

Data Sources: Accounting for Standard Delivery Renewable Energy

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Data Sources for Standard Delivery Renewable Energy

Companies use a variety of data sources to account for renewable energy (RE) and associated greenhouse gas (GHG) emissions delivered through the grid in a standard product. Below is a representative summary and analysis of data sources that are publicly available¹ and commonly used for this purpose in the U.S.²

Quick Comparison Table

Data Source	Organization	Type of Data	REC Required for RE?	Scope	Coverage
Company Carbon Emissions and Electricity Mix Reporting Database	EEI	Utility-specific resource mix (%) and emissions factor (CO ₂)	Yes	Annual, Utility- specific by state	U.S.
TCR EPS Protocol, Utility- specific Power Deliveries Metrics	TCR	Utility-specific emissions factor (CO ₂)	Yes	Annual, Utility- specific and/or Product-specific	U.S.; TCR members
California Power Content Label	CEC	Utility-specific resource mix (%) and emissions factor (CO ₂ e)	Yes	Annual, Product-specific	CA
New York Environmental Disclosure Label	NY DPS	Utility-specific resource mix (%)	Yes	Annual, Utility-specific	NY
RPS Compliance Data	LBNL	RPS Compliance Information (RE %)	Yes	Annual, Utility- specific, State-specific	U.S.
Certified Renewable Percentage	Xcel Energy	Utility-specific (RE %)	Yes	Annual, Product- specific by state	CO, MN, WI
Green Advantage Renewable Percentage	MidAmerican Energy	Utility-specific (RE %)	Yes	Annual, Utility-specific	IA
Regional Residual Mix	PJM-GATS, NYGATs, NEPOOL-GIS	Regional residual resource mix (%) and emissions factor	Yes	Annual or Quarterly, Regional	NY, DE, IL, MD, NJ, OH, PA, VA, WV
eGRID	U.S. EPA	Grid average emissions factors (CO ₂ , CH ₄ , N ₂ O)	No	Annual (not published annually), Subregional	U.S.

² This document does not evaluate data quality or transparency of different data sources. However, it is important to note that there can be significant variation in these characteristics.



¹ Center for Resource Solutions (CRS) researched publicly available information and conducted interviews with data source managers and others in the Summer of 2020.

Utility-Specific Information

A utility-specific "resource mix" describes the portfolio of resources that are used (owned or procured) for retail customers or sales. Utility-specific mixes can be developed for specific voluntary power products as well as a utility's standard offer. RE included in the standard offer may be considered Standard Delivery Renewable Energy that is delivered by default. The "emissions factor" is the measure of total GHGs produced from the generation of this mix, including any zero-emissions RE.

EDISON ELECTRIC INSTITUTE'S ELECTRIC COMPANY CARBON EMISSIONS AND ELECTRICITY MIX REPORTING DATABASE

Edison Electric Institute (EEI), in collaboration with member companies, corporate customers, and the World Resources Institute (WRI), developed a *Carbon Emissions and Electricity Mix Reporting Template* to collect carbon dioxide (CO₂) intensity rates for delivered electricity³ by operating company by state, and to provide that information to customers in one central location. RE is included in rates developed through use of the template. The methodology⁴ for these calculations is based on guidance published by The Climate Registry (TCR) and WRI.

What is included?

This data includes electricity delivered by operating company (MWh), Utility Average Emissions Rate (Ibs CO₂/MWh), Utility Specific Residual Mix Emissions Rate (Ibs CO₂/MWh), and the resource mix (%) for delivered electricity. Utilities can also indicate whether the information provided complies with guidance on emissions accounting from established protocols (e.g. TCR, WRI) and whether emissions data has

been verified by a third party. Emissions rates are intended for use by corporations for scope 2 emissions reporting.

Utility Average Emissions Rate: The total retail emissions rate by state. The average annual CO₂ emissions rate (lbs/MWh) of generation, including renewable generation and purchases, used for retail sales by state.

Utility Specific Residual Mix Emissions Rate: The average annual CO₂ emissions rate (lbs/MWh) of generation, including renewable generation, used for retail sales excluding voluntary RE and other specified electricity product sales by state.

Emissions from biogenic fuels are excluded in the calculations.

Treatment and role of Renewable Energy Certificates (RECs)

It is not clear how RECs are treated in the Utility Average Emissions Rate, though this rate still represents generation (and RE) that is assigned to retail load. In the Utility Specific Residual Mix, RECs must be retained by the utility and retired in that reporting year for all RE included. In this rate, Delivered Electricity of Specified Products and associated emissions are removed from total retail sales and emissions (the denominator and the numerator above respectively). Specified Products are defined to include both RECs that are retired on behalf of a specific customer or group of customers (e.g. for voluntary RE product sales) and those that are sold off (i.e. "null" power).5 Where null power is removed from sales, rather than included and assigned emissions, the Utility Specific Residual Mix may not represent all power and appear slightly cleaner than what is actually delivered to customers using the standard offer. There do not appear to be any REC vintage or location requirements, or differential treatment

⁵ Note however that utilities are encouraged to use calculations for specified products (including null power as defined) consistent with their jurisdictions and business practices.



³ EEI defines delivered electricity as annual sales to retail customers from owned generation and purchased electricity.

⁴ See https://www.eei.org/Pages/CO2Emissions-Access.aspx.

required for unbundled REC procurements, bundled RE contracts, and generation from owned RE facilities for which RECs are retained and retired. Utilities may use the notes section of the template to provide additional information about "whether and how RECs are used in the emissions factor calculation."

Scope of the data

The data is annual (for the previous year or the year before) and utility-specific by state served. It includes EEI member utilities across the U.S. Around half of EEI members (43% of U.S. electricity generation) provide data at this time.

THE CLIMATE REGISTRY'S (TCR'S) POWER DELIVERIES METRICS

TCR makes available utility-specific power deliveries metrics that are developed annually by utilities and third-party verified.

What is included?

This data includes CO₂ emissions metrics (lbs CO₂/ MWh) reflecting a reporting utility's system average, retail power product, special power product(s), wholesale power and self-consumed power. All power-delivery metrics have been developed to support reporting scope 2 GHG emissions. Utilities may report power-delivery metrics for multiple special power products to reflect different customer offerings. TCR does not publish system average powerdelivery metrics for utilities that choose to disclose retail, special power product or wholesale power deliveries metrics, in order to avoid double counting of emissions attributes across customers. All reported power-delivery metrics are developed using TCR's Electric Power Sector Protocol7, which is consistent with the GHG Protocol and ISO 14064-1.

- 6 EEI. April 2020. Instructions and Definitions: Electric Company Carbon Emissions and Electricity Mix Reporting Template for Customers. Pa. 2
- 7 See https://www.theclimateregistry.org/tools-resources/reporting-protocols/electric-power-sector-protocol/.

Emissions and electricity generation from biogenic resources are excluded from fossil-focused power deliveries metrics. TCR requires disclosure of a separate power delivery metric to address emissions from biogenic sources.

Treatment and role of RECs

RECs are required to be retired for all RE included in a utility-specific power delivery metric. There is no differentiation between bundled and unbundled RECs. RECs must be sourced from the same market⁸ and must have been generated within a period of six months before the emissions year to up to three months after the emissions year. Utilities must assign emissions to any null power delivered to customers based on the residual mix of the grid, or a grid-average emission rate in absence of a residual mix.

Scope of data

This data is annual (for the previous year) and utility-specific. About 5-10 utilities report each year (TCR members only).

State Electric Product Disclosure Programs

Many states require utilities to produce electric product disclosure labels that give customers information about the resources used to generate their power. These labels are typically designed to provide education or inform consumer choice, where available. There is a great deal of variety in terms of what information is included (e.g. RE definitions vary by state), whether the information represents electricity generated or delivered, whether a standardized reporting and accounting methodology is required, whether verification is required, etc. RE included on

8 A market is typically defined as within the same national boundary except where international grids are closely defined.



labels showing the sources of delivered electricity for a standard, non-voluntary product, or portfolio may be considered Standard Delivery Renewable Energy. This document includes examples of two electric product disclosure programs: California and New York. Both states have very specific rules for reporting information about the sources of electricity delivered to customers, but those rules are quite different.

CALIFORNIA'S POWER SOURCE DISCLOSURE PROGRAM

The California Energy Commission's (CEC's) Power Source Disclosure (PSD) program requires retail electricity suppliers to report information on the energy they use.

What is included?

The state's Power Content Label lists the resource mix (%) for each retail portfolio or product of the energy supplier as compared to the California overall power mix. Starting in 2021 (for 2020 generation) GHG emissions intensity will also be included. The GHG emissions intensity will be calculated by dividing the sum of all GHG emissions from specified adjusted net purchases9 and from unspecified power for the previous calendar year by the retail sales of that electricity portfolio during that same calendar year. Emissions from adjusted net purchases and unspecified power are calculated as the sum of adjusted net purchases from generators or unspecified power multiplied by the emissions factor of the generator or the default emissions rate of unspecified power for California.¹⁰ RE must be from facilities that are certified by the CEC pursuant to the Renewable Portfolio Standard (RPS) Program. Carbon dioxide emissions are not assigned to electricity production from biogenic fuels for GHG emissions intensity calculations.

Treatment and role of RECs

RECs are required for all RE that is included in the resource mix and GHG intensity calculations. RECs associated with bundled procurements do not need to be retired in the year of reporting but cannot be sold. Null power is assigned the emissions of unspecified power for California. Unbundled RECs cannot be used to calculate or adjust the fuel mix or GHG emissions intensity of an electricity portfolio but must be reported separately on the PSD label for the year in which they were retired. Firmed and shaped renewable procurements¹¹ are reported as renewable in the resource mix but are assigned the emissions of delivered power in the GHG emissions intensity calculation. There are no REC vintage requirements.

Scope of the data

All retail suppliers of electricity in California are subject to the PSD program annually (for the previous year).

NEW YORK'S ENVIRONMENTAL DISCLOSURE LABEL PROGRAM (EDP)

Energy services companies (ESCOs) selling electricity in the state are required to provide customers with periodic environmental disclosure statements or environmental disclosure labels in plain language. This information enables consumers to select an electricity supplier based on environmental quality and resource diversity.

What is included?

Labels include resource mix (%) of electricity serving retail load as well as air emissions relative to the state average. They do not include emissions intensity at this time.

- 9 See 20 CCR § 1393(a)(6).
- 10 The default emissions rate for California is specified in section 95111(b)(1) of California's Mandatory Reporting Regulation.
- 11 Otherwise called "Portfolio Content Category 2" procurements, which is defined at 20 CCR § 3203.



Treatment and role of RECs

REC retirement is required for all RE reported in the EDP. Unbundled REC imports and RECs sold to endusers where the seller does not serve the end-user's load are not included.¹² All unfulfilled load (not met with certificates from specified generation in an EDP Subaccount) is assigned the residual mix. RECs must be of the same vintage as the compliance year except for Tier 1 RECs,¹³ which may be up to two years old.

Scope of the data

All ESCOs in NY must comply. This data is annual and utility-specific, but not product-specific.

Renewable Portfolio Standard (RPS) Compliance Data

An RPS is a type of state regulation that typically requires a minimum amount or percentage of retail electricity sales supplied with renewable energy. Depending on how programs are structured, utility RPS compliance may represent a percentage of RE delivered to, and that may be claimed by, all utility customers. RE definitions vary by state.

LAWRENCE BERKELEY NATIONAL LABORATORY (LBNL) RPS COMPLIANCE DATA

LBNL tracks and analyzes state RPS programs in order to inform policymakers, program administrators, and others about the design and impacts of these policies.

What is included?

This data includes RPS obligations and achievements for each state, both total RE and by tier or class where applicable. Although qualifying RE resources vary by state, definitions of RPS eligibility are not provided.

RPS Obligations (MWh): The nominal RPS requirement prior to the application of multipliers, alternative compliance payments (ACPs), or waivers. These values do not represent RPS compliance, per se, as each state might define compliance differently. Neither do they represent the total amount of RE generated or available for RPS compliance.

RPS Achievement (% of RPS obligations): The sum total of the amount of RE generation or number of RECs applied towards each entity's compliance obligation, divided by the RPS obligations. It includes application of multipliers, ACPs, and/or waivers.

Treatment and role of RECs

RPS Obligations represent REC retirement obligations (notwithstanding the use of multipliers, ACPs, or waivers) where RECs are the compliance instrument used for the RPS. RPS Achievement reflects REC retirements, with the following specifications. Credit multipliers are reflected. Therefore, this data source does not reflect actual RE delivered. Any previously banked RECs retired for the purpose of RPS compliance are included. ACPs are not included. Borrowed RECs or deferred obligations are not included. RECs purchased or retired in excess of any individual entity's compliance requirement are not included.

Scope of data

The data is annual, state-specific, and utility-specific. It is not product-specific.

¹³ All eligible renewable energy resources that came into operation after January 1 2015 are classified as Tier 1 resources.



¹² This applies to certificates of any kind.

Utility Programs

Leading utilities are beginning to go above compliance obligations to provide additional information to customers about the power they receive. This disclosure will typically show the total RE delivered to standard offer customers divided by the amount of electricity used by customers (i.e. percent RE for the standard product). Two examples of this are programs from Xcel Energy and MidAmerica Energy.

XCEL ENERGY'S CERTIFIED RENEWABLE PERCENTAGE (CRP) PROGRAM

Xcel's CRP program provides the percentage of renewable energy delivered to customers in a given year. The program is currently available to customers in Colorado, Wisconsin, and Minnesota, and was approved by each state's PUC. It allows customers to claim the renewable energy that they are being delivered through state RPS requirements.

What is included?

For each calendar year, Xcel divides the total RE delivered to customers by total retail load that year. Eligible renewable generation may be state-specific.

Treatment and role of RECs

Unique REC retirements are required for all RE included in the CRP. Adjustments are made to remove retirements for voluntary programs to ensure the CRP is separate from voluntary RE programs. Null power is not included in the CRP. Unbundled REC procurements, bundled RE contracts, and generation from owned RE facilities for which RECs are retained and retired are treated equally. RECs retired for RPS compliance are included in the CRP. These RECs can be used during the year of generation and during the four years following the year of generation toward RES compliance. RECs that are retired above and beyond RES compliance are of current-year vintage.

Scope of data

This data is only available for Xcel Energy customers in Colorado, Wisconsin, and Minnesota that are not participating in Xcel's voluntary RE programs. In

Xcel Energy's Certified Renewable Percentage (CRP) Program Calculation

(Total RE generated (MWh)¹-[(RE associated with voluntary programs) + (REC sales) + (Wholesale REC transfers) + (RECs withheld for trade margin adjustment)²]

Total energy used by retail customers from all sources (MWh)³ + Customer Sited Solar Rewards Generation)

Notes:

- 1. This total Includes customer sited generation for which RECs are transferred to PSCo.
- 2. Xcel Energy will retain RECs issued in a given year based on the portion of sales that are trade margin sales. This Is calculated at the OpCo level. The CRP will not apply to trade margin sales.
- 3. This total includes Solar*Rewards Community Participation.

(RECs withheld for the trade margin adjustment)

Total RE generated by all system resources (Mwh)

Trade margin sales (MWh)
Total Sales (MWh



those cases, program-specific emission rates are provided through TCR and EEI (see above). Both the CRP and the product-specific emission factors are annual.

MidAmerican Energy's Green Advantage Program

MidAmerican Energy Services released a Green Advantage program to allow customers to claim the renewable energy delivered to them. The Renewable Energy Percentage (REP) was determined using the methodology and verification procedures defined in The Iowa Administrative Code, Chapter 30.14

What is included?

For each calendar year, MidAmerican divides the total RE delivered to customers by the amount of electricity customers used that year. Eligible renewable generation may be state-specific.

Treatment and role of RECs

Unique REC retirements are required for all RE included in the REP. Purchased RECs that are not bundled with the associated energy will not be counted as part of the REP unless the purchased RECs were used to replace otherwise eligible RECs. The purchased RECs must be purchased during the prior period, and their purchase price must be lower than the price of the sold RECs. Null power is not included in the CRP. There do not appear to be any REC vintage or location requirements.

Scope of data

This data is available for MidAmerican customers in Iowa that are not participating in voluntary renewable energy programs. This data is annual.

Regional Residual Mixes

In general terms, regional residual mixes represent "untracked or unclaimed energy and emissions." These can also be thought of as standard or "publicly shared electricity." In practice, residual mixes may be calculated as energy production data that factors out voluntary purchases, or the generation attributes remaining after all specified power and REC purchases are removed from the system (i.e. "unsettled" generation).

East Coast All-Generation Tracking System Residual Mixes

By tracking all generation and associated emissions attributes, the New England Power Pool Generation Information System (NEPOOL-GIS), the New York Generation Attribute Tracking System (NYGATS), and the PJM Generation Attribute Tracking System (PJM-GATS) automatically calculate residual and system mixes and emission rates. Residual mix certificates are created using all unsettled certificates from the settlement period. RE that is included in the residual mix is RE that is allocated to all unfulfilled load in the region by default, without being actively sourced by the account holder to meet their load, either for RPS or voluntary programs.

What is included?

The residual mix emissions rate is calculated as the average emission rate for all unclaimed certificates. This is the rate that is then applied to load that has not been matched to certificates (i.e. unfulfilled load). The residual mix in PJM-GATS¹⁷ and NEPOOL-GIS¹⁸ is

- 15 Sotos, M. Jan 2015. GHG Protocol Scope 2 Guidance: An Amendment to the GHG Protocol Corporate Standard. World Resources Institute. Pg. 8, 9, 56, 101.
- 16 Ibid. pg. 60, 65.
- 17 See https://gats.pjm-eis.com/GATS2/PublicReports/PJMResidualMix/Filter.
- 18 See https://wwwl.nepoolgis.com/myModule/rpt/ssrs.asp?rn =111&r=%2FPROD%2FNEPOOLGIS%2FPublic%2FNEPOOL_ Residual_Mix&apxReportTitle=NEPOOL%2OResidual%20Mix.



¹⁴ The Iowa Legislature: Iowa Administrative Code. Utility Division [199], Chapter 30: Renewable Energy Percentage Verification. https://www.legis.iowa.gov/law/administrativeRules/chapters?agency=199

broken out by fuel type. The residual mix in NYGATS¹⁹ is broken out by fuel type as well as location or jurisdiction (ISO-NE, NYISO, PJM).

Treatment and role of RECs

Unsettled RECs applied to the residual mix are automatically retired and cease to exist for the purposes of each tracking system.

Scope of data

With the exception of NEPOOL-GIS data, which is provided quarterly, this data is annual. Data is regional and collectively includes residual mixes for all states that fall within NYGATS, NEPOOL-GIS, and PJM-GATS (NY, DE, IL, MD, NJ, OH, PA, VA, WV).

Grid Average Emissions Factors

Grid average resource mixes and emissions factors typically represent the generation occurring within a region, country, or other geographic area. The generation may be transacted outside of that area or used to serve specific load within that area. This data should be distinguished from utility-specific and residual mixes, which provide information about electricity delivered to customers. RE included in a grid average may include RE that is delivered by default to customers as well as all other RE located in the area. Grid average data is included in this backgrounder because it is a lower precision (though sometimes high quality) data source that may be used for market-based scope 2 accounting²⁰ and is commonly used by companies as an estimation of standard delivery power and RE.

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA) EMISSIONS & GENERATION RESOURCE INTEGRATED DATABASE (EGRID)

eGRID is a comprehensive source of data that describes the environmental characteristics of almost all electric power generated in the U.S. eGRID data can be used for the following activities: greenhouse gas registries and inventories, carbon footprints, consumer information disclosure, emission inventories and standards, power market changes, and avoided emission estimates. The data is pulled together from more than a dozen federal data sources, including continuous emissions monitoring systems and forms delivered to the EIA by power plants. While the data Is not third-party verified, the EPA reviews it to ensure accuracy and precision.

What is included?

According to the 2018 Technical Support Document: "Emissions and emission rates in eGRID represent emissions and rates at the point(s) of generation. While they do account for losses within the generating plants (net generation), they do not take into account any power purchases, imports, or exports of electricity into a specific state or any other grouping of plants."21 This data includes air emissions, emissions factors, net generation and resource mix of varying regional granularities (state, eGRID region, NERC region, etc.). eGRID subregional (and other aggregated) data is based on plant-level data. Output emission rates for CO₂, CO₂e, CH₄, and N₂O (in lbs/ MWh) are calculated as total annual adjusted emissions divided by annual net generation by State, Balancing Authority, eGRID Subregion, NERC Region, and the total U.S. eGRID. These rates include adjustments for biogas emissions, for biomass emissions other than biogas, and for solid waste emissions for specified pollutants based on an assumption of zero emissions from biomass combustion. For plants that have a biomass adjustment, the amount of emissions

²¹ U.S. EPA. January 2020. eGRID2018 Technical Support Document. Pg. 19.



¹⁹ See https://nygats.ny.gov/ng/Report/getdto_view_Report_PublicSystemMixEmission.

²⁰ Sotos, M. Jan 2015. GHG Protocol Scope 2 Guidance: An Amendment to the GHG Protocol Corporate Standard. World Resources Institute. Pg. 48.

that the total emissions are adjusted by is included in the database. Emissions associated with useful thermal output at CHP plants are excluded.

Treatment and role of RECs

RECs are not accounted for in this database.

Scope of data

This data provides resource mixes and emissions factors for all of the United States at varying levels, including unit-level, plant-level, state-level, eGRID subregion, NERC region, and, balancing authority. Plant-level data is aggregated to make up the state-level, eGRID subregion, NERC region and balancing authority data. This data is annual, but it is not typically provided each year.

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