Auction Examples

California Cap-and-Trade Program and Québec Cap-and-Trade System Joint Auction of Greenhouse Gas Allowances

December 17, 2021

WCI, Inc.
Western Climate Initiative, Inc.

CALIFORNIA
AIR RESOURCES BOARD

Québec

TABLE OF CONTENTS

December 17, 2021

LIST OF TABLES

December 17, 2021

I.   BACKGROUND

This document provides information on auction bidding procedures and an outline of the settlement price determination process, as well as examples of how United States (U.S.) and Canadian currencies are managed; how to determine a bid guarantee amount; bid evaluation procedures for purchase limits, holding limits, and bid guarantees; the settlement price determination process; and how joint auctions are settled.

This document should be read in conjunction with the [Detailed Auction Requirements and Instructions](#) document. Terms defined in the Detailed Auction Requirements and Instructions also apply to this document. This document is guidance only and does not supersede the California Cap-and-Trade Regulation (California Regulation). In circumstances of uncertainty, the California Regulation is the controlling document.

When bidding in an auction during the open bidding window, the bid currency, bid price, number of bid lots, and instrument vintage are entered for each bid. When placing bids for the Current Auction, the vintage selection is "Current." The Current Auction may include allowances of vintages from the current and previous calendar years. In the event that the Current Auction offers allowances of vintages prior to the current year, bids cannot be placed for a particular vintage but are instead submitted as "Current" vintage. The vintage to be selected when placing bids in the Advance Auction is the year of the allowances offered in the Advance Auction (in 2022, vintage 2025 allowances are offered for Advance Auction and the vintage selection is 2025).

For each auction, an Auction Reserve Price will be determined as the higher of the Annual Auction Reserve Prices established in U.S. and Canadian dollars after applying the established Auction Exchange Rate (USD to CAD FX Rate). For the purposes of this document and all examples, the Auction Reserve Price for both the Current Auction and Advance Auction is $19.70 United States Dollars (USD) and $18.69 Canadian Dollars (CAD) based on the Annual Auction Reserve Prices posted by California and Québec on December 1, 2021, and a hypothetical Auction Exchange Rate of 1.1000 (USD to CAD FX Rate). The Auction Administrator will not accept any bids for which the bid price is less than the Auction Reserve Price.

The Settlement Price in an auction is determined after the bidding window is closed based on the following steps:

1. The value of all bid guarantees and bid prices submitted in CAD are converted into USD in whole cents using the established Auction Exchange Rate.

2. Each entity's submitted bids are evaluated to ensure that submitted bids or value of submitted bids do not exceed the purchase limits, holding limits, or the entity's bid guarantee.
3. Each entity's qualified bids are determined as the bid quantity that remains after the submitted bids have been evaluated and reduced to meet all limits.
4. Qualified bids are ranked in order of bid price, from highest to lowest.
5. Allowances are awarded to entities, beginning with the highest qualified bid price and moving to successively lower qualified bid prices, until the entire supply of allowances is exhausted or all qualified bids have been filled.

The discussion in the remainder of the document follows the steps listed above, in order, to discuss the various elements of the settlement price determination process.

II.   DETERMINING AN ENTITY'S BID GUARANTEE

Table 1 presents hypothetical bid submissions for an auction in which seven entities are participating. Each entity's set of bids is referred to as a bid schedule in the remainder of this document. In the following examples, it is assumed that each of the entities is only bidding in the Current Auction and all bids are submitted in USD. Considerations for participation in the Advance Auction are included at the end of this document. Each row in Table 1 provides the bid value at each bid price. The Auction Administrator will accept bids for lots of allowances; each bid lot represents 1,000 allowances.

Table 1: Bid Submissions for all Auction Examples

Entity Name	Bid Price (USD)	Bid Lots	Bid Number of Allowances	Entity Cumulative Bid Allowances	Entity Cumulative Bid Value (USD)
A	$41.24	40	40,000	40,000	$1,649,600
A	$33.54	55	55,000	95,000	$3,186,300
A	$28.06	70	70,000	165,000	$4,629,900
A	$22.54	85	85,000	250,000	**$5,635,000**
B	$30.74	80	80,000	80,000	$2,459,200
B	$22.03	170	170,000	250,000	**$5,507,500**
C	$78.26	25	25,000	25,000	$1,956,500
C	$70.82	100	100,000	125,000	**$8,852,500**
C	$51.55	40	40,000	165,000	$8,505,750
D	$39.16	50	50,000	50,000	$1,958,000
D	$33.43	120	120,000	170,000	**$5,683,100**
E	$35.86	35	35,000	35,000	$1,255,100

Entity Name	Bid Price (USD)	Bid Lots	Bid Number of Allowances	Entity Cumulative Bid Allowances	Entity Cumulative Bid Value (USD)
E	$31.90	50	50,000	85,000	$2,711,500
E	$28.06	70	70,000	155,000	$4,349,300
E	$22.01	110	110,000	265,000	**$5,832,650**
F	$22.01	200	200,000	200,000	**$4,402,000**
G	$35.86	50	50,000	50,000	$1,793,000
G	$33.43	120	120,000	170,000	**$5,683,100**

Table 1 Terminology:

- Bid Number of Allowances = Bid Lots * 1,000
- Entity Cumulative Bid Allowances = Sum of current Bid Number of Allowances and Bid Number of Allowances at each higher Bid Price
- Entity Cumulative Bid Value = Entity Cumulative Allowances * Bid Price
- Entity Maximum Bid Value (USD) = Entity Cumulative Bid Value at Bid Price where Entity Cumulative Bid Value is greatest

The Maximum Bid Value for each entity is in bold underline in the Entity Cumulative Bid Value (USD) column in Table 1.

For CA entities, the bid currency will be selected as USD. The cumulative allowances shown in Table 1 are not entered or shown in the bid schedule, but are shown here for illustrative purposes. The "Entity Cumulative Bid Allowances" column indicates the total allowances for which the entity has submitted bids to purchase at that bid price and all higher bid prices.

The California Regulation requires bid guarantees to be greater than or equal to the maximum value of the bids submitted (i.e., maximum bid value). Thus, each entity's bid guarantee should be equal to or greater than the maximum bid value for the planned bid schedule in Table 1. Entities bidding in an auction will be limited to incurring a total cost less than or equal to the dollar amount of the bid guarantee submitted and should evaluate their bids against the bid guarantee they provided in the manner illustrated in the examples below.

A. Minimum Bid Guarantee Calculation

The following is an example of how an entity might calculate the minimum bid guarantee required to avoid having their bids rejected:

Example 1: Calculating a Bid Guarantee When Submitting Multiple Bids in USD

As shown in Table 1, Entity A has submitted four different bids at four different bid prices in USD:

- Bid price of $41.24: Entity A bid for 40,000 allowances at a value of $1,649,600 USD.

- Bid price of $33.54: Entity A bid for 95,000 allowances at a value of $3,186,300 USD. (95,000 allowances = 40,000 + 55,000)

- Bid price of $28.06: Entity A bid for 165,000 allowances at a value of $4,629,900 USD. (165,000 allowances = 40,000 + 55,000 + 70,000)

- Bid price of $22.54: Entity A bid for 250,000 allowances at a cost of $5,635,000 USD. (250,000 allowances = 40,000 + 55,000 + 70,000 + 85,000)

Entity A's bid schedule shows that it is willing to purchase a total of 250,000 allowances at a price of $22.54 USD at a maximum bid value of $5,635,000 USD. **Entity A should submit a bid guarantee of at least $5,635,000 USD if it wants to buy all the allowances in its bid schedule as highlighted in Table 1.**

Using the same evaluation process for the bid schedules submitted by Entities B to G, the maximum bid value of each entity's bid schedule is determined and shown in Table 1, in bold underline.

The minimum bid guarantee Entities A to G should submit to avoid having their bid(s) rejected in lots of 1,000 allowances by the Auction Administrator would be as follows:

- Entity A – $5,635,000 USD

- Entity B – $5,507,500 USD

- Entity C – $8,852,500 USD

- Entity D – $5,683,100 USD

- Entity E – $5,832,650 USD

- Entity F – $4,402,000 USD

- Entity G – $5,683,100 USD

III. Bid Guarantees for Current and Advance Auctions

Entities submit a single bid guarantee for both the Current Auction and the Advance Auction. Once the Current Auction settlement price has been determined, the entity's total cost for allowances awarded in the Current Auction (USD settlement price multiplied by number of allowances awarded) will be determined and deducted from the bid guarantee amount, and any bid guarantee amount remaining will be applied to the entity's bids in the Advance Auction. The bid guarantee is applied to the Current Auction and the Advance Auction in the form of USD currency, regardless of the currency selected by the entity.

A. Bid Guarantee Application in Advance Auction

The following is an example of how an entity's bid guarantee is applied in an Advance auction.

Example 2: Application of a Single Bid Guarantee to Current and Advance Auction

If Entity A in Table 1 submitted a bid guarantee of $10,000,000 USD and the auction settlement price for the Current Auction is $25.98 USD, then the cost of allowances awarded in the Current Auction is $4,286,700 USD (165,000 allowances * $25.98 USD).

Entity A's remaining bid guarantee amount of $5,713,300 USD ($10,000,000 USD - $4,286,700 USD) would be available to be applied to bids submitted for the Advance Auction.

IV. Entity Bid Evaluation Procedures for Purchase Limits and Holding Limits

Example 3 and Example 4 illustrate how entities should evaluate their Current Auction bid schedules for purchase limits and holding limits.

A. Purchase Limits

The auction purchase limit applies to one entity or a group of entities that are members of a Corporate Association Group (CAG) or are related entities.[1] The purchase limit

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[1] For a definition of this term, please refer to the Detailed Auction Requirements and Instructions document.

applies to the total number of allowances offered for sale in the Current Auction and independently to the total number of allowances offered for sale in the Advance Auction. The purchase limits that apply to one entity or a group of entities that are related entities for the Current Auction and the Advance Auction are discussed in detail in the Detailed Auction Requirements and Instructions document.

Example 3: Determining an Entity's Current Auction and Advance Auction Purchase Limit

For each category of entity, multiply the purchase limit percentage for the entity category by the total amount of allowances available for auction. While the purchase limit percentages are the same for each auction, the allowance supply for the Current Auction and the Advance Auction are not, and thus the number of allowances an entity can purchase in the Current and Advance Auction without exceeding the purchase limit is different.

For example, if the Current Auction has 1,000,000 allowances offered for sale, the Current Auction purchase limit for an entity that is a CA covered entity is 250,000 allowances (0.25 * 1,000,000). Similarly, if the number of allowances offered for sale in the Advance Auction is 400,000, the Advance Auction purchase limit for this entity is 100,000 allowances (0.25 * 400,000).

B. Holding Limits

The holding limit is the maximum number of GHG allowances that may be held by an entity or jointly held by a group of related entities. The holding limit applies to all entities across all linked jurisdictions and is based on the following formula:

Holding Limit = 0.1 * Base + 0.025 * (Annual Allowance Budget – Base)

Where:
- "Base" equals 25 million metric tons of carbon dioxide equivalent (CO_2e).
- "Annual Allowance Budget" is the number of allowances issued for the current budget year.[2]

For 2022, the combined annual budget in California and Québec is 361,520,000 allowances.

2022 Holding Limit =   2,500,000 + 0.025 * (361,520,000 - 25,000,000)

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[2] The annual allowance budget in a linked program includes allowances issued by participating jurisdictions.

2022 Holding Limit =   10,913,000 allowances

Allowances purchased in the Current Auction are subject to the current vintage holding limit detailed in section 95920(c)(1) of the California Regulation. The current vintage holding limit applies to allowances from the current calendar year, previous calendar years, and allowances with no vintage, such as Early Reduction Credits issued by Québec and allowances purchased from the Québec Minister's reserve account.

There is a separate holding limit for each calendar year of allowances with a vintage year beyond the current calendar year. Allowances purchased in the Advance Auction are subject to the holding limit for the vintage year of the allowances sold at that Advance Auction pursuant to section 95920(c)(2) of the California Regulation.

A covered entity may exempt a limited number of allowances from the current vintage holding limit by transferring them to its compliance account. This "limited exemption" is described in section 95920(d)(2) of the California Regulation. The limited exemption is based on an entity's emissions, and is designed to allow California covered entities the ability to accumulate the allowances they need for compliance.[3]

Entities can calculate the maximum number of allowances they can hold by following Example 4 and using the holding limit values from Table 2.

<u>Example 4: Determining the Allowances an Entity Can Hold and Purchase within Holding Limit</u>

The maximum number of allowances an entity can hold at one time equals the holding limit plus the limited exemption. For allowances to be counted towards an entity's limited exemption, they must be held in the entity's compliance account. Assuming an entity takes full advantage of the limited exemption, in 2022 the maximum number of allowances that may be held is calculated as:

2022 Maximum Number of Allowances Held Subject to Current Vintage Holding Limit = 10,913,000 + Limited Exemption

When submitting bids in an auction, an entity may not exceed the applicable holding limit plus the limited exemption. Suppose an entity's limited exemption is equal to 4,000,000 allowances and it holds 1,000,000 allowances in its compliance account and an additional 2,000,000 allowances of vintage 2022 or prior year vintage allowances in its

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[3] More information on holding limits and limited exemptions can be found on the jurisdictions' webpages. Guidance on California's regulatory provision on holding limits and limited exemptions is available on the CARB Cap-and-Trade Program webpage at https://www.arb.ca.gov/cc/capandtrade/capandtrade.htm.

general holding account. The maximum number of current vintage allowances the entity may acquire before exceeding its holding limit plus the limited exemption is:

Maximum Number of Current Vintage Allowances That Can Be Purchased = 10,913,000 + 4,000,000 − 1,000,000 − 2,000,000 = 11,913,000 allowances.

Based on the example above, an entity could purchase 11,913,000 allowances without exceeding the holding limit plus limited exemption. If all purchased allowances are transferred to the entity's general holding account, the entity would exceed the holding limit by 3,000,000 allowances. The entity can transfer 2,000,000 allowances from its general holding account to its compliance account before purchased allowances are transferred. In this case, if purchased allowances are transferred to the entity's general holding account, the entity would still exceed the holding limit by 1,000,000 allowances. A transfer to an entity's compliance account is required any time the combined balance of an entity's general holding account and the number of purchased allowances exceeds the holding limit.

CA Entities: Pursuant to Section 95912(i)(4), the Executive Officer may transfer allowances awarded in an auction to an entity's general holding account or to its compliance account as needed to facilitate compliance with the holding limit. An entity is responsible for ensuring compliance with the holding limit when receiving allowances awarded in an auction. Allowances awarded in an auction will be transferred to an entity's general holding account, unless a transfer to an entity's compliance account is required to maintain compliance with the holding limit.

If an entity requires a transfer of allowance to its compliance account, the entity should contact CARB staff at least ten (10) business days prior to the date of transfer of allowances into CITSS accounts provided in the Auction Notice to determine the amount to be transferred to the entity's compliance account. CARB auction staff contact information is provided in the Auction Notice.

If a transfer to the entity's compliance account is required and CARB is not contacted to determine an amount to be transferred to an entity's compliance account, then transfers will be completed based on the entity's general holding account and compliance account balances the day prior to the auction when the maximum number of current vintage allowances the entity may acquire is determined. In the example above, 3,000,000 allowances would be transferred to the entity's compliance account to ensure that once all transfers are complete the general holding account balance does not exceed the holding limit.

V. AUCTION ADMINISTRATOR APPLICATION OF THE BID EVALUATION CRITERIA

Submitted bids that contain bid quantities in excess of the purchase limit or the holding limit, or have a maximum value in excess of the bid guarantee at the settlement price, will be rejected, in bundles of 1,000 allowances, until all bid limitations are met. Only that portion of the bid quantity that exceeds one or more limit(s) will be rejected, not the entire bid quantity. Bid quantities that have been rejected will not be considered in determining the settlement price. "Qualified bids" are the bids that remain after the submitted bids have been evaluated and reduced to meet all limits.

Determination of qualified bids occurs after the bidding window has been closed and before the settlement price is determined. The process is the same for the Current Auction and the Advance Auction. The result is a set of qualified bids from which the settlement price is determined for both the Current Auction and the Advance Auction.

Table 2 shows bid evaluation data for a sample Current Auction where 1,000,000 allowances are available. These data will be used in the examples below to demonstrate how the Auction Administrator will evaluate each entity's submitted bids for the Current Auction. In some cases, a bid may exceed more than one evaluation criterion (i.e., purchase limit, holding limit, or bid guarantee value). When a bid exceeds more than one criterion, the bid will be reduced in lots of 1,000 allowances to meet the most constraining bid limitation.

Table 2: Bid Evaluation Data

Entity Name	Entity Type	Purchase Limit (Number of Allowances)	Holding Limit (Number of Allowances)[4]	Bid Guarantee (USD)
A	QC Emitter	250,000	10,913,000	$5,635,354
B	CA Covered Entity	250,000	10,913,000	$4,847,213
C	CA Covered Entity	250,000	10,913,000	$11,071,296
D	QC Emitter	250,000	10,913,000	$5,684,774
E	QC Emitter	250,000	10,913,000	$5,817,139
F	CA Covered Entity	250,000	10,913,000	$4,453,747
G	QC Participant	40,000	10,913,000	$5,684,774

Purchase limits in the examples throughout this document are based on the percentages assigned to each entity type as described previously.

In the sample bid evaluation data in Table 2, the bid guarantees represent the bid guarantees submitted. In some cases, the bid guarantee is different from the maximum total value of an entity's bid schedule shown in Table 1. This has been done to demonstrate how the bid guarantee criterion impacts bids if the bid guarantee is less than the bid value at a specific bid price and how the bid guarantee is used in the Advance Auction.

Since the bid guarantee and bid prices submitted in CAD are converted to USD before any bid evaluations or determination of the settlement price, the bid evaluation process is the same for bids submitted in USD and CAD.

A. Purchase Limit Evaluation

Example 5: Purchase Limit Evaluation

Table 3 compares entity purchase limits from Table 2 with each entity's cumulative bid allowances from Table 1.

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[4] This column denotes the number of allowances that can be purchased within the current vintage holding limit. It is assumed general holding account balance is zero and that allowances in the compliance account are exactly equal to the limited exemption.

Table 3: Example 5 Purchase Limit Evaluation

Entity Name	Maximum Cumulative Bid Allowances	Purchase Limit	Purchase Limit Evaluation
A	250,000	250,000	OK
B	250,000	250,000	OK
C	165,000	250,000	OK
D	170,000	250,000	OK
E	265,000	250,000	Limit Exceeded
F	200,000	250,000	OK
G	170,000	40,000	Limit Exceeded

Entities E and G submitted bids that exceed their purchase limits.

Entity E: Entity E's bids are <u>not</u> within its purchase limit as the cumulative total of its bids, 265,000 allowances, exceeds the purchase limit of 250,000 allowances. As a result, Entity E's submitted bids that contain bid quantities in excess of the purchase limit will be rejected in lots of 1,000 allowances until the purchase limit is met. Thus, only the portion of the bid that exceeds the limit will be rejected, not the entire bid. Entity E's first three bids sum to 155,000 allowances. It can purchase no more than an additional 95,000 allowances (250,000 - 155,000). Thus, Entity E's fourth bid would be limited to 95,000 allowances.

Entity G: Entity G's bids are <u>not</u> within its purchase limit as the cumulative total of its bids, 170,000 allowances, exceeds the purchase limit of 40,000 allowances. Submitted bids that contain bid quantities in excess of the purchase limit will be rejected in lots of 1,000 allowances until the purchase limit is met. Thus, only the portion of the bid that exceeds the limit will be rejected, not the entire bid. Entity G's first bid is for 50,000 allowances. Thus, Entity G's first bid would be limited to 40,000 allowances and the second bid would be rejected.

B.   Holding Limit Evaluation

In Example 6, the available space within an entity's holding limit is defined as the maximum number of allowances that can be purchased by an entity at the auction while in compliance with the holding limit. This is described in the Detailed Auction Requirements and Instructions document as the holding limit cap that the jurisdictions transmit to the Auction Administrator prior to the auction. Denoted as 'Holding Limit' in Table 2, the holding limit cap indicates how many allowances an entity may acquire at auction before exceeding its holding limit.

Example 6: Holding Limit Evaluation.

In this example, all the bids submitted by entities are within their current vintage holding limit. Each entity's maximum cumulative bid allowances is less than 10,913,000.

C. Bid Guarantee Evaluation

Prior to auction settlement, the Auction Administrator will evaluate the submitted bid guarantee for each entity for the Current Auction in USD, regardless of the currency in which bids are submitted. Each entity provides a single bid guarantee that will be applied to both the Current Auction and Advance Auction. Any bid guarantee amount remaining once the Current Auction settlement price has been determined, and the cost of allowances awarded in the Current Auction has been deducted, will be applied to the Advance Auction.

The settlement price algorithm is structured to recognize that a bid that is limited by the bid guarantee at a submitted bid price may not be limited as much or limited at all at lower potential settlement prices. If a bid quantity is limited by the bid guarantee at the submitted bid price, but could be fulfilled if the settlement price is lower than the submitted bid price, the entity will be awarded allowances up to the bid quantity and the limits of the bid guarantee.

Table 4 compares entity bid guarantees from Table 2 with each entity's maximum bid value based on the Entity Cumulative Bid Value from Table 1. The bid guarantee data in Table 4 and other examples below are in USD.

Table 4: Example 7 Bid Guarantee Evaluation

Entity Name	Maximum Bid Value (USD)	Bid Guarantee (USD)	Bid Guarantee Evaluation
A	5,635,000	$5,635,354	OK
B	5,507,500	$4,847,213	Insufficient
C	8,852,500	$11,071,296	OK
D	5,683,100	$5,684,774	OK
E	5,832,650	$5,817,139	Insufficient
F	4,402,000	$4,453,747	OK
G	5,683,100	$5,684,774	OK

Example 7: Bid Guarantee Evaluation

Entities B and E submitted bids for which their bid guarantee is insufficient.

Entity B: Entity B's bid guarantee of $4,847,213 USD is not sufficient to cover its

maximum bid value of $5,507,500 USD. The Auction Administrator would reduce Entity B's second bid to 140,000 allowances. At the bid price of $22.03, a total of 220,000 allowances can be purchased with the submitted bid guarantee ($4,847,213 / $22.03 USD = 220,027, rounded down to 220,000). The total number of allowances that can be purchased through the second bid is 140,000 (220,000 - 80,000). Thus, Entity B's second bid would be limited to 140 bid lots based on the bid guarantee limitation. See Table 1 for Entity B's bidding details.

Entity E: Entity E's bid guarantee of $5,817,139 USD is not sufficient to cover its maximum bid value of $5,832,650 USD. At the bid price of $22.01 USD, the Auction Administrator would reduce Entity E's fourth bid to 109,000 allowances. A total of 264,000 allowances can be purchased with the submitted bid guarantee ($5,817,139 / $22.01 = 264,295). Rounded down to nearest bid lot, the total number of allowances that can be purchased through the fourth bid is 109,000 (264,000 - 155,000). Thus, Entity E's fourth bid would be limited to 109 bid lots based on the bid guarantee limitation. See Table 1 for Entity E's bidding details.

Entity E's fourth bid is limited by the purchase limit and its bid guarantee. When a bid is limited by more than one criterion, the bid will be reduced in lots of 1,000 allowances to the most limiting constraint. A reduction of the fourth bid to 109,000 allowances would meet the bid guarantee limit but not the purchase limit. The fourth bid would be reduced to 95,000 allowances to meet both limitations. The bid must pass all evaluations to be qualified and in this example, the most limiting criterion is the purchase limit. Therefore, Entity E's qualified fourth bid is 95 bid lots.

Entity G: Entity G's bid guarantee of $5,684,774 USD is sufficient to cover its maximum bid value of $5,683,100 USD. However, as discussed in Example 6, the bids submitted exceed the purchase limit and thus the first bid is reduced to 40,000, and the second bid is rejected.

Table 5 shows the qualified bids after the Auction Administrator has completed the bid evaluation process, with the reduced bid quantities in bold underline. These are the bids that would be used in calculating the settlement price. Please note that the cumulative allowances and bid values are also adjusted to reflect reduced bid quantities where applicable.

Table 5: Example 7 Bids Accepted by Auction Administrator

Entity Name	Bid Price (USD)	Submitted Bid Lots	Qualified Bid Allowances (Qualified Bid Lots * 1000 Allowances)	Entity Cumulative Qualified Bid Allowances	Entity Cumulative Qualified Bid Value (USD)
A	$41.24	40	40,000	40,000	$1,649,600
A	$33.54	55	55,000	95,000	$3,186,300
A	$28.06	70	70,000	165,000	$4,629,900
A	$22.54	85	85,000	250,000	$5,635,000
B	$30.74	80	80,000	80,000	$2,459,200
B	$22.03	170	**140,000**	220,000	$4,846,600
C	$78.26	25	25,000	25,000	$1,956,500
C	$70.82	100	100,000	125,000	$8,852,500
C	$51.55	40	40,000	165,000	$8,505,750
D	$39.16	50	50,000	50,000	$1,958,000
D	$33.43	120	120,000	170,000	$5,683,100
E	$35.86	35	35,000	35,000	$1,255,100
E	$31.90	50	50,000	85,000	$2,711,500
E	$28.06	70	70,000	155,000	$4,349,300
E	$22.01	110	**95,000**	250,000	$5,502,500
F	$22.01	200	200,000	200,000	$4,402,000
G	$35.86	50	**40,000**	40,000	$1,434,400
G	$33.43	120	**0**	40,000	$1,337,200

VI. SETTLEMENT PRICE DETERMINATION PROCEDURES

The process to determine the settlement price requires that the Auction Administrator rank qualified bids from all entities from highest to lowest using the USD value of the bids.[5] Allowances will be awarded to entities, beginning with the highest qualified bid price and moving to successively lower qualified bid prices, until the entire supply of allowances is exhausted or all qualified bids have been filled. Each bid will be assessed against purchase and holding limits and the value of the bid guarantee as described in the previous section. The bid price at which all available allowances are sold or all qualified bids are filled becomes the settlement price; this is the price per allowance that

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[5] The process for determining the settlement price is the same for the Current and Advance Auctions, although bid guarantee available, purchase limits, and holding limits would likely be different.

all entities will be charged for the allowances won in the auction. Bids submitted at prices below the settlement price will not be awarded any allowances.

In determining the settlement price, the Auction Administrator may find that the quantity of allowances bid for at a specific price exceeds the remaining allowances available for sale. When this occurs, a tiebreaker procedure is used to determine the number of allowances awarded to each entity.

A. Settlement Price Determination Examples

This section provides three examples of the calculation of the settlement price. Example 8 shows the sale of all available allowances with the last winning bid completely exhausting the available allowances. Example 9 shows the settlement price determination when an entity's bid schedule is limited by the entity's submitted bid guarantee. Example 10 illustrates the tiebreaker procedure.

<u>Example 8: Settlement Price When the Last Winning Bid Exhausts the Available Allowances</u>

This example is for bids submitted in the Current Auction (the process for determining the settlement price is the same for the Current and Advance Auctions). Qualified bids from Entities A to G in the bid evaluation process provided in Table 5 are used in this settlement price example. For this example, the quantity of allowances available for sale is 1,000,000.

All qualified bids submitted by all entities are ranked from the highest qualified bid price to the lowest qualified bid price using the USD value of the bid prices. In Table 6, the fifth column (Auction Cumulative Qualified Bid Allowances) shows the cumulative number of allowances for all entities at each declining bid price increment. The sixth column (Allowance Supply Remaining) shows allowances remaining to be sold, which is the difference between the allowance supply of 1,000,000 and the Auction Cumulative Qualified Bid Allowances in the fifth column.

Table 6: Example 8 Settlement Price Determination

Entity Name	Bid Price (USD)	Submitted Bid Lots	Qualified Bid Allowances (Qualified Bid Lots * 1000 Allowances)	Auction Cumulative Qualified Bid Allowances	Allowance Supply Remaining
C	$78.26	25	25,000	25,000	975,000
C	$70.82	100	100,000	125,000	875,000
C	$51.55	40	40,000	165,000	835,000
A	$41.24	40	40,000	205,000	795,000
D	$39.16	50	50,000	255,000	745,000
E	$35.86	35	35,000	290,000	710,000
G	$35.86	50	40,000	330,000	670,000
A	$33.54	55	55,000	385,000	615,000
D	$33.43	120	120,000	505,000	495,000
G	$33.43	120	0	505,000	495,000
E	$31.90	50	50,000	555,000	445,000
B	$30.74	80	80,000	635,000	365,000
A	$28.06	70	70,000	705,000	295,000
E	$28.06	70	70,000	775,000	225,000
A	$22.54	85	85,000	860,000	140,000
B	**$22.03**	170	140,000	1,000,000	0
E	$22.01	110	95,000	1,095,000	0
F	$22.01	200	200,000	1,295,000	0

At the highest bid price of $78.26 USD, only 25,000 allowances have been sold and 975,000 allowances remain to be sold. At the next lower bid price, $70.82 USD, a total of 125,000 allowances have been sold and 875,000 allowances remain. Continuing down the sixth column, at the bid price of $22.03 USD, the entire available supply of allowances is sold and qualified bids at prices below $22.03 USD cannot be filled. Hence, the settlement price is $22.03 (in bold underline in Table 6) and 1,000,000 allowances are sold at a total bid cost of $22,030,000 USD.

Allowances won by each entity and their respective total bid cost are shown in Table 7. Entity A would win 250,000 allowances from its four bids, and its total bid cost is $5,507,500 USD (250,000 * $22.03 USD).

Table 7: Example 8 Allowances Won and Total Costs

Entity Name	Entity Jurisdiction	Allowances Won	Total Cost (USD)
A	QC	250,000	$5,507,500
B	CA	220,000	$4,846,600
C	CA	165,000	$3,634,950
D	QC	170,000	$3,745,100
E	QC	155,000	$3,414,650
F	CA	0	$0
G	QC	40,000	$881,200
Total		1,000,000	$22,030,000

Example 9: Settlement Price Determination with a Bid Guarantee Limit

This example uses the same bid submissions as the previous example, however the quantity of allowances is increased to 1,060,000. The larger supply of allowances increases entity purchase limits as shown in Table 8. Bid guarantees for purposes of this example are also shown in Table 8 (note that the bid guarantee for Entity F has been revised).

Table 8: Example 9 Bid Evaluation Data

Entity Name	Purchase Limit (Number of Allowances)	Holding Limit (Number of Allowances)	Bid Guarantee (USD)
A	265,000	10,913,000	$5,635,354
B	265,000	10,913,000	$4,847,213
C	265,000	10,913,000	$11,071,296
D	265,000	10,913,000	$5,684,774
E	265,000	10,913,000	$5,817,139
F	265,000	10,913,000	$10,000
G	42,400	10,913,000	$5,684,774

Table 9 compares entity bid guarantees and purchase limits from Table 8 with each entity's maximum bid value and maximum cumulative bid allowances from Table 1. Note that the bid guarantee value for Entity F is reduced.

Table 9: Example 9 Bid Guarantee and Purchase Limit Evaluation

Entity Name	Maximum Total Bid Value (USD)	Bid Guarantee (USD)	Bid Guarantee Evaluation	Entity Cumulative Bid Allowances	Purchase Limit	Purchase Limit Evaluation
A	$5,635,000	$5,635,354	OK	250,000	265,000	OK
B	$5,507,500	$4,847,213	Insufficient	250,000	265,000	OK
C	$8,852,500	$11,071,296	OK	165,000	265,000	OK
D	$5,683,100	$5,684,774	OK	170,000	265,000	OK
E	$5,832,650	$5,817,139	Insufficient	265,000	265,000	OK
F	$4,402,000	$10,000	Insufficient	200,000	265,000	OK
G	$5,683,100	$5,684,774	OK	170,000	42,400	Limit Exceeded

Entities B, E, F, and G submitted bids for which their bid guarantee is insufficient or that exceeded their purchase limit.

Entity B: Entity B's bids are within the purchase limit. However, Entity B's second bid exceeds the submitted bid guarantee and is limited to 140,000 allowances.

Entity E: Entity E's bids are within the purchase limit. However, Entity E's fourth bid exceeds the submitted bid guarantee and is limited to 109,000 allowances.

Entity F: Entity F's bids are within the purchase limit. However, Entity F's bid exceeds the submitted bid guarantee and is limited to zero allowances.

Entity G: Entity G's first bid exceeds the purchase limit and is limited to 42,000 allowances, while Entity G's second bid is rejected. Entity G's bids are within the bid guarantee.

Table 10 shows the calculation of the settlement price determination with an entity's bids limited by the bid guarantee limitation in an auction with 1,060,000 allowances for sale. In this example, the settlement price is $22.01 USD.

Table 10: Example 9 Settlement Price Determination with a Bid Guarantee Limit

Entity Name	Bid Price (USD)	Submitted Bid Lots	Qualified Bid Allowances (Qualified Bid Lots * 1000 Allowances)	Auction Cumulative Qualified Bid Allowances	Allowance Supply Remaining
C	78.26	25	25,000	25,000	1,035,000
C	70.82	100	100,000	125,000	935,000
C	51.55	40	40,000	165,000	895,000
A	41.24	40	40,000	205,000	855,000
D	39.16	50	50,000	255,000	805,000
E	35.86	35	35,000	290,000	770,000
G	35.86	50	42,000	332,000	728,000
A	33.54	55	55,000	387,000	673,000
D	33.43	120	120,000	507,000	553,000
G	33.43	120	0	507,000	553,000
E	31.90	50	50,000	557,000	503,000
B	30.74	80	80,000	637,000	423,000
A	28.06	70	70,000	707,000	353,000
E	28.06	70	70,000	777,000	283,000
A	22.54	85	85,000	862,000	198,000
B	22.03	170	140,000	1,002,000	58,000
E	22.01	110	109,000	1,111,000	0
F	22.01	200	0	1,111,000	0

Since there are only 58,000 allowances remaining to be sold after Entity B's last bid was awarded, Entity E's bid at $22.01 USD would be awarded a total of 58,000 allowances, the total allowance supply remaining.

The settlement price algorithm is structured to recognize that a bid that is limited by the bid guarantee at a submitted bid price may not be limited as much or limited at all at other potential settlement prices. If a bid quantity is limited by the bid guarantee at the submitted bid price, but could be fulfilled if the settlement price is lower than the submitted bid price, the entity will be awarded allowances up to the bid quantity and the limits of the bid guarantee. However, the settlement price algorithm will not award the entity more allowances than they bid for.

For a Current Auction allowance supply of 1,060,000 allowances, the allowances won by each entity and their respective total bid cost are shown in Table 11.

Table 11: Example 9 Allowances Won and Total Cost

Entity Name	Entity Jurisdiction	Allowances Won	Total Cost (USD)
A	QC	250,000	$5,502,500
B	CA	220,000	$4,842,200
C	CA	165,000	$3,631,650
D	QC	170,000	$3,741,700
E	QC	213,000	$4,688,130
F	CA	0	$0
G	QC	42,000	$924,420
Total		1,060,000	$23,330,600

Example 10: Tiebreaker Example

Section 95911(e)(5) of the California Regulation specifies that the tiebreaker procedure is used when the sum of multiple entities' bid quantities at the settlement price exceeds the remaining allowances available for sale. During the tiebreaker procedure, each entity that has submitted qualified bids at or above the settlement price will be awarded allowances based on its share of qualified bids at the settlement price. An entity with a bid guarantee limited qualified bid will be included in the tiebreaker if it can purchase additional allowances at the settlement price.

Each entity is awarded allowances based on its share of qualified bids at the settlement price times the number of allowances remaining to be sold, rounded down to the nearest whole allowance. If there are allowances remaining as a result of rounding down, those allowances are awarded to entities by assigning a random number to each entity. The remaining allowances are awarded to entities starting with the lowest assigned random number and proceeding to the next higher random number until all remaining allowances are awarded. Under the tiebreaker procedure, allowances sold to entities in the tiebreaker will not necessarily be in lots of 1,000 allowances.

Example 10 includes the same bid submissions as used in Examples 8 and 9. The quantity of allowances available for sale for this example is 850,000. The bid evaluation data for this example including bid guarantee amount, purchase limit, and holding limit for each entity is provided in Table 12; note that the bid guarantee for Entity B has been revised and Entity F's bid guarantee has been returned to its original value.

Table 12: Example 10 Bid Evaluation Data

Entity Name	Purchase Limit (Number of Allowances)	Holding Limit (Number of Allowances)	Bid Guarantee (USD)
A	212,500	10,913,000	$5,635,354
B	212,500	10,913,000	$1,761,020
C	212,500	10,913,000	$11,071,296
D	212,500	10,913,000	$5,684,774
E	212,500	10,913,000	$5,817,139
F	212,500	10,913,000	$4,453,747
G	34,000	10,913,000	$5,684,774

Table 13 compares entity bid guarantees and purchase limits from Table 12 with each entity's maximum bid value and entity cumulative bid allowances from Table 1.

Table 13: Example 10 Bid Guarantee and Purchase Limit Evaluation

Entity Name	Maximum Total Bid Value	Bid Guarantee	Bid Guarantee Evaluation	Entity Cumulative Bid Allowances	Purchase Limit	Purchase Limit Evaluation
A	$5,635,000	$5,635,354	OK	250,000	212,500	Limit Exceeded
B	$5,507,500	$1,761,020	Insufficient	250,000	212,500	Limit Exceeded
C	$8,852,500	$11,071,296	OK	165,000	212,500	OK
D	$5,683,100	$5,684,774	OK	170,000	212,500	OK
E	$5,832,650	$5,817,139	Insufficient	265,000	212,500	Limit Exceeded
F	$4,402,000	$4,453,747	OK	200,000	212,500	OK
G	$5,683,100	$5,684,774	OK	170,000	34,000	Limit Exceeded

Entities A, B, E, and G submitted bids for which their bid guarantee is insufficient or that exceeded their purchase limit.

Entity A: Entity A's fourth bid exceeds its purchase limit and is limited to 47,000 allowances (47 bid lots). Entity A's fourth bid brings its cumulative bid allowances to 250,000, exceeding its purchase limit of 212,500 allowances. Entity A's bids are within its bid guarantee since its total bids worth $5,635,000 are less than its bid guarantee of $5,635,354.

Entity B: Entity B's second bid exceeds the purchase limit and is limited to 132,000 allowances (132 bid lots). However, Entity B's qualified bid(s) is determined by its bid guarantee (more constraining limit). Entity B's first bid also exceeds the submitted bid guarantee. Entity B's first bid would be limited to 57,000 allowances (57 bid lots) at the bid price of $30.74 ($1,761,020/ $30.74 = 57,287, rounded down to 57,000 allowances). As the settlement price algorithm is structured to recognize that Entity B's bids may not be limited as much at other settlement prices, Entity B's second bid at $22.03 is evaluated to determine if it can purchase any additional allowances given its bid guarantee (but no more than the submitted 250,000 total allowances). At $22.03, Entity B's bid guarantee is large enough to purchase 79,000 allowances ($1,761,020/ $22.03 = 79,937). Entity B's qualified second bid is 22,000 allowances (79,000 – 57,000), and this is less than the purchase limited qualified bid of 132,000 allowances. Entity B will be awarded allowances up to the bid quantity and the limits of its bid guarantee at the settlement price. If the settlement price is $22.01, Entity B can purchase an additional 1,000 allowances ($1,761,020 / $22.01 = 80,010, rounded down to 80 000 allowances). Table 14 shows Entity B has a bid for 1 bid lot at $22.01, in bold underline. This is not a bid that is in Entity B's bid schedule but represents the additional qualified bid allowances that Entity B can purchase at the settlement price of $22.01. Entity B's qualified bid of 79,000 allowances at $22.03 is awarded in the settlement process; however, at the price of $22.01, Entity B can purchase an additional 1,000 allowances and is part of the tiebreaker with Entity E and Entity F.

Entity E: Entity E's fourth bid exceeds both its bid guarantee and the purchase limit. At its bid guarantee of $5,817,139 USD, Entity E can purchase a total of 264,000 allowances at the bid price of $22.01, which exceeds the purchase limit of 212,500 allowances. The more constraining limit in this case is Entity E's purchase limit and Entity E's fourth bid must be reduced to meet this limit. Therefore, Entity E's fourth bid is limited to 57,000 allowances (212,500 – 155,000 = 57,500, rounded down to 57,000 allowances). At the bid price of $22.01 USD, Entity E's cumulative bid value with the adjusted fourth bid is $4,666,120 USD, which is less than its bid guarantee.

Entity G: Entity G's first bid exceeds the purchase limit and will be limited to 34,000 allowances (34 bid lots), and Entity G's second bid is rejected for the same reason. At the bid price of $35.86 USD, Entity G's cumulative bid value of $1,219,240 USD is within its bid guarantee of $5,684,774 USD.

Table 14 shows the determination of the settlement price for the allowance supply of 850,000 allowances. Again, bids from all entities are ranked from highest bid price to lowest bid price. At $22.03 USD, there are 35,000 allowances remaining to be sold, but

at the next bid price of $22.01 USD, Entities B, E, and F have combined qualified bids for 258,000 allowances. For this Current Auction, the settlement price is $22.01 USD where all 850,000 allowances are sold. The Auction Administrator must implement the tiebreaker procedure to determine allowances won by Entities B, E, and F at the settlement price.

Table 14: Example 10 Settlement Price Determination with a Tiebreaker

Entity Name	Bid Price (USD)	Submitted Bid Lots	Qualified Bid Allowances	Auction Cumulative Qualified Bid Allowances	Allowance Supply Remaining
C	$78.26	25	25,000	25,000	825,000
C	$70.82	100	100,000	125,000	725,000
C	$51.55	40	40,000	165,000	685,000
A	$41.24	40	40,000	205,000	645,000
D	$39.16	50	50,000	255,000	595,000
E	$35.86	35	35,000	290,000	560,000
G	$35.86	50	34,000	324,000	526,000
A	$33.54	55	55,000	379,000	471,000
D	$33.43	120	120,000	499,000	351,000
G	$33.43	120	0	499,000	351,000
E	$31.90	50	50,000	549,000	301,000
B	$30.74	80	57,000	606,000	244,000
A	$28.06	70	70,000	676,000	174,000
E	$28.06	70	70,000	746,000	104,000
A	$22.54	85	47,000	793,000	57,000
B	$22.03	170	22,000	815,000	35,000
E	$22.01	110	57,000	872,000	0
F	$22.01	200	200,000	1,072,000	0
B	**$22.01**	1	1,000	1,073,000	0

Entities B, E, and F have qualified bid allowances totaling 258,000 at the bid price of $22.01 USD. Entity shares of the 258,000 allowances bid are determined and entities are sold allowances, from the 35,000 remaining, according to their shares, with allowance amounts rounded down. Total allowances sold based on shares may be less than 35,000 due to rounding. The remaining allowances are sold based on random number assignments to entities, lowest random number first.

- Entity B's share is 0.003875969   (1,000 / 258,000 = 0.003875969).
- Entity E's share is 0.2209302326   (57,000 / 258,000 = 0.2209302326).
- Entity F's share is 0.7751937984   (200,000 / 258,000 = 0.7751937984).

- Entity B would be awarded 135 allowances (0.003875969 * 35,000).
- Entity E would be awarded 7,732 allowances (0.2209302326 * 35,000).
- Entity F would be awarded 27,131 allowances (0.775193798 * 35,000).

The total number of allowances awarded through this process is 34,998; two allowances remain to be awarded to the entities with the two lowest random numbers. If Entity B is assigned a random number of 5, Entity E is assigned a random number of 200, and Entity F is assigned a random number of 77, one allowance is awarded to Entity B and one allowance is awarded to Entity F.

While Entity B could have purchased up to 80,000 allowances at the settlement price of $22.01, due to the tiebreaker process Entity B is awarded a total of 79,136 allowances (57,000 + 22,000 + 135 + 1).

Allowances won in the tiebreaker are added to allowances won at higher bid prices. For example, Entity E's total allowances are 162,732 (35,000 + 50,000 + 70,000 + 7,732).

Allowances won by each entity and their respective total bid cost are shown in Table 15.

Table 15: Example 10 Allowances Won and Total Cost

Entity Name	Entity Jurisdiction	Allowances Won	Total Cost (USD)
A	QC	212,000	$4,666,120
B	CA	79,136	$1,741,783
C	CA	165,000	$3,631,650
D	QC	170,000	$3,741,700
E	QC	162,732	$3,581,731
F	CA	27,132	$597,175
G	QC	34,000	$748,340
Total		850,000	$18,708,500

VII. BID EVALUATION IN ADVANCE AUCTION

In the bid evaluation examples provided in this document, the assumption is that bids were submitted for a Current Auction. The bid evaluation process for an Advance Auction is the same, although the bid guarantee available, purchase limits, and holding limits would be different.

Entities submit a single bid guarantee for both the Current Auction and Advance Auction. As shown in Example 2, once the Current Auction settlement price has been determined, the entity's total cost for allowances awarded in the Current Auction (USD settlement price multiplied by number of allowances awarded) will be determined and deducted from the bid guarantee amount, and any bid guarantee amount remaining will be applied to the Advance Auction.