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RENEWABLE ENERGY CREDITS

Understanding a Key Tool in the Transition to Renewable Energy and a Low Carbon Future

RENEWABLE ENERGY CREDITS: TOOLS IN TRACKING & TRADING FOR RENEWABLE ENERGY TARGETS

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INTRODUCTION

Welcome to the world of Renewable Energy Credits, also known as Renewable Energy Certificates, or RECs.

This little understood system is a key tool in the conversion of our electric grids to a renewable, low carbon future. Like any tool, RECs can be used for positive purposes, but can also be abused. Determining whether RECS are in fact helping to attain specific renewable energy objectives, requires defining those objectives, and upon the diligence of the user. The goal of this publication is to increase public understanding of the REC market, to inform advocacy in support of renewable energy transition planning.

The RECs market was developed in the mid to late 1990's as a way to ensure utility compliance with state Renewable Portfolio Standards (RPS) or Renewable Energy Standards (RES), as they are called in Colorado. These standards require utilities to achieve specified levels of renewable energy in the electricity they provide by specified dates. For example, Colorado's first standard, approved by the voters in 2004, required Investor Owned Utilities (IOUs) to achieve 10% renewables by 2020.[1]

This posed some important questions. If utilities started claiming certain amounts of renewables in their portfolios, how were regulators, or the public, to judge whether those claims were accurate? How are we to tell the difference between legitimate achievements and 'greenwashing?' The RECs system emerged as part of the answer to these questions.

A REC is a digital accounting of the actual electricity generated by a renewable energy project. It is not electricity and it is not a direct reduction in carbon emissions for the buyer.

Utilities generating their own renewable energy could meet their state mandates, and then sell excess renewable energy and RECs to customers in other states looking to fulfill their own renewable energy standard requirements. This ability to sell the desired *new* renewable energy commodity (e.g. RECs) affected electricity rates, required certification, tracking and reporting and even led to some competition to profit from renewable energy generation. RECs exist in an intangible world of renewable energy accounting, compliance, and trading in a digital format. Thus, the emergence of the REC market as a tool for renewable energy development requires due diligence on the part of public advocates for renewable energy.

[1] Renewable Energy Standard. (2015, September 21). https://www.colorado.gov/pacific/energyoffice/renewable-energy-standard

The following question-answer format is designed to support public understanding of how RECs work in the renewable energy market. When looking into RECs, it's critical to ask:

- "What impact are we trying to have?" *and*
- "How transparent is the origin and nature of the RECs I am purchasing?"

This will help discern whether RECs are the correct tool to create the intended impact, and if RECs are the best way to exercise purchasing power to support renewable energy.

What are RECs?

A REC is a certificate which verifies that one megawatt-hour of renewable energy has been generated.[2] The reason this is important is because a REC represents the avoided CO2 and other air pollutants. The certificate outlines and tracks *where* the energy was generated (location), *how* it was generated (wind, solar, hydro), the age of that facility, *when* the energy was generated, and other generation details which together are called "environmental attributes".

Generating one megawatt-hour of power from a renewable source does not automatically create a certificate. RECs must first be certified by an accredited third party.[3] Top certifiers and sellers of RECs are identified on the platforms of Green-E[4] and WREGIS (Western Renewable Energy Generation System)[5].

What is the REC market?

Once the renewable energy is generated, and a certificate is established, RECs can be transferred or sold from one energy market participant to another. RECs can be sold either '**bundled**', that is sold *together with* the energy directly to the consumer or reseller, or sold '**unbundled**', separate from the energy that was generated. When a consumer buys an 'unbundled' REC, the consumer is not directly receiving renewable energy. The consumer is instead paying for the REC to support renewable energy in the larger grid, and to create a financial incentive to generators to produce more renewable energy. This may have benefits, but the benefits are not as clear when compared to consumers purchasing a renewable resource directly. And it is this abstract quality of unbundled RECs that leads to some of the uncertainty and concern about the system.

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[2] A megawatt-hour is a unit of energy derived from the use of one megawatt of electricity for one hour. A kilowatt is one thousand watts and a megawatt is one thousand kilowatts.

[3] Heeter, J. (2013). Renewable Energy Certificate (REC) Tracking Systems: Costs & Verification Issues. National Renewable Energy Laboratory. Golden, CO: NREL.

[4] Green-e | Powering a Renewable Future. https://www.green-e.org/

[5] WREGIS Home. https://www.wecc.org:443/WREGIS/Pages/Default.aspx

How do RECs differ?

RECs are not all equal, and do not all fetch the same price in the market.

Some less expensive RECs are meant to pay down "new" projects, defined as 15 years old or newer.[6] The amount of qualifying, available RECs on the market at any given time determines the price of the REC. An overabundance of RECs makes the REC price lower.

Older vintage RECs tend to be less expensive and priced as low as $1.[7] The price of RECs may be driven down by the vintage of the REC, supply in the market, how challenging different compliance market standards are, and varying project development costs.[8] As a general rule of thumb, the more expensive a REC, the more one is actually contributing to investment in a renewable energy project.

How Does the REC Market Promote More Renewable Energy?

The REC market can induce renewable energy investment to the extent that RECs are an additional revenue stream for project developers, beyond the revenue from the energy itself. Projects will generate energy that can be sold, but also generate RECs, that can also be sold. Creating an additional revenue stream has the potential to make a proposed project more financially viable. RECs can increase the probability for renewable energy projects to be built, however it is *additionality* which directly mitigates carbon emissions.

When a REC transaction results in new renewable energy development, such as a new solar array or wind farm, this is termed *additionality*. Additionality can be thought of as a principal goal of the REC market. Without which the positive impact of trading a REC may be nebulous at best.

[6] Holt, E., Sumner, J., & Bird, L. (2011). The Role of Renewable Energy Certificates in Developing New Renewable Energy Projects. National Renewable Energy Laboratory. Golden, CO: NREL.

[7] Pinkel, D., & Weinrub, A. (2013). What the Heck is a REC.pdf. http://www.localcleanenergy.org/

[8] See Note 7 above.

Renewable Energy Standards (RES) aka Renewable Portfolio Standards (RPS)

In the United States, RECs developed as states passed Renewable Portfolio Standards (RPSs) which require *some* electricity suppliers to obtain certain percentages of the electricity they sell from renewable sources. There are 29 states, the District of Columbia, and three territories which have Renewable Portfolio Standards. The percentages of renewables, and the years allowed to reach the percentages, vary from state to state. RECs are the current system for accounting for compliance.

As these standards were developed, it quickly became clear that some utilities could generate renewable energy more cheaply than others. Since consumers value low cost power, it made economic sense to generate renewable power where it was cheapest and let the utilities with fewer low-cost renewable options buy power from those who have more. In principle, the RECs market allows this to happen.

State Public Utilities Commissions (PUC), state legislatures, or, citizens at the ballot as in Colorado (also WA and MO) set the standards for what percentage of renewable energy they expect from the utilities they regulate.

In Colorado, there are four types of electricity suppliers:

1. Investor Owned Utilities (IOUs)
2. Rural Electric Co-ops
3. Municipal Utilities
4. Western Area Power Administration

The first two of these are subject to the Colorado Renewable Energy Standard (RES). While some large municipalities are also subject to the RES, small municipal utilities are not subject to the Colorado Renewable Energy Standard.[9]

The Colorado Renewable Energy Standard (RES) for Rural Electric Co-Ops serving 100,000 or more meters, as outlined in Senate Bill 18-246, states that 10% of electricity must be generated from renewable energy sources starting in 2020 and thereafter.[10] The RES for Investor Owned Utilities, as outlined in House Bill 10-1001, states that 30% of electricity must be generated from renewable energy starting in 2020.[11] Here, we can see the Colorado RES as a legal minimum for how utilities must supply their electricity.

The utilities that are subject to the RES must demonstrate that they are complying by annually submitting the required number of RECs to the state Public Utilities Commission. The RECs that

[9] The Colorado RES does not apply to municipal utilities with less than 40,000 customers.
[10] Renewable Energy Standard Repeal Senate Bill 13-252. Regular Session. (2018).
[11] Renewable Energy Portfolio Standard HB 10-1001. (2010).

they submit to demonstrate compliance can be either RECs a utility generates themselves, or RECs that they buy in the market.

Fresh from the Colorado 2019 legislative session, House Bill 1261 legally requires that utilities obtain 80% of their energy from renewable sources by 2030.[12] This will demand focus for all utilities, beyond the state Renewable Energy Standards.

How are RECs traded? Market Trading | Price Fluctuations

Market trading can exist when a producer generates a REC and a consumer is interested in purchasing that REC. An example is given above: a utility may want to buy a REC to meet a compliance standard. The REC is traded to the utility and national tracking systems ensure that the REC is only used once.[13] In states without Renewable Portfolio Standards, local utilities may not need RECs to demonstrate compliance, and can therefore sell them to utilities in other states that do need them for compliance.

There is currently an abundance of RECs available, in part because there are states that do not have Renewable Portfolio Standards. The abundance of RECs on the market means that they are quite cheap, which makes it appealing for those interested in establishing Renewable Energy targets. If the targets can be met with RECs, and RECs are cheap, then meeting the targets is not very difficult.

How are RECs currently used? Voluntary | Compliance | Green Power Programs

RECs are currently used by businesses, utilities, renewable energy developers, towns and individuals. Depending on how they are purchased, with what terms, and at what rates, they can have very different impacts. REC purchasers fall into two categories: *voluntary* and *compliance*.

Compliance - In the case of utilities required to comply with mandatory legal Renewable Energy Standard (RES) obligations, RECs are how they demonstrate compliance. Some utilities develop local renewable energy infrastructure such as solar or wind farms. In areas where this is expensive or simply not possible, purchasing RECs can be an appropriate tool to meet compliance standards. The compliance market can be thought of as the legal minimum amount of renewable energy that must be marketed by those utilities that are subject to the standard. As indicated, these legal minimum requirements exist in some states, but do not exist in others.

[12] Climate Action Plan To Reduce Pollution | Colorado General Assembly. https://leg.colorado.gov/bills/hb19-1261.

[13] Selling RECs more than once could constitute fraud: https://www.epa.gov/greenpower/national-association-attorneys-general-environmental-marketing-guidelines-electricity

Voluntary - The voluntary RECs market is the purchase of RECs in *excess* of what is needed for compliance. Ratepayers, businesses, towns, and industries all may voluntarily purchase RECs even if they have no legal compliance obligations. Voluntary REC buyers are typically environmentally conscious organizations focused on doing something to promote renewables or to offset their use of nonrenewable energy. For example, some resorts offer visitors the option to buy enough RECs to offset the carbon footprint of their vacations, including air travel. Some corporations have set internal renewable energy targets, that they demonstrate by purchasing RECs.[14]

Standards, Compliance, and Verification - In the compliance RECs market, a utilities' commission or other government body sets standards for RECs, which are certified by one of the certifying groups. Only RECs which meet these standards are acceptable.

In the voluntary market, certification does at least allow the consumer to distinguish between a fully certified REC and an uncertified Environmental Attribute. The quality of RECs varies considerably, and there are numerous entities that demand certain standards, from state utility commissions in the case of compliance, to voluntary groups that promote best industry practices. While the National Association of Attorneys General has issued a statement regarding environmental marketing in compliance with law in the sale of RECs, the fact that something falls short of illegality does not guarantee it is a meaningful contribution to the development of renewable energy.

[14] Microsoft, Sprouts, Volvo and many more corporations that wish to purchase RECs have signed the Corporate Renewable Energy Buyers' Principles, which help these corporations transparently reach climate goals.

Voluntary Green Power Programs - The voluntary RECs market is often termed "Green Power". Within the Green Power market, there is an opportunity for any willing market participants to contribute to renewable energy projects.[15] In the case of an existing renewable energy facility, the RECs generated from that facility can be sold as a product in the form of an 'unbundled' REC. In the case of developing new infrastructure, a voluntary program would need to be tied to a physical power purchase agreement, meaning voluntary funding would invest in long-term projects (explained further on pages 8 and 9).

Because people participate in the voluntary green power market for ethical, public relations, reputational or marketing reasons, as opposed to the mandates of the compliance market, 'voluntary' RECs do not have to be technically "certified". That is not to say that they are not a valid investment to support renewable energy, but if they are not certified, they do require a much higher level of due diligence on the part of the consumer.

An advantage of the voluntary market is that the consumer has more choice in the type of RECs they would like to purchase and from where. A disadvantage of this market is that there is much less guarantee of the quality of the product. The consumer can either use due diligence to ensure the product is of real value or the consumer can buy a substandard product and still make claims that it is "supporting renewables." This is an example of how RECs, or 'Environmental Attributes,' can be misused.

Certifying and Purchasing for the Compliance Market - When purchasing for the compliance market, there are regional tracking groups that ensure the REC is only used once and is not double-counted. In the United States, there are ten regional electronic REC tracking systems that facilitate the creation, management, and retirements of RECs. WREGIS[16] (Western Renewable Energy Generation Information System) serves Colorado and most western states.

Certifying and Purchasing for the Voluntary Market - When prospective participants in the voluntary market are interested in purchasing RECs, they can do so by working with a REC broker. There are thousands of brokers, and likely local or regional brokers to connect with. A main platform for finding a REC broker is Green-E.[17] When working with a broker, it is essential to return to the main questions of, "what impact are we trying to have?" and "how transparent is the origin and nature of the RECs I am purchasing?".

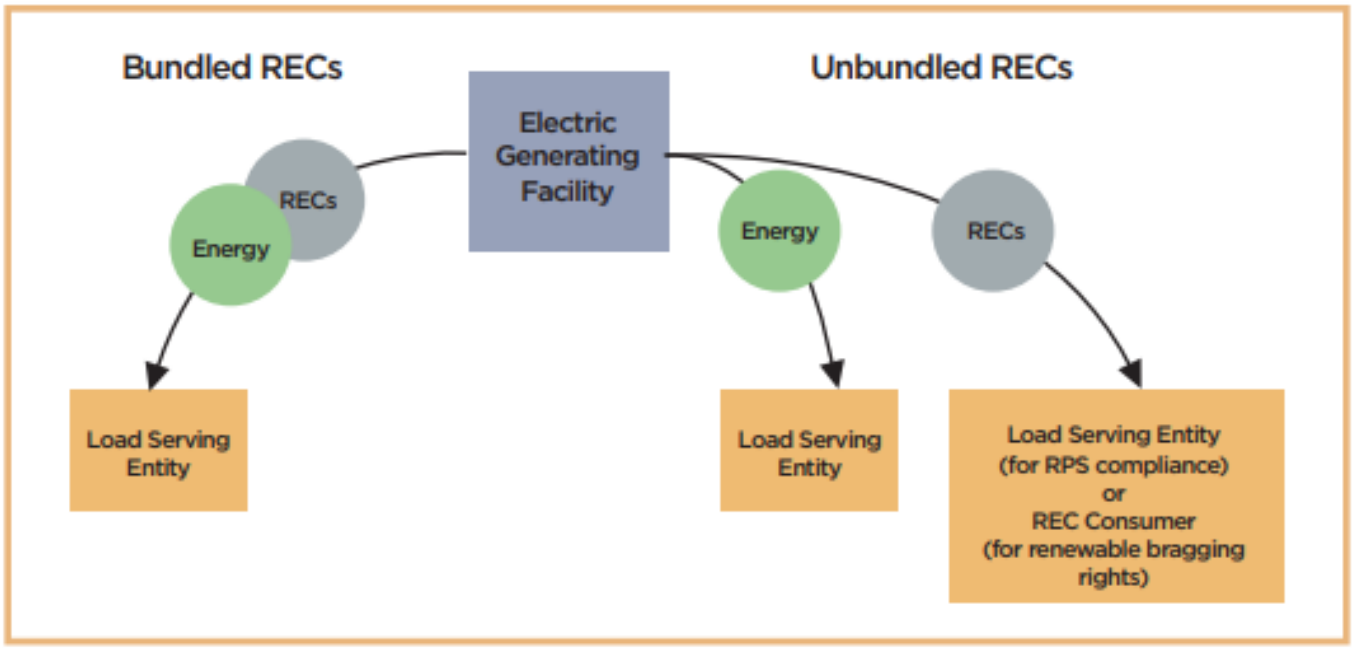
[15] An interesting range of projects can be reviewed at: https://www.goldstandard.org/

[16] *WREGIS Home*. https://www.wecc.org:443/WREGIS/Pages/Default.aspx

[17] *Green-e | Powering a Renewable Future*. https://www.green-e.org/

What is the difference between "bundled" and "unbundled" RECs?

RECs are sold bundled and unbundled, and in different types of power purchase agreements (PPAs). These ideas are discussed below.



Source: "What the Heck is a REC?" by Dan Pinkel and Al Weinrub (2013)

Unbundled | Virtual Power Purchase Agreements (VPPAs)

Unbundled RECs are sold, delivered, or purchased *separately* from electricity. RECs alone provide no physical delivery of renewable electricity to customers. The customer's power generation may not be coming from renewable energy. Unbundled RECs sell for extremely low cost and are not always included in carbon calculations because they are not tied to electricity and the electrons they represent have served someone else.

Buying unbundled RECs can be seen as a financial gesture of support for renewable energy, or a voluntary attempt to 'offset' the emissions associated with the nonrenewable electricity that is being consumed. Often, companies enlist in Virtual Power Purchase Agreements (VPPA); utilizing unbundled RECs as central components to these agreements. This means that a company is financially supporting renewables via a VPPA, even though their operating electricity still comes from the mixed grid.

Often, as the sun shines and the wind blows, RECs are generated beyond the current compliance market demand for RECs. Therefore, the REC price drops, and RECs are sold unbundled in the voluntary or the compliance market. While such financial gestures are appropriate in some circumstances, there are situations where consumers truly want to

transition from fossil fuel energy and ensure their consumed energy is coming directly from their participation in developing a renewable energy source. Unbundled RECs do not achieve that goal.

Bundled | Physical Power Purchase Agreement (PPPAs) | Additionality

Bundled RECs are sold *with* the renewable energy that is received by the consumer. RECs sold *with* energy are often acquired under a Physical Power Purchase Agreement (PPPA). A PPPA is a direct agreement between the producer and the consumer for the direct delivery to the consumer of the electrical power produced.

This does not mean that 100% of the electricity used by the consumer is renewable. Any electrical grid typically receives energy from a great number of different generation sources ranging from rooftop solar systems to hydroelectric dams to wind farms, gas turbines, or coal-fired power plants. Once the electrical energy is on the grid, there is no way to attribute a particular electron to a specific power source. The most that can be said is that the customer's consumption is equal to the amount of renewable energy the customer is paying for and that is delivered to the grid. These PPPAs can specify any certain percentage of renewable energy to non-renewable energy.

The RECs generated are sold to the consumer under the PPPA. When a PPPA is contracted with bundled RECs in a long-term contract, this helps to pay for additional renewable energy infrastructure. This is the value of 'additionality'.

RECs can be traded or sold in the market. Some consumers want to participate in Green Power Programs from a Physical Power Purchase Agreement and buy the RECs from that project directly. There are REC brokers who can help customers find RECs at different price points.

RECs may come bundled or unbundled and from anywhere in the U.S. They may be older or newer and contribute to developing new renewable energy projects to greater or lesser degrees. When purchasing RECs through the voluntary green power market the consumer has a right to exercise a consumerist ethos and seek transparency through disclosure of the data related to the digital RECs in which they invest. In other words, they can ask, where, when and how the electricity associated with the REC was generated. If the seller cannot provide that information, it is a bad sign.

Retirement of RECs

When RECs are submitted to a regulatory authority to demonstrate compliance with a Renewable Portfolio Standard, the RECs are formally 'retired.' They no longer exist, and cannot be further sold, or used to demonstrate compliance to other regulators or in future years. A REC can be used to demonstrate the environmental attributes of renewable energy within a 5-year period of when the REC is certified.[18] Within this 5-year window, the REC can only be sold or traded once. It is important to examine the age and environmental attributes of the REC as it is associated with its selling price. A REC that is about to retire will likely be sold very cheaply, and newer RECs will typically be priced higher. These price associations impact the market and should be carefully considered.

In the voluntary market, there is no guarantee that the purchaser of a REC will retire it. There is thus a danger that an entity will buy RECs (or uncertified Environmental Attributes), take public credit for its action to support renewable energy, and then sell the RECs at some future date. Buying RECs without retiring them is a questionable way to show support for renewable energy development.

Arbitrage

Utilities which produce more renewable energy than they need to meet their compliance percentages may sometimes participate in *arbitrage* to recoup some of their costs. Arbitrage is the near-simultaneous buying and selling of commodities. REC arbitrage occurs when RECs from one renewable electricity project are sold and substituted with less expensive RECs from another renewable electricity project.[19] There are advantages and challenges to REC arbitrage that are essential for consumers to consider. Since renewable electricity use claims must be associated with the replacement RECs, arbitrage can create a disconnect between the consumer and a local renewable electricity project.

The concept of REC arbitrage is buying or investing in certain RECs for a lower price than one can sell some other RECs. This type of arbitrage also helps utilities meet Renewable Energy Standards (RES) at the lowest cost, since the U.S. boasts an array of renewable resources in different states and RECs can be transferred across states to support utilities in meeting their RES.

[18] US EPA, OAR. "Renewable Energy Certificate (REC) Arbitrage." *US EPA*, 8 Sept. 2017, https://www.epa.gov/greenpower/renewable-energy-certificate-rec-arbitrage.

[19] See Note 18 above.

Exploring Other Supply Options

Currently, RECs are the certifying tool available to track renewable energy as it is traded from producer to consumer. It is important to remember that this method evolved with the creation of state Renewable Energy Standards which mandate that utilities meet a certain percentage (typically 10%-50%) of their energy supply via renewables. It will be important to follow and advocate for higher renewable energy requirements in order to transition away from fossil fuels and utilize a compliance approach.

Community Choice Aggregation - The State of Colorado is actively investigating Community Choice Aggregation (CCA)[20], also known as municipal aggregation or Community Choice Energy (CCE), as it is termed in Colorado. It seems likely that legislation in the coming session will require study of this option. These legislative processes would allow local governments to procure power on behalf of their residents, businesses, and municipal accounts from an alternative supplier while still receiving transmission and distribution service from their existing utility provider. While this would involve a process of withdrawing from supply contracts, the utility provider might remain intact by continuing to provide transmission and distribution services. This model is now operating in CA, IL, OH, NY, NJ, RI, and MA. Renewable proponents should actively follow this legislative process, and if it is found to be a viable model for Colorado, they may have the chance to vote for Community Choice Energy.

On-Site & Off-Site Self-Generation - While many individuals, businesses and municipalities are adding on-site solar to buildings, and creating off-site generation via solar and wind gardens, it is important to consider their relationship to their wholesale power suppliers and local renewable generation caps.

Because the business model of many of these generation and transmission organizations ("G & Ts") is to invest in power plants that may take many years to pay off, they may impose caps on local renewable energy generation because they see it as jeopardizing the repayment of their debt. In Colorado, utilities supplied by Tri-State Generation and Transmission are limited to generating no more than five percent of their own requirements. Utilities served by MEAN, the Municipal Energy Agency of Nebraska, are limited to two percent local generation. If a power supplier has a self-generation cap, then the consumer may only create a limited amount of their own energy. This cap is typically very low, making towns reliant on the energy mix of their power supplier.

Self-generation models do have high upfront capital investment, but also provide opportunities to surpass RESs and voluntary green power programs while reducing greenhouse gas emissions and provide more assurance of additionality than some of the REC options.

[20] US EPA, OAR. "Community Choice Aggregation." 25 July 2018, https://www.epa.gov/greenpower/community-choice-aggregation.

Main Takeaways

- The REC market and Renewable Portfolio Standards (RPS) as policy tools are only one part of the bigger equation for mitigating greenhouse gas emissions.
- The Renewable Energy Standard (RES) sets mandatory minimums for renewable energy generation, and those utilities who are required to meet those standards have a variety of ways to navigate how they will use RECs as a tool to comply with RESs.
- Anyone choosing RECs as a tool to meet a renewable energy goal, either as a financial gesture, or through a physical power purchase agreement, should understand the details of the REC they are acquiring, and the extent to which the REC creates additionality, i.e. the extent to which the REC transaction will support development of a new renewable energy project.
- It is essential to understand the parameters of any REC. In most cases, there are still a considerable amount of non-renewable resources in the utilities' portfolio and on the electric grid. Great discernment should be used when purchasing RECs to meet specific needs. With more understanding of the great variability and dynamics of a REC, these tools can be used strategically, carefully and with transparency.
- In the voluntary market, buyers have a lot of options. And their purchases can have effects that range from valuable support to renewable energy programs, to "greenwashing" schemes that discredit the whole concept.
- Buyers should be very wary of buying uncertified Environmental Attributes that are presented as somehow equivalent to RECs or an arrangement that does not guarantee that RECs or Environmental Attributes are going to be retired.
- There are opportunities for ratepayers and utility leaders to target the use of RECs to have meaningful impacts in the renewable energy transition. RECs are tools in a toolbox in climate action planning. Use thoughtfully and with discretion. Look for actions that create additionality via PPPAs, long-term contracts, and opportunities for a high percentage of direct investment.

Additional Web Resources for REC Consumers

Voluntary Market	Status and Trends in the U.S. Voluntary Green Power Market (2017)
Corporate REC market	Guide to Purchasing Green Power (updated September 2018) Corporate Renewable Energy Procurement

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