COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

APPLICATION OF KENTUCKY UTILITIES	**)**	
COMPANY FOR AN ADJUSTMENT OF ITS	**)**	**CASE NO.**
ELECTRIC RATES AND FOR CERTIFICATES	**)**	**2016-00370**
OF PUBLIC CONVENIENCE AND NECESSITY	**)**	

RESPONSE OF
KENTUCKY UTILTIES COMPANY
TO
SUPPLEMENTAL REQUESTS FOR INFORMATION OF
SIERRA CLUB
DATED FEBRUARY 7, 2017

FILED: FEBRUARY 20, 2017

VERIFICATION

COMMONWEALTH OF KENTUCKY)
) **SS:**
COUNTY OF JEFFERSON)

The undersigned, **Robert M. Conroy**, being duly sworn, deposes and says that he is Vice President – State Regulation and Rates for Louisville Gas and Electric Company and Kentucky Utilities Company, 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 20th day of February 2017.

(SEAL)
Notary Public

My Commission Expires:
JUDY SCHOOLER
Notary Public, State at Large, KY
My commission expires July 11, 2018
Notary ID # 512743

VERIFICATION

COMMONWEALTH OF KENTUCKY)
) **SS:**
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 20th day of February 2017.

_(SEAL)
Notary Public

My Commission Expires:
JUDY SCHOOLER
Notary Public, State at Large, KY
My commission expires July 11, 2018
Notary ID # 512743

VERIFICATION

COMMONWEALTH OF KENTUCKY)
) **SS:**
COUNTY OF JEFFERSON)

The undersigned, **William Steven Seelye**, being duly sworn, deposes and states that he is a Principal of The Prime Group, LLC, 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.

William Steven Seelye

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 13th day of February 2017.

(SEAL)
Notary Public

My Commission Expires:

JUDY SCHOOLER
Notary Public, State at Large, KY
My commission expires July 11, 2018
Notary ID # 512743

VERIFICATION

COMMONWEALTH OF KENTUCKY)
) **SS:**
COUNTY OF JEFFERSON)

The undersigned, **John P. Malloy**, being duly sworn, deposes and says that he is Vice President – Gas Distribution for Louisville Gas and Electric Company and Kentucky Utilities Company, 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.

____
John P. Malloy

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 20th day of February 2017.

______________________________ (SEAL)
Notary Public

My Commission Expires:
JUDY SCHOOLER
Notary Public, State at Large, KY
My commission expires July 11, 2018
Notary ID # 512743

VERIFICATION

COMMONWEALTH OF KENTUCKY)
) **SS:**
COUNTY OF JEFFERSON)

The undersigned, **John K. Wolfe**, being duly sworn, deposes and says that he is Vice President - Electric Distribution 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.

John K. Wolfe

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 20th day of February 2017.

Notary Public (SEAL)

My Commission Expires:
JUDY SCHOOLER
Notary Public, State at Large, KY
My commission expires July 11, 2018
Notary ID # 512743

VERIFICATION

COMMONWEALTH OF KENTUCKY)
) SS:
COUNTY OF JEFFERSON)

The undersigned, **Christopher M. Garrett**, being duly sworn, deposes and says that he is Director – Rates for Kentucky Utilities Company and Louisville Gas and Electric Company and an employee of LG&E and KU Services Company, 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 20th day of February 2017.

Notary Public (SEAL)

My Commission Expires:

JUDY SCHOOLER
Notary Public, State at Large, KY
My commission expires July 11, 2018
Notary ID # 512743

KENTUCKY UTILTIES COMPANY

CASE NO. 2016-00370

Response to Supplemental Requests for Information of Sierra Club
Dated February 7, 2017

Question No. 1

Responding Witness: Robert M. Conroy

Q-1. Reference KU Initial Response to Sierra Club Initial Request 2(b).

a) For calendar year 2016, please provide the average monthly energy consumption per residential customer.

b) For calendar year 2016, please provide the average monthly class non-coincident peak demand per residential customer.

c) For calendar year 2016, please provide the average monthly individual customer maximum demand per residential customer.

d) For calendar year 2016, please provide the number of residential customers whose average monthly energy consumption falls between:

i) 0 kWh and 500 kWh;

ii) 501 kWh and 750 kWh;

iii) 751 kWh and 1,000 kWh;

iv) 1,001 kWh and 1,200 kWh;

v) 1,201 kWh and 1,500 kWh;

vi) 1,501 kWh and 2,000 kWh;

vii) 2,001 kWh and 2,500 kWh; and

viii) 2,501 kWh and 3,000 kWh.

e) For calendar year 2016, please provide the average monthly energy consumption per customer over all residential customers whose average monthly energy consumption falls between:

i) 0 kWh and 500 kWh;

ii) 501 kWh and 750 kWh;

iii) 751 kWh and 1,000 kWh;

iv) 1,001 kWh and 1,200 kWh;

v) 1,201 kWh and 1,500 kWh;

vi) 1,501 kWh and 2,000 kWh;

vii) 2,001 kWh and 2,500 kWh; and

viii) 2,501 kWh and 3,000 kWh.

f) For calendar year 2016, please provide the average monthly class non-coincident peak demand per customer over all residential customers whose average monthly energy consumption falls between:

i) 0 kWh and 500 kWh;

ii) 501 kWh and 750 kWh;

iii) 751 kWh and 1,000 kWh;

iv) 1,001 kWh and 1,200 kWh;

v) 1,201 kWh and 1,500 kWh;

vi) 1,501 kWh and 2,000 kWh;

vii) 2,001 kWh and 2,500 kWh; and

viii) 2,501 kWh and 3,000 kWh.

g) For calendar year 2016, please provide the average monthly individual customer maximum demand per customer over all residential customers whose average monthly energy consumption falls between:

i) 0 kWh and 500 kWh;

ii) 501 kWh and 750 kWh;

iii) 751 kWh and 1,000 kWh;

iv) 1,001 kWh and 1,200 kWh;

v) 1,201 kWh and 1,500 kWh;

vi) 1,501 kWh and 2,000 kWh;

vii) 2,001 kWh and 2,500 kWh; and

A-1.

a) For calendar year 2016, the average monthly energy consumption per residential customer was 1,182 kWh.

b) The Company does not have demand data for the vast majority of residential customers.

c) See the response to part b.

d) The Company does not have the requested data readily available in the format requested, and does not have a business reason to maintain data in that format. To provide the information as requested would require significant effort and time to assemble, analyze, and perform the requested computations upon 12 months of data for over 420,000 residential customer accounts.

e) The Company does not have the requested data readily available in the format requested, and does not have a business reason to maintain data in that format. To provide the information as requested would require significant effort and time to assemble, analyze, and perform the requested computations upon 12 months of data for over 420,000 residential customer accounts.

f) See the response to part b.

g) See the response to part b.

KENTUCKY UTILTIES COMPANY

CASE NO. 2016-00370

Response to Supplemental Requests for Information of Sierra Club
Dated February 7, 2017

Question No. 2

Responding Witness: David S. Sinclair

Q-2. Reference KU Initial Response to Sierra Club Initial Request 3(d).

a) For calendar year 2016, please provide the average monthly class non-coincident peak demand per residential distributed generation customer.

b) For calendar year 2016, please provide the average monthly individual customer maximum demand per residential distributed generation customer.

A-2.

a) The Company does not have demand data for the vast majority of residential customers. The Company does have a sample of approximately 150 meters to record interval data for residential customers for the purposes of cost allocation and load research. This sample is not intended to provide representative data for distributed generation customers or other stratifications of the residential class.

b) See the response to part a.

KENTUCKY UTILTIES COMPANY

CASE NO. 2016-00370

Response to Supplemental Requests for Information of Sierra Club
Dated February 7, 2017

Question No. 3

Responding Witness: Robert M. Conroy

Q-3. Reference KU Initial Response to Sierra Club Initial Request 5(b).

a) Please identify the specific spreadsheet in the Company's response to PSC 1-53 that was used to derive KU Initial Response to Sierra Club Initial Request 5(a).

b) Please provide a complete description of all modifications made to the spreadsheet used to derive KU Initial Response to Sierra Club Initial Request 5(a).

A-3.

a) See the spreadsheet named:
"Att_KU_PSC_1-53_ElecScheduleM_Forecasted.xlsx" and the tab named "Sch M-2.3 pgs 3-15".

b) In the spreadsheet tab identified in part a, set the proposed basic service charge in cell I10 to $10.75 and the proposed energy charge in cell I14 to $0.09477 in order to achieve approximately the same proposed residential increase as originally filed in cell J32.

KENTUCKY UTILTIES COMPANY

CASE NO. 2016-00370

Response to Supplemental Requests for Information of Sierra Club
Dated February 7, 2017

Question No. 4

Responding Witness: Robert M. Conroy / William S. Seelye

Q-4. Reference KU Initial Response to Sierra Club Initial Request 6.

a) Please identify all relevant non-privileged documents other than pre-filed testimony by William S. Seelye and Robert M. Conroy that are "already in the record," as the Company's response implies.

A-4. See Exhibit WSS-2 to the testimony of Mr. Seelye; Filing Requirements, Tab 66, Schedule M-2.3, pages 3-4; and the responses to PSC 1-53 and 1-54. See also the response to PSC 2-66.

KENTUCKY UTILTIES COMPANY

CASE NO. 2016-00370

Response to Supplemental Requests for Information of Sierra Club
Dated February 7, 2017

Question No. 5

Responding Witness: John P. Malloy / John K. Wolfe

Q-5. Reference KU Initial Response to Sierra Club Initial Request 16.

a) Please provide the number of residential service drops in the Company's service territory as of year-end 2016.

b) Please provide the number of residential customers as of year-end 2016.

c) Please provide the number of service drops to multi-family buildings in the Company's service territory as of year-end 2016.

d) Please provide the number of residential customers residing in multi-family housing as of year-end 2016.

e) Please provide the number of secondary line transformers serving residential customers as of year-end 2016.

f) Please provide the number of secondary line transformers serving residential multi-family buildings as of year-end 2016.

g) Does the Company employ guidelines for sizing of line transformers? If so, please provide copies of such guidelines.

h) Has the Company studied the impact of load diversity on loadings on distribution equipment? If so, please provide copies of all such studies.

A-5.

a) The Company does not have a business reason to maintain the requested information, and therefore cannot provide the requested response.

b) See the table below.

KU Electric Residential Customers (KY Only)	428,241
KU Electric Residential Customers (TN Only)	4
ODP Electric Residential Customers (VA)	23,582
Total KU Residential Customers	451,827

c) The Company does not have a business reason to maintain the requested information, and therefore cannot provide the requested response.

d) The Company does not have a business reason to maintain the requested information, and therefore cannot provide the requested response.

e) The Company does not have a business reason to maintain the requested information, and therefore cannot provide the requested response.

f) The Company does not have a business reason to maintain the requested information, and therefore cannot provide the requested response.

g) The Company sizes transformers based on customer-provided load information where possible. Customers are required to provide detailed load information as part of the new service request process and an estimated diversified load is determined from customer-provided information. Where transformers are placed in advance of known customer loads, such as where electric facilities are built out in new underground subdivisions to facilitate development, transformer sizing is based on the number of customers to be served, the character of the service (i.e. all electric or gas and electric) and the anticipated square footage of future homes. Sizing guidelines were developed based on a load and diversity study. See attached.

h) Diversity and the potential for future growth is a consideration in the sizing of all distribution lines and equipment. See the response to part g for sizing of transformers. Distribution lines and non-transformer equipment is sized based on actual diversified historical loads. System Planning tools allocate loads throughout a distribution circuit based on expected customer demand.

Residential Load and Diversity

Prepared By: Rudy Dewitt Michael T. Leake Richard Jones
Status: Draft Pending Review

BACKGROUND

Residential development represents a substantial portion of most electric utility companies, and as such, requires a need to accurately estimate non-coincident and coincident peak demands. Accurate estimates help to determine electric systems' capacity requirements as well as provide design technicians and engineering a realistic design standard to maximize the use of materials and equipment. This is important for any electric utility to stay competitive and generally keep the "cost to serve" down. In an effort to develop residential demand and diversity equations suitable for the LG&E/KU/ODP operating region, a fairly comprehensive study was initiated and a set of standard equations developed for use.

For the sake of simplicity, only two general classes of service were considered, *RS* for residential service homes with non-electric heating, and *FERS* for full electric residential service. The Demand (D) equations can be used to estimate the realistic demand of a residence by its size and character of service. Because short term or instantaneous demands have little impact on system requirements, the calculated Demand is the peak one-hour demand value for a home of a given size and character of use.

The Diversified Demand Factor (DDF) equations can be used to estimate with a high degree of confidence the diversified load of multiple homes from a common load point, for example off a common secondary, off a common transformer, multiple customers on an overhead tap or half loop of a URD feed, etc. Or it can even be used to estimate load for the whole subdivision. The Diversified Demand Factor is applied to the sum of the individual peak demands to allow for the fact that all customer off a common source will not experience their peak demands at the same time. The LG&E/KU/ODP standard equations for Demand and the Diversified Demand Factor are:

FERS	*RS*
D= 6.5 watts/ft^2 + 6000 watts	D= 3.4 watts/ft^2 + 6000 watts
$DDF = .55 + \frac{.25}{N} + \frac{.20}{\sqrt{N}}$	$DDF = .52 + \frac{.38}{N} + \frac{.10}{\sqrt{N}}$
Where *N* is the number of homes and the square footage is the average conditioned living space of the homes	

These equations were derived from an extensive review of technical literature on residential demand and diversity and data derived from past PURPA studies. These equations were then refined and validated through an extensive study of real load data from load research meters on the LG&E system. For details on the most recent load study, visit the Electric Codes and Standards Home Page or contact the Electric Codes and Standards group. Also a spreadsheet for calculating residential loading, checking voltage drop and sizing transformers can be found on the home page.

RESIDENTIAL CUSTOMER CLASSIFICATIONS

Residential customers were classified into two basic groups: Full electric residential service (FERS) and residential service (RS). The FERS class would generally be a winter peaking load since some form of electric heating is used and the RS class would generally be a summer peaking load since most of these would have air conditioning. Each of these groups will have subclasses, but unfortunately these were not considered. A brief table of the subclasses is as follows:

FERS AND RS SUB-CLASSES

MAJOR CLASS	***SUB-CLASSES***	
	Heat Source	***Major Appliances***
FERS Winter Peaking	1. Heat Pump + Auxiliary Heating 2. Electric Furnace 3. Baseboard 4. Ceiling Cable 5. Electric Boiler (Steam Heating)	1. Oven 2. Range 3. Clothes Dryer 4. Water Heater

RS Summer Peaking	1. Natural Gas Furnace 2. Wood or Other Fossil fuel 3. Heat Pump + natural gas or Other Fossil Fuel 4. Natural Gas or Other Fossil Fuel Boiler (Steam Ht.) 5. Portable (Room Heaters) of Any Kind	1. Air Conditioning Room or Central 2. Any Combination of Any Number of The FERS Major Appliances

From this brief table of Sub-classes, there are at least 5 *FERS* subclasses and as many as 25 RS subclasses.

SOURCE DOCUMENTS AND RESOURCES

Many source documents were used in aiding this study and analysis. Primary documents included:

1. Westinghouse Electric Utility Engineering reference book – Distribution Systems, volume 3, Chapter 2.
2. Ebasco/Electrical World Electric Distribution Systems Engineering Manual, Volume 2.
3. KU/ODP and LG&E Residential Load Survey (PURPA) data.
4. Air Conditioning Contractors of America (ACCA) manual J, load calculations for residential Winter and Summer air conditioning.
5. Other utility companies' engineering standards or surveys.

The Westinghouse and EBASCO documents generally provide basic demand and diversity estimating equations. Although not explicitly stated in either document, there appeared to be two (2) load components for peak demand and two (2) diversity equations. The load components are variable and fixed, and diversity equations reflect these load components.

LOAD COMPONENTS

The variable load component is compromised predominantly of comfort heating and cooling, lighting and some other discretionary small loads. The comfort heating and air conditioning load is not only living area dependent, but also ambient and indoor comfort temperature dependent. This gives a wide range for maximum (15 minute) demands but this range narrows for hourly integrated demands.

As an example, an 1800 ft^2 FERS residence would typically have a 3 ton heat pump and 15 kW auxiliary (resistance) heating. For a mild winter day the heating demand would be about 3 kW, both 15 minute and hourly integrated, but on a cold day the 15 minute peak demand could approach 18 kW while the hourly integrated demand is only about 12 kW.

Lighting loads are reasonably proportional to living area as well as other discretionary devices such as TV sets, home computers, radios and clocks. The combination of the HVAC, lighting and discretionary loads can all be approximated as the variable load component expressed as watts per square foot of living area. A brief table of variable loads and their non-coincident demands is shown below:

VARIABLE LOAD COMPONENT WATTS/FT^2		
Heating	***Air Conditioning***	***Lighting & Misc.***
HP Only: 1.67 HP+ AH: 1.67 to 10.00 Other Electric: 5.00 to 10.00	HP or Central: 1.25 to 1.67	2.5 to 3.0

This brief table yields variable non-coincident demands of:
Winter 4.17 to 13.0 Watts/ft^2
Summer 3.75 to 4.67 Watts/ft^2

The fixed load component is comprised of many individual major and small appliance loads. A brief table of these, as well as their individual non-coincident demands is shown below.

FIXED LOAD COMPONENT			
Major Appliance	***Watts Demand***	***Small Appliance***	***Watts Demand***
Oven (2) Range (4) Water Heater (2) Clothes Dryer Clothes Motor	5000 8000 5000 5000 300	* Refrigerator Microwave Portable fans * Coffee Maker Toaster Freezer Dish Washer Hair Dryer Portable Heater * Washing Machine	300 700 200 1200 1200 500 1200 1500 1500 300
Undiversified Totals (2) = 2 Elements (4) = 4 Elements	23300	* Most Common For Both FERS and RS Classes	8600

This table yields a ***fixed*** load component of 25100 to 31900 watts for FERS class and 1800 to 31900 watts for RS class. The contribution to ***peak*** demands for either class is just as varied.

The combined variable and fixed load components yield non-coincident demand equations as follows:

Variable (w/ft2)	***Fixed (watts)***
Dw = 4.17 to 13	25100 to 31900
Ds = 3.75 to 4.67	1800 to 31900

These are actually total connected loads, and for an 1800 ft^2 residence, the total connected loads would be:

FERS Winter	***RS Summer***
32.606 to 55.3 kW	8.55 to 40.306 kW

Final estimated demand equations can be written in the forms:

Dw = **(Vw) (LA) + Fw**

Ds = **(Vs) (LA) + Fs**

Dw = Coincident winter demand of both variable and fixed
Vw = Variable winter demand coefficient in watts per square foot
LA = Living area of residence in square feet
Fw = Fixed winter demand component in watts
Ds = Coincident summer demand of both variable and fixed loads in watts
Vs = Variable summer demand coefficient in watts per square foot
LA = Living area of residence in square feet
Fs = Fixed summer demand component in watts

The determination of these components and their contributions to total residence coincident demand can reasonably be done if enough sample points (residences) can be obtained under peak loading conditions of individual residences. Additionally, coincident factors can be determined for a group of similar size residences to aid in determining diversity equations. LG&E and KU/ODP Residential Load Research programs (PURPA) were used to the extent possible to determine estimated demand and diversity equations.

DIVERSITY EQUATIONS

With a group of similar electrical loads with similar peak demands, the total coincident demand is almost always much less than the sum of the individual peak demands, this is especially true for residential loads. Since there are two load components, variable and fixed, there are two generic diversity equations as follows:

1. Variable Loads

A. Winter $DDF_{WV} = .7 + \frac{.3}{\sqrt{N}}$

B. Summer $DDF_{SV} = .8 + \frac{.2}{\sqrt{N}}$

2. Fixed Loads $DDF_F = F + \frac{1-F}{N}$

where:

DDF_{WV} = Diversified demand factor winter variable
DDF_{SV} = Diversified demand factor summer variable
N = Number of equal loads
DDF_F = Diversified demand factor fixed load
F = Coefficient usually in the range of .25 to .35

To get a single diversity equation for winter and a single diversity equation for summer some manipulations are required.

Let: $\overline{D}w = \overline{V}w + \overline{F}w$ and $\overline{V}w + \overline{F}w = 1.00$

$\overline{D}s = \overline{V}s + \overline{F}s$ and $\overline{V}s + \overline{F}s = 1.00$

then: $$DDFw = \overline{F}w\left(F + \frac{1-F}{N}\right) + \overline{V}w\left(.7 + \frac{.3}{\sqrt{N}}\right)$$

$$DDFs = \overline{F}s\left(F + \frac{1-F}{N}\right) + \overline{V}s\left(.8 + \frac{.2}{\sqrt{N}}\right)$$

Both of these equations are in the form of:

$$DDF = A + \frac{B}{N} + \frac{C}{\sqrt{N}}$$

and A + B + C = 1.00.

While it is theoretically possible to determine the A, B, and C coefficients for any size residence and either class (FERS or RS), it has been determined that the weighted average from the KU/ODP PURPA data would be most practical. The study from the LG&E data did indeed favorably match the KU/ODP weighted average coefficients.

The original estimated demand equations for the LG&E/KU/ODP companies were based upon the Westinghouse, EBASCO and several different utility companies' practices as follows:

For FERS Winter	***For RS Summer***
D = 5.4 watts/ft^2 + 6000 watts	D = 2.0 watts/ft^2 + 5300 watts

Linear regression from the LG&E PURPA data provides the following equations:

For FERS Winter	***For RS Summer***
D = 4.7 watts/ft^2 + 5790 watts	D = 3.94 watts/ft^2 + 2440 watts

Modifying the values from the linear regression to provide a 95% confidence level for actual load data, the demand equations selected to be somewhat conservative are:

For FERS Winter	***For RS Summer***
D = 6.5 watts/ft^2 + 6000 watts	D = 3.4 watts/ft^2 + 6000 watts

The original estimated diversity equations for the LG&E/KU/ODP companies were based upon the Westinghouse, EBASCO and several different utility companies' practices as follows:

FERS Winter

$$DDF = .55 + \frac{.25}{N} + \frac{.20}{\sqrt{N}}$$

RS Summer

$$DDF = .52 + \frac{.38}{N} + \frac{.10}{\sqrt{N}}$$

The LG&E PURPA data was used to develop the FERS and RS demand equations and to verify the diversity equations. The KU/ODP PURPA data was used for weighted average diversity equations. (Since no really accurate residence size was in the KU/ODP PURPA data, demand equations were not readily obtainable.)

The final equations for demands and diversities are:

FERS

D= 6.5 watts/ft^2 + 6000 watts

$$DDF = .55 + \frac{.25}{N} + \frac{.20}{\sqrt{N}}$$

RS

D= 3.4 watts/ft^2 + 6000 watts

$$DDF = .52 + \frac{.38}{N} + \frac{.10}{\sqrt{N}}$$

As more PURPA studies are done, there may be some refinements on estimated demands, but the diversity equations will probably remain the same.

KENTUCKY UTILTIES COMPANY

CASE NO. 2016-00370

Response to Supplemental Requests for Information of Sierra Club Dated February 7, 2017

Question No. 6

Responding Witness: William S. Seelye

Q-6. Reference KU Initial Response to Sierra Club Initial Request 17(d).

a) Please provide an electronic spreadsheet, with all cell formulas and file linkages intact, that calculates the Company's estimate of the residential intra-class subsidy resulting from the recovery of demand-related costs through the energy charge.

A-6. a) The Company does not currently have AMS meters or other types of metering equipment that can measure maximum demands for the vast majority of customers served under Residential Service Rate RS or General Service Rate GS. Therefore, the Company has not performed the requested analysis nor is it possible at this time to conduct such an analysis. However, it is not difficult to understand that residential or small commercial customers that purchase energy at high load factors, or purchase most of their energy requirements during off-peak periods, will subsidize customers that purchase energy at low load factors, or purchase most of their energy requirements during on-peak periods. The Company installs generation, transmission, and distribution capacity to serve customers' peak demands. Therefore, customers who have high peak demands but purchase very little energy (i.e., low load factor customers) would receive significant subsidies with a rate design that does not include a demand charge, particularly a time-differentiated demand charge. Likewise, customers with low peak demands who purchase an equivalent amount of energy would pay subsidies under a rate design that does not include a demand charge. This is a generally recognized weakness of two-part energy rates as compared to three- or four-part demand rates. It should be noted, however, that the Company is not proposing multi-part demand rates for Residential Service Rate RS or General Service Rate GS in this proceeding.

KENTUCKY UTILTIES COMPANY

CASE NO. 2016-00370

Response to Supplemental Requests for Information of Sierra Club
Dated February 7, 2017

Question No. 7

Responding Witness: William S. Seelye

Q-7. Reference KU Initial Response to Sierra Club Initial Request 19.

a) Please provide the number of customers who expressed interest in the RTOD-Demand rate option.

b) Of the customers who expressed interest in the RTOD-Demand rate option, how many did the Company perform "ad hoc calculations" on to determine potential savings.

c) Please provide copies of all documentation, including electronic spreadsheets with all cell formulas and file linkages intact, of the Company's "ad hoc calculations."

d) Please provide copies of all workpapers, including electronic spreadsheets with all cell formulas and file linkages intact, relied on to determine "that the on-peak demand charge was overstated."

A-7. a) The Company is aware of a small number of customers who expressed interest in the RTOD-Demand rate option but did not track the exact number.

b) The Company did not track the number of *ad hoc* calculations performed for customers that expressed interest in the RTOD-Demand rates. The Company did, however, conduct an *ad hoc* (or "dynamic") analysis of approximately 2,840 customers served under its AMS pilot program ("AMS Opt-In Program") and found that none of those customers appeared likely to benefit from taking service under the current RTOD-Demand rates. Therefore, the Company restructured the rate to encourage greater participation. The Company did not print or retain snapshots of the results of these *ad hoc* analyses.

c) See response to part b.

d) See response to part b.

KENTUCKY UTILTIES COMPANY

CASE NO. 2016-00370

Response to Supplemental Requests for Information of Sierra Club
Dated February 7, 2017

Question No. 8

Responding Witness: William S. Seelye

Q-8. Reference KU Initial Response to Sierra Club Initial Request 23(e).

a) Please provide detailed instructions for modifying the Excel spreadsheet for the cost of service study provided in PSC 1-53 in order to classify 100% of pole, conduit, conductor, and line transformer costs as demand-related.

A-8. a) To allocate 100% of pole, conduit, conductor, and line transformer costs as demand related, the externally generated functional vectors F002, F003, F004, and F005 must be modified. Those functional vectors can be found at the bottom of the Functional Assignment tab in rows 612 – 615. To allocate 100% of F002 (Poles, Towers, & Fixtures) and F003 (Overhead Conductor and Devices) to demand, the customer numbers in columns W and Y should be zero. The demand numbers in column V under Distribution Primary Lines should be .6521, and the demand numbers in column X under Distribution Sec. Lines should be .3479.

To allocate 100% of F004 (Underground Conductor and Devices) to demand, the customer numbers in columns W and Y should be zero. The demand number in column V under Distribution Primary Lines should be .9181, and the demand number in column X under Distribution Sec. Lines should be .0819.

To allocate 100% of F00 (Line Transformers) to demand, the customer number in columns AA should be zero, and the demand number in column Z should be 1.

KENTUCKY UTILTIES COMPANY

CASE NO. 2016-00370

Response to Supplemental Requests for Information of Sierra Club
Dated February 7, 2017

Question No. 9

Responding Witness: Christopher M. Garrett

Q-9. Reference KU Application, Schedule N (Attachment to Tab 67).

a) Please provide a working electronic spreadsheet version of the "typical bill comparison," with cell formulas and file linkages intact.

A-9.

a) See the Att_KU_PSC_1-54_Sch_N.xlsx file provided as a separate Excel attachment to PSC 1-54.

KENTUCKY UTILTIES COMPANY

CASE NO. 2016-00370

Response to Supplemental Requests for Information of Sierra Club
Dated February 7, 2017

Question No. 10

Responding Witness: John P. Malloy

Q-10. Reference Direct Testimony of John P. Malloy, page 20, lines 8 to 20.

a) Please describe in detail any differences between the AMS meters and associated network technology installed as part of the Company's AMS Customer Offering, and the AMS metering technology that the Company now proposes to deploy to all residential customers.

A-10.

a) The difference between the AMS meters installed as part of the DSM AMS Opt-in and the proposed AMS full deployment is that the AMS full deployment meters 200 amp and below will have a remote service switch.