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**ENBRIDGE GAS DISTRIBUTION INC. (EGD)**

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CARBON MARKET REPORT

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ALPHA INCEPTION LLC

*November 10, 2016*

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## Ontario Carbon Market Report

Alpha Inception (AI) has structured this report to be comprehensive, including basic program facts, and recommends it be read in its entirety, even by those already familiar with Cap and Trade because it will also focus on recent and potential regulatory changes and initiatives, recent allowance auctions and secondary market activity. Lastly, it will address near-to-medium term supply and demand, which has been accompanied by an excel file to allow for basic scenario analysis.

The purpose of this report is to provide key observations, including descriptions of the various compliance instruments and market products, and analysis of the fundamentals of the program to assist with the formulation of risk management procedures and processes. Specifically, its purpose is to build internal staff and senior management understanding and to provide valuable commercial insight and information to assist in developing a carbon portfolio strategy. Separately, specific carbon portfolio recommendations will be provided in a subsequent report called the Carbon Strategy Report.

### ONTARIO CLIMATE GOALS

#### CLIMATE CHANGE MITIGATION AND LOW-CARBON ECONOMY ACT, 2016

Canada recently signed the Paris Agreement, a broad-based international accord to combat climate change, on April 21, 2016 (“Earth Day”), complementing efforts taken in recent years by the province of Ontario to improve environmental awareness and reduce greenhouse gas emissions (GHG). The Green Energy Act of 2009 brought more clean energy to Ontario and helped to create more clean energy jobs. In 2014, Ontario completed an initiative to phase-out all coal-fired electricity generation and continues to pursue various aggressive renewables policies. On May 18<sup>th</sup>, 2016, the provincial government passed the Climate Change Mitigation and Low-carbon Economy Act, 2016, and one day later released Ontario’s Cap and Trade Regulations (“Ontario Cap and Trade”). The government expects that Ontario Cap and Trade will generate ~\$1.9 billion annually, which has been earmarked for further emissions reduction programs.

Ontario’s overarching climate goals have been set forth with the following specific target reductions:

- 15% below emissions levels in 1990 (2020 goal)
- 37% below emissions levels in 1990 (2030 goal)
- 80% below emissions levels in 1990 (2050 goal)

On June 8<sup>th</sup>, 2016, the provincial government released its Climate Change Action Plan. This sets forth specific actions and programs that will be used by the Ontario government to transition to a low-carbon economy and meet its GHG emissions reduction targets. Several of these actions are summarized below:

- Building energy efficiency through retrofits
- Developing a cleaner transportation system by promoting public transportation and railroad expansion
- Increasing bicycle transportation
- Incentives for switching from high-carbon to lower-carbon fuel in fleets (buses and freight)
- Low carbon fuel standards
- Electric vehicle incentives
- Establishing a Green Bank to assist homeowners and businesses finance energy-efficient technology investments
- Research and development of low-carbon technologies

Following a pattern set forth in California, Ontario Cap and Trade is a backstop mechanism that ensures emissions reduction targets are met while specific measures and programs pursued under the Climate Change Action Plan (the “Plan”) are complementary measures that provide the bulk of actual reductions. Cap and Trade revenues generated at auction are used to fund those complementary measures under the Plan – without those revenues, Ontario’s emissions reductions targets would be very difficult, and more expensive, to carry out.

## ONTARIO CAP AND TRADE

The Ontario Cap and Trade program begins on January 1<sup>st</sup>, 2017 and is a market-based approach to controlling emissions. It provides economic incentives for achieving reductions by imposing a cost on pollution. The Ministry of the Environment and Climate Change (MOECC) sets aggregate annual GHG emissions caps beginning in 2017 and declining over the life of the program. Approximately 80% of economy-wide emissions will be covered under Ontario Cap and Trade and entities with a compliance obligation will be required to retire or surrender at various intervals at least one compliance certificate or instrument for each metric tonne of CO2 equivalent (tCO2e) emitted over the period. Participants in the Ontario Cap and Trade market can buy, sell and trade compliance instruments with one another providing a mechanism for the most economic emissions reductions to occur. Compliance instruments that can be surrendered for compliance include: Allowances, Offsets, and Early Reduction Credits.

Ontario Cap and Trade applies to those entities whose annual emissions equal or exceed 25,000 tCO2e. However, there are other entities that may choose to participate in Ontario Cap and Trade. Here are descriptions of the three types of participants either required or allowed under the program:

1. **Mandatory Participants** – entities whose annual GHG emissions equal 25,000 tCO2e or greater. Ontario-based entities meeting the 25,000 tCO2e threshold are required by law to participate under Ontario Cap and Trade. Additionally, much lower thresholds have been designated to electricity importers and fuel suppliers, ensuring their mandatory participation. There are approximately 300 emitters (150 large emitters plus 12 fuel distributors represent most of emissions) that are expected to meet these criteria. Mandatory participants include the following:
  - Large Industrial Emitters
  - Electricity Importers (imports of 1 MWh or more, annually)
  - Natural Gas Distributors
  - Fuel Suppliers (sales of 200 litres or more, annually)

It should be noted that natural gas-fired electricity producers are excluded from the regulation, and purchasing allowances for the natural gas used by these facilities is the responsibility of the natural gas distributors.

2. **Voluntary Participants** – entities whose annual GHG emissions are greater than 10,000 tCO2e but less than 25,000 tCO2e may opt to participate. Voluntary participants will be subject to the same rules as mandatory participants. Voluntary participants may be incentivized through expected goodwill to the organization or by the potential economic benefit, should the organization apply for and receive free allocations, which will be discussed further under Compliance Instruments Under Ontario Cap and Trade.
3. **Market Participants** – These entities do not have a compliance obligation but desire to participate in the auctions or secondary market. These may include individuals, non-profit organizations, financial institutions and other organizations that may desire to participate for environmental or investment/trading purposes, including speculation.

[REDACTED]

[REDACTED]

[REDACTED]

Throughout 2017, Ontario Cap and Trade is only applicable to Ontario-based entities. The province of Québec implemented a Cap and Trade program in 2013, administered by the Québec Government (MDDELCC). The U.S. state of California launched a Cap and Trade program in 2012, administered by the California Air Resources Board (CARB). Under the Western Climate Initiative (WCI), the California and Québec programs were ‘linked’ together in 2014 forming a larger and multi-jurisdictional Cap and Trade program (“WCI Cap and Trade”). Ontario has stated its intent to link with California and Québec via the WCI Cap and Trade in 2018.

The Ontario, Québec and California programs are substantially similar, though key differences will be noted throughout this report. As Ontario’s program is roughly one-third the size of that of California, Ontario prices may be significantly influenced

by price and policy developments in California. In this report, AI has included a substantial amount of analysis on California's market, legal, and regulatory arenas because of the strong influence that it will have on Ontario in 2018 and possibly as early as 2017.

## COMPLIANCE INSTRUMENTS UNDER ONTARIO CAP AND TRADE

### ALLOWANCES

#### Overview:

An allowance is the authorization for a participant to emit one tCO<sub>2</sub>e in Ontario, whereas an offset demonstrates the reduction of one tCO<sub>2</sub>e elsewhere in the economy, even potentially outside of Ontario. Ontario has yet to publish formal regulations concerning offsets, though they have given some indications and offsets will be discussed further below.

The MOECC creates allowances, when aggregate annual GHG emissions caps or budgets are set beginning in 2017 and decline over the life of the program. The cap, expressed in tCO<sub>2</sub>e, is equivalent to the total volume of available allowances. As the cap declines each year, there are fewer allowances available over time and participants must reduce their emissions and/or purchase the limited number of allowances from the auctions or in the secondary market.

Additionally, each program removes a portion of the annual budgets for sale from an Allowance Price Containment Reserve (APCR or "Strategic Reserve"). The Strategic Reserves are intended to be a soft price ceiling if allowance prices rise considerably. Deducting the APCR allowances from the annual budgets produces an adjusted cap, which more accurately reflects available allowance supply under each jurisdiction. The table below shows a comparison of the emissions caps, adjusted for the APCR tonnes withdrawn, under Ontario Cap and Trade and WCI Cap and Trade during each year of the respective programs.

Figure 1: ANNUAL CAPS ADJUSTED FOR ALLOWANCE PRICE CONTAINMENT RESERVE ("APCR")

Million tCO <sub>2</sub> e	2013	2014	2015*	2016	2017	2018**	2019	2020
Ontario	N/A	N/A	N/A	N/A	135.2 Adjusted Cap	129.6	124.0	118.4
Québec	23.0 Adjusted Cap	23.0	62.7	60.7	58.6	54.8	52.9	50.9
California	161.2 Adjusted Cap	158.1	378.7	367.1	355.6	333.2	322.1	310.8
WCI Total	N/A	181.1 Aggregate Adjusted Cap	441.4	427.8	414.2	517.6	499.0	480.1

\*The Transportation fuels sector was not included in Québec and California until 2015

\*\*Assumes linkage in January 2018 and a WCI Cap and Trade including Ontario, Québec and California

Source: Alpha Inception and jurisdictional regulations for Ontario, Québec and California

#### Procuring Allowances:

Mandatory and voluntary opt-in participants in Ontario Cap and Trade have several options to procure allowances created by the MOECC. Allowances will be used for most compliance obligations to avoid severe penalties, with the balance made up from offsets and other credits. Other participants may also procure allowances based on commercial or environmental motives and, in some cases, expectations of becoming a future covered entity. Allowances can be procured through i) submitting

applications to the MOECC for free distributions, ii) quarterly auctions administered by the MOECC and iii) through strategic reserve sales, which operate like the quarterly allowance auctions.

### 1. *Allowances from Free Distribution*

Only those entities that are Mandatory participants or Voluntary Opt-in participants may apply for allowances distributed free of charge. Entities that expect to meet the criteria for Voluntary Opt-in by the end of the compliance year may also apply for free allowances. Any sectors can apply for free allowances except, specifically, the following: electricity generators/electricity importers, producer/suppliers of petroleum or fuel products, and distributors of natural gas. The deadline to submit applications for 2017 was on October 14, 2016. In future years, the deadline for the next compliance year is expected to be early fall. Free allocations are placed into receiving entities CITSS account each February. Free allocations of allowances are equivalent to allowances purchased in the auctions or on the secondary market and can be used for compliance, banked for future years and can also be bought or sold in the secondary market.

One key difference between Ontario Cap and Trade and California and Québec is that Ontario participants must apply for free distributions. In California and Québec, industrial emitters have been allocated transition assistance and certain industries have been identified as high-risk of emissions leakage, where a business or facility moves outside of the jurisdiction to avoid paying for compliance but does not reduce any emissions, and are given additional free allowances or their transitional assistance factors do not decline as sharply as others. In California, most covered entities outside of the merchant power generation and fuel distribution sectors (with some small exceptions) receive at least some portion of free allowances. Additionally, in California, certain entities are either required by regulation or given the option to consign free allowances to auction. The requirement to consign or sell allowances at auction, in California, applies to Investor Owned Electric Utilities (“IOUs”) and Natural Gas Distributors, though IOUs must consign all allowances to auction and Natural Gas Distributors have an increasing requirement to consign each year. Publicly Owned Electric Utilities (“POUs”) are given free allowances and have the option to sell these at auction or transfer them to a compliance account. Over time, as allocations and allowance budgets are reduced, entities will need to supplement these free allocations with additional purchases of compliance instruments in the auctions or in the secondary market. While EGD cannot apply for free distributions, many of its customers that meet either the Mandatory Participant requirements or Voluntary Opt-in criteria will apply for free distributions. As those who are EGD customers become Voluntary Opt-in participants and apply for and receive free allowances, EGD compliance obligations will decrease over time.

It is expected that between 20-35 million allowances will be allocated freely in 2017, with the amount increasing in 2018 with additional applications from those who missed the opportunity to apply in 2017. Over an extended timeframe, free distributions of allowances will decrease as Ontario reduces transitional assistance.

### 2. *Allowances Sold at Auction*

**Auction Format:** MOECC will hold quarterly allowance auctions, which represent significant liquidity events in the market. All allowances from the annual budgets that are not freely distributed or allocated to the Strategic Reserve or APCR will be auctioned by the MOECC, and unsold allowances from previous budget years may also be sold at future auctions. The auction is a single round, sealed bid, and uniform price format. Auction participants submit all their desired bids, in lots of 1,000 allowances, during the 3-hour auction bidding window and are permitted to add, delete or revise their bids prior to the closing of the auction.

The Auction Administrator will rank qualified bids from all bidders from the highest to the lowest. Allowances will be awarded to bidders, beginning with the highest bid price and moving to successively lower bid prices, until the entire supply of allowances is exhausted or all qualified bids have been filled. Allowances at auction are awarded to the highest bidders first and to subsequent lower bidders until all the volume available has been awarded. The auction settlement price or Auction Clearing Price (“ACP”) is the price at which all the volume available has been awarded. All winning bidders pay the same price, the ACP, even when they may have submitted bids at higher prices. An example of auction clearing mechanism is provided below:



Figure 2: EXAMPLE AUCTION BIDS RANKED HIGH TO LOW AND SETTLEMENT PRICE

Bidder	Bid Price	Lots	Allowances	Cumulative Bid Allowances	Allowances Awarded at ACP
A	\$35.00	3,000	3,000,000	3,000,000	3,000,000
B	\$27.15	2,500	2,500,000	2,500,000	2,500,000
A	\$30.00	1,500	1,500,000	4,500,000	1,500,000
C	\$25.39	2,000	2,000,000	2,000,000	2,000,000
C	\$21.37	1,200	1,200,000	3,200,000	1,000,000
<i>Auction Clearing Price ("ACP") = \$21.37</i>					
<i>Assumes 10,000,000 allowances offered</i>					
A	\$20.95	4,000	4,000,000	8,500,000	0
B	\$18.25	5,025	5,025,000	7,525,000	0

Source: Alpha Inception

Under the example provided above, the auction offered 10,000,000 tonnes and the settlement price was \$21.37 per tonne. Bids are ranked from highest to lowest and allowances are awarded to bidders, beginning with the highest bid price and moving to successively lower bid prices until the entire supply is exhausted. The price where bids equal supply is known as the Auction Clearing Price ("ACP"). All winning bidders pay the ACP for all allowances won in the auction. Bids below the ACP would not be awarded. In the example, winning bids would be fulfilled as follows:

**Bidder A** won a total of 4,500,000 allowances at \$21.37 per allowance

**Bidder B** won a total of 2,500,000 allowances at \$21.37 per allowance

**Bidder C** won a total of 3,000,000 allowances at \$21.37 per allowance

Forward Vintage Auctions: Each auction will consist of two simultaneous auctions for different vintages of allowances. A Class 1 or "Current Auction" is for allowances from the current compliance year vintage. A Class 2 or "Advance Auction" is for allowances with a vintage of the current year plus 3 years. Allowances in the Class 2 Auction represent 10% of the forward vintage budget year and are divided evenly over the auctions held in the year. Class 1 Auctions held in 2017 are for vintage 2017 allowances and Class 2 Auctions held in 2017 are for vintage 2020 allowances.

Bidders submit bids simultaneously to the Class 1 and Class 2 auctions, meaning that the outcome of one auction cannot influence bidder behaviour in the other. Auction format, including participation requirements, bid submission, settlement mechanism, purchase limits, and reserve prices are the same for both auctions but the ACP will be settled separately.

Auction Reserve Price: Auctions held each year will have a minimum price or Auction Reserve Price ("ARP") that will apply to both Class 1 and Class 2 auctions, with the same ARP applying to all auctions held in the calendar year. No bids will be accepted at prices that are lower than the ARP, effectively setting a minimum ACP. If there are fewer bids than volume available in any auction, bidders would pay the ARP for any allowances awarded.

The annual ARP for auctions held in Ontario in 2017 and forward will be set by the WCI Cap and Trade, regardless of whether Ontario ultimately links with California and Québec. The ARP is announced each December prior to the calendar year in which it will take effect, though, where the ARP is in USD it shall be converted into CAD using the Bank of Canada exchange rate

the day prior to the auction. It is calculated as the higher of California and Québec's respective ARP for the previous year increased by 5% plus the rate of inflation, which could be positive or negative. The ARP is converted into Canadian dollars ("CAD") using an exchange rate published the day prior to an auction.

**National Price on Carbon:** On October 3<sup>rd</sup>, 2016, the federal government announced that all Canadian provinces must adopt a carbon pricing scheme by 2018 or the government will impose a price for them. Specifically, provinces can adopt either a carbon tax or a carbon cap and trade program.

**Minimum Carbon Price (\$CAD):**

2018 - \$10  
2019 - \$20  
2020 - \$30  
2021 - \$40  
2022 - \$50

**Provinces with Existing Carbon Prices:**

AB – Carbon Tax of \$20 per tonne in 2017, rising to \$30 in 2018  
BC – Carbon Tax of \$30 per tonne  
QC – Cap and Trade with floor price of \$17.69 CAD in 2017  
ON - Cap and Trade with floor price of \$17.69 CAD in 2017

AI believes that this minimum price will apply to cap and trade by the time the legislation is passed. The objective of competitive equivalency between the provinces cannot work unless the minimum price applies to both taxes and cap and trade programs in equal measure. One of the implications of the national policy could be that Ontario and Quebec would be required to increase the ARP to meet the national minimum.

**Projected Auction Reserve Prices:**

The 2016 WCI ARP is \$12.73 U.S. Dollars ("USD") and recent historical data for Consumer Price Index in the U.S. ("US CPI") is on target to be between 0.7% and 1.0%, making the 2017 ARP between \$13.44-\$13.50 USD. Assuming 1% US CPI in 2017 and 2% thereafter it is reasonable to expect that the ARP will follow price increases approximated below in Figure 3

Figure 3: EXPECTED AUCTION RESERVE PRICES 2017-2020, USD AND CAD

	2017	2018	2019	2020	2021	2022
CALI ARP (USD)	\$13.50 USD	\$14.38	\$15.31	\$16.31	\$17.37	\$18.50
ON ARP (CAD) @ 1.31 CAD/USD	\$17.69 CAD	\$18.83	\$20.06	\$21.36	\$22.75	\$24.23

Source: Alpha Inception, September 2016 – assumes that program is extended

**Participation Requirements:** Those entities desiring to participate in the quarterly auctions must open a Compliance Instrument Tracking System Service Account ("CITSS") and register with the auction administrator. Participants must apply for each auction that they intend to submit bids and ensure that updated disclosures and corporate information has been provided. Additionally, auction participants must submit a financial bid assurance in the amount of the maximum value of the desired bids. The following steps must be taken to participate in an auction:

- Open a CITSS account

- Apply to participate in each quarterly auction
- Provide a financial bid assurance equal to the maximum value of bids intended to be submitted in both Class 1 and Class 2 auctions
- Update necessary disclosures and corporate information
- Abide by all auction participation rules regarding disclosures, purchase limits, holding limits and bid assurance

Auction participants must be diligent in self-monitoring to ensure that there are no violations of registration requirements, bid deposits, purchase limits, holding limits and inappropriate disclosure of auction participation and bidding strategies. More detailed information on auction participation will be provided in Appendix A – Auction Training Material.

Unsold Allowances at Auction: If an auction is undersubscribed and not all allowances offered for sale are sold in the quarterly auctions, the result will be a pool of unsold allowances. Understanding what happens to these unsold allowances in the various jurisdiction could be very important in projecting short-term as well as long-term supply and demand.

In Ontario, all allowances offered for sale at auction are essentially provincially-owned. Allowances that remain unsold in the Class 2 or forward-vintage auctions *may* be re-offered for sale in the Class 1 auction but only when those allowances become the current year's vintage. Allowances that are unsold in the Class 1 or current-vintage auctions *may* be re-offered by the MOECC but only after two auctions have successfully cleared above the ARP or reserve price. In either case, the MOECC reserves the discretion to offer previously unsold allowances at subsequent auctions but is not required to do so. Québec's treatment of unsold allowances is like Ontario's treatment of unsold allowances.

California, on the other hand, differs from Ontario and Québec. Firstly, California auctions consist of not only state-owned allowances but also allowances that are owned and have been consigned to auction by various electric and natural gas utilities. Secondly, the unsold consigned allowances are automatically *rolled* to the next auction, thus increasing the available supply. Unsold state-owned allowances are treated similarly to those in Ontario and Québec except that California is *obliged* to re-offer unsold allowances either in their vintage year, in the case of unsold forward-vintages, or after two consecutive auctions have cleared above the reserve price, in the case of current-vintages. Thirdly, California recently proposed regulatory amendments that would move state-owned allowances that remain unsold for 24-months into the APCR, which only becomes available at significantly higher prices.

### 3. Allowances from Strategic Reserves Sales

Like WCI Cap and Trade, Ontario creates a reserve pool of allowances to mitigate upward price spikes. This pool of Strategic Reserves or APCR, is populated at the beginning of the program from a carve-out from each of the annual allowance budgets equivalent to 5% or 26.7 million tonnes total through 2020. Strategic Reserve sales may be held quarterly, in addition to the allowance auctions. Only capped participants may purchase from the APCR.

Allowances in the reserve were split into three equal sized price tiers, set initially at 2016 price equivalents of \$47.88, \$53.86, and \$59.85, all in CAD. For 2017 and subsequent years, the price tiers shall increase by 5% + Ontario inflation each year. The reserve sale will be distributed on a first come, first served basis. Ontario makes allowances from the reserve available for sale six weeks after the completion of each quarterly allowance auction. Another interesting fact to note is that all allowances carved out and put into the APCR become universal vintage and are available for any compliance year. As such, allowances in the APCR are essentially equivalent to a 2017 vintage allowance, regardless of the actual budget year from where they have been taken.

## OFFSETS

An offset credit is like an allowance in that it can be retired to satisfy obligations under the Cap-and-Trade program. It is created through a verified reduction or absorption of one tCO<sub>2</sub>e elsewhere in the economy and through an approved methodology. It must demonstrate “additionality”, the concept that the CO<sub>2</sub> reductions would not have occurred without the payment for the offset and would not have occurred under a Business as Usual “BAU” scenario, this includes a restriction on ‘double-counting’ of emissions reductions that would have occurred as the result of another regulation or law.

As of the date of this report, Ontario has not formally released its regulations surrounding the use of offsets under Cap and Trade and it appears to have been significantly delayed. Offsets are not likely to have much of an impact, if any, in 2017, however, as will be discussed later in the Fundamental Supply & Demand of Cap and Trade, offsets may provide a significant value proposition in later years as Ontario offsets are developed. Should Ontario link with WCI, Ontario-based entities are expected to be able to purchase offsets from the WCI Cap and Trade, where the market for offsets is further along. The information provided below is a guideline only based on what is expected in Ontario.

Offsets Restrictions for Compliance: Under Ontario Cap and Trade and WCI Cap and Trade rules, the use of offset credits is limited to no more than 8% of a capped participant’s compliance obligation. The 8% can be a valuable cost reduction tool for entities that choose to optimize their portfolio of compliance instruments, as offsets generally are priced at a discount to allowances. The 8% permissible limit, however, cannot be carried forward into future compliance periods – in other words it is a “use it or lose it” opportunity. Though on the surface the 8% limit may seem inconsequential, in aggregate offsets are permissible for nearly 43 million tCO<sub>2</sub>e of compliance through 2020 under Ontario Cap and Trade.

Offset Invalidation Risk: It is not yet clear whether Ontario offsets would carry the risk of invalidation, where offsets, even once deposited into a holder compliance account, could be withdrawn if deemed to be fraudulent or in violation of various regulatory criteria. A key difference between the treatment of offsets in California and Québec is that in California invalidation risk, in most cases, lies with the offset buyer unless the offset contract is backed by a credit-worthy entity offering, at a premium, insurance against such invalidation risk (known as a “Golden California Carbon Offset” or “gCCO”). California’s uninsured offset credits come with either an 8-year or a 3-year invalidation period, after which the credits can no longer be invalidated. In Québec, no such buyer’s liability exists and instead the risk of invalidation is backed by the province’s Environmental Integrity Account (“EIA”). The EIA holds back a certain percentage of all offset credits issued and replaces illegitimate offset credits by withdrawing an equivalent amount from the EIA, essentially insuring all Québec-issued offsets.

Offset Protocols: Based on MOECC’s Request for Proposal on adaptation of offset protocols for the Ontario Cap and Trade, it is expected that offsets will be geographically restricted to Canada only. Should Ontario link with California and Québec, which allows for U.S. based offset projects, then those offset credits would become eligible for use in Ontario, though it would not be the MOECC that is issuing such credits, only the use thereof. Based on AI’s discussions, Ontario appears to be considering, at least initially, the following four offset protocols: Ozone Depleting Substances (“ODS”), Landfill Gas, Coalmine Methane (“CMM” or “MMC”), and Domestic Forestry. Given the intricacies of contracting and the varied risks embedded in the various offset protocols, certain considerations should be made when evaluating the value of offset credits, even where a seller-insured product is purchased. The invalidation risk does not exist in Québec due to the environmental integrity account – Ontario may follow this procedure to protect against invalidation. Brief descriptions of the likely protocols that may be accepted by Ontario, as the program is further developed, are provided below:

### 1. Ozone Depleting Substances (“ODS”)

This protocol refers to a large group of chemicals known to destroy the stratospheric ozone layer when released into the atmosphere. Projects would include the destruction of such chemicals, including refrigerants, blowing agents, solvents and fire suppressants. In addition to damaging the ozone layer, most ODS gases are very potent greenhouse gases and, thus, destroying 1 tonne of ODS creates many offset credits, with CFC-11 receiving 4,750x multiplier and CFC-12 a 10,900x multiplier.

One advantage of this protocol is that once a project has destroyed ODS no additional project monitoring is required, reducing costs and potentially reducing the risk of invalidation. [REDACTED]

[REDACTED] Additionally, no protocol is immune to administrative or other technical violations of environmental laws, which have the potential to invalidate otherwise verifiable offset credits.

On May 29, 2014 California issued a notice of investigation of ODS offset credits that were created at the Clean Harbors Incineration Facility in El Dorado, Arkansas. The investigation cited potential violations of the facility's operating permit issued under the federal Resource Conservation and Recovery Act (RCRA). Specifically, the facility is claimed to have improperly sold hazardous waste material as a commercial substitute during the period 2009-2011, which previously resulted in a settlement with the U.S. Environmental Protection Agency ("EPA") of \$581,236 USD. On November 14, 2015, California issued formal notice that it was invalidating 88,955 tCO<sub>2</sub>e offset credits from the Clean Harbors facility. The notice stated that while the offsets were real, quantifiable, measurable and additional, however, the invalidation resulted from a technical violation for not meeting certain environmental laws, which under California Cap and Trade was a violation of offsets rules and prevented their creation. The 88,955 credits were a much smaller subset of the over 4.3 million that were under investigation.

## 2. *Landfill Gas*

Accepted in Québec, for Canadian-based landfills, but not in California due to existing regulations already requiring the management of landfill gases, this protocol involves extracting methane gas from landfills and converting it to CO<sub>2</sub> for combustion in the power sector. A landfill is a disposal site for waste materials including household, commercial, industrial and non-hazardous solid waste. Bacteria break down the waste and produce landfill gas.

Landfill Gas has been included in some Cap and Trade programs, such as Québec and the U.S. Regional Greenhouse Gas Initiative ("RGGI") but also contested in others, such as California Cap and Trade. Although methane is a potent GHG and can be extracted from landfills and used for combustion in power generation, California has not adopted landfill gas as an offset protocol because it does not meet the criteria of 'additionality', or offset reductions that would otherwise occur absent Cap and Trade. Many landfills across the U.S. are already required to capture the methane at landfills or already do so to reap benefits to their Renewable Portfolio Standards ("RPS") in the power sector. As Ontario and Québec do not have similar RPS or similar programs, they can accept offsets from Landfill Gas as additional to the Business-As-Usual baseline case.

## 3. *Coalmine Methane*

Known as "Coal Mine Methane" or "Mine Mouth Capture", this protocol applies to methane emissions reductions or capture and destruction at coalmines. There are two key sources of methane from active mining: ventilated air methane and methane released from drainage systems. While the protocol has potential to add substantial supply to the offset market, Coal Mine Methane ran into political and environmental pressure during the adoption process in California. Environmentalists claim that the protocol may support the economics of coal producers, which in turn could lead to increased coal production and increased life-cycle emissions. [REDACTED]

[REDACTED] Coalmine Methane offsets required a substantial capital investment up-front and until the WCI program is officially extended beyond 2020, it is difficult for offset developers to dedicate the capital to these projects. To date, the Coalmine Methane offsets issuances in California have been much less than initially expected.

## 4. *Domestic Forestry*



Forestry offsets represent the absorption of CO<sub>2</sub> from the atmosphere rather than a reduction. This protocol includes projects for i) reforestation or tree planting, ii) improved forest management to maintain or increase carbon stock on forested lands by increasing rotation ages or increasing stocking of trees, and iii) avoided conversion by preventing the conversion of forestland to non-forestland. Forests act as a carbon sink by absorbing CO<sub>2</sub> from the atmosphere through photosynthesis and store it for a long time. Thus, offsets can be created by essentially planting new trees or preventing the harvesting of existing trees for lumber, in order capture CO<sub>2</sub> in the atmosphere as the trees grow and sequester CO<sub>2</sub>

Several of the issues that are in debate over whether Ontario should or should not include Forestry as an offset protocol are the difficulties in measuring the amount of CO<sub>2</sub> that can be absorbed over extended periods of time. Measurement and monitoring can be quite costly. Also, proving that the offsets are 'additional' can also be a challenge when provincial laws already require replanting when a forest has been cut or when existing forestry management rules are stricter in Canada than in the U.S. Additionally, the risk of forest fires can cause offsets to be invalidated or reduced.

Figure 4: COMPARISON OF OFFSET PROTOCOLS IN CALIFORNIA, QUÉBEC AND ONTARIO – ISSUED TONNES

tCO <sub>2</sub> e	California	Québec	Ontario
ODS	12,266,378	467,808	Expected
Livestock/Agricultural Methane	2,644,865	0	Under consideration
Domestic Forestry	28,940,365	N/A	Under consideration
Urban Forestry	0	N/A	
Coalmine Methane / Minemouth Capture	3,573,844	0	Expected
Rice Cultivation	0	N/A	N/A
Landfill Gas	N/A	37,800	Expected
<b>Total Issued:</b>	<b>47,425,452</b>	<b>505,608</b>	<b>0</b>

Source: Alpha Inception, CARB, MOECC, September 2016

California offsets are already undersupplied when compared to the maximum permissible usage of 8%

Additional descriptions of potential protocols that could be adopted by Ontario in the future and are currently in use in California have been provided below:

#### 5. *Urban Forestry*

This protocol includes projects for planned tree planting and maintenance activities that permanently increase carbon storage. Due to difficulty in obtaining urban projects, those that are 'additional' projects from this protocol are currently non-existent and are not expected to provide substantial supply of offsets in the future.

#### 6. *Livestock Management*

Known as Agricultural Methane, this protocol is accepted in California and Québec and is for the control of manure that is treated and stored under anaerobic conditions to decompose and thereby produce methane, which can be emitted into the atmosphere. Projects would include biogas capture and destruction either onsite or offsite. Methane, while not as potent as ODS, still receives a 21x multiplier when it is destroyed through burning or combustion.

Projects tend to be small and range from 10,000-20,000t per project and output needs to be verified each year. The cost per credit of developing and converting these offsets credits is potentially the most expensive of the common protocols, due to low economies of scale.

## 7. *Rice Cultivation*

This protocol allows rice farmers to generate offsets by implementing certain practices in their cultivation processes. Farmers can implement one of three methods or techniques: dry-seeding, early drainage, or alternate wetting and drying. Dry seeding involves sowing dry seeds instead of pre-germinated ones. Early drainage refers to draining the fields 7-10 days earlier than usual. Alternate wetting and drying is the practice of flooding and then drying the fields throughout the growing season. Although the agricultural sector uses various heavy farm equipment and machinery, the total expected volume of offsets that could be expected from this offsets protocol is quite small.

## EARLY REDUCTION CREDITS

There are some mandatory participants that are eligible to receive early reduction credits for actions that occurred between January 1, 2012 and December 31, 2015. An early reduction credit will serve the same purpose as a freely distributed allowance and can be turned in to satisfy compliance obligations under Cap and Trade.

Ontario has reserved a maximum of 2-million early reduction credit and participants must apply for such credits. AI expects that all 2 million available for 2017 will be applied for and granted. Ontario has not formally released its regulations surrounding the awarding of early reduction credits. Proposed regulations for early reduction credits is expected prior to the January 1, 2017 start of Ontario's Cap and Trade, though the credits themselves are not needed for compliance until the end of the compliance period, so a delay is possible. It is expected that natural gas distributors will not be allowed to apply for early reduction credits.

## APPLICATION OF HOLDING LIMITS

Holding Limits are imposed upon all Cap and Trade participants, and apply across affiliated entities. A holding limit is the maximum number of allowances, including strategic reserve allowances, and early reduction credits that can be held across all CITSS accounts (holding accounts and compliance accounts) for a participant or group of related participants. Offsets do not fall under a holding limit. Exemptions exist for capped participants who deposit allowances into their compliance accounts. The amount of the exemption is approximately equal the participant's accumulated compliance obligation through the end of the year that the exemption is calculated. For example, in 2017 a capped participant's exemption amount would be equal to 1-years' worth of emissions and in 2018 the exemption would be equal to 2-years' worth of emissions.

The calculation of the Holding Limit applies 1) to the current vintage year and all prior vintage years collectively and 2) to each forward vintage year. The calculation is as follows:

$$HL_j = 2,500,000 + 0.025 \times (C_j - 25,000,000)$$

$HL_j$  = the limit on emission allowances with vintage year  $j$  that are held in the cap and trade accounts during a year. Where year  $j$  is the current vintage year, the HL shall apply to current vintage allowances and all prior years, and

$C_j$  = the number of Ontario emission allowances created for year  $j$ .

The Holding Limit is imposed upon all market participants to prevent market abuse and hoarding of allowances. Holding Limits are viewed similarly by each of the WCI jurisdictions, however, the calculation is based on the combined annual budgets and is not simply the summation of the holding limits applied to each program individually. Figure 5 below shows the calculated Holding Limits for Ontario and the WCI Cap and Trade with and without an Ontario Linkage.

Figure 5: CALCULATED HOLDING LIMITS NOT INCLUDING EXEMPTIONS IN ONTARIO AND WCI - TONNES

	2017	2018	2019	2020
Ontario	5,433,300	5,286,000	5,138,900	4,991,700
WCI (w/o Ontario)	12,662,000	12,306,500	11,953,750	11,598,500
WCI (w/ Ontario)	N/A	15,717,500	15,217,650	14,715,200

Source: Alpha Inception, CARB, MOECC, September 2016

## TIMELY SURRENDER OF COMPLIANCE INSTRUMENTS

The Ontario Cap and Trade annual budgets are categorized into compliance periods. Compliance Period 1 in Ontario runs from 2017-2020, which will coincide with the end of Compliance Period 3 in Québec and California, which runs from 2018-2020. Thereafter, it is expected that each jurisdiction will maintain parallel compliance periods across the programs.

At the end of a compliance period, participants are required to surrender one compliance instrument in the form of an allowance, an offset, or an early reduction credit for each tCO<sub>2</sub>e emitted during the compliance period, generally on the first business day in November of the year following the end of a compliance period. The first compliance date in Ontario is November 1, 2021. One key difference in Ontario is that there is only a compliance surrender due at the end of the full compliance period whereas in California, covered emitters must make annual surrenders equal to 30% of their emissions and then provide the full balance at the end of the compliance periods. As the first compliance surrender in Ontario isn't due until 2021, if the programs link, an Ontario capped participant could satisfy their entire compliance obligation with allowances and, to the extent permissible, offsets, from California or Québec.

For capped participants that fail to surrender compliance instruments by the surrender deadline, the MOECC can levy a penalty equal to 3-times the shortfall for non-compliance. If the capped participant does not true up themselves for that amount, then MOECC will use the penalty volume multiplied by the most recent ACP. In addition to the penalty volume, the capped participant must also satisfy the initial shortfall, or in other words and shortfall after compliance is due would require 4-compliance instruments for each tCO<sub>2</sub>e shortfall. Furthermore, there could be administrative monetary penalties for non-compliance that have not yet been determined but could be as much as \$1 million.



## SECONDARY MARKET TRADING AND WCI AUCTION RESULTS

### EXCHANGE TRADING VIA INTERCONTINENTAL EXCHANGE

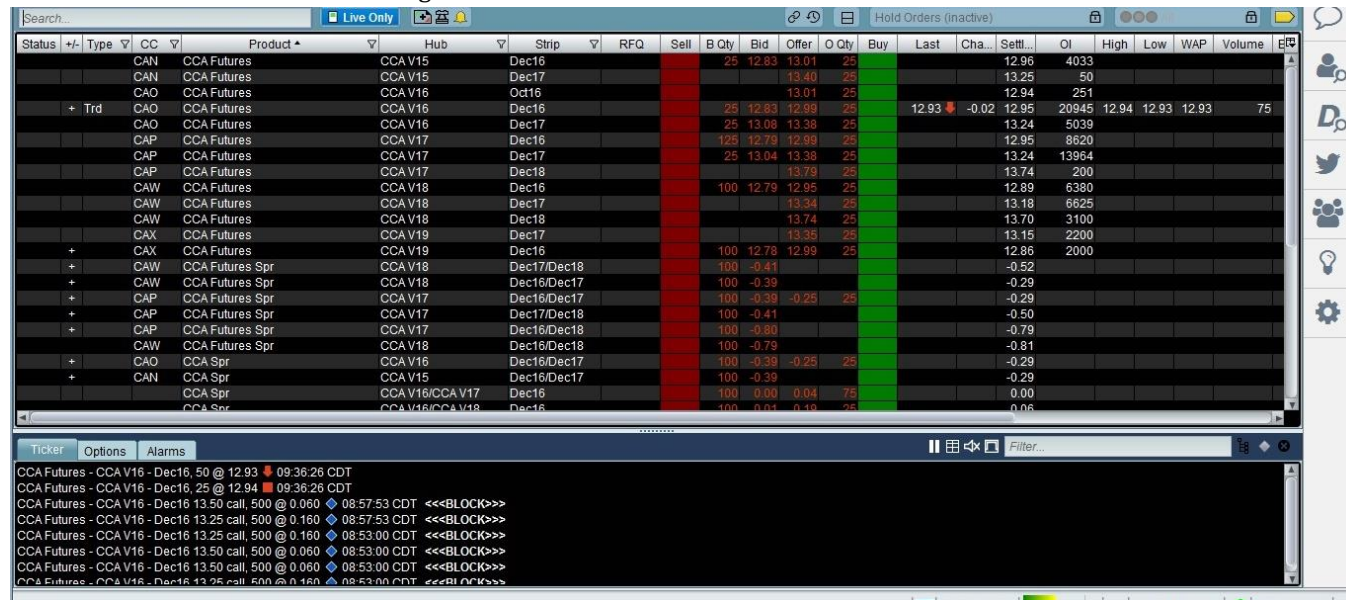
#### Overview:

Outside of the quarterly auctions, the two common methods of procuring and trading compliance instruments are via Exchange Trading on the Intercontinental Exchange (“ICE”) and “Over-The-Counter” (“OTC”) through direct-deal and broker markets.

ICE is an electronic trading platform that offers access to regulated futures exchanges, global OTC markets and clearinghouses in North America and Europe. In terms of the California carbon market, ICE has become the most successful and liquid exchange platform for California Carbon Allowances (“CCA”), including futures and options. ICE futures trade on a WebICE online trading platform, which can be seen below in Figure 6.

The ICE futures contracts are settled physically with delivery made via CITSS account transfer if CITSS is operational. If at delivery the Market Tracking System (“MTS”) or CITSS is not capable of transferring allowances or such allowances do not exist, then the contract will financially settle at the ARP for the year of delivery. The language of the ICE contract also allows the seller to deliver the contracted vintage allowances or an earlier vintage. Based on recent history in the U.S. federal emissions markets, CAIR allowances continued to trade in the absence of a current mandate. [REDACTED]

Figure 6: EXAMPLE WEBICE TRADING PLATFORM



Source: Intercontinental Exchange, September, 2016

#### Ontario Carbon Allowances (“OCA”) Futures:

Should Ontario link with WCI in 2018, as expected, then the CCA futures contract would provide allowances that would also be compliant with Ontario Cap and Trade. Prior to linkage, ICE intends to list a separate futures contract that would allow Ontario participants (and others, including market speculators) to trade futures on Ontario allowances without fear of purchasing a California or Québec allowance that may not be acceptable in Ontario if the programs ultimately do not link. The Ontario-

contract may also be used by speculators seeking exposure to Ontario prices and betting on non-linkage. Initial contract specs for the Ontario Carbon Allowance (“OCA”) futures contract are provided below:

**Contract Size:** 1,000 Ontario Carbon Allowances

**Currency:** CAD

**Settlement:** Physical delivery

**Registry:** CITSS

**Deliverable Instruments:** Carbon allowances issued by the Province of Ontario or a linked program that qualify for the Ontario Cap and Trade.

The OCA contract would prohibit the use of California or Québec allowances to satisfy a delivery obligation if the programs do not link but would allow for such if linkage occurs. ICE expects to launch the OCA futures contract shortly, with initial contract deliveries of Jun-2017 and Dec-2017. [REDACTED]

#### **California Carbon Allowance (“CCA”) Futures:**

**Liquidity and Open-Interest:** ICE has been the most liquid exchange in terms of volumes of CCAs purchased and sold. Across all existing contracts and deliveries, Open-Interest has been over 100 million tonnes, however, recent liquidity has been significantly lower than in previous years due to the cumulative oversupply of allowances available in the market and the perceived risk of outstanding legal challenges in California.

The lack of liquidity in the market for CCA futures is just one of the reasons that AI expresses concern over the Regulatory Framework (EB-2015-0363) issued by the Ontario Energy Board (OEB) regarding utility procurement practices. Specifically, the OEB determined that the CCA futures settlement prices over a 21-day measurement period should be used when developing an Annual Carbon Price Forecast. [REDACTED]

[REDACTED] This could result in a poor representation of market levels, the farther out in the term (1-year) that is being evaluated.

Additionally, CCA futures prices consider a market cost of capital and not the mechanism used to increase the annual auction reserve price and using the CCA price implies that linkage between California and Ontario is certain, [REDACTED]

[REDACTED] More information concerning the challenges of relying on CCA pricing will be discussed in the Carbon Strategy Report, in the context of developing a carbon price forecast.

The figure below shows the Open-Interest, or number of contracts with one buyer and one seller, for various futures and options contracts. Many participants do not yet have the capability to transact through the ICE or choose to purchase solely at auction or through bilateral contracts.

Figure 7: CCA FUTURES AND OPTIONS OPEN-INTEREST IN TONNES

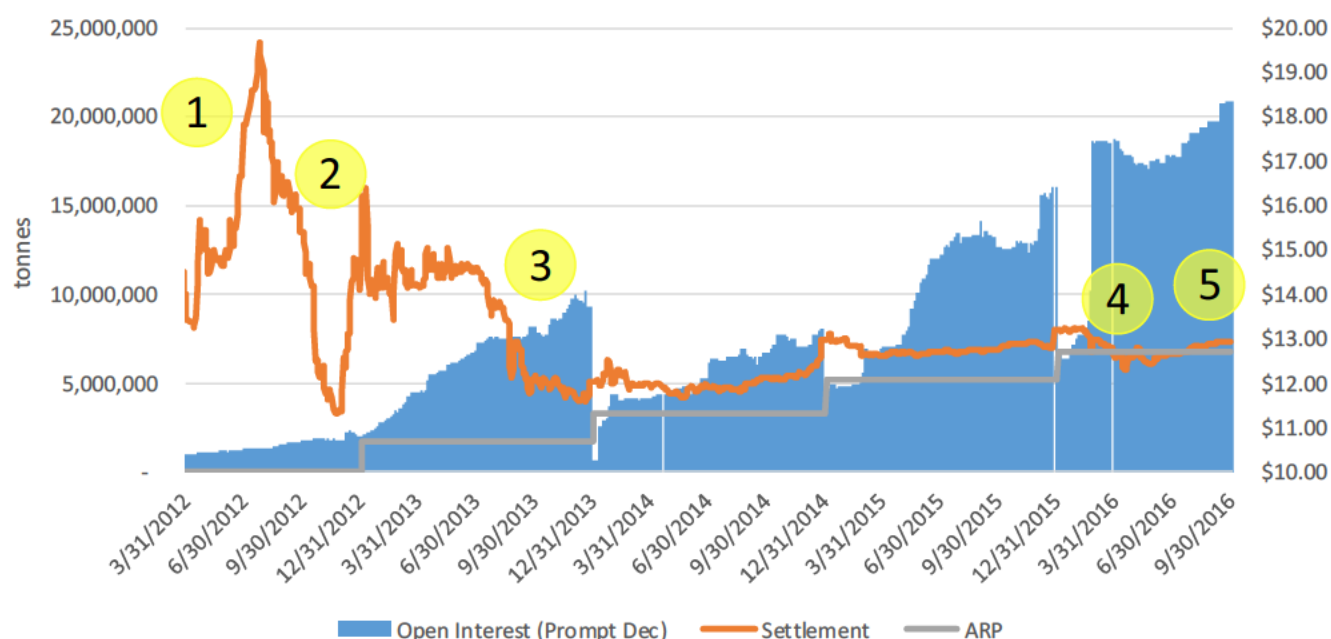
Product	Vintage	Contract	Type	Strike	Open-Interest in tonnes	Open-Interest (All Contracts) in tonnes
CCA	V2016	Dec-2016	Futures	N/A	20,945,000	29,656,000
CCA	V2017	Dec-2017	Futures	N/A	13,964,000	22,984,000

CCA	V2018	Dec-2017	Futures	N/A	6,625,000	27,605,000
CCA Options	V2016	Dec-2016	Call	\$13.25	6,500,000	24,525,000
CCA Options	V2016	Dec-2016	Put	\$11.75	2,800,000	7,825,000
CCA Options	V2017	Dec-2017	Call	\$13.75	9,500,000	18,600,000

Source: Intercontinental Exchange, September 26, 2016

**Historical Market Impacting Events:** As with many environmental markets, the liquidity and price action from day to day can be very volatile. Some days have traded substantial volumes whereas others have not traded any volume at all. Recently traded volumes have been far lower than in previous years. Additionally, the price volatility has been significant and large price moves typically have coincided with “regulatory” news or major events, such as the release of auction results. Highlighted below are several key market events with brief descriptions of the market impacts. The settlement prices and open-interest are for only the December contract each year (rolling prompt December):

Figure 8: CCA FUTURES DAILY SETTLEMENT PRICE AND OPEN-INTEREST



Source: Intercontinental Exchange, September 26, 2016

- July 2012 – Uncertainty about Supply/Demand and forecasts for \$55-\$80 USD carbon prices:** Although the auctions had been delayed by one year, various market analysts had published research and price forecasts that suggest California Carbon Allowances would reach as high as \$80 per tonne by 2020.
- November 2012 – California Chamber of Commerce files lawsuit against Cap and Trade:** Just days before the inaugural allowance auction, the California Chamber of Commerce filed a lawsuit against Cap and Trade that argued that auctions were an illegal tax not authorized by the California legislature. This resulted in secondary market prices collapsing very near the \$10 auction reserve price. The November auction settlement price was \$10.09 USD.

3. **June 2013 – Market realization of oversupply and legal appeal:** Due to low natural gas prices and an aggressive Renewable Portfolio Standard, analysts came to the realization that California's emissions would be significantly lower than the annual budget caps. Secondary markets and auction settlement prices gradually moved towards the auction reserve price. In November, 2013 a California Superior Court Judge rules in favour of CARB authorizing the cap and trade auctions. The decision was later appealed by the Chamber of Commerce and remains in appeal.
4. **February 2016 – Legal stay issued for the Clean Power Plan and RGGI fallout:** The U.S. Environmental Protection Agency ("EPA") had previously issued widespread environmental regulations under the Clean Power Plan ("CPP"). Various coal-states sued the EPA and were granted a stay of the CPP until such legal processes had been carried out. There was no immediate impact on California because the CPP targets were less aggressive than California's. However, the stay did lead to a significant drop in prices in the Regional Greenhouse Gas Initiative ("RGGI"), a companion cap and trade program in the U.S. Northeast. Within weeks, this led to de-risking across environmental markets and, for the first time, California prices fell below the auction reserve price or perceived market floor price and auction volumes began to be substantially undersubscribed.
5. **August 2016 – California legislature passes SB32 extending climate targets to 2030:** The California legislature passed long-awaited legislation through SB32 and AB197 that extended California's climate goals to reach a 40% reduction by 2030. The bills failed to explicitly extend Cap and Trade as the mechanism to achieve those goals and so uncertainty remains as to the future of Cap and Trade in California.

## OVER-THE-COUNTER TRADING

### Overview:

Bilateral or OTC transactions that occur directly between two parties (including brokered transactions) instead of on an exchange involve two parties agreeing on how a trade will be settled in the future. Significant differences can exist from one contract to the next. OTC transactions are particularly useful when transacting in highly specialized products, such as offset credits because of the uniqueness in protocol, vintage, invalidation risk, conversion and other terms that can exist in the contract. Below are several recommended environmental brokers and their contact information.

Additionally, futures transactions can be introduced by a broker and then cleared on ICE. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

**Broker Fees:**

Although not always necessary, most brokers prefer to execute a brokerage agreement prior to arranging any transactions. The brokerage agreements will detail specifically the notification details for sending confirmations, the settlement instructions for brokerage fees, the specific fees involved in different types of transactions, and, if possible, an exclusivity. [REDACTED]

Additional fees are also charged by the Futures Clearing Merchant ("FCM") and the Exchange. [REDACTED]

[REDACTED] More information on ICE fees can be obtained by visiting the fees page: [https://www.theice.com/publicdocs/futures\\_us/IFUS\\_Energy\\_Fees.pdf](https://www.theice.com/publicdocs/futures_us/IFUS_Energy_Fees.pdf)

AI may provide recommendations for environmental product brokers by request.

**Over-The-Counter Products:**

[REDACTED] Additionally, there are some products that, due to complexity or other contracts specific nuances, cannot be transacted on an exchange and must be conducted OTC. A few examples of OTC products are described below:

1. **Forwards:** Bilateral or OTC transactions that occur directly between two parties (including brokered transactions) instead of on an exchange involve two parties agreeing to contract specific terms including quality or vintage, delivery, quantity and credit provisions. Forwards are quite like futures contracts except they are conducted directly between the parties but can facilitate non-standard delivery terms and odd-lot quantities, including variable quantities.



2. **Block-Cleared Futures:** These are transactions for futures contracts that are not traded directly on the screen but, instead, can be broker-introduced and then sent to the exchange for clearing and to facilitate credit. Additionally, these transactions can be cleared between two parties wishing to transact but perhaps preferring to face the exchange rather than one another. In this instance, a trade is agreed to by the parties, with substantial similarity to the ICE futures contract terms. Next, the broker or one of the individual parties introduces the transaction to the exchange for clearing. Block-cleared futures can be particularly useful for obtaining larger-volume trades, where placing a bid or offer for large volume on the exchange platform may influence the market
3. **Options:** Like block-cleared futures, options on futures can be transacted on the exchange platform, through a broker, or can be directly negotiated between two parties and sent to the exchange for clearing. Non-standard options, or options structures, are typically negotiated directly between the parties as only standard options (puts, calls, spreads) can be executed on the exchange platform.
4. **Auction-Clearing Price-Indexed:** These transactions involve a purchase or a sale at the clearing price of a pre-designated auction plus a premium or a discount. An example of this type of transaction is provided below:

Volume = 100,000 allowances, divided equally in 25,000 purchases at each of the 2017 quarterly auctions.

Price =  $ACP_q + X$

Where:

“ACP” is the Auction Clearing Price

“q” designates each the relevant auction

“X” is either a premium or a discount to the ACP

Auction-Clearing Price-Indexed transactions links purchase prices to the ACPs. It can also be useful for those entities that choose not to participate in the auctions for any variety of reasons but still wishing to obtain exposure to auction prices, rather than secondary market pricing. It is important to note; however, these transactions do not obligate the seller to participate in the auction either. The volumes sold can be fulfilled from anywhere, including secondary market purchases.

5. **Offsets:** As discussed previously, offsets vary in more than just standardized contract terms and, now, can only be transacted OTC between parties or through a broker. More on contracting considerations and specific product types for offsets is provided below.
6. **Carbon Compliance Instrument:** These transactions also only occur in the OTC market. The Carbon Compliance Instrument is a product whereby the buyer essentially allows the seller to determine the portfolio optimization between allowances and offsets. It can be useful for entities too small to procure offsets on their own or those not wishing to expend the resources on evaluating optimization strategies. The buyer normally pays a discount when compared to a portfolio of only allowances and in exchange allows the seller to provide a mix of allowances and offsets, up to the maximum permissible amount of 8% offsets. These transactions can be short-term or even multi-year.

## OFFSET CREDITS – CONSIDERATIONS

Due to the various risk-sharing mechanisms and the uniqueness of each offset contract, there are several areas that should be given attention when entering contracts to buy or sell offset credits.

- **Invalidation:** Whose responsibility is it when a) there has been an overstatement in emission reductions, b) credits have been used in another program, or iii) the project violated local, state or national environmental or health and safety laws.

- Regulatory changes: what happens in a contract when regulations change, are amended or are temporarily stayed. Regulatory changes can be expected over the course of the program. These changes should not necessarily be out-clauses in contracts.
- Force majeure events: When the project is unable to delivery expected production due to uncontrollable events.
- Change in law: May affect the qualification and the ability to surrender an offset credit for compliance purposes. Geographic limitations placed on offsets is one potential example of this risk.

[REDACTED]

For the compliance buyer of offset credits, the creditworthiness of the seller can also be crucial, unless the offsets are insured by the jurisdiction providing the issuance. Most early-action credits have been sold from smaller, credit constrained developers to a very small group of large marketers and other speculators. They could absorb the risk of these constrained entities either through project liens or simply by purchasing issued credits that are available immediately, minimizing credit exposure but also opening conversion and program risk.

[REDACTED]

## OFFSET CREDITS - PRODUCTS

The early-action offset market has begun to evolve in several different ways to address needs of buyers. Below is a brief description of several common product structures that demonstrate the risk sharing mechanisms currently in the California Offset market, although most remain relatively illiquid when compared to allowances. Price can also vary widely in each contract depending on the risk sharing and how the costs of verification and conversion have been allocated.

**Golden California Carbon Offsets (“gCCOs”):** The “Gold” standard whereby the seller wears all the risk of product invalidation and guarantees a program compliant product (an early action credit or other that has been converted) with a firm delivery volume. Typically, these credits would be backed by either replacement offsets or allowances.

[REDACTED]

**Insurance Product:** [REDACTED] is an insurer that offers a policy to protect companies from the invalidation of carbon offset credits sold as part of California’s Cap and Trade program. [REDACTED] based in London, will sell insurance for credits originally issued by the Climate Action Reserve that will protect buyers against the risk of invalidation of offsets by ARB. Claims are expected to settle financially and not physically, which raises some concerns in terms of ability to satisfy compliance obligations. Additionally, it is not yet clear what the costs or the limitations of such insurance will be, however, most market participants expect it will be high and have a financial cap.

[REDACTED]

**Non-Guaranteed California Carbon Offsets (“CCOs”):** The Silver standard whereby the seller wears the risk of invalidation only after the credits have been retired for compliance. Again, these contracts typically have the seller taking the risk of non-conversion to CCO, if an early action credit is used, but could also be structured to have the buyer take on this risk. Delivery is typically non-firm, and subject to availability of the project. In California, CCOs are typically designated as either “CCO8” or “CCO3”, depending on the number of verifications that have been conducted and the extent of the invalidation risk. A CCO8 has one verification and retains 8-years of invalidation risk from the date of issuance whereas a CCO3 has received a double-verification and retains only 3-years of invalidation risk. Theoretically, a CCO that has passed the timeframe of invalidation is superior to even an gCCO because, assuming a spot transfer, there is no longer any invalidation risk and there is no extended counterparty credit risk.

**Index +/- Structure:** Buyer pays seller to effectively manage their portfolio of compliance instruments. Delivery is a firm volume and pricing is based upon the clearing price in the quarterly auctions. Seller typically has the option to optimize purchases between allowances and offsets but accepts all risks of invalidation or non-conversion.

There is a premium for the auction index structures due to the demand being primarily by entities with high internal cost of capital or inability to participate in the auctions.

Offset holders also have other structures available for selling in the offset market. These include: selling a fixed quantity vs variable quantity of credits; a non-guaranteed forward delivery that is project specific; credits from a portfolio of projects; and selling to an offset aggregator, financial intermediary or marketer.

## QUARTERLY ALLOWANCE AUCTIONS

### GROWING PAINS, AUCTION VIOLATIONS, AND UNSOLD TONNES

With 16 quarterly auctions held to date in California (8 of which have been held jointly with Québec), the auctions represent significant liquidity and market price influencing events in the marketplace. The auctions have been declared successes by CARB because few technical glitches have occurred in the auction platform and software and, up until only recently, the current vintage auctions have been fully subscribed (forward vintages have not typically been fully subscribed). However, failure on the part of some participants to understand the procedures, insufficient system testing, and the continued uncertainties plaguing the overall program have led to potentially costly missteps in buying and selling allowances. CARB-instituted penalties and fines have been levied upon auction participants for what could appeared to be administrative misinterpretation of regulatory guidance.<sup>1</sup>

1. ***Inaugural auction clears slightly above the floor with filing of lawsuit*** - In the November 14<sup>th</sup>, 2012 auction, where the clearing price was \$10.09 USD compared to the \$10.00 USD floor price, only 72 of the nearly 400 covered entities registered for the auction. This was attributed to the overall uncertainty of the program and whether the auction would in fact take place. Days prior to the auction, the California Chamber of Commerce filed a lawsuit that challenged the legality of the auctions<sup>2</sup>.
2. ***Auction miscues lead to costly mistakes and rules violations for large utility*** - After initially publishing auction results on November 19<sup>th</sup>, 2012, CARB re-issued auction statistics on December 6<sup>th</sup> clarifying that the number of Qualified Bids was much less than the submitted bids and revised the bid ratio from 3.1 down to 1.06. The excess submitted bids were incorrectly input by one of the largest utilities in the state, Southern California Edison (SCE). On December 20<sup>th</sup>, 2012, Bloomberg reported that Southern California Edison (“SCE”), one of the largest emitters in California, unintentionally bid for twice as many allowances as were for sale. Not only did this explain the high number of

<sup>1</sup> On February 14, 2014 ARB announced that action had been taken to administer four enforcement cases against cap and trade participants. Violations included exceeding a bid guarantee and improper disclosure of auction participation <http://www.arb.ca.gov/newsrel/newsrelease.php?id=575>

<sup>2</sup> <http://www.bizjournals.com/sacramento/news/2012/11/13/calchamber-sues-carb-cap-trade-auction.html>



unqualified bids initially reported by CARB, given that SCE represented 72 per cent of those bids, but also meant that SCE purchased approximately 1.6 million more allowances than intended. Ironically, SCE was fined for reporting the issue to shareholders, which they interpreted as a requirement by the Securities and Exchange Commissions (“SEC”).<sup>3</sup>

3. ***Technical glitch results in secondary market activity*** - In the February 19<sup>th</sup>, 2013 auction, a technical glitch in the communication of auction results led some entities to receive notification that none of their bids were successful even though the submitted bids were above the auction-clearing price of \$13.62 USD leading to a flurry of activity in the secondary markets.
4. ***Delayed linkage and nearly cancelled auction*** - Although California and Québec officially linked their programs in January 1<sup>st</sup>, 2014, lack of testing the joint auction platform led to implementation delays and the first joint auction was not held until November 25<sup>th</sup>, 2014. The November 25<sup>th</sup> auction was supposed to occur on November 19<sup>th</sup> but was initially cancelled on the day of the auction due to ‘technical difficulties’ that prevented some participants from gaining access to the auction platform<sup>4</sup>.
5. ***Poor participation rates and majority of auction allowances go unsold*** – After over 14 auctions that successfully sold most tonnes offered, recent joint auctions held on May 18<sup>th</sup>, 2016 and August 16<sup>th</sup>, 2016 have been severely undersubscribed and over 90 million allowances have gone unsold<sup>5</sup>. Low participation is greatly attributed to the lack of certainty in California’s post-2020 Cap and Trade program, an outstanding legal challenge, a structural deficiency in the program that has led to a massive oversupply of allowances, and a general de-risking by both compliance and speculative entities after a massive price drop in carbon allowances under the Regional Greenhouse Gas Initiative (“RGGI”) that was caused by the unexpected Supreme Court stay ruling of the federal regulation under the Clean Power Plan, discussed in detail below.

## HISTORICAL AUCTION RESULTS AND ANALYSIS

Auction results, arranged by auction number, to date are summarized below in Figure 10 and Figure 11:

<sup>3</sup> [www.bloomberg.com/news/articles/2012-12-20/edison-snafu-skews-demand-in-first-california-carbon-permit-sale](http://www.bloomberg.com/news/articles/2012-12-20/edison-snafu-skews-demand-in-first-california-carbon-permit-sale)

<sup>4</sup> David Clegern, a spokesman for the Air Resources Board, said there was a problem with access to the electronic auction platform “Some participants could get in, some couldn’t, and everyone needs the same opportunity to participate,” Clegern said in an email (<http://www.sacbee.com/news/business/article4021404.html>)

<sup>5</sup> [https://www.arb.ca.gov/cc/capandtrade/auction/may-2016/summary\\_results\\_report.pdf](https://www.arb.ca.gov/cc/capandtrade/auction/may-2016/summary_results_report.pdf)

Figure 10: 'CURRENT' AUCTION RESULTS IN CALIFORNIA, QUÉBEC AND WCI

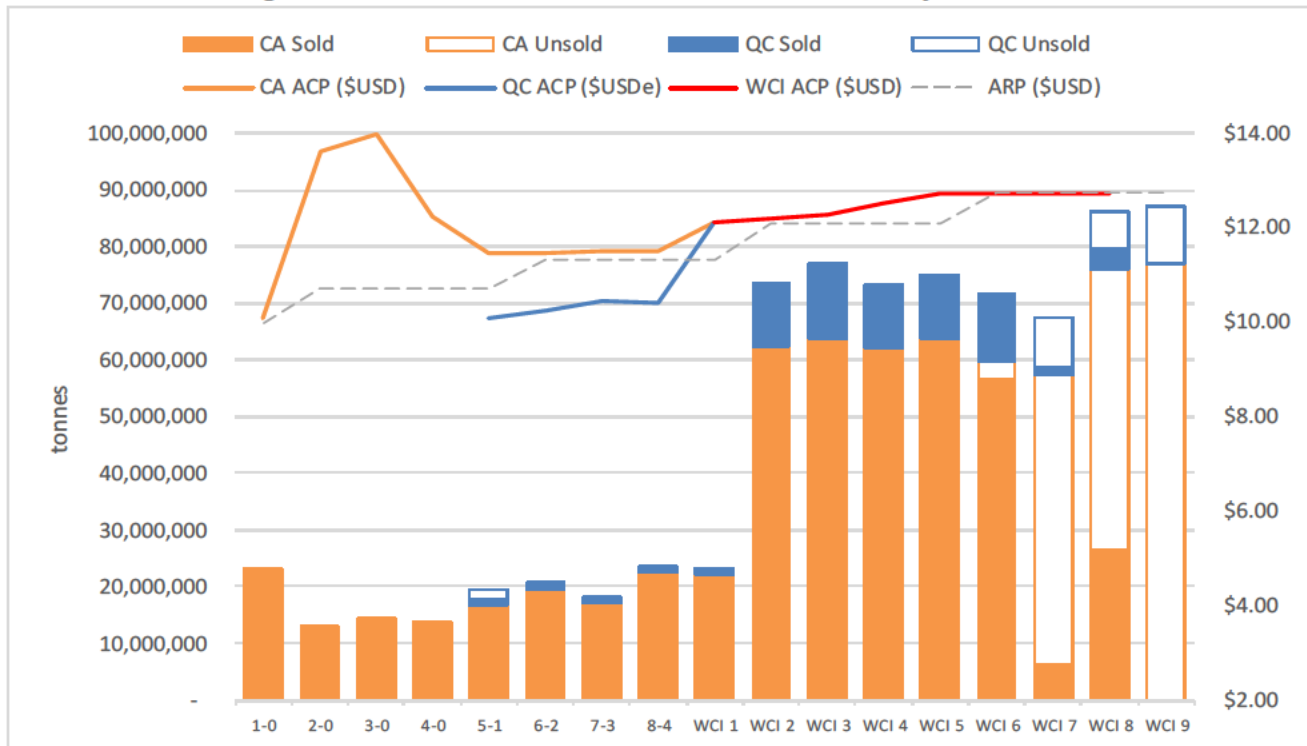


Figure 11: 'FORWARD' AUCTION RESULTS IN CALIFORNIA, QUÉBEC AND WCI

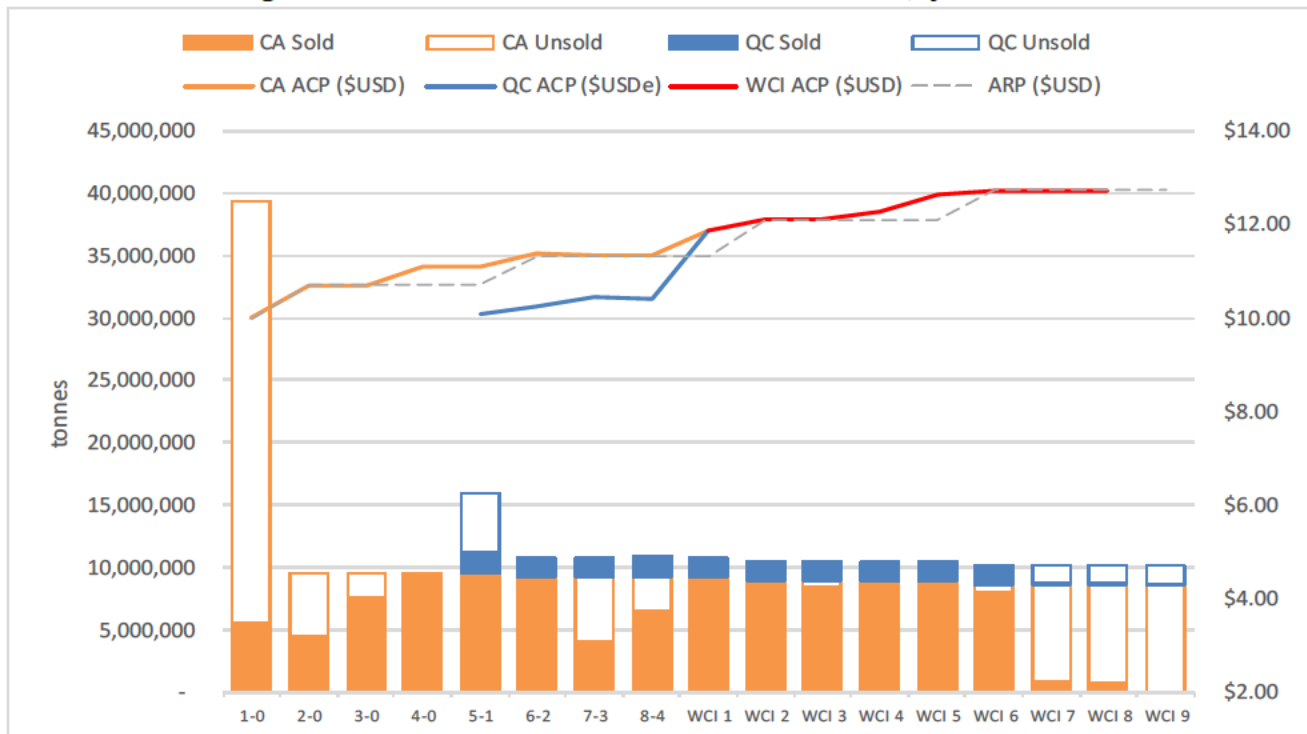


Figure 10 and Figure 11 Sources: Alpha Inception, CARB, MDELCC, September 2016

- 1) Data is arranged by auction number For example, '6-2' means CA Auction #6, held on Feb 19<sup>th</sup>, 2014, and QC Auction #2, held on Mar 4<sup>th</sup>, 2014
- 2) ARP represents only the California Auction Reserve Price and, subsequently, the WCI ARP
- 3) QC ACP has been converted into USD for purposes of comparison at the monthly average exchange rate as posted on [www.x-rates.com](http://www.x-rates.com)

## **Current Auctions:**

**Analysis of Settlement Price Trajectory:** Since California and Québec linked their Cap and Trade programs, the current-vintage auctions have cleared very close to the auction reserve price set each year. This has been in large part due to a worsening oversupply of allowances in California, as emissions have fallen significantly below the annual budgets set forth in 2006 because of the great recession in 2008 and the success of complementary measures, including the RPS. When the budgets (caps) were set, they could not foresee the lower emissions that would result from the economic slowdown due to the U.S. financial crisis of 2007-08, the swing from coal to natural-gas fired electric generation caused by low-priced natural gas and shale drilling, nor the subsequent, and substantial, increase to California's renewable portfolio standard, which has caused an expedited build-out of renewable electricity generation in California.

Auction prices over the past two years have remained very near the price floor levels. The most significant exceptions have been in the November 2014 and November 2015 auctions, where the increasing annual auction reserve price and the time value of money have lifted auction prices to the expected 2015 and 2016 auction reserve price levels, respectively. The November auctions represent the last opportunity before the auction reserve price increases for the next year and have typically resulted in increased participation and demand brought forward from the following year.

The first 4 auctions in Québec had low participation but *most* tonnes that were offered were sold. Québec's regulations, interestingly, did not initially align the auction reserve price in Québec with that of California because exchange rates were not involved in the calculation of the floor price. The first 3 auctions held in 2014, for example, had auction reserve prices of \$11.34 USD and \$11.39 CAD, in California and Québec, respectively. At an exchange rate of ~1.10 CAD/USD the effective floor price in Québec was ~\$10.25 USD, over \$1 lower than California's floor price. This was a significant market arbitrage opportunity but few entities could take advantage of it due to a requirement that Québec auction participants be domiciled in Québec. Ontario has a similar requirement for auction participants but has fixed the auction reserve price to the greater of the California and Québec calculated reserve prices, considering exchange rates.

**Herfindahl-Hirschmann Index (HHI):** WCI has released statistical information following each auction, which includes the HHI, a measure of market concentration. Taking out the November 2012 auction results, where an error in bid submission led to a large volume of allowance purchases by one single entity, the HHI from February 2013 through November 2015 has averaged around 613 – low market concentration.<sup>6</sup> Recently, in the 3 auctions held to date in 2016, the HHI has averaged 1,603 and reached a high of 2,780 – high market concentration – in the May auction. It is expected that Ontario will release similar statistics following each auction and an entity with a substantial market position and that entity's auction purchases, whether large or small, will be indicated by the HHI.

One aspect that is misleading about the HHI data point is that many of the "covered entities" in California, including several investment banks, electricity importers and energy marketers are categorized as covered entities even if their reported emissions are below 10,000 tCO<sub>2</sub>e. In both California and Ontario there is no threshold if you are an importer of electricity, which comes with a larger purchase limit at auctions than as a true 'speculators'.

**Qualified Bidders:** Participation in the California-only auctions has historically run between 70-80 participants per auction and less than 20 in Québec-only auctions. Participation reached its peak at 96 qualified bidders in the May 2015 combined WCI auction, which was several months before a major compliance surrender deadline. The participation per auction is far lower than the covered emitters under the WCI Cap and Trade but many covered entities receive free allowances and others may only purchase at auction one time per year or per compliance period. There has been a total of approximately 240 different entities that have qualified for at least one auction.

6 The Herfindahl-Hirschman index (HHI) is a commonly accepted measure of market concentration. It is calculated by squaring the market share of each firm competing in a market, and then summing the resulting numbers, and can range from close to zero to 10,000 (www.investopedia.com)

With the recent subdued market and only a one-third compliance obligation due each November (the remaining will not be due until after the compliance period in November 2018), participation has been low with 43 qualified bidders in the May 2016 auction and 53 in the August 2016 auction.

**Advance Auction**

Analysis of Settlement Price Trajectory and Participation: Auction prices in the forward-vintage auctions have consistently settled closer to the auction reserve prices. As the forward vintages are 3 years out cannot be used until the next compliance period, the auctions have generally not brought significant participation despite even the substantial discount to the current-vintage auctions earlier in the program. It should be noted that with the 4-year term for the first compliance period in Ontario, 2020 vintage allowances purchased as the advance auction in 2017 can be surrendered for the same compliance period.

[REDACTED]

- [REDACTED]

- [REDACTED]

- [REDACTED]

- [REDACTED]

- [REDACTED]

- [REDACTED]

Unsold allowances from the forward-vintage auctions do come back into the auctions when those vintages become the then current-vintage.

## CALIFORNIA CAP AND TRADE

### OVERVIEW

The U.S. state of California enacted the Global Warming Solutions Act of 2006 (“AB32”) and put California into a leadership role in combating climate change. The legislature, however, did not prescribe the specific measure to achieve the climate goals set forth in AB32, namely reducing GHG emissions by approximately 30% to 1990 levels by 2020, and instead delegated such authority to the California Air Resources Board (“CARB”). CARB adopted Cap and Trade in 2010 as the backstop to achieve their emissions reductions goals, though other programs or complementary measures have been enacted including the Renewable Portfolio Standard (“RPS”) and the Low-Carbon Fuel Standard (“LCFS”), which will be discussed below.

California Cap and Trade has been a trend setter for climate action programs around the world. California held its first Cap and Trade auction in November 2012, after a 1-year delay, and has since held 17 auctions. Effective January 2014, California linked its program with Québec under the Western Climate Initiative (“WCI”). California and Ontario have announced plans to link in 2018. Additionally, California Cap and Trade is expected to be the mechanism to comply with federal regulations issued by the Environmental Protection Agency (“EPA”) known as the Clean Power Plan (“CPP”). The CPP is currently embattled in a legal challenge by various coal-producing states.

Recently, the California Cap and Trade has been mired by a massive oversupply of allowances. The initial caps were set too high and California’s complementary measures have been very successful. Additionally, California is still battling an outstanding legal appeal challenge from the California Chamber of Commerce which could shut down or alter the quarterly auctions. Earlier this year the legislature passed the extension of California’s climate goals (“SB32”) with target reductions of 40% by 2030 but failed to explicitly extend Cap and Trade as the means to achieve such goal. In the meantime, CARB has issued proposed regulatory amendments to Cap and Trade, including extending annual caps through 2030 and making other revisions that could have a significant impact to WCI Cap and Trade and, by extension, to Ontario Cap and Trade. It is still uncertain whether CARB has the authority to extend Cap and Trade without legislative approval.

These topics are very relevant for the future of Ontario Cap and Trade and will be discussed in more detail below.

### LEGAL UPDATE

#### **CalChamber v CARB & Morningstar... v CARB:**

The California Chamber of Commerce (“CalChamber”) filed an action in November 2012 just days before the first auction of emissions allowances (California Chamber of Commerce v. Air Resources Board, Case No. 43-2012-80001313). The lawsuit challenged CARB’s authority to “allocate to itself an increasing percentage of each year’s authorized emissions allowances and sell them at auction or through reserve sales to the highest bidder (17 CCR§§ 95870, 95910-95914.)” The lawsuit takes issue with the use of the revenues generated from the auction. The Governor’s 2012-13 appropriated up to \$500 million of the auction proceeds to offset the State’s general fund costs. This designation of the auction revenue, per the CalChamber petition, is tantamount to an unauthorized tax, which under California law requires a two-thirds vote from the legislature.

Morning Star Packing Company, et al. v. CARB, et al was filed on April 16, 2013 and raised substantially the same issues as the CalChamber lawsuit. On April 24, 2013, the court consolidated the Morningstar and CalChamber cases. On August 28, 2013, the Court rejected the challenges, holding that CARB had acted within its authority to design a market system for distributing allowances, and that auction payments are valid regulatory fees not subject to the two-thirds requirement. In March 2014, the petitioners filed their appeals with the California Court of Appeal.

As of the date of this report, the parties are awaiting the court to set a date for oral arguments. As the petitioners are not arguing against cap and trade but rather the government revenues raised in the auctions, an adverse ruling should not impact compliance

obligations or the cap and trade program, in general. The allowances could be freely distributed or the auctions could be structured to be revenue neutral, resolving a key argument in the lawsuit.

After waiting more than two years for an Oral Hearing date to be set by the Appeals Court, the plaintiffs earlier this year asked the court to grant “Calendar Preference” which technically would mean that the case would be heard faster due to some pressing damage being suffered by the plaintiffs. On April 7, 2016, the Court unexpectedly granted Calendar Preference to the case and then on April 8th, 2016 asked the parties in the case to respond to various questions in supplementary written briefs:

[REDACTED]

- [REDACTED]
- [REDACTED]

As of the date of this report, the parties are waiting on the court to set a date for oral arguments, despite the Calendar Preference being granted. [REDACTED]

[REDACTED]

[REDACTED]

Under any scenario it is not likely that this case is settled anytime soon and the legal uncertainty may stretch well into 2018 or 2019 no matter what the outcome at the Appellate Court.

## LEGISLATIVE CONCERNS AND SB32

On April 16, 2016, the California Legislative Counsel’s Office issued a letter which stated that the Governor and CARB did not have the authority to use AB32 to enforce Cap and Trade goals beyond the 2020 date in the original legislation. The legislators’ law office concluded “the plain language” of state law dictates that the state’s cap-and-trade program “may not be applied or used” after 2020, though officials in Gov. Jerry Brown’s administration have sometimes publicly ignoring the vexing legal questions affecting the flagship program’s future and have as we have seen above by the proposed regulations released in August 2016, have instructed CARB to proceed as if they have legal authority. This difference of opinion turned into a divisive fight between the California Legislature and the Governor’s Office, both controlled by the Democratic Party in California. The legislature further emboldened by the Legislative Counsel’s letter, passed two important pieces of legislation this summer at the end of the session in August. With these bills passed and signed by the Governor, the consensus between the two bodies now seems to be that legislation needs to be passed to authorize cap and trade beyond 2020.

SB32 and its’ companion bill AB197, set out in law the legal requirement to reduce emissions to 40% below 1990 levels by 2030, but importantly do not authorize cap and trade as the mechanism for reaching these goals. Additionally, AB197 can be interpreted as instruction for CARB to prioritize “direct emission reductions”, which could be interpreted as an alternative to cap and trade starting in 2021.

Since the passing of AB197, the Legislature, the Governor’s Office and even most recently the CARB chair, Mary Nichols have started to proclaim very loudly that without an explicit reauthorization of cap and trade through 2030 by a 2/3 majority in

the legislature, that under AB197, they must examine other alternatives. A 2/3 majority is required to forestall another lawsuit like the current Chamber lawsuit and the Governor has indicated that only a 2/3 majority will be acceptable and has even threatened that if the Legislature cannot pass the bill with a 2/3 majority that his last act in office at the end of 2018 will be to put all his efforts and political energies towards a ballot measure. Opinion polls seem to be broadly in favour of the Ballot Measure if it were ever launched [REDACTED]

## RECENTLY PROPOSED CAP AND TRADE AMENDMENTS

In the fall of 2015, CARB kicked off a public process to develop various regulatory changes. There are three distinct efforts to being addressed:

1. **2030 Scoping Plan Update** –The purpose of the Scoping Plan is for CARB to evaluate the various options that California could use to achieve the emission reduction targets first under AB32 (2020 goal) and subsequently under SB32 (2030 goal). Cap and Trade and LCFS were two of the programs chosen because of the first Scoping Plan in 2007-2008 and while the Scoping Plan was updated in 2014, CARB is updating the Scoping Plan earlier than required by AB32 to follow an Executive Order from the California Governor.
2. **2030 Regulation Update** – While the Scoping plan has yet to be completed and make the final determination of what programs are best suited to achieve California’s emission reduction goals, CARB has chosen to update the Cap and Trade regulations foreshadowing the continuation of this program as the likely choice.
3. **CPP Plan Compliance Plan** – CARB has worked extensively with EPA and other California Agencies to complete a thorough analysis of the CPP and has determined that the California Cap and Trade Program with some minor changes can accommodate compliance with the final version of the CPP. California became the first State to submit a State Plan to the EPA, though technically the CPP is currently under judicial stay by the Supreme Court and therefore the EPA cannot evaluate California’s plan.

As part of these three parallel efforts, on August 2, 2016, the CARB released its most comprehensive proposed regulatory changes since the Cap and Trade program was launched. The following is a discussion of the most significant regulatory changes and analysis of the likely impacts on the combined WCI Program, as it relates to Ontario, assuming linkage occurs as currently planned in 2018.

### Extend Emissions Caps through 2030:

CARB has proposed to continue reducing the Caps through 2031, though at a slightly faster rate than the current annual reductions. CARB considered reducing the starting point in 2021 to be at the expected emissions for 2021 which would have resulted in a non-linear step down from 2020, but decided instead to continue the same glide path for caps and instead put a greater number of allowances into the APCR to account for the projected emissions oversupply. The reductions from 2021 to 2030 will be linear at around 13.3 million tCO<sub>2</sub>e per year.

1. Starting in 2021, collapse the APCR from three price tiers into one price tier
2. Starting in 2021, the one APCR price tier would be a fixed \$60 over the ARP
3. Starting in 2018, Any unsold allowances that have remained unsold for 24 months would be removed from the Auction Holding Account (“AHA”) and put into the APCR

CARB has proposed formally through these regulatory changes that California accept and recommend formal linkage to Ontario through the WCI starting in 2018. CARB has evaluated the Ontario program and the enabling legislation and accompanying regulation and deemed them to follow the California requirements for linkage. CARB also proposed some new one-way linkage methodologies for future use, though at this point CARB would still need to present to the Board any such linkages and have them approved as being compliant with California law.

California has a very specific law, SB1018, that was passed in 2012 when Québec linkage was being evaluated that set out requirements for any linkage to the California Cap and Trade Program. The requirement set out in SB1018 were as follows: 1) The linked program has adopted program requirements for greenhouse gas reductions; including, but not limited to, requirements for offsets; that are equivalent to or stricter than those required by AB 32; 2) The State of California is able to enforce AB 32 and related statutes against any entity subject to regulation under those statutes, and against any entity located within the linking jurisdiction to the maximum extent permitted under the United States and California Constitutions; 3) The proposed linkage provides for enforcement of applicable laws by the linking jurisdiction of program requirements that are equivalent to or stricter than those required by AB 32; and 4) The proposed linkage shall not impose any significant liability on the State or any State agency for any failure associated with the linkage.



CARB expects to present sometime at the end of 2016 or early in 2017 a finding to the California Governor that linkage to Ontario satisfies all the requirements under SB 1018. Once the finding is presented to the Governor, the Governor's office is expected to declare within a few months that the linkage has satisfied the requirements under SB 1018 and that the linkage is legally permissible. Once this approval has been reached, the only remaining step to linkage would be a formal acceptance of such linkage by Ontario followed by formal linkage timeline set out by the respective regulatory agencies in California, Québec and Ontario.

**CPP Compliance Demonstration:**

CARB has proposed a series of modest changes to the regulation that would be made once the Judicial Stay on the CPP is removed. At such time, CARB would submit its State Plan to US EPA under the State Measures pathway and once approved by US EPA as compliant would then implement the package of changes to the regulations. The proposed changes would include: 1) Alignment of Cap-and-Trade Program compliance periods with CPP compliance periods, including a bridge period to link the two programs. 2) Requirements for all CPP affected EGUs to participate in the Cap-and-Trade Program. 3) Provisions setting interim mass targets and final mass targets for aggregate emissions from affected EGUs. 4) Provisions establishing federally enforceable backstop emissions standards.

[REDACTED]

**Allowance Allocation Methodology:**

CARB has proposed a series of changes to the freely allocated allowances that are given to Industrial emitters, Electrical Utilities and Natural Gas Utilities. These changes include: 1) Elimination of the transition assistance currently given to Industrial emitters, 2) Revaluation of the leakage allocations such that new benchmarks are used to avoid economic leakage of industrial output out of state, 3) Directly allocate purchased electricity allocations to Industrials directly rather than through the Investor Owned Utilities ("IOU") and Publicly Owned Utilities ("POU") so that industrials are allocated under a consistent methodology directly by ARB regardless of where they get their electricity service 4) Modify and update allocations to Electric Utilities, both POUs and IOUs to account for their expected emission levels in 2021 as a new baseline for the 2021 to 2031 period and then reduce such allocations by a consistent factor through 2031. 5) remove the RPS Adjustment and replace it with an allocation of allowances 6) Require Natural Gas Utilities to return proceeds from allowance sales to customers within 10 years and accelerate the schedule under which their consignment percentages approach 100%.

[REDACTED]

## COMPLEMENTARY GHG REDUCTION POLICIES

### Renewable Portfolio Standard (“RPS”):

California has very aggressive mandates for renewable energy, established under the RPS program in 2002 and later expanded/increased in 2011 and, again, in 2015. It is the most ambitious standard for renewable energy in the U.S. with a 33% target by 2020 and a 50% target by 2030.

The RPS has progressively become more focussed on developing renewable resources only in-state. Retail sellers of electricity must procure 50% of their electricity from renewable resources by 2030, with a significant portion coming only from electricity generators located in-state. Most utilities are well on their way to achieving the initial RPS target of 33% in 2020. Achieving the 2030 target of 50% will result in approximately 5-6 million tCO<sub>2</sub>e less per year by 2030.

### Low-Carbon Fuel Standard (“LCFS”):

California’s LCFS program began in 2010. It is a performance-based regulation that requires sellers of transportation fuels (e.g. oil companies, fuel distributors and refiners) to reduce the average carbon intensity (CI) of the transportation fuel mix by at least 10% by 2020. The standard is back-loaded with increasing stringency in later years. This regulation contributes to California’s overall GHG emission reduction goals.

Regulated parties have several options to meet the standard. They can produce their own low carbon fuels, buy fuels from producers to sell on the market, purchase credits generated by others, or use some combination of these strategies. Potential low carbon fuel technologies include biofuels from waste and cellulosic materials, natural gas, electricity used in plug-in vehicles, and hydrogen used in fuel cell vehicles.

## EPA CLEAN POWER PLAN

### Overview:

The Clean Power Plan (CPP) was introduced by the U.S. EPA, under President Obama’s Climate Action Plan, and finalized on August 3, 2015. The CPP aims at reducing emissions from existing Electric Generating Units (EGUs) under the authority of 111(d) of the Clean Air Act with a goal of achieving a reduction in power sector emissions of 32% from 2005 levels by 2030. In short, the CPP sets forth a national carbon emissions reduction target. The EPA identified various flexibility mechanisms to assist states in formulating plans to comply with the national standards, which included participation in regional cap and trade programs.

**California Impact:**

It is widely believed that the “spirit” of California’s Cap and Trade is compliant with the CPP regulations. In fact, California’s existing emissions reduction targets are expected to be lower than those set forth under the CPP. Such an approach, however, may face regulatory scrutiny or even further lawsuits because California’s emissions reductions under Cap and Trade come from across the economy but the EPA rules are specific electric generating units (“EGUs”) only, beyond which the EPA does not have authority under the CPP. California may be required to demonstrate emissions reductions stemming directly from the affected EGUs in the power sector and meet the “letter” or legal enforcement of the proposed regulation. California may also be able to comply with the CPP under its aggressive RPS mandates, which *are* specific to the electricity sector.

[REDACTED]

**Legal Challenges to CPP:**

In Fall of 2015, multiples parties and states filed a lawsuit against the EPA to block implementation of the CPP, challenging EPA’s authority to regulate, among other arguments. In February 2016, the Supreme Court issued a stay of the CPP while legal proceedings play out in the lower Circuit Court.

Oral arguments were heard in the Circuit Court on September 27<sup>th</sup>, 2016 and an initial decision is expected by January. The panel of judges included 10 total and 6 were democratic appointed and 4 were republican, which analysts suggest bodes well for the EPA and chances of the stay being lifted. Regardless of the outcome, however, the losing party is likely to appeal the decision to the Supreme Court and a final decision may not come until late 2017. Additionally, the U.S. Presidential candidates have vocalized opposing views on the future of the CPP, so that fate of the program may lie in the next presidential election in November, 2016.<sup>7</sup>

<sup>7</sup> <https://www.brookings.edu/blog/order-from-chaos/2016/06/09/the-presidential-candidates-views-on-energy-and-climate/>

## QUÉBEC CAP AND TRADE

### MARKET OVERVIEW

Québec launched a Cap and Trade program beginning in 2013 and officially linked with California in January 2014. The program structure and rules are substantially like California and Ontario. Compared to California and Ontario, Québec's Cap and Trade market is relatively small, representing less than 12% of the total potential combined market. However, Québec's linkage with California is currently the largest cross-border carbon trading market since the launch of the European Union Emissions Trading Scheme.

While Québec is regulating less than 90 facilities in the Province, Ontario is expected to place caps on over 300. Ontario would represent over 26% of a combined market with Québec and California. Québec's power sector is 97% hydro, so it is unable to achieve the lower cost "fuel-switch" opportunities. Ontario is in a similar situation having recently become the first jurisdiction in North America to shut down its entire coal fleet.

### LINKAGE WITH CALIFORNIA

California and Québec officially linked programs in January 2014 but the first joint auction was postponed until November 2014. Québec's emissions cap is far more aggressive than California's, reducing GHG emissions 20 percent below 1990 levels by 2020 compared to California's target of reaching 1990 levels by 2020. Also, because Québec's power sector is largely hydropower based, it has very few opportunities to reduce emissions by switching to low carbon fuels. Without the linkage to California, Québec would face a very high marginal cost of abatement. Ontario is similarly situated and would likely, over time, experience dramatic price increases absent a linkage to the broader programs.

### SUPPLY AND DEMAND

The first compliance period covered about 80 facilities in Québec from the industrial and power sectors. In 2015, distribution of fossil fuels was also added under the caps and the total program covers about 85% of GHG emissions in Québec. [REDACTED]

[REDACTED] Additionally, Québec's mechanism for dealing with unsold allowances, like Ontario, is different from California in that unsold Québec allowances are not required to be re-offered at auction.

Analysts predicted that if Québec was unable to link with California; allowance prices may have reached \$80 by 2018. Similarly, the WCI's own analysis predicts an unlinked Québec allowance price of roughly double an unlinked California market allowance.

## FUNDAMENTAL SUPPLY & DEMAND OF CAP AND TRADE

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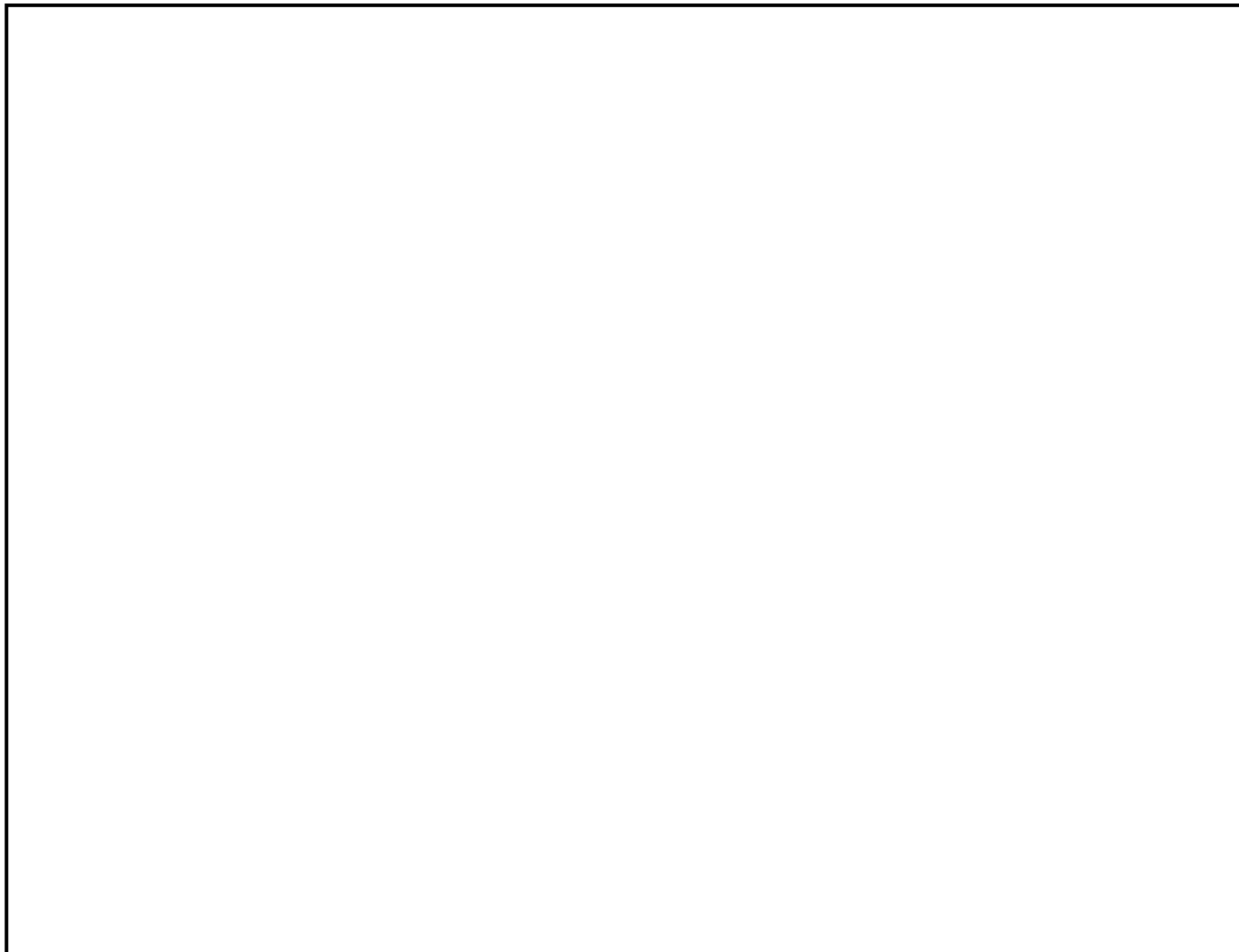
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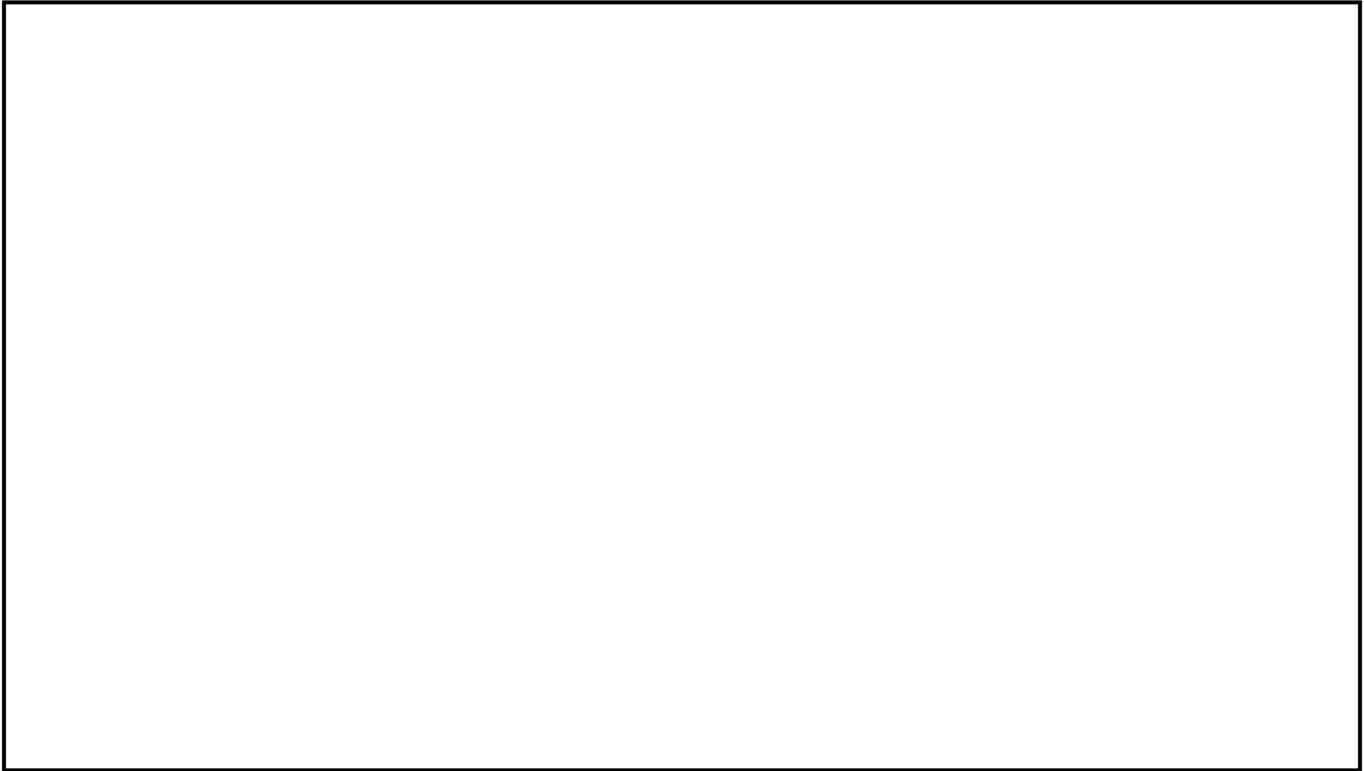
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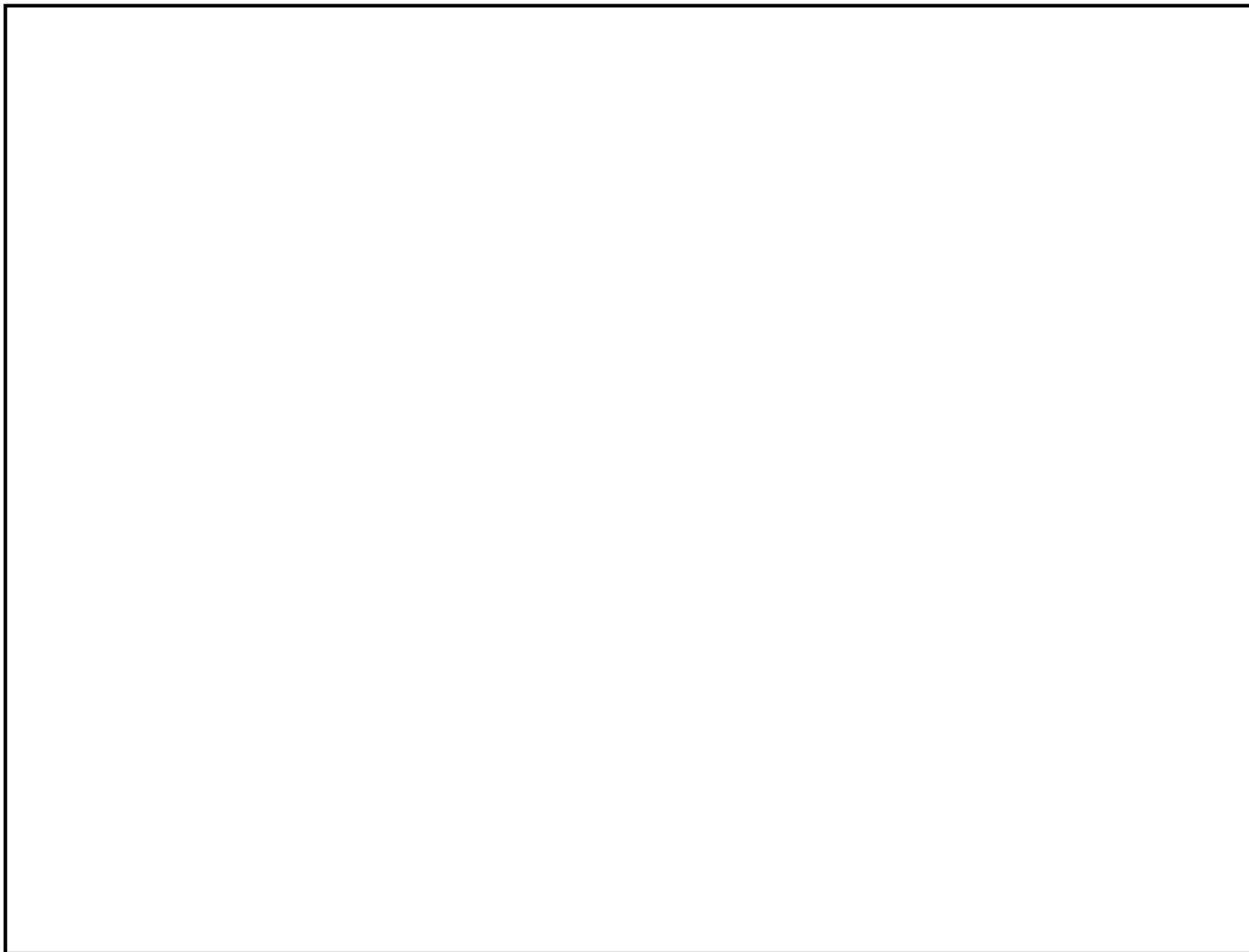
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## APPENDIX

### AUCTION TRAINING

As of the date of this report, no training or guidance has been provided that is specific to Ontario Cap and Trade. However, as Ontario Cap and Trade will utilize the same auction platform as the WCI Cap and Trade, the training materials below can be used to provide preliminary auction training for personnel that will be participating in the future Ontario Cap and Trade auctions or the WCI Cap and Trade auctions. When Ontario issues further guidance on auction participation, AI recommends reviewing fully as differences between the formats may exist.

Each quarterly auction will be conducted using an electronic, internet-based auction platform that bidders use to apply to participate in an auction and to submit bids in a single-round, sealed-bid auction format.

#### Auction Notice:

Auction notices are posted to the jurisdiction webpages 60 days prior to each auction. Such notices will provide key information such as eligibility criteria, auction format, reserve prices, and volumes to be offered in the Class 1 or Current auction and Class 2 or Forward/Advance auction. Additionally, detailed auction requirements and instructions for registration generally accompany the auction notice.

The auction notice will also contain a General Auction Schedule as follows:

Activities	Auction Time Period	Time – Pacific Time (PT) / Eastern Time (ET)
Auction Notice released/ Auction application period opens	60 days prior to auction	12:00 PM (Noon) PT / 3:00 PM ET
Deadline for CA entities to make changes in auction application information and submit all hard copy documents accompanying these changes	No later than 30 days prior to auction	
Deadline for CA entities to complete or provide an update to the Auction Application Attestation Disclosure	No later than 30 days prior to auction	
Auction application period closes	30 days prior to auction	8:59 PM PT / 11:59 PM ET

All bid guarantees due to Financial Services Administrator	12 days prior to auction	No later than 3:00 PM PT / 6:00 PM ET
Auction participants approved and Account Representatives (PAR and AARs) notified	2 business days prior to auction	
Auction Exchange Rate (FX Rate) and Auction Reserve Price Determined and Posted	1 business day prior to auction	
Auction held	Date provided in Auction Notice	Bidding window 10:00 AM – 1:00 PM PT / 1:00 PM – 4:00 PM ET
Joint Auction Summary Results Report released	5 business days after auction	12:00 PM (Noon) PT / 3:00 PM ET
Auction certified Auction results available to qualified bidders	5 business days after auction	12:00 PM (Noon) PT / 3:00 PM ET

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Financial settlement in cash due to Financial Services Administrator	7 days after certification of the auction and availability of entity results	No later than 3:00 PM PT / 6:00 PM ET
Distribution of auction proceeds completed by	9 business days after financial settlement is due	
Transfer of allowances into CITSS Accounts	9 business days after financial settlement is due	
California and Québec Post Joint Auction Public Proceeds Reports released	9 business days after financial settlement is due	
Earliest date for bid guarantee expiration	26 days after auction	

Source: CARB and MDDELCC

## Auction Reserve Price:

The annual ARP for auctions (Class 1 and Class 2) held in Ontario in 2017 and forward will be set by the WCI Cap and Trade, regardless of whether Ontario ultimately links with California and Québec. The ARP is announced each December prior to the calendar year in which it will take effect, though, where the ARP is in USD it shall be converted into CAD using the Bank of Canada exchange rate the day prior to the auction. It is calculated as the higher of California and Québec's respective ARP for the previous year increased by 5% plus the rate of inflation, which could be positive or negative. The ARP is converted into Canadian dollars ("CAD") using an exchange rate published the day prior to an auction.

In 2017, Ontario entities will submit bids in Canadian dollars and, it is expected, in 2018 and future auctions that are linked with WCI, Ontario entities will have the option to submit bids in Canadian dollars or U.S. dollars.

<b>Auction Exchange Rate</b>	<b>1.1000</b>
California Annual Auction Reserve Price (USD)	<b>12.73</b>
California Annual Auction Reserve Price (CAD Value)	<b>14.00</b>
Québec Annual Auction Reserve Price (CAD)	12.82
Québec Annual Auction Reserve Price (USD Value)	11.65

- The bolded values in the table above indicate that in this example the California Annual Auction Reserve Price will be the Auction Reserve Price (\$12.73 USD and \$14.00 CAD).
- The Auction Exchange Rate of 1.1000 is for example purposes only and is not representative of the actual anticipated exchange rate for any auction.

Source: CARB and MDDELCC

Source: WCI, Inc

### **Applying to Participate in an Auction:**

A participant must have an approved CITSS account before applying to participate in an auction. Additionally, individuals must be approved as Primary Account Representatives (“PAR”) or Alternate Account Representatives (“AAR”). Only the PAR or AAR can bid on behalf of the participant or download and save auction reports. Steps for a PAR or AAR to apply to participate in an auction are below:

1. Applications or confirmation of intent to participate must be submitted at least 30-days prior to each auction by selecting “Auction Participation” box in CITSS to indicate the interest in participating in the auction. First time participants will be required to provide information on the following items whereas previous participants will only need to provide updates if information has changed since the previous auctions, such as changes to corporate structure or mergers.
  - a. Information submitted in the process of obtaining a CITSS account
    - i. Corporate identity, ownership, and capital structure
    - ii. Existence of any direct or indirect corporate associations
    - iii. An allocation of the purchase limit and holding limit among associated entities, if applicable
  - b. Bid guarantee form and return instructions
  - c. An attestation response, if applicable, dealing with disclosures and auction participation
2. The PAR or AAR will receive an email from the auction administrator with a link to activate the auction account.
3. Must submit a financial bid guarantee in an approved form and by the deadline designated in the auction notice. Instructions on submitting bid guarantees will be provided in the auction notice.
4. Entities having successfully applied to participate and having been successfully approved to participate will receive confirmation emails from the auction administrator.

### **Form and Manner of Submitting Bids:**

Participants will submit bids manually or through an upload of a pre-defined excel template during the auction bidding window. The Class 1 and Class 2 auctions will occur simultaneously at the date and time identified in the auction notice. Bidding in the auction is as follows:

1. Auction participants submit a bid which includes the vintage of the allowances, the number of bid lots (1 lot = 1,000 allowances), the bid currency, and the bid price.

- To bid for allowances in the Class 1 auction, the bid vintage is selected as “Class 1”. To bid for allowances in the Class 2 auction, the bid vintage is selected as “Class 2”.
- Bids are entered in whole cents.
- Auction participants are allowed to submit as many bids as they wish during the bidding window.
- Auction participants can revise or withdraw confirmed bids at any time during the bidding window.
- Once the bidding window has closed, no further bids may be entered and no changes to bids can be made.

The screenshot shows the Alpha Inception Auction web application. The 'Auction' tab is selected. The main content area displays 'Joint Auction 3 NEW April 2014 Details'. It includes a table with 'Current' and 'Future - 2017' auction details, showing Reserve Price, Total Allowance, Total Allowance Bid, and Total Bids. A bidding window timer is visible, showing '01:34:28' remaining. Below the timer is a 'Submitted Bids' section with an 'Add Bid' button and a table for entering bids. A 'QUICK TIPS' section on the right provides instructions on adding bids.

Source: WCI, Inc

### Bidding Limitations:

The bidding limitations below must be strictly adhered to in order to ensure non-violation of auction rules. In some jurisdictions, such as California, enforcement actions including monetary penalties have been imposed for bidding limitations violations.

- Auction Reserve Price** – no bids will be accepted that are below the auction reserve price.
- Bid Guarantee** – Bidders submit one-single bid guarantee for all auction bids and potential purchases in the Class 1 and Class 2 auctions. The bid guarantee amount should be equal to the maximum value of a set of bids. An example of how the bid guarantee must be calculated is below:

Class 1			
A	B	C	D
Bid Price:	Bid Volume:	Cumulative Bid Volume:	Spend:
\$ 21.25	1,000,000	1,000,000	\$21,250,000
\$ 19.15	750,000	1,750,000	\$33,512,500
\$ 18.99	500,000	2,250,000	\$42,727,500
		Maximum Value	\$42,727,500
Class 2			
A	B	C	D
Bid Price:	Bid Volume:	Cumulative Bid Volume:	Spend:
\$ 20.50	250,000	250,000	\$ 5,125,000
\$ 20.00	250,000	500,000	\$10,000,000
\$ 19.50	250,000	750,000	\$14,625,000
\$ 19.00	250,000	1,000,000	\$19,000,000
		Maximum Value	\$19,000,000
Class 1 + Class 2 Max Value:			\$61,727,500

Source: Alpha Inception

Where:

“A” represents a different bid price

“B” is a different bid volume at the specified bid price

“C” is the cumulative bid volume at a specified bid price. Note that bid volumes are cumulative so if the auction clearing price is the lowest bid price submitted, all volume bid at prices above the ACP will be awarded.

“D” is the dollar amount that would be spent should the auction clear at the specified bid price, awarding all volume bid at that price or higher.

The total amount of the bid guarantee should be equal to the maximum possible value of bids in both the Class 1 and Class 2 auctions.

3. **Purchase Limits** - The purchase limit for emitters is 25 percent of the allowances offered for auction and the purchase limit for other participants is 4 percent of the allowances offered. Related entities that are part of a direct corporate association must allocate shares of the purchase limit amongst themselves. The joint purchase limit for corporate associations is the same as that of a single entity.
4. **Holding Limits** - Holding Limits are imposed upon all Cap and Trade participants, and apply across affiliated entities. A holding limit is the maximum number of allowances, including strategic reserve allowances, and early reduction credits that can be held across all CITSS accounts (holding accounts and compliance accounts) for a participant or group of related participants. Offsets do not fall under a holding limit. Exemptions exist for capped participants who deposit allowances into their compliance accounts. The amount of the exemption is approximately equal the participant’s accumulated compliance obligation through the end of the year that the exemption is calculated. For example, in 2017 a capped participant’s exemption amount would be equal to 1-years’ worth of emissions and in 2018 the exemption would be equal to 2-years’ worth of emissions.

The calculation of the Holding Limit applies 1) to the current vintage year and all prior vintage years collectively and 2) to each forward vintage year. The calculation is as follows:

$$HL_j = 2,500,000 + 0.025 \times (C_j - 25,000,000)$$

$HL_j$  = the limit on emission allowances with vintage year j that are held in the cap and trade accounts during a year. Where year j is the current vintage year, the HL shall apply to current vintage allowances and all prior years, and

$C_j$  = the number of Ontario emission allowances created for year j.

The Holding Limit is imposed upon all market participants to prevent market abuse and hoarding of allowances. Holding Limits are viewed similarly by each of the WCI jurisdictions, however, the calculation is based on the combined annual budgets and is not simply the summation of the holding limits applied to each program individually. Figure 5 below shows the calculated Holding Limits for Ontario and also the WCI Cap and Trade with and without an Ontario Linkage.

Figure 18: CALCULATED HOLDING LIMITS NOT INCLUDING EXEMPTIONS IN ONTARIO AND WCI - TONNES

	2017	2018	2019	2020
Ontario	5,433,300	5,286,000	5,138,900	4,991,700

WCI (w/o Ontario)	12,662,000	12,306,500	11,953,750	11,598,500
WCI (w/ Ontario)	N/A	15,717,500	15,217,650	14,715,200

Source: Alpha Inception, CARB, MOECC, September 2016

Submitted bids that contain bid quantities in excess of the purchase limit, holding limit, or that have a maximum value in excess of bid guarantee will be rejected by the auction administrator in bundles of 1,000 allowances, until all bid limitations are met.

#### **Auction Conduct:**

California and Québec have strict regulations regarding the non-disclosure of confidential information related to auction participation, including:

- Intent to participate, or not participate, at auction, auction approval status, and maintenance of continued auction approval;
- Bidding strategy;
- Bid price or bid quantity information;
- Information on bid guarantees provided to the financial services administrator.

Additionally, those regulations require that any entity participating in an auction that has retained the services of a consultant or bid advisor regarding auction bidding strategy must ensure the following:

- The entity must ensure against the consultant or advisor transferring information to other auction participants or coordinating bidding strategy among participants;
- The entity will inform the consultant or advisor of the prohibition of sharing information to other auction participants and ensure the consultant or advisor has read and acknowledged the prohibition under penalty of perjury; and

#### **Auction Clearing Price:**

The Auction Administrator will rank qualified bids from all bidders from the highest to the lowest. Allowances will be awarded to bidders, beginning with the highest bid price and moving to successively lower bid prices, until the entire supply of allowances is exhausted or all qualified bids have been filled. Allowances at auction are awarded to the highest bidders first and to subsequent lower bidders until all of the volume available has been awarded. The auction settlement price or Auction Clearing Price (“ACP”) is the price at which all the volume available has been awarded. All winning bidders pay the same price, the ACP, even when they may have submitted bids at higher prices. An example of auction clearing mechanism is provided below:

Figure X: EXAMPLE AUCTION BIDS RANKED HIGH-LOW AND SETTLEMENT PRICE

Bidder	Bid Price	Lots	Allowances	Cumulative Bid Allowances	Allowances Awarded at ACP
A	\$35.00	3,000	3,000,000	3,000,000	3,000,000
B	\$27.15	2,500	2,500,000	2,500,000	2,500,000
A	\$30.00	1,500	1,500,000	4,500,000	1,500,000
C	\$25.39	2,000	2,000,000	2,000,000	2,000,000
C	\$21.37	1,200	1,200,000	3,200,000	1,000,000



<i>Auction Clearing Price ("ACP") = \$21.37</i>					
<i>Assumes 10,000,000 allowances offered</i>					
A	\$20.95	4,000	4,000,000	8,500,000	0
B	\$18.25	5,025	5,025,000	7,525,000	0

Source: Alpha Inception

Under the example provided above, the auction offered 10,000,000 tonnes and the settlement price was \$21.37 per tonne, representing the highest price at which all allowances have been bid, also known as the Auction Clearing Price ("ACP"). Winning bidders pay the ACP for all allowances won in the auction. Bids below the ACP would not be awarded. Winning bids would be fulfilled as follows:

**Bidder A** won a total of 4,500,000 allowances at \$21.37 per allowance

**Bidder B** won a total of 2,500,000 allowances at \$21.37 per allowances

**Bidder C** won a total of 3,000,000 allowances at \$21.37 per allowances

#### **Auction Results:**

Following the posting of public auction results, representatives of qualified bidders will be able to view and download the entity's auction results in the auction platform. Any excess financial bid deposit, if applicable, will be returned to the participating entity in accordance with the schedule in the auction notice.

Allowances that have been awarded will be transferred into winning bidders CITSS accounts in accordance to the schedule in the auction notice.

AI recommends reviewing the Ontario guidance and training documents, when available, to ensure the EGD complies with any other specific requirements outlined by the MOECC.