Using Renewable Energy to Reduce Corporate Scope 2 Greenhouse Gas Emissions

This Program 201 back-pocket-insight (BPI) describes how corporate electricity customers have focused in recent years on procuring renewable energy (RE) and renewable energy credits (RECs) to reduce their reported Scope 2 greenhouse gas (GHG) emissions. This is the third BPI in a series designed to help electric companies and others conduct comprehensive GHG emissions accounting. It is based on 2021 research completed by P201.[1]

GHG Emission Scopes

The first BPI introduced GHG emissions "scopes." Direct emissions, referred to as "Scope 1," result from company activities that physically release (or remove) GHGs to the atmosphere, such as burning natural gas to generate power.

Indirect emissions can be classified either as Scope 2 or Scope 3; they result from company-related activities but are not directly emitted by the company.

The second BPI describes how electric companies can account for their indirect Scope 2 greenhouse gas (GHG) emissions as part of a corporate GHG emissions inventory.

Electricity Consumption and Scope 2 Emissions

One of the most important and widespread sources of Scope 2 emissions is the consumption of electricity, heat, steam, and cooling purchased by a corporate entity (including electric companies) to power their business operations.

Most corporate entities have this type of Scope 2 emission source, unless they supply 100% of the energy they use from their own carbon-free generation sources and do not purchase any electricity, heat, steam, and cooling from other parties.

For many commercial and industrial (C&I) customers, this type of Scope 2 emissions often is one of their largest sources of GHG emissions as they consume significant quantities of electricity in their operations.

By contrast, most integrated electric companies typically have small Scope 2 emissions compared to their scope 1 emissions, since the direct emissions associated with generating electricity typically are relatively large for these entities and they often generate most of the electricity they consume in their operations.

Calculating Scope 2 Emissions

Typically, Scope 2 emissions for purchased electricity are calculated by multiplying an estimate of the number of megawatt hours (MWh) of electricity purchased and consumed annually by an appropriate GHG emissions factor (EF) that relates CO_2 emissions to power generation (tons CO_2/MWh). Typically, Scope 2 EFs are limited to including only carbon dioxide (CO_2).

Often companies report Scope 2 "purchased energy" emissions based on using an annual average regional grid EFs published by the US EPA or other regulatory agencies that provide an average emissions rate for electricity generated across a large geographic regions and smaller sub-regions.

Goals of Corporate Renewable Energy Procurement

In the mid 1990s, some sustainability-oriented corporate electricity customers began to buy "green" power to reduce the environmental impact of their energy consumption.

While pledges to purchase 100% RE have been led by large technology companies (e.g., Google, Microsoft, Salesforce), companies in other sectors including retail, apparel, finance, insurance and manufacturing have made similar pledges. Today, hundreds of companies worldwide voluntarily have committed to procure 100% RE to meet corporate sustainability goals including reducing their GHG emissions.[2]

These efforts have focused almost entirely on procuring wind and solar RE resources. In 2019 alone, corporate power buyers procured almost 20,000 megawatts (MW) of new wind and solar PV capacity.[3]

Renewable Portfolio Standards (RPS)

To drive more rapid RE deployment and decarbonization, many states have adopted regulatory programs establishing renewable portfolio standards (RPS), clean energy standards (CES) and other programs that require electric companies to procure and track RE generation and other types of "clean energy."

An RPS typically requires a certain percentage of electricity delivered to end-use customers in a state to be generated by qualified "renewable" resources" by a certain date. CES mandates are similar to RPS requirements, but typically include a broader array of "clean energy" technologies such as energy storage, nuclear, CCS, and other generation resources.

Existing state RPS goals range from 10% by 2015 (Wisconsin) to 60% by 2030 (California) to 100% by 2045 (Hawaii). As of September 2020, 30 states had an RPS, and another and five had adopted a CES. A number of states also have adopted voluntary renewable energy goals.[4]

---

[1] *Greenhouse Gas Emissions Accounting for Electric Companies: A Compendium of Technical Briefing Papers and Frequently Asked Questions*. EPRI, Palo Alto, CA: 2021. 3002022366.

[2] See https://www.there100.org/ .

[3] *Harrison, K. Corporate PPA Deal Tracker. BloombergNEF. Feb. 2020.*

[4] http://www.ncsl.org/research/energy/renewable-portfolio-standards.aspx .

Renewable Energy Certificates (RECs)

Most RPS programs allow electric companies to create and trade RECs to achieve RPS compliance. Typically, RECs record the generation of one MWh by a "renewable" resource such as wind and solar, as defined by the specific RPS program. The use of RECs as a compliance instrument is complicated by RPS compliance rules that vary by state. Multiple tracking systems have arisen to accommodate different definitions of RPS-qualified RE in each state law. Currently, there are 10 REC tracking systems in North America.[5]

RECs often are described as being "bundled" when they are transferred in conjunction with the underlying renewable energy generated to create the REC, and "unbundled" when the RECs are separated and sold or transferred separately from the underlying renewable energy.

Voluntary REC transactions are not bound by the geographic restrictions imposed in state RPS laws, and corporate consumers can source RECs from anywhere.

Originally RECs were intended to be used as a tradable instrument solely for tracking compliance with electric company RPS procurement targets, but over time their use has expanded to include being a proxy for reducing a company's reported Scope 2 GHG emissions.

In addition to regulated power companies, corporate sustainability and decarbonization efforts among large corporate power buyers has resulted in these market players purchasing and retiring RECs to demonstrate achievement of their sustainability goals. Appropriate emissions accounting for RE purchases and RECs is complex and depends on the context and purpose for the accounting.

Renewable Energy Procurement and GHG Accounting

Some companies seek to use RE procurement to reduce their reported Scope 2 emissions. Recently, a number of leading large technology companies (e.g., Apple, Google, Microsoft), have been actively generating RE onsite, using Power Purchase Agreements (PPAs) to procure RE and buying and retiring RECs.

C&I customers who purchase RE or RECs to reduce their carbon footprint often seek to purchase enough MWhs of RE (or RECs) to equal their total annual electric power demand (i.e., total MWhs consumed in a year). Many companies have used these RE purchases as the justification for claiming the CO_2 emissions associated with their electricity consumption is zero because all the electricity they "consume" is generated by carbon-free RE or backed by RECs.

However, there are serious limitations to using RECs and RE procurement to do this, and this has led to confusion about the efficacy of using RECs to demonstrate achievement of corporate decarbonization milestones and goals. Critics of using RE and RECs to reduce Scope 2 emissions have long pointed out there is a critical difference between the content of the power *purchased* via contract by an end-use customer and the content of the electric power *delivered* to and consumed by the same customer.

Location & Market Methods to Estimate Scope 2

Under existing corporate GHG accounting standards, companies are allowed to report their Scope 2 emissions using either a "locational" and/or a "market" approach. [6]

The *locational* method reflects the average GHG emissions intensity of the power grid in which energy consumption occurs. This type of EF is based on the physical flow of electricity in the regional power grid.

The *market method* reflects emissions from the electricity that end-use customers have *procured* by contract or similar arrangements. This approach has incentivized large C&I and other customers to buy large amounts of RE and RECs.

Using use a location or market-based EF can have a profound impact on a company's reported Scope 2 GHG emissions. For example, a company that operated in Minnesota in 2020 and bought 100% RE could have reported its 2020 Scope 2 emissions using a locational EF such as the EPA's 2020 eGrid[7] regional CO_2 emissions factor for the RFMC region of 1,153.1 lbs. CO_2/MWh. Alternatively, the same company could have reported its Scope 2 emissions using a market-based EF of 0 lbs. CO_2/MWh.

The use of market-based EFs is controversial and has been questioned by some expert observers. This has led some companies to begin to match their hourly load with hourly-based RECs, and others to begin procuring 100% "carbon-free energy" to meet their load on a 24/7 hourly basis (24/7 CFE).

While it is legally appropriate for load serving entities (LSEs) to use RECs and other RE arrangements to demonstrate RPS compliance, it remains controversial for end-use customers to use the market approach as the basis for reporting their Scope 2 GHG or to track progress toward achieving corporate RE commitments and decarbonization goals.

Project Contacts

Adam Diamant (adiamant@epri.com; 650-855-2077)
Laura Fischer (lfischer@epri.com; 202-495-8144)

[5] https://resource-solutions.org/wp-content/uploads/2018/02/Tracking-System-Map.pdf .

[6] For example, see *WRI/WBSCD Revised Corporate Standard* (2004) .

[7] https://www.epa.gov/egrid .