Optimal ENERGY Integrated Energy Resources

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Exhibit B

KCP&L - Greater Missouri Operations Company
Integrated Resource Plan
Case No. EE-2009-0237
Analysis of Demand Side Management
Final Report

Prepared for

The Missouri Department of Natural Resources

by:

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PUBLIC VERSION

** ** denotes highly confidential information

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INTRODUCTION

On behalf of the Missouri Department of Natural Resources ("MDNR"), Optimal Energy Inc. ("OEI") has reviewed the Integrated Resource Plan ("IRP") submitted by Kansas City Power & Light - Greater Missouri Operations ("GMO" or "Company") and supplements relating to Demand Side Management. We have also assisted MDNR to issue extensive requests for data and reviewed GMO's responses. Our analysis shows that the IRP fails to meet the fundamental objectives of the rules governing electric utility resource planning. Our analysis also discovered several less significant deficiencies which we briefly address. We also comment on GMO's request for nontraditional DSM accounting.

DEFICIENCY #1 – FAILURE TO MEET FUNDAMENTAL OBJECTIVES

GMO's integrated resource plan fails to meet the fundamental objectives of resource planning. The relevant rule is:

4 CSR 240-22.010 (2) - The fundamental objective of the resource planning process at electric utilities shall be to provide the public with energy services that are safe, reliable and efficient, at just and reasonable rates in a manner that serves the public interest. This objective requires that the utility shall—

> **(A) Consider and analyze demand-side efficiency and energy management measures on an equivalent basis with supply-side alternatives in the resource planning process;**
>
> **(B) Use minimization of the present worth of long-run utility costs as the primary selection criterion in choosing the preferred resource plan;**

The Company's Integrated Resource Plan ("Plan") fails to treat demand-side management resources ("DSM") on equivalent basis and fails to use minimization of long-run costs as the primary selection criteria. Due to these two failures, the Plan will increase costs for ratepayers, increase profits for shareholders at the ratepayers' expense through the performance incentive proposal, expose ratepayers to volatile market conditions, and lead to substantially greater air emissions.

In addition, the documentation provided by the Company is not consistent. Factors or data points may have different values in different documents, as briefly described in Section C below. We offer examples of this deficiency after addressing the deficiencies related to the specific rule requirements. Despite clear, detailed, and repeated requests for information, the Company has not provided sufficient information to support its contention that the Plan serves the public interest.

We address the specific failings in the sections below.

SECTION (A) – FAILURE TO TREAT DSM ON AN EQUIVALENT BASIS WITH SUPPLY-SIDE ALTERNATIVES

The Company's IRP does not treat DSM on an equivalent basis with supply-side alternatives on several indices, including but not limited to scalability, investment horizon, analytic rigor and consistency, and risk assessment as demonstrated below.

1. The GMO analysis treats demand-side efficiency and energy management measures as a fixed capacity single resource which does not reflect their real nature. In comparison, GMO modeled supply-side resources as separable and scalable. The

Preferred Resource Plan (Plan 22) includes 700 MW of wind added in 100 MW increments and one 200MW increment. It also includes two 154 MW increments of combustion turbines added as needed.[1]

The DSM inputs GMO provided for the model did not treat these resources on an equivalent basis with supply side resources. For supply side resources, the analysis considered the requirements and the cost and optimized the investment to meet these requirements. For the demand side, the analysis started with two options at a fixed investment and did not allow for expansion of these resources if cost effective. The same exact DSM resource was included in 22 out of 24 alternative resource plans. By comparison, the Company considered 22 discrete supply resource alternatives.

2. GMO's IRP includes only five years of investment in efficiency resources, as summarized in Table 1 below.

Table 1 - DSM Planning Horizon

Program Name	Table#	# Years with Utilty Program Costs
Change a Light	77	3
Home Performance with ES	82	5
Low Income Weatherization	87	5
Low Income Affordable New Homes	92	5
Energy Star New Homes	97	5
Building Operator Certification	101	5
Energy Optimizer*	107	23
MPower*	112	20
Appliance Turn In	117	5
Blue Line	122	3
Cool Homes	127	5
Energy Star Products	132	5
On-Line Audit	137	5
C&I Custom Rebate	142	5
C&I Prescriptive Rebate	147	5
* - These programs are not attributed with energy (MWh) savings, only capacity (MW) savings		

By comparison, all but one of the alternative resource plans includes addition of fossil-fired supply in 2023 or later. The one exception is Plan 16, deemed "hypothetical" by the Company, as will be discussed in a later section. The investment horizon for DSM is significantly shorter than the investment horizon for supply, and thus the IRP does not treat DSM on an equivalent basis.

3. The underlying data for GMO's DSM analysis is less current than that used for the supply-side options, and less comprehensive. For example, the basis for the estimate of residential DSM potential is based on a 2006 statewide residential and appliance

[1] Vol 1, Table 4, Page 8

saturation study and a 2007 KCP&L single family residential potential analysis.[2] Neither of these studies is specific to GMO's service territory nor have they accommodated the significant shifts in the market, economic, regulatory, and technological environments of the current IRP.

In terms of comprehensiveness, for example, the file "Master Copy Probable Environmental Run Midas Input Templates Formal HC (5-21-09).xls" includes data on every supply side option GMO considered and no data on DSM.

4. The Company did not document the full ranges of DSM options. For example:

   - DSM Load impacts - The Company states that "High and low load impacts of DSM were simulated in the CapEx model. Resulting optimal expansion plans did not change as this factor was varied. Therefore, load impacts of DSM were not considered a critical resource factor and were not used as part of the integrated analysis."[3] It only considers one level of DSM implementation, not a scalable set of options, thus does not consider the full range of DSM alternatives.

   - Emissions impacts – The Company states that "Due to the small changes in optimal plans from CapEx, GMO determined that future NOx credit prices do not constitute a critical uncertain factor and therefore are not included in the integrated analysis."[4] It further states that "High and low SO2 credit price forecasts were simulated in the CapEx model. Resulting optimal expansion plans did not change as this cost was varied. SO2 credit prices are not considered a critical resource factor and were not used as part of the integrated analysis."[5]

The Company states that it "utilized a method by which DSM costs are treated in a logically consistent manner with traditional supply-side resource costs."[6] GMO does not meet this standard along the dimensions noted above. Furthermore, it fails to meet the requirement of the rule, reinforced in 4 CSR 240022.060(4)(D), to treat DSM on an "economically equivalent basis."

SECTION (B) – MINIMIZE NPV OF COSTS

GMO's IRP fails to minimize the net present value of long-run utility costs as highlighted below.

1. The Company inappropriately constrained its DSM design to arbitrarily low levels of performance through failing to treat it on an equivalent basis with supply. The Company labeled Plan 16, which included a 1% DSM portfolio, as a "hypothetical."

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[2] Vol. 5 HC page 5-6
[3] Vol 7HC, page 7.
[4] Vol 7, page 4
[5] Vol 7, page 6
[6] Vol 6, page 17

This plan achieved the lowest NPVRR of all of the submitted plans, a fact supported by documents submitted by the Company and the analyses performed by the Company's consultants. However, the Company did not provide any details about the programs that would achieve the specified savings. Achieving annual savings of 1 percent of retail sales is realistically achievable, and in fact has been achieved in a number of jurisdictions in the United States, as shown in Tables 2 and 3 below.

Table 2 - Savings Benchmarks

EIA Form 861 Reported Electric Energy Efficiency Savings for 2007 - Top Performers					
Utility Name	State	Retail Sales (MWh)	Incremental Savings (MWh)	Savings as % Load	$/kWh (1)
Glidden Rural Electric Coop	IA	101,177	2,606	2.58%	NA
Burlington City of	VT	364,586	9,276	2.54%	$0.01087
Pacific Gas & Electric Co	CA	79,450,903	1,662,875	2.09%	$0.01771
Southern California Edison Co	CA	79,505,231	1,551,503	1.95%	$0.01929
Connecticut Light & Power Co	CT	16,054,317	281,367	1.75%	$0.02410
Massachusetts Electric Co	MA	12,543,637	195,357	1.56%	$0.02704
United Illuminating Co	CT	5,917,448	86,011	1.45%	$0.02492
Laurens Electric Coop, Inc	SC	996,410	12,519	1.26%	$0.00019
Western Massachusetts Elec Co	MA	2,098,952	25,873	1.23%	$0.02592
Rochester Public Utilities	MN	1,307,897	15,815	1.21%	$0.00423
Fitchburg Gas & Elec Light Co	MA	276,004	3,049	1.10%	$0.03791
Unitil Energy Systems	NH	941,779	9,983	1.06%	$0.02431
Puget Sound Energy Inc	WA	21,626,537	222,310	1.03%	$0.01643
Austin Energy	TX	11,546,977	117,649	1.02%	$0.00994
Narragansett Electric Co	RI	6,808,288	64,992	0.95%	$0.02674
Arizona Public Service Co	AZ	29,171,321	273,656	0.94%	$0.00641
Snohomish County PUD No 1	WA	6,774,641	61,087	0.90%	$0.00231
Sacramento Municipal Util Dist	CA	10,817,859	95,952	0.89%	$0.01946
Madison Gas & Electric Co	WI	3,350,021	29,017	0.87%	$0.00346
Interstate Power and Light Co	IA	15,959,454	134,219	0.84%	$0.01720
New Hampshire Elec Coop Inc	NH	751,209	6,307	0.84%	$0.01354
Long Island Power Authority	NY	18,750,900	155,559	0.83%	$0.02091
Nevada Power Company	NV	21,873,043	180,290	0.82%	$0.00962
Public Service Co of NH	NH	7,585,627	59,400	0.78%	$0.02033
(1) Average 10 year measure life					

Table 3 - Savings Benchmarks 2

Incremental Electricity Savings by State		
State	Percent of Electricity Sales 2006	Percent of Electricity Sales 2007
California	0.7%	0.9%
Connecticut	1.0%	1.3%
Iowa	0.7%	0.7%
Massachusetts	0.8%	0.9%
Oregon	0.8%	0.9%
Rhode Island	1.2%	0.8%
Vermont	1.1%	1.8%
Washington	0.7%	0.7%
Note: Savings data reported to EIA should be reported as net savings, though it is difficult to tell whether states in fact report net or gross savings		
Excerpted from Table 2, ACEEE Report Number U091, accessed 11/15/09 - http://www.aceee.org/pubs/U091.htm		

The accomplishments reported for 2007 were planned during 2006, in an economy and a regulatory environment very different from the present. Many states passed legislation during or after 2006 requiring future savings levels between one and two percent annually.

Efficiency Vermont has already exceeded the levels noted above. In 2008, it achieved statewide savings of 2.5%[7] and captured 4.5% of the current electric load from efficiency savings in specifically targeted geographic areas.[8]

2. Senate Bill 376 advances the goal of "achieving all cost-effective demand-side savings." (393.1124 RSMo § 4). Cost-effective by definition means that the returns exceed the investment. The cost-effectiveness results presented in Volume 5 of the filing provide evidence that the DSM resources included in the "All DSM" portfolio fall short of the achievable potential and do not achieve the stated policy goal of achieving all cost-effective demand-side savings.. The results for the Total Resource Cost (TRC) test presented in tables 73-146 for each DSM program indicate that far greater levels of efficiency would be cost-effective. The benefit-cost ratio (BCR) using the TRC test is greater than 2.0 for most of the programs.[9] The programs with TRC BCRs less than 2.0 represent just **** percent of the total savings in 2010. Several sizable programs have BCRs exceeding 3.0.

[7] Efficiency Vermont 2008 Annual Report, March 2009. These figures are not yet fully verified by the VT DPS and are subject to adjustment. Past adjustments based on VT DPS EM&V process have ranged from 2% to 12% reduction in tracking estimates.

[8] Ibid. Analysis of geo-targeted loads based on 2006 actual electric loads and assumed 1.5% annual underlying (*i.e.,* without efficiency programs) growth.

[9] Because the benefits in the Total Resource Cost test are based on the avoided cost of supply, any efficiency program with a BCR greater than 1 represents a resource that is less expensive than the supply options used to set the avoided costs.

In response to MDNR's Data Request # 48 GMO provided a summary benefit cost analysis for its entire portfolio for a range of benefit-cost tests, as shown in Table 4 below.

Table 4 – GMO Benefit Cost Ratios (BCR)

KCP&L GMO DSM Portfolio Benefit Cost Test Results	
TEST	**Benefit-Cost Ratio**
Utility Test	***
TRC Test	****
RIM Test	****
Societal Test	****
Participant Test	****

This indicates a substantial additional opportunity for efficiency savings, through the inclusion of additional measures with lower measure-level BCRs (although still greater than 1.0) and/or through increases in program implementation budgets to generate higher program activity levels.

3. GMO reports levelized costs for DSM at ***[10] for new residential programs and ****[11] for new commercial and industrial programs for a weighted five-year average of ****. This is significantly less than the cost of supply for GMO and well under the average three cents per kWh top-performing programs are investing. A preliminary analysis based on linear scaling indicates that investment levels four times higher than GMO's current levelized cost per kWh would result in savings of at least two dollars for every dollar invested.

4. A significant portion of GMO's investment in DSM is directed to demand response programs. These programs, "Optimizer" for the residential sector and "MPower" for the commercial sector do not provide any energy savings.[12] These programs are shown to run for 23 and 20 years respectively, compared to five at most for all of the efficiency programs. These demand response initiatives dominate the utility costs (roughly **** million of **** million or ****) and avoided costs (roughly **** million of **** million or ****).[13] Demand response programs are a smaller yet significant percentage of participant costs, **** or roughly **** million of **** million over 23 years. Figure 1 below illustrates this.

[10] 20 yr RES SRS.xls – tab "Cost per kWh"

[11] C&I_ALL_DSMore Roll-Up Tool_GMOmid_wCAP_20Yr.xls – tab "Cost per kWh"

[12] Due to the design of the DSMore tool it is possible that these programs are shown to provide emissions savings. These are likely to be minimal and not considered in this analysis.

[13] In real 2010 dollars based on information complied from Vol 5, tables 73-147 provided in "MDNR_20090929 Q038 ATT 1Tables_73_147 HC.xls"

Figure 1. Demand Response (DR) Portion of Costs and Benefits
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This is significant in the over-all cost per unit energy of the portfolio The tables below capture a five-year snapshot of this impact.[14]

Table 5 - $/kWh without Demand Response

DSM Expenditure Per Unit Energy (kWh) - Five Year Program			
No Demand Response	Residential	C&I	Aggregate
kWh - Cumulative	****	****	****
kWh - Levelized	****	****	****
Total Utility Cost - Real 2010$	****	****	****
Levelized Cost/ kWh	****	****	****
Average first year cost / kWh	****	****	****

Table 5 shows the levelized cost per kWh excluding the costs of demand response programs over the first five years of the planning horizon. Table 6 shows the impact of including the demand response programs proposed by the company.

[14] Since efficiency programs/measures are only projected for five years, this was chosen as the appropriate time frame for this analysis.

Table 6 - $/kWh with Demand Response

DSM Expenditure Per Unit Energy (kWh) - Five Year Program			
With Demand Response Costs	Residential	C&I	Aggregate
kWh - Cumulative	****	****	****
kWh - Levelized	****	****	****
Total Utility Cost - Real 2010$	****	****	****
Levelized Cost/ kWh	****	****	****
Average first year cost / kWh	****	****	****

Demand response programs increase the levelized cost per lifetime kWh by **** for the residential, C&I, and aggregate portfolios respectively. These large increases in levelized cost occur without contributing kWh savings.

These conclusions support treating demand response and efficiency programs separately to provide a more accurate picture of investment and returns. This is especially critical for the analysis which follows.

5. MDNR Data Request # 47 asked for "the analyses or reports GMO utilized to determine incentive levels, including but not limited to a referenced 'S-curve on simple payback' and 'probability of adoption curves.'" GMO responses included the following statements and documents:

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There is no discernable correlation between the numerical data in these files and the information provided in GMO's IRP. It appears that the Company did not implement the recommendations of its consultant, ****, to whit:

- ****

This conclusion is based on a comparison of GMO's forecast results to the forecast results from the **** report. The GMO figures are based on the five years of efficiency program implementation and exclude demand response program components, since they are not included in the **** report. The **** and is thus a valid bench mark for comparison to the GMO proposal.

Table 7 - GMO Compared to ** ** Base and Optimized Incentive Plan

		Residential	C&I	Aggregate
Utility Share of Incremental Cost	GMO IRP	** **	** **	** **
	Consultant Base	** **	** **	** **
	Consultant Optimized	** **	** **	** **
		Residential	C&I	Aggregate

Levelized Cost per kWh	GMO IRP	** **	** **	** **
	Consultant Base	** **	** **	** **
	Consultant Optimized	** **	** **	** **
		Residential	C&I	Aggregate
Non-Incentive Cost - % of Total	GMO IRP	** **	** **	** **
	Consultant Base	** **	** **	** **
	Consultant Optimized	** **	** **	** **
		Residential	C&I	Aggregate
TRC - No DR	GMO IRP	** **	** **	** **
	Consultant Base	** **	** **	** **
	Consultant Optimized	** **	** **	** **
		Residential	C&I	Aggregate
UCT - No DR	GMO IRP	** **	** **	** **
	Consultant Base	** **	** **	** **
	Consultant Optimized	** **	** **	** **

Table 7 highlights the degree to which the GMO IRP underperforms compared to its own consultant's recommendations.

- The portion of incremental cost for the GMO program is about ** ** the incremental cost selected as optimal in the ** ** report.
- The levelized cost per kWh for the GMO program is less than ** ** of the ** ** optimized program.
- The portion of utility expenditures on non-incentive costs is almost ** ** greater than that of the optimized program.
- Despite this significant under investment, the TRC test ratio is only ** ** that of the ** ** optimized program and the UCT ratio is only about **** better than the ** ** program.

GMO's level of investment in, and acquisition of, efficiency resources fails to meet the requirements of the rule to minimize long run costs.

In summary, the information provided by the Company demonstrates that the selected level of DSM used in most of the alternative resource analysis is artificially constrained and is lower than sources referenced elsewhere by the Company or provided in response to discovery requests. Furthermore, the Company has offered no explanation of the derivation of "All DSM" portfolio. Demand-side resources have therefore not been treated on an equivalent basis to supply-side options.

SECTION (C) CONSISTENT AND ACCURATE INFORMATION

In its filing and responses to MDNR data requests the Company has provided approximately 4.5 gigabytes of electronic information in over 1,000 files. We have found omissions and variances within the documents that have cast doubt on the reliability of GMO's analysis. We present a few examples below.

1. The total of avoided costs presented in response to MDNR#48 is** We have compiled the tabular presentation in Volume 5 HC, Tables 73 – 147, cross checked this data with information provided in response to MDNR # 38 and find that these sources produce total avoided costs of** ** Thus, the two sources produce different values for total avoided costs, even though they produce the exact same values for participant costs, utility costs, and environmental benefits. The 30% difference in values for total avoided cost is significant.

2. As we have noted in the previous section (See Tables 5 and 6) the Company appears to have several estimates of potential that are not linked and appears to have utilized the lowest value in its planning. As we also noted in the same section, it appears that the potential estimate shown for the commercial and industrial sector is applicable to a different KCP&L service territory.

3. The presentation of data has not been done in a consistent format. For example, three files purport to represent the summary data for the programs. The files are:

   CEP_2_042709.xls
   20 yr RES SRS.xls
   C&I_ALL_DSMore Roll-Up Tool_GMOmid_wCAP_20Yr.xls

   The first file, which appears to relate to existing programs, is set up in a completely different manner than the second two, which appear to summarize the data for the new residential and C&I sectors. It does not contain a comparable data set.

4. GMO's conclusions are not consistent with its underlying analysis.

   Tables 8 and 9 below show the variety of annual incremental energy savings presented in GMO's filings and data response.

Table 8 – Incremental MWh savings by KCP&L-GMO source

	Volume 6		Volume 5			From Vol 5 Tables 73-147		
Year	All DSM	1% DSM	Res - Table 64	C&I - Table 65	Total	Res	C&I	Total
2010	23,591	87,970	** **	** **	** **	** **	** **	** **
2011	28,573	89,779	** **	** **	** **	** **	** **	** **
2012	31,332	91,673	** **	** **	** **	** **	** **	** **
2013	35,425	93,112	** **	** **	** **	** **	** **	** **
2014	22,599	94,614	** **	** **	** **	** **	** **	** **

Table 9 - Difference in Incremental Savings Estimates (% Load)

Year	"All" DSM	1% DSM	Vol 5 Potential Estimates	Vol 5 Tables 73-174
2010	0.27%	1.00%	** **	** **
2011	0.32%	1.00%	** **	** **
2012	0.34%	1.00%	** **	** **
2013	0.38%	1.00%	** **	** **
2014	0.24%	1.00%	** **	** **

The file "2009 GMO RP Supplemental Filing HC.pdf," submitted on November 2, 2009, states that the total C&I efficiency potential "is equal to an annual average energy savings of about ****"[15] This estimate of savings appears to be **** , and significantly larger than, the annual savings displayed in any of the other analysis presented by the Company.

These data issues have made our analysis significantly more difficult and reduced the level of confidence that can be placed in GMO's conclusions.

Conclusion

Every kilowatt-hour of cost-effective DSM resources that GMO does not acquire represents lost value for ratepayers and society. The tables below demonstrate the magnitude, if not the absolute value, of the lost opportunity. Due to the data issues noted above, we are not able to present this analysis at a higher level of precision.

For this comparison we used GMO data in our possession that inspired the greatest confidence (see Table 10). This is the summary of data for the DSM alternative described as "All DSM" as compiled from Table 73 – 147 in Volume 5. The only value GMO provided for the DSM alternative described as "1% DSM" was for the MWh savings. We scaled the other factors for this portfolio by ratios derived from the Volume 5 data.

Table 10 – Foregone Economic Benefit[16] -Societal Cumulative Presnet Worth

Program Year		MWh	Utility Cost	Avoided Cost	Participant Costs	Cumulative Present Worth
1	"All" DSM Vol 5	43,487	** **	** **	** **	** **
2		93,599	**	** **	** **	** **
3		149,717	** **	** **	** **	** **
4		197,771	** **	** **	** **	** **
5		246,483	** **	** **	** **	** **

[15] 2009 GMO IRP Supplemental Filing HC.pdf, page 13

II[16] Utility Discount rate per GMO – 8.25%

Five Year Total						****
1	1% DSM	87,970	** **	** **	** **	** **
2		177,749	** **	** **	** **	** **
3		269,422	** **	** **	** **	** **
4		362,534	** **	** **	** **	** **
5		457,148	** **	** **	** **	** **
Five Year Total						****
Five Year Benefit of 1% Plan						** **

[NOTE: In the above table "Cumulative Present Worth" is not equivalent to Net Present Value (NPV). It represents the annual difference between the benefits and costs expressed in constant dollars. NPV, by comparison, represents the total lifetime difference between the benefits and costs expressed in constant dollars. The fact that the present worth is negative in the first years is due to the nature of DSM activities. The investment, or cost, is generally incurred in one year and the benefits accrue over a number of years.]

Not all of the impacts of the lost opportunity are fully monetized. Table 11 below captures the difference in emissions between the two portfolios. To prepare this analysis we used the following assumptions:

- Aggregate emissions factors from GMO's own plants are representative of the total load emissions factors;
- Coal generation contributes all but a small increment of the emissions, and thus the impact of other energy sources is not included; and,
- The energy contribution of coal in GMO's plant mix, 85.9% of generation, is representative of the contribution of coal for GMO's total load.[17]

Foregone Emissions Savings							
				NOx (lb/MWh)	SOx(lb/MWh)	CO2(lb/MWh)	CH4(lb/MWh)
Program Year		MWh	Coal MWh	7.05	9.71	2299.87	26.16
1	"All" DSM Vol 5	43,487	37,356	263,357	362,723	85,913,030	977,223
2		93,599	80,402	566,832	780,701	184,913,558	2,103,310
3		149,717	128,607	906,679	1,248,774	295,779,330	3,364,359
4		197,771	169,886	1,197,693	1,649,589	390,714,745	4,444,207
5		246,483	211,729	1,492,686	2,055,884	486,948,197	5,538,820
Five Year Total				4,427,255	6,097,681	1,444,271,161	16,427,943
1	1% DSM	87,970	75,566	532,743	733,749	173,792,704	1,976,815
2		177,749	152,687	1,076,441	1,482,587	351,159,408	3,994,282
3		269,422	231,434	1,631,608	2,247,222	532,267,534	6,054,307
4		362,534	311,417	2,195,487	3,023,855	716,217,749	8,146,659
5		457,148	392,690	2,768,466	3,813,022	903,136,366	10,272,775
Five Year Total				12,632,000	17,398,116	4,120,844,921	46,872,781
Five Year Benefit of 1% Plan (pounds)				8,204,744	11,300,435	2,676,573,760	30,444,838

[17] Vol 1, Table 2, page 5

Table 11 - Foregone Emissions Savings

Table 11 compares the "All DSM" portfolio from Volume 5 to the "1% DSM" alternative portfolion. These two were the only portfolios that provided detailed emissions data. Due to accomplishments in other jurisdictions and the incomplete and inconsistent data GMO provided, we anticipate that a more rigorous analysis would develop a significantly higher level of savings.

Remedy for Deficiency #1 – GMO should update its estimates of cost-effective DSM potential and update all subsequent analysis and program designs based on this revision.

GMO's IRP does not meet the fundamental objectives of 4 CSR 240-22.010 (2). As such, the only remedy possible is a complete revision of the demand-side resource analysis and plans. The revised analysis must meet the following requirements:

1. At least one alternative resource plan shall include demand-side resources with an aggregate benefit-cost ratio (BCR) for efficiency programs no greater than 2.0 excluding demand response programs. This BCR target shall be achieved by progressively adding new energy efficiency measures with lower BCRs or by more aggressive implementation of measures that are already included, but not by discarding energy efficiency measures with higher BCRs unless doing so would increase the portfolio's overall cost effectiveness;

2. At least one additional alternative resource plan shall include demand-side resources with an aggregate benefit-cost ratio for efficiency programs between 2.0 and 3.0 excluding demand response programs;

3. The alternative resource plans shall project investments in DSM over a period equivalent to that for projected investments in supply;

4. Full accounting for the impact of increased DSM on the need for supply; and

5. KCP&L-GMO shall clearly define and document a consistent set of assumptions, inputs, and outputs for the DSM analysis, including BCRs for individual programs and aggregate BCRs for DSM program portfolios and annual load impacts of DSM program portfolios.

DEFICIENCY #2 – MAJOR END USE EXCLUDED

GMO fails to include consumer electronics ("plug loads"), a significant end use, in its planning. The relevant rule is:

4 CSR 240-22.050 (1)(C) "All major end uses, including at least…."

The PSC IRP rule requires that the analysis of demand-side measures and programs shall provide broad coverage of "all major end uses, including at least…" a list of specified end uses. GMO

excludes a significant end-use category, consumer electronics and plug loads. These loads constitute approximately 10% to 15% of all residential electricity consumption. Significant contributors to load are both the numbers of these devices and the amount of energy they consume when in "standby" mode, which is what "off" is for many devices on the market and in homes today. Nationally, these devices account for between 114 and 146 billion kWh per year, or 3% to 4% of all energy use. It is estimated that 40% of this energy is used while the devices are nominally "off." This is a significant and expanding energy end-use. This end-use includes:

a) small AC/DC converters and other plug loads.
b) consumer electronics e.g. televisions, set-top boxes, audio equipment.
c) computer and home office equipment.

MDNR Data Request # 2 raised this issue noting that this issue had been raised in a previous KCP&L IRP and asking that GMO "explain why KCP&L did not screen these measures in its GMO filing." GMO responded as follows:

** **

GMO did include measures for "Other Office Equipment," a comparable end use in the C&I sector, without noting the need for extensive analysis.[18] GMO also stated, with reference to the Multi-Family Residential Study that "Plug load electronics will be collectively reviewed as one potential measure. Under this measure the following technologies will be reviewed: a) televisions; b) set top boxes (cable or satellite); c) home computers/notebooks; d) printers; e) wireless routers; f) modems; g) compact audio systems; h) home entertainment systems; and i) DVD players. The qualification threshold for each of these measures will be whether or not they meet Energy Star [sic] standards."[19]

This is not emerging or speculative technology. The USEPA/DOE EnergyStar program provides a list of EnergyStar products for this end use. ACEEE's Consumers Guide to Home Energy Savings online version and the Federal Energy Management Program also provide comprehensive resources online. GMO should develop a program to capitalize on these resources and capture significant savings from this ignored end-use immediately.

Remedy #2 - GMO should include measures to save energy in this end-use category in 2010 programs based on existing analysis noted above without further delay.

DEFICIENCY #3 – ON-SITE RENEWABLE ENERGY

GMO does not include cost-effective renewable resources in its portfolio. The relevant rule is:

4 CSR 240-22.050 (1)(D) – "Renewable energy sources and energy technologies that substitute for electricity at the point of use."

[18] Vol 5, page 121.
[19] Vol 5, page 180

The PSC IRP rule requires that "technologies [are to be considered] that substitute for electricity at the point of use." Analysis provided by GMO in response to MDNR Data Request # 7 showed that two technologies, Solar Hot Water Systems and Solar Hot Air Systems had internal rates of return** and simple paybacks** that provide a benefit cost ratio greater than one without a utility incentive.[20] GMO reports that these measures **** the probable environmental benefits ("PEB") test.[21]

These technologies are generally found to be cost effective, in particular solar hot water even in northern climates. We believe that the treatment of emissions noted in the Primary Deficiency section above and specific artifacts of the analysis methodology resulted in failure of the PEB test. We note that the rule states that "The utility may relax this criterion [PEB test] for measures that are judged to have potential benefits which are not captured by the estimated load impacts or avoided costs."[22]

Remedy #3. We recommend that GMO develop a pilot project for these measures to evaluate consumer acceptance and metered savings.

DEFICIENCY #4 - CHP

GMO fails to include customer-sited combined heat and power resources that substitute for electricity at the point of use in its plan. The relevant rule is:

4 CSR 240-22.050 (1)(D) – "Renewable energy sources and energy technologies that substitute for electricity at the point of use."

GMO did not analyze the opportunity for combined heat and power ("CHP") applications, a significant and cost-effective demand-side resource. In the year 2000 an analysis for the U.S. Department of Energy estimated that the potential for CHP in the commercial and institutional sector alone was over 1,000 MW.[23] A recent review of CHP potential studies showed an average of 11.3% of peak load could be achieved from this resource (see Table 12).

20 MDNR_20090929 Q007 ATT 1 Renewable Energy System Performance Analysis_06_2009 HC.pdf

21 MDNR_20090929 Q007 ATT 2 Renewables Cost Effectiveness Summary_0909 HC.pdf, page 5.

22 4 CSR 240-22.050 (3) (E)

23 USDOE Energy Information Administration. *The Market and Technical Potential for Combined Heat and Power in the Commercial/Institutional Sector.* 2000, Washington, DC. : ONSITE SYCOM Energy Corporation.

Table 12 - CHP Potential

Summary of CHP Potential Study Results for Industrial & Commerical/Institutional Sectors							
State	Peak Load (MW)	Technical Potential (MW)	Base Mkt Potential (MW)	Intervention Potential (MW)	Tech % of Peak	Base Mkt % of Peak	Intervention % of Peak
CT	6,734	1,673	N/A	N/A	24.8%	N/A	N/A
ID	3,738	1,055	76	427	28.2%	2.0%	11.4%
MA	7,122	4,685	N/A	N/A	65.8%	N/A	N/A
MI	20,435	5,598	198	633	27.4%	3.5%	11.3%
NJ	17,275	4,557	1,367	2,734	26.4%	7.9%	15.8%
NY	38,262	8,477	764	2,169	22.2%	2.0%	5.7%
OR	25,043	3,452	384	1,831	13.8%	1.5%	7.3%
WA	17,476	4,860	731	2,847	27.8%	4.2%	16.3%
AVERAGE					29.5%	3.5%	11.3%

The energy source for CHP installations can range from opportunity fuels, such as process wastes, to renewables and fossil fuels. Regardless of the energy source, they reduce demand on the transmission and distribution system, reduce the need for imported and central station generation, and have often have positive economic and environmental impacts for both the customer and the load serving entity.

MDNR raised this issue in regard to KCP&L's IRP in Case No. EE-2008-0034. In the Nonunanimous Stipulation and Agreement for this case KCP&L agreed to enter into advisory discussions with the parties in response this issue and agrees to "include Combined Heat and Power (CHP) applications in the screening of end-use measures."

Remedy # 4. GMO should include CHP measures the screening of end-use measures, analyze the potential for CHP in its service territory, and develop and implement a program to acquire these resources as part of its 2010 DSM program.

DEFICIENCY #5 - RESEARCH

GMO has not demonstrated sufficient research to support comprehensive program development. The relevant rule is:

4 CSR 240-22.050 (5) – "The utility shall conduct market research studies, customer surveys, pilot demand-side programs, test marketing programs and other activities as necessary to estimate the technical potential of end-use measures and to develop the information necessary to design and implement cost-effective demand-side programs. These research activities shall be designed to provide a solid foundation of information about how and by whom energy-related decisions are made and about the most appropriate and cost-effective methods of influencing these decisions in favor of greater long-run energy efficiency."

Volume 5, Section 5 of the IRP includes reference to a host of market research activities. MDNR Data Requests # 12 through 21 asked for more information on this list of market research activities. We present as summary of the responses for each of the activities listed in Volume 5 (see Table 13).

Table 13: GMO Research Activities

Research Activity	Comment
J.D Power Customer Satisfaction	** **
J.D Power Communications Tracking	** **
Account Link	** **
Customer Solutions	** **
TQS Research	** **
Product & Services Awareness	** **
Concept Screening	** **
Online Energy Analyzer Campaign	** **
Cool Homes	** **
Energy Optimizer	** **
Focus Groups	** ** **
Customer Understanding (GMO Focus)	** ** **.
Segmentation	** **
Call Center	** **
Web Research	** **
Chartwell	** **
ESource	** **
EPRI	** **

As the summary shows, a significant portion of the research activities are focused on general customer satisfaction and attitudes. We note that the evaluation plan, included as appendix 7B, includes a program design/market assessment component.

Remedy #5. GMO should, in consultation with the parties, develop a comprehensive research plan that complements its evaluation plan and is targeted on energy efficiency.

DEFICIENCY #6 – COST-EFFECTIVE MEASURES

The GMO plan lacks several appropriate and cost-effective end use measures. The relevant rule is:

4 CSR 240-22.050 (6)(C) - "Assemble menus of end-use measures that are appropriate to the shared characteristics of each market segment and cost-effective as measured by the screening test"

GMO's plan failed to include a significant number of commonly implemented appropriate energy efficiency measures

MDNR Data Request # 4 submitted a list of measures commonly available in other jurisdictions and asked GMO why these were not screened. GMO responded that **

We applaud GMO's implementation of these measures on a custom basis. However, since many of these measures are offered on a prescriptive basis in other jurisdictions, limiting these

measures to custom projects unnecessarily constrains the quantity of savings achievable from these measures.

Remedy # 6. GMO should develop prescriptive approaches for the following measures, screen these measures, and add those that pass the PEB test to its programs and portfolio (see Table 14).

Table 14: End-Use Measures to be Considered

End-Use (Sector)	Measures
Food Service (C&I)	Hot water boost heaters Efficient hood systems Efficient fryolators Efficient Ovens (combination, convection, conveyor, rack) Efficient steam cookers & griddles Insulated holding cabinets Scroll and discus compressors Zero Energy Doors (refrigeration)
Lighting & HVAC (C&I)	Integrated energy management systems Dual Enthalpy Economizer
Compressed Air (C&I)	Efficient compressors Cycling dryers No Loss Condensate Drains Air Receivers for Load/No Load Compressors Air system audits and leak elimination Compressed Air Controls
Transformers (C&I)	Energy Star Transformers
Accommodations (C&I)	Key activated systems
HVAC (Res)	Efficient furnace fans (ECM, variable speed,etc.) Efficient ceiling fan Efficient ventilation fans
Clothes Dryer (Res)	Clothes dryer fuel switch
Waterbed (Res)	Replace waterbed with conventional mattress

DEFICIENCY # 7 – PLANNING HORIZON

GMO did not meet the requirement of the rule to use a twenty-year planning horizon for all resources. The relevant rule is:

4 CSR 240-22.060 (4) – "The analysis shall cover a planning horizon of at least twenty (20) years."

GMO used a planning horizon of twenty years for investment in supply-side resources pursuant to the rule. It used a planning horizon of only 5 years for demand-side resources except for its demand response offerings, *Optimizer* and *MPower*. Its modeling shows only five years of implementation budget for DSM programs. The planning horizon is defined at 4 CSR 240-22.020 Definitions (43), referenced in several sections of 4 CSR 240-22.050 including sections seven, eight, and eleven.

Remedy #7. GMO should develop demand-side resource acquisition plans for the full planning horizon, and project implementation beyond the fifth program year.

REQUEST FOR NONTRADITIONAL ACCOUNTING PROCEDURES UNDER 4 CSR 240-22.080 (2)

The Company's original filing included a proposal for nontraditional accounting procedures in Section 2 of Volume 8. This proposal included the following components:

1. Deferral of DSM program costs and accrual of an allowance for funds used during construction ("AFUDC");
2. Recovery of lost margins; and,
3. A performance incentive for meeting or exceeding DSM program energy goals.[24]

MDNR Data Request # 45, submitted on September 29th, is as follows:

Please describe, in reference to GMO's proposed performance mechanism the following:

a) The means of accounting for the return of and on DSM investments and the recovery of lost margins;
b) How these mechanisms, without the proposed performance incentive, fail to remove the disincentive to pursue DSM;
c) The means of recovering/retaining GMO's earned performance incentive and its impact on rates and bills; and
d) Please provide the projected maximum dollar value of the performance incentive for each of the four proposed performance payout levels

GMO's initial response, dated October 23rd, referred back to its original filing, noted that GMO is in the process of "evaluating non-traditional options," and stated that "We are currently modeling the estimated cost recovery and incentive levels required and will provide that data within two weeks."

GMO revised its proposal in a "highly confidential" response dated November 16.. 16th. The revised proposal **

We find this proposal deeply flawed in at least two ways:

1. Theoretical – ** ** runs counter to the intent of performance incentives in general and to the best practices in the industry.
2. Financial – ** ** the normal range of incentive awards expressed as a proportion of utility investment.

The following sections address each of these issues in turn.

Theoretical – Lost Margin Recovery and Performance Incentives

[24] Vol 8, page 5 et.seq.

The Company's proposal is flawed in this regard in the following ways:

- Lost Margin Recovery ("LMR") is typically allowed for a limited period of time. Regulatory theory acknowledges that the reduction of throughput from utility sponsored efficiency efforts may have detrimental impacts on utility returns, especially in the cases where the utility has incurred fixed costs to serve a greater load. The theory also posits that between planning cycles, natural load growth, and capital investment cycles, the impact of efficiency efforts is absorbed in a limited period of time, typically set around three to five years. LMR mechanisms typically require precise evaluation and close monitoring of efficiency program impacts to assure that the utility neither over collects nor under collects.

  GMO's proposal, **** Measure lives vary by measure and by program, but a typical average measure life, weighted by contribution to savings, is in the range of 10 years. The outcome of this proposal is that ****

- Performance incentives can be designed to achieve several goals. They can align utility interests with the ratepayers' interest in reducing bills, encourage exceptional performance, promote stabilization of customer rates and bills, and stabilize utility revenues. It appears that GMO's proposed performance incentive is primarily designed to ****

  Performance incentive mechanisms typically specify a minimum threshold of performance under which no incentive is received, an absolute cap on the maximum incentive relative to some fixed quantity, and a significant award for outstanding performance. GMO's proposal ****[25]

Financial – Unusually Rich

GMO's November 16th response provides a preliminary analysis of the dollar value of the incentive based in the first year of implementation. We present these estimates relative to total utility cost for the same year, as calculated from Tables 73 – 174 in Volume 5 of the IRP.

[25] For more information on LMR and performance incentives, see the National Action Plan for Energy Efficiency's guide *Aligning Utility Incentives with Energy Efficiency.*

Table 135- GMO First Year Incentive Compared to Utility Cost

% of Goal	65%	85%	100%	115%
Incentive	** **	** **	** **	** **
Utility Cost	** **	** **	**	** **
Incentive as % of Cost	** **	** **	** **	** **

For comparison, we present the maximum performance incentives expressed as a portion of program costs from a variety of jurisdictions below.[26]

Table 16- Other Incentives

Jurisdiction	Cap as % of Program Costs
Arizona	10%
Connecticut	8%
Massachusetts	5%
New Hampshire	12%
Vermont	<3%

In short, GMO proposes **** The California Public Utilities Commission has set a cap of 12% of shared savings while the Hawaiian Electric Company receives the maximum incentive of 5% of net system benefits if it exceeds its targets by 10%.[27]

[26] Ibid, except for Vermont.

[27] Ibid.