COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

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

RESPONSE OF
LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY
TO ATTORNEY GENERAL'S SUPPLEMENTAL DATA REQUESTS
DATED FEBRUARY 21, 2020

FILED: FEBRUARY 26, 2020

VERIFICATION

COMMONWEALTH OF KENTUCKY)
)
COUNTY OF JEFFERSON)

The undersigned, **Robert M. Conroy**, being duly sworn, deposes and says that he is Vice President, State Regulation and Rates, for Kentucky Utilities Company and Louisville Gas and Electric Company and an employee of LG&E and KU Services Company, and that he has personal knowledge of the matters set forth in the responses for which he is identified as the witness, and the answers contained therein are true and correct to the best of his information, knowledge and belief.

Robert M. Conroy

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 26th day of February 2020.

Notary Public

Notary Public, ID No. 603967

My Commission Expires:

7/11/2022

VERIFICATION

COMMONWEALTH OF KENTUCKY)
)
COUNTY OF JEFFERSON)

The undersigned, **David S. Sinclair**, being duly sworn, deposes and says that he is Vice President, Energy Supply and Analysis for Kentucky Utilities Company and Louisville Gas and Electric Company and an employee of LG&E and KU Services Company, and that he has personal knowledge of the matters set forth in the responses for which he is identified as the witness, and the answers contained therein are true and correct to the best of his information, knowledge and belief.

David S. Sinclair

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 26th day of February 2020.

Notary Public

Notary Public, ID No. KY 603967

My Commission Expires:

7/11/2022

Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Attorney General's Supplemental Data Requests
Dated February 21, 2020

Case No. 2020-00016

Question No. 1

Witness: David S. Sinclair

Q-1. How many acres will be needed by Rhudes Creek Solar, LLC to construct the solar facility?

a. Are all the acres located in Hardin County?

b. Are the acres continuous?

c. What is the current use of the acres, is it farmland, forest etc.? If there is more than one type of use, provide a breakdown of the different types of uses.

A-1. The Companies are entering into a PPA with Rhudes Creek Solar for the as-available, non-firm energy produced by the solar facility. The Companies are not involved in the planning, design, specification, and construction of the facility.

ibV has indicated that approximately 850 acres will be needed to construct the solar facility.

a. ibV has stated that all of the acres are in Hardin County.

b. The information that ibV has provided to the Companies indicates that the acres are contiguous.

c. ibV has indicated that the current land use is farmland.

Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Attorney General's Supplemental Data Requests
Dated February 21, 2020

Case No. 2020-00016

Question No. 2

Witness: David S. Sinclair

Q-2. How many acres of solar panels in Kentucky would it take to equal the generation output of the Companies' Trimble-1 and Trimble-2 generating units?

A-2. The acreage required to construct a utility-scale solar facility is site-dependent and varies across solar technologies. The land requirement consists of direct-use land, which is occupied by solar arrays, access roads, substations, service buildings, and other infrastructure, and ancillary land, which makes up the remainder of the total site. The ancillary land can be required for setback requirements, wetlands protection, or topographical or geological constraints. The National Renewable Energy Laboratory estimates single-axis tracking solar systems greater than 20 MW require total land of 8.3 acres per MWac.[1]

The Companies' share of the Trimble County units 1 and 2 produced approximately 6,000,000 MWh in 2019. Such generation occurs at all hours of the day and night. To produce this amount of energy, a solar facility approximately 25 times larger than the Rhudes Creek facility, or about 21,000 acres, would need to be constructed, assuming the same 8.5 total acres per MWac as that of the proposed Rhudes Creek Solar project. However, the energy produced by solar would only occur in the daylight hours.

[1] "Land-Use Requirements for Solar Power Plants in the United States," NREL, June 2013. See https://www.nrel.gov/docs/fy13osti/56290.pdf.

Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Attorney General's Supplemental Data Requests
Dated February 21, 2020

Case No. 2020-00016

Question No. 3

Witness: David S. Sinclair

Q-3. What will the solar panels be built on top of at the facility, grass, gravel etc.?

A-3. See the response to Question No. 1. The Companies will not be involved in the design and specification of the solar facility.

Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Attorney General's Supplemental Data Requests
Dated February 21, 2020

Case No. 2020-00016

Question No. 4

Witness: David S. Sinclair

Q-4. Who are the owners of the property on which the facility will be located and what is their respective acreage that they own?

A-4. See the response to Question No. 1. ibV has not provided the Companies with this detail about land ownership. ibV has the agreements for the property on which the facility will be located.

Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Attorney General's Supplemental Data Requests
Dated February 21, 2020

Case No. 2020-00016

Question No. 5

Witness: David S. Sinclair

Q-5. Once construction of the solar facility is completed who will own the property?

A-5. See the response to Question No. 1. ibV is responsible for the property arrangements. The Companies will not own or lease any property for this solar facility.

Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Attorney General's Supplemental Data Requests
Dated February 21, 2020

Case No. 2020-00016

Question No. 6

Witness: David S. Sinclair

Q-6. If Rhudes Creek Solar, LLC is not going to be the owner of the property, upon which the solar facility operates, then explain the relationship between Rhudes Creek Solar, LLC and the owners of the property.

A-6. See the response to Question No. 1. It is the Companies' understanding that Rhudes Creek Solar will either own or lease the property. Since the PPA is only for the energy produced by the facility, the Companies will not be involved in any property arrangements for the facility.

Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Attorney General's Supplemental Data Requests
Dated February 21, 2020

Case No. 2020-00016

Question No. 7

Witness: David S. Sinclair

Q-7. What happens to the solar panels when the lease is terminated either between Rhudes Creek Solar, LLC and LG&E-KU; or Rhudes Creek Solar, LLC and the property owners?

A-7. The Companies' PPA with Rhudes Creek Solar is for a 20-year term. The Companies will not be involved in any other arrangements with Rhudes Creek Solar beyond the 20-year term. Rhudes Creek Solar is responsible for their contractual relationship with the property owners.

Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Attorney General's Supplemental Data Requests
Dated February 21, 2020

Case No. 2020-00016

Question No. 8

Witness: David S. Sinclair

Q-8. Has an environmental impact study been done on converting 850 acres into a solar facility? If so, please provide a copy of any completed environmental impact study.

A-8. See the response to Question No. 1. In accordance with Article 3, Section 3.2 of the Purchase Power Agreement, Exhibit 1 to the Application, Rhudes Creek Solar is responsible for constructing the facility in accordance with all laws and regulations. Rhudes Creek Solar will complete any environmental impact studies required for construction of their facility as required by Article 6, Section 6.1.

Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Attorney General's Supplemental Data Requests
Dated February 21, 2020

Case No. 2020-00016

Question No. 9

Witness: David S. Sinclair

Q-9. How many acres would be needed in Arizona to produce 200 MW of solar power?

A-9. If a 100 MW facility requires 850 acres, the Companies assume that a 200 MW facility would require approximately 1,700 acres, regardless of location. If the question concerns the equivalent energy produced, the Companies understanding is that the equivalent solar capacity factor in Arizona is at least 40 percent versus 25 percent in Kentucky. On that basis, it would require about 38 percent less land in Arizona to build a solar facility to generate an equivalent amount of energy than a facility in Kentucky. Therefore, a solar facility producing energy volumes similar to a 200 MW facility in Kentucky would take approximately 1,054 acres in Arizona.

Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Attorney General's Supplemental Data Requests
Dated February 21, 2020

Case No. 2020-00016

Question No. 10

Witness: David S. Sinclair

Q-10. Have the Companies applied for all necessary permits from the Kentucky Energy and Environment Cabinet? If so, please list the permits applied for or received and provide copies of any permit applications or permits issued.

A-10. This Application before the Commission is the only permission the Companies need to purchase the energy from Rhudes Creek Solar, LLC. See the response to Question No. 1. ibV and Rhudes Creek Solar are responsible for obtaining all required permits for their facility in accordance with Article 6, Section 6.1 of the Purchase Power Agreement.

Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Attorney General's Supplemental Data Requests
Dated February 21, 2020

Case No. 2020-00016

Question No. 11

Witness: David S. Sinclair

Q-11. Explain why the RFP issued for this solar facility was for between 10 and 200 MW.

A-11. See Mr. Sinclair's testimony Section 2, pages 5-14 and the details contained in Exhibit DSS-2 for a description of the RFP process and rationale.

Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Attorney General's Supplemental Data Requests
Dated February 21, 2020

Case No. 2020-00016

Question No. 12

Witness: David S. Sinclair

Q-12. Did Toyota or Dow approach KU about renewable power or did KU first approach Toyota and Dow?

a. Regardless of who approached whom first, when did this initial approach take place?

A-12. As stated in Section 18 of the Application, both Toyota and Dow approached the Companies expressing an interest in purchasing renewable energy from new renewable sources pursuant to the Green Tariff Option #3.

a. See the testimony of David S. Sinclair at pages 24 through 25 and the response to PSC 1-4.

Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Attorney General's Supplemental Data Requests
Dated February 21, 2020

Case No. 2020-00016

Question No. 13

Witness: Robert M. Conroy

Q-13. Do Toyota and Dow still pay a demand base rate? Is it affected by this contract? If they are still paying a base demand rate, are they in fact paying twice for their energy?

A-13. See the testimony of Robert M. Conroy at page 10 and Section 2.7 of the Renewable Power Agreements with Toyota and Dow contained in Exhibits 2 and 3 of the Application, respectively, for the billing under the contracts. See also the responses to AG 1-6, PSC 1-6, and PSC 1-10.

Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Attorney General's Supplemental Data Requests
Dated February 21, 2020

Case No. 2020-00016

Question No. 14

Witness: David S. Sinclair

Q-14. How does the recently announced agreement between Clearway Energy Group LLC, AEP Energy Partners Inc. and Toyota North America Inc. for a planned 110-MW wind farm in Mineral County, W. VA. affect Toyota's need for renewable energy under their contract with KU?

A-14. The Companies do not have information about this agreement and cannot speculate on Toyota's position related to their need for renewable energy.

Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Attorney General's Supplemental Data Requests
Dated February 21, 2020

Case No. 2020-00016

Question No. 15

Witness: David S. Sinclair

Q-15. Will this solar farm displace other generation? If so, explain how and what generation will be impacted?

A-15. Yes. See Mr. Sinclair's testimony, page 18, lines 4-14 and Exhibit DSS-2, Section 3.4.2 "Source of Energy Displaced by the ibV Solar Power Contract," pages 21-22, where the displacement of existing generation is specifically discussed in detail.

Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Attorney General's Supplemental Data Requests
Dated February 21, 2020

Case No. 2020-00016

Question No. 16

Witness: David S. Sinclair

Q-16. Why aren't Toyota and Dow paying for 100% of the solar energy?

A-16. Toyota and Dow only wanted the quantities that they contracted for and are paying for 100 percent of their share of the solar energy. As discussed in Mr. Sinclair's testimony, the energy and the REC sales that are going to all customers is expected to reduce their energy costs.

Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Attorney General's Supplemental Data Requests
Dated February 21, 2020

Case No. 2020-00016

Question No. 17

Witness: David S. Sinclair

Q-17. Is this solar facility necessary to meet LG&E-KU's current energy demands of their customers?

A-17. Yes. It allows the Companies to meet its obligation to procure energy at the lowest reasonable cost. See the response to PSC 2-1.

Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Attorney General's Supplemental Data Requests
Dated February 21, 2020

Case No. 2020-00016

Question No. 18

Witness: David S. Sinclair

Q-18. Are LG&E-KU willing to have solar generation guarantee its baseload requirements?

A-18. If by "baseload requirements" the data request is asking about the ability of solar generation to provide energy at a very high capacity factor around-the-clock then it is not a matter of the Companies' willingness but a matter of the technical capabilities of solar generation. Based on today's solar and storage costs and the solar conditions in Kentucky (particularly clouds in the winter), solar generation plus storage is not competitive with other forms of generation for high capacity factor applications.

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Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Attorney General's Supplemental Data Requests
Dated February 21, 2020

Case No. 2020-00016

Question No. 19

Witness: David S. Sinclair

Q-19. By a yearly average, how much will this solar facility cost the average residential customer?

A-19. The customer impact will depend on many factors including fuel prices, unit life, CO_2 emissions prices, and REC prices, as summarized in the table below which was prepared using data supporting Table 12 in Exhibit DSS-2. These figures are arithmetic means of the twenty annual estimated customer impacts in each year of the PPA term for each scenario, without discounting to present value. This information is confidential and is being produced under seal pursuant to a Joint Petition for Confidential Protection.

The average annual impact over the term of the PPA to an average residential customer is estimated to range between [redacted] per year and [redacted] per year, assuming zero REC value. Assuming a $[redacted]/REC price over the term of the PPA, the impact to an average residential customer is estimated to be an average annual [redacted] ranging between [redacted] and [redacted]. Higher REC prices will result in higher savings.

Average Residential Customer Impact ($/Year; Negative values indicate savings and positive values indicate greater costs)

Fuel Price Scenario	CO_2 Emissions Price Scenario	Unit Life Scenario	Levelized REC Price			
			$0/REC	$[redacted]/REC	$[redacted]/REC	$[redacted]/REC
Low	Zero	55-Year	[redacted]			
		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				

Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Attorney General's Supplemental Data Requests
Dated February 21, 2020

Case No. 2020-00016

Question No. 20

Witness: David S. Sinclair

Q-20. What is driving the demand for LG&E-KU to construct generating sources of renewable power?

A-20. See the response to Question No. 1. The Companies are not proposing to construct or own the renewable resource that will supply the energy for the Solar Power Contract. Instead, the Companies will purchase the energy from the solar facility to be constructed by Rhudes Creek Solar, LLC under the Purchase Power Agreement. Customer demand for renewable energy and the opportunity to lower costs for customers led the Companies to propose entering into the Purchase Power Agreement.

Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Attorney General's Supplemental Data Requests
Dated February 21, 2020

Case No. 2020-00016

Question No. 21

Witness: David S. Sinclair

Q-21. Why shouldn't LG&E-KU's shareholders pay for this renewable energy, which is not necessary to meet demand load?

A-21. The Companies' shareholders do not stand to benefit from the solar contract or the RPAs. The energy produced by the solar facility will displace fuel that would otherwise have been burned to produce the same energy to serve customers. The Companies' shareholders do not receive a return on fuel expenses and thus do not benefit from any fuel related purchases, nor do shareholders benefit from power purchase agreements. The Companies are purchasing energy and selling RECs to meet their obligation to serve customers at the least reasonable cost.

Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Attorney General's Supplemental Data Requests
Dated February 21, 2020

Case No. 2020-00016

Question No. 22

Witness: David S. Sinclair

Q-22. Will this solar facility adversely affect LG&E-KU's current coal contracts? If so, explain how. What about future coal contracts?

A-22. No. As Mr. Sinclair discusses in his testimony on page 18, lines 4 through 23, the impact on the Companies' coal utilization ranges from 66,000 tons to 101,000 tons annually compared to an annual utilization of approximately 12.5 million tons. This has no impact on existing contracts. While the Companies will purchase less coal in the future, the annual volume reduction is easily incorporated into the existing coal and natural gas procurement strategy and practices.

Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Attorney General's Supplemental Data Requests
Dated February 21, 2020

Case No. 2020-00016

Question No. 23

Witness: David S. Sinclair

Q-23. For the 25 MW of solar power to be used to serve LG&E-KU's customers (excluding Toyota and Dow), compare the price ($/MWh) to the price of the fuel source currently and/or alternatively serving those customers.

A-23. See Mr. Sinclair's testimony on page 15, line 12 through page 18, line 3. See also response to PSC 2-1(c).

Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Attorney General's Supplemental Data Requests
Dated February 21, 2020

Case No. 2020-00016

Question No. 24

Witness: David S. Sinclair

Q-24. Discuss the basis for the fuel prices assumptions utilized in DSS-2 at page 17.

A-24. The fuel prices are those developed for the Companies' 2020 Business Plan.

The Henry Hub natural gas price scenarios are based on the following:

- **Low**: reflects NYMEX forward market prices as of 5/22/2019 for 2020-2030, which were extrapolated through 2050.
- **Base**: reflects a blend of NYMEX market prices and a smoothed version of the Energy Information Administration's ("EIA's") 2019 Annual Energy Outlook ("AEO's") High Oil and Gas Resource and Technology case through 2029, after which the smoothed EIA case was solely used.
- **High**: reflects a smoothed version of the EIA's 2019 AEO Reference case.

The Illinois basin, FOB mine coal prices are based on the following:

- **Low**: reflects the base case prices, adjusted lower by 0.29 times the percentage decrease from the base gas case to the low gas case. The reduction in variance between coal price cases compared to gas price cases is based on the historical relationship between coal and gas prices.
- **Base**: reflects a blend of coal price bids the Companies received and a long-term price forecast developed by IHS Markit through 2024. In 2025 and beyond, the 2024 price was escalated by the coal escalation rate provided in the EIA's 2019 AEO Reference Case.
- **High**: reflects the base case prices, adjusted higher by 0.29 times the percentage increase from the base gas case to the high gas case. The reduction in variance between coal price cases compared to gas price cases based on the historical relationship between coal and gas prices.

Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Attorney General's Supplemental Data Requests
Dated February 21, 2020

Case No. 2020-00016

Question No. 25

Witness: David S. Sinclair

Q-25. In the 2019 Resource Assessment at page 6, the Companies state, "the [redacted] from ibV was the lowest-price proposal overall." Explain that conclusion.

A-25. The referenced proposal provided the lowest reasonable energy price among all of the initial proposals received in response to the Companies' RFP. The prices for each of the other initial proposals are figures that are greater than this proposal's price.

CONFIDENTIAL INFORMATION REDACTED

Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Attorney General's Supplemental Data Requests
Dated February 21, 2020

Case No. 2020-00016

Question No. 26

Witness: David S. Sinclair

Q-26. Compare the finalist proposals where nameplate capacity was [redacted] with the selected proposal with a focus on the price impacts to LG&E-KU's customers (excluding Toyota and Dow).

A-26. See Table 6 in Exhibit DSS-2 to Mr. Sinclair's testimony for a comparison of all of the finalists' proposals. It shows that the [redacted] MWh that was agreed to the in the final agreement with Rhudes Creek Solar, LLC. Certain information is confidential and is being produced under seal pursuant to a Joint Petition for Confidential Protection.

Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Attorney General's Supplemental Data Requests
Dated February 21, 2020

Case No. 2020-00016

Question No. 27

Witness: David S. Sinclair

Q-27. Compare the costs for Toyota and Dow under the selected proposal, which resulted in

a. a $[redacted] /MWh level price, with the prices which would have resulted had one of the [redacted] proposals from ibV been selected.

A-27. See response to Question No. 26.

Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Attorney General's Supplemental Data Requests
Dated February 21, 2020

Case No. 2020-00016

Question No. 28

Witness: David S. Sinclair

Q-28. Discuss how or whether the proposal accounts for heat rate improvements anticipated to result from ACE Rule implementation.

A-28. Should the Companies' future investment in heat rate improvements be justified in order to comply with the ACE rule, any improvements would likely be small and would not have a material impact on the analysis presented in Exhibit DSS-2 to Mr. Sinclair's testimony.

Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Attorney General's Supplemental Data Requests
Dated February 21, 2020

Case No. 2020-00016

Question No. 29

Witness: David S. Sinclair

Q-29. If the selected proposal, "almost certainly reduces energy costs with relatively modest REC pricing," explain why proposals with greater nameplate capacity (e.g. 200 MW) were not given more serious consideration in order to extend these savings by an additional 100 MW.

A-29 Proposals with greater nameplate capacity were given serious consideration in the Companies' detailed production cost analysis, as discussed in section 3.2 of Exhibit DSS-2. However, as shown in Table 4 of that section (see page 11), the projected impacts to revenue requirements of these proposals were less favorable or unfavorable across the range of fuel price forecasts considered.

Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Attorney General's Supplemental Data Requests
Dated February 21, 2020

Case No. 2020-00016

Question No. 30

Witness: David S. Sinclair

Q-30. Does levelized pricing shift tomorrow's energy costs to today? Explain in complete detail.

A-30. No. The level price ensures that all customers over the 20-year term of the Purchase Power Agreement pay exactly the same price for the solar energy generated.

Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Attorney General's Supplemental Data Requests
Dated February 21, 2020

Case No. 2020-00016

Question No. 31

Witness: David S. Sinclair

Q-31. Discuss the risk of termination and/or default of the contracts with Toyota and Dow prior to the end of the 20-year solar power contract.

A-31. The RPAs cannot be terminated early. See Mr. Sinclair's testimony on page 28, line 18 through page 29, line 11. Also, instead of a parent guarantee as discussed in Mr. Sinclair's testimony, Toyota will post performance security according to section 2.9 of their RPA.

Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Attorney General's Supplemental Data Requests
Dated February 21, 2020

Case No. 2020-00016

Question No. 32

Witness: David S. Sinclair

Q-32. Reference the 2019 Resource Assessment at page 21, wherein it is stated: "[d]uring the first half of the contract term, almost all of the displaced energy is from coal generation." Displacement incrementally supports EGU closure. Discuss the potential for the closure of one or more EGUs in relation to this proposal. If that likelihood is hastened by the proposal, discuss the extent to which that schedule or potential has been changed.

A-32. See Mr. Sinclair's testimony, page 12, line 16 through page 13, line 3. Without the reliability and grid services that are provided by the Companies' existing coal and natural gas fleet, the Companies would not move forward with any of the Renewable RFP proposals.

Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Attorney General's Supplemental Data Requests
Dated February 21, 2020

Case No. 2020-00016

Question No. 33

Witness: David S. Sinclair

Q-33. Reference the response to AG 1-1, wherein the Companies were asked whether the adoption of the proposed solar PPA could require increased O&M costs on the Companies' existing fleet due to any increased throttling of existing generating units. The answer provided was not responsive to the question posed.

a. Reference also the response to PSC 1-11 (a), wherein the Companies stated, "The integration issues that can arise at some point from increasing the integration of intermittent renewable generation primarily relate to the ramping capabilities of the Companies' existing dispatchable generation to respond to intermittent generation and the cost-effective commitment of these units to continue to reliably serve customer's energy needs at every moment. In addition, intermittent renewables affect the operation of the transmission system both broadly and at the circuit level. Such impacts are evaluated on a case-by-case basis in the transmission studies conducted during a generator's interconnection request process."

i. Explain whether the use of the term "ramping capabilities" as used in this response are the equivalent of the term "throttling" as used in AG 1-1.

ii. Explain whether the integration of the energy from the proposed solar PPA will lead to increased ramping and/or throttling of the Companies' existing generating fleet. If so:

(1) Explain if the ramping / throttling will lead to increased O&M costs for the existing generating fleet; and

(2) identify which customers will pay for such increased O&M costs.

(iii) Explain whether the effect of intermittent renewables on the Companies' transmission system will lead to increased transmission O&M. If so, identify which customers will pay for such increased O&M costs.

A-33.

a.

i. The Companies view the term "ramping capabilities" as the industry terminology for a generating unit's ability to incrementally adjust its output up

or down. If this is what is meant by the term "throttling" in the data request, then the two terms are equivalent in this context.

ii. The integration of energy from the solar PPA should not lead to any discernable ramping changes for the Companies generation fleet.

iii. See the response to PSC 2-6.