4. Existing Supply-side Resources

Highlights

- *Ameren Missouri currently owns and operates 10,231 MW of supply-side resources: 5,114 MW of coal, 1,190 MW of nuclear, 3,091MW of natural gas/oil, and 836 MW of renewables and storage.*
- *Ameren Missouri Meramec Energy Center Units 1 & 2 began using natural gas as its fuel in 2016, with all units at Meramec planned to be retired by the end of 2022.*
- *Ameren Missouri is planning for additional retirements of fossil-fueled generating units during the planning horizon:*
  - *Assumed retirement by 2024 of 324 MW (summer net capacity) of older, less efficient gas and oil-fired CTGs.*
  - *Sioux Energy Center is assumed to be retired in 2033*
  - *Two Labadie Energy Center Units are assumed to be retired in 2036.*

Ameren Missouri owns and operates thermal, nuclear, hydroelectric and storage energy centers to serve the energy needs of its customers. About 95% of generation comes from its coal-fired, nuclear, and oil/natural gas-fired energy centers. Ameren Missouri regularly evaluates energy center performance and upgrades that are necessary to operate its plants in an efficient, safe, cost-effective and environmentally-friendly manner.

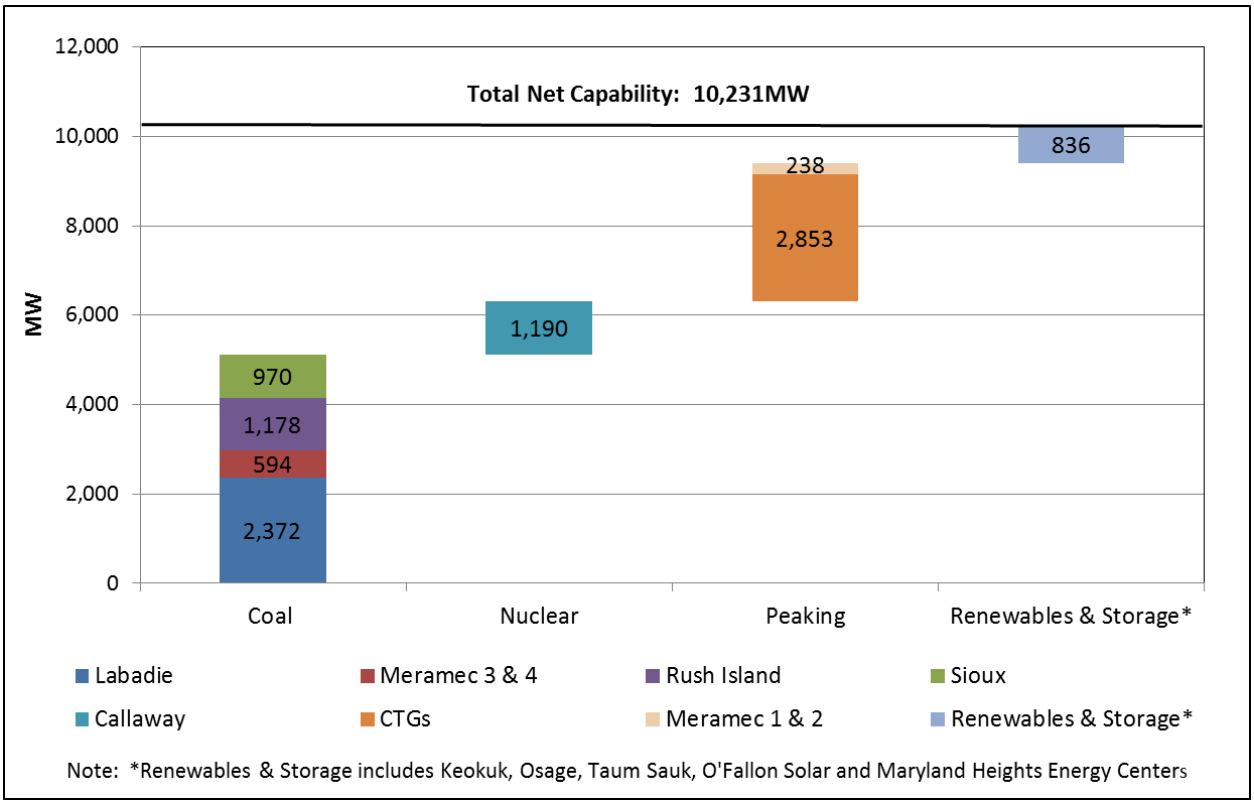
During the 20-year planning horizon, at existing energy centers, Ameren Missouri is planning to complete Keokuk Energy Center upgrades on Units 5 and 15 (the last of 15 main units), and retirement of the Meramec Energy Center, Sioux Energy Center, two units at Labadie Energy Center and seven older and less efficient CTG units.

Ameren Missouri has implemented various initiatives to maintain efficiency and reduce greenhouse gas (GHG) emissions at its existing facilities. Projects and work activities that restore efficiency lost due to equipment degradation or operating issues continue to be executed on a regular basis. Examples include high pressure turbine restoration work at Labadie and installation of split secondary air dampers at Sioux.

4.1 Existing Generation Portfolio[1]

Ameren Missouri owns and operates thermal, nuclear, hydroelectric and storage energy centers to serve the energy needs of its customers. Figure 4.1 reflects the 2017 summer net capability of Ameren Missouri's existing supply-side resources. Appendix A includes a unit rating summary table. Existing capacity position table for 2017-2037 can be found in Chapter 9-Appendix A and in the workpapers.

Figure 4.1 Existing Supply-side Resource Installed Capacity



4.1.1 Existing Coal Resources

Ameren Missouri has four coal-fired energy centers in its generation fleet. The Labadie, Rush Island, Meramec, and Sioux energy centers have a total summer net generating capability of 5,114 MW.

[1] 4 CSR 240-22.040(1); 4 CSR 240-22.040(2)

Labadie Energy Center

Labadie Energy Center is located outside Labadie, MO, on more than 1,100 acres adjacent to the Missouri River, 35 miles west of downtown St. Louis. The plant consists of four generating units with a summer net capability of 2,372 MW. The first unit started operating in 1970, and the plant was fully operational in 1973.

Labadie Energy Center is a national leader in generating electricity cleanly and efficiently:

- In 2013, Labadie was recognized as the Best Large Plant Performer by the Electric Utility Cost Group (EUCG) for its five year cost and reliability performance.
- In 2014, Navigant awarded Labadie a plant operational excellence award as the top performing large unit coal-fired energy center in the U.S.

Labadie 3 turbine efficiency was improved by approximately 7% following turbine restoration projects completed during a 2015 major outage. Labadie 4 turbine efficiency improved approximately 6% following similar projects in a Spring 2016 major outage. Numerous projects were completed at Labadie to comply with the EPA's Mercury and Air Toxics Rule (MATS) to reduce mercury and particulate emissions. Projects included new electrostatic precipitators on Units 1 & 2, rebuild of electrostatic precipitators on Unit 4 and installation of powdered activated carbon injection systems on all Units.

Rush Island Energy Center

Rush Island Energy Center is located 40 miles south of downtown St. Louis, in Jefferson County, Mo., on 500 acres on the western bank of the Mississippi River. The plant has two units with a net summer capability of 1,178 MW. The first unit started operation in 1976 and the second unit in 1977.

In 2016, the HP and IP turbines were cleaned and some turbine seals and packing were replaced on Rush Island Unit 2. The cleaning and seal replacements will improve the efficiency of the HP and LP turbines.

Rush Island was recognized in 2016 as Power Magazine's PRB Plant of the Year.

Meramec Energy Center

Meramec Energy Center is located in South St. Louis County on the Mississippi River on 420 acres. The first unit began operation in 1953 and the remaining three units were in service by summer of 1961. Net summer capability of the two coal-fired units at the site is 594 MW. In 2016, Units 1 & 2, representing 238 MW, began operating on natural gas. The facility is currently scheduled to be retired at the end of 2022.

Sioux Energy Center

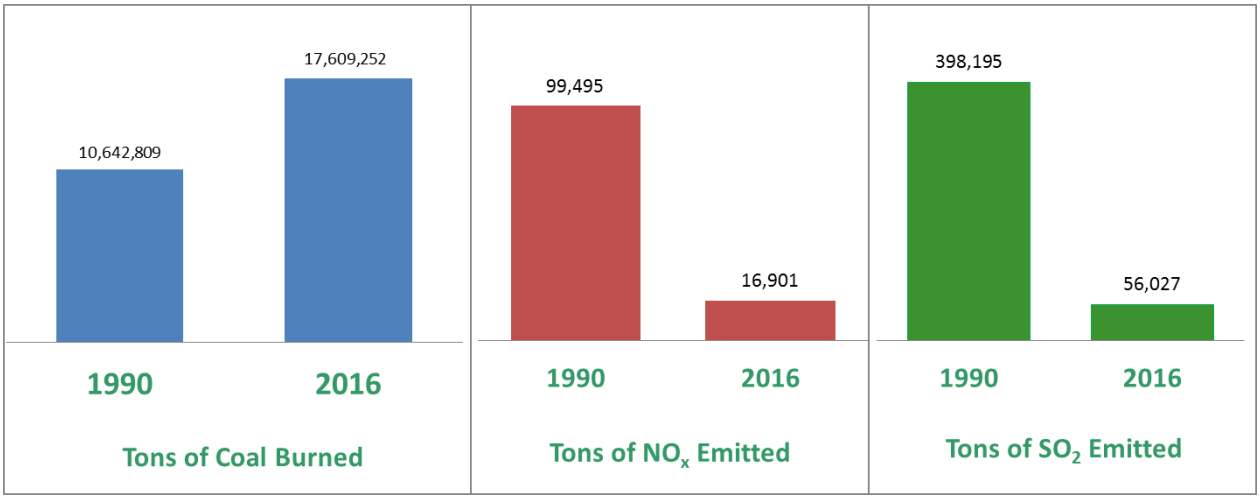
Sioux Energy Center is located in St. Charles County, Mo., 28 miles northwest of downtown St. Louis, on the Mississippi River. It consists of two cyclone boiler units which started operations in 1967 and 1968, respectively, and has a total net summer capability of 970 MW.

Both units at Sioux are equipped with wet flue gas desulfurization (FGD) equipment to comply with the Cross State Air Pollution Rule (CSAPR). CSAPR required significant reductions of sulfur dioxide (SO_2) and nitrogen oxide (NO_x) emissions on a regional scale by 2015. The FGD system at Sioux also provides significant co-benefits in complying with EPA's MATS rule for both mercury and particulate emissions.

Historical Emissions from Coal Resources

Ameren Missouri has achieved dramatic decreases in SO_2 and NO_x emissions during the past two decades, despite an increase in the amount of coal consumed to meet our customers' growing energy needs over that period. Over the years, Ameren Missouri has been able to reduce pollutant emissions by using lower-sulfur fuels, by installing cleaner-emitting burners with computer-controlled operation, by improving operation of existing precipitators -- collecting more than 99% of particulates -- and by installing scrubbers at Sioux Energy Center. In addition, Ameren Missouri developed an early, progressive approach to meeting NO_x control regulations. Figure 4.2 shows the decrease in Ameren Missouri's SO_2 and NO_x emissions as coal consumption has increased.

Figure 4.2 NO_x and SO_2 Emissions Reductions



4.1.2 Existing Gas & Oil Resources

Ameren Missouri owns and operates oil- or natural gas-fired combustion turbine generators (CTG) to provide electricity during times of high demand or when its higher utilization plants are not operating due to a forced outage or scheduled maintenance.

In 2015, one of the CTG plants, Howard Bend, was retired. Table 4.1 lists the Ameren Missouri combustion turbines and their 2014 summer net generating capabilities. **

[redacted]

[redacted][2]

[redacted]**

Table 4.1 CTG Capability

Audrain	Gas	600
Goose Creek	Gas	432
Kirksville	Gas	13
Pinckneyville	Gas	316
Raccoon Creek	Gas	300
Kinmundy	Gas/Oil	206
Meramec CTG	Gas/Oil	98
Peno Creek	Gas/Oil	188
Venice	Gas/Oil	487
Fairgrounds	Oil	54
Mexico	Oil	53
Moberly	Oil	53
Moreau	Oil	53
Total		2,853

[2] 4 CSR 240-22.040(3)(B)

4.1.3 Existing Nuclear Resource

Callaway Energy Center is located about 100 miles west of St. Louis, Missouri, in Callaway County. The plant started operations in December 1984 and is the only power plant that uses nuclear fuel in Ameren Missouri's generation fleet. Ameren Missouri continues to make cost-effective investments in Callaway to replace equipment that is at the end of service life, including components such as turbine rotors, steam generators and main transformers.

Callaway Energy Center is the second largest power generator on the Ameren Missouri system with a net capability of 1,190 MW.

4.1.4 Existing Renewable and Storage Resources

Currently, Ameren owns and operates 4.9 MW (AC) of solar generation, 385 MW of hydroelectric resources and 440 MW of pumped storage with an additional purchase power agreement for 102 MW of wind generation.

Existing Hydroelectric Resources

Keokuk

Ameren Missouri's Keokuk hydroelectric plant is located on the Mississippi River at Keokuk, Iowa, 180 miles north of St. Louis. The Keokuk Energy Center has a total net summer capability of 145 MW.

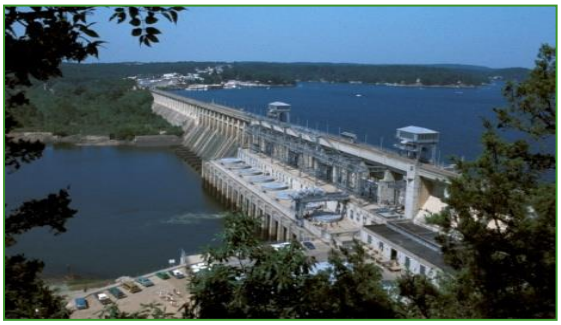
More than a million cubic yards of earth and rock were excavated to build the Keokuk dam and plant, which began operation in 1913. The history of the site as a power source began as far back as 1836, when Robert E. Lee conducted a survey for what was then known as the War Department and called attention to the power potential of this section of the Mississippi. An engineering marvel of its time, Keokuk is the largest privately owned and operated dam and hydroelectric generating plant on the Mississippi River. Over the years, Ameren Missouri has continued to invest in the modernization and repair of the plant and dam.

As it passes through the power plant, falling water spins turbines, or water wheels, which drive generators that produce electricity. Keokuk Plant is a "run-of-river plant,"

meaning that all water flowing downstream passes the plant on a daily basis. No water is stored. An average day of operation at Keokuk Plant saves the equivalent of nearly 1,000 tons of coal. The individual units at the Keokuk Energy Center, each having a nameplate rating of less than 10 MW, were certified as qualified renewable energy resources by the Missouri Department of Natural Resources (MoDNR) in September 2011.

Keokuk Energy Center completed two unit upgrades in December 2016. As a result, the ratings on Keokuk Units 6 and 14 are expected to increase by 2 MW each.

Osage



Ameren Missouri's Osage hydroelectric plant is located in Lakeside Missouri on the Osage River at the Lake of the Ozarks. The Osage Energy Center has a total net summer capability of 240 MW.

Osage began operation in 1931. For early settlers, the rolling Osage River in the heart of Missouri's Ozark wilderness provided a way of life and a source of livelihood, whether that was fishing, farming, logging or other pursuits. Then in the 1930s, the river was harnessed when Union Electric Company (now Ameren Missouri) built Bagnell Dam to provide power for a growing state and a budding economy. The 1930s-era building of Bagnell Dam and Ameren Missouri's Osage hydroelectric plant created a range of recreational opportunities in the now popular Lake of the Ozarks.

Every hour the Osage Plant operates, other energy resources are preserved. As water passes through the dam, the pressure of the falling water spins water wheels, which drive generators that produce electricity. In a typical year, Osage Plant uses the clean energy of falling water to produce as much power as 225,000 tons of coal or one million barrels of oil.

In 2017, Ameren Missouri started stability upgrades at Bagnell Dam to provide additional stabilization of the dam to conform with FERC guidelines. To stabilize the dam, 68 new plastic encapsulated state of the art post-tensioned anchors will be installed in the west retaining section, east retaining section, and spillway section. Additionally, mass concrete will be installed across the downstream side of the west and east retaining sections, which will reduce the number of anchors required. The project is expected to cost approximately $55M and is scheduled to be completed by December 2018.

Existing Pumped Storage

Taum Sauk

The Taum Sauk pumped storage plant is located approximately 120 miles southwest of St. Louis in the scenic Ozark highlands. The Taum Sauk Energy Center has a total net summer capability of 440 MW.

Taum Sauk Plant began operation in 1963, the turbines were completely rebuilt in 1999, and the upper reservoir rebuild project was completed in 2010. Taum Sauk is used primarily on a peaking basis and is put into operation when the demand for electricity is greatest. The pump storage system works much like a conventional hydroelectric plant, but is usually used only to meet daily peak power demands. Water stored in an upper reservoir is released to flow through turbines and into a lower reservoir during periods of high energy demand. Then, overnight, when the demand for electricity is low, the water is pumped back into the upper reservoir, where it is stored until needed.

Existing Renewables

Pioneer Prairie Wind Farm

In June 2009, Ameren Missouri executed an agreement to purchase 102 MW of wind power from Phase II of Horizon Wind Energy's Pioneer Prairie Wind Farm in northeastern Iowa in Mitchell County. The wind farm is fully operational with both phases having a total capacity of more than 300 MW. This Purchase Power Agreement runs from September 2009 through August 2024. The Pioneer Prairie Wind Farm was certified as a qualified renewable energy resource by the MoDNR in September 2011. The power Ameren Missouri is purchasing ties into the MISO transmission grid, of which the company is a member.

O'Fallon Renewable Energy Center

In December 2014 Ameren Missouri began operation of 4.8 MW (AC) of solar generation at the O'Fallon Renewable Energy Center. The O'Fallon facility includes more than 19,000 polysilicon solar panels covering 25 acres of land owned by Ameren Missouri. It is the largest investor-owned utility scale

solar facility in Missouri and was certified as a qualified renewable energy resource in April, 2015 by Missouri Department of Economic Development (DED).

Ameren Missouri also owns approximately 100 kW of various PV solar technologies at its headquarters office building in St. Louis, which was certified as a qualified renewable generation facility by the MoDNR on September 28, 2011. The total generation of this facility during year 2015 was 89 MWh.

Maryland Heights Renewable Energy Center

The MHREC is located in St. Louis County approximately 18 miles northwest of St. Louis. The MHREC is the largest landfill-gas-to-electric facility in Missouri and one of the largest in the country, generating enough renewable energy to power approximately 10,000 average Missouri homes.

The MHREC began operation in June 2012. It has a total net summer capacity of 8 MW (net). This facility burns methane gas produced by the IESI Landfill in Maryland Heights, MO, in three Solar Mercury 50 gas turbines to produce electricity. The current contract with the landfill guarantees enough gas supply for three generators until 2022. In August 2012, the MHREC was certified as a qualified renewable energy resource by the MoDNR.

4.1.5 Levelized Cost of Energy Evaluation for Existing Resources[3]

The levelized cost of energy (LCOE) was calculated for Ameren Missouri's existing resources. LCOE represents going forward costs of ownership and operation and provides a basis for comparison to new resource alternatives. It is important to note that the LCOE figures do not fully capture all of the relative strengths of each resource type. Table 4.2 shows the component analysis for the LCOE for each energy center. The average LCOE for Ameren Missouri's coal energy centers is approximately $42/MWh. The average LCOE for Ameren Missouri's entire generating fleet is approximately $43/MWh.

[3] 4 CSR 240-22.040(2)(A); 4 CSR 240-22.040(2)(B); 4 CSR 240-22.040(2)(C)1

Table 4.2 Levelized Cost of Energy Component Analysis for Existing Resources

Existing Resources	Levelized Cost of Energy (¢/kWh)										
	Non-Environmental Costs					Probable Environmental Costs					Total Cost
	Non-Env Capital	Fixed and Variable O&M	Fuel	Decommission	Pump MWh	Env Capital	Env O&M	CO2	SO2	NOx	
Labadie	0.55	0.30	2.15	--	--	0.16	0.04	0.27	0.00	0.03	**3.49**
Rush Island	0.54	0.40	2.35	--	--	0.20	0.03	0.38	0.00	0.00	**3.92**
Meramec	0.67	2.31	2.37	--	--	1.49	0.04	0.00	0.00	0.01	**6.88**
Sioux	0.67	0.65	2.23	--	--	0.35	0.04	0.17	0.01	0.01	**4.12**
Audrain	0.50	0.29	5.65	--	--	--	0.00	0.17	0.00	0.00	**6.61**
Goose Creek	1.47	0.52	5.38	--	--	--	0.00	0.16	0.00	0.00	**7.54**
Kirksville	0.10	0.04	7.87	--	--	--	--	0.00	0.00	0.00	**8.01**
Pinckneyville	0.77	1.46	4.53	--	--	--	--	0.14	0.00	0.00	**6.89**
Raccoon Creek	0.23	0.74	5.63	--	--	--	--	0.17	0.00	0.00	**6.77**
Kinmundy	0.89	1.19	5.10	--	--	--	--	0.15	0.00	0.00	**7.33**
Meramec CTG	2.52	0.17	5.60	--	--	--	--	0.00	0.00	0.00	**8.30**
Peno Creek	0.86	1.66	4.91	--	--	--	--	0.15	0.00	0.00	**7.57**
Venice	0.57	0.85	4.91	--	--	--	--	0.15	0.00	0.00	**6.48**
Fairgrounds	0.04	0.24	7.87	--	--	--	--	0.00	0.00	0.00	**8.15**
Mexico	0.06	0.42	8.03	--	--	--	--	0.00	0.00	0.00	**8.51**
Moberly	0.06	0.39	5.33	--	--	--	--	0.00	0.00	0.00	**5.79**
Moreau	0.04	0.28	8.79	--	--	--	--	0.00	0.00	0.00	**9.12**
Callaway	1.32	1.81	0.79	0.07	--	--	--	0.00	0.00	0.00	**4.00**
Keokuk	1.91	0.50	0.00	--	--	--	--	0.00	0.00	0.00	**2.40**
Osage	4.65	1.20	0.00	--	--	--	--	0.00	0.00	0.00	**5.85**
Taum Sauk	3.29	1.66	0.00	--	4.78	--	--	0.00	0.00	0.00	**9.73**
Maryland Heights CTG	1.14	3.05	8.05	--	--	--	0.00	0.00	0.00	0.00	**12.24**
O'Fallon (Solar)	0.00	0.41	0.00	--	--	--	0.00	0.00	0.00	0.00	**0.41**

4.1.6 Planned Changes to Existing Non-Coal Resources

During the 20-year planning horizon, Ameren Missouri is considering two Keokuk Energy Center Units for upgrades, adding a new CTG unit at MHREC, and the potential retirement of seven CTG units.

Portfolio Upgrades

Keokuk Energy Center completed upgrades to Units 6 and 14 in December 2016. The net output is expected to increase by 2 MW each with a total capital cost of approximately $24 million. In addition, upgrades at Keokuk Energy Center for Units 5 and 15 are scheduled to be complete in 2019. The net output Keokuk will increase by 2 MW each with a total capital cost of approximately $25 million (for the turbine component upgrades only) budgeted in 2017, 2018, and 2019.

Ameren Missouri is considering adding a fourth CTG unit at MHREC that will be in service in 2025. The fourth unit will provide an additional 3-4 MW of summer net capacity with a total capital cost of $16-18 million in 2024-2025 and will provide additional renewable energy needed for meeting the requirements of Missouri's Renewable Energy Standard (RES).

CTG Retirements

In 2013, Ameren Missouri conducted a high level retirement evaluation of the existing CTG fleet. The potential retirement recommendation is based on operating experience, condition of the assets, and qualitative analysis. The qualitative analysis considered factors such as condition of subsystems, obsolesce of control systems, availability of spare parts, and building condition. Based on the evaluation, Ameren Missouri should consider retiring some or all seven of its older gas- and oil-fired CTG units (i.e., Kirksville, Fairgrounds, Meramec CTG-1, Meramec CTG-2, Mexico, Moberly, and Moreau) with a total net capacity of 367 MW over the next 20 years. A combination of factors lead to the potential CTG retirement recommendations, including the fact that the average age of seven of the units is 41 years; and for some of the units, the long-term availability of spare parts is questionable. The lead time for obtaining spare parts is unknown. Table 4.3 provides a summary of the planned CTG retirements. The planned CTG retirements are included in the base capacity position (see Appendix B). Howard Bend was retired in early 2015 due to the age of the unit, long-term availability of spare parts, safety and the poor economics associated with refurbishment.

Table 4.3 Ameren Missouri Potential CTG Retirements during the Planning Period

Unit	Capacity (MW)	Fuel Type	Commerical Operation Date	Age as of 12/31/2016	Retirement Time Frame
Kirksville	13	Natural Gas	1967	49	12/31/2021
Fairgrounds	54	Oil	1974	42	12/31/2021
Meramec CTG-1	54	Oil	1974	42	12/31/2021
Meramec CTG-2	44	Natural Gas/Oil	1999 (1)	40	12/31/2021
Mexico	53	Oil	1978	38	12/31/2023
Moberly	53	Oil	1978	38	12/31/2023
Moreau	53	Oil	1978	38	12/31/2023

Note: (1) Meramec CTG 2 was acquired by Ameren Missouri in 1999 and is 1976 vintage.

The results of a detailed condition assessment for each unit will be used as the basis for economic analysis to be considered along with other factors such as overall age, condition, reliability, safety and cost, significant capital needs, near-term capacity value and availability of spare parts.

4.2 Existing Steam Generation Evaluation

Ameren Missouri has evaluated its coal energy centers in terms of condition, base retirement assumptions, reliability trends, operation and maintenance costs, and capital expenditures. Table 4.4 lists the commercial operation date for each generating unit, the average age at each energy center as of 12/31/2016, and the base retirement

assumptions based on the 2014 Black & Veatch Report on Life Expectancy of Coal-Fired Power Plants.

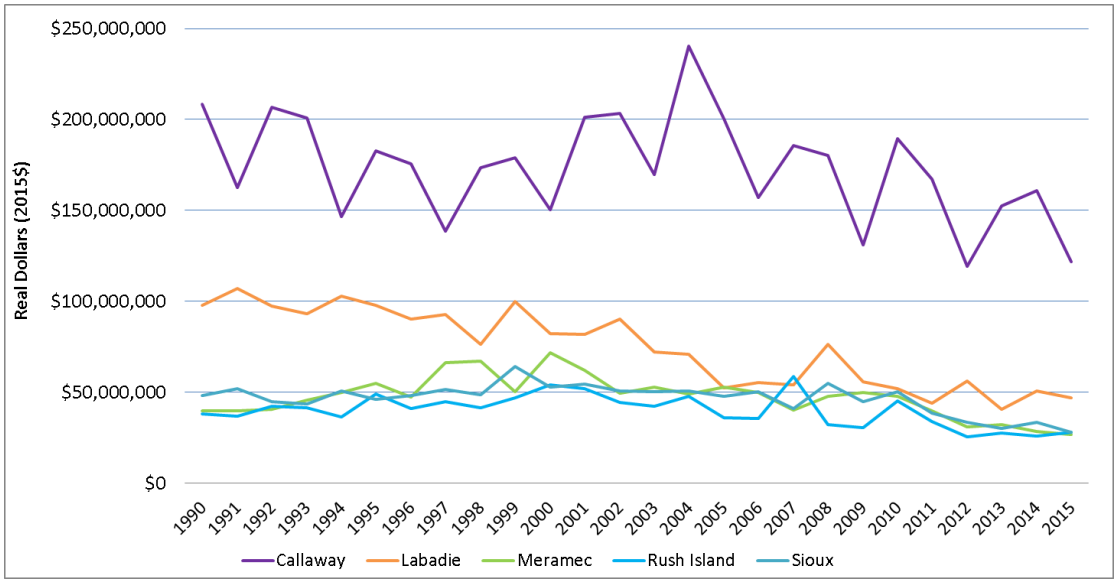
Table 4.4 Ameren Missouri Coal Energy Center Commercial Operation Dates, Average Age, and Base Retirement Assumptions

Energy Center	Commercial Operation Date				Average Age as of 12/31/2016	Base Retirement Assumptions (Retirement Date)
	Unit 1	Unit 2	Unit 3	Unit 4		
Labadie	1970	1971	1972	1973	45	2042
Meramec	1953	1954	1959	1961	60	2022
Rush Island	1976	1977			40	2045
Sioux	1967	1968			49	2033

4.2.1 Operations and Maintenance Costs

Figure 4.3 shows the historical operations and maintenance (O&M) costs for Ameren Missouri's four coal-fired energy centers from 1990 to 2015. The plant O&M costs were taken from the annual plant operating reports and then normalized to 2015 dollars using the Handy Whitman Index for Total Steam Production Plant. The average annual escalation for the period 1990 to 2015 was 3.2%. These costs are non-fuel O&M expenses. O&M has a relatively moderate downward trend in the last 10-15 years.

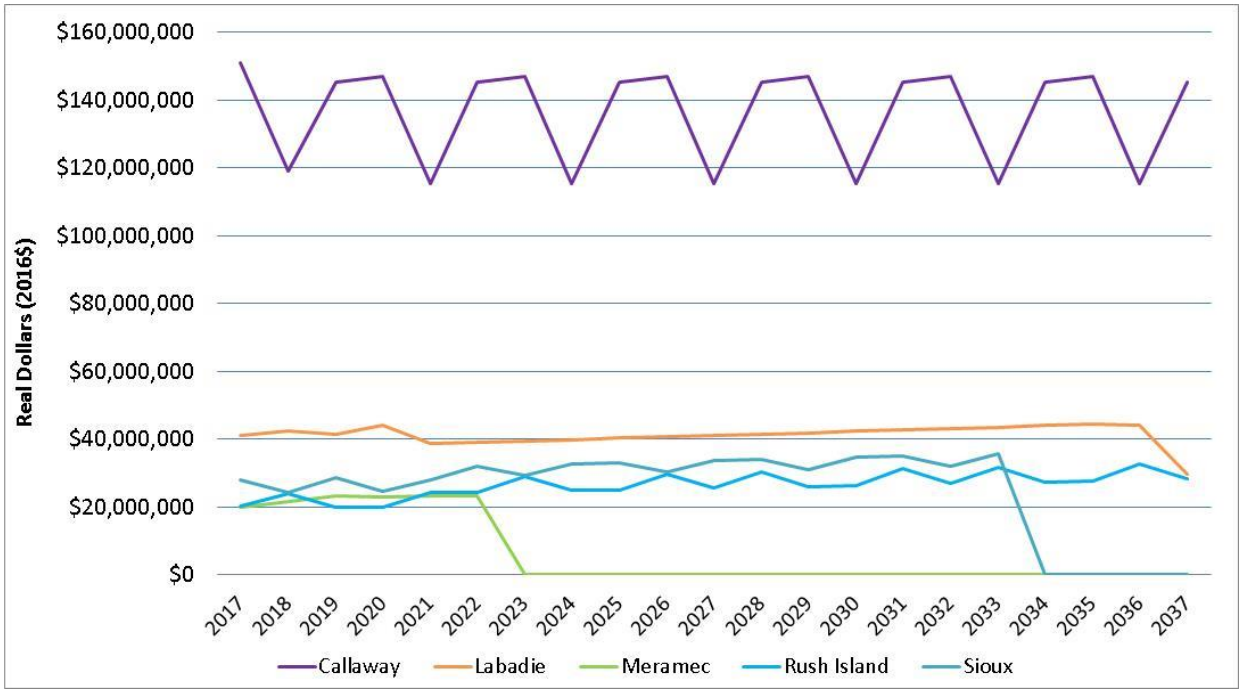
Figure 4.3 Historical Annual O&M for Ameren Missouri Energy Centers (2015$)



The plant O&M costs are anticipated to remain relatively flat in real terms in the future. Figure 4.4 shows the future O&M costs from 2017 to 2037 in 2016 dollars. The labor portion of the O&M assumes a 50% pension and benefit loading factor. In addition, the O&M forecasts assume annual revenues from refined coal operations at Rush Island

and Sioux from 2014 through 2021. A 4-year outage cycle for Labadie, a 5-yr outage schedule for Rush Island and a three-year outage cycle for Sioux are assumed in the O&M forecast. In the retirement year of each plant, what would otherwise be capital expenditures are included in O&M costs for modeling purposes.

Figure 4.4 Future Annual O&M for Ameren Missouri Coal Energy Centers (2016$)



4.2.2 Capital Expenditures

Figure 4.5 shows the historical non- environmental capital expenditures from 2001 to 2016. The plant capital expenditures were taken from the Ameren Missouri accounting system and normalized to 2016 dollars using a 2% escalation rate.

Figure 4.5 Historical Non-Environmental Capital Expenditures for Ameren Missouri Coal Energy Centers (2016$)

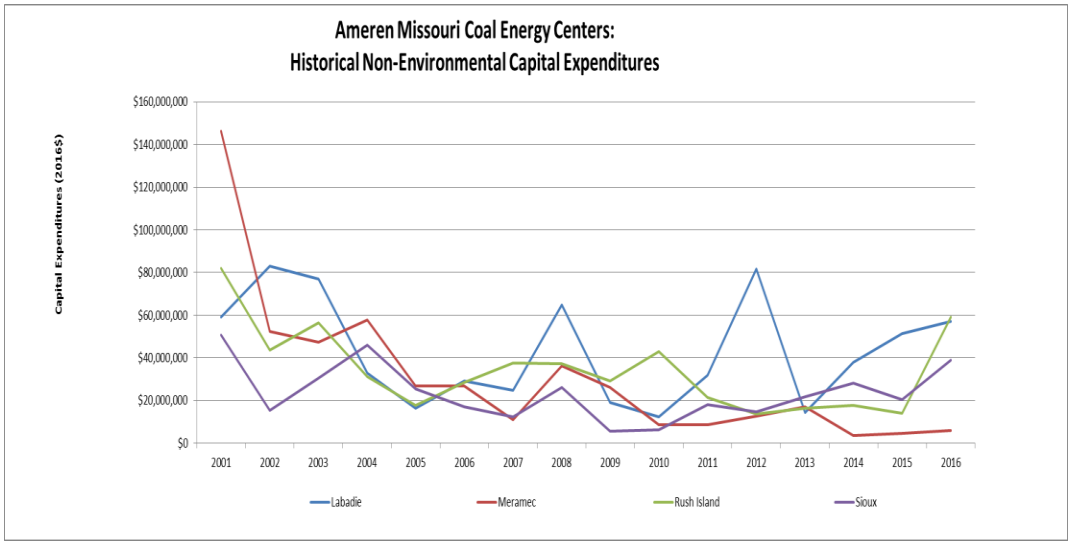
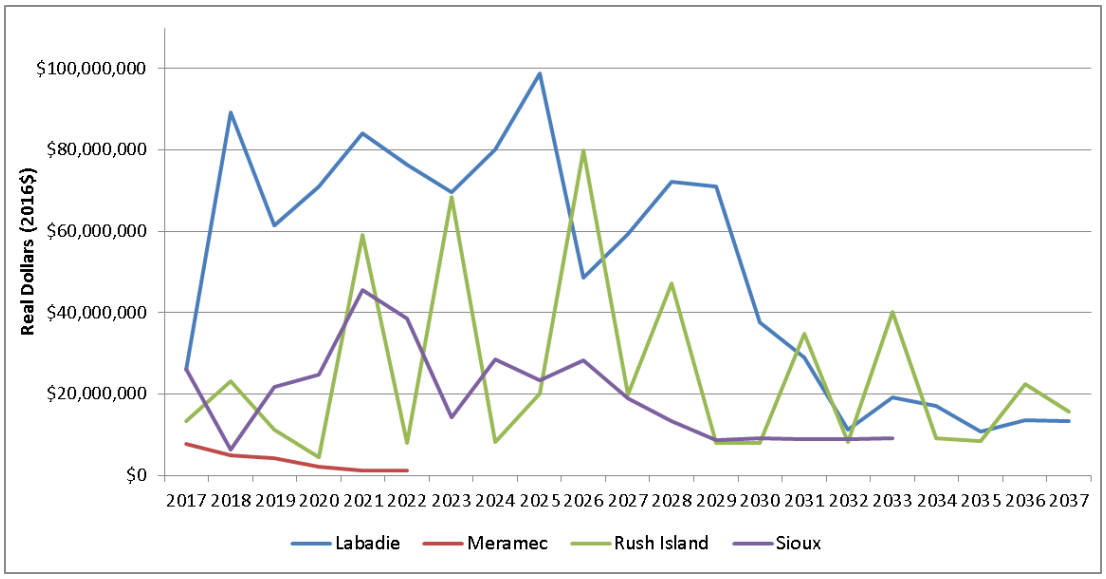


Figure 4.6 shows the future non-environmental capital expenditures for 2017 to 2037. Future environmental capital expenditures are discussed in Chapter 5. The future non-environmental plant capital expenditures were provided by Ameren Missouri Power Operations Services and normalized to 2016 dollars using a 2% escalation rate. Labadie's capital expenditures show a slight increasing trend over time due to boiler and landfill projects. Meramec and Sioux energy centers show a decreasing trend in non-environmental capital expenditures over the time period. Rush Island capital expenditures are expected to remain relatively flat over the time period.

Figure 4.6 Future Non-Environmental Capital Expenditures Ameren Missouri Coal Energy Centers (2016$)



4.3 Efficiency Improvement[4]

4.3.1 Existing Facility Efficiency Options

Ameren Missouri has implemented various initiatives to improve efficiency and reduce GHG emissions at its existing facilities. These initiatives include replacement of incandescent light bulbs with compact fluorescent light bulbs, and standardization of low-energy usage light fixtures during system replacements. Another initiative to improve efficiency and reduce GHG emissions in the operation of heating, ventilation, and air conditioning (HVAC) equipment through the installation of programmable thermostats for control of HVAC systems is expected to reduce energy consumption during off-hours. The projects completed in 2011 through 2015 will reduce energy consumption by more than 3,400 MWh annually and reduce CO2 emissions by more than 3,200 metric tons annually (assuming 0.94 metric tons of CO_2 per MWh). Ameren Missouri will continue assessing and implementing the projects that prove to be feasible on an ongoing basis.

Ameren Missouri has monitored the performance, costs, and benefits of light-emitting diode (LED) street lighting technology for many years. Starting in 2016, Ameren Missouri began a project to replace 125,000 company-owned street lighting fixtures (66% of existing street lights) with LEDs by 2022. Subsequent analysis identified an additional 15,000 company-owned lights (an additional 7% of existing street lights) that could be cost-effectively replaced with LEDs; and replacement for these lights began in the summer of 2017 with a five year completion goal. Furthermore, Ameren Missouri has agreed to replace 15,000 customer-owned street lights. The replacement of these street lights began in 2017 and is expected to be completed by 2023. These changes will benefit both customer rates and the environment. Upon installation, the LED street lights will result in immediate bill savings for lighting customers and once completed the LED street lights will reduce carbon emissions by 96,000 metric tons annually. Ameren Missouri is actively exploring cost effective LED replacement options for its remaining company-owned street lights as well as additional options for customer-owned street lights.

In late April 2016, Ameren Corporation published its fourth-ever corporate social responsibility report: a microsite available at AmerenCSR.com. The report details Ameren's commitment to energy sustainability and how the company works to balance its responsibilities to customers, shareholders, the environment and employees. In the report Ameren addresses a range of topics, including environmental performance, community betterment and financial strength. Ameren's report was recently recognized

[4] 4 CSR 240-22.040(1)

as one of the Top 100 Reports Worldwide, ranking #20 out of 1,000+ companies in the League of American Communication Professionals' (LACP) Vision Awards.

4.3.2 Existing Energy Center Efficiency Options[5]

Ameren Missouri continues to be focused on maintaining the efficiency of its coal-fired generating units. Projects that improve efficiency that are a benefit to the company and to customers continue to be evaluated and executed when appropriate. Projects and work activities that restore efficiency lost due to equipment degradation or operating issues continue to be evaluated and executed on a regular basis.

Ameren Missouri performs long-term scheduled major maintenance outages. Much of the work performed during these major outages (such as replacement or repair of leaking valves, restoration of duct work, insulation of equipment, and cleaning of equipment) typically results in improved efficiency when the unit returns to service. For example, high pressure turbine restoration work on Labadie Unit 3 improved turbine efficiency by approximately 7% following a major outage in 2015, and similar work on Labadie Unit 4 improved high pressure turbine efficiency by approximately 6% following a major outage in 2016. On Sioux Unit 1, the installation of split secondary air dampers on the boiler in late 2016 is estimated to provide a 1% unit efficiency improvement based on a previously completed project on Sioux Unit 2.

Operational monitoring at Ameren Missouri's coal plants is also an important tool in maintaining the heat rate (efficiency) at the coal plants. EtaPRO is a continuous monitoring software tool used at all the plants to monitor thermal performance of critical equipment. The EtaPRO system is maintained by Performance Engineering and is also used by performance engineers to generate plant heat rate (efficiency) reports. Operations personnel routinely check system components during operation and start-up modes to insure that valve line-ups are correct and equipment performance is maintained.

[5] 4 CSR 240-22.040(1)

4.4 Compliance References