Coversheet: High-level Design of an Auction System for the New Zealand Emissions Trading Scheme

Advising agencies	Ministry for the Environment
Decision sought	Approval
Proposing Ministers	Hon James Shaw, Minister for Climate Change

Summary: Problem and Proposed Approach

Problem Definition **What problem or opportunity does this proposal seek to address? Why is Government intervention required?**
An in-principle decision to introduce auctioning of New Zealand Units (NZUs) into the New Zealand Emissions Trading Scheme (NZ ETS) was taken by the Government in 2017. A separate Impact Statement on *Improving the NZ ETS Framework for Unit Supply* provides a full analysis for this decision. The proposals in this Impact Statement relate to the high-level design of an auctioning mechanism, including the **bidding format**, **pricing type**, **auction frequency** and eligibility for **participation**. The Climate Change Response Act 2002 (CCRA) already includes empowering provisions to implement auctioning. It is necessary to make high-level design choices about *how* auctioning will be implemented, in the context of how we understand the existing secondary spot market for NZUs to be operating. These decisions are required now so as to inform subsequent work. Analysis and decisions on operational and implementation detail of auctions will then be taken with reference to these preferred high-level design choices. In addition, in due course, a programme of work will be launched for building and operating the auctioning platform, and enabling it to commence operation in 2020. The high-level auction design is needed to inform the early stages of this work.

Proposed Approach **How will Government intervention work to bring about the desired change? How is this the best option?**
The proposed approach is to proceed with auctioning of NZUs using a single round, sealed-bid, uniform-price auctioning format, with some flexibility regarding frequency

(although likely to initially be monthly or quarterly). As decisions have not yet been made on the volume of units to be auctioned from 2021-2030, sufficient information to form a view on whether monthly or quarterly auctions are preferred is not available at this time.

This type of auction format provides an appropriate balance between minimising complexity, protecting against market integrity risks, and supporting market efficiency. It also accounts for the existence of a well-functioning secondary market for NZUs in New Zealand which is a very important contextual factor to take into account when designing an auctioning format (i.e. because the secondary market provides a source of price discovery and is likely to be used by participants to inform their bids at auction).

It is proposed that the auctions be open to all NZ Emissions Trading Register (NZ ETR) account holders who meet pre-determined criteria (for example, requiring the holding of deposits and/or charging small fees for participation). This is expected to encourage wide participation and maximise the opportunity for competitive bidding, while allowing the Government to manage potential risks of disruptive or market distorting behaviour by participants.

If Government intervention is not commenced now to progress the in-principle decisions taken by Cabinet in 2017, then the NZ ETS will no longer be fit-for-purpose from the 2020s onward. The introduction of auctioning, together with implementation of the other in-principle decisions, will assist the Government to achieve New Zealand's emissions reduction targets and manage its associated fiscal risks that come with the NZ ETS in its current form (e.g. from the current $25 Fixed Price Option).

Lastly, this option helps to improve New Zealand's prospects regarding international linking with other international emissions trading markets. Utilising a well-established and well known auction format will increase confidence in the integrity of NZU auctions. Improving the compatibility of the NZ ETS compared to other jurisdictions may facilitate market linkages in future.

Section B: Summary Impacts: Benefits and costs

Who are the main expected beneficiaries and what is the nature of the expected benefit?

The key beneficiaries and benefits are outlined here for the proposals.

Auction bidding format
The preferred bidding format is a single round sealed-bid format.

Bidders at auction: Bidders benefit from auction rules being simpler. The single round format ensures auctions are run in a time-efficient manner, without the need for bidders to devote resources to participating in multiple-round bidding over the course of the auction. In stakeholder consultation, 43 per cent of submitters expressed a preference for the single round sealed-bid format. Approximately 30 per cent of submitters did not agree with this format, with 13 submitters preferring an ascending clock auction as an alternative. Submitters often preferred an ascending clock auction due to the additional price-

discovery this format can provide provides. We believe any concerns about price discovery are mitigated through the existence of a secondary market for NZUs, and can be better addressed through parallel work to increase market transparency. The single round format reduces opportunities for collusion through bid signalling and other price distorting behaviour from bigger market bidders, which protects smaller level auction participants.

New Zealand Government: The integrity of New Zealand's carbon market is preserved since single round sealed-bid auctions are less vulnerable to collusion compared to multiple-round bidding. Single round auction formats are administratively simpler and more cost effective to manage. They are the format of choice for most other emissions trading schemes globally. This provides learning opportunities for officials and auction administrators. It also improves the compatibility of the NZ ETS compared to other jurisdictions' emissions trading schemes and this may facilitate market linkages in future.

General public: The general public benefits from an efficient market for NZUs, which is essential for a mature well-functioning emissions trading scheme capable of achieving emissions reduction targets.

Auction pricing type

The preferred pricing type for successful bids auctions is uniform-pricing.

NZ ETS participants: Participants benefit from uniform-pricing being used as the clearing price for successful bids, as it is a simpler pricing type and fairer for smaller participants who would otherwise be disadvantaged by their size, level of information and/or experience in determining their optimal bid.

New Zealand Government:

The Government seeks to provide a fair and equitable playing field for auction participants. Smaller players may benefit from uniform-pricing, as the alternative discriminatory-pricing format may incentivise strategic bidding from larger companies who have informational advantages when forecasting market clearing prices.

Frequency of auctions

The preferred frequency for auctions is monthly or quarterly.

NZ ETS participants: Participants will be provided with a clear schedule of regularly timed auctions to aid in planning and preparation. This allows for auctions to be scheduled so that they are neither be too frequent nor too infrequent, thereby avoiding disruption to the secondary market, and will assist participants in managing their exposure to future NZ ETS compliance costs.

Auction participation

The preferred approach is to allow all New Zealand Emissions Trading Register (NZ ETR) account holders who meet pre-determined criteria to participate in auctions.

General public: The public benefits from an effective NZ ETS, given that auctions will be representative of the broader market, ensuring that the bidding field is competitive and mitigating the risk of market abuse. Expanding auction participation eligibility beyond only

NZ ETS participants who have surrender obligations to all registry account holders enables participation by entities such as financial intermediaries and others with trading experience and market expertise. This broader range of auction participants could also assist in balancing information asymmetries, thereby benefitting smaller NZ ETS participants.

Where do the costs fall?

Decisions regarding costs pertaining to the development and implementation of the auctioning platform, including procurement for its design and build, will not be taken as part of the high-level design options that are the subject of this Impact Statement.

As the preferred auction format is both simpler to run and less complex than other options, it is anticipated to also be less costly. At this point it is expected that this format will help the Government to reduce the costs of running an auctioning platform in the future.

Regulated parties and regulators will bear the cost of participating in auctions, including attending training, learning about the system and potentially seeking advice or intermediary services relating to auctioning. These costs will be lower in comparison to those incurred if a more complex or multiple round auction format was in place.

What are the likely risks and unintended impacts, how significant are they and how will they be minimised or mitigated?

There are few anticipated risks or unintended impacts at the current time. This is primarily because decisions have not yet been taken regarding the volume of units to be auctioned. Once those decisions have been made, there is some risk that the combination of the auction format and the auction volumes cause unintended consequences for market liquidity and supply and demand, however we have mitigated those risks to the extent possible in arriving at the preferred design option. For example, through retaining some flexibility for auction frequency to adapt to changing circumstances.

The decisions being made in this Impact Statement (the high-level design) will be implemented through regulations, not through the CCRA legislation. This allows flexibility to respond to changing circumstances (such as future unit supply decisions), mitigating against the risks of needing to reverse decisions in the future.

Identify any significant incompatibility with the Government's 'Expectations for the design of regulatory systems'.

The proposals outlined in this Impact Statement are consistent with the Government's 'Expectations for the design of regulatory systems'.

Section C: Evidence certainty and quality assurance

Agency rating of evidence certainty?
Confident. Substantial research has been taken into the structure and operation of other emissions trading schemes worldwide. Policy development work has been undertaken to ensure that the proposed high-level design choices are appropriate for the New Zealand carbon market. There has been wide engagement with stakeholders, and consideration given to their views. The high-level design options are based on relatively well-accepted international best practice for auctioning in emissions trading schemes. Other international markets have utilised the single round sealed-bid auction format for many years and it has proved to be successful. There is less certainty when applying this evidence base to New Zealand's domestic market conditions. We have little granular data on secondary market trading .This information is not crucial for decisions regarding the high-level design for auctions, but will be relevant for subsequent operational rules.

To be completed by quality assurers:

Quality Assurance Reviewing Agency:
Treasury
Quality Assurance Assessment:
A Quality Assurance Panel with representatives from the Ministry for the Environment and the Treasury Regulatory Quality Team has reviewed the Regulatory Impact Assessment (RIA) "Impact Statement: High-level Design for an Auction System for the New Zealand Emissions Trading Scheme" produced by the Ministry for the Environment and dated November 2018. The panel considers that it partially meets the Quality Assurance criteria. More detail on the assessment of this and the other RIAs can be found at: [link to be added].
Reviewer Comments and Recommendations:

Impact Statement: High-level Design for an Auction System for the New Zealand Emissions Trading Scheme

Section 1: General information

Purpose

1. The Ministry for the Environment (MfE) is solely responsible for the analysis and advice set out in this Regulatory Impact Statement, except as otherwise explicitly indicated. This analysis and advice has been produced for the purpose of informing final decisions to proceed with a policy change to be taken by or on behalf of Cabinet.

Key Limitations or Constraints on Analysis

2. We are confident with our scoping of the problem, the evidence base, the range of options considered, the criteria used to assess options, and the underlying assumptions and quality of data.

3. A key constraint on the analysis is that decisions have not yet been taken regarding the number of units to be auctioned. There is therefore some risk that we are proposing an auctioning format that may be less appropriate if decisions are subsequently taken to auction a significantly different number of NZUs than we are currently anticipating. We are seeking to retain some flexibility in auctioning frequency as the key mitigation against this risk.

4. A second key constraint is applying a primarily international evidence base to New Zealand's domestic market conditions. We have little data on secondary market trading (at the granular level of individual trades as opposed to aggregated data). This information is preferable although not crucial for decisions regarding the high-level design for auctions, but will be relevant for subsequent operational rules.

Responsible Manager (signature and date):

Matthew Cowie

Manager – Climate Change Policy

Climate Change Directorate

Ministry for the Environment

Date: 22/11/18

A Quality Assurance Panel with representatives from the Ministry for the Environment and the Treasury Regulatory Quality Team has reviewed the Regulatory Impact Assessment (RIA) "Impact Statement: High-level Design for an Auction System for the New Zealand Emissions Trading Scheme" produced by the Ministry for the Environment and dated November 2018. The panel considers that it partially meets the Quality Assurance criteria.

More detail on the assessment of this and the other RIAs can be found at: [link to be added].

Section 2: Problem definition and objectives

2.1 What is the context within which action is proposed?

5. In July 2017, Cabinet made an in-principle decision to sell New Zealand Units (NZUs) by auction into the New Zealand Emissions Trading Scheme (NZ ETS) [CAB-17-MIN-0369 refers].

6. Auctioning will be used to align unit supply with our targets. When the Government sets emissions targets, it needs to fully allocate the emissions budgets that are available under these targets to ensure the NZ ETS drives mitigation in line with New Zealand's emissions targets. Selling NZUs by auction has previously been identified as the preferred option for providing any unallocated supply from our emissions budgets (after NZ ETS exemptions and free allocation were taken into account) to the carbon market.

7. A separate Impact Statement, *Improving the NZ ETS Framework for Unit Supply*, provides a full analysis of options for aligning unit supply in the NZ ETS with emissions reductions targets. That Impact Statement also provides background on the new climate change context, including the Paris Agreement and the Zero Emissions Bill (ZEB), and options to fully allocate carbon budgets so as to support emissions reductions at the lowest cost to the economy.

8. To implement the 2017 in-principle decisions as a package, a draft Bill to amend the primary legislation, the Climate Change Response Act (CCRA), is planned for 2019. The CCRA already includes provisions that enable regulations to be made for the sale of NZUs by auction, although this provision has not yet been utilised.

Consulting on the design of an auction system

9. Public consultation on proposed improvements to the NZ ETS was undertaken in August and September 2018. Four consultation questions focused on design choices relating to the auction system. The results of consultation have informed the high-level design decisions set out in this Impact Statement.

10. There are no amendments required to the empowering provisions of the CCRA to implement an auctioning mechanism. However, parallel proposals regarding unit supply decisions in the NZ ETS may result in amendments to the auctioning regulation-making powers. In addition, decisions anticipated for March 2019 on market governance (e.g. matters like insider trading, market manipulation, money laundering, disclosure requirements, licensing, conflicts of interest, liability for professional advice, etc) may include proposals relating to auctioning. If so, the auctioning-related provisions of the CCRA may need to be amended to reflect these decisions. These decisions are not the subject of this Impact Statement.

2.2 What regulatory system, or systems, are already in place?

Climate Change Response Act 2002 and the New Zealand Emissions Trading Scheme

11. The CCRA established the NZ ETS in 2008 and provides the legal framework for its implementation, operation and administration.

12. The NZ ETS puts a price on greenhouse gas emissions by requiring participants from all sectors of our economy to report their emissions and, with the exception of agriculture, to surrender units to the Government for their emissions. This creates a financial incentive for businesses to invest in technologies and practices that lower emissions.

13. The CCRA currently enables the Minister for Climate Change to sell NZUs by auction. To date, an auctioning mechanism has not been utilised. The current regulation-making power is sufficient to enable the development of an auctioning platform with the preferred high-level design options set out in this Impact Statement.

Introducing auctioning was a previous in-principle decision intended to solve a policy problem

14. In 2015, the Government initiated a review of the NZ ETS. The review resulted in Cabinet taking four in-principle decisions to strengthen the framework for managing the supply of units in the NZ ETS. The in-principle decisions were to:

    - introduce auctioning of NZUs
    - limit international units
    - introduce price controls
    - coordinate decision-making

15. The in-principle decisions need to be implemented together to provide the Government with the tools required to put a cap on emissions in the NZ ETS. They will also provide a predictable framework for decision-making in the scheme, improve overall credibility, provide businesses with more certainty to support investments in low emissions technologies and practices, and encourage afforestation.

16. As part of these in-principle decisions, it was recommended that an auctioning mechanism be established so as to align the NZ ETS with emissions targets.

17. Auctioning provides the Government with a competitive bidding process by which it can ensure full allocation of the emissions budget. It is expected that only a portion of the NZ ETS emissions budget will be allocated via auctioning, with the balance to be freely allocated for the foreseeable future.

Next steps for regulations development

18. It is expected that Cabinet will agree in December 2018 to begin developing an auction platform and regulations to implement auctioning of NZUs so as to align the supply of NZUs in the NZ ETS with emission reduction targets.

19. Regulations will be needed to fully implement the final policy decisions. These include technical details and setting unit supply volumes. It is expected that Cabinet will make decisions by mid-2019 to begin developing these regulations. Public consultation would follow this, with the aim of having the regulations in place by the end of 2019.

The existing secondary market for NZUs

20. The auction system needs to work in the context of the NZ ETS, which means it must take into account the existing secondary market for spot trading of NZUs. While this is an important market it is not highly regulated and therefore is not necessarily a standard regulatory system, but rather a market that has emerged in the absence of Government direction.

21. In other carbon markets that conduct auctions, the 'clearing price' at auction has typically been very close to the secondary market price. The secondary market also allows auction participants to on-sell surplus units or purchase any short-fall.

22. The volume of units sold at auction will need to consider the liquidity of the secondary market, so as to enable auction participants to effectively manage their unit balances with respect to surrender obligations.

23. The two markets will need to operate in a complementary manner, supporting liquidity, price discovery, transparency, and a stable and credible framework for the sale and purchase of NZUs.

2.3 What is the policy problem or opportunity?

24. We have an opportunity to ensure that the auction system to be implemented works most effectively and best complements New Zealand's existing market conditions.

25. This Impact Statement covers four choices about the high-level design of the auction system:

    i. bidding format – *will the auction have one round, or multiple rounds? Will bids be open for all participants to inspect (open-bid), or sealed?*
    ii. pricing type – *will successful bidders pay their own bidding price (discriminatory-pricing), or will they pay a uniform, market price?*
    iii. frequency – *how often will auctions occur: daily, weekly, monthly, quarterly, or annually?*
    iv. participation – *who will be able to participate in auctions – all New Zealand Emissions Trading Register (NZ ETR) account holders, or just those NZ ETR account holders with surrender obligations under the NZ ETS?*

26. The key reason these decisions are important is that they can either increase or reduce certain risks and behaviours (such as collusion). There is also a balance to strike between providing certainty and transparency to the market, and retaining flexibility to accommodate changes in auctioning, such as frequency, timings and volumes, if necessary.

27. The decisions for these high-level design choices will create the framework in which auctions will be conducted and determine the range of subsequent operational and regulatory options available to decision-makers. They must therefore be well considered decisions.

28. Operational rules that will be taken in reference to the high-level design include the permissible lot size, timing of auctions, monitoring, and post-trade transparency, amongst other things. These rules will be the subject of a separate consultation.

29. The high-level design decisions for the auctioning system are also necessary to support the early stages of the programme of work to implement (i.e. build and/or procure) and operate the auctioning platform, enabling the platform to commence operation in 2020.

30. Lastly, making these decisions now is important because a separate NZ ETS work stream, which proposes replacing the $25 fixed price option with a cost containment reserve (CCR), is dependent on the auctioning system being operational and capable of incorporating the CCR mechanism. Therefore these decisions will result in the Government being better placed to exercise more control over the fiscal risks associated with the existing $25 Fixed Price Option (one of the key benefits of replacing the $25 fixed price option with a CCR).

2.4 Are there any constraints on the scope for decision making?

31. The 2017 in-principle decisions that relate to auctioning only apply to selling NZUs by auctioning, not to selling vintaged units or to the direct auctioning of international units. Therefore we did not consider auction formats that would enable the sale of multiple unit types. This formed a natural constraint on the scope of decision-making. If multiple unit types were available in the NZ ETS there would be additional format and timing considerations to be assessed when designing an auctioning mechanism.[1]

32. Vintaging banked NZUs was an option considered during stage one of the NZ ETS review, but discounted [refer stage one NZ ETS Review RIS].[2] Vintaging auctioned NZUs would create more than one type of unit in the market. If vintaging was only applied to auctioned NZUs (i.e. as opposed to NZUs that have already been issued through free allocation or for forestry removals) it would create a range of broader issues for the market. These issues are outside the scope of this work and would require further analysis.

33. The 2017 in-principle decisions [and CCRA provisions for selling NZUs by auction] relate only to the Government selling NZUs by auctioning and do not include provision for auctioning to be used as a mechanism for the Government to 'buy-back' units or as a mechanism for the secondary sale of NZUs (i.e. by allowing private holders to NZUs to sell these via the auctioning mechanism). As a result, we considered only the primary sale of NZUs by the Government when assessing auctioning formats.

34. In addition, we gave consideration to all auction formats that are appropriate for auctioning emissions units, as identified in the literature and by studies of the carbon trading schemes of other countries. We did not attempt to identify new innovative auction formats. This decision was primarily taken to ensure the NZ ETS is designed in a way to make it compatible for linking to other emissions trading schemes, and to keep the scope of the analysis manageable.

[1] For example it would need to be decided whether or not the different unit types should be sold simultaneously or sequentially. Additionally, it may be appropriate to have different auctioning formats for each of the unit types (or at least separate auction clocks), as well as rules to attempt to minimise substitution across categories.

[2] http://www.mfe.govt.nz/more/cabinet-papers-and-related-material-search/regulatory-impact-statements/improving-alignment-new

2.5 What do stakeholders think

2018 consultation on proposed improvements to the NZ ETS

35. In July 2018, Cabinet approved public consultation on proposals for improving the NZ ETS [CAB-18-MIN-0374]. From 13 August to 21 September 2018, officials from the MfE, the Ministry for Primary Industries (MPI) and Te Uru Rākau conducted a joint public consultation on the implementation of the four in-principle decisions and other proposed improvements to the NZ ETS.

36. To ensure widespread engagement with the proposals, officials organised a national roadshow for stakeholders and Māori in ten locations across New Zealand. A total of nearly 600 people attended, representing a range of sector groups including transport, electricity, energy, forestry, local government and agriculture. Individuals and stakeholders from business associations, community groups, NGOs, and academics also attended.

37. A total of 253 submissions were received during the consultation period; 162 submissions on the NZ ETS framework improvement proposals and 147 on the forestry proposals. Approximately 60 submitters commented on both sets of proposals.

38. 85 submitters responded to the auctioning questions. There was wide support for the introduction of auctioning, however there was some disagreement from stakeholders as to the preferred format. Submitters almost exclusively preferred the frequency of auctions to be either monthly or quarterly, and there was majority support for auctions to be open to all NZ Emission Trading Register account holders.

39. Details of submissions responses to auctioning questions is contained in Section 5 (Conclusions) of this Impact Statement.

40. A summary of submissions will be published in early 2019.

Māori consultation

41. A separate Māori Leaders hui was held in Wellington and several key points were raised that are relevant to the decisions proposed in this paper. Attendees at the Māori Leaders hui held as part of the consultation emphasized the importance of considering the impacts on Māori of these proposals with a particular focus on those living in rural communities. They stated that the Government should ensure that Māori are not disadvantaged in any way. They requested that Māori should be involved, represented and influential in all decision-making arrangements and noted that stable and enduring policies are required to support investment decisions.

42. Consultation feedback was sought on the following topics (relevant to this document):

    i. The Government's proposed auctioning format for the sale of NZUs using a single round, sealed-bid, uniform price auction format.

    ii. Whether all NZ ETR account holders should be eligible to participate in auctions.

    iii. The frequency of auctions, including whether submitters had a preference for monthly or quarterly auctions.

Consultation with agencies

43. The following agencies have been consulted on the development of policy for the in-principle decisions, including the introduction of auctioning; Ministries of Business, Innovation and

Employment, Primary Industries, Foreign Affairs and Trade, Te Uru Rākau, the Treasury, Te Puni Kōkiri, Department of Conservation, the Energy Efficiency and Conservation Authority and the Environmental Protection Authority (EPA).

Section 3: Options identification

3.1 What options are available to address the problem?

44. Auctions differ in a number of ways and, prior to the auctioning system as a whole being implemented, all of the auctioning elements and their interrelationships need to be considered. Our intention is to design an auctioning function in a way that is consistent with the wider policy intent of the NZ ETS.

45. Auctions can take place over a long time period, (for example TradeMe auctions that last a week), or have a very short bidding window (for example most emissions trading auctions globally). They may be open to any individual or entity who chooses to participate, or there may be eligibility restrictions. The price paid by successful bidders may be a uniform price or may vary depending on the bidders' individual bid. Auctions may be conducted very frequently, or very infrequently, which will have supply and demand impacts.

46. Options for high-level auction design choices are the subject of this Impact Statement include:

    i. **Format**: this includes bidding format and pricing design. Bidding format refers to the way the process of making bids is structured, and pricing design is how auctions determine which bids win, and at which price.

    ii. **Frequency**: how often the Government holds auctions.

    iii. **Participation**: who is able to participate in auctions.

    We undertook research on auctioning mechanisms used in other trading markets, including emissions trading schemes, so as to identify the most appropriate options for the NZ ETS. This research included studies of the European Union Emissions Trading Scheme (EU ETS), the Regional Greenhouse Gas Initiative (RGGI), and the Western Climate Initiative (WCI).[3]

Description of high-level design options

Bidding format

47. Bidding formats are characterised by:

    i. whether the auctioning has a single round or multiple rounds;

    ii. whether the bidding is open (dynamic) or sealed; and

    iii. whether the bidding price is discriminatory (meaning that successful bidders pay their own bidding price), or whether it is a uniform, market-clearing price.

48. We identified four potential auction bidding format options, set out in Table 1 below.

[3] Appendix One for this Impact Statement provides an overview of the auction designs for these emissions trading schemes.

Table 1: Auction formats

	Sealed-bid, single round	Open-bid, multiple rounds
Uniform pricing	A. Uniform-price, sealed-bid, single round	C. Ascending clock
Discriminatory pricing	B. Discriminatory price sealed-bid single round	D. Descending clock

Single round versus multiple round auctions

49. Auctions can be conducted either as a single round, or in multiple rounds. Open-bid auctions occur over **multiple rounds**. This allows bidders to change their bids in response to information acquired after each round, and continue submitting bids in sequential rounds until there is no further demand for the amount of units for sale.

50. In a **single round auction** bidders submit their bid(s) simultaneously, and no further interaction occurs after the bidder has does this. They await the outcome of the auction to see whether they are successful or not. Sealed-bids formats are more common with single round auctions.

51. Each bid consists of both the price and the quantity of units that the bidder is seeking. The bids are combined to create a stacked demand curve that ranks all bids from highest to lowest price. The market clearing price is determined by ascertaining the point at which the available supply of units intersects with the stacked demand curve. Each successful bidder receives any quantity bid at prices at or above the clearing price.

Open-bid (dynamic) format versus sealed-bid

52. **Open-bid auctions** occur in real-time over multiple rounds between the auctioneer and multiple bidders. This allows bidders to change their bids in response to information acquired after each round. These auctions can be ascending or descending, depending on whether prices are raised or lowered over time.

53. For example, in “ascending clock” open-bid auctions, the price is raised in sequential rounds in response to excess demand. In each round, bidders state the amount they are willing to buy at the provisional price. The auction stops when demand falls below the amount available for sale, and all winning bidders pay the same clearing price.

54. In contrast, in “descending clock” open-bid auctions, the auction starts with a high provisional price, which falls by pre-determined increments until the number of units available is greater than or equal to the quantity for sale.

55. In **sealed-bid auctions**, all bidders simultaneously submit their bid(s) to the auctioneer, and no bidder knows how much the other participants have bid. Participants can make multiple bids, but they only have one opportunity to do so and cannot alter their volume or pricing subsequently.

Discriminatory-pricing versus uniform-pricing

56. When **discriminatory-pricing** is used to award units to the successful bidders in the single round auction, each bidder will pay the price they submitted for their successful bid. This type of design has frequently been used by governments to sell assets such as timber, securities, oil leases, and real estate.

57. When **uniform-pricing** is used, all bidders who successfully bid pay the same market

clearing price. Most carbon markets worldwide use uniform-price, sealed-bid auctions (for example, the EU ETS, the RGGI, and the WCI).

58. Figures 1 and 2 illustrate the difference between uniform-price sealed-bid single auctions and discriminatory-price sealed-bid, single round auctions.

Figure 1. Bidding schedule in a uniform-price sealed-bid single round auction

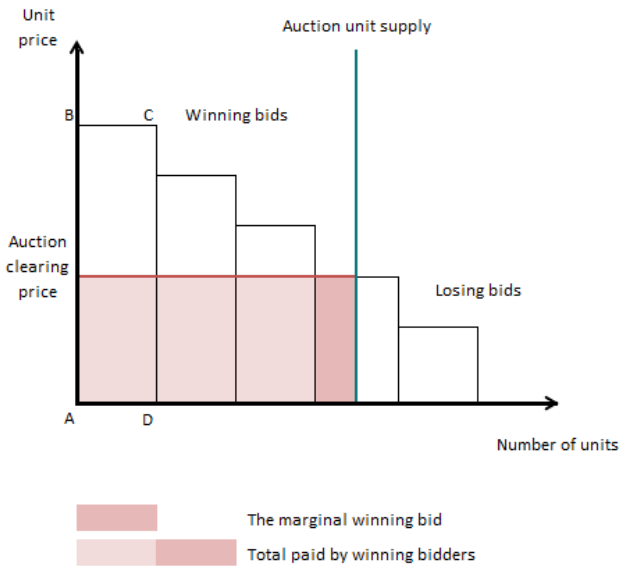
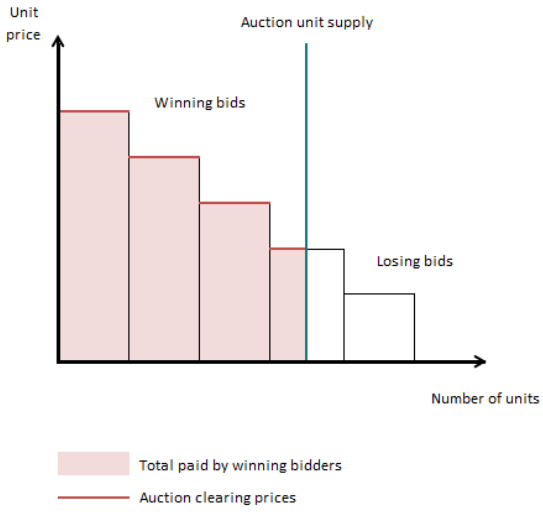


Figure 2 Bidding schedule in a discriminatory-price sealed-bid single round auction



Frequency of auctions

59. In theory, auctions could be held any number of times in a year, ranging from daily to annual.

60. The frequency of auctions and its impact on the size of the auction will have implications for:

- the reliability of information revealed at each auction;
- the timeliness of price information;

- the market's absorptive capacity (its ability to accommodate large transactions);
- administrative cost to participants and the Government; and
- the compliance entities' management of their cash flow and working capital.

61. In this Impact Statement we have assessed the following options for auction frequency: weekly, monthly, quarterly and annually. Neither of the extremes for auctioning frequency are desirable as they are potentially disruptive to the operation of the secondary market and would not be helpful to NZ ETS participants in managing their exposure to compliance costs. Weekly auctions would be disruptive because they may interfere with what would otherwise be secondary market trading activity (as participants are constantly waiting to see if they can do better at auction), and the sheer number of auctions could burden participants with time and resourcing costs. Annual auctions might be disruptive to the secondary market because participants may hold back from purchasing activity until the day of, or close to, the auction date, taking liquidity and volume from the secondary market. The volumes of units being supplied at annual auctions are likely to be high and therefore could also have an overwhelming effect on the market. Therefore weekly or annual frequency options have been discounted.

62. Flexibility is sought in order to adapt to changing circumstances as appropriate, while having regard to ensuring sufficient market certainty for the NZ ETS and auction participants.

Auction participation

63. The options for who is able to participate in auctions include:
    - all New Zealand Emissions Trading Register (NZ ETR) account holders; or
    - NZ ETS participants (i.e. only NZ ETR account holders with NZ ETS surrender obligations).

64. NZ ETR account holders includes pre-1990 foresters, financial intermediaries and voluntary participants in addition to mandatory participants. Note that options wider than 'all NZ ETR account holders' are not feasible because successful auction bidders are issued with NZUs and there must be an NZ ETR account for the Government to place these purchased units into.

65. As a starting point, our position is that mandatory participants in the NZ ETS should have access to auctions, so narrower options for participation were discounted.

3.2 What criteria, in addition to monetary costs and benefits, have been used to assess the likely impacts of the options under consideration?

- *Comment on relationships between the criteria, for example where meeting one criterion can only be achieved at the expense of another (trade-offs)*

66. The design choices must take into account the size and nature of New Zealand's carbon market, and be effective in supporting the proposed amended purpose of the NZ ETS; that being to assist New Zealand meet its international emissions reductions and reporting obligations, and to meet target(s) and domestic emissions budgets set under the ZEB.

67. The high-level design choices must also strike a balance between providing certainty and transparency to the market, and retaining flexibility to accommodate changes in auctioning, such as frequency, timings and volumes, in the future if necessary.

Criteria for options appraisal

68. We have used five criteria to judge the extent to which proposed auction design elements can support the efficient operation of the NZ ETS.

69. The criteria are defined in terms of implications for:

- complexity and administration costs
- consistency and proportionality
- market efficiency, and
- market integrity

70. The following sections describe the criteria in more detail.

71. **Complexity and administration costs**

- *Complexity* covers the transaction costs associated with participating in an auction. These transaction costs can arise as a result of various factors, such as the complexity of auction activity rules and the auction duration.
- *Administration costs* cover costs relating to implementing, running and overseeing the auction system.

72. **Consistency and proportionality**

- *Accessibility and fairness:* The auctioning function should be open to all qualifying bidders and be designed to ensure equal access so that no bidder has an advantage over another. For example, an accessible auctioning system could have a low minimum purchase size. Auction frequency would be such that it did not create impediments in terms of cash flow and working capital required to participate.
- *Simplicity:* The auctioning system should be simple, easy to use and understand, so that any eligible bidder, regardless of their auctioning training or experience, can participate effectively.

73. **Market efficiency**

- *The auction design should support the efficiency of the NZ ETS.* Market-wide efficiency can be affected by various aspects of auction design, such as accessibility and openness of participation. This particular criterion focuses on market price dynamics and liquidity. It looks at implications of auction design in terms of opportunities for strategic

bidding, price discovery, price volatility and liquidity of the NZ ETS market. These elements are defined in the glossary.

- *The auction design should provide an adequate level of transparency*. Auction information, such as operating rules, schedules and quantities, and results (such as the clearing price) should be publicly available and accessible to all in a timely manner at the conclusion of an auction, while ensuring confidentiality and having regard to collusion risks. This will provide confidence and certainty around the auctioning process. The auctioning function should also help ensure accurate and timely NZU price information for NZ ETS participants.

74. **Market integrity**

- *Prevention of collusion and manipulation.* Auctions should be designed to minimise the opportunity for collusion between participants and manipulation of the clearing price for units. Auctions should also limit opportunities for manipulative 'hoarding'. Hoarding can occur when market participants bid prices above the competitive price, hoard allowances, and then 'squeeze' the market as a compliance deadline approaches. This can be a particular issue in an under-supplied market.
- *Governance and oversight.* The auctioning function should be designed to operate at arm's length from the Government's role as a policy decision-maker, and operating rules should control the Government's release of market-sensitive information.

3.3 What other options have been ruled out of scope, or not considered, and why?

- *List the options and briefly explain why they were ruled out of scope or not given further consideration.*

75. There were auctioning format options that we investigated but after analysis discounted as not being appropriate for the NZ ETS.

We discounted Option D (descending clock auctions)

76. A descending clock auction starts with a high provisional price, which falls by predetermined increments. This is a discriminatory-price auction because in each round bidders can lock in some purchases at the current provisional price. The auction ends when the number of allowances locked in is greater than or equal to the quantity available for sale.

77. These auctions are particularly suitable for the sale of perishable goods which have an uncertain price, as they are built for speed. The price uncertainty for these goods means that the price discovery delivered from a descending clock auction has a great deal of value. They have not been used in a carbon market to date, most likely because the secondary market prices already provide this price discovery function for the participants in those markets. If the secondary market is well-functioning and liquid then participants can continuously reassess their view of an appropriate market price through trading with each other, both before and after any auction has occurred.

78. In addition, the use of a descending clock format would make both the proposed and

planned future price controls more difficult to operationalise. We are investigating the possibility of using a price floor at auction to prevent low-priced units being released to market, as well as a cost containment reserve to help mitigate the risk of very high market prices. Having a reserve price or a cost containment reserve with a descending clock auction format is likely to dilute the effectiveness of the price levels associated with those two mechanisms. For example, having a cost containment reserve price level or levels alongside a descending clock format may confuse the role of the cost containment reserve. This is because the Government will be 'asking' for bids at a price that could potentially trigger the cost containment reserve if the auction cleared at that price, while at the same time trying to communicate to the market that the trigger price level is undesirably high. In sum, there are a range of reasons why working up the marginal abatement curve is desirable, rather than down it.

79. The descending clock auction was not therefore viewed as a suitable format.

We discounted single round-open bid and multiple-round closed bid auctions

80. Options to progress with single round open-bid formats, and multiple round closed-bid formats were also not pursued.

81. A **single round open-bid format** is not a feasible option because the benefits of having an open bid format are lost with a single round as there is no opportunity for bidders to use the information gained from the open format.

82. A **multiple-round closed bid** format is similarly not feasible because the benefit of having an open auction format is that bidders have the ability to adapt their bids based on the information contained in other bids. However a closed auction does not provide this information, meaning there is no benefit in having multiple rounds and the format would simply add cost and complexity.

Section 4: Impact Analysis

Marginal impact: How does each of the options identified at section 3.1 compare with the counterfactual, under each of the criteria set out in section 3.2? *Add, or subtract, columns and rows as necessary.*

If possible use this table to provide information on monetary, as well as qualitative, costs and benefits for each of the options under consideration. Give evidence supporting your judgements, including stakeholder feedback where relevant.

Try to keep this table to a single side. If you find that you are having to write a lot to explain your assessment of whether each option is better or worse than taking no action under each criterion, add text under the table rather than filling the table with words.

Impact analysis for bidding formats

83. Please note that this table is a summary of the text that follows below in paragraphs 86-114.

	Sealed-bid single round	Multiple round, open-bid (ascending clock)	Uniform pricing	Discriminatory pricing
Complexity and cost	✓ Takes less time to run More simple auction rules	x Requires more complex auction rules Bidding decisions may be easier to make; however this benefit is less important in the presence of a well-functioning spot market	✓	x Requires more complex decisions around the bid strategy
Consistency and proportionality	o	o The informational feedback is beneficial for small bidders; however this benefit is less important in the presence of well-functioning spot markets	✓	x Favours larger bidders due to the associated informational burden and their own influence on the clearing price
Market efficiency	x	✓ Have better information gathering characteristics. This feature is important when the spot market is imperfect, and less so when it is well functioning	✓	x Less efficient when information is asymmetric Although these auctions are not subject to demand reduction incentives, they tend to result in bids below true values
Market Integrity	✓ More resistant to collusion	x	✓ Can protect against hoarding	x
Overall assessment	✓	✓	o	o

Key:

✓	Meets criteria
X	Does not meet criteria
0	Neutral

84. Note that the impact analysis below does not include Option D (descending clock auction), for the reasons outlined above.

85. In addition, the analysis for bidding format and pricing design has been separated for clarity. The effect of this is that Option A, B and C are analysed against the criteria.

Impact analysis for bidding formats measured against criteria

Criteria: complexity and administrative costs

Ascending clock auctions are more complex

86. Ascending clock auctions are more complex to run well than a single round sealed-bid format. Participants may have the incentive to hold back initially and submit large bids later in the auction when the bidding intentions of other participants have become evident. This could have implications for price discovery. Bids are also determined multiple times, which adds time costs for participants. Activity rules could be implemented to dissuade bidders from engaging in this type of conduct, however, this could add to complexity.

87. In contrast, in a single round sealed-bid auction, a bidder needs to only determine how to bid once (although they may make multiple bids at this time to reflect the price they are willing to pay for a successful bid). This bidding format may also be easier to understand for smaller market participants, as they are not required to engage in multiple rounds of information feedback to reassess their bid.

Bidding decisions may be easier in ascending clock options but this is less important

88. Ascending clock options provide information feedback in each round, which helps participants in making incremental bidding decisions. While single round, sealed-bid auctions require participation and ex-ante decisions about the bids participants submit. However, a well-functioning spot market helps reveal similar information to that of an ascending clock auction, so the information feedback carries less weight in the presence of a spot market.

Single round sealed-bid auctions take less time to run, but there are options to address longer duration of ascending auctions

89. With only one round of bidding, single round auctions are less time consuming to operate and participate in. Although there are measures available to ameliorate the time disadvantages of the ascending clock auction, such as a proxy bidding facility. A requirement that all bids be entered in the initial round, or that all losing bids not improved in the subsequent round be rejected, are measures that can be taken to incentivise early bidding.

Criteria: consistency and proportionality

90. The information feedback of ascending clock auctions is beneficial for small bidders, as they are unlikely to have the forecasting resources available to them that bigger market participants have. However this benefit is less pronounced in the presence of a well-functioning spot market which addresses asymmetry of information regarding unit prices.

91. Ascending clock auctions potentially allow small players to ‘free ride’ on the information sets of larger players. In sealed-bid auctions, small players do not have access to market

information during bidding and could arguably be less successful due to strategic bidding of larger participants.

Criteria: Market efficiency

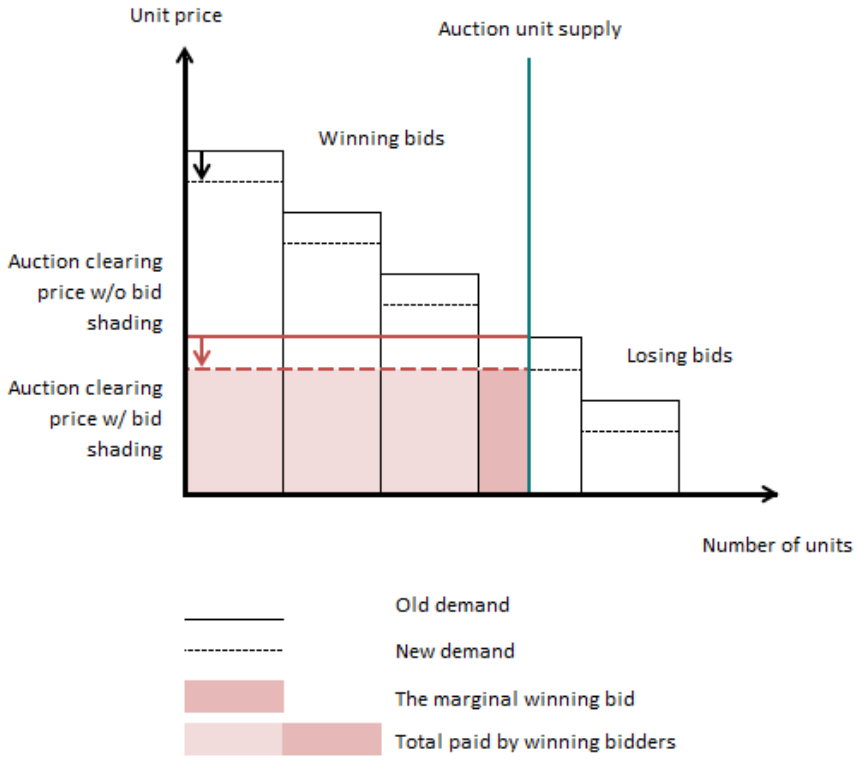
Market efficiency of uniform-pricing auctions is affected by incentives to shade bids, however these incentives are tempered by the presence of a spot market

92. Strategic bidding in auctions selling a large number of the same product (in this case, NZUs) is important because one bid may affect the price at which units from another winning bid are purchased. This 'price determining bid' is referred to as the marginal winning bid. This can incentivise a bidder to bid (or 'shade') below what they would typically bid (i.e. below their true unit demand curve), so the marginal winning bid clears at a lower price and therefore a lower cost for all bidders. This incentive is known as 'bid shading' or 'demand reduction', and leads to market inefficiency.

93. Bid shading can occur in either an ascending clock or a sealed-bid, single round auction. In the former, the incentive to bid below demand is to prevent the price from rising in subsequent rounds. In the latter, the incentive to bid below demand is to avoid the winning bid clearing at a price higher than the market price. This incentive is particularly strong for large participants, because their marginal bid is more likely to be the one clearing the market.

94. Overall, the impact a bid shading strategy can have on the auction clearing price is tempered by the presence of a reliable spot price signal, as it provides public information about the current market expectations of NZU value.

Figure 1 Demand reduction ('bid shading') in a uniform-price sealed-bid single round auction



Benefits of an ascending clock auction

95. Ascending clock auctions may improve participants' ability to easily acquire trade-relevant information. Given that there are multiple rounds of bidding, the auctions reveal information about the bids of participants and so may help bidders assess the true value NZUs being sold.

96. However, in the presence of a well-functioning spot market, this price discovery role of an auction is reduced. The spot market becomes the primary price discovery venue as it allows prices to change more quickly in response to changes in common factors affecting unit value.[4] In this case, because the private information about common factors is symmetric,[5] the key piece of information required by a bidder is his or her own marginal abatement cost.

97. An advantage of ascending clock auctions is that even in the presence of well-functioning spot markets this format provides information on the aggregate demand schedule at the end of the auction, which promotes efficient price discovery in the spot market. This is particularly relevant when the spot market is imperfect, e.g. due to informational asymmetries[6] that affect the participant's willingness to spot trade.

98. There is evidence of informational asymmetries in the NZ ETS, because there has been a history of unclear provision of information to the market from the Government regarding

[4] These factors can include changing economic conditions (e.g. economic boom) that affect the demand for units.

[5] i.e. all bidders observe the same change in common factors.

[6] In addition to differing views about common factors affecting NZU value, informational asymmetry can also be due to different understanding of how the market works and due to observing different distributions of marginal abatement costs.

market fundamentals and core policy decisions.[7] The uniform-pricing auction may therefore play an important price discovery role, at least initially. Nevertheless, achieving price discovery through auctioning alone is not a primary criterion for determining the auction design because the Government's long-term objective is to improve the functioning of the secondary spot market so as to provide an efficient price discovery marketplace.

Criteria: Market integrity – collusion and manipulation

Sealed-bid single round auctions are more resistant to collusion

99. Sealed-bid, single round auctions are generally regarded as more resistant to collusion than multiple-round auctions. This is because the repeated signals of demand and value can provide auction participants with opportunities to send signals to other participants and to detect when someone has reneged on a collusive agreement.

100. The advantage of sealed-bid auctions is particularly important when there are few bidders and there is limited competition. 2016 data on NZ ETS industrial allocations8 shows that the market includes both very small and very large participants.

Impact analysis for auction pricing types measured against criteria

Criteria: Complexity and administrative costs

101. Given that ascending clock auctions are not preferred, this impact analysis for pricing types focuses on uniform-pricing and discriminatory-pricing in single round sealed-bid auctions.

Administrative costs for discriminatory pricing are not significantly different from uniform pricing

102. In both discriminatory- and uniform-pricing auctions, bidders are required to deposit the full value of their bidding strategies with the auction system, typically a day prior to the auction being held. Discriminatory pricing does not imply that separate deposits would be required for each discriminatory price value. Such a requirement would add a layer of complexity.

103. Discriminatory pricing could potentially increase administrative costs if the auctioneer is required to allocate the winning bids at different prices. However, it is not clear that this would necessarily introduce significant additional implementation costs – the expectation is that this allocation would be facilitated through an integrated software solution.

Discriminatory-pricing requires more complex decisions around the bid strategy

104. Unlike uniform-price auctions, discriminatory-price auctions require decisions on multiple clearing prices, which would require more complex market analysis to formulate.

Criteria: Consistency and proportionality

[7] See http://www.mfe.govt.nz/publications/climate-change/provision-of-information-new-zealand-emissions-trading-scheme.

[8] See https://www.epa.govt.nz/industry-areas/emissions-trading-scheme/industrial-allocations/decisions/

Discriminatory pricing favours larger bidders due to the associated informational burden and their own influence on the clearing price

105. Discriminatory pricing incentivises bidding near the market-clearing price. This favours larger companies with greater resources for forecasting. Large bidders not only have greater resources for market analysis to estimate the clearing price, but also have better information about the clearing price as a result of knowledge of their own bids, which strongly influences this price. The combination of market knowledge of other bidders and their own influence on the bidding price allows them to estimate which bid will be from the marginal bidder and thus estimate the clearing price with more accuracy than a smaller bidder.

106. In contrast, the uniform-price auction imposes a smaller informational burden on small bidders, because to determine their optimal bid, a small bidder does not necessarily need to know the distribution of others' abatement costs.[9] Uniform-pricing levels the playing field by weakening the penalty for guessing wrong.

Criteria: Market efficiency

Discriminatory pricing is less efficient when information is asymmetric

107. Information asymmetry for discriminatory-pricing here specifically refers to bidders observing different distribution of abatement costs. In auctions with discriminatory-pricing, successful bidding strategies rely on having effective information as to the likely demand for units from others. When this information is held asymmetrically, some bidders may overestimate the overall distribution of others' demand for units. These bidders will tend to outbid those that have a higher demand but underestimate the overall distribution, leading to an inefficient NZU allocation.

108. In contrast, uniform-pricing means each bidder knows they will pay the price of the marginally winning bid. Therefore each bidder's strategy will be to bid up to their own marginal demand and, as a result, the bidders with the highest marginal value for NZUs will tend to win.

109. Several issues have been identified with the current provision of market-relevant information to the NZ ETS.[10] Measures are currently being proposed to improve this process, which will reduce information asymmetry.

Although discriminatory-price auctions are not subject to demand reduction incentives, they tend to result in bids below true values

110. Discriminatory-price auctions are not subject to demand-reduction incentives to shade bids, since lowering the bid on one unit does not affect the price paid on other units.

111. Nevertheless, discriminatory-pricing typically results in bids below market value. In discriminatory-price auctions bidders are not price takers. Their bid(s) affect their payments and this creates an incentive to lower bids in order to lower the price they pay. Bidders trade this off against the probability of no longer winning the unit.

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[9] Although there is a benefit in knowing this distribution, i.e. to avoid the 'winner's curse.'

[10] See http://www.mfe.govt.nz/publications/climate-change/provision-of-information-new-zealand-emissions-trading-scheme

Criteria: Market integrity – collusion and manipulation

Uniform pricing can protect against hoarding

112. Uniform-pricing can mitigate the risk of hoarding and protect against market disruptions due to sudden spikes in demand. This is because it makes it safer for bidders to place some of their bids at prices well above the forecast clearing price in order to ensure a large volume of NZUs. For example, if a bidder faces a high cost of not getting a minimum supply of allowances, they can bid high on some units (but are not forced to pay what they bid, they only pay the clearing price). This would greatly increase the probability of winning on those bids, but the amount paid in a uniform-pricing auction will still depend on the marginal (i.e. winning) bid. However, bidders wishing to disrupt the market by buying up available allowances would find it very expensive to purchase these high-value allowances (as they have to pay what they bid).

113. Hoarding can take place for many reasons. Bidders might wish to hoard in order to disrupt the market in this way (i.e. by constantly securing all of the auctioning supply by bidding well above the competitive price), in order to directly induce scarcity and raise the price so that allowances can be sold at a profit. It is worth noting that this form of market manipulation is not necessarily expected to be illegal, but rather disruptive and something that can be 'designed out' to a limited extent.

114. In contrast, with discriminatory-pricing hoarders would not necessarily have to buy high and sell low (the latter reflecting the clearing price), as there would be different marginal bids. Note that the risk of hoarding is mitigated by the participants' ability to bank allowances though time.

Impact analysis for auctioning frequency

	Very frequent ⟷	Very infrequent
Criterion: Complexity and cost	x Administrative costs increase with auction frequency Participation costs increase with auction frequency	✓
Criterion: Consistency and proportionality	✓ More frequent auctions improve accessibility as they imply lower working capital requirements, but this may be less important in the presence of well-functioning spot markets	x
Criterion: Market efficiency	x Very frequent auctions can be disruptive to existing secondary market trading activity	x Very infrequent auctions can increase price volatility if the market lacks liquidity. They can also have a destabilising effect on the secondary market by releasing volumes that are too large, overwhelming the existing trading patterns.
Criterion: Integrity	x Very frequent auctions can increase the risk of price manipulation	x

Key:

✓ meets criteria

X does not meet criteria

o neutral

Criteria: cost and complexity

Administrative costs increase with auction frequency

115. Planning and running more frequent auctions can increase administrative costs. Examples of costs include those incurred in managing the margin deposits required from participants prior to bidding, and the need for the auctioneer to frequently analyse and determine the minimum clearing price (if required);[11] typically the rules for determining this price are a function of current prevailing spot prices and/or previous auction clearing prices. Running more auctions also implies higher oversight costs to ensure the well-functioning of the market.

Participation costs increase with auction frequency

116. In sealed-bid single round auctions participation costs increase with auction frequency because bidders need to determine their bidding schedules more frequently.

Criteria: Consistency and proportionality

More frequent auctions improve accessibility as they imply lower working capital requirements, but this may be less important in the presence of a well-functioning spot market

[11] This is also known as the auction reserve price.

117. Concerns regarding working capital relate to the time interval between when units are purchased and when they are surrendered by NZ ETS participants in order to meet compliance obligations. More frequent auctions imply lower working capital requirements to meet compliance obligations (i.e. because the volume for sale in each auction and the size of bids per auction is expected to be smaller). This could provide participants with the flexibility to align their expenditure on units with their accruing liabilities over the compliance period (rather than having to source external funding in order to make larger bids ahead of, or after, liabilities have been accrued).

118. Working capital constraints are less of an issue in the presence of a well-functioning spot market, as market participants can trade on the market at any time. The 'well-functioning' qualifier is important here, as an illiquid spot market limits the intra-year access to units outside the auction marketplace. We do not have evidence of market participants facing significant issues in accessing NZUs through the existing secondary market.

Criteria: Market efficiency

Secondary market conditions and the volume of units to be auctioned alter the impact auction frequency has on market efficiency

Table 2 Auction frequency and possible effects on market efficiency

	Market conditions	Very infrequent auctions	More frequent auctions	Very frequent auctions
Price signal	**Normal market conditions**	x Unit prices may be depressed	o Smaller risk of lower or inaccurate prices	x Price signal may be less accurate
Price volatility	**Normal market conditions**	✓	o Smaller risk of higher volatility compared to too frequent auctions	x Price volatility can increase
	Illiquid, including under-supplied market	x Price volatility can increase	✓ Price volatility can decrease	✓
	Over-supplied market	✓	x Price volatility can increase	x Price volatility can increase

Criteria: Market integrity – collusion and manipulation

More frequent auctions reduce the risk of market abuse

119. More frequent auctions reduce the risk of market abuse, because they decrease the value at stake for bidders in individual auctions, while increasing bidders' flexibility to make

use of later auctions to adjust their trading positions. Acquiring large volumes would require successful bidding over a series of auctions, not just one. A higher frequency of auctions increases the chance of such a strategy being detected.

Very frequent auctions can increase the risk of price manipulation

120. Very frequent auctions imply small numbers of units being auctioned off per auction, which in turn can reduce participation on average (for example, due to transaction costs not warranting participation). Reduced participation would result in a less competitive bidding field, and increase the risk of price manipulation.

Impact analysis for auction participation

	Only NZ ETR account holders (wider option)	Only NZ ETS participants (narrower option)
Criterion: Complexity and cost	x	o Restricting participation of financial intermediaries would likely require complicated associated bidder rules
Criterion: Consistency and proportionality	✓	x Restricting participation of financial intermediaries can affect the ability of smaller entities to access the NZ ETS
Criterion: Market efficiency	✓ A larger number of auction participants is more likely to result in an efficient price	x Restricting participation of financial intermediaries can limit their role in supporting liquidity
Criterion: Integrity	✓ A larger number of auction participants reduces the risk of collusion and manipulation	x
Criterion: Clarity and transparency	o	o

Key:

✓ meets criteria

X does not meet criteria

o neutral

Impact Analysis - Auction participation measured against criteria

Criteria: Complexity and administrative costs

Allowing participation for bidders other than those with mandatory and voluntary obligations would increase administrative costs

121. Allowing participation in auctions from all NZ ETR account holders would involve higher administrative costs because it would require prudential checks for a larger number of

participants. It may also imply higher costs associated with deposit management, depending on the operational rules of the auction system.

Restricting participation would likely require more complicated bidder rules

122. Restricting auctioning participation to only include those with NZ ETS surrender obligations would likely require additional associated bidder rules and enforcement capabilities. For example, there could be ex-ante or ex-post rules on bidder association. The ex-ante option could include a combination of self-certification by bidders and a commitment by the auctioneer to assess applications to consider whether there are any significant concerns created by bidder associations. Alternatively, the ex-post option would see bidder associations only ex-post as and when suspicious behaviour has been identified or a complaint is made.

123. These rules would bring increased complexity and cost, and it is also unclear whether they would be effective.

Criteria: Consistency and proportionality

Restricting participation could have a larger impact on smaller entities

124. Smaller NZ ETS participants are likely to prefer to use financial intermediaries to help manage their obligations. Restricting these intermediaries from participating in auctions would reduce their ability to provide such services. This in turn could affect the smaller entities' ability to participate in the NZ ETS, given that such firms are likely to have fewer resources available to dedicate to trading.

Criteria: Market efficiency

Larger number of auction participants are more likely to result in an efficient price

125. A large number of market participants are more likely to achieve a competitive market clearing price, and limits the risk that strategic buyers shed their bids in order to depress and manipulate the auction clearing price.

126. This is because the extent to which clearing prices can be depressed depends on the relative elasticity of unit supply and demand. The price decrease is low when demand is elastic. Demand is most elastic when participation is wide and when the spot market is developed (as price deviations between the auction and the spot markets create arbitrage opportunities).

Restricting participation can limit the role of financial intermediaries in supporting NZ ETS market liquidity

127. Financial intermediaries help support liquidity in the spot market by acting as market makers and by being available as alternative counterparties to trades when other market participants are not actively trading. Restricting their access to auctions would reduce their ability to perform these roles in the sport market.

Criteria: Market integrity – collusion and manipulation

Larger number of auction participants reduces the risk of collusion and manipulation

128. Larger numbers of participants make it difficult to enter into collusive agreements aimed at manipulating the auction clearing price (the 'bid shading' effect discussed earlier). The presence of financial intermediaries at auctions also limits the potential for collusion by providing a secondary check on auction prices. By secondary check, we mean that there are non-collusive parties also bidding who will be closely monitoring bidding behaviour and therefore may notice any collusive arrangements and report the conduct.

Section 5: Conclusions

5.1 What option, or combination of options, is likely best to address the problem, meet the policy objectives and deliver the highest net benefits?

- *Where a conclusion as to preferred option is reached, identify it and set out reasons for considering it to be the best approach (by reference to the assessment criteria).*
- *If no conclusion as to preferred option is reached, identify the judgement (eg, which stakeholders, or which criteria, are the most important) or the additional information that is needed, to enable a decision to be made*
- *How much confidence do you have in the assumptions and evidence?*
- *What do stakeholders think - in particular, those opposed? Why are they concerned, and why has it not been possible to accommodate their concerns?*

Auction format

129. The preferred option is to introduce single round sealed-bid auction format with uniform pricing. Internationally, a single round, sealed-bid, uniform price auctioning platform is the most common type of auctioning format used. This auctioning format is currently being used as part of a range of emissions trading schemes internationally, including in the RGGI, WCI and EU ETS.

130. This format is preferred because the market efficiency advantage of ascending clock auctions is less evident given the presence of a secondary NZU spot market, it has less complex auction rules and is more appropriate given the large number of small participants in the NZ ETS.

131. Although, the preferred auction format is potentially less transparent than the ascending clock format, we note that transparency is more important in relation to unit supply decisions and the provision of market information, rather than the behaviour of individual bidders at auction. More transparency at auction also increases collusion risks and distracts the focus of bidders away from the value that participants place in NZUs, onto the bidding behaviour of others. Therefore the transparency benefits that come with the ascending clock format need to be considered in context.

132. In addition, the single round, sealed-bid format is the most commonly used

format in other trading emissions scheme. Although the NZ ETS is currently a domestic only scheme, it may not always remain so. If market links were established between the NZ ETS and another emissions trading scheme, commonality in auctioning mechanism may improve ETS participants' ability to participate in auctions in the linked market.

133. Improving the compatibility of the NZ ETS compared to other jurisdictions may facilitate market linkages in future. Utilising a well-established and well known auction format will increase confidence in the integrity of NZU auctions. If two-way linking were established, commonality in auction mechanism may improve the potential for participants in both markets to be able to easily participate in auctions in the corresponding market.

134. We consider discriminatory pricing to be a weak option, particularly due to the impact it would have on smaller participants and market efficiency. Uniform-pricing auctions are simpler to run and ensure that all market participants pay the same price irrespective of their size, level of information or experience. We do not consider discriminatory pricing to be a preferable option, particularly because of the impact it would have on smaller participants and on market efficiency.

What did stakeholders think?

135. The consultation document proposed the use of a single round, sealed-bid, uniform price auction. This option received support from 43 per cent of submitters who responded to the question, with 30 per cent preferring an ascending clock format. Two submitters suggested that the single round, sealed-bid format be used initially, followed by a transition to an ascending clock format.

136. Of the 43 per cent of submitters who approved our preferred option, 23 were current NZ ETS participants (therefore with a direct interest in the auction format), and 18 were not. The latter non-ETS participant group included iwi, business associations, market intermediaries, and energy groups with strong interests in the operation of auctions.

137. Some submitters agreed with the consultation document's position that the preferred format is less complex and has a lower risk of collusion. Eleven disagreed and took the view that it is either more complex, less transparent, or has a higher risk of collusion. There were also varying views expressed regarding the extent of price discovery and liquidity in the secondary market to support the preferred format. Three submitters felt that the secondary market lacks sufficient liquidity to provide adequate price discovery, and two thought deficiencies in levels of market information would mean it is challenging for auction participants to establish an appropriate bid level.

138. We took into consideration feedback in favour of an ascending clock auction format. The single round, sealed-bid format remains our preferred proposal, as it is simpler to use for participants and administrators. We also believe there is currently sufficient price discovery in the secondary market to support a

single round, sealed-bid format, and that anticipated improvements to market transparency will help to address concerns regarding price discovery (see para 139 – 141). This format is also the preferred format for auctioning in other jurisdictions operating emission trading schemes, which will enable New Zealand to learn from their experiences.

139. We have, however, sought to retain flexibility with the auctioning format, and note that design options will be implemented through regulations rather than through the primary legislation of the CCRA. This means amendments to the format will be simpler to adopt if the format needs to be adapted in the future. This approach was supported by some stakeholders, for example one who noted that flexibility may be desirable so as to amend format after a series of pilot or test-auctions are used to socialise the auctioning mechanism and will allow lessons learnt to be factored into its final design. This has been taken into consideration considering how to review the ongoing fit-for-purpose of the chosen auctioning format.

140. We agree with submitters who note that the preferred auction format is less transparent than the ascending clock format. We also acknowledge that transparency is a very important consideration in a carbon market. However, as noted above, transparency is more important in relation to unit supply decisions and the provision of market information, rather than the behaviour of individual bidders at auction.

141. For these reasons, a single round, sealed-bid format is preferred despite varying views from stakeholders on the preferred option.

142. There are separate work streams looking to improve the provision of market information (and therefore transparency) and improving the decision-making process for unit supply decisions. These two work streams will deal more directly with the broader issue of transparency.

Preferred option for auction frequency

143. Based on the analysis it is proposed that the extreme options for auctioning frequency (weekly or annually) be discarded at this time.

144. We consider that auction frequency should be monthly or quarterly. However, as decisions have not yet been made on the volume of units to be auctioned from 2021-2030, sufficient information to form a view on whether monthly or quarterly auctions are preferred is not yet available.

145. We consider that an approach which retains flexibility in auction frequency is adaptable to changing circumstances is appropriate.

Auction frequency

146. The preferred frequency for auctions is monthly or quarterly.

147. More frequent auctions are generally preferable to very infrequent auctions as they have less impact on the existing secondary market, thereby avoiding unnecessarily increasing price volatility.

148. Decisions on auction frequency are directly related to decisions on auction volumes. At the current time, the volumes of units to be auctioned from 2021-2030 are not known with certainty. Decisions on auction volumes will need to account for other decisions affecting the overall supply of NZUs in the market, such as those relating to the allocation of free allowances, forestry, and the use of international units. Separate work is currently underway to investigate these issues.

149. Thus, depending on the yearly auction volumes that are yet to be confirmed, the initial conclusion is that some flexibility should be retained with regards to auction frequency. This flexibility could be introduced via the five-year rolling process for coordinating decisions on unit supply.

150. Whatever the mechanism, it is important that the frequency of auctions is predictable so that market participants have a level of certainty about future unit supply in the market, to allow them to plan, particularly in relation to compliance obligations.

What did stakeholders think?

151. Feedback was sought on auctioning frequency, including any impacts and preferences for weekly, monthly, quarterly or annual auctions.

152. There was almost exclusive support for auctions to be held either monthly or quarterly.

153. One of the submitters supporting monthly auctions thought that this frequency would align with their business' monthly accounting to consumers, with others taking the view that this frequency would allow a regular flow of units into the market, thereby avoiding negative impact on operation of the secondary market.

154. Of submitters supporting quarterly auctions, there were views expressed that this frequency would limit transaction costs and administrative burdens for smaller businesses, and allow adequate time for participants to prepare bids.

Preferred option for auction participation

155. The preferred option is to allow all registered NZ ETS account holders be eligible to participate in auctions. Our view is that auctions should be representative of the broader market. This helps ensure that the bidding field is competitive, facilitates efficient intermediation and mitigates the risk of market abuse.

156. In practical terms, it would be difficult to restrict participation to entities with mandatory and voluntary obligations, because excluded entities could simply contract the eligible entities to buy on their behalf. Moreover, not allowing financial intermediaries to participate in auctions can hinder the further development of the secondary market.

157. To ensure that auctions are competitive and free from collusion and manipulation, there will be additional eligibility criteria required of auction participants (e.g. meeting prudential requirements, or having limits on the number of units that can be purchased in an auction). Decisions on eligibility criteria will be taken at a later time when further policy work on operational decisions are completed. We expect to create eligibility criteria that:

- ensures bidders are credible, to avoid spurious bidding strategies aimed at manipulating the auction price. This may include requiring the holding of deposits and/or charging small fees for participation.
- likely includes rules to limit the maximum parcel of permits that can be purchased by any one bidder, for example, to 25 per cent of the available NZUs.

What did stakeholders think?

158. There was majority support for the auctions to be open to all NZ Emission Trading Register account holders, with 81 per cent of submitters who responded to this question agreeing with our preferred option.

5.2 Summary table of costs and benefits of the preferred approach

Summarise the expected costs and benefits of the proposed approach in the form below. Add more rows if necessary.

*Give monetised values where possible. Note that only the **marginal** costs and benefits of the option should be counted, ie, costs or benefits additional to what would happen if no action were taken. Note that "wider government" may include local government as well as other agencies and non-departmental Crown entities.*

See http://www.treasury.govt.nz/publications/guidance/planning/costbenefitanalysis/x/x-guide-oct15.pdf and http://www.treasury.govt.nz/publications/guidance/planning/costbenefitanalysis for further guidance.

The Government has taken an in-principle decision to introduce auctioning. The table below assesses the costs and benefits of the preferred design options, and the expected impacts of these choices on affected parties.

Affected parties *(identify)*	**Comment**: *nature of cost or benefit (eg ongoing, one-off), evidence and assumption (eg compliance rates), risks*	**Impact** *$m present value, for monetised impacts; high, medium or low for non-monetised impacts*	**Evidence certainty** *(High, medium or low)*
Expected benefits of proposed approach			

Regulated parties	Auction participants will benefit from auctions being simple, time efficient, and designed to complement the secondary market. Smaller participants benefit from being protected from risks of market distorting behaviours of larger bidders. A wide group of participants are eligible to bid in auctions, which benefits all who are seeking a liquid, well supported, credible auction market.	Unclear	High
Regulators	The Commerce Commission, as the regulator of collusive conduct in New Zealand (that breaches the Commerce Act 1986) may save on investigative resource given that the preferred design is expected to reduce risks of collusion.	Unclear	Medium
Wider government	Efficiency of the NZ ETS, and the functionality of auctioning allowing the NZ ETS to cost effectively reduce emissions, will help the Government (and New Zealand) to meet its climate change targets and objectives.	Unclear	Medium
Other parties			
Total Monetised Benefit		*Unclear*	
Non-monetised benefits		*Unclear*	Medium

5.3 What other impacts is this approach likely to have?

- *Other likely impacts which cannot be included in the table above, eg because they cannot readily be assigned to a specific stakeholder group, or they cannot clearly be described as costs or benefits*
- *Potential risks and uncertainties*

N/A

Additional costs of proposed approach			
Regulated parties	Regulated parties will bear costs participating in auctions, including by attending training, learning about the system and potentially seeking advice or intermediary services relating to auctioning. The costs will be lower compared with those that would be incurred using a more complex or multiple round auction system.	Low	Medium
Regulators	As the preferred auction format is both simpler to run and less complex than other options, it is expected to be less costly. At this point it is expected that this will help the Government to reduce its costs in running an auctioning platform in the future.	Low	Medium
Wider government	At present, the Government has estimated the likely costs of building or procuring an auctioning system. This estimate is between $2m - $7.8m over four years, however this estimate is currently being refined to better reflect the policy intent as the thinking develops across both the high level design and operational rules.		
Other parties			
Total Monetised Cost		*Unclear*	
Non-monetised costs		*Unclear*	Medium

5.4 Is the preferred option compatible with the Government's 'Expectations for the design of regulatory systems'?

- *Identify and explain any areas of incompatibility with the Government's 'Expectations for the design of regulatory systems'. See http://www.treasury.govt.nz/regulation/expectations*

159. The preferred options are compatible with the Government's 'Expectations for the design of regulatory systems.'

Section 6: Implementation and operation

6.1 How will the new arrangements work in practice?

160. The auctioning system would be given effect through regulations empowered the CCRA.

161. Further decisions on the auctioning system are expected early in 2019, following a number of implementation decisions relating to the broader NZ ETS (for example, whether a competitive tender process would be used for the auctioning platform).

162. Sufficient time will be provided for implementation. The Government intends to offer training in the auctioning system to NZ ETS participants ahead of participants being expected to take part in auctions.

163. The EPA may be involved in the implementation of the auctioning system. No decisions have yet been taken on this. If the EPA were to be involved, EPA staff would be provided training to ensure that they are able to carry out this role effectively.

6.2 What are the implementation risks?

164. As a relatively large, new function, there are standard risks expected with any large procurement or build of an IT-type project. Due to the busy climate change work programme and cross-agency nature of the project, these risks may be slightly higher than in other contexts. These risks will be managed separately as part of those projects.

165. One concern raised by stakeholders was that the proposed single round, sealed-bid auction format would be more complex and less transparent than an alternative ascending clock auction option.

166. Although we prefer the single round, sealed-bid format, as outlined in Section 3.2, steps are being taken to improve transparency in other areas of the NZ ETS. Importantly, the work programme targeting the provision of market information will have positive outcomes for the transparency of information. There are also decisions being sought in relation to market governance that are expected to help reduce the implementation risks of auctioning.

Section 7: Monitoring, evaluation and review

7.1 How will the impact of the new arrangements be monitored?

167. This Impact Statement provides recommendations on intermediate decisions only, so there is limited ability to evaluate the impact of these intermediate decisions until final decisions have been made. However, it will be important to monitor the market response to the intermediate decisions to ensure there are no unintended consequences and so that reactions can feed into the further policy development process.

168. Subject to future decisions, an auction monitor may be established and may have a new role overseeing the functioning of the auctioning system. However this is likely to be first and foremost an organisation who focuses on the behaviour of bidders at auction to ensure that auctions are operating with integrity, rather than the effectiveness of the high level design itself.

Monitoring of the entire NZ ETS

169. The New Zealand Emissions Trading Register (NZ ETR) is operated by the EPA. The NZ ETS records NZU holdings and transactions. The EPA regularly reports on aggregated unit flows in several formats, including monthly reports provided within Government and in public reports available on the EPA website. MPI undertakes regular deforestation intentions surveys which gather NZ ETS-relevant information, as well as forecasting of expected forestry unit entitlements and surrenders for five years into the future. NZU prices and some information on trading volumes are also available from sources such as OMF Commtrade and Carbon Match.

170. These information sources provide a good base on which to monitor the impacts of decisions such as the introduction of an auctioning system, through monthly assessments of banked NZU holdings, trends in market behaviour, and any significant effects on liquidity. However, as the work developing the operational rules of auctioning there may be further desire for more granular trading data, to enable better monitoring and therefore better decision making. Such information needs will be assessed as part of those work streams.

7.2 When and how will the new arrangements be reviewed?

171. The Government's intention is that the NZ ETS is flexible and able to be continually updated, as much as practicable and in a manner that provides sufficient regulatory predictability. With this in mind, the NZ ETS is reviewed on an annual basis, so that any necessary operational changes can be identified and implemented.

172. Annual NZ ETS regulatory updates will provide an opportunity to ensure that the auction system is functioning as intended and addresses any issues. It will not be necessary to provide in the regulations for reviews to occur at specified intervals regarding the high level design. However, given the fact auctioning is a

new policy tool for the NZ ETS, we recommend officials' review whether the preferred auctioning format (a single-round sealed-bid with uniform pricing) is fit-for-purpose approximately one year after auctions have been fully implemented. This will provide an opportunity to review the policy arrangements for auctioning in the context of a secondary market that operates alongside auctioning and with a greater understanding of unit volumes.

173. If a decision is made to run auctioning through a private contract/s, ad hoc reviews can take place at the time that tender contracts come to an end or as otherwise deemed appropriate through the contractual negotiations.

174. Stakeholders will be able to contact Ministry officials at any stage to ask questions or raise concerns.

Glossary of terms with reference to emissions trading

Strategic bidding refers to situations where bidders may be incentivised to implement bidding strategies that reduce the clearing price for the units being auctioned. This directly affects market efficiency as it prevents the true value of units being revealed. Strategic bidding does not necessarily imply market manipulation, although it may sometimes be difficult to distinguish between the two.

Price discovery refers to the market's ability to quickly respond to changes in drivers of supply and demand. In order for the equilibrium price to be discovered, markets must be able to aggregate information that is dispersed among the participants. In the case of an emissions trading scheme, this information particularly relates to the market participants' valuation of units, as participants value units differently depending on their marginal abatement costs.

In a mature trading scheme, the secondary spot market is the primary venue for spot price discovery, as it provides a continuous summary of opinions about the current value on an NZU. In this case, the auction supports the price formation process in the spot market, as it helps establish a price close to the marginal abatement cost.

Price volatility is known to dampen incentives for low-carbon investment by increasing the carbon price risk. The auction itself should contribute little, if anything, to the volatility of prices. In the presence of a well-functioning secondary spot market, the residual risk in unit prices should not be from the auctioning of units but rather from shocks to demand or supply. Nevertheless, depending on market conditions, some auction design elements may contribute to volatility (for example, auction frequency).

Market liquidity refers to the ability of any market participant to buy or sell assets without significantly affecting the market price. Market liquidity and price volatility are closely related. Auctions should be designed such that they do not impede the liquidity of the larger emissions trading. Potential auction design elements that could affect liquidity include openness of participation and auction frequency.

Appendix One: Assessment of Auctions Used in a Number of Other Emissions Trading Schemes

Auctions in other emissions trading schemes

1. Auctions are a common feature of many emissions trading schemes worldwide.
2. Internationally, a single round, sealed-bid, uniform price auctioning platform is the most commonly used type of auction format.
3. We are proposing an auction mechanism which is consistent with the wider policy intent of the NZ ETS, and have developed criteria to ensure that auctioning is designed in this way. The criteria are set out above in Section 3.2.

European ETS

4. The European ETS (EU ETS) has operated since 2005. Auctioning has been the default method of allowance allocation since 2013 (in the third trading phase of the scheme). Allocation though auctions increases every year as the number of freely allocated allowances decreases faster than the cap. It is estimated that over half of all allowances will be auctioned over the 2013-2020 period.[12]
5. EU ETS auctions are single round and sealed-bid with uniform pricing. The choice for this format was motivated by "the desire for simplicity, fairness and cost-efficiency, and the need to mitigate the risk of market abuse."[13]
6. Emissions allowances are auctioned through a common platform on behalf of Member States, currently the Germany-based European Energy Exchange. Member States can develop their own auction platforms. For example, the United Kingdom contracted Intercontinental Exchange (ICE) Futures Europe to develop its platform.
7. EU ETS auctions are held at least weekly for stationary installations and at least once every two months for the aviation sector. Weekly auctions and the correspondingly high auction volumes reflect the large size of the EU ETS.
8. There is no auction reserve price, but an auction may be cancelled if the auction clearing price is "significantly under the prevailing secondary market price."[14]
9. Tight supply in the market causing upward pressure on prices is dealt with using a volume-based mechanism. The mechanism releases EU allowances from the reserve via an auction where there are 400 million allowances or fewer in circulation.[15]

Regional Greenhouse Gas Initiative

10. The Regional Greenhouse Gas Initiative (RGGI) programme covers the power sector in nine North-Eastern US states. The program is unique in that it is the only cap-and-trade system that auctions most of its allowances – in this case, around 90 per cent of allowances.

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[12] The EU ETS Auctioning Regulation, para (17).

[13] *Ibid*.

[14] More details on the rules can be found at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32015D1814&from=EN

[15] https://www.ieta.org/resources/Resources/Case_Studies_Worlds_Carbon_Markets/rggi_ets_case_study-may2015.pdf

11. Auctions are held on a quarterly basis and are single round, sealed-bid and uniform-price. Bidders can submit multiple confidential bids for specific quantities at specified prices.

12. The RGGI auction system also includes a Cost Containment Reserve (CCR). The CCR holds a fixed number of allowances above the cap in a reserve.[16] These allowances are released from the CCR if auction bids exceed the CCR trigger price. In this case, the auction clearing price can be equal or higher than the CCR trigger price.

California cap-and-trade program

13. In the Californian program, free allocation continues to be the main allocation method. Auctions are single round and sealed-bid with uniform pricing, and are open to eligible participants on a quarterly basis.

14. The California program includes an Allowance Price Containment Reserve, which currently acts as a soft price ceiling. The reserve is made up of allowances set aside from under the cap. Allowances can be bought at quarterly auctions at pre-determined prices.[17] It is envisaged that a hard price ceiling will be implemented in 2021.[18]

[16] § 95911. Format for Auction of California GHG Allowances.

[17] https://www.ieta.org/resources/Resources/Case_Studies_Worlds_Carbon_Markets/2018/California-Case-Study-Jan2018.pdf