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**CALIFORNIA  
ENERGY COMMISSION**



**CALIFORNIA  
NATURAL  
RESOURCES  
AGENCY**

California Energy Commission

## **STAFF REPORT**

# **Power Source Disclosure Proposals on Hourly and Annual Accounting**

**September 2023 | CEC-200-2023-014**



# California Energy Commission

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# ABSTRACT

California’s Power Source Disclosure program requires retail electricity suppliers to disclose through a power content label the power mix and greenhouse gas emissions of the electricity products customers purchased in the previous calendar year. The California Energy Commission plans to initiate a rulemaking to amend the Power Source Disclosure program regulations in accordance with Senate Bill 1158 (Becker, Chapter 367, Statutes of 2022), which requires the reporting of hourly data to the Energy Commission starting in 2028, and Assembly Bill 242 (Holden, Chapter 228, Statutes of 2021), which establishes annual deadlines for retail suppliers to post and distribute their power content labels. This staff report also proposes changes to the Power Source Disclosure program’s annual power source and greenhouse gas emissions accounting and provides an update about the program’s plans to modernize its methods of data collection to support new reporting requirements.

**Keywords:** Power Source Disclosure, PSD program, Senate Bill 1158, hourly accounting, annual accounting, greenhouse gas emissions, avoided greenhouse gas emissions, GHG emissions, loss-adjusted load, undersupply, oversupply, retail sales, over-procurement, Assembly Bill 242.

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# TABLE OF CONTENTS

|  |     |
|--|-----|
| Abstract.....  | i   |
| Table of Contents .....  | ii  |
| List of Figures .....  | iii |
| List of Tables .....   | iii |
| Executive Summary .....  | 1   |
| CHAPTER 1: Proposal for SB 1158 Hourly Accounting Implementation .....               | 3   |
| Background.....  | 3   |
| SB 1158 Request for Information .....  | 3   |
| Feasibility and Costs of Obtaining and Reporting Hourly Data.....                    | 4   |
| Proposed Hourly Accounting Methodology.....  | 6   |
| Core Principles .....  | 6   |
| Loss-Adjusted Load .....   | 6   |
| Loss Accounting .....  | 7   |
| Hourly Load Matching .....   | 8   |
| Undersupply and Oversupply.....  | 8   |
| GHG Emissions Attribution .....  | 9   |
| Stacking Order of Hourly Resources.....  | 10  |
| Hourly Unspecified Power Emissions Factors and Avoided GHG Emissions.....            | 11  |
| Storage.....   | 12  |
| Estimating Unavailable Hourly Data Using Distribution Proxies.....                   | 13  |
| CHAPTER 2: Proposed Updates to Annual Accounting and the Power Content Label .....   | 14  |
| Current Methodology for Reconciling Net Procurements with Retail Sales.....          | 14  |
| Under-Procurement of Specified Sources and Unspecified Power .....                   | 14  |
| The Over-Procurement Adjustment.....   | 14  |
| Underlying Issue: An Incomplete Disclosure of Power Sources and GHG Emissions .....  | 16  |
| Staff Proposal .....   | 19  |
| Benefits .....   | 20  |
| Additional Program Updates .....   | 23  |
| Chapter 3: Data Collection Modernization to Support New Reporting Requirements ..... | 24  |
| Annual Data Collection and Processing .....  | 24  |
| Generating Power Content Labels.....   | 25  |
| Hourly Data Collection and Processing .....  | 25  |

## **LIST OF FIGURES**

|  | Page |
|--|------|
| Figure 1: Sample 24 Hours of Loss-Adjusted Load Compared to Net Procurements.....  | 8    |
| Figure 2: Undersupply and Oversupply.....  | 9    |
| Figure 3: Emissions Accounting Based on Stacking Order .....                       | 11   |
| Figure 4: Specified Natural Gas Reported to PSD Program, 2021 Reporting Year ..... | 17   |
| Figure 5: Current PSD Program Methodology: An Incomplete Picture .....             | 19   |
| Figure 6: Proposed Power Content Label .....                                       | 21   |

## **LIST OF TABLES**

|   | Page |
|---|------|
| Table 1: Over-Procurement Offload Order .....                           | 15   |
| Table 2: Comparison of Annual and Hourly Accounting Methodologies ..... | 22   |

# EXECUTIVE SUMMARY

Power Source Disclosure is defined in statute as “a program under which entities offering electric services in California disclose accurate, reliable, and simple to understand information on the sources of energy, and the associated emissions of greenhouse gases, that are used to provide electric services.” The California Energy Commission uses the data reported to the Power Source Disclosure program, in part, to calculate California’s total system electric generation, which represents a full inventory of in-state generation and imports. Retail suppliers must disclose on a power content label the annual power mix and greenhouse gas emissions intensity (average emissions released per megawatt hour) associated with each of their electricity portfolios offered to customers. The label also includes for comparison the state’s total system electric generation mix and the average greenhouse gas emissions intensity for all utilities.

Senate Bill 1158, which became law in 2022, requires retail suppliers to report data on their hourly loss-adjusted load and associated emissions to the Energy Commission starting in 2028. The Energy Commission must adopt rules on these reporting requirements by July 2024.

As a result of this new legislation, the Power Source Disclosure program will be responsible for the reporting of power sources and emissions at both the annual and hourly level. Annual data will remain the basis for the power content label, the consumer information tool that allows customers to compare electric services. Senate Bill 1158 stipulates that the California Public Utilities Commission and the governing boards of publicly owned utilities may use hourly data to track progress toward greenhouse gas emissions reduction targets.

Power Source Disclosure program staff developed this paper to facilitate discussion on proposals to implement hourly accounting, update annual accounting, modernize data collection to support new reporting requirements, and address other minor program updates.

## **Implementing Hourly Accounting**

Senate Bill 1158’s accounting methodology requires retail suppliers to compare their hourly electricity sources with their “loss-adjusted load,” defined as “the total amount of electricity, measured at the utility-scale generation source, that a retail supplier requires in order to provide for retail sales after electrical losses in transmission and distribution.” The law’s aim is to track progress toward greenhouse gas reduction targets, which the California Air Resources Board established for the electricity sector based on total in-state and imported electrical generation, including losses. To ensure that hourly accounting data can fulfill this statutory purpose, staff interprets loss-adjusted load to include a retail supplier’s total load: retail sales to customers, self-consumption, and other end uses, plus losses.

Under hourly accounting, when a retail supplier has not procured enough electricity from specified sources to match its hourly loss-adjusted load (undersupply), the remaining load will be assigned unspecified power with an hourly greenhouse gas emissions factor. In hours when specified procurements exceed loss-adjusted load (oversupply), retail suppliers accrue avoided greenhouse gas emissions “to the extent that the excess electricity reduced the emissions of greenhouse gases associated with electricity from unspecified sources during that hour.”

Senate Bill 1158 stipulates that avoided emissions cannot be included in a retail supplier's greenhouse gas emissions total or its emissions intensity.

Staff proposes that greenhouse gas emissions remain attributed to the retail supplier that paid for an emitting resource to generate and deliver electricity to the grid, even if the retail supplier did not match the procured electricity to its hourly loss-adjusted load. This is necessary to ensure that all emissions associated with electricity procurements by California retail suppliers will remain attributable under hourly accounting.

## **Updating Annual Accounting**

Statute requires retail suppliers to report all annual specified and unspecified electricity purchases and the greenhouse gas emissions associated with each purchase. However, a retail supplier's data on the power content label shows only the power sources and emissions associated with retail sales to customers (approximately 90 percent of electricity end uses). Renewable and zero-carbon resources are preferentially assigned first to retail sales, and any resources in excess of retail sales are excluded from the label.

To ensure that annual data disclosed to the public is accurate, reliable, and simple to understand, staff recommends eliminating the over-procurement adjustment, which removes emissions-intensive electricity sources that are not matched to retail sales from the power content label. Staff proposes to add an additional column to the power content label for "other electricity uses," and to calculate a retail supplier's total greenhouse gas emissions intensity based on the energy to serve its loss-adjusted load. This update will require minimal changes to annual reporting requirements while improving the power content label as a consumer information tool.

This paper also provides an update on minor program changes reflected in the accompanying draft regulations. These include implementing the power content label due date changes under Assembly Bill 242 (2021), streamlining attestation requirements for public agencies, and codifying regulatory advisories on the retirement of unbundled renewable energy credits and on greenhouse gas emissions reporting requirements for new community choice aggregators.

## **Modernizing Data Collection and Processing**

To support new reporting requirements, the Energy Commission plans to modernize the Power Source Disclosure program's methods of data collection and processing. For both hourly and annual reporting, the Energy Commission will develop a Data Submission Portal to collect raw electricity data and a Snowflake database to automate data checks and generate official reports. The Snowflake database will also allow reported data to be shared more effectively and can be used to generate power content labels for retail suppliers.



# CHAPTER 1: Proposal for SB 1158 Hourly Accounting Implementation

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## Background

Senate Bill (SB) 1158 was adopted in part to assess whether retail electricity suppliers are demonstrating adequate progress toward achieving greenhouse gas (GHG) emissions reduction targets in their procurement plans. The legislation requires the California Energy Commission (CEC) to adopt and implement rules by July 1, 2024, for retail suppliers to report hourly electricity and GHG emissions data starting January 1, 2028.

Pursuant to Section 398.6(b) of the Public Utilities Code, retail suppliers will be required to annually report to the CEC:

- The sources of electricity used to serve loss-adjusted load for each hour of the previous calendar year.
- GHG emissions associated with each of those sources of electricity, to the extent feasible, and excluding any avoided GHG emissions.
- An annual GHG emissions total and annual average GHG intensity, calculated as a retail supplier's annual total GHG emissions divided by its annual total loss-adjusted load.
- An annual total of avoided GHG emissions.

The CEC will share hourly data with the California Air Resources Board (CARB), the California Public Utilities Commission (CPUC), and the California Independent System Operator (California ISO) for these entities to use in their own programs, as necessary. The CEC must annually publish on its website an aggregated summary of the reported data, which may include:

- The percentage of a retail supplier's annual loss-adjusted load from specified sources for each energy source type.
- The percentage of a retail supplier's annual loss-adjusted load derived from unspecified sources.
- The total GHG emissions associated with a retail supplier's annual loss-adjusted load, excluding any avoided GHG emissions.
- The average GHG emissions intensity of a retail supplier's loss-adjusted load.
- An annual total of avoided GHG emissions.

## SB 1158 Request for Information

As stated under Public Utilities Code Section 398.6(m), the timing for the implementation of hourly reporting requirements is conditional: "The Energy Commission may delay when retail suppliers shall begin reporting pursuant to this section if the Energy Commission determines that it is infeasible or unreasonably costly for retail suppliers to obtain the necessary data or develop the necessary reporting tools within the timeframe established in subdivision (b) [by January 1, 2028]."

To assess the feasibility and costs associated with hourly reporting, Power Source Disclosure (PSD) program staff released a Request for Information (RFI) on March 21, 2023. Although the law stipulates that owners of generators and storage facilities must provide hourly data in

a timely manner, responses about feasibility and costs came primarily from retail electricity suppliers. The following entities responded to the RFI:

#### Investor-Owned Utilities

- Bear Valley Electric Service
- Liberty Utilities
- PacifiCorp, as both retailer and balancing area authority
- San Diego Gas & Electric (SDG&E)
- Southern California Edison (SCE)

#### Publicly Owned Utilities

- California Municipal Utilities Association (CMUA) - joint comments
- Los Angeles Department of Water & Power (LADWP)

#### Community Choice Aggregators

- California Community Choice Association (CalCCA) - joint comments
- Pioneer Community Energy
- Sonoma Clean Power Authority (SCPA)

#### Electric Service Providers

- Alliance for Retail Energy Markets (AREM) - joint comments

#### Asset-Controlling Supplier

- Bonneville Power Administration

### **Feasibility and Costs of Obtaining and Reporting Hourly Data**

Respondents generally agreed that in-state hourly data was obtainable. Matching hourly load and generation data, however, might be administratively burdensome, particularly for retail suppliers that were not their own Scheduling Coordinator.<sup>1</sup> An additional complicating factor according to stakeholders would be allocating resources of purchases by multiple buyers, as well as Voluntary Allocation and Market Offer (VAMO) sales. While SCE stated that it has systems in place to implement VAMO at the hourly level,<sup>2</sup> other entities expressed concern about accurately assigning generation to multiple entities that purchased a percentage of an

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<sup>1</sup> [California Municipal Utilities Association](#) Response to Request for Information, Power Source Disclosure (April 14, 2023), 5. [California Community Choice Association's](#) Comments on the Request for Information, Power Source Disclosure (April 14, 2023), 2-3.

<sup>2</sup> [Southern California Edison](#) Company's Response to the California Energy Commission's March 22, 2023, Request for Information Docket No. 21-OIR-01 (April 14, 2023), 1.

entire portfolio of resources.<sup>3</sup> SCPA proposed a potential methodology for determining hourly data by volume purchased for each hour.<sup>4</sup>

The feasibility of obtaining hourly settlement data was mixed. Several entities commented that it would be straightforward and inexpensive to gather and report settlement data.<sup>5</sup> However, those entities that were not Scheduling Coordinators for some or all of their resources would find this data harder to obtain.<sup>6</sup> The CMUA contended that new reporting requirements should be met solely with “revenue quality meter data” because of the complexity and financial sensitivity of hourly settlement data.<sup>7</sup>

Obtaining hourly storage data was deemed feasible for the few respondents that addressed this question. SCE, which does not currently sell its stored electricity elsewhere, tracks hourly and sub-hourly charge and discharge data for batteries.<sup>8</sup> SDG&E sells its storage only to California ISO and can therefore provide hourly storage data; but if it eventually started selling stored electricity to other retail suppliers, reporting specific charge and discharge data on an hourly basis may prove infeasible.<sup>9</sup>

Obtaining and reporting hourly specified procurement data for out-of-state resources was broadly perceived as more costly and less feasible. The asset-controlling supplier Bonneville Power Administration contended that it could not provide hourly data and urged the CEC to accept its annual GHG emissions intensity for its mix of resources as the hourly emissions rate.<sup>10</sup> PacifiCorp responded in its role as a balancing area authority across multiple states that

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<sup>3</sup> [SDG&E](#) Response to Request for Information Related to Implementation of SB 1158 and the Power Source Disclosure Program (Docket No. 21-OIR-01) (April 14, 2023), 1. [CalCCA](#), 3-4. [AReM](#) Comments on Power Source Disclosure RFI (April 14, 2023), 1-2.

<sup>4</sup> “For equitable implementation, the CEC should stipulate that, for cases of allocations or purchases made by multiple buyers (including VAMO but also bilateral contracts unless otherwise specified), the hourly impacts should be allocated by volume. For example, if LSE A purchases 80% of a facility’s output and LSE B purchases the remaining 20%, LSE A should be allocated 80% of the hourly GHG impact and generation profile of the facility, with LSE B taking the other 20%.” [Sonoma Clean Power Authority’s](#) Comments on the Request for Information, Power Source Disclosure (April 17, 2023), 3.

<sup>5</sup> [Pioneer Community Energy](#) answers CEC request for information (April 14, 2023), 1. [AReM](#), 2.

<sup>6</sup> [SCE](#), 2.

<sup>7</sup> [CMUA](#), 5.

<sup>8</sup> [SCE](#), 2.

<sup>9</sup> [SDG&E](#), 2.

<sup>10</sup> Comments of the [Bonneville Power Administration](#), Docket #21-OIR-01, Request for Information, Power Source Disclosure (April 14, 2023), 1.

it cannot demonstrate which specific resources were delivered where on an hourly basis.<sup>11</sup> Multiple reporting entities highlighted that while E-Tags contain hourly data, E-Tag access for transactions may not always be accessible or connected to a specific generator.<sup>12</sup> Because of these complexities, CalCCA recommended the development of a methodology for estimating hourly import data.<sup>13</sup>

## **Staff Assessment**

In-state hourly data is generally feasible to obtain, but the CEC will need to develop rules for allocating resources to multiple buyers and VAMO resources, as well as hourly storage as the buying and selling of stored energy becomes more common. Hourly specified data from imports appears to be significantly more challenging to obtain, and in some cases may not exist at all. The CEC will need to develop proxies for estimating certain hourly imports and rely on existing data to make this requirement feasible and not overly burdensome for reporting entities.

## **Proposed Hourly Accounting Methodology**

### **Core Principles**

Staff developed this hourly reporting proposal around three core principles:

1. Hourly GHG emissions information should be accurate, reliable, and simple to understand.
2. To ensure that hourly accounting data can meet its statutory purpose under SB 1158, the implementation of hourly accounting should seek to align with the Regulation for the Mandatory Reporting of Greenhouse Gas Emissions (MRR) under CARB.
3. To avoid GHG emissions leakage, emissions remain attributable to the retail supplier that paid for an emitting resource to generate and deliver electricity to the grid, or the purchasing party in a specified resale. If resources were not matched to loss-adjusted load, the associated GHG emissions cannot be excluded from a retail supplier's GHG emissions intensity.

### **Loss-Adjusted Load**

SB 1158 defines "loss-adjusted load" as

the total amount of electricity, measured at the utility-scale generation source, that a retail supplier requires in order to provide for retail sales after electrical losses in transmission and distribution.

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<sup>11</sup> [PacifiCorp](#) Comments on 21-OIR-01: RFI Power Source Disclosure (April 14, 2023), 2.

<sup>12</sup> [CalCCA](#), 4. [SCPA](#), 3-4. [CMUA](#), 4

<sup>13</sup> [CalCCA](#), 4.

In its RFI response, LADWP sought clarification on the definition of loss-adjusted in SB 1158, noting that it was unclear if the term should be equated to “net energy for load” plus losses, the total retail load at customer facilities, or if the term should include unmetered consumption.<sup>14</sup>

Staff agrees that the meaning of loss-adjusted load needs clarification. SB 1158's hourly accounting requirements seek to assess if retail suppliers are meeting GHG reduction targets.<sup>15</sup> CARB sets reduction targets for the electric power sector based on total electric load plus losses. To support an accurate and reliable comparison between CARB's GHG reduction targets and SB 1158 hourly GHG data, staff interprets loss-adjusted load to mean a retail supplier's total load (retail sales, self-consumption, other end uses) plus transmission and distribution losses.

### **Loss Accounting**

Multiple RFI respondents recommended aligning SB 1158's treatment of losses with California ISO's loss accounting.<sup>16</sup> After meeting with the Department of Market Monitoring (DMM), an independent monitor of California ISO, staff determined that this methodology would not be effective for implementing SB 1158. California ISO does not calculate transmission and distribution losses; rather, it calculates hourly *marginal* losses at specific generator nodes (of which there are thousands) based on how those losses impact nodal prices. Hourly marginal loss accounting does not reflect the systemwide transmission and distribution losses that SB 1158 seeks to capture.

To determine default factors for systemwide losses, staff used CARB's 2 percent default loss factor for specified and unspecified imports as a baseline.<sup>17</sup> CARB does not factor in losses for in-state resources because it already measures in-state electrical generation at the source. To determine an in-state loss factor, staff analyzed line loss data reported to the Energy Information Administration (EIA) and electricity supply data reported to the CEC for the years 2012-2021.<sup>18</sup> During that period, line losses averaged 4.7 percent. Allocating those losses proportionally to in-state resources and to the remaining electricity supply results in losses of

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<sup>14</sup> Comments from the [Los Angeles Department of Water and Power](#) to the California Energy Commission's Power Source Disclosure Request for Information (April 14, 2023), 2.

<sup>15</sup> [Public Utilities Code Section 398.6\(g\)](#).

<sup>16</sup> [SCPA](#), 7; [SDG&E](#), 3; [AReM](#), 4.

<sup>17</sup> Air Resources Board, [Final Statement of Reasons](#): Public Hearing to Consider Adoption of Amendments to the Regulation for the Mandatory Reporting of Greenhouse Gas Emissions (December 16, 2010), 117.

<sup>18</sup> [Form EIA-861](#); [2021 California state electricity profile](#); and [California Total System Electric Generation](#).

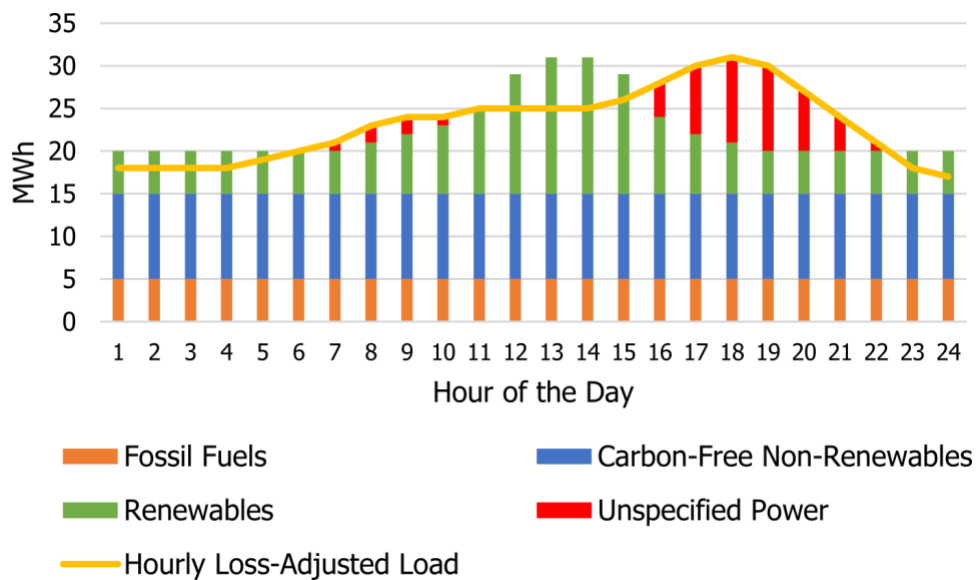
4.1 percent for specified in-state resources and 6.1 percent for specified and unspecified imports (including CARB’s 2 percent loss correction factor).

Consequently, to account for losses incurred within California, staff proposes to assign a 4 percent loss factor for all specified resources. To account for losses incurred outside California and to align with CARB’s default loss factor for imports, staff proposes an additional 2 percent adjustment factor for specified imports. Finally, staff proposes to assign unspecified power a variable loss adjustment factor for each hour of the year based on the hourly profile of unspecified imports, unspecified in-state resources, and oversupplied resources.

### Hourly Load Matching

In each hour of the year, a retail supplier shall compare its hourly net specified procurements and loss-adjusted load, as shown in Figure 1. Net specified procurements will be determined by deducting specified resales, generic resales, and hourly storage charging from hourly specified gross procurements. Hourly loss-adjusted load will be calculated as total hourly load plus hourly losses.

**Figure 1. Sample 24 Hours of Loss-Adjusted Load Compared to Net Procurements**

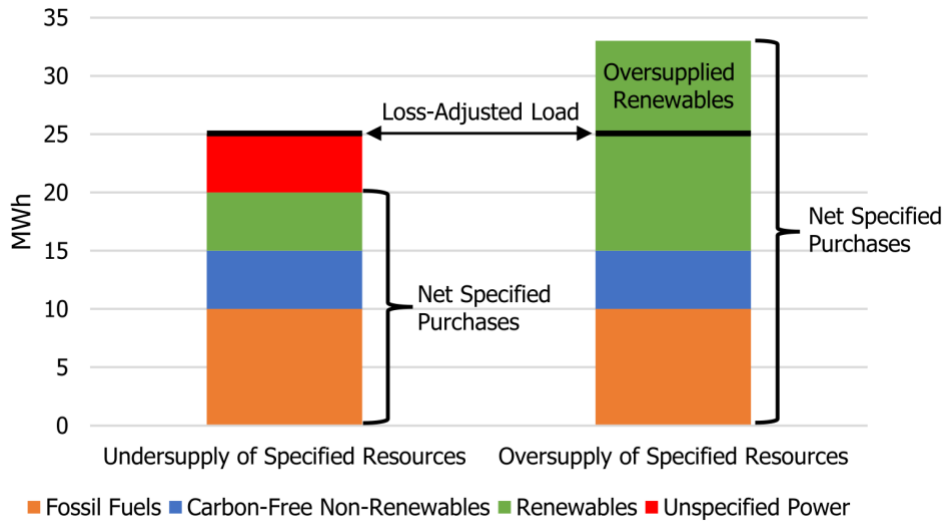


Source: California Energy Commission staff

### Undersupply and Oversupply

Hours in which a retail supplier’s loss-adjusted load exceeds its net specified procurements will be considered periods of undersupply; the difference between these figures will be classified as hourly purchases of unspecified power. Hours when a retailer supplier’s net specified procurements exceed its loss-adjusted load will be considered periods of oversupply, as shown in Figure 2.

**Figure 2. Undersupply and Oversupply**



Source: California Energy Commission staff

### GHG Emissions Attribution

Staff proposes that GHG emissions are attributable to the retail supplier that paid for an emitting resource to generate and deliver electricity to the grid. Retail suppliers must claim these emissions even if they did not use or load-match the underlying electricity.

This requirement is necessary for two reasons. First, it ensures that the atmospheric impact of providing electric services is reflected in a retail supplier’s GHG emissions inventory. In its RFI response, SCPA contended that allowing emissions associated with excess resources to be removed from a retail supplier’s inventory would create “perverse incentives” and “not accurately account for GHG impacts.” According to SCPA, the intent of SB 1158 was clear: all GHG emissions associated with a retail supplier’s procurements should be added up to determine its GHG emissions intensity.<sup>19</sup> Staff agrees with this assessment, which reflects an important distinction between accounting for electricity and emissions: in practice, electricity that is not load-matched is used elsewhere on the grid, while the associated GHG emissions are released into the atmosphere as a result of the retail supplier that paid for the electricity to be generated. By attributing GHG emissions to the original procuring party, a retail supplier’s GHG inventory reflects the emissions that were released due to its electric service operations.

Second, allowing emissions to become disassociated from a retail supplier that did not use the electricity it procured has the potential to produce significant emissions leakage. An hourly accounting mechanism that removed GHG emissions from a retail supplier’s inventory could not ensure that those emissions would be attributed to another party in the same hour. For emissions from oversupplied electricity to remain fully accounted for, other retail suppliers

<sup>19</sup> [SCPA](#), 5-6.

would always need sufficient procurements of unspecified power to cover each hour's quantity of oversupply. In staff's assessment, this degree of hourly alignment is unlikely, and SB 1158 cannot reasonably be interpreted to assume such implausible alignment between all reporting entities. Similarly, if a retail supplier procured from an emitting resource and resold the electricity back to the grid, the generic resale would have no identifiable purchasing party and no guarantee that the resold power was repurchased on a California market. Attributing GHG emissions to the party that paid for an emitting resource to deliver electricity to the grid ensures that all electricity sector emissions reported at the hourly level remain accounted for.

Specified resales are the exception to this rule. The purchasing party in a specified resale must claim both the power source and associated GHG emissions.

### **Stacking Order of Hourly Resources**

RFI respondents primarily favored a stacking order (the order in which resources are matched to hourly load) that assigned low-GHG resources to load first. In this methodology, GHG-intensive resources would be considered oversupplied and removed from hourly loss-adjusted load before other resources. AReM, CalCCA, CMUA, and LADWP all proposed some version of this approach,<sup>20</sup> while SDG&E suggested consulting with California ISO to determine a stacking order.<sup>21</sup>

SB 1158 does not specify a stacking order or offer guidance on the treatment of oversupplied GHG-intensive resources. But SB 1158 does explain how oversupplied clean resources are used to measure "avoided greenhouse gas emissions." Avoided emissions are defined as

greenhouse gas emissions associated with hourly purchases of electricity from specified sources that are in excess of the retail supplier's loss-adjusted load for that hour to the extent that the excess electricity reduced the emissions of greenhouse gases associated with electricity from unspecified sources during that hour.

The concept of avoided GHG emissions suggests that low-GHG resources should be matched to load last, and considered oversupplied when net specified procurements exceed loss-adjusted load. However, under the proposed approach in which all emissions from procurements are retained, a retail supplier's total GHG emissions and its GHG emissions intensity will be the same no matter the stacking order of resources. Staff therefore proposes that retail suppliers may choose their preferred stacking order for hourly resources. Resources will be arranged in a preferred order on the CEC hourly reporting template, and the hourly reporting template or database (Chapter 3) will calculate a GHG emissions total, GHG emissions intensity, and avoided GHG emissions.

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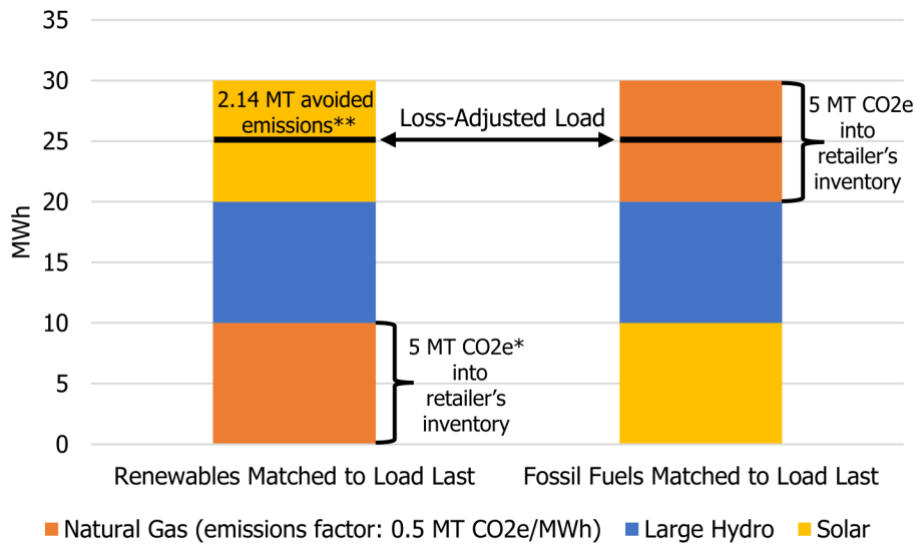
<sup>20</sup> [AReM](#), 3. [CalCCA](#), 6. [CMUA](#), 6. [LADWP](#), 5.

<sup>21</sup> [SDG&E](#), 2.



While the stacking order that retail suppliers choose will not affect their reported GHG emissions or emissions intensities, it will determine which resources are considered matched to loss-adjusted load and the total of avoided GHG emissions. If a retail supplier prefers to claim as many low-GHG resources in its portfolio as possible, it can preferentially assign those resources to its hourly load. If a retail supplier prefers to assign GHG-intensive resources to its loss-adjusted load first, it has the potential to accumulate more avoided GHG emissions. Figure 3 provides an example of accounting for emissions in metric tons of carbon dioxide equivalent (MT CO2e) based on stacking order.

**Figure 3. Emissions Accounting Based on Stacking Order**



The bars in Figure 3 represent two methods of stacking an hour's procurements of 10 MWh of natural gas, 10 MWh of large hydro, and 10 MWh of solar, with a loss-adjusted load of 25 MWh. Regardless of the stacking order chosen, the same quantity of GHG emissions was released into the atmosphere and is counted towards the retail supplier's emissions inventory. The stacking order that matched solar to load last had 5 MWh of oversupplied clean energy and accrued 2.14 MT of avoided GHG emissions.

\*  $(0.5 \text{ MT CO}_2\text{e/MWh}) \times 10 \text{ MWh} = 5 \text{ MT CO}_2\text{e}$ .  
 \*\*  $(0.428 - 0) \times 5 \text{ MWh} = 2.14 \text{ MT CO}_2\text{e}$  avoided GHG emissions. See formula below.  
 Source: California Energy Commission staff

### Hourly Unspecified Power Emissions Factors and Avoided GHG Emissions

The hourly GHG emissions intensity of unspecified power will be calculated based on that hour's quantity of unspecified imports, unclaimed in-state natural gas procurements by retail suppliers, and the oversupply of specified sources from other retailers. Unspecified imports and unclaimed in-state natural gas will be set at CARB's default unspecified emissions rate of 0.428 MT CO2e/MWh. The emissions factor of unspecified power for each hour will be calculated as:

$$\frac{(\text{unspecified imports MWh} + \text{unclaimed in-state natural gas MWh}) \times 0.428}{(\text{unspecified imports MWh} + \text{unclaimed in-state natural gas MWh} + \text{oversupply MWh})}$$

Hourly avoided GHG emissions will be determined based on the emissions factor and quantity of the oversupplied resource. If an oversupplied resource has an emissions factor less than 0.428 MT CO<sub>2</sub>e/MWh, it will be assigned avoided GHG emissions based on the following calculation:

$$(0.428 - \text{emissions factor of oversupplied resource}) \times \text{MWh of oversupplied resource}$$

Avoided greenhouse gas emissions are not factored into a retail supplier's total emissions and cannot reduce a retail supplier's emissions intensity.

Because an oversupplied retail supplier retains the emissions associated with its excess hourly electricity, only the excess energy is factored into hourly oversupply, without any associated emissions (see the hourly unspecified power emissions factor calculation above). All oversupplied electricity will therefore reduce the hourly emissions factor of unspecified power, because the emissions associated with that electricity have already been claimed. In this approach, hourly emissions factors for unspecified power reflect the electricity available on the grid and any unclaimed emissions associated with that electricity: marginal generation and unclaimed natural gas sold on the spot market (both assigned CARB's default emissions factor for unspecified sources) plus the electricity that oversupplied retailers procured but could not consume.<sup>22</sup>

Although all oversupplied electricity reduces the emissions factor of hourly unspecified power in this methodology, a retail supplier cannot accrue avoided emissions simply by procuring electricity in excess of its hourly loss-adjusted load. Avoided GHG emissions indicate that a retail supplier procured more electricity than it needed to cover its load, and that it did so from resources that were cleaner than the marginal generation that otherwise would have been required for that energy. Excess electricity from sources with an emissions factor cleaner than CARB's default rate therefore "avoided" the GHG emissions that otherwise would have been released into the atmosphere without those procurements.

## **Storage**

For storage systems that are paired or co-located with a specified resource, retail suppliers will report the net hourly electricity exported to the grid after storage losses are taken into account and will assume the GHG emissions intensity of the paired or co-located generator.

For storage systems that are not paired or co-located with a specified resource, charging will deduct from hourly electricity procurements, while discharging will add to hourly electricity procurements. Since the retail supplier retains any GHG emissions that may have been associated with electricity used for charging or lost during storage, no GHG emissions will be

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<sup>22</sup> CARB's default unspecified source emissions rate is 0.428 MT CO<sub>2</sub>e/MWh, or the approximate emissions factor of marginal generation from a single-cycle natural gas plant importing into California. Amendments to the Regulation for the Mandatory Reporting of Greenhouse Gas Emissions, [Final Statement of Reasons](#) (December 2018), 38-39.

assigned directly to these storage systems when they charge or discharge under the proposed hourly accounting methodology.

### **Estimating Unavailable Hourly Data Using Distribution Proxies**

In some cases, hourly data may not be obtainable. To accommodate this uncertainty, staff proposes to provide hourly production profiles for retail suppliers to approximate missing hourly data. Staff has identified the CPUC's Clean System Power (CSP) calculator as a source of hourly production profiles for asset-controlling suppliers and all resources except solar and wind (which the CSP does not include). Staff can also analyze California ISO hourly supply data to determine hourly production profiles for all resource types, including solar and wind.

A resource's hourly production profile can be used if a retail supplier procures from an electricity resource that is sold or allocated to multiple parties over the course of the year without specific hourly electricity distributions to each party. The retail supplier in this case would report its proportional share of annual procurement from the electricity resource and use the default hourly distribution for the relevant fuel type.

# **CHAPTER 2:**

## **Proposed Updates to Annual Accounting and the Power Content Label**

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### **Current Methodology for Reconciling Net Procurements with Retail Sales**

There are currently two distinct layers of annual disclosure to the PSD program: total retailer procurement and direct-to-customer retail sales. Under Section 398.5 of the California Public Utilities Code, retail suppliers are required to report all specified and unspecified electricity procurements to the PSD program and the retail sales associated with each electricity portfolio offered to customers. The PSD program uses retail sales as the denominator for calculating the power mix percentages and GHG emissions intensity of individual electricity portfolios, and the sum of all reported retail sales to calculate the statewide average GHG emissions intensity.

Typically, reported net procurements and retail sales do not match, which creates an accounting discrepancy. As part of the AB 1110 rulemaking, the PSD program implemented the following approaches to account for retail suppliers that under-procured or over-procured from specified resources relative to their retail sales.

#### **Under-Procurement of Specified Sources and Unspecified Power**

For retail suppliers that did not procure enough net specified resources to match their retail sales, the remaining energy is automatically classified as unspecified power and assigned CARB's default unspecified source emissions rate. This automatic calculation reflects reliance on system power and marginal generation sources to meet remaining retail load on an annual scale.

During the AB 1110 rulemaking, some stakeholders contended that the quantity of reported unspecified power should be based on hourly settlement data to more accurately assess reliance on system power. The PSD program, however, adopted its automatic calculation for several reasons. Statute stipulates that retail suppliers do not have to match load to resources on an hourly basis for the data displayed on the power content label.<sup>23</sup> Combining annual transaction data with hourly settlement data would also push total procurements in excess of retail sales. Automatically calculating unspecified power as the difference between retail sales and net specified procurements is thus a preemptive way to adjust out excess unspecified power.

#### **The Over-Procurement Adjustment**

Retail suppliers may also report net specified procurements in excess of retail sales. These resources may have been procured to meet other end uses, such as municipal street lighting,

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<sup>23</sup> [Public Utilities Code Section 398.2\(d\)](#); [Final Statement of Reasons](#): Modification of Regulations Governing the Power Source Disclosure Program (May 8, 2020), 25.

self-consumption, or losses associated with transmission, distribution, and storage. To address this accounting discrepancy, the CEC developed its current over-procurement offload order, as shown in Table 1. The offload order prescribes how to adjust resources in an over-procured portfolio based on fuel type and the degree of similarity in emissions profile to unspecified power.<sup>24</sup> Section 1393(a)(6) of the PSD Program Regulations states:

If the total procurement of specified net purchases of an electricity portfolio exceeds retail sales, each net purchase of electricity from a generator using natural gas shall be proportionally reduced so that the sum of all adjusted net purchases equals the retail sales of an electricity portfolio, as expressed in Equation 3. If an electricity portfolio has insufficient natural gas electricity sources to adjust to reconcile the excess specified net procurements with retail sales, each purchase from coal and other fossil fuel electricity sources shall then be proportionally reduced in accordance with Equation 3. If an electricity portfolio has insufficient natural gas or coal and other fossil fuel electricity sources to adjust to reconcile the excess specified net procurements with retail sales, all other specified purchases shall then be proportionally reduced in accordance with Equation 3.

*Equation 3:*  $ANP_i = NP_i - (NP - RS) \times (NP_i / NPNR)$

Where:

$ANP_i$  = Adjusted net purchase i, measured in MWh

$NP_i$  = Net purchase i, measured in MWh

NP = Sum of all net purchases, measured in MWh

RS = Total retail sales of an electricity portfolio, measured in MWh

NPNR = Any net purchase of a fuel type that is not an eligible renewable, large hydroelectric, or nuclear resource, measured in MWh<sup>25</sup>

**Table 1: Over-Procurement Offload Order**

| <b>Fuel Type</b>                                      | <b>PSD Regulations</b>   |
|---|--|
| Natural Gas   | Natural gas procurements are reduced out of the portfolio <b>first</b> .   |
| Coal and Other Fossil Fuels                           | Coal and other fossil fuel procurements are reduced <b>second</b> if the portfolio is over-procured beyond the natural gas resources.  |
| Large Hydroelectric, Nuclear, and Eligible Renewables | Large hydroelectric, nuclear, and eligible renewable procurements are reduced <b>last</b> if the portfolio is over-procured beyond natural gas, coal, and other fossil fuel resources. |

Source: California Energy Commission staff

<sup>24</sup> [Final Statement of Reasons](#), 10.

<sup>25</sup> [Modification of Regulations Governing the Power Source Disclosure Program](#) (May 4, 2020), 9.

## **Underlying Issue: An Incomplete Disclosure of Power Sources and GHG Emissions**

The statutory purpose of the PSD program is to provide “accurate, reliable, and simple to understand information on the sources of energy, and the associated emissions of greenhouse gases, that are used to provide electric services.”<sup>26</sup> However, stakeholder feedback during and after the AB 1110 rulemaking, along with the CEC’s own internal analysis, have made it clear that any treatment under the current over-procurement framework is not accurate or simple to understand. This is because the data presented on the power content label is fundamentally incomplete. Some method is necessary to adjust procurements down to match retail sales, whether by automatically excluding excess unspecified power or by removing excess specified procurements. Adding or shifting the reduction tiers of the offload order will not resolve the real-world discrepancy between the total procurement of a retail supplier and its smaller retail sales load. Regardless of how the over-procurement offload tiers are ordered, the power content label will still exclude procurements allocated to other electricity uses.

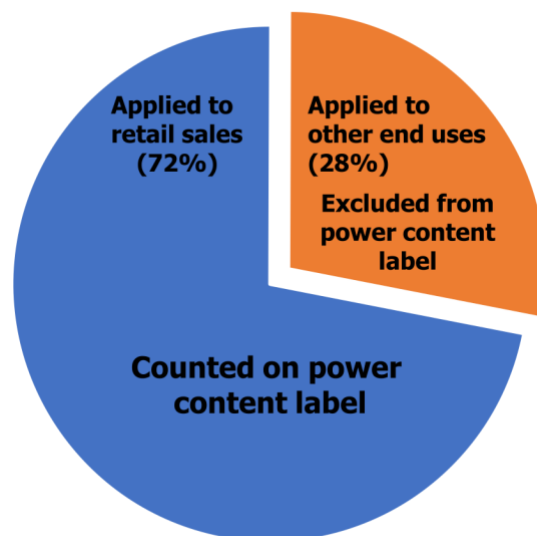
Retail sales of electricity account for approximately 90 percent of retailers’ overall loads, with the remaining generation meeting self-consumption, municipal uses, and losses.<sup>27</sup> Since fossil fuels are first in the offload order for over-procurement, this skews both the power mix percentages and overall GHG intensities of retail portfolios. Staff analysis of 2021 reported data, for example, found that a total of 14.9 million MWh was adjusted out of retail portfolios, of which 13.9 million MWh were procurements of natural gas (93 percent). As shown in Figure 4, those 13.9 million MWh of uncounted, over-procured natural gas released 5.86 million MT CO<sub>2</sub>e into the atmosphere — emissions that were not accounted for on a power content label.

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<sup>26</sup> [Public Utilities Code Section 398.1\(b\)](#).

<sup>27</sup> Based on the most recent SB 100 Joint Agency Report’s calculation of utilities’ retail sales loads, other end uses, and line losses. 2021 [SB 100 Joint Agency Report](#): Achieving 100 Percent Clean Electricity in California: An Initial Assessment (March 2021), 60.

**Figure 4. Specified Natural Gas Reported to the PSD Program, 2021 Reporting Year**



Source: California Energy Commission staff

The over-procurement adjustment and automatic calculation of unspecified power both attempt to reconcile the discrepancy between the PSD program’s two layers of retail disclosure: retail sales and total procurement. For the majority of its 25-year existence, the PSD program only collected power source data and used some version of this reconciliation to allow retail suppliers to preferentially designate the power sources that were procured for their customers or to meet Renewables Portfolio Standard (RPS) targets. The over-procurement adjustment reflects continuity with prior approaches by unifying the treatment of both power sources and emissions, excluding what does not fit within retail sales.

However, adapting this power source reconciliation to emissions accounting has proved inadequate for accurately assessing the GHG emissions impact of retail electricity providers. The emissions from over-procured resources are not disclosed to customers on the power content label because the current PSD program methodology designates the associated electricity towards end uses other than retail sales. Yet these GHGs *were* emitted in the process of meeting the electricity demand of customers and are a direct consequence of retail suppliers’ operations “to provide electric services.”<sup>28</sup> Customers have a vested interest in this information because the costs associated with retail supplier’s procurements and GHG emissions are ultimately passed down to ratepayers. Without a full disclosure of a retail supplier’s electricity sources and emissions, the power content label cannot meet its basic purpose as an accurate, reliable, and simple to understand consumer information tool for comparing electric services.

These issues were recognized during the AB 1110 rulemaking. In a joint comment in March 2019, PG&E and SCE stated that calculating emissions based on adjusted procurements rather than net procurements would “systematically undercount GHG emissions across all LSEs.”

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<sup>28</sup> [Public Utilities Code Section 398.1\(b\)](#).

Furthermore, these utilities highlighted that there were additional sources of missing emissions inherent in this methodology, such as the uncounted generation associated with line losses:

transmission and distribution losses are a necessary consequence of serving retail load. Customers pay for these losses (along with the associated cap-and-trade permit costs) in their retail rates. Further, electricity, not emissions, is delivered to customers. The question the PCL [power content label] must answer to customers is how many GHGs were emitted to produce each unit of electricity delivered to them. Delivery losses should affect the final retail sales denominator for the emissions intensity on the PCL but cannot reduce the total emissions associated with a portfolio of electricity delivered to customers.<sup>29</sup>

As these comments make clear, adjusting emissions numbers down to match customer consumption simply leaves uncounted millions of metric tons of GHGs, when those emissions were released at the site of generation. Losses must also be accounted for because they are an unavoidable part of providing retail electric service. Excluding the GHG emissions associated with them misrepresents the true environmental impact of providing electricity for customers, while also excluding a component of the generation costs for which ratepayers are billed each month. In the 2021 reporting year, 20 percent of retail suppliers reported their losses, totaling about 5.3 million MWh. EIA estimates California's 2021 losses as more than twice as high at 11.6 million MWh.<sup>30</sup> The compensatory generation needed to make up for these losses likely resulted in millions of metric tons of additional emissions.<sup>31</sup>

California ratepayers and policy makers have a fundamental interest in all power sources and GHG emissions attributed to retail electricity suppliers. But they typically lack the context to know that what they are viewing is a partial disclosure—a misinterpretation compounded by the fact that the state's power mix numbers displayed on the power content label *are* a full accounting of in-state generation and imported electricity, including losses. By excluding known power sources and emissions, the PSD program sacrifices accuracy and reliability, thereby lessening the value of the power content label as a consumer information tool. Figure 5 illustrates the information excluded from the power content label.

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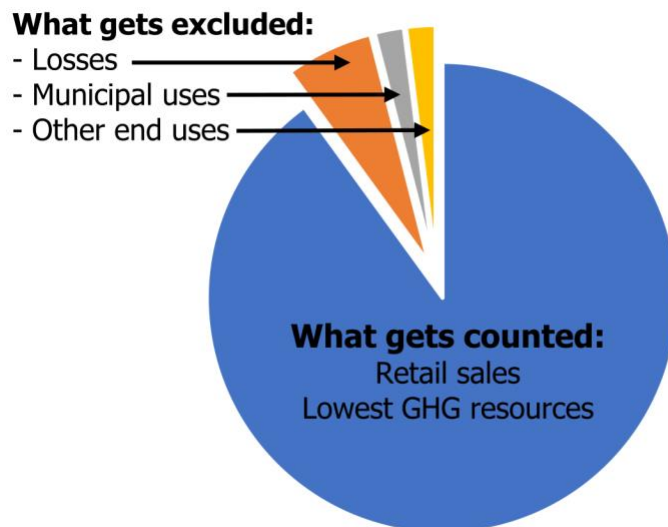
<sup>29</sup> [Pacific Gas and Electric - Southern CA Edison Post 3/7 Workshop Comments](#) (March 20, 2019), 3.

<sup>30</sup> [Table 10. Supply and Disposition of Electricity](#) (accessed June 23, 2023).

<sup>31</sup> Kavita Surana and Sarah M. Jordaan, "The climate mitigation opportunity behind global power transmission and distribution," *Nature Climate Change* 9 (2019): 660-665.



**Figure 5. Current PSD Program Methodology: An Incomplete Picture**



Source: California Energy Commission staff

## Staff Proposal

To fulfill the PSD program’s purpose to provide information that is accurate, reliable, and simple to understand, staff proposes to update the power content label so that it reflects all procurements a retail supplier used to meet its total annual load plus losses, rather than just the portion attributed to retail sales. Retail suppliers would continue to report the procurements used to meet the retail sales of individual portfolios, but the power content label would also include a column for Other Electricity Uses and disclose a retail supplier’s total procurements and associated emissions.

This approach eliminates the need for the over-procurement adjustment while meeting the statutory requirement for retail suppliers to report all procurements to the PSD program. It also provides consumers with a complete and simple to understand picture of their electricity provider’s power sources and associated GHG emissions, while ensuring the power content label will be accurate and reliable. Finally, it represents a minimal change to current reporting requirements. Retail suppliers already report all specified procurements to the PSD program, and many report their additional end uses. With one additional metric—total load plus losses—the PSD program can provide a full accounting of power sources and GHG emissions to California consumers.

Figure 6 shows the proposed power content label that includes an additional energy resource and GHG emissions intensity column for other electricity uses. The proposed label also adds a column for a retail supplier’s total power content. Table 2 compares the current PSD approach to the staff proposals for annual and hourly reporting.

## Benefits

1. *Broader flexibility for retail suppliers.* This approach resolves the resource attribution issues inherent to the over-procurement adjustment, allowing retail suppliers to fully convey the benefits of low-carbon procurements to customers by allocating the specific resources to individual retail portfolios that match their marketing preferences.
2. *Accurate comparison with California's power mix and electricity sector emissions.* A full accounting of power sources and emissions ensures that retail suppliers' power mix and GHG emissions data is properly contextualized.
3. *Consumer transparency.* These updates represent a transformative improvement to consumer awareness by making information that is already reported more accessible.

**Figure 6: Proposed Power Content Label**

| 2022 POWER CONTENT LABEL  |                         |   |                            |  |                         |
|---|-------------------------|---|----------------------------|--|-------------------------|
| (Retail Supplier Name)  |                         |   |                            |  |                         |
| (Website URL for PCL Posting)   |                         |   |                            |  |                         |
| Greenhouse Gas Emissions Intensity  | Electricity Portfolio 1 | Electricity Portfolio 2                             | Other Electricity End Uses | Retail Supplier Total Power  | 2022 CA Utility Average |
| (lbs CO <sub>2</sub> e/M Wh)  | 441                     | 285   | 827                        | 505  | 486                     |
|   |                         |   |                            |  |                         |
| Energy Resources  | Electricity Portfolio 1 | Electricity Portfolio 2                             | Other Electricity End Uses | Retail Supplier Total Power  | 2022 CA Power Mix       |
| <b>Eligible Renewable<sup>1</sup></b>   | <b>32.5%</b>            | <b>50.0%</b>  | <b>0.0%</b>                | <b>31.3%</b>   | <b>33.6%</b>            |
| Biomass & Biowaste  | 1.5%                    | 0.0%  | 0.0%                       | 1.4%   | 2.3%                    |
| Geothermal  | 1.0%                    | 0.0%  | 0.0%                       | 0.9%   | 4.8%                    |
| Eligible Hydroelectric  | 2.0%                    | 0.0%  | 0.0%                       | 1.8%   | 1.0%                    |
| Solar   | 17.0%                   | 50.0%   | 0.0%                       | 16.5%  | 14.2%                   |
| Wind  | 11.0%                   | 0.0%  | 0.0%                       | 10.7%  | 11.4%                   |
| <b>Coal</b>   | <b>0.0%</b>             | <b>0.0%</b>   | <b>0.0%</b>                | <b>0.0%</b>  | <b>3.0%</b>             |
| <b>Large Hydroelectric</b>  | <b>12.0%</b>            | <b>0.0%</b>   | <b>0.0%</b>                | <b>11.4%</b>   | <b>9.2%</b>             |
| <b>Natural Gas</b>  | <b>38.0%</b>            | <b>0.0%</b>   | <b>100.0%</b>              | <b>39.3%</b>   | <b>37.9%</b>            |
| <b>Nuclear</b>  | <b>0.0%</b>             | <b>0.0%</b>   | <b>0.0%</b>                | <b>0.0%</b>  | <b>9.3%</b>             |
| <b>Other</b>  | <b>0.0%</b>             | <b>0.0%</b>   | <b>0.0%</b>                | <b>0.0%</b>  | <b>0.2%</b>             |
| <b>Unspecified Power<sup>2</sup></b>  | <b>17.5%</b>            | <b>50.0%</b>  | <b>0.0%</b>                | <b>18.0%</b>   | <b>6.8%</b>             |
| <b>TOTAL</b>  | <b>100.0%</b>           | <b>100.0%</b>                                       | <b>100.0%</b>              | <b>100.0%</b>  | <b>100.0%</b>           |
| Percentage of Retail Sales Covered by Retired Unbundled RECs <sup>3</sup> :   | 3%                      | 0%  | 0%                         | 3%   |                         |
| <sup>1</sup> The eligible renewable percentage above does not reflect RPS compliance, which is determined using a different methodology.<br><sup>2</sup> Unspecified power is electricity that has been purchased through open market transactions and is not traceable to a specific generation source.<br><sup>3</sup> Renewable energy credits (RECs) are tracking instruments issued for renewable generation. Unbundled renewable energy credits (RECs) represent renewable generation that was not delivered to serve retail sales. Unbundled RECs are not reflected in the power mix or GHG emissions intensities above. |                         |   |                            |  |                         |
| For general information about the Power Content Label, visit:   |                         | (Retail Supplier Name)<br>(Retail Supplier Website) |                            | Energy Commission<br><a href="http://www.energy.ca.gov/pcl/">http://www.energy.ca.gov/pcl/</a> |                         |

Source: California Energy Commission staff

- Columns 1 and 2: The Electricity Portfolio columns represent a retail supplier’s disclosure of its electricity sources and GHG emissions associated with each electricity portfolio it offered in the previous calendar year. These columns are required under Public Utilities Code Section 398.4.
- Column 3: The Other Electricity Uses column provides necessary context to ensure information on the label is accurate, reliable, and simple to understand.

- Column 4: The Retail Supplier Total Power Content column is necessary for a reliable comparison with CA Power Mix in the following column, and for conveying a retail supplier’s overall GHG emissions impact.
- Column 5: This column represents California’s total system electric generation, which is required to be disclosed on the power content label under Public Utilities Code Section 398.4(g)(2).

**Table 2. Comparison of Annual and Hourly Accounting Methodologies**

|   | <b>Current PSD Annual Accounting</b>   | <b>Proposed PSD Annual Accounting</b>        | <b>Proposed Hourly Accounting</b> |
|---|--|--|-----------------------------------|
| <b>Total load reported</b>                                  | Other end uses inconsistently reported | Yes  | Yes                               |
| <b>Losses included in GHG calculations</b>                  | No                                     | Yes  | Yes                               |
| <b>Resource stacking order used to determine oversupply</b> | Yes                                    | No   | Yes, chosen by retail supplier    |
| <b>Emissions factor of unspecified power</b>                | 0.428 MT CO <sub>2</sub> e/MWh         | 0.428 MT CO <sub>2</sub> e/MWh               | Hourly variable                   |
| <b>Grandfathered firmed-and-shaped import GHGs</b>          | Yes                                    | Yes  | No                                |
| <b>Annual GHG intensity calculated</b>                      | Based on retail sales                  | Based on retail sales and loss-adjusted load | Based on loss-adjusted load       |
| <b>Avoided GHG emissions calculated</b>                     | No                                     | No   | Yes                               |

Source: California Energy Commission staff

## **Additional Program Updates**

Assembly Bill (AB) 242, passed in 2021, requires retail suppliers to publish power content labels to their website by October 1 annually and to make labels available in written and promotional materials by the end of the first complete billing cycle for the fourth quarter of the year.

The CEC held a workshop on December 7, 2021, to initiate AB 242 pre-rulemaking activities. During this workshop, retail suppliers and CEC staff identified other minor updates to the PSD program's regulations that could be addressed in this rulemaking, such as clarifying the reporting requirements for new CCAs and the disclosure of retired unbundled renewable energy credits (RECs). Retail suppliers also stated that the PSD program requirement for public agencies' governing boards to attest to annual reports and power content labels separately is redundant and burdensome to meet.

Based on the AB 242 pre-rulemaking workshop, feedback from stakeholders, and the CEC's data collection modernization efforts (Chapter 3), staff proposed changes within the draft regulatory updates that would

- Align program regulations with AB 242's modified due dates for power content label disclosure – 1393.1(b)(2).
- Clarify when new CCAs must begin reporting GHG emissions intensity data – 1393.1(g)
- Clarify that reported unbundled RECs must be retired in the previous calendar year – 1393(b)(2)(A) and 1394(b)(1)(B)(4).<sup>32</sup>
- Require governing boards of public agencies to attest only to their annual reports and not their power content labels – 1394(a)(2).
- Codify that the CEC may begin generating power content labels for retail suppliers once it has the infrastructure in place to support this update – 1393.1(i).

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<sup>32</sup> On the GHG reporting requirements for new CCAs and the reporting of retired unbundled RECs, see: Regulatory Advisory: Clarification of Power Source Disclosure Reporting Requirements, March 25, 2021. <https://efiling.energy.ca.gov/getdocument.aspx?tn=237300><https://efiling.energy.ca.gov/getdocument.aspx?tn=237300>

# Chapter 3: Data Collection Modernization to Support New Reporting Requirements

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The PSD program's updated reporting requirements for both annual and hourly accounting will require robust data collection and processing systems. The CEC is currently developing a Data Submission Portal and Snowflake<sup>33</sup> database for the PSD program's annual accounting requirements. Once this system is complete, staff can generate power content labels for retail suppliers after annual report data has been audited or approved by a public agency's governing board. As part of its SB 1158 implementation, the CEC plans to create a similar infrastructure to support the reporting of hourly data by 2028.

## Annual Data Collection and Processing

The PSD program intends to launch a Data Submission Portal and Snowflake database for annual data collection, tentatively by the 2023 reporting year (June 1, 2024). The principles behind this system are to use the Data Submission Portal to collect raw data from reporting entities and to have the Snowflake database process imported data to generate official reports. Both the portal and the database will automate certain data checks, minimizing the back-and-forth between CEC staff and reporting entities. Snowflake will also allow collected data to be used and shared more efficiently within the CEC and elsewhere.

To assist retail suppliers in arranging their annual procurements into their preferred portfolios, the PSD program will continue to provide an annual reporting template that includes visible calculations of power mix and GHG emissions data. Submitters will then use a macro within the completed Excel template to convert the document into a JSON file for upload into the Data Submission Portal. The converted file will only contain the raw values and fields that retail suppliers filled out within the Excel template; the calculated values and unofficial power mix in the template are included solely for the benefit of reporting entities to align their portfolios with their marketing practices. Staff will provide training resources for reporting entities before implementing the Data Submission Portal.

The portal will contain an initial stage of data verification, such as checksums of directly-delivered renewables, firmed-and-shaped imports, specified non-renewables, and procurements from asset-controlling suppliers. Additionally, the portal will issue error messages for certain data issues, such as:

- Improperly formatted or missing facility IDs.
- EIA IDs without an associated GHG emissions factor.
- Procurements reported without an associated state or location.
- Missing yes/no responses to whether firmed-and-shaped imports have grandfathered emissions.

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<sup>33</sup> Snowflake is a cloud-based data storage and processing system.

After retail suppliers attest to and submit their data through the portal, staff will review submissions within Snowflake. The database will be connected to other datasets to check alignment between reported facilities, locations, resource types, and associated CEC, RPS, WREGIS, and EIA IDs. Once any errors have been corrected, the database will generate official PSD annual reports.

Retail suppliers will benefit from this automated process by receiving quicker responses from staff about any potential reporting discrepancies. The portal will also require two-factor authentication to ensure greater data security than the current use of email for reporting, and Snowflake will encrypt all reported data. An additional benefit of this system is that if the CEC needs to revise internal data, such as a facility's GHG emissions factor, it can make the change within Snowflake without the need for a retail supplier to resubmit its reports.

Moreover, the database will allow PSD annual reports to be used more efficiently. The statewide GHG emissions intensity average can be calculated automatically without needing to compile data from an increasing number of Excel spreadsheets. PSD program data that is used in calculating total system electric generation can be easily shared internally, enabling the state's power mix to be more quickly available to the public.

### **Generating Power Content Labels**

To ease retail suppliers' reporting burdens, staff proposes to use its new data collection and processing software to generate power content labels for retail suppliers once this infrastructure is fully in place. The CEC can use Snowflake and the visualization software Tableau to generate power content labels automatically from retail suppliers' reported and audited data. Tableau is also a more flexible tool for displaying graphics than Excel, which would benefit retail suppliers that have struggled to contain their expanding electricity offerings within the current power content label Excel template.

### **Hourly Data Collection and Processing**

The CEC also plans to develop a Data Submission Portal and Snowflake database to support hourly reporting by 2028. To ensure functionality with the CEC's data collection and processing system, the reporting template will collect the following raw electricity data for each hour of the year:

- Load.
- Gross procurements from specified facilities.
- Specified resales.
- Generic resales.
- Stored electricity.
- Discharge of stored electricity.

Once uploaded to Snowflake, the database will automatically calculate:

- Hourly losses.
- Hourly reliance on unspecified power.

- Hourly unspecified power emissions factors.
- Hourly oversupply and applicable avoided GHG emissions.
- Annual procurements matched to loss-adjusted load.
- Annual GHG emissions from net procurements.
- Annual GHG emissions intensity.

Although calculations will be performed within the database, the CEC will ensure that reporting entities have full transparency on the operation of this hourly reporting system. The accompanying draft template provides an example of the calculations the database will perform automatically. It also reflects what a version of the hourly reporting template would look like if the Snowflake database is not ready by 2028. If the database is not completed by the start of SB 1158's reporting requirements, the CEC will provide an Excel template containing most calculations and will send reports back to retail suppliers after calculating and incorporating hourly unspecified power emissions rates and loss factors.

Staff welcomes feedback on the format and file types in which retail suppliers obtain their hourly generation and storage data to enable the hourly template to be completed as seamlessly as possible.