

**MISSOURI PUBLIC SERVICE COMMISSION**

**CASE NO. ER-2010-0355**

**DIRECT TESTIMONY**

**OF**

**JOHN J. REED**

**Submitted On Behalf**

**Of**

**SOUTHERN UNION COMPANY**

**D/B/A MISSOURI GAS ENERGY**

**NOVEMBER 10, 2010**

**NP**

## TABLE OF CONTENTS

I.	INTRODUCTION OF WITNESS AND PURPOSE OF TESTIMONY .....	1
II.	METHODS FOR MEASURING ENERGY EFFICIENCY .....	4
III.	THE RELATIVE ADVANTAGES OF NATURAL GAS.....	9
IV.	PROPOSED FUEL SWITCHING PROGRAM.....	19
V.	IMPACT OF FUEL SWITCHING PROGRAM ON KCP&L.....	33
VI.	ASSESSING COST EFFECTIVENESS AND THE PUBLIC INTEREST .....	39

1           **I.       INTRODUCTION OF WITNESS AND PURPOSE OF TESTIMONY**

2

3           **Q.       PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.**

4           A.       My name is John J. Reed, and my business address is 293 Boston Post Road  
5                   West, Suite 500, Marlborough, MA 01752.

6

7           **Q.       BY WHOM YOU EMPLOYED AND IN WHAT CAPACITY?**

8           A.       I am the Chairman and Chief Executive Office of Concentric Energy Advisors,  
9                   Inc. (“Concentric”) and CE Capital Advisors (“CE Capital”).

10

11          **Q.       PLEASE BRIEFLY DESCRIBE CONCENTRIC ENERGY ADVISORS,**  
12                   **INC.**

13          A.       Concentric is a management and financial advisory firm focused on the North  
14                   American energy industry. Concentric specializes in financial advisory  
15                   assignments, market assessments and strategy development, ratemaking and  
16                   utility regulation, litigation support, and management and operations consulting.

17

18          **Q.       PLEASE DESCRIBE YOUR EXPERIENCE AND QUALIFICATIONS.**

19          A.       I have more than 30 years of experience in the utility industry, having served as  
20                   an executive in energy consulting firms, including the position of Co-Chief  
21                   Executive Officer of the largest publicly-traded management consulting firm in  
22                   the United States and as Chief Economist for the largest gas utility in the United  
23                   States. I have provided expert testimony on a wide variety of economic and

1 financial issues related to the utility industry on numerous occasions before  
2 administrative agencies, utility commissions, courts, arbitration panels and elected  
3 bodies across North America. A summary of my educational background can be  
4 found in Attachment A, along with a list of my recent appearances as an expert  
5 witness.

6  
7 **Q. ON WHOSE BEHALF ARE YOU PROVIDING THIS TESTIMONY?**

8 A. I am sponsoring this testimony on behalf of Southern Union Company d/b/a  
9 Missouri Gas Energy (“MGE” or the “Company”).

10  
11 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

12 A. The purpose of my testimony is to recommend the initiation of a fuel switching  
13 program by Kansas City Power and Light (“KCP&L”) in Missouri as part of  
14 KCP&L’s energy efficiency and conservation measures. The testimony is  
15 supported by the analyses contained in Schedules Nos. JJR-1 through JJR-7.

16  
17 **Q. PLEASE SUMMARIZE YOUR RECOMMENDATIONS.**

18 A. I recommend that the Missouri Public Service Commission (the “Commission”)  
19 adopt a fuel switching program to be implemented by KCP&L as a cost effective  
20 way to promote energy efficiency and conservation by offering financial  
21 incentives to KCP&L customers to convert certain end-use applications such as  
22 water heating and space heating from electricity to natural gas. As explained later  
23 in my testimony, the proposed fuel switching program would benefit KCP&L

1 customers through lower energy use and reduced energy bills, while  
2 simultaneously reducing or deferring baseload capacity additions and reducing  
3 CO<sub>2</sub> emissions. For these reasons, implementation of the fuel switching program  
4 described herein is consistent with the intent of electric Demand Side  
5 Management (“DSM”) programs (i.e., to cost-effectively reduce electricity  
6 demand), is in the public interest, and should be implemented by KCP&L, subject  
7 to the approval of the Commission.

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**II. METHODS FOR MEASURING ENERGY EFFICIENCY**

**Q. PLEASE EXPLAIN WHAT IS MEANT BY THE TERM FUEL SWITCHING.**

A. Fuel switching or fuel conversion is commonly defined to occur when a customer switches from one fuel source to another for an end-use application such as water heating or space heating. In this particular circumstance, my testimony concentrates on switching certain end-use applications from electricity to natural gas.

**Q. WHAT IS THE OBJECTIVE OF FUEL SWITCHING?**

A. The objective of fuel switching is to promote the most efficient energy use for end-use applications (i.e., the right fuel for the right use.)

**Q. PLEASE EXPLAIN THE CONCEPT OF “THE RIGHT FUEL FOR THE RIGHT USE.”**

A. The choice of which energy to use for certain end-use applications has significant implications in terms of efficiency, economics and the environment.<sup>1</sup> In order to make this choice, customers need information that allows them to compare the relative merits of appliances that use different fuel sources such as electricity and natural gas. According to an American Gas Association (“AGA”) report:

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<sup>1</sup> “A Comparison of Energy Use, Operating Costs, and Carbon Dioxide Emissions of Home Appliances,” American Gas Association, Energy Analysis, EA 2009-3, October 20, 2009.

1 Most current government policies and regulations that influence  
2 energy matters are “site-based” – that is, they only consider the  
3 impacts at the site where the energy is ultimately consumed. Site-  
4 based regulations, such as appliance efficiency standards and  
5 measurement, can lead to higher energy resource consumption as  
6 well as higher levels of pollution.<sup>2</sup>  
7

8 **Q. IS THE CURRENT SITE-BASED APPROACH TO MEASURING**  
9 **ENERGY CONSUMPTION UNDER REVIEW?**

10 A. Yes, the U.S. Department of Energy (“DOE”) is considering whether to adopt an  
11 alternative method for measuring energy consumption known as the full-fuel-  
12 cycle approach. The change being considered by the DOE is based on a  
13 Congressionally-mandated report from the National Research Council (“NRC”),  
14 which is part of the National Academy of Sciences.<sup>3</sup> The change would address  
15 the primary concern with the site-based method, which is that it does not allow for  
16 comparison between appliances that use more than one fuel source, or between  
17 appliances that perform the same function but use different types of fuel.  
18

19 **Q. PLEASE EXPLAIN THE FULL-FUEL-CYCLE APPROACH IN MORE**  
20 **DETAIL.**

21 A. The full-fuel-cycle approach measures energy consumption by examining the  
22 impacts associated with energy use, including extraction/production,

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<sup>2</sup> Ibid, at page 1.

<sup>3</sup> The National Academy of Sciences is a non-profit organization that was established by Congress in March 1863. Its stated purpose is to “investigate, examine, experiment, and report upon any subject of science or art” whenever called upon to do so by any department of government. The NAS is comprised of approximately 2,100 members and 380 foreign associates, of whom nearly 200 have won Nobel Prizes. Most of the National Academy of Sciences’ science policy and technical work is conducted by its operating arm, the National Research Council.

1 conversion/generation, transmission, distribution, and ultimate energy  
2 consumption. Unlike the site-based method, the full-fuel-cycle method not only  
3 considers the total energy needed for end-use applications but also incorporates  
4 the importance of greenhouse gas emissions in the decision whether to use  
5 electricity or natural gas for certain end-use applications.

6  
7 **Q. WHAT WAS THE NATIONAL RESEARCH COUNCIL'S ULTIMATE**  
8 **RECOMMENDATION TO THE DOE?**

9 A. In its May 2009 report, the NRC stated:

10 The Committee's primary general recommendation is that the  
11 DOE/EERE consider moving over time to the use of a full-fuel-  
12 cycle measure of energy consumption for assessment of national  
13 and environmental impacts, especially levels of greenhouse gas  
14 emissions, and to providing more comprehensive information to  
15 the public through labels and other means, such as an enhanced  
16 website.

17  
18 The current use by DOE/EERE of site energy consumption is  
19 effective for setting standards for the operational efficiency of  
20 single-fueled appliances within the same class and should be  
21 continued without change. However, DOE/EERE's current use of  
22 site energy consumption does not account for the total  
23 consumption of energy when more than one fuel is used in an  
24 appliance (e.g., a heating system with a gas furnace and an electric  
25 fan) or when more than one fuel can be used for the same  
26 application. For these appliances, measuring full-fuel-cycle energy  
27 consumption would provide a more complete picture of energy  
28 used, allowing comparison across many different appliances as  
29 well as an improved assessment of impacts such as effects on  
30 energy security and the environment.<sup>4</sup>

31  

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<sup>4</sup> "Review of Site (Point-of-Use) and Full-Fuel-Cycle Measurement Approaches to DOE/EERE Building Appliance Energy Efficiency Standards," National Research Council, May 15, 2009, at page 10.



1 **Q. WHY HAS THE NRC RECOMMENDED USING THE FULL-FUEL-**  
2 **CYCLE APPROACH TO CALCULATE ENERGY CONSUMPTION**  
3 **RATHER THAN THE SITE-BASED METHOD?**

4 A. Using water heaters as an example, the NRC explained the difference between the  
5 site-based method and the full-fuel-cycle approach in measuring energy  
6 consumption:

7 [B]ased on their site energy consumption, an electric storage water  
8 heater might operate with 90 percent efficiency and a natural gas  
9 water heater with 70 percent efficiency. But for the electric  
10 storage water heater, energy losses of about 70 to 75 percent occur  
11 in acquiring the primary fuel and in the generation, transmission,  
12 and distribution of the electricity, yielding an overall energy  
13 efficiency for the electric storage water heater of about 0.30 X  
14 0.90, or 27 percent. This figure is much lower than the gas-fired  
15 storage water heater's overall energy efficiency of about 0.91 X  
16 0.70, or 64 percent, when fuel-fuel-cycle energy consumption is  
17 the measure employed. In general, energy losses in heating  
18 applications with electric resistance heaters are greater than in  
19 heating applications with natural gas when the measure is full-fuel-  
20 cycle energy use.<sup>5</sup>  
21

22 **Q. HAVE ANY OTHER GOVERNMENT AGENCIES ALREADY**  
23 **DETERMINED THAT SOURCE-BASED CALCULATIONS (I.E., FULL**  
24 **FUEL CYCLE) ARE PREFERABLE TO SITE-BASED MEASUREMENT?**

25 A. Yes. The U.S. Environmental Protection Agency ("EPA"), which jointly  
26 establishes ENERGY STAR ratings with the DOE, has already determined that a  
27 source-based energy calculation is the most equitable method of evaluation.  
28 Source energy represents the total amount of raw fuel that is required, including  
29 all energy losses that occur during production, transmission and delivery, thereby

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<sup>5</sup> Ibid, at page 6.

1 enabling a comprehensive assessment of energy efficiency.<sup>6</sup> Source-based  
2 calculations are comparable to the full-fuel-cycle approach, in that both rely on  
3 the same components to measure the total energy required, including energy  
4 losses.

5

6 **Q. HOW DOES THE USE OF THE FULL-FUEL-CYCLE METHOD IMPACT**  
7 **THE DECISION BETWEEN ELECTRICITY AND NATURAL GAS FOR**  
8 **CERTAIN END-USE APPLICATIONS?**

9 A. The AGA reports that when evaluated on a full-fuel-cycle basis, the use of natural  
10 gas rather than electricity in certain end-use residential applications results in (1)  
11 increased energy efficiency, (2) consumer energy cost savings, and (3) reduced  
12 environmental impacts.<sup>7</sup> The following section of my testimony discusses these  
13 advantages in more detail.

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<sup>6</sup> ENERGY STAR Performance Ratings Methodology for Incorporating Source Energy Use, December 2007.

<sup>7</sup> “A Comparison of Energy Use, Operating Costs, and Carbon Dioxide Emissions of Home Appliances,” American Gas Association, Energy Analysis, EA 2009-3, October 20, 2009, at page 11.

1                   **III. THE RELATIVE ADVANTAGES OF NATURAL GAS**

2

3   **Q. PLEASE DISCUSS THE FIRST ADVANTAGE THAT NATURAL GAS**  
4   **HAS WITH RESPECT TO ELECTRICITY IN CERTAIN END-USE**  
5   **APPLICATIONS UNDER THE FULL-FUEL-CYCLE APPROACH (I.E.,**  
6   **INCREASED ENERGY EFFICIENCY).**

7   A. Natural gas is more efficient than electricity under the full-fuel-cycle method due  
8   to the differences in energy losses between the fuel sources (i.e., the total energy  
9   input compared to the energy delivered to end-use customers). As discussed by  
10   the NRC, the cumulative efficiency of natural gas from the wellhead to the meter  
11   is 91.9 percent. This means that for every 100 MMBtu of energy produced,  
12   almost 92 MMBtu of energy is delivered to the consumer. By contrast, electricity  
13   on average delivers to the consumer only 31.9 percent of the energy produced.  
14   Coal-fired electric generation is even less efficient than average, delivering only  
15   29.3 percent of the energy produced to the end-use customer. Energy losses  
16   associated with electricity occur during the generation process (as input energy is  
17   lost while steam is being produced to turn large turbines/generators) and due to  
18   transmission line losses that occur before the electricity reaches the ultimate  
19   consumer.<sup>8</sup>

20

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<sup>8</sup> Ibid, at pages 5 and 6.

1 Table 1 demonstrates how energy losses associated with electricity result in that  
2 fuel source being less attractive than natural gas under the full-fuel-cycle  
3 approach, based on the energy requirements for a typical new home.

4 **Table 1: Site-Based Method vs. Full-Fuel-Cycle (MMBtu per year)**<sup>9</sup>

	Natural Gas	Electricity
Space Heating	74.3	31.5
Water Heating	25.4	16.6
Cooking	3.3	1.8
Clothes Drying	3.8	3.3
Total Site Use	<b>106.9</b>	<b>53.2</b>
Energy Losses	14.1	113.5
Full Fuel Cycle Use	<b>121.0</b>	<b>166.7</b>

5  
6 As shown by Table 1 above, the total site-based energy consumption for natural  
7 gas is 106.9 MMBtu per year compared to site-based energy consumption for  
8 electricity of 53.2 MMBtu per year. However, when energy losses are included in  
9 the comparison, energy consumption for natural gas increases by approximately  
10 13 percent to 121 MMBtu per year under the full-fuel-cycle method, while energy  
11 consumption for electricity increases by approximately 213 percent to 166.7  
12 MMBtu per year. Consequently, natural gas becomes the preferred fuel choice  
13 for many end-use applications under the full-fuel-cycle approach.

14  
15 On a full-fuel-cycle basis, natural gas is far more efficient than electricity for  
16 certain end-use applications. Table 2 compares the annual energy requirements  
17 for electricity and natural gas when measured on the full-fuel-cycle basis for

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<sup>9</sup> Ibid, at page 8. The total site use figure of 31.5 MMBtu for electric space heating refers to an electric heat pump, not an electric resistance heating system. Under the full-fuel-cycle approach, the electric heat pump's energy use is 98.8 MMBtu.

1 water heating and space heating. In contrast to Table 1 above, the figure for  
 2 electric space heating in Table 2 refers to an electric resistance heating system.  
 3 As shown by Table 2, the annual energy requirements for electric water heating  
 4 and electric resistance space heating under the full-fuel-cycle approach is more  
 5 than twice the energy required for those same end-use applications with natural  
 6 gas.

7 **Table 2: Annual Energy Requirements under Full-Fuel-Cycle Approach**  
 8 **(All values expressed in MMBtu)**

Appliance	Natural Gas	Electricity
Water Heating <sup>10</sup>	27.6	51.9
Space Heating <sup>11</sup>	85.1	192.3
Total	112.7	244.2

9  
 10 **Q. PLEASE DISCUSS THE SECOND ADVANTAGE THAT NATURAL GAS**  
 11 **HAS RELATIVE TO ELECTRICITY (I.E., CONSUMER ENERGY COST**  
 12 **SAVINGS).**

13 A. The higher efficiency of natural gas on a full-fuel-cycle basis results in lower  
 14 operating costs relative to electricity. Schedule JJR-1 presents the annual  
 15 operating cost savings for certain end-use applications including water heating  
 16 and space heating. This schedule assumes: (1) the energy consumption levels in  
 17 Table 2 above, (2) the average price of natural gas for MGE of \$11.35 per Mcf  
 18 including transport, storage and hedging costs,<sup>12</sup> (3) the KCP&L average price of  
 19 electricity for electric heating of \$0.0766/kWh and the KCP&L average price of

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<sup>10</sup> Ibid, at page 16.  
<sup>11</sup> Ibid, at page 17.  
<sup>12</sup> Information provided by Missouri Gas Energy in response to data request.

1 electricity for water heating of \$0.0947/kWh (based on the Residential General  
2 rate).<sup>13</sup> Table 3 summarizes those estimated annual savings.

3 **Table 3: Annual Operating Cost Savings**  
4 **Natural Gas vs. Electricity**

Appliance	Savings
Water Heating	\$178
Space Heating	\$507

5  
6 As illustrated by Table 3, a customer that switched from electricity to natural gas  
7 for water heating and space heating would save approximately \$178 and \$507 per  
8 year, respectively.

9  
10 **Q. PLEASE DISCUSS THE THIRD ADVANTAGE THAT NATURAL GAS**  
11 **HAS WITH RESPECT TO ELECTRICITY (I.E., REDUCED**  
12 **ENVIRONMENTAL IMPACTS).**

13 A. Compared to other fossil fuels, using natural gas rather than electricity results in  
14 numerous environmental benefits. Carbon dioxide emissions are about 36 percent  
15 lower for the natural gas residence than for an all-electric home.<sup>14</sup> Annual CO<sub>2</sub>  
16 emissions were 6.4 metric tons for natural gas appliances compared to 10.1 metric  
17 tons for electric appliances.<sup>15</sup> Table 4 compares the carbon dioxide emissions  
18 from natural gas, heating oil, and electricity for two new homes based on average  
19 household energy use. The table shows that CO<sub>2</sub> emissions from certain end-use

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<sup>13</sup> KCP&L, 2009 FERC Form 1, at page 304.

<sup>14</sup> "A Comparison of Energy Use, Operating Costs, and Carbon Dioxide Emissions of Home Appliances, American Gas Association, Energy Analysis, EA 2009-3, October 20, 2009, at page 4.

<sup>15</sup> Ibid, at page 11. This analysis is based on new homes that meet the 2009 International Energy Conservation Code. An analysis of the existing housing stock would be even more favorable to natural gas, as older homes tend to require more energy due to their lower thermal integrity and less efficient equipment.

1 applications that utilize electricity rather than natural gas are 2.65 times higher for  
 2 a new 1,500 square foot home and 2.42 times higher for a new 3,000 square foot  
 3 home.

4 **Table 4: Total CO<sub>2</sub> Emissions for New Homes<sup>16</sup>**

Total Energy Efficiency Carbon Dioxide Emissions for New Homes <sup>1</sup> (lbs of CO <sub>2</sub> per Average Household Energy Use <sup>2</sup> )		
	1,500 SQ. FT.	3,000 SQ. FT.
Natural Gas	7,423	10,583
Oil	13,095	15,198
Electricity <sup>3</sup> :		
Coal-Based	17,560	22,828
Oil-Based	582	757
Natural Gas-Based	1,561	2,029
<b>Total Electricity</b>	<b>19,703</b>	<b>25,614</b>
<sup>1</sup> Based on hypothetical fuel generating mix.		
<sup>2</sup> Excludes energy use for cooling and base electric requirements.		
<sup>3</sup> For existing generating capacity only.		

5  
6  
7 **Q. WHAT IS THE FUEL MIX ASSOCIATED WITH THE GENERATION**  
 8 **USED IN THE ABOVE ANALYSIS OF CO2 EMISSIONS?**

9 A. The above analysis relied on the 2007 actual generation mix of fossil fuels,  
 10 nuclear and renewable energy. According to the Energy Information  
 11 Administration (“EIA”), the 2007 generation mix was as follows:

12 **Table 5: 2007 Generation Fuel Sources<sup>17</sup>**

Fuel	2007
Coal	49%
Natural Gas	22%
Nuclear	19%
Hydroelectric	6%
Other Renewables	3%
Petroleum Liquids	1%
Total	100%

<sup>16</sup> “Electric-to-Gas Fuel Switching,” NARUC Summer Meeting, Paul H. Raab, July 20, 2009, Slide 14.

<sup>17</sup> “Net Generation by Energy Source: Total (All Sectors), 1996 through July 2010,” Energy Information Administration, Report No DOE/EIA-0226, released October 14, 2010, Table 1.1.

1 In summary, coal-based electric generation represented almost half of the  
2 electricity produced in 2007 with natural gas, nuclear and hydro-electric  
3 combined accounting for approximately the remaining 50 percent.  
4

5 **Q. DID YOU COMPARE THE CO<sub>2</sub> EMISSIONS RATE BETWEEN COAL**  
6 **AND NATURAL GAS IN THE GENERATION OF ELECTRICITY IN**  
7 **MISSOURI?**

8 A. Yes. According to the U.S. Environmental Protection Agency's eGRID 2007  
9 database, the CO<sub>2</sub> emission rate in Missouri in 2005 was 2,104 lbs/MWh for coal  
10 and 978 lbs/MWh for natural gas. In other words, the CO<sub>2</sub> emission rate for coal  
11 was more than twice the rate for natural gas.  
12

13 **Q. WHAT PERCENTAGE OF KCP&L'S GENERATION IS COAL-FIRED?**

14 A. As shown in Table 6 below, approximately 80 percent of KCP&L's actual 2009  
15 and estimated 2010 generation is coal-fired,<sup>18</sup> which is significantly higher than  
16 the national average of 49 percent in 2007.  
17

**Table 6: KCP&L Generation**

Fuel	Estimated 2010	Actual 2009
Coal	80%	80%
Nuclear	17%	17%
Natural gas and oil	2%	2%
Wind	1%	1%
Total	100%	100%

18  
<sup>18</sup> Great Plains Energy Inc., 2009 SEC Form 10-K, filed February 25, 2010, at page 8.



1 **Q. HOW MUCH CARBON IS KCP&L'S CURRENT GENERATION**  
2 **PORTFOLIO EXPECTED TO PRODUCE?**

3 A. KCP&L's current generation portfolio is estimated to produce about one ton of  
4 CO<sub>2</sub> per MWh, or approximately 17 million tons per year.<sup>19</sup>

5  
6 **Q. WOULD END-USE FUEL SWITCHING PROGRAMS CONTRIBUTE TO**  
7 **A REDUCTION IN CO<sub>2</sub> EMISSIONS?**

8 A. Yes. Fuel switching programs that encourage customers to convert certain end-  
9 use applications from electricity to natural gas would contribute to a reduction in  
10 CO<sub>2</sub> emissions. Specifically, fuel switching programs would reduce the amount  
11 of generation required and therefore reduce the emissions associated with that  
12 reduction in generation. This is especially true in the case of electric utilities,  
13 such as KCP&L, which generates approximately 80 percent of its electricity from  
14 coal-fired plants. As indicated above, each MWh reduction in electricity usage  
15 would reduce CO<sub>2</sub> emissions by approximately one ton.

16  
17 **Q. GIVEN THE BENEFITS OF ENERGY EFFICIENCY AND**  
18 **CONSERVATION GENERALLY, WHY WOULD CUSTOMERS NOT**  
19 **PURSUE THESE OPPORTUNITIES ON THEIR OWN?**

20 A. According to a July 2009 study by McKinsey & Company ("McKinsey"), there  
21 are several barriers to customer participation in energy efficiency and  
22 conservation programs.<sup>20</sup> These include: 1) up-front costs; (2) customer

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<sup>19</sup> Kansas City Power and Light, 2009 FERC Form 1, at page 123.28

<sup>20</sup> McKinsey & Company, "Unlocking Energy Efficiency in the U.S. Economy," July 2009, p. 7.

1 behavioral issues; and (3) misaligned incentives. Each barrier is discussed in  
2 more detail below.

3  
4 The first general barrier is that energy efficiency measures require large up-front  
5 capital outlays in order to achieve benefits in the form of energy savings that  
6 accrue over the measure's lifetime. Even if an efficiency measure is deemed cost-  
7 effective, that does not mean that it will be inexpensive. Many households may  
8 lack the up-front capital required to undertake energy efficiency projects, while  
9 others may prioritize Net Present Value-positive investments with shorter  
10 payback periods.

11  
12 The second general barrier identified by McKinsey stems from customer  
13 behavior. Behavioral barriers include a lack of customer awareness, both of their  
14 own energy consumption and of the efficiency measures available to them.  
15 Another behavioral barrier is the financial time horizon. Customers tend to opt  
16 for the energy measure with the least expensive up-front cost, rather than the  
17 energy efficient option with the lowest cumulative cost over the lifetime of the  
18 measure. Customers also hesitate to invest in energy efficiency measures due to  
19 the risk that they will not own their home long enough to capture all of the  
20 benefits.

21  
22 The third structural barrier involves the misalignment of incentives (e.g.,  
23 landlords and tenants). Landlords, who pay for equipment, have an incentive to

1 select energy measures with the least expensive up-front cost, while the tenants,  
2 who pay the energy bills, have the incentive to invest in energy efficiency  
3 measures, which offer lower operating costs. Also, more energy efficient features  
4 of equipment are often bundled with other costly premium features, dissuading  
5 those who would otherwise be interested in low cost efficiency measures from  
6 purchasing the more efficient equipment.

7  
8 In addition to the barriers identified by McKinsey, other barriers may include but  
9 are not limited to: promotional activities of utility service providers, promotional  
10 activities of appliance vendors, and difficulties that consumers may have in  
11 assessing the relative energy efficiency of appliances, particularly when those  
12 appliances may be fueled by different energy sources.

13  
14 **Q. GIVEN THE RELATIVE ADVANTAGES OF NATURAL GAS, WHY ARE**  
15 **CUSTOMERS RELUCTANT TO SWITCH FROM ELECTRICITY?**

16 A. Customers may be reluctant to switch from electricity to natural gas because they  
17 tend to focus on the higher initial cost of natural gas appliances rather than the  
18 lower operating costs once installed. Additionally, customers consider the cost of  
19 installing a gas service line to their home if they are not currently served by the  
20 local gas distribution company, as well as the cost and inconvenience of installing  
21 interior piping and ventilation ductwork to accommodate natural gas applications.

22

1 **Q. DOES KCP&L'S RATE STRUCTURE PROVIDE RESIDENTIAL**  
2 **CUSTOMERS A PRICE INCENTIVE NOT TO SWITCH FROM**  
3 **ELECTRICITY TO NATURAL GAS FOR CERTAIN END-USE**  
4 **APPLICATIONS SUCH AS SPACE HEATING?**

5 A. Yes. For residential customers who use electric space heating as their primary  
6 heating source, the rate per kWh during winter months provides a price incentive  
7 to continue using electricity for space heating purposes, even though it is not the  
8 most efficient fuel source from the full-fuel-cycle perspective. Please refer to the  
9 Direct Testimony of MGE witness, Mr. Michael Noack, for a more detailed  
10 discussion of rate design issues.

1                                   **IV.    PROPOSED FUEL SWITCHING PROGRAM**

2

3   **Q.    WHAT ARE THE COMPONENTS OF THE PROPOSED FUEL**  
4           **SWITCHING PROGRAM THAT KCP&L WOULD OFFER AS PART OF**  
5           **ITS ENERGY EFFICIENCY AND CONSERVATION MEASURES IN**  
6           **MISSOURI?**

7   A.    Under the proposed fuel switching program, KCP&L would offer financial  
8           incentives to either residential or multi-family customers in Missouri to encourage  
9           them to convert from electric water heating to natural gas water heating, and/or  
10          from electric resistance heat to natural gas heat.<sup>21</sup> The proposed fuel switching  
11          program would not include KCP&L customers who are currently using an electric  
12          heat pump. The fuel switching program would be available to customers who  
13          currently do not have a natural gas service line to their premise, and to customers  
14          who are not located near a gas main, if the customer is willing to make any  
15          necessary contributions for MGE to extend gas service lines or gas mains, as  
16          governed by MGE’s currently effective tariff provisions regarding facilities  
17          extensions.

18

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<sup>21</sup> Depending on the success of the fuel switching program, it would be possible to expand the program to include additional end-use applications such as clothes drying and cooking equipment, as well as to additional types of customers such as small commercial.

1 **Q. HAVE FUEL SWITCHING PROGRAMS BEEN APPROVED AS PART**  
2 **OF ENERGY EFFICIENCY AND CONSERVATION MEASURES IN**  
3 **OTHER JURISDICTIONS?**

4 A. Yes. Fuel switching programs have been approved for Puget Sound Energy in  
5 Washington and Oregon, CenterPoint in Texas, Avista Corporation in Idaho and  
6 Washington, and Philadelphia Electric Company in Pennsylvania, among others.

7

8 **Q. HAVE YOU REVIEWED THE FUEL SWITCHING PROGRAMS THAT**  
9 **HAVE BEEN APPROVED FOR THE ABOVE UTILITIES?**

10 A. Yes, I have. Schedule JJR-2 summarizes several of the fuel switching programs  
11 that have been approved in other jurisdictions. Some common characteristics of  
12 these fuel switching programs are as follows:

- 13 1. A major impetus for the development of the fuel switching programs has  
14 been the desire to reduce the demand for electricity;
- 15 2. The programs are offered to a variety of customer classes including,  
16 residential, multi-family, and commercial/industrial customers;
- 17 3. The programs offer customer rebates or bill credits, which provide a  
18 financial incentive to encourage customers to switch from electricity to  
19 natural gas for certain end-use applications; and
- 20 4. The programs are funded by both electric and natural gas customers, with  
21 electric customers generally funding some portion of the cost for  
22 converting the customer premise to natural gas and installing the natural

1 gas appliance, while gas customers fund some portion of the cost to  
2 upgrade to a more energy-efficient natural gas appliance.

3  
4 **Q. ARE YOU AWARE OF ANY FUEL SWITCHING PROGRAMS WHERE**  
5 **THE ELECTRIC UTILITY PROVIDES FINANCIAL INCENTIVES FOR**  
6 **ITS CUSTOMERS TO SWITCH TO A DIFFERENT COMPANY FOR**  
7 **NATURAL GAS SERVICE?**

8 A. Yes. Puget Sound Energy (“PSE”) recently received regulatory approval to offer  
9 fuel switching rebate programs in Washington for water heating and space heating  
10 applications.<sup>22</sup> PSE is a combination gas and electric utility, and the financial  
11 incentives offered under its fuel switching program are available to customers  
12 who switch from PSE electric service to PSE natural gas service, as well as to  
13 customers who switch from PSE electric service to Cascade Natural Gas’ service.  
14 Additionally, the City of Austin and Texas Gas Service are discussing initiation of  
15 a fuel switching program under which customers who currently obtain their  
16 electric service from the City of Austin would be eligible for rebates if they  
17 switched certain electric appliances to natural gas and obtained gas service from  
18 Texas Gas Service.<sup>23</sup>

19  

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<sup>22</sup> Puget Sound Energy filed tariff sheets with Advice Letter No. 2008-34, which was allowed to become effective by operation of law by the Washington Utility and Transportation Commission, effective January 19, 2009.

<sup>23</sup> Based on telephone conversation with representative of Texas Gas Service in October 2010.

1 **Q. PLEASE EXPLAIN HOW THE PROPOSED FUEL SWITCHING**  
2 **PROGRAM FOR KCP&L WOULD OPERATE.**

3 A. The proposed fuel switching program has two aspects: (1) as part of its current  
4 energy efficiency and conservation program in Missouri, KCP&L would offer  
5 rebates or bill credits to electric customers who convert their existing electric  
6 appliances to natural gas or who install natural gas appliances in a new residence;  
7 and (2) in accordance with its existing approved energy efficiency and  
8 conservation programs, MGE would offer financial incentives to customers (many  
9 of whom are also customers of KCP&L) who purchase and install energy efficient  
10 natural gas appliances.

11

12 **Q. WHAT IS REQUIRED IN ORDER TO CONVERT A RESIDENCE FROM**  
13 **ELECTRICITY TO NATURAL GAS?**

14 A. If the customer does not currently have natural gas service, MGE would need to  
15 install a gas service line from its gas main to the customer premise. Additionally,  
16 the conversion would require interior piping and ventilation ductwork, as well as  
17 installation of the new natural gas appliance(s).

18

19 **Q. WHAT IS THE ESTIMATED COST TO INSTALL: (I) A GAS SERVICE**  
20 **LINE; (II) INTERIOR PIPING AND VENTILATION DUCTWORK; AND**  
21 **(III) A GAS FURNACE AND/OR GAS WATER HEATER?**

22 A. Under terms of the gas service line extension provision in MGE's tariff, the  
23 customer would share some portion of the cost to install the gas service if the



1 installation requires more than 60 linear feet of pipeline. MGE estimates that the  
2 cost to install a gas service line to a customer whose residence is within 60 feet of  
3 MGE's gas main would be \$1,770, all of which would be paid for by MGE and  
4 included in the rate for gas service.<sup>24</sup> According to information provided by  
5 MGE from contractors, the cost for interior piping that would accommodate the  
6 installation of a natural gas water heater would be estimated at \*\*\$\_\_\_\_\_\*\*, and  
7 the cost for interior piping and ventilation ductwork that would accommodate the  
8 installation of a natural gas fired furnace would be estimated at \*\*\$\_\_\_\_\_\*\*.  
9 These estimates include parts and labor, assume that the installation is performed  
10 in an unfinished basement, and assume in the case of the natural gas furnace that  
11 HVAC ductwork is already in place from the electric heating system. The  
12 installation cost is estimated at \$800<sup>25</sup> for a natural gas furnace and \$150<sup>26</sup> for a  
13 natural gas water heater, excluding the costs of the appliances themselves. See  
14 Confidential Schedule JJR-3 for a summary of these costs.

15 **Q. WHAT REBATES/BILL CREDITS WOULD KCP&L OFFER TO**  
16 **ENCOURAGE CUSTOMERS TO SWITCH FROM ELECTRICITY TO**  
17 **NATURAL GAS?**

---

<sup>24</sup> MGE estimates the cost per linear foot at \$29.50 to install a new gas service line.

<sup>25</sup> "EIA - Technology Forecast Updates – Residential and Commercial Building Technologies – Reference Case Second Edition (Revised)," Navigant Consulting, Inc., presented to the Energy Information Administration September 21, 2007, at page 6. My understanding is that MGE's experience has been that these costs can be slightly, but not significantly, higher.

<sup>26</sup> Ibid, at page 18.

1 A. Table 7 summarizes the proposed rebates/bill credits that KCP&L would offer its  
2 customers to convert from electric water heaters and electric resistance space  
3 heating to natural gas units:

4 **Table 7: Proposed KCP&L Rebates**

Appliance	Rebate
Water Heater	\$700
Space Heater	\$1,000
Water Heater and Space Heater	\$1,200

5  
6 The proposed rebates for installation/conversion represent approximately \*\* \_\_\_\_  
7 \_\_\_\_\*\* percent of the costs associated with completing interior piping and  
8 ventilation ductwork, plus the cost of installing the new appliance (not including  
9 the purchase price of the appliance itself). The customer would be responsible for  
10 the remaining \*\* \_\_\_\_\_\*\* percent of the cost.

11

12 **Q. ARE THESE REBATE LEVELS CONSISTENT WITH THE AMOUNTS**  
13 **OFFERED THROUGH SIMILAR FUEL SWITCHING PROGRAMS IN**  
14 **EFFECT AT ELECTRIC UTILITIES ACROSS THE COUNTRY?**

15 A. Yes. As shown in Table 8, the proposed rebates and bill credits for water heating  
16 and space heating are consistent with those offered through fuel switching  
17 programs offered by other electric utilities.

1  
2

**Table 8: Customer Rebates/Bill Credits  
Offered By Other Approved Fuel Switching Programs**

Appliance	Puget Sound	Avista	TECO
Water Heater	\$950	\$250	\$500
Furnace	\$500 - \$2,500	\$750	\$725
Water Heater and Furnace	\$1,950 - \$3,950	N/A	N/A

3

4 **Q. WHAT REBATES/BILL CREDITS WOULD MGE OFFER TO**  
5 **ENCOURAGE CUSTOMERS TO INSTALL AN ENERGY EFFICIENT**  
6 **NATURAL GAS APPLIANCE?**

7 A. Table 9 summarizes the rebates/bill credits that MGE currently offers customers  
8 to encourage them to install energy-efficient natural gas appliances. MGE  
9 would offer these same rebates to customers who participate in the fuel switching  
10 program. My understanding is that MGE may propose revisions to these amounts  
11 as part of a future tariff filing with the Commission.

12

**Table 9: Proposed MGE Rebates**

Appliance	Rebate
Water Heater - Tank	\$40
Water Heater – Tankless	\$200
Gas-fired Furnace	\$200

13

14 **Q. WHAT FACTORS MAY INFLUENCE THE LEVEL OF CUSTOMER**  
15 **PARTICIPATION IN FUEL SWITCHING PROGRAMS?**

16 A. Customer participation rates depend on several factors, including (1) the number  
17 of potential customers that currently rely on electricity for certain end-use  
18 applications, and (2) the rebate level as a percentage of the conversion and

1 installation costs. Also, customer participation rates tend to increase over time as  
2 customers become more aware of the rebate program.

3  
4 **Q. WHAT IS THE MARKET POTENTIAL FOR FUEL SWITCHING**  
5 **PROGRAMS IN MISSOURI?**

6 A. The market potential for fuel switching programs can be estimated by considering  
7 the number of households that rely on electricity for space heating. According to  
8 KCP&L's 2009 FERC Form 1, KCP&L provided 36,643 Missouri customers  
9 with electric space heating and 9,549 Missouri customers with electric space  
10 heating on a separate meter.<sup>27</sup> The total number of KCP&L customers in  
11 Missouri with electric heating is approximately 46,200. A June 2009 report by  
12 the Gas Technology Institute indicates that in 2005 approximately 70 percent of  
13 electric heating in the West North Central census division (which includes  
14 Missouri) was provided by electric resistance heating, while 30 percent was  
15 provided by electric heat pumps.<sup>28</sup> By multiplying the 46,200 units by 70 percent,  
16 it suggests that approximately 32,340 customers use electric resistance heat in the  
17 KCP&L service territory in Missouri.

18  

---

<sup>27</sup> This is consistent with 2000 data from the U.S. Census Bureau for Kansas City, Missouri, which showed that there were approximately 26,600 households (or 14.5 percent of total households) that used electric heat in 2000, while 152,800 households (or 83.0 percent) relied on natural gas.

<sup>28</sup> "2005 Residential Energy Consumption Survey: Table HC 12.4 Space Heating Characteristics by Midwest Census Region," Energy Information Administration. The data used is for the total Midwest. Electric resistance heat includes the Built-In Electric Units and Central Warm-Air Furnace categories. It should be noted that the sample size for the 2005 Residential Energy Consumption Survey was approximately 4,400 households, and therefore data points should be considered estimates.

1 **Q. WHAT CUSTOMER PARTICIPATION LEVEL WOULD YOU EXPECT**  
2 **DURING THE FIRST TWO OR THREE YEARS OF THE PROPOSED**  
3 **PROGRAM?**

4 A. During the initial two or three years, it is reasonable to expect that customer  
5 participation in the fuel switching program in Missouri would approximate levels  
6 that have been experienced at PSE, which offers similar fuel switching incentives.  
7 During 2009, PSE reported that 445 residential customers participated in the fuel  
8 switching program, with 85 percent of those customers choosing to convert their  
9 water heater from electricity to natural gas and 15 percent converting their space  
10 heating from electricity to natural gas. If approximately 400 customers  
11 participated annually in the KCP&L fuel switching program, that would represent  
12 about 1.25 percent of the 32,340 potential customers with electric resistance heat.

13  
14 **Q. BASED ON YOUR ANTICIPATED CUSTOMER PARTICIPATION**  
15 **LEVEL, HOW MUCH WOULD KCP&L AND MGE RESPECTIVELY**  
16 **SPEND ON THE PROPOSED FUEL SWITCHING PROGRAM?**

17 A. Assuming that 400 customers participate in the proposed fuel switching program  
18 during the first year of availability, then KCP&L's total program spending would  
19 be \$298,000 and MGE's total program spending would be \$25,600 plus the cost  
20 to install 400 new service lines (approximately \$708,000). Table 10 shows the  
21 breakdown for the proposed conservation program budget for KCP&L, assuming

1 340 participants (or 85 percent) qualify for the natural gas water heater rebate and  
2 60 participants (or 15 percent) qualify for the natural gas furnace rebate.<sup>29</sup>

3 **Table 10: Proposed KCP&L Conservation Budget**

Appliance	Rebate	Participants	Budget
Water Heater	\$700	340	\$238,000
Furnace	\$1,000	60	\$60,000

4  
5 Table 11 shows the breakdown for the proposed conservation program budget for  
6 MGE, under the same participation assumptions as stated above.

7 **Table 11: Proposed MGE Conservation Budget**

Appliance	Rebate	Participants	Budget
Water Heater	\$40	340	\$13,600
Furnace	\$200	60	\$12,000

8  
9 **Q. WHAT IS KCP&L'S CURRENT PROGRAM BUDGET FOR ENERGY**  
10 **EFFICIENCY AND CONSERVATION IN MISSOURI?**

11 A. KCP&L's approved program budget for demand response, energy efficiency and  
12 affordability programs in Missouri in 2009 was \$\*\*\_\_\_\_\_\*\* million. The  
13 proposed fuel switching program budget of \$298,000 would represent  
14 approximately \*\*\_\_\*\* percent of the total program budget for KCP&L.

15  
16 **Q. HOW WOULD THE PROPOSED FUEL SWITCHING PROGRAM BE**  
17 **FUNDED?**

18 A. KCP&L would fund the costs associated with the conversion and installation  
19 portion of the fuel switching rebate program through its current energy efficiency

---

<sup>29</sup> The water heater and furnace participation is consistent with the experience of Puget Sound Energy during the 2009 program year for its fuel switching program.

1 and conservation program, under which KCP&L defers the costs of the program  
2 for possible future recovery in a rate case. MGE fully supports rate recovery of  
3 monies spent by KCP&L for the proposed fuel switching program, if it is  
4 approved by the Commission. It is my understanding that MGE would fund the  
5 costs related to the purchase of energy efficient natural gas appliances for  
6 customers who are converting from electricity to natural gas and the cost to install  
7 gas service lines to the customer premise (up to 60 linear feet). As the  
8 Commission is aware, the costs of MGE's energy efficiency programs are also  
9 deferred for future recovery.

10

11 **Q. HAS THIS FUNDING MODEL BEEN ADOPTED BY OTHER ELECTRIC**  
12 **AND NATURAL GAS UTILITIES THAT HAVE IMPLEMENTED FUEL**  
13 **SWITCHING PROGRAMS?**

14 A. Yes. This shared funding model has been implemented by other electric and  
15 natural gas utilities across the country including CenterPoint Energy in Texas,  
16 Puget Sound Energy in Washington and Oregon, and Avista Corporation in  
17 Washington and Idaho for purposes of promoting fuel switching. It is an  
18 equitable funding model because customers from both the electric and natural gas  
19 utility derive some benefits from fuel switching measures.

20

21 **Q. WHY SHOULD KCP&L'S ELECTRIC CUSTOMERS FUND A FUEL**  
22 **SWITCHING PROGRAM THAT ENCOURAGES CUSTOMERS TO**  
23 **CONVERT TO NATURAL GAS PROVIDED BY MGE?**

1 A. This program should be approved because: (1) it improves the energy efficiency  
2 of the State of Missouri, by increasing the total energy efficiency of residential  
3 end-users; (2) it improves Missouri's air quality by substantially reducing  
4 emissions from carbon and other pollutants; and 3) it represents a highly cost-  
5 effective application of electric utility energy efficiency program spending.

6  
7 KCP&L's electric customers who convert to natural gas for certain end-use  
8 applications would directly benefit from the proposed fuel switching program  
9 through (1) reduced energy consumption, (2) lower energy bills, (3) rebates for  
10 purchasing new energy efficient natural gas appliances, and (4) the added value  
11 associated with the installation of a gas service line to their residence. KCP&L  
12 customers (including both program participants and non-participants) would also  
13 benefit from the fuel switching program through reduced electric demand, which  
14 translates into the following benefits: 1) KCP&L's ability to reduce or defer  
15 construction of additional generation and transmission capacity; 2) KCP&L's  
16 ability to reduce CO<sub>2</sub> emissions; and 3) spending a portion of KCP&L's energy  
17 efficiency and conservation budget on a fuel switching program which typically  
18 has one of the highest benefit/cost ratios among those energy efficiency programs  
19 offered to residential and multi-family customers. For all of these reasons,  
20 KCP&L customers would derive significant benefits from the proposed fuel  
21 switching program and should contribute to its implementation and operation.

22



1 **Q. WHAT SAVINGS WOULD KCP&L CUSTOMERS REALIZE BY**  
2 **PARTICIPATING IN THE PROPOSED FUEL SWITCHING PROGRAM?**

3 A. As shown on Schedule JJR-4, a KCP&L customer who converts from electric to  
4 natural gas water heating could save \$740 through rebates and \$178 per year in  
5 operating costs. A customer who converts from electric resistance heating to a  
6 natural gas furnace could save \$1,200 through rebates and \$507 per year in  
7 operating costs. A customer who converts both water heating and space heating  
8 from electric to natural gas could save \$1,440 through rebates and \$685 per year  
9 in operating costs.

10

11 **Q. HAVE YOU ESTIMATED THE CUSTOMER PAYBACK PERIODS FOR**  
12 **THE PROPOSED FUEL SWITCHING PROGRAM?**

13 A. Yes. Confidential Schedule JJR-5 demonstrates the customer payback periods for  
14 the proposed fuel switching measures. As the schedule indicates, the payback  
15 period for converting from electricity to natural gas water heaters is  
16 approximately **\*\*\_\_\*\*** years, and the payback period for converting from electric  
17 resistance heat to a natural gas furnace is approximately **\*\*\_\_\*\*** years. If the  
18 customer converts both water heating and space heating from electricity to natural  
19 gas, the payback period would be approximately **\*\*\_\_\*\*** years because the costs  
20 to install the interior piping and ventilation ductwork would only be incurred once  
21 and would accommodate both end-use applications.

22

1 **Q. DOES MGE HAVE THE CAPACITY TO SERVE ADDITIONAL**  
2 **CUSTOMERS WITHOUT ADDING NEW MAINS TO ITS GAS**  
3 **DISTRIBUTION SYSTEM IN MISSOURI?**

4 A. Yes. My understanding is that MGE has sufficient capacity on its gas distribution  
5 system, especially in the urban core area of Kansas City, to add customers without  
6 incurring additional cost to add new mains. I also understand that MGE's  
7 distribution system has a high saturation level, meaning that the Company has gas  
8 mains running down most streets in urban and suburban locations. If the  
9 customer does not currently have a gas service line running to its house, MGE  
10 would need to install one before providing natural gas service.

11

12 **Q. WHAT WOULD BE THE NET EFFECT OF THE PROPOSED FUEL**  
13 **SWITCHING PROGRAM ON MGE?**

14 A. Based on the following assumptions: (1) that 400 customers participate in the  
15 fuel switching program during the first year; (2) that MGE's average cost to  
16 install the gas service line to the customer premise is \$1,770; (3) that MGE offers  
17 customer rebates for installing energy efficient natural gas appliances in the  
18 amounts shown in Table 9; and 4) that MGE's fixed customer charge is \$26.88  
19 per month, Schedule JJR-6 shows that the proposed fuel switching program would  
20 produce net benefits for MGE after approximately 5.7 years.<sup>30</sup>

---

<sup>30</sup> This analysis does not include any costs associated with additional CO<sub>2</sub> emissions that might occur as a result of increased natural gas usage. The CO<sub>2</sub> reductions that would occur in connection with reducing electricity usage would more than offset the increased CO<sub>2</sub> emissions related to increased natural gas usage, resulting in another net benefit to Missouri residents.

1           **V.      IMPACT OF FUEL SWITCHING PROGRAM ON KCP&L**

2

3   **Q.      WHAT WOULD BE THE IMPACT OF THE PROPOSED FUEL**  
4           **SWITCHING PROGRAM ON KCP&L'S ELECTRIC DISTRIBUTION**  
5           **REVENUES?**

6   A.      The revenue impact depends on the customer participation rate. As KCP&L  
7           customers convert from electricity to natural gas for certain end-use applications  
8           such as water heating and space heating, KCP&L's electric distribution revenues  
9           would be expected to be somewhat lower. These customers would continue to  
10          rely on KCP&L for electricity for other end-use applications such as lighting,  
11          refrigeration, televisions, computers, etc., and would continue to pay the fixed  
12          customer charge of \$8.67 per month. Assuming that 400 customers participate in  
13          the fuel switching program during the first year, the revenue impact for KCP&L  
14          would be a reduction of approximately \$255,488, or 0.040 percent of 2009  
15          electric operating revenues in Missouri.<sup>31</sup> See Schedule JJR-7 for this calculation.  
16          This does not consider the savings that KCP&L could realize from avoided  
17          generation costs.

18

19          To the extent the Commission is concerned that KCP&L may not have the  
20          opportunity to earn its revenue requirement because some portion of its fixed  
21          costs are being recovered through volumetric rates, the Commission should  
22          consider allowing KCP&L to recover the lost revenue through the current DSM

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<sup>31</sup> According to the 2009 FERC Form 1, KCP&L's operating revenues in 2009 were \$632,686,000 in Missouri.

1 tracking mechanism, or through alternative rate mechanisms such as revenue  
2 decoupling or straight-fixed variable rates, to ensure that KCP&L does not have a  
3 disincentive to promote energy efficiency and conservation programs, including  
4 fuel switching. It is my understanding that MGE would support consideration of  
5 alternative rate mechanisms to mitigate the impact of fuel conversion on  
6 KCP&L's financial integrity.

7  
8 **Q. WOULD THE PROPOSED FUEL SWITCHING PROGRAM HELP**  
9 **KCP&L REDUCE ITS PEAK LOAD OR DEFER FUTURE PLANS FOR**  
10 **NEW GENERATION OR TRANSMISSION FACILITIES?**

11 A. Yes. KCP&L has over 6,000 MWs of electric generating capacity, and the  
12 projected peak summer demand for 2010 is 5,515 MW. KCP&L expects to meet  
13 its projected capacity requirements through 2018 with generation assets, capacity  
14 purchases and demand side and efficiency programs. KCP&L expects to have  
15 Iatan No. 2, a coal-fired plant, in service during the fall of 2010, which will add  
16 approximately 620 MWs (KCP&L's share based on its 55 percent ownership  
17 stake) of generating capacity.<sup>32</sup> However, utility planning involves very long time  
18 horizons in order to meet future demand growth. To the extent fuel switching  
19 programs reduce electricity consumption, these programs would assist KCP&L in  
20 potentially reducing or deferring capital investments in generation and  
21 transmission capacity.

22  

---

<sup>32</sup> Great Plains Energy Inc. 2009 Form 10-K, filed February 25, 2010, at page 7.

1 **Q. HAS KCP&L PREVIOUSLY CONSIDERED FUEL SWITCHING IN**  
2 **MISSOURI AS PART OF ITS RESOURCE PLANNING?**

3 A. Yes. In KCP&L's 2008 Integrated Resource Plan ("IRP"), the company  
4 mentioned fuel switching among the various demand side options but noted that  
5 "the uncertainties surrounding natural gas price and availability may exclude the  
6 alternative of large scale fuel switching from both a fundamental and economic  
7 perspective."<sup>33</sup> KCP&L, however, did acknowledge in the 2008 IRP that the  
8 impact of greenhouse gas restrictions could encourage large scale fuel  
9 switching.<sup>34</sup>

10

11 **Q. DO YOU AGREE WITH KCP&L'S CONCERN REGARDING THE**  
12 **UNCERTAINTIES SURROUNDING NATURAL GAS PRICE AND**  
13 **AVAILABILITY?**

14 A. No, I do not. The situation in natural gas markets has changed considerably since  
15 2008. As shown on Figure 1, natural gas prices are forecasted to be much more  
16 stable than historical prices.

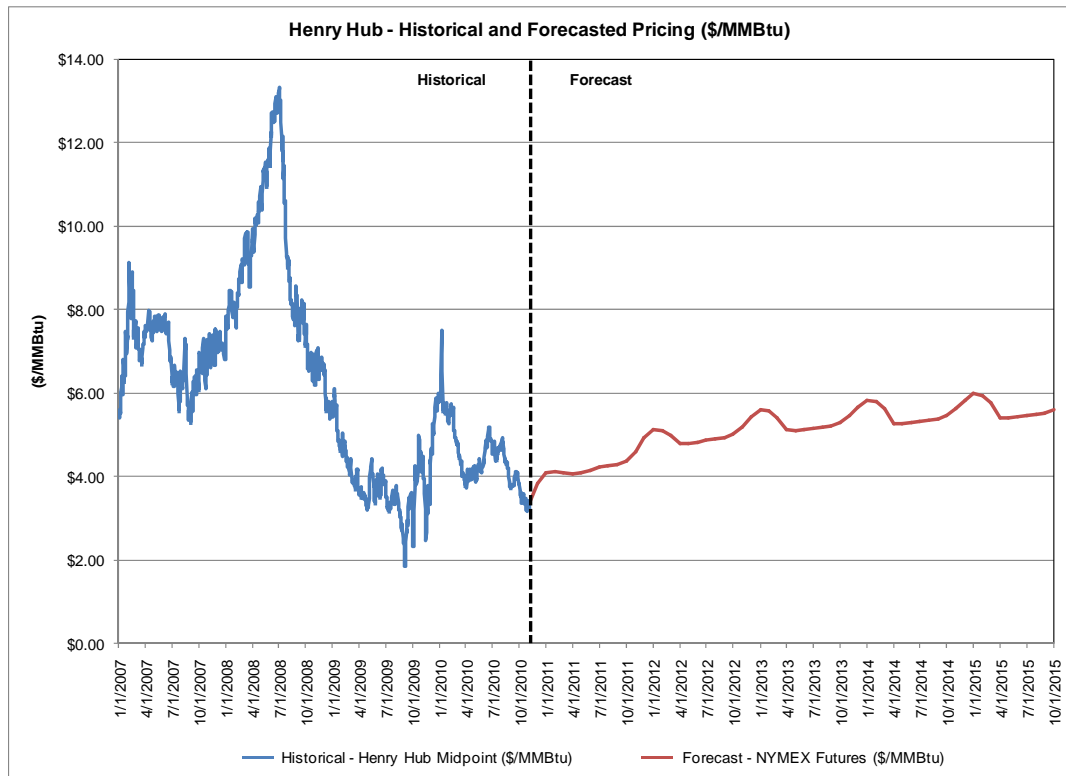
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<sup>33</sup> KCP&L 2008 Integrated Resource Plan, Volume 1: Executive Summary, page 4.

<sup>34</sup> Ibid, at 3.

1

**Figure 1: Henry Hub – Historical and Forecasted Pricing<sup>35</sup>**



2

3

4 **Q. WHAT IMPACT IS SHALE GAS EXPECTED TO HAVE ON NATURAL**  
 5 **GAS SUPPLIES OVER THE LONGER TERM?**

6 A. According to a June 2009 study by the Potential Gas Committee associated with  
 7 the Colorado School of Mines, the baseline of technically recoverable natural gas  
 8 resources grew by 39 percent (or 515 trillion cubic feet (“Tcf”)) from year end  
 9 2006 to year end 2008, and together with natural gas reserves of 238 Tcf reported  
 10 by the Energy Information Administration (“EIA”) represents a technically  
 11 recoverable endowment of 2,074 Tcf.<sup>36</sup> Based on 2009 natural gas consumption

<sup>35</sup> Source: Historical prices are taken from Platt’s Gas Daily; forecasted prices are taken from Bloomberg Financial and are based on closing prices on November 3, 2010.

<sup>36</sup> <http://www.mines.edu/Potential-Gas-Committee-reports-unprecedented-increase-in-magnitude-of-U.S.-natural-gas-resource-base>

1 levels reported by EIA, U.S. natural gas reserves would not be exhausted for  
2 approximately 91 years.

3  
4 **Q. HAS PIPELINE CAPACITY INCREASED DURING THE PAST THREE**  
5 **YEARS?**

6 A. Yes. Natural gas pipeline capacity has increased significantly from 2007 through  
7 2009 due to the construction of new pipelines. According to the EIA, 134 new  
8 interstate/intrastate pipelines were placed in service during 2007 and 2008 thereby  
9 adding more than 5,500 miles and 59,000 MMcf/day of new capacity in the  
10 United States. The EIA estimates that in 2009 an additional 78 pipeline projects  
11 were placed in service, further expanding U.S. natural gas pipeline capacity by an  
12 additional 3,600 miles and 36,000 MMcf/day.<sup>37</sup>

13  
14 **Q. HAS THE MISSOURI GENERAL ASSEMBLY RECENTLY PASSED**  
15 **LEGISLATION RELATING TO ENERGY EFFICIENCY INVESTMENTS**  
16 **BY ELECTRIC CORPORATIONS?**

17 A. Yes. In 2009, the Missouri General Assembly passed Senate Bill 376, which  
18 provides that: “It shall be the policy of the state to value demand side investments  
19 equal to traditional investments in supply and delivery infrastructure and allow  
20 recovery of all reasonable and prudent costs of delivering cost-effective demand-  
21 side programs.” Under SB 376, the Commission is directed to: 1) provide timely  
22 cost recovery for utilities; 2) ensure that utility financial incentives are aligned

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<sup>37</sup> “Expansion of the U.S Natural Gas Pipeline Network: Additions in 2008 and Projects Through 2011,”  
Energy Information Administration, Office of Oil and Gas, September 2009.

1 with helping customers use energy more efficiently and in a manner that sustains  
2 or enhances utility customers' incentives to use energy more efficiently; and 3)  
3 provide timely earnings opportunities associated with cost-effective measurable  
4 and verifiable energy savings.

5

6 **Q. WHAT ARE THE IMPLICATIONS OF THIS NEW LEGISLATION?**

7 A. It is clear from this legislation that the Missouri General Assembly is encouraging  
8 electric companies to make significant expenditures on energy efficiency and  
9 conservation. The Commission has opened a rule-making docket to implement  
10 this legislation. The proposed fuel switching program would further the Missouri  
11 General Assembly's directive to ensure that utility financial incentives are aligned  
12 to help customers use energy more efficiently.

13





1 **Q. PLEASE EXPLAIN THE RELATIONSHIP BETWEEN THE TRC TEST**  
2 **AND THE FULL-FUEL-CYCLE APPROACH.**

3 A. There is no direct relationship between these two concepts. The TRC test is one  
4 method to evaluate the cost effectiveness of an energy efficiency program such as  
5 fuel switching, while the fuel-fuel-cycle approach measures energy consumption,  
6 including all energy losses that occur before the energy reaches the ultimate  
7 consumer. As noted earlier in my testimony, the full-fuel-cycle approach allows  
8 for comparison between appliances that use more than one fuel source, or  
9 between appliances that perform the same function but different types of fuel, but  
10 it does not tell us whether the fuel switching program is cost-effective for the  
11 utilities.

12

13 **Q. HAVE YOU ANALYZED THE COST EFFECTIVENESS OF THE**  
14 **PROPOSED FUEL SWITCHING PROGRAM FOR KCP&L?**

15 A. No, I have not been able to analyze the cost effectiveness of the proposed fuel  
16 switching program for KCP&L. I have requested information from KCP&L  
17 regarding its energy efficiency and conservation program in Missouri, including  
18 the proposed budget for each measure, the energy savings for each measure, the  
19 benefit/cost ratio for each measure, the avoided costs used in performing the cost-  
20 effectiveness calculation, and how those avoided cost were determined. I am  
21 continuing to await KCP&L's response to that data request, and I reserve the right  
22 to supplement my testimony when that information becomes available.

23

1 **Q. ARE SIMILAR FUEL SWITCHING PROGRAMS OFFERED BY**  
2 **ELECTRIC UTILITIES IN OTHER JURISDICTIONS COST EFFECTIVE**  
3 **UNDER THE TRC TEST?**

4 A. Yes. The fuel switching program offered by Puget Sound Energy reported a  
5 benefit/cost ratio under the TRC test of 2.66 in Washington, while the fuel  
6 switching program offered by Avista Corporation reported a benefit/cost ratio  
7 under the TRC test of 3.38 in Idaho and 3.72 in Washington. In the case of Puget  
8 Sound Energy, the fuel switching program has the highest benefit/cost ratio of any  
9 residential energy efficiency program the company offers in Washington.

10

11 **Q. IN ITS FEBRUARY 2010 DECISION IN MGE'S MOST RECENT**  
12 **GENERAL RATE PROCEEDING, THE MISSOURI PSC INDICATED**  
13 **THAT MGE SHOULD TAKE STEPS TO REDUCE OVERALL NATURAL**  
14 **GAS CONSUMPTION IN MISSOURI. DO YOU BELIEVE THAT THE**  
15 **PROPOSED FUEL SWITCHING PROGRAM IS CONSISTENT WITH**  
16 **THAT DECISION?**

17 A. Yes. The proposal for KCP&L to initiate a fuel switching program is consistent  
18 with the Missouri PSC's overall objective of encouraging energy efficiency and  
19 conservation. The information on which the Commission relied in its February  
20 2010 decision has changed somewhat since the decision was issued. Specifically,  
21 the Commission relied on a report by the American Council for an Energy  
22 Efficient Economy ("ACEEE") which indicated that reducing natural gas  
23 consumption would help to drive down the wholesale price of natural gas. As

1 discussed earlier, since that ACEEE report was issued, natural gas prices have  
2 fallen substantially and the prevalence of shale gas has had a significant impact on  
3 gas supplies and forecasted natural gas prices.  
4

5 **Q. HOW HAS THE COMMISSION DEFINED THE TERM “PUBLIC**  
6 **INTEREST” IN MISSOURI?**

7 A. In approving the acquisition of Aquila, Inc. by Great Plains Energy, Incorporated  
8 (the parent of KCP&L), the Commission defined the term public interest as  
9 follows:

10 The public interest is a matter of public policy to be determined by  
11 the Commission. It is within the discretion of the Public Service  
12 Commission to determine when the evidence indicates the public  
13 interest would be served. Determining what is in the public  
14 interest is a balancing process. In making such a determination,  
15 the total interests of the public served must be assessed. This  
16 means that some of the public may suffer adverse consequences for  
17 the total public interest. Individual rights are subservient to the  
18 rights of the public. The ‘public interest’ must necessarily include  
19 the interests of both the ratepaying public and the investing public;  
20 however, as noted, the rights of individual groups are subservient  
21 to the rights of the public in general.<sup>39</sup>  
22

23 **Q. DO YOU BELIEVE THAT THE PROPOSAL FOR KCP&L TO INITIATE**  
24 **A FUEL SWITCHING PROGRAM IN MISSOURI IS IN THE PUBLIC**  
25 **INTEREST? IF SO, WHY?**

26 A. Yes. The proposal for KCP&L to initiate a fuel switching program in Missouri  
27 would benefit customers through lower energy use and reduced energy bills,

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<sup>39</sup> Missouri Public Service Commission, Case No. EM-2007-0374, In the Matter of the Joint Application of Great Plains Energy Incorporated, Kansas City Power and Light Company, and Aquila, Inc., for Approval of the Merger of Aquila, Inc., with a Subsidiary of Great Plains Energy Incorporated and Other Related Relief, July 1, 2008.

1 while simultaneously reducing CO<sub>2</sub> emissions and potentially reducing or  
2 deferring investment in additional generation and transmission capacity. For  
3 these reasons, I believe the proposed fuel switching program is in the public  
4 interest and should be approved by the Commission.

5

6 **Q. PLEASE SUMMARIZE YOUR RECOMMENDATIONS.**

7 A. I recommend that the Commission approve the proposal for KCP&L to initiate a  
8 fuel switching program as part of its existing energy efficiency and conservation  
9 measures. The fuel switching program is a cost effective way to promote energy  
10 efficiency and conservation by offering financial incentives (i.e., rebates) to  
11 KCP&L's electric customers to convert certain end-use applications such as water  
12 heating and space heating from electricity to natural gas.

13

14 **Q. DOES THIS CONCLUDE YOUR TESTIMONY AT THIS TIME?**

15 A. Yes, it does.