VOLUME 1

EXECUTIVE SUMMARY

KCP&L GREATER MISSOURI OPERATIONS COMPANY (GMO)

INTEGRATED RESOURCE PLAN

4 CSR 240-22.010

APRIL, 2015

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SECTION 1: INTRODUCTION

The fundamental objective of the resource planning process shall be to provide the public with energy services that are safe, reliable and efficient, at just and reasonable rates, in a manner that serves the public interest and is consistent with state energy and environmental policies. This objective requires that the utility shall:

- Consider demand-side resources, renewable energy, and supply-side resources on an equivalent basis
- Use minimization of the present worth of long-run utility costs as the primary selection criterion
- Identify and where possible, quantitatively analyze any other considerations which are critical to meeting the fundamental objective of the resource planning process

1.1 IRP REPORT STRUCTURE

Nine (9) separate volumes comprise this IRP filing:

1. Volume 1: Executive Summary
2. Volume 2: Missouri Filing Requirements including an index of Rule compliance
3. Volume 3: Load Analysis and Load Forecasting
4. Volume 4: Supply-Side Resource Analysis
5. Volume 4.5: Transmission and Distribution Analysis
6. Volume 5: Demand-Side Resource Analysis

7. Volume 6: Integrated Resource Plan and Risk Analysis

8. Volume 7: Resource Acquisition Strategy Selection

9. Volume 8: Filing Schedule and Requirements

1.2 IRP DEVELOPMENT

In developing the IRP filing, KCP&L Greater Missouri Operations Company (GMO) has endeavored to meet all requirements of Missouri's IRP rules covered under 4 CSR 240-22. GMO's IRP spans the 2015-2034 planning horizon. Data necessary to complete evaluations were derived from recognized industry sources, consultants, publications and other sources as appropriate. Data sources are noted in the text of the report or in the appendices of a volume.

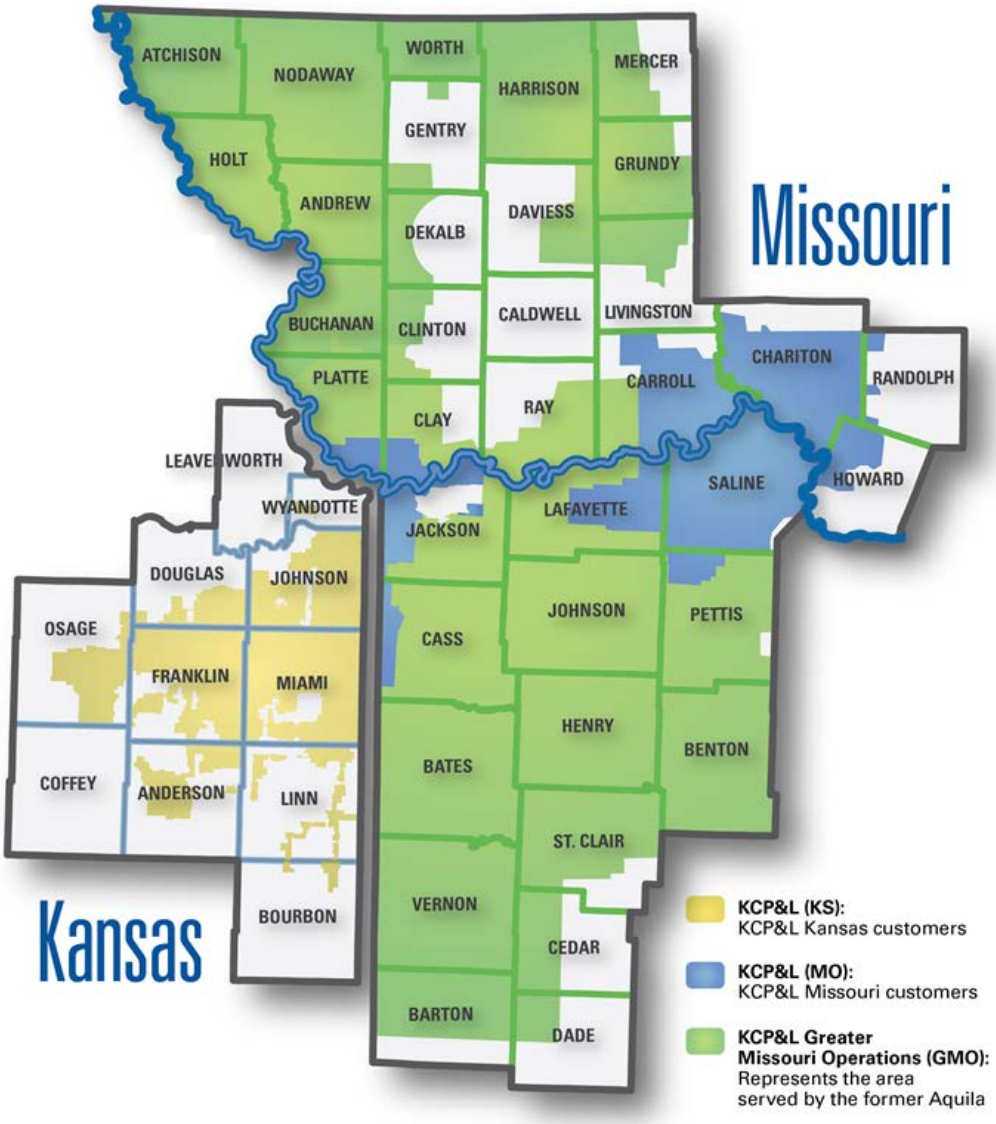
Several distinct tasks are included in the planning process:

- A detailed forecast of future demand and energy requirements
- An assessment of Supply-Side resource alternatives
- An assessment of Demand-Side resource alternatives
- An assessment of Transmission and Distribution alternatives
- Integrated Analysis evaluates the economics of various combinations of demand-side and supply-side alternatives that are developed as alternative resource plans over the planning timeline
- Risk Analysis provides a comparison of the range of economic results for the alternative resource plans due to identified critical uncertain factors
- The adoption and executive approval of a Resource Acquisition Strategy that includes a preferred resource plan, implementation plan, and contingency plans

SECTION 2: GMO SYSTEM OVERVIEW

GMO is an integrated, mid-sized electric utility serving portions of Northwest Missouri including St. Joseph and several counties south and east of the Kansas City, Missouri metropolitan area. GMO also provides regulated steam service to certain customers in the St. Joseph, Missouri area. A map of the Great Plains Energy (GPE) service territory which includes GMO is provided in Figure 1 below:

Figure 1: GPE Service Territory



GMO is significantly impacted by seasonality with approximately one-third of its retail revenues recorded in the third quarter. Table 1 provides a snapshot of the number of customers served, estimated retail sales and peak demand.

Table 1: Customers, NSI and Peak Demand

GMO 2014 Customers, Net System Input, and Peak Demand			
Jurisdiction	**Number of Retail Customers**	**Retail Sales (MWh)**	**Net Peak Demand (MW)**
MPS	**251,007**	**6,052,491**	**1,417**
SJLP	**65,576**	**2,146,899**	**465**
GMO	**316,583**	**8,199,390**	**1,849**

GMO owns and operates a diverse generating portfolio and Power Purchase Agreements (PPA) to meet customer energy requirements. Table 2,

Figure 2, and Figure 3 below reflect GMO's generation assets including wind PPAs currently in place. In addition, the Gray County wind facility has been renewed for another 15 years at 110 MW reflecting an increase from the current 60 MW.

Table 2: Capacity and Energy By Resource Type

Resource Type	Capacity (MW)	% of Total Capacity	Estimated Energy (MWh)	% of Annual Energy
Coal	1,018	45%	6,152,286	93%
Oil	59	3%	0	0%
Nat. Gas	1,030	45%	114,073	2%
Wind	159*	7%	345,561	5%
LFG	2	0.1%	11,034	0.2%
Total	2,268	100%	6,622,954	100%
*Nameplate Capacity				

Figure 2: Capacity By Resource Type

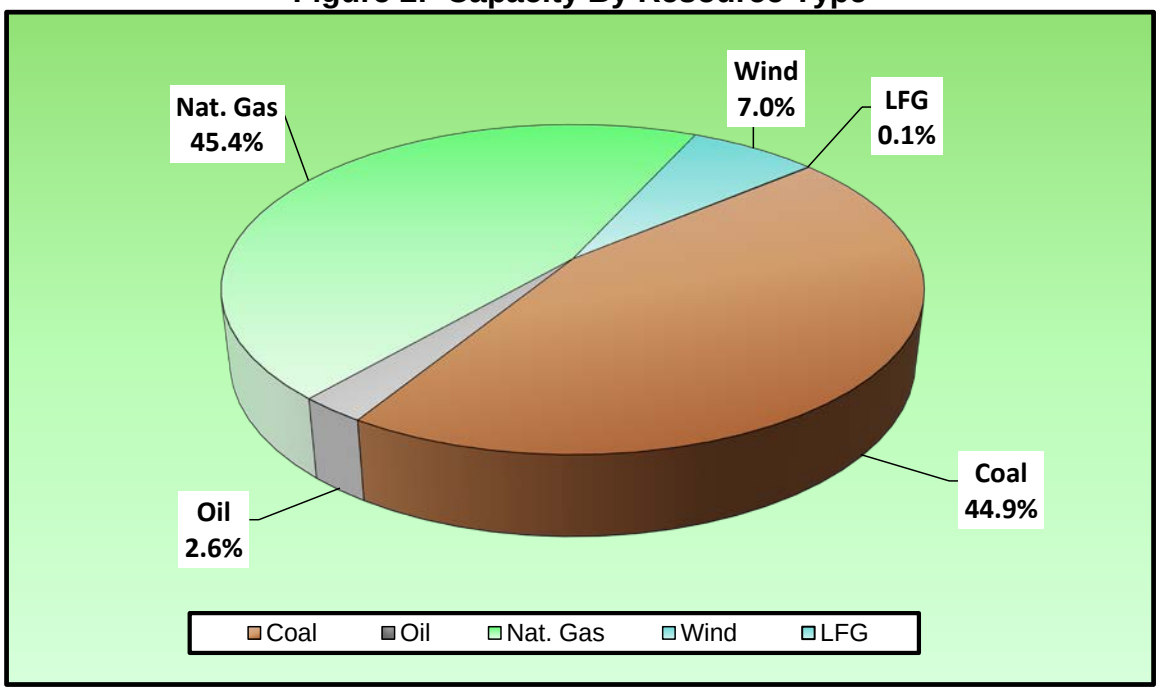
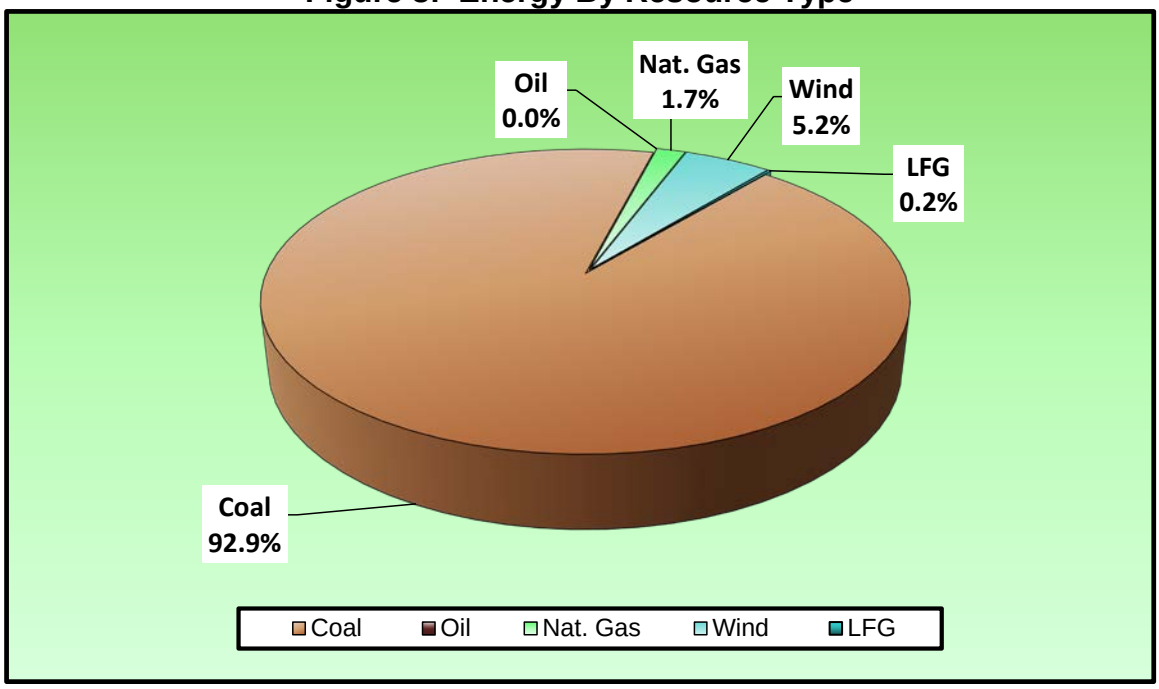


Figure 3: Energy By Resource Type



Additionally, GPE owns and operates a delivery system consisting of 3,700 miles of transmission lines, 22,400 miles of distribution lines, and 400 substations.

SECTION 3: LOAD FORECAST INFORMATION

2. For each major class and for the total of all major classes, the base load forecasts for peak demand and for energy for the planning horizon, with and without utility demand-side resources, and a listing of the economic and demographic assumptions associated with each base load forecast;

GMO uses detailed end-use information along with statistical techniques to construct its load forecast. End-use information is obtained from KCP&L/GMO's semiannual appliance saturation surveys and from results published by the US Department of Energy (DOE) for the West North Central Midwest region. This information is used to construct end-use level forecasts of electricity sales based on economic forecasts of key drivers specific to the Kansas City and Saint Joseph metro areas. Load is forecasted separately for each tariff group in each utility.

The forecasts of economic drivers were obtained through a contract with Moody's Analytics and include the number of households, population, personal income, gross metro product (GMP), manufacturing GMP, total employment, manufacturing employment, and the consumer price index (CPI). These drivers were provided for three scenarios that were used to construct base, high and low scenarios for GMO's load forecasts.

The end-use forecasts were calibrated to monthly billing statistics. Heating, cooling and base loads from the end-use models were each calibrated to optimize the ability of these forecasts to explain the monthly billing data. These calibrated models were then used to forecast monthly electric energy sales. Using load research data collected from a sample of GMO's customers, this end-use forecast was allocated to each hour of the forecast period and peak demands were determined from these results.

The load forecast used in the IRP was prepared using actual sales data through July 2014 and an economic forecast produced in June 2014.

Table 3 and Figure 4 summarize the forecast of energy sales and Net System Input (NSI) for MPS by rate class. Gross energy includes the impacts of energy efficiency and demand side management (DSM) program measures and thus represents actual energy sales. Net energy includes the impacts of future company programs. Neither gross nor net energy includes the impacts of programs that the company might adopt in the future as these are determined in the process for balancing supply and demand, discussed in a later section of this report. The energy sales shown in all but the last two columns are billed sales at the customers' meter. The last two columns show NSI, which includes line losses and company use and which represents the amount of generation and purchased power needed to serve the load for MPS. Sales for Resale (SFR) represent firm sales to other utilities under a FERC rate.

Growth rates are higher for Residential, 1.1%, Big General Service Commercial, 1.4% between 2014 and 2035 than for the Small General Service Commercial (Medium, Large, and Large Power), 0.3% and Industrial, 0.7%.

Table 3: MPS Energy with and without DSM Impacts (GWh) **Highly Confidential**

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Figure 4: MPS System Energy **Highly Confidential**

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Table 4 reports the MPS peak demands by rate class. These numbers include line losses and company use.

Table 4: MPS Peak Demand with and without DSM Impacts (MW) **Highly Confidential**

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Figure 5 summarizes the forecast of peak demands by year for MPS.

Figure 5: MPS System Peak **Highly Confidential**

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Table 5 and Figure 6 show the forecast for billed energy sales and NSI by rate class for SJLP. The growth rates for these sales are lower compared to MPS mainly because the KC metro area has grown faster and is expected to growth faster than the Saint Joseph metro area. Big Commercial sector sales are growing the slowest of the major classes

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Table 5: SJLP Energy with and without DSM Impacts (GWh) **Highly Confidential**

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Figure 6: SJLP System Energy **Highly Confidential**

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Table 6 summarizes the forecast of peak demands by customer class for SJLP.

Table 6: SJLP Peak with and without DSM Impacts (MW) **Highly Confidential**

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Figure 7 summarizes the forecast of peak demands by year for SJLP.

Figure 7: SJLP System Peak **Highly Confidential**

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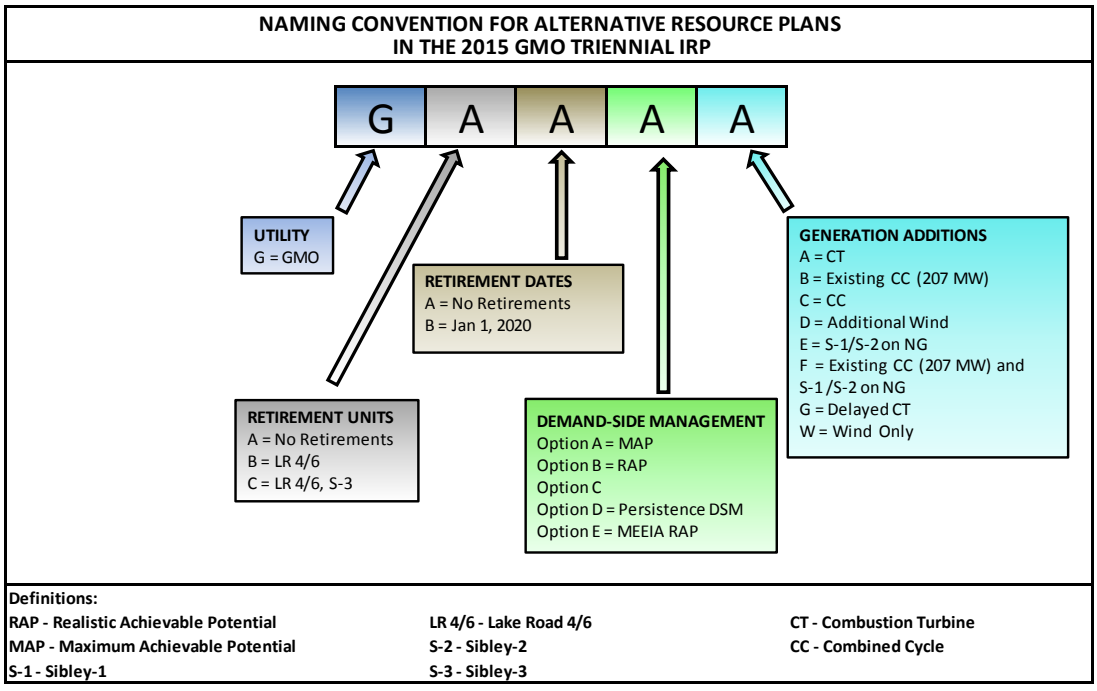
SECTION 4: PREFERRED RESOURCE PLAN SELECTION

4.1 ALTERNATIVE RESOURCE PLAN DEVELOPMENT

3. A summary of the preferred resource plan to meet expected energy service needs for the planning horizon, clearly showing the demand-side resources and supply-side resources (both renewable and non-renewable resources), including additions and retirements for each resource type;

Alternative resource plans were developed using a combination of various capacities of supply-side sources, demand-side resources and resource addition timing. The plan-naming convention utilized for the alternative resource plans developed is shown in Table 7 below:

Table 7: Alternative Resource Plan Naming Convention



In total, twenty-five alternative resource plans were developed for integrated resource analysis. Table 8 through Table 14 represents an overview of each plan over the 2015 through 2034 planning period.

Table 8: Overview of Alternative Resource Plans

Plan Name	DSM Level	Facility	Year to Cease Burning Coal	Renewable Additions		Generation Addition (if needed)
GAAAA	Option A - MAP	Sibley-1 Sibley-2	2019	Solar: 2016 - 5 MW 2026 - 5 MW	Wind: 2017 - 260 MW 2019 - 50 MW	n/n
GBBAA	Option A - MAP	Sibley-1 Sibley-2	2019	Solar: 2016 - 5 MW 2026 - 5 MW	Wind: 2017 - 260 MW 2019 - 50 MW	n/n
		Lake Road 4/6	2020 (convert to NG in 2016)			
GCBAA	Option A - MAP	Sibley-1 Sibley-2	2019	Solar: 2016 - 5 MW 2026 - 5 MW	Wind: 2017 - 260 MW 2019 - 50 MW	n/n
		Lake Road 4/6	2020 (convert to NG in 2016)			
		Sibley-3	2020			

Table 9: Overview of Alternative Resource Plans (continued)

Plan Name	DSM Level	Facility	Year to Cease Burning Coal	Renewable Additions		Generation Addition (if needed)
GAABA	Option B	Sibley-1 Sibley-2	2019	Solar: 2016 - 5 MW 2026 - 5 MW	Wind: 2017 - 260 MW 2019 - 50 MW	n/n
GBBBA	Option B	Sibley-1 Sibley-2	2019	Solar: 2016 - 5 MW 2026 - 5 MW	Wind: 2017 - 260 MW 2019 - 50 MW	n/n
		Lake Road 4/6	2020 (convert to NG in 2016)			
GBBBB	Option B	Sibley-1 Sibley-2	2019	Solar: 2016 - 5 MW 2026 - 5 MW	Wind: 2017 - 260 MW 2019 - 50 MW	207 MW Existing CC in 2016
		Lake Road 4/6	2020 (convert to NG in 2016)			
GCBBA	Option B	Sibley-1 Sibley-2	2019	Solar: 2016 - 5 MW 2026 - 5 MW	Wind: 2017 - 260 MW 2019 - 50 MW	414 MW CT in 2020
		Lake Road 4/6	2020 (convert to NG in 2016)			
		Sibley-3	2020			

Table 10: Overview of Alternative Resource Plans (continued)

Plan Name	DSM Level	Facility	Year to Cease Burning Coal	Renewable Additions		Generation Addition (if needed)
GAACA	Option C	Sibley-1 Sibley-2	2019	Solar: 2016 - 5 MW 2026 - 5 MW	Wind: 2017 - 260 MW 2019 - 50 MW	207 MW CT in 2016 207 MW CT in 2030
GAACB	Option C	Sibley-1 Sibley-2	2019	Solar: 2016 - 5 MW 2026 - 5 MW	Wind: 2017 - 260 MW 2019 - 50 MW	207 MW Existing CC in 2016 207 MW CT in 2030
GAACE	Option C	Convert to NG: Sibley-1 Sibley-2	2019	Solar: 2016 - 5 MW 2026 - 5 MW	Wind: 2017 - 260 MW 2019 - 50 MW	207 MW CT in 2016 207 MW CT in 2034
GAACF	Option C	Convert to NG: Sibley-1 Sibley-2	2019	Solar: 2016 - 5 MW 2026 - 5 MW	Wind: 2017 - 260 MW 2019 - 50 MW	207 MW Existing CC in 2016 207 MW CT in 2034

Table 11: Overview of Alternative Resource Plans (continued)

Plan Name	DSM Level	Facility	Year to Cease Burning Coal	Renewable Additions		Generation Addition (if needed)
GBBCA	Option C	Sibley-1 Sibley-2	2019	Solar: 2016 - 5 MW 2026 - 5 MW	Wind: 2017 - 260 MW 2019 - 50 MW	207 MW CT in 2016 207 MW CT in 2026
		Lake Road 4/6	2020 (convert to NG in 2016)			
GBBCB	Option C	Sibley-1 Sibley-2	2019	Solar: 2016 - 5 MW 2026 - 5 MW	Wind: 2017 - 260 MW 2019 - 50 MW	207 MW Existing CC in 2016 207 MW CT in 2026
		Lake Road 4/6	2020 (convert to NG in 2016)			
GBBCC	Option C	Sibley-1 Sibley-2	2019	Solar: 2016 - 5 MW 2026 - 5 MW	Wind: 2017 - 260 MW 2019 - 50 MW	200 MW CC in 2016 200 MW CC in 2025 200 MW CC in 2034
		Lake Road 4/6	2020 (convert to NG in 2016)			
GBBCD	Option C	Sibley-1 Sibley-2	2019	Solar: 2016 - 5 MW 2026 - 5 MW	Wind: 2017 - 260 MW 2019 - 150 MW	207 MW CT in 2016 207 MW CT in 2027
		Lake Road 4/6	2020 (convert to NG in 2016)			

Table 12: Overview of Alternative Resource Plans (continued)

Plan Name	DSM Level	Facility	Year to Cease Burning Coal	Renewable Additions		Generation Addition (if needed)
GBBCF	Option C	Convert to NG: Sibley-1 Sibley-2	2019	Solar: 2016 - 5 MW 2026 - 5 MW	Wind: 2017 - 260 MW 2019 - 50 MW	207 MW Existing CC in 2016 207 MW CT in 2030
		Lake Road 4/6	2020 (convert to NG in 2016)			
GBBCG	Option C	Sibley-1 Sibley-2	2019	Solar: 2016 - 5 MW 2026 - 5 MW	Wind: 2017 - 260 MW 2019 - 50 MW	207 MW CT in 2020 207 MW CT in 2026
		Lake Road 4/6	2020 (convert to NG in 2016)			
GBBCW	Option C	Sibley-1 Sibley-2	2019	Solar: 2016 - 5 MW 2026 - 5 MW	Wind: 2017 - 260 MW 2019 - 50 MW	670 MW Wind in 2016 670 MW Wind in 2026
		Lake Road 4/6	2020 (convert to NG in 2016)			
GCBCA	Option C	Sibley-1 Sibley-2	2019	Solar: 2016 - 5 MW 2026 - 5 MW	Wind: 2017 - 260 MW 2019 - 50 MW	207 MW CT in 2016 414 MW CT in 2020 207 MW CT in 2029
		Lake Road 4/6	2020 (convert to NG in 2016)			
		Sibley-3	2020			

Table 13: Overview of Alternative Resource Plans (continued)

Plan Name	DSM Level	Facility	Year to Cease Burning Coal	Renewable Additions		Generation Addition (if needed)
GCBCB	Option C	Sibley-1 Sibley-2	2019	Solar: 2016 - 5 MW 2026 - 5 MW	Wind: 2017 - 260 MW 2019 - 50 MW	207 MW Existing CC in 2016 414 MW CT in 2020 207 MW CT in 2029
		Lake Road 4/6	2020 (convert to NG in 2016)			
		Sibley-3	2020			
GCBCG	Option C	Sibley-1 Sibley-2	2019	Solar: 2016 - 5 MW 2026 - 5 MW	Wind: 2017 - 260 MW 2019 - 50 MW	621 MW CT in 2020 207 MW CT in 2029
		Lake Road 4/6	2020 (convert to NG in 2016)			
		Sibley-3	2020			
GBBDA	Option D - Persistence	Sibley-1 Sibley-2	2019	Solar: 2016 - 5 MW 2026 - 5 MW	Wind: 2017 - 260 MW 2019 - 50 MW	207 MW CT in 2016 207 MW CT in 2020 207 MW CT in 2024 207 MW CT in 2031
		Lake Road 4/6	2020 (convert to NG in 2016)			

Table 14: Overview of Alternative Resource Plans (continued)

Plan Name	DSM Level	Facility	Year to Cease Burning Coal	Renewable Additions		Generation Addition (if needed)
GBBEG	Option E - MEEIA to RAP	Sibley-1 Sibley-2	2019	Solar: 2016 - 5 MW 2026 - 5 MW	Wind: 2017 - 260 MW 2019 - 50 MW	207 MW CT in 2034
		Lake Road 4/6	2020 (convert to NG in 2016)			
GCBEB	Option E - MEEIA to RAP	Sibley-1 Sibley-2	2019	Solar: 2016 - 5 MW 2026 - 5 MW	Wind: 2017 - 260 MW 2019 - 50 MW	207 MW Existing CC in 2016 414 MW CT in 2020
		Lake Road 4/6	2020 (convert to NG in 2016)			
		Sibley-3	2020			
GCBEG	Option E - MEEIA to RAP	Sibley-1 Sibley-2	2019	Solar: 2016 - 5 MW 2026 - 5 MW	Wind: 2017 - 260 MW 2019 - 50 MW	621 MW CT in 2020
		Lake Road 4/6	2020 (convert to NG in 2016)			
		Sibley-3	2020			

Each plan is detailed in year-by-year charts in Volume 6, Section 4.

4.2 SELECTION OF PREFERRED RESOURCE PLAN

The Preferred Plan, GBBEG, selected for GMO is shown in Table 15 below:

Table 15: GMO Preferred Resource Plan

Year	CT's (MW)	Wind (MW)	Solar (MW)	DSM (MW)	Retire (MW)	Existing Capacity (MW)
2015	0			55		2143
2016	0		5	50		2143
2017	0	260		91		2135
2018	0			116		2135
2019	0	50		153		2038
2020	0			208	96	1942
2021	0			265		1942
2022	0			322		1942
2023	0			379		1942
2024	0			435		1942
2025	0			460		1942
2026	0		5	483		1942
2027	0			505		1942
2028	0			527		1942
2029	0			546		1942
2030	0			564		1942
2031	0			579		1942
2032	0			595		1942
2033	0			610		1942
2034	207			624		1942

Based in part upon current Missouri RPS rule requirements, the Preferred Plan includes 10 MW of solar additions and 310 MW of wind additions over the twenty-year planning period. It should be noted that the solar resource addition in 2016 is expected to consist of ownership in 2 MW Commercial and Industrial rooftop installations and 3 MW of a central station solar facility. The 260 MW wind addition in expected to be in service in 2017. The 50 MW wind addition in 2019 represents the balance of the Gray County wind facility at which GMO currently holds a 60 MW share. DSM resources consist of a suite of twelve residential and nine commercial programs. The Preferred Plan reflects Sibley Units 1 and 2 ceasing to burn coal in 2019 and the 96 MW Lake Road 4/6 converting to natural gas in 2016 and then retiring in 2020. The environmental

drivers that contributed to discontinuing coal use, and the Lake Road 4/6 retirement, include Mercury and Air Toxics Standards Rule, Ozone National Ambient Air Quality Standards (NAAQS), PM NAAQS, Clean Water Act Section 316(a) and (b), Effluent Guidelines, Coal Combustion Residuals Rule, and Clean Power Plan. These rules will be monitored by GMO to determine if the decision to cease burning coal and to retire Lake Road 4/6 in the projected retirement year of 2020 continues to be prudent.

The Preferred Plan was not the lowest cost plan from a Net Present Value of Revenue Requirement (NPVRR) perspective. The Alternative Resource Plan GBBBA had the lowest expected NPVRR of all modeled plans which also retired Lake Road 4/6 in 2020 and incorporated a Realistic Achievable Potential DSM level. The Preferred Plan has a slower implementation of DSM, but results in a lower 20-year levelized rate impact and lower NPVRR impact for much of the 20-year period.

The Preferred Plan also meets the fundamental planning objectives as required by Rule 22.010(2) to provide the public with energy services that are safe, reliable, and efficient, at just and reasonable rates, in compliance with all legal mandates, and in a manner that serves the public interest and is consistent with state energy and environmental policies.

The Forecast of Capacity Balance worksheet associated with the Preferred Plan selected for GMO is shown in Table 16 below:

Table 16: GMO Forecast of Capacity Balance - Preferred Plan **Highly Confidential**

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SECTION 5: CRITICAL UNCERTAIN FACTORS

4. Identification of critical uncertain factors affecting the preferred resource plan;

The ranges of critical uncertain factors are calculated by finding the value at which the critical uncertain factor needs to change in order for the Preferred Resource Plan to no longer be preferred. The values of the NPVRR for the Preferred Resource Plan and the lowest cost plan under extreme conditions are compared and by using linear interpolation a crossover point value is found and expressed as a percent of the range of the critical uncertain factor. These percentages are superimposed on the forecast levels for each critical uncertain factor to develop the resulting ranges.

In the analysis, the Preferred Plan, GBBEG and one other plan GCBEB proved to be the lowest cost DSM "E" level plans under different risk scenarios. The values of these two plans NPVRR under each of these risks are detailed in the following table.

Table 17: Alternative Plans for Each Uncertain Factor

Assuming Low CO2						
NPVRR ($MM)	**High Load**	**High NG**	**Low CO2**	**EV**	**Low NG**	**Low Load**
GCBEB	10,208	10,388	10,068	10,406	9,732	9,938
GBBEG	9,904	9,906	9,773	10,206	9,638	9,648
Assuming High CO2						
NPVRR ($MM)	**High Load**	**High NG**	**High CO2**	**EV**	**Low NG**	**Low Load**
GCBEB	11,087	11,214	10,920	10,406	10,599	10,765
GBBEG	11,019	11,024	10,862	10,206	10,658	10,713

The uncertain factors that may cause the company to modify the Preferred Plan include high CO_2 and low natural gas prices. Calculation details for the range of uncertain factors can be found in Volume 7, Section 2.

SECTION 6: PERFORMANCE MEASURES

5. For existing legal mandates and approved cost recovery mechanisms, the following performance measures of the preferred resource plan for each year of the planning horizon:

A. Estimated annual revenue requirement;

B. Estimated level of average retail rates and percentage of change from the prior year; and

C. Estimated company financial ratios;

Data for the Preferred Plan is provided in the table below. This information is also provided in the Company response to Rule 240-22.060(4)(C)1. in Volume 6.

Table 18: Financial Performance - Preferred Plan ** Highly Confidential **

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SECTION 7: COMPANY FINANCIAL RATIOS

6. If the estimated company financial ratios in subparagraph (2)(E)5.C. of this rule are below investment grade in any year of the planning horizon, a description of any changes in legal mandates and cost recovery mechanisms necessary for the utility to maintain an investment grade credit rating in each year of the planning horizon and the resulting performance measures of the preferred resource plan;

The Company calculated performance measures for all studied alternative plans including the Preferred Plan. The expected values of alternative plan performance ratios do not materially change below current conditions. The expectations would be that the investment rating of the company is not at risk from the choice of any particular alternative resource plan.

SECTION 8: RESOURCE ACQUISITION INITIATIVES

7. Actions and initiatives to implement the resource acquisition strategy prior to the next triennial compliance filing; and

8.1 ENVIRONMENTAL RETROFITS

Based on the 2015 Preferred Plan for GMO, retrofits are currently being undertaken at Sibley Station and Lake Road 4/6. While the Preferred Plan calls for Sibley 1 and 2 to cease burning coal by 2020 and Lake Road 4/6 to be retired, minor retrofits are needed by 2016 for MATS compliance at Sibley Station and Lake Road 4/6 is installing Fuel Oil backup. A draft schedule of major milestones for these retrofit projects are provided in the following table:

Table 19: Environmental Retrofits

Retrofit Project	Milestone Description	Date Range
Sibley 3 ACI	Studies/Specification/Bid/Award	03/2014 - 06/2015
Sibley 3 ACI	Engineering/Procurement/Construction	07/2015 - 12/2015
Sibley 3 ACI	Checkout/Startup/Tuning/Testing	01/2016 - 02/2016
Sibley 3 Cooling Tower	Studies/Specification/Bid/Award	01/2016 - 4/2018
Sibley 1, 2, and 3 ESP Improvements	Studies/Specification/Bid/Award	03/2014 - 02/2015
Sibley 1, 2, and 3 ESP Improvements	Engineering/Procurement/Construction	03/2015 - 12/2015
Sibley 1, 2, and 3 ESP Improvements	Checkout/Startup/Tuning/Testing	01/2016 - 02/2016
Sibley 3 SFC	Engineering/Procurement/Construction	02/2015 - 05/2016
LR 4/6 Fuel Oil Backup	Studies/Specification/Bid/Award	01/2015 - 06/2015
LR 4/6 Fuel Oil Backup	Engineering/Procurement/Construction	07/2015 - 12/2015
LR 4/6 Fuel Oil Backup	Checkout/Startup/Tuning/Testing	01/2016 - 02/2016
ACI : Activated Carbon Injection ESP: Electrostatic Precipitator SFC: Submerged Flight Conveyor		

8.2 SOLAR AND WIND INITIATIVES

The Preferred Plan includes solar resource additions in 2016 consisting of ownership in 2 MW Commercial and Industrial rooftop installations and 3 MW of a central station solar facility. A draft schedule of major milestones for these retrofit projects are provided in the following table:

Solar Initiatives	Date Range
Issue Central Solar Request for Proposal (RFP)	04/2015 - 06/2015
Evaluate Central Solar RFP Responses/Select Developer(s)	07/2015 - 09/2015
Site Design/Obtain Permits	10/2015 - 12/2015
Central Solar Site Mobilization/Construction	01/2016 - 5/2016
Commercial Operation for Central Solar and Rooftop Installations	05/2016 - 06/2016

In addition, GMO is working towards procuring additional wind resources.

SECTION 9: MAJOR RESEARCH PROJECTS

8. A description of the major research projects and programs the utility will continue or commence during the implementation period;

9.1 LOAD FORECASTING

GMO plans to conduct its next Residential Appliance Saturation Survey in 2016-2017. GMO is also looking at the option of expanding the survey to the commercial sector in 2016-2017. The last residential survey was completed in 2013. The timeline currently expected for the Residential Appliance Saturation Survey is shown in the following table:

Table 20: Appliance Saturation Survey Initiative

Appliance Saturation Survey Initiative	Date Range
Issue Appliance Saturation Survey Request for Proposal (RFP)	06/2015 - 12/2015
Evaluate Conducting a C&I Survey	1/2015 - 12/2015
Conduct Residential Appliance Saturation Survey	01/2016-06/2016
Tabulation Appliance Saturation Survey Results	06/2016-12/2016
Conduct Conditional Demand Study	01/2017-5/2017
Implement Survey Result in Load Forecast	05/2017-7/2017

9.2 DEMAND-SIDE MANAGEMENT PROJECTS

Major DSM research projects are discussed below.

9.2.1 DEMAND-SIDE MANAGEMENT MARKET POTENTIAL STUDY

GMO engaged Navigant Consulting, Inc. (Navigant) to conduct a Demand Side Management (DSM) Resource Potential Study in January 2012. Navigant provided a broad range of stakeholders opportunities to review and comment on the potential study methodologies, survey instruments and findings. The stakeholders included the Missouri Public Service Commission, Missouri Office of Public Counsel, Missouri Department of Natural Resources, National

Resources Defense Council, Empire Electric District, Renew Missouri, and Ameren.

Navigant completed Demand-Side Management (DSM) Potential Study in August 2013, which included an assessment of:

- Realistic Achievable Potential (RAP) and Maximum Achievable Potential (MAP) energy efficiency potential for the period of 2014-2033
- RAP and MAP demand response potential including time-based rates
- Combined heat and power potential

GMO adjusted the RAP and MAP scenarios to account for the roll-off of measures at the end of the measures' life, commercial and industrial opt-outs, and to match the 2016-2034 time period need for the IRP analysis.

The final reports can be found in Appendix 5A Navigant Demand-Side Resource Potential Study Report and Appendix 5B Navigant Demand Response Potential Study Report

Pursuant to 4 CSR 240-3.164 (2) (A), the current market potential study shall be updated no less frequently than every four (4) years. Therefore, in compliance with this requirement and as part of GMO's ongoing research efforts, GMO will initiate the next market potential study in 2015 with an estimated completion date of early 2017. GMO also recognizes that the current market potential study reflects a single data point and that a future market potential study may result in different energy and demand savings levels.

9.2.2 ADVANCED THERMOSTAT-COLLABORATION PROJECT WITH EPRI

GMO is collaborating with The Electric Power Research Institute (EPRI), as a host utility, to test and evaluate the potential of a new generation of programmable communicating thermostats that hold the potential for both energy and demand savings at a relatively low cost to the utility. Industry experience has shown that customer acceptance and usability can be key drivers to a

thermostat's energy or demand reduction potential. Given that smart thermostats may offer better customer usability due to their remote programming capability, the objective of this program is to evaluate their energy and demand savings impacts, as well as how customers perceive and use them.

The program will inform utilities and the public of the potential energy savings benefits of smart thermostats. For utilities, it may provide a measure of how these thermostats fit into their programs and key features that might promote energy efficiency and demand response. Demand response from residential air conditioners has been a target of many utility programs, but the cost of installation of load control devices and the perceived compromise in customer comfort have been large barriers. These thermostats, which are consumer-managed and possibly consumer-procured, may overcome these barriers at a relatively low cost. The knowledge gained about how customers perceive and interact with these types of devices may potentially inform future product designs and help bring about better thermostat choices for consumers.

9.3 SMARTGRID DEMONSTRATION PROJECT

The 5 year KCP&L SmartGrid Demonstration Project (SGDP) is implementing and evaluating end-to-end SmartGrid platform that includes advanced renewable generation, storage resources, leading-edge substation and distribution automation and control, energy management interfaces, and innovative customer programs and rate structures. The SGDP is focused on the geographic area served by the KCP&L Midtown Substation within Kansas City's urban core. The SGDP was awarded a funding grant from the DOE in and also collaborated with EPRI's SmartGrid Demonstration Program as a host utility.

The SGDP includes detailed analysis and testing to demonstrate the benefits of optimizing energy and information flows and utility operations across supply and demand resources, T&D operations, and customer end-use programs. The operational testing and data collection phase of the SGDP concluded September 31, 2014. The analysis, evaluation, and documentation of findings for the twenty

three operational demonstrations and tests conducted during the operational phase is ongoing and will be completed the first quarter of 2015. The SGDP Final Technical Report is due to the DOE May 1, 2015.

GMO anticipates that the results of SGDP and subsequent benefit cost analyses will determine that several of the advanced distribution grid technologies will be determined to be cost effective, or at a minimum we will understand under what conditions they become cost effective.

9.4 KCP&L/GMO CLEAN CHARGE NETWORK PILOT

KCP&L and GMO have launched an initiative to install and operate the KCP&L Clean Charge Network consisting of more than 1,000 electric vehicle charging stations throughout the Greater Kansas City region and within the KCP&L and GMO service territories.

KCP&L and GMO are partnering with organizations throughout our service territories that will host the charging station sites. Through these partnerships the KCP&L Clean Charge Network will offer free charging on every station to all drivers for a pilot period.

Prior to this pilot program KCP&L had deployed a limited number of EV charging stations as part of the SmartGrid Demonstration Project and a DOE Clean Cities grant. While these charging stations have provided some limited insight into EV charging characteristics, they have failed to provide much insight on the following questions:

- Can electric vehicles and electric vehicle charging stations enhance efficiency and utilization of the grid and, if so, how should such impacts be assessed, optimized and recognized?

- Do electric vehicles and electric vehicle charging stations present demand response opportunities and, if so, how should such opportunities be assessed, optimized and implemented?

The scale of the KCP&L Clean Charge Network is such that KCP&L and GMO should gain considerable insight in these and other public benefit areas, which could not be gained from the earlier limited deployments.

The Company plans to learn from these installations, gathering information during the pilot period to be shared with stakeholders in developing a longer term view.

9.5 DISTRIBUTED GENERATION AND PHOTOVOLTAIC SYSTEMS MARKET RESEARCH STUDY

GMO is participating with other utilities in an E Source market research study that will provide critical, timely information to help understand what motivates large and midsize business customers to acquire photovoltaic (PV) and other distributed generation (DG) technologies. It will also reveal which customers are most likely to reduce their demand for traditional utility-provided electricity.

Data will be gathered using a combination of qualitative and quantitative techniques on customer attitudes, desires, barriers, and actions that are essential to understand in order to create a viable PV and DG strategy. The E Source study covers the US and Canada and includes key market segments such as retail, grocery, healthcare, government, manufacturing, hotels and motels, data centers, and education. The DG questions focus on the following technologies: microturbines / combustion turbines, reciprocating engines, fuel cells, battery storage, thermal storage, combined heat and power (CHP), and waste heat recovery.

E Source will field a national survey, conduct customer interviews, perform research, and conduct analysis from January to April 2015. In addition, E Source will also field an oversample from the GMO service territory expected to be completed in the fall of 2015. The report and findings of the primary study is expected to be published in the spring of 2015.

Key questions addressed in this study include:

- What drives business customers to embrace PV and DG
- How do attitudes about utilities affect customers' decisions to adopt PV and DG
- What investment criteria are most commonly used for decision-making
- How do corporate sustainability goals affect these decisions
- What barriers may keep customers from adopting PV and DG
- Who are the preferred providers of PV and DG, including utilities, local contractors, and national vendors
- To what extent will on-site electric storage affect these decisions
- Can utility pricing models affect adoption
- How are corporate decisions made regarding PV and DG adoption
- Which customer segments are most likely to adopt PV and why

As a participant of this study GMO will receive:

- An interim intelligence report based on in-depth interviews
- A strategic outcome report, highlighting how the findings paint a picture for the future and illustrating how utilities can take advantage of, or defend, the PV and DG space
- A detailed results presentation report with key data in meaningful formats that can be used to help make strategic decisions
- A web conference on E Source's findings, including time for questions and a discussion of the results
- Full national data sets and, if fielded, utility-specific data sets