

This document is prepared to help Better Buildings, Better Plants, and Better Climate Challenge partners understand renewable energy certificates (RECs). For more information about renewable energy, please see the [Renewable Energy Guidance for Industry 2022 \[1\]](#) and the [Renewable Energy Guidance for Industry 2022: Supplemental Document \[2\]](#).

## 1 What are RECs?

Renewable energy certificates (RECs), also known as renewable energy credits and green tags, are tradable, nonphysical commodities in the energy market that represent the benefits associated with 1 MWh of generated renewable energy with several attributes, including the type of renewable energy, the emissions associated with that energy (zero), and the grid to which the energy was delivered.

### 1.1 How do RECs work?

The two main products of any renewable energy project are (1) generated energy and (2) environmental improvements. Both products can be monetized and sold separately on the open market. Generated energy is usually sold to the electric grid or can be delivered directly to consumers. Environmental improvements (e.g., reduced carbon emissions, cleaner air, reduced fossil fuel usage) can be sold as RECs.

Each REC has a unique ID number and is individually tracked by different RECs regional tracking systems (*RECs tracking systems are discussed later in this document*), which makes buying and selling RECs trustworthy and transparent.

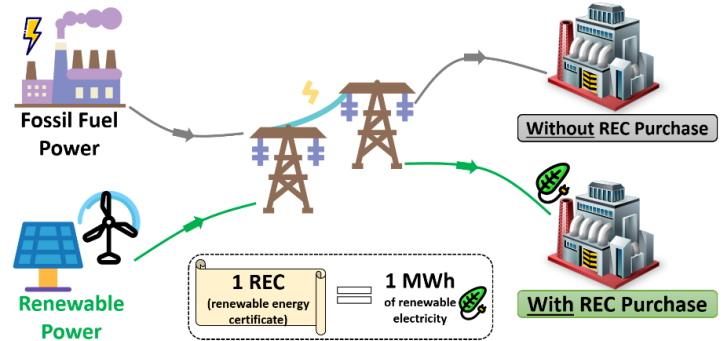
### 1.2 Bundled and unbundled RECs

An energy stream is considered renewable (i.e., green) only if the consumer has possession of the associated RECs, so when an amount of renewable electricity is purchased along with the RECs associated with that amount, these RECs known as **bundled** RECs. However, a company may choose to purchase only the environmental benefits of renewable energy through an **unbundled** REC without the associated energy stream.

For example, a company that consumes 100 MWh of electricity annually from a fossil fuel–powered electric grid but that has purchased 100 RECs from a solar project is considered 100% solar power–driven for 1 year, and thus, the company can claim zero emissions for the 100 MWh of electricity.

### 1.3 Understanding REC ownership

RECs only have one owner at a time. By purchasing and retiring a REC, the owner can claim the sole use of that



green power. Purchased RECs are “retired” by or on behalf of the purchaser in a tracking system to avoid multiple ownership of a REC (i.e., to avoid double counting, or claiming the environmental benefit of a REC by more than one entity). For example, a solar project generates RECs that are issued to the project owner’s account. When a REC is sold, the REC is **transferred** to the purchaser’s account (and the purchaser then may resell or retire the REC) or **retired** by the project owner on the purchaser’s behalf. Before a REC is retired, it can be resold multiple times. Once a REC is retired, it cannot be sold or transferred again.

### 1.4 Why buy RECs?

Procurement of RECs allows organizations to choose cleaner sources of energy and reduce their carbon footprints by reducing Scope 2 and Scope 3\* emissions. Also, RECs provide organizations with the flexibility to invest in renewable energy even if they cannot generate it themselves, or if their local utility company does not offer renewable power options. Furthermore, buying RECs helps provide revenue to support more renewable energy projects. When enough organizations buy RECs, these purchases promote growth in the green power marketplace and help to avoid greenhouse gas emissions across the country.

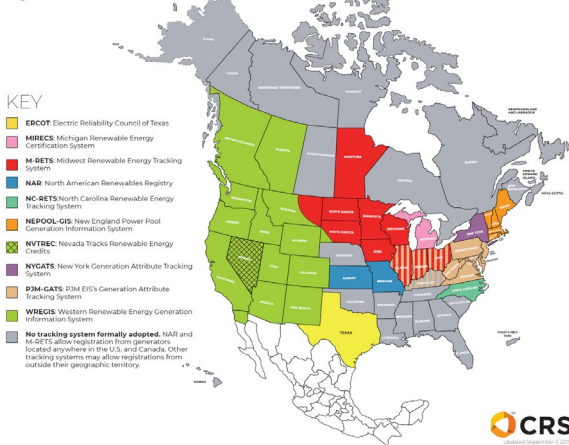
*\*Organizations can reduce Scope 3 emissions by retiring or allocating RECs on behalf of their value chain partners.*

## 2 REC Regional Tracking Systems

Tracking systems provide a basis for creating, managing, and retiring RECs, thus ensuring that each REC is counted only once.

RECs are considered the currency of the renewable energy market. Once renewable electricity is introduced to the grid, proving that electricity physically purchased and consumed by an end user comes from a renewable source (e.g., solar, wind) would be practically impossible. Therefore, RECs and their transactions are tracked and recorded in different tracking systems in different regions of the United States, as shown in the following map. For example, [M-RETS](#) covers part of the Midwest, and [WREGIS](#) covers the Western Interconnection territory. (Click map to enlarge.)

**Renewable Energy Certificate Tracking Systems in North America**



Credit: Center for Resource Solutions, September 2019.

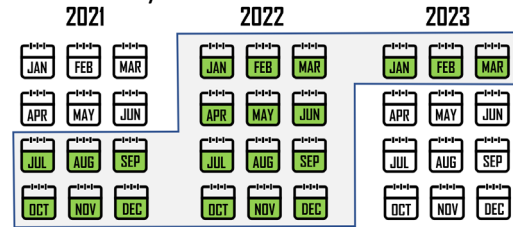
### 2.1 REC serial number

Each REC is assigned a unique serial number that consists of the tracking system’s ID, location and date of generation, type of renewable energy source, quantity, and unique identifier for tracking. Tracking systems may charge small fees when a REC is issued or retired in the system.

### 2.2 REC shelf life

Different states have different limits on the time between when a REC is generated and when it is retired. For example, Wisconsin and Nevada allow up to 4 years before a REC is retired, whereas New England only allows 3 months. RECs certified by Green-e have a 21-month window—12 months of the calendar year when the REC is sold, 6 months before that year starts, and 3 months after that year ends. For example, if a REC

is sold in January or even in December of 2022, that REC must not be generated before July 2021 and then it must be retired by March 2023.



## 3 REC Procurement

### 3.1 Voluntary and compliance renewable energy markets

Many consumers can purchase renewable energy through their existing electric utility company because many states require utility companies to supply a certain share of their energy from renewable sources, a policy called a Renewable Portfolio Standard. When REC purchasing happens in a state with a Renewable Portfolio Standard, this is called a **compliance market**.

*A **Renewable Portfolio Standard** is a regulatory policy adopted by 38 states and the District of Columbia\* in which electricity companies must generate a certain percentage of their electricity from renewable energy sources. Utilities that do not generate a high enough percentage themselves must purchase RECs to make up the difference.*

*\*Source: US Energy Information Administration, September 2020*

In a **voluntary market**, consumers can choose to purchase renewable electricity through different available mechanisms that best align with their goals. If utilities in compliance markets purchase more renewable energy than required, this is also considered participation in the voluntary market.

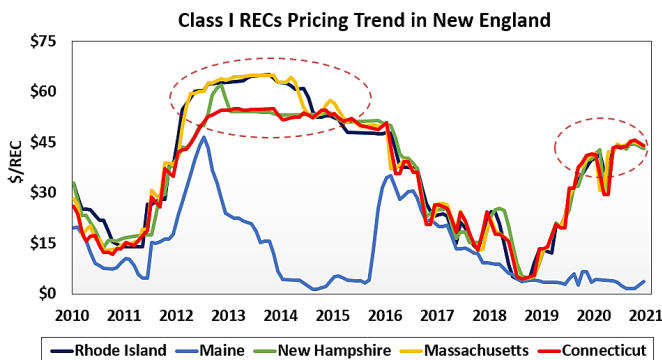
### 3.2 Where to buy RECs

An organization can buy RECs from anywhere in the United States, and generation does not necessarily need to be in the state where the organization is located. For example, according to the [US Energy Information Administration](#) in 2021, a large capacity of wind energy was generated in Texas, but a facility in any other state could buy RECs from that generation and claim the use of wind power.

Since some states with a compliance market have higher REC prices because of higher demand, an organization located in Massachusetts, where REC prices are high, would save some money by buying RECs

from Texas, where RECs prices are much lower. Ultimately, the decision of where to buy RECs is up to the organization. Various factors must be considered; buying RECs in Massachusetts in the previous example, for instance, would encourage more local development of renewable energy generation.

The price of RECs varies depending on market dynamics, such as supply and demand, and market policies, such as Renewable Portfolio Standards. If there is a significant discrepancy between REC prices in the voluntary and compliance markets, an organization may be able to leverage these differences to its financial advantage by selling its eligible renewable energy project's RECs at a high price in a compliance market and purchasing replacement RECs from another renewable project at a low price. This is commonly referred to as **REC arbitrage** (i.e., **REC swap**). The following examples show the trend of REC prices in New England between 2010 and 2021. Areas in red dotted circles indicate good opportunities for REC swap.



Data source: Barbose, G. L. 2021. *U.S. Renewables Portfolio Standards 2021 Status Update: Early Release.*

**Classes and Tiers of RECs**

In different states, RECs are classified based on the generation resource and the year it is generated. For example, in many states, **Tier 1** or **Class I** are RECs that were generated based on solar or wind projects and in the past 5 to 7 years. These RECs have a higher demand and are thus more expensive than Class II, Tier 2, or Tier 3.

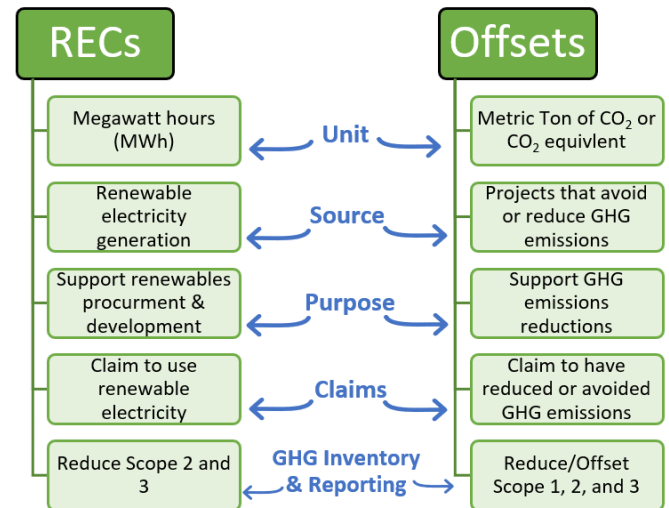
**3.3 How to buy RECs**

In the United States, there are around 850 power utility companies, including municipal, investor-owned, and cooperative utility companies that offer programs to allow customers to pay an additional premium rate per kilowatt-hour (around 1 to 2 cents per kilowatt-hour) to be supplied electricity bundled with RECs. Organizations should check with their utility for the

availability of bundled RECs in their area. Alternatively, organizations may bypass the utility company and instead procure RECs from an outside supplier. In this case, purchasing verified and certified RECs from a supplier that is Green-e certified is recommended to avoid double counting the RECs, and to guarantee that RECs come from new renewable energy generation (i.e., began operating in the last 15 years) to support the development of future renewable energy projects.

**4 RECs versus Carbon Offsets**

An important distinction should be drawn between a REC and a carbon/emissions offset. An offset represents 1 metric ton of avoided emissions; a REC represents 1 MWh of energy. RECs are only associated with renewable energy generation, whereas offsets can be created from any project that avoids or removes the release of greenhouse gases (i.e., carbon capture, efficiency upgrades, green energy). Unlike a REC, an offset only reduces a carbon footprint and has no effect on the renewable character of the energy streams being used by a facility. However, an offset can be applied to all emissions scopes, whereas a REC can only reduce an organization's Scope 2 and 3 emissions.



RECs and offsets are important tools in a company's energy portfolio, but in general, they are not included in energy baselines for the US Department of Energy's (DOE) Better Plants program. While both can be counted in other DOE, US Environmental Protection Agency (EPA), or state energy efficiency and environmental programs, Better Plants is concerned with the actual energy used by facilities. Ownership of a REC or an offset has no easily attributable effect on delivered power and is therefore excluded. However, under the DOE's Better Climate Challenge program,

RECs are allowed (offsets are not). For more information on energy baselining and accounting for renewables, please see the [DOE's Energy Intensity Baselining and Tracking Guidance](#) [3].

## 5 Helpful Resources

- EPA's [Green Power Partnership](#)
- [Center for Resource Solutions](#)
- [Green-e Energy](#) and [Green-e Marketplace](#)
- List of approved [Regional Tracking Systems](#) by Green-e



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## References

- [1] Abbas, A., C. Price, P. Nandy, and T. Wenning. 2022. *Renewable Energy Guidance for Industry*, ORNL/SPR-2021/2026, Oak Ridge National Laboratory, Oak Ridge, Tennessee.
- [2] Abbas, A., C. Price, P. Nandy, T. Wenning. 2022. *Renewable Energy Guidance for Industry: Supplemental Document*, ORNL/SPR-2021/2026, Oak Ridge National Laboratory, Oak Ridge, Tennessee.
- [3] US Department of Energy. 2020. *Energy Intensity Baselining and Tracking Guidance*