitz et al., 2017)
Advanced economies		USD 100-130	**$159-$207**	Forecast consistent with limiting warming to 1.5°C/well below 2°C. (IEA, 2021)
EU	EU ETS	EUR 44-65	**$73 – $108**	Forecast. (European Commission, 2021)
		EUR 96-151	**$160 - $252**	Forecast. (Carbon Pulse, 2022)
		EUR 99.63 2026-2030	**$166**	Forecast.(IETA & PwC, 2022).
United Kingdom	UK ETS	EUR 98.71 2026-2030	**$192**	Forecast. (IETA & PwC, 2022). *Note this report uses prices in Euros.*
Singapore	Carbon tax	SGD 50-80	**$57-$92**	Planned regulation. (Singapore Government, 2022)
Canada	Federal backstop carbon pricing	CAD 170	**$211**	Regulated. (Government of Canada, 2021)
Germany	ETS for buildings (heating) and transport fuels	EUR 65 (ceiling) 2026	**$108 (ceiling)**	Regulated. (German Environment Agency, 2022)
		EUR 55 (floor) 2026	**$92 (floor)**	
California	Cap-and-trade	EUR 55.00 2026-2030	**$107**	Forecast. (IETA & PwC, 2022)
		USD 101 (ceiling)	**$161 (ceiling)**	Regulated. (California Air Resources Board, 2020). *The prices quoted do not include an expected inflation adjustment.*
		USD 27 (floor)	**$43 (floor)**	
Ireland	Carbon tax on fossil fuels	EUR 100	**$167**	Regulated.(Ireland Department of Environment, Climate Change, and Communications, 2021)
Norway	Carbon tax on fossil fuels	NOK 2000	**$319**	Regulated.(Norway Ministry of Climate and Environment, 2020)
South Korea	K-ETS	EUR 58.33 2026-2030	**$113**	Forecast. (IETA & PwC, 2022)

* Exchange rates as of June 2022