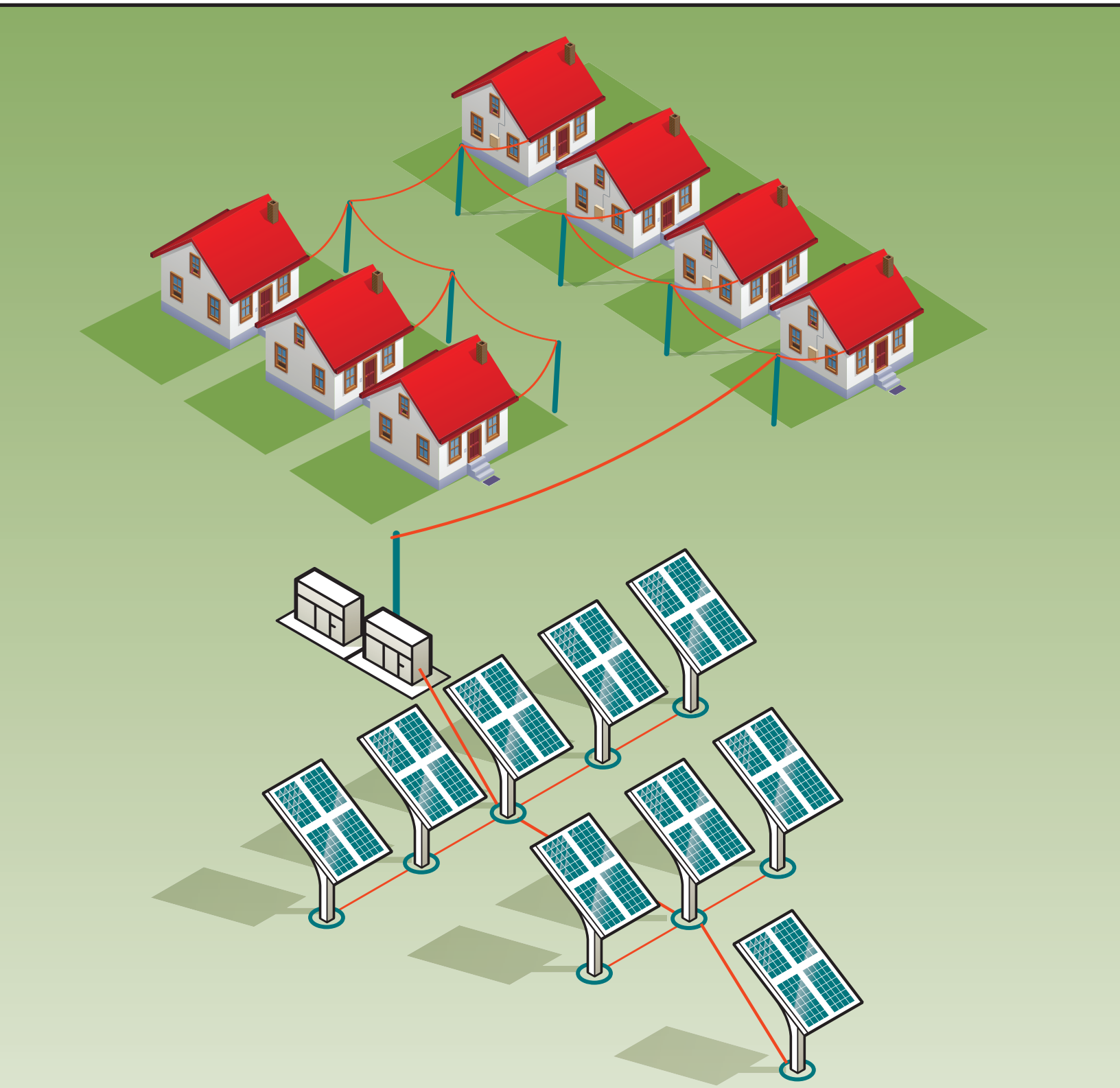
# Model Rules for Shared Renewable Energy Programs



IREC Interstate Renewable Energy Council, Inc.

THE Vote Solar INITIATIVE

# Model Rules For Shared Renewable Energy Programs

IREC believes clean energy is critical to achieving a sustainable and economically strong future. To pave this clean energy path, IREC works to expand consumer access to clean energy; generates information and objective analysis grounded in best practices and standards; and leads programs to build a quality clean energy workforce, including a unique credentialing program for training programs and instructors. Since 1982, IREC's programs and policies have benefitted energy consumers, policymakers, utilities and the clean energy industry.

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Shared renewable energy programs enable multiple customers to share the economic benefits from one renewable energy system via their individual utility bills. Shared renewable energy represents a critical means of expanding access to renewable energy to more Americans.

## I. Background

In November 2010, the Interstate Renewable Energy Council, Inc. (IREC) released the original version of our *Community Renewables Model Program Rules*. The intent of the *Model Program Rules* is to assist stakeholders in developing local or statewide, shared renewable energy programs that expand renewable energy access to more consumers. IREC worked closely with The Vote Solar Initiative (Vote Solar) to develop the *Model Program Rules*, taking into account the various approaches in place at that time around the United States, including efforts in Massachusetts, Colorado, California, Washington and Utah. In advance of publication, IREC and Vote Solar vetted the *Model Program Rules* with utilities, industry participants and other stakeholders, and their feedback was used to further refine the *Model Program Rules*.

Since issuing the first version of the *Model Program Rules*, IREC has participated actively in the growing shared renewable energy market, advising interested entities on program development and participating in regulatory proceedings in California, Colorado and Delaware to implement programs. In addition, IREC has continued to collaborate with Vote Solar to ensure that we are effectively advancing a common vision.

These current *Model Rules for Shared Renewable Energy Programs* represent an update to our initial model rules based on policy and market evolution over the past several years. Like the first version of the *Model Program Rules*, this updated version has been vetted with a wide range of stakeholders. As discussed in more detail below, we have moved from using the term "community renewables" to the term "shared renewable energy" or "shared renewables." We believe this new term better reflects the core innovation in these programs, which is enabling multiple consumers to share the benefits of a single renewable energy facility. Regardless of the change in nomenclature, the intent of the *Model Program Rules* remains the same: to assist stakeholders in developing shared renewable energy programs to broaden renewable energy access to more consumers. We believe the additional information and increased level of detail in this updated version of the *Model Program Rules* will help state and local stakeholders create programs that meet their particular needs and interests.

## II. The Opportunity Shared Renewable Energy Programs Represent

As renewable energy becomes increasingly cost-competitive with traditional electricity sources, more and more Americans are turning to renewable sources to meet their energy needs. Hundreds of thousands of home and business owners across the United States have invested in renewable energy and are generating their own electricity. However, the majority of residential and commercial energy consumers cannot install renewable energy systems on their own property. This may be because these consumers do not have adequate or appropriate roof area, or they rent, or due to a number of other reasons. In fact, a report from the National Renewable Energy Laboratory (NREL) estimated that only about one-quarter of U.S. residential buildings are physically suitable for installing solar on their roofs, a figure that does not even take into account the ownership status of the building.[1] In cases where homeowners and businesses do have a suitable site, they may have other reasons for not wishing to install solar on-site. For example, they may not want contractors installing and maintaining a system on their

roof, or they may be planning to move in the near future and are therefore unprepared to make such a property investment. In the end, for whatever reason, the majority of energy customers are currently unable to invest in renewable energy generation, despite their desire to green their energy supply.[2]

Shared renewable energy programs address this issue by allowing a single renewable energy facility to serve multiple, dispersed energy consumers, and enabling these consumers to receive direct benefits on their utility bill from their investment in renewable energy. Shared renewables programs can allow renewable energy developers to tap a market that is currently underserved but potentially quite large. For example, if just five percent of U.S. households were to invest in a five-kilowatt (kW) interest in a shared solar system—the size of a typical residential rooftop solar installation—it would result in over 28 gigawatts (GW) of additional solar capacity,[3] equivalent to the output of over 50 coal-burning power plants.[4]

While we refer to shared renewables throughout these *Model Program Rules*, which support any type of renewable energy generation, it is important to note that shared solar programs are currently the most prevalent form of shared renewables programs in the United States. Nonetheless, shared renewables programs that rely on other renewable generation, such as wind, may make sense for certain communities and some already exist today.[5]

Although typically still considered distributed generation, shared renewable energy facilities are often larger than typical customer-sited systems, which can result in lower costs due to economies of scale. The ability to site shared renewable energy facilities in optimal locations instead of being restricted to a particular customer's roof, the opportunity for new financing arrangements, and the potential simplicity of customer participation are other reasons shared renewable energy is gaining popularity.

## III. Guiding Principles for Shared Renewable Energy Programs

Four key principles guide IREC's approach with respect to shared renewable energy program development. The first three principles are definitional in nature; it is these characteristics that distinguish shared renewable energy programs from other types of programs. The final principle is a best practice that IREC believes to be important when designing shared renewable energy programs.

**First, shared renewable energy programs should expand renewable energy access to a broader group of energy consumers, including those who cannot install renewable energy on their own properties.** As described above, most Americans are currently unable to benefit directly from renewable energy generation because they cannot install renewable energy on-site. As a matter of equity between energy consumers this barrier should be removed as it unnecessarily limits participation in generally available renewable energy programs. Moreover, shared renewables programs allow greater energy consumers to participate in renewable energy generation, unlocking a substantial new market for renewable energy developers and thereby strengthening the renewable energy industry.

**Second, participants in a shared renewable energy program should receive tangible economic benefits on their utility bills.** By providing credits on participating customers' utility bills, shared renewable energy programs offer a clear, intuitive way for customers to save money by choosing renewable energy. Similarly, net energy metering (NEM) has been very

successful in motivating energy consumers to invest in renewable energy because it is a straightforward and simple concept. In addition, consumers participating in NEM programs have been shown to install more energy efficiency measures than nonparticipants, again because they are highly motivated to reduce their energy bills and maximize the efficacy of their on-site renewable energy system.[6] Keeping the benefits of participation in a shared renewables program on customers' bills maintains the linkage between a customer's participation in the program, their reduced energy use, and their lower bill. Even in cases where participants may pay more initially for participation in a shared renewable energy program, programs should be designed such that participants receive a valuable hedge benefit by locking in a rate through their participation in the program, which will save them money as standard electricity rates rise over time.

**Third, shared renewable energy programs should be flexible enough to account for energy consumers' preferences.** Consumers are more likely to purchase a product that is specifically tailored to suit their personal values and priorities. Therefore, we recommend that shared renewable energy programs be flexible with regard to business models so that developers and utilities can innovate to meet consumer desires. This can include preferences for specific technologies, project locations, or ownership models. For example, in IREC's experience, consumers are highly motivated to participate in shared renewable energy when the generation facilities are located in or nearby their communities. Structuring a program to allow for the realization of these preferences can broaden interest and participation in the program.

**Fourth, and finally, shared renewable energy programs should be additive to and supportive of existing renewable energy programs, and not undermine them.** Over the previous decades, renewable energy companies have invested considerable resources in building their businesses. This private investment in time and resources has helped expand markets for renewable energy in partnership with utility-run renewable energy programs. The success of both wholesale and retail oriented distributed generation programs has resulted in dramatic reductions in the cost of renewable energy. For this reason, it makes little sense to undermine successful programs, and the businesses based upon these programs, when seeking to expand access to new customer segments. Similarly, shared renewables programs should be designed so that they result in new "steel in the ground" instead of re-purposing existing renewable energy generation. In this way, shared renewable energy programs can promote renewable energy market development as effectively as possible. Shared renewables programs represent, in some cases, another mechanism by which a utility can meet renewable energy goals, for example as dictated in state Renewables Portfolio Standards (RPS), on top of the various existing mechanisms and programs that utilities may already be pursuing. In other cases, a shared renewables program can enable a state or utility to go above and beyond current RPS requirements.

## IV. Understanding Shared Renewables Terms and Nomenclature

In this section, we clarify what we mean by "shared renewable energy." In addition, we explain the relationship between shared renewables and three other renewable energy programs: NEM, group purchasing and green tariffs.

### A. Shared Renewables Versus Renewable Energy Project Investments

As interest in renewable energy has grown, various approaches have emerged to allow broader groups of consumers to benefit directly from renewable energy generation. IREC divides these approaches into two categories.

Shared renewable energy programs or shared renewables programs—the focus of these *Model Program Rules*—refer to programs that enable multiple customers to share the economic benefits of one renewable energy system via their individual utility bills. Participants purchase an interest in generation from a common renewable energy system, and directly receive the benefits of their participation on their utility bills.

Renewable energy project investments, on the other hand, refer to investments made by individuals in one or more renewable energy projects, similar to any other investments that individuals might make as part of their investment portfolio. The investment could be as direct as a membership in a limited liability company (LLC) that owns and operates a renewable energy system, or it could be via a company such as Mosaic,[7] which offers interested investors an easy platform for supporting specific solar projects and earning attractive returns. The funds invested and the resulting earnings are unrelated to participants' energy bills. Other similar programs, such as RE-volv, [8] have relied on a donation model in which interested participants donate to the construction of a renewable energy system in a community, sometimes receiving a tax deduction or a gift in return.

IREC focuses on shared renewables programs because they provide participants a direct utility bill benefit similar to what they might experience through other on-site renewable energy generation programs that have been extremely popular to date. Setting up these programs can raise thorny regulatory and policy issues so policy guidance on developing shared renewables programs is particularly vital.

### B. Relationship of Shared Renewables to Net Energy Metering

Shared renewable energy programs rely on utility bill credits to distribute the benefits of participation in the shared system to the participants. In this way, a shared renewables program looks similar to NEM, which also uses a bill credit mechanism to compensate consumers that have installed renewable energy generation facilities on-site.[9] NEM policies are in place in 43 states, Washington D.C., and four territories.[10] NEM has been one of the most successful policies to motivate energy consumers to invest in renewable energy, especially solar energy, because it is conceptually simple and it allows participants to directly lower their bill in a clearly intuitive way.[11] NEM credits are typically valued at the participant's retail rate, such that a participant receives essentially a one-to-one kilowatt-hour (kWh) offset on their bill for energy generated by that participant's net-metered system. In contrast, the bill credit for a shared renewable energy facility may be valued through a different process than a NEM credit, as discussed in section V.

In some states, NEM has been expanded to allow for meter aggregation, or aggregate net metering (ANM), which permits a single NEM participant to offset their load from multiple meters through NEM credits generated from a single renewable energy system connected to one of the participant's meters. As with traditional NEM, ANM credits are also typically valued at or near the NEM participant's retail rate, although valuation can vary depending on how ANM rules treat

meters on different rates. In some cases, meter aggregation is allowed only for meters on the same or contiguous properties; in other cases, the meters may be further apart or there are no geographical limitations.[12]

In still other states, virtual net metering (VNM) has been implemented to extend NEM to situations where multiple participants receive bill credits from a single net-metered renewable energy facility. Although VNM and ANM are used interchangeably in some states, IREC distinguishes between ANM (one customer, multiple meters) and VNM (multiple customers, multiple meters) for the sake of clarity. Because VNM is nested within a state's NEM paradigm, VNM credits are typically valued at, or at least based off of, participants' retail rate (or rates). The bill credit mechanism in a shared renewables program closely resembles VNM except that it need not have this direct tie to the existing NEM program, including with respect to how bill credits are valued. Nonetheless, in some places, the policies are conflated. In these updated *Model Program Rules*, however, IREC intentionally separates shared renewables from the NEM framework to allow for program design flexibility while retaining intuitive appeal and other benefits of a bill credit mechanism to distribute the benefits of participation in a renewable energy system.

### C. Relationship of Shared Renewables to Group Purchasing

Shared renewables programs bear some resemblance to group purchasing programs in that both types of programs allow energy consumers to leverage their combined purchasing power in order to receive a lower price for renewable energy. Group purchasing involves a group of energy consumers joining together to negotiate for better prices for the purchase of renewable energy systems for installation on their sites. For example, some communities have launched "Solarize" programs in which groups of consumers organize a bulk purchase of solar systems in order to receive a lower price.[13] Once the purchase is complete, however, each customer in the group has an individual solar system installed on their own home to serve their own load. By contrast, participants in a shared renewables program leverage their combined purchasing power to support the construction of a single renewable energy facility, whose generation they all share. Both types of programs can expand renewable energy access to more consumers, however shared renewables programs in particular allow consumers to participate even if they cannot install a renewable energy system on their properties.

### D. Relationship of Shared Renewables to Green Tariffs

Finally, shared renewables programs are similar in some ways to green tariffs. Electricity suppliers, either vertically integrated utilities or competitive suppliers can offer their customers a green tariff option, also referred to as green pricing or green marketing. Under these programs, energy consumers typically pay a premium for electricity generated from clean power resources, such as solar or wind. The premium covers costs incurred by the electricity supplier from adding green power to its power generation mix.

Like shared renewable energy programs, green tariffs can offer more energy consumers the chance to "green" their energy supply. Unlike shared renewables programs, however, green tariffs may not result in the construction of new renewable energy generation, particularly if they rely on short-term contracts for renewable energy credits (RECs) to "green" the power being provided to participants in the tariff. Moreover, a green tariff may be offered as a more expensive option overlaid on the participant's underlying rate for power from the utility. Under

this arrangement, participants lose an important tangible economic benefit of renewable energy: the ability to lock in the price for electricity as a hedge against future rate increases due to fossil fuel price volatility. Finally, green tariffs have historically not provided the flexibility of most shared renewable energy programs in terms of allowing participants to choose specific project locations, technologies, or ownership models. Experience has shown that energy consumers are keenly interested in greening their energy supply through programs that result in new generation, provide them with tangible economic benefits and result in clean energy facilities located near their communities. For these reasons, as shared renewables programs continue to expand, care must be taken to ensure that green tariff programs do not inadvertently foreclose opportunities for energy consumers to participate in shared renewables programs that would meet consumer preferences for green energy with the characteristics described above. IREC supports the development of green tariff programs to expand consumer access to renewable energy, and we are optimistic that green tariff programs can be developed that meet our guiding principles for shared renewables.

## V. Core Components to Consider for Shared Renewable Energy Programs

IREC believes five foundational issues require particular attention with respect to the development of shared renewable energy programs: (1) program administration; (2) the method of allocating the benefits of participation; (3) valuation of the energy produced by the system; (4) shared renewable energy facility size and location; and (5) shared renewable energy facility ownership and its implications for financing.

### A. Program Administration

Shared renewable energy programs have many moving parts: program design, marketing and consumer sign-up, facility maintenance, and utility interface and participant changes, among others. All of these components necessitate a formal program structure, which could be administered by a utility, a participant or a third party.

Utility program administration is the predominant model for shared renewable energy programs across the United States. Based on IREC's review of the shared renewable energy programs we were aware of in March 2013, 79 percent, or 30 out of 38 programs, were run by utilities or a utility-sponsored third party. This framework allows an entity with significant experience in administering complex energy programs to administer the details of a shared renewables program, which may have many participants. For example, Tucson Electric Power (TEP), an investor-owned utility in Arizona, administers its shared solar program called Bright Tucson Community Solar Program. The program was launched in March 2011 with an initial goal to develop 1.6 megawatts (MW) of new TEP-owned solar generating capacity over the following three years. To date, the program has been much more successful than originally planned. As of July 2012, the TEP Bright Tucson program included 777 customers, who were subscribed to a total of 4.13 MW in TEP- or third-party-owned solar installations. Such a large program with such rapid success may have been difficult for participants to manage, whereas TEP's experience and administrative infrastructure allowed it to manage the Bright Tucson program effectively.

Even in a smaller program, administrative experience can be an important asset. For example, Colorado Springs Utilities, a municipal utility, allows its customers to lease panels from three community solar garden project developers. The total pilot program size is 2 MW and it focuses

on residential customers and educational institutions as participants. As of October 2012, Springs Utilities had over 300 residential and educational customers participating in its program. As its program matures, Springs Utilities' administrative and customer service experience will continue to be critical.

In some cases, utilities may engage a third party to help to develop and/or administer a shared renewables program. For example, the Clean Energy Collective (CEC) has partnered with numerous utilities and community groups to develop shared solar programs.[14] Typically, under the CEC model, customers own the shared facility and receive bill credits based on their interest in the facility, and CEC handles administration, on-bill crediting, facility construction, operation and maintenance.

Nonetheless, some programs have used a customer-administration model, which have been met with success. Vermont's group billing approach is a prime example. The Vermont program allows for a group of energy consumers located within the same utility service territory to choose to combine meters in order to offset that billing against a single renewable energy facility.[15] In this case, the utility bills and credits all participants in the group individually, and the group is responsible for the other aspects of program design and management. Specifically, in order to participate in group billing, the group must file the following information with the Public Service Board and other entities as required: the customers and meters that are to be included as part of the group; the method for adding and removing meters; information regarding credit allocation to each customer-meter; the contact person responsible for communications; and a dispute resolution process. According to IREC's research, Vermont has over 50 group systems across multiple utility service territories, with fewer than 10 accounts per group. In considering a group billing approach, however, it is important to remember that it may be difficult to administer on a larger scale, with more customers participating.

### B. Allocating the Benefits of Participation

Allocating benefits to shared renewable energy program participants—that is, transferring value from the shared renewable energy system to participating energy consumers—is another critical element of developing a successful shared renewable energy program. As in our original *Model Program Rules*, IREC continues to recommend allocating benefits via a monetary bill credit on a participant's monthly bill.

While it may seem simpler to allocate benefits via a direct payment to participants, outside of the utility billing process, direct payments face several challenges. In particular, these payments may result in taxable income, which would reduce the benefit energy consumers receive from investing in greening their energy supply. In addition, payments could raise complicated securities issues. The U.S. Department of Energy (DOE) has a *Guide to Community Shared Solar*, which goes into additional detail about potential securities concerns, and is a good reference on this point.[16]

Because it is fundamentally a billing mechanism, allocating benefits via a bill credit may avoid many of the tax and security law implications and other challenges raised by allocating benefits via payment, which are discussed in more detail below. Moreover, many energy consumers are motivated to offset as much of their energy bill as possible, which has been a major driver behind the success of NEM programs. A shared renewables program can maintain this direct relationship between energy consumers' investments in renewable energy and a reduction in

their utility bills by relying on a bill credit mechanism to allocate the benefits of participation in a shared renewable energy facility.

Bill credits for shared renewables are typically translated into dollars to make the process easier to administer for utilities. By contrast, in most NEM programs, credits for excess generation not consumed on site are reflected as kWh credits on the bill. Under NEM, these kWh credits provide a one-to-one offset for the kWh a participant uses later in a billing period, when their system is not producing energy or when they consume more energy than the system is producing. Although this structure can work well for NEM, where most electricity produced by an on-site system is immediately used on-site, it can be more difficult to administer for a shared renewable energy system, where the generation source is separated from the participants who would like to receive electricity from that system. Providing kWh credits can be particularly difficult to track if a customer is on a time-of-use rate structure as kWh production would have to be tracked and applied to the customer's bills within the time-of-use periods contained in the customer's tariff. This can produce a major administrative burden if credits are allocated by hand. In order to simplify bill credit administration, as well as to more easily allow for appropriate bill credit valuation, IREC recommends a monetary bill credit. As with NEM, IREC recommends perpetual rollover of any excess credit to participants' next utility bill.

### C. Valuation of the Energy Produced by the Shared Renewable Energy System

In addition to deciding how to *allocate* the benefits of participation in a shared renewable energy program, it is also critical to decide how to *value* those benefits. Determining the appropriate monetary value to assign to kWh credits can be a complex process. While establishing the value of the generation alone may be relatively easy, understanding the wider costs and benefits of a shared renewable energy system is more difficult. As more programs have struggled with this valuation process, two distinct categories of approaches have emerged, and still others are being proposed.

**(1) Embedded cost-based approach**. This approach is based on the structure of a utility's electric rate design, including the generation, transmission and possibly the distribution cost components of retail rates, similar to a traditional NEM bill credit. We refer to it as "embedded cost" because it is based on the cost structure embedded in energy consumers' current rates. Programs have typically valued the credit based on the retail rate in effect for each participant versus at the facility location, which offers at least two distinct benefits.[17] First, it maintains the ability of renewable energy to act as a price hedge against future utility rate increases for a particular participant. And second, it allows energy consumers whose retail rates contain demand charge components to realize the grid benefits stemming from their participation in a shared renewables program.

As far as the components of the credit, there appears to be general consensus that bill credits should incorporate the generation cost component of a utility's retail rate, as a shared renewable facility is supplanting utility generation for a participant. The inclusion of transmission and/or distribution cost components of rates in the bill credit has proven more contentious. On the issue of transmission credit, depending on the structure of the program, participants might not utilize the transmission system in order to deliver power from their shared renewable energy facility so stakeholders argue that they should not pay for transmission that they do not use. This argument is particularly strong in situations where a shared renewable energy facility is hosted

on a participant's site or on the same distribution feeder as a participant. In these cases program participants typically consume most or all of the energy before it even reaches the substation. Delaware's shared renewables program rules address this by allowing participants to receive a full retail rate credit if they host or are on the same feeder as the shared renewables facility, and a lower credit if they are on a different feeder.[18]

The distribution cost component is the most controversial component of embedded-cost-based credit valuation and utilities often argue that they do not receive sufficient net benefits from shared renewable energy facilities to cover distribution costs incurred from delivering energy to participants. Therefore, utilities often argue that inclusion of the full distribution cost component in bill credits results in a cost-shift to nonparticipating ratepayers; care must be taken, however, to study this assumption in order to determine if it is accurate. For example, under California's VNM program, credits created by shared renewable energy facilities are valued at a fully bundled retail rate. As a result, participants *do not* pay distribution charges.[19] California's approach appears sensible because California's virtual net-metering program is available only to occupants of multitenant buildings. Thus, California participants will be located within the same building on the same distribution circuit and, as a result, use of the distribution system will be nonexistent or minimal. In contrast, Xcel's Solar*Rewards Community program, developed under Colorado's Community Solar Gardens rules, accounts for a participant's use of the transmission and distribution systems by backing out certain related charges from a participant's "total aggregate retail rate" bill credit. In this way, a participant is primarily credited for generation-related costs collected through base rates or riders.[20] One of the justifications for taking this approach in Xcel's program was that community solar gardens could be located anywhere within Xcel's service territory, as could participants, and therefore they relied on the transmission and distribution systems.

For non-residential energy consumers, developing an embedded-cost-based credit also generally necessitates consideration of how to treat time-of-use rates and non-kWh-based charges, such as demand charges. With respect to demand charges, Colorado's Community Solar Garden rules addressed this issue by integrating such charges into a participant's "total aggregate retail rate," which is required to include "all billed components." The total aggregate retail rate is used to calculate the participant's bill credit when it is multiplied by the participant's share of the community solar garden. For participants on a demand tariff, the total aggregate retail rate is determined by "dividing the total electric charges to be paid by the customer to the investor owned [utility] for the most recent calendar year (including demand charges) by the customers' total electricity consumption for that year."[21] Other options may work as well. For example, a shared solar facility's contribution to coincident or non-coincident peak loads could be calculated and the value of these contributions could be assigned to the facility. This revenue stream could be used to facilitate financing of the project similar to how other renewable energy systems are financed.

**(2) Value-based approach**. The value-based approach to bill credits is based on the value of shared renewable energy generation, usually to the participants' utility and its ratepayers. This value includes the value of the new generation source to the utility, and also the value of avoided transmission and distribution costs, such as system infrastructure costs and avoided line losses. Although sometimes more difficult to calculate, some states are considering including other components in renewable energy valuation, such as avoided carbon dioxide emissions and associated costs, and improved security and resiliency in the face of natural disasters or acts of terrorism. As with the embedded-cost-based approach, which components

to include and how to value them can be the subject of debate. In the end, the key difference between an embedded-cost approach and a value-based approach is that, under a value-based approach, the bill credit is generally the same for all participants as the credit is no longer based on an individual participant's retail rate which is often based on their customer class or other considerations. For this reason, a value-based bill credit approach can be easier to administer, especially if different customer classes are allowed to participate in a single shared renewable energy facility.

Until recently, Holy Cross Energy (HCE), headquartered in Glenwood Springs, Colorado, was the only utility that had implemented a value-based approach to bill credits for its shared solar program.[22] The CEC partnered with HCE to create this program in 2009. Under this program, participants purchase specific panels in solar arrays being installed within HCE's service territory. In return, the participant receives a bill-credit of $0.11 per kWh for each kWh generated by the panels purchased by the participant. This rate is approximately 30 percent higher than HCE's current retail rates and represents the value HCE believed the arrays bring to HCE's generation portfolio, including the purchase of Renewable Energy Credits (RECs). Automated on-bill credits are achieved through CEC's proprietary RemoteMeter technology. Colorado Springs Utilities recently joined HCE in offering a value-based credit of $0.09 per kWh along with an upfront REC payment per kW of capacity for the value of RECs received over the life of the solar array. Springs Utilities uses the RECs to meet its renewable energy standard. On-bill credits are provided through proprietary metering technologies that integrate with the utility's billing software that were developed separately by developers participating in the program such as SunShare[23] and CEC.

While still relatively rare, value-based approaches to determining bill credits represent an intriguing means of arriving at a bill credit pricing mechanism that moves away from utility embedded costs drawn from retail rates and towards approaches that rely more on the value of the facilities to the utility and its ratepayers. Since HCE's pioneering in this area, CEC has implemented a similar model with San Miguel Power Association[24] and Poudre Valley Rural Electric Association.[25] In addition, the concept of value-based rates for renewable energy is being considered outside of shared renewable energy programs and may have implications for how NEM programs are developed as well. For example, Austin Energy, in partnership with Clean Power Research, has developed a new Value of Solar Tariff (VOST) tariff to replace its NEM tariff, which is based on a value-of-solar rate instead of traditional retail-rate-based NEM.[26] The development of value of solar tariffs needs to be handled carefully to ensure that projects supported by the tariff continue to be able to clearly communicate the investment case to participants and financial institutions involved in financing the project.

**(3) Other Valuation Approaches**. As the number of shared renewable energy programs grows, utilities and other stakeholders have begun to develop new ways to provide tangible economic benefits to participants on their electricity bills. For example, stakeholders in California are developing a shared renewables offering that is based off of a green tariff framework, but permits participants to lock in a specific rate for renewable energy from shared facilities that meets up to 100 percent of their electricity needs.[27] Accordingly, although the customer may end up paying a modest premium for renewable energy today, locking in the energy rate provides a hedge benefit to a participant over time. In addition under the valuation methodologies being explored, the utility may also levy other program costs on the participant's bill, such as the costs of integration or delivery. The utility may also provide credit for any benefits the new renewable generation may provide, for example by exempting the participant from a renewable energy

standard compliance charge, or through a "value of solar credit" or a credit reflecting a particular facility's locational benefits. IREC continues to participate in efforts to address the issue of valuation.

In our original *Model Program Rules*, IREC recommended an embedded cost-based approach, and specifically one rooted in the retail rate in effect for each participant. We stated that valuing the kWh credit at the retail rate in effect for the participant maintains the ability of the project to act as a price hedge against future utility rate increases. In addition, our original *Model Program Rules* took a nuanced approach to compensating utilities for a project's impact on the distribution system by specifying that participants on the same distribution circuit as the shared renewable energy facility would have their kWh credits valued at their full retail rate. Finally, the original *Model Program Rules* also allowed for a stakeholder process to determine an appropriate level of compensation to the utility for delivery of the electricity to participants not on the same feeder as the facility—via a "reasonable charge"—once a number of factors have been taken into account. Colorado's community solar gardens program incorporates a similar "reasonable charge, as determined by the Commission" to cover the utility's costs of delivering electricity to participants' premises, integrating the solar generation with the utility's system, and administering the program.[28]

IREC continues to believe that the embedded-cost based approach may work for some programs. However, we also believe that a value-based approach or other emerging approaches may be solid options for other programs. In this updated *Model Program Rules*, IREC does not recommend one approach over another. Instead, we provide model language for the embedded-cost based and value-based types of bill credit approaches, which are the two most evolved approaches to date, and leave it to individual programs to evaluate their particular situation and to select the approach that works best for them. For the value-based approach, IREC recommends a process by which the appropriate regulatory authority determines the appropriate bill credit value by considering the costs as well as the benefits of shared renewable energy, including but not limited to avoided fuel expenses, avoid line losses, and capacity benefits.[29]

We encourage those designing a shared renewables program to keep in mind the trade-off between in-depth analysis and getting a program off the ground. It may make sense to identify a proxy value for the shared renewable energy generation that can be applied while a longer-term cost-benefit study is undertaken.

For any valuation approach, it is also important to consider who owns and receives the value for any RECs generated. RECs represent the renewable or "green" attributes of one megawatt-hour (MWh) generated from an eligible renewable energy resource, and are typically used by utilities in order to comply with RPS requirements. Some states also have Solar RECs or SRECs, which are specific to energy generated from eligible solar facilities. It is important to specify who owns the RECs from a shared renewable energy facility, in particular because RECs may carry a dollar value that, in some states, could significantly improve a project's bottom line for participants. In IREC's *Model Program Rules*, ownership of the RECs stays with the participants unless otherwise accounted for under separate contracts.

A final consideration related to valuation of shared renewable energy is how to treat net excess generation, in other words, a scenario in which a participant's bill credit from a shared renewable facility exceeds the charges on their electric bill in a given billing period. IREC recommends that credits for net excess generation be rolled over to the participant's next bill.

This is the simplest approach and helps address possible issues concerning jurisdiction of the Federal Energy Regulatory Commission over wholesale power sales.

### D. Shared Renewable Energy Facility Size and Location

In our original *Model Program Rules*, IREC specified a renewable system size cap of two MW. This size cap was chosen because a two-MW system maintains economies of scale both in the installed cost of the system and in the participation/marketing costs for a business engaged in developing shared renewable energy systems, and still allows for relatively low-cost interconnection on most utility distribution systems.[30] In addition, smaller facilities are more likely to be able to take advantage of locations closer to load, such as rooftops or brownfields, which can result in both grid and environmental benefits.[31] IREC continues to believe that a two-MW cap can make sense for some programs. In these revised *Model Program Rules*, however, we omit a facility size recommendation because we have observed that in some cases local stakeholders wish to enable larger installations. Larger installations may be subject to greater review under existing state interconnection standards and, depending on their location, may result in fewer grid and environmental benefits than smaller systems located closer to load. Nonetheless, they may be desirable to a particular community for other reasons, for example because participants wish to offset a combined load of larger than two MW, or because a community has a large plot of land that can host a larger system, or because participants are seeking to achieve the lowest cost possible. At this point, IREC believes it is best for stakeholders to have flexibility in developing shared renewable energy programs, with systems sized to meet their particular needs or preferences

Another important consideration with respect to system size is whether to require that a shared renewable energy facility be hosted at a site with on-site load, beyond just parasitic load, or whether these facilities can be stand-alone facilities. In order to allow for maximum flexibility, IREC specifically allows for both circumstances in our *Model Program Rules*.

### E. Shared Renewable Energy Facility Ownership and Financing Implications

Shared renewable energy facilities can be owned by participants directly, by the utility or by a third party, such as a renewable energy developer. The type of ownership structure affects what types of local, state and federal funding and incentives are available based on factors such the owner's credit rating and tax appetite. In order to maximize the availability of funding and to ensure available incentives are used as efficiently as possible, IREC's *Model Program Rules* support flexibility in facility ownership to allow for direct ownership, third-party ownership, and utility ownership of shared renewable energy systems.

An important aspect of allowing utility ownership is a requirement that all system purchase costs, operation and maintenance costs, necessary investment returns, and other costs related to a utility-owned system must be recovered from participants enrolled in a utility program. This requirement is important to maintaining a level playing field between utility offerings and offerings of other parties by ensuring that all costs incurred by a utility to operate a shared renewable energy system are recovered from program participants the same as occurs with other competitive providers, and not from non-participating ratepayers.

In addition, it is important to recognize that third-party ownership of a renewable energy system can be critical to tapping into funders who are able to fully utilize available federal tax credits.

The efficient utilization of federal tax credits can result in a reduction in the cost of renewable energy by almost 50 percent.[32] Recognizing the important role third-party ownership can play in increasing access to renewable energy, at least 22 states, Washington, D.C. and Puerto Rico explicitly authorize or at least allow for third-party ownership of renewable energy generation facilities.[33] In addition, legislation enacting VNM or shared renewable energy programs in Colorado, Massachusetts and Delaware has similarly explicitly enabled third-party ownership of shared renewable energy systems.[34]

### F. Additional Program Considerations

Beyond the five core components discussed above, there are several additional program considerations that inform provisions in our *Model Program Rules*, including the number of program participants, the portability and transferability of a subscription, and participation of low-income energy consumers.

#### 1. Number of Program Participants

Regarding the minimum number of participants, IREC considered conflicting program impacts raised by stakeholders. On one hand, if a program requires too many participants, gathering up the minimum number of participants can make participation by smaller systems difficult. On the other hand, if a program requires just one participant, then the "shared" aspect of a shared renewables program is taken out of the picture, which is a key motivator for some stakeholders. After considering these two concerns, IREC recommends a minimum of two participants in a shared renewable energy system. This requirement will allow duplex owners, small apartment buildings, and small commercial establishments to participate. According to IREC's research, existing programs have taken varying approaches to this issue. Colorado's Solar Gardens Act rules stipulate that a shared system must have a minimum of 10 participants. Vermont and California, on the other hand, require a minimum of two participants.

#### 2. Portability and Transferability of Participation

Inevitably participants may need to modify or discontinue their participation in a shared renewable energy facility, for example because their energy consumption has changed or they have moved. It is important for shared renewables programs to consider how to treat such changes. In particular, it is critical to determine whether or not to allow participants to bring their subscriptions in a shared renewable energy facility with them if they move within a program's territory ("portability"), and whether or not to allow participants to transfer their subscriptions to another energy consumer if they move outside of a program's territory ("transferability"). In our *Model Program Rules*, IREC recommends as much flexibility as possible in this regard, allowing for both portability and transferability of subscriptions. At the same time, we recognize that portability and transferability pose some level of administrative burden. For example, in some instances it may be administratively much easier to require a participant in a program to relinquish their interest in a shared renewables facility rather than allow them to directly transfer that interest to another qualified customer if they move outside of the utility service territory where the facility is located. Given that only half of Americans stay in a residence for longer than 10 years,[35] and that renters, younger and more urban households are likely to move even more frequently, it is essential to consider and specify how these situations will be treated with respect to program participation, regardless of the ultimate approach taken.

### 3. Low-Income Energy Consumer Participation

There has been increasing attention paid to including low-income households in shared renewable energy programs, and in renewable energy initiatives in general. For example, Colorado included low-income participation as a priority in their Solar Gardens program.[36] The Colorado Utilities Commission's rules for the program require utilities to reserve at least five percent of their renewable energy purchases from new community solar gardens for eligible low-income participants either through dedicated low-income solar gardens or as low-income set asides within other solar gardens, to the extent there is demand.[37] In implementing the program, the Public Service Company of Colorado (PSCo) requires solar gardens to provide an explicit plan for achieving this five-percent target.[38] It is not clear yet how successful this method of promoting low-income participation in shared renewable energy will be. Renewable energy and low-income advocates are continuing to brainstorm ways to make renewable energy available to low-income communities, which have traditionally been difficult to reach with existing programs. Delta-Montrose Electric Association in Colorado has sought to increase participation among low-income coop members by allowing for a solar lease with as little as $10 upfront. At this price point, the customer is able to lease 2.67 watts of capacity in the DMEA community solar array. While such a framework may raise administrative costs, it represents an innovative way to encourage participation among low-income households in shared solar by lowering the barrier upfront costs can present.

There are a number of challenges to facilitating low-income participation in renewable energy, including both on-site and shared renewables programs. To begin with, the long-term return on investment, which can be the selling point for these programs for higher-income energy consumers, is not a motivator for low-income individuals and families, who typically need a positive cash flow on day one. In other words, these opportunities present poor front-end economics that make them unappealing to low-income energy consumers. In addition, the current economic recession and the constrained lending environment makes loans even more difficult to obtain for low-income energy consumers, who may already be struggling with lack of capital and low credit ratings. Beyond the economics, renewable energy programs have not historically been marketed well to low-income individuals and families, who may benefit from multilingual and multicultural marketing to explain the value of such programs to them.

At the same time, there are a number of factors specific to low-income energy consumers that may motivate them to participate in renewable energy programs, including in particular shared renewables programs. For example, low-income individuals and families that have high energy costs will see a proportionately greater economic benefit to reducing those costs with renewable energy generation. There are also strong fairness and justice reasons for encouraging low-income participation in renewable energy: it should not just be a resource for middle- and high-income communities.

Likewise, from an environmental justice perspective, low-income communities are often the sites for polluting traditional power plants and as a result they face disproportionate health impacts from pollution generated by these facilities. Shared renewable energy offers one potential way to turn this trend into a positive development opportunity for low-income communities, by siting shared renewable energy projects in these communities. These projects can create high quality jobs for low-income families in the rapidly growing clean energy sector. For example, the California Environmental Justice Alliance has called for shared renewable energy programs to

include a requirement to site a percentage of shared renewable generation in "disadvantaged communities."

Ultimately, encouraging participation by low-income energy consumers or siting guidelines requires creative thinking about program design. However we are actively considering how to encourage participation in shared solar by low-income energy consumers and we hope to be able to offer more information on this front going forward. To lower the barrier to entry to shared solar programs, we have lowered the minimum subscription size from one kW to one panel in order to lower the initial cost of participation in a shared solar program.

## VI. Shared Renewables in States with Restructured Energy Markets

Shared renewable energy may face unique conditions in restructured states, where competitive supply of electricity has been introduced.[39] While retail suppliers in these states are largely unregulated, the design of retail choice markets and the interaction among the relevant players inherently presents certain opportunities and challenges that do not exist in vertically integrated states. Ultimately, retail choice itself opens up possibilities for shared renewable facilities without necessarily requiring additional policy changes, though certain policy changes can help facilitate greater consumer adoption.

Offering energy consumers renewable energy options, including shared renewables, may give some suppliers a marketing advantage in attracting customers. Indeed, some suppliers already offer shared renewables in restructured states. For example, in Massachusetts, retail suppliers that also operate as solar developers are able to facilitate participation among their customers in shared renewable energy facilities and then allocate the resulting bill credits under Massachusetts' VNM rules. The participants pay the retail supplier as they would under their regular tariff.

One challenge to implementing shared renewable energy in restructured states is that it may complicate the billing process. In retail choice states, billing requires an exchange of data between the supplier and the utility and accurate billing requires that both parties have a common understanding of what each piece of customer usage data represents. The potential for miscommunication exists for traditional customer-sited facilities, but is likely be magnified in a more complicated shared renewables arrangement. While the general parameters of the billing process are determined by state law, the responsibility for accomplishing reconciliation rests with utilities and suppliers, and in some states, the reconciliation process may differ among utilities. The provision of bill credits to retail supply customers, including to participants in a shared renewable energy facility, must be harmonized with the billing protocols in a particular state. If the utility handles this crediting and reconciliation, and bears the associated administrative burden, it is more likely that a retail supplier can bear the other costs of administering a shared renewable energy facility. Shared renewable energy becomes much more difficult, if not impossible, if retail suppliers are required to manage bill credit reconciliation because the administrative burden could be substantial, especially if participants include customers of more than one utility. On the other hand, the utility has the advantage of having a sophisticated billing system that is typically already calibrated to deal with the necessary state-mandated reconciliation and crediting processes. Moreover, the utility will likely recover any costs associated with revising or updating its billing system across a much broader base than a retail supplier.

A further complication arises when customers that participate, or wish to participate, in a shared renewables facility are served by different retail suppliers. In these circumstances, utility responsibility for the reconciliation process becomes even more critical, in order to relieve retail suppliers of the administrative burden as well as to alleviate the difficulty of a retail supplier coordinating in this way with a direct competitor. This complication is likely to be an issue only where a shared renewables facility is not being sponsored by a retail supplier, for example, where state law allows some other type of intermediary to offer shared subscriptions to a facility. Presumably, any programs offered by retail suppliers would avoid this possibility by requiring participants to be, or become, full customers of the supplier. Perhaps due to this competitive issue, IREC is not aware of such a structure being used to date.

Another important consideration is that retail suppliers are typically not required by law to offer any particular programs.[40] Therefore, if a retail choice customer wanted to participate in a shared renewable energy facility, but that customer's supplier does not provide such an option, the customer would need to break its contract to find a supplier that would offer it. Because of the time involved in setting up a retail choice contract, and penalties that the customer would incur in breaking it, there is little incentive to switch suppliers for this reason alone. It is possible that a consumer could elect to wait until an existing supply contract expires to pursue participation in a shared renewables program; however, availability could be limited and time sensitive so there is no guarantee that an attractive offer would exist when the customer's existing contract expired. The negative implications of switching could be mitigated in various ways by suppliers (e.g., offering to pay customer contract penalties as a customer recruitment tool) or through a regulatory regime that promotes flexible enrollment procedures.

Finally, it is important to note that the implications of restructured markets for the development of shared renewables programs are likely to be limited because the majority of retail choice load belongs to larger commercial and industrial customers. By contrast, many shared renewable energy programs target smaller commercial and residential customers, who, in many states, usually opt to stay with their utility service rather than rely on competitive suppliers. Moreover, in the wholesale market, these smaller customers' loads are aggregated based on the customer groups' load profiles and auctioned off through MW blocks. Therefore, retail suppliers typically serve and bill these customers under large portfolios and not individually. As a result, these small customers would need to be extracted from the portfolio and managed manually in order to participate in a shared renewable energy program. Such individual management poses a significant burden on retail suppliers and a thus represents a barrier to smaller customers' participation in shared renewables.

As comfort with the concept of shared solar continues to increase, we may see more interest in developing such programs in states with restructured energy markets. Likewise, as consumers become more aware of their energy options, we may see them leverage their market power and drive retail suppliers to offer more renewable energy options, including shared renewables. At this time, we have not modified our model rules to explicitly address shared renewables programs in restructured states, but we believe that the model still may serve as a useful starting point for such programs, as the same considerations are relevant. IREC believes there is substantial potential for shared renewable energy programs in restructured states, and we plan to continue to monitor interest in and development of programs, and to analyze opportunities and barriers particular to these markets.

## Model Rules For Shared Renewable Energy Programs

This section contains model rules for shared renewables programs, which are based on IREC's experience monitoring and assisting in the development of shared renewables programs around the United States. They are intended to serve as a guide for renewable energy stakeholders to consider along with their community's particular interests, constraints and priorities.

In addition to a few minor linguistic and stylistic changes, they are updated as follows:

- The term "Shared Renewable Energy Facility" replaces the term "Community Energy Generating Facility."
- The term "Participant" replaces "Subscriber."
- The term "Bill Credit" is defined and replaces the term "Net Metering Credits."
- The two-MW size limit on Shared Renewable Energy Facilities is removed.
- A Subscription minimum of one panel replaces a minimum of one kilowatt.
- In addition to the embedded cost-based valuation approach to bill credit valuation in our original model rules, a value-based approach is also included as a second option. Program developers can choose between the two options depending on their particular circumstances.

### I. Definitions

*As used within these rules, unless the context otherwise requires:*

a. "**Bill Credit**" means the monetary value of the kilowatt-hours (kWh) generated by the Shared Renewable Energy Facility allocated to a Participant to offset that Participant's electricity bill.

b. "**Biomass**" means a power source that is comprised of, but not limited to, combustible residues or gases from forest products manufacturing; waste, byproducts, or products from agricultural and orchard crops; waste or co products from livestock and poultry operations; waste or byproducts from food processing, urban wood waste, municipal liquid waste treatment operations, and landfill gas.[41]

c. **"Shared Renewable Energy Facility"** means Renewable Energy Generation that is located in or near the service territory of an Electricity Provider where the electricity generated by the facility is credited to the Participants to the facility. A Shared Renewable Energy Facility may be located either as a stand-alone facility, called herein a stand-alone Shared Renewable Energy Facility, or behind the meter of a participating Participant, called herein a hosted Shared Renewable Energy Facility. A Shared Renewable Energy Facility must have at least two Participants.

d. **"Electricity Provider"** means the entity providing electricity service to Participants.

e. **"Locational Benefits"** mean the benefits accruing to the Electricity Provider due to the location of the Shared Renewable Energy Facility on the distribution grid. Locational Benefits include such benefits as avoided transmission and

distribution system upgrades, reduced transmission and distribution level line losses, and ancillary services.

f. **"Renewable Energy Credit"** means a tradable instrument that includes all renewable and environmental attributes associated with the production of electricity from a Shared Renewable Energy Facility.

g. **"Renewable Energy Generation"** means an electrical energy generation system that uses one or more of the following fuels or energy sources: Biomass, solar energy, geothermal energy, wind energy, ocean energy, hydroelectric power, or hydrogen produced from any of these resources.

h. **"Participant"** means a retail customer of a utility who owns a Subscription and who has identified one or more individual meters or accounts to which the Subscription shall be attributed. Such individual meters or accounts shall be within the same Electricity Provider's distribution service territory as the Shared Renewable Energy Facility.

i. **"Participant Organization"** means an organization whose purpose is to beneficially own and operate a Shared Renewable Energy Facility for the Participants of the Shared Renewable Energy Facility. A Participant Organization may be any for-profit or non-profit entity permitted by [state] law. The Shared Renewable Energy Facility may also be built, owned, and operated by a third party under contract with the Participant Organization.

j. **"Subscription"** means an interest in a Shared Renewable Energy Facility. Each Subscription shall be sized to represent at least one panel in the Shared Renewable Energy Facility's generating capacity; provided, however, that the Subscription is sized to produce no more than 120% of the Participant's average annual electrical consumption. For Participants participating in meter aggregation, 120% of the Participant's aggregate electrical consumption may be based on the individual meters or accounts that the Participant wishes to aggregate pursuant to these rules. In sizing the Subscription, a deduction shall be made for the amount of any existing renewable energy generation at the Participant's premises or any Subscriptions owned by the Participant in other Shared Renewable Energy Facilities.

k. **"Total Aggregate Retail Rate"** means the total retail rate that would be charged to a Participant if all electric rate components of the Participant's electric bill, including any riders or other additional tariffs, except for minimum monthly charges, such as meter reading fees or customer charges, were expressed as per kWh charges.

## II. General Provisions

a. Subscriptions in a Shared Renewable Energy Facility may be transferred or assigned to a Participant Organization or to any person or entity that qualifies to be a Participant under these rules.

b. New Participants may be added at the beginning of each billing cycle. The owner of a Shared Renewable Energy Facility or its designated agent shall inform the Electricity Provider of the following information concerning the Participants in the Shared Renewable Energy Facility on no more than a monthly basis: (1) a list of

individual Participants by name, address, account number or meter number; (2) the proportional interest of each Participant in the Shared Renewable Energy Facility; and (3) for Participants who participate in meter aggregation, the rank order for the additional meters or accounts to which Bill Credits are to be applied.

c. A Participant may change the individual meters or accounts to which the Shared Renewable Energy Facility's electricity generation shall be attributed for that Participant no more than once quarterly, so long as the individual meters or accounts are eligible to participate.

d. An Electricity Provider may require that Participants participating in a Shared Renewable Energy Facility have their meters read on the same billing cycle.

e. If the full electrical output of a stand-alone Shared Renewable Energy Facility or the excess generation from a hosted Shared Renewable Energy Facility is not fully allocated to Participants, the Electricity Provider shall purchase the unsubscribed energy at a kWh rate that reflects the full value of the generation. Such rate shall include the avoided cost of the energy, including any Locational Benefits of the Shared Renewable Energy Facility.

f. If a Participant ceases to be a customer within the distribution service territory within which the Shared Renewable Energy Facility is located, the Participant must transfer or assign their Subscription back to their Participant Organization or to any person or entity that qualifies to be a Participant under these rules.

g. If the Participant ceases to be a customer of the Electricity Provider or switches Electricity Providers, the Electricity Provider is not required to provide compensation to the Participant for any unused Bill Credits.

h. A Shared Renewable Energy Facility shall be deemed to be located on the premises of each Participant for the purpose of determining eligibility for state and local incentives.

i. Neither the owners of, nor the Participants to, a Shared Renewable Energy Facility shall be considered public utilities subject to regulation by the [responsible agency having regulatory oversight] solely as a result of their interest in the Shared Renewable Energy Facility.

j. Prices paid for Subscriptions in a Shared Renewable Energy Facility shall not be subject to regulation by the [responsible agency having regulatory oversight].

k. A Participant owns the Renewable Energy Credits (RECs) associated with the electricity allocated to the Participant's Subscription, unless such RECs were explicitly contracted for through a transaction independent of any interconnection tariff or program contract. For a Shared Renewable Energy Facility located behind the meter of a participating Participant, the host Participant owns the RECs associated with the electricity consumed on-site, unless the RECs were explicitly contracted for through a separate transaction independent of any Shared Renewable Energy or interconnection tariff or contract.

l. The dispute resolution procedures available to parties in the Electricity Provider's interconnection tariff shall be available for the purposes of resolving disputes between an Electricity Provider and Participants or their designated representative for disputes involving the Electricity Provider's allocation of Bill

Credits to the Participant's electricity bill consistent with the allocations provided pursuant to Rule II.b. The Electricity Provider shall not be responsible for resolving disputes related to the agreements between a Participant, the owner of a Shared Renewable Energy Facility, and/or a Participant Organization or any other party. This provision shall in no way limit any other rights the Participant may have related to an Electricity Provider's provision of electric service or other matters as provided by, but not limited to, tariff, decision of [responsible regulatory body or agency], or statute.

## III. Bill Credit Provisions

a. An Electricity Provider shall not limit the cumulative, aggregate generating capacity of Shared Renewable Energy Facilities.

b. For a Shared Renewable Energy Facility, the total amount of electricity expressed in kWh available for allocation to Participants, and the total amount of RECs generated by the Shared Renewable Energy Facility and allocated to Participants, shall be determined by a production meter paid for by the owner(s) of the Shared Renewable Energy Facility. It shall be the Electricity Provider's responsibility to read the production meter.

c. For a hosted Shared Renewable Energy Facility, the determination of the quantity of Bill Credits available to Participants of that facility, including the host Participant, shall be based on any energy production of the Shared Renewable Energy Facility that exceeds the host Participant's instantaneous on-site consumption during the applicable billing period and the Participants' Subscriptions in that Shared Renewable Energy Facility.

d. For a stand-alone Shared Renewable Energy Facility, the determination of the quantity of Bill Credits available to each Participant of that Shared Renewable Energy Facility shall be based on the total exported generation of the Shared Renewable Energy Facility and each Participant's Subscription in that Shared Renewable Energy Facility.

e. The Electricity Provider shall carry over any excess Bill Credits earned by a Participant and not used in the current billing period to offset the Participant's consumption in subsequent billing periods until all credits are used or electric service is terminated. Any excess Bill Credits shall not reduce any fixed monthly customer charges imposed by the Electricity Provider.

## IV. Embedded Cost-Based Approach to Bill Credit Valuation

a. For Participants that host a Shared Renewable Energy Facility or where participating Participants are located on the same distribution feeder as the Shared Renewable Energy Facility, the value of the Bill Credits for the host Participant and those Participants on the same distribution feeder shall be calculated by multiplying the Participant's share of the kWh electricity production from the Shared Renewable Energy Facility by the retail rate for the Participant. For Participants on tariffs that contain demand charges, the retail rate for the Participant shall be calculated as the Total Aggregate Retail Rate for the Participant.

b. For all other Participants in a Shared Renewable Energy Facility, value of the Bill Credits allocated to each Participant shall be calculated by multiplying the Participant's share of the electricity production from the Shared Renewable Energy Facility by the retail rate as charged to the Participant, adjusted for cost and benefits, including locational benefits, [42] provided by the Shared Renewable Energy Facility. The [responsible agency having regulatory oversight] shall ensure that any costs included in this cost-benefit analysis are not already recovered by the Electricity Provider from the Participant through other charges.

## V. Value-Based Approach to Bill Credit Valuation

a. For all Shared Renewable Energy Facilities, the value of Bill Credits allocated to each Participant shall be calculated by multiplying the Participant's share of the kWh electricity production from the Shared Renewable Energy Facility by the value of the electricity produced as determined by the [responsible regulatory body or agency], taking into account both the costs and benefits of the Shared Renewable Energy Facility. The benefits of the Shared Renewable Energy Facility shall include but not be limited to the avoided cost of generation, capacity benefits, avoided line losses, avoided transmission and distribution investments, environmental benefits or avoided environmental compliance costs, and any other Locational Benefits.[43]

## Endnotes

[1] Paul Denholm & Robert Margolis, Nat'l Renewable Energy Lab., *Supply Curves for Rooftop Solar PV-Generated Electricity for the United States* 4 (Nov. 2008), *available at* http://www.nrel.gov/docs/fy09osti/44073.pdf.

[2] SEIA Solar Survey 2012 (http://www.seia.org/research-resources/america-votes-solar-national-solar-survey-2012), Gallup poll March 2013 (http://www.usnews.com/news/articles/2013/04/01/poll-americans-overwhelmingly-support-alternative-energy).

[3] *See* http://quickfacts.census.gov/qfd/states/00000.html (114,761,359 U.S. households in 2011).

[4] Union of Concerned Scientists, http://www.ucsusa.org/clean_energy/coalvswind/c01.html.

[5] For more detail on U.S. community wind efforts, see http://www.windustry.org.

[6] *See CPUC California Solar Initiative 2009 Impact Evaluation, Final Report* § 10, (June 2010), *available at* http://www.cpuc.ca.gov/PUC/energy/Solar/eval09.htm.

[7] Mosaic, https://joinmosaic.com.

[8] RE-volv, http://re-volv.org.

[9] For a more in depth explanation of NEM, see DSIRE, Solar Policy Guide: Net Metering, www.dsireusa.org/solar/solarpolicyguide/?id=17, and IREC, *Net Metering Model Rules* (2009), *available at* http://irecusa.org/wp-content/uploads/2010/08/IREC_NM_Model_October_2009-1-22.pdf.

[10] DSIRE, NEM Summary Map (Feb. 2013), http://www.dsireusa.org/documents/summarymaps/net_metering_map.pdf.

[11] Larry Sherwood, IREC, *U.S. Solar Market Trends 2011*, at 7, *available at* http://www.irecusa.org/wp-content/uploads/IRECSolarMarketTrends-2012-Web-8-28-12.pdf (showing that 93 percent of systems were net-metered as of 2011).

[12] Keyes & Fox LLP, on behalf of NAURC, *Exploring Aggregated Net Metering in Arizona*, Summary of Policies in Other States (Part 3) (Jan. 2011), *available at* http://www.naruc.org/grants/Documents/SERCAT_Arizona_2010.pdf.

[13] *See* NREL, *The Solarize Guidebook: A Community Guide to Collective Purchasing of Residential PV Systems* (May 2012), *available at* http://www.nrel.gov/docs/fy12osti/54738.pdf.

[14] For more information on the CEC, see www.easycleanenergy.com.

[15] Vermont's group billing rules also apply to a single consumer with multiple electric meters. For more detail on the Vermont program, see the Vermont Net Metering web site at http://psb.vermont.gov/utilityindustries/electric/backgroundinfo/netmetering and the DSIRE Vermont Net Metering web site at www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=VT02R.

[16] U.S. Dept. of Energy, *A Guide to Community Shared Solar: Utility, Private, and Non-Profit Project Development* (Nov. 2010), *available at* www.nrel.gov/docs/fy12osti/54570.pdf.

[17] *See e.g.,* CPUC, D.11-07-031, *California Solar Initiative Phase One Modifications* 5-22 (July 20, 2011), *available at*

http://docs.cpuc.ca.gov/PublishedDocs/WORD_PDF/FINAL_DECISION/139683.PDF (California); CPUC, D.08-10-036, *Decision Establishing Multifamily Affordable Solar Housing Program within the California Solar Initiative* 31-40 (Oct. 20, 2008), *available at* http://docs.cpuc.ca.gov/PublishedDocs/WORD_PDF/FINAL_DECISION/92455.PDF (California); C.R.S. § 40-2-127(5)(b)(II) (Colorado); 26 Del. Code § 1014(e) (Delaware).

In a few cases, like Massachusetts "neighborhood net metering" program, the credit is valued based on the retail rate in effect *where the project is located*. This may be easier to administer in some ways because the program administrator needs to only consider one retail rate rather than (potentially) several different rates of many participants, which could include customers in the residential, commercial and industrial sectors. *See* 220 CMR § 18.04(3); *see also* DSIRE, Mass. Net Metering, http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=MA01R&re=0&ee=0.

[18] *See* 26 Del. Code § 1014(e)(2); 26 Del. Admin. Code § 3001-8.4.

[19] *See* CPUC, D.11-07-031 & D.08-10-036, *supra* note 17.

[20] *See* CO PUC, Docket 11A-418E, Recommended Decision of Administrative Law Judge Paul C. Gomez Approving Application with Modifications, at 46-54 (March 8, 2012); Xcel Energy, *2012 Renewable Energy Standard Compliance Plan*, Vol. 1, § 9 (May 13, 2011); CO PUC, Docket 11A-418E, Direct Testimony and Exhibits of Scott B. Brockett, at 4-13 (May 13, 2011).

[21] 4 C.C.R. 723-3 § 3665(c)(1)(A)-(B) (referring to C.R.S. § 40-2-127(5)(b)(II)).

[22] *See* CEC HCE FAQ, http://www.easycleanenergy.com/faq.aspx.

[23] *See* http://mysunshare.com for more information on SunShare LLC.

[24] *See* San Miguel Power Association Community Solar, http://www.smpasolar.com/learn.aspx.

[25] *See* Poudre Valley Community Solar, http://www.pvreasolar.com/learn.aspx.

[26] *See* Austin Energy, Residential Solar Rate, http://www.austinenergy.com/energy%20efficiency/Programs/Rebates/Solar%20Rebates/proposedValueSolarRate.pdf; Karl Rábago, Leslie Libby & Tim Harvey, Austin Energy, and Benjamin Norris & Thomas E. Hoff, Clean Power Research, *Designing Austin Energy's Solar Tariff Using a Distributed Value PV Calculator*, World Renewable Energy Forum 2012, *available at* http://www.cleanpower.com/wp-content/uploads/090_DesigningAustinEnergysSolarTariff.pdf.

[27] *See* PG&E A.12-04-020 In the Matter of the Application of Pacific Gas and Electric Company to Establish a Green Option Tariff (U39E), and SDG&E A.12-01-008 Application of San Diego Gas & Electric Company (U902E) For Authority To Implement Optional Pilot Program To Increase Customer Access To Solar Generated Electricity. Dockets are available at http://delaps1.cpuc.ca.gov/CPUCProceedingLookup/f?p=401:1:596995556267001:::::

[28] *See* C.R.S. § 40-2-127(5)(b)(II). While IREC supported the incorporation of such a "reasonable charge," we participated in the Colorado rulemaking to calculate the charge and we ultimately did not support the outcome. IREC submitted an alternative proposal in the docket, 11A-418E,

https://www.dora.state.co.us/pls/efi/EFI.Show_Docket?p_session_id=&p_docket_id=11A-418E.

[29] Additional discussion of design of bill credits can be found in R. Thomas Beach & Patrick G. McGuire, Community Solar California, *The Design of Bill Credits for Community Solar Facilities in* California (January 2012); *see also* Joseph Wiedman & Jason Keyes, IREC, SolarABCs, *A Generalized Approach to Assessing the Rate Impacts of Net Energy Metering* (Jan. 2012), *available at* http://www.solarabcs.org/about/publications/reports/rateimpact/pdfs/rateimpact_full.pdf.

[30] Most state interconnection procedures specify 2 MW as the cutoff for Level 2 "Fast Track" interconnection procedures. Systems interconnecting at the distribution level that are able to take advantage of Level 2 interconnection procedures will generally proceed in a relatively quick and inexpensive fashion through the utility interconnection process.

[31] *See* Joseph F. Wiedman & Erica M. Schroeder, Keyes, Fox & Wiedman, Tom Beach, Crossborder Energy, IREC, *12,000 MW of Distributed Generation by 2020: Benefits, Costs and Policy Implications* (July 2012), *available at* http://www.irecusa.org/wp-content/uploads/Final-12-GW-report-7.31.12.pdf.

[32] This estimate is based on the federal 30-percent investment tax credit (ITC), which is scheduled to decline to 10 percent in 2016 if no action is taken before that. For more detail on the ITC, see http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=US02F.

[33] *See* DSIRE Third-Party Ownership Map, http://www.dsireusa.org/documents/summarymaps/3rd_Party_PPA_map.pdf

[34] *See* C.R.S. § 40-2-127(2)(b)(I)(A) (Colorado); 26 Del. Code § 1014(d)-(e) (Delaware); Mass.Gen.Laws, ch. 164, § 1G et seq. (Massachusetts).

[35] See Paul Emrath, Ph.D., National Association of Home Builders, *How Long Buyers Remain In Their Homes,* (Feb. 2009), available at http://www.nahb.org/generic.aspx?sectionID=734&genericContentID=110770&channelID=311

[36] C.R.S. § 40-2-127(1)(b)(II), (5)(a)(IV)(B), (5)(e).

[37] 4 C.C.R. 723-3 § 3665(d)(V).

[38] 2012 PSCo RES Plan, Vol. 1 at § 5, 25.

[39] Fully restructured states include Connecticut, Delaware, Illinois, Maine, Maryland, Massachusetts, Michigan, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Texas and Washington D.C

[40] *See* Justin Barnes & Laurel Varnado, N.C. Solar Center, IREC, *The Intersection of Retail Choice and Net Metering: An Overview of Policy Practice and Issues* (Dec. 2010), *available at* http://irecusa.org/wp-content/uploads/2010/12/FINAL-Intersection-of-Retail-Choice-and-Net-Metering-Report.docx.pdf (includes a table of state net metering policies, as they apply to retail choice states).

[41] The definition of Biomass may need to be adjusted to reflect state renewable portfolio standard definitions.

[42] Additional discussion of design of bill credits can be found in R. Thomas Beach & Patrick G. McGuire, Community Solar California, *The Design of Bill Credits for Community Solar Facilities in* California (January 2012); *see also* Joseph Wiedman & Jason Keyes, IREC, SolarABCs, *A Generalized Approach to Assessing the Rate Impacts of Net Energy Metering* (Jan. 2012), *available at* http://www.solarabcs.org/about/publications/reports/rateimpact/pdfs/rateimpact_full.pdf.

[43] For a more thorough discussion of the benefits of distributed generation to consider for the purposes of valuation, see Keyes, Fox & Wiedman, LLP, *Unlocking Distributed Generation Value: A PURPA-Based Approach to State Policy Design*, available at http://www.irecusa.org/wp-content/uploads/2013/05/Unlocking-DG-Value.pdf.