Decision 16-07-007 July 14, 2016

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Address Utility Cost and Revenue Issues Associated with Greenhouse Gas Emissions.	Rulemaking 11-03-012 (Filed March 24, 2011)

DECISION DENYING THE MAY 26, 2015 PETITION FOR MODIFICATION OF TESORO REFINING & MARKETING COMPANY LLC AND MODIFYING DECISION 14-12-037

Summary

By this Decision, the California Public Utilities Commission (Commission) denies the May 26, 2015 Petition for Modification of Tesoro Refining & Marketing Company LLC (Tesoro) of Decision (D.)14-12-037 (Decision Adopting Greenhouse Gas Allowance Revenue Allocation Formulas and Distribution Methodologies for Emissions-Intensive and Trade-Exposed Customers), but modifies D.14-12-037 as modified by D.15-08-006, so as to allow Commission staff to use actual production data at a sub-facility level when calculating the Industry Assistance allocation where such data is verified according to a standard established by ARB and ARB provides the verified data to the Commission. Additionally, this Decision makes minor updates, clarifications, and corrections to the formulas included in Appendix A of D.14-12-037, as modified by D.15-08-006. This proceeding is closed.

1. Background

On May 26, 2015, Tesoro Refining & Marketing Company LLC (Tesoro) filed a petition for modification of Decision (D.) 14-12-037. In D.14-12-037, the Commission adopted formulas and methodologies to distribute greenhouse gas (GHG) allowance proceeds to emissions-intensive and trade-exposed (EITE) customers, as those customers are defined in D.12-12-033 (Decision Adopting Cap-and-Trade Greenhouse Gas Allowance Revenue Allocation Methodology for the Investor-Owned Electric Utilities). D.14-12-037 ordered Energy Division to "be responsible for collecting all information and performing calculations necessary to return allowance revenue to [EITE] entities."[1]

D.14-12-037 directs the Commission's Energy Division to calculate the size of the credit each EITE facility should receive using one of three methodologies: a product-based, energy-based, or refinery methodology. The Commission found in D.14-12-037 that distribution of GHG allowance proceeds to EITE customers should closely mirror the California Air Resources Board's (ARB) Industry Assistance allocation methodologies whenever possible.[2] If a facility receives allowances from ARB pursuant to ARB's product-based methodology, it will receive California Industry Assistance according to the Commission's product-based methodology. On August 13, 2015, on its own motion, the Commission issued D.15-08-006 which modified D.14-12-037 to make the formulas and methodologies adopted in D.14-12-037 more consistent with ARB's formulas and methodologies. D.15-08-006 also revised and clarified the data sources used in the formulas in Appendix A to D.14-12-037.

[1] D.14-12-037 at Ordering Paragraph 3.

[2] D.14-12-037 at Conclusion of Law 1.

Among other things, D.14-12-037 acknowledged that an EITE facility could span investor-owned utility (IOU) and publicly-owned utility (POU) territories. However, because "the Commission has no insight into how POUs use their allowances…the Commission cannot conclude that POU electricity rates include a carbon price signal."[3] Therefore, the Commission's product-based formula does not compensate EITE facilities for the portion of the facility's product output that is associated with electricity purchases from POUs.[4] In the case of facilities that receive their credit under the product-based allocation methodology, D.14-12-037 concluded that "the Commission should discount the annual product output variable for each facility by the percentage of the facility's total electricity purchases that are from publicly-owned utilities because POUs are responsible for compensating their EITE customers."[5] This conclusion is reflected in Equation 1 of Appendix A to D.14-12-037.

D.14-12-037 also concluded that it is reasonable for the CPUC to use data that facilities report to ARB under the Regulation for the Mandatory Reporting of Greenhouse Gas Emissions (MRR),[6] when such data is available.[7] The MRR reporting for a facility that spans IOU and POU territories includes total product output for the facility; but does not separate product output for the portion of the facility that is associated with POU electricity purchases. To estimate the product output that should be used in the product-based allocation equation, the existing Commission equation discounts total product output reported in MRR

[3] D.14-12-037 Finding of Fact 69.

[4] The energy-based formula takes a similar approach, but we discuss the product-based formula here because it is the subject of the petition for modification.

[5] D.14-12-037 Conclusion of Law 30.

[6] Title 17, California Code of Regulations (CCR), sections 95100-95158.

[7] D.14-12-037 Conclusion of Law 33.

by the percentage of the facility's POU electricity purchases reported through MRR.[8] This methodology applies to any facility that spans IOU and POU territory and receives their allocation through the product-based allocation.

2. Petition for Modification

Tesoro's petition seeks modification of the adopted methodology in D.14-12-037 for distributing GHG allowance proceeds to EITE customers that have operations in the service territories of both an IOU and a POU. Specifically, Tesoro seeks a requirement that Energy Division calculate the product output between IOU and POU service territories based on the actual location-specific output data, when actual data are available, rather than relying on electricity purchases as a proxy for location. Tesoro proposes changes to page 32, Appendix A, and Conclusion of Law 30 to reflect its proposal.

Specifically, when Energy Division calculates allocations, Tesoro suggests it should use data on the actual production in IOU versus POU territory, rather than relying on electricity purchase data as a proxy for the location of production. Tesoro suggests that actual data may be available through a facility's MRR reporting to ARB that would show product output in POU versus IOU territory, and in those cases, Energy Division should use the MRR data in the formulas.

3. ARB's Response

ARB was the only party to file a response to Tesoro's Petition for Modification. ARB supports the concept of using location-specific production data to determine the fraction of output associated with each service territory, but suggests more stringent data validation is needed before this data could be

[8] D.14-12-037 Equation 1 of Appendix A.

used in Commission formulas. Specifically, if the Commission were to accept additional location-specific data, "ARB insists that location-specific purchased electricity data and purchased electricity provider information must be reported and verified annually by an ARB-accredited third-party verifier."[9] Thus, ARB supports the ends of the Petition for Modification, but not the means Tesoro proposes.

ARB is concerned that under current practices, the needed location-specific data would not be submitted as part of a facility's MRR reporting, as MRR reporting is done at the facility level. The location-specific data that Tesoro proposes would therefore not be subject to the same standards, requirements, and penalties as all other MRR data used to calculate the California Industry Assistance allocation; MRR data is verified by a third party verifier.

For the Commission to be able to use the data as Tesoro proposes, ARB suggests that the location-specific production data, purchased electricity data, and purchased electricity provider information be reported annually and verified by a third party that is accredited by ARB. ARB also recommends that the Commission only accept this supplemental, verified data from sub-facilities that were previously assigned a distinct facility ID for MRR reporting, and that these location-specific data be verified against that previous facility definition.

4. Discussion

4.1. Standard for Petition for Modification

Pursuant to Commission Rule 16.1, a petition for modification of a Commission decision must concisely state the justification for the requested relief and must propose specific wording to carry out all requested modifications to the decision. Any factual allegations must be supported with specific citations to

[9] ARB Response at 2.

the record in the proceeding or to matters that may be officially noticed. Allegations of new or changed facts must be supported by an appropriate declaration or affidavit. If the petitioner was not a party to the proceeding in which the decision proposed to be modified was issued, the petition must state specifically how the petitioner is affected by the decision and why the petitioner did not participate in the proceeding earlier. This Petition for Modification meets the above requirements.

4.2. Discussion

We agree with Tesoro and ARB that the most accurate method of calculating the Industry Assistance allocation under the product-based allocation method would be to use actual, location-specific production data. As stated above, the Commission found in D.14-12-037, as modified by D.15-08-006, that distribution of GHG allowance proceeds to EITE customers should closely mirror the ARB's Industry Assistance allocation methodologies whenever possible. D.14-12-037 notes that by developing methodologies that closely parallel ARB's, the Commission seeks to minimize administrative burdens for industries and regulators alike in the event that ARB decides at a later date to revise its benchmarking methodologies to include indirect emissions from electricity purchases. Furthermore, ARB's allocation methodologies were established and vetted through a lengthy public process with the participation of affected industries and interested parties.[10]

Since disaggregated facility output data is not available in the ARB MRR, in D.14-12-037, as modified by D.15-08-006, the Commission adopted a method for approximating the disaggregated product output at a facility by discounting

[10] D.14-12-037 at 13-14.

the electricity purchased from POUs relative to the facility's total electricity purchases. In its response to the Tesoro petition, ARB explains that a new verification process would be necessary to use actual, disaggregated data, as proposed by Tesoro. ARB further suggests that if the Commission were to allow for sub-facility production data, the Commission would need to be responsible for verification, defining the necessary terms (with reference to MRR terms where applicable), and specifying the standards against which verifiers are to provide assurances.

We agree with ARB that the Commission should only allow the use of sub-facility production data in its product-based allocation if that data is verified pursuant to ARB standards. However, we are concerned that placing the responsibility of verification on Commission staff is inappropriate. Such a modification would create a burden on Energy Division staff to identify which facilities would be eligible to submit this data, manage and receive additional sources of data, coordinate with ARB and/or the third-party verifier on verification of data, ensure the data are in the appropriate format, and update credit calculation methodologies.

That said, we do not want to preclude use of this data if ARB is able to develop the appropriate verification standards to provide sub-facility production data to the Commission. With this in mind, we will deny Tesoro's Petition for Modification but modify D.14-12-037, as modified by D.15-08-006, such that actual production data at a sub-facility level may be used by the Commission when calculating the Industry Assistance allocation, but only if this data is verified according to a standard established by ARB and ARB provides the verified data to the Commission. Location-specific production data should only be accepted from sub-facilities that were previously assigned distinct facility IDs

for MRR reporting. Energy Division staff should not be responsible for developing a verification standard of this data or otherwise receiving and assuring proper verification of the data.

Specifically, the following modifications should be made to D.14-12-037, as modified by D.15-08-006:

i) Section 4.7, Product-Based Allocation Formula, shall be modified to read:

> Additionally, though the product-based benchmark formula reflects all sources of electricity purchases, as described below, the Commission should only allocate allowance revenue for the fraction of a facility's annual product output that is associated with IOU, ESP or CHP meters ~~electricity purchases~~. Put another way, at a facility level, a portion of the product output may be associated with IOU, ESP or CHP meters while another portion of output may be associated with POU meters. When possible, actual location-specific product output data, that disaggregates production output by meter should be used to calculate the Industry Assistance allocation under a product-based allocation. This disaggregated production data should only be used if (i) it is verified according to a standard established by ARB and ARB provides the verified data to the Commission and (ii) the sub-facilities were previously assigned distinct facility IDs for MRR reporting. Otherwise, as a proxy, ~~The Commission cannot expect that electricity purchased from POUs includes a carbon cost; therefore,~~ the facility's product output included in the product-based formula should be discounted by the fraction of electricity purchased from POUs relative to the facility's total electricity purchases. This discounting should be based on the most current MRR data available, and to minimize administrative complexity it should not be trued up over time. The adopted product-based allocation formulas are set forth in Appendix A.

ii) Conclusions of Law 30 should be modified as:

> 30. Under the product-based allocation methodology, the Commission should discount the annual product output variable for each facility to remove product output produced within the service territory of a publicly owned utility because POUs are responsible for compensating their EITE customers. The Commission will use actual location-specific data if (i) it is verified according to a standard established by ARB and ARB provides the verified data to the Commission and (ii) the sub-facilities were previously assigned distinct facility IDs for MRR reporting. Otherwise, as a proxy, the Commission will use the percentage of the facility's total electricity purchases that are from publicly-owned utilities. This discounting should be based on the most recent MRR data available at the time Staff conducts the allocation.

iii) Appendix A, Page 1, Equation 1, shall be modified as shown in Attachment 1 to this decision.

Otherwise, D.14-12-037 and D.15-08-006 stand and a facility's product output included in the product-based formula should be discounted by the faction of electricity purchased from POUs relative to the facility's total electricity purchases.

4.3. Additional Modifications

Additional updates and clarifications to some of the calculations and methodologies described in D.14-12-037, as modified by D.15-08-006, are also necessary.

4.3.1. Updates to Refinery Formulas for the First Compliance Period

Energy Division staff hosted a public workshop on May 2, 2016 to provide a status update on calculating California Industry Assistance. During the workshop, ARB identified some concerns with the formulas originally adopted in Section 3 of Appendix A of D.14-12-037 (in equations 12 through 20) to

determine the allocation to refineries during the first Compliance Period of the Cap-and-Trade Program (2013-2014). Energy Division staff subsequently proposed formula changes and clarifications to variables to address ARB's concerns, and on May 20, 2016, emailed this proposal to the service list in this proceeding. No party to this proceeding expressed concerns with staff's proposed modifications. Accordingly, Section 3 of Appendix A of D.14-12-037, as modified by D.15-08-006, should be modified as shown in Attachment 1 to this decision.

4.3.2. Clarification of Sources of Electricity Purchase Data for Facilities with Annual Emissions Less Than 10,000 Metric Tons of Carbon Dioxide Equivalent (MTCO2e)

Commission staff will calculate the allocation to facilities with annual emissions less than 10,000 MTCO2e using the energy-based allocation equations. Section 2.1 of Appendix A of D.14-12-037, as modified by D.15-08-006, states that these facilities' historical electricity emissions benchmarks will be calculated using electricity purchases during 2008 through 2010. There are some instances where 2008 through 2010 data are not available for a facility and, as determined in Conclusion of Law 18, more recent data can be used. Section 2.1 of Appendix A of D.14-12-037, as modified by D.15-08-006, shall be modified as shown in Attachment 1 to this decision to clarify appropriate data source.

D.14-12-037 (as modified by D.15-08-006) describes how ARB's Cap-and-Trade Regulation addresses "new entrants" to the market that are covered under the Cap-and-Trade Program. D.14-12-037, as modified by D.15-08-006, also extended the rules for new entrants to facilities with annual direct emissions below 10,000 MTCO2e. For administrative simplicity, we find it appropriate to apply the Advance Energy-Based Allocation for an Individual Facility described

in Equation 5 of Appendix A of D.14-12-037, as modified by D.15-08-006, rather than annually applying the stability test to each of the several hundred facilities with emissions below 10,000 MTCO2e and then determining whether Equation 5 or Equation 9 applies to calculate that year's allocation. To this end, Section 2.5 of Appendix A of D.14-12-037, as modified by D.15-08-006, should be modified as shown in Attachment 1 to this Decision.

Also, since we have committed to flowing through any changes in ARB regulations in our implementation of the program, no further review is needed to introduce ARB's new eligibility criteria into the Commission's EITE revenue allocation methodologies; it is only necessary to apply consistent changes to ARB's new entrant regulations that have been discussed throughout this Decision (*e.g.* to introduce an electricity emission factor and a dollar conversion factor). For administrative simplicity, the rules for new entrants in Section 5.1 of D.14-12-037 shall be revised to show that they do not apply to EITE entities addressed in Section 6.2 that have annual direct emissions below 10,000 MTCO2e.[11] For any EITE entity with annual direct emissions below 10,000 MTCO2e, the Commission should calculate the facility's benchmark once using 2008 through 2010 data, or the closest years of data available.

4.3.3. Clarification of Sources of Electricity Purchase Data for Facilities with Annual Emissions Between 10,000 and 25,000 MTCO2e

Conclusion of Law 16 of D.14-12-037, as modified by D.15-08-006, states that the "Commission should use 2008 to 2010 MRR data when calculating fixed historical energy-based benchmarks for entities that have annual direct emissions equal to or greater than 10,000 MTCO2e and that report to ARB under its MRR."

[11] *See* D.14-12-037 at 47.

However, there may be entities with annual emissions between 10,000 and 25,000 MTCO2e that did not report electricity purchase data in the 2008 to 2010 MRR reporting but reported electricity purchase data in more recent MRR reporting. Because we prefer to use MRR data when available, it is appropriate to use the most recent three years' of electricity data that is available for these facilities through MRR reporting. Section 2.1 of Appendix A of D.14-12-037, as modified by D.15-08-006, should be modified as shown in Attachment 1 to this Decision.

4.3.4. Clarification of Sources of Electricity Purchase Data for Facilities with Annual Emissions Greater Than 25,000 MTCO2e

Conclusion of Law 33 of D.14-12-03,7 as modified by D.15-08-006, states that it is "reasonable to use ARB's MRR data as inputs when calculating product, energy and refinery allocations in cases when MRR data is available." There are some specific instances where covered entities with emissions greater than 25,000 MTCO2e did not report electricity purchase data through their MRR reporting, but ARB subsequently collected and reviewed electricity purchase data through a comparable survey. In these cases, the Commission should use the comparable electricity purchase data provided by ARB as a substitute for the MRR described in the formulas in Appendix A of D.14-12-037, as modified by D.15-08-006.

Consistent with the above, the second paragraph of Section 4.6 of D.14-12-037, as modified by D.15-08-006, should be modified adding the following sentences:

> There are some specific instances where covered entities with emissions greater than 25,000 MTCO2e did not report electricity purchase data through their MRR reporting, but ARB subsequently collected and reviewed electricity purchase

> data through a comparable survey. In these cases the Commission should use the comparable electricity purchase data provided by ARB as a substitute for the MRR described in the formulas in Appendix A of D.14-12-037, as modified by D.15-08-006.

4.3.5. Clarification of Application of Interest

The procedure for applying interest to any credit amounts owed from prior years should be clarified to make clear that it is more appropriate to use general language that describes a procedure for applying interest, rather than specifically identifying 2013 as the only credit year that accrues interest. Consistent with this approach, Finding of Fact 88 of D.14-12-037, as modified by D.15-08-006, should be modified to read as follows:

> 88. The GHG costs and allowance revenues that the IOUs deferred from inclusion in rates accrued interest while they remained in the IOUs' balancing accounts.

Similarly, Conclusion of Law 53 of D.14-12-037, as modified by D.15-08-006, should be modified to read as follows:

> 53. EITE entities should receive interest on any credits that the utilities distribute after the year in which the utilities generate the allowance proceeds for those credits. Interest should be applied to the annual credit on a monthly basis beginning in April of the year the GHG allowance proceeds were received through four months prior to credit distribution to the facility (e.g., a credit distributed in October 2016 from 2013 GHG allowance proceeds should accrue interest from April 2013 through June 2016). The interest rate applied to the credit should be the financial, three-month, commercial paper rate published by the Federal Reserve on a monthly basis.

5. Comments on Proposed Decision

Consistent with Rule 14.6(b), comments on the proposed decision must be filed within 18 days of its mailing and reply comments must be filed within 25 days of its mailing. Comments were file on July 5, 2016, by Tesoro and jointly

by the Energy Producers and Users Coalition (EPUC), the California Large Energy Consumers Association (CLECA), and the California Manufacturers & Technology Association (CMTA).

In response to the comments received, minor revisions were made to the proposed decision to clarify that the Commission will accept data at the sub-facility level only if (i) the data is verified according to a standard established by ARB and ARB provides the verified data to the Commission, and (ii) the sub-facilities were previously assigned distinct facility IDs for MRR reporting. Also, in response to comments regarding interest calculations on prior years' credits, the proposed decision was revised to calculate interest from April of the year the GHG allowance proceeds were received through four months prior to the distribution of the credit.[12]

6. Assignment of Proceeding

Carla J. Peterman is the assigned Commissioner and Darwin E. Farrar is the assigned Administrative Law Judge in this proceeding.

Findings of Fact

1. The Commission found in D.14-12-037 that distribution of GHG allowance proceeds to EITE customers should closely mirror ARB's Industry Assistance allocation methodologies whenever possible.

2. In D.14-12-037, the Commission adopted a method for approximating the disaggregated product output at a facility by discounting the electricity purchased from POUs relative to the facility's total electricity purchases.

[12] A four-month time period is necessary for staff to download the most recent interest rate data, perform the credit calculations, transfer the information to the utilities, and then allow the utilities to distribute the credit.

3. The Commission should only allow the use of sub-facility production data in its product-based allocation if (i) that data is verified pursuant to ARB standards and ARB provides the verified data to the Commission, and (ii) the sub-facilities were previously assigned distinct facility IDs for MRR reporting.

4. Placing the responsibility of verification on Commission staff is inappropriate.

Conclusions of Law

1. Tesoro's May 26, 2015 Petition for Modification of D. 14-12-037 should be denied.

2. D.14-12-037, as modified by D.15-08-006, should be modified to address the data verification concerns set forth herein regarding Tesoro's Petition for Modification of Decision 14-12-037.

3. D.14-12-037, as modified by Decision 15-08-006, should be modified to address the methodology updates to the formulas and rules for distribution of greenhouse gas allowance proceeds described in Attachment 1 of this decision.

4. R.11-03-012 should be closed.

O R D E R

IT IS ORDERED that:

1. Tesoro Refining & Marketing Company LLC's May 26, 2015 Petition for Modification is denied.

2. Decision (D.) 14-12-037, as modified by D.15-08-006, shall be modified as follows:

i) Section 4.7, Product-Based Allocation Formula, shall be modified to read:

> Additionally, though the product-based benchmark formula reflects all sources of electricity purchases, as described below, the Commission should only allocate

allowance revenue for the fraction of a facility's annual product output that is associated with IOU, ESP or CHP meters ~~electricity purchases~~. Put another way, at a facility level, a portion of the product output may be associated with IOU, ESP or CHP meters while another portion of output may be associated with POU meters. When possible, actual location-specific product output data, that disaggregates production output by meter should be used to calculate the Industry Assistance allocation under a product-based allocation. This disaggregated production data should only be used if (i) it is verified according to a standard established by ARB and ARB provides the verified data to the Commission and (ii) the sub-facilities were previously assigned distinct facility IDs for MRR reporting. Otherwise, as a proxy, ~~The Commission cannot expect that electricity purchased from POUs includes a carbon cost; therefore,~~ the facility's product output included in the product-based formula should be discounted by the fraction of electricity purchased from POUs relative to the facility's total electricity purchases. This discounting should be based on the most current MRR data available, and to minimize administrative complexity it should not be trued up over time. The adopted product-based allocation formulas are set forth in Appendix A.

ii) Conclusion of Law 30 should be modified as:

Under the product-based allocation methodology, the Commission should discount the annual product output variable for each facility to remove product output produced within the service territory of a publicly owned utility because POUs are responsible for compensating their EITE customers. The Commission will use actual location-specific data if (i) it is verified according to a standard established by ARB and ARB provides the verified data to the Commission and (ii) the sub-facilities were previously assigned distinct facility IDs for MRR reporting. Otherwise, as a proxy, the Commission will use the percentage of the facility's total electricity purchases that are from publicly-owned utilities. This discounting should be based on the most recent MRR data available at the time Staff conducts the allocation.

3. Appendix A of Decision (D.) 14-12-037, as modified by D.15-08-006, is modified as set forth in Attachment 1 to this decision.

4. Rulemaking 11-03-012 is closed.

This order is effective today.

Dated July 14, 2016, at San Francisco, California.

MICHAEL PICKER
President
MICHEL PETER FLORIO
CATHERINE J.K. SANDOVAL
CARLA J. PETERMAN
LIANE M. RANDOLPH
Commissioners

Attachment 1:

Modifications to Appendix A of Decision 14-12-037 as Modified by Decision 15-08-006

Appendix A

Formulas and Rules for Distribution of Greenhouse Gas Allowance Revenue to Emissions-Intensive and Trade-Exposed Customers

1. Product-Based Allocation Equation for an Advance Allocation

Equation 1. Product-Based Allocation Formula for an Advance Allocation

$$A_{b,t} = \left(\sum_{a=1}^{n} (O_{a,t-2} \times B_{EP,a} \times AF_{a,t} \times C_{a,t} \times D_{t-1} \times EF_b) \right) + Trueup_{b,t}$$

Where:

"a" is an eligible industrial activity defined in Table 9-1 of ARB's Cap and Trade regulation.

"b" is an individual industrial facility that operates in industrial activity "a."

"t" is the budget year for which the Commission is allocating revenue.

"$O_{a, t-2}$" is the total production output in year "t-2" associated with a given industrial activity at a given facility subject to the product-based benchmark. ARB's MRR data[1] is the source for product output, which must be discounted to remove product output produced within the service territory of a publicly owned utility (i) using actual location-specific data provided by ARB, or where such data are not available (ii) by the percentage of the facility's total electricity purchases in year "t-2" that are from publicly-owned utilities.

"$B_{EP,a}$" is the benchmark of electricity intensity of product output for industrial activity "a" in terms of megawatt-hours of electricity purchases per unit output for the applicable sector. The electricity intensity benchmark is calculated by summing the electricity purchases of all

[1] Throughout this Appendix, all references to ARB's MRR data refer to the verified MRR data that entities are required to report to ARB in September of each year.

California entities in industrial sector "a," that ARB used to calculate product-based industry benchmarks in the Cap-and-Trade Regulation, and then dividing this amount by these entities' total production output for the industrial activity. The exact formula used to calculate this benchmark for each industrial activity is discussed in Equation **2**, below.

"$AF_{a,t}$" is the "assistance factor" for budget year "t" assigned to a given industrial activity "a." Assistance factors for each industrial activity are specified in Table 8-1 of ARB's Cap-and-Trade regulation. The assistance factor is the percent of the emissions benchmark that will be provided in an allocation, ranging from 100% to 30%. The specific percentage is tied to ARB's determination of an industrial sector's leakage risk and the year for which the allocation is being sought.

"$C_{a,t}$" is the cap adjustment factor for budget year "t" assigned to each industrial activity "a." The cap adjustment factor represents the decline in the overall GHG cap. The schedule for the cap adjustment factor can be found in Table 9-2 of ARB's Cap-and-Trade Regulation as the Cap-and-Trade Adjustment Factor for All Other Direct Allocation.

"D_{t-1}" is the Dollar Conversion Factor calculated based on the average of CAISO's daily Greenhouse Gas Allocation Index Price for the year "t-1, and is in terms of dollars per $MTCO_2e$."

"EF_b" is the electricity emission factor in $MTCO_2e/MWh$ specific to industrial facility "b" based on the facility's mix of electricity purchases during the historical period that ARB determined was appropriate for that industry and each electricity provider's emission factor as discussed in Section 4.5. The EITE facility-specific emission factor is calculated according to Equation **3** below.

"$Trueup_{b,t}$" is the true-up term defined by Equation **4** below, which adjusts for updated product output "O" and dollar conversion factor "D" data for year "t" once they are available. This value shall only be calculated if the entity was covered under the Cap-and-Trade Program in year "t-2."

1.1. Electricity Intensity Benchmark Equation for a Product-Based Allocation

Equation 2. Electricity Intensity Benchmark Equation for Product-Based Allocation

$$B_{EP,a} = 0.9 \times \frac{\sum_{b=1}^{n}\left[\sum_{IOU=1}^{u} EP_{b,IOU} + \sum_{3rd\ party=1}^{p} EP_{b,3rd\ party}\right]}{\sum_{b=1}^{n} Production_b}$$

Where:

"a" is an eligible industrial activity defined in Table 9-1 of ARB's Cap and Trade regulation.

"b" is an individual industrial facility that operates in industrial activity "a" outlined in Table 9-1 of ARB's Cap and Trade regulation.

0.9 is a benchmark stringency factor chosen to reflect the emissions intensity of highly efficient, low-emitting covered entities for each industrial activity. For sectors in which there is only one covered entity or in which no covered entity is at least as efficient as the benchmark, 0.9 is not used and instead the benchmark is set based on the "best-in-class" value (i.e. the electricity emissions intensity of the most GHG-efficient California facility).

"$EP_{b,\ IOU}$" is the total electricity purchased in MWh by industrial facility "b" from an investor-owned utility. Electricity purchases by a single facility "b" may occur from one or more IOUs, each with its own associated emission factor. Electricity purchases are summed over a historical period that ARB determined was appropriate for that industry, using ARB's MRR data.

"EF_{IOU}" is the GHG emissions factor specific to each IOU from which the industrial facility "b" purchased electricity. This factor is 0.291 $MTCO_2e$ for PG&E and 0.379 $MTCO_2e$/MWh for all investor-owned utilities.

"$EP_{b,\ 3rd\ party}$" is the total electricity purchased in MWh by industrial facility "b" from a third party electricity provider. Electricity purchases by a

single facility "b" may occur from one or more third party providers, each with its own associated emissions factor. Electricity purchases are summed over a historical period that ARB determined was appropriate for that industry, using ARB's MRR data. Third party electricity providers include all non-investor-owned utility providers: publicly owned utilities (POUs), community choice aggregators (CCAs), direct access providers (DAs) and off-site CHP facilities. This factor is 0.379 $MTCO_2e/MWh$ for electricity purchases from all parties that are not investor-owned utilities, except when electricity is purchased from off-site CHP facilities a factor of 0.431 $MTCO_2e/MWh$ applies.

"$Production_b$" is the total product output from industrial facility "b," for the industrial activity for which the benchmark is being calculated. Product output is summed over a historical period that ARB determined was appropriate for that industry, using ARB's MRR data for all facilities that ARB used to calculate its product-based industry benchmarks in the Cap-and-Trade Regulation in industrial activity "a."

1.2. Industrial Facility-Specific Weighted Average Emission Factor

Equation 3. Industrial Facility-Specific Weighted Average Emission

$$EF_b = \frac{\sum_{t=2008}^{2010} \sum_{provider=1}^{n} \left(EP_{b,provider,t} \times EF_{provider} \right)}{\sum_{t=2008}^{2010} \sum_{provider=1}^{n} EP_{b,provider,t}}$$

Where:

"b" is an individual industrial facility that operates in industrial activity "a" outlined in Table 9-1 of ARB's Cap and Trade regulation.

"$EP_{b,provider,t}$" is the total electricity purchased in MWh by industrial facility "b" from each electricity provider in year "t," as reported in ARB's MRR data.

"$EF_{provider}$" is the GHG emission factor specific to each electricity provider from which the industrial facility "b" purchase electricity.

1.3. True-Up Term for a Product-Based Allocation

True-ups correct the allocation from two years prior to reflect the actual product output and dollar conversion factor. The first true-up will be conducted in 2016 (to true-up the 2014 allocation).

Equation 4. True-Up Term for a Product-Based Allocation

$$\mathrm{Trueup_{b,t}} = \left(\sum_{a=1}^{n}\left(\mathrm{O_{a,t-2}} \times \mathrm{B_{EP,a}} \times \mathrm{AF_{a,t-2}} \times \mathrm{C_{a,t-2}} \times \mathrm{D_{t-2}} \times \mathrm{EF_{b}}\right)\right) - \mathrm{A_{b,t-2,no\ trueup}}$$

Where:

"$\mathrm{A_{b,t\text{-}2,no\ trueup}}$" is the amount of allowance revenue that industrial facility "b" received for all industrial activities for budget year "t-2," not including the true-up for that budget year.

The assistance factor, benchmark, cap adjustment factor, output variable, dollar conversion factor and emission factor are all as defined in **Equation 1**, **Equation 2** and **Equation 3** above.

1.4. Illustrative Equation for 2013 Allocation

The allocation to address 2013 costs will occur in 2014 or early 2015 due to the timing of this decision's issuance, and it will occur after ARB has verified data about each facility's 2013 product output. In this case, the 2013 allocation does not need a true up since both 2013 product output and the 2013 dollar conversion factor are known. The following equation will be used.

$$A_{b,2013} = \left(\sum_{a=1}^{n}(O_{a,2013} \times B_{EP,a} \times AF_{a,2013} \times C_{a,2013} \times D_{2013} \times EF_{b})\right)$$

1.5. Illustrative Equation for 2014 Allocation

In 2014 the allocation formula will also not include a true-up term. The revenue that facilities receive for the 2014 budget year will be trued-up in the

2016 allocation after verified product output data for 2014 is available from ARB in September 2015. In 2014 the product-based allocation to individual industrial facility "b" will be calculated as follows, except that if the allocation occurs in early 2015 the dollar conversion factor for 2014 will be used:

$$A_{b,2014} = \sum_{a=1}^{n} (O_{a,2013} \times B_{EP,a} \times AF_{a,2014} \times C_{a,2014} \times D_{2013} \times EF_b)$$

1.6. **Illustrative Equation for 2015 Allocation**

A true-up term is also unnecessary in the 2015 allocation, since the 2013 allocation requires no true-up. In 2015 the product-based allocation to individual industrial facility "b" will be calculated as follows:

$$A_{b,2015} = \sum_{a=1}^{n} (O_{a,2013} \times B_{EP,a} \times AF_{a,2015} \times C_{a,2015} \times D_{2014} \times EF_b)$$

The total amount of allowance revenue that a facility will receive in 2015 will be equal to the 2015, 2014, and 2013 allocations.

1.7. **Illustrative Equation for 2016 and Subsequent Years**

The allocation formula for 2016 and all subsequent years will exactly follow the default formulas and will require no modification. In 2016, for example, the allocation will true-up the 2014 allocation and will be calculated as follows:

$$A_{b,2016} = \left(\sum_{a=1}^{n} (O_{a,2014} \times B_{EP,a} \times AF_{a,2016} \times C_{a,2016} \times D_{2015} \times EF_b) \right) + Trueup_{b,2016}$$

$$Trueup_{b,2016} = \left(\sum_{a=1}^{n} \left(O_{a,2014} \times B_{EP,a} \times AF_{a,2014} \times C_{a,2014} \times D_{2014} \times EF_b \right) \right) - A_{b,2014,no\ trueup}$$

2. **Energy-Based Allocation Equation**

Equation **5**, Equation **6** and Equation **7** below illustrate how the energy-based allocation will be conducted in general and for facilities that are classified as having stable emissions data. Opt-in covered entities that have no historical MRR data and entities that have transitional emissions data are addressed as special cases.

For facilities that have direct emissions less than 10,000 $MTCO_2e$ per year and that do not report data under MRR, the Commission will rely on data from the investor owned electric utilities about each facility's bundled (i.e. IOU) and unbundled (i.e. third party) electricity purchases during 2008 through 2010.

Equation 5. Advance Energy-Based Allocation for an Individual Facility

$$A_t = B_{EP,e} \times AF_{a,t} \times C_t \times D_{t-1} + Trueup_t$$

Where:

"t" is the budget year for which revenue is provided to address emissions from electricity purchases and to which the true-up is added to address emissions that occurred during year t-1.

"A_t" is the amount of revenue allocated to the operator of the industrial facility with an energy-based allocation for budget year "t";

"$B_{EP,e}$" is the historical baseline annual arithmetic mean amount of emissions resulting from electricity purchased by the industrial facility from an IOU or other electricity provider, excluding electricity from publicly-owned utilities, measured in $MTCO_2e$, using the years that ARB determined was appropriate for that facility as the historical baseline. The formula for this benchmark is defined in Equation **6** below.

"$AF_{a,t}$" is Assistance Factor for budget year "t" assigned to each industrial activity "a" in Table 8-1 of ARB's Cap-and-Trade Regulation. This factor represents the percent of the energy benchmark that will be provided in an allocation, ranging from 30% to 100% in a given budget year. The specific

percentage is tied to ARB's determination of an industrial sector's leakage risk and the year for which the allocation is being sought.

"C_t" is the Cap Adjustment Factor for budget year "t." The cap adjustment factor represents the decline in the overall GHG cap. The schedule for the cap adjustment factor can be found in Table 9-2 of ARB's Cap-and-Trade regulation as the Cap Adjustment Factor for All Other Direct Allocation.

"D_{t-1}" is the Dollar Conversion Factor calculated based on the average of CAISO's daily Greenhouse Gas Allowance Index Price for the year "t-1."

"$Trueup_t$" is the true-up term defined by Equation **7** below, which adjusts for the dollar conversion factor "D" for year "t" once available.

2.1. Historical Electricity Emissions Benchmark for an Energy-Based Allocation

The historical electricity emissions benchmark is specific to each facility that qualifies for an energy-based allocation. It is calculated once and is never updated from year to year. The subscript "e" in the benchmark variable distinguishes the benchmark used in the energy-based allocation methodology from that used in the product-based methodology.

For facilities that have direct emissions less than 10,000 $MTCO_2e$ per year and that do not report data under MRR, the Commission will rely on data from the investor owned electric utilities about each facility's bundled (i.e. IOU) and unbundled (i.e. third party) electricity purchases during 2008 through 2010; if 2008 through 2010 data is not available, the Commission will use the closest years available.

For facilities that have direct emissions between 10,000 MTCO2e and 25,000 MTCO2e per year and report under MRR, the Commission will rely on electricity purchase data from ARB. If electricity purchase data from 2008

through 2010 is not available through MRR, the Commission will use the most recent three years of electricity purchase data that is available through MRR.

Equation 6. Historical Electricity Emissions Benchmark for an Energy-Based Allocation

$$B_{EP,e} = \sum_{IOU=1}^{n} (EP_{IOU} \times EF_{IOU}) + \sum_{3rd\ party=1}^{n} \left(EP_{3rd\ party} \times EF_{3rd\ party}\right)$$

Where:

"EP_{IOU}" is the historical baseline annual arithmetic mean amount of electricity purchased by the industrial facility from an IOU, measured in MWh, using MRR data for the historical baseline that ARB determined was appropriate for that facility. Electricity purchases may occur from one or more IOUs, each with its own associated emissions factor.

"EF_{IOU}" is the GHG emissions factor specific to the IOU from which the industrial facility purchased electricity. This factor is 0.291 $MTCO_2e$ for PG&E and 0.379 $MTCO_2e$/MWh for all investor-owned utilities.

"$EP_{3rd\ party}$" is the historical baseline annual arithmetic mean amount of electricity purchased by the industrial facility from a third party electricity provider, excluding electricity from publicly-owned utilities, measured in MWh, using MRR data for the historical baseline that ARB determined was appropriate. Electricity purchased by a single facility may occur from one or more third party providers, each with its own associated emissions factor.

"$EF_{3rd\ party}$" is the GHG emissions factor specific to the third party electricity provider from which the industrial facility purchased electricity. This factor is 0.379 $MTCO_2e$/MWh for electricity purchases from all parties that are not investor-owned utilities, except when electricity is purchased from off-cite CHP facilities a factor of 0.431 $MTCO_2e$/MWh applies.

2.2. True-Up Term for an Advance Energy-Based Allocation

True-ups correct the previous year's allocation. The first true-up will likely be conducted in 2016 (to true-up the 2015 allocation), since the first revenue allocations in 2015, at which point the 2014 dollar conversion factor will be known.

Equation 7. True-Up Term for an Advance Energy-Based Allocation

$$Trueup_t = \left(B_{EP,e} \times AF_{a,t-1} \times C_{t-1} \times D_{t-1}\right) - A_{t-1,no\ trueup}$$

Where:

"$A_{t\text{-}1,no\ trueup}$" is the amount of allowance revenue that the industrial facility received for budget year "t-1," not including the true-up for that budget year.

The benchmark, assistance factor, cap adjustment factor and dollar conversion factor variables are as defined in **Equation 5**.

2.3. Illustrative Equation for 2015 Allocation and Subsequent Years

Like the 2013 and 2014 product-based allocations, the energy-based allocations conducted for 2013 and 2014 will not include a true-up term because the actual dollar conversion factor will be known. However, the 2015 allocation will need to be trued up to update the dollar conversion factor, and this true up will occur in the 2016 allocation in the following manner:

$$A_{2016} = B_{EP,e} \times AF_{a,2016} \times C_{2016} \times D_{2015} + \left(\left(B_{EP,e} \times AF_{a,2015} \times C_{2015} \times D_{2015}\right) - A_{2015,no\ trueup}\right)$$

2.4. **Opt-In Covered Entities without Historical Baseline Emissions**

When ARB allocates allowances pursuant to Section 95891(c)(3)(A) of its Cap-and-Trade Regulation, which only applies to opt-in covered entities that do not have historical baseline emissions data, the Commission will rely on information ARB provides about each facility's estimated electricity purchases. If ARB does not have these estimates, the facilities will not receive allowance revenue pursuant to the energy-based allocation methodology until ARB has verified MRR data from these facilities.

If ARB provides information about a facility's estimated electricity purchases, the Commission will calculate the facility's allowance revenue according to Equation **5**, Equation **6** and Equation **7**, except that the variable $B_{EP,e}$ in each of these equations shall be replaced with the following estimated emission benchmark variable $B_{EP,e,est}$, defined by the equation below:

Equation 8. Estimated Benchmark of Electricity Emissions

$$B_{EP,e,est} = \sum_{IOU=1}^{n} \left(EP_{IOU,est} \times EF_{IOU}\right) + \sum_{3rd\ party=1}^{n} \left(EP_{3rd\ party,est} \times EF_{3rd\ party}\right)$$

Where:

"$EP_{IOU,\ est}$" is the estimated annual amount of electricity purchased by the industrial facility from an IOU, measured in MWh, as determined by ARB. Electricity purchases may occur from one or more IOUs, each with its own associated emissions factor.

"EF_{IOU}" is the GHG emissions factor specific to the IOU from which the industrial facility purchased electricity. This factor is 0.291 $MTCO_2e$ for PG&E and 0.379 $MTCO_2e$/MWh for all investor-owned utilities.

"$EP_{3rd\ party,\ est}$" is the estimated annual amount of electricity purchased by the industrial facility from a third party electricity provider, excluding electricity purchased from publicly-owned utilities, measured in MWh, as determined by ARB. Electricity purchased by a single facility may occur

from one or more third party providers, each with its own associated emissions factor.

"$EF_{3rd\ party}$" is the GHG emissions factor specific to the third party electricity provider from which the industrial facility purchased electricity. This factor is 0.379 $MTCO_2e/MWh$ for electricity purchases from all parties that are not investor-owned utilities, except when electricity is purchased from off-cite CHP facilities a factor of 0.431 $MTCO_2e/MWh$ applies.

This equation only applies until ARB has verified MRR data for these facilities.

2.5. **New Entrants with Transitional Emissions Data**

The stability formula in Section 95891(c)(3)(D) of ARB's Cap-and-Trade Regulation applies to covered entities or opt-in covered entities, and it identifies whether an entity's emissions should be classified as stable or transitional. For any entity eligible for an energy-based allocation that ARB classifies as stable, Equation **5**, Equation **6** and Equation **7** will apply, unmodified. However, for entities that ARB classifies as having transitional data, the following formulas will apply, which mirror those in Section 95891(c)(3)(B) of ARB's Cap-and-Trade Regulation. These equations rely on electricity purchases from year "t-2," rather than on the historical baseline annual arithmetic mean amount of electricity purchased. ~~The stability test and Equation 9 also apply to facilities that have annual direct emissions less than 10,000 $MTCO_2e$ and that do not report to ARB under MRR, though in this case the Commission will rely on data from the investor owned electricity utilities rather than MRR data.~~

Equation 9. Advance Energy-Based Allocation for an Individual Facility with Transitional Emissions Data

$$A_t = B_{EP,e,t-2} \times AF_{a,t} \times C_t \times D_{t-1} + Trueup_t$$

Where:

"t" is the budget year for which revenue is provided to address emissions from electricity purchases and to which the true-up is added to address emissions that occurred during year "t-2."

"A_t" is the amount of revenue allocated to the operator of the industrial facility with transitional emissions data for budget year "t."

"$B_{EP,e,t-2}$" is the annual amount of emissions resulting from electricity purchases by the industrial facility from an IOU or other electricity provider, excluding publicly-owned utilities, measured in $MTCO_2e$, using "t-2" MRR data. The formula for this benchmark is defined in Equation **10** below.

"$Trueup_t$" is the true-up term defined by Equation **11** below, which adjusts for actual electricity purchases from year "t-2" and the dollar conversion factor "D" for year "t" once they are available. The true-up term will only be calculated if the entity was covered under the Cap-and-Trade Program in year "t-2."

The assistance factor, cap adjustment factor and dollar conversion factor are exactly as defined in Equation **5**.

2.5.1. Electricity Emissions Benchmark for an Energy-Based Allocation to Facilities with Transitional Emissions Data

The following benchmark variable will be used for facilities that have transitional emissions data:

Equation 10. Benchmark of Electricity Emissions for a Facility with Transitional Emissions Data

$$B_{EP,e,t-2} = \sum_{IOU=1}^{n} \left(EP_{IOU,t-2} \times EF_{IOU}\right) + \sum_{3rd\ party=1}^{n} \left(EP_{3rd\ party,t-2} \times EF_{3rd\ party}\right)$$

Where:

"$EP_{IOU,\ t\text{-}2}$" is the annual amount of electricity purchased by the industrial facility from an IOU in year "t-2," measured in MWh, using ARB MRR data. Electricity purchases may occur from one or more IOUs, each with its own associated emissions factor.

"EF_{IOU}" is the GHG emissions factor specific to the IOU from which the industrial facility purchased electricity. This factor is 0.291 $MTCO_2e$ for PG&E and 0.379 $MTCO_2e$/MWh for all investor-owned utilities.

"$EP_{3rd\ party,\ t\text{-}2}$" is the annual amount of electricity purchased by the industrial facility from a third party electricity provider in year "t-2," measured in MWh, using ARB MRR data. Electricity purchased by a single facility may occur from one or more third party providers, excluding publicly-owned utilities, each with its own associated emissions factor.

"$EF_{3rd\ party}$" is the GHG emissions factor specific to the third party electricity provider from which the industrial facility purchased electricity. This factor is 0.379 $MTCO_2e$/MWh for electricity purchases from all parties that are not investor-owned utilities, except when electricity is purchased from off-cite CHP facilities a factor of 0.431 $MTCO_2e$/MWh applies.

2.5.2. True-Up Term for an Advance Energy-Based Allocation to Facilities with Transitional Emissions Data

The following true-up term applies to facilities that have transitional emissions data. Like the true-up for the product-based allocation, this true-up term will correct the allocation from two years prior, once actual MRR data is available.

Equation 11. True-Up Term for Advanced Energy-Based Allocation for a Facility with Transitional Emissions Data

$$Trueup_t = \left(B_{EP,e,t-2} \times AF_{a,t-2} \times C_{t-2} \times D_{t-2}\right) - A_{t-2,no\ trueup}$$

The assistance factor, cap adjustment factor and dollar conversion factor variables are as defined in Equation **5**. The benchmark variable is as calculated in Equation **10**.

The 2015 allocation is the first that will certainly require a true-up, and this true-up will occur in 2016.

3. **Refinery Allocation Equation for First Compliance Period**

The following series of equations will be used to allocate allowance revenue to individual refineries during the first Cap-and-Trade compliance period. First, allowance revenue is allocated to the refinery sector as a whole, based on a product-based, "simple barrel," benchmark. This allows the total amount of allowance revenue allocated to the refinery sector to increase or decrease automatically in response to future production levels of refinery products. Second, allowance revenue is allocated to individual refineries based on the complexity of the refinery. For simple refineries (i.e. those without a Solomon Energy Intensity Index (EII) value) a simple barrel product benchmark applies; and for those with an EII value, a more complex formula applies that accounts for each refinery's historical emissions and its relative efficiency compared to other refineries.

3.1. **Refinery Sector Allocation**

Equation 12. Refinery Sector Allocation

$$SA_{EP,t} = AF_t \times B_{EP} \times C_t \times O_{t-2}$$

Where:

"$SA_{EP,t}$" is the annual allocation to the refining sector for emissions from purchased electricity for budget year t. This variable is in terms of allowances ($MTCO_2e$). (Allocations to individual refineries will be converted to dollars.)

"AF_t" is the assistance factor for budget year t assigned to petroleum refining sector (NAICS Code 324110) as specified in Table 8-1 of ARB's Cap-and-Trade regulation.

"B_{EP}" is the emissions benchmark for electricity purchased for primary products produced by the refining sector. It is determined by the following equation, which is identical to the product-based benchmark for electricity purchases defined in Equation **2**:

$$B_{EP} = 0.9 \times \frac{\sum_{r=1}^{n}\left[\sum_{IOU=1}^{u}\left(EP_{r,IOU} \times EF_{IOU}\right) + \sum_{3rd\ party=1}^{p}\left(EP_{r,3rd\ party} \times EF_{3rd\ party}\right)\right]}{\sum_{r=1}^{n} Production_r}$$

Where:

0.9 is the benchmark stringency chosen to reflect the emissions intensity of highly efficient, low-emitting covered entities within the sector.

"$EP_{r,IOU}$" is the total electricity purchased in MWh by industrial facility "r" within the refinery sector from an investor-owned utility. Electricity purchases by a single facility, "r," may occur from one or more utility. Electricity purchases are summed over a historical period that ARB determined was appropriate, using ARB's MRR data.

"EF_{IOU}" is the GHG emissions factor specific to the investor-owned utility from which the industrial facility "r" purchased electricity.

This factor is 0.291 $MTCO_2e$ for PG&E and 0.379 $MTCO_2e$/MWh for all investor-owned utilities.

"$EP_{r,\ 3rd\ party}$" is the total electricity purchased in MWh by industrial facility "r" within the refinery sector from a third party electricity provider. Electricity purchases by a single facility "r" may occur from one or more third party providers. Electricity purchases are summed over a historical period that ARB determined was appropriate, using ARB's MRR data.

"$EF_{3rd\ party}$" is the GHG emissions factor specific to the third party electricity provider. This factor is 0.379 $MTCO_2e$/MWh for electricity purchases from all parties that are not investor-owned utilities, except when electricity is purchased from off-site CHP facilities a factor of 0.431 $MTCO_2e$/MWh applies.

"$Production_r$" is the total output of primary refinery products produced by industrial facility "r," in the refining sector. Product output is summed over a historical period that ARB determined was appropriate, using ARB's MRR data ~~discounted by the percentage of the refinery sector's total electricity purchases in year "t-2" that are from publicly owned utilities.~~.

"C_t" is the cap adjustment factor for budget year "t." The schedule for the cap adjustment factor can be found in Table 9-2 of ARB's Cap-and-Trade regulation as the Cap Adjustment Factor for All Other Direct Allocation.

"O_{t-2}" is the output of primary refinery products, in barrels, from the refining sector in year t-2 <u>discounted by the percentage of the refinery sector's total electricity purchases in year "t-2" that are from publicly-owned utilities.</u>

Like the product and energy-based allocations, the refinery allocation will be granted in advance of costs being incurred.

3.2. **Allocation to Facilities Without EII Values (Simple Refineries)**

Refineries without an EII value are granted allowance revenue based on the following simple barrel benchmark approach, which is equivalent to the product-based allocation methodology, limited to be no greater than a refinery's historical emissions.

Equation 13. Revenue Allocation to Individual Refineries without EII Values (Simple Refineries)

$$AR_{X,t} = A_{X,t} \times D_t$$

Where:

"$AR_{X,t}$" is the allocation of revenue in dollars to an individual refinery "X" for budget year "t."

"$A_{X,t}$" is the allocation of allowances to an individual refinery "X" for budget year "t" as calculated by either Equation **14** or Equation **15** below.

"D_t" is the dollar conversion factor calculated based on the average of CAISO's daily Greenhouse Gas Allowance Index Price for the year "t." It is possible to use year "t" rather than year "t-1" since these refinery equations will only be used during the first compliance period, and the revenue allocations for 2013 and 2014 will not be conducted until early 2015, at which point the dollar conversion factors for 2013 and 2014 will be known.

Equation 14. If Simple Barrel Method Is Less than Historical Emissions

$$If: O_{X,t-2} \times B_{EP} \times AF_t \times C_t \leq BE_{EP,X} \times AF_t \times C_t$$

$$Then: A_{X,t} = O_{X,t-2} \times B_{EP} \times AF_t \times C_t$$

(A product-based allocation)

Equation 15. If Simple Barrel Method Exceeds Historical Emissions

$$If: O_{X,t-2} \times B_{EP} \times AF_t \times C_t > BE_{EP,X} \times AF_t \times C_t$$

$$Then: A_{X,t} = BE_{EP,X} \times AF_t \times C_t$$

(An emissions-based allocation)

Where:

"$O_{X,t-2}$" is the output of primary refinery products, in barrels, from refinery "X" in year t-2, discounted by the percentage of the refinery's total electricity purchases in year "t-2" that are from publicly-owned utilities. (However, verified 2013 product output data is presently available, so primary refinery product data from year "t" will be used for the 2013 allocation; and product data from year "t-1" will be used for the 2014 allocation.)

"B_{EP}" is the emissions benchmark for electricity purchased for primary products produced by the refining sector. This benchmark applies to the refinery sector as a whole, and is not specific to an individual refinery. It is defined in
Equation 12 above.

"AF_t" is the assistance factor for budget year "t" assigned to petroleum refining sector (NAICS Code 324110) as specified in Table 8-1 of ARB's Cap-and-Trade regulation.

"C_t" is the cap adjustment factor for budget year "t." The schedule for the cap adjustment factor can be found in Table 9-2 of ARB's Cap-and-Trade regulation as the Cap Adjustment Factor for All Other Direct Allocation.

"$BE_{EP,X}$" is the baseline average annual greenhouse gas emissions for purchased electricity excluding emissions associated with electricity purchased from publicly owned utilities for refinery "X" over a historical period that ARB determined was appropriate. This is a facility specific benchmark.

3.2.1. **True-Up for Refineries without EII Values**

The revenue allocation for 2014 will be trued-up to account for actual product output in the 2016 allocation. This true-up will occur according to the following equations, which will be added to the 2016 allocation to be conducted according to a complexity weighted barrel methodology.

Equation 16. True-Up if Entity Received Initial Revenue via a Product-Based Allocation

$$TrueUp_{X,t} = \left(O_{X,t-2} \times B_{EP} \times AF_{t-2} \times C_{t-2} \times D_{t-2}\right) - AR_{X,t-2}$$

Where:

"$TrueUp_{X,t}$"is the amount of true-up allowance revenue allocated to account for changes in product output and the dollar conversion factor not properly accounted for in prior allocations for refinery "X."

"$AR_{X,t-2}$" is the amount of allowance revenue that refinery "X" without an EII value received for budget year "t-2."

Equation 17. True-Up if Entity Received Initial Revenue via an Emissions-Based Allocation

$$If: AE_{EP,X,t-2} < BE_{EP,X} \times 0.8$$

$$Then: TrueUp_{X,t} = \left(AE_{EP,X,t-2} \times AF_{t-2} \times C_{t-2} \times D_{t-2}\right) - AR_{X,t-2}$$

Where:

"$AE_{EP,X,t-2}$" is the emissions from electricity purchased by refinery "X" without an EII Value for budget year "t-2," using the following equation:

$$AE_{EP,X,t-2} = \sum_{IOU=1}^{u} \left(EP_{IOU,t-2} \times EF_{IOU}\right) + \sum_{3rd\ party=1}^{p} \left(EP_{3rd\ party,t-2} \times EF_{3rd\ party}\right)$$

Where:

"$EP_{IOU,t-2}$" is the annual amount of electricity purchased by refinery "X" from an IOU in year "t-2," measured in MWh, using ARB MRR data. Electricity purchases may occur from one or more IOUs, each with its own associated emissions factor.

"EF_{IOU}" is the GHG emissions factor specific to the IOU from which the industrial facility purchased electricity. This factor is 0.291 $MTCO_2e$ for PG&E and 0.379 $MTCO_2e$/MWh for all investor-owned utilities.

"$EP_{3rd\ party,t-2}$" is the annual amount of electricity purchased by refinery "X" from a third party electricity provider in year "t-2," measured in MWh, using ARB MRR data. Electricity purchased by a single facility may occur from one or more third party providers, each with its own associated emissions factor. This value excludes electricity purchased from a publicly owned utility.

"$EF_{3rd\ party}$" is the GHG emissions factor specific to the third party electricity provider from which the industrial facility purchased electricity. This factor is 0.379 $MTCO_2e$/MWh for electricity purchases from all parties that are not investor-owned utilities, except when electricity is purchased from off-site CHP facilities a factor of 0.431 $MTCO_2e$/MWh applies.

3.3. **Allocation to Facilities with EII Values ~~(Complex Refineries)~~**

The methodology below exactly mirrors ARB's methodology with the same two changes employed throughout this decision: it ensures that the benchmark reflects emissions from electricity purchases, rather than direct emissions, and it converts allowances into dollars.

Equation 18. Revenue Allocation to Individual Refineries with EII Values ~~**(Complex Refineries)**~~

$$AR_{Y,t} = BE_{EP,Y} \times DF_{Y,t} \times F_t \times D_t$$

Where:

"$AR_{Y,t}$" is the allocation of revenue in dollars to an individual refinery "Y" that has an EII value for budget year "t".

"$BE_{EP,Y}$" is the baseline average annual greenhouse gas emissions from purchased electricity excluding emissions associated with electricity purchased from publicly owned utilities for refinery "Y" over a historical period that ARB determined was appropriate. This is a facility specific benchmark.

"$DF_{Y,t}$" is a distribution factor calculated as:

$$DF_{Y,t} = \left((Avg_{EP}/EII_Y) + Adj_{EP,t}\right)/\left(1 + Adj_{EP,t}\right)$$

Where:
"Avg_{EP}" is the weighted average EII for all facilities with EII values, and is calculated as:

$$Avg_{EP} = \frac{\sum_{Y=1}^{n} BE_{EP,Y}}{\sum_{Y}^{n}\left(BE_{EP,Y}/EII_Y\right)}$$

"EII_Y" is the Solomon Energy Intensity Index (EII) for facility "Y" for a historical period that ARB determined was appropriate. For the purposes of this calculation, EII values shall be rounded to one digit after the decimal. EII values are to remain confidential to ARB.

"$Adj_{EP,t}$" is an adjustment factor designed to provide the covered entity with the best EII the most allowances relative to its baseline level:

$$Adj_{EP,t} = \left((\mathrm{Avg_{EP}}/\mathrm{EII_{Best}}) \times \mathrm{F_t} - 1\right)/(1 - \mathrm{F_t})$$

"EII_{Best}" is the EII of the most efficient covered entity (lowest EII in the sector).

"F_t" is a fraction that adjusts the complex refinery allocation to account for the remaining refinery sector allowances after allocations are made for simple refineries, and is calculated as:

$$F_t = \frac{SA_{EP,t} - \sum_{X=1}^{n} A_{X,t}}{\sum_{Y=1}^{n} BE_{EP,Y}}$$

Where:
"$SA_{EP,t}$" is the annual allocation to the refining sector for emissions from purchased electricity for budget year t, as defined in **Equation 12**. This variable is in terms of allowances ($MTCO_2e$).

"$A_{X,t}$" is the allocation in terms of allowances ($MTCO_2e$) to simple refinery "X" without an EII value for year "t."

"D_t" is the dollar conversion factor calculated based on the average of CAISO's daily Greenhouse Gas Allowance Index Price for the year "t." (The year "t" can be used since the allocations for 2013 and 2014 will not occur until early 2015, at which point the dollar conversion factor for both years will be known.)

The calculations necessary to execute **Equation 18** require the use of confidential and proprietary Solomon EII values that ARB cannot share with Energy Division. To implement this calculation in a manner that respects these confidentiality requirements, Energy Division will compute the refinery sector allocation, $SA_{EP,t}$, and the sum of the revenue allocation to simple refineries without EII values, $\Sigma A_{X,t}$, and it will then communicate these results to ARB, which will allow ARB to calculate the fixed fraction, F_t, and the distribution factor specific to each complex refinery, $DF_{Y,t}$, without communicating EII data to Energy Division.

3.3.1. **True-Up Process for Refineries with EII Values**

The following true-up formulas parallel ARB's true-up for ~~complex~~ refineries with EEI values. If actual emissions from electricity purchases in the first compliance period are less than the amount of revenue provided for those years, a true-up will be conducted after September 2015 (after verified MRR data is available about 2014 electricity purchase is available) and the excess revenue that the refinery received will be subtracted from the revenue allocation that occurs in 2016. ~~This true-up equation included in the Staff Proposal because it is no longer necessary to true-up the 2013 allocation: as of this date, verified 2013 MRR data are available.~~

Equation 19. ~~(Complex Refinery)~~ True-Up for Refineries with EII Values If Actual Electricity Emissions Are Less than Revenue Provided

$$If: \left(AE_{EP,Y,2013} \times D_{2013} + AE_{EP,Y,2014} \times D_{2014}\right) < AR_{Y,2013} + AR_{Y,2014}$$

$$Then: TrueUp_{Y,Debit,2016} = 0.8 \times \left(\left(AE_{EP,Y,2013} \times D_{2013} + AE_{EP,Y,2014} \times D_{2014}\right) - \left(AR_{Y,2013} + AR_{Y,2014}\right)\right)$$

Where:

"$TrueUp_{Y,Debit,2016}$" is the revenue in dollars that will be deducted from the refinery "Y's" next revenue allocation in 2016 to account for changes in production or allocation not properly accounted for in prior allocations.

"$AR_{Y,t}$" is the allocation of revenue in dollars that individual refinery "Y" received for GHG emissions from electricity purchases experienced in year "t".

"$AE_{EP,Y,t}$" is refinery "Y's" actual GHG emissions for purchased electricity in year "t," excluding emissions associated with electricity purchased from publicly owned utilities. Since actual GHG emission from electricity purchases are difficult to exactly measure in any given year, these

emissions will be calculated based on the same fixed emissions factors approved in this decision. Actual emissions would therefore be estimated according to the following formula:

$$AE_{EP,Y,t} = \sum_{IOU=1}^{n} \left(EP_{IOU,t} \times EF_{IOU}\right) + \sum_{3rd\ party=1}^{n} \left(EP_{3rd\ party,t} \times EF_{3rd\ party}\right)$$

Where:

"$EP_{IOU,t}$" is the total electricity purchased in MWh by facility "Y" within the refinery sector from an investor-owned utility during year "t." Electricity purchases by a single facility, "Y", may occur from one or more IOU, each with its own associated emission factor.

"EF_{IOU}" is the GHG emissions factor specific to the investor-owned utility from which the industrial facility "Y" purchased electricity. This factor is 0.291 $MTCO_2e$ for PG&E and 0.379 $MTCO_2e$/MWh for all investor-owned utilities.

"$EP_{3rd\ party,t}$" is the total electricity purchased in MWh by facility "Y" within the refinery sector from a third party electricity provider during year "t." Electricity purchases by a single facility "Y" may occur from one or more third party providers, each with its own associated emissions factor. <u>This value excludes electricity purchased from publicly owned utilities.</u>

"$EF_{3rd\ party}$" is the GHG emissions factor specific to the third party electricity provider. This factor is 0.379 $MTCO_2e$/MWh for electricity purchases from all parties that are not investor-owned utilities, except when electricity is purchased from off-cite CHP facilities a factor of 0.431 $MTCO_2e$/MWh applies.

"D_t" is the dollar conversion factor applicable to budget year "t."

If actual 2014 emissions from electricity purchases are greater than the amount of revenue provided, a true-up allocation will be conducted after September 2015, and the facility will be credited with additional allowance

revenue in the 2016 revenue allocation. This true-up equation differs from the equation included in the Staff Proposal because it is no longer necessary to true-up the 2013 allocation: as of this date, verified 2013 MRR data are available.

Equation 20. ~~(Complex Refinery)~~ True-Up for Refineries with EII Values If Actual Emissions Are Greater than Revenue Provided

$$If: 2 \times BE_{EP,Y} < AE_{EP,Y,2013} + AE_{EP,Y,2014}$$

$$Then: TrueUp_{Y,Credit,2016} =$$

$$\Big(\big(AE_{EP,Y,2013} \times DF_{Y,2013} \times AF_{2013} \times F_{2013} \times D_{2013} + AE_{EP,Y,2014} \times DF_{Y,2014} \times AF_{2014} \times F_{2014} \times D_{2014}\big) - (AR_{Y,2013} + AR_{Y,2014})\Big)$$

Where:

"$TrueUp_{Y,Credit,2016}$" is the revenue in dollars that will be added to refinery "Y's" next revenue allocation in 2016 to account for changes in production or allocation not properly accounted for in prior allocations.

"$BE_{EP,Y}$" is the average annual greenhouse gas emissions from purchased electricity for refinery "Y" over a historical period that ARB determined was appropriate, excluding emissions associated with electricity purchased from publicly owned utilities. This value is expressed in **Equation 18**, and is calculated once at the outset of the program.

"$AE_{EP,Y,t}$" is refinery "Y's" actual GHG emissions for purchased electricity in year "t," excluding emissions associated with electricity purchased from publicly owned utilities. These emissions will be calculated based on the same fixed emissions factors used throughout this decision. Actual emissions would therefore be estimated according to the formula expressed in **Equation 19** above.

"$DF_{Y,t}$" is the distribution factor calculated as in **Equation 18**.

"AF_t" is the refinery assistance factor for year "t."

"F_t" is a fraction as calculated in **Equation 18**.

"D_t" is the dollar conversion factor used to convert metric tons of emissions into dollars.

"$AR_{Y,t}$" is the allocation of revenue in dollars that individual refinery "Y" received for GHG emissions from electricity purchases experienced in year "t".

(END OF ATTACHMENT 1)