Community Solar Programs in Iowa: Issues and Options

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Purpose
In 1983, Iowa passed the Alternative Energy Law, which required the two investor-owned utilities (IOUs) (MidAmerican Energy and Alliant Energy Interstate Power and Light) to own or contract for 105 megawatts (MW) of renewable generating capacity. This requirement does not apply to municipal utilities. However, the municipal utility serving the city of Cedar Falls (Cedar Falls Utilities) allows customers to purchase wind to meet up to 4% of community annual consumption. Additionally, the utility would like to evaluate the inclusion of solar energy in its portfolio. Stemming from this, the Iowa Economic Development Authority submitted a request for technical assistance under the National Renewable Energy Laboratory’s Solar Technical Assistance Team. The request was to identify issues and options for encouraging the development of community solar programs in Iowa. The content of this report draws out those issues and considerations for further local consideration but is not prescriptive. Additional resources and tools are also included.

Community Solar Background
Under cooperative ownership schemes, individuals in a community own a portion of the project and receive the associated economic benefits. Such arrangements have been a successful development model for wind energy projects in Europe for decades. Similar models for both wind and solar projects are now growing in popularity across the United States.

Community solar programs (also known as “solar gardens”) allow customers to participate in a solar system and receive some of the benefits of the project's production in return. There are many different ownership and management models for community solar projects, including utility ownership as well as business, school, non-profit organization, and citizen group ownership models. In this report we focus on how a municipally owned utility could structure such a program in Iowa.

Benefits to Ratepayers and Utilities
Community solar systems allow ratepayers to participate in solar electricity when other barriers may exclude them. Ratepayers who do not own suitable real property on which to site a photovoltaic (PV) system can buy into a community solar project. In some instances, subscribers to a community solar program can benefit from state PV incentives, although according to the Database of State Incentives for Renewable Energy (DSIREusa.org), some of the Iowa state incentives have already reached their capacity limit.

Community solar also allows ratepayers a choice as to where their electricity comes from. For those ratepayers with a desire to purchase carbon-free electricity, community solar projects offer an alternative to the utility’s current fuel mix. With green power programs, a choice may already exist, but community solar affords consumers additional benefits. Unlike some green power programs, the generation source is local and may contribute to the local economy. Green power programs may also source power from existing generation facilities, whereas community solar would create additional renewable generation sources. Moreover, community solar programs raise awareness about renewables amongst community members.
Solar power generation can help address power issues for the utility, including peak demand depending on the timing of peak loads, and other possible benefits such as voltage support for distribution circuits that experience overloading situations that are coincident with solar production. Reductions to peak power can help reduce costs that otherwise would put upward pressure on utility rates. By adding distributed solar electricity into its generation portfolio and within its distribution system, a municipal utility may be able to reduce costs and thereby save ratepayers money.

Solar electricity can also help a utility provide a hedge against future price increases from non-renewable power sources. Once the capital investment in a solar system is made, operations and maintenance costs per unit of production from solar projects is typically low and the fuel (the sun) is free. When utilities purchase power that is non-renewable based, they are subject to fuel price fluctuations. Adding solar to a utility's fuel mix can help stabilize rates for ratepayers.

**Disadvantages of Solar**

Solar power does come with some disadvantages, including costs, intermittency, and inequitable cost shifting. While the cost of equipment and components has significantly decreased, the total installed cost of solar still represents a formidable number. Indeed, the economic benefits of a solar system may not outweigh the costs if tax incentives are unachievable, resulting in a negative net present value.

Solar is a variable and intermittent source of energy. Variability refers to the predictable seasonal patterns, and intermittency refers to the unpredictable daily variation. Moreover, without storage, solar does not provide energy during nighttime hours. Utilities therefore, must still maintain other generation sources to make up for drops in production during the day due to unanticipated cloud cover, for instance. During times of high solar production, they must also be able to move other generation off-line.

Some recent studies have posited that the current structure may cause nonusers of solar to subsidize solar consumers. Utilities are mandated to provide service to all consumers. Thus, even if consumers are able to obtain all their energy needs from solar, the utility must still be prepared to provide them with energy should their systems fail or should their energy needs increase. Additionally, the maintenance and operation costs required for the grid infrastructure are fixed costs that may be rolled into electricity rates. Solar consumers still benefit from the option to use the grid (and may be using it if they produce net excess power or are unable to cover their full energy needs with solar), but may not be paying their “fair” share depending on their energy consumption. If their grid power consumption is low, the burden of these costs is shifted to

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nonsolar consumers. However, other reports counter that the benefits provided to the utility still far outweigh these costs\(^3\) and have shown that aggregate peak demand does not differ greatly from off-peak demand for distributed generation customers.

### Solar Market in Iowa

At the state level, Iowa offers various tax incentives to encourage adoption of renewable sources of energy, including solar, and also has a net metering rule in place as well as a mandatory utility green power option. Two tax credits are available for both individuals and corporations: the Renewable Energy Production (REP) Tax Credit and the Solar Energy Systems (SES) Tax Credit. We describe both in the financial incentives section. For the 2012 tax year (the first year), the breakdown for the SES tax credit was as follows:

<table>
<thead>
<tr>
<th>Individual</th>
<th>Corporate</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>Amount</td>
<td>Number</td>
</tr>
<tr>
<td>50</td>
<td>$108,936</td>
<td>14</td>
</tr>
</tbody>
</table>

Data on the installed capacity of the 64 systems were not available from the Iowa Department of Revenue. Parties claiming the SES credit were not eligible to claim the REP credit. The tax credit awards for the REP credit by fiscal year were as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013 (through March)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awards</td>
<td>$1,492,898</td>
<td>$2,570,197</td>
<td>$2,398,784</td>
<td>$2,503,361</td>
<td>$3,010,850</td>
<td>$3,918,708</td>
</tr>
</tbody>
</table>

The Iowa Department of Revenue does not break down the REP tax credit dollar awards by type of renewable. However, it does keep track of the capacity approved under the tax credit. As of November 15, 2013, 5 projects amounting to 7.9 MW of solar capacity had been approved under the program. However, over 85% of this capacity was approved in November 2013 and has until year-end 2014 to be operational.

Given the low amount of installed systems, state-specific installed PV capacity is difficult to find. According to data from the Interstate Renewable Energy Council, Iowa had 0.1 MW of PV capacity installed in 2011. States with similar installed capacities include:

- AL: 0.5 MW
- ID: 0.4 MW
- KS: 0.2 MW
- NE: 0.3 MW
- WY: 0.2 MW

In comparison, California, the state with the largest installed capacity, had 1,563.6 MW of installed PV capacity, while New Jersey, the second ranked, had 566 MW.

Installed capacity data for 2012 were unavailable, but we would expect it to have increased given the data on the SES credit awards.

Ernst and Young releases an annual state attractiveness index for solar (combined residential, commercial, and utility-scale), based on price received per kilowatt hour (kWh) of electricity, tax climate, financing availability, market growth potential, current installed base, and resource quality. In 2012, Iowa received a score of 56, compared to California, the highest ranked, at 79. The weights for the factors used in determining the score are: power offtake attractiveness (32%), market growth potential (26%), resource quality (18%), current installed base (8%), grant of soft loan availability (8%), and tax climate (8%).

In terms of solar resource, Iowa has a similar resource to Missouri, Illinois, Kentucky, Tennessee, Maryland, Delaware, New Jersey, Connecticut, Rhode Island, and most of Massachusetts (Figure 1).

![Figure 1. Photovoltaic Solar Resource of the United States](image)

**Financial Incentives**

Federal, state, and local governments, as well as utilities, may offer financial incentives for solar and other renewables. While a number of localities, such as the cities of Ames, Independence, Maquoketa, and Preston, offer financial incentive programs, we focus below on the federal and state programs.
Federal Financial Incentives for Solar
The Investment Tax Credit (ITC) applies to several renewable technologies, including solar. The one-time credit reduces federal income taxes for qualified owners based on capital investment in renewable energy projects that are placed into service on or before December 31, 2016. For solar, the credit is equal to 30% of expenditures, with no maximum set amount for the credit. Unused credits can be carried forward for up to 20 years. In general, the system must be used by the taxpayer. Moreover, the system owner must actually be a taxable entity (corporate or personal) and have a tax appetite for credits.

The Modified Accelerated Cost Recovery System (MACRS) allows businesses to fully depreciate the solar system over five years, or six tax years, as opposed to a longer period that would diminish the value of the depreciation deduction. Additionally, the system may qualify for a 50% first-year bonus depreciation. The bonus depreciation is only applicable to systems put into service by December 31, 2013, and applies to taxable corporate entities. Depreciation refers to the concept that, over time, assets such as equipment lose value and will eventually need to be replaced. To account for this reduction in asset value, businesses record an expense over a set period of time, which can be used to reduce taxable income. For projects taking the ITC, the depreciable basis must be reduced by half the value of the ITC. For example, if the ITC equals 30% of project costs, then the depreciable basis is reduced by 15%.

It is worth noting that there is a federal renewable production tax credit, but it is not applicable to solar.

Iowa State Incentives
Iowa provides a production tax credit, a SES tax credit, and sales tax exemption for solar. The personal and corporate SES tax credit is similar to and based on the ITC. Individuals can claim a credit of 50% of the federal ITC (15%) up to $3,000 for residential system and $15,000 for commercial systems. There is a cumulative limit of $1,500,000 for the credits.

There are two renewable production tax credits in Iowa, both of which are oversubscribed and hence closed to new applications. Parties are only eligible for either the REP tax credit or the SES tax credit; they cannot claim both. The production credit is for 1.5¢/kWh or 1.0¢/kWh, although the latter is only available for wind facilities.

Solar equipment is also exempt from state sales tax. Additionally, the market value added to a property by a solar system is exempt from property taxes for 5 full years.

Community Solar Ownership Structures and Financing Options
Typically, community solar programs are structured such that participants will provide an upfront payment for a portion of the capacity of the solar array (e.g., one kilowatt), and then receive bill credits each month based on how much their share actually produced. For example, Holy Cross Energy, a municipal utility in Colorado, developed an 80-kW community solar program;
participants purchased shares at an upfront cost of $3.15/watt and in return receive $0.11/kWh, according to the system’s production and the number of shares purchased. There are, however, various ownership structures with financing options usually playing a large role in determining the most valuable structure.

**Utility-owned**
The utility must determine whether it is willing and able to undertake ownership and maintenance of a solar project. It may appreciate and benefit from the experience and skill development that owning and operating a solar project can offer or may find it an unwelcome burden and expense.

Utility-owned projects are either purchased as turnkey projects or developed and built by the utility. Such projects are usually balance-sheet financed. Many IOUs have invested directly in solar projects or through developer subsidiaries and are able to take advantage of the ITC and MACRS, as well as any state incentives. Given their credit worthiness, IOUs are able to attract favorable rates for debt and equity financing. If directly owned, investments are recovered through an IOU’s rate base and would earn the company’s weighted average cost of capital. For example, Pacific Gas & Electric invests directly in solar projects via the Solar Power Initiative. Conversely, if the project is owned by an unregulated subsidiary or affiliate, the rate of return would not be regulated and the investment would likely be recovered through selling the energy to a utility. The highest profile instance of this situation is probably MidAmerican Energy Holdings, which owns MidAmerican Energy Company, a large utility company, and MidAmerican Renewables, an unregulated entity that owns solar, wind, geothermal, and hydro power plants. MidAmerican has successfully raised capital through private placement bonds. An IOU may also invest shareholder funds in a third-party project, with the investment not recovered from ratepayers given the private source of funding. Rather, the investment serves as tax equity and could modify taxes paid by and dividends paid to shareholders. Pacific Gas & Electric’s investment in SolarCity and SunRun serves as an example of this structure.

While the IOUs are able to take advantage of the ITC, under “normalization” accounting rules the utility must spread the ITC benefit over the useful life of the asset when setting retail electricity rates. The utility would still benefit from the ITC in the first year, but that benefit could not be directly transferred to ratepayers, which would put them at a cost disadvantage relative to nonutility developers.

A municipal utility is unable to take advantage of the federal tax credit and accelerated depreciation, but may be able to make use of direct subsidy bonds. Currently, there is only one direct subsidy bond program still operating – Qualified Energy Conservation Bonds (QECBs). Under this financing structure, the issuer pays a taxable coupon and receives a rebate from the U.S. Treasury, which results in a lower effective financing rate. The QECBs may be issued by state, local, and tribal governments. There is no statutory deadline for QECBS, but each state was allotted a

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4 SolarCity and SunRun are two of the largest providers of solar leasing options for the residential and commercial market. They operate in 15 states combined.
finite amount. As of June 2013, Iowa had not issued any of its allotment.\(^5\) Clean Renewable Energy Bonds (CREBs) were a previously available form of direct subsidy bonds; however, this program has expired. Under this program, Ashland, Oregon’s municipal utility was able to partially finance its Solar Pioneer II community solar program. The municipality was able to sell the bonds at 1.25% and then also secured a tax equity investor for the Oregon Business Energy Tax Credit. The tax equity investor purchased the tax credit for a payment equal to 25.5% of the system cost. Members of the program pay an upfront amount to purchase the power generated from an incremental number of panels (full, half, or quarter panels). Once a year, the members are then credited at the full retail rate for the power produced.

For municipal utilities, the municipal bond market represents another source of financing if they are unable to take advantage of the direct subsidy bonds. For the bonds to qualify as tax-exempt at the federal level (and hence able to receive lower financing rates), the proceeds must be used by the public. In other words, the municipal utility must own and undertake the building of the project. However, the viability of municipal debt financing ultimately depends on the credit rating of the municipality. Obtaining a credit rating may present a formidable cost to small municipalities. Indeed, voter-based debt restrictions may also be in place, thereby further limiting a municipality’s ability to take advantage of municipal debt. Moreover, a bond offering tied solely to a community solar project may not be met with strong investor appetite given risk considerations and the relative size of the deal. Under the Bond-Power Purchase Agreement (PPA) hybrid model discussed below, a public entity may issue municipal debt and transfer the capital to a developer in exchange for a lower PPA price. As the funds are issued for use by the privately owned developer, they are taxable at the federal level. This model is only beneficial if the government entity has a higher credit rating than the developer.

**Third-party Owned**

The utility can contract with a third party to own and operate the solar system. The third party can likely take advantage of the ITC, MACRS, and state incentives. The utility does not take on the risk of ownership of the system, but also cannot claim the system as an asset. In some cases, the third-party provider may provide additional services, such as automatic bill crediting for customer subscribers. This service can greatly reduce the administrative efforts required by the utility. The Clean Energy Collaborative is one such third-party developer that works with utilities to provide turn-key community solar programs that include billing service. There are several financing structures available to third-party owned projects, including PPA, bond-PPA hybrid, sale-leaseback, inverted lease, and utility pre-pay.

Under a PPA financing model, a separate taxable entity procures, installs, and operates the solar project. The utility enters into a long-term contract to purchase the power generated by the project. The taxable entity is able to take advantage of the ITC and MACRS and pass on some of the benefits to the utility through the price for power. A municipal utility would not otherwise be able to take

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advantage of the federal tax benefits. The taxable entity would also benefit from the electricity sale revenues in addition to the federal tax incentives. Enabling legislation is necessary for PPA structures to exist because, in some states, the definition of a utility may prohibit third-party owned systems. The Sacramento Municipal Utility District’s (SMUD) Solar Shares program is one example of a PPA financing model. SMUD awarded the contract to enXco, who financed, constructed, owns, and operates the system and supplies the generated power to SMUD through a 20-year PPA. SMUD in turn supplies the power to members of the Solar Shares program. Members pay a fixed monthly fee for a given capacity subscription and receive a credit (at the full retail rate) for its production.

As mentioned earlier, an extension of the PPA model is the Bond-PPA structure, under which a public entity may issue municipal debt and transfer the capital to a developer in exchange for a lower PPA price. Typically, government entities are able to issue municipal debt at low interest rates. In this case, however, the debt would be subject to federal taxes because it is used for private purposes, but may be exempt from state taxes. Under the model, the government entity sells bonds to finance the development costs of the solar project. The entity then enters into a PPA and lease-purchase agreement that transfers ownership of the project to the developer for federal tax purposes. The lease payments fully cover the bond payments, and should be lower than the loan payments on funds the developer would have otherwise borrowed. The cost savings, in turn, mean that the developer may offer an attractive PPA price to the government entity. This model was first implemented by Morris County, New Jersey.

The sale-leaseback is similar to the bond-PPA structure, but is privately financed. A project developer sells the project for cash to an investor and simultaneously enters into a long-term lease with the investor and arranges a PPA with a power purchaser. The developer then makes lease payments to the investor in exchange for the cash injection. The lease payments are financed through the revenue stream generated by the PPA and are fully tax deductible because they are considered operating expenses. However, the developer must make lease payments regardless of the performance of the system. The sale proceeds can be used by the developer for a variety of purposes, including paying off debt or funding a working capital account. In 2009, Wells Fargo and SunPower developed a Sale-Leaseback program. SunPower develops the projects while Wells Fargo finances them and receives the tax benefits.

The utility prepay structure uses the utility's low-cost capital to directly finance a solar project. The utility prepays for the energy to be delivered by a particular project. This prepayment serves as construction financing for the project or may be used to retire previously attained financing. The utility can be an IOU or a municipal-owned utility. The project would be owned by an investor that can take advantage of the ITC and MACRS benefits. In 2007, the Southern California Public Power Authority, acting on behalf of several municipal agencies, prepaid for energy from a 200-MW wind

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project using proceeds from a bond sale. The amount was sufficient to retire the debt incurred to build the project and to pay for the ongoing operating expenses. Such a structure could also be used for solar projects.

**Flip Structure**
The flip model of ownership offers some of the benefits of both the third-party owned and utility-owned projects. A third-party develops and owns the project in the initial years, taking advantage of the tax credit and accelerated depreciation incentives. Once these incentives are exhausted, the ownership is transferred to the utility, which can then claim the system as an asset and take over operations. Portland General Electric, an IOU, has successfully used this model, and it has been used as a model for several community-led wind projects across the country. Financing may come from both the utility and investor.

The flip structure may also be financed through an inverted lease in which the developer leases the project to an operator and passes through the ITC to the tax equity investor, usually in exchange for upfront funds that cover some of the project costs. The utility, via a PPA arrangement, purchases the electricity from the lessee, who in turn makes lease payments to the lessor. In this situation, the tax credit and MACRS benefit may be split between the developer (if an IOU or third party) and the tax equity investor. At the end of the lease, the developer takes back the project without paying any additional cost.

**Program Design Options**

**Capacity vs. Generation**
It must be decided whether customers are paying/subscribing to receive output from a portion of the system measured in kW of capacity or to receive generation (a defined number of kWh).

If the program is designed such that the customer is subscribing to receive capacity, it is as if they own or lease a certain portion of the solar panels. The SMUD Solar Shares program discussed earlier is one example of the capacity subscription design.

When using capacity subscription, the bill credits can be designed in several different ways:

- The actual generation produced by the system is divided amongst subscribing customers according to their subscription level. This method most closely mimics the customer owning a solar system on their roof.

- The estimated annual generation of the system is divided amongst subscribers according to their subscription level. The credits may be trued-up at the end of the year to account for actual generation. A minimum guarantee can be set to reduce risk to the customer in the case that generation is significantly less than expected.

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The estimated total lifetime generation of the system is used to calculate bill credits that are levelized across 20 years (or the expected life of the system). The credits can be the same every month or can vary by month according to a typical solar output curve (but be the same per annum). This method gives customers the certainty of a known bill credit and mimics the model that is often used by third-party solar developers. Because there is a risk that the system may not produce the total expected generation, a portion of the expected generation should be set aside (not subscribed) as a buffer. SMUD used a buffer of 5% of expected generation in its Solar Shares program.

When using a generation subscription method, the customer subscribes to a set number of kWh per month or year and is credited that number of kWh. This method simplifies the calculation for the customer because it skips the translation from kW of capacity to kWh of generation. Customers can easily compare the price paid per kWh of solar with the price per kWh of traditional generation. The utility must ensure that there is sufficient capacity to generate all subscribed kWh, which means setting aside a percentage of the expected generation as a buffer.

Whichever offering is made (whether it be based on actual or expected capacity or based on generation) the program should be explained clearly to customers so there is transparency regarding what they are subscribing to receive and how any true-ups, if applicable, will be made.

**Treatment of Renewable Energy Credits**

It must be decided how the renewable energy credits (RECs) generated by the project will be handled and whether the utility, a third-party developer, or the participating customer will retain ownership of the RECs. The utility may benefit from keeping the RECs for renewables portfolio standard compliance. The utility may offer to purchase the RECs from the subscribing customers. Some customers, particularly commercial customers, may choose to retain the RECs generated by their subscription so that they may claim the environmental attributes of their subscription. Some residential customers may have no interest in retaining RECs, while others may choose for the utility to retire the RECs on their behalf. The various options should be clearly explained to potential participants so they understand how the environmental attributes of the solar generation are accounted for.

**Program Monitoring**

A method for program monitoring can be incorporated into the program design in order to collect information regarding the reasons why customers subscribe, why customers leave the program, what program changes or additional services customers would like, etc.

**Implementation of Community Solar**

There are several phases and options in designing and implementing a community solar program. One option is to turn project and program development over to a turnkey vendor. As of this writing, the number of vendors that offer turnkey services is limited to a few providers, such as the Clean Energy Collective and Sunshare, but the number of providers is expanding. Another option would be for the city to design the program, then contract the project development and possibly the maintenance to a third-party vendor and purchase the electricity generated from the community.
solar projects for sale to its ratepayers. A third option is for a utility to develop and own the entire project. Requisite pieces of this process are described below and we start with the community’s expectations for “profitability” from the community solar project as that decision will likely drive subsequent decisions. NREL’s assumption is that the utility wants to recoup transmission, distribution, interconnection and administrative costs to “make the utility whole.” If subsidization is an option, the analysis can be refined according.

**Pricing of Community Solar Project**

Pricing for community solar can broadly be defined as the sum of administration, marketing, supply, operation, maintenance, and integration costs divided by either the capacity of the project (if price will be based on capacity) or the production of the project (if price will be based on generation) (see Figure 2). Some community solar projects also take into account a rebate or other incentive, similar to a rooftop solar system.

![Figure 2: Pricing a Community Solar Project](image)

The Solar Electric Power Association (SEPA) suggests that the pricing should be high enough for partial or full cost recovery, but low enough to gain subscribers. Because it can be difficult to know how many people will subscribe, SEPA suggests comparing pricing options to utility retail rates and third-party leases/PPAs. Because of the hedging value that a community solar purchase can provide, a rate that is initially higher than retail rate can still provide benefit as a hedge against future electric rate increases. (SEPA/EPRI Feb 2012)

NREL has developed tools that model prices for energy generated from a community solar project from both utility and subscriber perspectives. A description of the tools is included as Appendix A.

**Other pricing considerations**

Community solar pricing can also take into account the benefits that a community solar project would accrue to the utility or society at large. For example, pricing may provide an incentive to participants, which might represent the environmental benefit, capacity benefit, or other benefits. The capacity value of distributed PV can depend greatly on the coincidence of production with the utility's peak demand or, for many municipal utilities in particular, the coincidence of the PV array's
production with the peak demand of the municipal utility's power supplier or transmission system owner. Previous studies have valued this benefit between zero and 10 cents per kWh.⁹

**Group Billing/Virtual Net Metering**

There are two primary methods of distributing the benefits of a group solar project: group billing and virtual net metering. Traditional net metering is a prerequisite condition to both structures, but may place undue constraints on distributing the benefits. For instance, net metering policy may require that the solar installation be located on the customer’s property or limit the benefits to a single customer. Group billing and virtual net metering policies alleviate the limitations.

Group billing arrangements function similarly to aggregate metering arrangements. Under such a structure, a utility aggregates all participants’ energy consumption and relevant charges onto a single bill. The output from the shared PV system is then netted against the group bill with the remaining balance allocated to the individual participants according to a predetermined method. Thus, the participants are able to receive the benefits of a single solar installation under a group billing arrangement. However, the administration burden of the program may lie with one or more of the participants (which raises credit-worthiness issues) unless the utility agrees to handle administration of the program.

A virtual net metering system also allows net metering credits from a single facility to be distributed across multiple accounts. The programs seek to replicate the billing a customer would receive under a standard net metering agreement. As with traditional net metering, the credits appear on an individual’s bill and the administrative burden lies with the utility, which may charge for the related costs of the program.

The participant may pay an upfront fee or monthly fixed payment that entitles them to some of the benefits of the solar project. Depending on the structure, they may purchase the benefits of a particular number of panels, monthly blocks of power, or a percentage of the total electricity produced, which would then be credited at the appropriate rate.

Under virtual net metering systems, there is commonly a generation component and a distribution component when analyzing the value of the credits. If the customer is on the same distribution feeder, then the credits often carry the same value as the full retail rate. If not, then the credit is valued as a generation-only credit and the customer may still be charged for related transmission and distribution (T&D) costs. For example, Xcel Energy imposes a T&D charge of $0.02503/kWh as part of the Solar Rewards Community program.¹⁰ If the system is customer-hosted, then the participants must determine whether the total generation is distributed amongst participants or if the net excess generation of the host customer is used instead.

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Assessing Risks of Pursuing Community Solar

This section discusses the factors utilities should consider in assessing risks of various ownership models of community solar projects.

**Project siting:** Identifying key sites, any land use restrictions, zoning issues and building permits required.

**Subscriber base:** It can be challenging to determine how many subscribers might sign up for a community solar program. Some clues can be gleaned from participation in similar programs, such as a solar rebate program or green pricing program. For instance, several utilities, including Cedar Falls Utilities, offer wind energy from the Algona Wind Power Project. Cedar Falls Utilities’ related program, Harvest the Wind, currently only supports less than 10% of available wind energy resources. However, because a community solar program may offer different benefits from the wind program, subscriber levels may also differ. Utilities can perform a formal solar market potential study. Utilities can also work with potential communications partners (such as environmental NGOs, mayor’s office, or other solar allies) to assess potential demand. There is also the risk that a community solar program would result in a transfer of participants from the green power program rather than a net addition of participants.

Paul Spencer of Clean Energy Collective suggests that utilities be realistic about customer adoption. In his experience, less than 1 percent of customers will sign up, and the average subscriber offsets less than 50 percent of electricity use. In his experience, a 1-MW community solar array will support 300–400 customers, take 5–8 acres of space, and produce about 1,100–1,700 MWh per year.

The utility may want to consider its ability to fund the excess solar capacity should the community solar project not be fully subscribed.

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12 SEPA webinar
Securities Compliance: Determining the ownership structure of a community solar program has important ramifications for compliance with federal and state securities law. A project may be deemed to be issuing securities if it offers or sells stock, membership units, partnership interests, or other types of participation interests. Significant additional time and expense could be required for a project if it is determined to be issuing securities, and liability issues arise should the project fail to comply with securities law. Compliance with securities law requires registration with the Securities Exchange Commission and any applicable state regulatory agency. While registration exemption is possible, certain filings and offering documents may still be required and may represent a formidable upfront cost. Additionally, the number of “unsophisticated” (non-wealthy) investors allowed to participate in a project may be limited under securities law, as is often the ability of the project to advertise.

The definitions of a “security” under federal and state laws include a long list of financial instruments and agreements. Federal and various state definitions are not identical, but commonly include any note, stock, bond, evidence of indebtedness, certificate of interest or participation in any profit-sharing agreement, or investment contract. The most relevant test for analyzing whether a contract or an investment is a security under federal law is the “Investment Contract Test.” Many states have additional criteria for determining the existence of a security, but the basic components are similar to the Investment Contract Test. A security exists if (1) a person invests money or property, (2) in a common enterprise (i.e., an enterprise in which the benefit to the investor is dependent on the participation of others), (3) with an expectation of profits or other valuable benefits, (4) solely or primarily from the efforts of someone other than the person providing the money or, in other words, without the right to exercise practical and actual control over the managerial decisions of the enterprise.

In order to reduce the likelihood that the contract is a security, payments made under the contract could be: (1) applicable to a specific, relatively short period of time (e.g., monthly, quarterly); (2) due after solar power is provided; and (3) according to a specified, generally applicable market rate per unit that does not include a component for the purchase by the customer of an interest in the project. To the extent possible, the contract, pricing, and billing arrangements and related materials should resemble a customary consumer purchase of non-solar electricity and should not be marketed to emphasize that the amount of solar power sold to customers depends on the participation of other customers or the success of the utility in obtaining subscribing customers or in operating the project. The corollary is that customer dollars cannot be used upfront to finance the project. A utility interested in developing a community solar program should consult with an attorney and financial experts before taking any action.

REC ownership: The community solar project will produce renewable energy certificates (RECs). Existing community solar programs differ in how they treat RECs. In some programs, the RECs are given to the utility, and they are used to meet renewables portfolio standard compliance. In other programs, the RECs are either given to the customer or retired on the customer’s behalf. How the

RECs are allocated has important implications in terms of how the project's benefits are distributed, especially if renewables portfolio standard legislation is ultimately passed in Iowa.

Legal and Regulatory Issues for Utility-Owned Community Solar
There are several legal and regulatory requirements that may impact the development of a community solar project in Iowa. Other municipal utilities have created successful community solar programs, including SMUD, United Power, and others.

Local: Solar installations may be subject to applicable permitting and zoning requirements.

State: Is enabling legislation needed for PPAs and virtual net metering? Whether solar-system marketers can sell electricity in territories where local utilities have exclusive rights to customers is the subject of current litigation. Most recently, the Iowa District Court ruled that that behind-the-meter solar generation pursuant to a third-party PPA does not trigger utility regulation under the Iowa Public Utility Act. The case is *SZ Enterprises v. Iowa Utilities Board* and is currently on appeal to the state supreme court as of the date of this report. Additionally, the Iowa Utilities Board adopted a net metering rule that limits qualified systems to on-site generation, but the rule only applies to IOUs.

Federal: Securities issues as discussed in this report. The federal ITC is not available to municipal utilities. There are other ownership structures to consider that would enable eligibility for the ITC.

Organizational, Human, and Infrastructure Needs
The development of a community solar project requires access to certain skill sets, including finance, legal, and tax professionals; familiarity with local permitting requirements; procurement and contracting with particular attention to RFP development and evaluation; program and project management; engineering; construction; marketing; and community relations. Successful projects usually rely on a project team and supportive stakeholders. The project and program will also need approval by appropriate local decision makers, including the utility board and city council.

Some questions for consideration in determining whether a municipal utility has in-house expertise to implement the community solar program and project on its own or whether it would prefer to seek outside expertise might include:

- Do we have the expertise in evaluating solar sites for technical and economic potential?
- Can we gauge the community's support and willingness to subscribe to the program?
- Can we write a business plan if we need to seek funding outside of municipal funds or subscriber revenues?
- Does the City own all the property where community solar arrays will be located? If not, do we have the legal expertise to execute a land lease agreement?
- Can we engineer and construct the project ourselves adhering to all applicable codes?
• Can we operate and maintain the solar systems? Operations and maintenance typically consist of periodically cleaning the panels and monitoring system for expected performance, including inverters and meters.

• Decommissioning – what happens at the end of the useful life of the project (could be up to 50 years). Do we know how to dispose of or sell the system and restore the site?

NREL's Guide to Community Solar is a useful starting point in determining project steps and project costs.

References


Phone interview with SMUD 9/3/13.


http://www.dsireusa.org/


http://www.state.ia.us/government/com/util/energy/renewable_taxCredits.html
Appendix A

System Advisor Model (SAM):

- SAM makes performance predictions and cost of energy estimates for grid-connected power projects based on installation and operating costs and system design parameters that you specify as inputs to the model.

- Modeling results are displayed in tables and graphs, and range from data on levelized cost of energy, first year annual production, and other single-value metrics, to detailed annual cash flows and hourly performance data.
Sample SAM output

Community Solar Tool (CST):

- Based on a given PPA or levelized cost of energy input obtained from SAM or a comparable tool, the tool user can model different subscriber payment options, and CST calculates associated costs, as well as various bill credit values that the utility can offer the community solar subscriber for its pro-rata production of the PV system.

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<th>Monthly Charge</th>
<th>Average Monthly Bill Credit</th>
<th>Net Average Monthly Cost</th>
<th>Effective Average Cost per kWh</th>
<th>Average Monthly With Front Charge</th>
<th>One-Time, Upfront Charge</th>
<th>Net Cost per Share over Program Lifetime (monthly payment plan)</th>
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<td>Net Cost of Production for Utility per Share ($)</td>
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<td>Net Average Cost to Utility of Community Solar ($)</td>
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Sample CST Outputs