MISSOURI PUBLIC SERVICE COMMISSION

CASE NO. ER-2010-0356

DIRECT TESTIMONY

OF

JOHN J. REED

Submitted On Behalf

Of

SOUTHERN UNION COMPANY

D/B/A MISSOURI GAS ENERGY

NOVEMBER 17, 2010

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I. INTRODUCTION OF WITNESS AND PURPOSE OF TESTIMONY

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

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

Q. BY WHOM YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am the Chairman and Chief Executive Officer of Concentric Energy Advisors, Inc. ("Concentric") and CE Capital Advisors ("CE Capital").

Q. PLEASE BRIEFLY DESCRIBE CONCENTRIC ENERGY ADVISORS, INC.

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

Q. PLEASE DESCRIBE YOUR EXPERIENCE AND QUALIFICATIONS.

A. I have more than 30 years of experience in the utility industry, having served as an executive in energy consulting firms, including the position of Co-Chief Executive Officer of the largest publicly-traded management consulting firm in the United States and as Chief Economist for the largest gas utility in the United

States. I have provided expert testimony on a wide variety of economic and financial issues related to the utility industry on numerous occasions before administrative agencies, utility commissions, courts, arbitration panels and elected bodies across North America. A summary of my educational background can be found in Attachment A, along with a list of my recent appearances as an expert witness.

Q. ON WHOSE BEHALF ARE YOU PROVIDING THIS TESTIMONY?

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

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony is to recommend the initiation of a fuel switching program by KCP&L Greater Missouri Operations Company ("GMO") as part of GMO's energy efficiency and conservation measures. The testimony is supported by the analyses contained in Schedule Nos. JJR-1 through JJR-7.

Q. PLEASE SUMMARIZE YOUR RECOMMENDATIONS.

A. I recommend that the Missouri Public Service Commission (the "Commission") adopt a fuel switching program to be implemented by GMO as a cost effective way to promote energy efficiency and conservation by offering financial incentives to GMO customers to convert certain end-use applications such as water heating and space heating from electricity to natural gas. As explained later

in my testimony, the proposed fuel switching program would benefit GMO's residential and multi-family customers through lower energy use and reduced energy bills, while simultaneously reducing or deferring baseload capacity additions and reducing CO_2 emissions. For these reasons, implementation of the fuel switching program described herein is consistent with the intent of electric Demand Side Management ("DSM") programs (i.e., to cost-effectively reduce electricity demand), is in the public interest, and should be implemented by GMO, subject to the approval of the Commission.

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.[1] 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:

[1] "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.

> Most current government policies and regulations that influence energy matters are "site-based" – that is, they only consider the impacts at the site where the energy is ultimately consumed. Site-based regulations, such as appliance efficiency standards and measurement, can lead to higher energy resource consumption as well as higher levels of pollution.[2]

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

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

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

A. The full-fuel-cycle approach measures energy consumption by examining the impacts associated with energy use, including extraction/production, conversion/generation, transmission, distribution, and ultimate energy

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[2] Ibid, at page 1.

[3] 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.

consumption. Unlike the site-based method, the full-fuel-cycle method not only considers the total energy needed for end-use applications but also incorporates the importance of greenhouse gas emissions in the decision whether to use electricity or natural gas for certain end-use applications.

Q. WHAT WAS THE NATIONAL RESEARCH COUNCIL'S ULTIMATE RECOMMENDATION TO THE DOE?

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

> The Committee's primary general recommendation is that the DOE/EERE consider moving over time to the use of a full-fuel-cycle measure of energy consumption for assessment of national and environmental impacts, especially levels of greenhouse gas emissions, and to providing more comprehensive information to the public through labels and other means, such as an enhanced website.
>
> The current use by DOE/EERE of site energy consumption is effective for setting standards for the operational efficiency of single-fueled appliances within the same class and should be continued without change. However, DOE/EERE's current use of site energy consumption does not account for the total consumption of energy when more than one fuel is used in an appliance (e.g., a heating system with a gas furnace and an electric fan) or when more than one fuel can be used for the same application. For these appliances, measuring full-fuel-cycle energy consumption would provide a more complete picture of energy used, allowing comparison across many different appliances as well as an improved assessment of impacts such as effects on energy security and the environment.[4]

[4] "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.

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

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

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

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

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

[5] Ibid, at page 6.

enabling a comprehensive assessment of energy efficiency.[6] Source-based calculations are comparable to the full-fuel-cycle approach, in that both rely on the same components to measure the total energy required, including energy losses.

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

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

[6] ENERGY STAR Performance Ratings Methodology for Incorporating Source Energy Use, December 2007.

[7] "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.

III. THE RELATIVE ADVANTAGES OF NATURAL GAS

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

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

[8] Ibid, at pages 5 and 6.

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

Table 1: Site-Based Method vs. Full-Fuel-Cycle (MMBtu per year) [9]

	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	**106.9**	**53.2**
Energy Losses	14.1	113.5
Full Fuel Cycle Use	**121.0**	**166.7**

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

On a full-fuel-cycle basis, natural gas is far more efficient than electricity for certain end-use applications. Table 2 compares the annual energy requirements for electricity and natural gas when measured on the full-fuel-cycle basis for water heating and space heating. In contrast to Table 1 above, the figure for

[9] 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.

electric space heating in Table 2 refers to an electric resistance heating system. As shown by Table 2, the annual energy requirements for electric water heating and electric resistance space heating under the full-fuel-cycle approach are more than twice the energy required for those same end-use applications with natural gas.

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

Appliance	Natural Gas	Electricity
Water Heating[10]	27.6	51.9
Space Heating[11]	85.1	192.3
Total	112.7	244.2

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

A. The higher efficiency of natural gas on a full-fuel-cycle basis results in lower operating costs relative to electricity. Schedule JJR-1 presents the annual operating cost savings for certain end-use applications including water heating and space heating. This schedule assumes: (1) the energy consumption levels in Table 1 above, (2) the average price of natural gas for MGE of $11.35 per Mcf including transport, storage and hedging costs,[12] (3) the GMO average price of electricity for electric space heating of $0.0805/kWh (or $23.61 per MMBtu) and

[10] Ibid, at page 16.
[11] Ibid, at page 17.
[12] Information provided by Missouri Gas Energy in response to data request.

the GMO average price of electricity for water heating of $0.1004/kWh (based on the Residential General rate, or $29.44 per MMBtu).[13] Table 3 summarizes those estimated annual savings.

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

Appliance	Savings
Water Heating	$200
Space Heating	$606

As illustrated by Table 3, a customer that switched from electricity to natural gas for water heating and space heating would save approximately $200 and $606 per year, respectively.

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

A. Compared to other fossil fuels, using natural gas rather than electricity results in numerous environmental benefits. Carbon dioxide emissions are about 36 percent lower for the natural gas residence than for an all-electric home.[14] Annual CO_2 emissions were 6.4 metric tons for natural gas appliances compared to 10.1 metric tons for electric appliances.[15] Table 4 compares the carbon dioxide emissions

[13] KCP&L GMO, 2009 FERC Form 1, at page 304.
[14] "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.
[15] 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.

from natural gas, heating oil, and electricity for two new homes based on average household energy use. The table shows that CO_2 emissions from certain end-use applications that utilize electricity rather than natural gas are 2.65 times higher for a new 1,500 square foot home and 2.42 times higher for a new 3,000 square foot home.

Table 4: Total CO_2 Emissions for New Homes[16]

Total Energy Efficiency Carbon Dioxide Emissions for New Homes[1] (lbs of CO_2 per Average Household Energy Use[2])		
	1,500 SQ. FT.	3,000 SQ. FT.
Natural Gas	**7,423**	**10,583**
Oil	**13,095**	**15,198**
Electricity[3]:		
Coal-Based	17,560	22,828
Oil-Based	582	757
Natural Gas-Based	1,561	2,029
Total Electricity	**19,703**	**25,614**
[1] Based on hypothetical fuel generating mix.		
[2] Excludes energy use for cooling and base electric requirements.		
[3] For existing generating capacity only.		

Q. WHAT IS THE FUEL MIX ASSOCIATED WITH THE GENERATION USED IN THE ABOVE ANALYSIS OF CO_2 EMISSIONS?

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

Table 5: 2007 Generation Fuel Sources[17]

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

[16] "Electric-to-Gas Fuel Switching," NARUC Summer Meeting, Paul H. Raab, July 20, 2009, Slide 14.

[17] "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

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

Q. DID YOU COMPARE THE CO_2 EMISSIONS RATE BETWEEN COAL AND NATURAL GAS IN THE GENERATION OF ELECTRICITY IN MISSOURI?

A. Yes. According to the U.S. Environmental Protection Agency's eGRID 2007 database, the CO_2 emission rate in Missouri in 2005 was 2,104 lbs/MWh for coal and 978 lbs/MWh for natural gas. In other words, the CO_2 emission rate for coal was more than twice the rate for natural gas.

Q. WHAT PERCENTAGE OF GMO'S GENERATION IS COAL-FIRED?

A. As shown in Table 6 below, approximately 80 percent of GMO's actual 2009 and estimated 2010 generation is coal-fired,[18] which is significantly higher than the national average of 49 percent in 2007.

Table 6: GMO 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] Great Plains Energy Inc., 2009 SEC Form 10-K, filed February 25, 2010, at page 8. On page 8 of the Form 10-K, KCP&L and GMO report their generation mix for 2009 and 2010 as if the operations of the two entities had been combined.

Q. HOW MUCH CARBON IS GMO'S CURRENT GENERATION PORTFOLIO EXPECTED TO PRODUCE?

A. GMO's current generation portfolio is estimated to produce about one ton of CO_2 per MWh, or approximately six million tons per year.[19]

Q. WOULD END-USE FUEL SWITCHING PROGRAMS CONTRIBUTE TO A REDUCTION IN CO_2 EMISSIONS?

A. Yes. Fuel switching programs that encourage customers to convert certain end-use applications from electricity to natural gas would contribute to a reduction in CO_2 emissions. Specifically, fuel switching programs would reduce the amount of generation required and therefore reduce the emissions associated with that reduction in generation. This is especially true in the case of electric utilities, such as GMO, which generates approximately 80 percent of its electricity from coal-fired plants. As indicated above, each MWh reduction in electricity usage would reduce CO_2 emissions by approximately one ton.

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

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

[19] KCP&L GMO, 2009 FERC Form 1, at page 123.20
[20] McKinsey & Company, "Unlocking Energy Efficiency in the U.S. Economy," July 2009, p. 7.

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

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

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

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

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

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

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

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

Q. DOES GMO'S RATE STRUCTURE PROVIDE RESIDENTIAL CUSTOMERS A PRICE INCENTIVE NOT TO SWITCH FROM ELECTRICITY TO NATURAL GAS FOR CERTAIN END-USE APPLICATIONS SUCH AS SPACE HEATING?

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

IV. PROPOSED FUEL SWITCHING PROGRAM

Q. WHAT ARE THE COMPONENTS OF THE PROPOSED FUEL SWITCHING PROGRAM THAT GMO WOULD OFFER AS PART OF ITS ENERGY EFFICIENCY AND CONSERVATION MEASURES IN MISSOURI?

A. Under the proposed fuel switching program, GMO would offer financial incentives to either residential or multi-family customers in Missouri to encourage them to convert from electric water heating to natural gas water heating, and/or from electric resistance heat to natural gas heat.[21] The proposed fuel switching program would not include GMO customers who are currently using an electric heat pump. The fuel switching program would be available to customers who currently do not have a natural gas service line to their premise, and to customers who are not located near a gas main, if the customer is willing to make any necessary contributions for MGE to extend gas service lines or gas mains, as governed by MGE's currently effective tariff provisions regarding facilities extensions.

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

[21] 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.

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

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

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

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

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

A. Yes. Puget Sound Energy ("PSE") recently received regulatory approval to offer fuel switching rebate programs in Washington for water heating and space heating applications.[22] PSE is a combination gas and electric utility, and the financial incentives offered under its fuel switching program are available to customers who switch from PSE electric service to PSE natural gas service, as well as to customers who switch from PSE electric service to Cascade Natural Gas' service. Additionally, the City of Austin and Texas Gas Service are discussing initiation of a fuel switching program under which customers who currently obtain their electric service from the City of Austin would be eligible for rebates if they switched certain electric appliances to natural gas and obtained gas service from Texas Gas Service.[23]

Q. PLEASE EXPLAIN HOW THE PROPOSED FUEL SWITCHING PROGRAM FOR GMO WOULD OPERATE.

A. The proposed fuel switching program has two aspects: (1) as part of its current energy efficiency and conservation program in Missouri, GMO would offer rebates or bill credits to electric customers who convert their existing electric

[22] 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.

[23] Based on telephone conversation with representative of Texas Gas Service in October 2010.

appliances to natural gas or who install natural gas appliances in a new residence; and (2) in accordance with its existing approved energy efficiency and conservation programs, MGE would offer financial incentives to customers (many of whom are also customers of GMO) who purchase and install energy efficient natural gas appliances.

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

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

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

A. Under terms of the gas service line extension provision in MGE's tariff, the customer would share some portion of the cost to install the gas service if the installation requires more than 60 linear feet of pipeline. MGE estimates that the cost to install a gas service line to a customer whose residence is within 60 feet of MGE's gas main would be $1,770, all of which would be paid for by MGE and included in the rate for gas service.[24] According to information provided by

[24] MGE estimates the cost per linear foot at $29.50 to install a new gas service line.

MGE from contractors, the cost for interior piping that would accommodate the installation of a natural gas water heater would be estimated at **_____**, and the cost for interior piping and ventilation ductwork that would accommodate the installation of a natural gas fired furnace would be estimated at **_____**. These estimates include parts and labor, assume that the installation is performed in an unfinished basement, and assume in the case of the natural gas furnace that HVAC ductwork is already in place from the electric heating system. The installation cost is estimated at $800[25] for a natural gas furnace and $150[26] for a natural gas water heater, excluding the costs of the appliances themselves. See Confidential Schedule JJR-3 for a summary of these costs.

Q. WHAT REBATES/BILL CREDITS WOULD GMO OFFER TO ENCOURAGE CUSTOMERS TO SWITCH FROM ELECTRICITY TO NATURAL GAS?

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

Table 7: Proposed GMO Rebates

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

[25] "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.

[26] Ibid, at page 18.

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

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

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

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

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

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

Table 9: Proposed MGE Rebates

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

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

A. Customer participation rates depend on several factors, including (1) the number of potential customers that currently rely on electricity for certain end-use applications, and (2) the rebate level as a percentage of the conversion and installation costs. Also, customer participation rates tend to increase over time as customers become more aware of the rebate program.

Q. WHAT IS THE MARKET POTENTIAL FOR FUEL SWITCHING PROGRAMS IN MISSOURI?

A. The market potential for fuel switching programs can be estimated by considering the number of households that rely on electricity for space heating. According to GMO's 2009 FERC Form 1, GMO provided electric space heating to approximately 91,100 Missouri customers. A June 2009 report by the Gas Technology Institute indicates that in 2005 approximately 70 percent of electric heating in the West North Central census division (which includes Missouri) was provided by electric resistance heating, while 30 percent was provided by electric heat pumps.[27] By multiplying the 91,100 units by 70 percent, it suggests that approximately 63,770 customers use electric resistance heat in the GMO service territory in Missouri.

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

A. During the initial two or three years, it is reasonable to expect that customer participation in the fuel switching program offered by GMO would approximate levels that have been experienced at PSE, which offers similar fuel switching incentives. During 2009, PSE reported that 445 residential customers participated

[27] "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.

in the fuel switching program, with 85 percent of those customers choosing to convert their water heater from electricity to natural gas and 15 percent converting their space heating from electricity to natural gas. In my Direct Testimony in Case No. ER-2010-355, I determined that the number of participants in the fuel switching program for Kansas City Power and Light ("KCP&L") would be similar to the experience at PSE in 2009. Because GMO has approximately twice as many electric space heating customers as KCP&L, I have assumed that the number of customers participating in the GMO fuel switching program also would be twice the number assumed for KCP&L. If approximately 800 customers participated annually in the GMO fuel switching program, that would represent about 1.25 percent of the 63,770 potential customers with electric resistance heat.

Q. BASED ON YOUR ANTICIPATED CUSTOMER PARTICIPATION LEVEL, HOW MUCH WOULD GMO AND MGE RESPECTIVELY SPEND ON THE PROPOSED FUEL SWITCHING PROGRAM?

A. Assuming that 800 customers participate in the proposed fuel switching program during the first year of availability, then GMO's total program spending would be $596,000 and MGE's total program spending would be $51,200 plus the cost to install 800 new service lines (approximately $1,416,000). Table 10 shows the breakdown for the proposed conservation program budget for GMO, assuming

680 participants (or 85 percent) qualify for the natural gas water heater rebate and 120 participants (or 15 percent) qualify for the natural gas furnace rebate.[28]

Table 10: Proposed GMO Conservation Budget

Appliance	Rebate	Participants	Budget
Water Heater	$700	680	$476,000
Furnace	$1,000	120	$120,000

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

Table 11: Proposed MGE Conservation Budget

Appliance	Rebate	Participants	Budget
Water Heater	$40	680	$27,200
Furnace	$200	120	$24,000

Q. WHAT IS GMO'S CURRENT PROGRAM BUDGET FOR ENERGY EFFICIENCY AND CONSERVATION IN MISSOURI?

A. GMO's approved program budget for demand response, energy efficiency and affordability programs in Missouri in 2009 was $**_____** million. The proposed fuel switching program budget of $596,000 would represent approximately **____** percent of the total program budget for GMO.

[28] 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.

Q. HOW WOULD THE PROPOSED FUEL CONVERSION PROGRAMS BE FUNDED?

A. GMO would fund the costs associated with the conversion and installation portion of the fuel switching rebate program through its current energy efficiency and conservation program, under which GMO defers the costs of the program for possible future recovery in a rate case. MGE fully supports rate recovery of monies spent by GMO for the proposed fuel switching program, if it is approved by the Commission. It is my understanding that MGE would fund the costs related to the purchase of energy efficient natural gas appliances for customers who are converting from electricity to natural gas and the cost to install gas service lines to the customer premise (up to 60 linear feet). As the Commission is aware, the costs of MGE's energy efficiency programs are also deferred for future recovery.

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

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

Q. WHY SHOULD GMO'S ELECTRIC CUSTOMERS FUND A FUEL SWITCHING PROGRAM THAT ENCOURAGES CUSTOMERS TO CONVERT TO NATURAL GAS PROVIDED BY MGE?

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

GMO's electric customers who convert to natural gas for certain end-use applications would directly benefit from the proposed fuel switching program through (1) reduced energy consumption, (2) lower energy bills, (3) rebates for purchasing new energy efficient natural gas appliances, and (4) the added value associated with the installation of a gas service line to their residence. GMO customers (including both program participants and non-participants) would also benefit from the fuel switching program through reduced electric demand, which translates into the following benefits: 1) GMO's ability to reduce or defer construction of additional generation and transmission capacity; 2) GMO's ability to reduce CO_2 emissions; and 3) spending a portion of GMO's energy efficiency and conservation budget on a fuel switching program which typically has one of the highest benefit/cost ratios among those energy efficiency programs offered to residential and multi-family customers. For all of these reasons, GMO customers

would derive significant benefits from the proposed fuel switching program and should contribute to its implementation and operation.

Q. WHAT SAVINGS WOULD GMO CUSTOMERS REALIZE BY PARTICIPATING IN THE PROPOSED FUEL SWITCHING PROGRAM?

A. As shown on Schedule JJR-4, a GMO customer who converts from electric to natural gas water heating could save $740 through rebates and $200 per year in operating costs. A customer who converts from electric resistance heating to a natural gas furnace could save $1,200 through rebates and $606 per year in operating costs. A customer who converts both water heating and space heating from electric to natural gas could save $1,440 through rebates and $806 per year in operating costs.

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

A. Yes. Confidential Schedule JJR-5 demonstrates the customer payback periods for the proposed fuel switching measures. As the schedule indicates, the payback period for converting from electricity to natural gas water heaters is approximately **___** years, and the payback period for converting from electric resistance heat to a natural gas furnace is approximately **___** years. If the customer converts both water heating and space heating from electricity to natural gas, the payback period would be approximately **___** years because

the costs to install the interior piping and ventilation ductwork would only be incurred once and would accommodate both end-use applications.

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

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

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

A. Based on the following assumptions: (1) that 800 customers participate in the fuel switching program during the first year; (2) that MGE's average cost to install the gas service line to the customer premise is $1,770; (3) that MGE offers customer rebates for installing energy efficient natural gas appliances in the amounts shown in Table 9; and 4) that MGE's fixed customer charge is $26.88

per month, Schedule JJR-6 shows that the proposed fuel switching program would produce net benefits for MGE after approximately 5.7 years.[29]

[29] This analysis does not include any costs associated with additional CO_2 emissions that might occur as a result of increased natural gas usage. The CO_2 reductions that would occur in connection with reducing electricity usage would more than offset the increased CO_2 emissions related to increased natural gas usage, resulting in another net benefit to Missouri residents.

V. IMPACT OF FUEL SWITCHING PROGRAM ON GMO

Q. WHAT WOULD BE THE IMPACT OF THE PROPOSED FUEL SWITCHING PROGRAM ON GMO'S ELECTRIC DISTRIBUTION REVENUES?

A. The revenue impact depends on the customer participation rate. As GMO customers convert from electricity to natural gas for certain end-use applications such as water heating and space heating, GMO's electric distribution revenues would be expected to be somewhat lower. These customers would continue to rely on GMO for electricity for other end-use applications such as lighting, refrigeration, televisions, computers, etc., and would continue to pay the fixed customer charge of $7.90 per month. Assuming that 800 customers participate in the fuel switching program during the first year, the revenue impact for GMO would be a reduction of approximately $506,274, or 0.078 percent of 2009 electric operating revenues in Missouri.[30] See Schedule JJR-7 for this calculation. This does not consider the savings that GMO could realize from avoided generation costs.

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

[30] According to the 2009 FERC Form 1, GMO's operating revenues in 2009 were $646,852,000 in Missouri.

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

Q. WOULD THE PROPOSED FUEL SWITCHING PROGRAM HELP GMO REDUCE ITS PEAK LOAD OR DEFER FUTURE PLANS FOR NEW GENERATION OR TRANSMISSION FACILITIES?

A. Yes. GMO (in combination with Kansas City Power and Light) has over 6,000 MWs of electric generating capacity, and the projected peak summer demand for 2010 is 5,515 MW. KCP&L and GMO expect to meet their projected capacity requirements through 2018 with generation assets, capacity purchases and demand side and efficiency programs. The companies expect to have Iatan No. 2, a coal-fired plant, in service during the fall of 2010, which will add approximately 620 MWs (KCP&L and GMO's share based on their 55 percent ownership stake) of generating capacity.[31] However, utility planning involves very long time horizons in order to meet future demand growth. To the extent fuel switching programs reduce electricity consumption, these programs would assist GMO in potentially reducing or deferring capital investments in generation and transmission capacity.

[31] Great Plains Energy Inc. 2009 Form 10-K, filed February 25, 2010, at page 7.

Q. HAS THE MISSOURI GENERAL ASSEMBLY RECENTLY PASSED LEGISLATION RELATING TO ENERGY EFFICIENCY INVESTMENTS BY ELECTRIC CORPORATIONS?

A. Yes. In 2009, the Missouri General Assembly passed Senate Bill 376, which provides that: "It shall be the policy of the state to value demand side investments equal to traditional investments in supply and delivery infrastructure and allow recovery of all reasonable and prudent costs of delivering cost-effective demand-side programs." Under SB 376, the Commission is directed to: 1) provide timely cost recovery for utilities; 2) ensure that utility financial incentives are aligned with helping customers use energy more efficiently and in a manner that sustains or enhances utility customers' incentives to use energy more efficiently; and 3) provide timely earnings opportunities associated with cost-effective measurable and verifiable energy savings.

Q. WHAT ARE THE IMPLICATIONS OF THIS NEW LEGISLATION?

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

VI. ASSESSING COST EFFECTIVENESS AND THE PUBLIC INTEREST

Q. WHAT COST EFFECTIVENESS TEST DOES THE COMMISSION USE TO EVALUATE ENERGY EFFICIENCY AND CONVERSATION MEASURES?

A. The Commission has adopted the Total Resource Cost ("TRC") test to evaluate energy efficiency and conservation measures in Missouri. The TRC test measures the net costs of a DSM program as a resource option based on the total costs of the program including both the participants' and the utility's costs. This test represents the combination of the effects of a program on both the customers participating and those not participating in a program.[32] Table 12 shows the benefits and costs that are included in the TRC test.

Table 12: Benefits and Cost Included in TRC Test

Benefits	Costs
➢ Savings from avoided supply costs using net program savings (i.e., savings net of changes in energy use that would have happened in the absence of the program) ➢ Avoided supply costs for the energy using equipment not chosen by the program participant	➢ Program costs incurred by <u>both</u> the utility and the participant • Equipment • Operation and maintenance • Installation • Program administration • Removal of equipment (less salvage) ➢ Increase in supply costs for periods in which load is increased ➢ Tax credits (considered reduction in costs) ➢ Increased supply costs for utility providing fuel that is chosen as result of the program

[32] State of California, Governor's Office of Planning and Research, "California Standard Practice Manual: Economic Analysis of Demand-Side Programs and Projects," July 2002, at 18.

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

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

Q. HAVE YOU ANALYZED THE COST EFFECTIVENESS OF THE PROPOSED FUEL SWITCHING PROGRAM?

A. No, I have not been able to analyze the cost effectiveness of the proposed fuel switching program. I have received responses to data requests from GMO; however, the information contained in those responses still does not allow me to perform a benefit/cost analysis for the fuel switching program using the TRC test. I will continue to work with GMO to clarify the information that has been provided, especially as it relates to the avoided cost calculations, and I reserve the right to supplement my testimony when the necessary information becomes available.

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

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

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

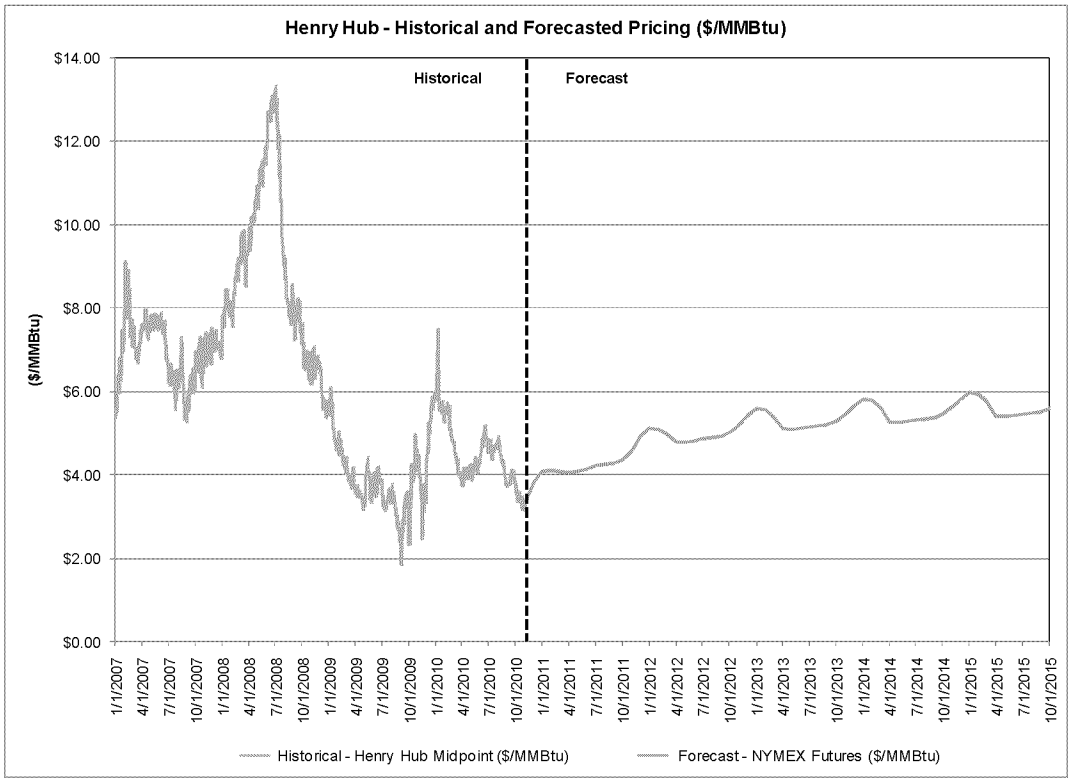
A. Yes. The proposal for GMO to initiate a fuel switching program is consistent with the Missouri PSC's overall objective of encouraging energy efficiency and conservation. The information on which the Commission relied in its February 2010 decision has changed somewhat since the decision was issued.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

that ACEEE report was issued, natural gas prices have fallen substantially and the prevalence of shale gas has had a significant impact on gas supplies and forecasted natural gas prices.

Q. PLEASE ELABORATE ON THE CURRENT SITUATION IN NATURAL GAS MARKETS.

A. The situation in natural gas markets has changed considerably since the ACEEE report was issued. As shown on Figure 1, natural gas prices are forecasted to be much more stable than historical prices.

Figure 1: Henry Hub – Historical and Forecasted Pricing[33]



[33] 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.

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

A. According to a June 2009 study by the Potential Gas Committee associated with the Colorado School of Mines, the baseline of technically recoverable natural gas resources grew by 39 percent (or 515 trillion cubic feet ("Tcf")) from year end 2006 to year end 2008, and together with natural gas reserves of 238 Tcf reported by the Energy Information Administration ("EIA") represents a technically recoverable endowment of 2,074 Tcf.[34] Based on 2009 natural gas consumption levels reported by EIA, U.S. natural gas reserves would not be exhausted for approximately 91 years.

Q. HAS PIPELINE CAPACITY INCREASED DURING THE PAST THREE YEARS?

A. Yes. Natural gas pipeline capacity has increased significantly from 2007 through 2009 due to the construction of new pipelines. According to the EIA, 134 new interstate/intrastate pipelines were placed in service during 2007 and 2008 thereby adding more than 5,500 miles and 59,000 MMcf/day of new capacity in the United States. The EIA estimates that in 2009 an additional 78 pipeline projects were placed in service, further expanding U.S. natural gas pipeline capacity by an additional 3,600 miles and 36,000 MMcf/day.[35]

[34] http://www.mines.edu/Potential-Gas-Committee-reports-unprecedented-increase-in-magnitude-of-U.S.-natural-gas-resource-base

[35] "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.

Q. HOW HAS THE COMMISSION DEFINED THE TERM "PUBLIC INTEREST" IN MISSOURI?

A. In approving the acquisition of Aquila, Inc. by Great Plains Energy, Incorporated, the Commission defined the term public interest as follows:

> The public interest is a matter of public policy to be determined by the Commission. It is within the discretion of the Public Service Commission to determine when the evidence indicates the public interest would be served. Determining what is in the public interest is a balancing process. In making such a determination, the total interests of the public served must be assessed. This means that some of the public may suffer adverse consequences for the total public interest. Individual rights are subservient to the rights of the public. The 'public interest' must necessarily include the interests of both the ratepaying public and the investing public; however, as noted, the rights of individual groups are subservient to the rights of the public in general.[36]

Q. DO YOU BELIEVE THAT THE PROPOSAL FOR GMO TO INITIATE A FUEL SWITCHING PROGRAM IN MISSOURI IS IN THE PUBLIC INTEREST? IF SO, WHY?

A. Yes. The proposal for GMO to initiate a fuel switching program in Missouri would benefit customers through lower energy use and reduced energy bills, while simultaneously reducing CO_2 emissions and potentially reducing or deferring investment in additional generation and transmission capacity. For these reasons, I believe the proposed fuel switching program is in the public interest and should be approved by the Commission.

[36] 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.

Q. PLEASE SUMMARIZE YOUR RECOMMENDATIONS.

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

Q. DOES THIS CONCLUDE YOUR TESTIMONY AT THIS TIME?

A. Yes, it does.