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EnergyTag Advice to California Energy Commission on SB1158 Implementation

Additional submitted attachment is included below.

California Energy Commission
715 P Street
Sacramento, CA 95814

RE: California Senate Bill 1158 Retail Electricity Suppliers Emissions of Greenhouse Gases

EnergyTag[1] is an **independent not-for-profit** organization focused on promoting and **enabling robust hourly electricity accounting standards globally**. EnergyTag maintains the world's only voluntary standard detailing how hourly Energy Attribute Certificates (EACs) can be issued and used to robustly verify hourly matching claims, including claims of deliverability and incrementality. Our standards are supported and developed alongside major stakeholders working on implementing granular electricity accounting including United Nations Energy, AES, Google, Clean Air Task Force, M-RETs, PWC, and Microsoft amongst others.

EnergyTag commends the ambition of SB 1158 which will bring greater transparency to electricity supplier energy source and emissions disclosure in California. This will, in turn, lead to improved demand signals for clean power, accelerating decarbonization in support of California's climate and energy objectives. In particular, EnergyTag commends the requirement for suppliers to disclose, on an hourly and local basis, the source of electricity supplied to consumers by January 1st, 2028.

Based on our extensive knowledge of hourly energy tracking implementation globally, EnergyTag would like to provide the following **five key recommendations** that could improve the robustness and ease of implementation SB 1158:

1. Implement an All-Generation Hourly EAC Registry
2. Require a Standard for this Hourly EAC registry
3. Ensure a fair and administrable framework for matching hourly generation to consumers
4. Enable Storage with robust hourly tracking
5. Encourage Robust Tracking of Unspecified Load with a residual or fossil-only mix.

We believe these recommendations will ***enable a harmonized and administrable framework*** for the ***streamlined implementation of SB1158*** for key stakeholders (e.g Generators, Retail Suppliers, Registries…) leading to more accurate and transparent disclosure to final consumers and stronger decarbonization incentivise for electricty supplied in California.

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[1] EnergyTag Ltd. has registered offices at 86-90 Paul Street, London, United Kingdom.

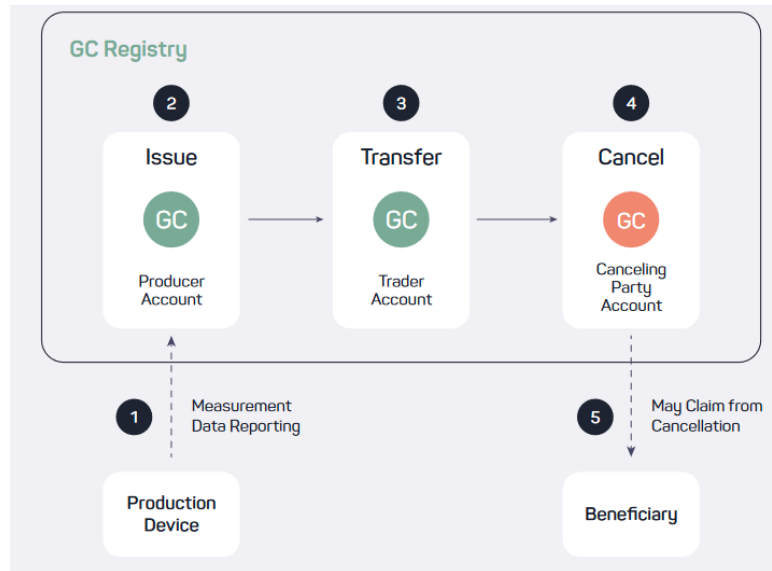## Recommendation 1- Implement an All-Generation Hourly EAC Registry

Figure 1 - Overview of Hourly EAC (or Granular Certificate) System[2]

- Implement an **hourly, all-generation tracking system[3] (using Energy Attribute Certificates)** in California. This should go beyond the REC system in California which tracks only renewable energy to ensure that all generation is tracked providing Final Consumers with full transparency on the origin of their electricity supply.
- Leading registries like M-RETs[4] (the technology provider for WREGIS Registry that serves California) and PJM GATS already offer hourly views of annual/monthly EACs and are scaling up their hourly EAC products.
- While not all registries in the United States can issue hourly EACs today, a recent report by the Center for Resource Solutions found that nearly all U.S registries could transition from annual to hourly certificates in 2 years.[5]
- The WREGIS registry that covers California was a notable exception, indicating that it would take them 3–5 years with the delays compared to other registries primarily due to potential delays in obtaining stakeholder and regulatory buy-in. WREGIS stated that the timeline could be closer to 3 years if (1) there is full state agency buy-in, (2) clear instructions are received from federal or state agencies, and (3) funding for stakeholder participation is made available. Therefore, 2028 is still ample time for an hourly EAC registry in California provided state agencies provide requisite support.
- While an hourly EACs system is optimal, the hourly reporting requirement of SB1158 can be implemented without it by using today's standard EAC system in California combined with hourly data of energy supply (See recommendation 3 - option 2 for more detail).

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[2] EnergyTag - Granular Certificates Scheme Standard
[3] A number of European Countries such as the Netherlands, Switzerland and Austria already have all generation monthly tracking for Full Disclosure of electricity origin to consumers
[4] https://www.mrets.org/hourlydata/
[5] CRS - Readiness for Hourly RECs,

Justification

Requiring implementation and utilization of an all-generation hourly EAC registry can broadly support these reporting requirements in an efficient, digital, auditable manner. This type of centralized solution would prevent double counting, include all necessary attributes (i.e. time of production, storage tracking, energy source type, production emissions etc…), and enable scalable reporting[6] and administrable disclosure by Retail Suppliers. Additionally, implementation in a harmonized manner with the best available industry standards can support synergistic measures, such as the Federal 45V Clean Hydrogen tax credit and corporate hourly matching goals that improve clean energy market incentives[7].

Recommendation 2 - Require an hourly EAC registry standard

- A standard for EAC registries is critical for robust, transparent, and auditable tracking.
- EnergyTag maintains an open-source standard[8] for Granular Certificate registries. It is supported by over 100 organizations globally[9]. Our standard is being implemented by EAC registries globally, including M-RETs in the United States. It was developed by the experts who designed the European Guarantee of Origin system, the world's largest standardized EAC system.
- The CEC should consider adopting this standard or similar.

Justification

Registries that adhere to established standards offer several critical benefits. Firstly, standard-compliant registries ensure compatibility, making it easier to integrate with other registries. This compatibility extends to interoperability, enabling seamless data exchange between different systems, which is especially crucial in environments where multiple registry solutions need to work in concert. Furthermore, following standards can significantly enhance the registries' quality and reliability, as standards embody best practices in registry development, including security protocols, data formats, and communication protocols[10]. Adherence to standards also facilitates easier maintenance and updates, as the software's foundational principles are well-documented and understood. This can lead to lower costs over the registry's lifecycle and a longer useful life.

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[6] For example, EnergyTag has an API spec for hourly EAC registries - https://energytag.org/api/
[7] Xu et al., Joule 8, 374–400. February 21, 2024 ª 2023 Elsevier Inc.https://doi.org/10.1016/j.joule.2023.12.00
[8] EnergyTag - Granular Certificate Scheme Standard
[9] For a full list of EnergyTag standard supporters, please see: https://energytag.org/
[10] For example, EnergyTag has an API spec for hourly EAC registries - https://energytag.org/api/

Recommendation 3 - Ensure a fair and administrable framework for matching hourly generation to consumers

- Implementing a comprehensive framework for overseeing disclosure of hourly energy supply to consumers involves robust tracking of electricity generation/storage (with hourly EACs) *and ensuring that these hourly EACs are verifiably matched to the consumer's load* (hourly matching) by the Retail Supplier.
- EnergyTag's standards provide a detailed set of protocols for doing this[11]. Below we provide an overview of an ideal system in California for demonstration of hourly energy source disclosure, which outlines key roles and responsibilities for implementing hourly energy source disclosure in California based on hourly EACs.
- The fair and representative allocation of electricity generation to consumers by retail suppliers involves several considerations. This report from the Regulatory Assistance Project[12] provides a holistic set of guidelines that should be taken into consideration.

Verification Option 1: Hourly EACs

Ensures
A) Unique ID Per EAC
B) No EAC double issuance
C) No EAC double claims
D) EAC owner identification
E) Public view of generators

Contains
A) Elec Tech/Feedstock
B) Elec Amount
C) COD Elec Facility
D) **Hour** of Production
F) Project ID

Match
1) Temporal Matching
   Hourly
2) Locational Matching
   California Balancing
   Authority

Figure 1 - Hourly Energy Source Disclosure Framework

- Figure 1 illustrates how hourly EACs can be used to disclose energy source information to Consumers on an hourly basis. The EAC Registry issues the certificates and the Claim Verifier is an independent third party that verifies hourly matching of hourly EACs for production to the Final Consumer load via the Retail Supplier. This should be the preferred verification method.
- However, in the unlikely event that California cannot implement an hourly EAC registry by 2028, there are robust alternatives for demonstrating hourly energy source disclosure.

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[11] https://energytag.org/standards/
[12] Regulatory Assistance Project - 24/7 Carbon-Free Electricity Transition Tariffs

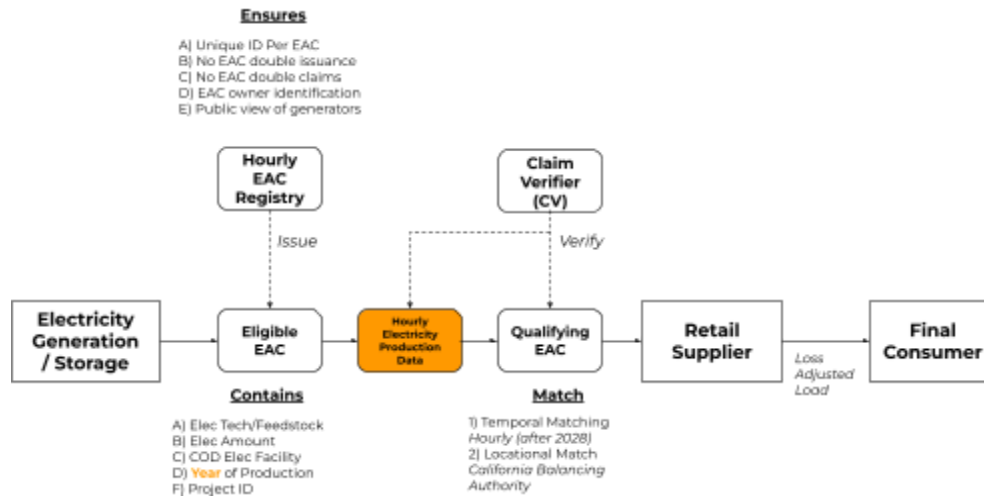*Verification Option 2 (Alternative): Annual EACs + Hourly Data*

Ensures

A] Unique ID Per EAC
B] No EAC double issuance
C] No EAC double claims
D] EAC owner identification
E] Public view of generators

Hourly EAC Registry — *Issue*

Claim Verifier (CV) — *Verify*

Electricity Generation / Storage → Eligible EAC → Hourly Electricity Production Data → Qualifying EAC → Retail Supplier → *Loss Adjusted Load* → Final Consumer

Contains

A] Elec Tech/Feedstock
B] Elec Amount
C] COD Elec Facility
D] Year of Production
F] Project ID

Match

1] Temporal Matching
Hourly (after 2028)
2] Locational Match
California Balancing Authority

Figure 2 - Alternative Hourly Tracking with Annual or Monthly EACs + Hourly Data

- The standard way of implementing hourly matching ***today*** is to add hourly meter data to Annual (or monthly) EACs. The use of registered annual/monthly EACs ensures that there is no double counting, while the additional hourly meter data enables hourly claims. This can be implemented without needing an hourly EAC system.
- This method of hourly tracking and verification is already being used in the United States and around the world. US registries like M-RETs and PJM GATS already offer this to customers, where hourly data is used to provide an hourly view of annual/monthly EACs.
- The map below (Figure 3) shows some hourly matching projects underway across the world, which collectively cover over 1 terawatt-hour (TWh) of electricity and involve some of the world's leading organizations focussed on hourly matching, such as Google, Microsoft, AES, Flexidao and Granular Energy. Some jurisdictions, such as Taiwan, only permit hourly matching for clean energy claims and have done so for years.
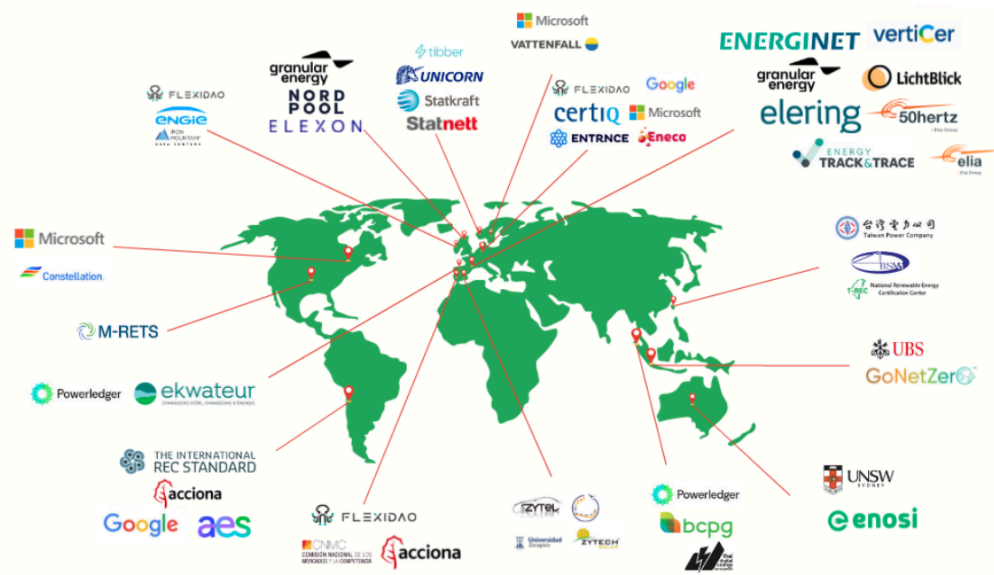
Figure 3 - Case Studies of Hourly Matching Globally (EnergyTag)

- Under this transitional approach, Claim Verifiers would verify Annual/Monthly EACs to ensure no double counting, together with metered Hourly Production Data and Hourly Consumption data to verify hourly matching. Once hourly EACs become widely available this approach should then be phased out.
- Standards such as EnergyTag, can ensure this is done robustly without double counting (See Configurations 2 and 3 in EnergyTag GC Scheme Standard).

Justification

A robust energy tracking framework, from generation to final consumer, that ensures fair attribute allocation helps ensure a robust and administrable scheme is put in place that ensures transparent disclosure to consumers and makes it easier for the Retail Supplier to ensure they are complying with SB1158.

Recommendation 4 - Enable Storage with Robust Hourly Tracking

- The ability of storage to time shift clean energy is central to energy consumers with hourly matching targets who already signed contracts with high levels of hourly matching[13]. In this way, storage can also provide significant value to the production of clean electricity by increasing rates of hourly clean energy matching[14]:
- We commend the inclusion of storage in SB1158 and believe that further guidance outlined below, could further improve its integration into an hourly reporting system in California.

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[13]https://www.prnewswire.com/news-releases/aes-announces-first-of-its-kind-agreement-to-supply-247-carbon-free-energy-for-google-data-centers-in-virginia-301282750.html
[14]https://www.utilitydive.com/spons/how-a-bess-can-improve-green-hydrogen-economics/705118/

- Hourly matching systems for storage have been tested on real-world batteries[15], are being addressed in detail by EnergyTag[16], and have the support of leading registries such as M-RETS.
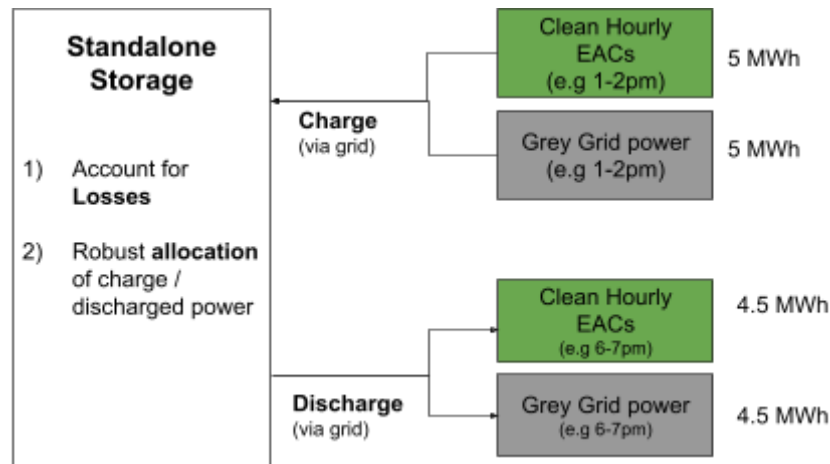

Figure 4 - Example of Storage Tracking

- Where storage is co-located "behind-the-meter" with clean electricity production or clean hydrogen production, this should be specifically permitted.
- For standalone storage, hourly EACs can be sourced from storage discharge provided that the following **conditions** are met[17]:

Process for Temporal Matching
- **Charging:** Hourly EACs from the production of clean electricity are retired during the same hour as storage charge. The volumes of EACs charged into the storage system in an hour cannot exceed the physical electricity charged into storage in that hour.
- **Storage:** Hourly EAC Attributes are stored in the storage system (i.e. reservoir) over time. Losses are applied to all types of energy in the reservoir on an hourly basis (as detailed below). The amount of hourly EACs stored cannot exceed the energy stored in the storage device at any given hour.
- **Discharge:** Hourly EACs are re-issued as discharge from the storage and matched to the consumption of the electrolyzer in the same hour as storage discharge. EAC volumes discharged from storage must never exceed electricity discharged from the storage system at any given hour.

Accounting for losses
- The energy lost during storage must be accounted for using Round-trip efficiency (RTE) applied each hour to the electricity charged into the storage system and applied proportionately to both clean EACs and gray energy charged into storage.

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[15] see Quinbrook's case study https://www.quintrace.com/hourly-case-study
[16] https://energytag.org/standards/
[17] Standards such as EnergyTag provide detailed guidelines on implementation of hourly storage tracking

- The RTE should be calculated on an hourly basis based on measured hourly charge and discharge and storage state of charge data. Hourly calculations are important to avoid large discrepancies between real losses and hourly EAC losses.
  - Where RTE is not or cannot be calculated using meter data, the manufacturer default value for the asset should be used but only for an initial period of 6 months only, following the start-up of a Storage System.
  - If neither measured hourly RTE nor storage system default values are available, a default storage RTE value for the storage technology may be used. This default list should be provided in CEC guidance and should reflect conservative estimates to encourage real measurement of RTE.

Attribute allocation

- A robust, consistent, and auditable methodology must be used to ensure a physically representative flow of clean/gray energy attributes in and out of the storage system.
- One of the methods used for storage tracking could be:
  - **Weighted average** → Discharge clean hourly EACs and gray power based on a weighted average of attributes in storage at the time of discharge.
  - **First in First out** → Discharge clean hourly EACs and gray power based on the order in which they were charged into the storage device
  - **Target Percentage** → Targeting a fixed percentage of renewables and grid energy for each hour, which gives the operator the most certainty of when clean energy will be used by the electrolyzer.

Justification
Including storage in any hourly reporting system is crucial as it will provide critical value signals for storage integration into electricity grids. However, the tracking of storage attributes is novel, and therefore care must be taken in its implementation by following the guidelines above.

Recommendation 5 - Encourage Tracking of Unspecified Load

- As noted in SB1158, tracking of unspecified energy is crucial.
- To account for unspecified load, ***the CEC should mandate the implementation of an hourly residual mix[18] in California*** that ensures that specific generation already allocated to a given Final Consumer is not double-counted.
- In the **absence of a residual mix,** the unspecified generation mix and load emissions should be calculated using the **fossil-only generation mix of California.**
- Once an all-generation tracking system is in place in California, there should be no need for a residual or fossil-only mix as all generation will be tracked.

Justification
This is important to avoid double counting and to encourage Retail Suppliers to provide an allocation of specific sources to consumers.

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[18] This document by the Center for Resource Solutions provides additional information on residual mix calculations

We hope these comments are informative in supporting the robust implementation of SB1158 in California. We remain available should you have any questions at killian@energytag.org.

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EnergyTag