VOLUME 7

RESOURCE ACQUISITION STRATEGY SELECTION

KCP&L GREATER MISSOURI OPERATIONS COMPANY (GMO)

INTEGRATED RESOURCE PLAN

4 CSR 240-22.070

APRIL, 2018

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PURPOSE: This rule requires the utility to select a preferred resource plan, develop an implementation plan, and officially adopt a resource acquisition strategy. The rule also requires the utility to prepare contingency plans and evaluate the demand-side resources that are included in the resource acquisition strategy.

SECTION 1: PREFERRED RESOURCE PLAN

(1) The utility shall select a preferred resource plan from among the alternative resource plans that have been analyzed pursuant to the requirements of 4 CSR 240-22.060. The utility shall describe and document the process used to select the preferred resource plan, including the relative weights given to the various performance measures and the rationale used by utility decision-makers to judge the appropriate tradeoffs between competing planning objectives and between expected performance and risk. The utility shall provide the names, titles, and roles of the utility decision–makers in the preferred resource plan selection process. The preferred resource plan shall satisfy at least the following conditions:

(A) In the judgment of utility decision-makers, strike an appropriate balance between the various planning objectives specified in 4 CSR 240-22.010(2);

The Alternative Resource Plans (ARP) developed and analyzed under the requirements of 4 CSR 240-22.060 were designed to meet the objectives of 4 CSR 240-22.010(2). Demand-side resources - in conjunction with MEEIA - and growth of the renewables portfolios have been key components in the resource planning efforts of the company for over a decade.

(B) Invest in advanced transmission and distribution technologies unless, in the judgment of the utility decision-makers, investing in those technologies

to upgrade transmission and/or distribution networks is not in the public interest;

These planning elements are discussed in 4 CSR 240-22.045 and in special contemporary issues.

(C) Utilize demand-side resources to the maximum amount that comply with legal mandates and, in the judgment of the utility decision-makers, are consistent with the public interest and achieve state energy policies; and

As indicated in section 1a above, demand-side resources are a key component of alternative resource plan development. Per 4 CSR 240-22.010(2)(A), demand-side resources, renewable energy, and supply-side resources are to be analyzed on an equivalent basis, subject to compliance with all legal mandates. Regarding demand-side resources, MEEIA provides the legal mandate structure that helps to translate the potential studies and other DSM tools into portfolios that are included in the alternative resource plans to be evaluated.

These planning elements are discussed in 4 CSR 240-22.050 and in special contemporary issues.

(D) In the judgment of the utility decision-makers, the preferred plan, in conjunction with the deployment of emergency demand response measures and access to short-term and emergency power supplies, has sufficient resources to serve load forecasted under extreme weather conditions pursuant to 4CSR 240-22.030(8)(B) for the implementation period. If the utility cannot affirm the sufficiency of resources, it shall consider an alternative resource plan or modifications to its preferred resource plan that can meet extreme weather conditions.

The Preferred Plan that has been selected for GMO is shown in Table 1 below:

Table 1: GMO Preferred Plan

Year	CT (MW)	Wind (MW)	Solar (MW)	DSM (MW)	Retire (MW)
2018	0	146		78	406
2019	0	120		72	97
2020	0			124	
2021	0			153	
2022	0			168	
2023	0			182	
2024	0			200	
2025	0			217	
2026	0			232	
2027	0			246	
2028	0		10	245	
2029	0			240	
2030	0			238	
2031	0			233	
2032	0			231	
2033	0			234	
2034	0			238	
2035	0			244	
2036	0			250	
2037	0			256	

Based in part upon current Missouri RPS rule requirements, the Preferred Plan includes 10 MW of solar additions and 266 MW of wind additions over the twenty-year planning period. The 266 MW of wind additions are from two power purchase agreements (PPA) executed in 2017. The one wind project consisting of 244 MW of total capacity is currently expected to be in-service in 2018. The second wind project consisting of 200 MW of total capacity is currently expected to be in service by June, 2019. The total capacity of each wind facility is shared between KCP&L and GMO. The DSM resources included in the Preferred Plan consist of a suite of six residential and eight commercial programs three of which are demand response programs, two are educational programs, and nine are energy efficiency programs.

The Preferred Plan also includes retiring 406 MW of coal generation at Sibley Station by 2019 and a 97 MW natural gas unit at Lake Road. Key drivers that contribute to these retirement decisions are a lower SPP reserve margin requirement which has been reduced from 13.6% to 12%, higher wind resource accreditations, and peak load based upon normal weather rather than actual peak. Additionally, continued low long-term gas price forecasts, low long-term peak load forecasts, and more wind capacity additions in the SPP region have reduced the economic value of these units. Also, environmental regulations including Ozone National Ambient Air Quality Standards (NAAQS), PM NAAQS, Clean Water Act Section 316(a) and (b), Coal Combustion Residuals Rule, Effluent Guidelines, Clean Power Plan increase the cost of operating these units, further reducing their economic value Vs. other generating options.

The Preferred Plan was not the lowest cost plan from a Net Present Value of Revenue Requirement (NPVRR) perspective. The lowest cost Alternative Resource Plan (ARP) was $4 Million lower over the twenty-year planning period. The single difference between the Preferred Plan and the lowest cost ARP was due to the difference in DSM assumptions between the plans. The Preferred Plan maintains the current level of DSM programs at a slight cost above the lowest cost plan evaluated. To reduce certain programs at this time would cause a disruption to some currently participating customers. GMO continually strives to minimize the cost of the DSM programs to maximize cost effectiveness. In addition, the MEEIA stakeholders will have an opportunity to provide input and recommendations on budgets, energy savings targets, and peak demand reduction targets when GMO makes its next application for MEEIA Cycle 3 later this year.

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

The Preferred Resource Plan was reviewed and approved by Terry D. Bassham, President and Chief Executive Officer, and Duane Anstaett, Vice President – Generation.

The Forecast of Capacity Balance worksheet associated with the GMO Preferred Plan is shown in Table 2 below.

Table 2: GMO Forecast of Capacity Balance - Preferred Plan

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
A. System Generating Capacity (GMO share)																				
Base Capacity																				
Iatan I	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126
Iatan II	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159
Jeffrey Energy Center 1	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58
Jeffrey Energy Center 2	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
Jeffrey Energy Center 3	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
Sibley 2	42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sibley 3	364	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Base Capacity	863	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457
Intermediate Capacity	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Peaking Capacity																				
Greenwood 1	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61
Greenwood 2	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Greenwood 3	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63
Greenwood 4	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58
KCI 1	-	-	-	-	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
KCI 2	-	-	-	-	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
Lake Road 1	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
Lake Road 2	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Lake Road 3	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Lake Road 4	97	97	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lake Road 5	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62
Lake Road 6	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
Lake Road 7	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
Ralph Green 3	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71
Nevada	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
South Harper 1	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101
South Harper 2	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102
South Harper 3	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Cross Roads Unit 1	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74
Cross Roads Unit 2	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74
Cross Roads Unit 3	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72
Cross Roads Unit 4	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72	72
SJLP Landfill Gas	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Total Peaking Capacity	1,171	1,171	1,074	1,074	1,108	1,108	1,108	1,108	1,108	1,108	1,108	1,108	1,108	1,108	1,108	1,108	1,108	1,108	1,108	1,108
Intermittent Capacity (Nameplate)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Percent Accredited Intermittent Capacity	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total Accredited Intermittent Capacity	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wind Additions																				
Solar Additions											1	1	1	1	1	1	1	1	1	1
Total Intermittent Capacity with Additions	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1
Total Generation Capacity (TGC)	**2,034**	**1,628**	**1,530**	**1,530**	**1,564**	**1,564**	**1,564**	**1,564**	**1,564**	**1,564**	**1,565**	**1,565**	**1,565**	**1,565**	**1,565**	**1,565**	**1,565**	**1,565**	**1,565**	**1,565**
B. Capacity Transactions																				
Purchases:																				
KCP&L	60	125	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NextEra Gray County (60 MW)	9	9	9	9	9	9	9	9	9	9	9	9	9	9	-	-	-	-	-	-
NextEra Ensign (98.9 MW)	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	-	-	-	-	-
Enel Rock Creek (120 MW)	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
NextEra Osborn (80 MW)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
NextEra Pratt (146 MW)	-	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69
EDPR Prairie Queen (120 MW)	-	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
PPA Purchase	-	134	324	332	302	287	299	279	271	263	302	314	326	340	367	413	423	432	467	460
Reduction in Capacity due to Steam Customers	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Total Capacity Purchases (P)	133	440	540	513	483	468	480	460	452	444	483	495	507	521	539	548	558	567	602	595
Sales:																				
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Capacity Sales (S)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Transactions (NT)	**133**	**440**	**540**	**513**	**483**	**468**	**480**	**460**	**452**	**444**	**483**	**495**	**507**	**521**	**539**	**548**	**558**	**567**	**602**	**595**
Total System Capacity (TSC)	**2,166**	**2,067**	**2,070**	**2,043**	**2,047**	**2,032**	**2,044**	**2,024**	**2,016**	**2,008**	**2,048**	**2,060**	**2,072**	**2,086**	**2,104**	**2,113**	**2,123**	**2,132**	**2,167**	**2,160**
C. System Peaks & Reserves																				
Peak Demands																				
Forecasted Peak	**1,900**	**1,910**	**1,965**	**1,970**	**1,982**	**1,995**	**2,007**	**2,011**	**2,024**	**2,036**	**2,052**	**2,063**	**2,076**	**2,089**	**2,104**	**2,116**	**2,131**	**2,147**	**2,165**	**2,179**
Less DSM:																				
Demand Response		(39)	(75)	(90)	(94)	(97)	(103)	(109)	(115)	(121)	(127)	(127)	(122)	(114)	(107)	(105)	(105)	(106)	(107)	(107)
Energy Efficiency		(7)	(18)	(26)	(30)	(34)	(39)	(44)	(49)	(55)	(60)	(64)	(68)	(72)	(76)	(80)	(84)	(89)	(94)	(99)
MEEIA	(78)	(27)	(26)	(25)	(25)	(24)	(24)	(24)	(23)	(20)	(10)	(1)	(0)	(0)	(0)	1	2	2	2	3
Demand-Side Rates	(0)	(0)	(5)	(12)	(20)	(27)	(35)	(41)	(45)	(48)	(48)	(48)	(47)	(48)	(49)	(50)	(51)	(52)	(52)	(53)
Peak Forecast less DSM (PF)	**1,821**	**1,837**	**1,840**	**1,817**	**1,813**	**1,813**	**1,806**	**1,793**	**1,792**	**1,793**	**1,807**	**1,822**	**1,838**	**1,855**	**1,872**	**1,882**	**1,892**	**1,903**	**1,915**	**1,923**
Capacity Reserves (CR)	**345**	**230**	**230**	**226**	**234**	**219**	**238**	**231**	**224**	**215**	**241**	**238**	**234**	**231**	**232**	**231**	**231**	**229**	**253**	**237**
D. Capacity Needs																				
% Reserve Margin	19%	13%	12%	12%	13%	12%	13%	13%	13%	12%	13%	13%	13%	12%	12%	12%	12%	12%	13%	12%
% Capacity Margin	16%	11%	11%	11%	11%	11%	12%	11%	11%	11%	12%	12%	11%	11%	11%	11%	11%	11%	12%	11%
Required Capacity (RC)	**2,040**	**2,058**	**2,061**	**2,035**	**2,031**	**2,030**	**2,023**	**2,009**	**2,007**	**2,008**	**2,023**	**2,041**	**2,058**	**2,078**	**2,097**	**2,107**	**2,119**	**2,131**	**2,144**	**2,153**
Capacity Balance	**126**	**10**	**9**	**8**	**16**	**2**	**21**	**15**	**9**	**0**	**25**	**19**	**14**	**8**	**7**	**6**	**4**	**1**	**23**	**7**

The Preferred Plan was tested under extreme weather conditions as defined by Rule 240-22.030(8)(B). There is no unserved energy under this extreme condition. The performance measure effects and annual amount of unserved energy given extreme weather conditions are provided below.

Table 3: Performance Measure Impact - Extreme Weather

Year	Revenue Requirement ($MM)	Revenue Requirement ($MM) - Extreme Weather	Levelized Annual Rates ($/kW-hr)	Levelized Annual Rates ($/kW-hr) - Extreme Weather	Rate Increase	Rate Increase - Extreme Weather	Times Interest Earned	Times Interest Earned - Extreme Weather	Debt to Capital	Debt to Capital - Extreme Weather	Internal Cash to Construction Expense	Internal Cash to Construction Expense - Extreme Weather
2018	812	813	0.09	0.09	0.00%	0.00%	3.34	3.34	47.70	47.70	1.43	1.43
2019	804	805	0.09	0.09	-1.05%	-1.03%	3.18	3.18	47.70	47.70	1.16	1.16
2020	819	820	0.09	0.09	1.89%	1.90%	3.18	3.18	47.70	47.70	1.33	1.33
2021	840	841	0.10	0.10	2.74%	2.75%	3.11	3.11	47.70	47.70	1.12	1.12
2022	844	845	0.10	0.10	0.02%	0.03%	3.01	3.01	47.70	47.70	1.11	1.11
2023	869	870	0.10	0.10	2.39%	2.39%	2.92	2.92	47.70	47.70	1.05	1.05
2024	891	892	0.10	0.10	2.09%	2.09%	2.94	2.94	47.70	47.70	1.08	1.08
2025	902	903	0.10	0.10	0.99%	1.00%	2.81	2.81	47.70	47.70	1.02	1.02
2026	961	962	0.11	0.11	5.98%	5.95%	2.83	2.85	47.70	47.70	1.08	0.92
2027	982	983	0.11	0.11	1.64%	1.64%	2.83	2.83	47.70	47.70	0.93	0.93
2028	995	997	0.11	0.11	0.39%	0.40%	2.77	2.77	47.70	47.70	1.19	1.20
2029	1,018	1,019	0.11	0.11	1.56%	1.57%	2.78	2.78	47.70	47.70	1.19	1.20
2030	1,034	1,035	0.11	0.11	0.85%	0.85%	2.75	2.75	47.70	47.70	1.12	1.13
2031	1,055	1,057	0.11	0.11	1.41%	1.41%	2.73	2.74	47.70	47.70	1.12	1.13
2032	1,077	1,078	0.12	0.12	1.16%	1.16%	2.72	2.72	47.70	47.70	1.07	1.08
2033	1,104	1,106	0.12	0.12	1.97%	1.98%	2.67	2.67	47.70	47.70	1.07	1.08
2034	1,135	1,136	0.12	0.12	1.89%	1.88%	2.66	2.66	47.70	47.70	1.05	1.06
2035	1,166	1,168	0.12	0.12	1.87%	1.87%	2.66	2.66	47.70	47.70	1.10	1.11
2036	1,199	1,201	0.12	0.12	1.84%	1.85%	2.66	2.66	47.70	47.70	1.09	1.10
2037	1,227	1,229	0.13	0.13	1.62%	1.60%	2.65	2.65	47.70	47.70	1.10	1.11

Table 4: Extreme Weather Unserved Energy

Year	Unserved Energy - Extreme Weather (MWh)
2018	0
2019	0
2020	0
2021	0
2022	0
2023	0
2024	0
2025	0
2026	0
2027	0
2028	0
2029	0
2030	0
2031	0
2032	0
2033	0
2034	0
2035	0
2036	0
2037	0

SECTION 2: RANGES OF CRITICAL UNCERTAIN FACTORS

The utility shall specify the ranges or combinations of outcomes for the critical uncertain factors that define the limits within which the preferred resource plan is judged to be appropriate and explain how these limits were determined. The utility shall also describe and document its assessment of whether, and under what circumstances, other uncertain factors associated with the preferred resource plan could materially affect the performance of the preferred resource plan relative to alternative resource plans.

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

The Company has selected its Preferred Plan (GAAGC), which was the second ranked lowest based on the results of the NPVRR (in $mm). This plan was selected as it provides better continuity for existing programs at a nominal cost. The Preferred Plan is projected to have greater energy savings of over 350 GWh during the 20-year IRP timeframe.

All ARPs are ranked based upon the expected value of results from the 18 scenario/endpoint decision tree represented in Figure 1 of Volume 6, "Integrated Resource Plan and Risk Analysis". Those results are presented below.

Table 5: Alternative Resource Plan Rankings

18 EP Expected Value		
PLAN	NPVRR	DELTA
GAAFC	9,594	-
GAAGC	9,598	4
GBCBC	9,608	13
GAABC	9,609	15
GAAFA	9,824	230
GAABA	9,849	255
GAADA	9,854	260
GAACA	9,873	279
GAABD	9,898	303
GAABB	9,939	345
GAAAA	9,954	360
GAABW	9,955	361
GAAEA	9,957	363
GAAFN	10,128	534

Those plans are also ranked by their sub-sets of results, representing a known state of CO_2, the nine endpoints assuming a future CO_2 tax are represented on the left side of Table 6 whereas no future CO_2 tax results are shown on the right side of Table 6 below.

Table 6: Alternative Resource Plan Ranking Based upon CO_2

9 EP EV (CO2)			9 EP EV (No CO2)		
PLAN	NPVRR	DELTA	PLAN	NPVRR	DELTA
GAAFC	9,782	-	GAAFC	9,469	-
GAAGC	9,786	4	GAAGC	9,473	4
GBCBC	9,794	12	GBCBC	9,483	14
GAABC	9,795	13	GAABC	9,484	15
GAAFA	10,015	233	GAAFA	9,697	228
GAABA	10,038	256	GAABA	9,723	254
GAABD	10,040	258	GAADA	9,727	258
GAADA	10,045	263	GAACA	9,747	278
GAACA	10,063	281	GAABD	9,803	334
GAABB	10,131	349	GAABB	9,812	343
GAABW	10,132	351	GAAEA	9,826	357
GAAAA	10,142	360	GAAAA	9,829	360
GAAEA	10,154	373	GAABW	9,837	368
GAAFN	10,336	554	GAAFN	9,990	521

The lowest ranked plan based on NPVRR by scenario/endpoint is shown in Table 7 below.

Table 7: Lowest NPVRR Alternative Resource Plan By Endpoint

EP	Plan	NPVRR	Load Growth	CO_2	Endpoint Probability
1	GAAFC	10,216	High	Yes	2.5%
2	GAAFC	9,891	High	No	3.8%
3	GAAFC	10,047	High	Yes	5.0%
4	GAAFC	9,708	High	No	7.5%
5	GAAFC	9,893	High	Yes	2.5%
6	GAAFC	9,550	High	No	3.8%
7	GAAFC	9,921	Mid	Yes	5.0%
8	GAAFC	9,616	Mid	No	7.5%
9	GAAFC	9,777	Mid	Yes	10.0%
10	GAAFC	9,463	Mid	No	15.0%
11	GAAFC	9,649	Mid	Yes	5.0%
12	GAAFC	9,332	Mid	No	7.5%
13	GAAFC	9,628	Low	Yes	2.5%
14	GAAFC	9,344	Low	No	3.8%
15	GAAFC	9,511	Low	Yes	5.0%
16	GAAFC	9,220	Low	No	7.5%
17	GAAFC	11,018	Low	Yes	2.5%
18	GAAFC	9,117	Low	No	3.8%

The tables following here represent the sensitivities for the uncertain factors by scenario/endpoint.

Table 8: Uncertain Factors Sensitivities - Load Vs. Natural Gas and CO_2

HIGH LOAD GROWTH

HIGH GAS	CO2 YES		CO2 NO	
	Endpoint	1	Endpoint	2
	PLAN	NPVRR	PLAN	NPVRR
	GAAFC	10,216	GAAFC	9,891
	GAAGC	10,219	GAAGC	9,894
	GBCBC	10,226	GBCBC	9,902
	GAABC	10,227	GAABC	9,903
	GAAFA	10,457	GAAFA	10,125
	GAABA	10,477	GAABA	10,147
	GAABD	10,480	GAADA	10,157
	GAADA	10,489	GAACA	10,173
	GAACA	10,503	GAABD	10,216
	GAABW	10,545	GAABB	10,227
	GAABB	10,564	GAABW	10,233
	GAAAA	10,578	GAAAA	10,250
	GAAEA	10,609	GAAEA	10,267
	GAAFN	10,819	GAAFN	10,463

MID GAS	CO2 YES		CO2 NO	
	Endpoint	3	Endpoint	4
	PLAN	NPVRR	PLAN	NPVRR
	GAAFC	10,047	GAAFC	9,708
	GAAGC	10,050	GAAGC	9,712
	GBCBC	10,059	GBCBC	9,722
	GAABC	10,060	GAABC	9,723
	GAAFA	10,290	GAAFA	9,947
	GAABD	10,302	GAABA	9,972
	GAABA	10,313	GAADA	9,976
	GAADA	10,320	GAACA	9,996
	GAACA	10,338	GAABD	10,040
	GAABB	10,403	GAABB	10,056
	GAABW	10,406	GAAAA	10,077
	GAAAA	10,416	GAAEA	10,080
	GAAEA	10,433	GAABW	10,084
	GAAFN	10,617	GAAFN	10,247

LOW GAS	CO2 YES		CO2 NO	
	Endpoint	5	Endpoint	6
	PLAN	NPVRR	PLAN	NPVRR
	GAAFC	9,893	GAAFC	9,550
	GAAGC	9,898	GAAGC	9,555
	GBCBC	9,908	GBCBC	9,567
	GAABC	9,909	GAABC	9,568
	GAAFA	10,139	GAAFA	9,791
	GAABD	10,152	GAABA	9,819
	GAABA	10,165	GAADA	9,819
	GAADA	10,167	GAACA	9,842
	GAACA	10,188	GAABD	9,890
	GAABB	10,254	GAABB	9,906
	GAAAA	10,269	GAAEA	9,915
	GAAEA	10,273	GAAAA	9,926
	GAABW	10,277	GAABW	9,952
	GAAFN	10,437	GAAFN	10,060

LOW LOAD GROWTH

HIGH GAS	CO2 YES		CO2 NO	
	Endpoint	13	Endpoint	14
	PLAN	NPVRR	PLAN	NPVRR
	GAAFC	9,628	GAAFC	9,344
	GAAGC	9,631	GAAGC	9,347
	GBCBC	9,637	GBCBC	9,355
	GAABC	9,639	GAABC	9,356
	GAAFA	9,851	GAAFA	9,560
	GAABA	9,872	GAABA	9,583
	GAADA	9,882	GAADA	9,591
	GAABD	9,890	GAACA	9,608
	GAACA	9,897	GAABD	9,670
	GAABW	9,945	GAABB	9,671
	GAABB	9,965	GAABW	9,675
	GAAAA	9,973	GAAAA	9,687
	GAAEA	9,995	GAAEA	9,694
	GAAFN	10,200	GAAFN	9,882

MID GAS	CO2 YES		CO2 NO	
	Endpoint	15	Endpoint	16
	PLAN	NPVRR	PLAN	NPVRR
	GAAFC	9,511	GAAFC	9,220
	GAAGC	9,515	GAAGC	9,225
	GBCBC	9,523	GBCBC	9,235
	GAABC	9,524	GAABC	9,236
	GAAFA	9,737	GAAFA	9,442
	GAABA	9,761	GAABA	9,468
	GAABD	9,764	GAADA	9,471
	GAADA	9,766	GAACA	9,491
	GAACA	9,785	GAABD	9,554
	GAABB	9,857	GAABB	9,561
	GAABW	9,858	GAAEA	9,567
	GAAAA	9,864	GAAAA	9,574
	GAAEA	9,873	GAABW	9,586
	GAAFN	10,051	GAAFN	9,727

LOW GAS	CO2 YES		CO2 NO	
	Endpoint	17	Endpoint	18
	PLAN	NPVRR	PLAN	NPVRR
	GAAFC	9,407	GAAFC	9,117
	GAAGC	9,412	GAAGC	9,121
	GBCBC	9,422	GBCBC	9,134
	GAABC	9,423	GAABC	9,135
	GAAFA	9,634	GAAFA	9,340
	GAABA	9,660	GAADA	9,367
	GAADA	9,662	GAABA	9,369
	GAABD	9,665	GAACA	9,391
	GAACA	9,683	GAAEA	9,455
	GAABB	9,756	GAABD	9,461
	GAAEA	9,761	GAABB	9,465
	GAAAA	9,766	GAAAA	9,478
	GAABW	9,778	GAABW	9,509
	GAAFN	9,918	GAAFN	9,593

Table 9: Uncertain Factors Sensitivities – Natural Gas Vs. Load and CO_2

HIGH NATURAL GAS PRICES

HIGH LOAD	CO2 YES		CO2 NO	
	Endpoint	1	Endpoint	2
	PLAN	NPVRR	PLAN	NPVRR
	GAAFC	10,216	GAAFC	9,891
	GAAGC	10,219	GAAGC	9,894
	GBCBC	10,226	GBCBC	9,902
	GAABC	10,227	GAABC	9,903
	GAAFA	10,457	GAAFA	10,125
	GAABA	10,477	GAABA	10,147
	GAABD	10,480	GAADA	10,157
	GAADA	10,489	GAACA	10,173
	GAACA	10,503	GAABD	10,216
	GAABW	10,545	GAABB	10,227
	GAABB	10,564	GAABW	10,233
	GAAAA	10,578	GAAAA	10,250
	GAAEA	10,609	GAAEA	10,267
	GAAFN	10,819	GAAFN	10,463

MID LOAD	CO2 YES		CO2 NO	
	Endpoint	7	Endpoint	8
	PLAN	NPVRR	PLAN	NPVRR
	GAAFC	9,921	GAAFC	9,616
	GAAGC	9,924	GAAGC	9,619
	GBCBC	9,930	GBCBC	9,627
	GAABC	9,931	GAABC	9,629
	GAAFA	10,150	GAAFA	9,839
	GAABA	10,170	GAABA	9,861
	GAADA	10,182	GAADA	9,871
	GAABD	10,184	GAACA	9,887
	GAACA	10,197	GAABD	9,942
	GAABW	10,242	GAABB	9,947
	GAABB	10,262	GAABW	9,951
	GAAAA	10,272	GAAAA	9,965
	GAAEA	10,298	GAAEA	9,976
	GAAFN	10,504	GAAFN	10,166

LOW LOAD	CO2 YES		CO2 NO	
	Endpoint	13	Endpoint	14
	PLAN	NPVRR	PLAN	NPVRR
	GAAFC	9,628	GAAFC	9,344
	GAAGC	9,631	GAAGC	9,347
	GBCBC	9,637	GBCBC	9,355
	GAABC	9,639	GAABC	9,356
	GAAFA	9,851	GAAFA	9,560
	GAABA	9,872	GAABA	9,583
	GAADA	9,882	GAADA	9,591
	GAABD	9,890	GAACA	9,608
	GAACA	9,897	GAABD	9,670
	GAABW	9,945	GAABB	9,671
	GAABB	9,965	GAABW	9,675
	GAAAA	9,973	GAAAA	9,687
	GAAEA	9,995	GAAEA	9,694
	GAAFN	10,200	GAAFN	9,882

LOW NATURAL GAS PRICES

HIGH LOAD	CO2 YES		CO2 NO	
	Endpoint	5	Endpoint	6
	PLAN	NPVRR	PLAN	NPVRR
	GAAFC	9,893	GAAFC	9,550
	GAAGC	9,898	GAAGC	9,555
	GBCBC	9,908	GBCBC	9,567
	GAABC	9,909	GAABC	9,568
	GAAFA	10,139	GAAFA	9,791
	GAABD	10,152	GAABA	9,819
	GAABA	10,165	GAADA	9,819
	GAADA	10,167	GAACA	9,842
	GAACA	10,188	GAABD	9,890
	GAABB	10,254	GAABB	9,906
	GAAAA	10,269	GAAEA	9,915
	GAAEA	10,273	GAAAA	9,926
	GAABW	10,277	GAABW	9,952
	GAAFN	10,437	GAAFN	10,060

MID LOAD	CO2 YES		CO2 NO	
	Endpoint	11	Endpoint	12
	PLAN	NPVRR	PLAN	NPVRR
	GAAFC	9,649	GAAFC	9,332
	GAAGC	9,653	GAAGC	9,337
	GBCBC	9,664	GBCBC	9,350
	GAABC	9,665	GAABC	9,351
	GAAFA	9,883	GAAFA	9,562
	GAABD	9,908	GAADA	9,590
	GAABA	9,909	GAABA	9,590
	GAADA	9,911	GAACA	9,613
	GAACA	9,932	GAABD	9,676
	GAABB	10,002	GAAEA	9,680
	GAAEA	10,013	GAABB	9,683
	GAAAA	10,014	GAAAA	9,699
	GAABW	10,024	GAABW	9,728
	GAAFN	10,171	GAAFN	9,820

LOW LOAD	CO2 YES		CO2 NO	
	Endpoint	17	Endpoint	18
	PLAN	NPVRR	PLAN	NPVRR
	GAAFC	9,407	GAAFC	9,117
	GAAGC	9,412	GAAGC	9,121
	GBCBC	9,422	GBCBC	9,134
	GAABC	9,423	GAABC	9,135
	GAAFA	9,634	GAAFA	9,340
	GAABA	9,660	GAADA	9,367
	GAADA	9,662	GAABA	9,369
	GAABD	9,665	GAACA	9,391
	GAACA	9,683	GAAEA	9,455
	GAABB	9,756	GAABD	9,461
	GAAEA	9,761	GAABB	9,465
	GAAAA	9,766	GAAAA	9,478
	GAABW	9,778	GAABW	9,509
	GAAFN	9,918	GAAFN	9,593

Table 10: Uncertain Factors Sensitivities – CO_2 Vs. Load and Natural Gas

HIGH _CO2

HIGH LOAD

HIGH GAS		MID GAS		LOW GAS	
Endpoint	1	Endpoint	3	Endpoint	5
PLAN	NPVRR	PLAN	NPVRR	PLAN	NPVRR
GAAFC	10,216	GAAFC	10,047	GAAFC	9,893
GAAGC	10,219	GAAGC	10,050	GAAGC	9,898
GBCBC	10,226	GBCBC	10,059	GBCBC	9,908
GAABC	10,227	GAABC	10,060	GAABC	9,909
GAAFA	10,457	GAAFA	10,290	GAAFA	10,139
GAABA	10,477	GAABD	10,302	GAABD	10,152
GAABD	10,480	GAABA	10,313	GAABA	10,165
GAADA	10,489	GAADA	10,320	GAADA	10,167
GAACA	10,503	GAACA	10,338	GAACA	10,188
GAABW	10,545	GAABB	10,403	GAABB	10,254
GAABB	10,564	GAABW	10,406	GAAAA	10,269
GAAAA	10,578	GAAAA	10,416	GAAEA	10,273
GAAEA	10,609	GAAEA	10,433	GAABW	10,277
GAAFN	10,819	GAAFN	10,617	GAAFN	10,437

MID LOAD

HIGH GAS		MID GAS		LOW GAS	
Endpoint	7	Endpoint	9	Endpoint	11
PLAN	NPVRR	PLAN	NPVRR	PLAN	NPVRR
GAAFC	9,921	GAAFC	9,777	GAAFC	9,649
GAAGC	9,924	GAAGC	9,781	GAAGC	9,653
GBCBC	9,930	GBCBC	9,790	GBCBC	9,664
GAABC	9,931	GAABC	9,791	GAABC	9,665
GAAFA	10,150	GAAFA	10,010	GAAFA	9,883
GAABA	10,170	GAABD	10,032	GAABD	9,908
GAADA	10,182	GAABA	10,033	GAABA	9,909
GAABD	10,184	GAADA	10,040	GAADA	9,911
GAACA	10,197	GAACA	10,058	GAACA	9,932
GAABW	10,242	GAABB	10,127	GAABB	10,002
GAABB	10,262	GAABW	10,129	GAAEA	10,013
GAAAA	10,272	GAAAA	10,137	GAAAA	10,014
GAAEA	10,298	GAAEA	10,149	GAABW	10,024
GAAFN	10,504	GAAFN	10,329	GAAFN	10,171

LOW LOAD

HIGH GAS		MID GAS		LOW GAS	
Endpoint	13	Endpoint	15	Endpoint	17
PLAN	NPVRR	PLAN	NPVRR	PLAN	NPVRR
GAAFC	9,628	GAAFC	9,511	GAAFC	9,407
GAAGC	9,631	GAAGC	9,515	GAAGC	9,412
GBCBC	9,637	GBCBC	9,523	GBCBC	9,422
GAABC	9,639	GAABC	9,524	GAABC	9,423
GAAFA	9,851	GAAFA	9,737	GAAFA	9,634
GAABA	9,872	GAABA	9,761	GAABA	9,660
GAADA	9,882	GAABD	9,764	GAADA	9,662
GAABD	9,890	GAADA	9,766	GAABD	9,665
GAACA	9,897	GAACA	9,785	GAACA	9,683
GAABW	9,945	GAABB	9,857	GAABB	9,756
GAABB	9,965	GAABW	9,858	GAAEA	9,761
GAAAA	9,973	GAAAA	9,864	GAAAA	9,766
GAAEA	9,995	GAAEA	9,873	GAABW	9,778
GAAFN	10,200	GAAFN	10,051	GAAFN	9,918

LOW_CO2

HIGH LOAD

HIGH GAS		MID GAS		LOW GAS	
Endpoint	2	Endpoint	4	Endpoint	6
PLAN	NPVRR	PLAN	NPVRR	PLAN	NPVRR
GAAFC	9,891	GAAFC	9,708	GAAFC	9,550
GAAGC	9,894	GAAGC	9,712	GAAGC	9,555
GBCBC	9,902	GBCBC	9,722	GBCBC	9,567
GAABC	9,903	GAABC	9,723	GAABC	9,568
GAAFA	10,125	GAAFA	9,947	GAAFA	9,791
GAABA	10,147	GAABA	9,972	GAABA	9,819
GAADA	10,157	GAADA	9,976	GAADA	9,819
GAACA	10,173	GAACA	9,996	GAACA	9,842
GAABD	10,216	GAABD	10,040	GAABD	9,890
GAABB	10,227	GAABB	10,056	GAABB	9,906
GAABW	10,233	GAAAA	10,077	GAAEA	9,915
GAAAA	10,250	GAAEA	10,080	GAAAA	9,926
GAAEA	10,267	GAABW	10,084	GAABW	9,952
GAAFN	10,463	GAAFN	10,247	GAAFN	10,060

MID LOAD

HIGH GAS		MID GAS		LOW GAS	
Endpoint	8	Endpoint	10	Endpoint	12
PLAN	NPVRR	PLAN	NPVRR	PLAN	NPVRR
GAAFC	9,616	GAAFC	9,463	GAAFC	9,332
GAAGC	9,619	GAAGC	9,467	GAAGC	9,337
GBCBC	9,627	GBCBC	9,477	GBCBC	9,350
GAABC	9,629	GAABC	9,478	GAABC	9,351
GAAFA	9,839	GAAFA	9,691	GAAFA	9,562
GAABA	9,861	GAABA	9,716	GAADA	9,590
GAADA	9,871	GAADA	9,720	GAABA	9,590
GAACA	9,887	GAACA	9,740	GAACA	9,613
GAABD	9,942	GAABD	9,797	GAABD	9,676
GAABB	9,947	GAABB	9,806	GAAEA	9,680
GAABW	9,951	GAAEA	9,819	GAABB	9,683
GAAAA	9,965	GAAAA	9,822	GAAAA	9,699
GAAEA	9,976	GAABW	9,832	GAABW	9,728
GAAFN	10,166	GAAFN	9,980	GAAFN	9,820

LOW LOAD

HIGH GAS		MID GAS		LOW GAS	
Endpoint	14	Endpoint	16	Endpoint	18
PLAN	NPVRR	PLAN	NPVRR	PLAN	NPVRR
GAAFC	9,344	GAAFC	9,220	GAAFC	9,117
GAAGC	9,347	GAAGC	9,225	GAAGC	9,121
GBCBC	9,355	GBCBC	9,235	GBCBC	9,134
GAABC	9,356	GAABC	9,236	GAABC	9,135
GAAFA	9,560	GAAFA	9,442	GAAFA	9,340
GAABA	9,583	GAABA	9,468	GAADA	9,367
GAADA	9,591	GAADA	9,471	GAABA	9,369
GAACA	9,608	GAACA	9,491	GAACA	9,391
GAABD	9,670	GAABD	9,554	GAAEA	9,455
GAABB	9,671	GAABB	9,561	GAABD	9,461
GAABW	9,675	GAAEA	9,567	GAABB	9,465
GAAAA	9,687	GAAAA	9,574	GAAAA	9,478
GAAEA	9,694	GAABW	9,586	GAABW	9,509
GAAFN	9,882	GAAFN	9,727	GAAFN	9,593

The values of the top two ARPs NPVRR under each of these risks are detailed in the following table.

Table 11: Risk Scenario NPVRR

Assuming No CO_2 Tax						
NPVRR ($MM)	**High Load**	**High NG**	**No CO_2 Tax**	**EV**	**Low NG**	**Low Load**
GAAFC	9,708	9,616	9,463	9,594	9,332	9,220
GAAGC	9,712	9,619	9,467	9,598	9,337	9,225
Assuming CO_2 Tax						
NPVRR ($MM)	**High Load**	**High NG**	**CO_2 Tax**	**EV**	**Low NG**	**Low Load**
GAAFC	10,047	9,921	9,777	9,594	9,649	9,511
GAAGC	10,050	9,924	9,781	9,598	9,653	9,515

The top two ARPs rank consistently in those positions across all uncertainty endpoint/scenario sensitivities. Because of this, no crossover point value is found and expressed as a percent of the range of the critical uncertain factor. The differences represented in Table 11 are due to the accelerated DSM programs of the Preferred Plan. Load, natural gas prices and CO_2 uncertainties represented in the remaining ARPs do not produce a crossover point for expression of those ranges.

SECTION 3: BETTER INFORMATION

The utility shall describe and document its quantification of the expected value of better information concerning at least the critical uncertain factors that affect the performance of the preferred resource plan, as measured by the present value of utility revenue requirements. The utility shall provide a tabulation of the key quantitative results of that analysis and a discussion of how those findings will be incorporated in ongoing research activities.

The Company calculates the value of better information for each of the critical uncertain factors identified in the preliminary sensitivity test. For each uncertainty, the Preferred Plan NPVRR for the specific uncertainty scenarios (or endpoints) is compared to the better plan under each extreme uncertainty condition. The comparison are made on an expected value basis assuming that only those three particular scenarios (high value uncertainty, mid value and low value uncertainty) would occur. Baye's Theorem is applied to the endpoint probabilities to develop conditional probabilities for the calculation scenarios. The difference between the expected value of the Preferred Plan and the expected value of the better information results is the expected value of better information.

As stated earlier, in this 2018 IRP the top two ARPs consistently ranked in those positions across all 18 scenarios. Given this, there is no value to better information for the uncertainties evaluated.

SECTION 4: CONTINGENCY RESOURCE PLANS

The utility shall describe and document its contingency resource plans in preparation for the possibility that the preferred resource plan should cease to be appropriate, whether due to the limits identified pursuant to 4 CSR240-22.070(2) being exceeded or for any other reason.

(A) The utility shall identify as contingency resource plans those alternative resource plans that become preferred if the critical uncertain factors exceed the limits developed pursuant to section (2).

The four top ranked GMO plans have a very narrow range in NPVRR, due to common characteristic of the capacity PPA, which separates them from the remainder of the ARPs modeled. The GMO set of contingency plans presented here are largely focused upon alternatives in DSM programs. As previously mentioned in the documentation of the Preferred Plan selection, the 2018 IRP DSM programs are driven by MEEIA rules and policy objectives, and will be determined in that next cycle filing.

The Preferred Plan and the contingency plans identified are robust and do not change in rankings due to sensitivity in the critical uncertain factors – Load, Natural Gas Price, and CO_2. However, since the value of DSM programs can change based on a number of uncertainties, adjustments to the level of DSM programs ultimately implemented may change. This is evaluated in each IRP annual update and triennial analysis.

The Contingency Resource Plans are shown in Table 12 below:

Table 12: Contingency Resource Plans

Plan Name	DSM Level	Retire	Renewable Additions		Generation Additions (if needed)
GAAFC	RAP- +DSR	Sibley-2: Dec 31, 2018 Sibley-3: Dec 31, 2018 Lake Road 4/6: Oct 1, 2019	Solar: 2028 - 10 MW	Wind: 2018 - 146 MW 2019 - 120 MW	PPA
GAABC	RAP+DSR	Sibley-2: Dec 31, 2018 Sibley-3: Dec 31, 2018 Lake Road 4/6: Oct 1, 2019	Solar: 2028 - 10 MW	Wind: 2018 - 146 MW 2019 - 120 MW	PPA

The contingency plans were identified through evaluation of the relative cost performance of each alternative resource plan under different combinations of the critical uncertain factors.

(B) The utility shall develop a process to pick among alternative resource plans, or to revise the alternative resource plans as necessary, to help ensure reliable and low cost service should the preferred resource plan no longer be appropriate for any reason. The utility may also use this process to confirm the viability of contingency resource plans identified pursuant to subsection (4)(A).

The process used to select Alternative Resource Plans was derived from the analysis of risks imposed on the GMO in that they are topped rank plans across all 18 scenarios.

(C) Each contingency resource plan shall satisfy the fundamental objective in 4 CSR240-22.010(2) and the specific requirements pursuant to 4 CSR 240-22.070(1).

The Contingency Plans meet the considerations of Rule 240.22.010(2) as they are Alternative Resource Plans developed and conformed in the response to Rule 240-22.060(3) in Volume 6 of this filing.

As for concurrence with Rule 240.070(1), the plans conform by meeting Rule 240.010(2), utilizes DSM that conforms to legal mandates and demonstrates adequate access to emergency short-term power supply.

SECTION 5: LOAD –BUILDING PROGRAMS

Analysis of Load-Building Programs. If the utility intends to continue existing load building programs or implement new ones, it shall analyze these programs in the context of one (1) or more of the alternative resource plans developed pursuant to 4 CSR 240- 22.060(3) of this rule, including the preferred resource plan selected pursuant to 4 CSR240-22.070(1). This analysis shall use the same modeling procedure and assumptions described in 4 CSR 240-22.060(4). The utility shall describe and document—

(A) Its analysis of load building programs, including the following elements:

1. Estimation of the impact of load building programs on the electric utility's summer and winter peak demands and energy usage;

2. A comparison of annual average rates in each year of the planning horizon for the resource plan(s) with and without the load building program;

3. A comparison of the probable environmental costs of the resource plan(s) in each year of the planning horizon with and without the proposed load-building program;

4. A calculation of the performance measures and risk by year; and

5. An assessment of any other aspects of the proposed load-building programs that affect the public interest; and

(B) All current and proposed load-building programs, a discussion of why these programs are judged to be in the public interest, and, for all resource plans that include these programs, plots of the following over the planning horizon:

1. Annual average rates with and without the load-building programs; and

2. Annual utility costs and probable environmental costs with and without the load-building programs.

At this time, GMO does not have any load-building programs.

SECTION 6: IMPLEMENTATION PLAN

The utility shall develop an implementation plan that specifies the major tasks, schedules, and milestones necessary to implement the preferred resource plan over the implementation period. The utility shall describe and document its implementation plan, which shall contain—

6.1 LOAD ANALYSIS - SCHEDULE AND DESCRIPTION

(A) A schedule and description of ongoing and planned research activities to update and improve the quality of data used in load analysis and forecasting;

GMO plans to conduct its next Residential Appliance Saturation Survey during the implementation period. GMO expanded the last survey in 2016 to include the commercial sector and is planning to include the result in the 2019 update. The last survey was completed in 2016. The results were used to calculate appliance saturations and these saturations were used to calibrate DOE forecasts of appliance saturations for use in GMO's load forecasting models. GMO also plans to match the responses with the customers' billing records and to conduct a conditional demand study to measure the unit energy consumption (UEC) for each major appliance.

GMO plans to conduct a price elasticity study during the implementation period.

GMO will continue develop and improve its framework of incorporating photovoltaic (PV) and electric vehicle (EV) impacts into the energy forecast to capture PV and EV energy impacts.

GMO developed a new industrial model that will allow the utility to create an industrial intensity index which would be calibrated to the GMO service area based on employment. It was implemented in the 2017 IRP update and GMO will continue to monitor and refine the model going forward.

6.2 DEMAND-SIDE PROGRAMS – SCHEDULE AND DESCRIPTION

(B) A schedule and description of ongoing and planned demand-side programs and demand-side rates, evaluations, and research activities to improve the quality of demand-side resources;

The current schedules for ongoing and planned DSM programs are shown in Table 13 and Table 14 below:

Table 13: DSM Program Schedule – Existing Programs

Program Name	Program Type	Segment	Program Implemented	Annual Report	Program Duration	EM&V Completed and draft report available
Home Lighting Rebate	Energy Efficiency	Residential	Apr., 2016	90-days following Plan Year	3-Years	1-Yr following Plan Year
Online Home Energy Audit	Educational	Residential	Apr., 2016	90-days following Plan Year	3-Years	1-Yr following Plan Year
Whole House Efficiency	Energy Efficiency	Residential	Apr., 2016	90-days following Plan Year	3-Years	1-Yr following Plan Year
Income-Eligible Multi-Family	Energy Efficiency	Residential	Apr., 2016	90-days following Plan Year	3-Years	1-Yr following Plan Year
Home Energy Report	Energy Efficiency	Residential	Apr., 2016	90-days following Plan Year	3-Years	1-Yr following Plan Year
Residential Programmable Thermostat	Demand Response	Residential	Apr., 2016	90-days following Plan Year	3-Years	1-Yr following Plan Year
Business Energy Efficiency Rebate - Standard	Energy Efficiency	C&I	Apr., 2016	90-days following Plan Year	3-Years	1-Yr following Plan Year
Business Energy Efficiency Rebate - Custom	Energy Efficiency	C&I	Apr., 2016	90-days following Plan Year	3-Years	1-Yr following Plan Year
Strategic Energy Management	Energy Efficiency	C&I	Apr., 2016	90-days following Plan Year	3-Years	1-Yr following Plan Year
Block Bidding	Energy Efficiency	C&I	Apr., 2016	90-days following Plan Year	3-Years	1-Yr following Plan Year
Online Business Energy Audit	Educational	C&I	Apr., 2016	90-days following Plan Year	3-Years	1-Yr following Plan Year
Small Business Direct Install	Energy Efficiency	C&I	Apr., 2016	90-days following Plan Year	3-Years	1-Yr following Plan Year
Commercial Programmable Thermostat	Demand Response	C&I	Apr., 2016	90-days following Plan Year	3-Years	1-Yr following Plan Year
Demand Response Incentive	Demand Response	C&I	Apr., 2016	90-days following Plan Year	3-Years	1-Yr following Plan Year

Table 14: DSM Program Schedule – Planned Programs

Program Name	Program Type	Segment	Projected Tariff Filing Date	Projected Approval Date	Projected Implementation Date	Annual Report
Home Lighting Rebate	Energy Efficiency	Residential	June, 2018	Oct., 2018	Apr., 2019	90-days following Plan Year
Home Energy Report	Energy Efficiency	Residential	June, 2018	Oct., 2018	Apr., 2019	90-days following Plan Year
Income-Eligible Home Energy Report	Energy Efficiency	Residential	June, 2018	Oct., 2018	Apr., 2019	90-days following Plan Year
Online Home Energy Audit	Educational	Residential	June, 2018	Oct., 2018	Apr., 2019	90-days following Plan Year
Whole House Efficiency	Energy Efficiency	Residential	June, 2018	Oct., 2018	Apr., 2019	90-days following Plan Year
Income-Eligible Multi-Family	Energy Efficiency	Residential	June, 2018	Oct., 2018	Apr., 2019	90-days following Plan Year
Income-Eligible Weatherization	Energy Efficiency	Residential	June, 2018	Oct., 2018	Apr., 2019	90-days following Plan Year
Residential Smart Thermostat w DLC	Demand Response	Residential	June, 2018	Oct., 2018	Apr., 2019	90-days following Plan Year
Central AC DLC Switch	Energy Efficiency	Residential	June, 2018	Oct., 2018	Apr., 2019	90-days following Plan Year
Water Heating DLC Switch	Energy Efficiency	Residential	June, 2018	Oct., 2018	Apr., 2019	90-days following Plan Year
Business Energy Efficiency Rebate - Standard	Energy Efficiency	C&I	June, 2018	Oct., 2018	Apr., 2019	90-days following Plan Year
Business Energy Efficiency Rebate - Custom	Energy Efficiency	C&I	June, 2018	Oct., 2018	Apr., 2019	90-days following Plan Year
Strategic Energy Management	Educational	C&I	June, 2018	Oct., 2018	Apr., 2019	90-days following Plan Year
Retrocommissioning	Energy Efficiency	C&I	June, 2018	Oct., 2018	Apr., 2019	90-days following Plan Year
Block Bidding	Demand Response	C&I	June, 2018	Oct., 2018	Apr., 2019	90-days following Plan Year
Online Business Energy Audit	Demand Response	C&I	June, 2018	Oct., 2018	Apr., 2019	90-days following Plan Year
Small Business Targeted	Demand Response	C&I	June, 2018	Oct., 2018	Apr., 2019	90-days following Plan Year
Business Smart Thermostat w DLC	Demand Response	C&I	June, 2018	Oct., 2018	Apr., 2019	90-days following Plan Year
Demand Response Incentive	Demand Response	C&I	June, 2018	Oct., 2018	Apr., 2019	90-days following Plan Year

Additional detail regarding the implementation plan for the DSM Preferred Plan can be found in Volume 5. It includes the descriptions of the programs, the implementation strategy, a discussion of risk management, the incentive levels used for planning purposes, energy and peak demand savings goals, and budget estimates. GMO will file an application under the Missouri Energy Efficiency Investment Act (MEEIA) in mid-2018 requesting Commission approval of demand-side programs for a program implementation period beginning in 2019.

6.3 SUPPLY-SIDE – SCHEDULES AND DESCRIPTIONS

(C) A schedule and description of all supply-side resource research, engineering, retirement, acquisition, and construction activities, including research to meet expected environmental regulations;

Based on the 2018 Preferred Plan, Sibley Units 2 and 3 and Lake Road 4/6 are expected to be retired by 2019, and 2020 respectively. Post Sibley station retirement activities includes but are not limited to disconnection, de-energization, cleanout and tasks to secure the units rendering the site safe until dismantlement can occur. Selected dismantlement is expected for the chimney and other selected items to render the site safe. A draft schedule of the major milestones expected to be undertaken for the retirement of these units within the next three years is provided in the following table:

Table 15: Sibley Station Retirement Milestones

Milestone Description	Date Range
Sibley 1 Retired from electrical producation	June 1, 2017
Selection of Owner's Engineer	Oct, 2017 - Nov, 2017
Phase 1: Initial Study - Cost and MHA*	Nov, 2017 - Mar, 2018
Phase 2: Develop isolation plans, specs, etc	April, 2018 - June, 2018
Bid process and selection	July, 2018 - Dec, 2018
Isolation activities	Dec, 2018 - Dec, 2019
Sibley Units Fully Retire	By Dec 31, 2018
Sibley Staff - post retire assignments	Jan 1, 2019
Sibley 3 Chimney Demolition	7/2019 - 12/2020
Sibley Post Isolation activities	5/2019 - 12/2020
Sibley Full Demolition	TBD

* Material Hazard Analysis

Post Lake Road Unit 4/6 retirement activities includes but not limited to disconnection, de-energization, cleanout that will render the unit safe until dismantlement can occur. A draft schedule of the major milestones expected to be undertaken for the retirement of this unit within the next three years are provided in the following table:

Table 16: Lake Road 4/6 Retirement Milestones

Milestone Description	Date Range
Notified SPP of anticipated plant closure	June 2, 2017
Selection of Owner's Engineer	Oct, 2017 - Nov, 2017
Phase 1: Initial Study - Cost and MHA*	Nov, 2017 - Mar, 2018
Phase 2: Develop isolation plans, specs, etc	April, 2018 - June, 2018
Bid process and selection	July, 2019 - Dec, 2019
Isolation Activities	Dec, 2019 - Dec, 2020
Lake Road 4/6 retires	By Dec 31, 2019
Asbestos Removal	Jan, 2020 - Dec, 2021
Lake Road Post isolation activities	May, 2020 - Dec, 2021
* Material Hazard Analysis	

There are also environmental retrofit projects continuing or expected to be initiated during the three-year implementation period. Table 17 below provides estimated dates for major projects currently expected.

Table 17: Environmental Retrofit Project Schedule

Milestone Description	Date Range
Sibley Station - Fly Ash Remediation	2020 - 2021
Sibley Station - Landfill Expansion	2019 - 2020
Sibley Station - Slag Pond Remediation	2020 - 2021
Sibley Station - Leachate Impoundment	2020 - 2021

6.4 MILESTONES AND CRITICAL PATHS

(D) Identification of critical paths and major milestones for implementation of each demand-side resource and each supply-side resource, including decision points for committing to major expenditures;

Critical paths and major milestones for implementation of each demand-side resource are shown above, in Section 6.2.

As described above, 266 MW of wind additions are from two power purchase agreements (PPA) executed in 2017. One wind project, Pratt Wind consists of 244 MW of total capacity and is currently planned to be in-service in 2018. GMO is expected to be allocated 146 MW of the 244 MW facility. Pratt Wind is cited over approximately 34,000 acres in Pratt County, Kansas and owned by NextEra. Table 18 provides the current milestone schedule of activities.

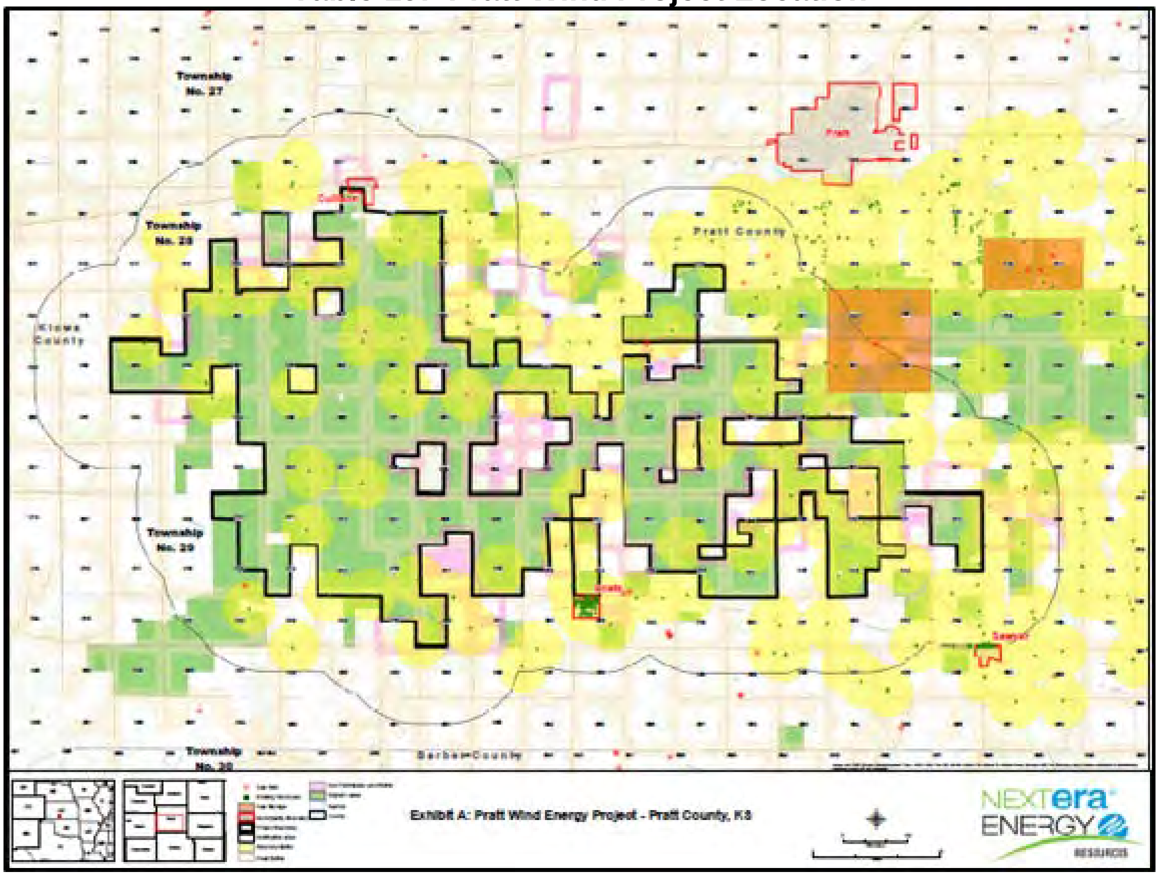
Table 18: Pratt Wind Schedule

Milestone Description	Milestone Dates
Unrestricted Construction Access	March, 2018
Pre-Construction Surveys and Staking	April, 2018
Install Station Service Power	April, 2018
Wind Farm EPC Mobilize (Start of Construction)	April, 2018
Substation EPC Mobilize	May, 2018
T-Line EPC Mobilize	June, 2018
Road Construction Complete	July, 2018
Foundation Construction Complete	August, 2018
Turbine Deliveries	July, 2018
WTG Erection Commence	July, 2018
Turbine Mechanical Completion	September, 2018
Turbine Pre Commissioning	October, 2018
Backfeed	October, 2018
Commissioning of Substation and TLine	November, 2018
Construction COD	November, 2018
Final Wind Farm Commissioning	November, 2018

EPC: Engineering/Procurement/Construction
WTG Wind Turbine Generator
COD: Commercial Operation Date

Table 19 provides the location of the Pratt wind project:

Table 19: Pratt Wind Project Location



The second wind project, Prairie Queen, consists of 200 MW of total capacity and is currently expected to be in service by June, 2019. GMO is expected to be allocated 120 MW of the 200 MW facility. Prairie Queen is cited over approximately 14,000 acres in Allen County, Kansas and owned by EDP Renewables.

Table 20 provides the current milestone schedule of activities.

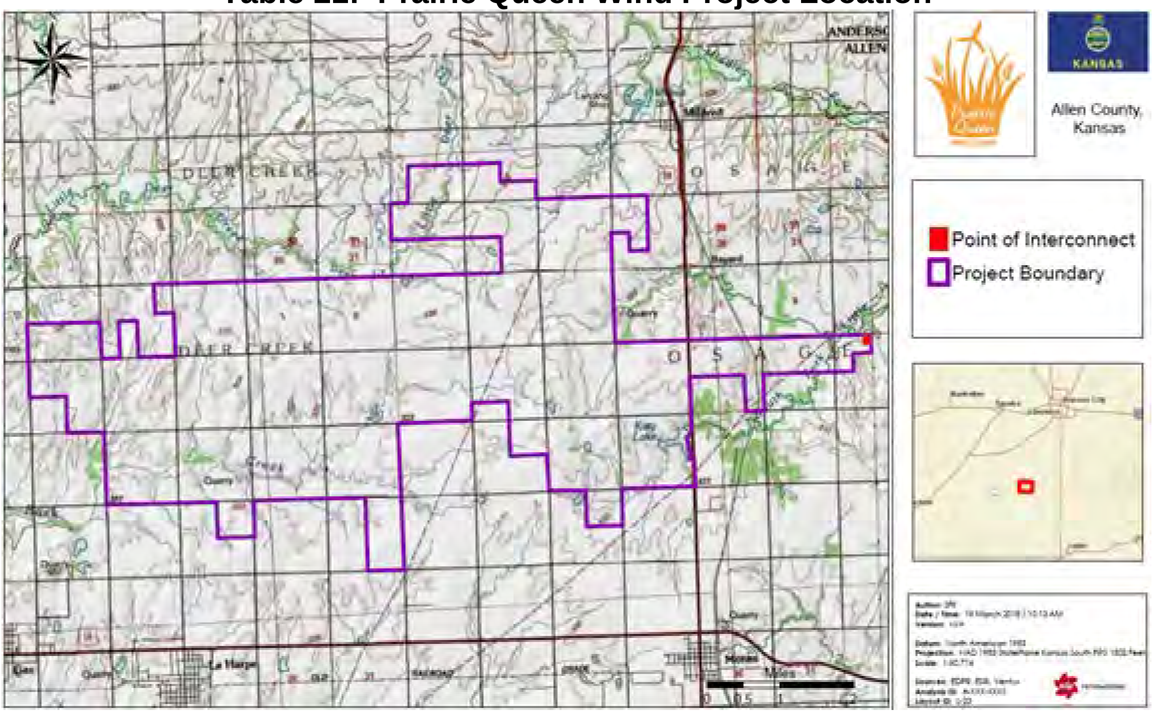
Table 20: Prairie Queen Wind Schedule

Milestone Description	Milestone Dates
Site Mobilization for general vegetation clearing	March 2018
Site Mobilization for Balance of Plant	June 2018
Completion of Dakota Substation (Point of Interconnection)	July 2018
Main Power Transfomer Delivered	December 2018
Turbine Deliveries and Erection Begin and Main Power Transformer Energized	January 2019
Mechanical Completion of Turbines Begins and Commencement of Turbine Commissioning	February 2019
Mechanical Completion of Turbines Complete	April 2019
Commercial Operation Date[1]	May 2019

1 Delays may be possible due to adverse weather

Table 21 shows the location of this wind project:

Table 21: Prairie Queen Wind Project Location



6.5 COMPETITIVE PROCUREMENT POLICIES

(E) A description of adequate competitive procurement policies to be used in the acquisition and development of supply-side resources;

GMO has competitive procurement policies in place to adequately gather and analyze potential acquisition and development of supply-side resources, including both ownership and power purchase agreements (PPAs). The following is a general overview of these policies and the associated timeline.

- A draft Request For Proposal (RFP) is developed and circulated internally with the appropriate parties for review and suggested edits.
- The final RFP document, edited for any agreed changes as a result of the above process, is made available to the appropriate audience for an opportunity to submit a proposal.
- In general, proposals are required to be submitted back to GMO within 30-60 days of the RFP being distributed.
- The proposals are gathered, summarized, and analyzed by the Energy Resource Management group, with appropriate modeling of the alternatives as required.
- After the proposals have been ranked, GMO develops a 'short-list' to identify those projects or proposals that will continue to be considered.
- Those proposals that do not make the short list are notified via a 'regret letter' that they are no longer being considered.

From the 'short-list', the winning bidder/project is chosen and final contracts are completed with the assistance of internal and/or external legal counsel.

6.6 MONITORING CRITICAL UNCERTAIN FACTORS

(F) A process for monitoring the critical uncertain factors on a continuous basis and reporting significant changes in a timely fashion to those managers or officers who have the authority to direct the implementation of contingency resource plans when the specified limits for uncertain factors are exceeded; and

Each critical uncertain factor is reviewed on an individual basis due to the varied nature of the information sources used in its review. This IRP analysis will be updated on an annual basis reflecting any changes to these critical uncertain factors. Results will be distributed to the V.P. of Generation.

Critical Uncertain Factor: CO_2

CO_2 credit prices are reviewed on a continual basis. The data sources used are third party views predicting the price of the credits. Most of these third party studies are sparked by proposed legislation or are updated up to a quarterly basis. This review and update is conducted by the Fuels department with a full review conducted on an annual basis.

Critical Uncertain Factor: Load

Load forecasts are updated on an annual basis as part of the company's annual budgeting process.

Critical Uncertain Factor: Natural Gas

Natural Gas forecasts are updated weekly with executive updates provided on a monthly basis.

6.7 MONITORING PREFERRED RESOURCE PLAN

(G) A process for monitoring the progress made implementing the preferred resource plan in accordance with the schedules and milestones set out in

the implementation plan and for reporting significant deviations in a timely fashion to those managers or officers who have the authority to initiate corrective actions to ensure the resources are implemented as scheduled.

6.7.1 DSM INITIATIVES

GMO has processes in place to monitor its Demand-Side Management programs and track and report their performance compared to the planned implementation schedule.

6.7.2 PLANT RETIREMENT INITIATIVES

A monthly meeting is held to monitor progress, issues and deviations concerning the preferred plant retirement or demolition plan. This will be in accordance with the milestones to be established and for reporting significant deviations to managers, directors or officers who have the authority to initiate corrective actions to ensure the resources are executed as scheduled.

6.7.3 PLANT RETROFIT INITIATIVES

A quarterly meeting is held with internal members of the Environmental Compliance team on progress made implementing the Coal Combustible Residual (CCR) plan. Reporting includes reviewing plans, project schedules and significant deviations. Significant deviations would be elevated to those managers or officers who have the authority to initiate corrective actions to ensure the resources are completed as required.

6.7.4 WIND INITIATIVES

Wind development activities are reported to the Vice President, Generation on an ongoing basis by receiving monthly progress reports from the developers of the two wind projects currently under development.

SECTION 7: RESOURCE ACQUISITION STRATEGY

The utility shall develop, describe and document, officially adopt, and implement a resource acquisition strategy. This means that the utility's resource acquisition strategy shall be formally approved by an officer of the utility who has been duly delegated the authority to commit the utility to the course of action described in the resource acquisition strategy. The officially adopted resource acquisition strategy shall consist of the following components:

7.1 PREFERRED RESOURCE PLAN

(A) A preferred resource plan selected pursuant to the requirements of section (1) of this rule;

The Preferred Resource Plan is outlined in Section 1 above per Rule 240-22.070(1).

7.2 IMPLEMENTATION PLAN

(B) An implementation plan developed pursuant to the requirements of section (6) of this rule; and

The Implementation Plan is outlined in Section 6 above per Rule 240-22.070(6).

7.3 CONTINGENCY RESOURCE PLANS

(C) A set of contingency resource plans developed pursuant to the requirements of section (4) of this rule and identification of the point at which the critical uncertain factors would trigger the utility to move to each contingency resource plan as the preferred resource plan.

The Contingency Resource Plan is outlined in Section 4 above per Rule 240-22.070(4).

SECTION 8: EVALUATION OF DEMAND-SIDE PROGRAMS AND DEMAND-SIDE RATES

(8) The utility shall describe and document its evaluation plans for all demand-side programs and demand-side rates that are included in the preferred resource plan selected pursuant to 4 CSR 240-22.070(1). Evaluation plans required by this section are for planning purposes and are separate and distinct from the evaluation, measurement, and verification reports required by 4 CSR 240-3.163(7) and 4 CSR 240-20.093(7); nonetheless, the evaluation plan should, in addition to the requirements of this section, include the proposed evaluation schedule and the proposed approach to achieving the evaluation goals pursuant to 4 CSR 240-3.163(7) and 4 CSR 240-20.093(7). The evaluation plans for each program and rate shall be developed before the program or rate is implemented and shall be filed when the utility files for approval of demand-side programs or demand-side program plans with the tariff application for the program or rate as described in 4 CSR 240-20.094(3). The purpose of these evaluations shall be to develop the information necessary to evaluate the cost-effectiveness and improve the design of existing and future demand-side programs and demand-side rates, to improve the forecasts of customer energy consumption and responsiveness to demand-side programs and demand-side rates, and to gather data on the implementation costs and load impacts of demand-side programs and demand-side rates for use in future cost-effectiveness screening and integrated resource analysis.

GMO will prepare a request for proposal ("RFP") to conduct an evaluation, measurement and verification ("EM&V") of all demand-side programs and demand-side rates that are approved by the Commission.

<u>EM&V Process Evaluation</u>

The scope of work will require that the Vendor conduct a process evaluation pursuant to requirements of 4 CSR 240-22.070 (8) (A) and require the Vendor to provide answers to questions 1 through 5 of this rule section in the EM&V final report (“Report”).

EM&V Impact Evaluation

The scope of work will require that the Vendor conduct the impact evaluation pursuant to requirements of 4 CSR 240-22.070 (8) (B) and require the Vendor to provide answers to questions 1 and 2 of this rule section in the Report.

EM&V Data Collection

The scope of work will require that the Vendor collect EM&V participation rate data, utility cost data, participant cost data and total cost data pursuant to requirements of 4 CSR 240-22.070 (8) (C).

EM&V Reporting Requirements

The scope of work for the EM&V RFP will also require that the Vendor perform, and report EM&V of each commission-approved demand-side program in accordance with 4 CSR 240-3.163 (7).

GMO will provide the Missouri Public Service Commission (“Commission”) Staff and other stakeholders with an opportunity to review and comment on the EM&V scope of work.

An EM&V for all demand-side programs and demand-side rates that are included in GMO’s preferred resource plan will begin after the completion of each program year.

The EM&V scope of work will require the vendor to evaluate and prepare an annual program performance report. Preliminary EM&V reports will be available 120 days following the program year. Commission Staff and stakeholders will be provided with an opportunity to review, and comment on the preliminary report. The final EM&V report will be available 255 days following the completion of each program year.

EM&V Schedule and Budget

The EM&V budget shall not exceed five percent (5%) of the total budget for all approved demand-side program costs. A tentative EM&V schedule is shown in Table 22 below. This schedule will be updated when GMO files for new programs under MEEIA.

Table 22: Estimated EM&V Schedule

Estimated EM&V Schedule	
1st Annual EM&V Begins	Day 1 of PY 1
1st Annual Draft Report	120 days after the end of PY 1
1st Annual Program Report	255 days after the end of PY 1
2nd Annual EM&V Begins	Day 1 of PY 2
2nd Annual Draft Report	120 days after the end of PY 2
2nd Annual Program Report	255 days after the end of PY 2
3rd Annual EM&V Begins	Day 1 of PY 3
3rd Annual Draft Report	120 days after the end of PY 3
3rd Annual Program Report	255 days after the end of PY 3

8.1 PROCESS EVALUATION

(A) Each demand-side program and demand-side rate that is part of the utility's preferred resource plan shall be subjected to an ongoing evaluation process which addresses at least the following questions about program design.

1. What are the primary market imperfections that are common to the target market segment?

See the response to Section 8, above.

2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?

See the response to Section 8, above.

3. Does the mix of end-use measures included in the program appropriately reflect the diversity of end-use energy service needs and existing end-use technologies within the target market segment?

See the response to Section 8, above.

4. Are the communication channels and delivery mechanisms appropriate for the target market segment?

See the response to Section 8, above.

5. What can be done to more effectively overcome the identified market imperfections and to increase the rate of customer acceptance and implementation of each enduse measure included in the program?

See the response to Section 8, above.

8.2 IMPACT EVALUATION

(B) The utility shall develop methods of estimating the actual load impacts of each demand-side program and demand-side rate included in the utility's preferred resource plan to a reasonable degree of accuracy.

1. Impact evaluation methods. At a minimum, comparisons of one (1) or both of the following types shall be used to measure program and rate impacts in a manner that is based on sound statistical principles:

A. Comparisons of pre-adoption and post-adoption loads of program or demand-side rate participants, corrected for the effects of weather and other intertemporal differences; and

See the response to Section 8, above.

B. Comparisons between program and demand-side rate participants' loads and those of an appropriate control group over the same time period.

See the response to Section 8, above.

2. The utility shall develop load-impact measurement protocols that are designed to make the most cost-effective use of the following types of measurements, either individually or in combination:

A. Monthly billing data, hourly load data, load research data, end-use load metered data, building and equipment simulation models, and survey responses; or

See the response to Section 8, above.

B. Audit and survey data on appliance and equipment type, size and efficiency levels, household or business characteristics, or energy-related building characteristics.

See the response to Section 8, above.

8.3 <u>DATA COLLECTION PROTOCOLS</u>

(C) The utility shall develop protocols to collect data regarding demand-side program and demand-side rate market potential, participation rates, utility costs, participant costs, and total costs.

See the response to Section 8, above.