

emissions from the underlying power with emissions representing the residual mix of the grid, or a grid-average emission rate in absence of a residual mix, to determine the carbon intensity of electricity products delivered to customers.

Electricity end users may use their electricity supplier's electricity deliveries metric (emissions rate) to calculate their Scope 2 emissions, and also have the option to directly purchase and retire additional energy attribute certificates that meet the quality criteria outlined in the GRP for their Scope 2 reporting.

19.3.2 Accounting for Unbundled RECs and Energy Attribute Certificates

This section provides the required methodology for LSEs to incorporate purchases and sales of unbundled energy attribute certificates into their deliveries metrics.^{48.3} Unbundled certificate sales are required to be reflected in deliveries metrics, but unbundled certificate purchases are optional to incorporate. Purchased certificates must be verifiably linked to a specific source of generation in deliveries metrics.

The methodology in this section must not be used when the certificates are bundled with the renewable power or low emissions generation. In this case, the power flows into the LSE's system (whether generated or purchased), and the benefits of the low emissions power (generated or purchased) are inherently reflected in the metric. All specified purchases of power must include certificates with the electricity to ensure that the emissions from the specified power are not double counted as both specified power emissions and through the methodology to incorporate unbundled certificates.

It is essential that energy certificates are only applied to one set of corresponding emissions, and that certificates are not double counted. LSEs that create and sell energy attribute certificates (associated with any portion of their generation) are required to provide a full accounting of those certificate purchases and/or sales to their verification body using the four-step process outlined below.

This section presents the adjustment methodology for the CO₂ metrics, but the methodology can be applied similarly to the optional CH₄ and N₂O metrics.

Step 1: Determine Eligibility of Energy Attribute Certificates

To apply purchased unbundled certificates to a delivery metric an LSE must demonstrate to its verification body that its certificates meet TCR's eligibility criteria for electricity listed in the GRP Quantification Module.^{48.4} Certificates must be purchased from an entity that is different and distinct from the LSE's own organization (i.e., not included within your organizational boundaries).

There are no limits on the number of certificates that may be used in this capacity. Certificates used to meet a LSE's Renewable Portfolio Standard (RPS) or another state policy (if applicable) may only be applied to metrics in the following ways:

- Application to a retail power metric (or system-average) only; or,
- Application to a retail power metric and a special power product comprised of 100% renewable electricity, or where the LSE is delivering voluntary certificates in addition to certificates reported towards a RPS or similar state policy. In this case, a percentage of the special power product content may be satisfied by certificates reported towards a RPS or similar state policy, only up to percentage of the RPS, with the condition that the retail metric includes at least the same percentage of certificates reported to the RPS. For example, an LSE with a 20% RPS obligation may apply certificates reported for the RPS for up to 20% of their 100% renewable special power product, as long as certificates reported for the RPS are also applied to at least 20% of their retail product. If the same LSE offers a special power product option including 30% voluntary RECs, they may apply certificates reported for the RPS for up to 20% of their special power product, and apply voluntary RECs for an additional 30% of the special power product.

Step 2: Accounting for GHG Emissions from Green or Special Power Technologies

Any anthropogenic or biogenic CO₂ emissions attributable to the underlying power source that certificates represent must be accounted for in deliveries metrics reported to TCR. Anthropogenic CO₂ emissions must be accounted for in anthropogenic metrics, and biogenic CO₂ emissions must be accounted for in biogenic metrics. This reporting should include all direct emissions operationally related to the generation of the underlying electricity. Examples include the anthropogenic process CO₂ emissions from some forms of geothermal energy production and biogenic CO₂ emissions from landfill gas combustion for electricity generation.

LSEs will need to assign these CO₂ emissions to the energy attribute certificates that they intend to apply to their reporting year inventory in the same way as they would report emissions for bundled power (generated or purchased). When the power generation represented by RECs or other certificates has associated CO₂ emissions, LSEs should use site-specific emission factors or default emissions factors as described in in Table 14.1 in this EPS Protocol to calculate emissions for the RECs or other certificates when the generation type has associated CO₂ emissions.

Step 3: Reporting Energy Attribute Certificates

When including energy attribute certificate purchases in deliveries metrics, LSEs will need to provide the following information to their verification body:

- Number of certificates and MWh represented;
- Relevant serial numbers or identification numbers associated with certificates;
- Renewable energy facility or facilities that created the certificate;
- Type of technology used to create the certificate;
- Name of the grid region or country served by the renewable energy facility;
- Anthropogenic and biogenic GHG emissions associated with the underlying power;
- Vintage or dates for certificate power generation;
- Registry or tracking system used for certificate registration and date of retirement; and,
- Intended use of certificate – for green power product or for system average metric/RPS requirement.

If LSEs sell any unbundled certificates, whether from generated or purchased power, they must provide the following information about the sold certificates to their verification body:

- Number of certificates created and sold (MWh) during emissions year;
- Name of registry(ies) or tracking system(s) used for certificate registration; and,
- Relevant serial numbers or identification numbers associated with certificates;

Step 4: Adjusting Emissions Metrics to Account for Certificate Purchases and Sales

When accounting for purchased energy attribute certificates in a delivery metric, LSEs must apply a CO₂ emissions rate consistent with each certificate's underlying generation source to the power (MWh) represented by purchased and retired certificates. This emissions total will displace the CO₂ emissions associated with an equivalent amount of power (MWh) from their generated or other purchased power.

If certificates are sold, the CO₂ emissions rate of the MWh represented by the sold certificates will reflect another market-based emission rate from the local

residual mix, the local grid average rate (if the residual mix is unavailable), or purchased unbundled “replacement” energy attribute certificates.

There are two options for accounting for purchased and sold energy certificates in each deliveries metric. The Aggregated Method applies an average CO₂ emissions intensity rate to delivered power, after the power associated with certificate purchases and sales is removed. The Detailed Method uses a detailed accounting of specified and unspecified sources of delivered power to adjust emissions for certificate purchases and sales. Summary data from the Detailed Method worksheet is automatically publicly disclosed, and Members may choose to opt in to publicly disclose the worksheet used to calculate metrics using the Detailed Method. The steps for each method are applied in the same way for the system-average metric, and for each product-specific metric (i.e., retail sales, wholesale and special power product metrics). Accounting for sold certificates is required, and accounting for purchased certificates is optional.

Aggregated Method

Accounting for purchased and sold energy attribute certificates for each delivery metric using the Aggregated Method involves the following steps.

1. Identify:
 - a. Total net MWh and the associated CO₂ emissions for all specified and unspecified sources of generated and/or purchased delivered power, without accounting for certificate purchases and sales.^{48.5}
 - b. The CO₂ emissions rate that corresponds with all delivered power identified in Step 1a (i.e., metric tons of CO₂ from generated and purchased power per MWh of delivered power).
 - c. Number of sold energy attribute certificates and corresponding “replacement” CO₂ emissions.^{48.6}
 - d. Number of purchased energy attribute certificates and corresponding CO₂ emissions.^{48.7}

Note: If attributes from purchased certificates are replacing attributes from sold certificates, only identify the delivered MWh represented by the purchased/sold certificates, and only identify the CO₂ associated with the replacement certificates for steps (c) and (d).

2. Calculate CO₂ emissions for power that is not represented by purchased or sold certificates:

- a. Subtract MWh represented by purchased and sold certificates from total net MWh identified in Step 1a.
 - b. Apply the CO₂ emissions rate in Step 1b to the remaining power that is not represented by purchased and sold certificates.
3. Calculate total adjusted emissions:
 - a. Sum CO₂ emissions from certificates purchases and sales.
 - b. Add to emissions from remaining power calculated in Step 2.
 4. Divide total adjusted CO₂ emissions by total MWh delivered to calculate the adjusted delivery metric.

Detailed Method

Accounting for purchased and sold energy attribute certificates for each delivery metric using the Detailed Method involves the following steps:

1. Identify:
 - a. Source and quantity (MWh) of delivered power whose emissions attributes will be replaced with purchased energy attribute certificates.
 - b. Number of sold energy attribute certificates and corresponding “replacement” CO₂ emission factors.
 - c. Number of purchased energy attribute certificates and corresponding CO₂ emission factors.^{48.8}
 - d. Net MWh and corresponding CO₂ emission factors for each specified and unspecified source of generated and/or purchased delivered power that is not replaced with purchased or sold certificates.^{48.9}
2. Calculate “replacement” CO₂ emissions for power whose energy attribute certificates have been sold:
 - a. Apply an appropriate “replacement” market-based CO₂ emission factor (i.e., the relevant residual mix emission rate, local grid-average emission rate, or emission rate from replacement certificates) to the number of sold energy certificates.
3. Calculate CO₂ emissions from purchased energy attribute certificates:
 - a. Apply the CO₂ emission factor associated with any purchased certificates to the number of purchased certificates.
4. Calculate CO₂ emissions for generated and purchased delivered power that is *not* represented by purchased or sold certificates:
 - a. Apply CO₂ emissions factors identified in Step 1d to their corresponding sources of power, *excluding any power whose certificates have been sold and any power that is replaced with purchased certificates.*^{48.10}

5. Sum CO₂ emissions in Step 2-4^{48.11} and divide by total delivered MWh to calculate the delivery metric.

Note: For certificates with associated biogenic CO₂ emissions, the biogenic CO₂ emissions will only be used to calculate a biogenic CO₂ metric.

Example 19.2 in Appendix A at the end of this EPS Updates & Clarifications document illustrates how this calculation works in practice.

19.3.4 Implications for the Regional Average Emission Factors

Currently eGRID subregional emission factors do not factor out voluntary purchases, which results in energy attribute certificates being reflected in both the subregional emission rate and claimed by entities that own and retire the certificates, such as LSEs reporting deliveries metrics. There is therefore some double counting of these certificates between multiple organizations in the market-based method of Scope 2 reporting. However, as not all GHG emitters participate in The Climate Registry's Carbon Footprint Registry, the quantity of certificates reported by EPS members is likely to represent an insignificant percentage in emissions terms of the regional average power mixes. As subregional residual mix emission factors are developed, entities reporting their market-based Scope 2 emissions will have the opportunity to report using residual mix emission factors and therefore avoid double counting of certificate claims.⁴⁹

^{47**} Electricity customers also use RECs in quantifying their market-based indirect emissions.

⁴⁸Energy attribute certificates are sometimes also referred to as green tags, green energy certificates, or tradable renewable certificates.

^{48.1} The approach taken in this section applies to all eligible energy attribute certificates that can be verifiably linked to a specific source of generation (including renewable and non-renewable generation).

^{48.2} More information about Green-e Energy is available here: <https://www.green-e.org/programs/energy>

^{48.3} Methods for end users of electricity to account for direct purchases of energy attribute certificates are addressed in the GRP.

^{48.4} TCR's eligibility criteria to prevent double counting includes providing documentation of permanent retirement of energy attribute certificates in an electronic tracking system in a dedicated, named retirement subaccount for a particular emissions year. LSEs may use a private electronic tracking system to meet this eligibility criteria as long as they provide a public report of the information in the private tracking system as a public document in CRIS. LSEs required to make retirements for a mandatory program may use the naming convention for that program.

^{48.5} Refer to Section 19.1 for further guidance on establishing customer categories and assigning power generation and purchases to specific customer categories. You should not include any emissions from non-power generation sources (e.g., mobile combustion, fugitive emissions). Report only CO₂ emissions (not CO₂e).

^{48.6} To calculate “replacement” CO₂ emissions for power whose energy attribute certificates have been sold, apply an appropriate market-based CO₂ emission factor (i.e., the relevant residual mix emission rate, local grid-average emission rate, or emission rate from replacement certificates) to the number of sold energy certificates.

^{48.7} To calculate CO₂ emissions from purchased energy attribute certificates, apply the CO₂ emission factor associated with any purchased certificates to the number of purchased certificates.

^{48.8} If total CO₂ emissions are provided with the certificate instead of an emission factor, you can skip this step and enter record the emissions to complete Step 3 instead of calculating them.

^{48.9} For generation units with CEMs, it is only necessary to derive the emissions rate from total MWh and CO₂ emissions if certificates from this power have been sold, or if purchased certificates will replace any of this power.

^{48.10} LSEs may choose any source of specified or unspecified power to replace with purchased certificates.

^{48.11} Add CO₂ emissions from generation units with CEMs as long as certificates from this power have not been sold and purchased certificates have not been used to replace any of this power.

⁴⁹Residual mix emission factors are third party developed factors representing subnational or national energy production, factoring out voluntary purchases to prevent double counting of these claims.

Appendix A: Example 19.2

Adjusting Deliveries Metrics to Account for the Purchase of Energy Attribute Certificates

USA Electric Company chose to report its power deliveries metrics to TCR and has used the method in Chapter 19 of the EPS Protocol to develop three metrics. The anthropogenic metric calculations are summarized below. Since there were no biogenic emissions, biogenic deliveries metrics are not calculated.

Electricity Product	MWh	Scope 1 + Scope 3 CO₂ Emissions (MT)	Anthropogenic Deliveries Metric (lbs/MWh)
Green Power Program Deliveries	1,500,000	150,000	220.46
Retail Electric Deliveries	80,000,000	24,000,000	661.387
Wholesale Electric Deliveries	1,200,000	600,000	1102.31

USA Electric Co. purchased 1,000,000 RECs from a wind power generator during the reporting year, and retired these on behalf of customers of its Green Power Program to develop an adjusted metric for this product using the Aggregated Method. The adjustment for the Green Power Program is shown below. The metrics for retail and wholesale electric deliveries remain the same as in the table above.

The steps used to calculate the Green Power Program metric according to the Aggregated Method are outlined below.

1. Identify:
 - a. Total net MWh delivered to Green Power Program customers and associated CO₂ emissions: 1,500,000 MWh, total emissions: 150,000 MT CO₂.
 - b. CO₂ emissions rate for all power delivered to Green Power Program customers: 150,000 MT CO₂ divided by 1,500,000 MWh = 0.1 MT CO₂/MWh
 - c. Sold certificates and corresponding “replacement” CO₂ emissions: no certificates sold
 - d. Purchased certificates and corresponding CO₂ emissions (if any): 1,000,000 MWh with zero CO₂ emissions.
2. Calculate CO₂ emissions for power that is *not* replaced with purchased/sold certificates: 1,500,000 MWh minus 1,000,000 MWh = 500,000 MWh, multiplied by average emissions rate (0.1 MT CO₂/MWh) = 50,000 MT CO₂
3. Calculate total adjusted emissions from purchases/sales (zero emissions in this example) and all remaining power from Step 2: 50,000 MT CO₂
4. Calculated adjusted emissions metric: 50,000 MT CO₂ divided by 1,500,000 MWh = 0.03 MT CO₂/MWh, converted to 73.49 lbs CO₂/MWh

Electricity Sources	MWh	Scope 1 + Scope 3 CO₂ Emissions (MT)
Purchased Renewable Energy Certificates	1,000,000	0
Remaining Power Sources in the Portfolio	500,000	50,000
Total	1,500,000	50,000

Green Power Program Adjusted Anthropogenic Deliveries Metric: 73.49 lbs/MWh

The resulting adjusted metric (73.49.75 lb/MWh) is included in TCR’s reporting software and listed on TCR’s public website for use by reporters who purchase electricity from the Green Power Program.

Adjusting Deliveries Metrics to Account for the Sale of Energy Attribute Certificates

Consider the wind power generator (Wind Power Co.) who sold the aforementioned 1,000,000 unbundled energy attribute certificates. This entity is a LSE located in North Dakota and wishes to report a system-average deliveries metric. Wind Power Co. delivered 3,000,000 MWh of wind power to retail customers, and sold certificate s for 1,000,000 MWh of their total delivered power. Wind Power Co. must calculate “replacement” emissions for the power whose associated energy attribute certificates were sold. To do this they apply the eGRID2018 MRO West emission factor (1,000,000 MWh multiplied by 1,239.8 lb CO₂/MWh = 1,239,800,000 lb CO₂/MWh, converted to 562,365 MT CO₂) and calculate their anthropogenic system-average deliveries metric as shown below.

Electricity Sources	MWh	Scope 1 + Scope 3 CO₂ Emissions (MT)
Delivered wind power whose energy attribute certificates have been sold	1,000,000	562,365
Remaining delivered power (certificates retained)	2,000,000	0
Total	3,000,000	562,365

System-average Anthropogenic Deliveries Metric: 413.27 lbs/MWh

Adjusting Deliveries Metrics for Certificate Purchases and Sales Using the Detailed Method

A utility in North Dakota wishes to develop system-average deliveries metrics. The chart below shows the sources of their delivered power, purchased and sold certificates, associated emission factors, and resulting anthropogenic and biogenic emissions.

The utility sells all 50,000 certificates from its wind generation, and thus uses the MROW grid average emission factor (1,239.8 lb CO₂/MWh = 0.562 mt CO₂/MWh) as a “replacement”

emission factor. The utility purchases 20,000 unbundled solar RECs and wishes to retire them on behalf of their customers, to replace the energy attributes from a portion of their coal generation (20,000 MWh of total delivered 120,000 MWh from coal).

Source of Delivered Power	Delivered MWh	MWh to be replaced with purchased certificates	Anthropogenic Emission Factor (mt CO ₂ /MWh)*	Biogenic Emission Factor (mt CO ₂ /MWh)*	Anthropogenic Emissions (mt CO ₂)	Biogenic Emissions (mt CO ₂)
Hydro	10,000	-	0	0	0	-
Biomass	20,000	-	0	0.8	0	16,000
Coal	120,000	20,000	0.9	0	90,000	-
Wind (Certificates sold, so MROW EF applied)	50,000	-	0.562	0	28,100	-

*The anthropogenic and biogenic emission factors used in this example are for illustrative purposes. Reporters should identify a generator-specific emission factor or refer to The Climate Registry's most recent Default Emission Factor Document for fuel-specific default emission factors.

Purchased certificates (Solar)	-	20,000 (To be applied to coal emissions)	0	0	0	0
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Total	200,000	-	-	-	118,100	16,000
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Anthropogenic system-average deliveries metric: 1,301.83 lbs CO₂/MWh

Biogenic system-average deliveries metric: 176.37 lbs CO₂/MWh

The steps used to calculate the anthropogenic system-average deliveries metric according to the Detailed Method are outlined below.

1. Identify:
 - a. Power whose emissions attributes will be replaced with purchased energy attribute certificates: 20,000 MWh of the total 120,000 MWh of coal generation will be replaced with certificates from solar generation.
 - b. Number of sold certificates and corresponding "replacement" emission factors: The MROW emission factor (0.562 mt CO₂/MWh) is used for the 50,000 MWh of wind generation since all attribute certificates have been sold.
 - c. Number of purchased certificates and corresponding CO₂ emission factors: The purchased solar certificates represent 20,000 MWh with zero emissions.
 - d. Net MWh and corresponding CO₂ emission factors for each source of delivered power that is not represented by purchased or sold certificates: 10,000 MWh of hydro with an emission factor of zero mt CO₂/MWh; 20,000 MWh of biomass with

an anthropogenic emission factor of zero mt CO₂/MWh; 100,000 *remaining* MWh of coal with an emission factor of 0.9 mt CO₂/MWh.

2. Calculate “replacement” CO₂ emissions for power whose energy attribute certificates have been sold: Applying the MROW emission factor to the 50,000 MWh of wind power results in 28,100 mt CO₂.
3. Calculate CO₂ emissions from purchased energy attribute certificates: There are zero CO₂ emissions associated with the solar certificates.
4. Calculate CO₂ emissions for delivered power that is not represented by purchased or sold certificates: 90,000 mt CO₂ from 100,000 MWh of coal generation and zero anthropogenic emissions from generation from biomass.
5. Sum CO₂ emissions from Steps 2-4 (28,100 + 0 + 90,000 = 118,100 mt CO₂) and divide by total delivered MWh (200,000 MWh) to calculate the anthropogenic deliveries metric: 1,301.83 lbs CO₂/MWh.

The biogenic system-average deliveries metric is calculated in the same manner as above using biogenic emission totals instead of anthropogenic emissions totals. 16,000 mt biogenic CO₂ divided by total delivered MWh (200,000 MWh) results in a biogenic deliveries metric of 0.08 mt CO₂/ MWh, or 176.37 lb CO₂/MWh.