

INSTRUCTIONS AND DEFINITIONS:

Electric Company Carbon Emissions and Electricity Mix Reporting Database for Customers

April 2021

OVERVIEW

This document and companion reporting database (a spreadsheet and online data entry tool) contain instructions and guidance to electric companies for providing carbon emissions (CO₂) intensity rates to customers for the purpose of Scope 2 greenhouse gas accounting. Specifically, this document instructs electric companies to make accounting adjustments to the carbon emissions intensity rates of delivered electricity to support GHG emissions accounting and the ownership and retirement of renewable and/or zero-carbon attributes for entry in the online data tool. The database also includes the energy resource mix for electricity delivered (i.e., owned generation and purchased power) at the operating company level.

The goal of the database is for retail electric companies to provide timely data to customers on the customer's estimated carbon emissions per megawatt-hour consumed and the electric company's current resource mix, differentiating between total supply on the grid and that which the customer can claim as having received in default service given sale and retirement of clean attributes.

The reporting database includes the following elements:

Instructions (this document)

Qualitative Narrative

Quantitative Data for 2019 and 2020:

- Total Electricity Delivered by Operating Company (MWh)
- Electricity Delivered from Owned Generation (%)
- Electricity Delivered from Purchased Power (%)
- Electricity Delivered from Unknown Generation Source (% of Total)
- Utility Specific Residual Mix Emissions Rate (lbs CO₂/MWh)
- Utility Average Emissions Rate (lbs CO₂/MWh)
- Protocol, Certification, Verification
- Resource Mix for Utility Specific Residual Mix Emissions Rate (%)
- Resource Mix for Utility Average Emissions Rate (%)

Electric Company Contact (name, title, email)

Definitions

QUALITATIVE NARRATIVE

- Provide qualitative description of carbon emissions and resource mix information (200 words max)
 - Include a weblink to your company's public announcement on CO₂ reduction goals.

QUANTITATIVE DATA

- Report information at the operating company level.
- Report total electricity delivered by operating company, the percent from purchased power, the percent from owned generation, and the percent of total that comes from unknown generation sources.
- Report utility specific residual mix emissions rate for delivered electricity (see definition, formula, and examples below).
- Report utility average emissions rate for delivered electricity (see definition and formula below).
- Report the resource mix (%) for the following:
 - Delivered electricity as specified in the numerator of the utility average emissions rate formula.
- Report the resource mix (%) for the following:
 - Delivered electricity as specified in the numerator of the utility specific residual mix emissions rate formula.
- Report if the information provided complies with guidance on emissions accounting as established by protocols from:
 - The Climate Registry's Electric Power Sector Protocol
 - World Resources Institute/World Business Council for Sustainable Development GHG Protocol Scope 2 Guidance
 - If your company takes a different approach from the instructions or uses a different protocol than those listed above, provide details of the methodology used to calculate CO₂ emissions intensity rates in the template's notes section.
- Report if all emissions included in your intensity rates were certified using EPA Part 75 emissions monitoring.
- Report if CO₂ emissions and intensity data has been verified and identify the standard followed (see examples below). Some standards require that verification is performed by a third-party entity accredited by an independent body (e.g., American National Standards Institute). Due to the time required to complete verification of CO₂ emissions data it is likely that in 2021 verified data will be available for the 2019 data year, but not yet for 2020.
 - California Mandatory GHG Reporting Regulations
 - The Climate Registry's General Verification Protocol
 - ISO 14001
 - Other
- Use the notes section of the template to explicitly disclose whether and how RECs are used in the emissions factor calculation.

Utility Specific Residual Mix Emissions Rate Formula and Instructions

- For many customers, their greenhouse gas accounting calls for “residual mix” carbon emissions rate that can be applied to energy consumption that is not tied to specified products such as a PPA, Green Tariff, or other voluntary renewable products.¹
- Utility Specific Residual Mix Emissions Rate (Definition): The average annual CO₂ emissions rate (in lbs. per MWh) of electricity delivered to customers, including renewable generation for which RECs are retained by the utility and retired in the reporting year, with accounting adjustments made for specified green energy products where another entity (e.g., a customer, a different electric company) owns the renewable attributes.

Utility Specific Residual Mix Emissions Rate Formula:

$$\text{Rate} = \text{lbs CO}_2 / \text{MWh}$$

$$\frac{\text{Sum of } \left(\text{Delivered Electricity by Gen Source (MWh)} \times \text{Emissions Rate } \left(\frac{\text{lbs CO}_2}{\text{MWh}} \right) - \text{Delivered Electricity of Specified Products (MWh)} \times \text{Emissions Rate } \left(\frac{\text{lbs CO}_2}{\text{MWh}} \right) \right)}{\text{Total Electricity Delivered (MWh)} - \text{Delivered Electricity of Specified Products (MWh)}}$$

- Specified Products:** Electric companies that generate renewable energy and RECs that are fully or partially sold to 3rd parties outside of their system or retired on behalf of customers should make calculations consistent with rules and methodologies that are consistent with their jurisdictions and business practices. These specified products include (but may not be limited to):
 - RECs that are retired on behalf of a specific customer or group of customers. For example, subscribers to a green tariff program that retires RECs on their behalf; community solar gardens; or, other voluntary program that retires RECs for subscribers.²
- Delivered Electricity:** Annual sales to retail customers from owned generation and purchased electricity.
- For market purchases where emissions are unknown or undifferentiated, use applicable regional or national emissions rate, including: ISO/RTO-level emission factors; The Climate Registry emissions factors; or, eGrid emission factors.³
- To avoid double counting, line losses should not be included in the emissions intensity calculations because customers report them as Scope 3 emissions.
- CO₂ emissions from biogenic fuels should be excluded in the calculations.

¹ Sotos (2015), 8.

² In some states, community solar programs do not convey or retire the RECs to subscribers, in which case no adjustment would be made.

³ This guidance is consistent with EEI’s environmental, social, governance (ESG), and sustainability-related reporting template used to provide the financial sector with more uniform and consistent ESG/sustainability data and information.

Utility Specific Residual Mix Emissions Rate Examples

Green Tariff Program (Example 1)

- A utility delivers 100,000 MWh of electricity to its retail customers.
- 80,000 MWh of electricity are generated by conventional resources at 1,500 lbs CO₂/MWh.
- 20,000 MWh are from owned wind resources with an emissions rate of 0 lbs CO₂/MWh.
- Of the 20,000 MWh of wind, 15,000 MWh are used for RPS compliance (i.e., RECs are retired) and 5,000 MWh are used for a green tariff program that retires RECs on behalf of subscribers.

Utility specific residual mix emissions rate is calculated as:

Energy Source	CO2 Emissions			Energy Delivered minus Specified Products	
	MWh	Intensity (lbs/MWh)	CO2 Emissions (lbs)	Energy Source	MWh
Conventional	80,000	1,500	120,000,000	Conventional	80,000
Wind	20,000	0	0	Wind	20,000
				Green Tariff Program	(5,000)
Totals			120,000,000		95,000

$$\text{Utility specific residual mix emissions rate} = \frac{120,000,000 \text{ lbs CO}_2}{95,000 \text{ MWh}} = 1,263 \text{ lbs CO}_2/\text{MWh}$$

Green Tariff Program and Wholesale Market Purchase (Example 2)

- A utility delivers 185,000 MWh of electricity to its retail customers.
- 135,000 MWh of electricity are generated by conventional resources at 1,500 lbs CO₂/MWh.
- 30,000 MWh of electricity are net purchases from the wholesale PJM market and the PJM system average CO₂ emissions rate is 950 lbs/MWh.
- 20,000 MWh are from owned wind resources with an emissions rate of 0 lbs CO₂/MWh, of which 15,000 MWh are used for RPS compliance (i.e., RECs are retired) and 5,000 MWh of wind is used for a green tariff program that retires RECS on behalf of subscribers.

Utility specific residual mix emissions rate is calculated as:

Energy Source	CO2 Emissions			Energy Delivered minus Specified Products	
	MWh	Intensity (lbs/MWh)	CO2 Emissions (lbs)	Energy Source	MWh
Conventional	135,000	1,500	202,500,000	Conventional	135,000
PJM Wholesale	30,000	950	28,500,000	PJM Wholesale	30,000
Wind	20,000	0	0	Wind	20,000
				Green Tariff Program	(5,000)
Totals			231,000,000		180,000

$$\text{Utility specific energy mix emissions rate} = \frac{231,000,000 \text{ lbs CO}_2}{180,000 \text{ MWh}} = 1,283 \text{ lbs CO}_2/\text{MWh}$$

For utilities that recognize zero emissions renewable energy regardless of whether they received the REC with the energy (do not apply null emissions):

Renewable Energy PPA with and without RECs (Example 3)

- A utility delivers 200,000 MWh of electricity to its retail customers.
- 190,000 MWh of electricity are generated by conventional resources at 1,100 lbs CO₂/MWh.
- 10,000 MWh are from renewable resources via PPA with an emissions rate of 0 lbs CO₂/MWh.
- Of the 10,000 MWh of renewable resources, 6,000 MWh are from wind resources and 4,000 MWh are from solar resources.
- The utility owns and retires the RECs for the solar energy but does not own (and did not retire) the RECs associated with the wind energy.

Utility specific residual mix emissions rate is calculated as:

Energy Source	CO2 Emissions			Energy Delivered minus Specified Products	
	MWh	Intensity (lbs/MWh)	CO2 Emissions (lbs)	Energy Source	MWh
Conventional	190,000	1,100	209,000,000	Conventional	190,000
Solar PPA	4,000	0	0	Solar PPA	4,000
Wind PPA	6,000	0	0	Wind PPA	6,000
Totals			209,000,000		200,000

Utility specific energy mix emissions rate = $\frac{209,000,000 \text{ lbs CO}_2}{200,000 \text{ MWh}} = 1,045 \text{ lbs CO}_2/\text{MWh}$

For utilities that recognize null emissions for renewable energy in which the RECs were sold and/or not received:

Renewable Energy PPA with and without RECs sales (Example 4)

- A utility delivers 200,000 MWh of electricity to its retail customers.
- 190,000 MWh of electricity are generated by conventional resources at 1,100 lbs CO₂/MWh.
- 10,000 MWh are from renewable resources via PPA with an emissions rate of 0 lbs CO₂/MWh.
- Of the 10,000 MWh of renewable resources, 4,000 MWh are from solar resources and 6,000 MWh are from wind resources.
- The utility retires the 4,000 MWh of RECs associated with the solar energy on behalf of all its customers. The utility sells the 6,000 MWh of RECs associated with the wind energy.
- The regional EPA eGRID emission factor is 1,000 lb CO₂/MWh, which is applied to the wind energy MWhs to account for the off-system sale of the associated RECs.

Utility specific residual energy mix emissions rate is calculated as:

Energy Source	CO2 Emissions			Energy Delivered minus Specified Products	
	MWh	Intensity (lbs/MWh)	CO2 Emissions (lbs)	Energy Source	MWh
Conventional	190,000	1,100	209,000,000	Conventional	190,000
Solar PPA	4,000	0	0	Solar PPA	4,000
Wind PPA	6,000	1,000	6,000,000	Wind PPA	6,000
Totals			215,000,000		200,000

$$\text{Utility specific energy mix emissions rate} = \frac{215,000,000 \text{ lbs CO}_2}{200,000 \text{ MWh}} = 1,075 \text{ lbs CO}_2/\text{MWh}$$

*Note that this methodology follows the WRI Scope 2 protocol and avoids double counting of REC retirements by applying a null emission factor (e.g. EPA eGRID emission factor or other applicable residual mix emission rate) to the MWh for which the RECs were sold consistent with the WRI Scope 2 protocol.

Utility Average Emissions Rate Formula

- Utility Average Emissions Rate (Definition): The average CO₂ lbs per MWh of electricity delivered to customers, including all renewable generation and purchases.
- Utility Average Emissions Rate Formula:

$$\frac{\text{Sum of } \left(\text{Delivered Electricity by Source (MWh)} \times \text{Emissions Rate by Generation Source} \left(\frac{\text{lbs CO}_2}{\text{MWh}} \right) \right)}{\text{Total Electricity Delivered (MWh)}}$$

- Delivered Electricity: Annual sales to retail customers from owned generation and purchased electricity.
- For market purchases where emissions are unknown or undifferentiated, use applicable regional or national emissions rate, including: ISO/RTO-level emission factors; The Climate Registry emissions factors; or, eGrid emission factors.⁴
- To avoid double counting, line losses associated with independent / regional transmission operators should not be included in the emissions intensity calculations because customers report them as Scope 3 emissions.
- CO₂ emissions from biogenic fuels should be excluded in the emissions intensity calculations.

⁴ This guidance is consistent with EEI's environmental, social, governance (ESG), and sustainability-related reporting template used to provide the financial sector with more uniform and consistent ESG/sustainability data and information.

DEFINITIONS

Contractual Instruments. Any type of contract between two parties for the sale and purchase of energy bundled with attributes about the energy generation, or for unbundled attribute claims. Markets differ as to what contractual instruments are commonly available or used by companies to purchase energy or claim specific attributes about it, but they can include energy attribute certificates (RECs, GOs, etc.), direct contracts (for both low-carbon, renewable, or fossil fuel generation), supplier-specific emission rates (such as green tariffs and some community solar programs), and other default emission factors representing the untracked or unclaimed energy and emissions (termed the residual mix) if a company does not have other contractual information that meets the Scope 2 Quality Criteria.⁵

Delivered Electricity. Annual sales to retail customers from owned generation and purchased electricity.

Emissions Free Energy Certificate (EFEC). An EFEC represents the clean energy attributes of 1 MWh of zero-carbon electricity and conveys the environmental and social attributes of the generated electricity to customers.

Energy Attribute Certificate (EAC). A category of contractual instrument that represents certain information (or attributes) about the energy generated but does not represent the energy itself. This category includes a variety of instruments with different names, including certificates, tags, credits, or generator declarations. For U.S. utilities, EACs used are often RECs.⁶

Null Electricity (or Power). The underlying power remaining when the RECs have been stripped off and sold elsewhere. Null power is not renewable but is the unspecified and undifferentiated power that has the attributes of the overall system mix or the residual mix where specified power purchases have been removed.

Owned Generation Mix. The total megawatt-hours (MWhs) and percentage of electricity generated by utility owned assets in a reporting year. Owned generation mix is not adjusted for sales or purchases of electricity.

Renewable Energy Certificate (REC). A REC represents the clean energy attributes of 1 MWh of renewable electricity and conveys the environmental and social attributes of the generated electricity to customers.⁷

Utility Average Emissions Rate. The average CO₂ lbs per MWh of electricity delivered to customers, including all renewable generation and purchases.

Utility Specific Residual Mix Emissions Rate. The average annual CO₂ emissions rate (in lbs. per MWh) of electricity delivered to customers, including renewable and/or zero-carbon generation for which attributes are retained by the utility and retired in the reporting year, with accounting adjustments made for specified green energy products where another entity (e.g., a customer, a different electric company) owns the renewable attributes.

Verified: As used here, “verified” means that the data provided has been third-party verified by an independent body, e.g., a Verifier accredited by the American National Standards Institute (ANSI) and approved by the organization publishing GHG protocols to verify GHG assertions against those protocols. “Verified” does not simply mean the electric company is applying a particular GHG accounting protocol. If this is the case, the electric company should indicate in the template which protocol it is following but specify that the reported data has not been third-party verified.

If you have any questions, please contact Adam Cooper acooper@eei.org, 202-508-5551.

⁵ Sotos (2015), 9.

⁶ Ibid

⁷ ACCC Renewables Accelerator (2019).

REFERENCES

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