Subscriber & Geographic Diversity in Community Solar Addendum to Environmental Defense Fund, Citizens Utility Board, and Respiratory Health Association's Responses to Illinois Power Agency's

Long-Term Renewable Resources Procurement Plan Request for Comments

This document expands on the principles introduced in Environmental Defense Fund, Citizens Utility Board, and Respiratory Health Association (EDF/CUB/RHA) Comments submitted to the Illinois Power Agency in June 27[1]. In this addendum, EDF/CUB/RHA expand on the 'sliding-scale' incentive proposed for the Community Solar portion of the adjustable block program. The main focus of this document is ensuring robust residential and small commercial participation (through a Small-Subscriber Adder) and promoting geographic diversity of projects (through a Community Solar Garden Adder).

Included with these comments are the following attachments:

I. **Revised Adjustable Block Incentive Formula – Community (PDF – Public) (XLS – Confidential)**
   This includes the complete model for the adjustable block incentive for community solar systems

[1] Environmental Defense Fund, Citizens Utility Board, and Respiratory Health Association's Responses to Illinois Power Agency's Long-Term Renewable Resources Procurement Plan Request for Comments. https://www.illinois.gov/sites/ipa/Documents/EDF-CUB-RHA-Responses-IPA-LTRRPP-Request-attachments.pdf.

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A. ENSURING ROBUST RESIDENTIAL & SMALL COMMERCIAL PARTICIPATION

Statutory goals for the community solar program include expanding renewable energy generation facility access to a broader group of energy consumers and ensuring robust participation opportunities for residential and small commercial customers (20 ILCS 3855/1-75(c)(1)(N)). As described in the original response to the IPA's Request for Comments on June 27, 2017, EDF/CUB/RHA believe that the IPA should establish a requirement that at least 25% of community solar subscriptions should be residential or small commercial class customers. The 25% minimum requirement for all Community Solar projects ensures that each project contributes toward the overall goals of the program.

However, a minimum subscription requirement alone may not stimulate "robust" participation, and the requirement does not address additional project costs that may arise from acquiring, enrolling, and maintaining multiple residential and small commercial subscriptions. Elevate Energy's comments to the IPA demonstrate that including many small subscribers in a project are likely to increase total costs for those projects.

We propose an additional incentive (a "Small-Subscriber Adder"), available to all community solar projects that go beyond the minimum residential & small commercial percentage requirements that accommodates the extra costs needed to meet the statutory goals. An incentive formula and details of a small subscription adder are proposed below. Additional discussion of key policy decisions and assumptions in developing the adder are further detailed.

a. Overview

In this Addendum, we propose the following formula for the Small-Subscriber Adder:

$$Small-Subscriber\ adder\ (\$) = ((Small\ subscriber\ administration\ costs\ (\$/kW) - (Large\ subscriber\ administration\ costs\ (\$/kW)) * (\%\ small\ subscribers - 25\%) * Project\ AC\ Capacity\ (kW)$$

The formula uses the following definitions:

- *Small & large subscriber administration costs*: The costs of attracting, enrolling, and maintaining small and large subscriber, respectively, over the course of the project.
- *% small subscribers:* The portion of subscribers by percentage of capacity that fall under residential or small commercial rate classes. Small subscribers are subtracted by 25% to account for the 25% requirement of small subscribers for the community solar incentive.
- *Project AC Capacity (kW):* Capacity of the whole project.

Incentive Levels: Rather than a sliding scale, the Small-Subscriber adder will instead be awarded at three levels, corresponding to small-subscriber rates of 50%, 75%, and 100%. The additional incentive awarded to the project will be equal to the lowest threshold achieved by the project at energization. Using a threshold approach rather than a sliding-scale one allows for the incentive to reward various levels of small-subscriber commitment, but maintains flexibility in maintaining the committed small-subscriber level.

Upfront Payment. EDF/CUB/RHA recommend that the Small-Subscriber Adder be provided to a project as an upfront incentive that would then lock-in the subscription percentage requirements over the life of the Adjustable Block Incentives 15-year contract. This means that if a project chose to receive the upfront incentive for the 75% level of residential or small commercial customers, they would be required to continue that percentage for the life of the project, as subscribers come and go.

Table 1. Parameters for a 'Small-Subscriber Adder' Incentive

Parameter	Recommendation
Small-subscriber minimum requirement	25% of capacity of projects must be subscribed to residential or small commercial rate classes
Additional Incentive Levels	50% | 75% | 100%
Payment Timing	Entire project adder is paid up-front
Verification & Eligibility	Projects are verified at interconnection, then 'locked' into the given percentage of small subscriptions.

b. Evaluating Additional Cost for Small Subscriptions

Small subscribers to a community solar project are likely to cost more to acquire, maintain, replace, and administer, on a per-kilowatt basis, than large commercial subscribers. Beyond the economies of scale afforded by large subscribers, small subscribers may require more education on the nature of community solar, be less willing to join a project due to financial restrictions, and may be more likely to transfer or leave their subscription. Additionally, they may present higher financial risks, resulting in a higher weighted average cost of capital (WACC) for the project.

Disentangling the added costs of small subscriptions from other project costs can be difficult. Disaggregated public cost data is not easily available, and it is difficult to attribute costs specifically to small subscribers.

Administrative Costs. Research has shown a significant difference in the administrative costs to acquire residential and small commercial community solar subscribers. EDF/CUB/RHA ultimately recommend that IPA should establish the relative outreach & subscriber management costs of small and large subscribers through a preliminary market survey. The analysis here establishes preliminary or estimated cost drivers from market research to estimate the direct costs borne by project developers from small versus large subscribers. This analysis uses average upfront marketing & communications costs plus all lifetime subscriber management costs from the revised Community Solar Business Case Tools submitted to IPA by Elevate Energy[2].

Table 2. Subscriber Administration Costs, Commercial versus Residential:

Consumer Type	Residential	Commercial
Upfront Administrative Costs (Marketing & Communications) ($/kW)	$33.18	$7.90
Lifetime Subscriber Management Costs ($/kW)	$470.16	$105.55
Total Subscriber Administration Costs ($/kW)	$503.34	$113.45
Difference between large and small administration costs ($/kw)	$389.89	

Additional Financial Risk. This analysis also looked into differences in financial risk and therefore a different Weighted Average Cost of Capital (WACC). NREL research[3] show a 0.5% difference in WACC between their mid-cost projections of distributed PV (our proxy for small subscribers) and utility-scale PV (proxy for large subscribers). It is possible that this measure is imprecise, but it is the best market indicator with limited market data available. Our research found that relative subscriber administration costs dominated the added incentive calculation, and that the added complexity of estimating increased WACC may not be worth the marginal change to the overall incentive. We recommend that the incentive be evaluated using the relative outreach & administration costs alone.

[2] "Response to Request for Comments on the Long-Term Renewable Resources Procurement Plan." Elevate Energy. https://www.illinois.gov/sites/ipa/Documents/Elevate-Energy-L-RRPP-Request-Comments-20170714-Updated.pdf

[3] National Renewable Energy Lab. "PV Project Finance in the United States, 2016." http://www.nrel.gov/docs/fy16osti/66991.pdf.

c. Small-Subscriber Adder Pricing

Example calculation. As noted above, the incentive will be issued at small subscriber percentages of 50%, 75%, and 100%. Using the modeled subscriber administration costs and Small-Subscriber Adder formula above, the adder incentive level for any given project can be calculated. For example, the appropriate adder for a 200-kW, 50% small subscriber project would be calculated as follows:

$$Small - Subscriber\ Adder\ (\$) = ((Small\ subscriber\ administration\ costs\ (\$/kW) - (Large\ subscriber\ administration\ costs\ (\$/kW)) * (\%\ small\ subscribers - 25\%) * Project\ AC\ Capacity\ (kW)$$

$$Small - Subscriber\ Adder\ (\$) = (503.34\ \$/kW - 113.45\ \$/kW) * (50\% - 25\%) * 200\ kW$$

$$Small - Subscriber\ Adder\ (\$) = (389.89\ \$/kW) * (25\%) * 200\ kW$$

$$Small - Subscriber\ Adder\ (\$) = (97.47\ \$/kW) * 200\ kW$$

$$Small - Subscriber\ Adder\ (\$) = \$19{,}494$$

To calculate the equivalent renewable energy credit (REC) premium, the adder's value is divided over the expected production, in MWh, over the 15-year REC delivery of the project.

$$Equivalent\ REC\ Premium\ (\$/MWh) = Small - Subscriber\ Adder\ (\$)\ /\ (Project\ Capacity\ (MW) * \sum_{i=1}^{15} 365\ days * 24\ hours/day * capacity\ factor * (1 - annual\ degradation\ rate)^{i})$$

The capacity factor (14.38%) is the average annual proportion of time that the project is producing at its maximum capacity. The level used here is equivalent to the expected capacity factor of the Illinois Power Agency during previous REC procurement plans. The degradation rate (0.5%) is the average amount of production lost per year as the project ages.

Modeled incentive values on a per-kilowatt basis are presented below for each small-subscriber bin. Based on average expected production values over the 15-year REC purchase period, the equivalent REC purchase premium is also shown below.

Table 3. Levels of Added Incentive for Small-Subscriber Adder

Percentage of Small Subscribers (% of capacity)	Level of Incentive ($/kW)	Equivalent REC Premium ($/REC)
25-50%	No additional incentive	No additional incentive
50-74%	$97.47	$5.34
75-99%	$194.94	$10.68
100%	$292.41	$16.02

d. Payment Timing

Upfront. As the modeled costs show, much of the additional costs borne by smaller subscriptions occur at the outset of the project, rather than as an additional on-going cost. Developers may also prefer up-front incentives to on-going ones because they mitigate the major up-front costs and gradual payback cash flow endemic to solar projects. We recommend that the incentive be paid up-front, at energization.

Separate from REC schedule. If the adder is considered a part of the REC payment, more than 20% of the overall incentive for the community solar project might be paid out through the first year's base incentive plus the additional small subscriber incentive. If not implemented carefully, the adder may not satisfy the requirement that only 20% of the renewable energy credit purchase price will be paid at interconnection. As such, it is important that the Small-subscriber Adder not be included in the REC purchase price. It should be considered a separate and distinct payment.

Implementation. An effective eligibility & verification system, implemented through the community solar subscription portal, might mitigate the need for clawback provisions in the event that a project does not continue to satisfy the small subscriber proportion proposed at interconnection. For example, ComEd has proposed that it could restrict a certain percentage of a project to a specific rate class or classes for the duration of a project through the portal it is developing. That should be a sufficient implementation tool to eliminate risk of bad actors.

Clawback. However, in the event such a restriction cannot be developed, an upfront adder may be able to be recovered through performance penalties to the REC payment paid in the 4th and 5th year of the program. A significant limitation of this policy is the inability to recover non-fulfilled added incentives after the 5th year of production.

Fixed Price. Costs of solar projects in Illinois will continue to drop as more installation is built and as developers, installers, and utilities identify best practices. Given our assumptions about utility rates and installed costs, we predict that adjustable block incentives will drop to zero for some projects by the late 2020s. The Small-Subscriber Adder, however, is designed to incentivize a particular project design, rather than ensure financial viability of the project. The amount of the Small-Subscriber Adder over the course of the program should vary with the difference in subscriber administration costs, rather than the overall viability of the project. As a result, small-subscriber added incentives may persist for new projects, even after the incentive from the adjustable block portion has declined to zero.

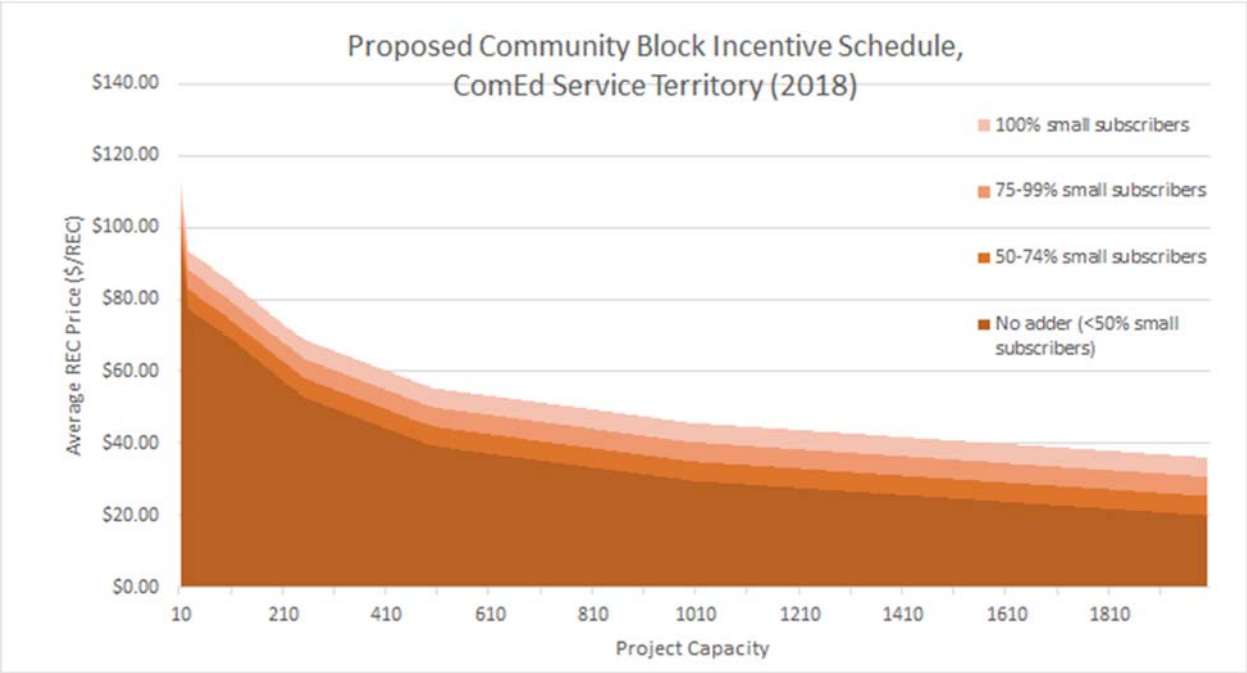
e. Eligibility, Monitoring, & Verification

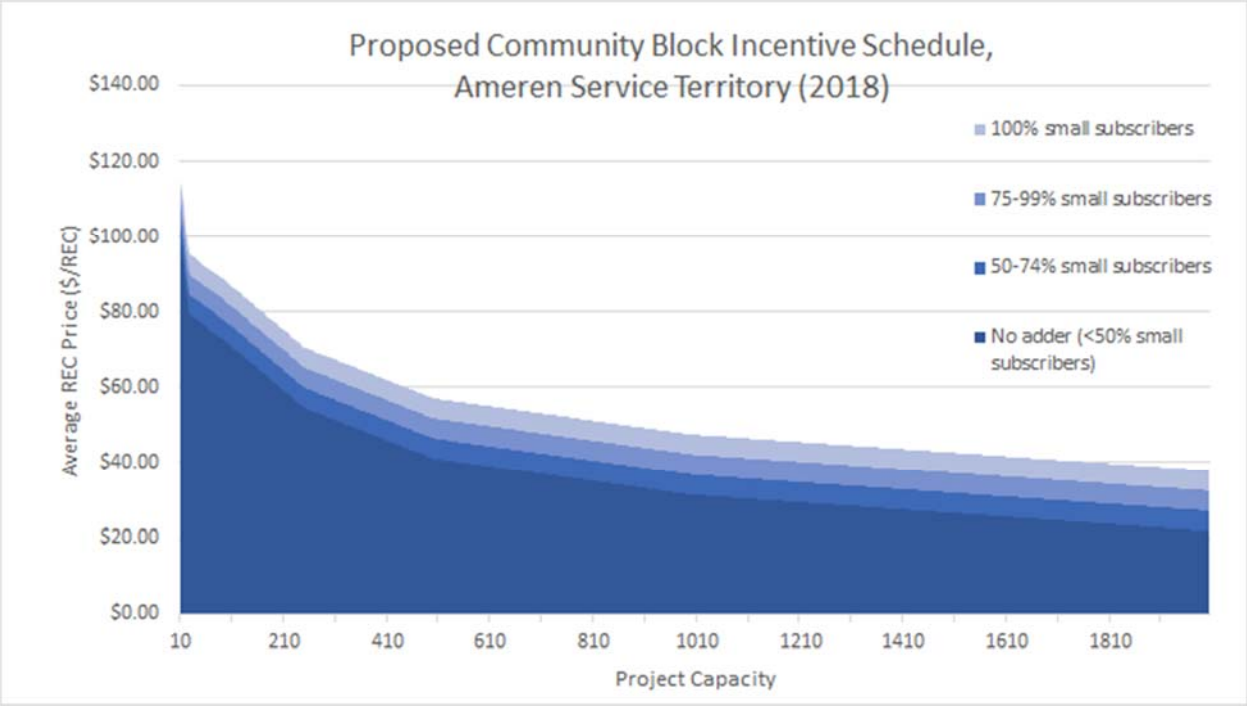
Net metering requirements in the Act will require utilities to create an online portal that links subscribers to projects. An efficiently-designed virtual net metering administration system might also allow program administrators to determine a project's eligibility for the community solar incentive at 25% small subscriber participation, and continue to check in to ensure small-subscriber proportions don't decline over time as subscribers end subscriptions and new ones enroll. Because the small subscriber incentive will be paid up-front, clawback provisions present additional complications. Tentatively, we recommend keeping the up-front incentive and 'locking in' small subscriber proportions within a certain range. If a subscription would push the proportion of subscribers below the minimum threshold ensured by the incentive, it might be prohibited by the monitoring system. This presents additional recruiting restrictions to the developer but eliminates the need for clawback provisions.

f. Modeling the Incentive

The Small-Subscriber Adder was modeled at each of the small subscriber thresholds (50%, 75%, and 100%) in both service categories (no additional adder is granted at 25% small subscribers). Based on typical solar production values in Illinois, the equivalent REC premium ranges from $5/REC at the 50-74% small-subscriber threshold to $15/REC for 100% small-subscriber projects. Because the adjustable block provides less incentives to larger projects and declines over time, the Small-Subscriber Adder provides a modest percentage increase to total incentives in early years and at small capacities (~10% for 25% small-subscriber in 2018 at 200 kW) and increases to the majority and even the entirety of incentives in later years and at large capacities.

Figure 1. Modeling the Impact of the Small-Subscriber Adder on average REC prices, 2018, ComEd and Ameren





B. GEOGRAPHIC DIVERSITY AND EXPANDING FACILITY ACCESS

EDF/CUB/RHA has noted the risk that, without adequate intervention, 'community' solar could end up for many subscribers looking far too similar to alternative retail electric supply in Illinois. Community solar projects may be developed far from subscribers' homes, managed invisibly and not meaningfully connected to their communities or their lives. Subscribers and communities preferring a community solar site within their community might pay a premium compared to a distant, green-field community solar project if REC prices are tracked to the larger, distant sites alone.

We believe that there is substantial value in community solar projects being located in the communities they serve. Community solar projects that are sited in close proximity to their subscribers provide opportunities for education and outreach and foster a connection between customers and their energy production. Given the ambitious goals of the Future Energy Jobs Act, building a social consensus toward community solar will be critical for hitting new-build targets.

We agree with other commenters, who have submitted that division between utility territories will, at least to some extent, drive geographic diversity and prevent concentrated solar development. We also agree that unduly restrictive geographic requirements may hinder development in some areas, and restrict access for some customers. Enabling community projects to recruit subscribers from across the utility territory without restriction will likley result in lower-cost projects. As a result, we recommend that there should be the option for projects to recruit subscribers from outside their immediate geographic area, and that a tight geographic requirement for community solar projects not be adopted at this time.

However, community solar projects that meaningfully connect with their subscribers fulfill unique benefits and should be adequately compensated for those benefits. We recommend an additional incentive be applied to small-capacity solar projects that are physically close to subscribers (a "Community Solar Garden Adder"). Unlike the other incentives recommended here, the "Community Solar Garden Adder" will be a single value with specific eligibility criteria, rather than a sliding scale or formula. The basic details of the incentive are detailed below. Following is the design of the incentive.

Community Solar Garden vs. Community Solar Farm

The "Community Solar Garden" description is intended to be different from a "Community Solar Farm," which would be developed without an intent to recruit from the immediate geographic area. This descriptive difference would allow customers to easily differentiate between the type of project, whether it is intended to be local and have restrictions, or whether it is regional and built at a lower cost.

a. Overview

In this addendum, we propose the following formula for the Community Solar Garden Adder:

$$\begin{aligned} &Community\ Solar\ Garden\ Adder\ (\$) \\ &= (\ Average\ community\ solar\ garden\ installed\ costs\ (\$/kW)\ - \\ &Average\ commercial\ solar\ project\ installed\ costs\ (\$/kW)\ ) \\ &* Project\ Capacity\ (kW, AC) \end{aligned}$$

The formula uses the following definitions:

- *Average community solar garden installed costs*: The average total project costs for community solar garden projects. Initially estimated by average project costs for non-profit hosts in an NREL market survey.
- *Average commercial solar project installed costs:* The average total project costs for commercial solar projects. Initially estimated by average project costs for commercial hosts in an NREL market survey.
- *Project AC Capacity (kW):* Project size, as measured by the maximum output of energy of the project under full sunlight.

Table 4. Parameters for a Community Solar Garden Adder Incentive

Parameter	Value
Payment Timing	Entire project adder is paid up-front
Incentive Level	$30/REC
Community Solar Garden Requirement	60% of subscribers are within a 10 mile radius from site (ComEd) / 30 mile radius from site (Ameren); Project capacity <500 kW
Eligibility & Verification	Projects are verified at interconnection, then 'locked' in at 60% local subscribers

Requirements for Incentive. Requirements should ensure that only the appropriate projects receive the added incentive, while also not adding undue burden on developers or communities seeking a community solar installation. The capacity cap on projects is designed such that large 'greenfield' projects near densely populated areas aren't able to take full advantage of the added garden incentive. A 60% minimum of subscribers within a certain radius ensures majority-community participation, but allows for the support of a large 'anchor' tenant at 40% or less of the project's capacity.

Upfront Payment. EDF/CUB/RHA recommend that the Community Solar Garden Adder be provided to a project as an upfront incentive that would then lock-in the local subscriber percentage requirements over the course of the Adjustable Block Incentive's 15-year contract. This means that if a project opts in to the Community Solar Garden Adder, they would be required to continue meeting the local subscriber requirements over the life of the project, as subscribers come and go.

b. Evaluating Additional Costs & Benefits of Community Solar Gardens

Like the Small-Subscriber Adder, the Community Solar Garden Adder is designed to adequately compensate for the added costs of a desirable trait of the project. In this case, the desirable trait is proximity of subscriber to a certain sized solar garden. Siting and size restrictions as well as added administrative burden can create additional costs for these specific projects.

Added costs of community solar garden projects. The added average installed cost of smaller systems are addressed through the capacity-based sliding scale, so the primary function of this adder is to compensate for the added costs of siting within communities. Many factors may contribute to a higher cost, including additional permitting and interconnection fees, a higher likelihood of canopy or rooftop projects (as opposed to ground-mount), and varying costs of site control and leasing. Disentangling these factors and calculating an accurate and fair premium for community solar gardens presented strong challenges for analysis.

Calculating benefits of community solar garden projects. While we have explained that here are significant benefits of developing community solar projects in locations close to subscribers, we have not attempted here to quantify all of those benefits. The benefits of locally-produced energy, local economic development, local health impacts, customer education and community ownership do outweigh the additional costs of projects. In addition, in the event that the community solar bill crediting tariff for either or both utility does not provide bill crediting for transmission-related charges, that he avoidance of transmission costs is a direct tangible, calculable benefit for projects located close to subscribers. The IPA could pursue a benefit study to determine the impacts of these, and other, benefits of proximity in community solar projects to subscribers.

Ultimately, given the data we have available today, we recommend that the incentive begin with a value determined through a preliminary survey based on the additional cost analysis and adjust as the program continues.

As a proxy for a survey at this stage, this analysis uses the relative difference between projects on commercial sites and non-commercial sites from NREL Tracking the Sun IX[4]. Average costs for these types of projects may be found in the table below:

Table 5. Average Project Costs, by Site Type

Project Site Sector	Non-profit	Commercial
Average Installed Price (2015 $/kW)	$3,800	$3,500

Using the difference in installed price values and the formula outlined above, the modeled per-kilowatt capacity incentive can be calculated for any given project. For example, the incentive for a 150-kW project that meets the requirements of a community solar garden would be calculated as follows:

$$\begin{aligned} &Community\ Solar\ Garden\ Adder\ (\$) \\ &\quad = (\ Average\ community\ solar\ garden\ installed\ costs\ (\$/kW) - \\ &Average\ commercial\ solar\ project\ installed\ costs\ (\$/kW)\ ) \\ &\quad * Project\ Capacity\ (kW, AC) \end{aligned}$$

$$Community\ Solar\ Garden\ Adder\ (\$) = (3{,}800\ \$/kW - 3{,}500\ \$/kW) * 250\ kW$$

$$Community\ Solar\ Garden\ Adder\ (\$) = 300\ \$/kW * 150\ kW$$

$$Community\ solar\ garden\ adder\ (\$) = \$45{,}000$$

To calculate the equivalent renewable energy credit (REC) premium, the adder's value is divided over the expected production, in MWh, over the 15-year REC delivery of the project.

$$\begin{aligned} &Equivalent\ REC\ Premium\ (\$/MWh) \\ &\quad = Community\ Solar\ Garden\ \ Adder\ (\$)\ /\ (Project\ Capacity\ (MW) \\ &\quad * \sum_{i=1}^{15} 365\ days\ *\ 24\ hours/day\ *\ capacity\ factor\ *\ (1 \\ &\quad - annual\ degradation\ rate)^{i}\ ) \end{aligned}$$

Calculated incentive levels, in both a per-kilowatt award and the equivalent REC premium, are shown below.

[4] https://emp.lbl.gov/sites/default/files/tracking_the_sun_ix_report.pdf.

Table 6. Community Solar Garden Adder, per kilowatt capacity and per REC

	Level of incentive ($/kW)	Equivalent REC premium ($/REC)
Incentive Paid	$300	~$16.50

c. Payment Timing

Upfront Payment. Like the Small-Subscriber Adder, most additional costs borne by developers and subscribers due to community garden siting will occur at the front end of the project. Similarly, up-front incentives may be more appealing to project developers compared to an ongoing incentive over 5 or 15 years. Developers may also prefer up-front incentives to ongoing ones because they mitigate the major up-front costs and gradual payback cash flow endemic to solar projects. We recommend that the incentive be paid up-front, at energization.

Implementation. As mentioned above, the community solar subscription portal might operate not only as an effective means for monitoring eligibility of projects, but also as an effective way to enforce the requirements of additional incentives. By using the portal in this way, clawback needs might be mitigated.

Separate from REC Schedule. If the adder is considered a part of the REC payment, more than 20% of the overall incentive for the community solar project might be paid out through the first year's base incentive plus the additional small-subscriber and community solar garden incentives. If not implemented carefully, the adder may not satisfy the requirement that 20 percent of the renewable energy credit purchase price will be paid at interconnection. As such, it is important that the Community Solar Garden Adder not be included in the REC purchase price.

Clawbacks. An effective eligibility & verification system, implemented through the community solar subscription portal, might mitigate the need for clawback provisions in the event that a project does not continue to satisfy the community solar garden eligibility criteria. However, the adder may be able to be recovered through performance penalties to REC payment paid in the 4th and 5th year of the program. A significant limitation of this policy is the inability to recover non-fulfilled added incentives after the 5th year of production.

Fixed Price. Like the small subscriber incentive outlined above, the Community Solar Garden Adder is designed to incentivize a particular type of solar project, rather than maintain the financial viability of solar projects in general. Variation in the added incentive over the course of the program should be indexed to the difference in costs between community solar gardens and larger community solar projects. As a result, community solar adders may persist

even after the adjustable block incentive declines to zero. IPA should conduct periodic surveys to ensure the incentive level remains appropriate.

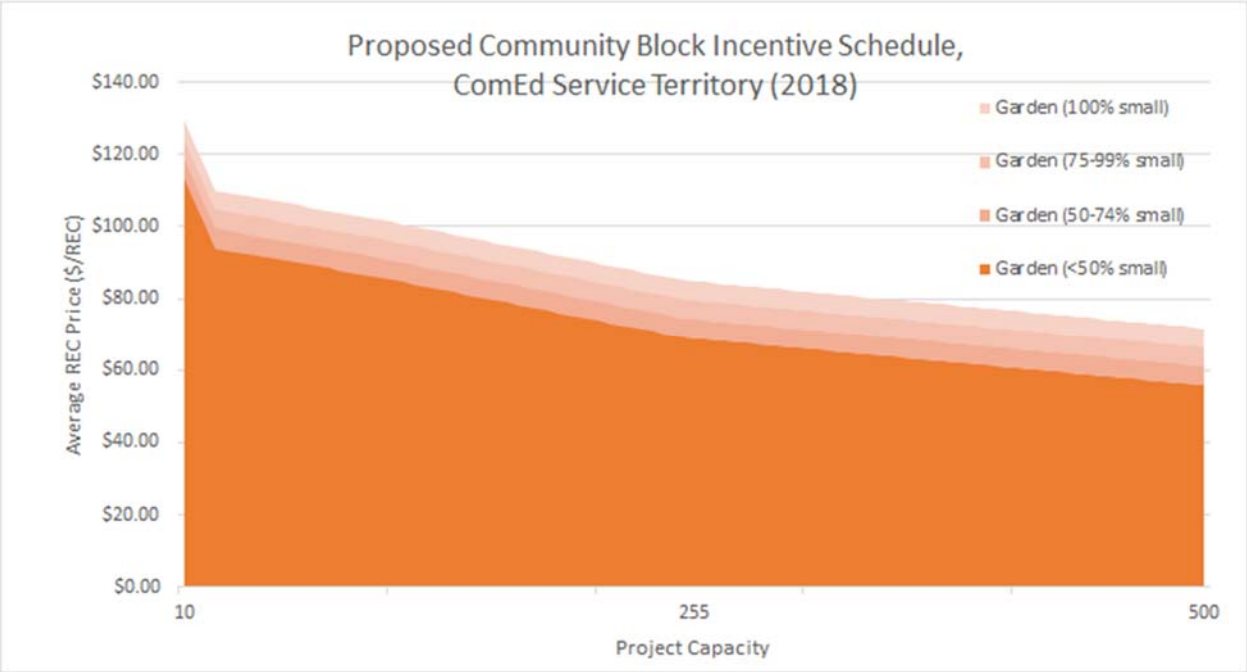
d. Eligibility, Monitoring, & Verification

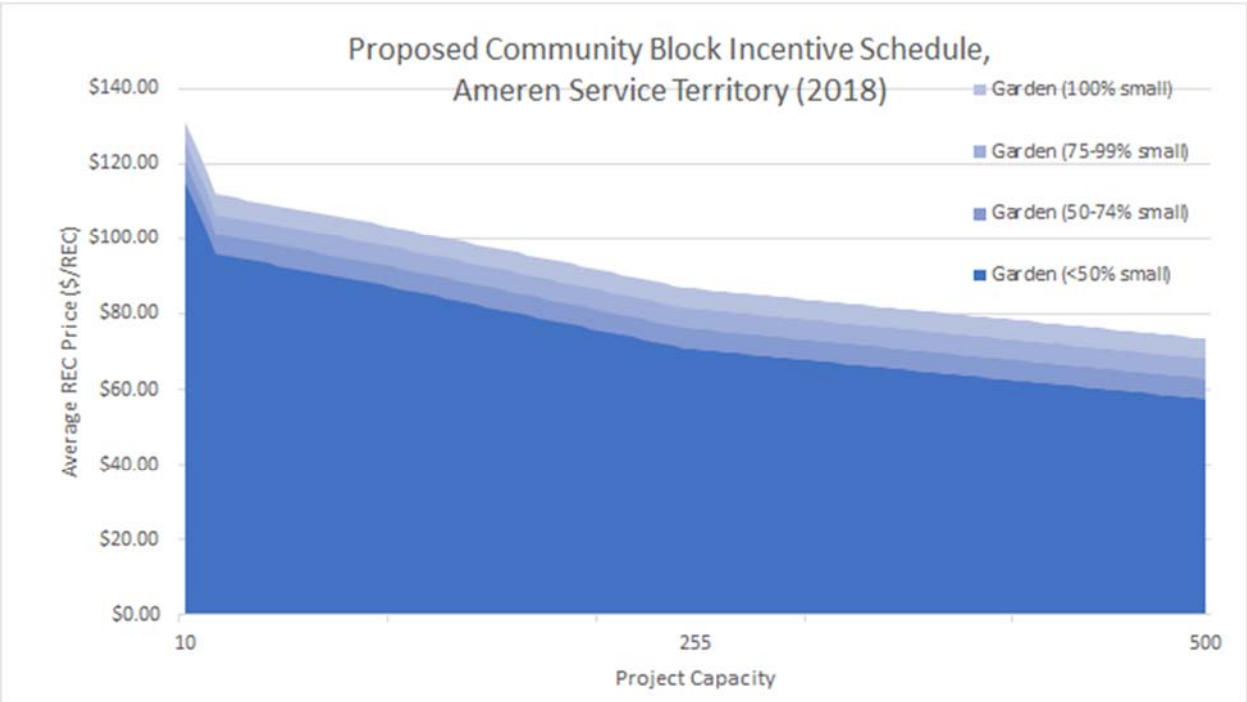
Net metering requirements in the Act will require to create an online portal that links subscribers to projects. An efficiently designed virtual net metering administration system might also allow program administrators to determine a project's eligibility for definition as a community solar program at 25% small subscriber participation and eligibility for the Community Solar Garden Adder at 60% of subscribers within a 10-mile radius of the site and less than 500 kW capacity. Like the Small-Subscriber Adder, up-front incentives for an ongoing characteristic of the invested population present a potential need for a clawback provision. Tentatively, we recommend that non-local subscribers be limited to less than or equal to 40% of the capacity of the system. With a non-local maximum, turnover of local subscribers will not force the project into non-compliance with incentive eligibility, but non-local subscriptions can be controlled. This solution presents additional recruiting restrictions to the developer but eliminates the need for clawback provisions.

e. Modeling the Incentive

Community solar projects are eligible for both the Community Solar Garden Adder and the Small-Subscriber Adder, separately and in tandem. Given the requirements for eligibility of the Community Solar Garden adder, it is likely that many community solar gardens may also achieve the 50% threshold for the Small-Subscriber Adder Together, added incentives may increase the average price paid for RECs by as much as $30/REC for a 100%-small subscriber community solar garden. Equivalent impacts on REC payments to solar projects of the Community Solar Garden Adder, including the Small-Subscriber Adder, are modeled below:

Figure 2. Modeling the Impact of the Community Solar Garden Adder on average REC prices, 2018, ComEd and Ameren





PROPOSED ADJUSTABLE BLOCK INCENTIVE FORMULA

Community Solar Block Group

August 16, 2017

1 To ensure that REC prices are cost-effective (1-75.(c)(1)(D)), RPS goals are met (1-75.(c)), and blocks are transparent (1-75.(c)(1)(K)), the following formula will be used to calculate block incentives for the Community Solar block of the Adjustable Block Program:

Incentive = Modeled Installed Cost - Solar Rebate Value -

Value of System over Project Period (10-Year NPV of Avoided Costs (Energy, Capacity, Transmission, Demand))

*Solar Rebate Value is the $250 smart inverter DG rebate, or the value-of-solar tariff to be developed by utilities after the 5% Net Metering cap is hit.
*Modeled Installed Costs assume developers take the Solar Investment Tax Credit.
*Incentives are paid for 15 years of RECs from the project. Project value is based on the net present value of a 10-year lifetime.
*Value of system over project period is evaluated for average community subscriber (25% residential, 75% commercial)
*Value of energy calculations assume residential customers will not avoid distribution costs & commercial customers will not avoid demand charges
*Average installation costs for will be established through an IPA-conducted Illinois market survey of solar developers.
*For 2018-2031, formula results are given below and calculated on the 'Calculation' tabs.

2 To reflect the varied economic considerations between rooftop 10 kW projects and green-field 2,000 kW projects, incentives will be offered on a sliding scale based on project capacity.
IPA will conduct an Illinois market survey to determine market clearing installed costs of projects at a number of project set points (currently 10 kW, 25 kW, 100 kW, 250 kW, 500 kW, 1,000 kW, and 2,000 kW
Estimated installed cost for new projects will be linearly extrapolated from the two nearest market survey set points (creating a 'sliding scale') and plugged in to the formula above.
Annual capacity caps will be used to ensure goals of long-term procurement are met.

3 Installed costs are expected to decrease over time and deployment. Blocks will be indexed to projected installed costs and electricity rates. Blocks will be retired annually at the end of the calendar year
Incentives will step down, year-to-year, based on projected decreases in installed costs and increases in electricity rates.
Block schedules and incentive levels will be adjusted periodically using IPA-conducted industry surveys and rates of adoption of the incentive.
Capacity caps for each block will ensure budgets are maintained. When a capacity cap is hit, the next block will begin without delay

4 To reflect differences in avoided cost between service areas, ComEd and Ameren service areas will operate independently, with distinct blocks, schedules, and incentive rates.
Capacity goals are divided between Ameren (30%) and ComEd (70%) service areas based on an estimate of current and future relative distribution load.

5 Projects receiving the block incentive may also receive additional incentives (adders), based on eligibility characteristics
Small-Subscriber Adder
Community Solar Garden Adder
Proposed adders for small subscribers ("Small Subscriber Adder") and geographic diversity ("Community Solar Garden Adder") are below.
Additional added incentives may be available based on:
Solar for All
Environmental Value

6 20% of the incentive will be paid up-front. The remaining 80% will be paid in 4 equal annual installments, each rated according to the performance of the project.
The project's performance includes generation of energy as indexed against projected generation.
Performance may also include compliance with requirements of added incentives received in the first year.

7 Some portion of the block may be reserved with an appropriate application. Some other portion will be first-come, first-served.

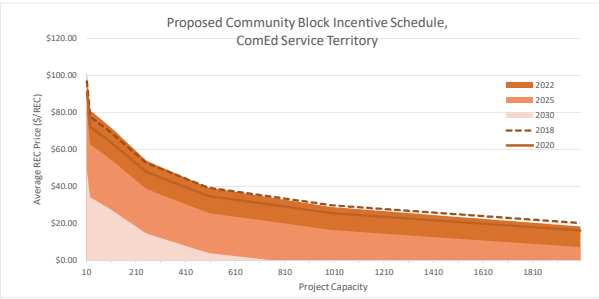
Tables and Graphs are included below.

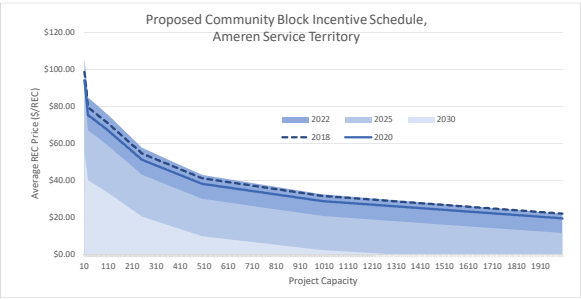
PROPOSED BLOCK INCENTIVE SCHEDULE (ComEd)

For Calendar Year Ending:		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Price ($/REC)															
Capacity (kW)	10	$ 96.76	$ 90.44	$ 90.77	$ 90.65	$ 102.06	$ 94.93	$ 87.98	$ 81.19	$ 74.55	$ 68.04	$ 61.66	$ 55.39	$ 49.22	$ 43.13
	25	$ 77.58	$ 72.02	$ 72.08	$ 71.75	$ 81.12	$ 74.83	$ 68.68	$ 62.66	$ 56.76	$ 50.96	$ 45.26	$ 39.65	$ 34.11	$ 28.63
	100	$ 69.91	$ 64.66	$ 64.61	$ 64.18	$ 72.74	$ 66.78	$ 60.96	$ 55.25	$ 49.64	$ 44.13	$ 38.71	$ 33.35	$ 28.06	$ 22.83
	250	$ 52.65	$ 48.09	$ 47.79	$ 47.16	$ 53.89	$ 48.69	$ 43.59	$ 38.57	$ 33.63	$ 28.76	$ 23.95	$ 19.19	$ 14.47	$ 9.77
	500	$ 39.22	$ 35.20	$ 34.71	$ 33.93	$ 39.23	$ 34.61	$ 30.07	$ 25.60	$ 21.18	$ 16.81	$ 12.47	$ 8.17	$ 3.89	$ -
	1000	$ 29.63	$ 25.99	$ 25.37	$ 24.47	$ 28.75	$ 24.56	$ 20.42	$ 16.33	$ 12.29	$ 8.27	$ 4.28	$ 0.30	$ -	$ -
	2000	$ 20.04	$ 16.78	$ 16.02	$ 15.02	$ 18.28	$ 14.51	$ 10.77	$ 7.07	$ 3.39	$ -	$ -	$ -	$ -	$ -
No incentive at (kW capacity)		2,000	2000	2000	2000	2000	2000	2000	2000	2000	1970	1525	1040	760	495
Expiration Date		End of 2018	End of 2019	End of 2020	End of 2021	End of 2022	End of 2023	End of 2024	End of 2025	End of 2026	End of 2027	End of 2028	End of 2029	End of 2030	End of 2031
Block Capacity		46	46	46	19	19	19	19	19	19	19	19	19	19	19
*indicates estimated incentive.					*	*	*	*	*	*	*	*	*	*	*

PROPOSED BLOCK INCENTIVE SCHEDULE (Ameren)

For Calendar Year Ending:		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Price ($/REC)															
Capacity (kW)	10	$ 98.61	$ 92.96	$ 94.08	$ 94.13	$ 105.75	$ 98.84	$ 92.13	$ 85.58	$ 79.20	$ 72.98	$ 66.89	$ 60.93	$ 55.09	$ 49.36
	25	$ 79.43	$ 74.55	$ 75.39	$ 75.22	$ 84.80	$ 78.74	$ 72.82	$ 67.05	$ 61.41	$ 55.90	$ 50.49	$ 45.19	$ 39.98	$ 34.86
	100	$ 71.75	$ 67.19	$ 67.92	$ 67.66	$ 76.42	$ 70.69	$ 65.10	$ 59.64	$ 54.30	$ 49.07	$ 43.94	$ 38.90	$ 33.94	$ 29.06
	250	$ 54.49	$ 50.62	$ 51.10	$ 50.64	$ 57.57	$ 52.60	$ 47.73	$ 42.96	$ 38.29	$ 33.70	$ 29.18	$ 24.73	$ 20.34	$ 16.00
	500	$ 41.07	$ 37.73	$ 38.02	$ 37.41	$ 42.91	$ 38.52	$ 34.22	$ 29.99	$ 25.84	$ 21.74	$ 17.71	$ 13.72	$ 9.77	$ 5.85
	1000	$ 31.48	$ 28.52	$ 28.67	$ 27.95	$ 32.44	$ 28.47	$ 24.57	$ 20.73	$ 16.94	$ 13.20	$ 9.51	$ 5.85	$ 2.21	$ -
	2000	$ 21.89	$ 19.31	$ 19.33	$ 18.50	$ 21.97	$ 18.41	$ 14.91	$ 11.46	$ 8.05	$ 4.66	$ 1.31	$ -	$ -	$ -
No incentive at (kW capacity)		2,000	Over 2,000	Over 2,000	Over 2,000	Over 2,000	Over 2,000	Over 2,000	Over 2,000	Over 2,000	Over 2,000	Over 2,000	1745	1295	905
Expiration Date		End of 2018	End of 2019	End of 2020	End of 2021	End of 2022	End of 2023	End of 2024	End of 2025	End of 2026	End of 2027	End of 2028	End of 2029	End of 2030	End of 2031
Block Capacity		20	20	20	8	8	8	8	8	8	8	8	8	8	8
*indicates estimated incentive.					*	*	*	*	*	*	*	*	*	*	*





PROPOSED SMALL-SUBSCRIBER ADDER

To ensure robust participation of residential & small commercial customers and to ensure access to a broader range of customers (20 ILCS 3855/1-75(c)(1)(N)), the following formula is proposed:

Small-Subscriber Adder ($) = ((Small subscriber administration costs ($/kW) -
(Large subscriber administration costs ($/kW)) * (% small subscribers - 25%) * Project Capacity (kW)

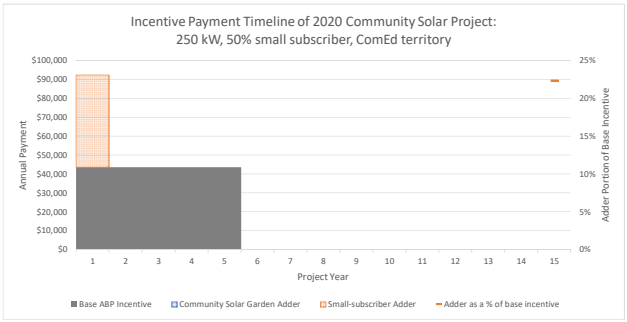
*Small subscriber administration costs ($/kW) is the average cost over the lifetime of a project for acquiring and maintaining a small (residential or small commercial rate class) subscriber
One method for calculating this value is dividing the total customer acquisition & administration costs over the project capacity for a 100% small-subscriber project.
*Large subscriber administration costs ($/kW) is the average cost over the lifetime of a project for acquiring and maintaining a large (large commercial or industrial rate class) subscriber
One method for calculating this figure is to divide the total customer acquisition & administration costs for a 100% large-subscriber project.
*% small subscribers is the portion of the project, on a capacity basis, subscribed to small subscribers as defined above.
25% is subtracted to reflect the minimum requirement for community solar projects.
Projects will receive 'credit' for the lowest threshold of 50%, 75%, and 100% achieved by the project.

The incentive is offered at four levels: Projects receive no added incentive at 25-49%, and receive credit for the smallest threshold achieved of 50%, 75%, and 100%.
Once projects receive a small-subscription adder at a given level, they are required to maintain subscriptions that maintain the threshold awarded.
Awarding the adder at these 'thresholds' allows for multiple small-subscriber incentives without requiring close monitoring of subscription levels.

If the project does not comply with the small-subscriber thresholds indicated by the incentive received, a performance penalty will be levied against the project's REC payments in the fourth and fifth years of performance.

Research by NREL, LBNL, and Elevate Energy suggest that, on a per-kW basis, costs are larger for small subscribers than large ones.
Small subscribers are likely to take smaller subscriptions, are more likely to transfer or retire their subscription, and may require more outreach than larger subscribers.
The adder is designed to compensate for additional costs by adding the difference in adminsitration costs between small & large customers to the incentive.
The adder is awarded on a sliding-scale basis to appropriately incentivize projects and avoid risks and over-incentives caused by thresholds.

To adequately incentivize developers to pursue small subscribers, the incentive will be paid up-front rather than in addition to the annual REC payments.
Because the adder payment may cause first-year payments to exceed 20% of the total incentive, the adder should be implemented through a separate process than REC payment.
An incentive timeline for a typical project (200 kW, ComEd territory, 50% small subscribers, 2020 energization year) is below. In this example, the adder represents >20% of REC payment.



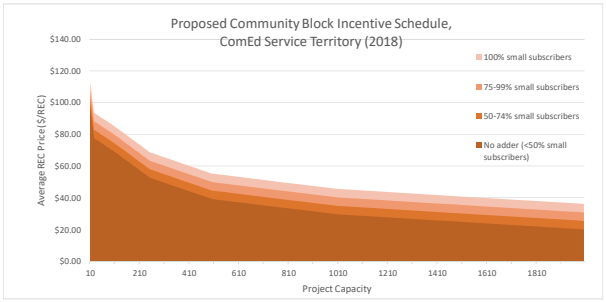
Administration costs modeled here are based on industry-wide studies and reasonable assumptions. IPA should conduct market surveys to determine appropriate costs and should revise the adder value as necessary.

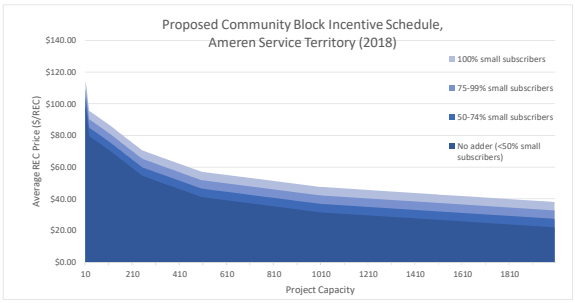
The small subscription adder is designed to incentive a particular project design, rather than ensure financial viability of the project.
The amount of the small subscriber adder over the course of the program should vary with the difference in subscriber administration costs, rather than the overall viability of the project.
As a result, the adder is not designed to vary across utility service areas, and is not designed to decline over time.
IPA should conduct periodic surveys and reviews to ensure that the incentive is appropriate and create separate incentives across service areas, as needed.

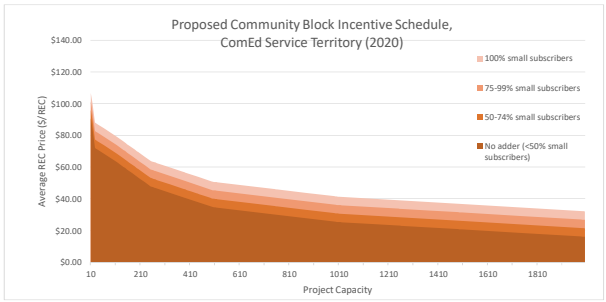
Small Subscription %	Added Incentive ($/REC)
<50%	$0.00
50-74%	$5.34
75-99%	$10.68
100%	$16.02

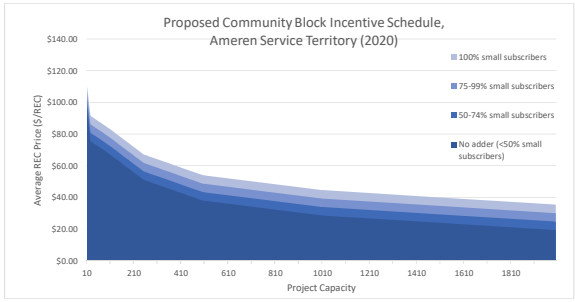
Although added incentives are only available to those solar projects in the adjustable block program, added incentives will not decline and do not have a maximum capacity.

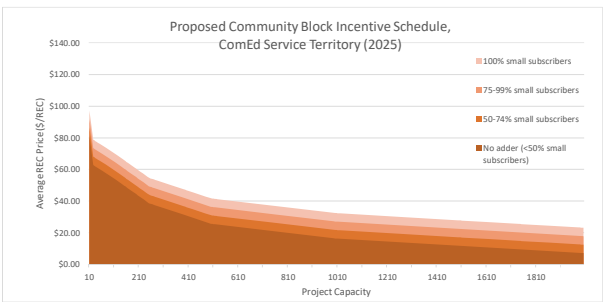
To better understand the impact on total incentives, the average REC price paid (including the adder) for projects at varying subscriptions and capacities is supplied below:

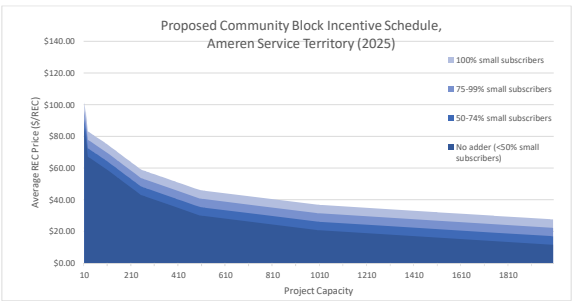


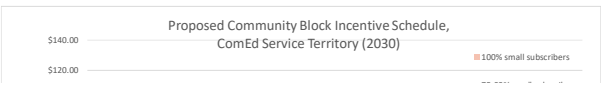


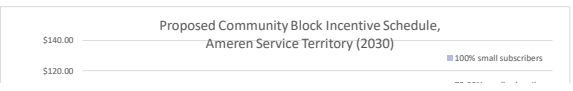


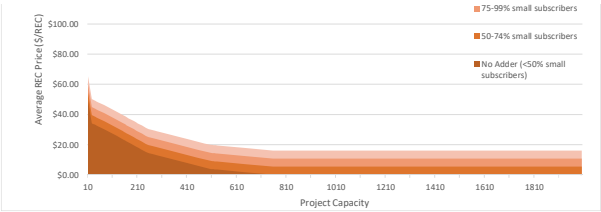


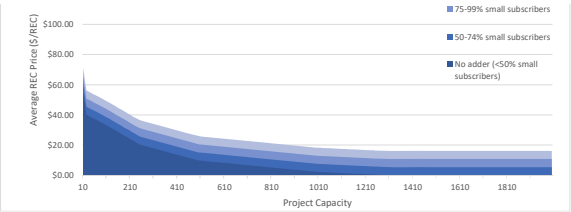












PROPOSED COMMUNITY SOLAR GARDEN ADDER

To to ensure energy facility access to a broader group of energy consumers, (20 ILCS 3855/1-75(c)(1)(N)), the following additional incentive ("adder") formula is proposed:

Community Solar Garden Adder ($) = (Average solar project installed cost, non-profit sites ($/kW) -
Average solar project installed cost, commercial sites ($/kW))* Project Capacity (kW)

**Average solar project installed cost, non-profit site ($/kW) is the average installed cost on a per-kilowatt basis for projects installed on non-profit sites.*
**Average solar project installed cost, commercial site ($/kW) is the average installed cost on a per-kilowatt basis for projects installed on commercial sites.*

IPA should conduct surveys with local projects and developers to assess the appropriate levels for average commercial and non-profit costs.
This analysis uses tax-exempt and commercial site costs from Lawrence Berekeley Lab's Tracking the Sun IX. Tax-exempt sites may be less likely to benefit from tax incentives and Encounter many of the same obstacles & barriers as community solar garden projects.

Host Type	Average Installed Cost ($/kW)
Commercial	$3.50
Tax-exempt	$3.80

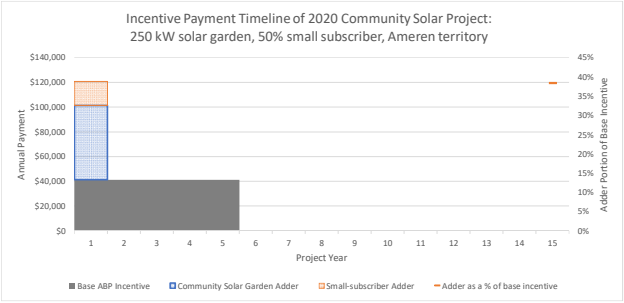
The modeled added incentive for community solar gardens is therefore $0.30/W, $300/kW, or approximately $16.40/REC.
The level of the communtiy solar gardenadder over the course of the program should vary with the difference in average costs between gardens and least-cost 'farms', rather than the overall viability of the project.
As a result, the adder is not designed to vary across utility service areas, and is not designed to decline over time.
IPA should conduct periodic surveys and reviews to ensure that the incentive is appropriate and create separate incentives across service areas, as needed.

Proposed eligibility criteria for the community solar garden adder are below:
Project AC capacity <500 kW
>60% of subscribers (by capacity) located within 10 miles (ComEd service area) or 30 miles (Ameren service area) of the project site
The threshold of 60% was selected because it ensures majority-community participation, but allows for the support of a large 'anchor' tenant at the 40% maximum or less.

If the project does not comply with the eligiblity criteria set out by the adder, a performance penalty will be levied against the project's REC payments in the fourth and fifth years of performance.

The adder is designed to adequately incentivize projects that are located close to subscribers and provide education & outreach benefits alongside economic benefits.
Because additional costs due to a different site include a variety of factors (site control, leasing costs, ground-mount vs rooftop, soiling, labor costs, permitting & interconnection), this adder uses a market survey-based average.

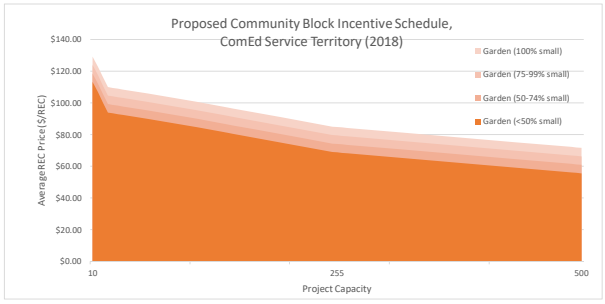
The adder will be paid up-front to compensate for site costs which may be paid at the beginning of the project.
Because the adder payment may cause first-year payments to exceed 20% of the total incentive, the adder should be implemented through a separate process than REC payment.
An incentive timeline for a typical solar garden project (250 kW, Ameren territory, 50% small subscribers, 2020 energization year) is below.
In this example, the combined small-subscription and community garden adders represent ~40% of base REC payment.

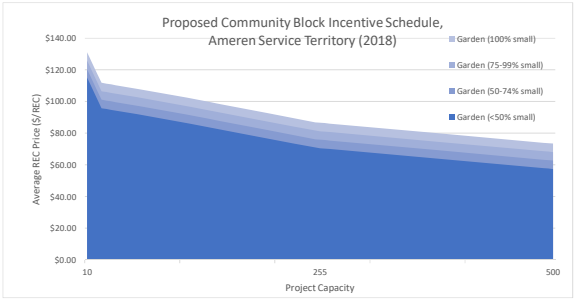


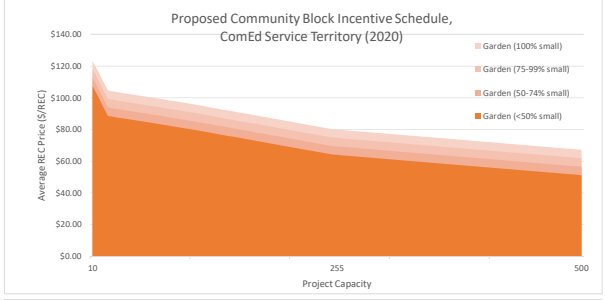
Although added incentives are only available to those solar projects in the adjustable block program, added incentives will not decline and do not have a maximum capacity.

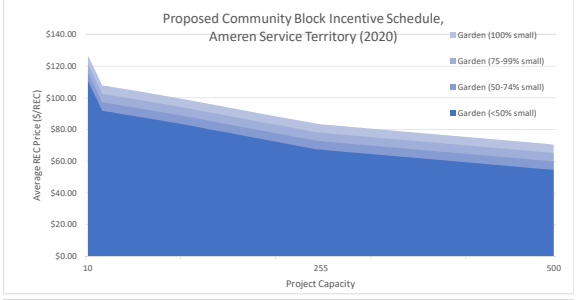
Community solar projects are eligible for both small-subscriber and community solar garden adders. Many projects that are eligible for the community solar garden adder may receive both.

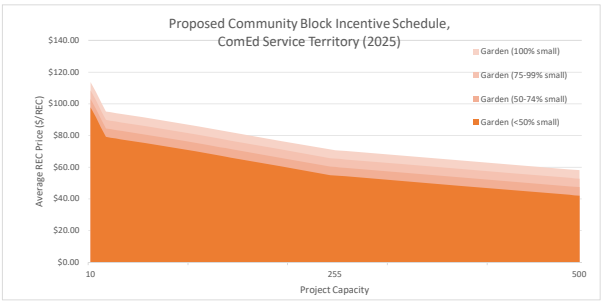
To better understand the impact on total incentives, the average REC price paid (including both adders) for projects at varying subscriptions and capacities is supplied below:

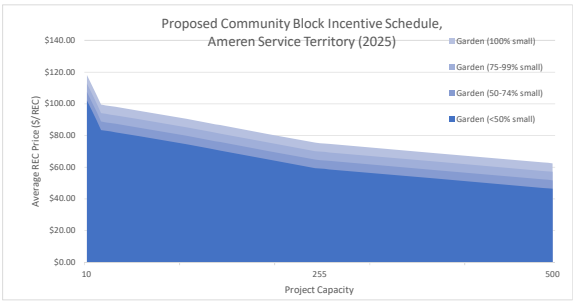


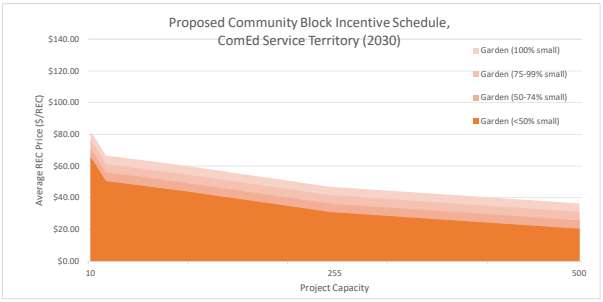


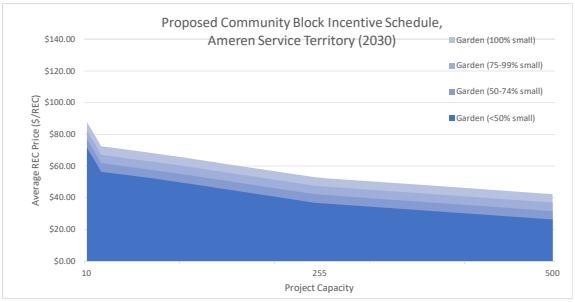












COMBINING SMALL SUBSCRIBER AND COMMUNITY SOLAR GARDEN ADDERS

Community solar projects will receive the base adjustable block incentive, and may be eligible for either or both of the small-subscriber adder (at three different levels) and the community solar garden adder. In all, 8 combinations of adders are available, from the base adder alone to a community solar garden with 100% small subscribers.

A combined graph, including community solar gardens and community solar 'farms', at each of the small subscriber levels, is below.