BEFORE THE PUBLIC SERVICE COMMISSION OF THE STATE OF MISSOURI

Filed
January 6, 2012
Data Center
Missouri Public
Service Commission

In the Matter of Union Electric Company's 2011 Utility Resource Filing Pursuant to 4 CSR 240 – Chapter 22.

File No. EO-2011-0271

STAFF'S REPORT ON UNION ELECTRIC COMPANY'S 2011 ELECTRIC UTILITY RESOURCE PLANNING COMPLIANCE FILING

COMES NOW the Staff ("Staff") of the Missouri Public Service Commission ("Commission"), and submits its Report on Union Electric Company d/b/a Ameren Missouri's 2011 Chapter 22 Electric Utility Resource Planning Compliance Filing. In support thereof, Staff states:

- 1. Former rule 4 CSR 240-22.080(5)¹ provided that Staff shall review each compliance filing and, within 120 days after each utility's scheduled electric resource plan filing date, file a report that identifies, among other things, any deficiencies in the electric utility's compliance with the provisions of Chapter 22.
- 2. As part of its attached report Staff identifies both the deficiencies and the concerns Staff found during its limited review of Ameren Missouri's 2011 Chapter 22 Compliance Filing.
- 3. Staff found four deficiencies in Ameren Missouri's filing with respect to the following rules:
 - 4 CSR 240-22.010 Policy Objectives
 - 4 CSR 240-22.050 Demand-Side Resource Analysis
 - 4 CSR 240-22.070 Risk Analysis and Strategy Selection

Staff Exhibit No. 11

Date 12/15/11 Reporter FMS

File No. E0-2011-02-71

¹ New Chapter 22 rules became effective on May 31, 2011.

- 4. Staff did not identify any deficiencies with respect to Ameren Missouri's obligations arising from Missouri's statutory Renewable Energy Standards.
- 5. In its report Staff discusses the deficiencies and concerns it identified in Ameren Missouri's Compliance Filing. Staff also provides recommended resolutions to the deficiencies and concerns it identified.

WHEREFORE, Staff submits its report on Ameren Missouri's 2011 Chapter 22 Electric
Utility Resource Planning Compliance Filing.

Respectfully submitted,

/s/ Nathan Williams
Nathan Williams
Deputy Counsel
Missouri Bar No. 35512

Attorney for the Staff of the Missouri Public Service Commission P. O. Box 360
Jefferson City, MO 65102
(573) 751-8702 (Telephone)
(573) 751-9285 (Fax)
Nathan Williams@psc.mo.gov (e-mail)

Certificate of Service

I hereby certify that copies of the foregoing have been mailed, hand-delivered, transmitted by facsimile or electronically mailed to counsel of record this 23rd day of June, 2011.

Land Color State Color C

/s/ Nathan Williams		

MISSOURI PUBLIC SERVICE COMMISSION

STAFF REPORT ON

UNION ELECTRIC COMPANY d/b/a AMEREN MISSOURI

ELECTRIC UTILITY RESOURCE PLANNING COMPLIANCE FILING

FILE NO. EO-2011-0271

June 23, 2011

JEFFERSON CITY, MISSOURI

** Denotes Highly Confidential Information **



Table of Contents

Summary of Staff's Findings and Recommendations Description of Ameren Missouri's Resource Acquisition Strategy and Integrated Resource Plan Deficiencies Concerns Summary of the Process and Filing	1 3 5 7
Deficiencies	3 5 7
Concerns	5 7
	7
	8
Ameren Missouri's 2011 IRP Filing and Adopted Resource Acquisition Strategy	
List of Staff's Deficiencies	3
List of Staff's Concerns	3
4 CSR 240-22.030 Load Analysis and Forecasting	5
4 CSR 240-22.040 Supply-Side Resource Analysis	6
4 CSR 240-22.050 Demand-Side Resource Analysis	8
Deficiencies1	
Concerns	
4 CSR 240-22.060 Integrated Resource Analysis	1
4 CSR 240-22.070 Risk Analysis and Strategy Selection	5
Deficiencies	
Concerns	
4 CSR 240-22.080 Filing Schedule and Requirements4	7

Summary of Staff's Findings and Recommendations

<u>Description of Ameren Missouri's Resource Acquisition Strategy and Integrated Resource Plan</u>

On February 23, 2011, Union Electric Company, d/b/a Ameren Missouri, filed its 2011 Integrated Resource Plan (IRP) compliance filing (Filing) in File No. EO-2011-0271, as required by rule 4 CSR 240-22 Electric Utility Resource Planning.

As a result of its review, Staff finds that Ameren Missouri's analysis gave its decision-makers¹ a comprehensive set of fourteen (14) candidate resource plans, and risk analyses for each candidate resource plan, for use during the decision-makers' strategy selection process. The risk adjusted present value of revenue requirements (PVRR) over 29 years for the fourteen (14) candidate resource plans² varies from a low of \$59.7 billion (for a plan with only realistic achievable potential (RAP) demand-side management (DSM) resources (Plan R0)) to a high of \$65.6 billion (for a plan with Low Risk DSM, combined cycle gas plant and 30% ownership of a nuclear plant (Plan H1)) for a range of \$5.9 billion. Ameren Missouri's adopted resource acquisition strategy includes its preferred resource plan (Plan B1), which consists of Low Risk DSM and the addition of a combined cycle plant late in the 20-year planning horizon; five contingency resource plans, Low Risk DSM³, two levels of RAP DSM⁴, addition of combined cycle plants, 30% of a nuclear plant, and/or the retirement of Ameren Missouri's Meramec Plant; and two decision factors - plant financing solution and

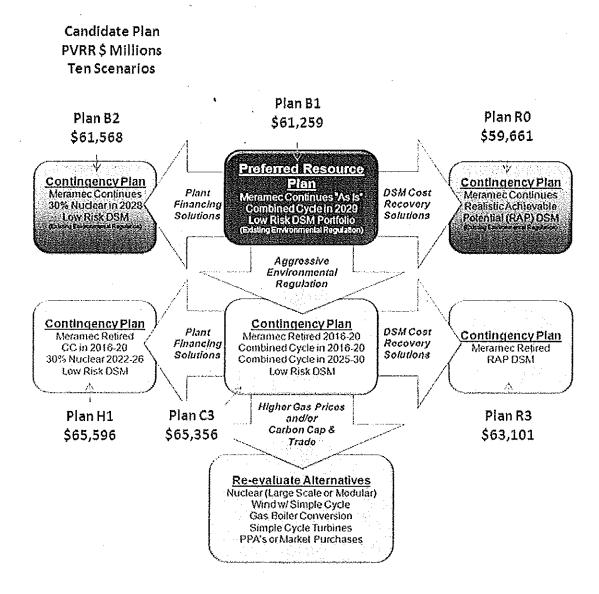
² See Addendum C Page 1 of 8 for risk adjusted PVRR for the fourteen (14) candidate resource plans for the ten scenarios probability tree.

¹ Chapter 10, Appendix D, of Ameren Missouri's filing indicates that Ameren Missouri decision-makers present at the January 31, 2011, Ameren Missouri Board of Directors Meeting who adopted the 2011 IRP resource acquisition strategy included: Board Chairman Baxter, and Board Members Cole, Heflin, Lyons, and Sullivan.

³ See Addendum A, Plan B1, Plan B2, Plan B3, Plan B4, Plan C1, Plan C2, Plan C3, Plan H1, Plan H2 and Plan H3 which each contain a pre-determined amount of energy savings from Low Risk DSM energy efficiency programs and, beginning in 2016, an amount of demand savings from demand response programs determined by the MIDAS model for each year. By 2030 the demand savings from Low-Risk DSM equals 232 MW from energy efficiency programs and 244 MW from demand response programs.

⁴ See Addendum A, Plan R0, Plan R1 and Plan R2 which each contain a pre-determined amount of energy and savings and demand savings from only energy efficiency programs. By 2030, the amount of demand savings from RAP energy efficiency programs is 1,007 MW. Also, see Addendum A, Plan R3 which contains a predetermined amount of energy and demand savings from energy efficiency programs and, beginning in 2016, an amount of demand savings from demand response program for each year determined by the MIDAS model. By 2030, the demand savings from RAP energy efficiency programs is 1,007 MW, and the demand savings from RAP demand response programs is an additional 826 MW for a total demand savings in Plan R3 of 1,833 MW in 2030.

DSM cost recovery solution. Ameren Missouri's resource acquisition strategy is shown in the following diagram:



Ameren Missouri selected Plan B1 as its preferred resource plan under current environmental regulations, even though its RAP DSM with only energy efficiency programs and no supply-side addition through the planning period plan (Plan R0) has a risk adjusted PVRR which is \$1.6 billion less than its preferred plan (Plan B1). If an acceptable DSM cost recovery solution is achieved under current environmental regulations, Ameren Missouri's strategy is to move to Plan R0. If an acceptable plant financing solution is achieved under

current environmental regulations, then Ameren Missouri's strategy is to move to its Low Risk DSM, 30% Nuclear plan (Plan B2) which has a PVRR \$0.31 billion higher than its preferred plan (Plan B1) and a PVRR \$1.9 billion higher than its plan with the lowest PVRR (Plan R0). Staff notes that Ameren Missouri's IRP filing has no discussion of Ameren Missouri's strategy should an acceptable plant financing solution and an acceptable DSM cost recovery solution both be achieved under current environmental regulations.

If there are aggressive environmental regulations, the Company's strategy is to retire its Meramec plant, which was put into operations in 1953, and to replace Meramec with other supply-side resources and/or demand-side resources. Under these conditions, the PVRR of Ameren Missouri's preferred plan to do Low Risk DSM and add combined cycle plants (Plan C3) is \$2.3 billion higher than the PVRR of its plan with RAP DSM with both energy efficiency programs and demand-response programs and no additional supply-side resources (Plan R3). If an acceptable DSM cost recovery solution is achieved under aggressive environmental regulations, then Ameren Missouri's strategy is to move to its Plan R3 which, again, has a PVRR \$2.3 billion lower than its Plan C3. If an acceptable plant financing solution is achieved under aggressive environmental regulations, then Ameren Missouri's strategy is to move to Plan H1 with Low Risk DSM, combined cycle plants and 30% of a nuclear plant which has a PVRR \$2.5 billion higher than Plan R3. Staff notes that Ameren Missouri's IRP filing has no discussion of Ameren Missouri's strategy should an acceptable plant financing solution and an acceptable DSM cost recovery solution both be achieved under aggressive environmental regulations.

Deficiencies

Although the load analysis and load forecast, analyses of alternative supply-side and demand-side resources, and the construction and operation of the Company's probability tree are complete, accurate overall and generally well documented, the Company's strategy selection process is incomplete and poorly documented, and its adopted resource acquisition strategy does not demonstrate compliance with the fundamental objective of the resource planning process for electric utilities in Missouri to minimize the present worth of long run utility costs—the primary selection criterion when choosing the preferred resource plan as required by rule 4 CSR 240-22.010(B). Staff finds the following additional deficiencies with the filing:

- The Company did not identify and screen all end-use measures as required by rule 4 CSR 240-22.050(3) when it failed to identify and screen for the cost effectiveness of two high-potential demand-side resources: 1) a voluntary curtailment program (such as the Company's current Rider L Peak Power Rebate program) and 2) a proven customer education program such as OPOWER which is designed to convert passive individual energy users into active participants in demand-side programs.
- The Company's filing is not in compliance with rule 4 CSR 240-22.010(2)(C), since it did not present an analysis of and a plan to request a demand-side programs investment mechanism (DSIM) it feels is necessary for the Company to implement its RAP DSM programs portfolio which is estimated to reduce the present worth of long run utility cost by \$1.6 billion to \$2.5 billion when compared to the Low Risk DSM programs portfolio now included in its adopted preferred resource plan.
- The Company is not in compliance with rule 4 CSR 240-22.070(8), since its IRP filing does not: 1) correctly quantify the expected value of better information by not including Plan R0 and Plan B3 in its analysis of the value of better information, and 2) quantitatively analyze and document the DSM cost recovery solution which is necessary for Ameren Missouri to select Plan R0 as its preferred resource plan under current environmental regulations with Meramec (initial operations in 1953) continuing to operate "as is," and to select contingency Plan R3 as its preferred resource plan under aggressive environmental regulations with Meramec either retired, converted to natural gas fuel or having environmental controls installed.

To remedy these deficiencies the Company should:

 Evaluate the cost effectiveness of a revised Rider L program and the OPOWER program for its customers, and present the evaluation results to its DSM stakeholders for discussion. Should one or both programs be found to be cost-effective, Ameren Missouri must evaluate the impact of one or both of the programs on the present value revenue requirements (PVRR) by including

- Rider L and/or the OPOWER program in the integrated resource analysis for Plan R0, and present the results to its DSM stakeholders for discussion;
- Prepare a filing under the Commission's MEEIA rules⁵ or, if the MEEIA rules
 are stayed due to legal action, under Section 393.1075, RSMo Supp. 2010;
- Should a filing under the Commission's MEEIA rules or, if the MEEIA rules are stayed due to legal action, under Section 393.1075, RSMo Supp. 2010, not be made by April 1, 2012, the Company should quantitatively analyze and document the DSM cost recovery solution which is necessary for Ameren Missouri to select Plan R0 as its preferred resource plan under current environmental regulations and Meramec continuing to operate "as is," and to select contingency Plan R3 as its preferred resource plan under aggressive environmental regulations and Meramec not continuing to operate "as is."
- In its future Chapter 22 filings including its next annual update IRP filing on April 1, 2012⁶, the Company should assign at least a majority of the weighting in the preferred resource plan selection process to present worth of long-run utility costs and correctly analyze the value of better information.

Concerns

Staff has five significant concerns. First, the documentation of Ameren Missouri's Board of Directors' meetings during which the resource acquisition strategy and preferred resource plan were discussed and "unanimously adopted" is significantly different from the IRP filing's documentation of the preferred resource plan selection scorecard and the adopted resource acquisition strategy (see Concern B). To resolve this concern, when presenting its analysis of candidate resource plans to Ameren Missouri decision-makers, Ameren Missouri should present the analysis for all candidate resource plans.

Second, Ameren Missouri's preferred resource plan does not meet the statutory goal of the Missouri Energy Efficiency Investment Act (MEEIA) to achieve all cost-effective demand-side savings. This concern could be resolved through a MEEIA filing. While the MEEIA filing in itself will not meet the statutory goal, it would be movement towards the

⁵ Rules 4 CSR 240-3.163, 4 CSR 240-3.164, 4 CSR 240-20.093 and 4 CSR 240-20.094.

⁶ Rule 4 CSR 240-22.080(3) effective June 30, 2011.

statutory goal and remove the uncertainty regarding a DSM cost recovery solution which would address this concern.

Third, should the plant financing regulations decision factor and/or the DSM cost recovery regulations decision factor change "to a degree to cause Ameren Missouri's management to select a different course of action," the Company may choose Plan B2 or Plan R0 as its preferred resource plan during the three-year implementation period. Ameren Missouri has spent significant resources in recent years to influence new plant financing regulations. Its efforts to determine a DSM cost recovery solution have been limited. This filing shows that RAP DSM will reduce the NPVRR by \$1.6 billion to \$2.5 billion. It is now time for the Company to work with its stakeholders and the Commission (through a MEEIA filing) to achieve the DSM cost recovery solution.

Fourth, one of the factors in the selection scorecard method used by Ameren Missouri is economic development resulting from each candidate resource plan. Staff's concern is not that Ameren Missouri included economic development as a factor in its decision; the concern is how Ameren Missouri calculated the economic impact results in its favoring the addition of 30% of a nuclear plant. The Company's estimations of the economic impact of each candidate resource plan is for only the direct impacts of each plan and does not address in any way the indirect impact on the economy as a result of various levels of long-run utility costs, i.e., lower revenue requirements for the utility. Put more simply, the Company's analysis of and scores for the economic development policy objective do not address the indirect economic impact of the \$1.6 billion lower PVRR and lower annual revenue requirements⁸ for Plan R0 vs. Plan B1 under current environmental regulations, and does not address the indirect economic impact of the \$2.5 billion lower PVRR and the lower annual revenue requirements⁹ for Plan R3 vs. Plan C3 under aggressive environmental regulations.

Finally, scores on Ameren Missouri's preferred resource plan selection scorecard are not logically consistent and may have serious flaws, because the comparison of one plan to another can only be done fairly when comparing plans designed for current environmental regulations with Meramec continuing to operate "as is" or when comparing plans designed for

⁷ In addition, Ameren Missouri did not include in its strategy which plan it would move to if both the plant financing regulations and the DSM cost recovery regulations decision factors change.

⁸ See Addendum C Page 6 of 8.

⁹ See Addendum C Page 7 of 8 and Page 8 of 8.

aggressive environmental regulations with Meramec not continuing to operate "as is." To resolve this concern, Ameren Missouri should be take steps necessary to assure that scores are internally consistent when using scorecards to select its preferred resource plan for its next IRP filing.

Staff's remaining three concerns are minor in nature and can be addressed in the Company's IRP update filing on April 1, 2012.

Summary of the Process and Filing

Prior to its IRP filing, Ameren Missouri held ten stakeholder meetings over two years to provide status updates on various aspects of its electric utility resource planning and to solicit stakeholder input to its planning process. Two stakeholder meetings were held soon after Ameren Missouri filed this IRP.

These meetings were very informative, helped clarify issues, and provided an appropriate forum for stakeholder education and sharing. Such pre- and post-filing stakeholder meetings are appreciated and encouraged.

Unlike past Ameren Missouri IRP filings, which were organized into one or more separate documents for each Chapter 22 rule, this IRP filing is organized into one volume with chapters containing the information, discussion and filing requirements that flow smoothly in a narrative that tells a clear story. At the end of each chapter is a Compliance Reference guide which cross references each Chapter 22 filing requirement met in the chapter with the page in the chapter on which the filing requirement is contained. Staff finds this approach to be productive and useful, and encourages Ameren Missouri to continue this practice in future filings.

Staff found the Company's electronic workpapers to be helpful and well organized. However, Staff would prefer to receive all electronic workpapers with all formulas intact. Ameren Missouri was very responsive to Staff's emails and phone calls concerning clarifying questions and data inquiries. Staff was able to use the Company's MIDAS model inputs in Staff's MIDAS model, and to verify that the outputs from its model match those of the Company's. Staff was also able to verify the correct construction and functioning of the Company's probability tree.

¹⁰ Rule 4 CSR 240-22.080(11) effective June 30, 2011, requires formulas in a utility's resource plan compliance filing workpapers to be intact.

Ameren Missouri's 2011 IRP Filing and Adopted Resource Acquisition Strategy

On February 23, 2011, Ameren Missouri filed its 2011 IRP compliance filing in File No. EO-2011-0271, as required by rule 4 CSR 240-22 Electric Utility Resource Planning. The remainder of this report provides a summary of Ameren Missouri's IRP filing and its adopted resource acquisition strategy, including its adopted preferred resource plan. It also includes Staff's discussion of Staff's review of the filing and each deficiency and concern Staff has identified, along with Staff's recommended remedy for the deficiency or concern.

On February 19, 2009, the Missouri Public Service Commission (Commission) issued its *Final Order Regarding AmerenUE's 2008 Integrated Resource Plan* in Case No. EO-2007-0409. In its final order, the Commission approved a partial stipulation and agreement to remedy most of the alleged deficiencies in Ameren Missouri's 2008 IRP. The Commission directed the Company to include specific analyses and information in its 2011 IRP to address the remaining alleged deficiencies. In its final order, the Commission concluded:

Because of the uncertainty in the 2008 IRP's treatment of the decision whether to build Callaway 2, the Commission finds that AmerenUE's 2008 IRP does not demonstrate compliance with the requirements of the Commission's IRP rule. Furthermore, for the same reason, the Commission finds that AmerenUE's resource acquisition strategy does not meet the requirements stated in 4 CSR 240-22.010(2)(A)-(C).

Despite the deficiencies in AmerenUE's 2008 IRP filing, it would be a waste of resources to require AmerenUE to look backward to revise that filing. Instead, the Commission will direct AmerenUE and the other interested parties to look forward to AmerenUE's next IRP filing.

On February 24, 2010, Ameren Missouri filed, in File No. EE-2010-0243, its *Motion* to Establish a Proceeding and Request for Waivers in connection with Ameren Missouri's 2011 IRP filing due in February 2011. In this filing, Ameren Missouri did not seek complete relief from any portion of the Commission's IRP rules without offering replacement language intended to comply with the spirit of the rule, and stated that granting the requested relief from the rules would improve the Company's planning process for its February 2011 Filing. In its order dated June 30, 2010, the Commission granted Ameren Missouri relief from the rules as requested, with the exceptions that follow: 1) Commission-adopted language provided by the Office of Public Counsel (OPC) for 4 CSR 240-22.050(2), and 2) a resolution of issues reached between Ameren Missouri and the Missouri Department of Natural

Resources (MDNR) for various sections of rules 4 CSR 240-22.030, 4 CSR 240-22.040 and 4 CSR 240-22.050. The Commission denied the Company's waiver request concerning rule 4 CSR 240-22.040(1)(K).

During its analysis for and preparation of its 2011 IRP filing, Ameren Missouri conducted ten stakeholder meetings to provide status updates and an opportunity for stakeholder feedback concerning a wide range of electric utility resource planning issues. Staff and other key stakeholders actively participated in the stakeholder meetings: The date of each meeting and a brief description of the meeting topic follow:

- January 9, 2009 Renewable energy study conducted by Black & Veatch
- April 2, 2009 Waivers requested by Ameren Missouri
- August 26, 2009 Renewable energy follow-up and coal and natural gas resource options study conducted by Black & Veatch
- November 20, 2009 2008 IRP implementation plan update and overview of 2011 IRP planning process
- January 26, 2010 Conference call on financing analysis plan
- March 8, 2010 Scenarios, uncertain factors, load analysis and forecasting, EPRI end-to-end efficiency study, and initial supply-side screening results
- April 16, 2010 Conference call on financing analysis plan
- May 25, 2010 Forecasting results, demand-side management (DSM) analysis, alternative resource plan development, scenario modeling results
- September 14, 2010 Integration analysis, sensitivity analysis, critical independent uncertain factors and decision framework
- February 22, 2011 Risk analysis, environmental scenarios and strategy selection

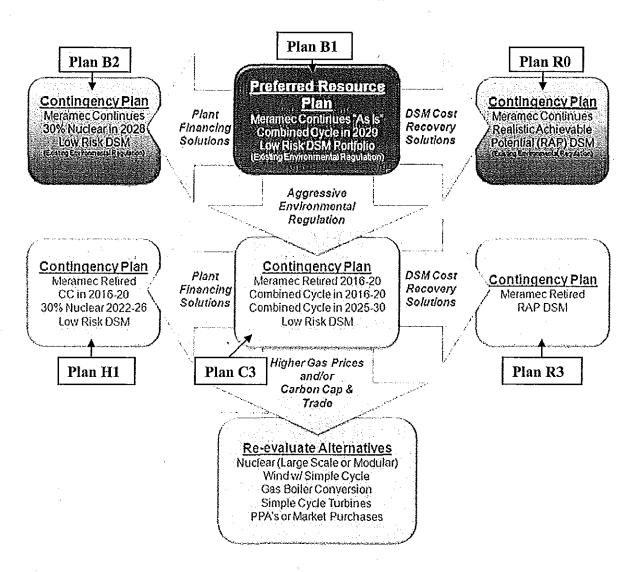
Staff has completed its limited review of the documents and workpapers Ameren Missouri provided, as well as the presentations and discussions that occurred during the following meetings Ameren Missouri held with its stakeholders to review its 2011 IRP filing:

- April 5, 2011 Integrated resource analysis and strategy selection
- April 6, 2011 Supply-side resource analysis and DSM cost recovery

Presented following are: 1) A flow chart of the Company's Decision Roadmap; 2) a summary table of capacity additions and retirements or reductions for the preferred resource plan (Plan B1) as well as contingency resource plans (Plan B2, Plan R0, Plan C3, Plan H1 and Plan R3); and 3) a highly confidential table with the capacity balance for the preferred resource plan (Plan B1) which illustrates that Ameren Missouri is expecting to be long on

capacity through 2027 under this plan. Addendum A contains more detailed information for all fourteen (14) candidate resource plans.

Decision Roadmap



					ndary															2030
D. farting and 120 21 -	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	
Existing capacity position	-117 2	211 6	516 30	440 34	387 38	318 15	250	168 85	65 85	-22 91	-116	-212 91	-3[] 91	412	-520 69	-626 69	-736 69	-852 69	-969 69	-1,089 6
F Total plant upgrades F Meramec retirement	6	0	9	34 0	0	12	85 0	0	0	91	91 0	91	91	68 0	07	0	0	0	0.	9
Renewables	ů	0	8	8	8	12	12	17	17	20	21	23	26	28	31	33	36	39	41	4
Noranda termination	Ô	0	0	0	ő	0	0	0	0	0	0	0	0	0	0	0	0	0	0	•
- Energy efficiency	-49	-69	-83	-111	-134	-154	-172	-189	-201	-206	-216	-223	-228	-232	-235	-235	-235	-236	-235	-23
- Demand response	0	0	0	0	0	-14	-49	-75	-93	-(1)	-121	-133	-145	-157	-167	-185	-202	-213	-229	-24
+ New primary supply side	0	ŏ	Ğ	0	ŏ	0	ő	Ö	ő		0	0	0	0	0	ů.	0	0	600	60
New secondary supply side	Q.	9	0	ō	ŏ	Õ	0	ŏ	Ů.	ő	Ô	0	ō	0	õ	ō	ő	ŏ	0	
Capacity position after adjustment	-66	286	643	593	567	513	569	534	461	407	332	258	178	73	-17	-103	-194	-295	205	10
Purchases(+) or sales(-)	66	-286	-643	-593	-567	-513	-569	-534	-461	-407	-332	-258	-178	-73	17	103	194	295	-205	-10
Plan B2: No	uke 30	0% - 1 2012	No Se 2013	2014	ary - I 2015				oles - 1	Low 1 2020	Risk I	OSM -	Mer 2023	conti 2024	nues - 2025	- Nor	conti 2027	nues 2028	2029	2030
m 1 11	_	_			_	2016	2017	2018			_	_			_					_
Existing capacity position	-117	211	516	440	387	318	250	168	65	-22	-116	-212	-311	412	-520	-626	-736	-852	-969	1,089
+ Total plant upgrades	2	6	30	34	38	15	85	85	85	91	91	91	91	68	69	69	69	69	69	61
+ Meramec retirement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
+ Renewables	0	0	8	8	8	12	12	17	17	20	2[23	26	28	31	33	36	39	41	4
+ Noranda termination	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
- Energy efficiency	-49	-69	-88	-111	-134	-154	-172	-189	-201	-206	-216	-223	-228	-232	-235	-235	-235	-236	-235	-232
- Demand response	0	0	0	0	0	-[4	-49	-75	-93	-111	-121	-133	-145	-157	-167	-185	-202	-213	-229	-24
+ New primary supply side	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	480	480	48
+ New secondary supply side	0	106	0	603	647	512	0	0	0	407	9	0	170	9	0	103	0	0	0	
~ Capacity position after adjustment	-66	286	643	593	567	513	569	534	461	407	332	258	178	73	-17	-103	-194	185	85	-24
Purchases(+) or sales(-)	66	-286	-643	-593	-567	-513	-569	-534	-461	-407	-332	-258	-178	-73	17	103	194	-185	-85	20
Plan C3: Combin	ned C	ycle -		bined		- Pr	op C	Rene	wa ble	s - Lo	w Ris	k DS	M - N	Ier re	tire 2	016 -	Nor		tues	
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Existing capacity position	-117	211	516	440	387	318	250	168	65	-22	-116	-212	-311	-412	-520	-626	-736	-852	-969	-1,089
+ Total plant upgrades	2	6	30	34	38	-59	11	11	11	41	41	41	4[41	41	41	41	41	41	4
+ Meramee retlement	0	0	0	0	0	-854	-854	-854	-854	-854	-854	-854	-854	-854	-854	-854	-854	-854	-854	-854
+ Renewables	0	0	8	8	8	12	12	17	17	20	21	23	26	28	31	33	36	39	41	41
+ Noranda termination	0	0	ō	Û	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	•
- Energy efficiency	-49	-69	-83	-111	-134	-154	-172	-189	-201	-206	-216	-223	-228	-232	-235	-235	-235	-236	-235	-232
- Demand response	0	0	0	0	0	-14	-49	-75	-93	-111	-121	-133	-145	-157	-167	-185	-202	-213	-229	-244
New primary supply side	0	0	0	Ö	0	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600
New secondary supply side	0	0	0	ō	0	0	0	0	G	0	0	0	0	0	0	600	600	600	600	600
- Capacity position after adjustment	-66	286	643	593	567	185	241	206	133	103	28	-46	-126	-208	-299	215	124	23	-77	-182
Purchases(+) or sales(-)	65	-286	-643	-593	-567	-185	-241	-206	-133	-103	-28	46	126	208	299	-215	-124	-23	77	182
Plan H1: Con															e 201					
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Existing capacity position	-117	211	516	440	387	318	250	168	65	-22	-116	-212	-311	-412	-520	-626	-736	-852	-969	-1,089
							11	11	11	41	41	4[41	41	41	41	41	41	41	41
Total plant upgrades	2	6	30	34	38	-59														
- Meramec retirement	0	0	0	0	0	-854	-854	-854	-854	-854	-854	-854	-854	-854	-854	-854	-854	-854	-854	
H Meramec retirement H Renewables	0	0	8	0 8	0 8	-854 12	-854 12	-854 17	-854 17	-854 20	21	23	26	28	31	-854 33	-854 36	-854 39	41	44
+ Meramec retlement + Renewables + Noranda termination	0 0 0	0	0 8 0	0 8 0	0 8 0	-854 12 0	-854 12 0	-854 17 0	-854 17 0	-854 20 0	21 0	23 0	26 0	28 0	31 0	-854 33 0	-854 36 0	-854 39 0	41 0	44
Meramec retirement Renewables Noranda termination Energy efficiency	0 0 0 -49	0 0 0 -69	0 8 0 -88	0 8 0 -111	0 8 0 -134	-854 12 0 -154	-854 12 0 -172	-854 17 0 -189	-854 17 0 -201	-854 20 0 -206	21 0 -216	23 0 -223	26 0 -228	28 0 -232	31 0 -235	-854 33 0 -235	-854 36 0 -235	-854 39 0 -236	41 0 -235	44 0 -232
Meranec refrement Renewables Noranda termination Energy efficiency Demand response	0 0 0 -49 0	0 0 0 -69 0	0 8 0 -88	0 8 0 -1[1 0	0 8 0 -134 0	-854 12 0 -154 -14	-854 12 0 -172 -49	-854 17 0 -189 -75	-854 17 0 -201 -93	-854 20 0 -206 -111	21 0 -216 -121	23 0 -223 -133	26 0 -228 -145	28 0 -232 -157	31 0 -235 -167	-854 33 0 -235 -185	-854 36 0 -235 -202	-854 39 0 -236 -213	41 0 -235 -229	-232 -244
Meramec refrement Renewabks Noranda termination Energy efficiency Demand response New primary supply side	0 0 0 49 0	0 0 0 -69 0	0 8 0 -88 0 0	0 8 0 -1[1 0	0 8 0 •134 0	-854 12 0 -154 -14 600	-854 12 0 -172 -49 600	-854 17 0 -189 -75 600	-854 17 0 -201 -93 600	-854 20 0 -206 -111 609	21 0 -216 -121 600	23 0 -223 -133 -600	26 0 -228 -145 600	28 0 -232 -157 600	31 0 -235 -167 600	-854 33 0 -235 -185 600	-854 36 0 -235 -202 600	-854 39 0 -236 -213 600	41 0 -235 -229 600	-232 -244 - 600
Merance retirement Renewables Norand a termination Energy efficiency Demand response New primary supply side New secondary supply side	0 0 -49 0 0	0 0 0 -69 0 0	0 0 -88 0 0	0 8 0 -1[1 0 0	0 8 0 -134 0 0	-854 12 0 -154 -14 600 0	-854 12 0 -172 -49 600 0	-854 17 0 -189 -75 600 0	-854 17 0 -201 -93 600 0	-854 20 0 -206 -111 609 0	21 0 -216 -121 600 0	23 0 -223 -133 -600 0	26 0 -228 -145 600 0	28 0 -232 -157 600 0	31 0 -235 -167 600 480	-854 33 0 -235 -185 600 480	-854 36 0 -235 -202 600 480	-854 39 0 -236 -213 600 480	41 0 -235 -229 600 480	-232 -244 -600 480
Meramec retlement Renewabks Noranda termination Energy efficiency Demand response New primary supply side New scondary supply side Capacity position after adjustment	0 0 49 0 0	0 0 0 -69 0 0 0	0 8 0 -88 0 0 0	0 8 0 -111 0 0 0 593	0 8 0 -134 0 0 0	-854 12 0 -154 -14 600 0 185	-854 12 0 -172 -49 600 0 241	-854 17 0 -189 -75 600 0 206	-854 17 0 -201 -93 600 0 133	-854 20 0 -206 -111 609 0 103	21 0 -216 -121 600 0 28	23 0 -223 -133 -600 0 -46	26 0 -228 -145 600 0 -126	28 0 -232 -157 600 0 -208	31 0 -235 -167 600 480 181	-854 33 0 -235 -185 600 480 95	-854 36 0 -235 -202 600 480 4	-854 39 0 -236 -213 600 480 -97	41 0 -235 -229 600 480 -197	-232 -244 -600 480
Merance retirement Renewables Norand a termination Energy efficiency Demand response New primary supply side New secondary supply side	0 0 -49 0 0	0 0 0 -69 0 0	0 0 -88 0 0	0 8 0 -1[1 0 0	0 8 0 -134 0 0	-854 12 0 -154 -14 600 0	-854 12 0 -172 -49 600 0	-854 17 0 -189 -75 600 0	-854 17 0 -201 -93 600 0	-854 20 0 -206 -111 609 0	21 0 -216 -121 600 0	23 0 -223 -133 -600 0	26 0 -228 -145 600 0	28 0 -232 -157 600 0	31 0 -235 -167 600 480	-854 33 0 -235 -185 600 480	-854 36 0 -235 -202 600 480	-854 39 0 -236 -213 600 480	41 0 -235 -229 600 480	-854 44 0 -232 -244 600 480 -302 302
Merance retrement Revealables Roranda termination Eargy efficiency Demand response New primary supply side New secondary supply side Capacity position after adjustment Purchas es(+) or saks(-)	0 0 49 0 0 0 -66 66	0 0 -69 0 0 0 286 -286	0 -88 0 0 0 0 643 -643	0 8 0 -111 0 0 0 593 -593	0 8 0 -134 0 0 0 567 -567	-854 12 0 -154 -14 600 0 185 -185	-854 12 0 -172 -49 600 0 241 -241	-854 17 0 -189 -75 600 0 206 -206	-854 17 0 -201 -93 600 0 133 -133	-854 20 0 -206 -111 600 0 103 -103	21 0 -216 -121 600 0 28 -28	23 0 -223 -133 -600 0 -46 46	26 0 -228 -145 600 0 -126 126	28 0 -232 -157 600 0 -208 208	31 0 -235 -167 600 480 181 -181	-854 33 0 -235 -185 600 480 95 -95	-854 36 0 -235 -202 600 480 4	-854 39 0 -236 -213 600 480 -97 97	41 0 -235 -229 600 480 -197	-232 -244 -600 480
Meramec retlement Renewabks Noranda termination Energy efficiency Demand response New primary supply side New scondary supply side Capacity position after adjustment	0 0 49 0 0 0 -66 66	0 0 -69 0 0 0 286 -286	0 -88 0 0 0 0 643 -643	0 8 0 -111 0 0 0 593 -593	0 8 0 -134 0 0 0 567 -567	-854 12 0 -154 -14 600 0 185 -185	-854 12 0 -172 -49 600 0 241 -241	-854 17 0 -189 -75 600 0 206 -206	-854 17 0 -201 -93 600 0 133 -133	-854 20 0 -206 -111 600 0 103 -103	21 0 -216 -121 600 0 28 -28	23 0 -223 -133 -600 0 -46 46	26 0 -228 -145 600 0 -126 126	28 0 -232 -157 600 0 -208 208	31 0 -235 -167 600 480 181 -181	-854 33 0 -235 -185 600 480 95 -95	-854 36 0 -235 -202 600 480 4	-854 39 0 -236 -213 600 480 -97 97	41 0 -235 -229 600 480 -197	-232 -244 -600 -302
Merance retrement Renewabks Renewabks Norand a termination Energy efficiency Demand response New primary supply side New secondary supply side Capacity position after adjustment Purchas es(+) or sakes(-) Plan RO: 1	0 0 49 0 0 -66 66 66 No Pr	0 0 0 -69 0 0 286 -286	0 8 0 -88 0 0 0 643 -643 / - No	0 8 0 -111 0 0 0 593 -593 Seco	0 8 0 -134 0 0 567 -567	-854 12 0 -154 -14 600 0 185 -185 - Pro	-854 12 0 -172 -49 600 0 241 -241 2017	-854 17 0 -189 -75 600 0 206 -206 -206	-854 17 0 -201 -93 600 0 133 -133	-854 20 0 -206 -111 600 0 103 -103	21 0 -216 -121 600 0 28 -28 -28	23 0 -223 -133 -600 0 -46 46 46	26 0 -228 -145 600 0 -126 126	28 0 -232 -157 600 0 -208 208	31 0 -235 -167 -600 480 181 -181 -181 -182	-854 33 0 -235 -185 600 480 95 -95 -95	-854 36 0 -235 -202 600 480 4 -4	-854 39 0 -236 -213 600 480 -97 97 97	41 0 -235 -229 600 480 -197 197	44 (-232 -244 600 480 -302 302
Meramee retrement Renewabks Renewabks Noranda termination Energy efficiency Demand response New primary supply side New secondary supply side Capacity position after adjustment Purchases(+) or saks(-) Plan R0: I Existing capacity position	0 0 -49 0 0 -66 66 No Pr	0 0 0 -69 0 0 286 -286	0 8 0 -88 0 0 0 643 -643	0 8 0 -111 0 0 593 -593	0 8 0 -134 0 0 567 -567 -mdary	-854 12 0 -154 -14 600 0 185 -185 -Pro	-854 12 0 -172 -49 600 0 241 -241	-854 17 0 -189 -75 600 0 206 -206	-854 17 0 -201 -93 600 0 133 -133 vables 2019	-854 20 0 -206 -111 609 0 103 -103	21 0 -216 -121 600 0 28 -28	23 0 -223 -133 -600 0 -46 46	26 0 -228 -145 600 0 -126 126	28 0 -232 -157 600 0 -208 208	31 0 -235 -167 -600 480 181 -181	-854 33 0 -235 -185 600 480 95 -95	-854 36 0 -235 -202 600 480 4 -4 -4 -4 -4 -736	-854 39 0 -236 -213 660 480 -97 97 IES 2028 -852	41 0 -235 -229 600 480 -197 197	44 (-232 -244 600 480 -302 302
Merance retrement Renewabks Renewabks Rorand remination Exergy efficiency Demand response New primary supply side New secondary supply side Capacity position after adjustment Purchas es(+) or saks(-) Plan R0: I Existing capacity position Total plant upgrades	0 0 0 49 0 0 -66 66 No Pr	0 0 0 -69 0 0 0 286 -286 -286 -286	0 8 0 -88 0 0 0 643 -643 -643 7 - No 2013 516 30	0 8 0 -111 0 0 593 -593 -593 Seco	0 8 0 -134 0 0 0 567 -567 -567 -7 -7 -7 -7 -7 -7 -7 -7 -7 -7 -7 -7 -7	-854 12 0 -154 -14 600 0 185 -185 - Pro 2016 318 15	-854 12 0 -172 -49 600 0 241 -241 DP C 1 2017 250 85	-854 17 0 -189 -75 600 0 206 -206 -206 Renev 2018 168 85	-854 17 0 -201 -93 600 0 133 -133 -133 yable: 2019 65 85	-854 20 0 -206 -111 609 0 103 -103 5 - RA 2020 -22 91	21 0 -216 -121 600 0 28 -28 -28 -28 -29 -116 91	23 0 -223 -133 -600 0 -46 46 -46 -2022 -212 91	26 0 -228 -145 600 0 -126 126 1er cc 2023 -311 91	28 0 -232 -157 600 0 -208 208 208 2024 -412 68	31 0 -235 -167 600 480 181 -181 105 - P	-854 33 0 -235 -185 600 480 95 -95 -95 Vor cc	-854 36 0 -235 -202 600 480 4 -4 -4 -2027 -736 69	-854 39 0 -236 -213 600 480 -97 97 1es 2028 -852 69	41 0 -235 -229 600 480 -197 197 -969 69	44 (232 -24- 600 480 -302 302 -1,089
Merance retrement Renewabkes Renewabkes Noranda termination Energy efficiency Demand response New primary supply side New accordary supply side Capacity position after adjustment Purchases(+) or sales(-) Plan RO: 1 Existing capacity position Total plant upgrades Merance retrement	0 0 49 0 0 66 66 66 No Pr	0 0 0 -69 0 0 286 -286 -286 -2912 2012 211 6	0 8 0 -88 0 0 643 -643 -7 No 2013 516 30 0	0 8 0 -111 0 0 593 -593 -593 Seco 2014 440 34	0 8 0 -134 0 0 0 567 -567 -567 -2015 387 38 0	-854 12 0 -154 -14 600 0 185 -185 -185 - Pro 2016 318 15 0	-854 12 0 -172 -49 600 0 241 -241 -241 -250 85 0	-854 17 0 -189 -75 600 0 206 -206 -208 Renev 2018 168 85 0	-854 17 0 -201 -93 600 0 133 -133 -133 -2019 65 85 0	-854 20 0 -206 -111 609 0 103 -103 5 - RA 2020 -22 91	21 0 -216 -121 600 0 28 -28 -28 -29 -116 91 0	23 0 -223 -133 -600 0 -46 46 -46 -2022 -212 91 0	26 0 -228 -145 600 0 -126 126 1er cc 2023 -311 91 0	28 0 -232 -157 600 0 -208 208 	31 0 -235 -167 600 480 181 -181 -181 -12025 -520 69 0	-854 33 0 -235 -185 600 480 95 -95 -95 -00r cc	-854 36 0 -235 -202 600 480 4 -4 -4 -2027 -736 69 0	-854 39 0 -236 -213 600 480 -97 97 97 -852 69 0	41 0 -235 -229 600 480 -197 197 -969 69 0	4-4-6-6-6-6-6-6-6-6-6-6-6-6-6-6-6-6-6-6
Merance retrement Renewabks Renewabks Norawda termination Energy efficiency Demand response New secondary supply side New secondary supply side Capacity position after adjustment Purchas es(+) or saks(-) Plan R0: I Existing capacity position Total plant upgrades Merance retrement Renewabks	0 0 0 49 0 0 -66 66 No Pr	0 0 0 -69 0 0 0 286 -286 -286 -286	0 8 0 -88 0 0 0 643 -643 -643 7 - No 2013 516 30	0 8 0 -111 0 0 593 -593 -593 Seco	0 8 0 -134 0 0 0 567 -567 -567 -7 -7 -7 -7 -7 -7 -7 -7 -7 -7 -7 -7 -7	-854 12 0 -154 -14 600 0 185 -185 - Pro 2016 318 15	-854 12 0 -172 -49 600 0 241 -241 2017 250 85 0 12	-854 17 0 -189 -75 600 0 206 -206 -206 Renev 2018 168 85	-854 17 0 -201 -93 600 0 133 -133 -133 yable: 2019 65 85	-854 20 0 -206 -111 609 0 103 -103 -103 -2020 -22 91 0 20	21 0 -216 -121 -600 0 28 -28 -28 -2921 -116 91 0 21	23 0 -223 -133 -600 0 -46 46 -46 -2022 -212 91	26 0 -228 -145 600 0 -126 126 1er cc 2023 -311 91	28 0 -232 -157 600 0 -208 208 	31 0 -235 -167 600 480 181 -181 105 - P	-854 33 0 -235 -185 600 480 95 -95 -95 Vor cc	-854 36 0 -235 -202 600 480 4 -4 -4 -2027 -736 69	-854 39 0 -236 -213 600 480 -97 97 97 -852 69 0 39	41 0 -235 -229 600 480 -197 197 -969 69 0 41	44 (-232 -244 600 480 -302 302 -1,089
Merance retrement Renewabks Renewabks Rorand remination Exergy efficiency Demand response New primary supply side New secondary supply side Capacity position after adjustment Purchas es(+) or saks(-) Plan R0: I Existing capacity position Total plant upgrades Merance retrement Renewabks Noranda termination	0 0 0 49 0 0 66 66 66 70 117 2011 -117 2 0 0	0 0 0 -69 0 0 286 -286 -286 -286 -211 6 0	0 8 0 -88 0 0 643 -643 -7 No 2013 516 30 0 8	0 8 0 -111 0 0 593 -593 -593 Seco 2014 440 34 0 8	0 8 0 -134 0 0 567 -567 -567 -7 -7 -7 -7 -7 -7 -7 -7 -7 -7 -7 -7 -7	-854 12 0 -154 -14 600 0 185 -185 -Pro 2016 318 15 0 12	-854 12 0 -172 -49 600 0 241 -241 DP C 1 2017 250 85 0 12	-854 17 0 -189 -75 600 0 206 -206 -206 -208 Xenev 2018 168 85 0 16	-854 17 0 -201 -93 600 0 133 -133 -133 vables 2019 65 85 0 16	-854 20 0 -206 -111 600 0 103 -103 5 - RA 2020 -22 91 0 20 0	21 0 -216 -121 -600 0 28 -28 -28 -2921 -116 91 0 21 0	23 0 -223 -133 -600 0 -46 46 -46 -2022 -212 91 0 24 0	26 0 -228 -145 600 0 -126 126 126 2023 -311 91 0 26 0	28 0 -232 -157 600 0 -208 208 201 -412 63 0 29 0	31 0 -235 -167 -600 480 181 -181 -181 -2025 -520 69 0 31 0	-854 33 0 -235 -185 600 480 95 -95 -95 -96 -626 69 0 34 0	-854 36 0 -235 -202 600 480 4 -4 -4 -736 69 0 37 0	-854 39 0 -236 -213 600 -97 97 1ES 2028 -852 69 0 39 0	41 0 -235 -229 600 480 -197 197 -969 69 0 41 0	2030 -1,089 -244 -302 -302 -1,089
Merance retrement Renewabks Renewabks Norand a termination Energy efficiency Demand response New secondary supply side New secondary supply side Capacity position after adjustment Purchas es(+) or saks(-) Plan R0: I Existing capacity position Total plant upgrades Merance retrement Renewabks Noranda termination Energy efficiency	0 0 49 0 0 66 66 70 117 2011 -117 2 0 0	0 0 0 -69 0 0 286 -286 -286 -286 0 0 0 0	0 8 0 -88 0 0 643 -643 7 - No 2013 516 30 0 8 0	0 8 0 -111 0 0 593 -593 Seco 2014 440 34 0 -210	0 8 0 -134 0 0 0 567 -567 -567 -587 387 38 0 8 0	-854 12 0 -154 -14 600 0 185 -185 -185 - Pro 2016 318 15 0 12 0	-854 12 0 -172 -49 600 0 241 -241 2017 250 85 0 12 0 -507	-854 17 0 -189 -75 600 0 206 -206 -206 -2018 168 85 0 16 0 -603	-854 17 0 -201 -93 600 0 133 -133 -133 vable: 2019 65 85 0 16 0	-854 20 0 -206 -111 600 0 103 -103 5 - RA 2020 -22 91 0 20 0 -758	21 0 -216 -121 600 0 28 -28 -28 -29 -116 91 0 -21 0 -825	23 0 -223 -133 -600 0 -46 46 	26 0 -228 -145 600 0 -126 126 126 126 2023 -311 91 0 -26 0 -927	28 0 -232 -157 600 0 -208 208 208 201 -412 63 0 -29 0 -955	31 0 -235 -167 600 480 -181 -181 -181 -181 -2025 -520 69 0 -977	-854 33 0 -235 -185 600 480 95 -95 -95 -96 -2026 626 69 0 34 0	-854 36 0 -235 -202 600 480 4 -4 -4 -736 69 0 37 0 -1,000	-854 39 0 -236 -213 600 480 -97 97 108 2028 -852 69 0 39 0 -1,006	41 0 -235 -229 600 480 -197 197 -969 69 0 41 0 -1,009	2030 -1,089 (44
Merance retrement Renewabks Norand a termination Energy efficiency Demand response New secondary supply side New secondary supply side Capacity position after adjustment Purchas es(+) or sales(-) Plan RO: I Existing capacity position Total plant upgrades Merance retrement Renewabks Noranda termination Energy efficiency Demand response	0 0 0 49 0 0 66 66 66 70 117 2011 -117 2 0 0 48 0	0 0 0 -69 0 0 286 -286 -286 -2912 2012 211 6 0 0 0 -85 0	0 83 0 0 0 643 -643 516 30 0 8 0 -134	0 8 0 -111 0 0 593 -593 Seco 2014 440 34 0 -210 0	0 8 0 -134 0 0 0 567 -567 -567 -2015 387 38 0 8 0 -306	-854 12 0 -154 -14 600 0 185 -185 -2016 318 15 0 -407 0	-854 12 0 -172 -49 600 0 241 -241 2017 250 85 0 12 60 0 250 7 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	-854 17 0 -189 -75 600 0 206 -206 -206 -2018 168 85 0 16 0 -603 0	-854 17 0 -201 -93 600 0 133 -133 -133 2019 65 85 0 16 0 -688	-854 20 0 -206 -111 609 0 103 -103 -103 -2020 -22 91 0 0 -758 0	21 0 -216 -121 600 0 28 -28 -28 -29 -116 91 0 -21 0 -825 0	23 0 -223 -133 -600 0 -46 46 	26 0 -228 -145 600 0 -126 126 126 126 126 0 -927 0	28 0 -232 -157 600 0 -208 208 208 201 int 2024 -412 68 0 29 0 -955 0	31 0 -235 -167 600 480 181 -181 -181 -181 -2025 -520 0 0 -977 0	-854 33 0 -235 -855 -600 480 95 -95 -95 -626 69 0 34 0 -989 0	-854 36 0 -235 -202 600 480 4 -4 -4 -4 -736 69 0 0 -1,000 0	-854 39 0 -236 -213 600 480 -97 97 97 2028 -852 69 0 -1,006 0	41 0 -235 -229 600 480 -197 197 -969 69 0 41 0 -1,009 0	2030 -1,089 -1,007
Merance retrement Renewabks Renewabks Rorand remination Exergy efficiency Demand response New primary supply side New secondary supply side Capacity position after adjustment Purchas es(+) or saks(-) Plan R0: I Existing capacity position Total plant upgrades Merance retrement Renewabks Noranda termination Energy efficiency Demand response New primary supply side	0 0 0 49 0 0 66 66 70 Pr 2011 -117 2 0 0	0 0 0 -69 0 0 0 286 -286 -286 -286 0 0 0 -35 0	0 8 0 -88 0 0 0 643 -643 -643 516 30 0 8 0 -134	0 8 0 -111 0 0 593 -593 -593 -593 -440 34 0 0 -210 0	0 8 0 -134 0 0 567 -567 -567 -7 -7 -7 -7 -7 -7 -7 -7 -7 -7 -7 -7 -7	-854 12 0 -154 -44 600 0 185 -185 -185 -2016 318 15 0 12 0	-854 12 0 -172 -49 600 0 241 -241 250 85 0 12 0 -507 0	-854 17 0 -189 -75 600 0 206 -206 -206 -2018 168 85 0 168 0 -603 0	-854 17 0 -201 -93 600 0 133 -133 -133 2019 65 85 0 16 0 -688 0	-854 20 0 -206 -111 609 0 103 -103 -103 -2020 -22 91 0 0 -758 0	21 0 -216 -121 600 0 23 -28 -28 -116 91 0 211 0 -825 0	23 0 -223 -133 -600 0 -46 -46 -46 -2022 -212 -91 0 -883 0 0	26 0 -228 -145 600 0 -126 126 126 2023 -311 91 0 26 0 -927 0	28 0 -232 -157 600 0 -208 208 208 2011 -412 63 0 29 0 -955 0 0	31 0 -235 -167 -600 480 181 -181 -181 -2025 -520 0 0 -977 0	-854 33 0 -235 -185 600 480 95 -95 -95 -626 69 0 34 0 -989 0	-854 36 0 -235 -202 600 480 4 -4 -4 -4 -736 69 0 37 0 -1,000 0	-854 39 0 -236 -213 600 480 -97 97 2028 -852 69 0 39 0 -1,006 0	41 0 -235 -229 600 480 -197 197 -969 0 41 0 -1,009 0	2030 -1,089 -1,007
Merance retrement Renewabks Renewabks Noranda termination Energy efficiency Demand response New primary supply side New secondary supply side Capacity position after adjustment Purchas es(+) or saks(-) Plan RO: I Existing capacity position Total plant upgrades Merance retrement Renewabks Noranda termination Energy efficiency Demand response New primary supply side New secondary supply side	0 0 49 0 0 66 66 66 No Pr 2011 -117 2 0 0 48 0	0 0 0 0 0 0 286 -286 -286 -286 -286 0 0 0 -35 0	0 8 0 0 643 -643 7 - NO 2013 516 30 0 8 0 -134 0	0 8 0 -111 0 0 593 -593 Seco 2014 440 34 0 8 0 -210 0	0 8 0 0 0 567 -567 -567 -587 387 38 0 -306 0	-854 12 0 -154 -14 600 0 185 -185 -185 0 12 0 -407 0 0	-854 12 0 -172 -49 600 0 241 -241 DP C 1 2017 250 85 0 12 0 -507 0	-854 17 0 -189 -75 600 0 206 -206 -206 -2018 168 85 0 16 0 0 -603 0 0	-854 17 0 -201 -93 600 0 133 -133 -133 -2019 655 85 0 16 0 0 -688 0 0	-854 29 0 -206 -111 609 0 103 -103 -103 -2020 -22 91 0 20 0 -758 0 0	21 0 -216 -121 600 0 28 -28 -28 -29 -2021 -116 91 0 21 0 -825 0 0	23 0 -223 -133 -600 0 -46 46 -2022 -212 91 0 24 0 -883 0 0	26 0 -228 -145 600 0 -126 126 2023 -311 91 0 26 0 -927 0	28 0 -232 -157 600 0 -208 208 -201 -412 68 0 29 0 -955 0	31 0 -235 -167 -600 480 181 -181 -181 -182 -520 69 0 31 0 -977 0	-854 33 0 -235 -850 480 95 -95 -95 -95 -96 0 34 0 -989 0 0	-854 36 0 -235 -202 600 480 4 -4 -4 -4 -4 -736 69 0 37 0 -1,000 0	-854 39 0 -236 -213 600 480 -97 97 1es 2028 -852 69 0 39 0 -1,006 0 0	41 0 -235 -229 600 480 -197 197 -969 0 41 0 -1,009 0	2036 -1,007 -1,007
Merance retrement Renewabks Renewabks Rorand remination Exergy efficiency Demand response New primary supply side New secondary supply side Capacity position after adjustment Purchas es(+) or saks(-) Plan R0: I Existing capacity position Total plant upgrades Merance retrement Renewabks Noranda termination Energy efficiency Demand response New primary supply side	0 0 0 49 0 0 66 66 70 Pr 2011 -117 2 0 0	0 0 0 -69 0 0 0 286 -286 -286 -286 0 0 0 -35 0	0 8 0 -88 0 0 0 643 -643 -643 516 30 0 8 0 -134	0 8 0 -111 0 0 593 -593 -593 -593 -440 34 0 0 -210 0	0 8 0 -134 0 0 567 -567 -567 -7 -7 -7 -7 -7 -7 -7 -7 -7 -7 -7 -7 -7	-854 12 0 -154 -44 600 0 185 -185 -185 -2016 318 15 0 12 0	-854 12 0 -172 -49 600 0 241 -241 250 85 0 12 0 -507 0	-854 17 0 -189 -75 600 0 206 -206 -206 -2018 168 85 0 168 0 -603 0	-854 17 0 -201 -93 600 0 133 -133 -133 2019 65 85 0 16 0 -688 0	-854 20 0 -206 -111 609 0 103 -103 -103 -2020 -22 91 0 0 -758 0	21 0 -216 -121 600 0 23 -28 -28 -116 91 0 211 0 -825 0	23 0 -223 -133 -600 0 -46 -46 -46 -2022 -212 -91 0 -883 0 0	26 0 -228 -145 600 0 -126 126 126 2023 -311 91 0 26 0 -927 0	28 0 -232 -157 600 0 -208 208 208 2011 -412 63 0 29 0 -955 0 0	31 0 -235 -167 -600 480 181 -181 -181 -2025 -520 0 0 -977 0	-854 33 0 -235 -185 600 480 95 -95 -95 -626 69 0 34 0 -989 0	-854 36 0 -235 -202 600 480 4 -4 -4 -4 -736 69 0 37 0 -1,000 0	-854 39 0 -236 -213 600 480 -97 97 2028 -852 69 0 39 0 -1,006 0	41 0 -235 -229 600 480 -197 197 -969 0 41 0 -1,009 0	44 () -232 -244 600 480 -302 302 -1,089 69
Merance retrement Renewabkes Renewabkes Rorand remination Energy efficiency Demand response New primary supply side Reactly position after adjustment Purchas es(+) or saks(-) Plan R0: I Existing capacity position Total plant upgrades Merance retrement Renewabkes Noranda termination Energy efficiency Demand response New primary supply side New secondary supply side Rew secondary supply side Reactly position after adjustment Purchas es(+) or saks(-)	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 -69 0 0 0 0 0 286 -286 2012 211 6 0 0 0 0 0 302 303 0 0 0 0 0 0 0 0 0 0 0	0 8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 8 0 0 -111 0 0 0 593 -593 -593 -593 -440 0 3 0 0 0 0 -210 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 8 0 -134 0 0 0 567 -567 mdary 2015 387 38 0 3-306 0 0 0 7379	-854 12 0 -154 -14 600 0 185 -185 -Pre 2016 318 15 0 12 0 -407 0 0 0 752 -752	-854 12 0 0 -172 -49 600 0 241 -241 -250 85 0 0 12 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	-854 17 0 -189 -75 600 0 206 -206 Renery 2018 168 85 0 16 0 0 0 0 0 873 3-873	-854 17 0 -201 -93 660 0 0 133 -133 -133 -2019 65 85 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	-854 20 0 0 -206 -111 600 0 103 -103 8 - RA 2020 -22 91 0 0 20 0 0 0 0 0 0 0 0 0 0 4 0	21 0 -216 -121 600 0 23 -28 -28 -116 91 0 0 21 0 0 825 0 0 825 825	23 0 -223 -133 -600 0 -46 -46 46 -80 -10 -10 -10 -10 -10 -10 -10 -10 -10 -1	26 0 -228 -145 -600 0 -126 126 -126 -311 91 0 26 0 -927 0 0 0 33 -733	28 0 -232 -157 600 0 -208 208 -412 -63 0 0 0 0 -308 -412 -63 0 0 0 -63 0 -63 0	31 0 235 -167 6600 480 181 -181 -182 -18 -180 -181 -2025 -520 69 0 0 31 0 0 -977 0 0 0 0 557 -557	-854 33 30 -235 -185 600 480 95 95 -95 -626 69 0 34 0 0 0 0 0 0 466 0 0	-854 36 0 -235 -202 600 480 4 4 -202 -736 69 0 37 0 0 0 0 370 -370	-854 39 0 -236 -213 600 480 -97 97 108 -852 69 0 0 0 0 0 0 2028 -213 600 0 0 -97 97 0 0 0 0 0 0 0 0 0 0 0 0 0	41 0 -235 -229 600 480 -197 197 -969 0 41 0 -1,009 0 0	2030 -1,082 -1,092 -1,093 -1,0
Merance retrement Renewabks Norand a termination Energy efficiency Demand response New primary supply side New accordary supply side Capacity position after adjustment Purchases(+) or sales(-) Plan RO: I Existing capacity position Total plant upgrades Merance retirement Renewabks Noranda termination Energy efficiency Demand response New primary supply side New secondary supply side Capacity position after adjustment	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 -69 0 0 0 0 0 0 0 286 -286 2012 211 6 0 0 0 0 0 0 286 2012 211 6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 8 8 0 0 -1111 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 8 0 0 -134 0 0 0 567 -567 387 38 0 306 0 0 739 4dary	-854 12 0 -154 -14 600 0 185 -185 -185 -2016 318 15 0 12 0 0 0 0 752 -752	-854 12 0 -172 -49 600 0 241 -241 250 85 0 0 0 12 0 0 0 241 -241 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	-854 17 0 -189 -75 600 0 206 -206 Renev 2018 163 85 0 16 0 0 0 0 873 -873 enew	-854 17 0 -201 -93 6600 0 133 -133 2019 655 85 0 0 16 0 0 0 855 -855	-854 20 0 -206 -111 600 0 103 3 -103 6 - RA 2020 -22 91 0 0 0 -758 0 0 0 847 -847	21 0 2-216 -121 6600 0 0 28 2-28 2021 -116 91 0 0 21 0 0 821 821 P DSI	23 0 223 -133 -600 0 46 -46 -81 - N 2022 -212 91 0 0 -883 0 0 0 785 785 -785	26 0 -228 -145 -600 0 -126 -126 -126 -126 -126 -0 -227 0 0 0 -927 0 0 0 -733 -733	28 0 -232 -157 600 0 -208 208 -412 -639 0 0 0 0 -204 -412 -63 0 0 0 0 -600	31 0 235 -167 660 480 181 -181 -181 -2025 -520 69 0 0 0 0 0 0 557 -557	-854 33 30 -215 -185 600 480 95 -95 -95 -626 69 0 0 34 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	-854 36 0 -235 -202 600 480 4 -4 -736 69 0 -370 0	-854 39 0 -236 -213 660 -97 97 1es -852 69 0 0 0 0 0 0 0 0 0 0 0 0 0	41 0 -235 -229 600 480 -197 197 -569 0 41 0 -1,009 0 0 0 151 -151	44 () -233 -244 -600 -302 -302 -1,089 -1,089 -1,097 -1,00
Merance retrement Renewabks Renewabks Noranda termination Energy efficiency Demand response New primary supply side New secondary supply side Capacity position after adjustment Purchas es(+) or sakes(-) Plan RO: I Existing capacity position Total plant upgrades Merannec retrement Renewabkes Merannec retrement Renewabkes Noranda termination Energy efficiency Demand response New primary supply side New secondary supply side New secondary supply side Capacity position after adjustment Purchas es(+) or sakes(-) Plan R3: N	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 8 8 0 0 -111 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 8 0 -134 0 0 0 567 -567 mdary 2015 387 38 0 0 8 0 -306 0 0 0 239 -739 ddary 2015	-854 12 0 -154 -14 600 0 185 -185 -185 0 12 0 0 0 0 12 -0 752 -752 -Pro	-854 112 0 0 -1-72 -49 600 0 0 241 -241 220 250 85 0 12 0 0 0 0 241 -250 85 0 0 0 0 285 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	-854 17 7 -189 -75 600 0 0 206 -206 Renev 2018 168 85 0 16 0 0 0 0 0 873 -873 -873	-854 177 0 -201 -93 660 0 0 133 -133 -133 -2019 65 85 0 0 0 0 0 0 85 0 0 0 85 0 0 0 85 0 0 0 85 0 0 0 85 0 0 0 85 0 0 0 0	-854 20 0 0 0 0 0 103 -103 -103 -103 -2020 -22 91 0 20 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	21 0 0 -216 -121 6600 0 0 28 -28 2021 -116 91 0 0 21 0 0 825 0 0 821 -821 P DSi	23 0 -223 -133 -600 0 -46 -46 -600 -2022 -212 91 0 0 -83 0 0 0 785 -785 -785	26 0 -228 -145 6600 0 -126 126 2023 -311 91 0 0 26 0 0 -927 0 0 0 733 -733	28 0 -232 -157 600 0 -208 -208 	31 0 235 -167 6600 480 480 181 -181 -181 -182 -520 69 0 0 0 0 557 -557	-854 33 30 -235 -185 6600 480 995 -95 -5026 69 0 0 34 466 -466 Nor c	-854 36 0 -235 -202 600 480 4 -4 -736 69 0 377 0 -1,000 0 0 370 -370 -370	-854 39 0 -236 -213 660 480 -97 97 10ES -852 -69 0 0 0 0 0 0 0 0 0 0 0 0 0	41 0 2-235 -229 6600 4800 -197 197 -969 0 0 41 0 0 0 0 151 -151	4 4 60 60 60 60 60 60 60 60 60 60 60 60 60
Merance retrement Renewabkes Renewabkes Ronand atemination Energy efficiency Demand response New primary supply side New secondary supply side Capacky position after adjustmente Purchas est+) or sakes(-) Plan R0: I Editing capacity position Total plant upgrades Merance retrement Renewables Noranda termination Energy efficiency Demand response New primary supply side New secondary supply side Capacky position after adjustmente Purchas est+) or sakes(-) Plan R3: N Existing capacity position	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 236 -286 281 2012 211 6 0 0 0 85 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 8 0 0 88 0 0 0 643 643 516 30 0 0 683 688 688 7 No 2013 516 516 516 516 516 516 516 516 516 516	0 8 8 0 1-111 0 0 0 593 -593 Seco 2014 440 0 0 692 -592 Seco 2014 440	0 8 0 0 -134 0 0 0 567 -567 7 10dary -2015 387 0 0 0 0 0 739 -739 10dary -2015 387 38 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	-854 12 20 -154 -24 600 0 185 -185 -Pro 2016 318 15 0 12 0 0 0 752 -752 -Pro 2016 318	-854 112 0 0 -1-72 -49 600 0 241 -241 250 0 0 12 250 0 0 0 85 0 0 0 0 0 0 0 0 0 0 0 0 0 0	-854 17 0 -189 -75 600 0 0 206 -206 2018 168 85 0 0 16 0 0 0 873 -873 168	-854 177 0 -201 -93 660 0 133 -133 -2019 65 85 0 0 0 688 0 0 0 855 -855	-854 20 0 -206 -4111 6000 0 103 -103 8 - RA 2022 -22 91 0 0 -758 0 0 847 -847 RA 2020 22	21 0 2-216 600 0 28 2-28 2021 -116 91 0 0 21 0 0 825 0 0 821 -821	23 0 -223 -133 -600 0 -46 -46 -46 -46 -46 -2022 -212 -212 -91 0 0 -883 0 0 0 -883 0 0 0 -885 -785	26 0 -228 -145 600 0 -126 126 126 126 126 127 0 0 0 0 -227 0 0 0 0 -227 0 0 0 0 -227 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	28 0 -232 -157 600 0 -208 -208 	31 0 235 -167 -600 480 181 182 -181 -181 -182 -520 69 0 0 0 0 -977 0 0 0 0 557 -557 -557	-854 33 0 -235 -185 600 95 -95 -95 -626 69 0 0 34 0 0 0 0 0 466 -466 Nor c	-854 -36 0 -235 -202 600 480 4 -4 -4 -736 69 0 37 0 -1,000 0 0 370 -370 -370 -376	-854 39 0 -236 -213 660 -97 97 1es -852 69 0 0 0 0 0 0 0 0 0 0 0 0 0	41 0 2-235 -229 600 480 -197 197 2029 0 0 41 0 -1,009 0 0 0 151 -151	4 4 60 60 60 60 60 60 60 60 60 60 60 60 60
Merance retrement Renewabkes Renewabkes Rorand response Demand response New primary supply side New secondary supply side Capacity position after adjustment Purchas es(+) or saks(-) Plan R0: I Existing capacity position Total plant upgrades Merance retrement Renewabkes Merande redress Merance retrement Renewabkes	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 286 -286 0 0 0 0 0 302 302 302 302 302 302 302 3	0 8 0 0 643 643 516 30 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 8 0 0 -111 0 0 0 0 593 -593 593 593 440 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 8 0 0 -134 0 0 0 567 -567 38 0 0 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	-854 12 0 -154 -14 600 0 185 -185 -185 0 12 0 0 0 0 752 -752 -Pro 0 0 0 318 15 0 0 18 15 0 0 18 18 19 19 19 19 19 19 19 19 19 19 19 19 19	-854 112 0 0 -172 -49 600 0 0 241 -241 250 0 12 0 0 0 0 0 85 85 0 0 0 0 0 0 0 0 0 12 25 0 0 0 0 12 12 12 12 12 12 12 12 12 12 12 12 12	-854 177 0 -189 -75 600 0 0 206 -205 2018 168 835 0 0 16 0 0 0 0 873 -873 enew 2018 168 168 168 168 168 168 168 168 168 1	-854 177 0 -201 -93 600 0 0 133 -133 -133 vables 2019 65 88 0 0 0 0 0 0 0 0 855 -885 -885 5 0 0 0 166 0 0 0 0 176 186 186 186 186 186 186 186 186 186 18	-854 200 0 -206 -1111 6009 0 103 -103 -103 -2020 -22 91 0 0 20 0 0 0 0 847 -847 -RA	21 0 0 2-216 600 0 28 2-28 AP DS 2021 -116 0 0 821 -821 -821 -116 41 41 41	23 0 223 -133 -600 0 -46 -46 -46 -46 -46 -2022 -212 -212 0 0 0 0 -83 0 0 0 0 -85 -785 -785 -785 -486 -48	26 0 0 -228 -145 6600 0 -126 126 126 2023 -311 91 0 0 -927 0 0 0 -927 0 0 0 -927 33 -733 -733 -733 -414 -414 -414 -414 -414 -414 -414 -4	28 0 -232 -157 -600 0 -208 208 	31 0 0 -235 -167 600 480 181 -181 -181 -182 -520 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	-854 33 0 -235 -185 600 95 -95 Vor c 2026 69 0 0 34 0 9 9 9 9 9 0 0 0 0 0 0 0 0 0 0 0 0 0	-854 36 0 -235 -202 600 480 4 -4 -1000 0 37 0 -1,000 0 0 370 -370 -370 -370	-854 399 0 -236 -213 600 430 -97 97 108 -852 69 0 0 0 0 0 0 0 0 0 0 262 -262 -2028 -852 41	41 0 0 -235 -229 660 480 480 -197 197 -969 0 0 1-1,009 0 0 1-1,151	203- 203- 203- 203- 203- 203- 203- 203-
Meramec retrement Renewables Renewables Noranda termination Energy efficiency Demand response New primary supply side New secondary supply side Capacity position after adjustment Purchases(+) or sales(-) Plan RO: I Existing capacity position Total plant upgrades Meramec retrement Renewables Noranda termination Energy efficiency Demand response New primary supply side New secondary supply side Capacity position after adjustment Purchases(+) or sales(-) Plan R3: N Existing capacity position Total plant upgrades Meramec retrement	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 8 8 0 0 0 643 643 516 30 0 0 688 3 516 30 0 0 0 688 3 516 30 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 8 8 0 1-111 0 0 0 593 -593 Seco 2014 0 0 0 0 692 -592 Seco 2014 440	0 8 0 0 -134 0 0 0 0 567 -567 mdary 2015 387 38 38 0 0 2015 399 -739 mdary 2015 387 38 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	-854 12 0 1-154 -144 600 0 185 -185 -185 0 12 0 0 0 0 752 -752 -Pro 2016 318 15 0 0 0 12 0 0 0 12 0 0 0 0 13 0 0 0 0 0 0 0 0 0 0 0 0 0 0	-854 112 0 0 -1-72 -49 600 0 241 -241 250 0 0 12 250 0 0 0 85 0 0 0 0 0 0 0 0 0 0 0 0 0 0	-854 17 0 -189 -75 600 0 0 206 -206 2018 168 85 0 0 16 0 0 0 873 -873 168	-854 177 0 -201 -93 660 0 133 -133 -2019 65 85 0 0 0 688 0 0 0 855 -855	-854 20 0 -206 -4111 6000 0 103 -103 8 - RA 2022 -22 91 0 0 -758 0 0 847 -847 RA 2020 22	21 0 -216 600 0 28 -28 -28 -28 -29 -116 91 0 0 -825 0 0 821 -821 -821	23 0 223 -133 -600 0 -46 -46 -46 -46 -46 -2022 -212 91 0 0 24 0 0 -883 0 0 0 -883 0 0 0 -883 0 0 0 0 0 0 0 0 0 0 0 0 0	26 0 -228 -145 6600 0 -126 126 126 126 126 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	28 0 -232 -157 600 0 -208 -208 	31 0 235 -167 600 480 181 -181 -181 -182 -520 69 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	-854 33 0 -235 -185 600 95 -95 -95 -626 69 0 0 34 0 0 0 0 0 466 -466 Nor c	-854 36 0 -235 -202 600 480 4 4 4 -4 -736 69 0 37 0 -1,000 0 0 370 -370 -370 -376	-854 39 0 -236 -213 600 -97 97 105 -852 69 0 39 0 0 0 0 0 0 0 262 -262 -2028 -852 690 0 0 0 0 0 0 0 0 0 0 0 0 0	41 0 0 2235 -229 600 -197 197 2029 -969 0 41 0 0 0 0 0 151 -151 -151 -151 -151 -151	2033 -1,086 -1,000 -1,086 -1,000
Meramec retrement Renewables Noranda termination Energy efficiency Demand response New primary supply side New secondary supply side New secondary supply side New secondary supply side Purchase set+) or sakes (-) Existing capacity position Total plant upgrades Meramec retrement Renewables Noranda termination Energy efficiency Demand response New primary supply side Capacity position after adjustment Purchase set+) or sakes (-) Plan R3: N Existing capacity position Total plant upgrades Meramec retrement Renewables	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 8 0 -88 0 0 0 0 0 643 516 683 -683 516 530 0 0 8 8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 8 0 0 -111 0 0 0 0 593 -593 Seco 0 0 0 0 0 0 0 692 -592 440 34 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 8 0 -134 0 0 0 567 -567 387 38 0 0 -306 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	-854 12 0 -154 -14 600 0 185 -185 -185 0 0 12 0 0 0 0 0 0 0 185 -185 -195 0 0 0 0 12 0 0 0 0 12 0 0 0 0 0 0 0 0 0	-854 12 0 0 -172 -49 600 0 241 -241 250 85 0 0 12 85 -507 0 0 854 -854 11 -854	-854 177 0 -189 -75 600 0 -206 -206 -2018 168 85 0 0 16 0 0 0 0 0 873 -873 168 118 169 169 169 169 169 169 169 169 169 169	-854 177 0 -201 -93 660 0 0 133 -133 -133 0 0 16 65 85 0 0 0 0 0 855 -855 -855 11 -854 16	- RA - 2020 - 22 91 0 0 0 0 0 0 0 0 0 0 0 0 0	21 0 0 0 0 21 600 0 28 28 28 2021 -116 91 0 825 0 0 821 -821 -821 -116 41 -854 21	23 0 223 -133 -600 0 -46 -46 -46 -46 -46 -46 -46 -883 0 0 0 -883 0 0 785 -785 -785 -785	26 0 0 -228 -145 6600 0 -126 126 -126 -2023 -311 91 0 0 26 0 0 927 0 0 0 33 -733 -733 -733 -733	28 0 -232 -157 600 0 0 -208 208 -107 -	31 0 235 -167 600 480 480 181 -181 -181 -2025 -520 69 0 0 0 -977 0 0 0 0 557 -557 -557 -557 -557 -557	-854 33 0 -235 -185 -600 480 95 -95 -626 69 0 0 0 0 0 0 0 0 0 0 0 0 0	-854 36 0 -235 -202 600 4 4 4 -4 -736 69 0 0 0 0 0 0 0 0 0 0 0 0 0	-854 399 0 -236 -213 600 430 -97 97 108 -852 69 0 0 0 0 0 0 0 0 0 0 262 -262 -2028 -852 41	41 0 60 600 480 -197 197 -969 69 0 41 0 0 0 0 151 -151 -151 -969 41 -959 41 -959 41 -959 41 -959 480 -1,00	2033 -1,086 -1,000 33 -1,086 4 -1,000 33 -3 -1,086 4 -1,000
Meramec retrement Renewabks Noranda termination Energy efficiency Demand response New primary supply side New secondary supply side New secondary supply side New secondary supply side Purchas es(+) or saks(-) Plan R0: I Existing capacity position Total plant upgrades Meramec retrement Renewabks Noranda termination Energy efficiency Demand response New primary supply side New secondary supply side Capacity position after adjustment- Purchases(+) or saks(-) Plan R3: N Existing capacity position Total plant upgrades Meramec ret ferment Remewables Noranda termination	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 8 8 0 0 0 643	0 8 0 0 -111 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 8 0 -134 0 0 0 567 -567 38 0 0 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	-854 12 0 0 -154 -144 600 0 185 -185 15 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	-854 122 -49 600 0 241 -241 2017 250 0 0 0 0 0 0 0 0 0 0 854 -854 12 2017 250 12 12 12 13 14 15 16 16 16 16 16 16 16 16 16 16 16 16 16	-854 177 0 -189 -755 600 0 206 -206 Reneu 2018 168 8 35 0 0 16 0 0 0 0 0 8 873 -873 renew 2018 168 169 169 169 169 169 169 169 169 169 169	-854 177 0 -201 -93 660 0 -133 -133 -133 -133 -133 -133 -133 -135 -688 0 0 0 0 0 0 0 855 -855 -855 -11 -854 -16 0 0	- RA - RA	21	23 0 223 -133 -600 0 -46 46 -81 0 0 -883 0 0 0 -883 0 0 0 -883 0 0 0 -883 0 0 0 0 0 0 0 0 0 0 0 0 0	26 0 0 0 128 -145 600 0 -126 126 2023 -311 91 0 0 -927 0 0 0 -927 0 0 267 27 33 -733 -733 -733 -734 -734 -735 -735 -735 -735 -735 -735 -735 -735	28 0 -232 -157 -600 0 0 -208 -208 -412	31 0 235 -167 6600 480 480 -181 -181 100 5 - 2005 -520 69 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	-854 33 0 -235 -185 6600 95 -95 Nor c c 2026 -626 -626 441 -854 34 0	-854 36 0 -235 -202 600 480 4 4 -4	-854 399 0 -236 -213 6600 480 -97 97 97 -852 669 0 0 39 0 0 -1,006 0 0 262 -262 -262 -852 41 -854 39 0	41 -235 -229 600 -197 197 -969 0 41 0 0 0 0 0 151 -151 -151 -151 -151 -151 -151	2033 -1,080 -1,090 -1,080 -1,0
Meramec retrement Renewabks Noranda termination Energy efficiency Demand response New primary supply side New secondary supply side New secondary supply side New secondary supply side Purchas es(+) or saks(-) Plan R0: I Existing capacity position Total plant upgrades Meramec retrement Renewabks Noranda termination Energy efficiency Demand response New primary supply side New secondary supply side Capacity position after adjustment- Purchases(+) or saks(-) Plan R3: N Existing capacity position Total plant upgrades Meramec ret ferment Remewables Noranda termination	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 8 8 0 0 0 643 643 516 683 516 30 0 0 8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 8 0 0 -111 0 0 0 0 593 -593 Seco 0 0 0 0 0 0 0 692 -592 440 34 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 8 0 0 -134 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	-854 12 0 -154 -14 600 0 185 -185 -185 0 0 12 0 0 0 0 0 0 0 185 -185 -195 0 0 0 0 12 0 0 0 0 12 0 0 0 0 0 0 0 0 0	-854 12 0 0 -172 -49 600 0 241 -241 250 85 0 0 12 85 -507 0 0 854 -854 11 -854	-854 177 0 0 -189 -75 600 0 0 206 -206 -206 -2018 168 -853 -600 0 0 873 -873 -873 -873 -874 -166 -166 -166 -166 -166 -166 -166 -16	-854 117 0 0 -201 -93 6600 0 133 -133 vable: 2019 65 85 0 0 0 0 0 855 -855 -855 -855 -855 -855 -855 -855	- RA - RA - RA - RA - RA - RA - RA - RA - RA - RA RA RA 	21 0 0 0 0 21 600 0 28 28 28 2021 -116 91 0 825 0 0 821 -821 -821 -116 41 -854 21	23 0 0 223 -133 -600 0 0 -46 -46 -46 -46 -46 -46 -46 -46	26 0 0 0 1-218 -145 6600 0 126 126 -126 -126 -126 -126 0 0 0 0 0 0 -727 0 0 0 0 -727 0 0 0 0 126 0 0 0 0 126 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	28 0 -232 -157 600 0 0 -208 208 -107 -	31 0 235 -167 600 480 480 181 -181 -181 -2025 -520 69 0 0 0 -977 0 0 0 0 557 -557 -557 -557 -557 -557	-854 33 0 0 -235 -185 6600 95 -95 Vor cc 2076 69 0 0 34 0 0 -989 0 0 0 0 466 -466 Nor c 2006 -627 -626 -626 -626 -627 -626 -626 -627 -626 -626 -627 -627 -627 -627 -628 -628 -628 -629 -6	-854 36 0 -235 -202 600 4 4 4 -4 -736 69 0 0 0 0 0 0 0 0 0 0 0 0 0	-854 399 0 -236 -213 6600 480 -97 97 97 -852 669 0 0 39 0 0 -1,006 0 0 262 -262 -262 -852 41 -854 39 0	41 0 60 600 480 -197 197 -969 69 0 41 0 0 0 0 151 -151 -151 -969 41 -959 41 -959 41 -959 41 -959 480 -1,00	2033 -1,080 -1,090 -1,080 -1,0
Meramec retrement Renewabks Noranda termination Energy efficiency Demand response New primary supply side New secondary supply side New secondary supply side Purchas es(+) or saks(-) Plan R0: I Existing capacity position Total plant upgrades Meramec retrement Renewabks Noranda termination Energy efficiency Demand response New primary supply side New secondary supply side Capacity position after adjustment Purchases(+) or saks(-) Plan R3: N Existing capacity position Total plant upgrades	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 8 8 0 0 0 643	0 8 0 0 -111 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 8 0 -134 0 0 0 567 -567 38 0 0 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	-854 12 0 0 -154 -144 600 0 185 -185 15 0 0 12 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	-854 122 -49 600 0 241 -241 2017 250 0 0 0 0 0 0 0 0 0 0 854 -854 12 2017 250 12 12 12 13 14 15 16 16 16 16 16 16 16 16 16 16 16 16 16	-854 177 0 -189 -755 600 0 206 -206 Reneu 2018 168 8 35 0 0 16 0 0 0 0 0 8 873 -873 renew 2018 168 169 169 169 169 169 169 169 169 169 169	-854 177 0 -201 -93 660 0 -133 -133 -133 -133 -133 -133 -133 -135 -688 0 0 0 0 0 0 0 855 -855 -855 -11 -854 -16 0 0	- RA - RA	21	23 0 223 -133 -600 0 -46 46 -81 0 0 -883 0 0 0 -883 0 0 0 -883 0 0 0 -883 0 0 0 0 0 0 0 0 0 0 0 0 0	26 0 0 0 128 -145 600 0 -126 126 2023 -311 91 0 0 -927 0 0 0 -927 0 0 267 27 33 -733 -733 -733 -734 -734 -735 -735 -735 -735 -735 -735 -735 -735	28 0 -232 -157 -600 0 0 -208 -208 -412	31 0 235 -167 6600 480 480 -181 -181 100 5 - 2005 -520 69 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	-854 33 0 -235 -185 6600 95 -95 Nor c c 2026 -626 -626 441 -854 34 0	-854 36 0 -235 -202 600 480 4 4 -4	-854 399 0 -236 -2136 -2136 -600 480 -97 97 97 -852 -69 0 0 0 0 0 0 262 -262 -262 -854 39 0 0	41 -235 -229 600 -197 197 -969 0 41 0 0 0 0 0 151 -151 -151 -151 -151 -151 -151	2033 -1,080 -1,000 -1,000 -1,000 -1,000 -1,000 -1,000 -1,000
Meramec retrement Renewables Noranda termination Energy efficiency Demand response New primary supply side New secondary supply side New secondary supply side Purchases(+) or sales(-) Plan RO: I Existing capacity position Total plant upgrades Meramec retrement Renewables Noranda termination Energy efficiency Demand response New primary supply side Capacity position after adjustment Purchases(+) or sales(-) Plan R3: N Existing capacity position Total plant upgrades Meramec retrement Renewables Noranda termination Total plant upgrades Meramec retrement Renewables Noranda termination Energy efficiency	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 8 8 0 0 0 643 643 516 683 516 30 0 0 8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 8 0 0 -111 0 0 0 0 593 3 593 Seco 2014 440 0 0 692 -592 Seco 1 2014 440 0 8 0 0 -210 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 8 0 0 -134 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	-854 12 0 -154 -144 600 0 185 -185 -185 0 0 12 0 0 0 0 752 -752 -752 -Pro 2016 318 15 0 0 0 0 12 0 0 0 13 15 15 16 16 16 16 16 16 16 16 16 16 16 16 16	-854 12 0 -172 -49 600 0 241 -241 0 220 35 507 0 0 0 35 507 250 0 0 0 0 0 0 0 0 0	-854 177 0 0 -189 -75 600 0 0 206 -206 -206 -2018 168 -853 -600 0 0 873 -873 -873 -873 -874 -166 -166 -166 -166 -166 -166 -166 -16	-854 117 0 0 -201 -93 6600 0 133 -133 vable: 2019 65 85 0 0 0 0 0 855 -855 -855 -855 -855 -855 -855 -855	- RA - RA - RA - RA - RA - RA - RA - RA - RA - RA RA RA 	21	23 0 0 223 -133 -600 0 0 -46 -46 -46 -46 -46 -46 -46 -46	26 0 0 0 1-218 -145 6600 0 126 126 -126 -126 -126 -126 0 0 0 0 0 0 -727 0 0 0 0 -727 0 0 0 0 126 0 0 0 0 126 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	28 0 -232 -157 600 0 -208 208 -208 -412 -63 0 0 0 0 0 0 0 0 0 0 10 10	31 0 0 2355 -167 6600 480 -181 -181 -181 -182 -520 69 0 0 0 0 0 0 0 0 0 0 0 0 557 -557 -557 -	-854 33 0 0 -235 -185 6600 95 -95 Vor cc 2076 69 0 0 34 0 0 -989 0 0 0 0 466 -466 Nor c 2006 -627 -626 -626 -626 -627 -626 -626 -627 -626 -626 -627 -627 -627 -627 -628 -628 -628 -629 -6	-854 36 0 -235 -202 660 4 4 4 -1,000 0 370 -370	-854 39 0 -236 -213 6600 -97 97 108 2028 -852 69 0 0 0 0 0 0 0 0 262 -262 -203	41 0 0 2235 -229 600 -197 197 2029 969 0 41 100 0 0 0 151 -151 -151 2029 44 44 41 85 44 41 0 -1,009	2033 -1,080 -1,000 -1,000 -1,000 -1,000 -1,000 -1,000 -1,000
Meramec retrement Renewables Noranda termination Energy efficiency Demand response New primary supply side New secondary supply side New secondary supply side New secondary supply side New secondary supply side Purchas es(+) or sakes(-) Existing capacity position Total plant upgrades Meramec retrement Renewables Noranda termination Energy efficiency Demand response New primary supply side Capacity position after adjustment Purchases(+) or sakes(-) Plan R3: N Existing capacity position Total plant upgrades Meramec retrement Renewables Noranda termination Energy efficiency Demand response	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 8 0 0 -134 0 0 0 567 -567 387 38 0 0 -306 38 8 0 -306 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	-854 12 0 0 -154 -14 600 0 0 185 -185 0 0 12 0 0 0 0 12 0 0 0 0 0 0 0 0 0 0 0	-854 12 0 -172 -49 600 0 241 -241 -241 250 0 12 250 0 0 0 0 12 250 0 0 12 250 0 0 12 250 0 0 12 250 0 0 12 250 0 0 12 12 12 12 12 12 12 12 12 12	-854 177 0 189 -75 600 0 206 -206 -206 -206 0 0 0 0 0 0 0 0 0 0 0 0 0	-854 177 0 -201 -93 660 0 0 133 -133 -133 0 0 16 65 85 0 0 0 0 0 0 855 -855 11 -854 16 0 0 65 11 -854 16 0 0 0 0 18 18 18 18 18 18 18 18 18 18 18 18 18	- RA 2020 -206 -1111 600 0 103 -103 -103 -103 -722 91 0 0 -758 0 0 847 -847 RA 2020 22 41 854 20 0 0 354 354 329	21 0 0 0 216 -121 6600 0 28 -28 28 21 -116 91 0 0 821 -821 -116 41 854 21 0 0 325 -399	23 0 223 -133 -600 0 -46 -46 -46 -46 -46 -46 -46 -46	26 0 0 -228 -145 6600 0 -126 -126 -126 -126 0 0 26 0 0 0 0 -927 0 0 0 0 -927 0 0 0 -927 3 3 3 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	28 0 -232 -157 600 0 -208 208 -412 -412 -639 0 0 0 0 0 0 0 203 -412 -639 0 0 0 0 29 0 0 0 10 10 10 10 10 10 10 1	31 0 235 -167 600 480 480 181 -181 188 -520 69 0 0 0 0 0 0 0 0 557 -557 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	-854 33 0 -235 -185 -600 480 95 -95 -626 69 0 0 0 0 0 0 0 0 0 0 0 0 0	-854 36 0 -235 -202 -203 -206 480 4 4 -4	-854 39 0 -236 -213 660 480 -97 97 97 108 -852 69 0 0 0 0 0 0 0 0 0 0 262 -262 -2028 -852 -85	41 0 0 600 480 -197 197 -969 69 0 41 0 0 0 0 151 -151 -969 41 -854 41 -854 41 0 -109 -969 -969 -969 -969 -1,009	2033 -1,080 -1,000 -1,000 -1,080 -1,080 -1,000
Meramec retrement Renewabks Noranda termination Energy efficiency Demand res ponse New primary supply side New secondary supply side New secondary supply side Purchas es(+) or saks(-) Plan R0: I Existing capacity position Total plant upgrades Meramec retrement Renewabks Noranda termination Energy efficiency Demand response New primary supply side Capacity position after adjustment- Purchas es(+) or saks(-) Plan R3: N Existing capacity position Total plant upgrades Meramec ret ferment Renewabks Noranda termination Eargy efficiency Demand response Noranda termination Eargy efficiency Demand response Noranda termination Eargy efficiency Demand response New primary supply side	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 -69 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 8 8 0 0 0 0 643 516 643 516 683 516 30 0 0 8 8 683 516 30 0 0 8 8 683 516 516 516 516 516 516 516 516 516 516	0 8 0 0 -111 0 0 0 0 593 3 593 593 593 593 6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 8 0 -134 0 0 0 0 567 -567 38 0 0 8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	-854 12 0 -154 -14 600 0 185 -185 -185 -185 0 0 12 0 0 0 0 752 -752 -752 0 0 0 0 0 0 0 135 0 0 0 14 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	-854 122 -49 600 0 241 -241 2017 2507 0 0 0 0 0 0 0 0 854 -854 12 0 0 -507 2507 2507 2507 2507 2507 385 12 2017 2507 385 385 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	-854 177 0 -189 -755 600 0 206 -206 Reneu 2018 168 85 0 0 16 0 0 0 0 873 -873 168 169 169 169 169 169 169 169 169 169 169	-854 177 0 0 -201 -93 6600 0 133 -133 -133 -133 0 0 0 0 0 0 0 0 0 0 0 0 855 -855 11 -854 16 0 0 -688 2019 65 65 0	- RA - 2000 - 2006 - 1013 - 103 - 103 - 2020 - 22 - 20 - 0 - 0 - 0 - 0 - 0 - 0 - 0 -	21	23 0 223 -133 -600 0 -46 46 600 -2022 -212 -91 0 0 -883 0 0 0 -883 0 0 0 -883 -785 -785 -46 -46 -46 -46 -46 -46 -46 -46	26 0 0 0 0 126 126 2003 -311 41 41 854 26 0 0 0	28 0 0 -232 -157 600 0 -208 208 -208 -208 -208 -208 -208 -308 -	31 0 235 -167 -600 -181 -181 -181 -185 -181 -185 -2025 -520 -977 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	-854 33 0 -235 -185 660 95 -95 Nor c 2026 -626 69 0 0 34 0 0 0 0 0 0 0 0 0 0 0 0 0 0 466 -626 -626 -466 -626 -626 -626 -626 -626 -626 -626 -627 -626 -627 -627 -627 -628 -628 -628 -629	-854 36 0 -235 -202 600 480 4 4 -4	-854 399 0 -236 -213 660 480 -97 97 97 97 -1,006 0 0 0 0 262 2028 -852 -462 -962 -462 -462 -462 -462 -784 0 0	41 0 235 -229 600 197 197 2029 -969 0 41 0 -1,009 0 0 0 151 -151 -151 -1,009 -1,00	2033 -1,000 -1,000 -1,000



	8		097	9	2413	3 (1 2	\$ ¥	}	6639	ğ	ş	\$	и	g (; ă	;	9	ĸ	ı ızı	ង	Ħ	316	Ř	ă	×ŝ	8	Ď	11173	80		۰.	8	11173	2030		ដ ខ្	į	3057	(B)	\$60	-	500	8	į	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	3	1	
	8		3	3	3127	3 5	i j	\$ <u>£</u>	1	6639	នាំ	3	\$	2 5	g c	7 5	ជ	ij	55	8	×	891	316	ğ	ā	x	8	4224	11173	502		96		11173	3028		8	3 -	275	â	8676	,	212	200	Ì	171	5	Š	
	800		32	ន្ទ }	2415	3	7 78	} <u>r</u>	1	689	ă	3	8	8 8	ğ ę	7 2	2	3	×	អ	13	188	316	ğ	š	8		3674	10673	2006		ယ္ဝ	ట	10673	80		57.0 5.00 5.00 5.00 5.00 5.00 5.00 5.00	ind.	, if	8	90,00		1634	8	Ì	2 7 5 2 2 5	ş	B	
	707		3	S			7 75	<u></u>	ì	6833	234	94	ğ	2 5	9 5	308	១	3	ĸ	13	S	881	316	305	\$25	23		3674	10673	2022		• •	6	106773	2027		156 157 167 167 167 167 167 167 167 167 167 16	<u> </u>	000	ĝ	97.90	į	32,		ţ	1 17 E	Ş	}	
	2026		7,70	3 j	2413	3 8	1 2	1	ı	6099	ä	\$	8	a 8	g ę	2	្ន	77.7	ક્ષ	×	ន	138	316	첧	ĸ	25		3674	10573	2026		~ O	c	10573	80		2256	3 0	(042)	(301)	Bobe		1867	333	Š	15.10 10101	. 057	2	
			97	2	9 5	3 6	3,75	} ±	2	6039	ğ	3	3	2 5	7 5	7 8	n	3	×	t/A	×	188	316	ğ	254	×		3674	10673	3000		0 0	٥	10673	203		8	3	200	(£	6009		1966	8	Ì	ដូច្ន	ş	į	
	70		1269	3	A. 18	3 6	87.4	ដ	1	8	ă	07	3	2 8	អ៊ី ទូ	208	=	3	ĸ	55	S	251	316	304	ģ	*		3674	10673	3034		w 23	æ.	10501	302		5	3 -	, (S)	(156)	1561	:	3070	2007		15.8	659	3	
	303		97	ន្ទ រ	ST 57	3 8	772	} ¥	3	683	45	03	Š	ន	9 5	2 2	1	7	ĸ	ĸ	×	881	316	304	224	×		3674	10673	2023		∾ w	υü	10591	202		326	3	609	<u>8</u>	6471		310	SI	Ì	568	5	3	
	2202		200	3	7418	3 6	12	ş <u>x</u>	2	ම්	គំ	3	3 3	8 8	ទីជ	22	១	Ħ	ŧЯ	នា	প্ত	188	25	Ř	Š	×		3074	10673	2007		ec 90	ųΔ	10591	202					1064			1623	3033	è	រុះខ្លុំ	ě	1	
	200		35.	3 ;	24.5	3 6	7.2	} ¥1)	83	ă	3	3	а€	9 ₽	3	2	3	ĸ	К	8	188	316	36	Ř	*		787	10673	2007		ω 10	ac-	10001	50						. 0493		1089	700		, Ç.	9	2	
	88		126							689																		3674	10673	2020		=> 00	æ	10881	2					(PE			1950	2020		17.1	Ę,	-	
	g		1260							88																		3644	3 10643	2019		w 10		10651	80						9238			8100		12.00	25		
	8	,								6699																		364	3 10543	3018		10 B\$														1 7 8			
	뙶		1260		, .					883																		A	3 10543			n us		10651	2017		_									1775			
	뛺		S (වුනි																		364	3 10473	2016		40 sa)			2018					(131)				30 N					
	2016									6833																		364	10473			~a t0			2015									300		2000	509		
	ğ				,					মঞ																		ZČe4	5 10468			ന മ		3 10477							34436			<u>20</u>		171	Ĕ		
	E E		다 다							_	**																	755E	9 10466	2013		**	-	5 10.073	2013		•				_			200		3 2 2	1989		
-	ă E		81			-				653	ង																	1 3611	4 10408	2002		03 KO	æ	2 10416	2012		1658				2003		2002	1 2013		1 E	ş		
	8		ear 1130							66	e e			ន៖				Gas 112			•				K 491		2	1198 Agi	10404	100		er 00	ω	10412	2011		8379	2 8	; c	(62)	9328	,	<u>4</u>	둾	45,	169	172	į	
	Capacity		Nudear	Ardio	3 .	5 3	3 8	9	\$		Hydro	ł	g i	5 (3 2	3 6		VIIO	ō	ō	õ		3		Gas			eaking Caped	À O	ons		d (See Note)		(A+E)	Serves					ment (DSM)	Leston e nts	,	Ç				Ś	ĩ	
AmerenUE	updated 5/2/2011 per INP EU-2011-0/27 1 A. System Generation Copecity	Existing Generation Capacity	Callevay	Keokuk	Capadio		Menmer	fred Weber		Total Base Capacity	Osago	Taum Sauk	YINGS I	rainprounas	House Sand	Kirmindy	Kirkswille	Meramoc 1,2 CTGs	MAKICO	Michenty	Moreau	Peno Creek Evergy Co	Pirrokneyalle	Raccon Cheek	Venice 1,23,4,5 CTs	Viaduct	NowOO	Total intermediate/Pooking Capacity	Total Generation Capacity	Capacity Transactions	Purchases	Ploneer Praitic Wind (See Note 3) Yotal Purchases	Net Trensactions	Total System Capacity (A+3)	System Peaks & Reserves	Peak Compods	UE Forcasted Peak	Votage Reduction	Demand Recognice	Damand Side Monagement (DSM)	Peak Forecast with adjustments		Capacity Reserves (A-ELC)	Capachy Needs	Capacity Reserves	Resulted Capacity	Canadly Balance (A+BJ)	The section of the section	NOTES
Am.	9 4 9																													ಣೆ					ប់									ď					

HC

List of Staff's Deficiencies

- 1. Ameren Missouri did not perform cost-effectiveness screening for a modified Rider L program or for potential customer education programs provided by third party providers such as OPOWER. Rule 4CSR 240-22.050 (3).
- 2. Ameren Missouri did not use minimization of the present worth of long-run utility costs as the primary selection criterion in choosing its preferred resource plan as required by rules 4 CSR 240-22.070(6)(A) and 4 CSR 240-22.010(2)(B).
- 3. Ameren Missouri has not quantitatively analyzed and documented the DSM cost recovery solution which is necessary for Ameren Missouri to select Plan R0 as its preferred resource plan under current environmental regulations and Meramec continuing to operate "as is," and to select contingency Plan R3 as its preferred resource plan under aggressive environmental regulations and Meramec not continuing to operate "as is" as required by rules 4 CSR 240-22.070(6)(A) and 4 CSR 240-22.010(2)(C).
- 4. Ameren Missouri did not correctly quantify the expected value of better information concerning at least the critical uncertain factors that affect the performance of its preferred resource plan, as measured by the present value of utility revenue requirements. Rule 4 CSR 240-22.070(8).

List of Staff's Concerns

- A. Ameren Missouri did not consistently use the value for avoided capacity costs in various calculations in its IRP. Rule 4 CSR 240-22 050(2).
- B. Documentation of Ameren Missouri's Board of Directors' meetings¹¹ during which the preferred resource plan was discussed and "unanimously adopted" does not indicate that all candidate resource plans analyzed pursuant to the requirements of 4 CSR 240-22.060 and the requirements of 4 CSR 240-22.070(1) (5) were considered by Ameren Missouri's decision-makers and does not indicate that the lowest cost candidate resource plans (Plan R0 and Plan R2) were considered at all by Ameren Missouri's decision-makers.
- C. The two sets of independent critical uncertain factors which are included as "joint" independent critical uncertain factors in Ameren Missouri's probability tree do not correctly reflect the values and probabilities for these two sets of the individual independent critical uncertain factors. Rule 4 CSR 240-22.070(1) variance.
- D. The high-case, base-case and low-case natural gas prices may be too high as a result of the recent development of shale gas plays in the United States. Rule 4 CSR 240-22.070(3)

¹¹ Documents include: 1) Chapter 10, Appendix D; 2) Ameren Missouri's response to The Office of Public Counsel's data request 2007; 3) Ameren Missouri's response to The Office of Public Counsel's data request 2008.

- E. Ameren Missouri's preferred resource plan does not meet the statutory goal of the Missouri Energy Efficiency Investment Act to achieve all cost-effective demand-side savings.
- F. Ameren Missouri has made very limited effort to achieve the DSM cost recovery solution necessary for it to choose Plan R0 as its preferred resource plan under current environmental regulations.
- G. When analyzing the economic development policy objective for various candidate resource plans, Ameren Missouri did not analyze the indirect economic impacts of various candidate resource plans due to the lower risk adjusted PVRR for RAP DSM no supply-side resources Plan R0 under current environmental regulations (up to \$1.9 billion vs. Plan B2), and for Low Risk DSM Combined Cycle plants in 2016 and 2026 Plan R3 under aggressive environmental regulations (up to \$2.5 billion vs. Plan H1).
- H. Scores on Ameren Missouri's preferred resource plan scorecard are not logically consistent and may have serious flaws, because the comparison of one plan to another can only be done fairly when comparing plans designed for current environmental regulations with Meramec continuing to operate "as is" or when comparing plans designed for aggressive environmental regulations with Meramec not continuing to operate "as is."

4 CSR 240-22.030 Load Analysis and Forecasting

Summary

The stated purpose of rule 4 CSR 240-22.030, Load Analysis and Forecasting, is the setting of the "minimum standards for the maintenance and updating of historical data, the level of detail required in analyzing and forecasting loads, and for the documentation of the inputs, components and methods used to derive the load forecasts."

In Staff's limited review of Ameren Missouri's load analysis and energy and demand forecasts, Staff found no deficiencies concerning compliance with this rule, and Staff has not identified any additional concerns. Staff believes this filing also meets the Load Analysis and Forecasting requirements of the Non-Unanimous Stipulation and Agreement in Case No. EO-2007-0409.

Ameren Missouri requested waivers from specific provisions of this rule. All were granted by the Commission. These waivers pertained to all or part of the following subsections of the rule:

4 CSR 240-22.030 (1)(D)1.	Start date of historical energy data base
4 CSR 240-22.030 (1)(D)2.	Start date of historical peak and hourly load data base
4 CSR 240-22.030 (3)	Analysis of use per unit
(4 CSR 240-22.030 (3)(B)1.	Measures of stock of energy-using capital goods
4 CSR 240-22.030 (4)(A)	Load Profiles for Class and for Net System Load
4 CSR 240-22.030 (4)(B)	Calibrate Class Load Profiles to Net System Load Profiles
4 CSR 240-22.030 (5)(B)2.B.	End Use Detail
4 CSR 240-22.030 (8)(B)2.	Plots of coincident demands showing end-use com
4 CSR 240-22.030 (8)(E)1.	Plots of hourly load profiles with end use components

Ameren Missouri's retail energy sales grew by 45 percent (45%) over the 14-year period from 1995 to 2009, a compound annual rate of 1.87%, and retail peak demand grew by 9.4% over the 7-year period from 2003 to 2009, a compound annual rate of 1.29%. For the planning forecast period of 2010 to 2030 Ameren Missouri projects retail sales will grow by 23% over 20 years, 1.09% annually, and retail peak demand will grow by 18% over 20 years, 0.91% annually.

Based on its limited review, Staff concludes Ameren Missouri's Load Analysis and Forecasting filing meets the requirements of rule 4 CSR 240-22.030, and Staff has identified no deficiencies or concerns.

4 CSR 240-22.040 Supply-Side Resource Analysis

Summary

Rule 4 CSR 240-22.040, Supply-Side Resource Analysis, requires Ameren Missouri to review existing resources for opportunities to upgrade or retire them, and also to review a wide variety of supply-side resource options to determine cost estimates for each. Resource options are to be ranked based upon their relative annualized utility costs, as well as based upon their probable environmental costs. Resources which do not have significant disadvantages pass this pre-screening process and are to be included in the integrated resource analysis process used to select the preferred resource plan.

Ameren Missouri reviewed fossil fuel, renewable energy, and nuclear resource options, as well as its transmission and distribution system options. Ameren Missouri evaluated technologies based on capital, fixed and variable cost estimates from Black and Veatch, Burns & McDonnell, Energy Information Administration (EIA), Electric Power Research Institute ("EPRI"), projects in the region under construction, manufacturers' data, consultants, various reports, and Ameren Missouri in-house experts. Ameren Missouri ranked these options to obtain a high, base and low range of costs based on a broad range of technology development, probable environmental regulations and cost uncertainties. Ameren Missouri excluded some technologies from its further review because the technologies are in the developmental stage, resource inadequacy, or absence of geological features required for their implementation or use by Ameren Missouri.

Ameren Missouri's supply-side resource screening analysis identified potential costeffective options that it passed on to consider further in its integrated resource analysis. Ameren Missouri evaluated the efficiency, life extension, environmental enhancements and retirement scenarios of the existing facilities it relies upon for capacity and power. Ameren Missouri also analyzed its transmission and distributions systems as required by the Commission's Chapter 22 rules.

With respect to rule 4 CSR 240-22.040 Supply-Side Resource Analysis, Ameren Missouri requested, and the Commission granted, in Docket No. EE-2010-0243, waivers of the following specific provisions of that rule:

4 CSR 240-22.040(2)(B)2.	Specify at least two levels of mitigation of environmental
4 CSR 240-22.040(3)	pollutants Analysis of existing and planned interconnectedgeneration
4 CSR 240-22.040(6)	resources Future transmission facilities required over planning horizon

Ameren Missouri requested a waiver in this filing from rule 4 CSR 240-22.040(1)(K) and the Commission's Order in its last Chapter 22 compliance filing Case No. EO-2007-0409 concerning environmental impacts associated with the release of radioactive tritium and noble gases (krypton and xenon) from the Callaway I nuclear plant. The Commission denied this waiver request.

Based on its limited review, Staff concludes Ameren Missouri's Supply-Side Resource Analysis filing meets the requirements of rule 4 CSR 240-22.040, and Staff has identified no concerns or deficiencies.

4 CSR 240-22.050 Demand-Side Resource Analysis

Summary

Rule 4 CSR 240-22.050, Demand-Side Resource Analysis, specifies the methods by which end-use measures and demand-side programs shall be developed and screened for cost-effectiveness. It also requires the ongoing evaluation of end-use measures and programs, and the use of program evaluation information to improve program design and cost-effectiveness analysis.

The current Ameren Missouri 2011 IRP filing improves and expands Ameren Missouri's overall consideration and evaluation of demand-side resources from its previous 2008 IRP filing. A primary improvement is the knowledge gained from the actual program implementation and evaluation experience from its previous and current demand-side programs. Another primary improvement is the incorporation of a substantial DSM Market Potential Study prepared by Global Energy Partners that utilized primary market research data from Ameren Missouri's customers and input received as a result of multiple stakeholder workshops and meetings. The 2011 IRP filing also reflects: (1) the acquisition of the DSMoreTM model – one of the leading cost effectiveness measurement tools for energy efficiency and demand response programs; (2) the acquisition of multiple measure level databases; (3) a robust economic screening process including approximately 500 electric energy efficiency measures; (4) a review of utility program design best practices; and (5) the incorporation of input from outside consultant reports such as Navigant for distributed generation and an evaluation of the peak power rebate programs by ADM associates.

Ameren Missouri applied for and received from the Commission variances from six (6) provisions of this rule related to the following:

4 CSR 240-22.050 (2)	Specifies the required methods for calculating and allocating avoided costs
4 CSR 240-22.050(3)(F)	End-use measures in at least one (1) potential demand-side
	program
4 CSR 240-22.050(6)(D)	Design a marketing plan and delivery process
4 CSR 240-22.050(9)	Evaluation of demand-side program
4 CSR 240-22.050(11)(D)	Document methods and assumptions used in avoided cost
	estimates
4 CSR 240-2.050(11)(J)	A description of the process and impact evaluation plans

Staff believes Ameren Missouri's Demand-Side Resource Analysis filing is deficient in meeting the requirements of rule 4 CSR 240-22.050(3), and Staff has also identified one (1) concern for this rule.

Deficiencies

1. Ameren Missouri did not perform cost-effectiveness screening for a modified Rider L program or for potential customer education programs provided by third party providers such as OPOWER. Rule 4CSR 240-22.050 (3).

Ameren Missouri's current Rider L for C&I (commercial and industrial) business customers is described on page 52, section 7.2.6.5 "NDDR Large Business." An evaluation report for the Rider L Peak Power Rebate Program, dated April 2010, prepared by ADM Associates recommended that Rider L be revised to provide increased customer compensation, with the implied intent of increasing the retention rate of existing customers and the program's appeal to new customers. Specifically, ADM recommended revising the customer specific baseline calculation formula and the formula by which credits are paid. Staff notes that File No. EO-2009-0437 was opened to investigate tariff language changes to Rider L, and that Rider L is set to expire on December 31, 2011.

A proven customer education program designed to convert passive individual energy users into active participants in demand-side programs (provided by third party providers such as OPOWER¹²) was neither described nor included in Ameren Missouri's cost-effectiveness screening. OPOWER provided a presentation during Staff's Smart Grid Workshop on June 28, 2010, that was submitted in File No. EW-2009-0292. In its presentation, OPOWER reported very impressive results for customer engagement with 1) over 85 percent (>85%) of customers receiving the OPOWER personalized monthly report taking significant action to save energy, 2) realized first year energy savings for individual utility clients ranging from 1.5 percent (1.5%) to 3.5 percent (3.5%), and 3) a 20 percent (20%) increase in overall effectiveness of energy efficiency programs for utility clients as a result of those clients implementing the customized OPOWER monthly report approach to customer engagement.

¹² http://www.opower.com/.

To resolve this deficiency Ameren Missouri should: 1) perform cost-effectiveness screening for revised Rider L program based upon the incorporation of the ADM report recommendations and stakeholder input from File No. EO-2009-0437 as part of its next IRP filing, and 2) contact OPOWER to obtain its input as to a recommended program scope and implementation cost and perform a cost-effectiveness screening based upon this data as part of its next IRP filing. Further, Ameren Missouri should evaluate the cost effectiveness of a revised Rider L program and of the OPOWER program for its service territory and present the evaluation results to its DSM stakeholders for discussion.

Concerns

A. Ameren Missouri did not consistently use the value for avoided capacity costs in various calculations in its IRP. Rule 4 CSR 240-22 050(2).

Attachment 1 of the Order Regarding Application of Waivers, File No. EE-2010-0243, dated June 30, 2010, established the MISO Cost of New Entry (CONE) value as an acceptable avoided cost. Staff notes that in the MISO FERC compliance filing regarding the annual CONE recalculation dated August 2, 2010, MISO established a CONE value of \$95,000/MW-month for the planning year commencing June 1, 2011. Section 7.2.4, "Avoided Costs," page 27, establishes this cost based upon a value of \$90/kW-year. When adjusted by an inflation factor, as indicated in Figure 7.11. Section 7.2.6.2, "DDR Large Business", page 49, the resulting capacity cost is in the range of \$67-\$74/kW-year. The graph of "Utility Avoided Energy Costs" on page 29 of the Ameren Missouri DG Market Penetration Assessment Report prepared by Navigant Consulting dated September 30, 2009, does not agree with the values previously referenced on page 27 of Ameren Missouri's IRP.

To resolve this concern, Ameren Missouri should review its calculations to assure that it utilizes the correct MISO CONE value for avoided capacity costs. If Ameren Missouri did not use the MISO CONE value in the calculation, then the calculation should be revised and the new results submitted in the next IRP filing.

4 CSR 240-22.060 Integrated Resource Analysis

Summary

Rule 4 CSR 240-22.060, Integrated Resource Analysis, requires the utility to design alternative resource plans to meet the planning objectives identified in rule 4 CSR 240-22.010(2), to set minimum standards for the scope and level of detail required in resource plan analysis, and to perform a logically consistent and economically-equivalent analysis of alternative resource plans.

Ameren Missouri applied for and received approval from the Commission for five (5) waivers from this rule related to:

4 CSR 240-22.060(4)	Process to select candidate resource plans
4 CSR 240-22.060(4)(C)	Impact of changes in electric rates on electric future loads
4 CSR 240-22.060(6)(A)	Description of alternative resource plans and candidate resource plans
4 CSR 240-22.060(6)(B)	Summary of performance of each alternative resource plan and candidate resource plan
4 CSR 240-22.060(6)(C)	Plots of performance measures for each alternative resource plan and candidate resource plan

Ameren Missouri developed five attributes or dimensions for use in its creation of alternative resource plans:

- 1. Nine (9) Supply-Side Types Attributes
 - Coal with carbon capture
 - Combined cycle (greenfield)
 - Combined cycle (Meramec)
 - Combined cycle (Venice)
 - Simple cycle (greenfield)
 - Pumped storage
 - Nuclear 30% (partial ownership)
 - Nuclear 50% (partial ownership)
 - Wind with simple cycle
- 2. Four (4) Demand-Side Portfolio Attributes
 - Maximum achievable potential (MAP)
 - Realistic achievable potential (RAP)
 - Low risk
 - None

3. Three (3) Meramec Status Attributes

- Meramec retired 2015
- Meramec retired 2022
- Meramec continues as-is

4. Two (2) Renewable Portfolios

- Federal
- Missouri

5. Two (2) Noranda Status Attributes

- Noranda continues
- Noranda contract expires 2020

The various combinations of these five attributes result in 432 different alternative resource plans. However, some combinations result in duplicate alternative resource plans or infeasible alternative resource plans, e.g., the Meramec combined cycle option is contingent on Meramec's retirement so the interaction of Meramec continuing and the Meramec combined cycle option would produce an infeasible plan. Ultimately, Ameren Missouri analyze 216 alternative resource plans in an initial screening process based on a scorecard approach that embodied several measures linked to the following Ameren Missouri policy objectives and relative weightings:

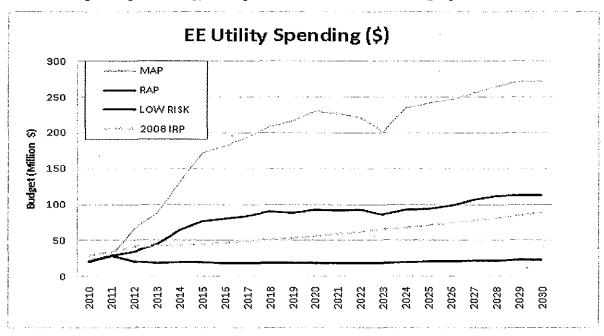
- 1. Environmental and resource diversity (20%) measured by resource diversity, carbon emissions, SO₂ emissions and NO_x emissions;
- 2. Energy efficiency (10%) measured by energy savings;
- 3. Financial and regulatory (20%) measured by return on equity (ROE), return on invested capital (ROIC), earnings per share (EPS), free cash flow, stranded cost risk, transaction risk and [cost] recovery;
- 4. Customer satisfaction (15%) measured by average rates and single year rate increase;
- 5. Economic development (10%) measured by primary job growth (FTE-years); and
- 6. Cost (25%) measured by net present value of revenue requirements (NPVRR).

Ameren Missouri identified fourteen (14) candidate resource plans for further consideration in its risk analysis and strategy selection. Each of the fourteen (14) candidate resource plans includes the following plant upgrades which total 139 MW by the year 2020:

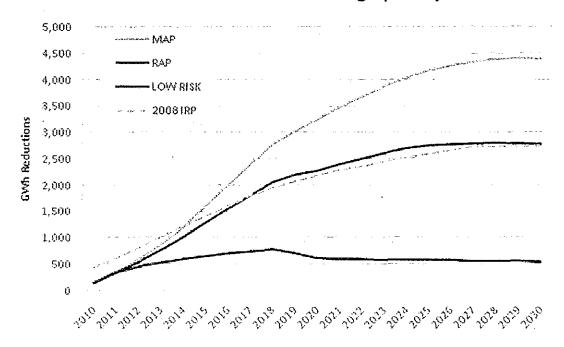
1. Meramec Units 3 and 4 – 15 MW in 2011

- 2. Rush Island Unit 1 13 MW in 2013
- Labadie Unit 2 11 MW in 2013
- 4. Callaway Unit 1 70 MW in 2017
- 5. Audrain Combustion Turbines 30 MW in 2020

Each of the fourteen (14) candidate resource plans includes the "pre-determined" low risk energy efficiency programs based on continuation of the existing regulatory framework or the "pre-determined "RAP energy efficiency programs and RAP demand response programs which are added "on an as-needed basis to meet capacity needs." The maximum achievable potential (MAP) DSM portfolio was determined to not be cost effective. Low Risk DSM, RAP DSM and MAP DSM spending and energy savings are summarized in following figures:



Cumulative EE Savings (GWh)



The fourteen (14) candidate resource plans are shown in Table 9.11 of the Ameren Missouri filing which is reproduced following:

Envir. Scenario	Meramec Status	First Suppty-Side	Second Supply-Side	Renewable Portfolio	DSM Portfollo	Norenda Status
Moderate	Continues As-Is		**	Missouri RES	RAP	Continues
Moderate	Continues As-Is	Combined Cycle	**	Missouri RES	Low Risk	Continues
Moderate	Continues As-Is	Simple Cycle	**	Missouri RES	Low Risk	Continues
Moderate	Continues As-Is	Nuclear 30%	. **	Missouri RES	Low Risk	Continues
Moderate	Continues As-Is	Wind/SC		Missouri RES	Low Risk	Continues
Aggressive	Retired 2016	·		Missouri RES	RAP	Continues
Aggressive	Retired 2016	Combined Cycle	Combined Cycle	Missouri RES	Low Risk	Continues
Aggressive	Retired 2016	Combined Cycle	Simple Cycle	Missouri RES	Low Risk	Continues
Aggressive	Retired 2016	Combined Cycle	Nuclear 30%	Missouri RES	Low Risk	Continues
Aggressive	Retired 2016	Combined Cycle	Wind/SC	Missouri RES	Low Risk	Continues
Aggressive	Controlled	• • • • · · · · · · · · · · · · · · · ·		Missouri RES	RAP	Continues
Aggressive	Controlled	Combined Cycle	• ••	Missouri RES	Low Risk	Continues
Aggressive	Gas Conversion	**	77	Missouri RÉS	" RAP	Continues
Aggressive	Gas Conversion	Combined Cycle	••	Missouri RES	Low Risk	Continues

Based on its limited review, Staff has identified no deficiencies or concerns for Ameren Missouri's Integrated Resource Analysis filing.

4 CSR 240-22.070 Risk Analysis and Strategy Selection

Summary

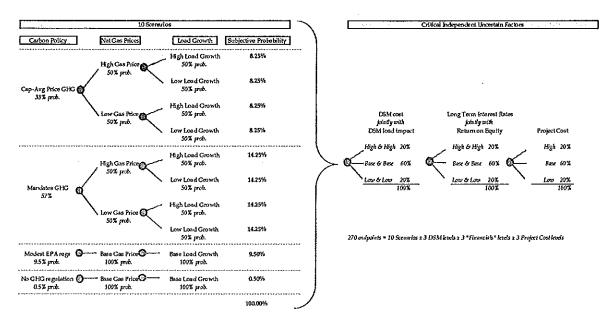
Rule 4 CSR 240-22.070, Risk Analysis and Strategy Selection, requires the utility to identify the critical uncertain factors that affect the performance of resource plans, establishes minimum standards for the methods used to assess the risks associated with these uncertainties, and requires the utility to specify and officially adopt a resource acquisition strategy.

Ameren Missouri applied for and received approval from the Commission for relief from ten requirements of this rule. They relate to the following:

4 CSR 240-22.070(1)	Method of formal decision analysis
4 CSR 240-22.070(2)	Detailed decision-tree
4 CSR 240-22.070(2)(E)	Siting and permitting costs and scheduling for new generation and generation-related transmission
4 CSR 240-22.070(2)(F)	Construction costs and scheduling for new generation and transmission
4 CSR 240-22.070(3)	Construction of decision-tree
4 CSR 240-22.070(4)	Chance node for load growth uncertainty
4 CSR 240-22.070(5)	Cumulative probability distribution of the values of each performance measure of each of the alternative resource plans
4 CSR 240-22.070(6)(B)	Trend of expected unserved hours for the preferred resource plan
4 CSR 240-22.070(7)	Impact of the preferred resource plan on future requirements for emergency imported power
4 CSR 240-22.070(11)(A)	Decision-tree diagram for each of the alternative resource plans

Ameren Missouri's probability tree (Figure 0.12 on page 20 of Chapter 9 of its filing) consists of the following dependent and independent critical uncertain factors, and is represented in the chart which follows:

- 1. Dependent critical uncertain factors (which together define ten (10) planning scenarios and subjective probabilities for each planning scenario)
 - CO₂ policy
 - Natural gas prices
 - Load growth
- 2. Independent critical uncertain factors
 - DSM costs jointly with DSM load impacts
 - Long term interest rates jointly with return on equity
 - Project cost



The various combinations of dependent critical uncertain factors and subjective probabilities of each combination of dependent critical uncertain factors result in ten (10) distinct planning scenarios. Ameren Missouri's probability tree includes four (4) scenarios for the carbon policy critical uncertain factor:

- No greenhouse gas (GHG) regulations with a probability of 0.5%
- Modest EPA regulations with a probability of 9.5%
- Mandates for GHG regulations with a probability of 57%
- Cap-average price GHG regulations with a probability of 33%

Addendum A to this Staff Report includes a summary of the annual capacity additions and capacity reductions for each of the fourteen (14) candidate resource plans. Following is a summary of the fourteen (14) candidate resource plans and the expected risk adjusted PVRR of each, ordered from lowest PVRR to highest PVRR, for the entire ten (10) scenarios probability tree¹³:

¹³ The candidate resource plans that are included in Ameren Missouri's resource acquisition strategy are highlighted in colors that correspond to the adopted resource acquisition strategy (Decision Roadmap) that follow in this report.

Ameren Missouri 2011 Chapter 22 Compliance Filing (File No. EO-2011-0271) Candidate Resource Plans and Expected Risk Adjusted NPVRR Through 2039

Candidate	NPVRR	vs. RO	vs. R3	Supp	ly-Side Reso	urces	•		
Plan	\$ Milions	\$ Millions	\$ Millions	Primary	Secondary	Renewables	DSM	Meramec	Noranda
RO	\$ 59,661	()	\$ (3,440)	None	None	₽œ€	RVAP	·Conti	Conte
B3	\$ 61,161	\$ 1,500	\$ (1,940)	SC	None	Prop C	Low Risk	Cont.	Cont.
3 2 3	\$ 151,250	6 6 6 6 6 6	5 (2.24%)	CC	Tene :	1. P. 101. C	ેડમાં સંકંદ	168	Ç <u>a</u> , 16-
84	\$ 61,403	\$ 1,742	\$ (1,698)	Wind/SC	None	Prop C	Low Risk	Cont.	Cont.
B2	\$ 61,568	\$ 1,907	\$ (1,533)	*Nuke 30%≣	None	Prop C	夏Low Risk書	Cont	。(Cont.世)
R1	\$ 62,867	\$ 3,206	\$ (234)	None	None	Prop C	RAP	Controlled	Cont.
RB RB	\$ 63,100	\$ 3440	\$.5	iVone	- Mone	Perios (8	ikap -	Recorded With	ા (ઉગ્રાહિ
R2	\$ 63,358	\$ 3,697	\$ 257	none	None	Prop C	RAP	Convert Gas	Cont.
C1	\$ 64,403	\$ 4,742	\$ 1,302	CC	None	Prop C	Low Risk	Controlled	Cont.
C2	\$ 64,875	\$ 5,214	\$ 1,774	CC	None	Prop C	Low Risk	Convert Gas	Cont.
H2	\$ 65,198	\$ 5,537	\$ 2,097	CC	SC	Prop C	Low Risk	Retired 2016	Cont.
<u>@</u>	\$ 165,356	\$ \$450E	\$ 2,255	- 66	CC.	Rioji (E	്മഗ്രീദ്ര്യ	Resinco 2016	Com⊧
Н3	\$ 65,420	\$ 5,759	\$ 2,319	CC	Wind/SC	Prop C	Low Risk	Retired 2016	Cont.
 	\$ 65496	S 5985	\$ 2,495	.00	Nuke 30%	Domiti	140W/Right	रिक्षां क्यां स्थापित	- Comi⊨

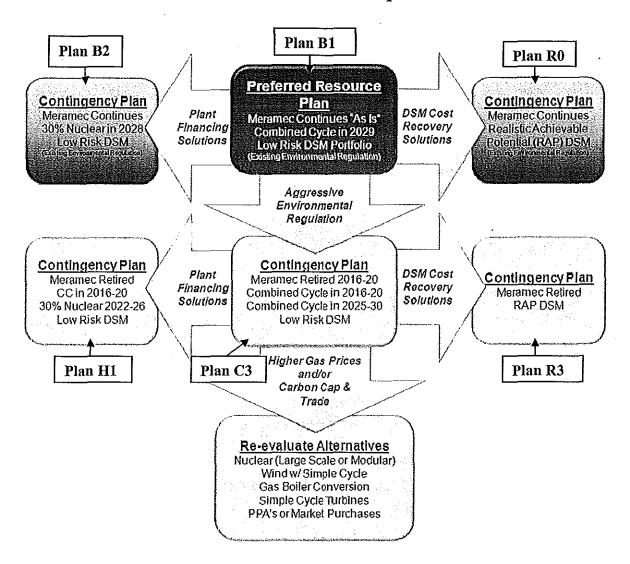
Ameren Missouri's decision-makers chose to use a scorecard approach¹⁴ to evaluate its fourteen (14) candidate resource plans during their strategy selection process to adopt a resource acquisition strategy and a preferred resource plan for Ameren Missouri. The preferred resource plan selection scorecard and the adopted resource acquisition strategy (Decision Roadmap) follow:

 $^{^{14}}$ See Chapter 10, Pages 12 – 14 of Ameren Missouri's 2011 IRP Filing.

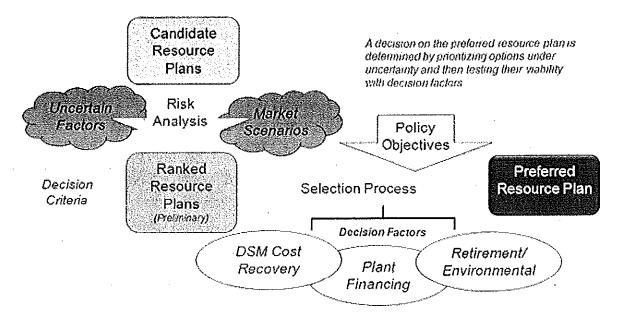
Ameren Missouri 2011 IRP Preferred Plan Selection Scorecard

PellorOblectures	PellorOblactives Valida sand Mascres	Control of the Contro						Cardions R	Beave of Pigns	- Francisco de Companyo de Com			Transport of the second	da e) e e e e e e e e e e e e e e e e e	
	· · · · · · · · · · · · · · · · · · ·						al.	SI.	31	đ	01	α	Ħ,	S	¶.
							a para di Sensi di Sensi di	MAG: Do		Ab Cartioled Vivalis Gav N.1 Cit	Minimatory Ugana Jawilshan Gilama	MH mand Dayling Dayling Dayling Dayling	Milk Laterard Lay31/2015 Law Roll ESIM CC in 2015 Mickey 19255	MM Browd GRAZELS Low But ES M GE147016	Mid familied inglighbils love to titch core and
Estadoramental philosophity	Retained Receiving Craims ferrowers 2D ferromers R R arcon ec	0	0		0	0	•	•	•	0	•	•	•	•	•
Grengy (Widdency	Lecturalization	0	◐	ల	•	•	•	•	•	0	•	0	0	O	0
Fannsia) Peyslatory	art 1955 AMB Procedures art Variations art Managine art Normany art	•	•	•	•	•	0	•	•	•	•	•	e	•	•
Contemp Selfaction	Souther Earls terpart	•	•	•	•	0	•	•	€	•	•	0	•	٥	•
EarnanicDewisemant	(115-WANE	\circ	•	0	•	e	•	•	€	€	0	ಲ	•	Ð	O
Š	(1/4)	e	0	•	o	•	•	0	C	€	()	•	•	Ů	0
Design	Overall extension	(3)	(3)	(3)	0	*	<u>ې</u>	Ç	(3)	\Diamond	٠,		③	٠.	
South Interditing African day Market and Charles and Market and Charles and Market and Charles and Market and Charles and Andrews and Charles and Char	Sowing Guide ((9) (5)	© Tapedery hr Mid-ters ha Sectored er ph										·	•	
Profremental Diseases	the control and the court of pieces of the court of the c	Tagodiszan skrzeky denten gerikalet gan kelenten artise gan	Ladina (1997) determination of the state of	naestaal out fi present out h Bip it moresta film	r jarcym sw _e co ice togg o so syrigeno, aceiro gog y po cesseg poca o equicy) men jares [MI benning gannenden]	didinalera in di energialera de la energialera de la	COLONE DE DESTRESSE DE L'ANNIONNE DE L'ANNIO	o Tambardon distribution of the second secon	road (15) "slavitus" and they arrest term	nete envit contactions and the state of the	er e., kinckraania e ari e. pres aktoo i yokibi estate esemj	vand place un off steps sale, CL,CC g orkense asters	ogseteres atuas gásec vasor atuas líser t,	a sala prespir april A sala resemplicalle	encel, of cristians less has estace accel
Briefer Efficients Regard Pagalety	The first planteness and a few or the second of the control of the	riger staatsk kyker Prei Kanksek evar Herbertykkeer (614)	witz et leif stad pe ter esterajoral (s.	e est tris glass bretalfor coek coedal ples, v	ester "medication electric, Servans elikateya kualik	fitadus a spolofo vocadus falsa vo cessivigas maso	bykonomyrywy, <u>nog art feld fantwar</u> warkinenfundung my haron makest menye gangert at waking af elef and pleutskifen standeligist, destandening blas was bipendaet in par eliski et applemenagy alls, standik plant, kontanya kan lastanengan mawi mag wase "mahena mi	tion aludine charm	enterprisabilita bartu entatudo fu	panistajn pėradi	, Hosbatanden jouts, übstantere	of plan and "de	almerican estable	obsetuge" depte	hypotanial s) he manani
Ceromer Salabadion	nen ikild gene bing tendak salah kan kan dan kan ing dalah salah kan dalah salah salah salah salah salah salah	Transport of the	parenthy offart by references as	ere in proceeding the spine of personal process of the relative of the result of the relative	eraniferi	II Bo' escaforia, libra) per paramentar	ryd a sern went wit	auvalk kerellutt	ratives" sector.	edo Tregadación on	total Basderjs Lider	wer, parabelivi fyrana zenena zenena zenen zenen zenen zenen zenen zenenan ad Gremmenne daerrak berriketainen en benena paraigy daria mubri gartepes, benanzoa deuer de daerrak dere en	Day sales	heave and
ication countingment	Bestry planter, "ignored and east and the factor of the property of the first factor in "ender a state of the factor of the fact	ege algerte begander erer Verebergeren	enthas Copy "district	estantos inales estantifether	sed week jaster, 25 dates das egyther	file tieg p' seid. I	Linguage Cost & series	ing a to the way to	instructions	tig of himsing cale	sa ifallessa a sud on of volvassasial	era is sentences et a pall contribut, Cità	ni plan onen en	d kanonistang utat Afrikatings essaku	Avadrayor dans to
Constitution of the Consti	Act this plant of business were described by the business of t	i 'as at' p tae roune' optamener plact	Ngadicad adva e man "es deba e a	rapi^danin sagah	ect praintanter	na Periodosa Kachar Periodosa Kachar Periodosa	roum Vignilista diva egit sepensi pistanaren 1878 antaza. Artanita di And Dicaratena estatua eta estatua parta Hari vizut en india enpredicatuaren barinaren 1878 antazan eta estatua di Antaza estatuaren barina eta estatua	land galanca wasan Walqani lipil da yan	et place want des	egetanedes es borelo libes "egetanos besult	ologi a malod s stal'symbolic	er skrachise ograd Arabasakaja").	room Vignitical about ago Amin segrence print announce of Stances and Confedence of Stances Stances of Indicates and Amin and Ami	t en spirit in de	is es et.
Koste Abbendakar Costs estem Costs dustan Generatus		अधानम् विकास				Ref - Inchaines	Red - May Estic Sackers of the Sales of tol Sec. Sa states	diciti fariata		C-Conthiese(C	C -Conthant Cych Gas In the De Grandoss	, i jejzijekje	SCaller photocle	SCASses placycle Cas (unitere Compagner	

Decision Roadmap



At the September 14, 2010, stakeholder meeting, Ameren Missouri presented an overview of the decision process it intended to use for selection of its preferred resource plan. The overview included one slide which is essentially the same as the Figure 10.1 of its 2011 IRP filing. There was no discussion of the use of a scorecard to select the preferred resource plan at the September 14, 2010, stakeholder meeting.



Ameren Missouri's preferred resource plan selection process is described on pages 12-15 of Chapter 10 of the Company's filing.

Staff's review of the Company's workpapers used to develop Table 10.5 Preferred Resource Plan Selection Scorecard (see Addendum B Page 1 of 4) resulted in the following observations:

- The Company incorrectly claims that it used the same policy objectives for Figure 10.5 as those in Table 9.2¹⁵, in that Energy Efficiency is not a policy objective included in Figure 10.5 while it is included as a policy objective in Table 9.2;
- Although there are no weights for the policy objectives on Figure 10.5, there are
 weights for each of the policy objectives in the Company's workpapers used to
 develop Figure 10.5;
- The weights for the policy objectives in Figure 10.5 and in Table 9.2 are as follows:

¹⁵ Chapter 10, bottom of page 12: "To select Preferred Plan Ameren Missouri relied on a scorecard approach similar to that used to perform an initial screen of the 216 alternative resource plans, as discussed in Chapter 9. However, that process was limited to purely quantitative measures since the screening included a large number of plans. With only 14 plans there is greater opportunity to use both quantitative and qualitative reasoning to rank plans according to the same policy objectives. Figure 10.5 shows the comparison."

Environmental/Diversity
Energy Efficiency
Financial/Regulatory
Customer Satisfaction
Economic Development
Cost
Total

Table 9.2	Figure 10.5
20%	20%
10%	0%
20%	20%
15%	20%
10%	10%
25%	30%
100%	100%

The weighted average scores for each candidate resource plan on Addendum B
 Page 1 of 4 were used by the Company to determine which candidate resource plans are considered to be "top tier plans" in Figure 10.5;

Addendum B Page 2 of 4 attached to this report is Staff's analysis which uses the same policy objectives and same weights from Table 9.2 of the IRP filing to rank Ameren Missouri's candidate resource plans based on weighted average scores. However, Staff's analysis also includes changes to the scores for Ameren Missouri's RAP candidate resource plans (Plan R0, Plan R1, Plan R2 and Plan R3) for the Energy Efficiency policy objective and for the Customer Satisfaction policy objective as follows:

- Change scores for Energy Efficiency policy objective for Ameren Missouri's RAP plans (Plan R0, Plan R1, Plan R2 and Plan R3) from "4" to "5" to be consistent with the comment in the discussion of the Energy Efficiency objective at the bottom of the score card where Ameren Missouri states: "RAP DSM plans score 'significant advantage' due to high energy savings." ¹⁶
- Change scores for Customer Satisfaction policy objective for RAP plans from "2" to "4", as a result of Staff's Concern H.

Addendum B Page 3 of 4 attached to this report is Staff's analysis which: a) assigns a 50% weight for the Cost policy objective to comply with rule 4 CSR 40-22.010(2)(B)¹⁷, and b) adjusts the remaining weights in Addendum B Page 2 of 4 from a total of 75% to a total of 50%.

¹⁶ According to the scorecard, a score of "4" indicates moderate advantage whereas a score of "5" indicates a significant advantage.

¹⁷ Rule 4 CSR 240-22.010(2)(B): "Use minimization of the present worth of long-run utility costs as the primary selection criterion in choosing the preferred resource plan;"

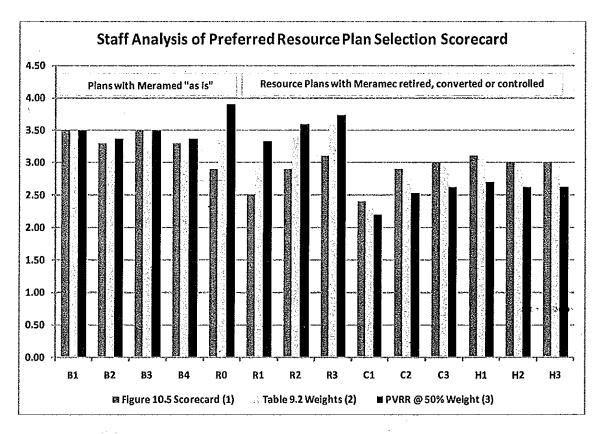
A comparison of Staff's analysis with Ameren Missouri's analysis is shown in the following table and chart and is further illustrated in Addendum B Page 4 of 4 attached to this report.

Staff Analysis of Preferred Resource Plan Selection Scorecard

Figure 10.5 Scorecard (1) Table 9.2 Weights (2) PVRR @ 50% Weight (3)

B1	B2 1	В3	84	RĐ	R1	R2	R3	C1	C2	C3	H1	H2	H3
3.50										3.00	3.10	3.00	3.00
3.25	3.05	3.25	3.05	3.35	3.00	3.40	3.60	2.30	2.80	2.95	3.05	2.95	2.95
3.50	3.37	3.50	3.37	-3.90	3.33	3.60	3.73	2.20	2.53	2.63	2.70	2,63	2.63

= Top Tier Plans



Notes:

⁽¹⁾ Weighted scores from Addendum B Page 1 - Ameren Missouri analysis to generate Figure 10.5 of its 2011 IRP Filing

⁽²⁾ Weighted scores from Addendum B Page 2 - Staff analysis to include the following changes to Addendum B Page 1: a) change weights to those in Table 9.2, b) change scores for Energy Efficiency of RAP plans from 4's to 5's to be consistent with comment "RAP DSM plans score "significant advantage" due to high energy savings.", and c) change scores for Customer Satisfaction for RAP plans from 2's to 4's.

⁽³⁾ Weighted scores from Addendum B Page 3 - Staff analysis to include the following changes to Addendum B Page 2: a) 50% weight for Cost (PVRR) to comply with Rule 4 CSR 240-22.010(2)(B), b) adjust the remaining weights in Addendum B Page 2 from total of 75% to total of 50%.

This table shows that both of Staff's analyses clearly favor RAP when Meramec continues to operate "as is" and clearly favor RAP when Meramec does not continue to operate "as is".

Another noticeable difference between Staff's scorecard analysis and the Company's is that Staff's analysis does not result in either of the two plans that include the addition of nuclear power (Plans B2 and H1) being "top-tier" plans.

Based on its limited review of Ameren Missouri's IRP filing, Staff has identified three (3) deficiencies and seven (7) concerns with Ameren Missouri's Risk Analysis and Strategy Selection filing.

Deficiencies

2. Ameren Missouri did not use minimization of the present worth of long-run utility costs as the primary selection criterion in choosing its preferred resource plan as required by rules 4 CSR 240-22.070(6)(A) and 4 CSR 240-22.010(2)(B).

See discussion above. The word "primary" or the words "primary selection criterion" are not defined in Chapter 4 CSR 240-22. "Primary" means: of first rank, importance or value; basic; forming the base or essence; fundamental; constituting or serving as the basis or starting point; of central importance; principal ¹⁸. When weighting selection criterion for the selection of a utility's adopted preferred resource plan the utility must assign at least a majority of the weighting in the preferred resource plan selection process to the present worth of long-run utility costs as measured through PVRR.

To resolve this deficiency Ameren Missouri should assign at least a majority of the weighting in the preferred resource plan selection process to present worth of long-run utility costs policy objective (as measured by risk adjusted PVRR) in its future Chapter 22 filings including its April 1, 2012 annual update filing¹⁹.

3. Ameren Missouri has not quantitatively analyzed and documented the DSM cost recovery solution which is necessary for Ameren Missouri to select Plan R0 as its preferred resource plan under current environmental regulations and Meramec continuing to operate "as is," and to select contingency Plan R3 as its preferred resource plan under aggressive environmental regulations and Meramec not continuing to operate "as is" as required by rules 4 CSR 240-22.070(6)(A) and 4 CSR 240-22.010(2)(C).

¹⁸ Webster's New Collegiate Dictionary, copyright 1979, definition of primary and its synonyms principal, basic and fundamental.

¹⁹ Rule 4 CSR 240-22.080(3) effective June 30, 2011.

In its review and analysis of Ameren Missouri's IRP filing Staff found the following:

- Ameren Missouri did not identify or screen two significant potential demand-side resources characterized as (1) a modified Rider L program; and (2) potential customer education programs provided by third party providers such as OPOWER (see Deficiency 1);
- For the five (5) candidate resource plans which include continued operation of Meramec "as is," there are distinctly different risk adjusted PVRR savings for Plan R0 (RAP DSM, no supply-side resources) compared to other plans under current environmental regulations. Plan R0 has a risk adjusted PVRR \$1.9 billion less than that of Plan B2 (Low Risk DSM, 30% Nuclear in 2029) and \$1.6 billion less than the preferred resource plan Ameren Missouri adopted, Plan B1 (Low Risk DSM, Combined Cycle in 2029):

Expected Risk Adjusted PVRR Through 2039 for Ten Scenarios Probability Tree for Candidate Resource Plans Which Include Meramec Continuing to Operate "As Is"

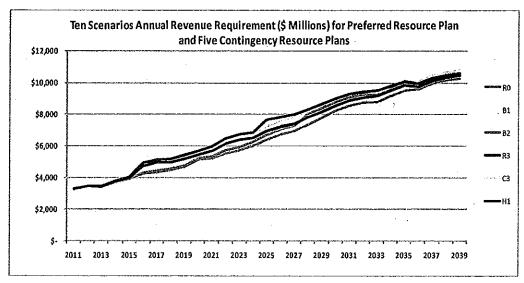
Candidate	PVRR	vs. RO	Sup	ply-Side Resou	rces	_		
Plan	\$Millions	\$ Millions	Primary	Secondary	Renewables	DSM	Meramec	Noranda
RO	\$ 59,661	\$	None	None -	Prop(0	RAP	ી/હોદ	Cont
B3	\$ 61,161	\$ 1,500	SC	None	Prop C	Low Risk	"As Is"	Cont.
80	\$ 64,259	\$ 1,598	CG.	None	Prop.C	HowRisk .	As is	Conta
B4	\$ 61,403	\$ 1,742	-Wind/SC	None	Prop C	Low Risk	"As is"	Cont.
B2	\$ 61,568	\$ 11907	Nuke 30%	None	Prop@	liow Risk	"Asla"	Cont

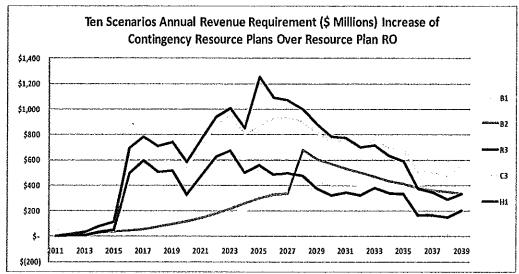
For the nine (9) candidate resource plans which do not include continued operation of Meramec "as is" there are distinct risk adjusted PVRR savings for Plan R3 (RAP DSM, no supply-side resources) compared to other plans under aggressive environmental regulations. Plan R3 has a risk adjusted PVRR \$2.5 billion less than that of Plan H1 (Low Risk DSM, Combined Cycle in 2016 and 30% Nuclear in 2025):

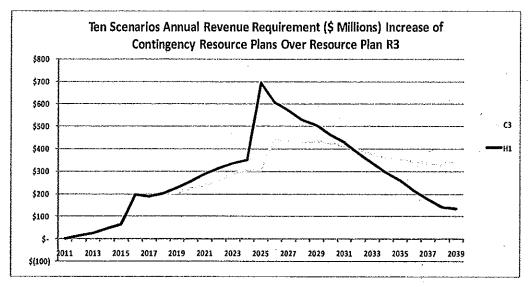
Expected Risk Adjusted PVRR Through 2039 for Ten Scenarios Probability Tree for Candidate Resource Plans Which Include Meramec Not Continuing to Operate "As Is"

Candidate	PVRR vs. R3		Sup	ply-Side Resou	rces	•				
Plan	\$1	\$Millions \$Millions		Primary	Secondary	Renewables	DSM	Meramec	Noranda	
R1	\$	62,867			None	None	Prop C	RAP	Controlled	Cont.
(8)	S	63400	\$1		None	ത്രം	PMC -	17410	Remer 2016	ത്ര
R2	\$	63,358	\$	257	none	None	Prop C	RAP	Convert Gas	Cont.
C1	\$	64,403	\$	1,302	CC	None	Prop C	Low Risk	Controlled.	Cont.
C2	\$	64,875	\$	1,774	cc	None	Prop C	Low Risk	Convert Gas	Cont.
H2	\$	65,198	\$	2,097	CC	SC	Prop C	Low Risk	Retired 2016	Cont.
(3)	S	65,356	Ś	7/255	(00	(G =	Proprie	elovikisk	Refree 2006	(60);
H3	\$	65,420	\$ 2,319		CC	Wind/SC	Prop C	Low Risk	Retired 2016	Cont.
123 H1 #	52	\$ 32,65596 \$ 32,2495		00	Nuke 30%	Proje	kowa Risk	Remed2016	(m);	

• Summarized below are the risk adjusted annual revenue requirements for the candidate resource plans included in the Company's Decision Roadmap resulting from the ten scenarios probability tree analysis. The following graphs and tables illustrate the significantly higher annual revenue requirements for Low Risk DSM Plan B1 and Low Risk DSM, 30% Nuclear in 2029 Plan B2 when compared to RAP DSM, no supply-side resources Plan R0 under current environmental regulations (Meramec continues "as is"), and the significantly higher annual revenue requirements for Low Risk DSM, Combined Cycle plants in 2016 and 2026 Plan C3 and for Low Risk DSM, Combined Cycle in 2016 and Nuclear in 2025 Plan H1 when compared to RAP DSM no supply-side Plan R3 under aggressive environmental regulations:







Ten Scenarios Probability Tree Risk Adjusted Average Annual Revenue Requirement (\$ Millions) Increase of Plan B1 and Plan B2 Over Plan RO

	2011 - 2020	2021 - 2030	2031 - 2039
	\$ 48	\$ 256	\$ 4 <u>14</u>
B92	\$ 48	\$ 361	\$ 40.7/

Ten Scenarios Probability Tree Risk Adjusted Average Annual Revenue Requirement (\$ Millions) Increase of Plan C3 and Plan H1 Over Plan R3

	2011 - 2020	2021 - 2030	2031 - 2039
(CS)	\$ 1965	\$114,358	S 3(5)2
Há	\$ 121	\$ 465	\$ 262

- The relative ranking of candidate resource plans, the relative risk adjusted PVRR savings, and the levels of annual revenue requirements savings do not change appreciably among the all ten scenarios probability tree, the mandates for GHG scenarios probability tree, the cap-average price GHG scenarios probability tree, the EPA scenarios probability tree or the business-as-usual (BAU) scenarios probability tree (see Addendum C to this report for Staff's analysis);
- If selection of Ameren Missouri's preferred resource plan is based only on minimization of long-term utility cost (risk adjusted PVRR), RAP DSM, no supply-side resources Plan R0 is the selection if Meramec continues to operate "as is" in an environment of current carbon regulations, and Low Risk DSM Combined Cycle plants in 2016 and 2026 Plan C3 is the selection if Meramec does not continue to operate "as is" in an environment of aggressive carbon regulations.²⁰
- Ameren Missouri did not comply with rules 4 CSR 240-22.070(6)(A) and 4 CSR 240-22.020(2)(B) when selecting its preferred resource plan (see Deficiency 2);

²⁰ Top of page 25 of Chapter 9 of Ameren Missouri's filing: "If decision making were solely based on PVRR then the analysis would be complete at this point. Since decision making is multi-dimensional, Ameren Missouri created a scorecard that embodied its policy objective."

- Compliance with rules 4 CSR 240-22.070(6)(A) and 4 CSR 240-22.020(2)(B) would likely result in Ameren Missouri selecting Plan R0 as its preferred resource plan and not Plan B1;
- Ameren Missouri did not comply with rule 4 CSR 240-22.070(8) when analyzing the value of better information (see Deficiency 4);
- Staff's analysis shows that had Ameren Missouri complied with rule 4 CSR 240-22.070(8) spending up to \$234 million to obtain better information concerning DSM costs and DSM load impacts would be prudent to better manage risk associated with the implementation of its RAP DSM portfolio.

From its analysis, Staff concludes:

- The risk adjusted PVRR savings and annual revenue requirements savings from RAP DSM no supply-side resources Plan R0 under current environmental regulations, and from RAP DSM no supply-side resources Plan R3 under aggressive environmental regulations, are significant and are relatively consistent in all five planning scenarios Staff analyzed;
- Rules 4 CSR 240-22.070(6)(A) and 4 CSR 240-22.010(2)(C) require that Ameren Missouri "explicitly identify and, where possible, quantitatively analyze any other considerations which are critical to meeting the fundamental objective of the resource planning process, but which may constrain or limit the minimization of the present worth of long run expected utility costs." Ameren Missouri has not complied with these requirements and has not adequately analyzed and documented a DSM cost recovery solution which is necessary for Ameren Missouri to select Plan R0 as its preferred resource plan under present environmental regulations and continued operation of Meramec "as is," or to select Plan R3 as its preferred resource plan under aggressive environmental regulations and Meramec not continuing to operate "as is."

To resolve this deficiency, Ameren Missouri should work with its stakeholder group to:

Resolve Deficiency 1 by evaluating the cost effectiveness of a revised Rider L
program and the OPOWER program for its customers, and present the evaluation
results to its DSM stakeholders for discussion. Should one or both programs be

found to be cost-effective, Ameren Missouri must evaluate the impact of one or both of the programs on the present value revenue requirements (PVRR) by including Rider L and/or the OPOWER program in the integrated resource analysis for Plan R0, and present the results to its DSM stakeholders for discussion;

- Prepare a filing under the Commission's MEEIA rules²¹ or, if the MEEIA rules are stayed due to legal action, under Section 393.1075, RSMo Supp. 2010;
- Should a filing under the Commission's MEEIA rules or, if the MEEIA rules are stayed due to legal action, under Section 393.1075, RSMo Supp. 2010, not be made by April 1, 2012, the Company should quantitatively analyze and document the DSM cost recovery solution which is necessary for Ameren Missouri to select Plan R0 as its preferred resource plan under current environmental regulations and Meramec continuing to operate "as is," and to select contingency Plan R3 as its preferred resource plan under aggressive environmental regulations and Meramec not continuing to operate "as is."
- 4. Ameren Missouri did not correctly quantify the expected value of better information concerning at least the critical uncertain factors that affect the performance of its preferred resource plan, as measured by the present value of utility revenue requirements. Rule 4 CSR 240-22.070(8).

Appendix C of Chapter 10 of Ameren Missouri's IRP filing is Ameren Missouri's analysis and quantification of the expected value of better information for the six (6) critical uncertain factors Ameren Missouri identified. Ameren Missouri excluded the RAP DSM, no supply-side resources Plans R0 and B3 from its analysis of the expected value of better information with the following explanation: "The two low cost plans were excluded because of the use of decision factors and a scorecard designed to reflect multiple planning objectives other than merely PVRR." Plans R0 and B2 should not be excluded from this analysis and quantification of the expected value of better information.

Addendum D to this Staff Report is Staff's quantification of the expected value of better information concerning at least the critical uncertain factors for all fourteen (14) candidate resource plans and for the nine (9) candidate resource plans which include the control of

²¹ Rules 4 CSR 240-3.163, 4 CSR 240-3.164, 4 CSR 240-20.093 and 4 CSR 240-20.094.

Meramec, the conversion of Meramec to burning natural gas or the retirement of Meramec. Addendum D illustrates:

- For all fourteen (14) candidate resource plans, with B1 as the preferred resource plan, the expected value of better information under conditions of risk neutrality is \$1,598 million for load, for gas prices, for carbon policy, for DSM cost and DSM load impact, and for project cost; and \$1,299 million for interest rates and return on equity;
- For all fourteen (14) candidate resource plans, with R0 as the preferred resource plan, the expected value of better information under conditions of risk neutrality is \$0;
- For nine (9) candidate resource plans which include the control of Meramec, the conversion of Meramec to burn natural gas or the retirement of Meramec, and with C3 as the preferred resource plan, the expected value of better information under conditions of risk neutrality is: \$2,489 million for load growth, \$2,539 million for gas prices, \$2,556 million for carbon policy, \$2,489 million for DSM cost and DSM load impact, for project cost, for interest rates, and return on equity; and
- For nine (9) candidate resource plans which include the control of Meramec, the conversion of Meramec to burn natural gas or the retirement of Meramec, and with R3 as the preferred resource plan, the expected value of better information under conditions of risk neutrality is: \$234 million for load growth, \$284 million for gas prices, \$301 million for carbon policy, and \$234 million for DSM cost, DSM load impact, project cost, interest rates, and return on equity.

Staff's analysis of the value of better information is contained in Addendum D.

Further, rule 4 CSR 240-22.070(8) does not limit the quantification of expected value of better information to only the critical uncertain factors, but rather to "at least the critical uncertain factors." Staff believes that Ameren Missouri should have quantitatively analyzed and documented the regulatory framework which is necessary for Ameren Missouri to select Plan R0 as its preferred resource plan under present carbon regulations and to select contingency Plan R3 as its preferred resource plan under aggressive carbon regulations (see Deficiency 3).

Ameren Missouri did not correctly complete an analysis of the value of better information, and did not meet the requirements of rule 4 CSR 240-22.070(8). Staff concludes that had Ameren Missouri correctly completed its analysis of the value of better information that the result would show Ameren Missouri spending up to \$234 million to obtain better information concerning DSM costs and DSM load impacts to better manage risk associated with the implementation of the RAP DSM portfolio is prudent.

To resolve this deficiency, Ameren Missouri should correctly analyze the value of better information in its future Chapter 22 filings including its April 1 2012 annual update.

Concerns

B. Documentation of Ameren Missouri's Board of Directors' meetings22 during which the preferred resource plan was discussed and "unanimously adopted" does not indicate that all candidate resource plans analyzed pursuant to the requirements of 4 CSR 240-22.060 and the requirements of 4 CSR 240-22.070(1) - (5) were considered by Ameren Missouri's decision-makers and does not indicate that the lowest cost candidate resource plans (Plan R0 and Plan R2) were considered at all by Ameren Missouri's decision-makers.

Staff's concern has two dimensions. First, Staff's review of documentation of Ameren Missouri Board of Directors' meetings during which the preferred resource plan was discussed and "unanimously adopted" suggest that only four (4) of the fourteen (14) candidate resource plans analyzed pursuant to requirements of rule 4 CSR 240-22.060 and the requirements of rule 4 CSR 240-22.070(1) – (5) were presented to the Ameren Missouri decision-makers²³. Second, what is characterized in this documentation to the Board of Directors as the "Lowest Cost Resource Plan" (Meramec continues "as is" through 2030, new combined cycle in 2029 – 2030 and modest energy efficiency (EE) portfolio, which is Plan B1) is not the lowest cost plan, since Plan R0 and Plan B3 have risk adjusted PVRR which are \$1.6 billion lower than Plan B1 and \$1.5 billion lower that Plan B1, respectively.

Documents include: 1) Chapter 10, Appendix D; 2) Ameren Missouri's response to The Office of Public Counsel's data request 2007; 3) Ameren Missouri's response to The Office of Public Counsel's data request 2008.
 Chapter 10, Appendix D, of Ameren Missouri's filing indicates that Ameren Missouri decision-makers present at the January 31, 2011, Ameren Missouri Board of Directors Meeting who adopted the 2011 IRP resource acquisition strategy included: Board Chairman Baxter, and Board Members Cole, Heflin, Lyons, and Sullivan.

To resolve this concern, when presenting candidate resource plans to Ameren Missouri decision-makers, Ameren Missouri should comply with rules 4 CSR 240-22.070(6) and 4 CSR 240-22.080(11)(F)²⁴ in future IRP filings, including the annual update filings.

C. The two sets of independent critical uncertain factors which are included as "joint" independent critical uncertain factors in Ameren Missouri's probability tree do not correctly reflect the values and probabilities for these two sets of the individual independent critical uncertain factors. Rule 4 CSR 240-22.070(1) variance.

Through its analysis of uncertain factors, Ameren Missouri determined that long-term interest rates, authorized return on equity, DSM program costs, and DSM energy and demand savings (DSM load impacts) are each independent critical uncertain factors, having the assigned values and probabilities in Table 0.10 on page 18 of Chapter 9 of Ameren Missouri's filing. Ameren Missouri, with the assistance of Charles River Associates, did a good job of determining the probabilities and values for each of these four independent critical uncertain factors. However, Ameren Missouri's probability tree includes values and probabilities for DSM cost jointly with DSM load impact, and includes values and probabilities for long-term interest rates jointly with return on equity. Ameren Missouri chose to treat DSM cost jointly with DSM load impact, and to treat long-term interest rates jointly with return on equity, in order to reduce the number of branches on the probability tree and to reduce the run time for integrated resource analysis with the MIDAS model. The following example illustrates; 1) how joint probabilities are calculated correctly, 2) how Ameren Missouri chose (incorrectly) to include the joint probabilities and values in its probability tree, and 3) what Staff believes are more correct joint probabilities and values to use given the analysis of the long-term interest rates and of the return on equity critical uncertain factors:

²⁴ For revised Chapter 22 rules to be effective June 30, 2011, the corresponding subsections are: 4 CSR 240-22.070(7) and 4 CSR 240-22.080(2)(A).

Indepen	dent Critic	ai Uncertain I	actors	Correct 1	Probabilities a Branc		Joint Probabilities for Three Branches					
LT Interes	st Rates	RC	Œ	Correct Joint I	T Interest Rates		ROE	Incorrect Joint	More Correct	More Correct		
Probability	Value	Probability	Value	Probabilities	Value		Value	Probabilities	Option	Option		
		20%	10.16%	4%	5.7%	and	10.16%	20%	4%	0%		
- 20%	5.7%	60%	11.35%	12%	5.7%	and	11.35%	0%	0%	20%		
		20%	13,27%	4%	5.7%	and	13.27%	0%	0%	0%		
		20%	10,16%	12%	7.2%	and	10,16%	0%	0%	0%		
60%	7.2%	60%	11,35%	36%	7.2%	<u> ಪ</u> ಾರ	11,35%	60%	92%	60%		
		20%	13,27%	12%	7.2%	anđ	13.27%	0%	0%	0%		
		20%	10.16%	4%	8,4%	and	10.16%	0%	0%	0%		
20%	8.4%	60%	11.35%	12%	8.4%	and	11.35%	0%	0%	20%		
		20%	13.27%	4%	8.4%	and	13,27%	20%	4%	0%		

To resolve this concern Ameren Missouri should investigate and utilize ways to more correctly represent two independent critical uncertain factors as joint critical uncertain factors in its annual update to be filed April 1, 2012.

D. The high-case, base-case and low-case natural gas prices may be too high as a result of the recent development of shale gas plays in the United States. Rule 4 CSR 240-22.070(3)

Staff is concerned that Ameren Missouri's natural gas prices used in its MIDAS model may be too high, and that the operations costs of the natural gas-fueled generation resources may be overstated throughout its IRP filing. Staff analyzed natural gas prices from the Energy Information Administration (EIA) and compared them to Ameren Missouri's natural gas inputs in MIDAS. Staff finds that the EIA base-case natural gas prices are lower than Ameren Missouri's low-case natural gas prices over a 20-year time frame. The EIA base-case natural gas price for 2011 is \$5.13 per MMBtu and Ameren Missouri's base case average natural gas price for 2011 is \$6.34 per MMBtu. However, Ameren Missouri's analysis of the natural gas critical uncertain factor was reasonable with the data available at the time of its analysis.

Staff recommendations a discussion on the impact of lower gas prices than what was modeled be included in Ameren Missouri's annual update to be filed on April 1, 2012.

E. Ameren Missouri's preferred resource plan does not meet the statutory goal of the Missouri Energy Efficiency Investment Act to achieve all cost-effective demand-side savings.

Because of the relatively low levels of energy and demand savings reflected in Ameren Missouri's adopted preferred resource plan (Plan B1), Ameren Missouri has not satisfied the statutory requirement of a goal of achieving all cost-effective demand-side savings contained in Section 393,1075.4, RSMo Supp. 2010.

To resolve this concern, Ameren Missouri should work with its stakeholder group to:

- Resolve Deficiency 1 by evaluating the cost effectiveness of a revised Rider L
 program and of the OPOWER program for its service territory and presenting the
 evaluation results to its DSM stakeholders for discussion prior to its annual update
 to be filed on April 1, 2012;
- If revised Rider L and/or the OPOWER program are found to be cost effective, run revised Rider L and/or the OPOWER program through the integrated resource analysis for Plan R0 to determine the impact on PVRR; and
- Prepare a filing under the MEEIA rules, or if the MEEIA rules are not effective, under MEEIA prior to its annual update to be filed on April 1, 2012.
- Should a filing under the Commission's MEEIA rules or, if the MEEIA rules are stayed due to legal action, under the Section 393.1075, RSMo Supp. 2010, not be made by April 1, 2012, the Company should quantitatively analyze and document the DSM cost recovery solution which is necessary for Ameren Missouri to select Plan R0 as its preferred resource plan under current environmental regulations and Meramec continuing to operate "as is," and to select contingency Plan R3 as its preferred resource plan under aggressive environmental regulations and Meramec not continuing to operate "as is".

F. Ameren Missouri has made very limited effort to achieve the DSM cost recovery solution necessary for it to choose Plan R0 as its preferred resource plan under current environmental regulations.

Should the plant financing regulations decision solution and/or the DSM cost recovery regulations decision solution be achieved "to cause[s] Ameren Missouri's management to select a different course of action," the Company may choose Plan B2 or R0 as its preferred resource plan during the 3-year implementation period. Ameren Missouri has spent significant resources in recent years related to new plant financing regulations and legislation. Its efforts to determine a DSM cost recovery solution have been limited. Ameren Missouri's filing shows RAP DSM will reduce risk adjusted NPVRR by up to \$1.6 billion under current environmental regulations and by up to \$2.5 billion under aggressive environmental regulations. It is now time for the Company to work with its stakeholders and the Commission (through a MEEIA filing) to achieve the DSM cost recovery solution. To resolve this concern the Company should:

- Prepare a filing under the Commissions MEEIA rules²⁵ or, if the MEEIA rules are stayed due to legal action, under the Section 393.1075, RSMo Supp. 2010;
- Should the Company receive approval of a DSIM which provide sufficient cost recovery and financial incentives to implement the RAP DSM portfolio, provide notification to the Commission as required by rule 4 CSR 240-22.080(10) that the Company's preferred resource plan is no longer appropriate and advise the Commission of the selected contingency option for its adapted preferred resource plan.
- Should the Company receive Commission approval of a DSIM which provides sufficient cost recovery and financial incentives to implement the RAP DSM portfolio, provide notification to the Commission as required by rule 4 CSR 240-22.080(10) that the Company's preferred resource plan is no longer appropriate and advise the Commission of the selected contingency option for its adapted preferred resource plan.
- G. When analyzing the economic development policy objective for various candidate resource plans, Ameren Missouri did not analyze the indirect economic impacts of various candidate resource plans due to the lower risk adjusted PVRR for RAP DSM no supply-side resources Plan R0 under current environmental regulations (up to \$1.9 billion vs. Plan B2), and for Low Risk DSM Combined Cycle plants in 2016 and 2026 Plan R3 under aggressive environmental regulations (up to \$2.5 billion vs. Plan H1).

Staff's concern is not that Ameren Missouri included economic development as a factor in its decision; Staff's concern is how Ameren Missouri calculated the economic impact results in its favoring the addition of 30% of a nuclear plant. The Company's estimations of the economic impact of each plan is for only the direct impacts of each plan (i.e., construction jobs, jobs operating generating plants, jobs installing end-use measures for DSM programs) and does not address in any way the indirect impact on the economy as a result of various levels of long-run utility costs, i.e., lower revenue requirements for the utility. Put more simply, the Company's analysis of and scores for the economic development policy objective do not address the indirect economic impact of the \$1.6 billion lower risk adjusted PVRR and lower annual revenue requirements²⁶ for the RAP DSM no supply-side resources Plan R0 vs. Low Risk DSM Combined Cycle plant in 2026 Plan B1 under current environmental regulations, and do not

²⁶ See Addendum C Page 6 of 8.

^{25 4} CSR 240-3.163, 4 CSR 240-3.164, 4 CSR 240-20.093 and 4 CSR 240-20.094.

address the indirect economic impact of the \$2.5 billion lower risk adjusted PVRR and the lower annual revenue requirements²⁷ for RAP DSM no supply-side resources Plan R3 vs. Low Risk DSM Combined Cycle plants in 2016 and 2026 Plan C3 under aggressive environmental regulations.

To resolve this concern the Company should analyze and document the indirect economic impacts of its candidate resource plans, if the Company chooses to use the economic development policy objective in risk analysis and strategy selection for future IRP filings.

H. Scores on Ameren Missouri's preferred resource plan scorecard are not logically consistent and may have serious flaws, because the comparison of one plan to another can only be done fairly when comparing plans designed for current environmental regulations with Meramec continuing to operate "as is" or when comparing plans designed for aggressive environmental regulations with Meramec not continuing to operate "as is."

In its review of scores in Figure 10.5, Staff has developed considerable concern about the apparent inconsistency of the scores Ameren Missouri has assigned. Staff is concerned that scoring all fourteen (14) plans against each other is very difficult, if not impossible, to do because five resource plans (Plan B1, Plan B2, Plan B3, Plan B4 and Plan R0) are resource plans designed for Meramec continuing to operate "as is," while the remaining nine (9) resource plans are designed for Meramec not continuing to operate "as is." Staff has studied the scores assigned to the Customer Satisfaction policy objective and determined that when considering the average rate impact and the single year rate impact for the five (5) resource plans with Meramec continuing to operate "as is," there is less than 0.8% variation between the average rate impacts of the five plans and less that 1.4% variation between the single year rate impact. Staff believes the appropriate score for this result is for all five plans to have the same "no advantage or disadvantage" score of 3. However Ameren Missouri's scorecard shows a "significant advantage" score of 5 for Plan B1, Plan B2, Plan B3 and Plan B4 and a "moderate disadvantage" score of 2 for Plan R0.

To resolve this concern, Ameren Missouri should take steps necessary to assure that when using scorecards to select its preferred resource plan for its next IRP filing the resulting scores are internally consistent.

²⁷ See Addendum C Page 7 of 8 and Page 8 of 8.

4 CSR 240-22.080 Filing Schedule and Requirements

Summary

Chapter 4 CSR 240-22 Electric Utility Resource Planning sets minimum standards to govern the scope and objectives of the integrated resource planning process of the electric utilities regulated by the Commission. The focus of Chapter 4 CSR 240-22 is on the planning process used to determine the utility's preferred resource plan, not the outcome of that process, i.e., the adopted preferred resource plan. Rule 4 CSR 240-22.080 identifies minimum reporting requirements concerning who is to file, when to file, what to file, the review process and the Commission's authority with respect to compliance filings.

Ameren Missouri has taken the initiative to organize and present the information in this IRP filing differently from the way it has in its past IRP filings. Past IRP filings have been organized into chapters for each rule of Chapter 22. Ameren Missouri has organized this IRP in one volume with chapters of information and discussion which flows smoothly in a narrative form to tell a clear story. At the end of each chapter is a Compliance Reference guide which cross references each Chapter 22 filing requirement met in the chapter tied to the page in the chapter on which the filing requirement is contained. Staff finds this approach to be productive and useful and encourages Ameren Missouri to continue this practice in future filings.

The Commission has filed with the Missouri Secretary of State final revisions to all rules contained in Chapter 4 CSR 240-22 Electric Utility Resource Planning. The revised Chapter 4 CSR 240-22 rules have an effective date of June 30, 2011. The Commission's formal rulemaking process for revisions to Chapter 4 CSR 240-22 is recorded in File No. EX-2010-0254.

The final revised rule 4 CSR 240-22.080(1) provide as follows concerning filing dates of compliance filing for all electric utilities:

- (1) Each electric utility which sold more than one (1) million megawatt-hours to Missouri retail electric customers for calendar year 2009 shall make a filing with the commission every three (3) years on April 1. Companies submitting their triennial compliance filings on the same schedule may file them jointly. The electric utilities shall submit their triennial compliance filings on the following schedule:
 - (A) Kansas City Power & Light Company and KCP&L Greater Missouri Operations Company, or their successors, on April 1, 2012, and every third year thereafter;

- (B) The Empire District Electric Company, or its successor, on April 1, 2013, and every third year thereafter; and
- (C) Union Electric Company d/b/a Ameren Missouri, or its successor, on April 1, 2014, and every third year thereafter.

Therefore, Staff expects Ameren Missouri's next triennial compliance filing will be made on April 1, 2014. Rule 4 CSR 240-22.080(3), which goes into effect on June 30, 2011, requires that electric utilities file updates to their resource plans on April 1 of the years where they do not make a triennial compliance filing. Therefore, Ameren Missouri is to file annual updates to this compliance filing on April 1, 2012 and April 1, 2013. Ameren Missouri is to report any significant changes in compliance with 4 CSR 240-22.080(10), which will become effective on June 30, 2011.

Based on its limited review, Staff has identified no deficiencies or concerns related to Ameren Missouri's rule 4 CSR 240-22.080 filing.

																				
P		ഗ്രേഷ്																		
	2011	2012	2013	2014	2015	2016	2017	2018	2019	<u>2020</u>	<u>2021</u>	2022	<u>2023</u> -311	2024	<u>2025</u> -520	<u>2026</u>	2027 -736	2028 132	2029	2030
Existing capacity position + Total plant upgrades	-117 2	211	516 30	440 34	387 38	318 15	250 85	168 85	63 85	-22 91	+116 91	-212 91	91	-412 68	-210	-626 69	69	69	-969 69	-1,089 69
+ Meramec rotirement		ő	~	ô	õ	0	b	õ	0	0	0	٥		0	0	ő	0	0	. 6	0
+ Renewables	ō	9	8			12	12	17	. 17	20	21	23	26	28	31	33	36	39	41	44
+ Neranda termination	0	0	0	0	0	0	0	0	¢	. 0	9	0	0	0	0	0	0	0	0	0
 Energy efficiency 	-49	-69	-88	-111	-134	-154	-172	-189	-201	-206	-216	-223	-228	-232	-235	-233	-233	-235	-235	-232
 Demandresponse 	0	0	0	0	0	-14	-49	-75	-93	-111	-121	-133	-1:45	-157	-162	-185	-202	.213	-229	-244
+ New primmy supply side	9	0	G	Û	0	9	0	0	0	0	0	0	G	9	0	0	9	0	600	600
+ New secondary supply side	9	0	0	0	0	0	4	0	0	0	0	Q	0	0	٥	0	0	0	0	0
= Capacity position after adjustments	-66 65	286 -186	643 -643	593 -593	567 -567	513 -513	569 -569	534 -534	461 -461	407 -407	332 -332	256 -258	178 -178	73 -73	·17	·103	-194 194	-295 295	205 -205	-100
Purchases(+) or sales(-)	09	-250	-642	-393	+301	-513	•309	•334	-401	-407	-331	-238	-170	-/3	11	103	724	293	-203	-100
CONTRACTOR OF THE PARTY OF THE PARTY.	Plan B	24.2Ntil	ke 30 %	No S	econd	arv=1	ion(e	Renew	anese	IPW I	lige II	VI K	(e.co)	linues	-Nora	ontini	nc.			
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Existing capacity position	-117	216	316	440	367	315	250	168	65	-22	-116	-212	311	-412	-520	-626	-736	-852	-969	-1,029
+ Tolal plant upgrades	2	6	30	34	38	15	85	85	8.5	91	91	91	91	68	69	69	69	69	69	69
+ Meramec tetirement	0	0	G	0	0	0	0	0	0	0	0	0	0	ð	0	0	0	0	0	0
+ Renewables	. 0	0	8	8	8	12	12	1.7	17	20	21	23	26	28	31	33	36	39	11	44
+ Noranda termination	0	0	0	0	0	0	0	. 0	0	0	0	0	.228	-732	·235	-235	-235	.236	0	0
- Energy efficiency	-10	-69	-88 O	-111 0	-j34 0	-154	-172	-183	-201	-206	-116	-323		-157				·2,55	-235 -229	-232 -244
 Demand response New primitry supply side 	9	0	0	0	0	-14 0	~†9 0	-75 0	-93 0	-111 0	·121 0	-133 0	-145 0	157	-167 0	-15,5 Ĉ	-202 C	480	480	-244 480
+ New secondary supply side	0	ŏ	ā	ŏ	ō	ŏ	ő	å	ō	ō	ō	ő	ō	ŏ	8	c	Ğ	0	G	°°
= Capacity position after adjustments	-66	266	66	593	557	513	\$69	334	461	407	332	258	176	73	-17	-103	-194	185	85	-20
Purchases(+) or sales(-)	66	-286	-6#3	-593	-567	-513	-569	-534	-461	-407	-332	-258	-178	-73	17	103	19-1	-185	-85	20
F	lan B3			le - No			Prop (
	2011	2012	2013	2014	2015	<u> 2016</u>	2017	<u>2018</u>	2019	2020	2021	2022	2023	2024	2025	2026	<u>2027</u>	2028	2029	2030
Existing especity position	-117	211	516	440	387	318	250	168	5,5	-22	-116	-212	-3[1	-412	-520	-626	.736	-852	-949	-1,089
Total plant upgrades Meramec referensent	2	6	30 0	34 0	38 0	13	8.5 G	85 0	85 0	91 0	91	16	98 0	66 D	69	69 0	<i>69</i>	69 0	<i>ல</i> 0	69 0
+ Renewables	0	0	2	£	8	12	12	17	17	20	0 21	0 23	26	28	31	33	35	39	41	44
+ Noranda termination	٥	0	ů.	a	ò	0	10	0	0	0	0	دے 0	0	0	0	٥	٥	9	-11	0
- Energy efficiency	. 49	-69	-88	-111	-134	-154	-172	-189	-201	-106	-216	-223	-128	-232	-235	-235	-235	-236	-233	-232
- Demandresponse	G	Q	0	0	0	-14	-19	-75	-93	-111	-121	-133	-145	-157	-167	-183	-202	-213	229	-244
+ New primary supply side	0	0	0	0	0	0	0	0	0	0	0	0	0	ů.	G	٥	0	0	692	692
 New secondary supply side 	0	0	٥	0	0	0	0	0	0	٥	0	0	0	¢	0	0	¢	0	0	U
Capacity position after adjustruents	-66	266	643	593	367	513	569	534	451	407	332	258	178	73	-17	-103	-19-1	-195	297	192
Purchases(+) or sales(-)	66	286	-613	193	-567	-513	-569	-534	-461	407	-332	-258	-178	-73	17	103	194	293	-297	-192
Die	n B4: \	W-AK	olo	Cyc - I	la Saa	ndon	. Drav	CPa	newabl	ne E	ue Diel	nexe	Mor	contin	1100 - N	or con	tinnes			
sa	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Existing capacity position	117	211	516	440	367	318	250	168	65	-22	-116	-212	-311	+412	-520	·626	736	832	-969	-1,089
+ Total plant upgrades	2	6	30	34	3\$	15	8.5	8.5	85	91	91	91	91	65	69	69	69	69	69	59
+ Meramec rollrement	0	. 0	¢	0	0	0	0	0	0	0	a	0	٥	0	0	a	0	0	0	. 0
+ Renewables	5	0	8	8	8	12	12	17	17	20	2 (23	26	28	31	33	36	39	41	44
+ Noranda termination	9	0	. 0	0	¢	0	0	0	0	0	G	0	0	9	0	Q	Q	0	0	0
Energy efficiency	-19	-69	-28	-111	-134	-154	-172	-189	-201	-206	-216	-223	-228	-232	-235	-235	-235	-236	-235	-232
Domand response New primary supply side	0	0	0	0	0	-14 0	-49 0	-7.5 O	-93 0	-111 0	+121 0	-133 0	-1:45 0	-157 C	-167 Q	-185 0	-702 0	-213 410	-229 -410	-244 -310
+ Heat secondary widely side + Heat bitman, subby age	G G	o o	0	0	0	0	0	0	0	0	0	0	0	0	٥	0	0	410	410	410
Capacity position after adjustments	-66	286	6-13	593	167	513	569	534	45[407	332	258	178	73	-17	-103	-194	115	15	-90
Purchases(+) or sules(-)	65	-256	-613	-593	-267	-513	-569	-534	-461	-407	331	-258	-176	-73	17	103	194	-115	-15	90
• • •																				
ni	n C1: (Car. 21		olo N	o @aa-	nde	- Prop	C Par	owehr.		w D:-?-	DCM	Man	Ant-A	lad N	OF 65-	Hauss			
Fia	2011	2012	2013	2014	2015	<u>2016</u>	- PFOD 2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Existing expanity position	-117	2012 211	<u>2013</u> 516	440	387	318	2017 250	168 168	2019 65	-22 -22	-116	-212	-311	-112	-520	-626	-735	-852	-969	-1,089
+ Total plent upgrades	2	6	30	34	38	-39	11	100	11	41	41	41	-311	41	41	41	41	41	41	41
+ Meranec retirement	0	ő	~	~	0	0	ő		0	0	0	0	0	0	0	0	ō	0	0	Ö
+ Renewables	ů.	0	8	8	8	12	12	17	17	20	21	23	25	28	31	33	36	39	41	4-1
+ Nortada termination	0	0	0	0	0	¢	0	0	0	0	. 0	0	0	o-	0	0	9	Q	0	0
- Energy efficiency	•10	-69	-88	-111	-134	-154	-172	-189	102-	-206	-216	-223	-228	-232	-Z35	-235	-235	-236	-235	-232
Demandresponse	0	Ç	0	0	0	-14	-10	-7.5	-93	-111	-121	-(33	-1.45	-157	-167	-185	-202	213	-219	-244
+ New primary supply side	٥	0	0	0	0	0	0	0	0	Q O	0	8	٥	0	0	0	Q.	600	600	600
+ New secondary supply side = Capacity position after a dustments	0 -66	0 285	643 0	0 593	0 567	0 439	0 455	0 460	0 387	0 357	0 282	0 208	0 126	0 45	0 -15	-131	0 -222	0 277	0 177	0 72
Enteres (+) or sayer(-)	-00 66	285 -286	643 643	-593	-557	-439	-495	460 -460	-387	357 -357	-282	-10s	-128	40 -16	-43 -45	131	122	-277	177	-72
	~~	***	~				***		~ • •	~~.		-40	4**		-	***			• • • •	

l Plant	C2: Co	mbine	d Cvel	e - No.	Second	larv . I	Pron C	Renew	ables.	Low	Risk D	SM - N	Ter nat	095 60	nvert	- Nor o	ontinu	PS		
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Existing expenity position	-117	211	516	440	387	277	2017	117	24	-63	-157	453	-352	-455	-561	-647	-777	-893	-1,010	+I,130
+ Total plant up grades	2 2	111	30	. 190	38	-31	39	39	39	. 69	69	49	-532	69	-301	-001	69	69	59	62
	0	9			0	. 21	٥	20	39	. 0	0	4	0	0	0	0	9	a	0	0
+ Meramec tentement	-	-	0	0	- 7	-	_	-	-	-			•		-	_	-	-		
+ Resembles	0	0	8	8		12	12	17	17	20	21	53	26	28	31	33	36	39	41	44
+ Noranda termination	0	9	0	0	0	٥	. 0	0	9	0	Q	0	. 0	0	0	0	0	8	0	0
 Energy efficiency 	~49	-69	-88	-111	·134	-154	-172	-189	-201	-206	-216	-223	-228	-232	-233	-235	-235	-235	-235	-232
- Demandresponte	0	٥	0	0	0	-14	-49	-25	-93	-111	-121	-133	-145	-1.57	-167	-185	-202	-113	229	-244
+ Mew primmy supply side	0	¢	0	0	9	0	0	0	0	9	0	0	0	0	0	0	0	600	600	690
+ New secondary supply side	0	0	0	0	9	0	0	0	0	9	0	0	0	0	0	0	O.	¢	Q	0
 Capacity position after adjustments 	-66	286	643	593	567	47.5	482	447	374	344	269	195	115	33	-58	-144	+235	264	164	59
Purchases(t) or sales(·)	66	-286	-613	-593	-567	~116	481	~447	-374	-344	-269	-195	-115	-33	38	144	235	-161	-161	-59
Per Space Sept Plan	C3 S C	ombini	d'Cve	le «Co	mbine	l Cvel	Proj	C Re	iewab	ES JA	w Ris	EDSM	Mer	telire	2016	Norce	bunue			
A About the San S. Commission of the San	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Existing capacity position	-117	211	516	440	387	318	250	168	65	-22	-116	-212	-311	-112	-520	-626	·736	·852	-269	-1,089
+. Total plant opgredes	3	6	30	34	38	-59	11	11	11	41	41	41	41	41	41	41	41	41	41	41
+ Pleiswecktaueus	0	ő	- 0	3	0	-844	-85#	-854	-844	-854	-851	-854	-84	-854	-854	-854	-8.54	-854	-854	-854
+ Recombles		٥	8	8	8	12	12	37	17	20	21	23	26	26	31	33	36	32	41	44
	J	0		-					17	20 0	Q.	23	70		31	33	30	32	41	44
+ Noranda termination		-	0	0	0	0	0	0	-	-	-		**	0	,,	-				-
- Energy efficiency	-49	-69	-68	-111	-134	-154	-172	-189	-201	-206	-216	-123	-218	-232	-235	-235	-235	-236	-235	-232
- Demandresponte	0	0	0	0	0	-14	-19	-75	-93	-111	-121	-133	-145	-157	-167	-165	+20 £	-213	-229	-244
+ New primary supply side	0	0	G	0	0	600	600	500	600	600	600	600	600	600	600	600	600	600	600	600
+ New secondary supply side	0	0	0	0	σ	0	0	0	0	0	G.	0	0	0	0	600	600	600	600	600
- Capacity position after adjustments	-66	166	643	593	567	185	241	266	133	103	28	-45	-116	-108	-299	215	124	23	-17	-182
Purchases(+) or sales(-)	65	-186	-643	593	-567	-165	-241	-206	-133	-103	-28	46	126	208	299	-215	-124	-23	37	182
,																				
(Carrier States of the Carrier States of the	934719		****			200		-	27 - 2 - Vise	****	irist.	STATES.	*** *** ***	2000	200		****			ASSESSED OF
TI.	an III;		ined C	ycle =	Núkeg	0% = 1	rop C	Renew				SM)÷N		re 201	6 No		nues		A31 - 500	2020
	2011	<u>2012</u>	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Existing capacity position	-117	211	516	440	387	318	250	168	65	-22	-116	-212	-311	+412	-520	-616	•736	-832	-262	-1,089
+ Total plant upgrades	2	6	30	34	38	-59	11	11	11	41	41	41	41	41	41	41	41	11	41	41
+ Meramec retirement	0	٥	0	0	0	-854	-854	-854	-854	-854	-854	-854	-834	-854	-83-1	-854	-854	-85-1	-854	-854
+ Renewables	9	0	8	8	8	12	12	17	17	20	21	23	16	28	31	33	36	39	-11	44
+ Moranda temelination	0	ā	ō	0	ä	0	0	8	0	0	e	0	0		n	0	0	0	0	0
- Energy efficiency	-49	-69	+88	-111	13.1	-154	-112	-189	-201	-206	-216	-223	-228	-232	-235	-235	-233	236	-235	-232
- Demandresponce	9	0	0	0	0	-14	-49	-75	.93	-111	-121	-133	-145	-137	-167	-185	-202	-213	-220	-244
+ New primary supply side	-	-	ő	•	-	600	600	600	600	600	600	600	600	600	600	603	600	600	600	600
A treathrent anily a soc												444	600	600	500					480
	6	0		0	0									~	***	100	100	100		
+ New secondary supply side	¢	ō	o	0	ō	0	0	0	0	0	0	0	0	0	480	460	180	469	480	
= Capacity position after adjustments	0 -66	0 286	0 643	593	0 567	0 185	0 241	106	133	103	28	-46	-126	-208	181	93	4	-97	197	302
	¢	ō	o	0	ō	0	0	-	-	-	-	-			,		,			
= Capacity position after adjustments Furchases(+) or sales(-)	-65 65 n H2; (0 286 -286 Combi	643 -643 ned Cy	593 -593	567 -567 Imple (0 183 -183 Cycle -	0 241 -241 Prop (206 -206 C Rene	133 -133 wables	103 -103 - Low	28 -28 Risk I	-46 46 DSM -	-128 126 Mer re	-208 208 tire 20	181 -181 116 - N	93 -95 or con	tinues	-97 97	-197 197	302 302
= Capacity position after adjustments Purchases(+) or sales(-) Plai	0 -66 65 n H2; 0	0 286 -286 Combi	643 -643 ned Cy 2013	0 .593 -593 rele - S	0 567 -567 Imple (0 183 -183 -183 -2016	0 241 -241 Prop (206 -206 C Rene	133 -133 Wables	103 -103 - Low 2020	28 -28 Risk I	-46 46 DSM - 2022	-126 126 Mer re	-208 208 tire 20	181 -181 116 - N	93 -95 or con	4 -1 tinues 2027	-97 97 2028	-197 197 2029	302 302 2030
Capacity position after adjustment's Eurobases(+) or sales(-) Plan Existing capacity position	-65 65 n H2; (0 286 -286 Combi	643 -643 ned Cy	593 -593	567 -567 Imple (0 183 -183 Cycle -	0 241 -241 Prop (206 -206 C Rene	133 -133 wables	103 -103 - Low 2020 -22	28 -28 Risk I 2021 -116	-46 46 DSM - 2022 -212	-128 126 Mer re	-208 208 tire 20	181 -181 116 - N	93 -95 Or con 2026 -626	4 -4 tinues <u>2027</u> -736	-97 97 2028 -852	-197 197 2029 -969	302 302 2030 -1,029
= Capacity position after adjustments Purchases(+) or sales(-) Plai	0 -66 65 n H2; 0	0 286 -286 Combi	643 -643 ned Cy 2013	0 .593 -593 rele - S	0 567 -567 Imple (0 183 -183 -183 -2016	0 241 -241 Prop (206 -206 C Rene	133 -133 Wables	103 -103 - Low 2020	28 -28 Risk I	-46 46 DSM - 2022	-126 126 Mer re	-208 208 tire 20	181 -181 116 - N	93 -95 or con	4 -1 tinues 2027	-97 97 2028	-197 197 2029	302 302 2030
Capacity position after adjustment's Furchases(+) or sales(-) Plan Existing capacity position	0 -66 -65 -65 -117	0 286 -286 Combii 2012 211	643 -643 ned Cy 2013 516	0 593 -593 -593 <u>2014</u> 440	0 567 -567 -567 -587	0 183 -183 -183 -2016 - 2016 318	0 241 -241 Prop (2017 250	206 -206 C Rene 2018 168	133 -133 wables 2019 65	103 -103 - Low 2020 -22	28 -28 Risk I 2021 -116	-46 46 DSM - 2022 -212	126 126 Mer re 2021 311	-208 208 tire 20 2024 -412	181 -181 116 - N 2025 -520	93 -95 Or con 2026 -626	4 -4 tinues <u>2027</u> -736	-97 97 2028 -852	-197 197 2029 -969	302 302 2030 -1,029
Capacity position after adjustments Furchase (4) or rules(.) Plan Existing supecity position + Total plant upgrades	0 -66 65 65 m H2; 0 -2011 -117 2	0 286 -286 Combi 2012 211 6	0 643 -643 ned Cy 2013 516 20	0 .593 -593 rele - Si 2014 440 34	0 567 -567 -567 -587 -587 -387 -38	0 183 -183 -183 -2916 - 2016 318 -59	0 241 -241 Prop (2017 250	206 -206 C Rene 2018 168 11	123 -133 wables 2019 65	103 -103 -103 - Low 2020 -22 41	28 -28 Risk I 2021 -116 -11	-46 46 DSM - 2022 -212 41	126 126 Mer re 2021 311 41	-208 208 tire 20 2024 -412	181 -181 16 - N 2025 -320 41	93 -95 Or con 2026 -626 -41	4 -1 tinues 2027 -736 41	-97 97 2028 -852 -41	-197 197 2029 -969 -41	302 302 2030 -1,029
Capacity position after adjustments Furchasen(+) or rates(-) Plan Existing capacity position Total plant upgrades Meramer settlement Renewables	0 -66 c6 m H2; 0 2011 -117 2 0	0 286 -286 Combin 2012 211 6	0 643 -643 ned Cy 2013 516 30 0 8	0 593 -593 rele - S 2014 440 34 0	0 567 -567 -567 -567 -587 -38 -38	0 183 -183 -183 -2016 -318 -39 -854 12	0 241 -241 Prop C 2017 250 11 -854	206 -206 C Rene 2018 168 11 -854	123 -133 Wables 2019 65 11 -854	103 -103 - Low 2020 -22 41 -854	28 -28 Risk I 2021 -116 -41 -851	-46 46 DSM - 2022 -212 41 -854	126 126 Mer re 2021 311 41 -854 26	-208 208 tire 20 2024 -412 -41 -554 26	181 -181 116 - N 2025 -320 41 -854	93 -95 Or con 2026 -626 -41 -854	4 -4 tinues 2027 -736 -41 -854	-97 97 2028 -852 41 -854	-197 197 2029 -969 -11 -854	302 302 2030 -1,029 -41 -854
Capacity position after adjustment's Funchase (f) or sales(.) Plat Existing capacity position + Total plant upgrades + Meranec settement + Renewables + Noranda termination	0 -65 -65 -65 -65 -65 -65 -65 -65 -65 -65	0 285 -286 Combin 2012 211 6 0	0 643 -643 ned Cy 2013 516 20 0 8	0 593 -593 2014 440 34 0 8	0 567 -567 Imple 6 2015 387 38 0 6	0 185 -185 -2016 -318 -59 -854 12 0	0 241 -241 Prop (2017 250 11 -854 12 0	206 -206 C Rene 2018 168 11 -854 17	133 -133 wables 2019 65 11 -854 17	103 -103 5 - Low 2020 -22 41 -854 10	28 -28 Risk I 2021 -116 -41 -851 -21 0	-46 46 DSM - 2022 -212 41 -854 23 0	126 126 Mer re 2021 311 41 -854 26	-208 208 208 2024 -412 -41 -854 26	181 -181 2025 -520 41 -834 31	93 -95 OF COID 2026 -626 -41 -854 -33 0	4 -4 tinues 2027 -736 -41 -854 -36 0	-97 97 2028 -852 41 -854 39	-197 197 2029 -969 -41 -854 -41 0	302 302 2030 -1,029 -41 -854 -44 0
Capacity position after adjustments funchase (cf.) or safes(.) Plat Existing capacity position Total plant upgrades Meranec settlement Renewables Moranda termination Energy efficiency	0 -66 -65 -65 -65 -117 -117 -2 -0 -0 -49	0 286 286 Combii 2012 211 6 0 0	0 643 -643 ned Cy 2013 516 30 0 8 0 -88	0 593 -593 2014 440 34 0 8 0	0 567 -567 Imple (2015 387 38 0 6 0	0 183 -183 -183 -2016 318 -59 -854 12 0	0 241 -241 Prop (2017 250 11 -854 12 0 -372	206 -206 C Rene 2018 168 11 -854 17 0 -189	123 -133 wables 2019 65 11 -854 17 0 -201	103 -103 - Low 2020 -22 41 -854 10 0 -206	28 -28 Risk I 2021 -116 -116 -854 21 0 -216	-46 46 DSM - 2022 -212 41 -854 23 0 -223	126 126 Mer re 2023 311 41 -854 16 0 -228	-208 208 2024 -412 -41 -854 26 0 -232	181 -181 16 - N 2025 -520 41 -834 31 0	93 -95 Or cont 2026 -616 -41 -834 -33 0	4 -4 finues 2027 -736 -41 -854 -36 0 -235	2028 -852 -11 -854 -39 0	2029 2029 2069 41 854 41 0	302 302 2030 -1,029 -41 -854 -44 0 -232
Capacity position after adjustment's Furchases(4) or subset(4) Plat Existing capacity position Total plant upgrades Meramee retirement Renewables Noranda termination Energy efficiency Demand response	n H2; (2011 -117 2 0 0 0 -49 0	0 286 286 286 Combin 2012 211 6 0 0 0	0 643 -643 ned Cy 2013 516 30 0 8 0 -88	0 593 -593 2014 440 34 0 8 0 -111	0 567 -567 Imple (2015 387 38 0 6 0 -134	0 183 -183 -183 -2016 318 -59 -854 12 0 -154 -14	0 241 -241 Prop (2017 250 11 -854 12 0 -272 -49	2006 -2006 -2006 -2018 -	133 -133 wables 2019 65 11 -854 17 0 -201 -93	103 -103 ; - Low 2020 -22 41 -854 10 0 -206 -111	28 -78 Risk I 2021 -116 41 -854 21 0 -216 -121	-46 46 DSM - 2022 -212 41 -854 23 0 -223 -139	126 126 Mer re 2023 341 41 -854 26 0 -228 -145	-208 208 2024 -412 -41 -554 26 0 -232 -157	181 -181 2025 -520 41 -854 31 0 -235 -167	93 -95 Or con 2026 -616 -41 -854 -33 0 -235 -183	tinues 2027 -736 41 -854 36 0 -235 -202	-97 97 2028 -852 41 -854 -39 0 -236 -213	2029 969 41 854 41 0	302 302 2030 -1,020 -41 -854 -44 0 -232 -244
Capacity position after adjustment's Funchase (f) or safes(.) Plan Existing expectly position Total plant upgrades Meranee settrement Renewables Noranda termination Energy efficiency Demand response New primary supply side	n H2; 4 2011 -117 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 286 286 286 Combit 2012 211 6 0 0 0	0 643 643 0 2013 516 30 0 8 0 8 0 85	0 .593 -593 -593 -2014 -440 -34 -0 8 0 -111 0	0 567 -567 -567 -567 -2015 -38 0 6 0 -134 0	0 183 -183 -183 -2016 318 -59 -854 12 0 -151 -14	0 241 -241 Prop (2017 250 11 -854 12 0 -372 -49 600	206 -206 Rene 2018 168 11 -854 17 0 -189 -75 609	133 -133 wables 2019 65 11 -854 17 0 -201 -93 600	103 -103 -103 -103 -103 -2020 -22 41 -854 10 0 -205 -111 600	28 -28 Risk I 2021 -116 41 -854 21 0 -216 -121 600	-46 46 2022 -212 41 -854 23 0 -223 -139 600	126 126 Mer re 2023 341 41 -854 26 0 -228 -145 600	-208 208 2024 -412 -41 -554 26 0 -232 -157 600	181 -181 116 - N 2025 -520 41 -834 31 0 -235 -167 600	93 -95 Or con 2026 -626 -41 -854 -33 0 -235 -183 600	finues 2027 -736 41 -854 36 0 -235 -202 600	-97 97 2028 -852 41 -854 39 0 -236 -213	2029 969 41 554 41 0 223 -229 600	302 302 2030 41,020 41 -854 44 0 -232 -244 690
Capacity position after adjustment's Furchases(4) or subset(4) Plat Existing capacity position Total plant upgrades Meramee retirement Renewables Noranda termination Energy efficiency Demand response	n H2; (2011 -117 2 0 0 0 -49 0	0 286 286 286 Combin 2012 211 6 0 0 0	0 643 -643 ned Cy 2013 516 30 0 8 0 -88	0 593 -593 2014 440 34 0 8 0 -111	0 567 -567 Imple (2015 387 38 0 6 0 -134	0 183 -183 -183 -2016 318 -59 -854 12 0 -154 -14	0 241 -241 Prop (2017 250 11 -854 12 0 -272 -49	2006 -2006 -2006 -2018 -	133 -133 wables 2019 65 11 -854 17 0 -201 -93	103 -103 ; - Low 2020 -22 41 -854 10 0 -206 -111	28 -78 Risk I 2021 -116 41 -854 21 0 -216 -121	-46 46 DSM - 2022 -212 41 -854 23 0 -223 -139	126 126 Mer re 2023 341 41 -854 26 0 -228 -145	-208 208 2024 -412 -41 -554 26 0 -232 -157	181 -181 2025 -520 41 -854 31 0 -235 -167	93 -95 Or con 2026 -616 -41 -854 -33 0 -235 -183	tinues 2027 -736 41 -854 36 0 -235 -202	-97 97 2028 -851 41 -854 -39 0 -236 -213	2029 969 41 854 41 0	302 302 -1029 -1029 -41 -854 -44 0 -232 -244 600 692
Capacity position after adjustments furchase (f) or rules(c) Plat Existing capacity position Total plant upgrades Meramee retirement Renewables Moranda termination Energy efficiency Demand response New pofmany supply side New recondary supply side Capacity position after adjustments	0 -66 -66 -66 -66 -66 -66 -66 -66 -66 -6	0 285 -286 Combil 2012 211 6 0 0 0 0 0 0 185	0 643 -643 -643 -643 -516 -30 0 8 0 -88 0 0 0 543	0 593 -593 refe - S 2014 440 34 0 8 0 -111 0 0	0 567 -567 -567 -587 -387 -38 0 6 0 0 0 567	0 183 -183 -185 -2016 318 -59 -854 12 0 .154 -11 600 0 185	0 241 -241 Prop 0 2017 250 11 -854 12 0 -372 49 600 0 241	2006 -2006 C Rene 2018 168 11 -854 17 0 -189 -75 609 0 206	123 -133 wables 2019 65 11 -854 17 0 -201 -93 600 0 133	103 -103 -103 i - Low 2020 -22 41 -854 10 0 -206 -111 600 0 103	28 -28 Risk I 2021 -116 -41 -854 21 0 -216 -121 600 0 28	-46 46 2022 -212 41 -854 23 0 -223 -139 600 0 -46	125 126 Mer re 2023 331 41 -854 16 0 -228 -145 600 0 -126	-208 208 2024 -412 -41 -554 26 0 -232 -157 600 0 -208	181 -181 2025 -520 41 -83 & 31 0 -235 -167 600 0 -299	93 -95 Or cont 2026 -616 -614 -334 -33 0 -235 -183 600 692 307	4 4 2027 -736 41 -854 36 0 -235 -201 600 671 216	2028 -852 -41 -854 -39 0 -236 -213 600 692	197 197 2029 969 41 854 41 0 -235 -229 600 672	302 302 2039 -1,029 41 -854 44 0 -232 -244 600 692
Capacity position after adjustments Furchasen(+) or referct) Plat Existing expectly position + Total plant upgrades + Meranner settlement + Renewables + Noreach terministion - Energy efficiency - Demand response - New primary supply side + New secondary supply side	0 -66 -66 -66 -66 -66 -66 -66 -66 -66 -6	0 285 286 2012 2012 211 6 0 0 0 0 0	0 643 -643 ned Cy 2013 516 30 0 8 0 -86 0	0 593 -593 -593 -6le - Si 2014 -440 -34 -0 8 0 -111 0 0	0 567 -567 -567 -587 -387 -38 0 6 0 0	0 183 -183 -183 -2016 -318 -59 -854 12 0 -151 -14 600 0	0 241 -241 Prop (2617 250 11 -854 12 0 -372 -49 660 0	2006 -2006 C Rene 2018 168 111 -854 17 0 -189 -75 609 0	123 -133 wables 2019 65 11 -854 17 0 -201 -93 600 0	103 -103 -103 5 - Low 2020 -22 41 -854 10 0 -206 -111 600 0	28 -28 Risk I 2021 -116 -41 -854 21 0 -216 -121 600 0	-46 46 DSM - 2022 -212 41 -854 23 0 -223 -133 600 0	125 126 Mer re 2023 341 41 -854 16 0 -228 -145 600 0	-208 208 2024 -412 -41 -554 26 0 -232 -157 600 0	181 -181 116 - N 2025 -520 41 -834 31 0 -235 -167 600	93 -95 Or cont 2026 -616 -41 -854 -33 0 -235 -183 600 692	finues 2027 -736 41 -854 -854 0 -235 -202 600 691	-97 97 2028 -852 41 -854 39 0 -236 -213 600 692	197 197 2029 969 41 854 41 0 235 -229 600 692	302 302 -1029 -1029 -41 -854 -44 0 -232 -244 600 692
Capacity position after adjustments furchase (f) or rules(c) Plat Existing capacity position Total plant upgrades Meramee retirement Renewables Moranda termination Energy efficiency Demand response New pofmany supply side New recondary supply side Capacity position after adjustments	0 -65 -65 -65 -65 -65 -65 -65 -65 -65 -65	0 185 -285 Combit 2012 211 6 0 0 0 -59 0 0 185 -285	0 643 -643 ned Cy 2013 516 20 8 0 -88 0 0 -88	0 593 -593 -593 -61e - Si 2014 -440 -34 0 8 0 -111 0 0 0 593 -593	0 567 -567 Imple (2015 387 38 0 6 0 -134 0 0 557 -567	0 185 -185 Cycle - 2016 318 -554 12 0 -154 -11 600 0 185 -185	0 241 -241 Prop (2017 250 11 -854 12 0 -372 49 600 0 241 -241	2018 106 -206 2018 168 11 -854 17 0 -189 -75 609 0 206 -206	123 -133 wables 2019 65 11 -854 17 0 -201 -93 600 0 133 -133	103 -103 -103 5 - Low 2029 -22 41 -854 10 0 -206 -111 600 0 103 -103	28 -28 -28 -28 -28 -28 -28 -21 -116 -121 -600 -2 -28 -28	-46 46 2022 -212 41 -854 23 0 -223 -139 600 0 -46	128 126 Mer re 2021 311 41 -354 26 0 -228 -145 600 0 -126 .126	-208 208 2024 -412 -41 -554 26 0 -232 -157 600 0 -208 208	181 -181 2025 -520 41 -834 31 0 -235 -167 600 0 -299 299	93 -95 Or cont 2026 -626 -416 -334 -335 -183 -609 -307 -307	4 4 2027 -736 41 -854 36 0 -235 -201 600 671 216	2028 -852 -854 -854 39 0 -236 -213 600 692 115	197 197 2029 969 41 854 41 0 -235 -229 600 672	302 302 2039 -1,029 41 -854 44 0 -232 -244 600 692 -90
Capacity position after adjustments Furchasen(+) or rates(-) Plant Existing capacity position + Total plant upgrades + Meramer settlement + Renewables + Nonada termination - Energy efficiency - Demand response + New primary supply side + New recondary supply side - Capacity position after adjustments - Purchasen(+) or adject(-)	0 -66 -66 -66 -66 -66 -66 -66 -66 -66 -6	0 285 -285 Combil 2012 211 6 0 0 0 0 0 0 185 -285	0 643 -643 ned Cy 2013 516 20 0 8 0 -86 0 0 643 -643	0 593 -593 rete - S 2014 440 34 0 8 0 -111 0 0 0 593 -593	0 567 -567 -567 -567 -134 0 0 0 -134 0 0 0 -567 -567	0 185 -185 Cycle - 2016 318 -59 -854 12 0 -151 -11 600 0 185 -185	0 241 -241 Prop (2617 250 11 -854 12 0 -372 -49 660 0 241 -241 c - Pro	206 -206 C Rene 2018 168 11 -854 17 0 -189 -75 609 206 -206	123 -133 wables 2019 63 11 -854 17 0 -201 -93 60 0 133 -133 newab	103 -103 -103 -103 -103 -103 -2020 -22 -11 -854 -206 -111 -600 -103 -103	28 -28 Risk J 2021 -116 -116 -121 -600 0 28 -28	-46 46 DSM - 2022 -212 41 -854 23 0 -223 -159 600 0 -46 46 k DSM	128 126 Mer re 2021 311 41 -854 26 0 -228 -145 600 0 -126 -126	-208 208 2024 -412 41 -554 26 0 -232 -157 600 0 -208 208	181 -181 116 - N 2025 -520 41 -83 t 31 0 -235 -167 600 0 -299 299	93 -95 Or cont 2026 -626 -626 -634 -33 0 -235 -183 600 692 307 -307	tinues 2027 -736 -41 -854 -36 0 -235 -202 600 691 216 -216 ontinue	2028 -852 -854 39 0 -236 -213 600 692 115	2029 -060 41 -854 41 0 -228 -229 -600 692 -15	302 302 302 -1,025 -41 -854 44 0 -232 -244 690 692 -90
Capacity position after adjustments Furchase (f) or rules(.) Plan Existing capacity position Total plant upgracks Meranec retirement * Renewables Noranda termination - Energy efficiency Demanderspoase * New pointery supply side New recondary supply side New eccandary supply side * New pointery supply side * Capacity position after adjustments * Purchases(f) or sules(.) Plan I	0 -66 -66 -66 -66 -66 -66 -66 -66 -66 -6	0 285 -286 Combin 2012 211 6 0 0 0 0 0 0 185 -286 combine 2012	0 643 -643 ned Cy 2013 516 20 0 8 0 -85 0 0 6 543 -643 d Cycle	0 593 -593 cele - S 2014 440 34 0 8 0 0 0 0 0 0 0 0	0 567 -567 Imple 6 2015 387 38 0 6 0 -134 0 0 0 -567 -567	0 183 -183 Cycle - 2016 318 -59 -854 12 0 .154 -14 600 0 185 -185	0 241 -241 Prop (2617 250 11 -854 12 0 -277 249 660 0 241 -241 c - Pro	2018 106 -206 C Rene 2018 168 11 -814 17 0 -189 -75 600 0 206 -206 P C Re	123 -133 wables 2019 -63 -11 -854 -17 -0 -201 -93 -600 -133 -133 newab	103 -103 -103 -103 -103 -103 -2020 -22 -21 -854 -10 -206 -111 -600 0 103 -103 -103	28 -28 Risk J 2021 -116 -116 -854 0 -216 -121 -600 0 28 -28 DW Ris	-46 46 DSM - 2022 -12 41 -854 23 0 -223 -139 600 0 -46 46 k DSM	128 126 Mer re 2023 341 41 -854 16 0 -228 -145 600 0 -126 126	-208 208 208 2024 -412 -41 -554 26 0 -232 -157 600 0 -208 208 retire	181 -181 116 - N 2025 -520 41 -83 & 31 0 -235 -167 600 0 -299 299 2016 -	93 -95 Or cont 2026 -616 -618 -854 -33 -0 -235 -692 -307 -307 	4 -4 finues 2027 -736 41 -854 36 0 -235 -202 600 671 216 ontinue	2028 -851 -41 -854 -39 0 -236 -213 -600 -692 115 -115	2029 969 41 854 41 0 223 600 692 15 -15	302 302 2039 -1,089 -41 -854 44 -232 -244 600 692 -90
Capacity position after adjustments Furchasen(+) or rates(-) Plant Existing capacity position Truth plant upgardes Moramor retirement Renewables Noranda termination Energy efficiency Demand response New primary supply side New recondary supply side Capacity position after adjustments Purchasen(+) or sales(-) Plant I Enating capacity position	0 -66 -66 -66 -66 -66 -66 -66 -66 -66 -6	0 186 -286 -286 -2012 -211 -6 -0 -0 -0 -0 -0 -0 -0 -0 -0 -0 -0 -0 -0	0 643 -643 ned Cy 2013 516 30 0 -85 0 0 643 -643 d Cycle	0 593 -593 Cite - Si 2014 440 34 0 0 0 0 0 0 0 0 0	0 567 -567 Imple 6 2015 38 0 6 0 -134 0 0 0 567 -567 Id/Sim	0 183 -183 2016 318 -59 -854 12 0 -154 -15 0 185 -185 ple Cy	0 241 -241 Prop (2017 250 11 -854 12 -972 49 600 0 241 -241 c - Pro	2006 -	123 -133 wables 2019 65 11 -854 17 0 -201 -93 600 0 133 -133 newab	103 -103 -103 -103 -103 -103 -103 -103 -	28 -28 Risk l 2021 -116 -121 -121 -121 -128 DW Ris	-46 -46 2022 -212 -41 -854 -23 0 -223 -139 -600 0 -46 -46 k DSM	128 126 Mer re 2023 311 41 -354 26 0 -228 -145 600 0 -126 126 126	-208 208 208 2024 -412 41 -854 28 0 -232 -157 600 0 -208 208 retire	181 -181 116 - N 2025 -520 41 -834 -31 0 0 -235 -167 600 0 -299 299 299	95 -95 Or con/ 2026 -626 -626 -627	4 -4 tinues 2027 -736 41 -854 -854 -90 -235 -202 -600 -216 -216 -216 -217 -735	-97 97 -852 -854 -854 -39 -236 -213 -600 -215 -115	197 197 197 2029 -969 41 554 41 0 225 500 692 15 -15	302 302 1,029 41 44 44 600 692 -244 600 692 -90 90
Capacity position after adjustments Furchases(4) or safet() Plat Existing capacity position Total plant upgracks Meramer settement Renewables Noranda termination Energy efficiency Demand reposes New pofmary supply side New recorders vapply side Capacity position after adjustments Purchases(4) or safet() Plant I Existing capacity position Tatal plant upgrader	0 -66 66 66 66 66 66 66 66 66 66 66 66 66	0 286 286 Combin	0 643 -643 -643 -516 -30 0 -88 0 -88 0 0 643 -643 -643 -643 -516 -32	0 593 -593 refe - Si 2014 440 34 0 8 0 -111 0 0 0 593 -593 e - Wir 2014 440 34	0 567 -567 Imple (2015 387 38 0 0 -134 0 0 0 0 567 -567 -567	0 183 -183 2016 318 -59 -854 12 0 -151 -14 600 0 185 -185 -185	0 241 241 Prop (2017 250 11 -854 12 0 -272 49 660 0 241 -241 c - Pro	206 -206 C Rene 2018 168 11 -854 17 0 0 -189 -75 600 0 206 -206 P C Re	123 -133 Wables 2679 63 11 -854 17 0 -201 -93 600 0 133 -133 -133 -123 -123 -123 -123 -123	103 -103 -103 -103 -103 -103 -111 -854 -10 -103 -103 -103 -103 -1252 -22 -41	28 -28 -28 -28 -2921 -116 -41 -854 -21 -0 -216 -121 -600 -0 -28 -28 -28 -28 -28 -41 -41	-46 46 DSM - 2022 -212 41 -854 23 0 -223 -139 600 0 -46 46 k DSM 2012 -212 -41	128 126 Mer re 2021 311 41 -354 26 0 -228 -145 600 0 -126 .126	-208 208 2098 -412 -41 -554 -25 0 -232 -157 -600 0 -208 -208 retire 2224 -412 -414	181 -181 116 - N 2025 -520 41 -834 -31 0 -235 -167 600 0 -299 299 299 2016 -	95 -95 Or coni 2026 -626 -626 -41 -834 33 -235 -183 600 692 -307 -307 -307 -Nor co	tinues 2027 -736 -41 -554 -36 -0 -233 -201 -600 -216 -216 -216 -216 -217 -336 -41	-97 97 97 -851 -41 -854 -39 -236 -213 -600 -215 -115	2029 -060 -41 -854 -41 0 -235 -229 -600 -691 -15 -15	302 302 302 -1,029 -41 -854 -44 -0 -232 -244 -690 -90 -90 -1,039 -41
Capacity position after adjustments Furchasen(+) or rates(-) Plant Existing capacity position Truth plant upgardes Moramor retirement Renewables Noranda termination Energy efficiency Demand response New primary supply side New recondary supply side Capacity position after adjustments Purchasen(+) or sales(-) Plant I Enating capacity position	0 -66 -66 -66 -66 -66 -66 -66 -66 -66 -6	0 186 -286 -286 -2012 -211 -6 -0 -0 -0 -0 -0 -0 -0 -0 -0 -0 -0 -0 -0	0 643 -643 ned Cy 2013 516 30 0 -85 0 0 643 -643 d Cycle	0 593 -593 Cite - Si 2014 440 34 0 0 0 0 0 0 0 0 0	0 567 -567 Imple 6 2015 38 0 6 0 -134 0 0 0 567 -567 Id/Sim	0 183 -183 2016 318 -59 -854 12 0 -154 -15 0 185 -185 ple Cy	0 241 -241 Prop (2017 250 11 -854 12 -972 49 600 0 241 -241 c - Pro	206 -206 C Rene 2018 1108 11 -854 17 0 -189 -75 600 0 206 -206 -206 -206 103 11 -554	123 -133 wables 2019 65 11 -854 17 0 -201 -93 600 0 133 -133 newab 2019 65 11 -854 11 -854 11 -854 11 -854 11 -854 12 -854 13 13 13 13 13 13 13 13 13 13	103 -103 -103 -103 -103 -103 -103 -103 -	28 -78 -78 -78 -78 -78 -78 -78 -78 -78 -7	-46 46 2022 -212 41 -854 23 0 -223 -139 600 0 -46 46 k DSM -212 -212 -212 -212 -213	126 Mer re 2021 341 41 -854 26 0 -228 -145 600 0 126 -126 -126 -126 -146 41 -34	-208 208 208 2024 -412 -41 -554 26 0 -232 -157 600 0 -208 208 retire	181 -181 166 - N 2025 -520 41 -834 31 -235 -167 600 0 -229 299 299 2016 -	93 -95 Or cont 2026 -626 -41 -534 -235 -183 -600 -692 -307 -307 -Nor co	4 -4 finues 2027 -736 41 -534 36 0 -235 -200 600 691 216 -216 ontinue 207 -735 41 -854	2028 -852 -41 -853 -41 -854 -39 -0 -236 -213 -600 -692 -115 -115 -852 -41 -854	2029 -969 -41 -854 -41 0 -235 -229 -500 -672 -15 -15	302 302 302 -1,020 -41 -854 -44 -600 -232 -244 -600 -90 -90
Capacity position after adjustments Furchases(4) or safet() Plat Existing capacity position Total plant upgracks Meramer settement Renewables Noranda termination Energy efficiency Demand reposes New pofmary supply side New recorders vapply side Capacity position after adjustments Purchases(4) or safet() Plant I Existing capacity position Tatal plant upgrader	0 -66 66 66 66 66 66 66 66 66 66 66 66 66	0 286 286 Combin	0 643 -643 -643 -516 -30 0 -88 0 -88 0 0 643 -643 -643 -643 -516 -32	0 593 -593 refe - Si 2014 440 34 0 8 0 -111 0 0 0 593 -593 e - Wir 2014 440 34	0 567 -567 Imple (2015 387 38 0 0 -134 0 0 0 0 567 -567 -567	0 183 -183 2016 318 -59 -854 12 0 -151 -14 600 0 185 -185 -185	0 241 241 Prop (2017 250 11 -854 12 0 -272 49 660 0 241 -241 c - Pro	206 -206 C Rene 2018 168 11 -854 17 0 0 -189 -75 600 0 206 -206 P C Re	123 -133 Wables 2679 63 11 -854 17 0 -201 -93 600 0 133 -133 -133 -123 -123 -123 -123 -123	103 -103 -103 -103 -103 -103 -111 -854 -10 -103 -103 -103 -103 -1252 -22 -41	28 -28 -28 -28 -2921 -116 -41 -854 -21 -0 -216 -121 -600 -0 -28 -28 -28 -28 -28 -41 -41	-46 46 DSM - 2022 -212 41 -854 23 0 -223 -139 600 0 -46 46 k DSM 2012 -212 -41	128 126 Mer re 2021 311 41 -354 26 0 -228 -145 600 0 -126 126 126	-208 208 201 2024 -412 -41 -554 25 0 -232 -157 600 0 -208 208 retire 2224 -412 -412 -41	181 -181 116 - N 2025 -520 41 -834 -31 0 -235 -167 600 0 -299 299 299 2016 -	95 -95 Or coni 2026 -626 -626 -41 -834 33 -235 -183 600 692 -307 -307 -307 -Nor co	tinues 2027 -736 -41 -554 -36 -0 -233 -201 -600 -216 -216 -216 -216 -217 -336 -41	-97 97 97 -851 -41 -854 -39 -236 -213 -600 -215 -115	2029 -060 -41 -854 -41 0 -235 -229 -600 -691 -15 -15	302 302 302 -1,029 -41 -854 -44 -0 -232 -244 -690 -90 -90 -1,039 -41
Capacity position after adjustments Furchase (#) or rates(*) Plant Estiming capacity position Total plant upgrades Merames retirement Reconvoltes Noranda termination Energy efficiency Demand response New primary supply side Capacity position after adjustments Furchase (#) or adject(*) Plant I Enating capacity position Total plant upgrades Merames carierance New procedulary states (*)	0 -65 -65 -65 -65 -65 -65 -65 -65 -65 -65	0 186 -286 Combin 2012 211 6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 643 643 ed Cycle 643 643 643 643 643 643 643 643 643 643	0 593 -593 cle - Si 2014 440 34 0 8 0 -111 0 0 0 593 -593 c - Wir 514 440 0 0	0 567 -567 Imple 6 2015 387 38 0 6 0 -134 0 0 0 567 -567 ad/Sim	0 183 -183 2016 318 -59 -854 12 0 -154 -600 0 185 -185 -185 -185 -185	0 241 241 Prop (2017 250 11 - 854 12 0 0 - 172 49 600 0 241 - 241	206 -206 C Rene 2018 1108 11 -854 17 0 -189 -75 600 0 206 -206 -206 -206 103 11 -554	123 -133 wables 2019 65 11 -854 17 0 -201 -93 600 0 133 -133 newab 2019 65 11 -854 11 -854 11 -854 11 -854 11 -854 12 -854 13 13 13 13 13 13 13 13 13 13	103 -103 -103 -103 -103 -103 -103 -103 -	28 -78 -78 -78 -78 -78 -78 -78 -78 -78 -7	-46 46 2022 -212 41 -854 23 0 -223 -139 600 0 -46 46 k DSM -212 -212 -212 -212 -213	126 Mer re 2021 341 41 -854 26 0 -228 -145 600 0 126 -126 -126 -126 -146 41 -34	-208 208 208 2024 -412 -41 -554 26 0 -232 -157 600 0 -208 208 retire	181 -181 166 - N 2025 -520 41 -834 31 -235 -167 600 0 -229 299 299 2016 -	93 -95 Or cont 2026 -626 -41 -534 -235 -183 -600 -692 -307 -307 -Nor co	4 -4 finues 2027 -736 41 -534 36 0 -235 -200 600 691 216 -216 ontinue 207 -735 41 -854	2028 -852 -41 -853 -41 -854 -39 -0 -236 -213 -600 -692 -115 -115 -852 -41 -854	2029 -969 -41 -854 -41 0 -235 -229 -500 -672 -15 -15	302 302 302 -1,020 -41 -854 -44 -600 -232 -244 -600 -90 -90
Capacity position after adjustments Furchases (f) or subset(s) Plat Extining capacity position Total plant upgrades Meramee retirement Renewables Moranda termination Energy efficiency Demand response New pofmary supply side Capacity position after adjustments Purchases (f) or subset(s) Plant I Entiting capacity position Total plant upgrades Meramen retirement Entiting capacity position Total plant upgrades Meramen retirement Entiting capacity position Total plant upgrades Meramen retirement Entiting capacity position Meramen retirement Meramen subsetutions Meramen retirement	0 -65 65 H2; 0 0 0 0 0 66 65 H3; Co	0 186 - 286	0 643 643 643 643 643 643 643 643 643 643	0 593 -593 cle - S 2014 440 34 60 60 60 60 60 60 60 6	0 0 567 -587 September 1	0 185 -185 Cycle - 2016 318 59 2016 12 0 155 154 14 600 0 185 185 185 185 185 59 2016 318 59 -54 12 0 0	0 241 241 Prop (2017 250 211 -854 12 2 49 600 0 241 -241 254 12 2 50 11 -654 12 2 0 0	206 -206 C Rene 2018 168 11 -854 17 0 -189 -75 600 0 206 -206 -206 P C Re	133 133 wables 2019 65 11 12 0 0 -201 -33 600 0 133 -133 889 65 11 -21 -21 -21 -21 -21 -21 -21	103 -103 -103 -103 -103 -103 -103 -104 -106 -106 -103 -103 -103 -103 -103 -103 -103 -103	28 -28 Risk I 2021 -116 -41 -854 -121 600 0 28 -28 DW Ris 221 -116 -41 -854 -21 -0	-46 46 DSM - 2022 -212 41 -854 -839 600 0 -46 46 k DSM 2011 -212 -41 -54 -39	128 126 Mer re 2021 311 41 -354 60 0 -228 -145 600 0 126 126 126 127 311 41 -311 41 -311 41 -312	-208 208 2024 -412 -41 -554 -25 -0 -232 -157 -600 0 -208 208 retire 224 -412 -412 -412 -412 -412 -412 -412 -413 -554 -414 -554 -415 -600 -708 -7	181 -181 -181 -181 -181 -181 -181 -181	93 -95 Or con 2026 -616 -	4 -4 finues 2027 -736 -41 -854 -36 -0 -235 -202 600 692 216 -216 -216 -216 -216 -216 -216 -216	2028 -852 -854 -854 -854 -39 0 -236 -213 -600 -600 -600 -115 -115	2029 -260 -41 -554 -41 0 -223 -223 -229 -500 -672 -15 -15	302 302 302 -1,029 -41 -854 -44 -0 -232 -244 690 692 -90 90
Capacity position after adjustments Furchasen(+) or referct) Plant Estiming expectly position + Total plant upgrades + Meramer settrement + Renewables + Noranda termination - Energy efficiency - Demander spoase - New primary supply side + New secondary supply side - Capacity position after adjustments - Purchasen(+) or salen(-) Plant I Exacting expacity position + Total plant upgrades - Warmer enforcement - Renewables - Noranda termination - Econy efficiency	0 -65 -65 -65 -65 -65 -65 -65 -65 -65 -65	0 188 -286 Combin 2012 211 6 0 0 0 188 6 0 188 6	0 643 643 643 643 643 643 643 643 643 643	0 593 -593 -593 -593 -611 - 6 - 8 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	0 0 567 -597 Imple 6 2015 387 0 8 0 0 -134 0 0 0 567 -567 Id/Sim, 2015 397 38 0 0 0 134 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 185 155 2016 2016 2016 2016 2016 2016 2016 2016	0 0 241 241 241 241 241 241 241 241 241 241	206 -206 C Rene 2018 168 11 -854 17 0 -189 206 -206 -206 11 -454 11 -544 11 -544 11 -544 11 -544 11 -544	133 wabbes 2019 65 11 -854 17 0 -201 -393 600 0 133 -133 newab 859 65 11 0 13 14 15 16 16 17 17 18 18 18 18 18 18 18 18 18 18	103 -103 - Low 2020 -22 -21 -21 -20 -20 -20 -20	28 -78 -78 -78 -78 -78 -78 -78 -78 -78 -7	-46 46 DSM - 2022 -212 41 -8,54 -23 -139 -600 -46 -46 k DSM	126 126 126 126 127 131 141 1854 126 0 126 126 127 141 141 141 141 141 141 141 141 141 14	-208 208 -208 -412 -412 -411 -854 -228 -00 -208 -208 -208 -208 -208 -412 -412 -412 -413 -414 -415 -415 -416 -416 -416 -416 -417 -417 -418 -4	181 -181 116 - N 2025 -520 41 -854 -854 -167 -600 0 0 -299 299 2016 - -235 -520 41 -524 -529 -529 -529 -529 -529 -529 -529 -529	93 -95 2026 -616 -41 -844 -133 0 -235 -183 -600 -692 -307 -	### ##################################	2028 -851 -854 -854 -39 -0 -236 -213 -602 -115 -115 -652 -41 -854 -39 -952 -41 -954 -39 -952 -41 -954 -952 -952 -952 -952 -953 -953 -953 -953 -953 -953 -953 -953	197 197 2022 -969 41 654 41 0 22x5 690 691 15 -15	302 302 2039 41,085 41 44 40 0 -232 -244 600 90 90 -1,089 41 -554 44 0
Capacity position after adjustments Furchase (4) or rules() Plai Estiming capacity position Total plant upgrades Meramer settlement Renewables Noranda termination Energy efficiency Demand response New primary supply side Capacity position after adjustments Purchase (4) or sales(c) Plant I Enating capacity position Total plant upgrades Merame retirement Renewables Meramed termination Energy efficiency Demand response New conditions Energy efficiency Demand retirement Energy efficiency Demand response	0 0 -66 65 H3; Co	0 188 -286 Combin 2012 2111 6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 643 med Cy 2013 516 20 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 593 -593 -593 -593 -593 -593 -6 - Wirth 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 567 -597	0 185 -185 Cycle - 2016 318 559 -854 112 600 155 -185 -185 599 2016 318 -185 -185 318 -59 -854 12 0 -154 -154 -154 -154 -154 -154 -154 -154 -155 -1	0 0 241 241 241 241 241 241 241 241 241 241	206 -206 C Rene 2013 168 11 68-189 -75 600 206 -206 -206 11 168 11 17 0 216 -216 -216 -216 -216 -216 -216 -216	2019 655 111 656 112 0 1201 1200 0 133 1333 1333 1333 14333	103 - 103 -	28 - 78 - 78 - 78 - 78 - 78 - 78 - 78 -	-46 -46 -46 -46 -46 -46 -41 -41 -41 -41 -41 -41 -41 -41 -41 -41	126 126 126 126 127 1311 141 16 0 128 145 160 0 128 126 126 126 126 126 126 126 126 126 126	-208 208 -208 -412 -412 -41 -554 -28 0 -293 -208 -208 -208 -208 -208 -208 -208 -412 -412 -413 -414 -415 -415 -415 -416 -416 -417 -417 -417 -418	181 -181 116 - N 2025 -520 41 -834 31 0 -235 -167 600 0 0 -299 299 299 2016 - 2015 -520 41 41 -524 -525 -520 41 -525 -520 41 -525 -520 -520 -520 -520 -520 -520 -520	93 -95 Or Common 2026 -616 -616 -618 -618 -618 -634 -135 -600 -692 -692 -692 -692 -693	4 -4 finues 2027 -736 41 -834 -834 -205 -201 -216 -216 -217 -35 -4 -4 -5 -5 -6 -7 -7 -7 -7 -7 -7 -7 -7 -7	97 97 97 851 41 854 39 0 236 692 2413 600 692 415 415 852 41 854 39 0 7 7 854 39	197 197 197 2022 -969 41 41 0 0 523 523 522 -229 569 41 -15	302 302 41,025 41,025 44 44 40 600 224 590 90 220 220 41 44 46 600 41 41 45 44 46 40 40 40 40 40 40 40 40 40 40 40 40 40
Capacity position after adjustments Furchase (fr) or sales(s) Plai Existing capacity position Total plant upgracks Meramee retirement Renewables Noranda termination Energy efficiency Demand response New pofmany supply side Capacity position after adjustments Furchases (fr) or sales(s) Plain I Existing capacity position Total plantupgrades Merame retirement Renewables Merame retirement Renewables Merame retirement Renewables Merame retirement Empty officiency Demand response New portures Demand response Meramy supply side	0 0 -66 65 H3; Co	0 285 -286 -286 -286 -286 -286 -286 -286 -286	0 643 med Cy 2013 516 0 0 8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 593 -593 -593 -593 -61e - S 2014 -440 -34 -0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 567 -597	0 185	0 0 241	206 -2006 C Rene 2013 168 168 169 169 169 175 160 160 160 160 175 160 175 175 175 175 175 175 175 175 175 175	2019 2019 655 11 654 12 0 -2011 93 600 0 133 -133 133 133 1433	103 -103 -103 -103 -103 -103 -103 -103 -	28 -78 Risk 1 2021 -116 - 654 - 121 - 600 0 0 28 8 221 -116 41 854 41 854 41 854 41 854 42 50 0 216 421 600 0	2022 -416 -426 -427 -412 -423 -423 -423 -423 -423 -423 -424 -424	126 126 126 126 126 126 126 126 126 126	-208 208 2024 -412 -412 -413 -554 -252 -157 -600 0 0 -208 208 retire 222 -412 -412 -413 -654 -208 -208 -208 -208 -412 -412 -412 -413 -414 -415 -415 -415 -415 -415 -415 -415	181 -181 116 - N 2025 -520 41 -854 31 0 -235 -167 600 0 0 299 299 2016 - 299 299 41 -540 41 41 41 41 41 41 41 41 41 41 41 41 41	93 -95 Or Con 2026 -616 -616 -618 -618 -619 -619 -619 -619 -619 -619 -619 -619	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	97 97 97 97 97 97 97 97 97 97 97 97 97 9	197 197 197 2022 -050 -050 -15 -15 -15 -15 -15 -15 -15 -15 -15 -15	302 302 2030 41,020 41 600 692 -224 41 600 692 -1,029 90 41 41 42 44 44 600 692 -24 41 41 41 41 41 41 41 41 41 41 41 41 41
Capacity position after adjustments Furchasen(+) or rates(+) Estiming capacity position Froit plant upgrades Moramer retirement Renewables Noranda termination Energy efficiency Demand response New primary supply side Capacity position after adjustments Purchasen(+) or sales(-) Plant I Enating capacity position Find lighting grades Marmor capacity Enating capacity position Enation capacity Demand required Nor primary supply side Nor primary supply side Here secondary apply side	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 185 -286 Combin 2012 2111 6 0 0 0 0 0 0 185 -286 211 6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 643 643 643 643 643 643 643 643 643 643	0 0 593 593 6 - Win 593 6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 567 -597 Imple 6 2015 38 0 8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 183 185 185 186 187 187 187 187 187 187 187 187 187 187	0 0 241 241 241 241 250 0 0 172 250 111 250 0 172 250 111 241 241 250 111 250 0 172 250 111 250 172 250 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	206 -206 C Rene 2013 168 11 168 11 17 0 -189 -75 600 206 -206 P C Re 2011 454 11 0 -199 -75 600 0	133 1433 wables 2019 65 65 11 12 -00 -201 -93 65 133 -133 newab 852 65 11 654 11 7 0 401 -93 600 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	103) -103 - Low 2020 -21 -554 -100 -105 -103 -103 -103 -103 -103 -105 -105 -105 -105 -105 -105 -105 -105	28 - 78	-46 46 46 46 46 46 46 46 46 46 46 46 46 4	126 126 126 126 126 126 126 126 126 126	-208 208 -208 -412 -412 -413 -554 -28 -208 -208 -208 -208 -208 -208 -208 -208 -208 -208 -208 -208 -208 -412 -412 -413 -413 -414 -415 -415 -416 -416 -417 -417 -417 -418 -418 -418 -419 -4	181 -181 166 - N 2025 -520 41 41 41 -235 -167 600 0 -229 299 2016 - 299 299 2016 - 31 31 31 31 31 31 31 31 31 31 31 31 31	93 -95 Or con 2026 -616 -616 -618 -	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	97 97 97 97 97 97 97 97 97 97 97 97 97 9	197 197 2022 269 269 213 223 223 229 209 215 315 315 41 41 42 43 44 44 44 45 44 44 45 44 46 47 48 48 48 48 48 48 48 48 48 48 48 48 48	302 302 2030 41,025 44 44 44 49 600 50 90 220 41 44 44 45 44 45 41 41 41 41 41 41 41 41 41 41 41 41 41
Capacity position after adjustments Furchase (fr) or sales(s) Plai Existing capacity position Total plant upgracks Meramee retirement Renewables Noranda termination Energy efficiency Demand response New pofmany supply side Capacity position after adjustments Furchases (fr) or sales(s) Plain I Existing capacity position Total plantupgrades Merame retirement Renewables Merame retirement Renewables Merame retirement Renewables Merame retirement Empty officiency Demand response New portures Demand response Meramy supply side	0 0 -66 65 H3; Co	0 285 -286 -286 -286 -286 -286 -286 -286 -286	0 643 med Cy 2013 516 0 0 8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 593 -593 -593 -593 -61e - S 2014 -440 -34 -0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 567 -597	0 185	0 0 241	206 -2006 C Rene 2013 168 168 169 169 169 175 160 160 160 160 175 160 175 175 175 175 175 175 175 175 175 175	2019 2019 655 11 654 12 0 -2011 93 600 0 133 -133 133 133 1433	103 -103 -103 -103 -103 -103 -103 -103 -	28 -78 Risk 1 2021 -116 - 654 - 121 - 600 0 0 28 8 221 -116 41 854 41 854 41 854 41 854 42 50 0 216 421 600 0	2022 -416 -426 -427 -412 -423 -423 -423 -423 -423 -423 -424 -424	126 126 126 126 126 126 126 126 126 126	-208 208 2024 -412 -412 -413 -554 -252 -157 -600 0 0 -208 208 retire 222 -412 -412 -413 -654 -208 -208 -208 -208 -412 -412 -412 -413 -414 -415 -415 -415 -415 -415 -415 -415	181 -181 116 - N 2025 -520 41 -854 31 0 -235 -167 600 0 0 299 299 2016 - 299 299 41 -540 41 41 41 41 41 41 41 41 41 41 41 41 41	93 -95 Or Con 2026 -616 -616 -618 -618 -619 -619 -619 -619 -619 -619 -619 -619	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	97 97 97 97 97 97 97 97 97 97 97 97 97 9	197 197 197 2022 -050 -050 -15 -15 -15 -15 -15 -15 -15 -15 -15 -15	302 302 2030 41,020 41 600 692 -224 41 600 692 -1,029 90 41 41 42 44 44 600 692 -24 41 41 41 41 41 41 41 41 41 41 41 41 41

				_												_				
	ามิกา	RUER	O Jun	Fig.	0.50	្រាល់ខែក <u>េ</u>	កម៉ែញ	(B)K	สคากส	cc-IIV	CoS.	36-34 6	ie/Ami	ការនេះ-	20-5	minne	X.			
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	<u> 2026</u>	2027	2028	2029	2030
Existing expecity position	-117	211	516	440	387	311	250	168	63	-22	-116	211	. 411	-412	-510	-624	•736	-132	909	1,089
+ Total plant apprades	3	6	30	31	38	15	8.5	1.5	#5	91	91	91	91	68	69	69	69	59	69	69
+ Meramec redrement	0	0	Q	0	0	0	0	0	. 0	0	0	0	0	٥	a	0	Đ	9	0	0
+ Recenables	9	0	8	8	· ·	12	12	16	16	20	21	24	26	29	31	34	37	39	41	44
+ Moranda termination	0	0	0	0	0	Q.	Ö	0	0	0	0	. 0	0	Ġ	0	Ð	Ģ	•	0	. 0
 Energy efficiency 	~18	-85	-134	-210	-306	-497	-507	-603	-688	-758	-525	-583	-927	-955	-977	-989	1,000	+1,004	-1,009	-1.007
- Demandresponse	0	0	9	0	0	0	Q.	0	Ü	0	0	3	0	0	0	0	0	0	0	¢
+ New primary supply side	0	0	0	Ð	0	0	0	•	0	0	q.	0	0	0	0	0	0	0	0	9
+ Mew secondary supply side	Q	0	o	Ġ	0	0	0	0	0	0	0	٥	0	٥	6	0	0	0	0	0
 Capacity position after adjustments 	-66	302	688	592	139	752	854	673	855	847	831	785	733	639	557	466	370	262	151	31
Purchasses(+) or sales(-)	66	-302	-688	-692	-739	-752	-854	-873	-855	-847	-821	-785	-733	-639	-337	~165	-370	-162	-15t	-31
	Plan	R1: N	o Prim	ary - N	lo Seco	ndary	- Prop	C Ren	ewabl	es - RA	P DSM	1 - Me	r contr	olled -	Nor co	ontinu	es			
	<u> 2011 </u>	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Existing especity position	117	211	516	440	387	318	250	168	63	-22	-116	-212	-311	-412	-570	-626	-736	-852	-269	-1,089
+ Total plant upgrades	2	6	30	34	38	-59	11	11	11	41	41	41	41	41	46	41	41	41	41	41
+ Moramec retirement	0	6	0	0	0	0	0	0	0	0	0	Ō	0	0	o`	. 0	0	0	0	0
+ Renewables	0	0	8	6	8	12	12	16	16	20	21	24	26	29	31	34	37	39	41	44
+ Noranda temeination	0	0	0	0	G.	0	0	0	0	0	0	0	0	0	0	Ð	0	· ¢	0	Ö
- Energy efficiency	-13	-85	-134	-210	-306	-407	-507	-603	-568	-758	-825	-383	-927	-955	-972	-989	-1,000	-1,005	1.009	-1.007
- Demandresponse	0	. 0	0	Q	0	٥	0	0	0	0	¢	0	0	0	٥	9	. 0	0	٥	0
+ New primary supply side	0	0	G	Q.	0	0	0	0	Q.	٥	0	a	0	0	¢	0	Q	0	Q.	0
+ New secondary supply side	0	0	0	0	0	0	0	0	0	0	0	- 0	0	0	G	0	٥	Q	0	0
Copacity position after adjustments	-66	302	683	692	739	678	780	299	781	797	771	735	683	612	529	438	342	234	123	3
Purchases(+) or sales(∙)	65	-302	-638	-693	-739	-678	-789	-799	-181	-197	-771	-735	-683	-612	-329	~138	-342	-234	-123	-3
P	lan R2	: No I	rimar	y - No	Second	lary - F	rop C	Renev	ables -	RAP	DSM -	Mer n	at gas	conver	t - No	conti	nues			
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2036
Existing expectly position	-117	211	516	410	387	277	209	127	24	-63	-157	-253	-352	~153	-561	-657	-777	-593	-1,010	-1,130
+ Total plant upgrades	2	6	30	34	38	-31	39	39	39	69	69	69	69	69	69	69	69	49	69	69
+ Meranec refirement	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	٥	0	0	0
+ Renewables	0	٥	8	8	8	12	12	16	16	20	21	24	26	19	31	34	37	39	41	44
+ Morenda termination	0	0	0	0	0	0	0	Q		0	0	0	0	0	0	0	Ü	•	0	ø
- Energy efficiency	48	-85	-134	-210	-306	-407	-507	-503	-68B	-758	-825	413	-927	-955	-917	-989	1,000	-1,006	-1,009	1,007
- Demandresponse	0	0	0	Q	0	0	٥	0	0	0	0	0	0	0	0	0	0	0	9	-20
+ New primary supply side	0	0	0	O.	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0
+ New secondary supply side	0	0	0	0	0	٥	0	0	0	Q	0	0	0	0	0	0	0	0	8	0
= Cepecity position after adjustments	-66	302	683	692	739	665	767	786	768	784	758	153	470	599	316	425	329	221	110	10
Purchases(+) or select-)	66	-302	-688	-692	.739	-645	-767	-786	-768	-781	-758	-122	-570	-599	-516	425	-339	-221	-11G	-10
	Plan I	G: No	Prim	ary S N	ó Seco	ndary	Prop	C Ren	ewable	s=RA	P DSN	1-Mei	retire	2016	None	ontinu	es 🔻	(48)		
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Existing capacity position	-117	211	516	440	387	318	250	168	53	-12	-116	-212	-311	-412	-520	-525	-734	-852	-269	1,089
+ Total plant magradus	2	6	30	34	38	-59	11	11	11	41	41	41	41	41	41	41	41	41	48	41
+ Menmec telitaneni	0	0	0	0	0	-554	-85 €	-85-5	-854	-854	-854	-85-1	-854	-854	-851	-854	-854	-854	-854	-854
+ Renewables	0	ō	8	8	8	12	12	16	16	20	21	24	26	29	31	31	37	39	41	44
+ Norsada'termination	0	ō	Q	ō	ō	0	0	0	0	0	0	0	0	0		0	0	0	0	0
- Energy efficiency	-43	-85	.134	-210	-306	-497	-307	-693	-688	-758	-82.5	-853	-937	-955	-977	-989	-1,000	-1,004	-1,009	-1,007
- Demand response	0	o o	0	0	0	-20	-63	-35B	-236	-329	-359	-174	.5.59	-020	-679	-732	-765	-784	-803	-824
+ New primary supply side	ō	0	ō	ů	ŏ	0	0	0	0	0	0	0	0	0	.,	0	0	0	0	0
+ New secondary supply side	9	0	o o	o.	ō	٥	0	0	0	a	o o	ŏ	ō	ō	ō	0	ō	0	Q.	0
" Capadly position after adjustments	-66	302	688	692	139	-156	10	103	163	272	316	335	378	378	354	316	252	164	74	-25
Purchases(+) or sales(-)	66	102	-688	-692	-739	156	-10	-103	-163	-272	-316	-355	-378	-37.6	-354	-316	-252	-16‡	-74	15

Ameren Missouri 2011 IRP

Preferred Plan Selection Scorecard

	nd Measures							Condidate Re	Source Plans						
							MIA Collisited 1/1/2016 (Air Octo	4	2 2 2 2 2 2 3 2 3 3 3 3 3 3 3 3 3 3 3 3	15 2 € 3 2 5 5 5 2 5 5 5 2 5 5 5 2 5 5 5	8 8 8 8 9 8 8 8 9 8 8 8 8 7 8 8	53 MM Kechrod 12/31/2015 Low Risk DSM CC in 2016 CC in 2026	H1 MM Resired 12/31/2015 Low Risk OSM CC in 2016 Nuclear in 2025	M2 MM Retired 12/31/7015 Low Rink DSM CC in 2016 SC in 2026	### Falls Revine 12/31/2019 Low Pink I/S CC in 2016 Wins I/SC in 20
Environmental/Diversity 20%	Resource Diversity Carbon Emissions 502 Emissions NOx Emissions	1	3	1	1	1	2	3	4	2	3	4 .	\$	4	5
Energy Efficiency est	Energy Savings	2	. 2	2	2	4	4	4	4	2	2	2	2	2	2
Financial/Regulatory 20%	ROL EPS ROIC Free Cash Flow Stranded Cost Risk Transaction Risk Recovery Risk	5	2	5	3	2	1	2	2	2	4	4		4	3
Customer Satisfaction 200	Average Rate Impact Single Year Rate Impact Action Service (Service)	5	5	\$	5	2	2	2	2	4	4	3	3	3	3
Economic Development '10%	FTE-Years	1	>	1	3	4		3	3	2	1.	2	5	2	. 2
Cost	PVRR		4	4	4	5						2	2	2	2

Scoring Guide	
Significant Advantage	5
Moderate Advantage	4
No Advantage or Disadvantage	3
Moderate Disadvantage	2
Significant Disadvantage	i

nvironmental/Diversity	Notes on Service by Policy Objective The transportation of Service and the control of the contr
nergy Efficiency	Zelipat particular involves a contrate to the
	er franches une tropic de la completa que la franches de la completa del completa de la completa de la completa del completa de la completa del la completa del la completa de la completa del la completa del la completa de la completa del la
	RAP was found with was a second to the contract of the contrac
	Bernalder and the second of th
oct (PVRR)	realistance of the control of the co

Note: Ameren Missouri analysis to generate Figure 10.5 of its 2011 IRP Filing



Addendum B Page 1 of

Ameren Missouri 2011 IRP Preferred Plan Selection Scorecard

Policy Objective	s, Weights an	d Measures	1						Candidate Ki	esource Plans					1	
								50 MAC 104 117204 14724	MAGACOT 1/4/2016 0/4/1936	11/4 (00) est 11/4 (00) est 12/2 (20)5		4 6 2 3 3 8 3 3 3 8 3 3 3 3	MM Retired 12/31/2015 Lew Risk DSM CC in 7016 CC in 2026	H1 MM Retired 12/31/2015 Cov Bisk DSM CC in 2016 Nuclear in 2025	#2 MM fustired 12/31/7015 Low Nek DSM CC in 2016 SC in 2026	MM letined 12/21/2015 Low Mick (15M) CC in 2016 Windjac in 2024
Environmental/Diversity	20%	Resource Diversity Carbon Emissions SOZ Emissions NOx Emissions	1	1	1	1	1	2	3	4	2	3	4	S	4	5
Energy Efficiency	, tops	Energy Savings	2	2	2	2	5	s	s	5	2	2	2	2	2	ż
Pinencial/Regulatory	20%	ROE CFS ROIC Free Cath How Stranded Cost Risk Transaction Risk Recovery Risk	5	2	5	3	2	1	2	2	2	4	4		4	3 -
Customer Satisfaction	154	Average Rate Impact Single Year Rate Impact Febb Sea Greated Raped	s	5	5	5	4	4	4	4	4	4	3	3	3	3
Economic Development	10%	FTE-Years	1	s	1	3	4		3	3	2	1	2	5	2	2
Cost		PYRR		4	*	4	5	-	-				2	2	2	2
Wordted Average States	AND PROPERTY.	RAME THE COURT OF THE PARTY OF	州城外,水土河城市	一种企业工作	CHARGE PARKETS	WASH KU YOUR	京為明大をいる時代	SWING OF THE STREET	SHADISH DISKNIS	北京政策等力等等的	SPACENTE MEN	网络欧州沙塞 特的	188941886	AND TO SAIL		Mark San

Scoring Guide	
Significant Advantage	5
Moderate Advantage	4
No Advantage of Disadvantage	3
Moderate Disadvantage	2
Significant Disadvantage	1

	Notes on Scores by Policy Objective	
Environmental/Diversity	Administration of the state of	er de la constituencia er de la constituencia er de la constituencia
Energy Efficiency	Bar walkip programment of the control of the contro	
100	Water Supply and Walder Superson and date of the entry of	in the angle of the filter for the filter for
Customer Satisfaction	Bandada gundar est est est est de de la companya de Mandada gundanda de de de la companya del companya de la companya de la companya del companya de la comp	of Sold Section 1981
	Hersephanese watered the greater of the first of the second of the material of the first of the greater of the first of the second of the first of the second of the first of the second	Silvinia i Sentreped Silvinia de Ma
Cost (PVRR)	Bernsteller (1906) in the control of	

H(

Note: Staff analysis to include the following changes to Addendum B Page 1: a) change weights to those in Table 9.2, b) change scores for Energy Efficiency of RAP plans from 4's to 5's to be consistent with comment "RAP DSM plans score "significant advantage" due to high energy savings.", and c) change scores for Customer Satisfaction for RAP plans from 2's to 4's.

RAP = Realistic Achievable Potential DSM Portfolio CC = Combined Cycle Gas Turbine Generator

ddendum B Page 2 of 4

Ameren Missouri 2011 IRP

Preferred Plan Selection Scorecard

Policy Objective	s, Weights and	Measures							Condidate Re	rsource Plans						
ns Olema									44 05 05 12 2016 84 0514	MM Relied 12/31/2015 RAP/DSM	MM Controlled 1/1//03b Low Risk DSM CC 0/2028	MIN GO COTO 1/1/2010 Co (00) COM CC (0 2028	53 p.164 featured 12/31/2015 Low Rick DSM CC In 2016 CC In 2026	MM Retired 12/31/2015 Low Rick DSM CC in 2016 Nuclear in 2025	MZ IMM Resided D/31/2015 Low Back DAM CC in 2016 SC in 2026	#32 Fallst Retired 12/31/2015 Law Pink DSM CC in 2016 Wind/SC in 2074
Environmental/Diversity	13%	Resource Olversity Carbon Emissions SO2 Emissions NOx Emissions	1	1	1	1	1	2	3	4	2	3	4	S	4	5
Energy Efficiency	761	Energy Savings	2	2	2	2	\$	5	5	5	2	2	z	2	2	2
Financial/Regulatory	13%	ROE EPS ROIC Free Cash Flow Stranded Cost Rik Transaction Risk Recovery Risk	5	2	\$	3	2 .	1	2	2	2	4	4		4	3
Customer Satisfaction	70.58°	Average Rate Impact Single Year Rate Impact (Note: package and account)	5	S	5	\$	4	4	4	. 4	4	4	3 .	3	3	. 3
Economic Development	7%	FI E-Years	1	5	1	3	4		3	3	2	1	2	5	2	2
Cost		PVRK		4	4	4	5		,	:			2	2	2	2
Volgbied/Avorage Score, v2	in the second state of	January Carles Skiws.	新始于中心 基础	建设施长州 线型	以此来 其中的	高级的种类的	AND HOUSE	THE DESIGNATION	moduska.	reactive medical	are in the same	加热中共16 5000	了那样人生对他	经16/10/10/10	建2007多大测量	30 W/C 168

Scoring Guide							
Significant Advantage	5						
Moderate Advantage	4						
No Advantage or Disadvantage	3						
Moderate Disadvantage	2						
Significant Disadvantage	1 1						

экринских отничалико	
	Notes on Scores by Policy Objective
nvironmental/Diversity	Basedur treatment for a filter trade in improvement to the control of the control
	discontinuation of the control of th
	provided the second of the sec
nergy Efficiency	A Wind two wars, the first contains two cases of the first f
inancial Regulatory	ateria per la computation de l
	esta wednerma, descriptions are some series of the control of the
	A second to the execution of the second seco
Justomer Satisfaction	h SP SSE plant rather than the plant of the control
	construction of the experimental and the construction of the const
conomic Development	Butter provided from the state of the control of th
	employ Marria and Development of the control of the control of the employer of the control of th
	Self-reference for the contraction of the contracti
- CONTROL - CONT	
	A CALLEGAR CONTROL OF THE CONTROL OF
(ex to Abbreviations	
the state of the s	inston MM = Meramec RAP = Realistic Achievable Potential DSM Portfolio CC = Combined Cycle Gas Turbine Generator CC = Simple Cycle Gas Turbine Generator

HC

Note: Weighted scores from Addendum B Page 3 - Staff analysis to include the following changes to Addendum B Page 2: a) 50% weight for Cost (PVRR) to comply with Rule 4 CSR 240-22.010(2)(B), b) adust the remaining weights in Addendum B Page 2 from total of 75% to total of 50%.

Idendum B Page 3 of

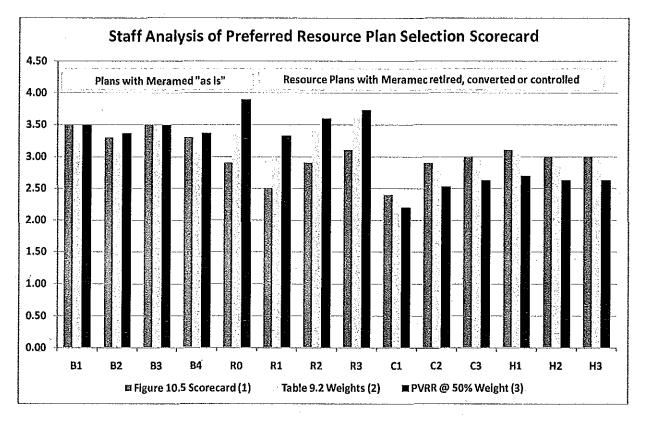
Addendum B Page 4 of 4

Staff Analysis of Preferred Resource Plan Selection Scorecard

Figure 10.5 Scorecard (1) Table 9.2 Weights (2) PVRR @ 50% Weight (3)

81 .	B2	В3	B4	RO	R1	R2	R3	C1	C2	C3	H1	H2	Н3
3.50	3.30	3,50	\$3:30	2.90	2.50	2.90	3,10	2.40	2.90	3.00	23.10	3.00	3.00
							3.60						
3.50	3.37	3.50	3.37	3.90	3,33	3.60	3,73	2.20	2.53	2,63	2.70	2.63	2.63

= Top Tier Plans

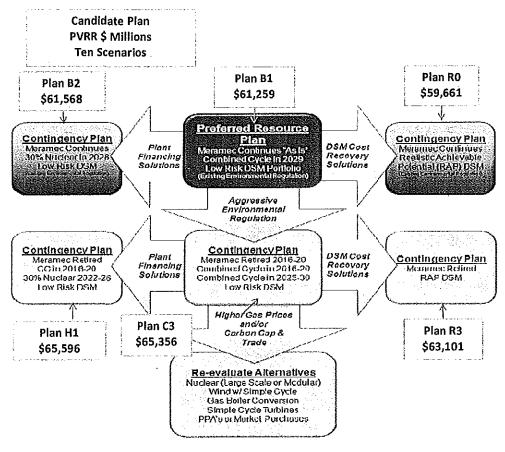


Notes

- (1) Weighted scores from Addendum B Page 1 Ameren Missouri analysis to generate Figure 10.5 of its 2011 IRP Filing
- (2) Weighted scores from Addendum B Page 2 Staff analysis to include the following changes to Addendum B Page 1: a) change weights to those in Table 9.2, b) change scores for Energy Efficiency of RAP plans from 4's to 5's to be consistent with comment "RAP DSM plans score "significant advantage" due to high energy savings.", and c) change scores for Customer Satisfaction for RAP plans from 2's to 4's.
- (3) Weighted scores from Addendum B Page 3 Staff analysis to include the following changes to Addendum B Page 2: a) 50% weight for Cost (PVRR) to comply with Rule 4 CSR 240-22.010(2)(B), b) adjust the remaining weights in Addendum B Page 2 from total of 75% to total of 50%.

Candidate Resource Plans and Expected Risk Adjusted NPVRR Through 2039 Ten Scenarios

Candidate	PVRR	vs. RO	vs. R3	Supply-Side Resources		_			
Plan	\$ Millions	\$ Millions	\$ Millions	Primary	Secondary	Renewables	DSM	Meramec	Noranda
170	\$ 59,66	à ;	\$ (2,440)	Meπe.	(tens	3.00E	(Ø:0	ીં છે કે	Conte
В3	\$ 61,161	\$ 1,500	\$ (1,940)	SC	None	Prop C	Low Risk	"As is"	Cont.
B)=	\$ 61,759	9 1,598	\$ (0,842)	- (c(c),	None	Prop.C	LOW RISK	ું જેલાં ક	
B4	\$ 61,403	\$ 1,742	\$ (1,698)	Wind/SC	None	Prop C	Low Risk	"As Is"	Cont.
**B2	\$ \$61,568	\$1,907	\$ (0,593)	Nuke30%	1 None	Rrop.C	Low Risk	7/6/6	Cont
R1	\$ 62,867	\$ 3,206	\$ (234)	None	None	Prop C	RAP	Controlled	Cont.
113 12	\$ 68/1011	\$ 3,440	(\$ ₁₀ - 10 - 10	None	None	Prop.C	RAP	Retired 2016	Cont
R2	\$ 63,358	\$ 3,697	\$ 257	none	None	Prop C	RAP	Convert Gas	Cont.
C1	\$ 64,403	\$ 4,742	\$ 1,302	CC	None	Prop C	Low Risk	Controlled	Cont.
C2	\$ 64,875	\$ 5,214	\$ 1,774	CC	None	Prop C	Low Risk	Convert Gas	Cont.
H2	\$ 65,198	\$ 5,537	\$ 2,097	CC	SC	Prop C	Low Risk	Retired 2016	Cont.
55 (C3 4) £	\$ 65,356	\$ 5,695	\$ 62,955	(dc	- 00	PropC	Low Risk	Retired 2016	Cone
H3	\$ 65,420	\$ 5,759	\$ 2,319	CC	Wind/SC	Prop C	Low Risk	Retired 2016	Cont.
学出生的	\$ 65,596	\$ 5,985	\$ 2,495		Nuke 30%	Prop €	Stow Risk	Rettred 2016	Cont



Ten Scenarios Average Annual Revenue Requirement (\$ Millions) Increase of Contingency Resource Plans Over Resource Plan RO

2011 - 2020 2021 - 2030 2031 - 2039

01	SV	48	S	756	30	7414
(B2)	S	48		365	V.	417
3 78	\$	253	\$	497	\$	265
	\$	369	\$	855	\$	627
159	\$	374	\$	962	\$	526

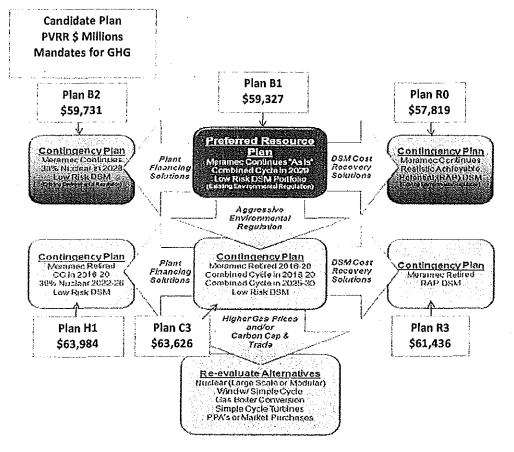
Ten Scenarios Average Annual Revenue Requirement (\$ Millions) Increase of Contingency Resource Plans Over Resource Plan R3

2011 - 2020 2021 - 2030 2031 - 2039

(G)	ও 🕳 📶 চ	\$ 358	\$ 367
ं ।ईहा	\$ 1250	\$ 465	\$ 262

Candidate Resource Plans and Expected Risk Adjusted NPVRR Through 2039 Mandates for GHG Scenarios

Candidate	PVRR	vs. RO	vs. R3	Supply-Side Resources		•			
Plan	\$ Millions	\$ Millions	\$ Millions	Primary	Secondary	Renewables	DSM	Meramec	Noranda
RO*	\$ 57,819	\$ 750	\$ (3,617)	None	None	ProteC	PAC .	Fefic -	CÓTIE —
B3				SC	None	Prop C	Low Risk	"As Is"	Cont.
₹ 9B1 * \$	\$ 259,327	\$ 1,507	\$ (2/1/10)	(00-	None	from e =	■ COW/RISK	1/36/8	(O)(e
B4				Wind/SC	None	Prop C	Low Risk	"As Is"	Cont.
₩ B2	\$ 59,731	\$ 1,911	\$ (17705)	Nuke 30%	None *	Prop Care	Mow Risk	*/\G!5**	CONT.
R1				None	None	Prop C	RAP	Controlled	Cont.
R3.58	\$ 61,436	\$ 3,617	\$	■ None	None	Propless	STERIO E	Retired 2016	(On):
R2				none	None	, Pròp C	RAP	Convert Gas	Cont.
C1				CC	None	Prop C	Low Risk	Controlled	Cont.
C2				CC	None	Prop C	Low Risk	Convert Gas	Cont.
H2				CC	SC	Prop C	Low Risk	Retired 2016	Cont.
3 C3	\$ 63,626	\$ 5,807	\$ 2/190	(0C	60	(Prop.(C	LOW RISK	Remed 2016:	Consum
H3				CC	Wind/SC	Prop C	Low Risk	Retired 2016	Cont.
## (H1 ###	\$ 563,984	\$ 6,165	\$2/548	CC1	Nuke 30%	Prop.C	Low Risk	Retired 2016	(Ont



Mandates GHG Scenarios Average Annual
Revenue Requirement (\$ Millions)
Increase of Contingency Resource Plans
Over Resource Plan RO
2011 - 2020 2021 - 2030 2031 - 2039

661	5	45	S.	M	Ś	392
(82)	S	୍ୟ ହ	Ś	ଃଶ§	8	445
िध्य	\$	260	\$	528	\$	299
C3	\$	373	\$	873	\$	651
141	\$	378	\$	1,000	\$	599

Mandates GHG Scenarios Average Annual Revenue Requirement (\$ Millions) Increase of Contingency Resource Plans Over Resource Plan R3

2011 - 2020 2021 - 2030 2031 - 2039

@	\$ តែនិ	\$ 345	952
({6	\$ 16B	\$ 4 <u>7</u> 92	\$ 301

Candidate Resource Plans and Expected Risk Adjusted NPVRR Through 2039 Cap-Ave. Price GHG Scenarios

Candidate	PVRR	vs. RO	vs. R3	Sup	ply-Side Resou	rces	•		
Plan	\$ Millions	\$ Millions	\$ Millions	Primary	Secondary	Renewables	DSM	Meramec	Noranda
RO	\$ = 69,374	\$ 22	\$ (2-998)	None	None	ിന്ത്രി	RE	/e i e	Cont
B3				SC	None	Prop C	Low Risk	"As Is"	Cont.
B1 = 3	\$=0.65/1839	\$ 1,759	\$ (1,239)	(6C	None	Prop.C	Fory Risk	ୀ/ଓ ଓ	(ত্যা)
84				Wind/SC	None	Prop C	Low Risk	"As Is"	Cont.
B2	\$ 65,275	\$ 1,901	\$ (1,097)	Nuke 30% \$	None s	Prop <i>G</i>	Low Risk #	//s/ie	Cont
R1				None	None	Prop C	RAP	Controlled	Cont.
宝星R3字字	\$= 66,372	\$ 2,998	\$	None :	- None	Prop C	VRAP	Retired 2016	(Ont.
R2				none	None	Prop C	RAP	Convert Gas	Cont.
C1				CC	None	Prop C	Low Risk	Controlled	Cont.
C2				CC	None	Prop C	Low Risk	Convert Gas	Cont.
H2				CC	SC	Prop C	Low Risk	Retired 2016	Cont.
(C3)	\$ 68,768	\$ 5,395	\$2,396	- C	00	Propies	LowiRisk	Retired 2016	Come
H3				CC	Wind/SC	Prop C	Low Risk	Retired 2016	Cont.
是使H18等	\$ 68,796	S 5,422	\$ 2/424	(CC:2:1)	Nuke30%	Propie	Low Risk	Retired 2016	Cont

PVRR \$ Millions Cap-Ave. GHG Price Plan B1 Plan B2 Plan RO \$65,133 \$65,275 \$63,374 Preferred Resource Contingency Plan Medimoc Continues Realistic Achievable Poloniki (RAP) DSM 2000 RAP (Market) **Contingency Plan** DSM Cost Merames Continues 30% Nuclearin 2028 Plant Financing Solutions Recovery Solutions Low Kisk DSM economical install Aggrossive Environmental Regulation Contingency Plan Meramec Retred 2010 20 Contingency Plan DSM Cost Plant <u>Contingency Plan</u> Maramec Retired CC in 2016-20 Financing Solutions Recovery Solutions Combined Cycle in 2016-20 Combined Cycle in 2025-30 Low Risk DSM Meramec Retired RAP DSM 30% Nudear 2022 26 Low Risk DSM Higher Gas Prices Plan H1 Plan C3 Plan R3 and/or Carbon Cap & \$68,768 \$68,796 \$66,372 Trado

Re-evaluate Alternatives
Nuclear (Large Scale or Modular)
Wind w/ Simple Cycle
Cas Boiler Conversion

Simple Cycle Turbines
PPA's or Market Purchases

Cap-Ave Price Scenarios Average Annual Revenue Requirement (\$ Millions) Increase of Contingency Resource Plans Over Resource Plan RO 2011 - 2020 2021 - 2030 2031 - 2039

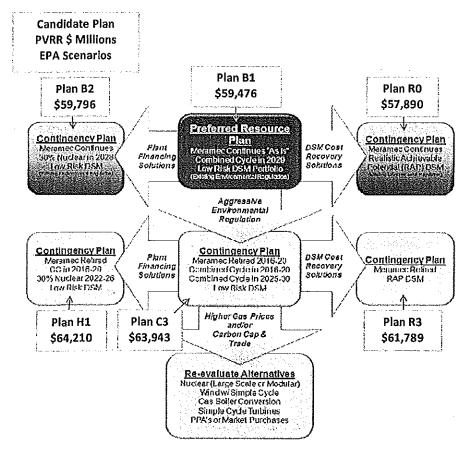
Candidate Plan

Cap-Ave Price Scenarios Average Annual Revenue Requirement (\$ Millions) Increase of Contingency Resource Plans Over Resource Plan R3 2011 - 2020 2021 - 2030 2031 - 2039

(6)	\$ 120	\$ 38%	\$ 300
1:0	\$ \$25	Š 456	\$ 200

Candidate Resource Plans and Expected Risk Adjusted NPVRR Through 2039 EPA Scenarios

Candidate	PVRR	vs. RO	vs. R3	Sup	piy-Side Resou	rces	•		
Plan	\$ Millions	\$ Millions	\$ Millions	Primary	Secondary	Renewables	DSM	Meramec	Noranda
RO	\$ 57,890	\$ -	\$ (3,899)	Nоле	None	Prop.6	RAN	7:016	Come
B3				SC	None	Prop C	Low Risk	"As Is"	Cont.
181	\$ 59,476	\$ 1,586	\$ (2,313)	CC -		ProjeC*	Low Risk	Acie	Ont.
B4				Wind/SC	None	Prop C	Low Risk	"As Is"	Cont.
3 82	\$ 59,796	\$ 1,907	\$ (1,993)	Nuke 30%	a None	Prop G	Low Risk	##YACIC	Ont -
R1				None	None	Prop C	RAP	Controlled	Cont.
₩R3	\$ 61,789	\$ 1:3,8991	\$ 656	Моле 1	None 5	Prop.C	RAP	Retired 2016	Cont
R2				none	None	Prop C	RAP	Convert Gas	Cont.
C1				CC	None	Prop C	Low Risk	Controlled	Cont.
C2				CC	None	Prop C	Low Risk	Convert Gas	Cont.
H2				CC	SC	Prop C	Low Risk	Retired 2016	Cont.
C3	\$ 63,943	\$, 6,054	\$ 2154	CC.	(CC	₽rop C	Low Risks	Reffred/2016	Cont
H3				CC	Wind/SC	Prop C	Low Risk	Retired 2016	Cont.
23H13	\$ 64,210	\$ 6,320	\$ 2,421	** CC:	Nuke 30%	Prop.C	Łow Risk	Retired 2016	Cont



EPA Scenarios Average Annual Revenue Requirement (\$ Millions) Increase of Contingency Resource Plans Over Resource Plan RO 2011 - 2020 2021 - 2030 2031 - 2039

 B1
 S
 481
 S
 257
 SS
 400

 B2
 S
 472
 S
 363
 S
 413

 B3
 \$
 265
 \$
 574
 \$
 388

 C2
 \$
 378
 \$
 915
 \$
 718

 F6
 \$
 384
 \$
 1,026
 \$
 630

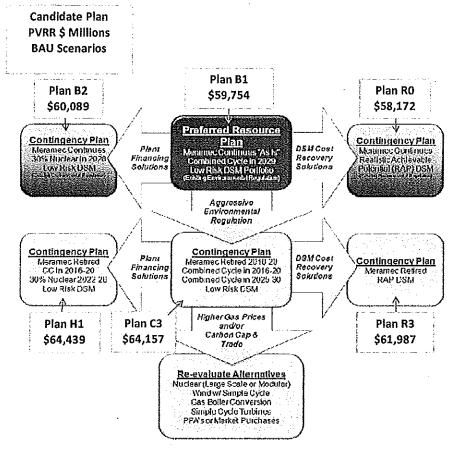
EPA Scenarios Average Annual Revenue Requirement (\$ Millions) Increase of Contingency Resource Plans Over Resource Plan R3

2011 - 2020 2021 - 2030 2031 - 2039

(3 × 4 §	664) S 30	n (s. 2000)
46 (f0 46 S	16D S (4	2 5 2/3

Candidate Resource Plans and Expected Risk Adjusted NPVRR Through 2039 BAU Scenarios

Candidate	PVRR	vs. RO	vs. R3	Sup	ply-Side Resou	rces			
Plan	\$ Millions	\$ Millions	\$ Millions	Primary	Secondary	Renewables	DSM	Meramec	Noranda
F(0)	\$ 58,172		\$ (3,816)	None	None	Prop.C -	F/N	ેંગુલ્કોરે	(M)
B3				sc	None	Prop C	Low Risk	"As Is"	Cont.
## B1 ##	\$ 59754	\$ 1,582	\$ 4(2,234)	(CC	None	PropC	Low Risk	ASIS	ത്ര
B4				Wind/SC	None	Prop C	Low Risk	"As Is"	Cont.
82	\$ 60,089	\$ 1,917	\$ 3(1,899)	Nüke30%/s	None	Prop.C	Low Risk	Asid	(OMF
R1				None	None	Prop C	RAP	Controlled	Cont.
R3=	\$ 61,987	\$ 3,816	\$ 4.34 5	None	None	Prop 🤄	RAP	Retired 2016	Cont.
R2			٠	none	None	Prop C	RAP	Convert Gas	Cont.
C1				CC	None	Prop C	Low Risk	Controlled	Cont.
C2				CC	None	Prop C	Low Risk	Convert Gas	Cont.
H2				CC	SC	Prop C	Low Risk	Retired 2016	Cont.
(3)	\$ 64,157	\$ 5,986	\$ 42,170	(qG	, 66°	PropC	Low Risk	Retired2016	Cont
H3				CC	Wind/SC	Prop C	Low Risk	Retired 2016	Cont.
第6H1 5章	\$ 64,439	\$ 6,267	\$ 2,451	66	Nuke80%	Perop.C	Low Risk	Retired 2016	@ont-



BAU Scenarios Average Annual Revenue Requirement (\$ Millions) Increase of Contingency Resource Plans Over Resource Plan RO 2011 - 2020 2021 - 2030 2031 - 2039

 B0
 \$
 \$47
 \$ 256
 \$3
 \$401

 B2
 \$
 \$47
 \$ 363
 \$ 421

 R3
 \$
 \$263
 \$ 563
 \$ 353

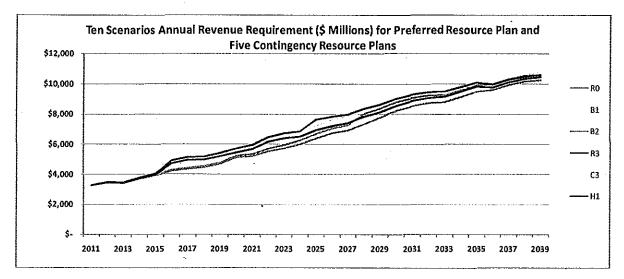
 \$
 \$377
 \$ 906
 \$ 694

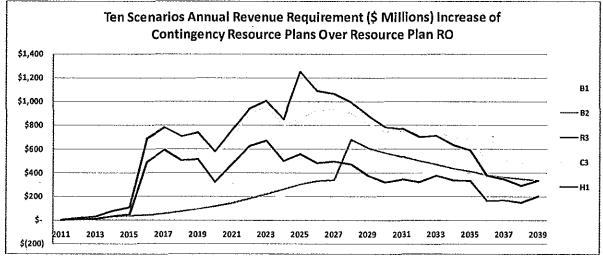
 \$
 382
 \$ 1,019
 \$ 613

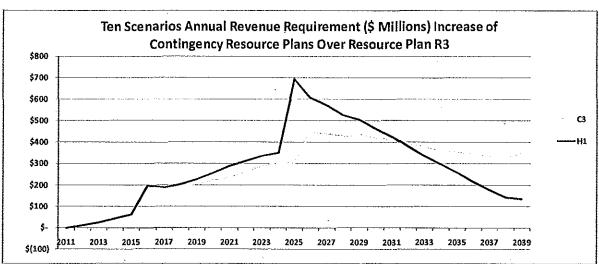
BAU Scenarios Average Annual Revenue Requirement (\$ Millions) Increase of Contingency Resource Plans Over Resource Plan R3

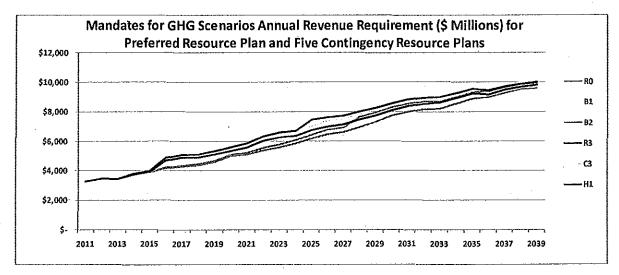
2011 - 2020 2021 - 2030 2031 - 2039

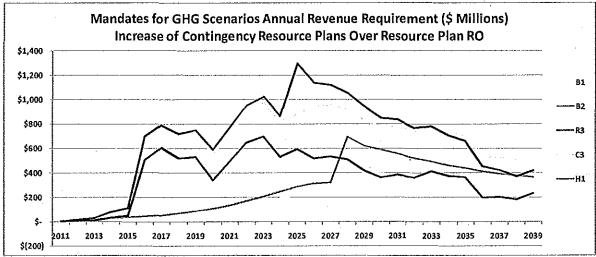
(3)	S ME	S 49	SY51
(10)	\$ 119	\$ 455	§ 2(5)

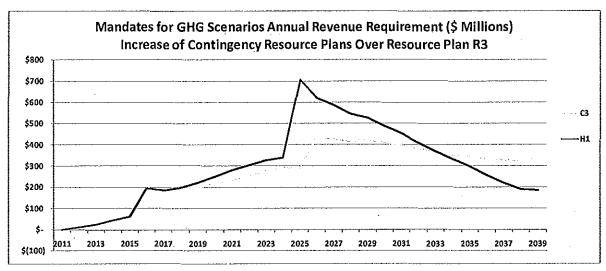


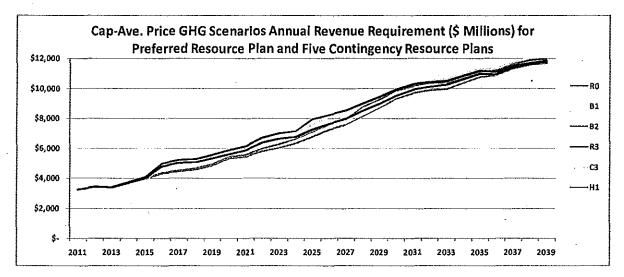


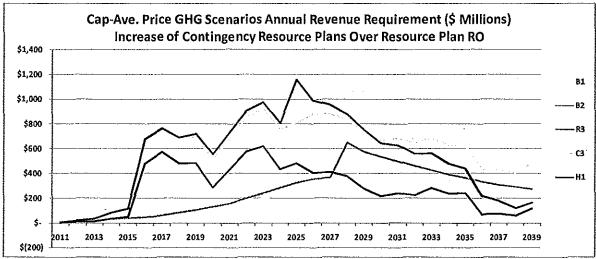


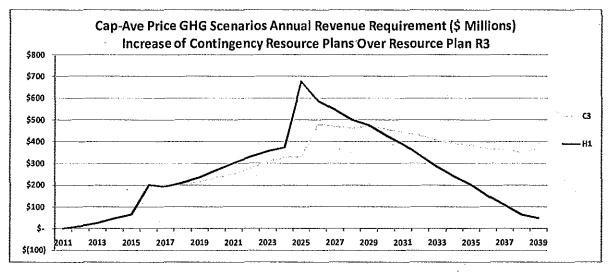












Addendum D Page 1 of 4

Value of Better Information Analysis for Resource Plan B1 (\$ Millions)

14 Final Candidate Resource Plans	Without	100	Load	See See		as Price		HAIT		Carbon	Cap&Trade	Large State	DSM	OFFICE High		roject Co			st Kato d Base	
B1 - Meramec Continues As Is, Combined Cycle	A P p jesyfir	_		64,886						59,327	65,133						_		61,124	_
B2 - Meramec Continues As Is, Nuclear 30%	61,568	58,347	59,811	65,180	62,805	59,811	60,722	60,089	59,796	59,731	65,275	61,726	61,545	61,480	61,045	61.539	62,180	58,554	61,429	64,999
B3 - Meramec Continues As Is, Simple Cycle	61,161	57,922	59,415	64,788	62,322	59,415	60,388	59,668	59,401	59,208	65,065	61,311	61,140	61,074	60,796	61,137	61,600	58,289	61,031	64,424
84 - Meramec Continues As is, Wind w/Simple Cycle	61,403	58,178	59,648	65,018	62,611	59,648	60,585	59,918	59,634	59,526	65,178	61,561	61,380	61,313	60,948	61,371	61,955	58,498	61,268	64,713
C1 - Combined Cycle, Meramec Controlled	64,403	61,180	62,588	68,030	65,557	62,588	63,652	62,854	62,574	62,482	68,272	64,571	64,371	64,330	63,590	64,349	65,380	61,215	64,257	68,031
C2 - Combined Cycle, Meramec Gas Conversion	64,875	61,535	63,511	68,518	65,660	63,511	64,392	63,705	63,501	63,119	68,321	65,022	64,849	64,807	64,206	64,829	65,682	61,787	64,732	68,392
C3 - Combined Cycle, Meramec Retired	65,356	62,035	63.954	68,988	66,119	63,954	64,905	64,157	63,943	63,626	68,768	65,505	65,335	65,270	64,546	65,296	66,346	62,214	65,209	68,939
H1 - Meramec Retired, CC, Nuclear 30%	65,596	62,284	64,221	69,213	66,487	64,221	65,010	64,439	64,210	63,984	68,796	65,744	65,569	65,527	64,615	65,534	66,762	62,302	65,438	69,362
H2 - Meramec Retired, CC, Simple Cycle	65,198	61,867	63,821	68,834	65,975	63,821	64,726	64,014	63,810	63,447	68,639	65,337	65,171	65,138	64,426	65,141	66,139	62,084	65,050	68,752
H3 - Meramec Retired, CC, Wind w/Simple Cyde	65,420	62,104	64,043	69,042	66,269	64,043	64,877	64,252	64,032	63,760	68,703	65,576	65,397	65,332	64,523	65,354	66,515	62,258	65,270	69,031
R0 - Meramec Continues As Is, RAP DSM	59,661	56,448	57,904	63,264	60,935	57,904	58,777	58,172	57,890	57,819	63,374	60,204	59,625	59,226	59,338	59,638	60,053	59,338	59,527	62,929
R1 - RAP DSM, Meramec Controlled	62,867	59,663	61,068	66,472	64,150	61,068	61,984	61,338	61,054	61,036	66,575	63,390	62,836	62,439	62,163	62,819	63,718	59,695	62,722	66,475
R2 - RAP DSM, Meramec Gas Conversion	63,358	60,030	62,018	66,984	64,277	62,018	62,738	62,214	62,008	61,689	66,647	63,917	63,317	62,926	62,700	63,333	64.092	60,229	63,219	66,905
R3 - RAP DSM, Meramec Retired	63,101	59,746	61,799	66,746	64,038	61,799	62,454	61,987	61,789	61,436	66,372	63,604	63,030	62,812	62,481	63,083	63,777	60,061	62,960	66,565
Minimum PVRR among plans		56,448	57,904	63,264	60,935	57,904	58,777	58,172	57,890	57,819	63,374	60,204	59,625	59,226	59,338	59,638	60,053	58,289	59,527	62,929
Plan with Minimum PVRR		R0	R0	RO	R0	RO	RO	R0	R0	R0	R0	R0	R0	R0	R0	R0	R0	RO	RO	RO
Subjective Probability		45%	10%	45%	45%	10%	45%	1%	10%	57%	33%	20%	60%	20%	20%	60%	20%	20%	60%	20%
PVRR with Better info		\$		59,661	\$		59,661	\$			59,661	\$		59,661	\$		59,661	\$		59,960
Expected Value of Better Info		\$		1,598	\$		1,598	\$			1,598	\$		1,598	\$		1,598	\$	•	1,299

Addendum D Page 2 of 4

Value of Better Information Analysis for Resource Plan RO (\$ Millions)

14 Final Candidate Resource Plans	PVRR		"Load"	37.873.UE		as Price		3000203		Carbon 💨			DSM	ŵ. W - 20		oject Co			st Rate &	
The called the second of the s	Without	Low	Base	_a High _a	_LOW_	_Base_	High	EAU.	EPA.	Mandate	Cap&Trad	Low	Base_	. igh	Low	Base_	High	LOW	Basc	High_
B1 - Meramec Continues As Is, Combined Cycle	61,259	58,025	59,489	64,886	62,406	59,489	60,505	59,754	59,476	59,327	65,133	61,411	61,240	61,164	60,862	61,239	61,715	58,381	61,124	64,540
82 - Meramec Continues As Is, Nuclear 30%	61,568	58,347	59,811	65,180	62,805	59,811	60,722	60,089	59,796	59,731	65,275	61,726	61,545	61,480	61,045	61,539	62,180	58,554	61,429	64,999
B3 - Meramec Continues As is, Simple Cycle	61,161	57,922	59,415	64,788	62,322	59,415	60,388	59,668	59,401	59,208	65,065	61,311	61,140	61,074	60,796	61,137	61,600	58,289	61,031	64,424
B4 - Meramec Continues As Is, Wind w/Simple Cycle	61,403	58,178	59,648	65,018	62,611	59,648	60,585	59,918	59,634	59,526	65,178	61,561	61,380	61,313	60,948	61,371	61,955	58,498	61,268	64,713
C1 - Combined Cycle, Meramec Controlled	64,403	61,180	62,588	68,030	65,557	62,588	63,652	62,854	62,574	62,482	68,272	64,571	64,371	64,330	63,590	64,349	65,380	61,215	64,257	68,031
C2 - Combined Cycle, Meramec Gas Conversion	64,875	61,535	63,511	68,518	65,660	63,511	64,392	63,705	63,501	63,119	68,321	65,022	64,849	64,807	64,206	64,829	65,682	61,787	64,732	68,392
C3 - Combined Cycle, Meramec Retired	65,356	62,035	63,954	68,988	66,119	63,954	64,905	64,157	63,943	63,626	68,768	65,505	65,335	65,270	64,546	65,296	66,346	62,214	65,209	68,939
H1 - Meramec Retired, CC, Nuclear 30%	65,596	62,284	64,221	69,213	66.487	64,221	65,010	64,439	64,210	63,984	68,796	65,744	65,569	65,527	64,615	65,534	66,762	62,302	65,438	69,362
H2 - Meramec Retired, CC, Simple Cycle	65,198	61,867	63,821	68,834	65,975	63,821	64,726	64,014	63,810	63,447	68,639	65,337	65,171	65,138	64,426	65,141	66,139	62,084	65,050	68,752
H3 - Meramec Retired, CC, Wind w/Simple Cycle	65,420	62,104	64,043	69,042	66,269	64,043	64,877	64,252	64,032	63,760	68,703	65,576	65,397	65,332	64,523	65,354	66,515	62,258	65,270	69,031
R0 - Meramec Continues As is, RAP DSM	100	56,448	57,904	63,264	60,935	57,904	58,777	58,172	57,890	57,819	63,374	60,204	59,625	59,226	59,338	59,638	60,053	59,338	59,527	62,929
R1 - RAP DSM, Meramec Controlled	62,867	59,663	61,068	66,472	64,150	61,068	61,984	61,338	61,054	61,036	66,575	63,390	62,836	62,439	62,163	62,819	63,718	59,695	62,722	66,475
R2 - RAP DSM, Meramec Gas Conversion	63,358	60,030	62,018	66,984	64,277	62,018	62,738	62,214	62,008	61,689	66,647	63,917	63,317	62,926	62,700	63,333	64,092	60,229	63,219	66,905
R3 - RAP DSM, Meramec Retired	63,101	59,746	61,799	66,746	64,038	61,799	62,454	61,987	61,789	61,436	66,372	63,604	63,030	62,812	62,481	63,083	63,777	60,061	62,960	66,565
Minimum PVRR among plans		56,448	57,904	63,264	60,935	57,904	58,777	58,172	57,890	57,819	63,374	60,204	59,625	59,226	59,338	59,638	60,053	58,289	59,527	62,929
Plan with Minimum PVRR		R0	R0	R0	R0	R0	R0	R0	R0	R0	R0	R0	R0	RO	R0	- R0	R0	R0	RO	R0
Subjective Probability		45%	10%	45%	45%	10%	45%	1%	10%	57%	33%	20%	60%	20%	20%	60%	20%	20%	60%	20%
PVRR with Better Info		\$		59,661	\$		59,661	\$			59,661	\$		59,661	\$		59,661	\$		59,960
Expected Value of Better Info		\$		0	\$		0	\$			0	s		0	\$		0	\$		-

Addendum D Page 3 of 4

Value of Better Information Analysis for Resource Plan C3 (\$ Millions)

14 Final Candidate Resource Plans	PVKK		Load	AMTA EST												o ect Co			st Rate	
	Without	LOW	Base	Jileh.	Low.	Base		⊒EAU.	EPA.	Mandate	Cap&Trad	Low	Base.	EHISDE.	LOW	Base	. Hens	Low	Base	High
B1 - Meramec Continues As is, Combined Cycle																<u> </u>				
B2 - Meramec Continues As Is, Nuclear 30%																				
B3 - Meramec Continues As is, Simple Cycle																				
B4 - Meramec Continues As Is, Wind w/Simple Cycle																				
C1 - Combined Cycle, Meramec Controlled	64,403	61,180	62,588	68,030	65,557	62,588	63,652	62,854	62,574	62,482	68,272	64,571	64,371	64,330	63,590	64,349	65,380	61,215	64,257	68,031
C2 - Combined Cycle, Meramec Gas Conversion	64,875	61,535	63,511	68,518	65,660	63,511	64,392	63,705	63,501	63,119	68,321	65,022	64,849	64,807	64,206	64,829	65,682	61,787	64,732	68,392
C3 - Combined Cycle, Meramec Retired	• 14 Juli	62,035	63,954	68,988	66,119	63,954	64,905	64,157	63,943	63,626	68,768	65,505	65,335	65,270	64,546	65,296	66,346	62,214	65,209	68,939
H1 - Meramec Retired, CC, Nuclear 30%	65,596	62,284	64,221	69,213	66,487	64,221	65,010	64,439	64,210	63,984	68,796	65,744	65,569	65,527	64,615	65,534	66,762	62,302	65,438	69,362
H2 - Meramec Retired, CC, Simple Cycle	65,198	61,867	63,821	68,834	65,975	63,821	64,726	64,014	63,810	63,447	68,639	65,337	65,171	65,138	64,426	65,141	66,139	62,084	65,050	68,752
H3 - Meramec Retired, CC, Wind w/Simple Cycle	65,420	62,104	64,043	69,042	66,269	64,043	64,877	64,252	64,032	63,760	68,703	65,576	65,397	65,332	64,523	65,354	66,515	62,258	65,270	69,031
R0 - Meramec Continues As Is, RAP DSM																				
R1 - RAP DSM, Meramec Controlled	62,867	59,663	61,068	66,472	64,150	61,068	61,984	61,338	61,054	61,036	66,575	63,390	62,836	62,439	62,163	62,819	63,718	59,695	62,722	66,475
R2 - RAP DSM, Meramec Gas Conversion	63,358	60,030	62,018	66,984	64,277	62,018	62,738	62,214	62,008	61,689	66,647	63,917	63,317	62,926	62,700	63,333	64,092	60,229	63,219	66,905
R3 - RAP DSM, Meramec Retired	63,101	59,746	61,799	66,746	64,038	61,799	62,454	61,987	61,789	61,436	66,372	63,604	63,030	62,812	62,481	63,083	63,777	60,061	62,960	66,565
Minimum PVRR among plans	<u> </u>	59,663	61,068	66,472	64,038	61,068	61,984	61,338	61,054	61,036	66,372	63,390	62,836	62,439	62,163	62,819	63,718	59,695	62,722	66,475
Plan with Minimum PVRR		R1	Ř1	R1	R3	R1	R1	R1	R1	R1	R3	R1	R1	R1	Ŕ1	R 1	R1	R1	R1	R1
Subjective Probability		45%	10%	45%	45%	10%	45%	1%	10%	57%	33%	20%	60%	20%	20%	60%	20%	20%	60%	20%
PVRR with Better info		\$	1	52,867	\$		62,817	\$			62,800	\$	1	52,867	\$		62,867	\$		62,867
Expected Value of Better Info		\$		2,489	\$		2,539	\$			2,556	\$		2,489	\$		2,489	\$		2,489

Addendum D Page 4 of 4

Value of Better Information Analysis for Resource Plan R3 (\$ Millions)

14 Final Candidate Resource Plans	PVKK			- 100 P. S.							11/30-11/00 P		DSM	177.00	and of P	oject C	est des		st Rate	
	Without	ELOW.	Base.	High.	_Low_	Base	High	BAU	EPA.	Mandate	Cap&Trad	Low	Base	High	_ Low_	Ease	High	Low	Base	High
B1 - Meramec Continues As Is, Combined Cycle																				
B2 - Meramec Continues As is, Nuclear 30%																				
B3 - Meramec Continues As Is, Simple Cycle																				
B4 - Meramec Continues As Is, Wind w/Simple Cycle																				
C1 - Combined Cycle, Meramec Controlled	64,403	61,180	62,588	68,030	65,557	62,588	63,652	62,854	62,574	62,482	68,272	64,571	64,371	64,330	63,590	64,349	65,380	61,215	64,257	68,031
C2 - Combined Cycle, Meramec Gas Conversion	64,875	61,535	63,511	68,518	65,660	63,511	64,392	63,705	63,501	63,119	68,321	65,022	64,849	64,807	64,206	64,829	65,682	61,787	64,732	68,392
C3 - Combined Cycle, Meramec Retired	65,356	62,035	63,954	68,988	66,119	63,954	64,905	64,157	63,943	63,626	68,768	65,505	65,335	65,270	64,546	65,296	66,346	62,214	65,209	68,939
H1 - Meramec Retired, CC, Nuclear 30%	65,596	62,284	64,221	69,213	66,487	64,221	65,010	64,439	64,210	63,984	68,796	65,744	65,569	65,527	64,615	65,534	66,762	62,302	65,438	69,362
H2 - Meramec Retired, CC, Simple Cycle	65,198	61,867	63,821	68,834	65,975	63,821	64,726	64,014	63,810	63,447	68,639	65,337	65,171	65,138	64,426	65,141	66,139	62,084	65,050	68,752
H3 - Meramec Retired, CC, Wind w/Simple Cycle	65,420	62,104	64,043	69,042	66,269	64,043	64,877	64,252	64,032	63,760	68,703	65,576	65,397	65,332	64,523	65,354	66,515	62,258	65,270	69,031
R0 - Meramec Continues As Is, RAP DSM								-												
R1 - RAP DSM, Meramec Controlled	62,867	59,663	61,068	66,472	64,150	61,068	61,984	61,338	61,054	61,036	66,575	63,390	62,836	62,439	62,163	62,819	63,718	59,695	62,722	66,475
R2 - RAP DSM, Meramec Gas Conversion	63,358	60,030	62,018	66,984	64,277	62,018	62,738	62,214	62,008	61,689	66,647	63,917	63,317	62,926	62,700	63,333	64,092	60,229	63,219	66,905
R3 - RAP OSM, Meramec Retired	X88X8300	59,746	61,799	66,746	64,038	61,799	62,454	61,987	61,789	61,436	66,372	63,604	63,030	62,812	62,481	63,083	63,777	60,061	62,960	66,565
Minimum PVRR among plans	•	59,663	61,068	66,472	64,038	61,068	61,984	61,338	61,054	61,036	66,372	63,390	62,836	62,439	62,163	62,819	63,718	59,695	62,722	66,475
Plan with Minimum PVRR		R1	R1	R1	R3	R1	R1	R1	R1	R1	R3	R1	R1	R1	R1	R1	R1	R1	R1	R1
Subjective Probability		45%	10%	45%	45%	10%	45%	1%	10%	57%	33%	20%	60%	20%	20%	60%	20%	20%	60%	20%
PVRR with Better Info		\$	- 1	52,867	\$		62,817	\$	····		62,800	\$	- (32,867	\$	***************************************	62,867	\$		62,867
Expected Value of Better Info		S		234	\$		284	\$			301	\$		234	\$		234	\$		234

In the Matter of Union Electric Company's 2011 Utility Resource Filing Pursuant to 4 CSR 240 – Chapter 22.))	Case No. EO-2011-0271
AFFIDAVIT OF JO	HN A.	ROGERS
STATE OF MISSOURI)) ss COUNTY OF COLE)		
John A. Rogers, of lawful age, on his operation of the foregoing \(f - f - f - f - f - f - f - f - f - f -	Sta	ff Report in pages
		John A. Rogers
Subscribed and sworn to before me this <u>23rd day</u>	y of Jun	e, 2011.
SUSAN L. SUNDERMEYER Notary Public - Notary Soal State of Missouri Commissioned for Callaway County My Commission Exches: October 03, 2014 Commission Number: 10942086	.\u	sur Mundermeyer. Notary Public

In the Matter of Union Electric)	•
Company's 2011 Utility Resource Filing)	Case No. EO-2011-0271
Pursuant to 4 CSR 240 – Chapter 22,)	Clist (40, 150*2011**02.71
AFFIDAVIT OF I	DAVID C.	. ROOS
STATE OF MISSOURI)		
COUNTY OF COLE) ss		
David C. Roos, of lawful age, on his preparation of the foregoing		•
forth in such Report; and that such matters		
forth in such Report; and that such matters belief.	are true t	o the best of his knowledge and
•		
		1
	<u></u>	David C. Roos
Subscribed and sworn to before me this <u>23rd d</u>	lav of June	2011
	,	,
	/	(
SUSAN L. SUNDERMEYER Notary Public - Notary Seal State of Missouri	Hen	Notary Public
Gommissioned for Callaway County My Commission Expres: October 03, 2014 Commission Number: 16942086		civing (with)
Commission Number: 10942086		

In the Matter of Union Electric Company's 2011 Utility Resource Filing Pursuant to 4 CSR 240 – Chapter 22.)))	Case No. BO-2011-0271
AFFIDAVIT OF LI	EON C.	BENDER
STATE OF MISSOURI)) ss COUNTY OF COLE)		
Leon C. Bender, of lawful age, on his preparation of the foregoing 10 // ; to forth in such Report; and that such matters belief.	Sta that he l	off Report in pages that knowledge of the matters set
	·	
		Leon C. Bender
Subscribed and sworn to before me this <u>23rd da</u>	ay of Jun	ne, 2011.
SUSAN L. SUNDERMEYER Notary Public - Notary Seal State of Missouri Commissioned for Callaway County My Commission Explics: October 03, 2014 Commission Number: 10942086	ŢĬ,	Notary Public

In the Matter of Union Electric Company's 2011 Utility Resource Filing Pursuant to 4 CSR 240 – Chapter 22.))	Case No. EO-2011-0271			
AFFIDAVIT OF HOJONG KANG					
STATE OF MISSOURI)) ss COUNTY OF COLE)		•			
Hojong Kang, of lawful age, on his operation of the foregoing 18 30 ; to the forth in such Report; and that such matters	oath state Stat that he h	es: that he has participated in the ff Report in pages has knowledge of the matters set			
forth in such Report; and that such matters belief.	are true	to the best of his knowledge and			
	M	Hojong Kang			
Subscribed and sworn to before me this <u>23rd de</u>	ay of June	e, 2011.			
SUSAN L. SUNDERMEYER Notary Public - Notary Seal State of Missouri Commissioned for Callaway County My Conndission Expires: October 03, 2014 Commission Number: 10942086	Jus	na Ashardermay Notary Public			

In the Matter of Union Electric Company's 2011 Utility Resource Filing Pursuant to 4 CSR 240 – Chapter 22.) Case No. EO-2011-0271
AFFIDAVIT OF I	RANDY S. GROSS
STATE OF MISSOURI)) ss COUNTY OF COLE)	
preparation of the foregoing	is oath states: that he has participated in the Staff Report in pages that he has knowledge of the matters set is are true to the best of his knowledge and
	Randy S. Gross
Subscribed and sworn to before me this 23 rd o	day of June, 2011.
SUSAN L. SUNDERMEYER Notary Public - Notary Seal State of Missouri Commissioned for Callaway County My Commission Explics: October 03, 2014	Lugar Defundermay Notary Public

In the Matter of Union Electric Company's 2011 Utility Resource Filing Pursuant to 4 CSR 240 - Chapter 22.) Case No. EO-2011-0271
AFFIDAVIT OF MA	TTHEW J. BARNES
STATE OF MISSOURI) ss COUNTY OF COLE)	
the preparation of the foreg	n his oath states: that he has participated in going Staff Report in pages that he has knowledge of the matters set
forth in such Report; and that such matters belief.	are true to the best of his knowledge and
•	
	Matthew J. Barnes
Subscribed and sworn to before me this <u>23rd c</u>	lay of June, 2011.
SUSAN L. SUNDEAMEYER Notary Poblic - Notary Soat State of Missouri Commissioned for Callaway County My Gornalistion Explos: October 03, 2014 Gornalistion Number: 10942006	Notary Public

BEFORE THE PUBLIC SERVICE COMMISSION OF THE STATE OF MISSOURI

In the Matter of Union Electric Company's 2011 Utility Resource Filing Pursuant to 4 CSR 240 – Chapter 22.

File No. EO-2011-0271

CORRECTIONS TO STAFF'S REPORT ON UNION ELECTRIC COMPANY'S 2011 ELECTRIC UTILITY RESOURCE PLANNING COMPLIANCE FILING

COMES NOW the Staff ("Staff") of the Missouri Public Service Commission ("Commission"), and submits the following corrections to its Report on Union Electric Company d/b/a Ameren Missouri's 2011 Chapter 22 Electric Utility Resource Planning Compliance Filing:

- 1. Page 7, second line, delete the word "be."
- Page 14, fifth line of Concern G., delete "Low Risk DSM Combined Cycle plants in 2016 and 2026" and substitute "RAP DSM and no new supply-side resources."
- 3. Page 37, beginning on fourth line of the second to last bullet, delete "Low Risk DSM Combined Cycle plants in 2016 and 2026 Plan C3" and substitute "RAP DSM and no new supply-side resources Plan R3."
- 4. Page 38, top line, change "4 CSR 240-22.020(2)(B)" to "4 CSR 240-22.010(2)(B).
- 5. Page 41, first line of Concern B., change word "meetings22" to "meetings²²."
- 6. Page 43, last paragraph in Concern D., change word "recommendations" to "recommends."
- 7. Page 45, delete the second bullet in its entirety.
- 8. Page 45, fifth line of Concern G., delete "Low Risk DSM Combined Cycle plants in 2016 and 2026" and substitute "RAP DSM and no new supply-side resources."
- Page 48, sixth line of first paragraph, change "4 CSR 240-22.080(10)" to "4 CSR 240-22.080(12)."

WHEREFORE, Staff corrects its report on Ameren Missouri's 2011 Chapter 22 Electric Utility Resource Planning Compliance Filing as set forth above.

Respectfully submitted,

/s/ Nathan Williams

Nathan Williams Deputy Counsel Missouri Bar No. 35512

Attorney for the Staff of the Missouri Public Service Commission P. O. Box 360
Jefferson City, MO 65102
(573) 751-8702 (Telephone)
(573) 751-9285 (Fax)
Nathan Williams@psc.mo.gov

Certificate of Service

I hereby certify that copies of the foregoing have been mailed, hand-delivered, transmitted by facsimile or electronically mailed to counsel of record this 27th day of June, 2011.

/s/ Nathan	Williams	