How time-stamping works in EAC markets

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Introduction

End-users that claim the use of renewable electricity by cancelling Energy Attribute Certificates (EACs) mostly frequently report their power consumption annually. For many end-users, this means that the precise moment of generation of the unit of power for which an EAC is issued is irrelevant as long as their electricity consumption in a given year is matched with their purchase and cancellation of EACs from that same year. However, some end-users, particularly those with flexible demand and/or access to storage, are seeking to develop ways to show that they consumed renewable electricity at the same time as such electricity was being generated.

Disclosure and reporting

Disclosure is the provision of information to a final customer about the specific attributes of each unit of energy supplied to them. A disclosure period is a period within which a unit of energy is generated, its attributes are certified through the issuance of an EAC, and those certified attributes are consumed by cancelling the related EAC. Energy consumption reporting is the process through which end-users declare – either on their own or through a third-party – their energy consumption to an independent body, such as the CDP or RE100, for verification against that body's reporting rules.

A distinction should be made between the *frequency* of the disclosure of information to final consumers and the *granularity* of those disclosures. For example, many people pay a monthly phone bill which details calls and messages down to the second. The frequency of such bills is monthly, and their granularity is every second. Many jurisdictions mandate that the disclosure period should have the frequency of a rolling or a calendar year, while some are looking to shorten the frequency of mandatory disclosure periods to a month. Within these frequencies, issuing bodies may provide additional information on the granularity of the disclosure by stating on the EAC the month, week, or day during which the unit of certified power was generated. Such granularity about the time of generation can be maximised by putting a precise time-stamp on an EAC, which can specify the moment of generation down to the 15-minute physical balancing period. End-users can voluntarily report their energy consumption as frequently and with as much granularity as is allowed for by the issuance of, and information on, the EACs they are using.

Why report electricity use with greater frequency and granularity?

End-users can already claim the use of very specific types of renewable energy. Thanks to the details on EACs issued within standardised schemes, end-users can already specify, for example, the exact generation plant they want to consume energy from. However, there has been less granularity about the time when a given unit of energy was generated and injected into the grid. This has posed a challenge to end-users who want to closely match their consumption of renewable power with its generation. Instead of wanting to match their consumption of renewable electricity within a year, month or day – which is already possible in nearly all EAC markets – they want to be able to match it within an hour, or even a quarter-hour.

Choosing to report electricity consumption at such a granular level requires resources that may not be available to all end-users. As such, it should be remembered that the most important practice is for end-users to prove their consumption of renewable electricity by cancelling EACs within the laws and standards of the jurisdiction they are in. The main focus should not be on whether different levels of granularity of consumption are more impactful than others. It should be on encouraging those end-users who do not consume renewables in the first place to do so through EAC systems and markets.

Nevertheless, more granularity can benefit EAC markets as well as individual consumers. EACs issued in standardised markets already provide important details, such as the exact production device, whether that device benefited from any public support, and when that device first became operational. These details allow end-users to choose, fairly specifically, the EAC product they want to buy. This, in turn, can help to drive demand for renewable energy in general, and specific forms of renewable energy in particular. Indeed, temporal granularity is just one of many aspects of information on standardised EACs that could become more detailed. Where the greater granularity of information for consumers is feasible and can help to grow the demand for renewable energy it should be provided.

How to facilitate more granular reporting

It should be relatively straight-forward to facilitate more granular reporting by end-users. The first step would be to ensure that EACs include a time-stamp which states the moment when the certified unit of electricity was generated and injected into the grid. In some jurisdictions, this may require improvements

to metering infrastructure for production devices and the verification process for meter readings. This could also be done on a voluntary basis, by overlaying this information on an existing EAC through, for example, a specific label. Likewise, for end-users to have a precise understanding of the time of their consumption by megawatt-hour, they may also have to ensure their meters provide this type of granularity on the consumption-side. Once the first two steps are implemented, end-users would be able to buy and cancel GOs that were issued at times they were consuming electricity. This does not have to happen in 'real-time', which would place significant technical requirements on both power and EAC systems and markets and how they interact. Instead, hourly matching can be done retrospectively by consumers who first identify when they were consuming power, and each day, month, or year, buy the EACs that were issued during those moments of consumption. Just as telephone bills are issued monthly but include granularity down to the second, so too would it be logical and possible to do the same for EAC markets.

Challenges to more granular reporting

It should be remembered that EAC markets were created because electricity cannot be tracked between producer and consumer as other products, such as Fairtrade coffee, can. Electricity is not a tangible product that can be physically transported. It is a charge that must be maintained on a grid. This is why power markets are essentially balancing markets and all market participants face balancing responsibility rules such as those set out in the EU's Electricity Market Regulation[1].

Even if an end-user buys power from a specific producer, generated at a specific time, it cannot be boxed-up and directly delivered. Instead, producers inject their electrical charge onto the grid in one place and somewhere else the end-user takes the amount of charge they need off the grid. System operators work to maintain a balance between the injection and off-taking of power. When we buy power we are buying the right to remove a given amount of charge from the grid. Therefore, the only way to track the production and use of a megawatt-hour of power, along with its attributes, is through a book & claim accounting system. These systems let EAC market participants book the attribute certificates when power is injected into the grid, transfer those attributes to their consumer, who then claims them as proof that they paid for a given type of electricity.

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[1]   In Europe, Balance responsibility rules on market participants are included in Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on The Internal Market For Electricity, especially in Articles 5 & 6 (**https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019R0943&from=EN**).

Changing the disclosure period for EACs, or the frequency or granularity of end-user reporting does not change the fundamental properties of electricity systems, or the need for a book and claim system to support the certification, transfer, and use of electricity attributes. It is also crucial to maintain the confidence of all stakeholders in EAC schemes and the information that EACs contain. Currently, EAC schemes are based on meter readings that have to be reconciled and settled to ensure their accuracy. This is most commonly done every month. Even if meters have a very high accuracy rating, for example above 99.5%, without the reconciliation and settlement process inaccuracies would occur. It has not yet been shown how the hourly matching of generation and consumption of electricity that does not allow for reconciliation and settlement could avoid such inaccuracies.

A further challenge to the development of hourly matching schemes is the fact that several jurisdictions, such as the European Union, stipulate that only by cancelling one specific standardised EAC can an end-user claim the consumption of renewable energy, or a supplier claim to have supplied renewable energy. Therefore, end-users are bound by the granularity of those certificates, and any effort on their part to report with more granularity would require one or other of the following to happen. Either a given standardised EAC scheme would have to stipulate more granularity through, for example, the inclusion of a time stamp on EACs issued within that scheme. Alternatively, end-users could seek to secure such additional details through a label that could be applied to standardised EACs - as are currently used to convey additional information on other aspects of energy generation, such as its environmental impact.

Conclusion

A central goal of EAC markets and systems is to provide information to consumers. Increasing the granularity of the information available to consumers, such as through time-stamping, can allow them to make more precise choices about the renewable electricity they consume. This can help to accelerate demand for renewable energy as a whole. Stakeholders, including system operators, labelling schemes, and market participants should work together to agree on how more granular time information could be generated and communicated to end-users who want it. By working together we can collectively ensure that the twin goals of more information to consumers and maintaining the reliability of EAC systems can be secured.