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WORKING PAPER

IMPLEMENTATION GUIDE FOR UTILITIES: DESIGNING RENEWABLE ENERGY PRODUCTS TO MEET LARGE ENERGY CUSTOMER NEEDS

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EXECUTIVE SUMMARY

Highlights

- Traditional, regulated utilities are well-positioned to meet commercial and industrial (C&I) customer demand for renewable energy through green tariffs.
- Successful green tariff programs have helped to bring more than 900 megawatts (MW) of new solar and wind projects to the grid since 2013.
- Keys to successful green tariffs include: engaging senior leadership from across the utility; consulting customers throughout the design; finding ways to offer fixed-price, cost-based energy from compelling renewable energy projects; and integrating renewable energy into an attractive package for customers.
- It is important to design products with sufficient flexibility to make them attractive to a broad class of customers and to ensure that these products are not putting an unfair burden on any other customers in the utility's service territory.
- Attractive green tariff programs can serve as a strategic competitive differentiator for traditional utilities.

CONTENTS

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Suggested Citation: Barua, P. 2017. "Implementation Guide for Utilities: Designing Renewable Energy Products to Meet Large Energy Customer Needs" Working Paper. Washington, DC: World Resources Institute. Available online at http://www.wri.org/publication/implementation-guide-green-tariffs.

Vertically integrated investor-owned utilities[1] face a unique set of challenges in today's U.S. electricity market. There is increasing pressure from many customers for more choice and control over energy supply, and the expectation of high-quality and reliable service at affordable prices. Simultaneously, there is competition from renewable energy options that are cheaper than current retail rates. Yet utilities are operating within a regulatory model that is based on owned assets and that was developed in the 1950s.

Traditional, regulated utilities are well positioned to offer many of the features that customers are seeking in renewable energy. Both residential and industrial customers are looking to purchase renewable energy to reduce their electricity bills and carbon footprint and mitigate their exposure to fuel price volatility. When large-scale energy buyers are expanding their operations, they look to make investments in service territories that offer a higher mix of renewable energy. Traditional, regulated utilities can offer many of the features that customers are seeking, along with greater flexibility and lower transaction costs than third-party approaches because of their extensive experience with aggregating load and balancing resources in the electricity system.

One effective approach to meeting customer demand for renewables within existing regulatory frameworks is through green tariffs. Green tariffs enable participating customers to source up to 100 percent of their electricity through renewable energy. However, not all green tariff programs are successfully designed or delivered. In this paper, successful green tariffs refer to green tariff programs where renewable energy deals have been signed with large C&I customers.

Successful green tariffs effectively meet large buyers' needs without impacting other customers. Effective green tariffs are designed to prioritize the customers' needs and values. Successful utilities create a cross-functional team that has executive sponsorship and regularly consults with customers while creating and implementing the green tariff. The team finds the best opportunities to create an attractive, value-added package that solves a problem for customers. The team proactively explains the value of the product to customers and works closely with regulators to avoid unfair cost-shifting to other customers.

ABOUT THIS PAPER

Large-scale corporate energy buyers are seeking renewable energy as a central element of their overall energy strategy. In a few states, these C&I customers have collaborated with their utilities to create new opportunities to buy renewable energy in ways that deliver more value to the customer.

Building on that experimentation, this guide provides a synthesis of the ways utilities can meet the renewable energy demand of large-scale energy buyers. The analysis draws on existing and emerging utility green tariff programs. The findings are based on direct discussions with utilities that have designed and/or offered these programs and C&I customers who are seeking large-scale, grid-connected renewable energy products. The analysis also draws on information filed with state public utility commissions (PUCs) for regulatory approval of each proposed green tariff program.

This guide first describes some of the existing green tariff designs; addresses why some of the country's largest shareholder utilities, like Xcel Energy, Duke Energy, and some of the regulated subsidiaries of Berkshire Hathaway Energy, are offering green tariff options; and concludes by outlining the considerations necessary to build an attractive and pragmatic green tariff offering based on learnings to date. Although utilities can increase the number of renewable energy products they offer, it is only when customers sign deals and use the products that renewable energy is delivered to the grid.

RENEWABLE ENERGY PRODUCT: GREEN TARIFFS

Green tariffs are an emerging renewable energy product that has found success among regulated utilities. This section explores the product, the emerging designs, and the current green tariff market.

Introduction to Green Tariffs

A green tariff is a price structure, or an electricity rate, offered by a local utility and approved by the state's public utility commissions (PUC) that allows eligible customers to source up to 100 percent of their electricity from renewable resources. Through a green tariff, customers are able to purchase both the energy from a renewable energy project at a large-scale, and the associated environmental attributes, which are called renewable energy certificates[2] (RECs; Tawney, Barua et al. 2017). Corporate buyers seek RECs to match their renewable electricity usage and meet their sustainability goals (Tawney and Ryor 2014).

Green tariffs do not include green pricing programs that rely exclusively on RECs and have no energy-pricing component.[3] An example of this would be a utility program in which RECs are a premium charge on top of the standard retail electricity rate. See Box 1 for more details.

Since the creation of the first green tariff in 2013, there has been a significant increase in the number of pending and approved green tariffs, as seen in Figure 1. By May 2017, 13 utility green tariffs were proposed or approved across 10 states — up from only 3 tariffs in 2013 (Tawney, Bonugli et al. 2017).

Box 1 | **How Do Green Tariffs Differ from Green Power Programs?**

Utility green power programs have existed since the early 2000s. These programs allowed customers to buy green power from local renewable energy projects through an additional line item on their utility bills. Some of these programs, like Xcel Energy's Windsource program, have a fixed green power payment with a monthly energy credit for fuel costs, which varies. Unlike green tariffs, green power programs offer customers access to renewable energy certificates (RECs) at a premium charge on top of their retail rates to cover the incremental cost of the additional renewable energy.

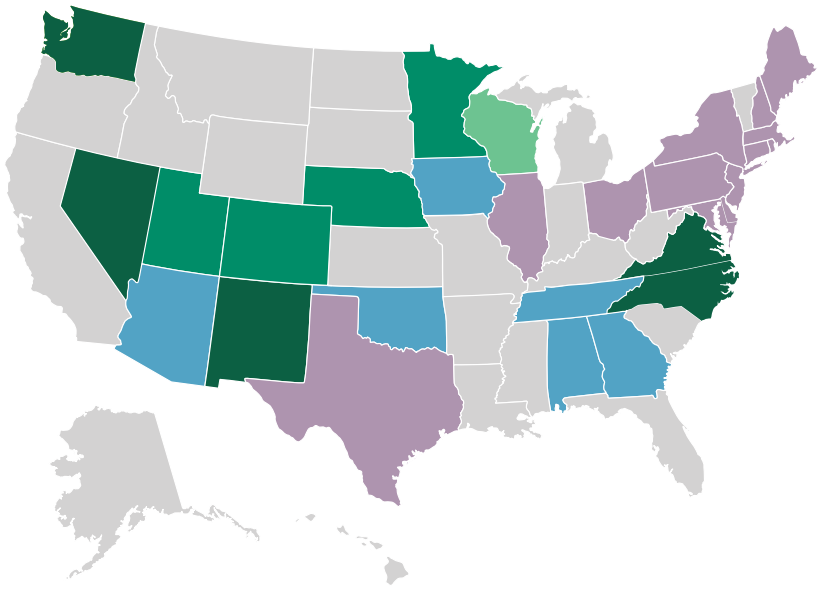
However, recently costs of renewable technologies have dropped dramatically, and they operate without any fuel costs, so in many markets they are cost-competitive with existing fossil-based electricity supply. Because of this, customers are no longer willing to pay a premium cost for renewable energy. Buyers are seeking products that reflect the true cost of service; that is, products where the charge paid for the renewables reflects the actual cost of obtaining the renewable energy plus the utility costs associated with managing the renewables.

Under the traditional green power program structure, customers do not have access to the economic benefits of a fixed-price green tariff. Since green power programs lack the predictable renewable energy project costs essential to the customers' bottom line, they can be less cost-effective. However, REC-based green power programs are simpler to set up and win regulatory approval for and can easily serve very small customers or customers not interested in a long-term contract. For this reason, green power programs will likely continue to be offered.

Figure 1 | States with Green Tariff Programs, May 2017

Utility Renewable Energy (RE) Deals

- Green tariff(s) and executed RE deal(s) through tariff
- Green tariff(s) but no deal(s) through tariff to date
- Considering a green tariff (proposal with the PUC)
- One-on-one RE deal(s) between companies and utilities, but no green tariff to date
- Electric retail choice easily available
- No known direct large-scale RE access available



YEAR PROPOSED OR APPROVED	STATE	UTILITY	GREEN TARIFF PROGRAM	STATUS
2013	Nevada	NV Energy	Green Energy Rider, Schedule NGR	Approved
	North Carolina	Duke Energy	Green Source Rider, Rider GS	Approved
	Virginia	Dominion Energy	Renewable Energy Supply Service, Schedule RG	Approved
2015	Utah	Rocky Mountain Power (RMP)	Service from Renewable Energy Facilities, Schedule 32	Approved
2016	Colorado	Xcel Energy	Renewable*Connect	Approved
	New Mexico	Public Service Company of New Mexico (PNM)	Green Energy Rider, Rider No. 47	Approved
	Utah	RMP	Renewable Energy Purchases for Qualified Customers, Schedule 34	Approved
	Virginia	Dominion Energy	Schedule MBR	Approved
	Washington	Puget Sound Energy (PSE)	Long-Term Renewable Energy Purchase Rider, Schedule No. 139, branded as "Green Direct"	Approved
	Virginia	Appalachian Power Company (APCo)	Rider REO	Proposal with the PUC
	Wisconsin	Madison Gas and Electric (MGE)	Renewable Energy Rider	Proposal with the PUC
2017	Minnesota	Xcel Energy	Renewable*Connect	Approved
	Nebraska	Omaha Public Power District (OPPD)	Schedule No. 261 M – Large Power – High Voltage Transmission Level – Market Energy	Approved

Note: In states with multiple green tariffs, the green coloring indicates the furthest a green tariff has been utilized. For example, in Virginia there are three green tariffs with differing statuses; however, only one green tariff has been used to execute a renewable energy deal. The interactive version of this map includes additional information on the various tariffs provided in each state and the deals executed under each. See WRI 2017a.

Source: WRI 2017a; Tawney, Barua et al. 2017.

For more specific details on the green tariffs discussed in this guide, see the World Resources Institute (WRI) publication, *Emerging Green Tariffs in U.S. Regulated Electricity Markets*, which is updated regularly (Tawney, Barua et al. 2017). This guide draws examples from the May 2017 edition.

Green Tariff Designs

Green tariff programs offer the customer the ability to enter a contract with their local utility to procure both the power and RECs from a renewable energy project for up to 100 percent of their electricity needs.

Green tariff programs have taken three main design forms:

- **Access to individual power purchase agreements:** These green tariffs, which can appear on the customer's bill as either a tariff or a rider (a line item additional to the base service tariff), enable large-scale energy buyers to access a renewable energy power purchase agreement (PPA) through the utility. The tariff allows a "sleeved" PPA between the customer, utility, and renewable energy developer. A tariff replaces the customer's standard electricity rate with the cost of the renewable energy from the PPA. A rider is added to the standard electricity rates. Riders are usually the total of the cost of the renewable energy plus a credit for other services not used under the tariff—for example the fossil-fueled power the customer replaced or the capacity the renewable resource provided. This can result in an overall credit on the bill, although some utilities disallow any credit, leaving the customer at best cost neutral compared to standard utility rates. Rocky Mountain Power (RMP), NV Energy, Dominion Energy, Public Service Company of New Mexico (PNM), Madison Gas and Electric (MGE), and Duke Energy have used this approach in their green tariff offerings.

- **Subscriber programs:** A subscriber program allows customers to subscribe to a portion of a larger renewable energy project and replace the standard charge for fossil-fueled power on their bill. The utility aggregates smaller customers to make a single, larger project more cost effective. Appalachian Power Company (APCo), Xcel Energy, and Puget Sound Energy (PSE) have used this model in their green tariff offerings.

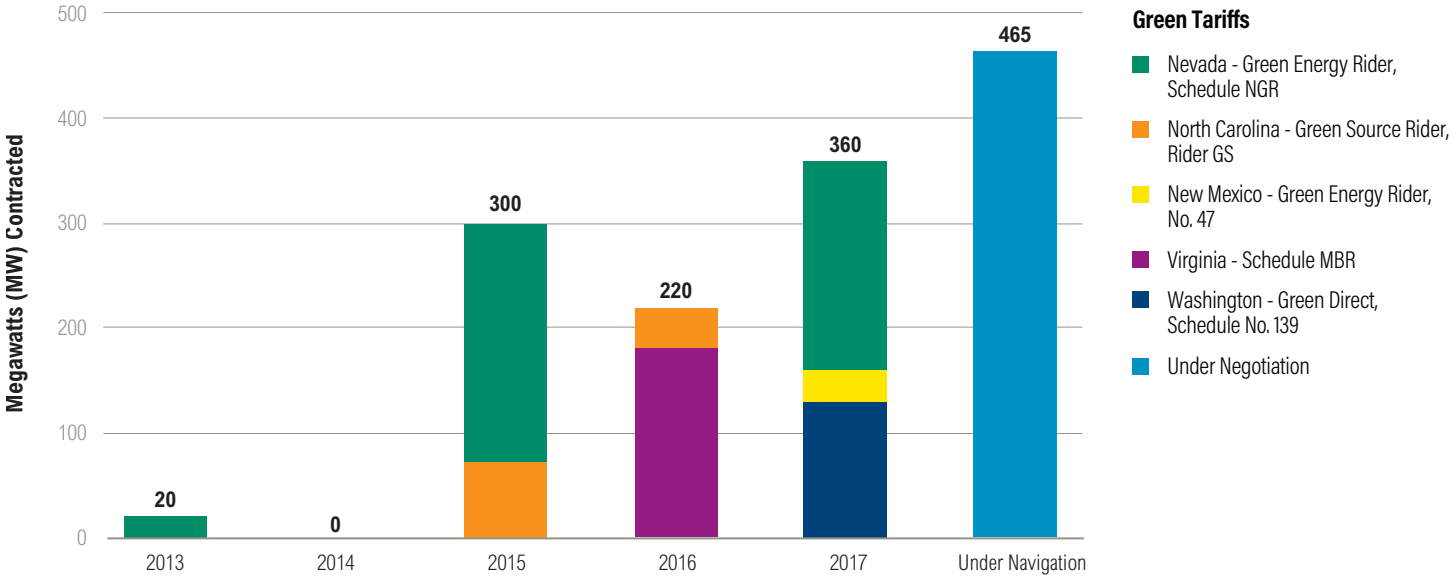
- **Market-based rate programs:** This emerging approach, currently being used by Dominion Energy and Omaha Public Power District (OPPD), leverages access to a regionally organized wholesale electricity market (Pennsylvania-New Jersey-Maryland Interconnection [PJM] and Southwest Power Pool [SPP] in these two cases), with the vertically integrated utility serving as a "middle man" by providing scheduling and settlement services for wholesale market participation. Under this approach, the corporate customer signs a PPA for the energy and RECs from a dedicated renewable energy facility, and the utility sells all the renewable energy output into the wholesale market at the point closest to where it was generated. The wholesale market price received for the renewable energy is credited to the customer. The customer buys power for its facility at the wholesale market electricity rate. Since the sale into the market and the purchase from the market are highly correlated, the purchase price for the PPA becomes essentially the effective energy purchase price for the facility.

In all three program designs, the utility and customer have unbundled the cost-of-service rate—isolated transmission, distribution, capacity, fuel costs, and other energy costs—and inserted the appropriate cost of service for the renewable resource. Green tariffs are not unlike combined heat and power tariffs, which accommodate new generation behind the meter and estimate what the customer should fairly pay for the utility services that wrap around and support that generation source.

Green Tariff Market Overview

Successful green tariff programs have already helped bring more than 900 megawatts (MW) of new, additional solar and wind power through utilities within traditional electricity markets, as shown in Figure 2. These green tariff deals have occurred in Nevada, North Carolina, New Mexico, Virginia, and Washington, and more than 460 MW of wind and solar projects is anticipated in the second half of 2017 (WRI 2017b).

Figure 2 | **U.S. Green Tariff Deals**



Source: WRI 2017b.

Some green tariff programs have witnessed more success than others. In fact, some of the first programs failed to attract any customers for a variety of reasons, including a premium charge for renewable energy that was deemed too high (e.g., Dominion Energy's Schedule RG), too complex a design, and unattractive economics of the tariff itself (e.g., RMP's Schedule 32).

MARKET BENEFITS OF OFFERING A GREEN TARIFF

The market for green tariffs is expected to remain strong because the corporate appetite for purchasing green energy is expected to grow, corporations prefer purchasing large-scale power from their local utility if the price is right, and renewable energy is a cost-competitive fuel and acts as a hedge against market volatility. Some corporations have even selected new sites based on the local utility's green tariff offering.

Corporate Appetite for Green Energy Is Expected to Grow

As of April 2017, 48 percent of the 2016 Fortune 500 companies had a greenhouse gas target, a renewable energy target, an energy efficiency target, or some combination thereof. The largest companies continue to lead, with 63 percent of Fortune 100 companies setting targets (Calvert Investments et al. 2017).

Companies report increasing pressure from customers, shareholders, employees, and other stakeholders to use more renewable energy. In fact, research conducted by Pricewaterhouse Coopers in 2016 revealed that 72 percent of large companies headquartered in the United States are actively pursuing additional renewable energy purchases, and 63 percent of those companies stated that their interest in this strategy had increased within the past six months (Greentech Media 2016). In a joint report, the Retail Industry Leaders Association and the Information

Technology Industry Council ranked all 50 states on the ease with which solar and wind power can be procured by large corporate companies based on demand from their members (Clean Edge et al. 2017)—further evidence that this is a prevalent area of interest across multiple sectors.

As the price of renewable energy continues to fall, more corporate customers see an opportunity to reduce their energy costs and long-term energy risks, as well as meet their sustainability goals.

Large Corporate Buyers Are Looking to Utilities to Access the Scale they Need

To meet their renewable energy goals, corporate buyers need to make large-scale renewable energy purchases through the grid (WRI 2014). Most companies simply cannot buy renewable energy at the scale they need through onsite opportunities alone. Even the most energy-efficient big-box retailer can get only up to 30 percent of its energy needs through onsite solar, and that drops to about 1 percent for a data center.

In addition to onsite production and utilities, customers can utilize renewable energy developers or third-party energy providers. However, these deals are often complex and take time to execute, thus increasing transaction costs. These options are only available in states that allow customers retail choice. When bypassing their utility, companies must weigh the risks and complexities of entering into PPA. They often also pay an "exit fee," which can delay any financial savings from the project. Finally, corporate buyers can also undertake a financial transaction called a "virtual PPA" or VPPA. VPPAs can be done in any organized electricity market, including a market outside of the company's geographic footprint. However, if the renewable energy is produced far from the actual facility load, the transaction does not offer any energy cost hedge. Some stakeholders also tend to dispute the claim that the facility's load is sourced from renewable energy, despite proper retirement of RECs. Companies are increasingly looking for the ability to point to a specific, often local, renewable energy project as the power source for their load.

Corporate buyers are interested in pioneering solutions with their local electric service providers, which are already established as a trusted energy provider and can enable them to access large-scale energy in markets where they have a facility footprint.

Renewable Energy Is Cost-Competitive and a Hedge against Market Volatility

Renewables are more affordable than ever, with solar prices around $1.20 per watt. The U.S. Energy Department's National Renewable Energy Lab expects costs to continue to decline to $1.00 per watt by 2020. Coupled with the continued advancement of technology, these prices are predicted to fall further (Martin and Shankleman 2017). As the cost of generating electricity from renewable energy continues to fall, wind and solar become increasingly cost-competitive with conventional generation technologies like coal, even when the federal tax credits are excluded (Lazard 2016). Even without corporate demand, the economics surrounding renewables drive utility purchasing.

The capital cost and marginal cost structures of renewable energy lend themselves to long-term, fixed-price contracting for the output. This long-term, fixed-price nature is attractive when compared to volatile fossil-fuel- or peak-demand-driven electricity prices. How much a large-scale energy buyer values that hedge depends a great deal on its overall energy strategy and the proportion of energy in its cost of goods and services.

Green Tariffs Can Attract Corporations to a Utility Service Territory

Because corporate facility expansions, operational changes, and investment choices are often made on relatively short timescales—in months at the most—having a green tariff in place can be a strategic competitive differentiator. While it may be difficult to justify a "build it and they will come" approach for utility products, working with existing commercial and industrial (C&I) customers to develop a standard offering that can be used by a class of customers can be a powerful way to signal to the marketplace that a utility service territory is open for business. Data center siting and expansion decisions are characterized by short timelines, as they are for many other companies that have a growing energy demand and ambitious renewable energy goals. Facebook chose to site a $250-million facility in New Mexico in part because PNM worked with Facebook to develop a cost-of-service-based green tariff that the state Public Regulation Commission could review and approve within 40 days—in advance of the siting decision.

Green tariffs are proven to be an effective utility product that offers access to 100 percent renewable energy at the scale sought by corporate buyers. However, not all green tariffs are equal. Successful green tariffs must be designed in a way that companies will use.

In addition to green tariffs, one-on-one deals or "special contracts" are another way utilities have attracted corporate buyers (see Box 2).

Box 2 | **Special Contracts Are a Stepping Stone**

Some vertically integrated utilities, like Arizona Public Service, Alabama Power, and MidAmerican Energy, have successfully met the renewable energy needs of a few of their large-scale energy buyers through one-on-one deals or "special contracts." One-on-one deals represent willingness on the part of an electric utility and a public utility commission to innovate and try new options in providing renewable energy to customers. In this capacity, one-on-one deals indicate states where customers or developers have an opportunity to start a new conversation.

Although one-on-one deals are a starting place, each contract requires negotiation with a customer to design a workable arrangement, followed by regulatory approval, which has high transaction costs and presents real uncertainty for the customer during the negotiation. Customers are less likely to make siting choices until those negotiations are complete. A finalized standard offer available to a large class of customer through a green tariff that clearly identifies the costs, options, and eligibility resolves much of that uncertainty.

CREATING A SUCCESSFUL GREEN TARIFF PROGRAM

In designing a successful renewable energy product, utilities should: 1) consider the basic demands of large-scale energy buyers; 2) consider the common practices of other successful green tariff programs; and 3) balance these needs with the concerns of the regulator. This section offers three steps to accomplish successful design elements.

Step 1: Consider What Large-Scale Energy Buyers Want

In 2014, more than a dozen iconic U.S. corporate brands articulated what they are looking for when buying renewable energy from the grid in the form of six principles—the Corporate Renewable Energy Buyers' Principles (WRI and WWF 2017). Today, 65 large corporate buyers, representing 48 million megawatt hours (MWh) of unmet renewable energy demand per year by 2020, have signed on to these principles. As the principles make clear, these customers want access to the long-term, fixed-price structure of renewable energy. The principles provide a framework for utilities to consider in designing the types of renewable energy products that C&I customers seek. These principles are described in Table 1.

The more principles that are met in a renewable energy product, the more likely the product will be attractive to customers. Recently approved green tariff programs, like Xcel Energy's Renewable*Connect in Minnesota and PSE's Schedule No. 139 Green Direct, which both relied on the Buyers' Principles in their program design, already have a pipeline of corporate and public sector customers ready to use the programs.

Although the Buyers' Principles establish a strong backbone for utilities designing green tariffs, utilities need additional detail to create truly successful renewable energy products. This detail lies in common practices that have emerged across successful green tariffs and in those utilities' efforts to address regulatory concerns.

Table 1 | **Corporate Renewable Energy Buyers' Principles: Elements**

PRINCIPLE	ELEMENTS THAT HELP ADDRESS THE PRINCIPLE
1 Greater choice in our options to procure renewable energy	■ Ability to go beyond the basic portfolio of utility resources in rate base and procure up to 100% of energy from a renewable energy resource of the customer's choice
2 Cost-competitiveness between traditional and renewable energy rates	■ Cost reflects fair cost of service for the renewable energy resource ■ Ability to retain the economic benefits if that resource costs less than the utility's standard offer, particularly if the customer has paid the full cost of that resource
3 Access to longer-term, fixed-price renewable energy	■ Option to enter into a contract over various time periods—for example, 5 years, 10 years, 15 years ■ Certainty of energy cost over that period
4 Access to projects that are new or help drive new projects to reduce energy emissions beyond business as usual	■ New renewable power generation that directly adds new capacity to the system ■ Access to bundled renewable energy products—that is, energy and RECs ■ Ability to claim the consumption of renewable energy through retired RECs ■ Renewable energy delivered from sources that are within reasonable proximity to customer facilities, benefiting local economies and communities and enhancing the resilience and security of the local grid
5 Increased access to third-party financing vehicles, as well as standardized and simplified processes, contracts, and financing for renewable energy projects	■ Financing vehicles that include financing and/or procurement of renewable energy through PPAs and/or lease arrangements ■ Ability to preserve the company's capital for core businesses
6 Opportunities to work with utilities and regulators to expand choices for buying renewable energy	■ Continuing relationships between customers and their electric utilities while increasing options for renewable energy procurement ■ Creation of products that reflect the net costs, taking into consideration the actual cost of procurement, and the benefits to the system, while avoiding shifting any cost to other ratepayers

Source: Bonugli, C. 2017. "U.S. Renewable Energy Map: A Guide for Corporate Buyers." Technical Note. Washington, DC: World Resources Institute. http://www.wri. org/publication/technical-note-us-re-corporate-buyers-map.

Step 2: Consider the Common Practices of Successful Green Tariffs

The successes and failures of the 13 green tariff programs designed and approved or pending approval as of mid-2017 offer useful insights for the design of future programs. Engagement from senior leadership from across the utility, actively consulting customers throughout the design process, and integrating the renewable energy offering into an attractive package for customers have been key elements in green tariff offerings that have attracted buyers. As more green tariff offerings emerge nationally, these will continue to be crucial elements for designing and delivering successful programs. This section describes these common practices in more detail.

Get executive sponsorship within the utility, and engage with a cross-cutting, entrepreneurial team

Engagement from senior leadership has been crucial to completing products that have been used by buyers. NV Energy's successful development and use of one of the first green tariffs included customer discussions at the CEO level, with the full support of the holding company, Berkshire Hathaway Energy. Similarly, Dominion Energy made substantial progress in designing new structures for potential renewable energy offerings with the championship of then Vice President of Customer Service Becky Merritt. PNM's executive team was also closely engaged in developing the green tariff that helped them win a new energy load from Facebook's newest data center (Moss 2016). Several executive level team members

from Xcel Energy—the Chairman of the Board, President, and Chief Executive Officer Ben Fowke; President of Xcel Energy Minnesota Christopher Clark; and Executive Vice President, Group President for Utilities, and Chief Administrative Officer Marvin McDaniel Jr.—all took a personal interest in seeing the green tariff in Minnesota, called Renewable*Connect, move forward. Creating these products is an integral part of the larger evolution that utilities are undergoing, and executive leadership is necessary to keep the effort on track.

In private conversations with utility teams striving to create new products, WRI researchers found that executive sponsorship alone is not enough. Utilities are most successful when the executives find and empower an entrepreneurial, cross-functional team that can work across the customer service, generation, and regulatory divisions. In the traditional monopoly utility, business development decisions were made in the generation and rates and regulation divisions. In the changing business model, utilities are reorganizing their customer service teams to be more responsive and empowered. Those teams can lead this effort, but the other parts of the business must be flexible and inventive to deliver green tariffs that can achieve regulatory approval and win customer business.

As one utility representative said, "any change inside a utility will face considerable inertia and this needs to be overcome." Internal champions partnered with cross-cutting entrepreneurial teams are key in overcoming the initial obstacles in designing and providing a successful renewable energy product.

Consult with customers throughout development

In all the green tariff programs that have executed deals to date, utilities have worked in partnership with their customers to design, or redesign, green tariff offerings to meet customer needs. This is a change from the traditional utility approach to rate design and product development. In May 2016, WRI facilitated a customer/utility simulation where participants, including utility staff and corporate energy buyers, explored creating a mock green tariff together. In the group debriefing, a utility participant reflected on how unusual it was to co-create a product rather than present a finished and fully internally vetted product to customers.

One utility that changed its approach is PSE with its design of Schedule No. 139 Green Direct (see Box 3). PSE approached several customers before filing the tariff with the Washington Utilities and Transportation Commission. This enabled the customers to better understand the tariff and to file comments in support of it during the proceeding. Ultimately, this collaboration led to the pilot program being nearly fully subscribed early in its enrollment process.

Box 3 | The Importance of Customer Consultation

By actively engaging with customers before filing its green tariff program, Puget Sound Energy (PSE) learned that the initial name of the program, "Premium Green," implied a price premium to some customers. When customers gave feedback to PSE that the name would hinder internal messaging and participation approval, PSE changed the name to "Green Direct." Although it may seem minor, this small act enabled some of the large customers that were interested in the program to win internal approval. Signing on to a program called "Premium Green" would have been less financially attractive to their chief financial officers, even though the structure of the program remained unchanged. PSE's close engagement with customers strongly shaped the structure of the program in many areas and allowed commercial and industrial customers as well as large public sector customers to avail themselves of the program.

With more utilities striving to attract and retain large-scale energy buyers, products created without customer engagement are much more likely to sit on the shelf unused. For example, RMP spent time and effort developing Schedule 32, a cost-of-service-based renewable energy tariff, in response to customer-driven legislation. However, designing the details of the tariff without active customer engagement resulted in a tariff that met the letter of the law and perceived customer needs, but was too complex for most customers to understand, and was not economic when applied to actual renewable energy projects and customer loads. As a result, RMP went back to the design stage and gained regulatory approval for two new programs, a Subscriber Solar Program and Schedule 34, to meet the original intent of Schedule 32.

Duke Energy's Green Source Rider has at least seven executed deals, but it went unused for more than a year after receiving regulatory approval. Customers reported one of the key reasons for low uptake was that the utility chose to narrow customer engagement to a few parties and present the finished product as relatively nonnegotiable.

It took time for customers and Duke Energy to find ways to make deals given the Green Source Rider's limitations and pricing structure. Duke Energy also ran the initial request for proposal for renewable energy projects under the tariff with limited customer input, resulting in quite high initial bids that included services in which customers were less interested. Duke Energy has since reorganized its internal teams and is working to be more collaborative with customers, building on what it learned in the initial deals. Discussions of a revision are under way.

In contrast, NV Energy worked closely with a large-scale buyer, Apple, to shape the more flexible Green Energy Rider program (Schedule NGR) available in northern Nevada. Although the program still lists renewable energy as a premium over the standard retail rate (NV Energy is considering revisions), Apple could immediately use the green tariff to sign hundreds of megawatts of deals in the region. The Green Energy Rider has also opened the door for other large customers like the Las Vegas city government to execute similar deals.

It is essential for utilities to engage with their customers like a concierge. Customers have come to expect utilities to proactively walk customers through their options and identify potential risks. In ultimately creating a successful renewable energy product, utilities should be prepared and willing to engage in active, ongoing conversations with customers.

Provide an attractive package

As utilities transition into energy services providers, they are in the unique position to offer a full range of solutions to their customers—integrating renewables with energy efficiency, demand response, disaster recovery, and electric vehicle charging. Utilities can create a valuable package that embeds renewables, even in states where renewables may still be offered at a premium.

Energy buyers must articulate to their management teams why any agreement is good for their business. Products that help them articulate the potential money they are saving or value they are deriving over business-as-usual tend to be more successful.

Utilities must understand what a customer needs in a renewable energy package in order to secure approval on the energy contract from the customer's chief financial officer. Customers evaluate a premium based on many factors, including what they:

- pay today for energy plus RECs;
- pay today for their full retail rate, which bundles energy, capacity, transmission and distribution, and any administrative fees or taxes;
- anticipate paying in two to five years for their full retail rate;
- anticipate the green tariff will cost over time, if any cost elements adjust from period to period;
- anticipate paying for any fuel cost riders and/or other line items on their existing utility bills that may be replaced by a green tariff;
- anticipate paying for a renewable energy contract on the wholesale market; and
- anticipate paying for a standard energy contract on the wholesale market.

Deals executed under green tariffs designed as a premium above the customers' standard retail rates have all integrated additional value to customers in the following ways:

- Valuing the grid benefits of high load factor[4] customers and reducing their overall rates. For example NV Energy and PNM Resources have lowered standard retail rates for high load factor customers to be closer to the marginal cost of serving customers who offer a consistent, predictable load. These customers improve the utility's system load factor, which benefits other grid customers by reducing system cost.
- Offering economic and/or tax incentives to attract or keep large-scale energy buyers within their service territories. These incentives are often justified to encourage economic development and to ensure a large base across which to distribute fixed costs, thereby lowering costs for all customers.
- Accounting and valuing renewable energy's capacity contributions to a utility grid system, in addition to the avoided energy values.

In addition, offering marketing value through naming or billboarding rights enables customers to showcase the renewables project to the local community. In the short run, this may be a sufficient threshold for some customers to justify paying a premium above their standard rate. For example, the agreement between data center company Switch and NV Energy is named Switch Station and Switch can host tours and other outreach efforts at its facility. More ideas are offered in Box 4.

Box 4 | **Finding Ways to Maximize Value from Customer Infrastructure**

Although it has not been explored to its full potential in a green tariff, integrating and valuing the capabilities that large-scale energy buyers could deliver to the grid, including a controllable load, storage, or generation, could leverage further efficiencies. This could reduce the customer's costs, the utility's costs, and the risks to other customers, while delivering systemwide benefits.

Although it was not explicitly a green tariff, Microsoft and Black Hills Energy in Wyoming collaborated on an innovative tariff, the Large Power Contract Service, which gives the regulated utility the ability to tap into the customer's back-up generation capacity to meet peak demand needs (Trabish 2016). This arrangement eliminated the need for redundant generation capital costs and can accommodate Microsoft's anticipated growth on the system without negatively impacting other customers in the utility's service territory.

In addition, large-scale, grid-connected renewable energy offered directly through the utility provides some value streams to the grid itself, including energy, capacity, reduced long-term regulatory compliance and externality costs (due to positive environmental and health impacts because of reduced greenhouse gas emissions). For local distributed resources, the value extends to reduced line losses and distribution capacity investments as well.

Offer flexibility on resource selection and/or project length

Most green tariffs used so far enable customers to choose options that serve their specific needs. These include providing large-scale energy buyers with the ability to choose from new or existing renewable energy projects; service for an entire facility, portion of a facility or aggregation of many facilities; a choice in renewable energy projects and providers; and contract term lengths that fit the customers' internal contracting rules. However, the tariff must clearly describe these options so that customers and developers can effectively evaluate the economics of projects.

Two areas where customers most value flexibility are in resource selection (of both projects and providers) and term length of the contract. Most customers are less concerned with who owns the renewable energy assets as long as the arrangement can deliver a competitive cost.

Corporate customers such as retail operations that have a large but dispersed load across a service territory also value aggregation, the ability to choose which physical locations commit to the green tariff, and options for reallocation if specific locations close.

The choice of project is an important factor for customers seeking renewable energy, and one that significantly influences whether a company will take service under a renewable energy program. In fact, conversations with customers and utilities have revealed that there are several instances in which customers can secure better pricing than utilities can, so allowing customers to bring their preferred project to the tariff has "win-win" potential for all.

Step 3: Balance Customer Needs with Regulator Concerns

Customers are seeking to optimize the economic value and positive environmental and social impact of renewable energy projects for their companies. From a utility perspective, the challenge lies in creating a renewable energy product that helps meet these corporate customer needs while balancing the needs of and potential financial implications for other customers using the system. Successful utilities design green tariffs that enable customers to access the economic value of the renewable energy projects that they help to bring online while ensuring that they are still paying their fair share of the grid and any associated administration, system delivery, and balancing costs.

Customer needs

Utilities should not underestimate the need to market the value of a green tariff to customers. Having engaged customers throughout the design process, the customer service team should have some sense of how customers will evaluate the costs and benefits of the product, compare it to other options, and make the internal case to go forward or not. Utilities that have used clear explanations, proactive outreach, spreadsheet-based pricing models to estimate future costs, and consistent customer engagement have stronger customer relationships, as well as successful green tariff deals.

ACCESS TO FIXED, PREDICTABLE COSTS

Corporate customers value a predictable, fixed renewable energy rate. This often depends on the term length (e.g., 5 years, 10 years, 15 years) of the green tariff project contract.

These customers may be willing to pay slightly higher fixed costs for renewable energy upfront with the potential for future savings compared with traditional fuel prices, though this depends on how they anticipate future price changes. The term length that customers value varies with customer type: retailers or data center co-location providers tend to prefer shorter term lengths (5–10 years) because of uncertainties within their own industries. In contrast, a customer with its own data center or manufacturing facilities may prefer a 10–15-year term if it provides a more compelling business case. Xcel Energy's Renewable*Connect programs offer term lengths from 1 month to 10 years, at different prices, to cover the related administrative costs and risks involved with different term lengths. Having transparent and predictable energy prices over the length of the contract is one of the features that customers value most.

All cost elements in a green tariff, including credits, must be relatively predictable. If they adjust regularly, for example, as fuel riders adjust, then the adjustment process must be transparent and predictable. This allows customers to effectively model the economics and risk profile of the tariff and weigh different options.

ACCESS TO A COMPELLING PROJECT (OR PROJECT PORTFOLIO)

Buyers want to make it clear to their stakeholders, internal and external, that they are having a positive impact on the net greenhouse gas emissions from the electricity sector. They seek to maximize the impact of corporate voluntary procurement to move markets and policy to decarbonize the grid quickly. This is often stated as "they want new projects" in their local service territories that help reduce energy emissions beyond business as usual.

The reality is more complex. There are many ways to have positive impact. For example, the best options for impact may differ depending on whether a buyer has a large, single-point load or many smaller loads. At the most fundamental level, customers want to know that RECs were retired by the utility to match their annual load. In states with clean energy mandates, or where utilities retire the RECs associated with the renewable energy in their generation mix, companies will count that renewable energy toward their goals. As ratepayers, they are the consumers and bear final financial responsibility for those RECs. However, their goals often outstrip regulatory mandates and they will want to see RECs retired for either all or a larger portion of their load. NV Energy's Green Energy Rider (Schedule NGR) applies this logic. The first portion of RECs associated with the PPA goes toward renewable purchase obligations that the utility has on behalf of the customer. The remainder is retired on behalf of the customer as voluntary RECs. Utilities that retain and retire the RECs associated with the renewable energy already in their portfolios should be transparent about the proportion of renewable energy their customers can already claim.

Elements that are important to customers looking for compelling projects include the following:

- **Proximity –** One way corporate customers demonstrate that they are driving impact through their renewable energy commitments is to bring new renewable energy projects onto the grid serving their local facilities. This allows them to show benefits to the local communities that they serve. (See Box 5 for additional location considerations.)

- **New –** This is often shorthand for going beyond "business as usual." Customers have a strong desire to participate in projects that would not have been feasible without their involvement. Apple is proud of the deals it has been able to execute under NV Energy's Green Rider because they helped bring new solar projects onto the grid. Similarly, Microsoft has touted its innovative partnerships with both Dominion Energy and Black Hills Energy as opportunities to expand the amount of renewable energy available on the grid. In Virginia, Microsoft's long-term commitment to buy RECs enabled Dominion to move forward with Virginia's first 20-MW solar farm at no cost to other ratepayers (Bernard 2016) after the project had been rejected by state regulators on the grounds of cost. In Wyoming, Black Hills Energy could pursue more wind power without having to invest in additional capacity by tapping into back-up capacity that Microsoft was already integrating into its data center facility.

- **Bundled RECs –** Because many large corporate customers want to be climate leaders, they are looking for bundled renewable energy products that include access to a PPA or other large-scale, long-term contracting options along with the corresponding RECs.

Box 5 | **Location, Location, Location**

Some large-scale energy buyers want to demonstrate their impact and leadership by sourcing their renewable energy resource nearby. If they are also using a virtual PPA (VPPA), this can also improve the value of the hedge the VPPA creates.

In order to do this, there needs to be transparency and an agreement between the utility and the customer about where the renewable electricity is going and what is "close enough." The customer can receive dedicated renewable electricity for its operations if the generation is behind the meter or if there is a dedicated feeder from project to customer, but those two solutions are often impractical. Many new data centers are being developed in conjunction with a new renewable energy project in the same service territory or transmission area. In other cases, the customer may want the utility to show that it has transmission contracts to move the energy to its service territory. If the customer is served by a transmission independent system operator (ISO) the customer may only require that the project also be in that ISO, even though they are many states and hundreds of miles apart.

More and more businesses are closely matching their load, monthly or hourly, with the renewable energy they are purchasing to better argue that they are reducing the need for fossil-fuel resources. Some are also beginning to ask what power sources fill in the gaps when the renewable resource is not generating.

Regulatory concerns

The key to designing a successful green tariff offering lies in enabling customers to access the economic value of the renewable energy projects that they help to bring online, while ensuring that they are still paying their fair share of the grid and any additional costs associated with bringing these renewable projects online.

Addressing these concerns should begin early in the design process. Ensuring the commissioners and the commission staff are familiar with the evolving field of green tariffs can avoid misunderstandings that impact the final economics of the product.

PREVENT COST SHIFTING TO OTHER CUSTOMERS

When regulators assess renewable energy products that utilities offer to a specific class of customers, like a green tariff, they want to ensure that these products are not putting an unfair burden on other customers that do not have access to the product or choose not to use it. Green tariffs have accomplished customer protection using a few different approaches. The most common—used by NV Energy's Green Energy Rider (Schedule NGR) and Duke Energy's North Carolina Green Source Rider—is to charge the customer the full kilowatt-hour price of the renewable energy under contract and credit back avoided costs for the same kilowatt-hours. This captures the difference between the discounted cost of the next "least cost" resource the utility might add and the cost of the renewable energy project. In both cases, the rider can reach zero, or no premium, as avoided costs change over time. However, it cannot become a credit and reduce the bill below standard retail rates. Although customers have signed such deals, they are considered part of the first generation of green tariffs. Customers feel that this approach likely underestimates the benefits of the renewable energy that is brought onto the grid, particularly if it is serving new load, but does fall squarely in commonly understood approaches for valuing new resources brought onto the grid.

As of April 2017 there were a few cases of approved, cost-of-service-based renewable energy tariffs: for example, Xcel Energy's Renewable*Connect programs and PSE's Schedule No. 139 Green Direct.[5] In these green tariffs, the energy-related costs in the customers' standard electricity tariff is replaced by a fixed charge, which reflects the renewable energy costs from the PPA. This can provide energy cost certainty over the contract period. It also enables the customer to save money if the renewable energy price in the service agreement falls below the utility's standard rate in a future contract year. This makes the offer much more attractive to customers and will likely improve participation in these green tariff programs. It also allows the customer to take the risk of locking in the price of this resource over a long time frame—a risk that the utility commission is not interested in the average electric customer taking on in these particular cases. Each program has used a slightly different approach to recover administrative, grid, and balancing costs to ensure that participants are contributing their fair share of the grid, and to minimize any negative impact on other customers. In some jurisdictions, crediting the marginal cost or market-based cost of energy that the resource is replacing might better reflect the economic value of the renewable energy than traditional avoided-cost approaches.

Xcel Energy's program charges a fixed kilowatt-hour price from the outset, which incorporates the renewable energy

resource cost, monthly capacity credit for the renewable resource, "neutrality adjustment" (to avoid cost shifting to nonparticipant customers), and administrative costs. Customers also pay other standard charges (e.g., demand charges) under their existing electric service schedule. The total costs vary on the basis of the contract length that the customer chooses, and the charges for the "neutrality adjustment," which are based on projected assumptions of line losses, curtailment costs, balancing and integrating variable resources, stranded asset effects, and economic impacts. Since it is based on future anticipated costs that are unknown, customers and the PUC will pay close attention to the "neutrality adjustment" in the pilot program. Customers will want to ensure these costs are close to actual costs, rather than a premium price.

In the PSE program, conversely, the "resource option" energy charge is fixed, on the basis of the renewable energy contract, and replaces the customer's existing energy charge, but the customer continues to pay all the other standard charges (e.g., demand charges, monthly fees) under their existing electric service schedule. These charges, and the energy charge credit, are subject to being updated with each general rate case, power-cost-only rate case, or other power-related filings. In addition, each participating customer signs up for a 10, 15, or 20-year contract to better align with the renewable energy contract term.

In all of these approaches, it is crucial that the customer can estimate the future cost of the product and the scale of the risk that cost will change positively or negatively. See the discussion on pages 11–12 above regarding both how customers compare costs and how they value the fixed-price nature of renewable energy contracts.

SAFEGUARDING AGAINST STRANDED ASSETS

There are two concerns about stranded assets. The first concern is that customers who are not participating in a green tariff contract will bear a contract risk if the participating customers default. The second is that a new resource could leave other resources underutilized if there is insufficient demand for both.

In subscriber programs, the utility either assumes some risk if the full program is not utilized or designs a way for the unsubscribed portion to go into the generation mix for other customers. In designing its subscriber program, PSE limited its initial pilot to approximately 250 MW of renewable energy resources. PSE did not sign the PPA for the new renewable energy resources until it had customer commitments for at least 75 percent of this first tranche and PSE agreed that any unsubscribed renewable energy resources could be utilized by their traditional green power program. A ~250 MW program is large enough to be attractive to large customers, and to test out the cost assumptions in the underlying tariff, without risking that the program will grow out of control and draw too many customers away from the standard rate base or raise large contractual risks. It was also an appropriate scale in the context of market transactions PSE already does to meet its load.

The sleeved PPA style tariffs, such as NV Energy's Green Energy Rider (Schedule NGR), explicitly call for simultaneous contracts between the utility and the renewable energy project and the utility and the customer. This structure very clearly puts all the risk on the customer and requires that the contracts reflect that.

Additional measures include long-term commitment options for customers, termination fees within customer agreements, and prohibitions on jumping from one project or project tranche to another if future pricing is better. Providing these transparent boundaries has helped to allay regulatory and consumer advocate concerns around stranding contract risk on the nonparticipating rate base. However, they should follow industry standards for risk mitigation and need not be punitive.

Addressing the concern about new resources leaving other resources underutilized is more complex. Because vertically integrated utilities typically have a plan for procuring sufficient resources to meet existing customer needs at the least cost, new renewable energy resources may not be needed to serve existing customers. PSE's green tariff is the first to provide a new resource for existing customers because it replaces market transactions that PSE was doing instead. Most green tariffs have been used for new load or, in the case of Xcel Minnesota and APCo, to reallocate existing renewable resources to existing customers.

Adopting the use of avoided cost as the credit for existing customers, as RMP's Schedule 34 does, is one way to address this. Avoided cost, in the context of Public Utility Regulatory Policies Act (PURPA) Qualifying Facilities,[6] is theoretically the appropriate value to the system of a previously unanticipated resource. However, if the avoided cost does not account for factors such as the avoided capacity cost and avoided regulatory cost, it may undervalue the renewable energy on the grid. Avoided

cost may be less appropriate for new load, depending on the avoided cost calculation used because new load could indicate that new resources will be needed sooner. RMP's Schedule 34, for example, uses a different formula for new load that takes this nuance into account.

Considering what might be proposed in a utility's integrated resources plan and allowing customer preference to drive that resource need to renewable energy is another way to address concerns about stranding existing assets. Other approaches could include considering the scale of market-based purchases (sometimes called front office transactions) the utility makes today and allowing customers to sign PPAs equivalent to that volume, as PSE has done. Alternatively, a utility could consider future renewable portfolio standard (RPS) needs and allow customers to purchase today a resource that will likely be needed in the future. If renewable energy prices are low enough, utilities could experiment with bundling accelerated coal depreciation into the tariff, though no one has attempted this yet.

Finally, considering the design of combined heat and power rates and standby charges can be useful. Those rates typically accommodate a customer bringing 30 or 40 MW of their own generation to the grid, displacing generation the utility had historically provided. The design of RMP's Schedule 32 used the existing combined heat and power tariff as a template for the design. In that case, it led to a complicated tariff for variable renewable energy resources that negatively penalizes large-energy-load customers through demand charges. OPPD's market-based rate more effectively incorporates fair capacity charges while enabling customers to purchase energy from the market.

JUSTIFY WHY THESE PROJECTS DON'T BELONG IN THE RATE BASE FOR ALL CUSTOMERS

One concern that regulators raise in deciding whether to approve a green tariff is whether these projects should be available to all customer classes if there is a long-term cost savings potential over regular retail electricity rates. These deals are not necessarily transferable to the general rate base, however. Because large-scale energy buyers can make a long-term commitment to purchasing renewable energy and RECs from a project, they are in a unique position to bring new renewable projects online that might not otherwise be economically feasible today. In some cases, customer commitment to buying RECs through a long-term agreement is sufficient to make a project economically viable. The utility would not typically purchase the RECs to meet a resource need rather than a compliance obligation. In some cases a large-scale energy buyer's ability to invest capital enables a project to be built at lower cost. In Nevada, in the first deal under NV Energy's Green Rider, Apple covered the initial capital costs of the solar array and NV Energy has the option to purchase the array after five years and the full use of the Investment Tax Credit.[7] NV Energy will continue to sell the renewable energy to the Apple facility under the Green Rider. Some customers report their credit ratings are better than their utilities' and they can thus achieve lower-cost PPAs.

There may also be system benefits that offset the potential lost savings for the general rate base. These large energy customers are often able to provide large, steady energy loads, which benefit the functioning of the grid and costs for all customers. In addition, enabling access to renewable energy through a simplified green tariff transaction helps to bring economic development benefits to the local community and a wider sharing of fixed costs. Finally, WRI researchers are aware of one confidential, proposed deal that may share the cost savings with the general rate base but credit the RECs to the corporate buyer.

CONCLUSION

Customized renewable energy products present a real opportunity for utilities to meet the evolving needs of their customers, and green tariffs offer an effective way for utilities in traditional, regulated markets to offer many of the features that customers are seeking. 2017 is positioned to be the year in which more than 1 gigawatt (1,000 MWs) of cumulative renewable energy transactions next generation of products will likely go beyond selling renewable energy and find ways to increase the value that the customer receives for every dollar spent.

ENDNOTES

1. There are various regulatory approaches for arranging the relationship between electricity generation and end-use consumption. Historically, a vertically integrated utility in the United States was an investor-owned utility and was regulated by an independent public entity typically known as a PUC or public service commission (PSC). For additional information on the basic functions of the electric power industry, see the University of Texas at Austin Energy Institute's "The History and Evolution of the U.S. Electricity Industry." https://energy.utexas.edu/files/2016/09/UTAustin_FCe_History_2016.pdf.
2. The U.S. Environmental Protection Agency defines a renewable energy certificate as a market-based instrument that represents the property rights to the environmental, social, and other nonpower attributes of renewable electricity generation. RECs are issued when one MWh of electricity is generated and delivered to the electricity grid from a renewable energy resource.
3. For additional information on utility renewable energy products, like green power programs, that are not considered green tariffs, see the WRI Technical Note, *U.S. Renewable Energy Map: A Guide for Corporate Buyers*. www.wri.org/publication/technical-note-us-renewable-energy-map.
4. Load factor is a measure of the utilization rate. It is the ratio of total energy in kWhs used in the billing period divided by the possible total energy used within the period, as though the facility ran at peak demand during the entire period. A low load factor indicates that electricity is being used in a highly variable way relative to peak demand. In contrast, a high load factor indicates that power usage is relatively constant from moment to moment through the billing period.
5. RMP's Schedule 32 was also designed as a cost-of-service tariff, but since this tariff is not an economically attractive option that has been used by any customer, it is not covered in this section.
6. The Public Utility Regulatory Policies Act of 1978 (PURPA) was implemented to encourage the conservation of electric energy, the increased efficiency in the use of facilities and resources by electric utilities, and equitable retail rates for electric consumers, among other things. To accomplish its goals, PURPA established a new class of generating facilities that would receive special rate and regulatory treatment. Generating facilities in this group are known as qualifying facilities. The Federal Energy Regulatory Commission expands on these qualifying facilities. https://www.ferc.gov/industries/electric/gen-info/qual-fac/what-is.asp.
7. The Investment Tax Credit was created under the Energy Policy Act of 2005 (P.L. 109-58) and is a 30 percent federal tax credit claimed against the tax liability of residential (Section 25D) and C&I (Section 48) investors in solar energy property. For additional information on the Investment Tax Credit, see the Solar Energy Industries Association's breakdown. http://www.seia.org/policy/finance-tax/solar-investment-tax-credit.

GLOSSARY OF TERMS

APCo – Appalachian Power Company.

C&I – Commercial and industrial customers.

Demand Charge – Daily or monthly charges paid by large electricity customers for their peak demand in kilowatts from the grid. This is a measure of the capacity they require from the grid during a time period.

ISO – Independent system operator.

kWh – Kilowatt hour.

MGE – Madison Gas and Electric.

MW – Megawatts.

MWh – Megawatt hour.

OPPD – Omaha Public Power District.

PJM – Pennsylvania-New Jersey-Maryland Interconnection, regional transmission organization that coordinates the wholesale electricity in parts of 13 Mid-Atlantic and Midwestern states and Washington, DC.

PNM – Public Service Company of New Mexico.

PPA – Power purchase agreement.

PSC – Public service commission.

PSE – Puget Sound Energy.

PUC – Public utility commission, which regulates the electric utilities in a given state.

RECs – Renewable energy certificates, a market-based instrument that represents the property rights to the environmental, social, and other nonpower attributes of renewable electricity generation.

Rider – Additional rate applied to an electricity tariff, over a customer's base electricity rate.

RMP – Rocky Mountain Power.

RPS – Renewable Portfolio Standard; for example, state-law requirements as to the proportion of energy sold by a regulated utility that must come from specified types of renewable energy generation.

Sleeved power purchase agreement – An agreement the customer negotiates directly with a renewable energy generator, then contracts through a utility.

SPP – Southwest Power Pool, regional transmission organization that coordinates the wholesale electricity in the wind-belt region from Texas to North Dakota.

Subscriber products – A utility procures renewable energy, then sells portions to customers.

Tariff – Electricity pricing, or price structure, charged to customers. This can include the overall utility contract.

Vertically integrated – An arrangement in which the same company owns all aspects of making, selling, and delivering a product or service. In the electric industry, a vertically integrated utility means the utility owns its own generating plants, transmission system, and distribution lines to provide all aspects of electric service.

VPPA – Virtual power purchase agreement, sometimes called a synthetic or financial PPA or a contract-for-difference (CFD). A financial contract that buys energy from a power generator at a fixed price and immediately sells it on into the wholesale market at the market clearing price.

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ACKNOWLEDGMENTS

We are pleased to acknowledge our institutional strategic partners, who provide core funding to WRI: Netherlands Ministry of Foreign Affairs, Royal Danish Ministry of Foreign Affairs, and Swedish International Development Cooperation Agency.

The author would like to thank the many people whose thoughtful inputs and reviews helped shape this paper. This includes corporate sustainability and energy teams at Facebook, General Motors, Microsoft, REI, Starbucks, Switch, Target, Walmart, and utility representatives at American Electric Power, Dominion Energy, NV Energy, Puget Sound Energy, Rocky Mountain Power, and Xcel Energy. Furthermore, Steve Keisner with Edison Electric Institute, Lisa Wood with the Edison Foundation and the Institute for Electric Innovation, and Bryn Baker at the World Wildlife Fund.

The author would particularly like to acknowledge the following colleagues for their valuable contributions: Letha Tawney, Jennifer Layke, and Laura Malaguzzi Valeri for their guidance and review; Rebecca Gasper, Kristin Igusky, Deepak Krishnan, Emily Nilson, and Davida Wood for their peer review; Tom Maclean of Puget Sound Energy; James Gardner of Sturgill, Turner, Barker & Maloney, PLLC (and former chairman of the Kentucky Public Services Commission); and Holly Lahd of Target for their external review; Mary Paden for her copyediting assistance; and Carin Hall, Emily Matthews, and Jenna Park for providing administrative, editing, and design support. Celina Bonugli has also made substantial contributions to this publication and deserves special recognition.

This effort was made possible by the generous support from the Energy Foundation, Facebook, General Motors, IBM, the Michael Polsky Family Foundation, and the Walmart Foundation. All errors of fact and interpretation are the author's alone.

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ABOUT WRI

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Natural resources are at the foundation of economic opportunity and human well-being. But today, we are depleting Earth's resources at rates that are not sustainable, endangering economies and people's lives. People depend on clean water, fertile land, healthy forests, and a stable climate. Livable cities and clean energy are essential for a sustainable planet. We must address these urgent, global challenges this decade.

Our Vision

We envision an equitable and prosperous planet driven by the wise management of natural resources. We aspire to create a world where the actions of government, business, and communities combine to eliminate poverty and sustain the natural environment for all people.

Our Approach

COUNT IT

We start with data. We conduct independent research and draw on the latest technology to develop new insights and recommendations. Our rigorous analysis identifies risks, unveils opportunities, and informs smart strategies. We focus our efforts on influential and emerging economies where the future of sustainability will be determined.

CHANGE IT

We use our research to influence government policies, business strategies, and civil society action. We test projects with communities, companies, and government agencies to build a strong evidence base. Then, we work with partners to deliver change on the ground that alleviates poverty and strengthens society. We hold ourselves accountable to ensure our outcomes will be bold and enduring.

SCALE IT

We don't think small. Once tested, we work with partners to adopt and expand our efforts regionally and globally. We engage with decision-makers to carry out our ideas and elevate our impact. We measure success through government and business actions that improve people's lives and sustain a healthy environment.

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