

**STATE OF ILLINOIS
ILLINOIS COMMERCE COMMISSION**

THE CITIZENS UTILITY BOARD)
and)
THE ENVIRONMENTAL DEFENSE FUND) **Docket No. 15-____**
)
Proceeding for Approval of a Tariff Implementing)
A Community Solar Pilot Program)

**DIRECT TESTIMONY OF ANDREW BARBEAU
ON BEHALF OF THE CITIZENS UTILITY BOARD AND
THE ENVIRONMENTAL DEFENSE FUND**

CUB/EDF Exhibit 1.0

February 27, 2015

1 **I. Introduction and Qualifications**

2 **Q. Please state your name and business address.**

3 A. My name is Andrew Barbeau, and my business address is 18 S. Michigan Avenue, 12th Floor,
4 Chicago, IL 60603.

5 **Q. By whom are you employed and in what capacity?**

6 A. I am retained by the Environmental Defense Fund (“EDF”) as a consultant. EDF is a non-
7 profit organization whose mission is to preserve the natural systems on which all life
8 depends. Guided by science and economics, EDF strives to find practical and lasting
9 solutions to the most serious environmental problems. I act as an EDF representative in
10 Illinois and work with Illinois stakeholders such as the Citizens Utility Board (“CUB”) to set
11 specific performance criteria for smart grid deployment and develop regulatory reforms
12 and new electric sector business models to create market opportunities for entrepreneurs
13 with innovative energy technologies and services.

14 Since 2012, I have been working with CUB and EDF on how best to maximize the
15 consumer and environmental benefits from the deployment of new energy infrastructure, in
16 this instance the investments that Commonwealth Edison Company (“ComEd” or “the
17 Company”) described in its proposed Smart Grid Advanced Metering Infrastructure
18 Deployment Plan (“AMI Plan”), filed on April 23, 2012 with the Illinois Commerce
19 Commission (“ICC” or “the Commission”). In particular, I have been working with parties on
20 how best to capitalize on ratepayers’ investment in advanced metering infrastructure
21 (“AMI”) deployment to design and promote new opportunities in energy efficiency and
22 demand response.

23 **Q. Please describe your education and relevant work experience.**

24 A. I have Master’s and Bachelor’s degrees from Loyola University Chicago. I have been
25 President of The Accelerate Group, LLC for two years, serving as a consultant to non-profit
26 organizations and entities looking to advance innovative energy projects. I previously
27 served as Managing Director of the Robert W. Galvin Center for Electricity Innovation at
28 Illinois Institute of Technology.

29 **Q. In what capacity are you testifying in this proceeding?**

30 A. I am testifying as a witness for CUB and EDF.

31 **Q. What is the purpose of your testimony?**

32 A. I recommend that the Commission direct ComEd to implement a community solar program
33 by utilizing virtual net metering.

34

35 **II. What is Net Metering and How Has It Been Implemented?**

36 **Q. What is traditional net metering?**

37 A. Traditional net metering allows customers of ComEd and the Ameren Illinois Company
38 (“Ameren”) to generate their own electricity in order to offset their electricity usage.
39 Common examples of net metering installations include solar panels on a home or a wind
40 turbine at a school. These installations are connected to a meter, which measures the net
41 quantity of electricity that the customer uses. The meter spins forward when the customer
42 uses electricity from the utility, and it spins backward when the customer generates excess
43 electricity (thereby “exporting” electricity to the electric grid).

44 Typically, and as is the case in Illinois, a net metering customer is billed for the
45 amount of energy she consumes minus the amount of energy she exports to the grid. In
46 other words, she is billed for her “net” energy usage. For traditional net metering, a special
47 retail meter is required to allow for the netting of usage and generation.

48 **Q. What are the benefits of net metering?**

49 A. Net metering has many benefits for participating retail customers and the grid as a whole.
50 First, net metering leads to lower electric bills for customers and allows them to reap the
51 benefits of their renewable energy and/or distributed generation (“DG”) projects. Second,
52 participating customers are able to provide electric power to the grid in order to reduce the
53 need for new large central generating stations that can be cost prohibitive. Third, by
54 encouraging generation near the point of consumption, net metering also reduces the strain
55 on distribution systems—reducing system maintenance and repair—as well as preventing
56 line losses in long-distance electricity transmission and distribution. These reductions are
57 especially beneficial during periods of peak consumption when the electric grid is
58 constrained and energy prices and line losses spike for all customers.

59 Net metering, moreover, encourages consumers to play an active role in energy
60 production and management, which, in the case of renewable energy, reduces greenhouse
61 gas emissions. Homeowners that use net metering tend to be more aware of, and therefore
62 more conscientious about, their energy consumption. This awareness provides lasting
63 benefits to all consumers since reducing energy consumption lowers costs for all
64 consumers.

65 **Q. How has traditional net metering been implemented in Illinois?**

66 A. When the General Assembly created Illinois’ net metering programs, its stated goal was
67 “[to] stimulate economic growth, enhance the continued diversification of Illinois’ energy
68 resource mix, and protect the Illinois environment.”¹

69 According to the enabling statute in Illinois, eligible net metering electric generation
70 facilities are limited to a rated capacity of 2,000 kW and can be powered by:

¹ 220 ILCS 5/16-107.5(a)

- 71 • Solar energy (photovoltaic, or “PV”);
- 72 • Wind;
- 73 • Dedicated crops grown for electricity generation;
- 74 • Anaerobic digestion of livestock or food-processing waste;
- 75 • Fuel cells or microturbines powered by renewable fuels;
- 76 • Hydroelectric energy.²

77 To date, the uptake of net metering among retail customers in Illinois remains promising
78 but relatively modest:

	<i>ComEd</i> ³	<i>Ameren</i> ⁴
Number of Net Metering Customers (2014)	308	389
% Change in Net Metering Customers Since 2013	-10%	+6.6%
Capacity of Net Metering Customers (2014)	3.03 MW	2.30 MW
% Change in Net Metering Capacity Since 2013	+3.6%	+12.8%

79

80 **Q. What is inhibiting more widespread adoption of net metering in Illinois?**

81 A. Utilities currently only provide traditional net metering to customers when the eligible
82 generating facility is located on the customer’s premises. Unnecessarily restricting net
83 metering to on-site generation facilities fails to account for many barriers that interested
84 customers face when considering investing in qualifying net metering projects including:

- 85 • Poor project siting. Property owners sometimes lack the space necessary to install
86 net metering projects on a cost-effective scale. Similarly, for on-site solar
87 photovoltaic (“PV”) systems, residents’ roofs may not be south-facing or southwest-
88 facing (ideal for fully capturing the benefit of PV systems) and/or may be partially
89 or fully shaded.
- 90 • Renters have no land/rooftop ownership. Renters do not own the property and are
91 therefore unable to install distributed generation themselves.
- 92 • Relocation disincentive. People who may relocate to a different residence are
93 disincentivized from installing net metering systems on their property, which may
94 take 10 to 20 years to realize the full monetary benefits of their investment.

² 220 ILCS 5/16-107.5(b)

³ Annual Net Metering Reports for Commonwealth Edison (2013, 2014) as required under the Illinois Public Utilities Act, 16-107.5(k).

⁴ Annual Net Metering Reports for Ameren Illinois (2013, 2014) as required under the Illinois Public Utilities Act, 16-107.5(k).

- 95 • Upfront and ongoing capital expenses. Many net metering installations require
96 upfront capital investment that may be prohibitive for residents who would
97 otherwise support the project, particularly low-income residents.

98 Combined, these barriers can greatly inhibit the ability of willing residents to
99 participate in net metering programs. For example, a 2008 study by the National
100 Renewable Energy Laboratory (“NREL”) found that only 22 to 27% of residential rooftop
101 area is suitable for hosting an on-site PV system after adjusting for structural, shading, or
102 ownership issues.⁵ These effects are even more prominent in densely populated urban area
103 such as ComEd’s service territory, where viable project siting is limited and a
104 disproportionate amount of customers are renting tenants rather than homeowners. Over
105 half (55%) of occupied housing units in the City of Chicago are occupied by renters.⁶

106

107 **III. Why Does Illinois Need Virtual Net Metering?**

108 **Q. What is virtual net metering?**

109 A. In contrast with traditional net metering projects in Illinois – which require generation of
110 electricity to occur on the same site where it is consumed in order to offset customers’
111 electricity usage – virtual net metering allows customers to receive net metering credits
112 from projects that generate electricity in a location other than where it is consumed.

113 **Q. What are the added benefits of virtual net metering?**

114 A. Virtual net metering allows for many additional benefits over traditional net metering
115 including:

- 116 • Choosing the most productive sites: Virtual net metering allows installers, investors,
117 and customers to choose the best possible site for a renewable energy system. Rather
118 than being constrained to construction on less-than-adequate roofs or in geographic

⁵ National Renewable Energy Laboratory (NREL), *Supply Curves for Rooftop Solar PV-Generated Electricity for the United States* (November 2008); p. 4.

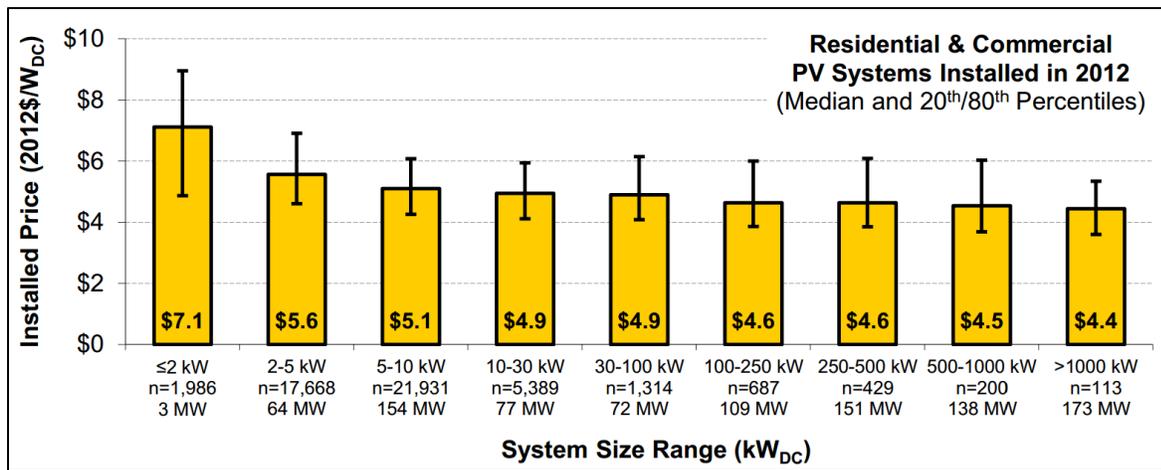
⁶ U.S. Census Bureau; Census 2010, Profile of General Population and Housing Characteristics, Table DP-1; using American FactFinder; <<http://factfinder2.census.gov>>; (4 December, 2014)

- 119 spaces too small or too shaded for the most cost-effective distributed generation
120 projects, virtual net metering allows for ideal siting, making for a lower system cost and
121 reduced investment. Virtual net metering also allows for greater flexibility when
122 considering local planning, zoning, or historical requirements.
- 123 • Innovative project finance: Virtual net metering policies facilitate community renewable
124 energy projects and third-party ownership models, expanding opportunities for
125 customer participation.
 - 126 • Greater customer participation: Virtual net metering helps enable non-homeowners to
127 invest in energy projects and can even facilitate the participation of affordable housing
128 tenants. For example, California’s successful Multifamily Affordable Solar Housing
129 (“MASH”) Program was designed in 2008 for low-income affordable housing as a means
130 to encourage participation and lower electric bills. Currently, MASH has led to 20.5 MW
131 of solar capacity interconnected across 323 projects in California that serve 6,371
132 affordable housing tenant units with net metering.⁷ The California Public Utility
133 Commission has since expanded MASH and used the program as a model for statewide
134 virtual net metering policies.
 - 135 • Ease of relocation: Because virtual net metering often attaches net metering credits to a
136 customer utility bill instead of the on-site meter, a customer who has invested in an off-
137 site generation project but decides to relocate can simply request that the net metering
138 be transferred to her new location. This transferability helps assuage concerns some
139 customers may have about long-term payback periods required of some net metering
140 projects.
 - 141 • Ease of utility interconnection: Virtual net metering can streamline the interconnection
142 application and review process for utilities and customers alike by reducing the number
143 of applications. For example, in the case of community solar projects, virtual net
144 metering simplifies the interconnection process, which often can be prohibitively slow
145 and expensive, by requiring a smaller number of interconnection applications than
146 would be required if each resident installed solar panels on his/her home. Presently,
147 ComEd has minimal staffing for its interconnection process, and will likely claim a need
148 for higher operational expenditures to process thousands of independent
149 interconnection applications.
 - 150 • Reduces peak load and maximizes benefits of innovative retail electricity pricing: Virtual
151 net metering—particularly solar projects—allows customers to take advantage of
152 dynamic retail rates (such as the utilities’ real-time pricing programs and similar rates
153 enhanced with Smart Meter technology such as time-of-use) during warm summer
154 months when electricity prices are at their highest. Because these times often coincide
155 with maximum solar electricity production, customers who have barriers to installing
156 on-site PV systems would be able to take advantage of this benefit under virtual net
157 metering. Likewise, the potential of virtual net metering to reduce peak load has
158 potential system-wide benefits for all Illinois ratepayers and puts less strain on the
159 utilities’ distribution systems.

⁷ California Public Utility Commission (CPUC), *Multifamily Affordable Solar Housing (MASH) Semiannual Progress Report* (June 30, 2014); pp 11-18.

- 160 • Achieving economies of scale: Virtual net metering allows for economies of scale in
 161 larger project development and also minimizes costs associated with house alterations
 162 and project maintenance. For example, according to a 2013 study conducted by the
 163 Lawrence Berkeley National Laboratory (“LBNL”), the installed cost of solar drops over
 164 30% on average when moving from a 2kW system to a 10kW system, and almost 40%
 165 on average when moving from a 2kW system to a 1 MW system (Figure 1). In addition
 166 to driving down installation and maintenance costs, economies of scale also may allow
 167 investors and developers to target construction on flat ground in brownfield or
 168 greenfield sites, as opposed to rooftops, considerably bringing down a project’s
 169 equipment requirements and resulting costs. .

170 **Figure 1: Installed Price of Residential and Commercial PV According to System Size⁸**



171

172 **Q. Are there other areas where virtual net metering has been adopted?**

173 A. Yes. Virtual net metering has been successfully implemented in various forms throughout
 174 the country including in Connecticut, Maine, New Hampshire, Massachusetts, California,
 175 Colorado, and Vermont.

176 **Q. What has been the result in those areas?**

177 A. While many of these virtual net metering policies are still in their early stages of
 178 implementation, their adoption has greatly expanded customer participation in community
 179 solar projects. For example, California’s successful Multifamily Affordable Solar Housing
 180 (“MASH”) Program was the state’s first attempt at a virtual net metering system, and the

⁸ Lawrence Berkeley National Laboratory, *Tracking the Sun VI: The Installed Price of Photovoltaics in the United States from 1998 to 2012* (2013); p 23.

181 program has led to 20.5 MW of solar capacity interconnected across 323 projects in
182 California that serve 6,371 affordable housing tenant units with net metering.⁹ California
183 Public Utility Commission has since expanded MASH and used the program as a model for
184 the statewide virtual net metering policies, which saw nearly 1MW of installed virtual net
185 metering capacity only months after the rules took effect.¹⁰

186

187 **IV. Why Should Illinois Adopt Virtual Net Metering to Promote Community Solar**
188 **Projects?**

189 **Q. Why is CUB/EDF proposing a virtual net metering tariff?**

190 A. CUB/EDF recognizes the need for updating Illinois' net metering policies to comport with
191 emerging best practices and modern technologies and utility billing capabilities. Updating
192 these policies is especially important given that Illinois is likely to experience an
193 increasingly faster pace of renewable energy and DG market growth in the near future due
194 to the following national and local long-term trends:

- 195
- 196 • The specific carve-outs for solar energy development and distributed generation in
197 Illinois' Renewable Energy Portfolio Standard ("RPS") call for substantial new
distributed solar development.¹¹
 - 198 • The 2015 Illinois Power Agency ("IPA") Procurement Plan (issued on August 15,
199 2014) includes plans for substantial DG procurement in 2015.¹²
 - 200 • Illinois legislation allocates \$30 million for solar procurement; much of this likely to
201 be distributed solar.¹³
 - 202 • The ongoing roll-out of Advanced Metering Infrastructure ("AMI") and Smart Meters
203 in Illinois greatly facilitate DG development and net metering evaluation,

⁹ California Public Utility Commission (CPUC), *Multifamily Affordable Solar Housing (MASH) Semiannual Progress Report* (June 30, 2014); pp 11-18.

¹⁰ California Public Utilities Commission (CPUC), *California Solar Initiative Annual Program Assessment* (June 2013); p 32.

¹¹ See 20 ILCS § 3855/1-75.

¹² See IPA 2015 Draft Procurement Plan at 90-109, ICC Docket No. 14-0588..

¹³ See Public Act 98-0672, adopting Section 1-56(i) of the Illinois Power Agency Act; Final Order, *In Re Illinois Power Agency*, ICC Docket No. 14-0651 (Jan. 21, 2015).

204 measurement, and verification. Under the accelerated timeline approved by the ICC
205 last summer, ComEd was scheduled to invest over \$200 mm in 2014 on Smart Meter
206 installation alone.

- 207 • The Environmental Protection Agency’s 111(d) Proposed Rule (also known as the
208 “Clean Power Plan”) implementation will also likely drive more renewable
209 development across the state.
- 210 • Costs for distributed generation—especially wind and solar—continue to fall in
211 Illinois and across Midwest.¹⁴

212 Given these established policies and trends that will affect the state’s renewable
213 energy and other DG resources in the near- and long-term, it is important to update Illinois’
214 net metering policies to reflect modern utility billing capabilities and emerging best
215 practices. Doing so will allow all customers to fully participate and benefit from such
216 investments.

217 **Q. What are you proposing?**

218 A. CUB/EDF is proposing a Virtual Net Metering Rider to be included with ComEd’s Schedule
219 of Electric Service Rates, Riders, and Terms and Conditions. The proposed Rider is based on
220 ComEd’s traditional net metering Rider Parallel Operation of Retail Customer Generating
221 Facilities with Net Metering (“Rider POGNM”). Using the framework of Rider POGNM, the
222 proposed Rider Parallel Operation of Community Generating Facilities with Virtual Net
223 Metering (“Rider POGVNM”) sets clear, minimum standards for virtual net metering for
224 eligible ComEd customers by adapting national best practices to the environment specific to
225 Illinois. This tariff would be designed to facilitate community solar projects, and would be a
226 pilot project designed to evaluate how well ComEd’s billing systems and business processes
227 could be arranged to facilitate community solar projects.

228 **Q. What is a community solar project?**

¹⁴ See <http://www.seia.org/research-resources/solar-market-insight-report-2014-q1>.

229 A. It is a project that involves a solar array, just as in traditional net metering, but with the
230 additional opportunity for customers who are not located on the same premise as the array
231 to share in the net metering credits from that resource.

232 **Q. How does virtual net metering relate to community solar?**

233 A. It creates a means for those customers to take advantage of a shared resource. The
234 proposed Rider POGVNM establishes a framework in which a single Host Customer
235 develops and owns a renewable or DG electric generating facility (termed the “Virtual Net
236 Metering Project” in Rider POGVNM) that produces net metering credits. The Host
237 Customer is then allowed to share net metering credits with a group of designated
238 Subscribing Customers as long as the Subscribing Customers’ premises are connected
239 within five miles of the resource or to the same substation as the community solar project.
240 The Host Customer is responsible for enrolling Subscribing Customers and informing
241 ComEd how to allocate net metering credits produced by the Virtual Net Metering Project
242 among its Subscribing Customers. The Host Customer should express this allocation by
243 listing the percentage of net kilowatt-hours produced by the Virtual Net Metering Project
244 that each associated customer’s account should receive. Such a percentage allocation
245 should add up to 100%. Rider POGVNM allows for the Host Customer to share in the virtual
246 net metering credits if it so chooses.

247 **Q. What’s the biggest difference between this and traditional net metering?**

248 A. The biggest difference between ComEd’s traditional net metering rider (“Rider POGNM”)
249 and the proposed Rider POGVNM is that the traditional net metering rider requires eligible
250 electric generating facilities to be located on the retail customer’s premises. In contrast,
251 Rider POGVNM allows customers to participate in the benefits of net metering even if the
252 electric generating facility is located off-site. Similarly, traditional net metering only

253 provides net metering credits to the individual customer who owns and maintains the
254 electric generating facility on her premises; the proposed Rider POGVNM allows virtual net
255 metering credits to be shared among a group of people. This allocation of net metering
256 credits is predetermined and expressed by listing the percentage of net kWhs produced by
257 the Virtual Net Metering Project that each associated customer's account should receive.
258 Such a percentage allocation should add up to 100%.

259 **Q. What kind of project do you envision being eligible for this pilot?**

260 A. I expect numerous community solar projects being eligible for the pilot, including the
261 following hypothetical examples:

- 262 • A 2 MW solar array located on a landfill site that wants to serve subscribers located
263 in the City of Chicago.
- 264 • A 1 MW solar array in a rural town developed as part of a community energy
265 strategy.
- 266 • Several 100 kW rooftop solar projects located on schools, recruiting subscribers
267 from the school community.
- 268 • A 500 kW – 1 MW solar array designed to be a part of a microgrid serving critical
269 facilities.
- 270 • A 1.5 MW solar array distributed across a civic institution campus, serving several
271 institutional subscribers, as well as downtown Chicago residents.
- 272 • A 500 kW solar array on a brownfield site, serving nearby small commercial and
273 residential customers in a low-income community.

274 **Q. Can you provide an example of a community solar project and how it would work?**

275 A. Yes. For example, there may be a neighborhood high school which has a roof that is in an
276 ideal location and size for solar panels. The school, which is the Host Customer in this
277 example, may register subscribers from the surrounding neighborhood to help fund the
278 installation of the solar panels and agree to provide net metering credits to those who
279 subscribe. The neighbors who participate are the Subscribing Customers in this example.
280 Once the school collects enough money for the installation, it goes through the standard
281 construction and interconnection processes with the solar developer and ComEd. The

282 school would also submit to ComEd the Virtual Net Metering Application the Host would
283 submit.

284 While a real world Virtual Net Metering Project may have dozens or hundreds of
285 Subscribing Customers, take, for instance, a project with only three Subscribing Customers:
286 Neighbor A, Neighbor B, and Neighbor C. Since Neighbor A provided 60% of the project's
287 funding, the school promises that he will receive 60% of the net metering credits produced
288 by the solar panels. Neighbor B and C each provided 20% of the funding to the project, and
289 receive the remaining portion, or 20% each. Alternatively, the school may develop a solar
290 PV system in order to receive a portion of the net metering credits to offset its energy usage.
291 In this case, the school might receive 20%, Neighbor A receives 48%, and Neighbor B and C
292 receive 16% each. The school would indicate these allocations on the Virtual Net Metering
293 Application and they would begin to appear on the school and/or Neighbors' electric bills.

294 **Q. What about a larger project?**

295 A. For the purposes of illustration, I will use the example of a 500 kW solar array located on a
296 brownfield site. The 500 kW system in this example recruits 250 subscribers that, in order
297 to simplify this example, have equal percentage shares of the project (0.4%). At current
298 installation costs, the host would build the community solar project at a total cost of \$1.35
299 million, or \$2.7/Watt.

- 300 1. The host would enter into financial arrangements with each of the subscribers, who
301 are committing to their share of the project (\$5,400) by providing up-front capital
302 through cash, debt, or some other two-party financial arrangement.
- 303 2. The 500 kW system would have an estimated monthly output of 75,000 kWh.
- 304 3. Each subscriber would get his or her 0.4% share of the monthly output credit
305 against their electric bill. In this case, that would be 300 kWh / month – worth
306 roughly \$30 / month.
- 307 4. If a subscriber were to move to a new address within the geographic boundary, they
308 would notify the Host Customer, who would update the account information with
309 ComEd during the regular update, and continue to be a subscriber at their new
310 address.

311 5. If a subscriber were to cancel their subscription, due to moving out of the
312 geographic area or some other reason, the Host Customer could find a new
313 Subscribing Customer to fill that spot. If, in the interim, there were virtual net
314 metering credits that were not allocated to a Subscribing Customer that stayed
315 unallocated until the end of the annual period, the credits would be applied to the
316 account of the Host Customer. If there were further unused credits, the Host
317 Customer would receive a bill credit in the amount of the unused credits at the
318 Illinois Power Agency default rate for the applicable period in which the credits
319 were earned.

320 In this scenario, a Subscribing Customer would receive a roughly \$30 / month benefit on
321 their bill due to their \$5,400 commitment to a community solar project. Not taking into
322 account rate hikes and increases in the price of electricity, inflation or the cost of debt, the
323 Subscribing Customer would see a simple payback of approximately 15 years.

324 This example illustrates the cost benefit of community solar projects as well. If that
325 Subscribing Customer were to install an equivalent 2 kW solar PV system on his or her
326 residential rooftop, the upfront cost of the system would be closer to \$9,000, or \$4.50/Watt.
327 The simple payback on such a system would be 25 years, similarly not taking into account
328 rate hikes, increases in electricity costs, inflation, or the cost of debt.

329 **Q. Who does this apply to?**

330 A. Rider POGVNM applies to ComEd and its retail customers. CUB/EDF intends for Rider
331 POGVNM to be first piloted among a select group of ComEd customers with the goal of
332 expanding virtual net metering to the entire ComEd territory and throughout the state.

333 **Q. Does this pilot apply to Ameren Illinois Company (“Ameren”)?**

334 A. Not at this time. CUB/EDF believes the ComEd is the ideal electric utility to pilot this project
335 given the size of its customer base (currently serving approximately 70% of the state’s
336 population). I understand that several parties, including the City of Chicago, have expressed
337 interest in developing community solar projects and support the establishing of virtual net
338 metering capabilities, rules, and procedures for ComEd. However, nothing in CUB/EDF’s

339 proposal would bar Ameren from adopting similar virtual net metering policies in the
340 future.

341 **Q. Who can participate?**

342 A. The proposed Rider POGVNM sets the same parameters for participation as ComEd's
343 traditional Rider POGNM with one important distinction—rather than restricting net
344 metering participation to the sole owner of the on-site electric generating facility, Rider
345 POGVNM allows net metering energy credits to be shared among a group of customers
346 whose premises may not be physically connected to the electric generating facility. The
347 proposal requires that customers wishing to share in the net metering credits must reside
348 within five miles of the associated electric generating facility or be connected to the same
349 substation as a community solar resource.

350 Aside from these differences, the proposed Rider POGVNM is consistent with
351 ComEd's traditional Rider POGNM. That is, Rider POGVNM will be available to the following
352 customer's taking service under Basic Electric Service ("Rate BES"), Basic Electric Service
353 Hourly Pricing ("Rate BESH"), and Retail Delivery Service ("Rate RDS") and according to the
354 following customer classifications:

- 355 • VNM1 Classification: Non-hourly pricing residential customers who receive bundled
356 energy supply and distribution services from ComEd.
- 357 • VNM2 Classification: Hourly pricing residential customers who receive bundled
358 energy supply and distribution services from ComEd.
- 359 • VNM3 Classification: Non-hourly pricing residential customers who receive energy
360 supply from a RES and distribution services from ComEd.
- 361 • VNM4 Classification: Hourly pricing residential customers who receive energy
362 supply from a RES and distribution services from ComEd.
- 363 • VNM5 Classification: Non-residential customers who receive bundled energy supply
364 and distribution services from ComEd. Includes customers who are either on hourly
365 pricing or whose ComEd distribution charge is determined on a \$/kW basis.
- 366 • VNM6 Classification: Non-residential customers who receive energy supply from a
367 RES and distribution services from ComEd. Includes customers who are either on
368 hourly pricing or whose distribution charge is determined on a \$/kW basis. It is

369 important to note that both Rider POGNM and the proposed Rider POGVNM identify
370 these customers but do not allow them to receive net metering credits. However,
371 VNM6 customers may act as Host Customers under Rider POGVNM.

372 **Q. Why are you proposing this tariff as a pilot?**

373 A. While virtual net metering is in place in other states, CUB/EDF recognizes that the concept
374 is new in Illinois. CUB/EDF is proposing that Rider POGVNM be implemented as a pilot to
375 allow for ComEd and interested participants to become accustomed to the processes and
376 procedures. Beginning as a pilot also will allow stakeholders to measure the success of the
377 proposal and identify areas of improvement when offering virtual net metering on a larger
378 scale. The pilot will allow the Commission and stakeholders to learn (a) how Hosts can and
379 perhaps likely will allocate credits to their Subscribers, (b) how ComEd's billing systems can
380 and should be arranged to facilitate such arrangements, and (c) what, if any, impact a
381 geographic limitation has on the development of community solar projects.

382 **Q. What is the role of a Host Customer?**

383 A. The Host Customer is the owner of the eligible electric generating facility, officially termed
384 "Virtual Net Metering Project" in the proposal. As the owner of the generating facility, the
385 Host Customer is responsible for development and maintenance of the Virtual Net Metering
386 Project in addition to being responsible for ensuring that the Project complies will all
387 applicable interconnection standards. The Host Customer is the primary point of contact
388 for ComEd with respect to the Virtual Net Metering Project and must submit a Virtual Net
389 Metering Application to ComEd that includes:

- 390 • The Subscribing Customer's name;
- 391 • The Subscribing Customer's address;
- 392 • The Subscribing Customer's billing account number;
- 393 • Identification of the premises at which Virtual Net Metering Project is to be
394 installed;
- 395 • The total rated capacity of the Virtual Net Metering Project located at such premises;

- 396 • The proportional amount of net metering credits to be allocated among the Host
397 Customer and Subscribing Customers' billing accounts expressed as a percentage of
398 the total amount of net metering credits produced by the Virtual Net Metering
399 Project;
- 400 • The Subscribing Customer's chosen annual billing period (April monthly billing
401 period or October monthly billing period), as described in the Term of Service
402 section of the Rider;
- 403 • The Subscribing Customer's Retail Electric Supplier, if applicable; and
- 404 • Sufficient information showing that the electric generating facility meets the
405 statutory requirements for net metering.

406 The Host Customer is responsible for recruiting Subscribing Customers who wish to
407 receive a share of the net metering credits produced by the Virtual Net Metering Project and
408 for notifying the utility of the enrollment and termination of Subscribing Customers. The
409 proposal states that, once a project is fully subscribed and 100% of the expected excess
410 generation credits are allocated, the Host Customer may change the allocation of net
411 metering credits no more than three times per calendar year. During ramp-up period of a
412 project, prior to the project being fully subscribed or until the first 12 months of the project
413 generating credits has passed, the Host Customer can change the allocation once per month.

414 **Q. What is a Subscribing Customer?**

415 A. A Subscribing Customer is a retail customer who resides in ComEd's service territory and
416 who wishes to share in the net metering credits produced by a Host Customer's Virtual Net
417 Metering Project. In order to be eligible to receive such net metering credits, the
418 Subscribing Customer must reside within five miles of the Virtual Net Metering Project or
419 be connected to the same substation. Subscribing Customers who are eligible to share net
420 metering credits from a Virtual Net Metering Project include: hourly/non-hourly pricing
421 residential customers who receive bundled service from ComEd; hourly/non-hourly pricing
422 residential customers who receive energy from a RES and distribution services from
423 ComEd; hourly pricing non-residential customers who receive bundled energy supply and

424 distribution services from ComEd or whose ComEd distribution charge is determined on a
425 \$/kW basis.

426 **Q. Is there a maximum number of Subscribing Customers per Host Customer?**

427 A. The proposed Rider POGVNM puts no limit on the maximum number of Subscribing
428 Customers per Host Customer. The number of Subscribing Customers per Host Customer
429 should be left to the discretion of the agreement between these parties. The existing
430 limitations on the size of any net metering resource will limit the number of the Subscribing
431 Customers during the pilot phase. If the utility demonstrates that it is not capable of
432 crediting Host and Subscribing Customers in an efficient manner during the pilot phase of
433 this tariff, I believe some limitation on the number of customers ultimately taking service
434 under this Rider could be appropriate.

435 **Q. Can a Host Customer have more than one agreement with the Company?**

436 A. Yes. The proposed Rider POGVNM puts no limit on the number of agreements a Host
437 Customer may have with the Company. Limiting the number of agreements between the
438 Host Customer and the Company is unnecessary and may stifle the ability of Host and
439 Subscribing Customers to participate in virtual net metering.

440 **Q. How do Subscribing Customers enroll or disenroll?**

441 A. Subscribing Customers enroll and disenroll by contacting their associated Host Customer. It
442 is the responsibility of the Host Customer to establish the rules and procedures for enrolling
443 and disenrolling its Subscribing Customers. The Host Customer then is responsible for
444 notifying the utility of any changes in the enrollment or disenrollment of its Subscribing
445 Customers.

446 **Q. Can customers who take supply service from someone other than ComEd participate?**

447 A. Yes. As is the case with ComEd' traditional net metering Rider POGNM, the proposed Rider
448 POGVNM allows both hourly and non-hourly pricing residential customers who take supply
449 service from a RES to participate. However, as is the case with ComEd's traditional net
450 metering Rider POGNM, hourly pricing non-residential customers and non-residential
451 customers whose ComEd distribution charge is calculated on a \$/kW basis who take supply
452 service from a RES are not allowed to participate as Subscribing Customers.

453 **Q. Is that the same case for traditional net metering?**

454 A. Yes.

455 **Q. What kinds of facilities are included?**

456 A. As is the case with ComEd's traditional net metering Rider POGNM, the proposal would
457 remain consistent with the applicable statute, which states that eligible net metering
458 electric generation facilities are limited to a rated capacity of 2,000 kW.¹⁵ While nothing
459 bars the participation of types of DG other than solar from participating in Rider POGVNM
460 once the pilot phase is complete, CUB/EDF proposes that the pilot specifically target
461 community solar projects. It's my understanding that there are efforts underway now in
462 ComEd's territory to deploy larger solar projects which would benefit from this type of
463 virtual net metering.

464 **Q. Are there limitations on how many facilities can operate at one time?**

465 A. Yes. ComEd's traditional net metering Rider POGNM stipulates that the company can deny
466 net metering applications in accordance with 220 ILCS 5/16-107.5(j) of the Public Utilities
467 Act, which states:

468 An electricity provider shall provide net metering to eligible customers until the
469 load of its net metering customers equals 5% of the total peak demand supplied by
470 that electricity provider during the previous year. Electricity providers are
471 authorized to offer net metering beyond the 5% level if they so choose.

¹⁵ 220 ILCS 5/16-107.5(b)

472 This five percent limit would include capacity produced by Virtual Net Metering Projects.

473 **Q. Is the Company close to hitting the five percent limit?**

474 A. No. As of March 15, 2014, the percent of net metering capacity to peak demand supplied by
475 ComEd was 0.06201%.¹⁶

476 **Q. Are there limitations on the size of facilities?**

477 A. Yes. Applicable statute limits traditional net metering projects to a maximum rated capacity
478 of 2,000 kW.¹⁷ Virtual net metering projects would fall under the same limits.

479 **Q. Are there limitations on who can subscribe to any one facility?**

480 A. The only limitation on who can subscribe to any one facility is that a customer must fall into
481 one of the following customer classifications, which have been copied from ComEd's
482 traditional net metering Rider POGNM for the CUB/EDF proposal. These customer
483 classifications are: hourly/non-hourly pricing residential customers who receive bundled
484 service from ComEd; hourly/non-hourly pricing residential customers who receive energy
485 from a RES and distribution services from ComEd; hourly pricing non-residential customers
486 who receive bundled energy supply and distribution services from ComEd or whose ComEd
487 distribution charge is determined on a \$/kW basis. It is important to note that several types
488 of customers may subscribe to a single Virtual Net Metering Project. Each customer should
489 receive compensation for net metering according to the compensation protocol outlined in
490 the Rider.

491 **Q. How are customers compensated for generation from the facility?**

492 A. In terms of compensation, the proposal borrows language from ComEd's traditional net
493 metering Rider POGNM, which reflects the applicable net metering statute 220 ILCS 5/16-

¹⁶ *Annual Net Metering Report for Commonwealth Edison Company* as required by Illinois Public Utilities Act, 16-107.5(k), Received at the Illinois Commerce Commission on April 4, 2014.

¹⁷ 220 ILCS 5/16-107.5(b).

494 107.5. Each Subscribing Customer should receive compensation for net metering according
495 to the following compensation protocol outlined in the proposed Rider POGVNM:

- 496 • Non-hourly pricing residential customers who receive bundled energy supply and
497 distribution services from ComEd (VNM1) are provided energy and delivery credit,
498 in kWhs, by the Company according to the customer's indicated allocation. Such
499 credits are allowed to accrue during the course of the determined annual period and
500 offset net kWhs, on a one-to-one basis.
- 501 • Hourly pricing residential customers who receive bundled energy supply and
502 distribution services from ComEd (VNM2) are provided both a monetary supply and
503 delivery adjustment, in dollars rounded to the cent according to the customer's
504 indicated allocation. The supply adjustment is valued at the same price per kWh that
505 the Company would charge for kWh energy sales during that same hourly period.
506 The delivery adjustment is valued the sum of the DFC, Illinois Electricity
507 Distribution Tax Charge (IEDT), and other generally applicable charges applicable to
508 the customer in \$/kWh, as such charges are described in the Monthly Charges
509 section of Rate BESH or in the Monthly Charges section of the Rates and Charges
510 part of Rate RDS, as applicable, multiplied by the net output, in kWhs, delivered to
511 the Company's distribution system by the Virtual Net Metering Project in each such
512 hour.
- 513 • Non-hourly pricing residential customers who receive energy supply from a RES
514 and distribution services from ComEd (VNM3) are provided a delivery credit only,
515 in kWhs, by the Company according to the customer's indicated allocation. Such
516 credits are allowed to accrue during the course of the determined annual period and
517 offset net kWhs, on a one-to-one basis.
- 518 • Hourly pricing residential customers who receive energy supply from a RES and
519 distribution services from ComEd (VNM4) are provided a monetary delivery
520 adjustment only according to the customer's indicated allocation. The delivery
521 adjustment is valued the sum of the DFC, Illinois Electricity Distribution Tax Charge
522 (IEDT), and other generally applicable charges applicable to the customer in \$/kWh,
523 as such charges are described in the Monthly Charges section of Rate BESH or in the
524 Monthly Charges section of the Rates and Charges part of Rate RDS, as applicable,
525 multiplied by the net output, in kWhs, delivered to the Company's distribution
526 system by the Virtual Net Metering Project in each such hour.
- 527 • Hourly pricing non-residential customers who receive bundled energy supply and
528 distribution services from ComEd or whose ComEd distribution charge is
529 determined on a \$/kW basis (VNM5) are provided a monetary supply adjustment
530 only, in dollars rounded to the cent according to the customer's indicated allocation.
531 The supply adjustment is valued at the same price per kWh that the Company would
532 charge for kWh energy sales during that same hourly period.

533 **Q. Is there a cap on the amount of net metering credits a customer can receive?**

534 A. No. The proposed Rider POGVNM reflects the Company's traditional net metering practices
535 and places no limit on customer compensation.

536 **Q. Is there a cap on the number of subscribers for each project?**

537 A. Not explicitly. If the utility demonstrates that it cannot allocate net metering credits in an
538 efficient manner, I could propose limiting the number of subscribers for each project to
539 2,000 Subscribing Customers to account for the minor administrative burden of allocating
540 net metering credits to accounts while still providing projects the ability to offer
541 subscriptions at small enough installed capacities to enable low-use customer participation.
542 However, at this time I do not want to propose a strict limitation on the number of
543 Subscribing Customers per project. We do propose that ComEd would only have to credit 1
544 kWh to each Subscribing Customer, meaning that only when the excess credit to a
545 Subscribing Customer reaches 1 kWh would that Customer receive a bill credit.

546 **Q. Do virtual net metering credits expire?**

547 A. Yes. The proposed Rider POGVNM reflects the Company's traditional net metering practices
548 and applicable net metering statute 220 ILCS 5/16-107.5. Accrued energy credits are
549 cashed out at the earliest of the (a) end of the current annual period, (b) date that the retail
550 customer Host or Subscribing Customer terminates service from the Company, or (c) date
551 that the retail customer Host or Subscribing Customer terminates service under Rider
552 POGVNM. Accrued energy credits are cashed out at the value of the IPA-procured default
553 rate for the time period for which they were earned.

554 **Q. Who owns the rights to the renewable energy credits ("RECs") produced by the
555 Virtual Net Metering Project?**

556 A. The Host Customer owns the RECs produced by the Virtual Net Metering project and may
557 sell or trade them, including allocating them to subscribers, as he/she sees fit.

558 **Q. What types of facilities will be eligible to participate in the pilot program?**

559 A. The pilot program will be open to a variety of solar projects that are proposed by host
560 customers, but must, at a minimum, include the following: micro-grid projects, brown-field
561 or landfill projects, projects that relieve local capacity or grid constraints, commercial sites,
562 civic or non-profit sites, multi-family buildings, or projects serving low-income
563 communities.

564 **Q. How long will the pilot program last?**

565 A. The pilot program begins with ComEd's compliance filing and the evaluation period is in
566 effect for three years from that date. However, CUB/EDF believes the Commission should
567 make clear that a tariff approved in compliance with this investigation remains in effect for
568 15 years to provide Host Customers and Subscribing Customers the opportunity to have
569 regulatory certainty and to recoup upfront capital investments.

570 **Q. How many projects are eligible during the pilot phase?**

571 A. I expect approximately four to five projects will be eligible. This is because I recommend
572 the Commission limit the eligible projects to ones that test various models for community
573 solar, for example:

- 574 • A resource located within a microgrid project;
- 575 • A commercial rooftop project;
- 576 • A project located within a brownfield redevelopment or landfill redevelopment
577 area;
- 578 • A non-profit sponsored project; and/or
- 579 • A resource located to relieve ComEd system constraints.

580 The first projects to meet one or more of these criteria should be eligible during the
581 pilot phase of this program. If a significant amount of viable projects emerge, including

582 those that would test a model not considered above or serve distinct populations, then I
583 recommend the Commission expand the total number of projects beyond four to five to
584 a number it considers an effective sample for evaluation.

585 **Q. Is it necessary for Virtual Net Metering Projects to be in ComEd's interconnection**
586 **queue at the time of the compliance filing in order to participate in Rider POGVNM?**

587 A. No. Virtual Net Metering Projects that enter ComEd's interconnection queue after the
588 utility's compliance filing are eligible to participate in Rider POGVNM as well as those that
589 are in the interconnection queue at the time of the compliance filing.

590 **Q. How will you determine if the pilot is successful?**

591 A. After three years, ComEd will evaluate and publish the results of the pilot program as a
592 filing to the Commission. The evaluation will examine the success of the virtual net
593 metering process including but not limited to:

- 594 • The ease of the application process for Host Customers;
- 595 • The ease of enrollment/disenrollment of Subscribing Customers;
- 596 • The efficiency of the determination and allocation of virtual net metering credits;
- 597 • The accuracy of virtual net metering billing procedures;
- 598 • The effect of limiting projects to a capacity rating of 2,000 kW; and
- 599 • The effect of requiring Subscribing Customer's to reside no more than five miles
600 from the Virtual Net Metering Project or be connected to the same substation as the
601 Virtual Net Metering Project.

602 **Q. Will there be ongoing evaluation after the pilot program phase is completed?**

603 A. Yes. In addition to reporting required by Section 16-107.5 of the Act, the proposed Rider
604 POGVNM requires the Company to include in its annual net metering report to the Manager
605 of the Energy Division of the Illinois Commerce Commission Staff: (a) the number of Virtual

606 Net Metering Projects, (b) the total rated capacity of each Virtual Net Metering Project, and
607 (c) the number of Subscribing Customers associated with each Virtual Net Metering Project.
608 This will allow stakeholders to measure the success of virtual net metering in Illinois on an
609 ongoing basis.

610 **Q. Does this conclude your direct testimony?**

611 A. Yes it does.