



ACCOUNTING FOR PRODUCTION, CONSUMPTION AND SALE OF RENEWABLE ENERGY

This document provides additional accounting guidance for organizations that generate renewable electricity, consume renewable electricity through a direct line, or wish to claim contractually delivered renewable energy attributes through the market-based method. The guidance also describes how ownership of energy attribute certificates affects claims that organizations can make about their consumption of renewable power.

Role of Energy Attribute Certificates in the Market-Based Method

Energy attribute certificates convey information about energy generation to entities involved in the sale, distribution, consumption, or regulation of electricity. Where energy attribute certificates are issued, the certificates themselves serve as the emission factor for the market-based method. If energy attribute certificates are sold to and retired by an end-use power customer bundled with the electricity, the power customer can claim the certificates. If the certificates are sold separately (unbundled), the power customer cannot claim the attributes of the specific generator. In this case, the purchaser of the unbundled certificates will claim the attributes of the generator in the market-based method by matching certificates to their own power consumption, and the power customer will need to select another emission factor from the market-based emission factor hierarchy. This will likely be the grid-average factor,¹ but could also be from energy attribute certificates purchased and retired separately by the power consumer (or from energy attribute certificates that are purchased and retired on their behalf).

Renewable Energy Certificates in the Market-Based Method

In the U.S. and Canada, renewable energy projects result in the generation of Renewable Energy Certificates (RECs), which are a type of energy attribute certificate. RECs provide proof of renewable electricity generation from a recognized renewable energy source and represent the rights to claim the environmental, social and other nonpower characteristics resulting from the use of that renewable electricity generation.

RECs are generated for specified renewable energy generation on a shared electricity distribution grid in the U.S. and Canada. RECs are measured in units of energy such that one REC is equal to one MWh of renewable electricity.



RECs used in the market-based method must meet The Climate Registry (TCR)'s Eligibility Criteria. Certified RECs from Green-e inherently meet the eligibility criteria. Contact TCR at help@theclimateregistry.org to request evaluation of an additional REC product or program.

The attributes of renewable energy that are included in a REC can be divided into two categories, the primary attributes and the secondary attributes. The primary attributes include the identifying characteristics of the electricity generation, such as the energy source, the project location, and the

¹ Residual mix emission factors have preference over grid-average emission factors in the market-based emission factor hierarchy, but are not widely available in the U.S.

direct emissions of generation. The secondary attributes, also known as the derived attributes, include the emissions from fossil fuel facilities that are displaced by the renewable generation.

When accounting for RECs in the market-based Scope 2 total, organizations must use the primary emission rate. Although the CO₂ emissions from renewable energy power generation are usually zero or small, it is important to account for the emissions that do occur. This reporting should include all direct emissions operationally related to the generation of the underlying electricity. An example would be the process CO₂ emissions from some forms of geothermal energy production. Combustion of landfill gas will also result in biogenic CO₂ emissions.

ACCOUNTING FOR BIOMASS RECS

Some RECs may be created from biomass combustion. The biogenic emissions associated with these RECs must be reported as indirect market-based emissions. If a standalone emission factor for the biomass is not provided, organizations may use a default emission factor from Tables 1.1 and 1.2² to report the emissions, or may disclose that indirect biogenic emissions have been excluded.

Owned Renewable Energy Generation

Organizations that own or operate renewable electricity generation sources will report any associated emissions as direct emissions.³ Self-consumed electricity is included in direct emissions reporting rather than indirect emissions reporting, provided the generating organization owns the energy attribute certificates. Further accounting guidance for situations when energy attribute certificates have been sold is provided [below](#).

Net Metering

Net metering enables customers to use their own generation from on-site energy systems to reduce their grid-based electricity purchase over a billing period by allowing their electric meters to turn backwards when they generate electricity in excess of their demand. Organizations that participate in a net metering program, where excess production is sent to the grid, must report emissions associated with all power produced in Scope 1 or as direct biogenic emissions and gross grid purchases⁴ in Scope 2 and as indirect biogenic emissions.

Community Solar

Community solar programs provide electricity, financial benefit to, or are owned by multiple community members.⁵ Participants in a community solar program can make claims on the renewable attributes of their share of the renewable generation if they receive energy attribute certificates (i.e., RECs) or the program owner or utility retires the attributes on their behalf.

Virtual Net Metering

Virtual net metering may be used when a renewable energy generation system is installed externally instead of on-site. The generation is tied to the grid, with no direct line transfer to a specific consumer. Participants in a virtual net-metering program receive credits on their electric bill reflecting their share of the renewable energy generation. When the system is not owned/operated by the consumer, indirect

² Emission factor tables are available at www.theclimateregistry.org.

³ Reporting depends on the consolidation methodology employed. For financial and equity share inventories, owned renewable energy generation is reported. For operational control inventories, operated generation is reported.

⁴ The total electricity purchased from the provider. Any on-site electricity sent back to the grid may not be subtracted from this number.

⁵ Definition of community solar from A Guide to Community Solar: Utility, Private, and Non-profit Project Development, published by the U.S. Department of Energy: <https://www.nrel.gov/docs/fy11osti/49930.pdf>

emissions will be reported for consumed electricity. The consumer must own the energy attribute certificates⁶ for their share of the renewable generation in order to claim attributes of the energy in the market-based Scope 2 total. Consumers must use an emission factor from the location-based emission factor hierarchy to report their indirect emissions in the location-based total.

Alternative Accounting Methods if Certificates Are Transferred to a Third Party

Only the owner of eligible energy attribute certificates may claim the associated attributes of the renewable generation. When attributes have been sold to a third party, the generator of the renewable electricity may no longer claim the renewable attributes of their self-consumed power. Likewise, the attributes of power delivered over a direct line may not be claimed by the energy consumer if energy attribute certificates have been sold to another entity.

For Organizations That Own/Operate Renewable Generation

When energy attribute certificates from owned and consumed generation are transferred or sold to a third party, the organization must account for emissions of the underlying (or null) power in Scope 2 or as indirect biogenic emissions.⁷ The organization must treat consumed electricity as though it were purchased from the grid, using a grid-average emission factor (for the location-based method) and other market-based method emission factors such as “replacement” certificates, a supplier-specific emission rate, or residual mix (for the market-based method).⁸ Direct emissions from the generation source are always reported in Scope 1 or as direct biogenic emissions, whether or not energy attribute certificates are sold.

For Organizations That Consume Power from a Renewable Generation Facility Through a Direct Line

When energy attribute certificates are not transferred to the organization consuming power from a direct line, the consuming organization may not claim the attributes but instead must calculate emissions for the null power. For the location-based method, grid-average emission factors⁹ must be used in lieu of the direct line emission factor.¹⁰ For the market-based method, an appropriate emission factor from the market-based emission factor hierarchy must be used.

Choosing a Default Emission Factor When Generator Does Not Provide an Emissions Rate

In cases where energy attribute certificates are not minted or they are minted but not sold to a third party, a generator-specific emission rate or the appropriate fuel-specific default emission factor for stationary combustion may be used for purchased electricity (See Tables 1.1, 1.2, etc.).¹¹

6 Or an alternative contractual instrument that meets TCR’s eligibility criteria.

7 Under the [Solar Massachusetts Renewable Target \(SMART\) Program](#), RECs from organizations participating in the incentive program are automatically transferred to the local electric distribution company and must not be claimed by the generating organization.

8 When the consumer that has sold certificates from renewable generation operates on a microgrid that receives electricity from directly connected generation as well as the regional grid, a prorated emission factor may be substituted for the grid-average emission factor, provided emissions from connected generation are not double counted.

9 In the U.S. and Canada, members should use the Location-B emission factors, while members outside these countries would use Location-C emission factors.

10 Members consuming electricity from a direct line transfer that has sold energy attribute certificates to a third-party forfeit the right to claim these emissions in the location-based method. While overall the location-based method is designed to quantify the emissions from local consumption without reference to contractual instruments, the attributes conveyed in certificates usually carry legally enforceable claims, which should take precedence.

11 Emission factor tables are available at www.theclimateregistry.org.

Prorating Emissions When Power Is Received from Both a Direct Line Generation Source and the Electric Grid

Organizations that consume power both from a known direct line electric generation source as well as from the grid¹² should pro-rate emissions using the direct line generator emission factors for the portion of electricity taken from the known direct line sources and the appropriate grid average emission factors for the portion of the electricity consumption taken from the grid. Note that if energy attribute certificates from a direct line generation source are sold, the generator's emission factor is not eligible to be claimed, and another emission factor from the market-based emission factor hierarchy (e.g., residual mix or regional grid-average emission factor) must be used for that portion of electricity consumption in the market-based Scope 2 total.

¹² Regional grid or microgrid.