

**COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION**

In the Matter of:

Electronic Application Of Kentucky Power Company)	
For (1) A General Adjustment Of Its Rates For)	
Electric Service; (2) Approval Of Tariffs And Riders;)	
(3) Approval Of Accounting Practices To Establish)	Case No. 2020-
Regulatory Assets And Liabilities; (4) Approval Of A)	00174
Certificate Of Public Convenience And Necessity;)	
And (5) All Other Required Approvals And Relief)	

DIRECT TESTIMONY OF ANDREW MCDONALD,
DIRECTOR, APOGEE-CLIMATE &
ENERGY TRANSITIONS

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Society

October 7, 2020

1 **Q. Please state your name, business address, and affiliation.**

2 A. Andrew McDonald, CEM, 316 Wapping St., Suite 204, Frankfort, KY 40601. I am
3 the Director of Apogee-Climate & Energy Transitions and Vice-Chair of the
4 Kentucky Solar Energy Society.

5 **Q. On whose behalf are you testifying today?**

6 A. My testimony is filed on behalf of the Kentucky Solar Energy Society (KYSES).

7 **Q. What is the Kentucky Solar Energy Society?**

8 A. The KYSES is a not-for-profit membership organization whose mission is to
9 promote the use of renewable energy resources, energy efficiency, and conservation
10 in Kentucky through education, advocacy, networking, and demonstration of
11 practical applications. KYSES is comprised of members who include residential
12 solar energy customers; solar energy enthusiasts (including potential future solar
13 customers); professionals working in the clean energy field in business, non-
14 governmental organizations, and academia; and advocates for a transition to a clean
15 energy economy.

16 **Q. Please briefly describe your qualifications.**

17 A. I am a Certified Energy Manager and have a Masters of Science in Sustainable
18 Systems from Slippery Rock University of Pennsylvania. Since 2004 I have worked
19 in the solar energy and energy efficiency fields in Kentucky. My work has included
20 local and state energy policy; clean energy project design, development, and
21 installation; education; and consulting. Throughout these 16 years net metering has
22 been an important element of my professional work. In 2008 I participated in PSC
23 Case No.2008-00169 on behalf of Appalachia-Science in the Public Interest

1 (ASPI). In this capacity I helped produce the Kentucky Interconnection and Net
2 Metering Guidelines which resulted from that collaborative case. For many years I
3 have engaged in the legislative process, advocating for policies that would support
4 the expansion of clean energy in Kentucky, such as net metering. I have participated
5 in several cases before the Public Service Commission related to net metering and
6 utility rate cases. I have helped to develop over two dozen net metered solar PV
7 systems in Kentucky, including at my home in Frankfort.

8 **Q. What is the purpose of your testimony today?**

9 A. The purpose of my testimony is to respond to Kentucky Power Company's proposal
10 for replacing their current Net Metering tariff in response to the Net Metering Act
11 of 2019 (SB 100). I intend to raise concerns with the proposed new tariff (NMII)
12 which show that it is poorly designed and would incentivize customers to shift load
13 into peak time periods; and that it is based on an incomplete and inadequate analysis
14 of the costs and benefits of net metering. I will furthermore demonstrate that the
15 Company has failed to answer the basic question of whether the cost of net metering
16 is of a magnitude that warrants any action by the Commission and will show that
17 the answer is no; that in fact, the scale of net metering in KPC's territory is so small
18 that even if we disregard all the benefits it provides, the financial impact on
19 ratepayers is negligible. Finally, I shall recommend to the Commission that they
20 reject KPC's proposed changes to Net Metering and convene a Workshop or
21 Administrative Case, to which all regulated utilities and interested stakeholders
22 would be party, to develop a comprehensive methodology for evaluating the costs
23 and benefits of net metering and distributed generation.

1 Q. **Is the design of KPC’s NMII tariff consistent with electric utility best practices**
2 **which seek to reduce costs by smoothing customer loads and reducing peak**
3 **demand?**

4 A. No, it is not. KPC’s proposed NMII tariff would incentivize net metering customers
5 to shift energy consumption into peak time periods and reduce consumption during
6 off-peak times. The NMII tariff proposes to record customer generation and
7 consumption within two time blocks, Daytime (8:00 AM to 6:00 PM) and
8 Nighttime (6:00 PM to 8:00 AM). Excess customer generation that’s fed back to
9 the utility would generate credits which would be applied to offset consumption at
10 a later time *but only within the same time block in which the energy was generated.*
11 This would be a significant change from traditional net metering, in which kWh
12 credits produced by excess solar generation could offset consumption at any later
13 time.

14 This would give net metering customers an incentive to shift loads into the
15 Daytime period, because this consumption could be offset by the solar generation
16 during the Daytime period. Solar PV systems produce a minimal amount of energy
17 from 6:00 PM to 8:00 AM, therefore customers would have little opportunity to
18 offset their evening and nighttime consumption with their solar PV system.
19 Customers might take steps to shift their loads such as setting their water heaters
20 on timers to heat up during the afternoon; or operating electric dryers or charging
21 electric vehicles in the afternoon before 6:00 PM.

22 Encouraging customers to shift their loads into the mid-afternoon, when
23 customer loads commonly peak and require the utility to operate more costly

1 peaking power plants, is contrary to the utility and ratepayers' best interests. In the
2 Company's response to our question on this issue (JI-2-05), they state, "*The rate*
3 *structure of proposed tariff NMS II properly incentivizes a net metering customer*
4 *to align their customer generation with their load profile. It does not incentivize*
5 *on-peak usage beyond what can be produced by the customer's qualifying*
6 *generator as the customer would pay standard retail tariff rates for said usage.*"
7 This response fails to acknowledge that the net metering customer exists within the
8 utility grid and that if the customer does not need the power at peak times, another
9 nearby customer will use it and reduce the utility's need for higher-cost peaking
10 power resources. The Company's response assumes that having net metering
11 customers consume all their generation on-site is the optimal outcome, but this
12 ignores the benefits provided to the grid when the customer exports solar power
13 during times of peak demand.

14 **Q. Has KPC established the overall cost of net metering to the Company and the**
15 **rate impact of net metering to non-net metering ratepayers?**

16 A. No, it has not. In our second set of data requests (JI-2-027), we asked, "For each of
17 the last five years provide the financial cost of net metering to the utility. Provide
18 all analysis performed to show the rate impact, if any, of providing service under
19 the current N.S. (sic) tariff, on non-net-metering customers." The Company
20 responded by stating "that it has not performed the requested analysis." The
21 Company further stated, "The Company objects to this request because it seeks
22 information that is neither relevant nor reasonably calculated to lead to the
23 discovery of admissible evidence."

1 For multiple years KPC worked alongside other investor owned utilities,
2 East Kentucky Power Cooperative, and industry lobbyists to lobby the legislature
3 to change Kentucky’s net metering statute, on the premise that net metering was
4 causing an unfair cost-shift between ratepayers and presumably causing a
5 measurable, non-negligible financial impact to the general ratepayer. It is therefore
6 notable that KPC has performed no analysis of the financial impact of net metering
7 to the Company itself or to non-net metering customers. While rhetorical arguments
8 which are unsupported by evidence have been persuasive with legislators, the
9 Commission has an obligation to ensure that rates are just, fair, reasonable, and
10 based on the evidence.

11 The implementation of KPC’s proposed NMII tariff would significantly
12 undermine the market for distributed solar in KPC’s service territory by
13 substantially reducing the value of a solar investment for interested customers. This
14 will have a significant, negative impact on solar businesses operating in Eastern
15 Kentucky, diminish the local economic development potential of the regional solar
16 industry, and reduce KPC’s customers’ options for generating their own power and
17 reducing their utility bills. In sum, the NMII tariff would have significant negative
18 impacts on KPC’s customers, communities, and economic development. It is
19 therefore highly relevant to understand if the benefits of this proposed tariff
20 outweigh the costs. KPC has asserted a cost-shift between net metering and non-
21 net metering customers; eliminating this cost shift is the presumed benefit of the
22 tariff change. How can we evaluate if the costs of the NMII tariff outweigh the

1 benefits if KPC has not analyzed it and quantified the rate impact of net metering
2 on ratepayers?

3 **Q. Have any other parties attempted to estimate the potential financial impact of**
4 **net metering on Kentucky ratepayers?**

5 A. Yes. In comments submitted to the Commission in proceedings related to the
6 Implementation of the Net Metering Act of 2019 (PSC 2019-00256), Karl Rabago
7 presented an analysis estimating the potential financial impact of net metering on
8 Kentucky's residential ratepayers. (Rabago's testimony is included as Attachment
9 1 to my testimony, see pp. 37 - 39). This analysis considered what the financial
10 impact of net metering on residential ratepayers would be, if one accepted the
11 utilities' argument that the value of solar energy delivered to the utility is only
12 worth the utility's "avoided cost" rate (which is what KPC is, in fact, arguing).
13 Following the utilities' line of reasoning, which disregards the multiple benefits
14 produced by distributed solar, the study assumed that net metering customers were
15 being over-compensated by \$0.07/kWh for their excess generation (estimating the
16 average residential retail rate to be \$0.10/kWh and the average "avoided cost" rate
17 to be \$0.03/kWh). KPC, like other utilities, contends that these additional costs are
18 shifted onto other customers and must be paid by all other ratepayers.

19 Using data from 2018 supplied by KPC and eight other utilities to the US
20 Energy Information Administration on Form EIA-861, the study calculated how
21 much each utility paid in "excess" of the avoided cost rate to net metering
22 customers. For KPC, which received 85,203 kWh of excess solar generation from
23 residential net metering customers in 2018, the amount of their "overpayment" was

1 \$5,964. If distributed among all 134,959 of KPC’s residential ratepayers, the cost
 2 per customer would have been \$0.04 per year or less than half a penny per month.

3 I have updated Rabago’s analysis for KPC using current Test Year data
 4 (April 2019 – March 2020), as reported in “KPCO_R_KPSC_4_82_Attachment1,”
 5 and KPC’s proposed Residential Retail Rates and NMII compensation rates for
 6 excess solar generation. As shown in Table 1, assuming that distributed solar has
 7 no value beyond KPC’s avoided cost rate, the total financial impact of net metering
 8 on non-net metering residential customers would be \$9,739, which would cost each
 9 customer \$0.07 per year.

10

Table 1 - Potential Financial Impact of Net Metering on KPC's Residential Ratepayers for Current Test Year (April 2019 to March 2020), Assuming Distributed Solar Has No Value Beyond KPC's Avoided Cost Rate.

Utility Name	Residential NM Solar Energy “Sold Back” in Test Year (KWH)	Value of NM “Subsidy” @ \$0.086/kWh ¹	# of Residential Customers in 2018	Annual Cost per Customer	Monthly Cost per Customer
Kentucky Power Company	113,169	\$ 9,739	134,959	\$ 0.07	\$ 0.006

1. The ‘Value of NM “Subsidy” @ \$0.086/kWh’ is based on the difference between KPC's proposed new Residential Rate (\$0.12265/kWh) and NMII solar compensation rate (\$0.03659/kWh), which is their claimed avoided cost rate.

11

12 **Q. What is the significance of this finding?**

13 This finding represents the *upper limit* of the cost net metering might impose on
 14 KPC’s ratepayers, if there were no other benefits associated with distributed solar.
 15 Viewed in the context of KPC seeking to raise their fixed charges by \$3.50 per
 16 month and increase residential rates by 25%, we can see that the actual impact of
 17 net metering on ratepayers is negligible, less than a penny per month. This begs the

1 question of whether determining a method for KPC to recover these costs is worth
2 the time and resources required from the Commission, utility, and everyone else
3 involved. I recognize that statute has directed the Commission to determine a
4 method for enabling the utilities to recover their costs from customer-generators;
5 however, this presumes there are tangible costs to be recovered. The Commission
6 might consider whether in cases such as this, in which even the upper range of
7 potential costs to ratepayers is exceedingly small, the reasonable course would be
8 to defer changes to the tariff until a subsequent rate case. This would allow KPC's
9 customers and communities to continue enjoying the benefits of distributed solar,
10 while imposing no tangible costs upon ratepayers or the utility. Meanwhile, the
11 Commission would have more time to work with the expert consultant which they
12 are presently seeking to hire, to develop a comprehensive methodology for
13 determining the costs and benefits of net metering and reasonable rate structures
14 for administering the next generation of net metering.

15 **Q. Is KPC's proposed NMII tariff based on a comprehensive assessment of the**
16 **costs and benefits of net metering to the Company and its ratepayers?**

17 A. No, it is not. The Company has provided a simplistic, one-sided analysis of the
18 costs associated with net metering. In response to our question JI_1_026, the
19 Company summed up their approach by stating, "*The current NMS Tariff increases*
20 *costs for nonparticipating customers by reducing fixed cost collection for service*
21 *and infrastructure being used by participating customers, thus increasing costs for*
22 *all other customers.*" When asked to provide the references consulted in developing
23 its methodology for accounting the costs and benefits of net metering, (JI_2_016),

1 KPC replied, “*The Company has not proposed ‘an accounting of the costs and*
2 *benefits of net metering.’”*”

3 In his testimony on behalf of the Joint Intervenors (Mountain Association,
4 KFTC, and KYSES), Mr. James Owen has described the multiple benefits that
5 distributed generation can provide to the utility, ratepayers, and society. Mr. Owen
6 describes the dozens of studies of the value of solar that have been performed across
7 the United States, as well as methodologies that now exist to guide these studies.

8 I recommend that the Commission reject KPC’s proposed NMII tariff
9 because it is based on an incomplete and inadequate cost-benefit analysis which
10 excludes significant benefits provided by net metering to the Company and its
11 ratepayers; and for failing to provide the most basic financial analysis to evaluate
12 the scale of the costs they seek to recover; and because the financial impact of net
13 metering on ratepayers has been shown to be negligible. It would be unfair, unjust,
14 and unreasonable to undermine every customer’s ability to enjoy the benefits of
15 distributed solar energy, and diminish the economic viability of solar companies
16 working in Eastern Kentucky, and deprive the region of the economic development
17 potential offered by distributed solar, with so little justification.

18 **Q. How do you recommend the Commission proceed with KPC’s net metering**
19 **tariff if they reject the NMII proposal?**

20 I would second Mr. James Owen’s proposal that the Commission convene a
21 Workshop or Administrative Case, to which all regulated utilities and interested
22 stakeholders would be party, to develop a fair, just, reasonable, and consistent
23 methodology for analyzing the value of distributed generation and net metering,

1 using a comprehensive benefit-cost analysis framework. This process could be
2 greatly assisted by the expert consultant that the Commission is presently seeking
3 to advise them on net metering issues. It would also be prudent to allow the
4 administrative case concerning updating Kentucky's Interconnection Guidelines to
5 be completed before convening such a Net Metering Workshop, as that update may
6 raise issues relevant to the question of net metering rates.

7 As we have shown that net metering is having a negligible financial impact
8 on KPC and its ratepayers, there is no need to rush approval of a new net metering
9 tariff for KPC. Time invested now to develop a well-designed methodology for
10 evaluating the benefits and costs of net metering, with buy-in from all stakeholders,
11 would be well-spent if it can prevent a contentious process from being repeated
12 within every upcoming utility rate case.

13 **Q. Are there any notable comparisons between KPC's NMII proposal and its**
14 **proposal to deploy AMI infrastructure?**

15 A. Yes. On pages 13 to 15 of his testimony (KPCO 2020-00174 Sec 3 vol_1),
16 Company witness Blankenship explains the multiple benefits offered by AMI
17 meters, which may include support for energy efficiency and distributed energy
18 resources. Mr. Blankenship states,

19
20 *The Company evaluated these benefits against the forecasted costs of AMI and*
21 *determined that the customer, reliability, and cost savings benefits are sufficient to*
22 *support AMI's implementation; however, because many of the foregoing benefits*

1 *are not readily quantifiable, the Company did not prepare a formal cost/benefit*
2 *analysis regarding its planned AMI implementation.*

3

4 It is notable that with regards to AMI, the Company has identified a wide range of
5 benefits for customers and is comfortable with an informal assessment that the
6 benefits outweigh the costs. Contrast this with their approach to net metering, in
7 which they have failed to acknowledge and account for the numerous benefits that
8 are provided by distributed generation. In the one case, KPC wishes to deploy a
9 new grid modernization technology (AMI) with the aim to increase their
10 profitability and benefit their customers, at a significant cost to customers. In the
11 other case (net metering) their proposal would suppress a grid modernization
12 technology, depriving their customers of its benefits, despite net metering's
13 negligible cost to customers.

14 If KPC is capable of recognizing the multiple benefits provided by AMI to
15 the utility and its customers, and acknowledging real benefits even when they are
16 hard to quantify, then the Company is capable of performing a comprehensive
17 benefit-cost analysis for net metering and distributed energy resources.

18 **Q. Does that conclude your testimony?**

19 A. Yes.

20

Certificate of Service

This is to certify that the electronic version of the foregoing is a true and accurate copy of the same document that will be filed in paper medium; that the electronic filing has been transmitted to the Commission on October 7, 2020; that there are currently no parties that the Commission has excused from participation by electronic means in this proceeding; and that in accordance with the March 16, 2020 Commission Order in Case No. 2020-00085 an original and ten copies in paper medium of this filing will not be mailed until after the lifting of the current state of emergency.



Tom FitzGerald

12 October 2019

Comments on KY PSC Implementation of KY GA SB 100 – Net Metering Act of 2019

on behalf of

Kentuckians for the Commonwealth (KFTC)

and

Mountain Association for Community Economic Development (MACED)

by

Karl R. Rábago

- I. General Introduction and Purpose of Remarks
 - a. The Kentucky Public Service Commission (“Commission”) order of 30 July 2019 in this proceeding requested comments on issues relating to the implementation of the Kentucky General Assembly’s Net Metering Act of 2019 (“NEM Act”), also known as KY Senate Bill 100, which amended several provisions of KRS 278, and which takes effect on 1 January 2020.
 - b. Kentuckians for the Commonwealth (“KFTC”) and Mountain Association for Community Economic Development (“MACED”) are two organizations working for several decades for a better quality of life for all Kentuckians and to support just and reasonable rates and fair opportunities for individuals, households, local governments and enterprises (both for-profit and not-for-profit) to take advantage of and personally invest in distributed solar photovoltaic [“solar PV”] electricity systems to help manage their electricity bills. More information about KFTC and MACED is provided in Appendix A to these comments.

- c. Karl R. Rábago is an independent consultant with thirty years of relevant experience working in a wide range of roles and on many regulatory issues relating to distributed energy resources, including solar PV. More information about Mr. Rábago's experience relating to solar PV is provided in Appendix B to these comments.
- d. The purpose of these comments is to request that the Commission implement the requirements and changes in the NEM Act in a manner consistent with the terms of the statute and in a manner which will result in just and reasonable rates for residential and small commercial customers seeking to invest in self-generation solar PV that operates interconnected to the grid. First and foremost, the Commission should preserve the fundamentals of traditional net metering, including monthly—"over a billing period"—netting, full retail rate credit for exported/excess generation, and traditional rate design, and deviate from this fair and easily understood framework only if substantial evidence supports any changes. Meeting the requirements of the Net Metering Act requires adopting a well-structured process that addresses issues of general applicability to precede and inform the development of utility-specific tariff proposals. KFTC and MACED also specifically call upon the Commission, in its rules and regulation of retail electric utilities relating to customers-owned and/or -operated solar PV, to take proper account of the following:
 - i. NEM customers are making significant private investments in order to exercise a measure of control over their electricity and energy bills.
 - ii. The private investments that NEM customers make bring well-documented and significant benefits to the electric grid and non-NEM customers, and that these benefits have been found to greatly exceed any

potential costs to the utility or non-NEM customers connected to the same grid.

- iii. Electric utility companies are monopoly businesses that are permitted to operate in our free-market capitalist society only pursuant to a kind of “regulatory compact” in which they may only seek return of and on investments made in the public interest by utility shareholders for costs prudently incurred to deliver safe, reliable, and affordable electric service. Utility return may be earned only through the charging of just and reasonable rates. With utilities in Kentucky proposing large-scale solar energy projects, it is incumbent on the Commission to establish a process for evaluating the costs and benefits of distributed solar generation options to serve as a benchmark against which to assess the cost-effectiveness and reasonableness of utility-scale proposals.
- iv. The Commission has the primary regulatory responsibility for ensuring the advancement and protection of the public interest inherent in electric rates and services by ensuring that the utilities meet their burden of proving that their proposed rates are just and reasonable and in the public interest.
- v. The public interest in Kentucky will be advanced if customers enjoy the right and are not unfairly discriminated against as they seek to recover the value of their own investments in solar PV systems installed to help manage their electric bills, and if Kentucky becomes home to a strong and thriving market for products and services that advance customer choice, customer agency over their own electricity usage, and empowerment to make solar PV investments in and on their own property.

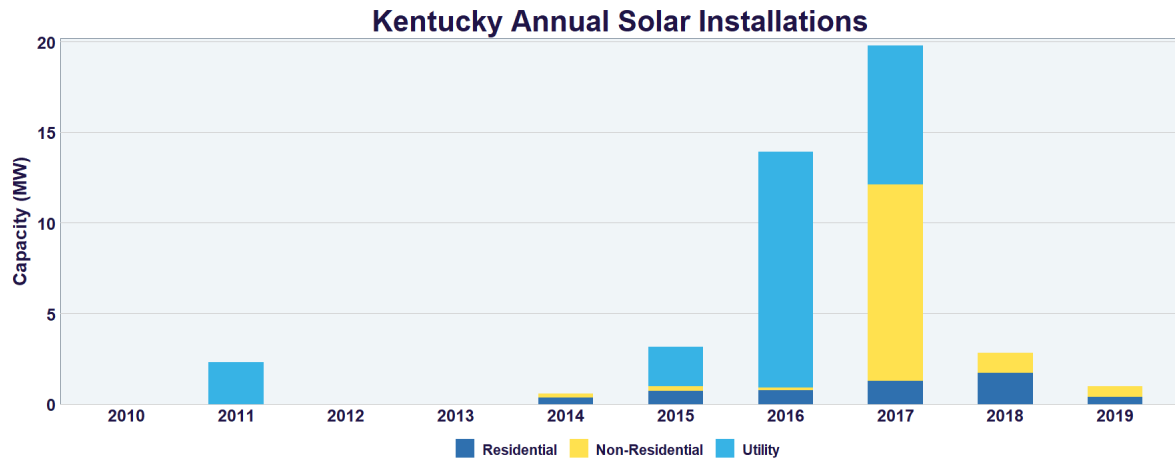
- vi. Electric utilities, by their nature as Commonwealth-chartered monopoly businesses, wield enormous market power and control over customers and potential competitors. These utilities are also charged with operating and maintaining a safe, reliable, and cost-effective grid. The Commission must ensure that the NEM Act is implemented so as to transparently, objectively, and fairly establish charges and compensation rates for customers that seek to interconnect solar PV systems on their homes or business to the grid. Where utilities are permitted to charge for actual costs incurred and measured, customer-generators must be fully compensated for the value of the benefits and avoided costs their solar PV systems create.
- vii. Net metered distributed generation systems are one of many distributed energy resources entering the market and potentially available to all Kentucky customers. Utility rates impact the economics of private decisions to invest in and operate such resources. Therefore, the Commission ensure that all customers have full participatory intervention rights in rate and tariff or other proceedings impacting the economics of private investments in distributed energy resources, including net metered generation.
- viii. Charges and rates for net metered generation directly impact accessibility to clean, level-priced energy resources for all Kentucky customers. The rates and charges the Commission approves must recognize the importance of economically-affordable access to clean energy resources especially for low-income customers. Excessive charges based on theoretical cost-shifts that *might* occur under extremely high-penetration

market scenarios will do great harm to emerging markets, customer choice, and low-income access, and are unjustified under any reasonable market growth estimates over the next five or even ten years.

II. The Current Status of Customer-Scale Solar PV in Kentucky

- a. According to Energy Information Administration (“EIA”) data, there were about 1,200 net metering customers in Kentucky in 2018. There are about 2.3 million electricity customers in Kentucky in 2017. So, net metering customers represent about one half of one-one hundredth of a percent of the customers in Kentucky (.05%). In other words, net metering market penetration in Kentucky would have to be about 20 times higher in order to reach 1% of the number of customers.
- b. According to the same EIA data, there was about 10.3 MW of installed net metered solar in Kentucky in 2017, and those facilities exported about 1,300 MWh of energy to the grid. This compares to over 20,000 MW of installed generation capacity in the Commonwealth, and total delivered energy of nearly 73 million MWh. Net metering exports (called “sales” by EIA) in Kentucky represents less than .02% of total energy, and just .05% of installed generation capacity.
- c. Net metering represents a miniscule component of overall Kentucky generation and makes a similarly miniscule contribution to both costs and benefits in Kentucky. While there is promise for growth of this exciting sector, with local jobs, environmental benefits, and reduced utility costs for all customers, the policies in Kentucky are already having a chilling effect on customers’ solar option. As data from the Solar Energy Industries Association dramatically depicts,

new solar installations in 2018 fell precipitously, and 2019 is on a course to be the worst year for solar generation growth in Kentucky since at least 2015.¹



- III. The Commission’s Tasks – The Commission has been presented with an awesome responsibility. The actions that the Commission takes will determine whether Kentucky will host a vibrant, growing, and job-creating distributed generation market that empowers customers, reduces pollution, and lowers costs for electricity services.
- a. Determine the charge for consumption – The Commission’s first task is to develop the methods and process that will be used to assess the consumption charges paid by customers for the electricity they use over the billing period that applies to them for electric service. The Net Metering Act establishes a symmetrical structure for consumption and export charges, and contemplates a netting calculation of the two—over the billing period. The Act further contemplates that consumption charges will be based on the tariff applicable to the customer consumption of electricity. As a result, the structure that should be adopted and would be consistent with the requirements of the Net Metering Act is represented by the following simple formula:

¹ See SEIA, *Kentucky Solar*, data as of Q2 2019, available at: <https://www.seia.org/state-solar-policy/kentucky-solar>.

$$\text{Billing Period Consumption Charge} = (\text{Billing period consumption, kWh} - \text{Billing period generation, kWh}) \times \text{Applicable Consumption Tariffed Rate, \$}$$

- b. The critical components of this structure are:
- i. Netting of self-generation over the billing period
 - ii. The structure puts investment in self-generation on a par with home improvements and efficiency investments that customers make to reduce bills as to the impact on consumption charges.
 - iii. Customers are only required to pay for what they use. This is the only pricing structure that can ensure utilities do not exert improper market power on small customers. If they are allowed to charge for use “but for” private investments in distributed resources like solar PV, they are charging for services not provided and will rely on hypothetical, not metering, bills for consumption.
 - iv. Retains administrative and technical simplicity for the utility and customers.
 - v. Treats customer-generators who generate to offset their bills reasonably. These are customers who generate electricity primarily for use, and not for sale. These customers are not in the business of generating electricity for sale. This distinction underpins the entire concept of net metering. Such customers should not be expected to instantaneously manage both energy consumption and generation in order to earn a fair return on their distributed generation investments.
 - vi. Avoids the perverse economic incentives associated with two-channel billing or similar rate designs which encourage customers to increase consumption during summer peak hours.

- c. Preserve the one-for-one offset credit. Again, the Net Metering Act adopts a symmetrical structure for exports and consumption over the billing period. Charges over the billing period should allow customers to earn a one-for-one cost-of-service based credit for avoided consumption through self-generation over the billing period. The customer monthly bill over the billing period is based on the cost of service reflected in rates. So, if the service requirement is reduced, the bill should be reduced by the cost of the service as reflected in the consumption rate. Just as a customer will earn a full retail reduction on their electric bill when they conserve energy through energy efficiency, they should be able to earn the same bill reduction with self-generation.
- d. The Commission must set a process for calculating a just and reasonable rate for net exports over the billing period. The Commission should conduct or adapt from another jurisdiction a full benefit-cost analysis (“BCA”) to characterize and account for the benefits and costs created when customers generate and export solar PV electricity. This process, which should be guided by principles of objectivity, transparency, and stakeholder engagement, involves three distinct steps. First, the process should fully account for all costs and benefits (including avoided costs) resulting from the generation of electricity from net metered facilities. The following tables² represents a starting point for the categories of impacts—benefits and costs that may be created by distributed energy resources.

² National Efficiency Screening Project, *National Standard Practice Manual for Assessing the Cost-Effectiveness of Distributed Energy Resources*, DRAFT (Forthcoming, 2020).

Table 1. Potential Costs and Benefits of: Utility System

Type	Utility System Impact	Benefit, Cost, or Depends (/)
Generation	Energy Generation	B/C
	Generation Capacity	B/C
	Environmental Compliance	B/C
	RPS Compliance	B/C
	Market Price Response	B/C
	Ancillary Services*	B/C
Transmission	Transmission Capacity	B/C
	Transmission Line Losses	B/C
	Transmission Congestion	B/C
Distribution	Distribution Capacity	B/C
	Distribution Line Losses	B/C
	Distribution O&M	B/C
	Distribution Voltage	B/C
	Grid Flexibility	B
	Interconnection Costs	C
General	Utility Program Measure Costs	C
	Program Financial Incentives	C
	Program Administrative Costs	C
	Program EM&V Costs	C
	Shareholder Incentives	C
	Credit and Collection Costs	B
	Risk	B/C
	Reliability	B/C
	Resilience	B
	Optionality	B
	Market Transformation	B

* Ancillary services can include: spin/non-spin reserve, voltage support, energy arbitrage, frequency regulation, black start.

Table 2. Potential Costs and Benefits of Distributed Energy Resources: Host Customer

Type	Host Customer Impact	Benefit, Cost, or Depends (/)
Customer	Measure Costs (customer)	C
	Transaction Costs	C
	Interconnection Fees	C
	Other Fuel Consumption	B/C
	Water Consumption	B/C
	Asset Value	B
	Productivity	B
	Economic well-being	B
	Health and Safety	B
	Comfort	B/C
	Low Income: Customer	B
	Satisfaction/Pride	B
	Customer Empowerment	B
	Risk	B
	Reliability	B
	Resilience	B
	Power Quality	B
Optimize Other DERs	B	

Table 3. Potential Costs and Benefits of Distributed Energy Resources: Societal

Type	Societal Impact	Benefit, Cost, or Depends (/)
Society	Risk	B
	Reliability	B
	Resilience	B
	GHG Emissions	B/C
	Other Environmental	B/C
	Economic and Jobs	B/C
	Public Health	B/C
	Low Income: Society	B
	Energy Security	B

Second, the process should review and select from available methods to quantify impacts and understand who—utilities, participants, non-participants, and/or society at large—bears the costs or enjoy the benefits. Quantification efforts should, in turn, be founded on a few key execution principles, including the following:

- Costs and benefits should be assessed over the entire anticipated useful life of the net metering resource, using levelization techniques and appropriate

discount rates to derive present value estimates of impacts that can support meaningful comparison of alternative resources.

- Absolute precision is not possible, nor has it ever been the standard in utility planning and rate making. Methods exist for addressing uncertainty, including range estimates and periodic updating.
- Ignoring or disregarding a cost or benefit category assigns a value of zero to the category—resulting in the only valuation that is, with 100% certainty, wrong.
- Utilities must be good faith participants in the process, especially in the provision of data. Unreasonable efforts to mark data as “trade secret” or “business confidential” must be rejected.
- Proper assignment of costs or benefits to the right stakeholder perspective is essential. In assessing impacts on the utility and its customers, for example, private investment costs associated with net metering facilities are not a cost. Indeed, the amount of money spent by customers on interconnected net metering facilities is a benefit to the utility and non-participant customers because it reduce the need for capex and opex associated with utility investments—reducing rates for all customers.
- Grid impacts and grid integration costs are extremely sensitive to net metering penetration rates. Most distribution systems can avoid significant amounts of distributed generation and exports from such facilities without the need for system upgrades. Grid integration and grid costs cannot be properly assessed using a “lost revenues” approach derived from existing cost-of-service studies. First, lost revenues are not a cost. Second, lost revenues bear no rational relationship to integration costs.

Third, and only after the characterization and quantification steps are completed, the Commission should determine the appropriate uses—such as indexing net metering compensation rates—for the benefit-costs analysis results. For example, it is appropriate for the Commission to determine that some values are too imprecise or inadequately substantiated with data to be used in a rate or tariff. Such decisions should never constrain the first two steps (impact identification and quantification), because data and methods can always be improved and in some cases values change.

In conducting the BCA for Net Metering generation, the Commission should also be mindful of the following issues and principles. The Commission should:

- Recognize that exports physically serve the nearest unserved load and are metered when they do so, earning the utility full retail rate charges for such service. Electric utilities and their customers receive a benefit when net metering facilities export energy in avoiding the costs associated with generating, transmitting, and distributing energy from central station power plants. Moreover, since this energy moves through the grid to the nearest unserved load—likely a neighbor of the net metering customer—the utility will charge the receiving customer for the full retail value of that exported energy. Contrary to one popular anti-distributed solar argument, therefore, net metering customers are not using the grid to “store” or “sell” their excess electricity. The utility is using the grid to sell the excess to customers. Net metering only gives a credit for the excess that is applied to the generating customer’s bill. Significantly, the exported energy from net metering facilities is made available to the utility during hot sunny days when peak demands and system marginal costs are high. The credit to net metering customers, in turn,

is applied against lower-cost off peak consumption. These values vary with winter-peaking systems during the winter, but the essential fact that the utility resells and charges for excess net metering production for full retail remains true.

- Adapt the best-practices principles, set forth in Table 1, below, of the National Standard Practice Manual SPM for Assessing Cost-Effectiveness of Energy Efficiency Resources published by the National Efficiency Screening Project (“NSPM-EE”),³ and the soon-to-be published NSPM for Distributed Energy Resources. These can help guide the Commission and stakeholders in their review of relevant impacts and the options for accounting for them. While the current NSPM Edition focuses on energy efficiency, the principles and framework are generally applicable to all DERs.⁴

³ National Efficiency Screening Project, *National Standard Practice Manual SPM for Assessing Cost-Effectiveness of Energy Efficiency Resources* (Spring 2017), available at:

⁴ The NSPM for DERs is currently in development, with an anticipated release date of June 2020. See *National Standard Practice Manual for Benefit-Cost Analysis of Distributed Energy Resources (DERs): Overview*. National Efficiency Screening Project (June 2019). Retrieved from < <https://nationalefficiencyscreening.org/wp-content/uploads/2019/06/NSPM-for-DERs.pdf>>.

Table 4. Universal Principles

Efficiency as a Resource	EE is [and other DERs like Net Metering generation are] one of many resources that can be deployed to meet customers' needs, and therefore should be compared with other energy resources (both supply-side and demand-side) in a consistent and comprehensive manner.
Policy Goals	A jurisdiction's primary cost-effectiveness test should account for its energy and other applicable policy goals and objectives. These goals and objectives may be articulated in legislation, commission orders, regulations, advisory board decisions, guidelines, etc., and are often dynamic and evolving.
Hard-to-Quantify Impacts	Cost-effectiveness practices should account for all relevant, substantive impacts (as identified based on policy goals,) even those that are difficult to quantify and monetize. Using best-available information, proxies, alternative thresholds, or qualitative considerations to approximate hard-to-monetize impacts is preferable to assuming those costs and benefits do not exist or have no value.
Symmetry	Cost-effectiveness practices should be symmetrical, where both costs and benefits are included for each relevant type of impact.
Forward-Looking Analysis	Analysis of the impacts of resource investments should be forward- looking, capturing the difference between costs and benefits that would occur over the life of the subject resources as compared to the costs and benefits that would occur absent the resource investments.
Transparency	Cost-effectiveness practices should be completely transparent, and should fully document all relevant inputs, assumptions, methodologies, and results.

Note. Adapted from *National Standard Practice Manual for Assessing Cost-Effectiveness of Energy Efficiency Resources*, Table ES-1 at viii. National Efficiency Screening Project (May 18, 2017).

- Establish that utility excess capacity should not be used to de-value Net Metering benefits. Kentucky must always be on the search for more cost-effective, just, and environmentally responsible ways of meeting the need for energy services.
- Establish that compliance with existing regulatory requirements does not equate to definitive quantification of environmental costs and benefits relating to Net Metering generation. Compliance regimes based on yesterday's

understanding of climate and pollution impacts result in permitted residual impacts that still impose costs on society. The fact that a pollutant or impact is not today regulated does not reasonably support a conclusion that there are no costs or benefits associated with avoiding that pollutant or impact.

- Recognize that market prices can serve as a useful starting point for estimating resource value, but market prices do not necessarily capture the long-run costs or benefits of Net Metering generation. Market prices are artifacts of a wide range of factors, including the subjectively-formed bidding behaviors of market participants. Wholesale markets in particular tend to externalize many aspects of resource value, including for example, the economy-wide and job creation benefits of Net Metering generation.
- Recognize that not estimating a component value is valuation—at a level of zero. For any recognized value component, zero is the value that is certainly wrong. Uncertainty should be characterized, but estimates should be developed using available data. Sensitivity analysis and confidence intervals can be used to characterize uncertainty.
- Establish that valuation of streams of future benefits and costs must account for the appropriate discount rates associated with particular values. Societal values, like the social cost of carbon and other emissions should be assessed with societal (lower) discount rates than private investments such as energy or capacity.
- Establish that valuation methods must assess resources over their useful life and not arbitrarily constrain the term for evaluation of impacts. For example, reasonable distributed solar generation estimates should assume at least 25 years of operation based on the industry standard warranties offered today,

and should include sensitivity analyses for the much longer useful lives that these systems demonstrate.

- Recognize that net metered generation valuation studies are often hampered by lack of availability of and access to utility distribution system cost data. This lack of data can be an artifact of either of two drivers—the failure of utilities to gather the data in the first place, and unreasonable use of business-confidential designations.
- Recognize that multiple methods may exist for estimating values. Often the argument of a stakeholder for a particular method is the result of subjective and self-serving assumptions and preferences. Variability in valuation resulting from variability in methodologies should be expressly acknowledged through the use of output ranges, not through elimination of reasonable methods.
- Recognize that experience with valuation exercises shows that the biggest arguments are often associated with the smallest values, and with attributes for which precise quantification methods are not available. The answer should never be to ignore the value stream, but rather to acknowledge the legitimate competing arguments.
- Establish that utility revenue impacts associated with reduced use of utility-supplied energy and services are not a cost.
- Recognize that private investment in Net Metering generation is an appropriate consideration when evaluating the macro-level economic impacts of policy priorities. However, private investment is not a cost of net metering generation for the purpose of setting utility rates or charges. In fact, private investment in Net Metering systems that generate electricity system benefits

adds an additional benefit in terms of avoided utility revenue requirements that would otherwise be recovered from customers as a whole.

- Understand that process matters. The Commission should host a series of public workshops that explore the various costs and benefits of net metering generation (and other distributed energy resources). The Commission should consider the hiring of an independent third-party consultant to build confidence in the integrity of the process used to develop the evaluation methodology. The Minnesota experience, conducted by that state's Department of Commerce, remains the gold standard for process.
- Provide adequate time and opportunity for comments and stakeholder engagement. The issues embedded in valuation are complex and challenging. Some parties will be unfairly disadvantaged if forced to engage in a rushed process that requires extensive analysis and response. These parties do not enjoy the opportunity to pass docket participation costs on to customers.
- Require utilities to provide real, metered data to support any asserted costs relating to “usage of the grid,” “reliability costs,” and “grid integration costs” before allowing charges relating to those costs in rates. Sunk costs are not caused by customer-generation—the principle of cost-causation must be paramount in rate design for solar PV under NEM. Under utility rate making law and regulation, utilities bear the dual and distinct burdens of producing substantial evidence to support rate proposals and of proving that rates are just, reasonable, and in the public interest. Assertions of grid-related costs stemming from the operation of net metered facilities must be supported with actual, metered and measured data. The fact that net metering customers seek to reduce their electricity bills and use less utility-produced energy is

undeniable. Reduction in use, and deviation from the class-average level of energy use do not create costs. Given the amount of net metering in place and anticipated in Kentucky today, there is no credible argument that net metering generation creates a threat to utility financial integrity that cannot be addressed in the next general rate case.⁵ Analysis from Andrew McDonald, in Appendix C, establishes that even under the wildly inflated assertions from KU/LGE in 2017 about “cost shifts,” the impact of net metering is negligible—almost impossible to track and certainly less significant than many other causes of rate and revenue variation. At a sufficiently large penetration of distributed generation, cost shifts associated with revenue recovery for sunk utility fixed cost investments between participating and non-participating could arise and reach a level of materiality. Given the many other drivers of revenue volatility and the many offsetting benefits associated with the operations of a net metering facility over its entire lifetime, the net present value of such cost-shifts are likely to be tiny, and given the experience with value of solar studies across the United States over recent years, are even likely to be negative—all customers will see net benefits from the operation of net metering facilities.

- e. Avoid the creation of regulatory “cliffs” and customer uncertainty. If net metering customers are fairly compensated for the net value they bring to Kentucky and its electricity system, it is possible that the number of customers investing in distributed generation will grow rapidly. Markets do not become self-sustaining

⁵ In KU’s most recent rate case (Case No. 2018-00294), the “Companies were requested to provide the cost of service impact of existing distributed generation discussed by witness Sinclair. The Companies responded that they have not performed an analysis of the cost of service impact of distributed generation.” Direct Testimony of Glenn A. Watkins, on behalf of the Kentucky Office of the Attorney General, January 16, 2019, p. 32.

or flourish in a start-stop regulatory environment. For that reason, it is imperative that the Commission require utilities to maintain frequently updated websites containing the most current information on net metering applications and installations and progress toward the statutory 1% level. Well in advance of the time when any utilities reach the 1% level, the Commission should prepare a report for the General Assembly that summarizes the costs and benefits (derived from the benefit-cost analysis previously described plus actual data relating to grid integration costs, rate impacts, and other outcomes) associated with net metering investments and operations.

- IV. Take the time to do things right—The numbers are small and the potential negative impacts are huge. Net metering market growth represents an awesome potential step forward in customer empowerment and choice, economic development, job creation, and improved energy security for Kentucky and its economy. The United States was founded on principles of free-market capitalism and consumer choice. It has been ironic and arguably necessary that a major service required for modern life—electricity—has been provided by monopoly utilities for the past 100 years. The rapidly improving technical and economic characteristics of distributed generation and other distributed energy resources offer a return to our founding principles in the electricity sector. Because of the way these distributed non-utility resources can empower customers and provide reliable and affordable energy services, they can also address systemic problems related to energy insecurity. Given this awesome potential and significance associated with distributed generation market opportunities, it is important that the Commission take the time to fully assess the costs and benefits of distributed generation in order to best inform decisions required by the Net Metering Act. There is no financial or technical crisis compelling a rush to judgment on such a

momentous issue, yet there is great potential for errors to kill this nascent market and cripple customer choice. The Net Metering Act requires no rush. Moreover, the full BCA and the effort to conduct it will yield valuable understanding in assessing and establishing just and reasonable rates for the entire family of distributed energy resources, including stationary and mobile electricity storage (electric vehicles), demand response and energy efficiency, combined heat and power systems, and others.

- V. Address issues of general applicability before development of utility-specific tariffs begins. As previously discussed, the sequencing of the Commission’s work is critical to meeting the requirements of the Net Metering Act and ensuring just and reasonable rates that are in the public interest:
 - a. Costs and benefits – identify all impacts.
 - b. Methodologies – choose the methodologies used to quantify costs and benefits.
 - c. Special issues – account for special issues (e.g., distributed generation that burns fuel, combination systems).

This process of developing a resource valuation framework and methodology first, and then determining compensation levels, rate design, and/or resource acquisition levels has been used for distributed generation (primarily solar) in Arkansas, California, Connecticut, Georgia, Mississippi, Minnesota, New York, North Carolina, Oregon, South Carolina, TVA, Utah, and Vermont. The “characterize and count first” process is also a hallmark of the process for establishing qualifying facility rates under PURPA in nearly every state.

- VI. “In God We Trust; all others must bring data.” This W. Edwards Demming quote is especially appropriate to the task before the Commission under the Net Metering Act. The only way to ensure that compensation rates for net metering generation are just

and reasonable for all citizens of Kentucky is to ensure that those rates are founded on credible, relevant data derived from real utility and net metering system operations.

This data must be public and accessible to all shareholders, and it should be statistically significant—sourced from a sufficient number of sources over a sufficient period of time. Again, it is important to retain traditional allocations of burdens—the utilities bear the burdens of production of evidence and proof that its proposed rates are just, reasonable, and in the public interest.

- VII. Both cost-effectiveness and cost-shifting should be addressed and considered, but not together. They are not the same thing. Cost-shifting is ubiquitous in cost-of-service regulation. That is, assumptions made in rate cases about which customers will generate which revenues at what time are only assumptions based on forecasts of sales, weather, economic conditions, and costs. Utilities are not and never have been guaranteed recovery of specific revenues from specific customers—the *Hope* and *Bluefield* standards⁶ only provide for a reasonable opportunity to earn a reasonable return on prudent investments committed to public utility service. Cost-shifting arises when actual revenue recovery departs from forecasted revenue recovery due to systemic changes that are addressed in a subsequent rate case. If the utility fails to forecast for reduced sales due to net metered generation installed by customers, reduced sales do not *create* costs, they only raise the prospect that the denominator in the basic rate making formula (the sales volume over which costs are distributed) is

⁶ Federal Power Comm'n v. Hope Natural Gas Co., 320 U.S. 591 (1944); Bluefield Water Works & Improvement Co. v. Pub. Serv. Comm'n of West Virginia, 262 U.S. 679 (1923).

smaller and rates for remaining sales must be increased incrementally to recover the same revenue requirement.

Cost-shifting can result from net metering, and even though it does not create costs, the Net Metering Act requires the Commission to determine whether these potentially shifted costs should be shifted to all customers, all customers in the class, or just to a limited set of net metering customers.

Deciding how to allocate potentially shifted costs requires a multi-part analysis, most of which is done through the BCA described earlier in these comments:

1. All cost and benefit impacts from net metering should be characterized and quantified.
2. The magnitude of the potential cost shift must be quantified. It is also important to recognize that net metering customers pay consumption charges for the grid-supplied electricity that they use, just as all customers do. As described above, net metering customers produce much of their energy and are likely to export electricity during high-cost summer peak periods. A time-differentiated analysis of the value of net metering generation, both consumed on-site and exported, is likely to show that net metering customers make an above-average contribution to reducing both fixed and variable demand-related costs. These impacts will not be captured merely by extracting lost revenue calculations from cost-of-service studies done for consumption-only customers, although properly calculated time-variant rates may be more strongly indicative of the value of on-peak exports.
3. The Commission must make a decision about whether and to whom to allocate any remaining cost-shift amounts. At the very low levels of net metering penetration in Kentucky today, there is good reason to believe that

any net and net-present value cost-shifting will be miniscule and will not justify the billing system calculations and administrative effort to recover it. Again, there is a very good chance that under such analysis, net metering customers are actually subsidizing non-net metering customers. It is also unlikely that actual cost-shifts will be material even at a 1% penetration level, however, with a good reporting and BCA system in place, the Commission can revisit the issue any time if feels the effort is warranted.

Sunk costs are not caused by customer-generation, and, as explained above, net metering customers do not cause costs merely by not using as much electricity as the utility forecast that they would, or as much electricity as the average customer in the class. In other words, nothing about net metering or the Net Metering Act compels the Commission to deviate from the principle of cost-causation. As explained above, adherence to cost-causation principles should be a paramount concern in rate design for solar PV under NEM. Private customers make huge personal investments in solar generation property—these are investment-backed expectations that should not be frustrated on the basis of incomplete and unsubstantiated assertions.

While many utilities assert that net metering customers do not “pay their fair share of fixed costs,” this assertion must be carefully scrutinized—and often will be found to be baseless. First, close scrutiny shows that the highly subjective term “fair” is used in this context to mean the amount of contribution to fixed cost revenue requirement recovery that the customer would have made through bill payments (1) if that customer was either an average customer in the class or (2) if that customer would have hypothetically made in the absence of the production from the net metering system.

Second, cost of service rate making is the process used to allocate utility costs to customers through rates based on cost-causation. Given the massive disparity in market power between monopoly utilities and individual customers, cost-of-service rate making and reliance on use-based and tariffed rates ensures fairness and equity. In other words, there is no precedent under cost-of-service rate making for charging customers for not using electricity or for not using what the utility expected they would use. When a net metering customer reduces their use, if the rates are truly cost-based, that customer also reduces their cost causation. There is no logical basis to distinguish reduced use due to solar generation from reduced use due to conservation, energy efficiency, or other means by which customers seek to exert some control over their electricity bills. Singling out net metering customers for such charges, or for the oft-proposed “grid access charges” denominated by installed kilowatts and targeted at net metering customers, are therefore unjust and unjustified discrimination against customer-generators that is fundamentally inconsistent with cost-of-service rate making.

An example might serve to make the point more clearly: Imagine a small electrical device, such as a calculator or cell phone that has a battery, a solar cell for charging, and a plug for wall-charging. Further imagine that the owner puts the device on a window sill in the sunlight *and* plugs the charger into the wall. The idea of the utility proposing a tariff and sending the customer a bill for not using as much wall-sourced energy to charge their device (due to the supplemental solar charging) would be a waste of utility and Commission time; it would also be unjust and unreasonable as a matter of cost-of-service rate making. The further idea of charging the customer for use of the grid when the device battery is full and solar energy trickles onto the grid (assuming the device system allows this to occur), is also untenable.

The point of this example is to emphasize the point that the impacts must be measured and shown to be material, and the proposed remedy must be just and reasonable and based on demonstration of cost-causation in order to support a charge on the customer.

Finally, the assertion about fixed costs assumes that all fixed costs are sunk costs. Careful and complete assessment of the costs and benefits of net metering systems over their projected useful life shows a substantial net benefit in terms of reduced future fixed costs. These benefits result from reduced strain on system components, especially during summer peak demand periods, and from reduced demand in general. Net metering customers and their non-utility investments in distributed generation facilities reduce fixed costs for all customers and the utility.

VIII. Keep Things in Perspective. Utilities see net metering as a problem for several reasons—it challenges their non-capitalistic and non-free market monopoly status; it reduces sales at a time when sales growth is low, flat, or even negative; it puts customers in control of their energy services and may lead to even more expectations for customer empowerment. The typical approach for yesterday's utilities is to impose charges, reduce credits, and frustrate interconnection for customers who want to install net metered generation as a way to manage their household or business energy bills.

Another aspect of the typical approach for utilities that want to stop customer generation is to assert that net metering requires payments in excess of market prices for generation. This argument is wrong and intentionally misleading on several levels, but it is also an invitation to the Commission to waste valuable time and resources on questions that are nearly insignificant in importance.

The argument that net metering requires excessive payments or credits is inadequate and insufficient to support just and reasonable rates unless backed by objective data derived from the kind of full evaluation of benefits and costs already described in these comments. The experience from such analysis in many other states is that compensation for distributed solar generation at the full retail rate results in net metering customers subsidizing the utility and other utility customers, because distributed solar generation is better and more valuable than the average kWh the utility delivers to its customers.

A mainstay of arguments by anti-customer solar utilities is that net metering gives customers more compensation than the wholesale avoided cost rate, and therefore must give rise to a cross-subsidy to net metering customers. This argument is fundamentally flawed on many levels. First, it falsely equates distributed solar—which generates at or very near the point of load—with remote wholesale generation from fossil resources. Customer-generators are not in the business of selling electricity at wholesale—they are customers whose exports are jurisdictionally and quantitatively fundamentally different from wholesale sales. Second, it ignores environmental benefits from clean distributed generation, including permanent insurance against environmental costs relating to atmospheric pollution. This regulatory hedge value of distributed solar is not reflected in wholesale rates—because wholesale energy prices are fundamentally unhedged and more volatile. Third, it ignores the fact that customers make substantial private investments in net metered generation—investments that captive monopoly utility customers do not have to make. This means that unlike utility purchases or generation of wholesale power, it does not demand a utility rate of return and reflection in the rate base. Fourth, it ignores the fact that distributed solar is a constant-price resource with no

marginal cost and no fuel price volatility. This economic hedge value means that the overall portfolio of electricity generation serving all citizens of Kentucky has superior value and improved affordability.

All these differences are ignored by the flawed utility argument that distributed solar is over-compensated at anything but the wholesale rate. Even more, the utility argument ignores the empirical significance of the issue entirely. That is, even if the flawed utility arguments were taken at face value, the impact on non-customer generators would be so tiny and insignificant that it beggars regulatory and administrative efficiency, not to mention statistical reliability, to address the issue.

Under the assumptions that the wholesale rate is three cents per kilowatt-hour (\$0.03/kWh) and that the retail rate is ten cents per kilowatt-hour (\$0.10/kWh), the cost of net metering in Kentucky would be seven cents per kilowatt-hour (\$0.07/kWh). The reasonable *upper* limit of the impact on residential rates from an assumed “cost” of seven cents per kWh for each unit of energy exported to the grid is less than \$76,000 per year state wide at today’s market penetrations. That means that net metering represents about seven cents of the total annual electric bill per residential customer per year! A detailed treatment of this analysis is included in Appendix D to these comments.

- IX. The Commission should take the long view, including a realistic view of the opportunity for encouraging an electricity system in Kentucky that provides customers with a robust menu of choices and tools for managing energy bills, that grows the economy of Kentucky, and that encourages electric utilities to embrace innovation, customer preferences, and customer choices. Fairly considered in utility system planning, customer-owned and -financed distributed generation system offer significant and highly cost-effective resource value that leverages private investment

dollars, federal tax dollars (that mostly originate from taxpayers in other states), and the power of customer choice. As an attractive market for distributed energy resources and innovation, Kentucky can, in time, build the job base and economic development value that accompanies supply chain maturity and sector growth. Kentucky's future is on the table, and yesterday's business model for electricity services should not be allowed to sweep it off or monopolize it for private gain.

Appendix A

Information about Kentuckians for the Commonwealth and Mountain Association for Community Economic Development

Kentuckians for the Commonwealth (“KFTC”) is a community of people, inspired by a vision, working for a brighter future for all people, no matter our color, where we come from, or how much money we have. Together, we organize for a fair economy, a healthy environment, new safe energy, and an honest democracy. Our membership is open to all people who are committed to equality, democracy and non-violent change. Today we have fourteen chapters across the state, with 12,000 members in nearly all of Kentucky’s 120 counties.

KFTC is a grassroots organization with local chapters and at-large members in many counties in Kentucky. KFTC uses a set of core strategies, from leadership development to communications and voter empowerment, to impact a broad range of issues, including coal and water, new energy and transition, economic justice and voting rights.

KFTC members include:

- Folks from cities, rural areas and small towns
- Workers, unemployed and retired
- People of all income levels
- Families and single people
- Teachers, farmers, miners, nurses, social workers
- Young and old

KFTC website: <https://kftc.org>

Mountain Association for Community Economic Development (“MACED”) is a 43-year-old nonprofit that works with businesses and communities in eastern Kentucky to advance a just transition to a new economy in Central Appalachia. MACED offers loans and business guidance

to existing and startup enterprises, particularly those that may not qualify for traditional financing. MACED's energy programs help homeowners, businesses, nonprofits, schools and local governments use less energy and save money through utility bill analysis, on-site walk-through energy audits, consulting and financing.

MACED's values, which shape its work, include:

- Results — Meaningful outcomes for people and places in need.
- Sustainability — Long-term maintenance of the health of people, communities and the complex natural systems they depend on.
- Excellence — Constant attention to quality in all we do.
- Integrity and Respect — The foundation for our interactions with people in the region, partners, funders and each other.
- Place Matters — Local culture, history, natural beauty and identity are central to what is unique and important about Appalachia.
- Risk Taking — The complexity and persistence of the challenges we face require efforts that are creative, courageous, skilled and willing to fail.
- Equity — All people deserve fairness and our region needs development that is shared and just.

MACED website: <https://maced.org>

Appendix B

Information about Karl R. Rábago, Rábago Energy LLC

Karl R. Rábago, Rábago Energy LLC

Solar Experience

General: Karl R. Rábago has 30 years of experience working with the regulatory, technology, and business issues associated with solar energy, energy efficiency, wind energy, and utility regulation. He is an attorney and has earned degrees in business management, law, military law, and environmental law. He is a veteran of more than twelve years of service in the US Army, in the Armored Cavalry and Judge Advocate General's Corps. He has been married to Pam Rábago for more than 40 years, and has three children and two grandchildren. Karl lives in Denver.

Key Relevant Experience:

As a public utility commissioner in Texas in the early 1990s, Mr. Rábago worked with utilities in Texas to craft line extension rules and supported utility pilot and demonstration projects in Texas.

As NARUC Energy Conservation Committee Vice Chair, he co-led, with stakeholders from around the country, efforts to establish the Photovoltaic Collaborative Market Project to Accelerate Commercial Technology ("PV-COMPACT"), a supporting organization to the Utility PhotoVoltaic Group ("UPVG"), funded by an innovative and successful new approach to public/private partnership in technology demonstration and deployment.

As Deputy Assistant Secretary at the U.S. Department of Energy, he was responsible for the solar photovoltaic research, development, and demonstration, and supervised research programs conducted at the National Renewable Energy Laboratory, Sandia National Laboratory, universities, and other organizations. He testified before and worked with Congress to grow solar research programs funded at the Department of Energy.

While at the Environmental Defense Fund, Mr. Rábago worked with all the major utilities in Texas on deliberative polling exercises in the context of integrated resource planning to gauge and report strong public support in Texas for solar energy, and to reflect that support in the RPS enacted in utility restructuring.

While with CH2M HILL, an engineering firm, Mr. Rábago co-authored electricity industry restructuring studies for both Colorado and Alaska that addressed, among many other things, potential for solar energy development in those states.

At Rocky Mountain Institute, as a managing director, Mr. Rábago co-authored "Small Is Profitable," a definitive reference that characterizes the operational, engineering, financial, and economic benefits of right-sized energy resources, including solar PV.

While leading the Energy Solutions Group at the Houston Advanced Research Center, Mr. Rábago also served as President of the Board of Directors for the Texas Renewable Energy Industries Association.

As a director for the Jicarilla Apache Nation Utility Authority, Mr. Rábago oversaw the installation and operation of a solar PV demonstration project on tribal land.

At Austin Energy, Mr. Rábago led the utility's \$5 million annual capital program for solar project development on public buildings, and managed commercial and residential rebate and net metering programs as well. While there, he developed a new performance-based Incentive

program for commercial customers, and created the award winning “Value of Solar Tariff” now used in Austin for residential customers and subsequently adopted in Minnesota law.

Since 2012, Mr. Rábago has frequently provided advice to solar developers working throughout the United States.

As Executive Director of the Pace Energy and Climate Project, Mr. Rábago was an active participant in the New York “Reforming the Energy Vision” proceeding, including proceedings relating to the Value of Distributed Energy Resources.

As a consultant advisor to the National Audubon Society’s Arkansas chapter, Mr. Rábago has worked and continues to work on several past and on-going dockets before the Arkansas Public Service Commission on matters relating to net energy metering and markets for distributed energy resources.

Mr. Rábago has testified and/or submitted formal comments on solar valuation in Arkansas, California, Connecticut, Georgia, Guam, Iowa, Kentucky, Louisiana, Maine, Massachusetts, Michigan, Minnesota, Missouri, New York, North Carolina, Rhode Island, Vermont, and Virginia. (Case and docket citations available on request.)

Relevant Publications:

“Achieving 100% Renewables: Supply-Shaping through Curtailment,” with Richard Perez, Marc Perez, and Morgan Putnam, PV Tech Power, Vol. 19 (May 2019).

“A Radical Idea to Get a High-Renewable Electric Grid: Build Way More Solar and Wind than Needed,” with Richard Perez, The Conversation, online at <http://bit.ly/2YjnM15> (May 29, 2019).

“Reversing Energy System Inequity: Urgency and Opportunity During the Clean Energy Transition,” with John Howat, John Colgan, Wendy Gerlitz, and Melanie Santiago-Mosier, National Consumer Law Center, online at www.nclc.org (Feb. 26, 2019).

“Revisiting Bonbright’s Principles of Public Utility Rates in a DER World,” with Radina Valova, The Electricity Journal, Vol. 31, Issue 8, pp. 9-13 (Oct. 2018).

“Achieving very high PV penetration – The need for an effective electricity remuneration framework and a central role for grid operators,” Richard Perez (corresponding author), Energy Policy, Vol. 96, pp. 27-35 (2016).

“The Net Metering Riddle,” Electricity Policy.com, April 2016.

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The Potential Rate Impacts of Net Metering for KU/LG&E

Analysis of KU/LG&E Data Shows Net Metering Has Negligible Impact on Electric Rates

By Andy McDonald

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Kentucky's electric utilities, including KU/LG&E, have argued that net metering customers fail to pay their fair share of the costs of receiving service from the utility. They say that the general ratepayer is subsidizing net metering customers and legislation is needed to correct this unfair arrangement. This argument runs counter to mounting evidence from across the United States, which shows that net metering imposes no net costs on ratepayers and often actually provides net benefits.ⁱ However, even if KU/LGE's claims *were* true, how much money would we be talking about?

At a meeting of stakeholders to discuss net metering on September 15, 2015, KU/LGE made a presentation claiming that net metering customers were presently avoiding paying \$94,000 of fixed charges which all other ratepayers are thereby required to pay. They then projected that if net metering continues to expand until it reaches 1% of KU/LGE's annual peak demand, this alleged cost shift would grow to exceed \$4 million per year.ⁱⁱ While we can question how they arrived at this figure without any consideration of the benefits provided by net metering, let's accept it for the sake of discussion to gain some perspective on the magnitude of costs the utilities are concerned about.

According to the US Energy Information Administration (EIA), KU/LG&E sold 10.08 billion kWh of electricity to residential customers in 2015, generating over \$1 billion of revenue.ⁱⁱⁱ The amount that they claimed net metering customers avoided paying in 2015 was \$94,000, representing 0.009% of their total revenue from residential customers. If this cost were distributed among all ratepayers, it would add \$0.000009 per kWh to each customer's bill. The average residential customer who uses 1,080 kWh/month would see their bill increase by \$0.01 per month.

Projecting into the future when net metering reaches 1% of KU/LG&E's peak load (when the use of solar is 20 times greater than it is today), KU/LGE claim net metering will be shifting \$4.5 million per year onto all other ratepayers. This would add an additional \$0.00045/kWh to each ratepayer's bills. The impact of this on the average residential ratepayer would be \$0.49 per month.

Alleged Costs KU/LG&E Claimed Were Shifted from Net Metering Customers to All Ratepayers in 2015.^{iv}		
Total Residential Electricity Sales	10,075,843,000	kWh
Total Revenue from kWh Sales	\$ 1,002,158,000	
Costs Net Metering customers allegedly avoided paying in 2015, according to KU/LG&E presentation on 9/15/15	\$ 94,000	
Additional cost per kwh allegedly caused by net metering	\$ 0.000009	Per kWh
Potential impact on average residential customer's monthly bill (using 1,080 kWh/month)	\$ 0.01	per month

However, this is the scale of the potential costs of net metering claimed by KU/LGE **before accounting for any of the benefits offered by net metering.** The following are just a few of the categories where the benefits of distributed generation can be found:

- Avoided Energy and Demand Costs
- Avoided Capital and Capacity Investment
- Reduced Wear on Utility Infrastructure
- Mitigating Financial Risk
- Improving Grid resiliency
- Avoided Environmental Compliance Costs

Many studies of the value of distributed solar and net metering have been performed by state agencies, public utility commissions, and private research firms, as well as by electric utilities. When they look at the broad range of benefits that net metering provides to the grid and ratepayers, they commonly find that there is no net cost to ratepayers and that in fact, in many cases there are benefits that actually reduce costs for everyone. These net benefits are found even before considering broader societal benefits such as economic development, job creation, or public health.^v

As stated in a report by the Brookings Institution: "So what does the accumulating national literature on costs and benefits of net metering say? Increasingly it concludes—whether conducted by PUCs, national labs, or academics — that the economic benefits of net metering actually outweigh the costs and impose no significant cost increase for non-solar customers. Far from a net cost, net metering is in most cases a net benefit—for the utility and for non-solar rate-payers."^{vi}

The electric utilities claim that net metering customers impose costs on all other ratepayers, but they fail to acknowledge and account for the benefits of net metering, resulting in a one-sided, incomplete assessment of its actual value. It is only reasonable to expect the utilities to do a complete accounting of all relevant cost and benefits when there has been so much research throughout the country demonstrating that these benefits are real.

But before we proceed with this cost/benefit analysis, we need to ask whether it is even necessary considering the minimal scale of the issue. Is it a reasonable use of the Public Service

Commission's time and resources to save customers one cent per month? Would the cost of administering rate cases to litigate these issues exceed the benefit to ratepayers?

These conclusions are consistent with a report released by the US Department of Energy's Berkley Lab, *Putting the Potential Rate Impacts of Distributed Solar into Context*. This study concluded, "for the vast majority of states and utilities, the effects of distributed solar on retail electricity prices will likely remain negligible for the foreseeable future."^{vii} The report states that there are numerous factors which have a much greater impact on electricity rates than distributed solar, such as capital expenditures, natural gas prices, and energy efficiency.

Net metering is a simple, effective policy that supports one of the fastest growing industries in the United States. The solar industry offers great economic development potential for Kentucky. The minimal financial impact that the utilities have focused on pales in comparison to the great good that could come from a thriving solar industry in Kentucky. It also pales in comparison to the great harm that would occur to the small businesses offering solar services in Kentucky and the customers who would seek to use solar to control their energy costs, should net metering be undermined or eliminated.

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The Potential Economic Impact on Kentucky Residential Customers of Energy “Sold”⁷ to Utilities from Net Metering Solar Customers in 2018

This section explores the economic impact of net metering on non-participating residential ratepayers from excess electricity supplied to the grid and compensated at the one-to-one retail rate. The analysis is based on data reported by utilities to the U.S. Energy Information Administration on Form EIA-861.⁸

One argument that electric utilities have made is that under one-for-one retail rate net metering, customer-generators receive excessive compensation for the excess generation that they supply to the utility. The utilities argue that this excess generation should be valued closer to their "avoided cost" rate or the wholesale rate, which we estimate to be about \$0.03 to \$0.04/kWh. Assuming an average residential retail rate is \$0.10/kWh, and the average "avoided cost" rate is \$0.03/kWh, net metering customers, according to the utilities, “cost” about \$0.07/kWh for their excess generation. The utilities contend that these additional costs must be paid by all other ratepayers.

This analysis shows that, for 2018, the economic impact for any non-participating customer ranged from a high of 4.7 cents per month, or 56 cents a year, to a low of 0.2 cents per month, or 3 cents per year, with an average impact on non-participating customers of 0.6 cents per month, or 6.7 cents per year.

The total amount of alleged “additional costs” paid by all utilities in Kentucky due to net metering in 2018 was \$75,458 or \$8,384 per utility with net metering customers. Data for all regulated utilities who reported net metering information to the US EIA is provided in the accompanying table.

This analysis assumes that excess generation from net metering customers is in fact only worth the avoided cost rate, which is incorrect. This assumption disregards the many benefits that net metering provides to the utility and other ratepayers, and the important fact that excess distributed generation serves the nearest distribution load—without any wholesale transmission costs or losses. At times of peak demand in the summer when solar production is also at its peak, solar generation offsets the need for utilities to use their most costly peaking generation resources. *This analysis therefore reflects the upper limit of potential costs* that net metering might impose on other customers.

⁷ The EIA data set uses the term “Energy Sold Back” to describe excess generation supplied by the net metering customer-generator to the utility. However, we should be clear that NM customers do not “sell” electricity to the utilities and are never “paid” for their generation. Until the Commission issues a new order to change the compensation rates for net metering in accordance with the Net Metering Act of 2019, compensation for excess generation has been and will be in the form of kwh credits.

⁸ US Energy Information Administration, *Sales to Ultimate Customers 2018* (filename: Sales_Ult_Cust_2018.xlsx) provided the total number of residential customers per utility. Net Metering 2018 (filename: Net_Metering_2018.xlsx) provided the total MWh sold back to each utility from residential customers. These reports can be found at *US Energy Information Administration, Annual Electric Power Industry Report, Form EIA-861 detailed data files*. <https://www.eia.gov/electricity/data/eia861/>



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The Potential Economic Impact on Residential Ratepayers Of Energy Supplied To Utilities From Net Metering Customers in 2018

Comparing the value of excess generation from net metering customers credited at the retail rate vs. the avoided cost rate (a difference approximated to be \$0.07/kWh).

A	B	C	D	E	F	G
Utility Name	RESIDENTIAL Energy "Sold Back" in 2018 (MWH)	RESIDENTIAL Energy "Sold Back" in 2018 (KWH)	Value of NM Credits @ \$0.07/kWh	# of Residential Customers	Annual Cost per Customer	Monthly Cost per Customer
Clark Energy Coop Inc - (KY)	44.790	44,790	\$ 3,135.30	24,693	\$ 0.13	\$ 0.011
Cumberland Valley Electric, Inc.	176.000	176,000	\$ 12,320.00	21,978	\$ 0.56	\$ 0.047
Grayson Rural Electric Coop Corp	9.857	9,857	\$ 689.99	14,185	\$ 0.05	\$ 0.004
Kentucky Utilities Co	191.724	191,724	\$ 13,420.68	431,614	\$ 0.03	\$ 0.003
Louisville Gas & Electric Co	141.711	141,711	\$ 9,919.77	362,112	\$ 0.03	\$ 0.002
Nolin Rural Electric Coop Corp	236.000	236,000	\$ 16,520.00	33,446	\$ 0.49	\$ 0.041
Salt River Electric Coop Corp	85.400	85,400	\$ 5,978.00	48,714	\$ 0.12	\$ 0.010
South Kentucky Rural E C C	107.280	107,280	\$ 7,509.60	61,575	\$ 0.12	\$ 0.010
Kentucky Power Co	85.203	85,203	\$ 5,964.21	134,959	\$ 0.04	\$ 0.004
TOTAL		1,077,965	\$ 75,457.55	1,133,276		
Average "Cost" per utility			\$ 8,384.17			
Average "Cost" per ratepayer					\$ 0.067	\$ 0.006

One utility argument is that under one-for-one retail rate net metering, customer-generators receive excessive compensation for their excess generation supplied to the utility. The utilities argue that this excess generation should be valued closer to their "avoided cost" rate or the wholesale rate, which is about \$0.03 - 0.04/kWh. Assuming the average residential retail rate is \$0.10/kWh and the average "avoided cost" rate is \$0.03/kWh, this table shows how much the utilities "over-compensated" for net metering customer's excess generation (column D). Columns F and G show what the impact of this "cost shift" would be if the utility were to recover this value from all other residential ratepayers.



- i “Rooftop Solar: Net metering is a net benefit,” Mark Muro and Devashree Saha, Brookings Institution, May 23, 2016, p. 4.
- ii Power Point Presentation from KU/LGE to Senator Morgan McGarvey and the Net Metering Discussion Group, September 15, 2015.
- iii US Energy Information Administration, Form 861 for 2015. <https://www.eia.gov/electricity/data/eia861/>.
- iv Ibid.
- v “Shining Rewards: The Value of Rooftop Solar for Consumers and Society,” Environment America and the Frontier Group, 2016.
- vi “Rooftop Solar: Net metering is a net benefit,” p. 4.
- vii “Putting the Potential Rate Impacts of Distributed Solar into Context,” Galen Barbose, US DOE Berkley Lab, February 2017, p.3.

COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

ELECTRONIC APPLICATION OF KENTUCKY)
POWER COMPANY FOR (1) A GENERAL)
ADJUSTMENT OF ITS RATES FOR ELECTRIC)
SERVICE; (2) APPROVAL OF TARIFFS AND)
RIDERS; (3) APPROVAL OF ACCOUNTING)
PRACTICES TO ESTABLISH REGULATORY)
ASSETS AND LIABILITIES; (4) APPROVAL OF)
A CERTIFICATE OF PUBLIC CONVENIENCE)
AND NECESSITY; AND (5) ALL OTHER)
REQUIRED APPROVALS AND RELIEF)

CASE NO.
2020-00174

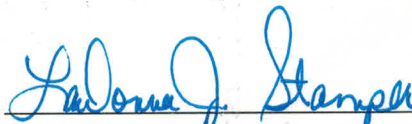
AFFIDAVIT

I hereby affirm that my prefiled direct testimony in the matter of *Electronic Application Of Kentucky Power Company For (1) A General Adjustment Of Its Rates For Electric Service; (2) Approval of Tariffs And Riders; (3) Approval Of Accounting Practices To Establish Regulatory Assets And Liabilities; (4) Approval of A Certificate Of Public Convenience And Necessity; And (5) All Other Required Approvals And Relief*, is true and accurate to the best of my information and belief.



Andy McDonald

Subscribed and sworn to before me, a notary public in the County of Franklin Ky, by Andy McDonald, this 7th day of October, 2020.



Notary Public

My commission expires 06.03.2024 KYNP#8586

