Preliminary Concepts
Price Containment Points, Price Ceiling, and Allowance Pools
Introduction

Assembly Bill (AB) 398 (Chapter 135, Statutes of 2017) provides legislative direction on the role of the Cap-and-Trade Program (Program) between 2021 and 2030. AB 398 contains specific provisions directing the California Air Resources Board (CARB or Board) to modify features of the existing allowance price containment reserve (Reserve) into a new cost containment structure during the post-2020 Program. AB 398 also directs CARB to evaluate and address concerns related to overallocation in the state board’s determination of the available allowances for years 2021 to 2030, inclusive, as appropriate.

This staff concept paper is intended to commence the public discussion on how the Cap-and-Trade Regulation (Regulation) will be modified to comport with the direction in AB 398 on establishing a price ceiling and two price containment points and the distribution of allowances amongst them, while considering total availability of allowances between 2021 and 2030. This paper is organized in specific topic areas as follows:

Part 1

- Structure of the current Reserve and post-2020 Reserve as currently included in the Cap-and-Trade Regulation
- Considerations for new post-2020 Reserve in response to direction in AB 398
- Considerations for a Price Ceiling in response to direction in AB 398
- Discussion: Price Range for new post-2020 Reserve and Price Ceiling
- Mechanics of Sales from the Price Ceiling
- Mechanics of Sales from the new post-2020 Reserve

Part 2

- Distribution of allowances for post-2020 in response to direction in AB 398
- Discussion: Relationship between distribution of allowances and Reserve and price ceiling values

Staff is not including any specific proposals for regulatory changes in this paper. Based on stakeholder feedback, staff will prepare more detailed proposals and analyses for future materials as part of the ongoing informal discussions, and later as part of the formal rulemaking process to amend the Cap-and-Trade Regulation consistent with the direction in AB 398.

For the purposes of this paper, “current Reserve” means the existing allowance price containment reserve with the three price tiers, “post-2020 Reserve” means the

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1 For a high-level overview of other direction AB 398 gives to CARB regarding changes to the post-2020 program, refer to the “Cap-and-Trade Regulation Workshop” October 12, 2017, available here: https://www.arb.ca.gov/cc/capandtrade/meetings/20171012/ct_presentation_11oct2017.pdf
collapsed single tier reserve as currently included in the Cap-and-Trade Regulation, and “new post-2020 Reserve” means the two tier reserve structure as directed in AB 398.

Part 1
Structure of the Current Reserve and Post-2020 Reserve as Currently Included in the Cap-and-Trade Regulation

The Cap-and-Trade Program has always included an Allowance Price Containment Reserve. This mechanism was filled with a specified number of allowances removed from the overall cap at the beginning of the Program. Covered entities may purchase reserve allowances at specified prices during quarterly sales if market prices are high or they expect prices to be higher in the future. To date, no quarterly Reserve sales have been held. The current structure of the Reserve is provided in Table 1. Each year, the price for each tier escalates at 5 percent plus inflation. Additional detail on the design and considerations for the existing Reserve are provided here: https://www.arb.ca.gov/regact/2010/capandtrade10/capv3appg.pdf

Table 1. Current Reserve Structure

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier 1</td>
<td>40,611,000</td>
<td>$54.26</td>
<td>$51.13</td>
</tr>
<tr>
<td>Tier 2</td>
<td>40,611,000</td>
<td>$61.06</td>
<td>$57.54</td>
</tr>
<tr>
<td>Tier 3</td>
<td>40,611,000</td>
<td>$67.93</td>
<td>$64.01</td>
</tr>
</tbody>
</table>

*The quantity of allowances in the Reserve tiers does not include any unsold auction allowances that would be transferred to the Reserve after remaining unsold for 24 months.

In July 2017, the Board adopted regulatory amendments that change the structure of the Reserve beginning in 2021.3 The three tiers were collapsed into a single tier and the Reserve Sale Price was changed to be calculated as the sum of the annual Auction Reserve Price and a fixed dollar amount. This approach maintains a fixed difference between the two prices in terms of real value, but would be adjusted for inflation. This restructuring of the price was to avoid divergence between the Auction Reserve Price and the Reserve Sale Price over time. Under the current Regulation, the estimated Auction Reserve Price is $16.2 ($2015) and the Reserve Sale Price is $72.9 ($2015) in 2021. Similarly, the estimated Auction Reserve Price is $25.2 ($2015) and the Reserve

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2 This table includes the 2018 Reserve Price in both $2018 and $2015 to reflect the published (actual) 2018 Reserve Price (see here: https://www.arb.ca.gov/cc/capandtrade/reservesale/2018_reserve_sale_apcr_notice.pdf) and to assist in comparison with the remaining prices in the paper (which are based on $2015), respectively. A 2 percent inflation rate compounded once annually is assumed to compare 2018 with 2015 dollars.

3 https://www.arb.ca.gov/regact/2016/capandtrade16/capandtrade16.htm
Sale Price $81.9 ($2015) in 2030. Table 2 provides the structure for the post-2020 Reserve as currently included in the Regulation.

Table 2. Post-2020 Reserve as Currently Included in the Cap-and-Trade Regulation

<table>
<thead>
<tr>
<th>Reserve Tier</th>
<th>Current Quantity of Reserve Allowances*</th>
<th>2021 Reserve Price ($2015)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Tier</td>
<td>121,833,000</td>
<td>$72.90</td>
</tr>
</tbody>
</table>

*The quantity of allowances in the Reserve tier does not include any unsold auction allowances that would be transferred to the Reserve after remaining unsold for 24 months. It also does not include the approximately 52 million allowances removed from the post-2020 annual allowance budgets in the current Regulation.

Considerations for New Post-2020 Reserve in Response to Direction in AB 398

This section describes legislative direction that staff will rely on, in addition to stakeholder comments and additional analyses, to propose a new post-2020 Reserve. Specifically, AB 398 directs CARB to:

“Establish two price containment points at levels below the price ceiling. The state board shall offer to covered entities non-tradable allowances for sale at these price containment points. The price containment points shall be established using two-thirds, divided equally, of the allowances in the allowance price containment reserve as of December 31, 2017.” (Id. at 38562(c)(2)(B).)

Utilizing this direction, the new post-2020 Reserve would have a structure similar to the one provided in Table 3.

Table 3. New Post-2020 Reserve as directed in AB 398

<table>
<thead>
<tr>
<th>Reserve Tier</th>
<th>Current Quantity of Reserve Allowances*</th>
<th>2021 Reserve Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier 1</td>
<td>40,611,000</td>
<td>TBD</td>
</tr>
<tr>
<td>Tier 2</td>
<td>40,611,000</td>
<td>TBD</td>
</tr>
</tbody>
</table>

*The quantity of allowances in the Reserve tiers is the minimum and reflects the specific direction provided in AB 398. It also does not include the approximately 52 million allowances removed from the post-2020 annual allowance budgets in the current Regulation.

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4 https://www.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf
Considerations for a Price Ceiling in Response to Direction in AB 398

This section describes legislative direction that staff will rely on, in addition to stakeholder comments and additional analyses, in developing and proposing a price ceiling mechanism for a post-2020 program. Specifically, AB 398 directs CARB to:

“Establish a price ceiling… consider[ing]… all of the following:

(I) The need to avoid adverse impacts on resident households, businesses, and the state’s economy.

(II) The 2020 tier prices of the allowance price containment reserve.

(III) The full social cost associated with emitting a metric ton of greenhouse gases.

(IV) The auction reserve price.

(V) The potential for environmental and economic leakage.

(VI) The cost per metric ton of greenhouse gas emissions reductions to achieve the statewide emissions targets established in Sections 38550 and 38566.”

(Health & Safety Code § 38562(c)(2)(A)(i).)

As for the remaining one third of the allowances currently in the Reserve, AB 398 provides direction that “[a]llowances remaining in the allowance price containment reserve as of December 31, 2020, shall be utilized solely for the purpose of sale at the price ceiling established by this section.” (Id. at 38562(c)(2)(A)(ii).) The legislation further specifies that “[i]f the allowances from the allowance price containment reserve are exhausted, the state board shall offer covered entities additional metric tons at the price ceiling if needed for compliance.” (Id.)

Utilizing this direction, the price ceiling mechanism would have a structure similar to the one provided in Table 4.

Table 4. Price Ceiling Mechanism as directed in AB 398

<table>
<thead>
<tr>
<th>Price Ceiling</th>
<th>Compliance Instruments*</th>
<th>2021 Reserve Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reserve Allowances</td>
<td>40,611,000 + Unsold auction allowances</td>
<td>TBD</td>
</tr>
<tr>
<td>Price Ceiling Units**</td>
<td>Quantity as needed for compliance on a metric ton-per-ton basis to ensure environmental integrity</td>
<td></td>
</tr>
</tbody>
</table>

*The quantity of allowances in the Reserve tiers is the minimum and reflects the specific direction provided in AB 398. It does not include the approximately 52 million allowances removed from the post-2020 annual allowance budgets in the current Regulation.

**Staff is proposing a new instrument type that would be created and reported in the public compliance reports similar to the details provided on how an entity surrenders any combination of allowances or offsets.
Price Range for New Post-2020 Reserve and Price Ceiling

AB 398 provides specific considerations for setting the price ceiling value, but is silent on setting the prices for the new post-2020 Reserve tiers. Table 5 highlights available data that will facilitate undertaking the AB 398 considerations for the price ceiling value.

Table 5. Available Data for AB 398 Price Ceiling Considerations

<table>
<thead>
<tr>
<th>The need to avoid adverse impacts on resident households, businesses, and the state’s economy</th>
<th>In the development of the 2017 Scoping Plan Update, it was demonstrated that a suite of policies that includes a Cap-and-Trade Program, as currently structured, is the least cost portfolio of climate policies to achieve the 2030 target while meeting other statutory mandates (e.g., minimize leakage, technologically feasible, no disproportionate impacts on the most burdened communities)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The 2020 tier prices of the allowance price containment reserve</td>
<td>Information provided in Tables 1 and 2</td>
</tr>
<tr>
<td>The full social cost associated with emitting a metric ton of greenhouse gases</td>
<td>The 2017 Scoping Plan Update utilized a Social Cost of Carbon price of $57 ($2015) in 2030</td>
</tr>
<tr>
<td>The auction reserve price</td>
<td>$16.2 ($2015)</td>
</tr>
<tr>
<td>The potential for environmental and economic leakage</td>
<td>AB 398 set the assistance factor at 1 from 2021 through 2030 to address concerns regarding leakage</td>
</tr>
<tr>
<td>The cost per metric ton of greenhouse gas emissions reductions to achieve the statewide emissions targets established in Sections 38550 and 38566</td>
<td>The 2017 Scoping Plan Update includes AB 197 cost per metric ton values</td>
</tr>
</tbody>
</table>

In establishing a price ceiling, staff is also considering the following information:

- Voluntary corporate internal carbon pricing that can range from <$1 to >$800 globally and as high as $150 within the United States.5
- Academic study that found the existing social cost of carbon is too low and could be closer to $220.6

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6 [https://www.nature.com/articles/nclimate2481#t1](https://www.nature.com/articles/nclimate2481#t1)
Staff’s initial thinking is to use the information as laid out above as a guide for setting a price ceiling value in 2030. If these values represent the high end of the range for the price ceiling, it means the price ceiling value in 2030 would not be lower than the single tier value for Table 2 of approximately $81.9 ($2015) and no higher than $150 disclosed voluntarily as a company’s internal carbon pricing value.

Staff is proposing the new post-2020 Reserve prices in 2030 be below the price ceiling value. Staff’s initial thinking is to also set the lower new post-2020 Reserve price in 2021 no lower than approximately $70 ($2015) using the information in Table 1 and Table 2 as a guide.

**Mechanics of Sales from Price Ceiling**

Staff is proposing to treat the price ceiling as a separate design feature from the new post-2020 Reserve with additional rules concerning eligibility to purchase and purchase procedures. Staff is considering potential conditions which could apply to sales from the price ceiling and requests feedback on the following items:

- Frequency of holding sales from the price ceiling.
- Timing for sales from the price ceiling.
- Limitations to purchases that only allow purchasing enough to be in compliance.
- Proposal for no bidding as in the current Reserve sale. Instead, over a fixed period, perhaps one week, entities may make a cash payment.
- A proposal that at the end of the payment period, CARB would determine the quantity of metric tons purchased and make those available for compliance by placing directly into the entity’s compliance account – which would make these metric tons non-tradable.

**Mechanics of Sales from the New Post-2020 Reserve**

For purposes of this paper, staff is proposing that the existing rules for accessing the Reserve, contained in section 95913 of the Cap-and-Trade Regulation, would apply to the new post-2020 Reserve.

In addition, staff is requesting stakeholder input on possible modifications to the existing Reserve sale rules, including:

- Holding the Reserve sale once per year, between finalizing of the previous year’s compliance obligation and the time of the yet-to-be-determined price ceiling event. Under the existing Regulation, the Reserve sale scheduled immediately before a compliance event is always offered, and three additional quarterly Reserve sales would be offered only if the auction settlement price from a preceding auction exceeds 60 percent of the lowest Reserve tier price.
- Limitations to purchases that only allow purchasing enough to be in compliance for the next compliance event.
- Requiring an entity’s holding account to be empty of compliance instruments valid for surrender before allowing the entity to purchase.
Staff is requesting stakeholder input on these conditions as well as any additional conditions stakeholders may suggest.

**Part 2**

**Allowance Pools**

AB 398 directs CARB to use two-thirds of the allowances remaining in the current Reserve as of December 31, 2017 to fund each tier of the new post-2020 Reserve. Consequently, these allowances will not be available to the Reserve until 2021. Consistent with this direction, the staff proposal will remove these allowances from the Reserve through 2020.

As of December 31, 2017, the Reserve contained 121,833,000 allowances, allocated from the existing pre-2021 allowance budgets. This implies that each tier of the new post-2020 Reserve could have at least 40,611,000 allowances on January 1, 2021. Assuming no Reserve sales before the end of 2020, this will also leave approximately 40,611,000 for the price ceiling. Any other allowances remaining in the Reserve as of December 31, 2020 will also be moved to the price ceiling. Table 6 shows the distribution of these allowances under this structure.

**Table 6: 2021 Allowance Distribution of Pre-2021 Reserve Allowances.**

<table>
<thead>
<tr>
<th>Cost Containment Allowance Pool</th>
<th>Pre-2021 Allowances</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier 1</td>
<td>40,611,000</td>
</tr>
<tr>
<td>Tier 2</td>
<td>40,611,000</td>
</tr>
<tr>
<td>Ceiling</td>
<td>40,611,000 + other remaining Reserve allowances</td>
</tr>
</tbody>
</table>

The current Regulation includes a framework for post-2020 allowance budgets. It also designates 52,400,000 allowances from vintage 2021-2030 year allowances to be added to the post-2020 Reserve. As specified in the amendments approved by the Board in 2017, these allowances reflect what CARB staff believes should be removed from general circulation once we take into account that the 2020 emissions will be lower than the 2020 annual cap. In other words, this amount of allowances reflects staff’s accounting for expected emissions in 2021, and accounts for approximately 2 percent of post-2020 allowances.

Staff is seeking stakeholder input on whether these 52,400,000 allowances should be placed in the price ceiling, as they represent staff’s accounting of expected 2021 emissions.

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7 This language was added to the Program regulation prior to AB 398’s legislative direction on the post-2020 program. Table 8-2 of the Program regulation: [https://www.arb.ca.gov/cc/capandtrade/capandtrade/unofficial_ct_100217.pdf](https://www.arb.ca.gov/cc/capandtrade/capandtrade/unofficial_ct_100217.pdf)
emissions, or whether they should be distributed in another manner across the new post-2020 Reserve tiers and price ceiling.

Moreover, under the current Program design, the original offset credit usage limit had been four percent, but was increased to eight percent to account for the removal of four percent of the 2013-2020 allowance budget to fund the Reserve. Staff is considering whether it would be appropriate to allocate an additional two percent of allowances from budget years 2026 through 2030 into the price ceiling or new post-2020 Reserve tiers. AB 398 increases the offset usage limit in 2026 to 6 percent from the 4 percent limit it imposes for compliance years 2021 through 2025. A removal of 2 percent of allowances from the 2026 through 2030 annual allowance budgets would be consistent with the policy decision made in the current program to remove allowances from the annual allowance budgets to effectively represent allowance budgets with a 4 percent offset usage limit.

This additional two percent of the 2026 to 2030 budgets is equal to nearly 23 million allowances. Table 7 shows the existing allowance budgets from 2020 through 2031, the allowances created for the Reserve under the current Regulation, and the potential additional 2 percent that could be removed and distributed between the new post-2020 Reserve tiers or price ceiling. Staff is seeking stakeholder input on this concept and how such allowances could be distributed across the new post-2020 Reserve and price ceiling. Figure 1 and Table 7 provide information on the specific pools of allowances for post-2020 that could be distributed across the Reserve tiers and price ceiling.

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Figure 1: Allowance Budgets from 2020 Through 2030
**Table 7: Allowance Budgets from 2020 Through 2030**

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Budget</th>
<th>Non-APCR</th>
<th>Existing for APCR</th>
<th>Proposed Additional APCR</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>334,200,000</td>
<td>310,806,000</td>
<td>23,394,000</td>
<td>0</td>
</tr>
<tr>
<td>2021</td>
<td>320,800,000</td>
<td>308,027,400</td>
<td>10,500,000</td>
<td>2,272,600</td>
</tr>
<tr>
<td>2022</td>
<td>307,500,000</td>
<td>295,927,400</td>
<td>9,300,000</td>
<td>2,272,600</td>
</tr>
<tr>
<td>2023</td>
<td>294,100,000</td>
<td>283,727,400</td>
<td>8,100,000</td>
<td>2,272,600</td>
</tr>
<tr>
<td>2024</td>
<td>280,700,000</td>
<td>271,427,400</td>
<td>7,000,000</td>
<td>2,272,600</td>
</tr>
<tr>
<td>2025</td>
<td>267,400,000</td>
<td>259,327,400</td>
<td>5,800,000</td>
<td>2,272,600</td>
</tr>
<tr>
<td>2026</td>
<td>254,000,000</td>
<td>247,027,400</td>
<td>4,700,000</td>
<td>2,272,600</td>
</tr>
<tr>
<td>2027</td>
<td>240,600,000</td>
<td>234,827,400</td>
<td>3,500,000</td>
<td>2,272,600</td>
</tr>
<tr>
<td>2028</td>
<td>227,300,000</td>
<td>222,727,400</td>
<td>2,300,000</td>
<td>2,272,600</td>
</tr>
<tr>
<td>2029</td>
<td>213,900,000</td>
<td>210,427,400</td>
<td>1,200,000</td>
<td>2,272,600</td>
</tr>
<tr>
<td>2030</td>
<td>200,500,000</td>
<td>198,227,400</td>
<td>0</td>
<td>2,272,600</td>
</tr>
</tbody>
</table>

Staff is requesting feedback on how to allocate the post-2020 vintage allowances to ensure a sufficient carbon price signal to prompt action to reduce GHGs, while balancing for cost-containment.

**Relationship Between Allowance Distribution and Price Points**

When considering the direction in AB 398, it is important to recognize the fundamental purpose of the Program. The Program needs to be designed in a way that allows for identification of the lowest cost GHG emissions reductions across the economy. There also needs to be market expectation of a steady and increasing carbon price to prompt businesses to monitor and take actions to reduce GHGs. AB 398 provides several opportunities to meet these fundamental objectives of the Program.

In setting specific Reserve tier values in the new post-2020 Reserve, it will be important to consider the relationship between allowance price and abatement. Setting low Reserve tier prices may dampen the long-term price signal needed for businesses to make capital investments in on-site transformational technology and could lead to lower GHG emissions reductions than required to achieve the SB 32 target. Conversely, Reserve tier prices that are significantly higher than the marginal abatement cost needed to achieve reductions under the Program could lead to concerns over emissions leakage and consumer impacts.

Similarly, the relationship between abatement and the Reserve tier prices also requires careful consideration. The values at which the Reserve tier prices are set can impact the price of allowances and affect the abatement strategies of covered businesses. Providing a bank of additional allowances at prices near the Auction Reserve Price could weaken the incentive for technologies and innovations with marginal costs above the Reserve tiers. Multiple Reserve tiers near the Auction Reserve Price could further...
mute the carbon price signal necessary for long-term innovation. Conversely, Reserve tiers too close to the price ceiling might not provide for adequate slowing of the allowance price trajectory if there are short-term spikes in demand.

The number of allowances contained within the Reserve tiers also impacts the trajectory of allowance prices. Reserve tiers that contain a small amount of allowances may not provide for a gradual slowing of allowance prices. Reserve tiers containing a large amount of allowances may also result in jumps in allowance prices as demand for allowances converges to the Reserve tiers. Reserve tiers near the Auction Reserve Price with many allowances could also further mute the carbon price signal and result in a de-facto ceiling price above which little to no abatement occurs. Large Reserve tiers near the price ceiling could have a similar effect of a de-facto price ceiling.

Another consideration in structuring the new post-2020 Reserve and price ceiling is how the Cap-and-Trade Program interacts with complementary policies. If all measures perform exactly as modeled, the 2017 Scoping Plan estimates that 62 percent of emissions reductions during from 2021 through 2030 will be achieved through other policies and regulations outside of the Cap-and-Trade Program.9 Reductions achieved under these complementary policies will have associated costs – but those costs are largely independent of the Cap-and-Trade Program allowance price. Table 10 in the 2017 Scoping Plan Updates includes the estimated cost per metric ton of GHG emissions reductions for each measure.10 Some of these measures are codified in existing legislation, including the 50 percent Renewables Portfolio Standard with an estimated cost of $100 to $200 per metric ton and the Short Lived Climate Pollutant Strategy with an estimated cost of $25 per metric ton. The reductions associated with complementary policies will occur outside the Cap-and-Trade Program and will not be responsive to the allowance price.

Therefore, the Cap-and-Trade Program allowance price does not need to reflect the cost of each metric ton of GHG emissions reductions needed to achieve the SB 32 target. Given the existence of complementary policies, the Cap-and-Trade Program allowance price will reflect the need to achieve the estimated 38 percent of GHG emissions reductions needed to achieve the SB 32 target. The Auction Reserve Price and new post-2020 Reserve will need to reflect the role of the Cap-and-Trade Program with complementary policies.

Figure 2 provides an illustration of how the distribution of allowances and the design of the new post-2020 Reserve and price ceiling would look. For illustrative purposes, the two price tiers of the new post-2020 Reserve are placed towards the middle of the Auction Reserve Price and the price ceiling with equal quantities of allowances. Lower Reserve tier prices would shift the tiers down vertically in the graph, higher prices would

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9 Figure 7, page 28 https://www.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf
10 Table 10, page 46 https://www.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf
shift the tiers vertically up, closer to the price ceiling. Staff is seeking specific feedback from stakeholders on the following:

- Price ceiling value.
- New post-2020 Reserve tier prices.
- Distribution of post-2020 allowances, eligible for removal from the allowance budgets, between the new post-2020 Reserve tiers and price ceiling.
- It would be most helpful if stakeholders could provide data or rationale for their suggestions so that staff may fully consider and evaluate stakeholder feedback in developing their proposal for potential amendments.

**Figure 2: Illustration of New Post-2020 Reserve and Price Ceiling**

**Next Steps**

As described throughout this paper, staff is requesting feedback on several topics. Staff will also continue discussions on each of these elements, as well as other modifications required by AB 398, with our linked partners in Québec and Ontario, as changes within California’s Program will be carefully assessed in terms of potential impacts to the linked programs. As staff develops more refined proposals for potential amendments, additional analyses and discussion with stakeholders is planned ahead of any formal regulatory proposal.