

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

**In the Matter of:**

<b>ELECTRONIC JOINT APPLICATION</b>	)	
<b>OF LOUISVILLE GAS AND</b>	)	
<b>ELECTRIC COMPANY AND</b>	)	
<b>KENTUCKY UTILITIES COMPANY</b>	)	
<b>FOR APPROVAL OF A SOLAR</b>	)	
<b>POWER CONTRACT AND TWO</b>	)	<b>CASE NO. 2020-00016</b>
<b>RENEWABLE POWER</b>	)	
<b>AGREEMENTS TO SATISFY</b>	)	
<b>CUSTOMER REQUESTS FOR A</b>	)	
<b>RENEWABLE ENERGY SOURCE</b>	)	
<b>UNDER GREEN TARIFF OPTION 3</b>	)	

**TESTIMONY OF**  
**DAVID S. SINCLAIR**  
**VICE PRESIDENT, ENERGY SUPPLY AND ANALYSIS**  
**KENTUCKY UTILITIES COMPANY AND**  
**LOUISVILLE GAS AND ELECTRIC COMPANY**

**Filed: January 23, 2020**

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1 **Section 1 – Introduction and Overview**

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

3 A. My name is David S. Sinclair. I am Vice President, Energy Supply and Analysis for  
4 Kentucky Utilities Company (“KU”) and Louisville Gas and Electric Company  
5 (“LG&E”) (collectively “Companies”), and an employee of LG&E and KU Services  
6 Company, which provides services to KU and LG&E. My business address is 220  
7 West Main Street, Louisville, Kentucky 40202.

8 **Q. Have you previously testified before the Kentucky Public Service Commission**  
9 **(“Commission”)?**

10 A. Yes, I have testified before the Commission numerous times in a variety of cases.<sup>1</sup> I  
11 testified most recently in Case No. 2018-00294, *Electronic Application of Kentucky*  
12 *Utilities Company for an Adjustment of Its Electric Rates*, and Case No. 2018-00295,  
13 *Electronic Application of Louisville Gas and Electric Company for an Adjustment of*  
14 *Its Electric and Gas Rates*.

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<sup>1</sup> Among other cases, I testified before the Commission in the following cases: Case No. 2016-00370, *Application of Kentucky Utilities Company for an Adjustment of Its Electric Rates and for Certificates of Public Convenience and Necessity*; Case No. 2016-00371, *Application of Louisville Gas and Electric Company for an Adjustment of Its Electric and Gas Rates and for Certificates of Public Convenience and Necessity*; Case No. 2015-00194, *Investigation of Kentucky Utilities Company's and Louisville Gas and Electric Company's Respective Need for and Cost of Multiphase Landfills at the Trimble County and Ghent Generating Stations*; Case No. 2014-00371, *Application of Kentucky Utilities Company for an Adjustment of Its Electric Rates*; Case No. 2014-00372, *Application of Louisville Gas and Electric Company for an Adjustment of Its Electric and Gas Rates*; Case No. 2011-00161, *The Application of Kentucky Utilities Company for Certificates of Public Convenience and Necessity and Approval of Its 2011 Compliance Plan for Recovery By Environmental Surcharge*; Case No. 2011-00162, *The Application of Louisville Gas and Electric Company for Certificates of Public Convenience and Necessity and Approval of Its 2011 Compliance Plan for Recovery By Environmental Surcharge*; Case No. 2011-00375, *Joint Application of Louisville Gas and Electric Company and Kentucky Utilities Company for a Certificate of Public Convenience and Necessity and a Site Compatibility Certificate for the Construction of a Combined Cycle Combustion Turbine at the Cane Run Generating Station and the Purchase of Existing Simple Cycle Combustion Turbine Facilities From Bluegrass Generation Company, LLC in La Grange, Kentucky*; and Case No. 2014-00002, *Joint Application of Louisville Gas and Electric Company and Kentucky Utilities Company for a Certificate of Public Convenience and Necessity for the Construction of a Combined Cycle Combustion Turbine at the Green River Generating Station and a Solar Photovoltaic Facility at the E.W. Brown Generating Station*.

1 **Q. Please describe your job responsibilities.**

2 A. I have five primary areas of responsibility: (i) fuel procurement (coal and natural gas)  
3 and coal combustion residuals marketing for the Companies' generating stations, (ii)  
4 real-time dispatch optimization of the generating stations to meet the Companies'  
5 native load obligations, (iii) wholesale market activities, (iv) sales and market analysis  
6 and generation planning, and (v) technology research and analysis. As it pertains to  
7 this proceeding, the Generation Planning group prepared the Resource Assessment of  
8 the responses to the Companies' Request for Proposals for renewable generation  
9 ("Renewable RFP") and the Power Supply group negotiated the solar power contract  
10 with ibV Energy Partners, the winning bidder from the Renewable RFP, and the  
11 Renewable Power Agreements ("RPA") with Toyota Motor Manufacturing, Kentucky  
12 Inc., ("Toyota") and Dow Silicones Corporation ("Dow") as described under Option  
13 #3 of the Companies' Green Tariff. Green Tariff Option #3 enables large customers  
14 with greater than 10 MVA (or 10 MW as is appropriate) load to purchase renewable  
15 energy in excess of 10 MW nameplate AC through the Companies. This work was  
16 performed under my direction and overall supervision.

17 **Q. What are the purposes of your testimony?**

18 A. The purposes of my testimony are to describe the Companies' process for soliciting  
19 potential renewable energy sources, the methodology used to evaluate various  
20 responses to the Renewable RFP, the negotiations undertaken which resulted in the  
21 contract with Rhudes Creek Solar, LLC<sup>2</sup> ("Solar Power Contract"), and the major  
22 commercial attributes of the Solar Power Contract and RPAs.

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<sup>2</sup> Rhudes Creek Solar, LLC is a limited liability company organized under the laws of Delaware and is wholly owned by ibV Energy Partners. It is authorized to transact business in Kentucky.

1 **Q. Are you sponsoring any exhibits to your testimony?**

2 A. Yes. I am sponsoring the following exhibit to my direct testimony:

3 **Exhibit DSS-1** Renewable RFP

4 **Exhibit DSS-2** 2019 Resource Assessment: Renewable RFP

5 **Section 2 – Overview of the Renewable RFP**

6 **Q. Please describe the Companies' Renewable RFP.**

7 A. The Companies issued the Renewable RFP on February 4, 2019 for 10 MW to 200  
8 MW of renewable electrical power and energy with a preference for delivery starting  
9 no later than January 1, 2022. The Renewable RFP stated that the generation facilities  
10 must be in Kentucky or surrounding states, energy delivery be for a term from five to  
11 twenty years, and new generation assets were preferred. The Renewable RFP was  
12 sent to over 50 project developers, marketers, generation asset owners, and renewable  
13 energy trade groups. The Companies also issued a press release regarding the  
14 Renewable RFP<sup>3</sup> and placed a link to the Renewable RFP on their website to generate  
15 interest.<sup>4</sup> Responses to the Renewable RFP were due on March 29, 2019. A copy of  
16 the Renewable RFP is attached to my testimony as Exhibit DSS-1.

17 **Q. Why did the Companies issue the Renewable RFP?**

18 A. The Companies issued the Renewable RFP to systematically assess the cost of  
19 acquiring renewable energy delivered to its transmission system as a means to either  
20 reduce customers' energy costs or increase renewable generation at a modest

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<sup>3</sup> Press Release, Louisville Gas and Electric Company and Kentucky Utilities Company, LG&E and KU Issue Request for Renewable Energy (February 4, 2019) (*available at* <https://lge-ku.com/newsroom/press-releases/2019/02/04/lge-and-ku-issue-request-renewable-energy>).

<sup>4</sup> Request for Proposals (RFP) to Sell Renewable Electrical Power and Energy (February 4, 2019) (*available at* <https://lge-ku.com/sites/default/files/2019-02/RFP-February-2019.pdf>).

1 incremental cost. As the Companies had recently proposed the establishment of a new  
2 “green tariff” for larger customers in their pending rate cases,<sup>5</sup> the responses to the  
3 Renewable RFP would provide real transactional opportunities to support interest in  
4 what became known as Green Tariff Option #3 if the Kentucky Public Service  
5 Commission approved the proposal.

6 **Q. Did the Renewable RFP fundamentally differ from other RFPs the Companies**  
7 **had previously issued?**

8 A. No. It differed from previous RFPs only in it was focused exclusively on renewable  
9 generation technologies, preferred new generation projects, and was not issued to meet  
10 a need for reliability or capacity. The Renewable RFP was focused on trying to  
11 acquire lower cost energy that could displace energy on a non-firm basis from the  
12 Companies’ existing fossil fuel fleet. By focusing on energy only, the Companies  
13 were increasing the likelihood that renewable generation would be competitive.

14 **Q. Why did the Companies prefer new generation projects?**

15 A. The Companies primarily made this request in anticipation that potential Green Tariff  
16 Option #3 customers would prefer new projects to meet “additionality” attributes for  
17 renewable energy. Often, to meet corporate sustainability goals, large corporations  
18 wish to promote their procurement of renewable energy from a new renewable  
19 generation source so their actions are viewed as supporting “additional” renewable  
20 generation beyond business as usual generating assets that would be added regardless  
21 of their own participation.

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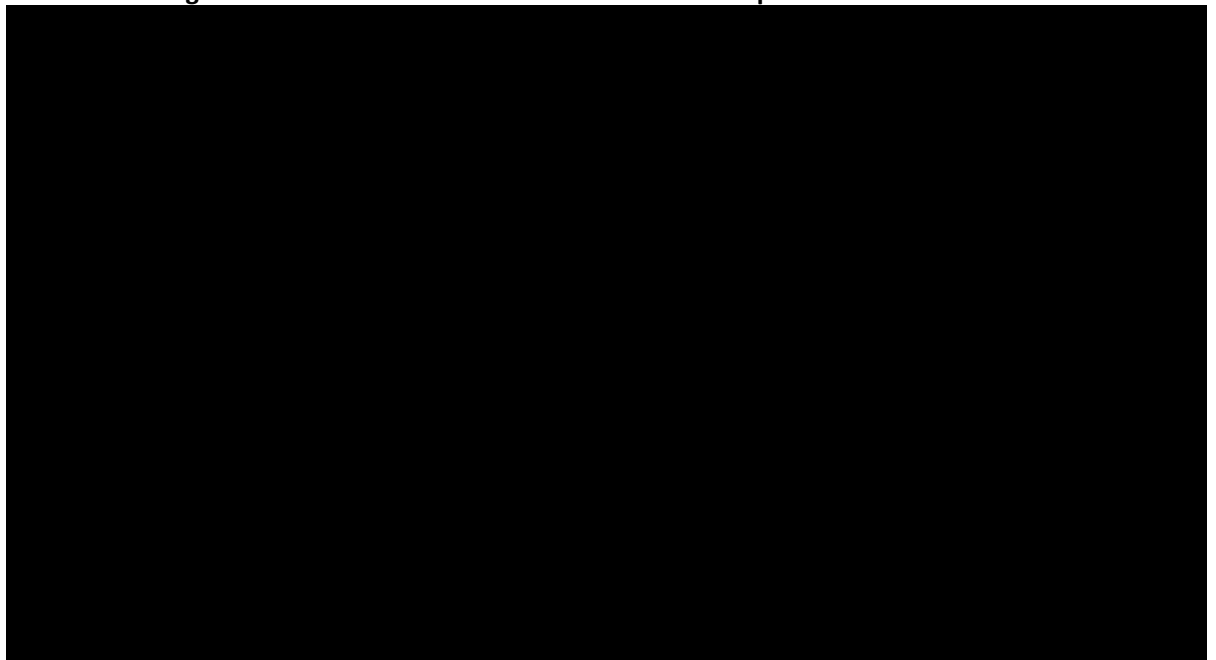
<sup>5</sup> *Electronic Application of Kentucky Utilities Company for an Adjustment of its Electric Rates*, Case No. 2018-00294 (April 30, 2019); *Electronic Application of Louisville Gas and Electric Company for an Adjustment of its Electric and Gas Rates*, Case No. 2018-00295 (April 30, 2019).

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1 **Q. How many responses were received to the Renewable RFP?**

2 A. The Companies received 94 proposals from 16 respondents, including 71 initial  
3 proposals and 23 subsequent proposals that the Companies requested for revised sizes  
4 and terms. The proposals were primarily for solar energy located in Kentucky but  
5 included wind energy in Illinois and Ohio and battery storage options in Kentucky.  
6 The proposals ranged between 10 MW and 200 MW in size, between 10 and 30 years  
7 in term, and between \$■/MWh and \$■MWh in price, on a level price basis. Figure  
8 1 shows the range of responses.

**Figure 1 – Distribution of Initial Solar and Wind Proposals’ Costs and Terms**



9 **Q. Please describe the process that was used to evaluate the responses.**

10 A. The process used to evaluate the Renewable RFP is described in detail in “2019  
11 Resource Assessment: Renewable RFP,” which is attached to my testimony as Exhibit  
12 DSS-2. The Companies conducted their analysis of the Renewable RFP proposals in  
13 four phases:

- 1                   1. A screening analysis was performed to identify the lowest cost proposals  
2 among the various technology types, nameplate capacity sizes, and contract terms;
- 3                   2. The lowest cost proposals from the screening analysis were evaluated in a  
4 detailed production cost analysis to estimate each proposal's impact to system energy  
5 costs and from this evaluation a short-list of bidders was developed;
- 6                   3. Best and final pricing and terms from the short-listed bidders were  
7 evaluated; and,
- 8                   4. The top proposal was evaluated based on new fuel forecasts from the 2020  
9 Business Plan and scenarios with CO<sub>2</sub> and renewable energy certificate ("RECs")  
10 pricing.

11 **Q. Did the Companies conduct meetings with any of the short-listed bidders?**

12 A. Yes.

13 **Q. Please describe the nature and purpose of the meetings with these bidders.**

14 A. The Companies met with the best two evaluated short-listed bidders. These meetings  
15 allowed the Companies to address such issues as land control, local and state permits,  
16 transmission interconnection, construction schedule, the overall project timeline;  
17 plans for operation and maintenance of the facility and how those plans would align  
18 with the guaranteed availability; and each bidder's general project development  
19 experience and capabilities.

20 **Q. What was the Companies' criteria for determining the best proposal?**

21 A. The primary factor was the proposal's potential to lower customers' energy costs over  
22 the life of the contract with the least risk. Since both finalists proposed new generation  
23 facilities, the Companies also focused considerable time and attention to each project's



1 attributes, the degree to which each developer had made progress on the project (e.g.,  
2 land control), and the developer’s track record for developing, financing, and  
3 constructing solar projects.

4 **Q. What did the Companies select as the best proposal?**

5 A. The Companies have negotiated a 20-year, 100 MW nameplate solar contract with a  
6 commercial operation target date of December 31, 2021 with ibV Energy Partners  
7 (“ibV”) for a level price of \$27.82/MWh. ibV Energy Partners is a wholly-owned  
8 subsidiary of ib vogt GmbH of Berlin, Germany that has developed, built and  
9 commissioned more than 80 projects while investing in and developing more than 2  
10 GW of solar photovoltaic systems around the world. The actual contract counterparty  
11 will be Rhudes Creek Solar, LLC, which is wholly owned by ibV. ibV Energy  
12 Partners submitted its proposal for a 20-year, 100 MW nameplate solar contract during  
13 the third phase of the evaluation process in response to the Companies’ request to  
14 short-listed bidders for proposals for a standardized set of contract capacities, terms  
15 and start dates.

16 **Q. The 2019 Resource Assessment states at Section 3.3 (Finalist Evaluation) that ibV**  
17 **offered two possible project start dates, December 31, 2021 and December 31,**  
18 **2022. Why did the Companies select the earlier project start date?**

19 A. As I mentioned, the Companies stated in the Renewable RFP a preference for energy  
20 delivery beginning before January 1, 2022. This preference was driven by (i) the  
21 ability to provide renewable energy to potential Green Tariff Option #3 customers  
22 earlier and (ii) a desire to mitigate uncertainties that increase with the passage of time.  
23 For example, tax incentives for renewables are scheduled to decrease beginning in

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1 2020. Also, as with any construction project, delay only allows the potential for issues  
2 to arise that could further delay the project. Furthermore, adding a resource sooner  
3 rather than later allows more time to learn how additional intermittent resources will  
4 impact the operation of the Companies' grid and generation fleet. This is especially  
5 important because many analysts are forecasting that solar and wind resources will  
6 become increasingly competitive with energy costs from coal generation. Despite the  
7 Companies' preference to begin receiving renewable energy earlier, the Companies'  
8 were willing to delay the start date if the delay produced material savings for  
9 customers.

10 Late in the discussions, ibV proposed delaying the project by one year and  
11 reducing the level price by [REDACTED]/MWh. This lower price level was not material,  
12 saving only about \$ [REDACTED] annually, and would have introduced unnecessary delay  
13 with all the associated delayed benefits and increased project risks that I just discussed.

14 **Q. The 2019 Resource Assessment states at Section 3.3 (Finalist Evaluation) that ibV**  
15 **also offered both level and escalating pricing. Why did the Companies select the**  
16 **level pricing alternative?**

17 A. The Companies chose the level price option to (i) ensure the Solar Power Contract's  
18 price in the future does not become perceived as out of line with potential new  
19 renewable generation should future solar generation costs decline as some analysts  
20 forecast, (ii) reduce the risk from long-term future fuel price escalation, (iii) reduce  
21 the risk from future REC price levels, and (iv) be more attractive to potential Green  
22 Tariff Option #3 customers with a preference for stable prices.

1 **Q. Why are the Companies moving forward with only one proposal and for less than**  
2 **the full 200 MW that was requested in the Renewable RFP?**

3 A. The 200 MW request in the Renewable RFP was a maximum nameplate capacity, not  
4 a minimum. This project is the Companies' first foray into a solar contract and we  
5 have selected the best proposal and project from the Renewable RFP. It so happens  
6 that this project is for 100 MW nameplate. While a second-best proposal and project  
7 could have been selected and pursued to reach an arbitrary size of 200 MW in total  
8 renewable generation, the economics, risk profile, and ability to contract with potential  
9 Green Tariff Option #3 customers were not sufficiently compelling at this time to  
10 pursue a second contract.

11 This project is a major step in solar generation for the Companies and the  
12 Commonwealth. If approved and constructed, it will be the one of the largest solar  
13 projects in Kentucky - 10 times larger than the Companies' Brown Solar project.

14 Adding 100 MW of nameplate solar to the Companies' system will allow the  
15 Companies to gain additional experience in the integration of large solar facilities into  
16 the existing generation and transmission systems. For example, having a second large  
17 solar site will allow the Companies to better study the impact of geographical diversity  
18 on the coincident intermittence of multiple renewable resources. Finally, assuming  
19 this project and Solar Power Contract are successfully implemented, and solar costs  
20 continue to moderate, then the Companies' experience from the Renewable RFP, the  
21 subsequent analysis, and Solar Power Contract negotiations and implementation will  
22 provide valuable insights for future renewable generation efforts.

23 **Q. Will the Companies seek to add more renewable generation in the future?**

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1 A. The Companies are always seeking ways to lower their cost of providing energy to  
2 their customers, regardless of generating technology. So long as renewable generation  
3 permits the Companies to lower their energy costs, they will seek to add more  
4 renewable generation.

5 **Q. Were there any lessons learned that might impact future efforts to acquire**  
6 **renewable generation?**

7 A. Yes. The following factors clearly impacted pricing:

- 8 • Larger projects (100 MW or larger) were generally lower priced than smaller  
9 projects – in the range of \$■/MWh to \$■/MWh.
- 10 • A longer contract term (20 years) was less expensive than a shorter contract  
11 term (15 years) – in the range of \$■/MWh to \$■/MWh.

12 Therefore, to get the best pricing, future Green Option #3 customers will likely want  
13 to be part of a larger project like this one and be willing to commit to 20-year term.  
14 Similarly, the Companies will likely emphasize project size and contract term the next  
15 time they issue a renewable RFP.

16 **Q. Will any coal units be retired if the proposed Solar Power Contract is approved?**

17 A. No. As demonstrated in the 2019 Resource Assessment, the energy from the Solar  
18 Power Contract is non-firm, must-take energy. Non-firm energy cannot be counted  
19 on to reliably serve load and, as the Resource Assessment demonstrates, the energy  
20 that is expected to be delivered will generally replace energy from higher cost  
21 resources. It is only in this context of non-firm, must-take energy that the Solar Power  
22 Contract is valuable to customers. Because the energy is “must-take,” it is different  
23 from pure economy energy in that it is not dispatchable or guaranteed to be economic

1 in every hour. Without the reliability and grid services that are provided by the  
2 Companies' existing coal and natural gas fleet, the Companies would not move  
3 forward with any of the Renewable RFP proposals.

4 **Q. Should the proposals that included battery storage be considered firm capacity?**

5 A. Yes. However, as discussed in Section 3.2.1 of the 2019 Resource Assessment, the  
6 Companies evaluated the battery proposals as a dispatchable resource comparable to  
7 an existing natural gas-fired simple cycle turbine and were determined not to be  
8 economic. The analysis demonstrated that batteries are not currently economically  
9 viable to replace the Companies' existing dispatchable capacity. Furthermore, since  
10 battery storage can be charged with any type of generation, the more reliable the  
11 energy source for charging the battery, the more reliable the battery becomes. Hence,  
12 intermittent generation from wind and solar may not be the best source for reliably  
13 charging a battery.

14 **Q. In the Companies' evaluation of the various proposals, did they assume that a  
15 long-term purchase power contract would be treated as long-term debt by the  
16 debt rating agencies?**

17 A. No, not in the evaluation contained in the 2019 Resource Assessment. However, it is  
18 quite possible that the rating agencies may view the Solar Power Contract or any future  
19 long-term purchase power agreement as a debt equivalent. Should that be the case,  
20 the Companies will include in future evaluations any potential cost implications from  
21 treating long-term purchase power contracts as debt.

22 **Q. What would be the impact to the Companies should rating agencies treat the  
23 Solar Power Contract or any future purchase power contracts as long-term debt?**

1 A. If the Companies' took no actions to adjust their equity balance to offset a portion of  
2 the higher level of debt calculated by the rating agencies or adjust other rating criteria,  
3 then it is possible that the Companies' debt would be downgraded which would  
4 increase future borrowing costs. The Companies will monitor this issue and take the  
5 appropriate actions to mitigate the risk of any negative consequences from long-term  
6 purchase power agreements on future borrowing costs and our customers' rates.

7 **Section 3 – Impact of the Solar Power Contract on Future Energy Costs**

8 **Q. How will energy from the Solar Power Contract be allocated between Toyota,  
9 Dow, and all customers?**

10 A. For each interval of time (e.g., an hour), the energy received from the Solar Power  
11 Contract will be allocated as follows: 50 percent to Toyota, 25 percent to Dow, and  
12 25 percent to all customers. Furthermore, of the portion allocated to all customers, 39  
13 percent is allocated to LG&E customers and 61 percent is allocated to KU customers.  
14 This means that, of the 25 percent that is not allocated to Toyota and Dow, all LG&E  
15 customers will receive 9.75 percent and all KU customers will receive 15.25 percent  
16 of the energy in an hour. For example, if during an hour the Rhudes Creek Solar plant  
17 produced 60 MWh then Toyota would receive 30 MWh, Dow would receive 15 MWh,  
18 all LG&E customers would receive 5.85 MWh (= 60 MWh \* 9.75%), and all KU  
19 customers would receive 9.15 MWh (= 60 MWh \* 15.25%). Table 1 summarizes  
20 these allocations.

<b>Table 1</b>				
	<b>All Customers</b>	<b>Green Tariff Option #3</b>		<b>Overall</b>
		<b>Toyota</b>	<b>Dow</b>	
<b>Total Solar Power Contract Allocation</b>	25%	50%	25%	100%
<b>Customer Assignment by Utility</b>				
LG&E	39%	--	--	
KU	61%	100%	100%	
<b>Utility Solar Power Contract Allocation</b>				
LG&E	9.75%	--	--	9.75%
KU	15.25%	50%	25%	90.25%

1 **Q. Will the Companies acquire renewable energy certificates (“RECs”) with the**  
2 **energy purchased from the Solar Power Contract?**

3 A. Yes. For each MWh of energy that the Companies purchase via the Solar Power  
4 Contract they will receive one REC at no additional cost.

5 **Q. What will the Companies do with these RECs?**

6 A. Absent an obligation in Kentucky or Virginia for renewable energy, the RECs  
7 associated with the energy that is delivered to all customers will be sold into the  
8 market, with the proceeds being returned to all customers, just as is currently done  
9 with the RECs created by Brown Solar. The RECs associated with the energy  
10 delivered to Toyota and Dow will be transferred to those two customers at no  
11 additional cost since they will be paying for that energy under their RPAs.

12 **Q. Please describe the economic implications of the Solar Power Contract to all**  
13 **customers, excluding the energy that will be delivered to Toyota and Dow.**

14 A. The Companies evaluated the Solar Power Contract under numerous scenarios, which  
15 considered the uncertainty in fuel prices, CO<sub>2</sub> emissions prices, REC prices, and the

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1 timing of the retirement of the Companies’ generating units. The net present value for  
2 revenue requirements (“NPVRR”) for the portion of the Solar Power Contract  
3 allocated to all customers is summarized in Table 12 of the 2019 Resource Assessment  
4 and is reprinted below as Table 2 of my direct testimony. Over all the scenarios  
5 evaluated, the NPVRR in 2019 dollars ranges from [REDACTED]  
6 [REDACTED] with an average of [REDACTED]. Only 6 of the 48 cases  
7 result in an [REDACTED] in NPVRR. In the 6 cases where the Solar Power Contract  
8 [REDACTED] NPVRR, the average [REDACTED] is [REDACTED], while in the 42 cases where  
9 NPVRR [REDACTED] the average [REDACTED] is [REDACTED]. Excluding the 24 high CO<sub>2</sub>  
10 emissions price cases, the overall average of the 24 zero CO<sub>2</sub> emissions price cases is  
11 [REDACTED]. In the 18 zero CO<sub>2</sub> emissions price cases that [REDACTED] NPVRR,  
12 the average [REDACTED] is [REDACTED], which compares favorably to the [REDACTED]  
13 [REDACTED] in the 6 cases where NPVRR [REDACTED]. In the scenarios with low fuel  
14 prices and zero CO<sub>2</sub> emissions prices, the NPVRR is favorable when the levelized  
15 REC price is [REDACTED]/REC or higher, a price level that is well below the over \$10/REC  
16 average price achieved by the Companies in 2019 when they sold Brown Solar RECs.  
17 In the scenarios with base fuel prices and zero CO<sub>2</sub> emissions prices, the NPVRR is  
18 favorable when the levelized REC price is [REDACTED]/REC or higher.



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Table 2						
Fuel Price Scenario	CO <sub>2</sub> Emissions Price Scenario	Unit Life Scenario	Levelized REC Price			
			\$0/REC	\$█/REC	\$█/REC	\$█/REC
Low	Zero	55-Year	█	█	█	█
		65-Year	█	█	█	█
	High	55-Year	█	█	█	█
		65-Year	█	█	█	█
Base	Zero	55-Year	█	█	█	█
		65-Year	█	█	█	█
	High	55-Year	█	█	█	█
		65-Year	█	█	█	█
High	Zero	55-Year	█	█	█	█
		65-Year	█	█	█	█
	High	55-Year	█	█	█	█
		65-Year	█	█	█	█

- 1 **Q. Will the Solar Power Contract likely reduce the cost of energy for customers over**  
2 **its 20-year life?**
- 3 **A.** Yes. While the renewable energy is not likely to result in lower energy costs in every  
4 hour of the Solar Power Contract’s 20-year term, the Companies expect that the Solar  
5 Power Contract will reduce energy costs on a present value basis over the 20-year  
6 term, depending on commodity prices as I just discussed. RECs are currently trading  
7 between \$6 and \$7 per REC through 2021, but there is no liquid market for RECs to  
8 cover the period of the proposed Solar Power Contract and new laws regarding RECs  
9 may be enacted. However, if the current market price for 2021 RECs persists only  
10 through █ or █, the ibV proposal is favorable in the base fuel price and low fuel  
11 price scenarios, respectively, assuming zero CO<sub>2</sub> emissions prices. If REC prices are  
12 \$0/REC, the likely worst-case scenario in any year will be that the price of energy  
13 from the Solar Power Contract is approximately \$█/MWh greater than the Companies’  
14 avoided fuel cost and results in an increase in fuel costs of approximately \$█

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1 (25 MW x 8760 hours x 25% capacity factor x \$/MWh). Given that the Companies'  
2 annual fuel expense is approximately \$800 million, this potential \$ increase  
3 in fuel cost is insignificant.

4 **Q. You have stated that the energy purchased under the Solar Power Contract will**  
5 **potentially reduce energy costs for customers by displacing higher cost energy.**  
6 **How much of this energy reduction will come from coal and natural gas**  
7 **generation?**

8 A. All of it. Sections 3.2 and 3.4.2 of the Resource Assessment discuss how the avoided  
9 cost of the existing generation fleet was calculated and why the vast majority of the  
10 energy displaced by the Solar Power Contract will likely be coal generation. Even  
11 when natural gas generation from simple cycle gas turbines are on-line, the marginal  
12 heat rate of coal is higher than the gas turbines so that almost all the displaced energy  
13 is from coal generation. However, as coal units are assumed to be replaced by natural  
14 gas generation in the analysis and as gas prices increase, the percentage of Solar Power  
15 Contract energy that displaces coal generation decreases and the percentage of Solar  
16 Power Contract energy that displaces natural gas generation increases. Table 10 of  
17 the Resource Assessment shows the annual reduction in coal generation for each  
18 scenario evaluated.

19 **Q. Approximately how much less coal would the Companies utilize as a result of**  
20 **purchasing energy from the Solar Power Contract?**

21 A. The amount will vary based on the fuel and CO<sub>2</sub> price scenarios but averages 66,000  
22 tons annually and ranges up to 101,000 tons annually. This compares to the  
23 approximately 12.5 million tons that the Companies currently utilize each year.

1 **Q. Since the energy from the Solar Power Contract will be displacing fossil fuel-**  
2 **based generation, what is the anticipated impact on the Companies' CO<sub>2</sub>**  
3 **emissions?**

4 A. The level of CO<sub>2</sub> emissions reductions depends primarily on the type of generation  
5 that is displaced, which varies based on the fuel and CO<sub>2</sub> price scenario. CO<sub>2</sub>  
6 emissions are approximately 1 ton/MWh for coal generation, 0.6 tons/MWh for  
7 simple-cycle combustion turbines, and approximately 0.4 tons/MWh for natural gas  
8 combined cycle units. Table 11 in the Resource Assessment shows annual CO<sub>2</sub>  
9 emissions reductions for each of the scenarios evaluated. Over the first several years  
10 of the Solar Power Contract, CO<sub>2</sub> emissions reductions range from 210,000 tons to  
11 230,000 tons. By the end of the 20-year term, the range of CO<sub>2</sub> emissions reductions  
12 is 70,000 tons to 170,000 tons.

13 **Q. Have the Companies included potential off-system sales impacts from the Solar**  
14 **Power Contract in their analysis?**

15 A. No. Off-system sales are very small compared to total system costs and are highly  
16 uncertain due to market factors that are out of the Companies' control. Therefore,  
17 consistent with the Companies' prior practice for making resource planning decisions,  
18 the potential impact to off-system sales was not included in the evaluation.

19 **Q. Was the process used to evaluate the Renewable RFP proposals materially**  
20 **different from the process the Companies have used in the past to evaluate**  
21 **alternative generation resources?**

22 A. No. As in prior generation resource evaluations, the Companies performed an initial  
23 screening of the alternatives, followed by a detailed production cost analysis focusing

1 on multiple fuel and CO<sub>2</sub> emissions price scenarios to identify the option with the  
2 least-cost NPVRR. In this case, one slight difference is that the Companies did not  
3 explicitly run each resource through the PROSYM model but instead used output from  
4 PROSYM to calculate decremental costs in order to hold unit commitment constant.  
5 It was necessary to hold unit commitment constant due to the uncertain and  
6 intermittent nature of the solar and wind resources and the need to ensure system  
7 reliability each and every hour.

8 **Q. Is it your opinion that the Solar Power Contract is a good value for customers?**

9 A. Yes. The Companies' analysis indicates that the Solar Power Contract will likely  
10 reduce the cost of energy for customers and reduce CO<sub>2</sub> emissions with limited  
11 anticipated operational issues. The Solar Power Contract provides a stable energy  
12 price for its 20-year term at a level that is likely to be competitive with the Companies'  
13 coal and simple cycle natural gas generation in the long run. Given the existence and  
14 price levels of today's REC market, it is likely that the near-term higher energy cost  
15 of the Solar Power Contract can be more than offset with REC sales. Finally, it will  
16 provide useful information for integrating additional cost-effective renewable  
17 generation on the Companies' system in the future.

#### 18 **Section 4 – Overview of the Solar Power Contract**

19 **Q. Please describe the key attributes of the Solar Power Contract.**

20 A. The Solar Power Contract is with Rhudes Creek Solar, LLC ("Seller"), a wholly  
21 owned subsidiary of ibV Energy Partners, LLC. The contract requires the solar  
22 generation facility to begin commercial operations no later than December 31, 2021  
23 with limited extensions for force majeure and unforeseeable condition precedent

1 delays.<sup>6</sup> The as-available solar energy is priced at a level rate of \$27.82 per MWh.<sup>7</sup>  
2 The contract contains an energy availability mechanism (called the “Availability  
3 Guarantee”) to provide reasonable assurance that the facility will be maintained over  
4 the term of the agreement.<sup>8</sup> It requires the Seller to transfer the RECs produced by the  
5 facility at no additional charge to the Companies.<sup>9</sup> To ensure the Seller performs its  
6 contractual obligations, the contract requires the Seller to provide certain credit  
7 support.<sup>10</sup> Finally, to ensure the project is progressing in a timely manner toward the  
8 commercial operation date of December 31, 2021, the contract establishes various  
9 milestones related to state and local permitting, securing financing, and construction  
10 related activities. The failure to achieve these milestones permits the Companies to  
11 terminate the Solar Power Contract.<sup>11</sup>

12 **Q. What is the process timeline that the parties negotiated assuming the Commission**  
13 **approves the Companies’ application?**

14 A. Sections 6.1 and 6.2 of the Solar Power Contract establish several milestones (termed  
15 “tiers” in the contract) that must be achieved before the Companies can receive energy  
16 from the solar facility in December 2021. First, and in parallel with the Companies’  
17 obtaining Commission approval, the Seller has until March 31, 2020 to finalize  
18 transmission line easements, receive an environmental assessment and site title report,  
19 and to obtain a ruling or other assurance from the Kentucky Department of Revenue  
20 regarding the facility taxation. Second, by June 30, 2020, the Seller must obtain all

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<sup>6</sup> *Solar Power Contract* at art. 4.

<sup>7</sup> *Id.* at § 1.4 (defining Solar Energy Payment Rate).

<sup>8</sup> *Id.* at § 8.3

<sup>9</sup> *Id.* at § 7.1, § 7.3, and § 8.1.

<sup>10</sup> *Id.* at art. 11.

<sup>11</sup> *Id.* at art. 6.

1 siting, zoning, planning commission, and other governmental permits necessary for  
2 the facility's construction and operation. Third, by December 31, 2020, the Seller  
3 must have received approval for the facility from the Kentucky State Board on Electric  
4 Generation and Transmission Siting and received several items related to transmission  
5 system interconnection. Likewise, by December 31, 2020, the Companies must obtain  
6 the appropriate transmission service to deliver the energy from the solar facility to its  
7 customers. Finally, by March 31, 2021, the Seller must secure construction financing.  
8 Overall, approvals and permitting are expected to occur in 2020 with construction  
9 taking place through 2021.

10 **Q. What are the Companies' rights and remedies if these milestones are not met?**

11 A. Section 6.3 of the Solar Power Contract details each party's rights and available  
12 remedies if the milestones in Sections 6.1 and 6.2 are not met. Generally, a party can  
13 provide a notice of termination pending a specific cure period to remedy an issue. For  
14 example, if the Kentucky Department of Revenue has not issued a ruling regarding  
15 tax treatment of the solar facility by March 31, 2020, either the Buyers or the Seller  
16 may issue a notice of termination.

17 **Q. What will happen if this Commission denies the Companies' application?**

18 A. Assuming the reason(s) for the denial cannot be addressed in a manner mutually  
19 acceptable to all parties and the Commission, the Companies would terminate the  
20 Solar Power Contract and the RPAs with Toyota and Dow.

21 **Q. Please describe the Seller's "availability" obligations to the Companies.**

22 A. Section 8.3 of the Solar Power Contract sets forth the availability requirements that  
23 the Seller must meet. These requirements address the performance of the equipment,

1 not the absolute amount of energy produced. The solar facility will deliver energy  
2 commensurate with the amount of light available. Based on how solar photovoltaic  
3 technology works, energy will be produced when clouds do not block the sunlight –  
4 the contract does not require the seller to guarantee sunlight conditions. However, the  
5 Seller must apply prudent industry practices to maintain and repair equipment.  
6 Section 8.3 (B) of the Solar Power Contract describes the actions that can be taken by  
7 the Companies and the damages the Seller must pay if availability provisions are not  
8 met. Ultimately, the contract can be terminated as noted in Section 12.1 (C)(vii) if the  
9 availability provisions are not met for an extended period. For instance, if the facility  
10 is not performing to the Guaranteed Availability level, the Companies can issue an  
11 Availability Underperformance Notice at which time the Seller has 30 days to return  
12 the facility to the guaranteed level before paying liquidated damages. If  
13 underperformance continues, the Companies have the right to provide written notice  
14 of default and can terminate the contract subject to specific cure period provisions.  
15 Article 14 addresses the force majeure events that affect the issues that can be excluded  
16 from the availability provisions.

17 **Q. Can the Seller assign the Solar Power Contract or sell the solar generation facility**  
18 **to others?**

19 A. Yes. Article 19 addresses assignment and other transfer provisions. For example,  
20 assignment of the Solar Power Contract can occur provided the assignee assumes all  
21 the contract's obligations. The Companies may withhold their consent to a proposed  
22 assignment if the proposed assignee is adverse to the Companies in litigation or an

1 administrative proceeding or does not have experience operating and maintaining a  
2 utility scale solar facility.

3 **Q. How is the obligation as a buyer being allocated between LG&E and KU?**

4 A. Based on the energy allocation that I previously discussed, since Toyota and Dow are  
5 KU customers, the overall allocation of the Solar Power Contract is 9.75 percent to  
6 LG&E and 90.25 percent to KU.

7 **Q. Do Toyota and Dow have any rights or responsibilities associated with the Solar  
8 Power Contract?**

9 A. No. They are not a party to the Solar Power Contract, but their RPAs were developed  
10 with the Solar Power Contract's terms and conditions and the Companies' rights and  
11 obligations in mind.

12 **Q. Based on your experience in negotiating power purchase agreements, have the  
13 Companies prudently negotiated the Solar Power Contract with an eye toward  
14 creating value for customers and protecting them from inappropriate risks?**

15 A. Yes. I have personally been involved in wholesale energy markets for over 25 years  
16 and have either led or been on the team that negotiated numerous power purchase  
17 agreements as both a buyer and a seller. Based on this experience, it is my opinion  
18 that the Companies have negotiated a contract that creates value for customers and  
19 appropriately allocates risks between the Seller and the Companies.

20 **Section 5 – Overview of Renewable Power Agreements**

21 **Q. How did Toyota and Dow advise the Companies of their interest in being Green  
22 Tariff Option #3 customers?**

23 A. Both Toyota and Dow are among several existing and prospective customers that have  
24 expressed an interest in renewable energy to meet their own corporate sustainability



1 goals. Toyota has inquired about the purchase of renewables from the Company on  
2 several occasions over the past years while Dow expressed such interest last year after  
3 the Commission's approval of Green Tariff Option #3. Responses to the Renewable  
4 RFP allowed the Companies to present Toyota and Dow with concrete proposals,  
5 including draft pricing and terms, that led to each customer's interest in pursuing an  
6 RPA.

7 **Q. Please describe the key attributes of the RPA.**

8 A. The RPAs are structured for the Companies to pass through to Toyota and Dow all  
9 commercial terms, benefits, and risks associated with the Solar Power Contract. In  
10 other words, the RPAs do not subject the Companies or the Companies' other  
11 customers to any additional risks or benefits than they are already subject to under the  
12 Solar Power Contract. For example, the term of the RPA corresponds to the term of  
13 the Solar Power Contract; Dow and Toyota only receive energy from the Rhudes  
14 Creek Solar facility when that facility produces energy; and, Dow and Toyota pay the  
15 same price to the Companies for that energy as the Companies pay Rhudes Creek  
16 Solar.

17 While many of each RPA's provisions mirror those found in the Solar Power  
18 Contract, some provisions are unique to and appropriately found only in the RPA. For  
19 example, Section 2.8 addresses the energy payments for Solar Power Contract energy  
20 in excess of the customer's load during a 15-minute interval. This provision is  
21 necessary because the solar energy coming from the Rhudes Creek facility may  
22 sometimes be greater than the customer's load in a particular 15-minute interval.  
23 Since the customer cannot use the solar energy but is paying for it, the Companies

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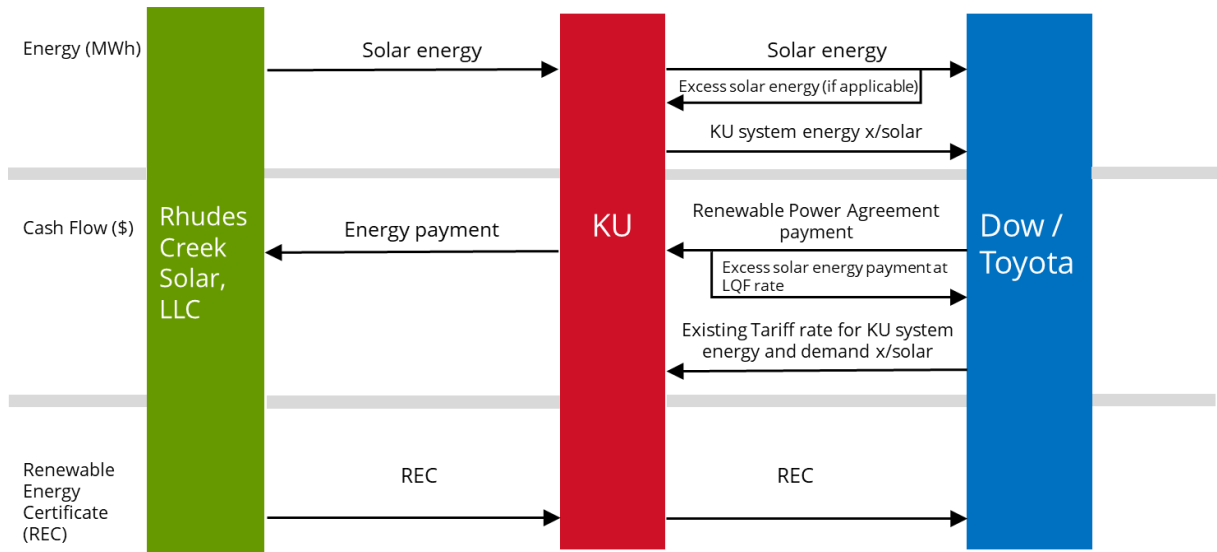
1 have agreed to buy back this energy at their avoided energy cost as set forth in the  
2 Large Capacity Cogeneration and Small Power Production Qualifying Facilities  
3 (“LQF”) tariff rider.

4 To protect the interests of all customers for the entire 20-year term of the RPA,  
5 the Companies have negotiated a provision for financial support from [REDACTED]  
6 [REDACTED] both Toyota and Dow [REDACTED]

7 **Q. How will the energy from the Solar Power Contract impact the bills for Toyota**  
8 **and Dow?**

9 A. Section 2.7 addresses how the energy that Toyota and Dow purchases under the RPA  
10 will impact the bills that each pays for its existing service. Figure 2 of my direct  
11 testimony illustrates the flow of energy, payments, and RECs between the Solar Power  
12 Contract, the Companies, and Toyota and Dow. It breaks down the RPA into three  
13 main attributes: energy flow, payments, and REC transfer. It shows that energy flows  
14 from the Rhudes Creek Solar facility to KU and then on to Dow and Toyota. All of  
15 this is measured on 15-minute intervals based on the current tariffs for Dow and  
16 Toyota. Figure 2 also shows that if Dow or Toyota is unable to utilize all of its share  
17 of solar energy in a 15-minute increment, its unused portion will be used to serve the  
18 load of all other customers. The Cash Flow section of Figure 2 shows the payments  
19 from Dow and Toyota being made to KU and then KU making the same payment to  
20 Rhudes Creek Solar. It also shows the payment by KU to Dow and Toyota for excess  
21 solar energy at the LQF rate. Lastly, the REC section shows the RECs being  
22 transferred by Rhudes Creek Solar to KU and then to Dow and Toyota.

**Figure 2 – Energy, Payment, and REC Flow**



1                    Also shown in Figure 2 are the energy and payments from Dow and Toyota to  
2                    KU for energy that is not coming from the Rhudes Creek Solar facility. Since the  
3                    demand and energy consumption at the Dow and Toyota facilities will be measured  
4                    as they have always been, each RPA establishes the mechanism by which the  
5                    customer’s existing billing volumes will be reduced in each 15-minute interval by the  
6                    solar energy that is deemed delivered to it from the Rhudes Creek Solar facility via  
7                    the Companies’ system. This will result in Dow and Toyota purchasing less energy  
8                    from KU at their existing tariff rates. The Base Demand component of their bills,  
9                    however, will not change. The charges associated with the Base Demand billing  
10                    component are for the transmission and distribution cost of providing service. Since  
11                    the energy from the Rhudes Creek Solar facility must be delivered to Toyota and Dow,  
12                    each must continue to pay for that portion of the system revenue requirements.

13    **Q.    Do the Companies’ anticipate that the RPAs will reduce future electricity costs**  
14    **for Toyota and Dow?**

1 A. Whether the RPAs will reduce the future electricity costs of Toyota or Dow is  
2 uncertain. Any reduction depends on the Companies' future rates for power supplied  
3 under Toyota's and Dow's existing rate schedules and how each customer's future  
4 load correlates with the Rhudes Creek Solar facility's energy production. During the  
5 negotiations of the RPAs, the Companies provided Toyota and Dow with projected  
6 solar energy production from the proposed Rhudes Creek Solar facility and calculated  
7 each entity's bill as if its RPA had been in effect. That information indicated that each  
8 entity had the potential to lower its electricity cost or would not experience a material  
9 increase in cost. Regardless of the bill impact, both Toyota and Dow will make  
10 progress toward meeting their corporate sustainability goals, which each considers an  
11 important objective. Each has full knowledge of the potential bill impact and has  
12 willingly entered into its RPA.

13 **Q. Will the energy from the Solar Power Contract that is deemed delivered to**  
14 **Toyota and Dow impact the energy cost of all other customers?**

15 A. Yes. By displacing energy that otherwise would have been generated, the Solar Power  
16 Contract energy deemed delivered to Toyota and Dow will reduce overall fuel costs  
17 for all customers.

18 **Q. What happens if Toyota or Dow cease taking service from the Companies?**

19 A. As I have previously described, Sections 2.7(b) and 2.8 of each RPA provide that any  
20 time the customer's share of energy from the Rhudes Creek Solar facility exceeds that  
21 customer's load during a 15-minute billing interval, the customer remains obligated  
22 to pay for that energy but the Companies will provide a bill credit to the customer for  
23 the excess energy at the LQF tariff rate. Therefore, should either Toyota or Dow close

1 its facilities, the guaranteeing affiliate would be financially responsible and would pay  
2 or receive the difference between the RPA price and the LQF rate and would also  
3 receive the RECs associated with the RPA energy. In other words, a complete closure  
4 of the facility is simply an extreme case of what may happen during any 15-minute  
5 billing interval during normal plant operations. This provision protects all customers  
6 from any additional costs.

7 **Q. What would happen if the guaranteeing affiliate defaults on its obligations?**

8 A. In that case, the Companies remain obligated to purchase the energy from the Rhudes  
9 Creek Solar facility and would search for new Green Tariff Option #3 customers to  
10 take the energy or use the energy to serve the load of all customers and sell the  
11 additional RECs, or both.

12 **Q. Are the RPAs a good value for Toyota and Dow and all customers?**

13 A. Yes. The RPAs cost-effectively meet the needs of Toyota and Dow for renewable  
14 energy with no material impact on energy costs to other customers. Furthermore, since  
15 each entity has freely executed its RPA, it is rational to believe that each finds the  
16 contract a good value.

17 **Section 6 – Conclusion**

18 **Q. Please summarize why the Solar Power Contract and the RPAs with Toyota and**  
19 **Dow should be approved by the Commission.**

20 A. The Solar Power Contract will likely lower customers' future energy costs, especially  
21 when considering the sale of RECs in the early years of the contract. At a minimum,  
22 it will bring price certainty to a small portion of future energy costs. The RPAs allow  
23 two of the Companies' larger customers to make cost-effective strides in meeting their  
24 corporate sustainability goals. The Solar Power Contract will allow the Companies to

1           reduce their CO<sub>2</sub> emissions in a cost-effective manner and to build on many of the  
2           lessons learned from the Brown Solar project about integrating solar generation by  
3           using the existing fossil fuel fleet to reliably integrate the 100 MW Rhudes Creek Solar  
4           facility - a project that is ten times larger than Brown Solar - into the Companies' grid.

5   **Q.   Does this conclude your testimony?**

6   A.   Yes.

7

## APPENDIX A

### **David S. Sinclair**

Vice President, Energy Supply and Analysis  
Kentucky Utilities Company  
Louisville Gas and Electric Company  
220 West Main Street  
Louisville, Kentucky 40202  
(502) 627-4653

### **Education**

Arizona State University, M.B.A. -1991  
Arizona State University, M.S. in Economics – 1984  
University of Missouri, Kansas City, B.A. in Economics - 1982

### **Professional Experience**

LG&E and KU Energy, LLC  
2008-present – Vice President, Energy Supply and Analysis  
2000-2008 – Director, Energy Planning, Analysis and Forecasting

LG&E Energy Marketing, Louisville, Kentucky  
1997-1999 – Director, Product Management  
1997-1997 (4<sup>th</sup> Quarter) – Product Development Manager  
1996-1996 – Risk Manager

LG&E Power Development, Fairfax Virginia  
1994-1995 – Business Developer

Salt River Project, Tempe, Arizona  
1992-1994 – Analyst, Corporate Planning Department

Arizona Public Service, Phoenix, Arizona  
1989-1992 – Analyst, Financial Planning Department  
1986-1989 – Analyst, Forecasts Department

State of Arizona, Phoenix, Arizona  
1983-1986 – Economist, Arizona Department of Economic Security

### **Affiliations**

Consensus Forecasting Group (2013-present) - nonpartisan group of economists that monitor Kentucky's revenues and the economy on behalf of the governor and legislature.

### **Civic Activities**

Serve on the Board of Junior Achievement of Kentuckiana

Graduate of Leadership Louisville (2008) and Bingham Fellows (2011)