

COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

| | | |
|--|---|----------------------------|
| THE 2018 INTEGRATED RESOURCE PLAN |) | |
| OF LOUISVILLE GAS AND ELECTRIC |) | |
| COMPANY AND KENTUCKY UTILITIES |) | CASE NO. 2018-00348 |
| COMPANY |) | |

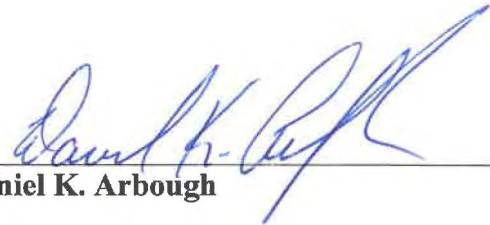
RESPONSE OF
LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY
TO SIERRA CLUB'S SUPPLEMENTAL REQUEST FOR INFORMATION
DATED NOVEMBER 25, 2019

FILED: DECEMBER 17, 2019

VERIFICATION

COMMONWEALTH OF KENTUCKY)
)
COUNTY OF JEFFERSON)

The undersigned, **Daniel K. Arbough**, being duly sworn, deposes and says that he is Treasurer 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.



Daniel K. Arbough

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 17th day of December 2019.



Notary Public

My Commission Expires:
Judy Schooler
Notary Public, ID No. 603967
State at Large, Kentucky
Commission Expires 7/11/2022

VERIFICATION

COMMONWEALTH OF KENTUCKY)
)
COUNTY OF JEFFERSON)

The undersigned, **Christopher M. Garrett**, being duly sworn, deposes and says that he is Controller 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.



Christopher M. Garrett

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 17th day of December 2019.




Notary Public

My Commission Expires:
Judy Schooler
Notary Public, ID No. 603967
State at Large, Kentucky
Commission Expires 7/11/2022

VERIFICATION

COMMONWEALTH OF KENTUCKY)
)
COUNTY OF JEFFERSON)

The undersigned, **Stuart A. Wilson**, being duly sworn, deposes and says that he is Director, Energy Planning, Analysis & Forecasting for 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.



Stuart A. Wilson

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 17th day of December 2019.



Notary Public

(SEAL)

My Commission Expires:
Judy Schooler
Notary Public, ID No. 603967
State at Large, Kentucky
Commission Expires 7/11/2022

Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Sierra Club's Supplemental Request for Information
Dated November 25, 2019

Case No. 2018-00348

Question No. 1

Witness: Stuart A. Wilson

Q-1. Reference the Companies' response to SC 1-7, stating in part that "[t]he Companies' analysis demonstrated that CO₂ pricing would weaken the overall value of battery storage because it would increase the cost of charging the battery."

- a. Please explain whether the Companies believe that CO₂ pricing would increase the cost of charging a battery if the battery were being charged specifically by a non-CO₂-emitting source of generation, such as solar or wind, as opposed to a CO₂-emitting generation source, such as a coal- or gas-fired power plant.
- b. Please explain whether the Companies agree that, as a general matter, the institution of CO₂ pricing would tend to diminish any pre-existing economic advantage, or (by the same token) exacerbate any pre-existing economic disadvantage, of CO₂-emitting generation sources of generation compared to non-CO₂-emitting source (for example, CO₂ pricing would tend to worsen the comparative economics of a coal-fired plant relative to renewables plus storage).

A-1.

- a. No scenario in the IRP included battery storage or any other resource specifically for the purpose of addressing the intermittent nature of renewables. Instead, the IRP assumed the Companies' existing resources could provide the load following capabilities required to integrate the amounts of renewables included in each scenario. Therefore, battery storage was modeled as a peaking resource and assumed to be connected to the grid to improve the likelihood of it being charged when needed to serve load. When the load following capabilities of existing resources can account for the intermittent nature of renewables, adding battery storage to renewables is not prudent and unnecessarily increases costs. Furthermore, when a battery is connected only to a renewable resource, its value as a peaking resource is significantly diminished.

Regardless of whether a battery is physically charged from a non-CO₂-emitting source of generation, the cost of charging the battery is equal to the system's marginal cost of generation, which in the case of the Companies' current generating portfolio would always be a CO₂-emitting resource. The act of charging the battery with a renewable source implies that another generating source must provide the energy that would otherwise have been provided by the renewable source.

- b. Agreed. The institution of CO₂ prices would tend to diminish the economic advantage of CO₂-emitting sources (such as a coal-fired plant) when compared to non-CO₂-emitting sources (such as wind or solar) assuming that each resource was equally reliable on its own. However, if battery storage is required to allow intermittent resources to reliably match load, then the quantity of generation and storage required to reliably meet load at any given moment may offset the cost of CO₂ emissions from the fossil resource. For example, the Companies' case study for using solar and storage to meet 100 percent of the real-time actual electricity needs of the Highland 1103 circuit showed that approximately 75 MW of solar and 300 MWh of battery storage would be required to meet a peak load of about 9 MW with an annual energy need of 20,500 MWh.¹

¹ Study is located on the Companies' website at: <https://lge-ku.com/sites/default/files/Using-Solar-And-Storage-Case-Study-LGE-Highland-1103-Circuit.pdf>.

**Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Sierra Club's Supplemental Request for Information
Dated November 25, 2019**

Case No. 2018-00348

Question No. 2

Witness: Stuart A. Wilson

- Q-2. Reference the Companies' response to SC 1-8, stating in part that "[t]he Companies' modeling of CO₂ prices was not an attempt to accurately forecast the CO₂ prices that might occur from any new regulation that might be developed," but rather was "intended to demonstrate a range of possible futures that could drive different scenarios of future replacement generation capacity"; and that "the Companies did not treat either CO₂ price case [i.e., "High" or "Zero"] as more likely than the other."
- a. Confirm whether the Companies have ever attempted to accurately forecast the CO₂ prices that might occur from any new regulation that might be developed; and provide such forecast(s) (and all supporting analysis), if any.
 - b. Granted the Companies' IRP analysis did not treat either its High or Zero case as more likely than the other, explain whether the Companies have an opinion on whether any particular CO₂ price forecast, whether it is one of the two price cases set out in the IRP or not, is in fact the most likely—or at least whether the Companies had one at the time the IRP was authored. Provide all documents showing or related to the development of such opinion, if any.
- A-2.
- a. If regulations are passed that place a cost on CO₂ emissions, the cost will depend on the nature of the regulations and the response by parties who are impacted by the regulations. Given the significant uncertainty surrounding these potential regulations, the Companies have historically assumed a wide range of CO₂ emissions prices that represent a reasonable view of potential outcomes.
 - b. The Companies believe the cost of CO₂ emissions will be zero in the near-term. The Companies do not have an opinion on the likelihood of any particular long-term CO₂ emissions price forecast.

**Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Sierra Club's Supplemental Request for Information
Dated November 25, 2019**

Case No. 2018-00348

Question No. 3

Witness: Stuart A. Wilson

- Q-3. Reference the Companies' response to SC 1-9. Identify and provide all documents (including without limitation all reports, analysis, messages, slides, meeting minutes, etc.) comprising or otherwise related to the referenced "near-term replacement analysis that evaluated replacing Brown 3 with a combination of battery storage and renewables and determined that such a combination was not least-cost."
- A-3. See attached. The information requested is confidential and proprietary and is being provided under seal pursuant to a petition for confidential protection.

The entire attachment is
Confidential and
provided separately
under seal.

**Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Sierra Club's Supplemental Request for Information
Dated November 25, 2019**

Case No. 2018-00348

Question No. 4

Witness: Stuart A. Wilson

- Q-4. Reference the Companies' response to SC 1-18.
- a) Whereas the Companies stated, in part, "It is economic for the Companies to continue purchasing energy from OVEC, given the Companies' obligation to participate through 2040 in the ICPA, which was amended in 2010 and approved by the Kentucky Public Service Commission in Case Nos. 2011-00099 and 2011-00100"—
 - i. Explain the meaning of "economic" as the Companies mean it there—i.e., "economic" for whom (the Companies' retail customers?); by what measure(s); relative to what alternatives; etc.
 - ii. Explain the basis for that assertion that it is "economic" (e.g., based solely on the record and decision in Case Nos. 2011-00099 and 2011-00100? other?).
 - b) Explain whether it is the Companies' contention that, if the Companies were not obligated to purchase energy from OVEC, the Companies' customers' retail rates would still be lowest if the Companies chose to continue purchasing energy from OVEC in the same way they do now, relative to other options.
 - c) Confirm or deny that, at least since Case Nos. 2011-00099 and 2011-00100, the Companies have not (re)assessed the relative net impacts on their customers of continuing to purchase energy from the OVEC units as required under the ICPA. If denied, explain and provide such assessment(s).
 - d) Other than the Company's contractual obligation under the ICPA or reliance on the approval in Case Nos. 2011-00099 and 2011-00100, identify and explain any Company need for taking power from OVEC.
 - e) Whereas the Companies stated that "OVEC's continued operation is determined by its board," identify the factors that the OVEC board considers in making that determination.
 - f) Whereas the Companies have two representatives on the OVEC board, explain whether the Companies' representatives and/or other OVEC board members regularly consider, as a consideration in discussions regarding whether to continue operations,

the question of the relative net impact on OVEC members' customers' retail rates of continuing OVEC's operations.

- g) Whereas the requests above compare substantively to those in SC 2-1 in Case Nos. 2018-00294 and 2018-00295, confirm or deny that the substance of the Companies' responses to the requests above, here, are the same as in the Companies' analogous responses to SC 2-1 in those dockets. If denied, explain how and why the responses here are different.

A-4.

- a)
- i. The Companies evaluate unit commitment, decommitment, and energy costs when determining whether any generator should be online. The decision to purchase energy from OVEC is no different. The Companies attempt to commit the most economic units at all times. Therefore, the Companies do not anticipate any circumstances in which it would purchase energy from OVEC that would be considered uneconomic when commitment and decommitment costs are properly considered.
 - ii. The Companies take at least their share of OVEC's minimum output or pay their share of any of OVEC's costs related to commitment/decommitment. The Companies always attempt to economically commit and decommit its generation fleet, including OVEC.
- b) See the response to part (a)(i).
- c) See the response to part (a)(i).
- d) The Companies are obligated to dispatch economically for the purposes of serving customers at the lowest reasonable cost. The IRP demonstrated that with the Companies' share of OVEC capacity, the Companies' reserve margin falls within the target reserve margin range.
- e) These factors have not been specified by the OVEC board.
- f) The Companies are not aware of such discussions. See the response to SC 1-31.
- g) The above responses are substantively the same as the responses to the referenced questions from Case Nos. 2018-00294 and 2018-00295. However, part (d) includes additional clarifying information.

Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Sierra Club's Supplemental Request for Information
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Case No. 2018-00348

Question No. 5

Witness: Robert M. Conroy / Stuart A. Wilson / Counsel

- Q-5. Reference the Companies' response to SC 1-20(b).
- a) Confirm or deny that the Companies conveyed an opinion to the Commission regarding the operating lives of the OVEC Units in Case Nos. 2011-00099 and 2011-00100, in which the Companies requested that the Commission authorize their entrance into the Amended ICPA and approve the proposed extension of the Companies' long-term purchase contract with OVEC from 2026 to 2040.
 - b) Indicate and explain the Companies' understanding of whether the Commission could effectively release the Companies from some or all of their obligations under the ICPA if the Commission (hypothetically in some proceedings) were to withdraw the authorizations it granted in Case Nos. 2011-00099 and 2011-00100.
- A-5.
- a) The Companies refer to their respective filings in *Verified Application of Louisville Gas and Electric Company for an Order Pursuant to KRS 278.300 and for Approval of Long-Term Purchase Contract*, Case No. 2011-00099, and *Verified Application of Kentucky Utilities Company for an Order Pursuant to KRS 278.300 and for Approval of Long-Term Purchase Contract*, Case No. 2011-00100, which speak for themselves. The Companies confirm that in these applications, they each sought Commission approval, pursuant to KRS 278.300, of their respective entrance into the Amended and Restated Inter-Company Power Agreement dated September 10, 2010. In response to Commission Staff Information Requests, the Companies provided a draft Independent Technical Review of the Kyger Creek and Clifty Creek Plants performed by URS Corporation, dated June 27, 2011 ("URS Report"). The URS Report is an independent technical review prepared at the request of OVEC, not the Companies. The URS Report concluded that if the OVEC units "continue to be operated and maintained as they are currently, and have been for the past several years, and if current plans for equipment maintenance and upgrades are successfully conducted on an ongoing basis, then an additional 30 years or more of useful life can be reasonably expected."² In response to the Commission Staff's Supplemental Information Request No. 1, the

² *Verified Application of Louisville Gas and Electric Company for an Order Pursuant to KRS 278.300 and for Approval of Long-Term Purchase Contract*, Case No. 2011-00099, Attachment to July 11, 2001 Supplemental Response of Louisville Gas and Electric Company to the Supplemental Information Request of Commission Staff Dated June 14, 2011, No. 1, at p. 45.

Companies referred to the findings of the URS Report and did not express an independent judgment on the operating lives of any of the OVEC units.

- b) The Companies object to this request on the grounds that it is vague and calls for a legal conclusion interpreting Kentucky law, Commission precedent and the terms of the Amended ICPA. On the basis of this objection, the Companies decline to engage in speculation as to the legal consequences of hypothetical Commission action which is not contemplated by KRS 278.300, the Amended ICPA, or by the Commission's Order entered August 11, 2011 in Case Nos. 2011-00099 and 2011-00100, authorizing the Companies to enter into the Amended ICPA.

**Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Sierra Club's Supplemental Request for Information
Dated November 25, 2019**

Case No. 2018-00348

Question No. 6

Witness: Stuart A. Wilson

- Q-6. Reference the Companies' response to SC 1-29(a) and Attachments 1 & 2 thereto.
- a) Identify the preparer/author/source of each Attachment's charts (e.g., OVEC? the Companies?)
 - b) Whereas the above request compares substantively to request SC 2-3 in Case Nos. 2018-00294 and 2018-00295, confirm or deny that the substance of the Companies' response to the request above, here, is the same as in the Companies' analogous response to SC 2-3.
- A-6.
- a) Attachment 1 was prepared by the Companies, from information provided by OVEC for its board meeting held on December 8, 2017. Attachment 2 was prepared by OVEC. The Companies do not have any information regarding the preparation of this document beyond what is shown in the attachment.
 - b) This response is same as the responses to the referenced questions from Case Nos. 2018-00294 and 2018-00295.

**Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Sierra Club's Supplemental Request for Information
Dated November 25, 2019**

Case No. 2018-00348

Question No. 7

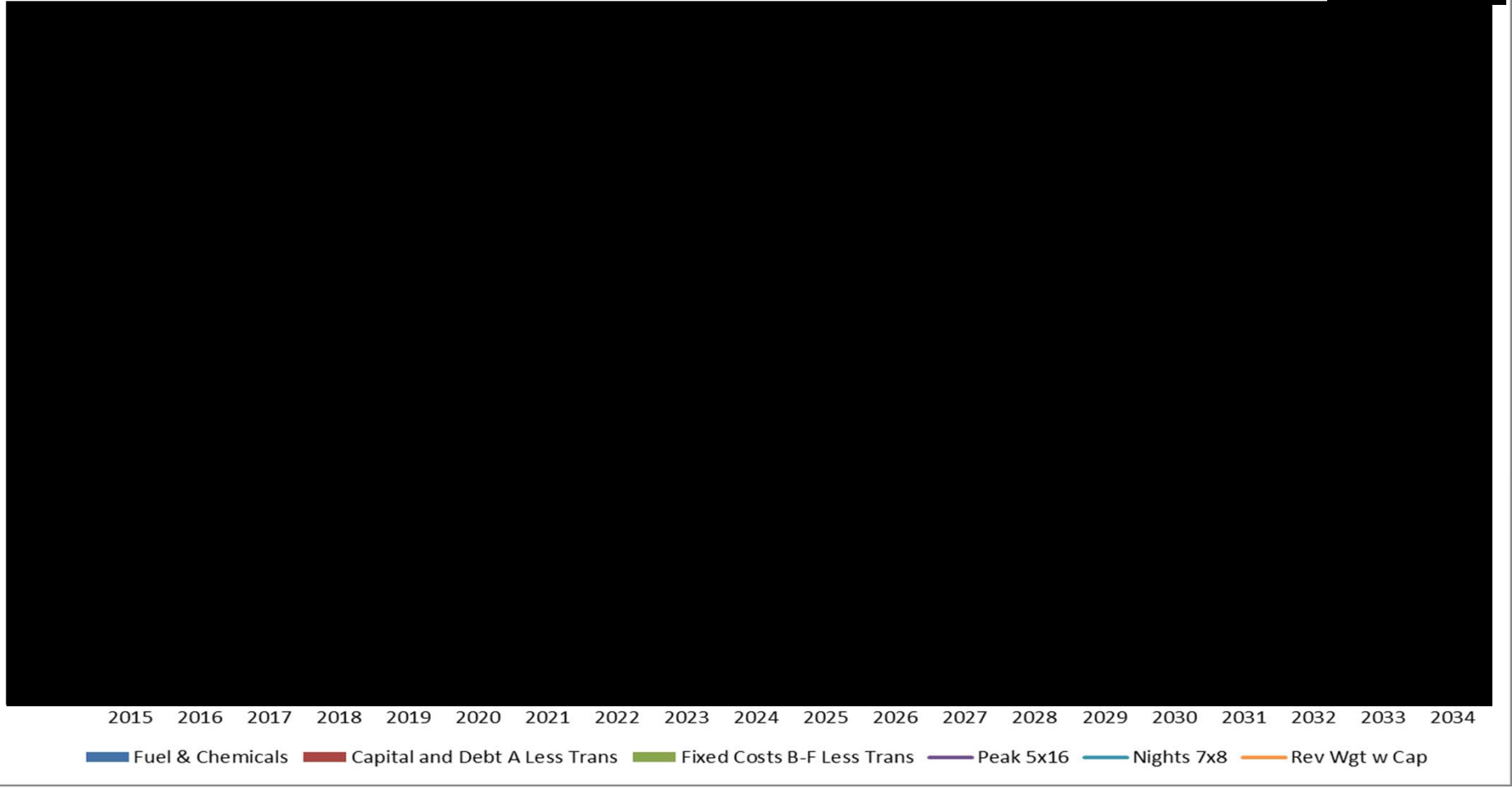
Witness: Stuart A. Wilson

- Q-7. Reference the Companies' response to SC 1-31 and Attachment thereto.
- a) Discuss the "merchant plant analysis" referred to at pp. 3 and 9 of the Attachment, explaining (without limitation)—
 - i) who prompted it and why.
 - ii) when was it commenced and completed.
 - iii) what point in time, or timeframe, did it purport to address.
 - iv) who performed it.
 - v) was it a regular, periodic analysis or a one-off analysis.
 - vi) any other pertinent details.
 - b) Provide a copy of that merchant plant analysis (or analyses), along with (if distinct therefrom) the corresponding "handout" (or handouts) that were "provided to the Board," as referenced in the Attachment.
 - c) Whereas the above requests compare substantively to request SC 2-4 in Case Nos. 2018-00294 and 2018-00295, confirm or deny that the substance of the Companies' responses to the requests above, here, is the same as in the Companies' analogous response to SC 2-4 in those dockets. If denied, explain how and why the response here is different.
- A-7.
- a) These analyses were provided by OVEC to the board to compare OVEC's projected cost components to a projection of market energy and capacity prices. The two analyses in question were performed and completed once per year in late 2015 and late 2016 by OVEC staff with input from an OVEC sponsor as noted in the attachment to part (b).
 - b) See attached. Certain information requested is confidential and proprietary and is being provided under seal pursuant to a petition for confidential protection.
 - c) The above responses are the same as the responses to the referenced questions from Case Nos. 2018-00294 and 2018-00295.

**OHIO VALLEY ELECTRIC CORPORATION (OVEC)
INDIANA-KENTUCKY ELECTRIC CORPORATION (IKEC)
Agenda
Boards of Directors' Meeting
December 1, 2015**

OVEC Merchant Analysis – Mid (Expected) Case

Comparison of **Mid** Case Annual Market Prices for Energy and Capacity
Vs
OVEC COE



Generation based on [redacted] dispatch and forecasted variable costs against [redacted] projected energy and capacity prices, (PJM, AD Hub).

Case No. 2018-00348

Attachment to Response to SC-2 Question No. 7

**OHIO VALLEY ELECTRIC CORPORATION (OVEC)
INDIANA-KENTUCKY ELECTRIC CORPORATION (IKEC)**

Agenda

Boards of Directors' Meeting

December 1, 2016



OVEC Merchant Analysis Mid Case (Prior Year Capacity Assumptions)

Comparison of **Mid** Case Annual Market Prices for Energy and Capacity
Vs
OVEC COE

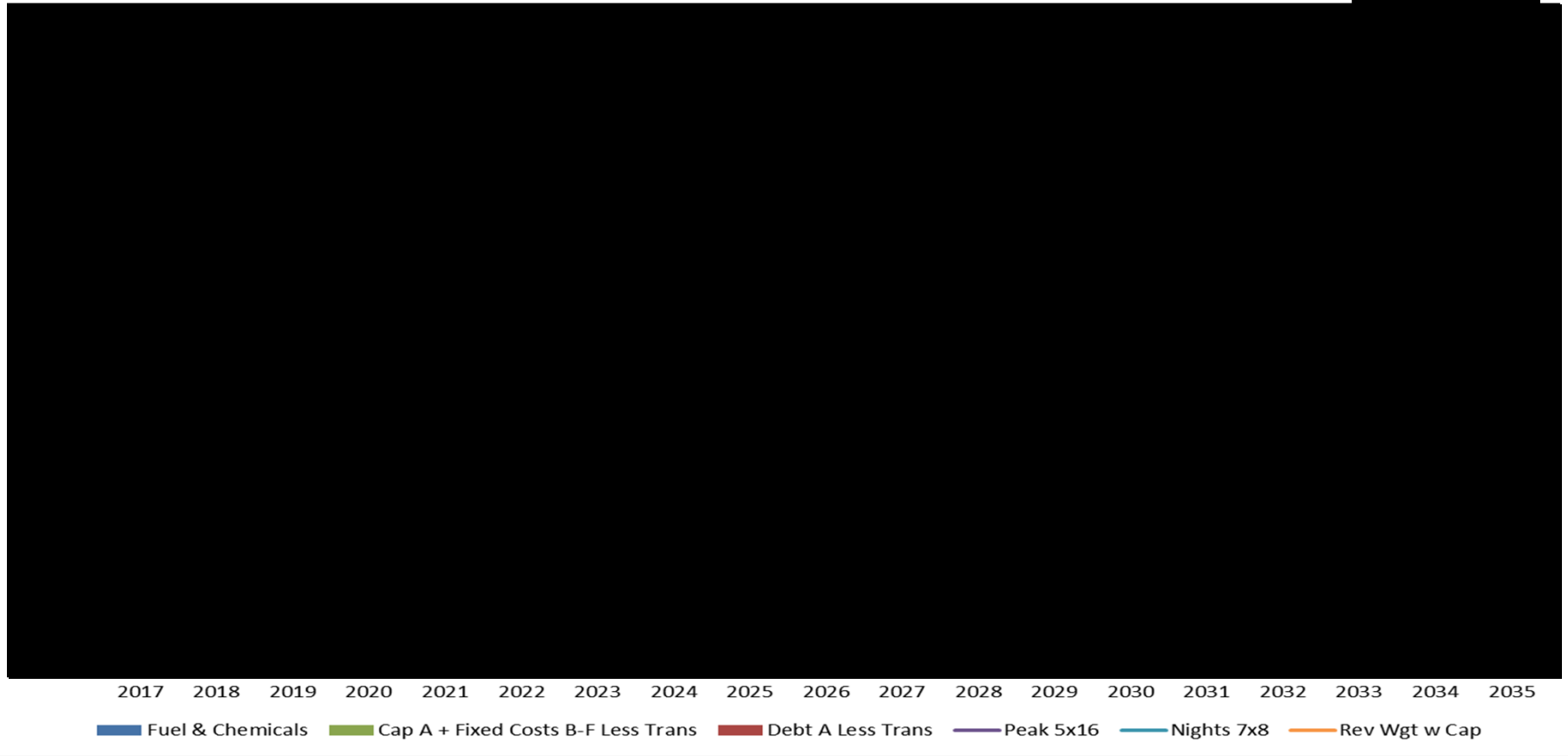


Generation based on [REDACTED] dispatch and forecasted variable costs against [REDACTED] projected energy and capacity prices, (PJM).
Case No. 2018-00348
Attachment to Response to SC-2 Question No. 7



OVEC Merchant Analysis Mid Case (Current Capacity Assumptions)

Comparison of **Mid** Case Annual Market Prices for Energy and Capacity
Vs
OVEC COE



Generation based on [REDACTED] dispatch and forecasted variable costs against [REDACTED] projected energy and capacity prices, (PJM).

Case No. 2018-00348

Attachment to Response to SC-2 Question No. 7

**Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Sierra Club's Supplemental Request for Information
Dated November 25, 2019**

Case No. 2018-00348

Question No. 8

Witness: Stuart A. Wilson

Q-8. Reference the Companies' Response to SC 1-32 and Attachment.

- a) Confirm or deny that, as of today, no actual construction has commenced of any capital projects needed at the OVEC Units to achieve compliance with the ELG Rule or CCR Rule (see, e.g., Attachment at p.2).
 - i) If confirmed, explain whether any definitive, committed decisions have been made at this time regarding whether and when to commence construction of such capital projects.
 - (1) If so, identify such decided-upon, committed-to project(s), including (without limitation) the plant at which construction has commenced, when construction began and when it is projected to be completed, and compliance with which rule(s) it is intended to achieve.
 - ii) If denied, identify and discuss such project(s), including (without limitation) the plant at which construction has commenced, when construction began and when it is projected to be completed, and compliance with which rule(s) it is intended to achieve.
- b) Whereas the above requests compare substantively to request SC 2-5 in Case Nos. 2018-00294 and 2018-00295, confirm or deny that the substance of the Companies' responses to the requests above, here, is the same as in the Companies' analogous response to SC 2-5 in those dockets. If denied, explain how and why the response here is different.

A-8.

- a) Other than the preparatory spending noted in the Attachment to SC 1-32, it is the Companies' understanding that no actual construction has commenced. However, the Companies do not have access to OVEC's detailed corporate, accounting, or operating information.
 - i) No committed investment decisions have been made at this time.
 - (1) Not applicable.

- ii) Not applicable.
- b. The above responses are substantively the same as the responses to the referenced questions from Case Nos. 2018-00294 and 2018-00295.

**Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Sierra Club's Supplemental Request for Information
Dated November 25, 2019**

Case No. 2018-00348

Question No. 9

Witness: Daniel K. Arbough / Christopher M. Garrett

Q-9. Reference the Companies' response to SC 1-36.

- a) Confirm or deny that it is the Company as a corporate entity which owns the referenced amount of OVEC common stock. If denied, explain who/what else instead "owns" that stock.
- b) Whereas the above request compares substantively to request SC 2-6 in Case Nos. 2018-00294 and 2018-00295, confirm or deny that the substance of the Companies' response to the request above, here, is the same as in the Companies' analogous response to SC 2-6 in those dockets. If denied, explain how and why the response here is different.

A-9.

- a) LG&E and KU confirm that each owns stock in OVEC.
- b) This response is the same as the response to SC 2-6 in Case Nos. 2018-00294 and 2018-00295.