

**BEFORE THE STATE CORPORATION COMMISSION  
OF THE STATE OF KANSAS**

---

**DIRECT TESTIMONY OF**

**THOMAS J. SULLIVAN, JR., P.E.**

**ON BEHALF OF  
KANSAS CITY POWER & LIGHT COMPANY**

---

**IN THE MATTER OF THE APPLICATION OF  
KANSAS CITY POWER & LIGHT COMPANY  
TO MAKE CERTAIN CHANGES IN  
ITS CHARGES FOR ELECTRIC SERVICE**

**DOCKET NO. 18-KCPE-\_\_\_\_-RTS**

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**INTRODUCTION**

1

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

3 A. Thomas J. Sullivan, Jr., 15898 Millville Road, Richmond, Missouri, 64085.

4 **Q. By whom are you employed?**

5 A. I am President and owner of Navillus Utility Consulting LLC.

6 **Q. How long have you been with Navillus Utility Consulting?**

7 A. I started the company in June 2011.

8 **Q. What is your educational background?**

9 A. I received a Bachelor of Science Degree in Civil Engineering Summa Cum Laude from  
10 the University of Missouri - Rolla in 1980 and a Master of Business Administration  
11 Degree in Business Administration from the University of Missouri - Kansas City in  
12 1985.

1 **Q. Are you a registered professional engineer?**

2 A. Yes, I am a Registered Professional Engineer in the State of Missouri.

3 **Q. To what professional organizations do you belong?**

4 A. I am a member of the American Society of Civil Engineers.

5 **Q. What is your professional experience?**

6 A. Prior to forming Navillus Utility Consulting LLC, I worked for Black & Veatch  
7 Corporation. I worked for Black & Veatch for over 31 years as an engineer, project  
8 engineer, project manager, vice president, and director. I have been responsible for the  
9 preparation and presentation of numerous studies for gas, electric, water, and wastewater  
10 utilities. My clients served include investor-owned utilities, publicly-owned utilities, and  
11 their customers. The professional studies that I have prepared involve valuation and  
12 depreciation, cost of service, cost allocation, rate design, cost of capital, supply analysis,  
13 load forecasting, economic and financial feasibility, cost recovery mechanisms, and other  
14 engineering and economic matters.

15 **Q. Have you previously appeared as an expert witness?**

16 A. Yes, I have. In Exhibit TJS-1, I list cases where I have filed expert witness testimony and  
17 appeared as an expert witness. As noted on that exhibit, I have appeared before the  
18 Kansas Corporation Commission (“Commission”) as an expert witness for Peoples  
19 Natural Gas in Docket No. 193,787-U, UtiliCorp United Inc. in Docket No. 00-UTCG-  
20 336-RTS, Aquila Networks in Docket No 05-AQLG-367-RTS, Aquila Networks in  
21 Docket No. 07-AQLG-431-RTS, and Black Hills/Kansas Gas Utility Company, LLC in  
22 Docket No. 14-BHCG-RTS. In these cases my responsibilities included class cost of  
23 service, rate design, peak day demand, irrigation adjustment, and weather normalization.

1 **Q. For whom are you testifying in this matter?**

2 A. I am testifying on behalf of the Kansas City Power & Light Company (“KCP&L” or  
3 “Company”).

4 **Q. What is the purpose of your direct testimony?**

5 A. I am sponsoring KCP&L’s proposed production cost allocation methodology used in its  
6 class cost of service (“CCOS”) study. My testimony specifically focuses on the  
7 classification and allocation of production related costs. Company witness Ms. Marisol  
8 Miller is sponsoring the Company’s CCOS and her Direct Testimony includes the  
9 discussion of the Company’s model and actual analyses. In his Direct Testimony,  
10 Company witness Mr. Bradley Lutz discusses the recent history of the Company’s  
11 production cost allocation and the Company decision regarding the methodology to use in  
12 this case.

13 **Q. Do you sponsor any exhibits with your testimony?**

14 A. Yes. I sponsor the following exhibits:

15 Exhibit TJS-1 – Expert Witness Testimony of Thomas J. Sullivan

16 Exhibit TJS-2 – KCP&L’s Generating Facilities

17 Exhibit TJS-3 – Comparison of Fuel and Capacity Unit Costs

18 Exhibit TJS-4 – Comparison of Capacity Factors and Capacity Unit Cost

19 Exhibit TJS-5 – Class Coincident Peak Load Factors

20 Exhibit TJS-6 – Operating Characteristics of KCP&L’s Generating Assets  
21 (Capacity & Load Factors)

22 Exhibit TJS-7 – Unit Costs of KCP&L’s Generating Assets

1 Exhibit TJS-8 – Unit Costs of KCP&L’s Generating Asset Reflecting System-  
2 wide Fuel Cost

3 Exhibit TJS-9 – Comparison of Production Cost Allocations – NARUC

4 Exhibit TJS-10 – Comparison of Production Cost Allocations - KCP&L

5 The sources of data used to prepare Exhibits TJS-2, TJS-3, TJS-4, TJS-6, TJS-7, and  
6 TJS-8 are the Company’s Federal Energy Regulatory Commission Form No. 1 (“FERC  
7 Form 1”) for the years 2015 through 2017. Exhibit TJS-9 relies upon data in the 1992  
8 National Association of Regulatory Utility Commissioners Electric Utility Cost  
9 Allocation Manual (“NARUC Manual”). Exhibits TJS-5, TJS-7, TJS-8 and TJS-10  
10 utilize data and analyses from the Company’s CCOS Study filed in this case

11 **Q. Do you support the Company’s recommended use of the classification and allocation**  
12 **of production related costs using the Average and Excess Demand methodology?**

13 A. Yes, I do.

14 **Q. What are the primary reasons you are supporting the use of this methodology?**

15 A. In my opinion the Average and Excess Demand (“A&E”) methodology best meets the  
16 primary goal of a CCOS Study which is to align cost allocation with cost causation for  
17 the following reasons:

- 18 1. Lower load factor customers have directly resulted in the Company  
19 needing to construct and operate facilities that have higher unit costs.
- 20 2. The total unit cost of the facilities built to serve these lower load factor  
21 loads are significantly more expensive than the facilities that would be  
22 built if the system operated at a much higher load factor.

1           3.     Fuel costs are currently recovered on an energy basis even though the  
2                     lower load factor generating facilities have much higher fuel costs. Thus,  
3                     the recovery of fuel related costs on an energy basis results in a benefit to  
4                     lower load factor customers.

5           4.     The use of allocation methods that approach an energy based allocation  
6                     does not give adequate differentiation between the cost associated with  
7                     higher and lower load factor facilities and higher and lower load factor  
8                     customers.

9           5.     The A&E or 100 percent demand based allocations produce results that  
10                    provide a reasonable balance between the energy and capacity function of  
11                    generating facilities.

12 **Q.     Please outline your direct testimony.**

13 A.     My direct testimony is broken down in the following sections:

- 14           1.     Discussion of CCOS principles and definition of terms.
- 15           2.     Discussion of Production Cost Allocation.
- 16           3.     Discussion of KCP&L's generating assets and load profile.
- 17           4.     History of methodologies used in Kansas and Missouri.
- 18           5.     Discussion of the production cost allocation methodologies.

19                    **CLASS COST OF SERVICE PRINCIPLES AND TERMINOLOGY**

20 **Q.     What is the purpose of a CCOS study?**

21 A.     A CCOS study is intended to determine the cost of providing service to the various  
22           classes of service provided by the utility. The classes of service are defined as relatively  
23           homogeneous groups of customers whose usage characteristics and service requirements

1 are similar. The classes generally align with the various rates the utility charges for  
2 service. The costs allocated to the customer classes consist of the various components of  
3 rate base and revenue requirements. The primary component of rate base is the net plant  
4 investment in the facilities of the utility system. Revenue requirements primarily consist  
5 of operation and maintenance expenses, depreciation expenses, return on rate base, and  
6 taxes.

7 The CCOS study is used as a tool or as one of the principle considerations in the  
8 design of the rates charged by the utility. While a CCOS study does provide the overall  
9 cost of service or overall revenue requirement for each customer class, the real value of  
10 the CCOS study is providing detail regarding the cost of the various functions or services  
11 that the utility provides. Further, rates generally consist of fixed and variable  
12 components that target specific fixed and variable costs. Fixed costs are costs that do not  
13 vary with the amount of the product produced or used. Variable costs are costs that do  
14 vary directly with the amount of product produced or used. To the extent practical, rates  
15 should be designed to reflect the fixed and variable nature of the underlying costs.

16 **Q. Please discuss further the various functions and services provided by an electric**  
17 **utility like KCP&L.**

18 A. The functions provided by an electric utility like KCP&L consist of the following:

19 Generation or Production – producing electricity.

20 Transmission – moving electricity from generating resources to general areas of  
21 demand.

22 Distribution – delivery of electricity to the individual customers.



1            Customer related – providing customer specific services and services related to  
2            billing customers and collecting revenues.

3            For utilities like KCP&L that use the FERC Uniform System of Accounts, investment  
4            and operating costs are tracked at a level of detail that follows these functions.

5            Electric utilities provide service that is available 24 hours a day and 365 days a  
6            year whenever the customers demand that service. The electric utility’s facilities must be  
7            designed to be able to respond to demands of customers over which the utility has no  
8            direct control. Therefore, in the CCOS study, functional costs are further classified as  
9            demand, commodity, or customer related. Demand related costs are the costs associated  
10           with providing the capacity in the system needed to meet both the highest demand of  
11           individual customers but also the aggregate requirements of all of its customers with an  
12           adequate level of reserves to meet contingencies. Commodity (or energy) related costs  
13           are the costs of providing the variable needs of the customers. Customer related costs are  
14           those costs incurred to connect and serve a customer independent of the customer’s actual  
15           demand or usage.

16    **Q.    What specific component of the CCOS study is addressed in your direct testimony?**

17    A.    My direct testimony will specifically address appropriate allocation of the production or  
18           generation function to customer classes.

19    **Q.    Please discuss what facilities and costs constitute the production function?**

20    A.    The production function for KCP&L consist of the power plants owned by KCP&L and  
21           the various components associated with these generating assets up to the point where the  
22           electricity is delivered to the electric transmission or distribution systems. A listing of  
23           these facilities is shown in Exhibit TJS-2.

1           The production net plant includes the Company's investment less the accumulated  
2 depreciation associated with these facilities. Based on the FERC Uniform System of  
3 Accounts, these costs are tracked in FERC Accounts 310 through 347. This breakdown  
4 provides the detail on plant in service, accumulated depreciation, and depreciation  
5 expenses associated with these assets. The direct costs associated with operating and  
6 maintaining these facilities are tracked in FERC Accounts 500 through 557.

7           In addition to these direct costs, the revenue requirement for production also  
8 includes the return and income taxes associated with the rate base associated with these  
9 facilities as well as allocations of taxes other than income taxes and an allocation of  
10 general and administrative costs.

11 **Q. How are electric production related costs classified?**

12 A. Generally, the non-fuel production (function) related costs are classified as demand  
13 (capacity) or commodity (energy). Fuel (used in the generating facilities) is usually  
14 unbundled from the CCOS study and collected through a separate fuel charge component  
15 of the rate or in some manner that directly accounts for fuel. There are several different  
16 methodologies that are used to determine what portion of non-fuel production related  
17 costs are classified as demand or capacity and commodity or energy. Later in my  
18 testimony, I will discuss not only the A&E methodology I am recommending but other  
19 methodologies that have been used or considered for use for KCP&L in the recent past.

20 **Q. Once non-fuel production related cost are classified, how are these costs allocated to**  
21 **customer classes?**

22 A. The Production Demand related costs are typically allocated to customer classes based on  
23 some measure of the customer class's share of the peak demand of the system. The

1 Production Commodity related costs are allocated to customer classes based on the  
2 customer class's share of the annual energy requirements (or total energy production) of  
3 the system.

4 **Q. Please define what you mean by commodity or energy requirements.**

5 A. A customer class's commodity or energy requirements are the class's aggregate sales plus  
6 energy losses usually measured in kilowatt-hours ("kWh"). In the context of the CCOS  
7 study the sales can be annual, monthly, or seasonal. The losses for each customer class  
8 represent the amount of energy in excess of what the customer consumes that needs to be  
9 inputted into the system in order to account for the energy losses that occur through all of  
10 the facilities required to deliver that energy to the customer. For example, each time the  
11 energy flows through a transformer, a certain amount of energy is lost (as heat) in the  
12 process of increasing or decreasing the voltage. So, all other things being equal, the  
13 losses associated with each customer class are generally correlated with the voltage levels  
14 at which the customers in that class are served.

15 **Q. Please define what you mean by capacity or peak requirements.**

16 A. The customer class's capacity or peak requirements are the class's aggregate rate of  
17 energy usage plus losses usually measured in kilowatts (kW). There are several different  
18 ways to measure this peak requirement. The rate of energy use can be viewed as the  
19 amount of energy used in one hour (or sometimes shorter time periods such as 15  
20 minutes). The peak demands discussed in my testimony will be one hour demands.  
21 Class coincident peak ("CP") is the aggregate demand of that class at the time of  
22 (coincident with) the system peak. Class non-coincident peak is the maximum aggregate  
23 demand of that class that occurs any time during the time period defined. The non-

1 coincident peaks (“NCP”) of each of the customer classes do not necessarily occur at the  
2 time of the system peak and they do not necessarily occur at the same time as each other  
3 (i.e. one class’s NCP may not occur at the same time as another class’s NCP). CP’s and  
4 NCP’s can be defined both annually, monthly, seasonally or ranked (the highest 4 CP’s  
5 for example). For purposes of production cost allocation, the class demands are  
6 aggregated for the class. The class demands are the sum of the demands for all of the  
7 customers in that class at a given point in time; in other words, for the class, the demands  
8 of the individual customers are coincident with each other (i.e. occur at the same time).

9 **Q. Are there some other terms you would like to discuss prior to discussing specific**  
10 **production cost allocation methodologies?**

11 A. Yes. There are four terms I would like to define and discuss because they are particularly  
12 important to the discussion of the production cost allocation – Capacity Factor, Load  
13 Factor, Coincident Peak, and Non-Coincident Peak.

14 **Q. Please define what you mean by capacity factor.**

15 A. Capacity factor as it relates to an electric utility is defined as the ratio of the average  
16 output (kilowatts) of a generating unit over a specified period of time to the rated  
17 capacity (kilowatts) of a generating unit over that same time period. Capacity factor is a  
18 measure of how efficiently the unit is operated or dispatched. For example, if a  
19 generating unit with a rated capacity of 200,000 kilowatts generates 1,314,000,000  
20 kilowatt-hours of electricity over a year for an average output of 150,000 kilowatts  
21 (1,314,000,000 kilowatt-hours divided by 8760 hours in a year), that unit had a capacity  
22 factor of 75 percent. In other words, the unit produced 75 percent of the energy it could  
23 have theoretically produced if it operated 100 percent of the time at its rated capacity.

1 **Q. What factors impact the capacity factor of a generating unit.**

2 A. There are several factors that impact a unit's capacity factor. One factor is the variable  
3 operating cost of the unit. The variable operating costs include both the fuel cost of the  
4 unit as well as the variable operation and maintenance expenses associated with the unit.  
5 When an electric utility's generating units are dispatched, it generally makes the most  
6 economic sense to dispatch the available units with the lowest variable cost first. This  
7 will generally result in the lowest overall variable cost of operating the facilities. With  
8 this in mind, there are factors other than economic dispatch that might impact which units  
9 are dispatched at any specific point in time. The second factor is the availability of the  
10 unit. The availability of the unit is a function of several factors including the age of the  
11 unit, the cycle of regularly scheduled maintenance, and other unplanned outages or  
12 unscheduled maintenance and repairs. Further, how the unit is used (i.e. the frequency of  
13 restarts) impacts the availability of the unit. Most generating units operate most  
14 efficiently if they are operating at or near their rated capacity with minimal fluctuations in  
15 output or restarts. Fluctuations in output and restarts are generally caused by variations  
16 in system demand. Fluctuations in output and restarts cause stress on equipment that  
17 increases operation and maintenances costs and reduces the life of components.

18 **Q. Please define what you mean by load factor.**

19 A. Load factor for an electric utility is defined as average demand divided by peak demand.  
20 Load factor is a measure of how efficiently a customer uses the facilities required for  
21 service. For example, if a customer uses 8,760 kilowatt-hours over the course of a year,  
22 that customer's average demand is 1 kilowatt. However, if the customer used 5 kilowatts  
23 during the hour of its maximum demand, the customer's load factor would be 20 percent

1 (1 divided by 5). If this customer's demand also occurred at the same time as the system  
2 peak, this 20 percent could further be stated at the customer's coincident peak load factor.  
3 If, on the other hand, this demand occurred at a time other than the system peak, this 20  
4 percent would be stated as the customer's non-coincident peak load factor. A customer  
5 with a 20 percent load factor, on average used 20 percent of the capacity available to  
6 serve their demand; or stated differently, 80 percent of the available capacity was not  
7 fully used.

8 While capacity factor is typically used to measure the output of a generating unit,  
9 load factor can be used as either a measure of a customer's load profile or as a measure of  
10 how the generating asset is used over a finite period of time. Also, there is a subtle  
11 difference between a generating unit's capacity factor and its load factor. Load factor for  
12 a generating unit would be based on the unit's peak output whereas capacity factor is  
13 based on the unit's rated capacity.

14 **Q. When you use the terms peak or average demand in your testimony, do the figures**  
15 **include allowance for losses?**

16 A. Yes. In my testimony, when I am referring or referencing specific numbers, the class  
17 average demands are based on the annual customer class demands including allowance  
18 for losses and the class peak demands also include allowance for losses. Therefore, all  
19 the figures are assumed to be at the system input level, rather than what is ultimately  
20 measured at the meter. So, for example, if a customer uses 1,000 kilowatt-hours in a  
21 month, the amount of energy that actually has to be generated is higher than that figure  
22 due to the fact that some energy is lost or consumed through the delivery of that energy  
23 through the system.

1 **Q. Please define coincident peak.**

2 A. In the context of my testimony, I will use the term Coincident Peak to mean the class  
3 peak coincident (occurring at the same time) with the system peak. The coincident peak  
4 associated with the single highest system demand is referred to as the 1 CP. I refer to  
5 coincident peaks based on the average of multiple months as the number with CP. For  
6 example, 3 CP would mean the average of the three highest class coincident peaks in  
7 three different months.

8 **Q. Please define Non-coincident peak.**

9 A. In the context of my testimony, I will use the term Non-Coincident Peak to mean the  
10 highest demand for the class occurring at any time (may or may not be coincident with  
11 the system peak). The non-coincident peak associated with a class' highest demand is  
12 referred to as the 1 NCP. I refer to non-coincident peaks based on the average of multiple  
13 months as the number with NCP. For example, 3 NCP would mean the average of the  
14 three highest class peaks in three different months.

15 **Q. Within a customer class, how is the CP or NCP determined.**

16 A. When I use the term CP or NCP, I am assuming that within a class the peak demands of  
17 the individual customers are coincident with each other and the CP and NCP are the  
18 aggregated demand of the whole class. There may be demand factors used (on  
19 distribution facilities for example) where the term NCP may mean the sum of the  
20 individual customer demands that may not be coincident with each other, but in the  
21 context of my testimony, I will only be referring to class demands where the demands of  
22 the individual customers within the class are coincident with each other.

1 **PRODUCTION COST ALLOCATION**

2 **Q. What is the overall goal of cost allocation in general and production cost allocation**  
3 **in particular as it relates to a CCOS study?**

4 A. The goal of a CCOS study is to align the cost with causation to the maximum extent  
5 practical. In other words, the cost should be aligned as closely as practical to the  
6 customers who result in the cost being incurred. Different types of generating assets are  
7 more efficient at serving different types of loads. The utility's decisions regarding what  
8 generating assets are to be built are based on analysis of these loads and the relative cost  
9 of different types of generating assets that could serve these loads, the goal being to  
10 construct facilities that result in the lowest overall cost. The relative unit costs of these  
11 different types of generating assets can generally be summarized as follows:

- 12 1. Higher capital (fixed) cost facilities generally have lower operating  
13 (variable) costs.
- 14 2. Lower capital cost facilities generally have higher operating costs.

15 As such, the lowest overall cost usually results from building the higher fixed cost  
16 facilities to operate at high capacity (or load) factors and the lower fixed cost facilities to  
17 operate at lower capacity (or load) factors.

18 As system load factor declines with the corresponding decline in the capacity  
19 factors of the generating assets – base load units become less economical and the  
20 generation mix turns to intermediate and peaking type units that have lower capital costs  
21 but higher operating costs. Overall such units have higher unit costs because their costs  
22 correspond with less generation (lower capacity factors). Also, as system load factor  
23 declines, the diversity between customer classes generally increases and you start to see



1 the stratification between customer classes. This stratification will manifest itself in  
2 increasing differences between average demand and peak demand allocation factors as  
3 the spread between class load factors increase.

4 The allocation of generation costs should then primarily focus on properly  
5 allocating costs to the classes that produce the lower load factor and the higher unit cost  
6 associated with non-base load generation.

7 **Q. Have you confirmed these relationships as they relate to the Company's generating**  
8 **assets?**

9 A. Yes. In Exhibit TJS-3 I provide a graph that shows the fixed cost of KCP&L's principle  
10 generating resources in terms of the original cost of the facilities divided by their rated  
11 capacity (\$/kW) and their average fuel cost (\$/kWh) for 2017. As shown in this graph,  
12 the variable fuel cost is generally inversely correlated to the fixed capacity cost of the  
13 facilities.

14 In Exhibit TJS-4, I show the relationship between capital cost and capacity factor  
15 over the 2015-2017 period. The graph shows that the higher capital cost units have  
16 higher capacity factors (they are dispatched more). It should be noted that as discussed  
17 previously, a unit's capacity factor is also impacted by issues other than cost.

18 **Q. Is there one specific cost allocation methodology that is generally better at aligning**  
19 **costs to the customer classes causing the cost?**

20 A. No. The methodology used should take into consideration the following:

- 21 1. The load characteristics of the customers served by the utility.
- 22 2. The generating assets constructed to meet customer requirements.
- 23 3. How fuel costs are recovered.

1           4.       Methodologies generally used by similarly situated utilities.

2       As a secondary consideration, the methodology historically used by the utility should also  
3       be taken into consideration primarily from the perspective of the impact the CCOS study  
4       may have on the design of rates. In my opinion, the methodology used should not be  
5       driven by what has been used in the past. The methodology used should be the  
6       methodology that best recognizes the four considerations listed above. However, I do  
7       recognize that a change in methodology and full application of this methodology in the  
8       design of rates could be disruptive and the reflection of a methodological change in rate  
9       design may need to be phased in over time to mitigate disruption.

10 **Q.   Is there one specific cost allocation methodology that is recommended by the**  
11 **NARUC Manual?**

12 A.   No. The intent of the manual (published in 1992) was to provide a comparison of  
13       methodologies in use at the time the manual was published. The manual specifically  
14       discusses the following methodologies for production cost allocation:

15           Peak Demand Methods

- 16           1.       Single Coincident Peak (“1 CP”)
- 17           2.       Summer and Winter Coincident Peak (“6 CP”)
- 18           3.       Monthly Coincident Peak (“12 CP”)
- 19           4.       Other Multiple Coincident Peaks (“4 CP” would be an example)
- 20           5.       All Peak Hours (“On-peak Energy”)

21           Energy Weighting Methods

- 22           6.       Average and Excess
- 23           7.       Equivalent Peaker

- 1                   8.     Base and Peak
- 2                   9.     Judgmental Energy Weighting (includes Average and Peak)

3                   Time Differentiated Methods

- 4                   10.    Production Stacking
- 5                   11.    Base-Intermediate-Peak
- 6                   12.    Loss of Load Probability (“LOLP”)
- 7                   13.    Probability of Dispatch (“POD”)

8                   Within these methods there are also hybrids. For example, the energy weighting methods  
9                   might include either coincident peaks or non-coincident peaks and differing number of  
10                  peaks (3, 4, 6, or 12, for example).

11   **Q.    Is there a common point of comparison between these various methods?**

12   A.    Yes. All of these methods use different approaches to determining the relative weighting  
13           of capacity (peak) and energy requirements in the allocation of production related costs.  
14           Generally speaking, the relative weightings will range from a Single Non-Coincident  
15           Peak Method which allocates all the costs on the basis of non-coincident peak demand to  
16           methodologies that approach a pure energy allocation. Generally, the higher number of  
17           peaks included in the calculation combined with a higher percentage weighting of energy  
18           in the allocation will generally produce allocations that near a pure energy allocation.

19   **Q.    Are all of the methodologies identified in the NARUC Manual commonly used?**

20   A.    No. Based on my review of KCP&L’s recent rate cases and recent rate cases filed in  
21           Kansas and Missouri, the following methods have generally been used or proposed (with  
22           various numbers and types of peaks - CP versus NCP):

- 23                  1.     Average and Excess

1                   2.     Average and Peak

2                   3.     Base-Intermediate-Peak

3                   In the remainder of my testimony, I will primarily focus on these methodologies. I will  
4                   also use the 1 NCP and 1 CP method and pure energy allocation method for comparative  
5                   purposes. Please refer to the direct testimony of company witness Mr. Bradley Lutz for a  
6                   more detailed history of the recent use of the methods above as they pertain to KCP&L.

7 **Q.   Of the methodologies on which you will focus in the remainder of your testimony,**  
8 **please generally discuss the relative weighting of peak demand and energy**  
9 **requirements in those allocation bases.**

10 A.   If the three methodologies are considered along a continuum with a 1 NCP or 1 CP  
11       method having a zero weighting of energy requirements and a pure energy allocation  
12       having a 100 percent weighting of energy requirements, the three methodologies listed  
13       above can generally be ranked as follows as they relate to a 1 NCP methodology:

14                   1.     1 NCP

15                   2.     1 CP

16                   3.     Average and Excess

17                   4.     Average and Peak

18                   5.     Base-Intermediate-Peak

19                   6.     Energy Only

20                   Later in my testimony, I will provide examples of the allocation bases produced by these  
21                   methods as discussed in the NARUC Manual and also as they relate to test year analyses  
22                   in this case.

1 **KCP&L'S LOAD PROFILE AND GENERATING ASSETS**

2 **Q. What are the primary considerations in determining the appropriate cost allocation**  
3 **methodology for KCP&L?**

4 A. As stated above, the primary considerations are the Company's load profile and the  
5 generating assets constructed to serve that load profile. If a system operated at a very  
6 high load factor (say 80 percent or higher), the differences between the load profiles of  
7 the customer classes would be small and thus the differences between allocation  
8 methodologies would be relatively small. Further, the utility would generally build base  
9 load generating facilities that are intended to operate at very high capacity or load factors.  
10 There would be a great deal of homogeneity between the generating resources. As  
11 system load factor declines, the relative differences between class load profiles and  
12 allocation methods increases and the utility relies upon ever increasing investments in  
13 peaking units (the homogeneity between generating resources decreases) which have  
14 lower capital costs but higher operating and fuel costs. Also, as system load factor  
15 declines, the overall utilization rates (capacity factors and load factors) of all of the  
16 generating units decline. Base load units are cycled more and peaking units are cycled  
17 even more. The core issue in any production cost allocation is who should pay for the  
18 higher unit costs that result from the lower utilization of generating units and the greater  
19 reliance upon peaking units. In other words, who should pay for the unused or under-  
20 utilized capacity? The simple answer is the customers who contribute to the unused or  
21 underutilized capacity, or broadly speaking, the customer classes whose usage  
22 characteristics contribute to the lower system load factor.

1 **Q. Please explain how load profile should determine the appropriate cost allocation**  
2 **methodology.**

3 A. For systems with very high load factors, the differences in load profile between the  
4 classes are relatively small with all of the classes necessarily having very high load  
5 factors. In other words, there is a great deal of homogeneity between the load profiles of  
6 the various customer classes and also a great deal of homogeneity between the generating  
7 assets. As such, it would be difficult to argue that particular classes are contributing to  
8 unused capacity since the capacity is being highly utilized. As such, it would be  
9 reasonable to utilize methodologies that are more energy based. Also, as a practical  
10 matter, there would be little difference in the results produced by different  
11 methodologies.

12 As system load factor declines and differences between class load factors  
13 increases (i.e. there is not homogeneity between the customer classes and less  
14 homogeneity between generating assets), the differences between a pure peak and a pure  
15 energy allocation increase. Most importantly, allocation bases that give higher  
16 recognition to energy requirements become less and less appropriate because they fail to  
17 adequately recognize which classes are contributing to the lower system load factor and  
18 higher cost.

19 **Q. Based on the Test Year Ended September 30, 2017, what are the class load factors**  
20 **for the Customer classes used in KCP&L's CCOS study?**

21 A. Exhibit TJS-5 summarizes the derivation of class load factors based on test year  
22 coincident peak demand (1 CP) and test year energy requirements. As shown in Exhibit  
23 TJS-5, the system load factor is 52 percent and the class load factors range from 42

1 percent for the Residential class to 68 percent for the Large General Service class. The  
2 Medium General Service class has a load factor of 58 percent and the Small General  
3 Service has a load factor of 51 percent. Based on this analysis, there are significant  
4 differences between the class load factors with the Residential class being the primary  
5 contributor to the system's relatively low load factor.

6 **Q. Is there a significant diversity in KCP&L's generating resources and how these**  
7 **resources are operated?**

8 A. Yes. As shown in Exhibit TJS-6, there is diversity in types of units, fuels used, and in  
9 how the units are used. There is a very clear delineation between plants that have high  
10 rates of utilization and plants that have low rates of utilization. As shown in Exhibit TJS-  
11 7, the plants with the highest utilization rates also have the lowest fuel cost and generally  
12 the lowest overall unit cost.

13 **Q. What is the correlation between how KCP&L's Generating resources are operated**  
14 **and customer demands?**

15 A. The high utilization rate and low cost units generally meet the highest load factor  
16 demands. In other words, the high consistent customer use is met by these highly utilized  
17 and lowest unit cost plants. Conversely, the low utilization rate and higher cost units are  
18 used sparingly to meet the lowest load factor demands. These lowest load factor  
19 demands are the infrequent higher demands caused by lower load factor customers.

20 **Q. Please generally discuss Fuel Costs and how they are related to the CCOS study.**

21 A. Fuel costs are recovered through a combination of fuel in the base rates plus a separate  
22 Energy Cost Adjustment (ECA) rider that tracks the difference between the base amount  
23 of fuel and the incremental change in fuel costs. As such, fuel costs are tracked separately

1 from the non-fuel portion of base rates. As such the CCOS study generally focuses on  
2 the non-fuel related production costs. Generally, fuel costs are recovered from customers  
3 on an aggregated basis (system-wide unit cost) with no specific recognition given to the  
4 differences in fuel costs between generating units and how the usage characteristics of  
5 different customer classes contribute to how generating units with different fuel costs are  
6 utilized to meet the different customer class requirements. The primary reason for this is  
7 to simplify the application and administration of the fuel cost rider. As shown in Exhibit  
8 TJS-7, there are significant differences in the fuel costs between the generating units and  
9 as shown in Exhibit TJS-6, there are significant differences in how the units are utilized.  
10 Further, as discussed above, how the units are utilized is directly related to the differing  
11 customer requirements.

12 **Q. Is the cost recovery of fuel costs relevant to the allocation and cost recovery of non-**  
13 **fuel costs?**

14 A. Yes. As indicated above, the unit fuel cost does not reflect the significant differences in  
15 fuel cost between generating units and the significant difference in customer  
16 requirements that cause these different fuel costs to be incurred. As such, it is important  
17 to recognize that this difference exists when considering how the non-fuel production  
18 related costs should be allocated to customer classes. While there are a variety of reasons  
19 that it makes sense to use a system-wide average fuel cost, that does not mean that  
20 differences in fuel costs should be ignored in developing the overall cost to serve  
21 customer classes and ultimately in the overall rate design. The CCOS study can and  
22 should take into consideration the overall cost of the generating assets.



1 **Q. How can the costs of the generating units reflect the actual treatment of fuel costs?**

2 A. In Exhibit TJS-7, I show the actual unit fuel costs for each of the Company's generating  
3 units for the 2015-2017 period, as well as the overall unit fuel cost (on Line 15). The  
4 total unit costs for each unit shown on Lines 23-45 reflect each generating unit's specific  
5 fuel cost. In Exhibit TJS-8, I show the unit cost of each unit excluding their fuel costs on  
6 Lines 2 through 14 and including the system-wide average fuel cost (in lieu of the unit's  
7 specific fuel costs) on Lines 17 through 29. As shown on Lines 15 and 30, the total  
8 overall non-fuel cost does not change, only the unit costs of the individual units.

9 **Q. How can the analysis shown in Exhibit TJS-8 be used to determine how non-fuel  
10 production costs should be allocated to customer classes?**

11 A. On Line 32 of Exhibit TJS-8, I show the average unit cost of the most highly utilized  
12 generating units for each year (units with load factors above the system average), and on  
13 Line 34, I show the average unit cost of the remaining generating units. These unit costs  
14 reflect the use of a system-wide unit cost for fuel. A comparison between Lines 32 and  
15 34 shows that the unit cost of the highly utilized generating units is significantly lower  
16 than the unit cost of the remaining (lower utilized) generating units. In 2017, this cost  
17 difference was \$0.0547 per kWh. The differences were lower in 2016 and 2015.

18 The allocation methodology used to allocate production related costs should  
19 recognize both this difference in cost and how the customer classes contribute to this  
20 difference in cost. The use of an energy based allocation basis, allocation bases that  
21 heavily weight energy, or allocation bases that approximate the result produced by an  
22 energy allocation will not adequately reflect these differences in cost and the customer  
23 classes whose usage characteristics contribute to these differences.

1        **METHODOLOGIES USED BY OTHER UTILITIES IN KANSAS AND MISSOURI**

2        **Q.     Would you please discuss production cost allocations recently used in Kansas and**  
3        **Missouri?**

4        A.     As I indicated earlier, the production cost allocations used or proposed in recent Kansas  
5        and Missouri rate cases include the following:

- 6                1.     Average and Excess
- 7                2.     Average and Peak
- 8                3.     Base-Intermediate-Peak

9        Mr. Lutz discusses the history of the methodologies used in the Company’s recent rate  
10       cases. I would like to focus on the methodologies used by the other two large electric  
11       utilities in Kansas and Missouri, Westar and Ameren, respectively.

12       **Q.     What methodologies were proposed in the most recent Westar rate case?**

13       A.     In its most recent rate case in Kansas Corporation Commission (“KCC”) Docket No. 15-  
14       WSEE-115-RTS, Westar’s witness proposed the use of the A&E methodology using the  
15       four monthly highest coincident peaks for the class peak demands. The KCC Staff  
16       proposed a method that would best be described as average and peak where costs  
17       classified as average and peak using the same classification as the A&E methodology but  
18       the peak portion is allocated based on the class’ four monthly highest coincident peak  
19       demands.

20       **Q.     What methodologies were proposed in the most recent Ameren rate case?**

21       A.     In its most recent case in Missouri Public Service Commission Docket No. ER-2016-  
22       0179, Ameren’s witness proposed the use of the A&E Demand methodology using the  
23       maximum four monthly non-coincident peaks for the class peak demands. The Missouri

1 Public Service Commission Staff proposed the use of the BIP methodology. The witness  
2 for the Missouri Industrial Energy Consumers (“MIEC”) proposed the use of the A&E  
3 methodology using the two highest summer non-coincident peaks for the class peak  
4 demands.

5 **Q. Why does it matter what methodologies are used for Westar and Ameren?**

6 A. The primary reason it matters deals with competition and specifically competition for  
7 industrial customers. As discussed earlier in my testimony, KCP&L’s industrial  
8 customers generally have a very high load factor, much higher than the system average  
9 and much higher than the other customer classes. As will be discussed in the next section  
10 of my testimony, of the three methodologies predominantly recommended in Kansas and  
11 Missouri, the A&E methodology is the only method that gives a significant recognition to  
12 the relative load factors of the customer classes. Further, when a system is not operating  
13 at a very high load factor, the A&E methodology best assigns the higher cost of unused  
14 capacity.

15 If the CCOS study is used as a principle tool in assigning the utility revenue  
16 requirement to customer classes and thus rate design, industrial cost responsibility and  
17 thus industrial rates for utilities using the A&E methodology will be lower than using  
18 either of the other two methodologies, all other things being equal. Thus, if the rates for  
19 the two major utilities with which KCP&L competes are using the A&E methodology  
20 and KCP&L is not, KCP&L will be at a competitive disadvantage in attracting and  
21 retaining industrial load.

1 **Q. Why is it important to attract and retain industrial load?**

2 A. There are numerous reasons why this is important. First, industrial customers have  
3 higher load factors that increase the overall efficiency of the electric system, particularly  
4 generation and transmission facilities. The loads are stable throughout the day, allowing  
5 the utility to invest in lower cost base load generating facilities. Second, industrial  
6 customers usually provide a large amount of direct and indirect jobs. The direct jobs are  
7 associated with the industrial facility itself. The indirect jobs include the supporting  
8 companies that provide materials to the facility and the residential and commercial  
9 development supported by the employees of the industrial company.

10 **DISCUSSION OF PRODUCTION COST ALLOCATION METHODOLOGIES**

11 **Q. Up to this point you have discussed several production cost allocation**  
12 **methodologies. can you please define these methodologies, starting with the average**  
13 **and Excess Demand methodology?**

14 A. The A&E method is a hybrid method combining average demand and peak demand  
15 components. The rationale of hybrid methods is that generating assets serve the function  
16 to meet requirements 8,760 hours a year and, also to meet peak hour requirements. The  
17 hybrid methods seek to balance these two functions in the allocation.

18 I generally prefer to view the A&E method as two steps even though the  
19 mathematics can be combined into one overall allocation factor. The first step in the  
20 application of the A&E method is to determine how much non-fuel cost is classified to  
21 the Energy function and how much is assigned to the Capacity (or Demand) function. In  
22 the A&E method, the amount classified to the Energy function is equal to the system load

1 factor (based on the annual system peak). One minus the system load factor is then  
2 classified as Capacity related.

3 In the second step, the amount classified to the Energy function is then allocated  
4 to customer classes based on the class annual energy requirements or average demand.  
5 The amount classified to the Capacity function is allocated to customer classes based on  
6 the class peak demand in excess of their average demand (in other words peak demand  
7 minus average demand).

8 **Q. Please define the A&P demand methodology.**

9 A. While there may be different iterations of the A&P method, the following is how it will  
10 be used in my testimony. This method is similar to the A&E method in that the  
11 classification of costs between Energy and Capacity is done the same way. The  
12 allocation of the cost classified as Energy is also allocated in the same fashion. The  
13 difference is that the Capacity component is allocated to customer classes based on the  
14 total class peak demand.

15 **Q. Please define the BIP methodology.**

16 A. The BIP method is based upon assigning generating resources to base, intermediate and  
17 peaking components based the type of load the unit primarily serves usually based on the  
18 relative operating costs of the units. For example, a base load unit (a unit operating at a  
19 high capacity or load factor) runs most of the time and thus serves load during base,  
20 intermediate and peaking periods. A peaking unit that has a very low capacity or load  
21 factor would generally only operate during peak (or emergency) periods and thus only  
22 serves load during peak periods. Once the non-fuel costs are classified as base,  
23 intermediate and peaking, there may be a variety of methods used to allocate costs to

1 customer classes. Costs classified as peaking would be allocated based on some measure  
2 of demand during peak period, cost classified as intermediate based on some measure of  
3 intermediate or shoulder period demand, and base costs allocated on average demand.

4 **Q. Please define the non-Coincident Peak Demand (1 NCP) methodology.**

5 A. While the three methods previously discussed would be considered hybrid methods, the  
6 next three methods I discuss would be considered either pure demand or energy methods  
7 in that costs are allocated based on either 100 percent peak demand or 100 percent energy  
8 (or average demand).

9 The 1 NCP method assigns 100 percent of the non-fuel costs to the Capacity  
10 function and then allocates costs to customer classes based on the class NCP as a  
11 percentage of the sum of all the classes NCP. While this method would not typically be  
12 used to allocate production related costs, I have included it in my testimony for  
13 comparative purposes with the other methods.

14 **Q. Please define the Coincident Peak Demand (1 CP) methodology.**

15 A. The 1 CP method assigns 100 percent of non-fuel costs to the Capacity function and then  
16 allocates costs to customer classes based on the class CP contribution to the overall  
17 system CP.

18 **Q. Please describe an allocation based on 100 percent energy requirements.**

19 A. As the name implies, this method assigns 100 percent of the non-fuel costs to the Energy  
20 function and then allocates costs to customer classes based on annual requirement (or  
21 average demand). Like the 1 NCP method, this method is not commonly used to allocate  
22 capacity related costs but is include for comparative purposes. However, as previously

1 discussed, the fuel portion of production costs are essentially allocated to customer  
2 classes using this allocation.

3 **Q. Please generally contrast each of these methodologies?**

4 A. In Exhibit TJS-9, I show an example of the resulting composite allocation (combining the  
5 energy and capacity components into one allocation factor) using each of these methods.  
6 I have used the example utility used in the NARUC Manual to demonstrate each of the  
7 methods. Generally speaking, the results produced by these methods can be segregated  
8 into two groups. The single peak and A&E methods tend to produce similar results.  
9 Likewise, the pure energy and BIP tend to produce similar results, with the A&P being  
10 somewhat towards the midpoint of all the methods.

11 The single peak and A&E methods tend to allocate more cost to lower load factor  
12 customer classes and less to higher load factor customer classes. The BIP method differs  
13 very little from a pure energy allocation.

14 **Q. Please discuss the impact of including multiple peaks in the demand allocation**  
15 **factors.**

16 A. Generally, the use of multiple peaks will tend to dilute the impact that peak demand has  
17 on the allocation bases and will tend to move the allocation towards a pure energy  
18 allocation. This makes some intuitive sense for a couple of reasons. First, as more hours  
19 are included in the demand analysis, you by necessity are moving towards an energy  
20 allocation basis. Second, as more hours are included, the impact is to reduce the gross  
21 demand of lower load factor customer classes since these classes have more variability in  
22 their hourly demands than do higher load factor customer classes where demands do not  
23 vary significantly from hour-to-hour.

1 **Q. Have you done a comparative analysis of methodologies based on KCP&L?**

2 A. Yes. In, Exhibit TJS-10 I compare the resulting allocation factor using a 1 NCP, 1 CP,  
3 A&E – 4 NCP, A&E – 4CP, A&P – 4 NCP, and pure energy allocations. The results are  
4 very similar to the analysis in Exhibit TJS-9 from the NARUC Manual.

5 Like the single peak methods, the A&E method results in an allocation that  
6 specifically differentiates between customer classes with high load factors and low load  
7 factors. Further, there is not a great deal of variation between methods for customer  
8 classes with load factor near the system average.

9 **Q. What methodology do you believe best achieves the goals you identified earlier in**  
10 **your testimony regarding production cost allocation?**

11 A. The Average and Excess Demand methodology.

12 **Q. Please explain why.**

13 A. As I stated earlier in my testimony, the goal of a CCOS study is to align the cost with  
14 causation; cost should be aligned as closely as practical to the customers who result in the  
15 cost being incurred. Different types of generating assets are more efficient at serving  
16 different types of loads. The utility's decisions regarding what generating assets are to be  
17 built are based on analysis of these loads and the relative cost of different types of  
18 generating assets that could serve these loads, the goal being to construct facilities that  
19 result in the lowest overall cost.

20 In my opinion the A&E methodology best meets this goal for the following  
21 reasons:

22 1. Lower load factor customers have directly resulted in the Company  
23 needing to construct and operate facilities that have higher unit costs.



- 1           2.     The unit cost of the facilities built to serve these lower load factor loads  
2                   are significantly more expensive than the facilities that would be built if the  
3                   system operated at a much higher load factor.
- 4           3.     Fuel costs are currently recovered on an energy basis even though the  
5                   lower load factor generating facilities have much higher fuel costs. Thus,  
6                   the recovery of fuel related costs on an energy basis results is a benefit to  
7                   lower load factor customers.
- 8           4.     The use of allocation methods that approach an energy based allocation  
9                   does not give adequate differentiation between the cost associated with  
10                  higher and lower load factor facilities and higher and lower load factor  
11                  customers.
- 12          5.     The A&E or 100 percent demand based allocations produce results that  
13                   provide a reasonable balance between the energy and capacity function of  
14                   generating facilities.

15           Further, as discussed earlier in my testimony, the production cost allocation  
16           methodologies used by utilities in the region are an important consideration primarily due  
17           to how the cost allocation ultimately impacts rate design, particularly for higher load  
18           factor, large industrial customers. Since the other large utilities in Missouri and Kansas  
19           use the A&E methodology, designing rates for KCP&L using either the A&P or BIP  
20           methodologies puts KCP&L at a competitive disadvantage relative to these other utilities.  
21           Therefore, using the A&E methodology for cost allocation for KCP&L and using the  
22           resultant cost allocation as the basis for rate design is more reasonable than using the

1 methods used in the past for KCP&L since using the A&E methodology results in a  
2 better alignment of the basis for KCP&L's rates with these other utilities.

3 **Q. Does this complete your direct testimony?**

4 A. Yes, it does.

**BEFORE THE CORPORATION COMMISSION  
OF THE STATE OF KANSAS**

In the Matter of the Application of Kansas City )  
Power & Light Company to Make Certain ) Docket No.: 18-KCPE-\_\_\_-RTS  
Changes in Its Charges for Electric Service )

**AFFIDAVIT OF THOMAS J. SULLIVAN, JR.**

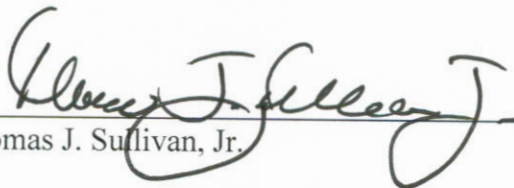
**STATE OF MISSOURI**     )  
                                          ) ss  
**COUNTY OF RAY**         )

Thomas J. Sullivan, Jr., being first duly sworn on his oath, states:

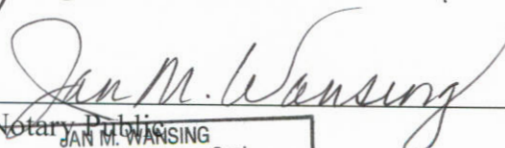
1. My name is Thomas J. Sullivan, Jr. and my business address is Navillus Utility Consulting LLC, 15898 Millville Road, Richmond, Missouri, 64085. I have been retained to serve as an expert witness to provide testimony on behalf of Kansas City Power & Light Company.

2. Attached hereto and made a part hereof for all purposes is my Direct Testimony on behalf of Kansas City Power & Light Company consisting of thirty-two ( 32 ) pages, having been prepared in written form for introduction into evidence in the above-captioned docket.

3. I have knowledge of the matters set forth therein. I hereby swear and affirm that my answers contained in the attached testimony to the questions therein propounded, including any attachments thereto, are true and accurate to the best of my knowledge, information and belief.

  
\_\_\_\_\_  
Thomas J. Sullivan, Jr.

Subscribed and sworn before me this 25<sup>th</sup> day of April 2018.

  
\_\_\_\_\_  
Notary Public  
JAN M. WANSING  
Notary Public - Notary Seal  
State of Missouri  
Commissioned for Ray County  
My Commission Expires: March 14, 2020  
Commission Number: 12379779

My commission expires: 3/14/20

## Expert Witness Testimony of Thomas J. Sullivan, Jr.

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- Peoples Natural Gas (UtiliCorp United, Inc.), Iowa Utilities Board Docket No. RPU-92-6 (1992). Natural gas utility class cost of service study and peak day demand requirements.
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- *The Empire District Electric Company, Corporation Commission of Oklahoma Cause No. PUD 201100082 (2011).* Electric utility depreciation rates.
- *SourceGas Distribution, LLC, Nebraska Public Service Commission Docket No. NG-0067-RTS (2011).* Natural gas utility jurisdictional and class cost of service study, rate design, customer and usage trends, number of customer change adjustment, use per customer adjustment, and competitive factors.

- Interstate Power and Light Company, Iowa Utilities Board Docket No. RPU-2012- 0002 (2012). Natural gas utility class cost of service study and weather normalization adjustment.
- The Empire District Electric Company, Missouri Public Service Commission Docket No. ER-2012-0345 (2012). Electric utility depreciation rates.
- Rocky Mountain Natural Gas Company LLC, Public Utilities Commission of the State of Colorado Docket No. 13AL-0067G (2013). Intrastate natural gas pipeline cost of service study and rate design.
- Rocky Mountain Natural Gas Company LLC, Public Utilities Commission of the State of Colorado Docket No. 13AL-067G (2013). Safety and System Integrity Rider (SSIR).
- SourceGas Distribution LLC, Public Utilities Commission of the State of Colorado Docket No. 13AL-143G (2013). Tariff provisions to incorporate Docket No. 13AL-0067G unbundling and tariff changes.
- Black Hills/Kansas Gas Utility Company, LLC, Kansas Corporation Commission Docket No. 14-BHCG-RTS (2014). Natural gas utility class cost of service study, rate design, weather normalization adjustment, irrigation adjustment, annualization adjustment, synchronization adjustment, and bypass revenue rider
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- Wyoming Gas Company, Wyoming Public Service Commission Docket No. 30009-60-GR-16 (2016). Natural gas utility weather normalization adjustment, test year billing determinants, revenues under existing and proposed rates, cost of capital, revenue requirement, class cost of service study, and rate design.
- The Empire District Electric Company, The Corporation Commission of Oklahoma Cause No. PUD 201600468 (2016). Electric utility depreciation rates.
- Zia Natural Gas Company, New Mexico Public Regulation Commission Case No. 18-00018-UT (2018). Natural gas utility cost of capital, billing determinants and revenues, weather normalization adjustment, peak day analysis, revenue requirement, class cost of service study, and rate design.
- Kansas City Power & Light Company, Missouri Public Service Commission Case No. ER-2018-00145 (2018). Electric utility class cost of service study – production cost allocation.
- KCP&L Greater Missouri Operations Company, Missouri Public Service Commission Case No. ER-2018-00146 (2018). Electric utility class cost of service study – production cost allocation.

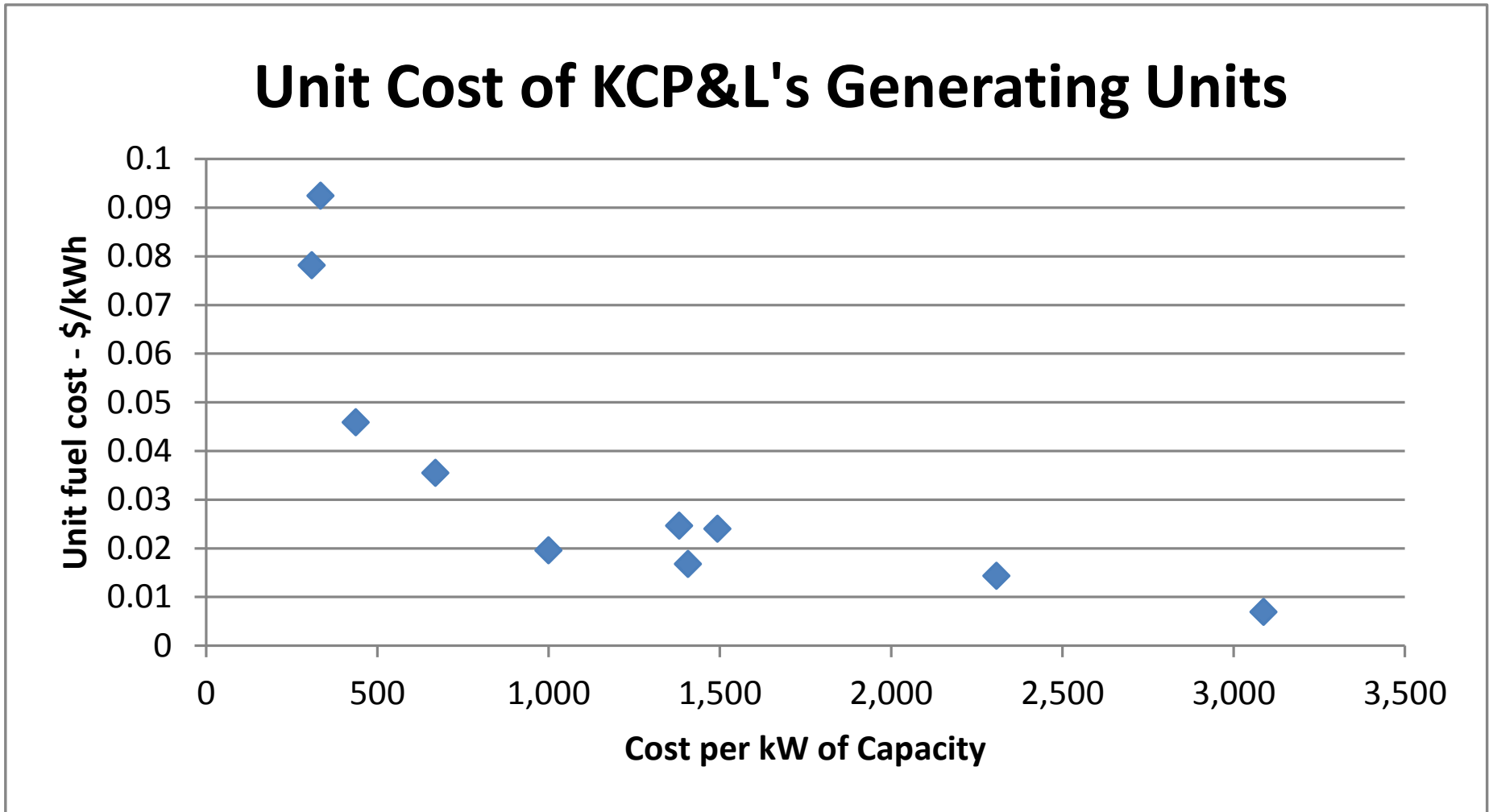
Kansas City Power & Light Company  
 Generating Facilities

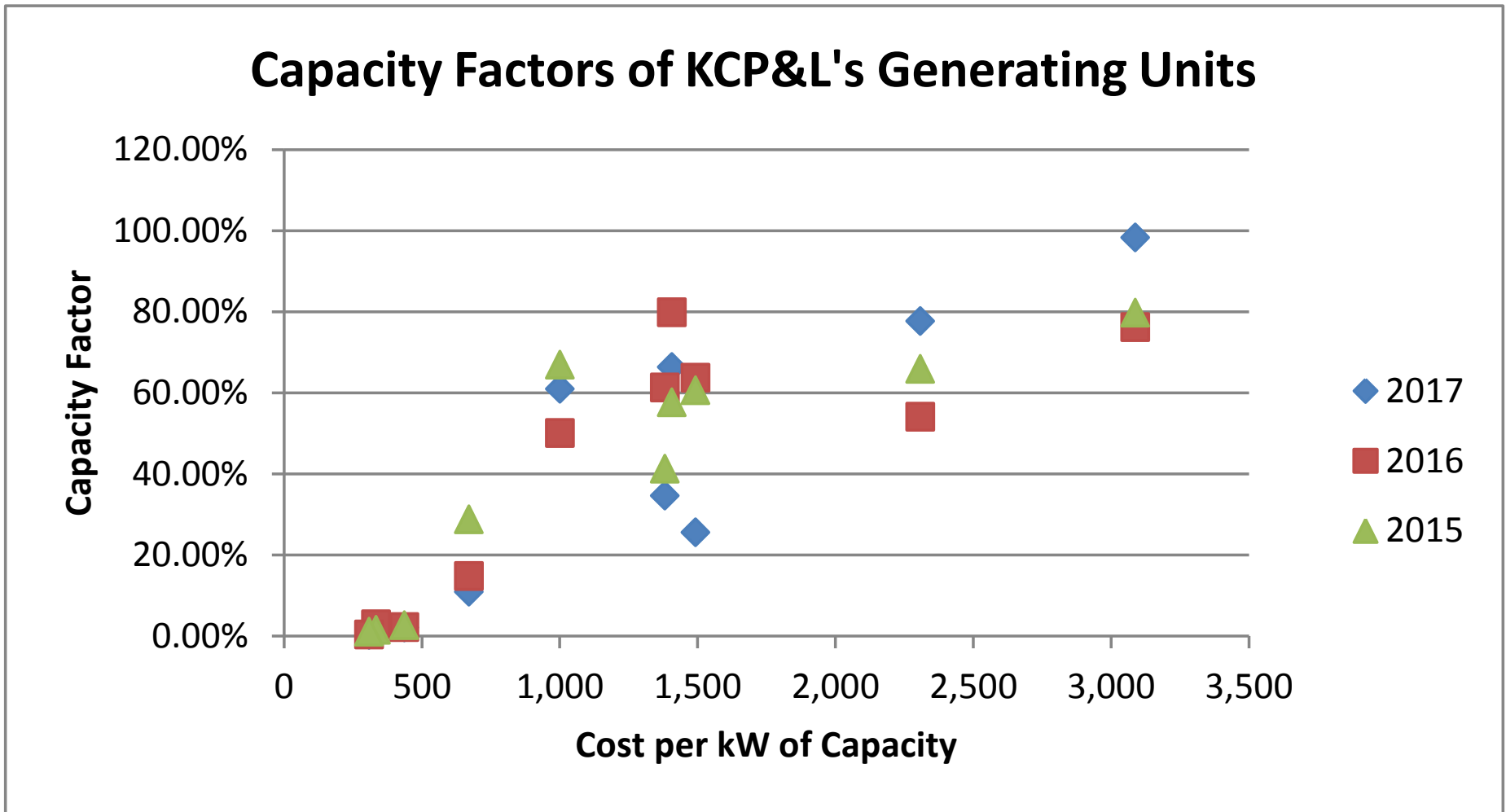
[A] [B] [C] [D] [E]

Line No.	Description	KCPL Ownership	Fuel	Plant Type	Generating Capacity (1) MW
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1	Montrose	100.00%	Coal/Oil	Steam	376.00
2	Hawthorn 5	100.00%	Coal/Gas	Steam	594.00
3	Hawthorn 6&9	100.00%	Gas	Combined Cycle	301.00
4	Hawthorn 7&8	100.00%	Gas	Gas Turbine	164.00
5	Osawatomie	100.00%	Gas	Gas Turbine	102.00
6	Iatan 1	70.00%	Coal/Oil	Steam	508.00
7	Iatan 2	54.71%	Coal/Oil	Steam	547.00
8	West Gardner	100.00%	Gas	Gas Turbine	408.00
9	Northeast	100.00%	Oil	Internal Combustion	491.00
10	Wolf Creek	47.00%	Nuclear	Nuclear	581.00
11	LaCygne 1	50.00%	Coal/Oil	Steam	436.50
12	LaCygne 2	50.00%	Coal/Oil	Steam	362.93
13	Spearville Wind	100.00%	Wind	Wind Turbine	151.70
14	(1) KCPL's share				







Kansas City Power & Light Company - KS  
Class Coincident Peak Load Factors

[A]

[B]

Line No.	Customer Class	Load Factor
1	Residential	41.56%
2	Small General Service	50.77%
3	Medium General Service	58.07%
4	Large General Service	68.07%
5	Lighting	100.00%
6	Total System	51.70%

Kansas City Power & Light Company  
 Operating Characteristics of KCP&L's Generating Assets  
 2015-2017

	[A]	[B]	[C]	[D]	[E]	[F]
Line No.	Description	Fuel	Type	2017	2016	2015
<b>1 Capacity Factors</b>						
2	Montrose	Coal/Oil	Steam	10.94%	14.76%	28.77%
3	Hawthorn 5	Coal/Gas	Steam	60.89%	50.05%	66.88%
4	Hawthorn 6&9	Gas	Combined Cycle	2.05%	2.19%	2.60%
5	Hawthorn 7&8	Gas	Gas Turbine	2.07%	2.91%	1.54%
6	Osawatomie	Gas	Gas Turbine	0.05%	0.15%	0.40%
7	Iatan 1 (70%)	Coal/Oil	Steam	66.35%	79.80%	57.62%
8	Iatan 2 (54.71%)	Coal/Oil	Steam	77.70%	54.07%	65.85%
9	West Gardner	Gas	Gas Turbine	0.28%	0.34%	0.98%
10	Northeast	Oil	Internal Combustion	0.00%	0.03%	0.02%
11	Wolf Creek (47%)	Nuclear	Nuclear	98.33%	76.15%	79.70%
12	LaCygne 1 (50%)	Coal/Oil	Steam	34.62%	61.34%	41.22%
13	LaCygne 2 (50%)	Coal/Oil	Steam	25.60%	63.68%	60.63%
14	Spearville Wind	Wind	Wind Turbine	23.35%	31.50%	34.70%
<b>15 Load Factors</b>						
16	Montrose	Coal/Oil	Steam	12.47%	24.95%	31.70%
17	Hawthorn 5	Coal/Gas	Steam	64.36%	52.53%	72.23%
18	Hawthorn 6&9	Gas	Combined Cycle	2.56%	2.85%	3.20%
19	Hawthorn 7&8	Gas	Gas Turbine	2.36%	3.39%	1.71%
20	Osawatomie	Gas	Gas Turbine	0.07%	0.20%	0.54%
21	Iatan 1 (70%)	Coal/Oil	Steam	68.51%	81.24%	59.86%
22	Iatan 2 (54.71%)	Coal/Oil	Steam	89.48%	60.60%	71.76%
23	West Gardner	Gas	Gas Turbine	0.42%	0.45%	1.42%
24	Northeast	Oil	Internal Combustion	-0.01%	0.11%	0.06%
25	Wolf Creek (47%)	Nuclear	Nuclear	98.33%	76.41%	80.11%
26	LaCygne 1 (50%)	Coal/Oil	Steam	39.35%	72.56%	47.11%
27	LaCygne 2 (50%)	Coal/Oil	Steam	27.65%	66.79%	62.87%
28	Spearville Wind	Wind	Wind Turbine	25.86%	34.62%	37.07%
<b>29 Highest Load Factors (Above System Average)</b>						
30	Iatan 1			68.51%	81.24%	59.86%
31	Wolf Creek			98.33%	76.41%	80.11%
32	LaCygne 1				72.56%	
33	LaCygne 2				66.79%	62.87%
34	Iatan 2			89.48%	60.60%	71.76%
35	Hawthorn 5			64.36%		72.23%

Kansas City Power & Light Company  
Unit Costs of KCP&L's Generating Assets  
2015-2017

	[A]	[B]	[C]	[D]
Line No.	Description	2017	2016	2015
<b>1</b>	<b><u>Fuel Cost per kWh</u></b>			
2	Montrose	0.0355	0.0277	0.0265
3	Hawthorn 5	0.0196	0.0192	0.0196
4	Hawthorn 6&9	0.0459	0.0487	0.0483
5	Hawthorn 7&8	0.0924	0.0655	0.0692
6	Osawatomie	0.0976	0.0109	-0.3724
7	latan 1 (70%)	0.0167	0.0161	0.0173
8	latan 2 (54.71%)	0.0143	0.0147	0.0152
9	West Gardner	0.0781	0.0980	0.0773
10	Northeast	-5.2785	1.0458	1.0924
11	Wolf Creek (47%)	0.0069	0.0069	0.0067
12	LaCygne 1 (50%)	0.0246	0.0210	0.0217
13	LaCygne 2 (50%)	0.0239	0.0211	0.0218
14	Spearville Wind	0.0000	0.0000	0.0000
15	Total	0.0152	0.0160	0.0164
<b>16</b>	<b><u>Five Lowest Fuel Costs</u></b>			
17	Wolf Creek (47%)	0.0069	0.0069	0.0067
18	latan 2 (54.71%)	0.0143	0.0147	0.0152
19	latan 1 (70%)	0.0167	0.0161	0.0173
20	Hawthorn 5	0.0196	0.0192	0.0196
21	LaCygne 1 (50%)		0.0210	0.0217
22	LaCygne 2 (50%)	0.0239		
<b>23</b>	<b><u>Total Unit Cost - \$/kWh</u></b>			
24	Montrose	0.1327	0.0790	0.0578
25	Hawthorn 5	0.0426	0.0474	0.0389
26	Hawthorn 6&9	0.3280	0.2951	0.2612
27	Hawthorn 7&8	0.2639	0.1876	0.3002
28	Osawatomie	7.1607	2.2946	0.4765
29	latan 1 (70%)	0.0447	0.0377	0.0483
30	latan 2 (54.71%)	0.0488	0.0657	0.0547
31	West Gardner	1.3188	1.0931	0.4248
32	Northeast	-74.8632	6.7416	11.1918
33	Wolf Creek (47%)	0.0558	0.0709	0.0667
34	LaCygne 1 (50%)	0.0749	0.0481	0.0604
35	LaCygne 2 (50%)	0.0950	0.0483	0.0481
36	Spearville Wind	0.0863	0.0626	0.0569
37	Total	0.0579	0.0573	0.0558
<b>38</b>	<b><u>Five Lowest Total Unit Costs per kWh</u></b>			
39	latan 1 (70%)	0.0447	0.0377	0.0483
40	Hawthorn 5	0.0426	0.0474	0.0389
41	LaCygne 1 (50%)	0.0749	0.0481	
42	LaCygne 2 (50%)		0.0483	0.0481
43	latan 2 (54.71%)	0.0488	0.0657	0.0547
44	Wolf Creek (47%)	0.0558		
45	Montrose			0.0578

Kansas City Power & Light Company  
Unit Costs of KCP&L's Generating Assets  
Reflecting System-wide Fuel Cost  
2015-2017

	[A]	[B]	[C]	[D]
Line No.	Description	2017	2016	2015
<b>1</b>	<b><u>Total Unit Cost Less Fuel per kWh</u></b>			
2	Montrose	0.0972	0.0514	0.0313
3	Hawthorn 5	0.0230	0.0282	0.0193
4	Hawthorn 6&9	0.2822	0.2464	0.2129
5	Hawthorn 7&8	0.1715	0.1221	0.2311
6	Osawatomie	7.0630	2.2837	0.8490
7	Iatan 1 (70%)	0.0280	0.0216	0.0310
8	Iatan 2 (54.71%)	0.0345	0.0510	0.0396
9	West Gardner	1.2407	0.9950	0.3475
10	Northeast	-69.5847	5.6958	10.0994
11	Wolf Creek (47%)	0.0488	0.0640	0.0600
12	LaCygne 1 (50%)	0.0503	0.0271	0.0388
13	LaCygne 2 (50%)	0.0711	0.0272	0.0263
14	Spearville Wind	0.0863	0.0626	0.0569
15	Total	0.0427	0.0413	0.0394
<b>16</b>	<b><u>Total Unit Cost Less Average Fuel per kWh</u></b>			
17	Montrose	0.1174	0.0630	0.0414
18	Hawthorn 5	0.0273	0.0314	0.0225
19	Hawthorn 6&9	0.3128	0.2791	0.2448
20	Hawthorn 7&8	0.2487	0.1716	0.2838
21	Osawatomie	7.1454	2.2786	0.4601
22	Iatan 1 (70%)	0.0295	0.0217	0.0319
23	Iatan 2 (54.71%)	0.0335	0.0497	0.0383
24	West Gardner	1.3036	1.0771	0.4084
25	Northeast	-74.8785	6.7256	11.1754
26	Wolf Creek (47%)	0.0405	0.0549	0.0502
27	LaCygne 1 (50%)	0.0597	0.0321	0.0440
28	LaCygne 2 (50%)	0.0798	0.0323	0.0317
29	Spearville Wind	0.0710	0.0466	0.0405
30	Total	0.0427	0.0413	0.0394
31	Highest Load Factor Units (1)			
32	Unit Cost - \$/kWh	0.0337	0.0389	0.0326
33	All Other Units			
34	Unit Cost - \$/kWh	0.0884	0.0506	0.0679
35	(1) Load factors above system average.			

Comparison of Selected Production Cost Allocations  
 NARUC Electric Utility Cost Allocation Manual

	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]
Line No.	Class or Classification	CP Load Factor	Allocation Methods						
			1 NCP	1 CP	AE-1NCP	AP-1CP	AP-1NCP	BIP	Energy
1	Average				57.98%	57.98%	57.98%		
2	Demand				42.02%	42.02%	42.02%		
3	Domestic	51.53%	36.94%	34.84%	36.46%	32.59%	33.48%	31.55%	30.96%
4	Lighting, Small & Medium Power	52.73%	34.91%	37.25%	34.82%	35.28%	34.30%	34.04%	33.86%
5	Large Power	73.47%	23.34%	24.63%	23.97%	28.44%	27.90%	30.58%	31.21%
6	Agriculture & Pumping	56.82%	3.94%	3.29%	3.88%	3.25%	3.52%	3.12%	3.22%
7	Street Lighting	100.00%	0.87%	0.00%	0.86%	0.43%	0.80%	0.71%	0.74%
8	Total	57.98%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

## KCP&L - Comparison of Production Allocations

