

SCOPE 2 GREENHOUSE GAS ACCOUNTING FOR U.S. RENEWABLE ENERGY

Guidance For Accounting and Reporting Renewable Electricity

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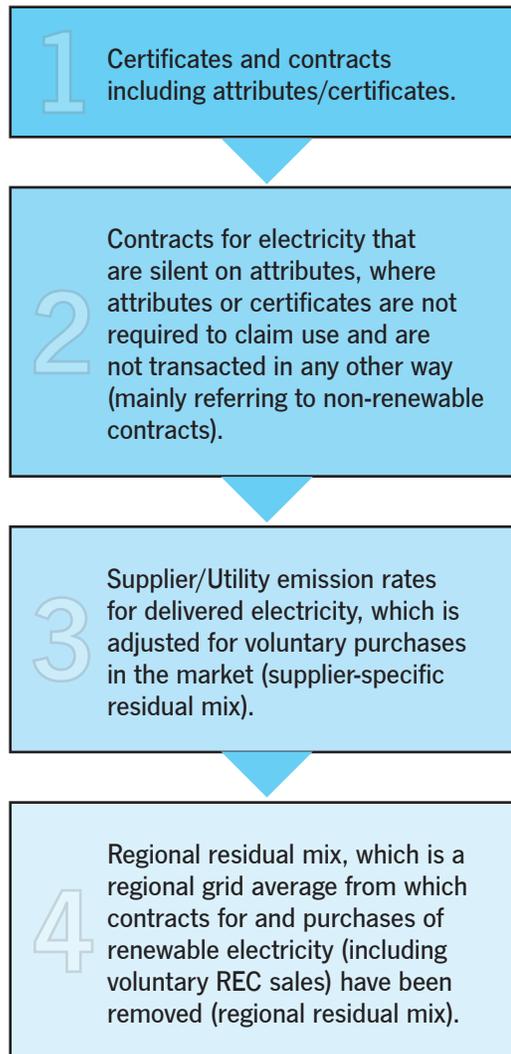
The Greenhouse Gas Protocol, a joint initiative of the World Resources Institute (WRI) and World Business Council on Sustainable Development (WBCSD), released this month new requirements under its Corporate Accounting and Reporting Standard for reporting of Scope 2 greenhouse gas emissions—emissions from purchased electricity, steam, heat, and cooling. These are global standards that recognize a diversity of market conditions. Based on this guidance from WRI, this document contains our guidance for accounting and reporting of renewable electricity in North America in particular.

8 Principles for Accounting for U.S. Renewable Energy in Greenhouse Gas Reporting

1. Scope 2 emissions are calculated using generation-only emission factors, as opposed to avoided grid emissions.
2. In the U.S. and Canada, RECs convey the rights to the generation attributes of renewable generation, including the greenhouse emissions per megawatt-hour of electrical output (emissions factor) of the renewable generator, which is zero for resources like wind, solar, geothermal, and hydroelectric power.
3. There is a clear hierarchy of emissions factors to be used in Scope 2 greenhouse gas accounting for purchased electricity. See Figure 1.
4. Unbundled RECs and bundled electricity and RECs (delivered through a utility green power product, competitive renewable electricity product, power purchase agreement with RECs, or on-site/owned generation with

RECs) constitute the top of the hierarchy and the most precise emissions factor

Figure 1.
Hierarchy of Emission Factors for U.S. Customers Reporting Scope 2 Emissions



- information for Scope 2 accounting for renewable electricity in the U.S. and Canada.¹
5. All specific contracts and purchases of electricity, including RECs, must be substantiated to ensure exclusive ownership, regulatory surplus, and prevent double counting and double claiming, for example using Green-e® certification.
 6. The vintage of the REC must be reasonably close to the inventory year of the electricity consumption to which it is applied.
 7. RECs generated in the U.S. and Canada can only be applied to electricity consumption in the U.S. and Canada, and cannot be used for Scope 2 accounting for electricity consumption outside of the U.S. and Canada.
 8. RECs also include the benefit that GHG emissions on the grid are avoided as renewable generation displaces emitting generation.² These total avoided grid emissions can be reported as supplemental information where renewable energy purchasing has such an effect.

Example Scope 2 Emissions Calculations

Scenario 1: Renewable energy purchase from a region without a cap or with a cap with an allowance set-aside for voluntary renewable energy purchasing.

| Scope 2 Emissions | Supplemental Information |
|---|---|
| A. Elec. Consumption = 100 MWh B. RE Purchased = 95 MWh C. Adjusted Consumption = 5 MWh (A-B) D. Avg. System GHG Emission Rate = 0.68 tCO ₂ e/MWh | F. Avoided Non-baseload GHG Emission Rate = 0.90 tCO ₂ e/MWh |
| E. Scope 2 Emissions = 3.4 tCO ₂ e (C x D) | G. Avoided Grid Emissions = 85.5 tCO ₂ e (B x F) |

Scenario 2: Renewable energy purchase from a region with a cap without an allowance set-aside for voluntary renewable energy purchasing.

| Scope 2 Emissions | Supplemental Information |
|---|--|
| A. Elec. Consumption = 100 MWh B. RE Purchased = 95 MWh C. Adjusted Consumption = 5 MWh (A-B) D. Avg. System GHG Emission Rate = 0.68 tCO ₂ e/MWh | F. Avoided Non-baseload GHG Emission Rate = 0 tCO ₂ e/MWh |
| E. Scope 2 Emissions = 3.4 tCO ₂ e (C x D) | G. Avoided Grid Emissions = 0 tCO ₂ e (B x F) |

NOTES

1. Mexico is currently developing a clean electricity certificate system that may be able to integrate with markets in the U.S. and Canada.
2. In areas where greenhouse gas emissions are not controlled through a cap-and-trade system or where an allowance/permit-retirement mechanism is in place for voluntary renewable energy purchasing within a capped area (e.g. in California and 8 of 9 states in the Regional Greenhouse Gas Initiative).



Background

Scope 2 greenhouse gas emissions are indirect emissions—your indirect emissions associated with the energy you purchase and use. When you purchase and use electricity, or steam, or cooling that is generated by someone else, the emissions associated with the production of that energy are your scope 2 emissions.

“Indirect” means that you are not the entity physically emitting greenhouse gases. In the case of scope 2 emissions, the energy generators are emitting. They control whether or not they emit, but they respond to different market forces, like the demand for their products and services. Scope 2 emissions are the emissions of other entities, but by purchasing the energy product that is made by those emissions, you are also claiming indirect responsibility for them.

Scope 2 emissions are *your* emissions. Measuring changes in your emissions, or your “footprint,” is not the same as measuring changes in global emissions (which would involve the aggregation of everyone’s emissions or at least an understanding of how your emissions relate to others’ emissions or to a baseline level of emissions). For example, just because you calculate and report emissions of 100 tons of carbon dioxide in the month of January doesn’t mean that global emissions increased by 100 tons in January, even if those emissions were your direct emissions.

We measure and report scope 2 and other indirect emissions to understand the emissions that are associated with the production of the products and services that we use, and so that we can make decisions to use cleaner products. When we switch to cleaner energy products, we can reduce our scope 2 emissions, though this may not mean that global emissions have decreased (the old energy products might get used by someone else and those emissions might simply become their responsibility rather than ours). But switching to clean energy and reducing our scope 2 emissions does reflect our decision to use cleaner products—the change in the emissions that we are responsible for—and in aggregate everyone’s individual decisions add up. By using cleaner products and services, we

affect demand-side change, meaning if enough people switch to cleaner products, the market will respond by producing fewer dirty products and more clean ones.

Scope 2 emissions in particular are important because the emissions associated with the production of electricity, heating, and cooling make up such a large part of our total emissions. By purchasing clean energy, energy produced without emitting greenhouse gases, we reduce our personal footprint, our scope 2 emissions, and we also affect demand-side change in the energy sector. We can have an indirect impact and an aggregate impact on the type of energy that is generated.

A renewable energy certificate, or REC, is how we purchase and track delivery and use of renewable electricity in the United States. It is the instrument that we use to track and claim electricity that was generated using renewable resources like wind, solar, geothermal, and hydroelectric resources; electricity generated without emitting greenhouse gases.

Our use of different generators on the grid can only be determined contractually. Once an electricity generator is connected to the interconnected electricity grid, the energy it produces is indistinguishable with respect to how it was produced (including the emissions associated with its production) and cannot otherwise be traced from any specific generation facility or to any specific consumer. Since the first REC sale in the late 1990s, RECs have become a part of the machinery of electricity markets in the U.S., functioning as the currency for renewable electricity. RECs are how we allocate and track usage and delivery of renewable generation to specific consumers both for voluntary purposes and in order to demonstrate compliance with a renewable electricity law or mandate.

A REC is generated for each megawatt-hour of renewable electricity that is added to the grid and represents the generation characteristics or “attributes” of that generation—for example, the size, fuel type (wind, solar, etc.), location, and emissions from the generation facility, as well as other benefits and impacts. Whosoever owns the REC can claim those attributes of generation for



a megawatt-hour of electricity consumption. In other words, the REC purchaser can claim to be the recipient of or to have used that megawatt-hour of renewable electricity. RECs are required for all renewable electricity usage claims in the U.S. The consumers that do not buy RECs are therefore getting a mix of non-renewable electricity, any unbought RECs, and RECs that were bought or acquired on their behalf (as a result of state law, for example), and are therefore indirectly responsible for the emissions associated with producing that mix of non-renewable electricity (their scope 2 emissions). Increasingly, RECs are tracked electronically (See Figure 2).

RECs can be bought separately from electricity or “bundled” with electricity from an electricity provider. Whether purchased bundled or unbundled, the buyer receives the same attributes and may make the same renewable electricity usage claims.

Since RECs are how we choose and access output from new and existing renewable electricity facilities, RECs are how we switch to a clean electricity product, which reduces our scope 2 emissions and our carbon footprint. RECs are also the way to affect demand-side change on the electricity grid, as they facilitate consumer choice and make it possible for people to choose renewable electricity. The more people and companies buy RECs, the more renewable electricity the market will have to create to meet that aggregate demand. This works like any other market for any other product. Growing and sustaining demand for renewable electricity, which can only be expressed using RECs, drives new development of renewable generation facilities.

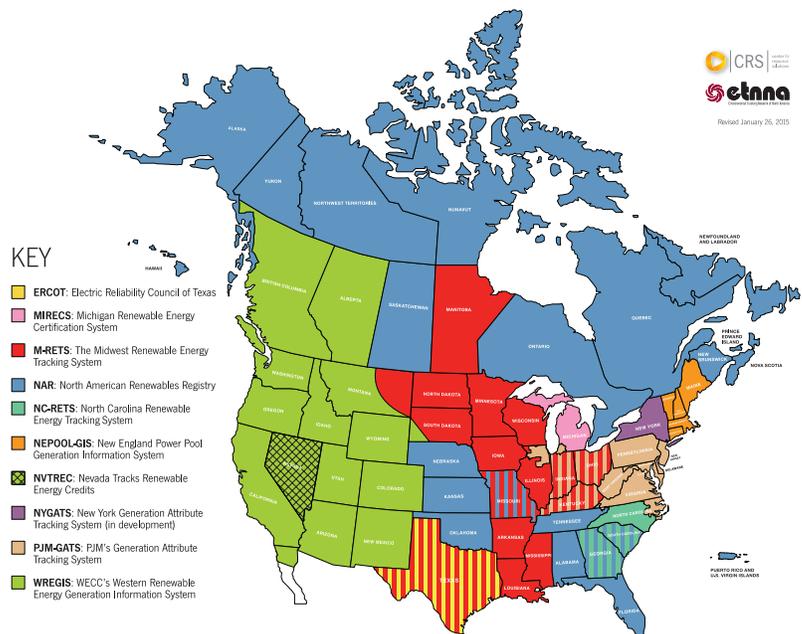
Misconceptions

One popular misunderstanding of RECs and scope 2 emissions is that because REC purchases do not necessarily reduce global emissions or cause an immediate change in the mix of generators feeding the grid (depending on supply and demand), RECs therefore should not be used to reduce a customer’s scope 2 emissions. It is true that if not enough people choose renewable energy and buy RECs, then

the market will not reduce global emissions even though REC purchasers have reduced their own scope 2 emissions. This is due to supply and demand. However, this does not mean that RECs are “greenwashing,” as some have suggested, or that those reports of scope 2 emissions are inaccurate or meaningless.

As explained previously, RECs are just clean electricity and a change in any one person’s purchasing decisions and resultant scope 2 emissions will not necessarily affect global emissions. A seller of RECs or a utility selling renewable electricity may simply source from existing renewable plants on the grid, an existing supply of RECs, if available, which have been produced in anticipation of demand. Even though your individual REC purchase may not have caused that generation to occur, in this case, or result in the creation of a new renewable plant to supply that renewable electricity, you are still receiving renewable electricity and its benefits and you are still adding to overall demand for renewable energy. As a REC purchaser, you are taking responsibility for your own electricity usage and impact, and the benefits of using renewable generation,

Figure 2. Renewable Energy Certificate Tracking Systems in North America



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including the fact that it was generated without emissions, belong to you and do not depend on whether the generation facility is existing or new. It is also important to remember that if we want the REC market to have more of an impact on the development of new renewable generation facilities, then we must grow demand and everyone should buy more RECs, not less.

Another popular misconception is that since RECs do not affect where the physical electricity that we use comes from (what is “keeping the lights on”), this again means that RECs should not be used to claim use of renewable energy or lower scope 2 emissions. While it is true that RECs do not affect where the physical power that comes through your outlet was generated, and it is fairly likely that the nearest generation source is pushing electrons through the grid toward you, the actual source of your electricity cannot be known for certain since electrons are indistinguishable and cannot be traced back to an individual generation source. What is most important with respect to our impact as consumers, and what we are trying to measure when we report emissions, is the types of electricity we choose to buy and support.

Regardless of what resources originally provided the electrons that keep the lights on, what is important is who is paying or responsible for the attributes of that generation. Emissions reporting should reflect how electricity is delivered and consumed as a product, and how electricity consumers interact with emitting sources. Scope 2 emissions should reflect what consumers have done—their purchase decision, activity, or choice of generation, where they have made one, or the resources or product that has been delivered to them based on a utility’s contractual arrangements with generators. Scope 2 reporting should be based on what resources or generation the reporting entity is paying for, or the electricity product that is purchased and delivered, which is both knowable and better reflects the consumer’s impact on the grid. These may not be the same resources or generation that produce the electrons that keep the lights on. This is because the attributes of production, or the way the electricity is generated, including the emissions

associated with production, are not delivered on the wires to consumers.

The central assumption behind this misunderstanding appears to be that a company cannot claim to use renewable electricity (or in other words, claim the attributes of renewable generation) without changing how it physically obtains electricity and without altering how electricity is delivered and sold into the grid. But there is no such thing as a “green” or “brown” electron. In the U.S., electricity is traded using contracts and consumers have choice of electricity products. Emissions are separate from electricity and do not enter the grid. They are conveyed outside the grid and can only be tracked through contracts and certificates. There is no actual or physical distribution of the attributes of electricity generation and RECs do not distort any “truthful” allocation of attributes.

Though for scope 2 accounting we are less concerned with the impact of one’s electricity purchase on the grid and more concerned with the emissions associated with the product that was purchased (since, again, payment for either electricity or unbundled attributes will not necessarily cause any generation to occur depending on supply and demand), it is still important to note that load and the consumption of physical electrons is not the sole determinant of what gets dispatched in different places and is not necessarily equivalent to one’s impact where consumers have choice, as they do in the U.S. The market matters. Market forces, not just location, determine what resources get dispatched. Electricity is not just a location-based service provided by a mix of generating units dispatched by a grid operator in response to system demand at different times in the day. Grid operators respond to contractual transactions that utilities and other providers and generators have made in acquiring electricity to meet load order to dispatch different resources. ●





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