Statement of Warren G. Lavey Submitted to the Illinois Power Agency

Revising Rules for Competitive Procurements of Community Solar RECs Under the Adjustable Block Program

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Introduction

This statement addresses questions posed by the IPA on July 3, 2019 in connection with the workshop sessions on June 26 – Adjustable Block Program (ABP); REC Pricing Model; Distributed Generation (DG), and Community Solar.

For future community solar REC procurements, the IPA should not continue with the initial procurement's price schedule and applicants (in the waitlist order or otherwise). Cost and demand conditions have changed in Illinois since those applications and will change further through future procurements in ways that are difficult to predict. Instead, the IPA should build on its experience with the initial ABP procurement and adopt important revisions for future procurements.

The formula for schedules of prices and quantities for procuring community solar RECs should better reflect market conditions in Illinois at those times. The rules should reflect three key points – cost differences across projects; cost differences over time; and uncertainty in setting REC prices. A formula like the two alternatives recommended below would reduce costs to Illinois utility ratepayers, provide resources for procuring more RECs, incentivize more clean energy production and associated jobs, and use the state's property and other resources more efficiently. Each formula described below would produce transparent schedules and procurements in compliance with the ABP statute.

I am an adjunct professor at the University of Illinois at Urbana-Champaign and Chicago, teaching environmental policy, law and health.[1] For over 25 years, I advised government regulatory agencies, non-profit organizations, municipal governments, and companies on competitive procurements of wireless radio spectrum and RECs. In 2011, I wrote a law review article on regulatory processes for utility procurements of solar RECs.[2] In 2017-19, my students and I developed a website hosted by the University of Illinois College of Law to help Illinois municipalities with community solar projects.[3]

Key Observations

The IPA now has the experience of its first DG procurement under the Future Energy Jobs Act (FEJA). As the IPA considers rules for its future community solar REC procurements, three key observations are:

1. Cost differences across projects. Community solar projects in Illinois vary substantially in the costs to the developers. Examples of significant cost differences include transmission lines and grid interconnection; payments with subscribers, other customers and utilities; land leases; installation, operation, maintenance, and decommissioning; marketing and administrative; solar panel production

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[2] Lavey, W. G., "Overcoming Conceptual and Practical Hurdles to Market-Based Discovery of Prices for Utility Procurements from Rooftop Solar Systems", 25 *Tulane Environmental Law Journal* 289 (2011).

[3] University of Illinois College of Law Libguide "Community Solar" https://libguides.law.illinois.edu/community_solar.

efficiency varying with sun exposure; site preparation to comply with zoning and other requirements; regulatory approvals; and taxes and other governmental fees and incentives.[4]

These cost differences affect developers' willingness to build different community solar projects at different REC price levels. A REC procurement process that better incentivizes the development of lower-cost projects will yield resources to procure more RECs, resulting in more solar energy production and associated jobs in the state. There would also be benefits in terms of more efficient use of the state's resources, such as locating projects on brownfields, rooftops or marginal farm land close to major grid transmission equipment, as opposed to on prime agricultural land at sites requiring lengthy new transmission lines.

Moreover, the REC procurement process should reduce costs for utility ratepayers by incentivizing installations of lower-cost projects at competitive REC prices. Competitive REC pricing should yield reasonable rates of return for developers of lower-cost projects, without giving windfall profits to such lower-cost projects or even to higher-cost projects. Lower costs for utilities in procuring RECs mean more affordable utility rates for consumers and more support for the transition to clean energy production.

2. Cost differences over time. Solar power costs continue to fall, reflecting price declines in solar panels, battery storage and other factors. For the segment that includes community solar, national solar PV system pricing fell by 9.8% from Q1 2018 to Q1 2019, and by 2.7% in Q1 2019.[5] In particular, the first round of REC procurements under FEJA kick-started in Illinois the industry of solar developers, equipment suppliers and installers. In Illinois, solar prices fell by 34% over the past five years, and solar installations are projected to grow by 1,551 MW over the next five years.[6] So, too, has interest in community solar projects grown in the state's site owners, electricity customers and zoning authorities.

The cost, location and other characteristics of future community solar projects will differ substantially from those developed in 2017-18 and submitted to the IPA in early 2019. The next REC procurement from community solar projects should not simply pick up from applications submitted in the initial procurement at the same price schedule. The flood of applications for that procurement was affected by the high prices offered. As explained below, continuing with the same set of project applications and selection rules in the order of the current waitlist (or re-ordered through another lottery) would be contrary to the public interest. Other options can and should be explored.

3. Uncertainty in setting REC prices. Establishing REC prices many months in advance of an IPA procurement is extremely difficult because of changing, uncertain market conditions. Technology costs; interest by developers, site owners and customers; opportunities in other states; and other factors are

[4] See materials posted on the University of Illinois College of Law Libguide "Community Solar", supra.
[5] Solar Energy Industry Association (SEIA) and Wood Mackenzie Power & Renewables, "U.S. Solar Market Insight: Executive summary Q2 2019" at 16 (2019) https://www.seia.org/us-solar-market-insight. See also Weaver, J., "Los Angeles seeks record setting solar power price under 2¢/kWh" *pv magazine* (June 28, 2019) https://pv-magazine-usa.com/2019/06/28/los-angeles-seeks-record-setting-solar-power-price-under-2%C2%A2-kwh/; Bolinger, M. and Seel, J., "Utility-Scale Solar: Empirical Trends in Project Technology, Cost, Performance, and PPA Pricing in the United States" (2018) https://emp.lbl.gov/sites/default/files/lbnl_utility_scale_solar_2018_edition_report.pdf.
[6] SEIA, "Solar Spotlight – Illinois" (Q1 2019) https://www.seia.org/sites/default/files/2019-06/Factsheet_Illinois_0.pdf.

highly dynamic.[7] A forecasted price is unlikely simultaneously to incentivize lower-cost community solar projects and yield reasonable cost burdens to utility ratepayers. My 2011 article described numerous large misses by domestic and foreign government agencies, despite the best efforts of experts to forecast supply and demand curves.[8]

The Illinois General Assembly and IPA recognized this problem by providing for auctions of RECs for larger projects and the ABP for smaller DG projects.[9] For community solar, the ABP in the first DG procurement attempted to be driven by actual market conditions through the four percent price reductions by block.

Unfortunately, the initial ABP procurement for community solar suffered in starting at a formula-derived price level that was set when few community solar projects were developed in Illinois far in advance of the procurement. Additionally, the quantities assigned to each block, the four percent price reductions, and the small subscriber adders were again forecasted and set far in advance of the procurement. Under the formula the IPA used, none of these critical components of the procurement was able to adjust for the actual market conditions at the procurement time. The resulting community solar REC prices were:

- so high that the capacity in applications exceeded the targeted procurement amount by a ratio of nine to one;
- so high that the community solar REC prices became a heavy cost burden for utility ratepayers and limited the number of community solar projects receiving this incentive;
- so high that developers were incentivized to submit applications for some projects with relatively high costs; and
- so high that developers, communities, and subscribers for most lower-cost projects -- after engaging in burdensome, disruptive and expensive zoning, land lease, design, and application processes -- were left out by the lottery used to resolve the excess quantity of applications.

Building on the Initial ABP Experience with a Revised Formula for Setting Prices or Quantities

Turning now to the rules for future IPA procurements of RECs from community solar projects, the IPA should build on its experience with the initial ABP procurement. The new rules should reflect the key points described above – cost differences across projects; cost differences over time; and uncertainty in setting REC prices. Going forward, the IPA's formula for a schedule of prices and quantities for procuring community solar RECs should better reflect the market conditions in Illinois at the procurement time. The new formula should encompass both project applications on the waitlist and new applications.

A wide range of processes that better reflect market conditions could be used to procure SRECs.[10] States apply different approaches, and non-governmental auction markets for SRECs are operating.[11] The relevant statutory section for Illinois, 20 ILCS 3855/1-75(c)(1)(K), allows the IPA substantial

[7] As Sol Systems observed: "SREC prices are constantly changing as policy and market behavior continuously evolve." Sol Systems, "SREC Customers: State Markets" https://www.solsystems.com/srec-customers/state-markets/. See also Flett Exchange, "Market Data/SREC Pricing" https://www.flettexchange.com/.

[8] See note 2 supra.

[9] 20 ILCS 3855/1-75(c)(1)(K).

[10] See Bichier, M. and Goeree, J. (eds.), Handbook of Spectrum Auction Design (2017); Parsons, S., Rodriguez-Aguilar, J. and Klein, M., "Auctions and Bidding: A Guide for Computer Scientists", 43 *ACM Computing Surveys* 10:1 (2011).

[11] See note 7 supra.

discretion in designing the ABP for community solar RECs, and setting the prices of blocks, quantities per block, small subscriber adder, and adjustment process:

> The Adjustable Block program shall be designed to provide a transparent schedule of prices and quantities to enable the photovoltaic market to scale up and for renewable energy credit prices to adjust at a predictable rate over time. The prices set by the Adjustable Block program can be reflected as a set value or as the product of a formula.

The following description sketches out two approaches to community solar REC procurements that would comply with the Illinois statute – (1) Base Schedule with Back-Ups, and (2) Setting Quantities per Block. Each approach described here builds on the structure and experience of the initial ABP in establishing prices and quantities per block. The first approach uses a formula for prices, while the second uses a formula for quantities per block. Both approaches yield a transparent schedule of prices, quantities, and block transitions prior to the transparent selection among applicants.

1. Base Schedule with Back-Ups. Under this approach, the IPA would publish a base schedule of REC prices and quantities as well as several back-up schedules. The prices in each schedule would be quoted before any adders for small subscribers or other features selected by the IPA.[12] Market conditions in Illinois at the time of the procurement would be used to select one of the published schedules for use in the procurement.

To illustrate, suppose that the IPA's analysis – using the National Renewable Energy Laboratory's model or other algorithm -- determines that the highest price it should pay for a community solar REC (before reflecting adders) is $20. The IPA also decides that blocks should be limited to 40 units each; prices should adjust down by $1 per block; and 100 units should be procured in total. The Base Schedule would be:

Table 1 Base Schedule

REC Price ($)	Nameplate Capacity for Procurement (units)
20	40
19	40
18	20

Because of uncertainty about the falling costs for community solar projects and the demand in Illinois at or around the prices in the Base Schedule, the IPA would also publish two back-up schedules with different starting (maximum) prices:

Table 2 First Back-Up

REC Price ($)	Nameplate Capacity for Procurement (units)
19	40
18	40
17	20

[12] The IPA would publish a table of adders and qualification criteria. A developer would consider these payments in addition to the REC prices shown in the schedules when deciding whether it would build at the REC prices in the base schedule or at the lower prices in a back-up schedule.

Table 3 Second Back-Up

REC Price ($)	Nameplate Capacity for Procurement (units)
18	40
17	40
16	20

Applicants would submit a project for one or more schedules, and pay a deposit associated with the schedule(s) they choose. To further this example, suppose that:

- Applicant X (facing higher costs and no small subscriber adder) may be willing to build a community solar project if it sold RECs to the IPA according to the prices and quantities shown in Table 1, but not if Table 2 or 3 were used. This applicant would pay a deposit only for the Base Schedule.
- In contrast, Applicant Y (facing lower costs and a high small subscriber adder) may be willing to sell RECs to the IPA if any of the three schedules were used. Applicant Y recognizes that it would face fewer competing applicants, and thus have a higher probability of selling RECs to the IPA, under Table 3 than if Table 1 or 2 were used. This Applicant would pay a deposit on Tables 1, 2 and 3.

The selection of the final schedule and eligible applicants would depend on the deposits by the applicants. In selecting a schedule, the IPA would use this formula to set prices:

> Select the lowest-price schedule published such that the quantity from applicants submitting deposits for that schedule equals or exceeds the quantity to be procured.

Suppose that the quantities from applicants submitting deposits were 400 for the Base Schedule, 280 for the First Back-Up, and 150 for the Second Back-Up. The formula would tell the IPA to use the Second Back-Up (Table 3). Applicant Y would be eligible for the IPA procurement, but Applicant X would be dropped from the procurement. Deposits would be returned to Applicant X (associated with Table 1) and Applicant Y (associated with Tables 1 and 2, but the IPA would retain this applicant's Table 3 deposit).

The IPA would then use the Second Back-Up, transparently showing before the procurement the prices, quantities, and transitions between blocks. This step is unlike the initial ABP procurement when the IPA estimated a price schedule, but had no formula for prices when applications flooded in. The IPA would conduct a lottery among the 150 projects with deposits for that schedule -- starting with the first block (40 units at $18), next going to the second block (40 units at $17), and ending with the third block (20 units at $16).

Compared to only using the Base Schedule (as in the initial ABP procurement), this approach would:

- Reduce the average cost for the RECs procured from $19.20 under the Base Schedule to $17.20 per unit under the Second Back-Up.
- Increase the likelihood that the lower-cost applicant (Y) would be selected to sell RECs to the IPA from 25% to 67%. Its expected revenues from applying to sell RECs to the IPA would rise from $4.80 ($19.20 x 0.25) under the Base Schedule to $11.52 ($17.20 x 0.67), plus any adders for which it qualified. The higher expected revenues would incentivize lower-cost projects to go through the development and application processes.

- Decrease the likelihood that the higher-cost applicant (X) would be selected to sell RECs to the IPA from 25% (associated with $4.80 in expected revenue) to 0%. The lower expected revenues would incentivize higher-cost projects not to go through the development and application processes.

2. Setting Quantities per Block. An alternative improvement formula would focus on the quantities per block. This focus is unlike the initial ABP procurement when the IPA estimated a price and quantity schedule, but had no formula to adjust the quantities by block when applications flooded in.

The IPA would determine the maximum it would be willing to pay for RECs from community solar, and publish a schedule starting with that price and showing the total quantity of units to be procured. Again, the prices in the schedule would be quoted as before any adders to the REC prices for small subscribers or other features selected by the IPA.

Applicants would submit a project with a deposit for a particular price at or below the starting price. The quantities per block would then be set by this formula.

> Determine the lowest price such that deposits at or below that price equal or exceed the total quantity to be procured. Set the quantity for that block equal to the total quantity minus 20, and set the quantity at 10 for each of the two immediately higher prices.

The IPA would publish the schedule of transparent prices and quantities before the procurement. Only applicants submitting deposits at or below the lowest price on the schedule would be eligible for the IPA's procurement. The IPA would use a lottery to select applicants for each of the three blocks, starting with the highest price.

To illustrate this procedure, suppose that the IPA estimated the highest price for such RECs in a procurement at $20; announced that it would procure 100 units; and decided on blocks at $1 intervals. The applicants submitted deposits by price with these quantities: 400 units at or below $20; 280 units at or below $19; 175 units at or below $18; 115 units at or below $17; and 70 units at or below $16. In this case, applicants for 115 units would be selected by lottery using the following schedule:

Table 4 Quantities per Block

REC Price ($)	Nameplate Capacity for Procurement (units)
19	10
18	10
17	80
16	0

The IPA would conduct a lottery among the 115 projects with deposits at or below $17 -- starting with the first block (10 units at $19), next going to the second block (10 units at $18), and ending with the third block (80 units at $17). Deposits would be returned to the 285 applicants submitting at prices above $17.

Compared to using the quantities for blocks shown in Table 1, selection by lottery based on Table 4 would yield the following:

- Reduce the average cost for the RECs procured from $19.20 to $17.30.
- Increase the likelihood that a lower-cost applicant would be selected to sell RECs to the IPA, incentivizing more such applicants.
- Decrease the likelihood that a higher-cost applicant would be selected to sell RECs to the IPA, incentivizing fewer such applicants.

Conclusion

The IPA should build on its experience with the initial ABP procurement for community solar RECs by revising the formula to set prices and quantities by block. The new rules would adjust for market conditions in Illinois at the time of the procurement. That formula should reflect three key observations -- cost differences across projects; cost differences over time; and uncertainty in setting REC prices.

Rules like the ones recommended above would reduce costs to Illinois utility ratepayers, provide resources for procuring more RECs, incentivize more clean energy production and associated jobs, and use the state's property and other resources more efficiently. This statement sketched two approaches which would improve on the initial ABP procurement, one using a Base Schedule with Back-Ups and the other setting Quantities per Block. Each process uses a transparent formula to set prices and quantities by block, leads to a published schedule prior to the procurement, and yields a transparent selection process among applicants.

The IPA's future procurements should not continue with the initial procurement's price schedule and applicants. Cost and demand conditions have changed in Illinois since those applications were submitted and will continue to change through future procurements in ways that are difficult to predict. Instead, the IPA should use rules which better reflect contemporaneous market conditions for Illinois community solar RECs.

Finally, a set of rules where prices and quantities reflect market conditions in Illinois at the time of each procurement would be more predictable over time than a process in which the IPA sets a schedule, experiences applications for that schedule which vary from forecasts (high or low), and then embarks on a re-examination of its rules.