Appendix D - REC Pricing Model Description

REC Pricing Approach

The objective of the REC Pricing Model is to calculate the revenue and incentive levels required for a typical distributed solar or community solar project to meet its threshold investment requirements and the associated price in $/REC ("the REC price").[1] The calculated REC price should be representative of a price that would be sufficient to allow a developer of a typical system to meet a project's expenses and debt service obligations, as well as the equity investors' minimum required after-tax rate of return.

The calculated REC price is net of (i) revenues received through net metering, (ii) any assumed incentives such as federal tax credits, and (iii) the Distributed Generation Rebate[2] value ("Smart Inverter Rebate"), if applicable.

Under Section 16-107.5(j) of the Public Utilities Act ("PUA"), net metering is a credit for energy, capacity, transmission, and distribution charges for the net generation produced by distributed generation projects until net metering accounts for 5% of the total peak demand of the electricity provider's eligible customers. For systems that receive a Smart Inverter Rebate, the net metering credit does not include distribution charge credits, pursuant to Section 16-107.6(c)(3) of the PUA. For community solar, net metering is for energy only. (Once the 5% level is hit, net metering for all new installations will be for energy only.)

As further described in the section on the REC price calculation, the REC Pricing Model is set up using the following five capacity-based bins for block pricing:

- up to 10 kW
- greater than 10 to 100 kW
- greater than 100 to 200 kW
- greater than 200 to 500 kW
- greater than 500 to 2,000 kW

There is one price for all systems within a bin. The bins were chosen based on the available pricing data points as described in the section on installation cost data. A base price is calculated for the most economic block size (greater than 500 to 2,000 kW), and the prices for the other bins are determined through the use of adders, as further described in the section on the REC pricing calculation. The adders were determined using a midpoint approach and using the same model that was run for the base price, as further described in the section on REC base model adders. Community Solar projects face additional costs and less revenue than distributed generation systems. On the revenue side, they are eligible

[1] The model uses inputs from currently available information, including current utility rates and tariffs. As discussed in Section 6.4 of the Plan, inputs will be updated after the Plan is approved by the Commission in 2018.

[2] See, generally, 220 ILCS 5/16-107.6.

only for energy-only net metering,[3] while on the cost side, there may be the cost of acquiring, maintaining, and managing subscribers. The initial block price for community solar reflects a baseline for those additional costs and lower revenue. To ensure that the benefits of solar energy are widely shared by Illinois residents, the Adjustable Block Program ("ABP") will offer an additional incentive for community solar projects with a higher level of residential subscribers. There will therefore be two adders for community solar projects: (i) a base adder, and (ii) an adder to incentivize residential participation. Projects meeting a 50% or 75% requirement for residential participation will receive the additional adder.

The IPA also notes that the prices presented in this Draft Plan are preliminary and may change based on comments received.[4] The IPA seeks stakeholder comments and inputs on the prices and the methodology of the REC Pricing Model, in particular the input assumptions to the model. The prices listed in the draft Plan should therefore not be used for anything other than providing comments on the Plan.

Model Selection and Description

The REC Pricing Model uses a modified version of National Renewable Energy Laboratory's ("NREL") publicly available Cost of Renewable Energy Spreadsheet Tool ("CREST").[5] CREST is widely known and respected in the renewable energy industry. For the purpose of setting REC prices for the ABP, modifications (as described in the following sections) to the model inputs and format of the outputs were made so as to refine the results for use in determining REC prices for the blocks.[6]

The CREST model was developed by NREL to aid policymakers, regulators and renewable energy developers with estimating renewable energy costs for various public policy purposes, such as establishing cost-based or performance-based incentives. The model calculates the total incentive necessary for a renewable project to cover its costs and achieve a necessary economic return to the project developer and/or investors.

As described in the User Manual published with the CREST model, CREST at its core is an economic cash flow model designed to assess project economics, design cost-based incentives (e.g., feed-in tariffs ("FITs")), and evaluate the impact of various state and federal support structures.[7] CREST is a suite of four analytic tools, one for each solar (photovoltaic and solar thermal), wind, geothermal, and anaerobic digestion technologies.

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[3] 220 ILCS 5/16-107.5(*l*)(2).

[4] In addition, the REC Pricing Model was developed prior to the September 22, 2017 U.S. ITC injury ruling on the Suniva/SunWorld trade petition that may ultimately result in tariffs being imposed on certain imported photovoltaic modules and cells. See Section 6.8.4 of the Plan. The REC Pricing Model does not currently reflect any market changes that may arise from that proceeding.

[5] The CREST model is available on NREL's website: https://financere.nrel.gov/finance/content/crest-cost-energy-models.

[6] As described in the previous section, the CREST model output is not the final REC price as revenues received from net metering must be netted out from the LCOE.

[7] Gifford, Jason S. & Grace, Robert C. "CREST Cost of Renewable Energy Spreadsheet Tool: A Model for Developing Cost-Based Incentives in the United States." User Manual Version 4. July 2013. https://financere.nrel.gov/finance/files/crest_user_manual_v-4.pdf.

The CREST User Manual provides a summary of the primary and secondary model outputs:[8]

> *The primary output is the modeled project's COE. The COE is the year-one price in cents per kilowatt hour (¢/kWh) necessary for the project to meet all expenses and debt service obligations (if applicable), as well as the equity investors' minimum required after-tax rate of return. At the model user's discretion, the COE can be calculated to assume an escalation rate (applied to all or a portion of the initial rate) over time. In calculating the COE, the CREST model includes the option to specify both a percentage of the tariff subject to escalation and the associated tariff escalation rate. The results can be used to inform a range of cost-based incentives, including FIT rates.*
>
> *The secondary output is the modeled project's levelized cost of energy (LCOE)[9]. The LCOE is a single, fixed, non-escalating value over the incentive's payment duration. The escalating stream of payments generated by the COE and the constant stream of payments generated by the LCOE have the same Net Present Value (NPV) when discounted at the same required rate of equity return. Policymakers can refer to the LCOE output if policy objectives favor a single, fixed price per kWh for the life of the cost-based tariff. If the tariff rate escalation factor is set to zero, then the calculated COE and LCOE values will be equal.*

CREST provides the interface for the input assumptions necessary for the calculation of a REC price for a solar photovoltaic project including, but not limited to (i) capital costs (module and inverter costs, balance of plant costs, interconnection costs, development costs and fees, reserves and financing costs), (ii) operations and maintenance costs, (iii) cost-based tariff rate structure, and (iv) federal and state incentives / rebates / tax credits, etc. The REC Pricing Model uses input assumptions modified from the default CREST values that are based on more current and granular installation cost data, and input from stakeholder responses to the Request for Comments.[10]

Installation Cost Data

Regarding the inputs to the CREST model, in particular installation cost data, a number of stakeholders suggested that the IPA issue a survey to stakeholders involved in the development of solar projects to determine the inputs to the model. There was a suggestion to use the survey issued by the Massachusetts Department of Energy Resources ("MA DOER") as part of the Solar Massachusetts Renewable Target ("SMART") program.

[8] Ibid, pages 3-4.

[9] The "levelized cost-of-energy" is presented either as a constant price in each year (nominal levelized) or as a constant price adjusted for inflation (real levelized). Real LCOE is often used for comparative studies, whereas the nominal LCOE is typically used in setting, describing, or establishing actual prices. The CREST model calculates a nominal LCOE.

[10] The Request for Comments was sent out following the Agency's May 17, 2017 and May 18, 2017 workshops held in Chicago to discuss the RPS, ABP, Community Solar, and Illinois Solar for All Program. The Request for Comments was sent out to stakeholders on June 6, 2017. Stakeholder responses were received by June 27, 2017.

The Agency reviewed the MA DOER Task 1 Report[11] which highlighted data quality concerns arising from the stakeholder survey. In particular, the report noted that self-reported system costs for two of the largest residential installers in the dataset were significantly above the costs reported by other firms.[12] The report deemed the self-reported data from these installers as questionable and removed them from the dataset. Because of concerns regarding data quality, based on the Massachusetts experience, the Agency decided against issuing a similar survey. As a result, the IPA made a decision to use publicly available data for the REC Pricing Model.

To develop the REC Pricing Model, several data sources for populating the CREST Model were reviewed and analyzed—including but not limited to (i) NREL Q1 2016 Benchmarking Report,[13] (ii) LBNL Tracking the Sun Report – August 2016[14] (iii) NREL Open PV Report,[15] and (iv) SEIA/GTM Research (US Solar Market Insight – Q2 2017).[16] While all reviewed reports provide national average data, due to the immaturity of the Illinois solar market, the reports do not provide detailed Illinois-specific installation cost data.

The REC Pricing Model uses the NREL Q1 2016 Benchmarking Report, which provides the most detail in terms of cost categories necessary for populating the CREST Model. The report publishes the following installation cost categories:

- Module
- Inverter
- Balance of System ("BOS")
- Installation Labor & Equipment
- Permitting, Inspection and Interconnection
- EPC[17] Overhead
- Developer Overhead

The NREL Q1 2016 Benchmarking Report models and provides national averages for a Residential Solar Project, a Commercial Solar Project, and a Utility Scale Project. The average Residential System modeled in the NREL report is 5.6 kW. The average Commercial System modeled is 200 kW. The report, however, also models and provides the costs for 100 kW, 500 kW, and 1,000 kW systems.

Table D-1 through Table D-5 provide an analysis of the installation costs based on the NREL Report.

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[11] Task 1 Report: Evaluation of Current Solar Costs and Needed Incentive Levels Across Market Segments. See http://www.mass.gov/eea/docs/doer/rps-aps/doer-post-400-task-1.pdf.

[12] Ibid at section 4.2.1.

[13] http://www.nrel.gov/docs/fy16osti/66532.pdf.

[14] https://emp.lbl.gov/publications/tracking-sun-ix-installed-price..

[15] https://openpv.nrel.gov.

[16] Report available through subscription.

[17] EPC stands for engineering, procurement, and construction.

Table D-1 - Residential Solar PV Installed Costs (Scaled from 5.6 kW System)

			Total Project Cost ($)
	$/W DC	$/kW DC	10 kW
Module	0.64	640	**$6,400**
Inverter	0.21	215	**$2,146**
Hardware BOS - Structural Components	0.12	116	**$1,163**
Hardware BOS - Electrical Components	0.25	249	**$2,485**
Supply Chain Costs	0.18	185	**$1,849**
Sales Tax	0.08	82	**$822**
Installation Labor	0.30	297	**$2,971**
Permitting, Inspection and Interconnection (PII)	0.10	98	**$981**
Total EPC Cost	**1.88**	**1,882**	**$18,817**
Sales & Marketing (Customer Acquisition)	0.37	368	**$3,679**
Overhead (General & Admin.)	0.33	330	**$3,300**
Net Profit	0.35	352	**$3,522**
Total Development Cost	**1.05**	**1,050**	**$10,501**
Total Installation Cost	**2.93**	**2,932**	**29,318**
NREL Model Categories			
Generation Equipment			**$11,846**
Balance of Plant			**$8,468**
Interconnection			**$981**
Development Costs and Fee			**$8,023**
Total			**$29,318**

Table D-2 - Commercial PV Installed Costs (100 kW System)

			Total Project Cost ($)
	$/W DC	$/kW DC	100 kW
Module	0.64	640	**$64,000**
Inverter	0.13	130	**$13,000**
Hardware BOS - Structural Components	0.17	166	**$16,632**
Hardware BOS - Electrical Components	0.19	193	**$19,252**
Installation Labor & Equipment	0.25	246	**$24,585**
Permitting, Inspection and Interconnection (PII)	0.07	75	**$7,481**
EPC Overhead	0.23	228	**$22,807**
Sales Tax	0.07	74	**$7,432**
Total EPC Cost	**1.75**	**1,752**	**$175,189**
Contingency (4%)	0.07	70	**$7,008**
Developer Overhead	0.43	426	**$42,610**
EPC/Developer Net Profit	0.04	45	**$4,490**
Total Installation Cost	**2.29**	**2,293**	**$229,297**
NREL Model Categories			
Generation Equipment			**$118,736**
Balance of Plant			**$60,469**
Interconnection			**$7,481**
Development Costs and Fee			**$42,610**
Total			**$229,297**

Table D-3 - Commercial PV Installed Costs (200 kW System)

			Total Project Cost ($)
	$/W DC	$/kW DC	200 kW
Module	0.64	640	**$128,000**
Inverter	0.13	130	**$26,000**
Hardware BOS - Structural Components	0.17	166	**$33,263**
Hardware BOS - Electrical Components	0.16	159	**$31,812**
Installation Labor & Equipment	0.19	187	**$37,477**
Permitting, Inspection and Interconnection (PII)	0.05	46	**$9,215**
EPC Overhead	0.20	202	**$40,401**
Sales Tax	0.07	70	**$14,088**
Total EPC Cost	**1.60**	**1,600**	**$320,256**
Contingency (4%)	0.06	64	**$12,810**
Developer Overhead	0.43	426	**$85,221**
EPC/Developer Net Profit	0.04	42	**$8,353**
Total Installation Cost	**2.13**	**2,133**	**$426,640**
NREL Model Categories			
Generation Equipment			**$229,652**
Balance of Plant			**$102,552**
Interconnection			**$9,215**
Development Costs and Fee			**$85,221**
Total			**$426,640**

Table D-4 - Commercial PV Installed Costs (500 kW System)

			Total Project Cost ($)
	$/W DC	$/kW DC	500 kW
Module	0.64	640	**$320,000**
Inverter	0.13	130	**$65,000**
Hardware BOS - Structural Components	0.17	166	**$83,159**
Hardware BOS - Electrical Components	0.15	152	**$75,783**
Installation Labor & Equipment	0.16	157	**$78,670**
Permitting, Inspection and Interconnection (PII)	0.03	29	**$14,414**
EPC Overhead	0.19	191	**$95,587**
Sales Tax	0.07	69	**$34,450**
Total EPC Cost	**1.53**	**1,534**	**$767,063**
Contingency (4%)	0.06	61	**$30,682**
Developer Overhead	0.43	426	**$213,052**
EPC/Developer Net Profit	0.04	40	**$20,185**
Total Installation Cost	**2.06**	**2,062**	**$1,030,981**
NREL Model Categories			
Generation Equipment			**$565,904**
Balance of Plant			**$237,611**
Interconnection			**$14,414**
Development Costs and Fee			**$213,052**
Total			**$1,030,981**

Table D-5 - Commercial PV Installed Costs (Scaled from 1,000 kW System)

			Total Project Cost ($)
	$/W DC	$/kW DC	2,000 kW
Module	0.64	640	**$1,280,000**
Inverter	0.13	130	**$260,000**
Hardware BOS - Structural Components	0.17	166	**$332,635**
Hardware BOS - Electrical Components	0.15	148	**$295,486**
Installation Labor & Equipment	0.15	146	**$292,458**
Permitting, Inspection and Interconnection (PII)	0.02	23	**$46,158**
EPC Overhead	0.19	187	**$373,402**
Sales Tax	0.07	68	**$136,610**
Total EPC Cost	**1.51**	**1,508**	**$2,948,444**
Contingency (4%)	0.06	60	**$120,670**
Developer Overhead	0.43	426	**$852,208**
EPC/Developer Net Profit	0.04	40	**$79,668**
Total Installation Cost	**2.03**	**2,035**	**$4,069,296**
NREL Model Categories			
Generation Equipment			**$2,250,350**
Balance of Plant			**$920,580**
Interconnection			**$46,158**
Development Costs and Fee			**$852,208**
Total			**$4,069,296**

Because the programs are expected to launch in 2018, the NREL Q1 2016 Benchmarking Report prices were then rolled forward two years by reducing prices by 4% per year, reflecting recent historical trends in solar price declines.

Other Cost Data

The REC Pricing Model also relies on the following sources for data on the other costs required to populate the CREST model.

- Financing and operating cost data was obtained from the following sources – (i) CREST model default assumptions, (ii) Elevate Energy's Community Solar model[18] and (iii) NREL: "Emerging Opportunities and Challenges in Financing Solar", May 2016.[19]
- Electricity pricing data was obtained from the utilities' filed tariffs.
- The federal Investment Tax Credit ("ITC") was extended in 2016 to provide a 30 percent tax credit that would ramp down incrementally through 2021 and remain at 10 percent from 2022 forward.

[18] https://www.illinois.gov/sites/ipa/Documents/Elevate-Energy-L-RRPP-Request-Comments-20170714-Updated.pdf.

[19] https://www.nrel.gov/docs/fy16osti/65638.pdf.

- NREL provides estimates of the cost of renewable distributed generation including PV broken out into three size groupings: <10 kW, 10-100 kW, and 100-1000 kW.[20] These costs, which were updated in February 2016, include installed costs as well as fixed O&M costs.[21]

REC Price Calculation

Base Model[22]

As noted before, the REC Pricing Model adapts and modifies the NREL CREST model for the purposes of calculating REC prices for this Plan. The CREST model is an economic cash flow model that estimates the cost of energy in terms of ¢/kWh associated with specific input assumptions regarding technology type, location, system capital and operating costs, expected production, project useful life, and various project financing variables. The base model was run with modifications made to certain input assumptions to reflect current publicly available data. Modified assumptions are annotated with a source document and highlighted in yellow in the accompanying REC Pricing Model Excel spreadsheets (see Appendix E). As noted earlier, the approach for REC pricing is based on calculating a base price for the most economic block size (500 - 2,000 kW), and then determining the prices of the other project sizes through adders. The base REC price is based on the costs for a 2,000 kW project and is the price for the first Adjustable Block Program block. The REC price declines by 4% for each successive block after Block 1, as it is anticipated that necessary incentives will decline with the declining cost of solar. The 4% is based on the average drop in solar installation costs as estimated in the NREL Q1 2016 Benchmarking Report.[23] The blocks and prices have been structured with the goal of meeting the procurement targets by the end of the delivery year 2020.

The base model provides results under two scenarios. For systems over 10 kW to 2,000 kW, the model includes an assumption that the system is non-residential and takes the Smart Inverter Rebate and thus, under state law, does not receive net metering distribution credits.[24] For systems up to 10 kW, the model assumes the system is residential and thus does not receive the Smart Inverter Rebate, instead receiving net metering distribution credits.

The Smart Inverter Rebate of $250 per kW, as discussed in Section 6.8.2 of the draft Plan, accounts for a credit of $500,000 for the 2,000 kW system. (It is assumed that if the project is over 10 kW, it elects to take the rebate under Section 16-107.6(c)(1) of the Public Utilities Act.) The $500,000 credit was deducted from the capital costs prior to running the CREST model. This credit was allocated proportionally across the four NREL cost

[20] https://www.nrel.gov/analysis/tech_lcoe_re_cost_est.html.

[21] Ibid.

[22] Presented in Appendix E-1 - Adjustable Block Program Distributed Generation Pricing Model.

[23] http://www.nrel.gov/docs/fy16osti/66532.pdf.

[24] See 220 ILCS 5/16-107.6(c)(1), (3).

categories (Generation Equipment, Balance of Plant, Interconnection, Development Costs and Fee) based on the each category's share of total capital costs.

The raw LCOE output calculated by the modified version of the CREST model for the 2,000 kW system size is not the final base REC price. The expected net metering revenues by utility must therefore be subtracted from the LCOE to get the net LCOE which is equivalent to the final base REC price. There are four categories that may fall under the net metering tariff that are assumed credits to ABP participants, including the energy, capacity, transmission, and distribution credits.[25] For base model pricing bins, it is assumed that eligible customers will receive the net metering tariff including, as applicable by customer type, the credits for the energy, capacity, transmission, and distribution charges, as specified by each utility for the corresponding customer class.

The energy credit for each utility was calculated as a weighted average of retail purchased electricity charges ($/kWh) for the four summer and eight non-summer months for the 2017-2018 delivery year; further years are extrapolated from the 2017-2018 delivery year price assuming a 2% annual inflation rate. The capacity credit for Ameren Illinois[26] was based on the weighted average price of capacity (in $/MW-Day, converted to $/kW-Month) procured in the MISO Planning Resource Auction and capacity procured by the Agency in the bilateral procurement for the 2017-2018 delivery year. The weighted average capacity price was converted to $/kWh by applying the 17% capacity factor (See Section 6.14.5) and further adjusted by the estimated peak load contribution ("PLC").[27] For ComEd[28] the capacity credit was based on the 2017-2018 Capacity Charge from the ComEd tariff (in $/kW-Month) which was converted to $/kWh by applying the 17% capacity factor and adjusted by the PLC. For Ameren Illinois, the transmission credit was calculated by converting the transmission charge as provided in the utility tariff in $/kW-day to a $/kW-Month value, which was further adjusted by the PLC and capacity factor as described above to arrive at a $/kWh value. For ComEd, the transmission credit from the tariff was simply converted from a ¢/kWh value to a $/kWh value.

For systems up to 10 kW, the distribution credit for the Ameren Illinois residential class was calculated by taking the weighted average distribution charge in $/kWh of four months of summer and eight months of non-summer tariff rates,[29] while the residential class ComEd customer distribution credits were calculated by multiplying the distribution charge by the Incremental Distribution Uncollectible Cost Factor ("IDUF") for the

[25] It is assumed that a residential customer with a solar system will receive full retail net metering with all four of these credits. 220 ILCS 5/16-107.5(d), (d-5). A non-residential customer that elected the $250/kW rebate under Section 16-107.6(c)(1) of the Public Utilities Act would no longer be eligible to receive the distribution service rate portion of the net metering credit. 220 ILCS 5/16-107.6(c)(3).

The community renewable net metering tariff for ComEd approved by the Commission on September 27, 2017 includes credits for only the energy supply rate (which includes capacity), but not transmission or distribution rates. Ameren Illinois' net metering tariff approved by the Commission on the same date credits community renewable net generation at the Avoided Cost.

[26] As described in Chapter 6, Ameren Illinois represents Group A, which also includes Mt. Carmel and Rural Electric Cooperatives.

[27] The PLC represents an estimate of the project's contribution to the respective utility's peak load. The estimate is based on NREL's PV Watts model and is shown in the "PLC Estimate" worksheet in the REC Pricing Model.

[28] As described in Chapter 6, ComEd represents Group B, which also includes Mid-American and Municipal Utilities.

[29] Ameren Illinois' volumetric distribution charges differ in summer vs. non-summer.

appropriate customer class. Table D-6 shows the 15-year levelized net metering credits for residential and non-residential customer classes for both Ameren Illinois and ComEd.

Table D-6 - 15 year Levelized Net Metering Credit ($/MWh)[30]

Customer Class	Ameren Illinois	ComEd
Non-Residential	$80.94	$92.27
Residential	$98.53	$108.15

The modified CREST model, including the Smart Inverter Rebate as described above, was run to calculate the LCOE for the 2,000 kW system size in order to set the base REC price to which adders are applied. For the up to 10 kW category, the model did not include the Smart Inverter Rebate, as residential systems are not currently eligible for that rebate under Section 16-107.6(c)(1) of the PUA, but did include net metering distribution credits.

Ameren Illinois and ComEd REC prices are not equal to the LCOE output from the model as the REC price is set by subtracting any net metering credits, which differ by utility, from the LCOE to arrive at the final base REC price as shown below.

> Base REC Price ($/REC)[31] = LCOE for 2,000 kW ($/MWh) – Utility Net Metering Credits ($/MWh)

After calculating the base REC price, base adders were calculated for the other bins, i.e., (i) up to 10 kW, (ii) greater than 10 to 100 kW, (iii) greater than 100 to 200 kW, and (iv) greater than 200 to 500 kW, based on a midpoint approach using the IPA's modified CREST model output for the bin size bookends. The base adders were calculated using the net LCOE output from the modified CREST model for each of the system sizes that bookend a pricing bin presented in Table D-7. The net LCOE for each system size is calculated by subtracting the relevant net metering credits for the system size from the modeled LCOE output for that system size. To calculate the adder for each size-based bin, the midpoint between the net LCOE for the two bookend system sizes was calculated. The adder for each pricing bin is on top of the base REC price. Each adder is the sum of (i) the incremental calculated midpoint of the bin, and (ii) the adder of the next-larger-sized pricing bin. Adders differ by utility because the net metering tariffs differ between the two largest utilities. The resulting adder for each utility and pricing bin is shown in Table D-8. By way of example, the 100 to 200 kW adder was calculated as shown below.

> [greater than 100 to 200 kW Adder] = ([100 kW net LCOE] – [average of 100 & 200 kW net LCOE]) + [greater than 200 to 500 kW Adder]

The smallest system size incorporates any system up to 10 kW, warranting a different approach to the midpoint approach used for the other base adders. The adder for the up to 10 kW size is the difference between the net LCOE for a 10 kW system and the net LCOE for

[30] References to "Ameren Illinois" and "ComEd" in this Table D-6, as well as subsequent tables in this Appendix D, denote "Group A" and "Group B" described in Chapter 6 of the Plan.

[31] One REC is equal to one megawatt-hour ("MWh") of electricity generated such that $/REC are equivalent to $/MWh.

the midpoint of the greater than 10 to 100 kW pricing bin, plus the 10 to 100 kW pricing bin adder.

Table D-7 - Modified CREST Model Results[32]

Block Adder	Ameren Illinois Net LCOE ($/MWh)	ComEd Net LCOE ($/MWh)
10 kW	$90.97	$81.35
100 kW	$47.56	$36.23
200 kW	$37.56	$26.23
500 kW	$32.56	$21.23
2000 kW	$31.56	$20.23

Table D-8 shows both the Base Adder for each utility and Table D-9 shows the base ABP REC price for each utility and pricing bin. For example, the 100 to 200 kW bin REC price is calculated by adding that bin's adder ($7.50) to the base REC price of $20.23 for ComEd or $31.56 for Ameren Illinois.

Table D-8 - Base Adders for Each Utility[33]

Bin	Ameren Illinois Adder ($/REC)	ComEd Adder ($/REC)
<= 10 kW	$50.91	$52.63
> 10 to 100 kW	$29.21	$30.06
> 100 to 200 kW	$7.50	$7.50
> 200 to 500 kW	$2.50	$2.50
> 500 to 2,000 kW	$0.00	$0.00

Table D-9 - Base ABP REC Prices

Bin	Ameren Illinois REC Price ($/REC)	ComEd REC Price ($/REC)
<= 10 kW	$82.47	$72.85
> 10 to 100 kW	$60.76	$50.29
> 100 to 200 kW	$39.06	$27.73
> 200 to 500 kW	$34.06	$22.73
> 500 to 2,000 kW	$31.56	$20.23

[32] The results in this table are the LCOE output from the CREST model prior to subtracting the net metering credits shown in Table B7 from the LCOE.

[33] Base adders for pricing bins including the 10 kW system size (i.e. the two smallest pricing bins) are unequal across the two utilities because the change from non-residential to residential differs across the two net metering tariffs.

Community Solar Model[34]

As noted above, community solar projects receive at least one and possibly two adders: (i) the base community solar adder ("Community Solar Base Adder") that is applied to the REC price for each Adjustable Block Program group in addition to the base adders shown in Table D-8, and, (ii) an adder to incentivize residential participation. Projects that meet or exceed a 50% or 75% requirement for residential participation will receive the additional adder ("the Residential Participation Adder").

The calculation of the Community Solar Base Adder is based on changing the assumptions to the net metering credit for each utility. For ComEd, as approved by the Commission on September 27, 2017 in Docket No. 17-0350, the energy supply credit does not include transmission or distribution charges. For Ameren Illinois, as approved by the Commission on September 27, 2017 in tariff no. ERM 17-144, the net metering compensation rate for community renewable generation is at Ameren's Avoided Cost rate as specified in its Rider QF. The Avoided Cost credit does not include transmission or distribution charges. In addition, the Community Solar Base Adder also accounts for the added costs of subscriber acquisition and management based upon the Elevate Energy analysis described below; for non-residential systems, that amount is $4.98/REC.

REC prices for community solar eligible customers for each utility were calculated by adding the Community Solar Base Adder, which includes the $4.98 per REC for administrative costs, for the utility to each pricing bin on top of the Base Adders in Table D-8. By way of example, the community solar price for the greater than 100 to 200 kW is the sum of the base REC price, the corresponding pricing bin Base Adder, and the utility Community Solar Base Adder. The resulting community solar REC prices along with the base REC prices and utility Community Solar Base Adders are shown in Table D-10 below.

Table D-10 –Community Solar REC Prices

Bin	Ameren Illinois REC Price ($/REC)	ComEd REC Price ($/REC)
<= 10 kW	$121.46	$95.72
> 10 to 100 kW	$99.75	$73.16
> 100 to 200 kW	$78.05	$50.59
> 200 to 500 kW	$73.05	$45.59
> 500 to 2,000 kW	$70.55	$43.09
Base REC Price	$31.56	$20.23
Community Solar Base Adder	$38.99	$22.86

[34] Presented in Appendix E-2 - Adjustable Block Program Community Solar Pricing Model.

In order to determine the added costs of subscriber acquisition and management as well as the value for the Residential Participation Adder, the REC Pricing Model relies on modelling data provided by Elevate Energy.[35] Elevate Energy modelled a 1,000 kW system and determined the system's 25-year administration and customer acquisition costs for 100% commercial participation (i.e., 0% residential participation), and 100% residential participation. *First*, to determine the added costs of subscriber acquisition and management, the 25-year administration and customer acquisition costs for 100% commercial were divided by the project's 25-year generated energy which was determined by taking into account the assumed capacity factor (13.1%)[36] and a degradation of 0.5%, resulting in a 25-year effective capacity factor of 12.34%. The resulting amount, as mentioned above, is $4.98/REC. *Second*, to determine the adder for residential participation, the 25-year incremental cost for 100% residential participation was determined by calculating the difference between the cost for 100% commercial participation and 100% residential participation. Based on the 100% incremental residential participation cost and the project's 25-year generated energy, the adder for 100% residential participation was calculated by dividing the incremental cost by the generated energy. Finally, the 50% and 75% residential participation adders were calculated through extrapolation. Based on this extrapolation, the 50% Residential Adder is $7.89/REC and the 75% Residential Adder is $11.83.

Illinois Solar for All Models[37]

There are three groups under Illinois Solar for All that will receive incentives as described in Chapter 8 of the Plan: Low-Income Distributed Generation Initiative, Low-Income Community Solar Project Initiative, and Incentives for Non-Profits and Public Facilities. There are two approaches used for setting REC prices for Illinois Solar for All groups. The first method applies to the Low-Income Distributed Generation Initiative, and the second method applies to both the Low-Income Community Solar Project Initiative and the Incentives for Non-Profits and Public Facilities. The incentive for Illinois Solar for All builds on the model used for the Adjustable Block Program.

Section 1-56(b)(2) of the Act requires that the Illinois Solar For All incentives deliver tangible economic benefits for eligible low-income customers. The incentive payments for the low-income customers are intended to be sufficient to provide tangible economic benefits to participants through enabling project developers to eliminate upfront costs to the participants for the installation of photovoltaic projects. The incentive will be a standard incentive and not customized for each project.

The CREST model was used to determine the LCOE for low-income customers by setting the debt financing parameter to zero percent, assuming they would have difficulty

[35] See https://www.illinois.gov/sites/ipa/Documents/Elevate-Energy-L-RRPP-Request-Comments-20170714-Updated.pdf (Page 14).

[36] A 13.1 % capacity factor is used here to be consistent with the other input assumptions used by Elevate Energy in determining the costs for the 100% residential and commercial participation. As reported elsewhere, the capacity factor that the Agency generally uses is 17%.

[37] Presented in Appendices E-3 - Illinois Solar for All Distributed Generation Incentive Pricing Model, E-4: Illinois Solar for All Community Solar Pricing Model, and E-5: Illinois Solar for All Non-profit and Public Facility Pricing Model.

accessing credit markets. The difference between (i) the LCOE for the most economic bin (greater than 500 to 2,000 kW) under the base model assuming 45 percent debt financing, and (ii) the LCOE for that pricing bin assuming zero-percent debt financing, provides the Adder of $44 per REC for the low-income customers. Table D-11 provides the bundled REC prices for the low-income customers based on the ABP prices for each pricing bin and the low-income adder for this group.

Table D-11 – REC Prices for Low-Income Distributed Generation Initiative

Bin	Ameren Illinois REC Price ($/REC)	ComEd REC Price ($/REC)
<= 10 kW	$126.47	$116.85
> 10 to 100 kW	$104.76	$94.29
> 100 to 200 kW	$83.06	$71.73
> 200 to 500 kW	$78.06	$66.73
> 500 to 2,000 kW	$75.56	$64.23

As described in Chapter 8 of the Plan, the Low-Income Community Solar Project Initiative is intended to support participation in community solar by low-income subscribers. Section 1-56(b)(2)(C) of the Act also specifies that "non-profits and public facilities" will be eligible to receive incentives for on-site photovoltaic generation. These incentives are designed to "support on-site photovoltaic distributed renewable energy generation devices to serve the load associated with not-for-profit customers and to support photovoltaic distributed renewable energy generation that uses photovoltaic technology to serve the load associated with public sector customers taking service at public buildings."[38] For Low-Income Community Solar Project Initiative and the Incentives for Non-Profits and Public Facilities participants, a different approach was used than the zero percent debt financing used for the Low-Income Distributed Generation Initiative. While the base REC price was calculated using the assumption of a 15-year payback period, the REC prices for these two groups were calculated using a shortened, 10-year payback period. The resulting difference between the LCOE from the modified CREST model for a 10-year payback and a 15-year payback period is the Adder of $27 per REC used for Low-Income Community Solar and an Adder of $22 per REC used for Non-Profit and Public Facilities.

REC prices for participants of Low-Income Community Solar Project Initiative and Incentives for Non-Profits and Public Utilities are shown in Table D-12 and Table D-13, respectively. Low-Income Community Solar values in Table D-12 build upon the base community solar REC prices in Table D-10 while Incentives for Non-Profits and Public Facilities values in Table D-13 build upon the base ABP REC prices in Table D-9.

[38] 20 ILCS 3855/1-56(b)(2)(C).

Table D-12 – Low-Income Community Solar Project Initiative REC Prices

Bin	Ameren Illinois REC Price ($/REC)	ComEd REC Price ($/REC)
<= 10 kW	$148.46	$122.72
> 10 to 100 kW	$126.75	$100.16
> 100 to 200 kW	$105.05	$77.59
> 200 to 500 kW	$100.05	$72.59
> 500 to 2,000 kW	$97.55	$70.09

Table D-13 – Incentives for Non-Profits and Public Facilities REC Prices

Bin	Ameren Illinois REC Price ($/REC)	ComEd REC Price ($/REC)
<= 10 kW	$104.47	$94.85
> 10 to 100 kW	$82.76	$72.29
> 100 to 200 kW	$61.06	$49.73
> 200 to 500 kW	$56.06	$44.73
> 500 to 2,000 kW	$53.56	$42.23