



Transparency and Accurate Accounting in the Electricity Sector: The Importance of All-Generation Tracking and Residual Mixes for State Programs

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All-generation electricity certificate tracking and residual mixes are two related and essential tools that can help states ensure transparency and accuracy in their electricity programs and in retail electricity markets more generally. These mechanisms help establish an accurate picture of electricity generation and consumption, prevent double counting, and support state renewable energy and climate policies.

Energy Attribute Tracking Systems: An Elegant Solution

Energy attribute certificates (EACs), such as Renewable Energy Certificates (RECs), solve the problem of verifying use and delivery of specified power on the shared grid. Since electricity is indistinguishable based on how it was produced and cannot be directed from specific generators to specific consumers on the grid, EACs like RECs are an essential accounting and tracking tool for allocating specified generation to specific customer load, verifying compliance with electricity disclosure and procurement mandates like Renewable Portfolio Standards (RPS), and enabling the purchase of clean power.

Electronic certificate tracking systems issue and serialize certificates, one for each megawatt-hour (MWh) of generation injected into the grid, to registered generators with accounts. Certificates can be transferred and tracked between account holders and ultimately permanently retired by the end-use consumer or on behalf of an end-user claiming use of that MWh. They can indicate the program or reason for which the certificates have been retired, allowing compliance and voluntary retirements in the system to be reported. Each registered generator has certificates issued for all its production. These tracking systems provide exclusive issuance, transfer, and retirement of certificates, as well as verification of static and dynamic generation data. Most, if not all, state RPS and voluntary programs require tracking systems for issuance, transfer, and retirement of RECs.

The U.S. is covered by a combination of nine different tracking systems. They all track RECs for certain renewable resources. Only the three systems covering the northeast and mid-Atlantic—the PJM

Generation Attribute Tracking System (PJM-GATS), the New England Power Pool Generation Information System (NEPOOL-GIS), and the New York Generation Attribute Tracking System (NYGATS)—are “all-generation” tracking systems. They track and issue certificates for production from all generation resources and each MWh of generation in the region, not only renewable facilities. All-generation tracking facilitates comprehensive power source disclosure and residual mix calculations.

All-Generation Tracking: Comprehensive and Consistent Electricity Use Data

Regional all-generation electricity tracking systems provide a uniform mechanism to account for every MWh generated, ensuring that all electricity attributes—whether renewable, fossil fuel, or nuclear—are tracked and allocated correctly. Expanding existing REC tracking systems to track all generation sources would enhance electricity and emissions disclosures by reducing uncertainty around use and preventing double counting in both compliance and voluntary markets.

Key benefits of such a system include:

1. **Transparency and Complete Allocation:** All-generation tracking ensures a complete allocation of electricity generation, allowing electricity suppliers to provide power source and emissions disclosures and enabling consumers to report their electricity use and associated emissions using supplier-specific data, voluntary procurement and retirement data, and residual mix data.
2. **Consumer Choice:** Tracking generation to load allows consumers to choose the type of power they want by ensuring reliable and verifiable data on different generation sources.
3. **Regulatory Compliance:** These systems support states in implementing RPS, Clean Energy Standards (CES), greenhouse gas (GHG) emissions reporting and compliance programs, and Power Source Disclosure (PSD) programs.
4. **Eliminating Double Counting:** Consistent use of all-generation certificate tracking systems will avoid double counting of electricity generation and associated emissions, increasing the accuracy and regional effectiveness of state programs.

The Residual Mix: The Missing Piece

One key output of all-generation tracking systems is residual mix data, which has multiple uses across different state programs. Residual mix refers to the unallocated or unclaimed electricity generation and associated emissions in a particular area over a specific period. Once specified power purchases, tracked using RECs and other EACs, have been allocated, the remaining generation mix becomes the residual mix. This mix serves as the default mix and emissions rate for unspecified power, unfulfilled load, and “null power” (described further below).

Without residual mixes, states often default to using grid-average resource mixes and emissions factors, which includes all generation in a region, even that which has been transacted, allocated and claimed by specific customers. This double counts that generation and misrepresents (specifically undercounts) emissions associated with electricity use. Alternatively, states will use a static default emissions factor to

characterize unspecified or market purchases, often based on the rate of a typical marginal fossil generating unit. This is inaccurate and does not account for changes on the grid over time. Proper residual mix calculations ensure accurate accounting and avoid use of poor proxies like grid average and default emissions rates.

Critical Uses of Residual Mixes in State Programs

Residual mixes can be applied in several key state programs to enhance emissions accounting and policy effectiveness.

1. GHG Reporting or Compliance

Load-serving entities (LSEs) can use residual mixes to report their emissions accurately, ensuring that emissions are correctly attributed to unclaimed electricity rather than claimed clean and renewable purchases. Specifically, residual mix should be used for:

- **Unspecified power purchases:** Purchases of electricity where the generation resource type or specified source is unknown or not available, either through bilateral contracts or the local organized wholesale electricity market.
- **Unspecified imported electricity:** Purchases from a different region or market where more precise information about the import (e.g., a specified resource type or mix, or seller's mix) is not available.
- **Null power:** Electricity that has been stripped of its generation attributes or for which the attributes/certificates have been sold off. By removing the EACs, null power represents a generic electricity commodity which cannot be attributed to a particular fuel source or set of environmental characteristics.

These all refer to power without generation attributes or EACs, or where the origins of the procured electricity or precise energy sources involved are not known. Properly recognizing and accounting for unspecified power is essential in comprehensive energy assessments, as it enables a more accurate understanding of the energy mix, sourcing dynamics, and potential environmental implications associated with in- and cross-market electricity transactions. It can also facilitate participation in organized markets, compared to using a default emissions factor, for example, since the residual mix may change over time.

2. Power Source Disclosure

Many states require LSEs to disclose their retail power mix—resources used for retail electricity sales—to consumers, e.g., through an electricity product content or environmental disclosure label. Residual mix should be used for:

- **Unspecified purchases or wholesale market purchases:** Electricity procured for retail sales where the resource type is unknown or not specified.
- **Unfulfilled LSE load:** The portion of an LSE's electricity demand that has not been met with specified generation or purchases. Assigning residual mix certificates representing the average mix of unused certificates and unallocated generation in the market to unfulfilled load accurately assesses total emissions to all load and prevents double counting. This is already standard practice in environmental disclosure labeling programs in states served by all-generation tracking systems.

3. Clean Fuels Programs:

More states are adopting clean or low-carbon fuel standards for the transportation sector. These programs often recognize electricity as a low-carbon transportation fuel, i.e., for electric vehicles (EVs). RECs can be used in these programs to verify use of renewable electricity in an EV. But a residual mix emissions factor should be used for:

- **Default grid electricity where utility-specific mixes are not available:** A state default emissions rate is a constant, predetermined rate, usually taken from the average emissions rate of a marginal fossil unit. A residual mix emissions factor is a more accurate representation of electricity generation used when utility-specific mixes are not available.

Conclusion

As the U.S. electricity sector continues to evolve, states should champion policies and tools that promote transparency, accountability, and accurate electricity and emissions accounting. Implementing robust all-generation electricity tracking and residual mix calculations are essential steps in ensuring truthful disclosures and effective policies. By embracing these tools, regulators can enhance compliance and GHG reporting, prevent double counting, and empower themselves and consumers to make informed policy and energy decisions—all crucial components of a clean and equitable electricity future.