VOLUME 6:

INTEGRATED ANALYSIS

KCP&L GREATER MISSOURI OPERATIONS COMPANY (GMO)

INTEGRATED RESOURCE PLAN

CASE NO. EE-2009-0237

4 CSR 240-22.060

**** PUBLIC ****

KCP&L
energizing life

TABLE OF CONTENTS

TABLE OF TABLES

TABLE OF FIGURES

INDEX OF RULES COMPLIANCE

VOLUME 6: INTEGRATED RESOURCE ANALYSIS - REVISED

PURPOSE: This rule requires the utility to design alternative resource plans to meet the planning objectives identified in 4 CSR 240-22.010(2) and sets minimum standards for the scope and level of detail required in resource plan analysis, and for the logically consistent and economically equivalent analysis of alternative resource plans.

SECTION 1: RESOURCE PLANNING OBJECTIVES

(1) Resource Planning Objectives. The utility shall design alternative resource plans to satisfy at least the objectives and priorities identified in 4 CSR 240-22.010(2). The utility may identify additional planning objectives that alternative resource plans will be designed to serve.

The Company elected to look at several drivers in developing the alternative resource plans to be studied in the integrated analysis. Results of the screening analysis preformed for the August 5, 2009 IRP filing were still considered viable with some changes due to information gathered in subsequent RFPs. A total of twelve (12) alternative resource plans are included in this revised integrated analysis. The Integrated Analysis was modified from the method used in the August 5, 2009 and January 18, 2011 filings to incorporate additional recommendations from the Stakeholder Process and Utility Risk Summit held on March 30, 2011.

The issues that drove plan selection for this filing are the impact of DSM programs, ** [redacted] **, choice of alternative generation, natural gas conversion, early imposition of environmental rules, and the risk of a Federal Energy Efficiency Standard.

As required by Rule 22.010(2), demand-side resources were analyzed on an equivalent basis with supply-side resources. Net present value of revenue requirements [NPVRR] of each plan including probable environmental costs [PEC]

was calculated. Minimization of NPVRR with PEC was used as the primary criteria for determination of the ordinal preference of a particular plan.

Table 1 below summarizes the alternative resource plans simulated for this filing.

Table 1: Alternative Resource Plans ** Highly Confidential **

		[redacted]					
CAA00	ENHANCED		X				
CAA01	ENHANCED			X			
CAB00	ENHANCED		X				
CAB01	ENHANCED			X			
CAB02	ENHANCED						X
CAB04	ENHANCED		X		X		
CAB05	ENHANCED		X		X		
CBB00	ENHANCED		X				
CCB00	ENHANCED		X				
CCB01	ENHANCED		X			X	
CXX00	ENHANCED		X				
XAB00	NONE		X				

Tabular data that created Table 1: Alternative Resource Plans is provided on the work paper disc in an Excel file entitled "Table240-22 060(1)Alternative Resource Plans.xlsx"

1.1 PLANS CAA00 AND CAA01

These plans study the risk of an early imposition of environmental rules ** [redacted] **

1.2 PLANS CAB00 AND CAB01

These plans study the risk of a staged environmental policy ** [redacted] **

1.3 PLAN CAB02

This plan studies the risk of a Federal Energy Efficiency Standard modeled on the "Markey Bill" HR 889. Please note that this is not the same bill that was incorporated as Title II of the Waxman-Markey Bill. Due to the large market price adjustments the results of this plan are also simulated using a separate risk analysis. This additional analysis is described in detail in Section 2.14.1 of Volume 7. This Plan is not included among the Plans simulated in the non-Federal Energy Efficiency Standard analysis due to the fact that this plan would not meet reserve requirements for native load without the load reduction from the Standard.

1.4 PLANS CAB04 AND CAB05

These plans look at an additional construction of 100MW of wind generation above what is required for Missouri Proposition C requirements. Plan CAB04 assumes the additional wind generation goes online 1/1/2015 while Plan CAB05 assumes the additional wind generation goes online 1/1/2020.

1.5 PLANS CBB00, CCB00 AND CXX00

These plans look at ** [redacted] **

1.6 PLAN CCB01

This plan studies the effectiveness of converting Lake Road 4/6 fuel from 100% coal to 100% natural gas. It is a similar plan to Plan CCB00 which assumes a retrofit of Lake Road 4/6.

1.7 PLAN XAB00

This plan tests the effectiveness of the DSM programs by assuming no DSM effects within the portfolio. This plan ** [redacted]

[redacted] **

SECTION 2: PERFORMANCE MEASURES

(2) Specification of Performance Measures. The utility shall specify a set of quantitative measures for assessing the performance of alternative resource plans with respect to identified planning objectives. These measures shall include at least the following: present worth of utility revenue requirements, present worth of probable environmental costs, present worth of out-of-pocket costs to participants in demand-side programs, levelized annual average rates and maximum single-year increase in annual average rates. All present worth and levelization calculations shall use the utility discount rate and all costs and benefits shall be expressed in nominal dollars. Utility decision-makers may also specify other measures that they believe are appropriate for assessing the performance of resource plans relative to the planning objectives identified in 4 CSR 240-22.010(2)

GMO calculated each of the specified performance measures using the methods described below.

GMO has calculated a 20-year net present value of the revenue requirement (NPVRR) estimate of the individual plans. The calculation methodology consisted of simulating each alternative plan by use of the MIDAS™ model through 100 scenarios. Each scenario simulates a set of long-term market assumptions as described by the decision tree detailed in Volume 7, Risk Analysis and Strategy Selection, Section 3 of this filing. These simulations calculate each alternative plan's annual revenue requirement for each of the risk tree scenarios. The annual revenue requirement is then discounted over the 20-year study period using a constant discounting factor and weighted for each scenario's expected probability. The NPVRR used for the ranking of plans includes probable environmental costs (PEC). Throughout this report, the term "NPVRR" is assumed to include the PEC unless otherwise stated.

The present worth of PEC are calculated by running an alternative plan through the MIDAS™ model process described in the preceding paragraph. However as the

environmental costs are integrated into each plan, it is not possible to distinctly and separately estimate these costs without greatly changing the nature of the alternative plan. For this filing, the PEC are fully incorporated in the NPVRR analysis and measurement.

The present worth of DSM program costs is calculated from the annual expected cash outlays for the DSM portfolio of programs included in an alternative resource plan. These annual costs are discounted using the same discount rate used to develop NPVRR. This information is a part of the definition of the alternative plan and treated as an input component of the simulation. Therefore this value does not vary with the risk tree scenario and no risk distributions can be developed. All plans use the Enhanced level of DSM, subject to approval of the GMO Missouri Energy Efficiency Investment Act (MEEIA) filing, referred to in Appendix 7A, with the exception of Plan XAB00 which tests the sensitivity of having no DSM in the future.

Annual rates are developed by taking the annual revenue requirement as calculated for each plan under each of the 100 scenario endpoints. The value of each scenario annual revenue requirement is weighted by each scenario endpoint probability to determine the plan expected revenue requirement. This value is divided by the total kilowatt-hour net retail system load to arrive at an expected average retail rate. This process simulates perfect rate making. Levelized annual rates are 20-years of expected annual rates averaged over the plan horizon.

The maximum single-year increase in annual rates compares each expected annual rate increase or decrease as a percentage. The maximum rate increase is then reported.

A summary of these measures for each revised integrated analysis plan is included in Table 2 below. GMO holds that these measures are appropriate for assessing the performance of resource plans relative to the planning objectives identified in 4 CSR 240-22.010(2).

Table 2: Plan Performance Measures

Plan	NPVRR ($MM)	DSM Costs ($MM)	Levelized Annual Rates ($/kw-hr)	Maximum Rate Increase
CAA00	12,677	153.50	0.1417	17.84%
CAA01	12,773	153.50	0.1432	19.09%
CAB00	12,603	153.50	0.1413	12.42%
CAB01	12,695	153.50	0.1427	12.42%
CAB04	12,670	153.50	0.1419	14.63%
CAB05	12,661	153.50	0.1420	12.42%
CBB00	12,754	153.50	0.1432	14.09%
CCB00	12,689	153.50	0.1422	13.82%
CCB01	12,778	153.50	0.1434	14.32%
CXX00	12,752	153.50	0.1430	14.46%
XAB00	13,066	-	0.1402	11.87%

Tabular data that created Table 2: Plan Performance Measures is provided on the work paper disc in an Excel file entitled "Table240-22.060(2)Plan Performance Measures.xlsx"

SECTION 3: ALTERNATIVE RESOURCE PLANS

(3) Development of Alternative Resource Plans. The utility shall use appropriate combinations of candidate demand-side and supply-side resources to develop a set of alternative resource plans, each of which is designed to achieve one (1) or more of the planning objectives identified in 4 CSR 240-22.010(2). The alternative resource plans developed at this stage of the analysis shall not include load-building programs, which shall be analyzed as required by section (5) of this rule.

Alternative resource plans were developed using a combination of various supply-side resources, demand-side resources, environmental retrofits with differences respecting the timing of resource additions. The issues that drove plan selection for this filing are the impact of DSM programs, ** [redacted] **, choice of alternative generation, natural gas conversion, early imposition of environmental rules, and the risk of a Federal Energy Efficiency Standard. In total, twelve (12) alternative resource plans were developed for this integrated resource analysis.

As required by Rule 22.010(2), demand-side resources were analyzed on an equivalent basis with supply-side resources. NPVRR of each plan including PEC was calculated. Minimization of NPVRR with PEC was used as the primary criteria for determination of the ordinal preference of a particular plan.

The complete set of all alternative resource plans used in the revised integrated analysis are detailed in the following tables.

Table 3: Integrated Analysis-Plan CAA00 ** Highly Confidential **

PLAN CAA00						
YEAR	SOLAR	WIND	CT	CC	DSM	[redacted]
2012	-	-	-	-	54	
2013	-	-	-	-	73	
2014	3	100	-	-	93	
2015	-	-	308	-	112	
2016	-	-	-	-	131	
2017	-	-	-	-	149	
2018	7	100	-	-	168	
2019	-	100	-	-	186	
2020	-	-	-	-	194	
2021	7	150	-	-	207	
2022	-	-	-	-	218	
2023	-	-	-	-	235	
2024	1	-	-	-	253	
2025	-	-	-	-	270	
2026	-	-	-	-	288	
2027	1	-	-	-	306	
2028	-	-	154	-	324	
2029	-	-	-	-	342	
2030	-	-	-	-	361	
2031	-	-	-	-	361	

Table 4: Integrated Analysis Plan CAA01 ** Highly Confidential **

PLAN CAA01						
YEAR	SOLAR	WIND	CT	CC	DSM	[redacted]
2012	-	-	-	-	54	
2013	-	-	-	-	73	
2014	3	100	-	-	93	
2015	-	-	-	300	112	
2016	-	-	-	-	131	
2017	-	-	-	-	149	
2018	7	100	-	-	168	
2019	-	100	-	-	186	
2020	-	-	-	-	194	
2021	7	150	-	-	207	
2022	-	-	-	-	218	
2023	-	-	-	-	235	
2024	1	-	-	-	253	
2025	-	-	-	-	270	
2026	-	-	-	-	288	
2027	1	-	-	300	306	
2028	-	-	-	-	324	
2029	-	-	-	-	342	
2030	-	-	-	-	361	
2031	-	-	-	-	361	

Table 5: Integrated Analysis Plan CAB00 ** Highly Confidential **

PLAN CAB00					
YEAR	SOLAR	WIND	CT	CC	DSM
2012	-	-	-	-	54
2013	-	-	-	-	73
2014	3	100	-	-	93
2015	-	-	-	-	112
2016	-	-	-	-	131
2017	-	-	-	-	149
2018	7	100	154	-	168
2019	-	100	154	-	186
2020	-	-	-	-	194
2021	7	150	-	-	207
2022	-	-	-	-	218
2023	-	-	-	-	235
2024	1	-	-	-	253
2025	-	-	-	-	270
2026	-	-	-	-	288
2027	1	-	-	-	306
2028	-	-	154	-	324
2029	-	-	-	-	342
2030	-	-	-	-	361
2031	-	-	-	-	361

Table 6: Integrated Analysis Plan CAB01 ** Highly Confidential **

PLAN CAB01					
YEAR	SOLAR	WIND	CT	CC	DSM
2012	-	-	-	-	54
2013	-	-	-	-	73
2014	3	100	-	-	93
2015	-	-	-	-	112
2016	-	-	-	-	131
2017	-	-	-	-	149
2018	7	100	-	300	168
2019	-	100	-	-	186
2020	-	-	-	-	194
2021	7	150	-	-	207
2022	-	-	-	-	218
2023	-	-	-	-	235
2024	1	-	-	-	253
2025	-	-	-	-	270
2026	-	-	-	-	288
2027	1	-	-	300	306
2028	-	-	-	-	324
2029	-	-	-	-	342
2030	-	-	-	-	361
2031	-	-	-	-	361

Table 7: Integrated Analysis Plan CAB02 ** Highly Confidential **

PLAN CAB02					
YEAR	SOLAR	WIND	CT	CC	DSM
2012	-	-	-	-	54
2013	-	-	-	-	73
2014	3	100	-	-	93
2015	-	-	-	-	112
2016	-	-	-	-	131
2017	-	-	-	-	149
2018	7	100	-	-	168
2019	-	100	-	-	186
2020	-	-	-	-	194
2021	7	150	-	-	207
2022	-	-	-	-	218
2023	-	-	-	-	235
2024	1	-	-	-	253
2025	-	-	-	-	270
2026	-	-	-	-	288
2027	1	-	-	-	306
2028	-	-	-	-	324
2029	-	-	-	-	342
2030	-	-	-	-	361
2031	-	-	-	-	361

Table 8: Integrated Analysis Plan CAB04 ** Highly Confidential **

PLAN CAB04					
YEAR	SOLAR	WIND	CT	CC	DSM
2012	-	-	-	-	54
2013	-	-	-	-	73
2014	3	100	-	-	93
2015	-	100	-	-	112
2016	-	-	-	-	131
2017	-	-	-	-	149
2018	7	100	154	-	168
2019	-	100	-	-	186
2020	-	-	154	-	194
2021	7	150	-	-	207
2022	-	-	-	-	218
2023	-	-	-	-	235
2024	1	-	-	-	253
2025	-	-	-	-	270
2026	-	-	-	-	288
2027	1	-	-	-	306
2028	-	-	154	-	324
2029	-	-	-	-	342
2030	-	-	-	-	361
2031	-	-	-	-	361

Table 9: Integrated Analysis Plan CAB05 ** Highly Confidential **

PLAN CAB05						
YEAR	SOLAR	WIND	CT	CC	DSM	[redacted]
2012	-	-	-	-	54	
2013	-	-	-	-	73	
2014	3	100	-	-	93	
2015	-	-	-	-	112	
2016	-	-	-	-	131	
2017	-	-	-	-	149	
2018	7	100	154	-	168	
2019	-	100	154	-	186	
2020	-	100	-	-	194	
2021	7	150	-	-	207	
2022	-	-	-	-	218	
2023	-	-	-	-	235	
2024	1	-	-	-	253	
2025	-	-	-	-	270	
2026	-	-	-	-	288	
2027	1	-	-	-	306	
2028	-	-	154	-	324	
2029	-	-	-	-	342	
2030	-	-	-	-	361	
2031	-	-	-	-	361	

Table 10: Integrated Analysis Plan CBB00 ** Highly Confidential **

PLAN CBB00						
YEAR	SOLAR	WIND	CT	CC	DSM	[redacted]
2012	-	-	-	-	54	
2013	-	-	-	-	73	
2014	3	100	-	-	93	
2015	-	-	-	-	112	
2016	-	-	-	-	131	
2017	-	-	-	-	149	
2018	7	100	154	-	168	
2019	-	100	-	-	186	
2020	-	-	-	-	194	
2021	7	150	-	-	207	
2022	-	-	-	-	218	
2023	-	-	-	-	235	
2024	1	-	-	-	253	
2025	-	-	154	-	270	
2026	-	-	-	-	288	
2027	1	-	-	-	306	
2028	-	-	-	-	324	
2029	-	-	-	-	342	
2030	-	-	-	-	361	
2031	-	-	-	-	361	

Table 11: Integrated Analysis Plan CCB00 ** Highly Confidential **

PLAN CCB00					
YEAR	SOLAR	WIND	CT	CC	DSM
2012	-	-	-	-	54
2013	-	-	-	-	73
2014	3	100	-	-	93
2015	-	-	-	-	112
2016	-	-	-	-	131
2017	-	-	-	-	149
2018	7	100	154	-	168
2019	-	100	-	-	186
2020	-	-	-	-	194
2021	7	150	-	-	207
2022	-	-	-	-	218
2023	-	-	-	-	235
2024	1	-	-	-	253
2025	-	-	154	-	270
2026	-	-	-	-	288
2027	1	-	-	-	306
2028	-	-	-	-	324
2029	-	-	-	-	342
2030	-	-	-	-	361
2031	-	-	-	-	361

Table 12: Integrated Analysis Plan CCB01 ** Highly Confidential **

PLAN CCB01					
YEAR	SOLAR	WIND	CT	CC	DSM
2012	-	-	-	-	54
2013	-	-	-	-	73
2014	3	100	-	-	93
2015	-	-	-	-	112
2016	-	-	-	-	131
2017	-	-	-	-	149
2018	7	100	154	-	168
2019	-	100	-	-	186
2020	-	-	-	-	194
2021	7	150	-	-	207
2022	-	-	-	-	218
2023	-	-	-	-	235
2024	1	-	-	-	253
2025	-	-	154	-	270
2026	-	-	-	-	288
2027	1	-	-	-	306
2028	-	-	-	-	324
2029	-	-	-	-	342
2030	-	-	-	-	361
2031	-	-	-	-	361

Table 13: Integrated Analysis Plan CXX00 ** Highly Confidential **

PLAN CXX00						
YEAR	SOLAR	WIND	CT	CC	DSM	[redacted]
2012	-	-	-	-	54	
2013	-	-	-	-	73	
2014	3	100	-	-	93	
2015	-	-	-	-	112	
2016	-	-	-	-	131	
2017	-	-	-	-	149	
2018	7	100	-	-	168	
2019	-	100	-	-	186	
2020	-	-	-	-	194	
2021	7	150	-	-	207	
2022	-	-	154	-	218	
2023	-	-	-	-	235	
2024	1	-	-	-	253	
2025	-	-	-	-	270	
2026	-	-	-	-	288	
2027	1	-	-	-	306	
2028	-	-	-	-	324	
2029	-	-	-	-	342	
2030	-	-	154	-	361	
2031	-	-	-	-	361	

Table 14: Integrated Analysis Plan XAB00 ** Highly Confidential **

PLAN XAB00						
YEAR	SOLAR	WIND	CT	CC	DSM	[redacted]
2012	-	-	-	-	-	
2013	-	-	-	-	-	
2014	3	100	154	-	-	
2015	-	-	-	-	-	
2016	-	-	-	-	-	
2017	-	-	-	-	-	
2018	7	100	308	-	-	
2019	-	100	-	-	-	
2020	-	-	-	-	-	
2021	7	150	-	-	-	
2022	-	-	-	-	-	
2023	-	-	154	-	-	
2024	1	-	-	-	-	
2025	-	-	-	-	-	
2026	-	-	-	-	-	
2027	1	-	154	-	-	
2028	-	-	-	-	-	
2029	-	-	-	-	-	
2030	-	-	-	-	-	
2031	-	-	154	-	-	

HC

Tabular data that created Table 3: Integrated Analysis-Plan CAA00 through Table 14: Integrated Analysis Plan XAB00 is provided on the work paper disc in the "Table060.3" tab of the Excel files entitled "Table240-22.060(3) Plan CAA00.xlsx", "Table240-22.060(3) Plan CAA01.xlsx", "Table240-22.060(3) Plan CAB00.xlsx", "Table240-22.060(3) Plan CAB01.xlsx", "Table240-22.060(3) Plan CAB02.xlsx", "Table240-22.060(3) Plan CAB04.xlsx", "Table240-22.060(3) Plan CAB05.xlsx", "Table240-22.060(3) Plan CBB00.xlsx", "Table240-22.060(3) Plan CCB00.xlsx", "Table240-22.060(3) Plan CCB01.xlsx", "Table240-22.060(3) Plan CXX00.xlsx" and "Table240-22.060(3) Plan XAB00.xlsx".

SECTION 4: ANALYSIS OF RESOURCE PLANS

(4) Analysis of Alternative Resource Plans. The utility shall assess the relative performance of the alternative resource plans by calculating for each plan the value of each performance measure specified pursuant to section (2). This calculation shall assume values for uncertain factors that are judged by utility decision-makers to be most likely. The analysis shall cover a planning horizon of at least twenty (20) years and shall be carried out with computer models that are capable of simulating the total operation of the system on a year-by-year basis in order to assess the cumulative impacts of alternative resource plans. These models shall be sufficiently detailed to accomplish the following tasks and objectives:

GMO analyzed the alternative resource plans incorporating critical uncertain factors identified from the preliminary risk analysis performed for the original filing as updated and expanded by the methods detailed in Volume 7, Section 2 of this filing.

All analysis covered at least twenty years and was conducted using the MIDAS™ computer model. MIDAS™ simulated year-by-year impacts and assessed cumulative impacts corresponding to each alternative resource plan. The MIDAS™ model is sufficiently detailed to accomplish all tasks and objectives listed in Rule 4 CSR 240-22.060(4).

4.1 FINANCIAL IMPACT

(A) The financial impact of alternative resource plans shall be modeled in sufficient detail to provide comparative estimates of at least the following measures of the utility's financial condition for each year of the planning horizon: pretax interest coverage, ratio of total debt to total capital and ratio of net cash flow to capital expenditures;

GMO analyzed the financial impact of the alternative resource plans and comparatively estimated pretax interest coverage, ratio of total debt to total capital

and ratio of cash flows to capital expenditures. This analysis is developed from the results of the annual reporting data from the output of the MIDAS™ model.

The results of these analyses are plotted in Figure 29 through Figure 31 in the Reporting Requirements, Section 6 of this Volume.

4.2 ANNUALLY ADJUSTED RATES

(B) The modeling procedure shall be based on the assumption that rates will be adjusted annually, in a manner that is consistent with Missouri law. This provision does not imply any requirement for the utility to file actual rate cases or for the commission to accord any particular ratemaking treatment to actual costs incurred by the utility;

GMO utilized the MIDAS™ model to simulate each alternative resource plan and measure financial and operational performance. Rates are calculated by taking the annual total revenue requirement (called Total Base Revenue within the model) and spread over the total retail energy load for the simulation year. This method of calculation produced annually adjusted rates. From a utility standpoint, these rates would be the outcome of a perfect continuous ratemaking process.

The development of annual total revenue requirement assumes a utility plant in ratebase from which a return is earned. This ratebase is subject to depreciation. Utility annual expenses flow directly to revenue requirement without any assumption of return or disallowance.

DSM expenses are treated as a capital expense and included in the total utility rate base. However the DSM expenditures are amortized in six years unlike other utility supply assets which generally have longer depreciation periods. It is important to note that actual DSM cost recovery may differ depending on approval of an acceptable DSM recovery mechanism related to GMO's forthcoming filing under MEEIA As referenced in Appendix 7A.

4.3 RATE ELASTICITY

(C) The modeling procedure shall include a method to ensure that the impact of changes in electric rates on future levels of demand for electric service is accounted for in the analysis; and

The methods by which electric rates impact future levels of demand is detailed in Volume 3 of the original filing which details the load forecasting process.

4.4 DSM EQUIVALENCY

(D) The modeling procedure shall treat supply-side and demand-side resources on a logically consistent and economically equivalent basis. This means that the same types or categories of costs, benefits and risks shall be considered, and that these factors shall be quantified at a similar level of detail and precision for all resource types.

GMO utilized a method by which DSM costs are treated in a logically consistent manner with traditional supply-side resource costs. Both DSM and supply options were analyzed under identical risk assumptions.

SECTION 5: LOAD BUILDING PROGRAMS

(5) 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 plans developed pursuant to section (3) of this rule, including the preferred resource plan selected pursuant to 4 CSR 240-22.070(6). This analysis shall use the same modeling procedure and assumptions described in section (4) and shall include the following elements:

5.1 DEMAND IMPACT

(A) Estimation of the impact of load-building programs on the electric utility's summer and winter peak demands and energy usage;

GMO does not have any existing or proposed load-building programs.

5.2 RATE IMPACT

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

GMO does not have any existing or proposed load-building programs.

5.3 PROBABLE ENVIRONMENTAL COST IMPACT

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

GMO does not have any existing or proposed load-building programs.

5.4 OTHER IMPACTS

(D) An assessment of any other aspects of the proposed load-building programs that affect the public interest.

GMO does not have any existing or proposed load-building programs.

SECTION 6: REPORTING REQUIREMENTS

(6) Reporting Requirements. To demonstrate compliance with the provisions of this rule, and pursuant to the requirements of 4 CSR 240-22.080, the utility shall prepare a report that contains at least the following information:

6.1 ALTERNATIVE PLANS

(A) A description of each alternative resource plan including the type and size of each resource addition and a listing of the sequence and schedule for retiring existing resources and acquiring each new resource addition;

Alternative resource plans were developed using combinations of supply-side resources, demand-side resources ** [redacted] ** Timing of supply additions ** [redacted] ** and quantity of resources are varied. In total, twelve (12) alternative resource plans were developed for integrated resource analysis. Table 15 represents an overview of each plan included in the revised integrated analysis over the 2012 through 2031 planning period. While not shown in the table below, each alternative resource plan included sufficient renewable resource to meet the Missouri Renewable Energy Standard.

Table 15: Overview of Alternative Resource Plans ** Highly Confidential **

		[redacted]					
CAA00	ENHANCED		X				
CAA01	ENHANCED			X			
CAB00	ENHANCED		X				
CAB01	ENHANCED			X			
CAB02	ENHANCED						X
CAB04	ENHANCED		X		X		
CAB05	ENHANCED		X		X		
CBB00	ENHANCED		X				
CCB00	ENHANCED		X				
CCB01	ENHANCED		X			X	
CXX00	ENHANCED		X				
XAB00	NONE		X				

Charts that describe each alternative resource plan including the amounts and timing of resource additions are shown in Table 3 through Table 14 in Section 3: of this document. Please note that Table 15 is identical to Table 1 on Page 2 of this Volume.

6.2 PERFORMANCE SUMMARY

(B) A summary tabulation that shows the performance of each alternative resource plan as measured by each of the measures specified in section (2) of this rule;

The performance of each plan using the measures specified in 4 CSR 240-22.060 (2) is detailed in Table 2: Plan Performance Measures on page 7 of this document.

6.3 ALTERNATIVE PLAN PLOTS

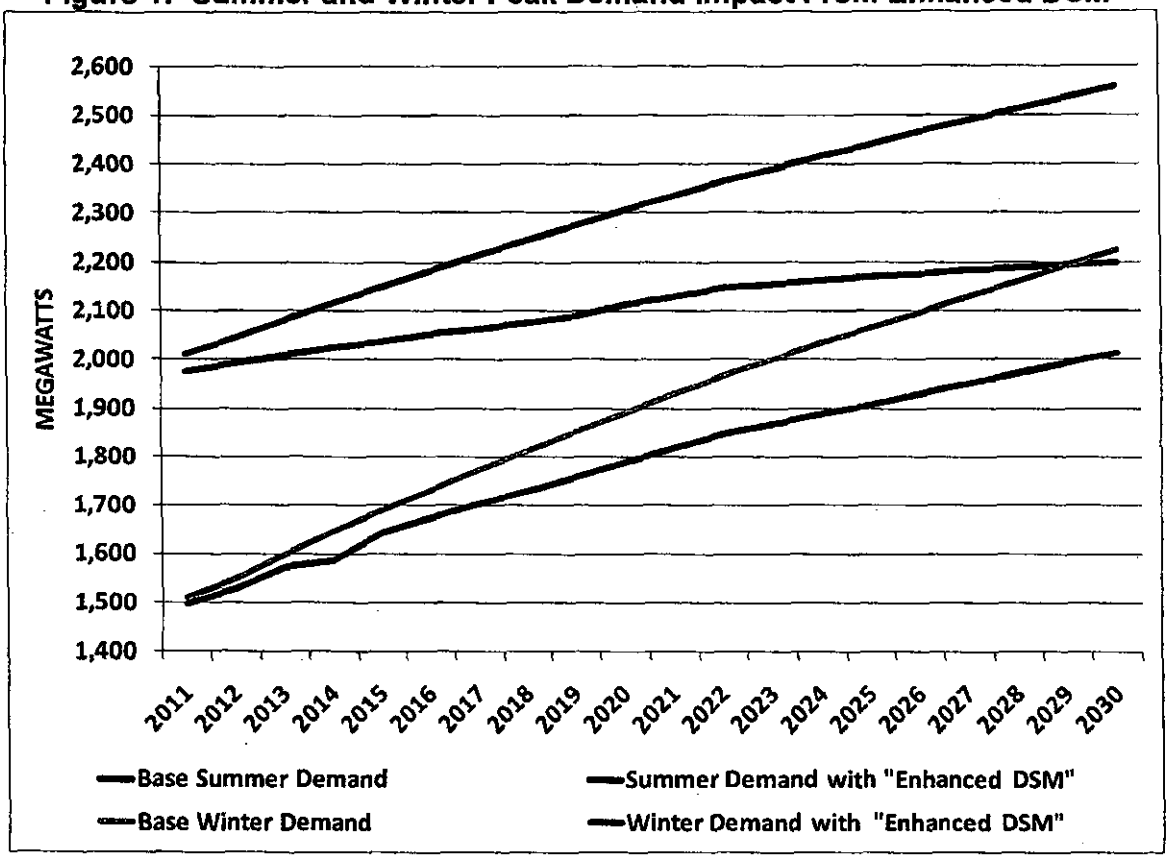
(C) For each alternative resource plan, a plot of each of the following over the planning horizon:

6.3.1 DSM IMPACT

1. The combined impact of all demand-side resources on the base-case forecast of summer and winter peak demands;

All alternative resource plans in this filing utilize the Enhanced DSM portfolio of programs with the exception of Plan XAB00. Summer and Winter peak demand impact for these plans are provided in Figure 1 below. Tabular data that created Figure 1 is provided on the work paper disc in an Excel file entitled "Figure240-22.060(6)(C)(1)Summer and Winter DSM Peak Impact Enhanced DSM_GMO.xlsx".

Figure 1: Summer and Winter Peak Demand Impact From Enhanced DSM

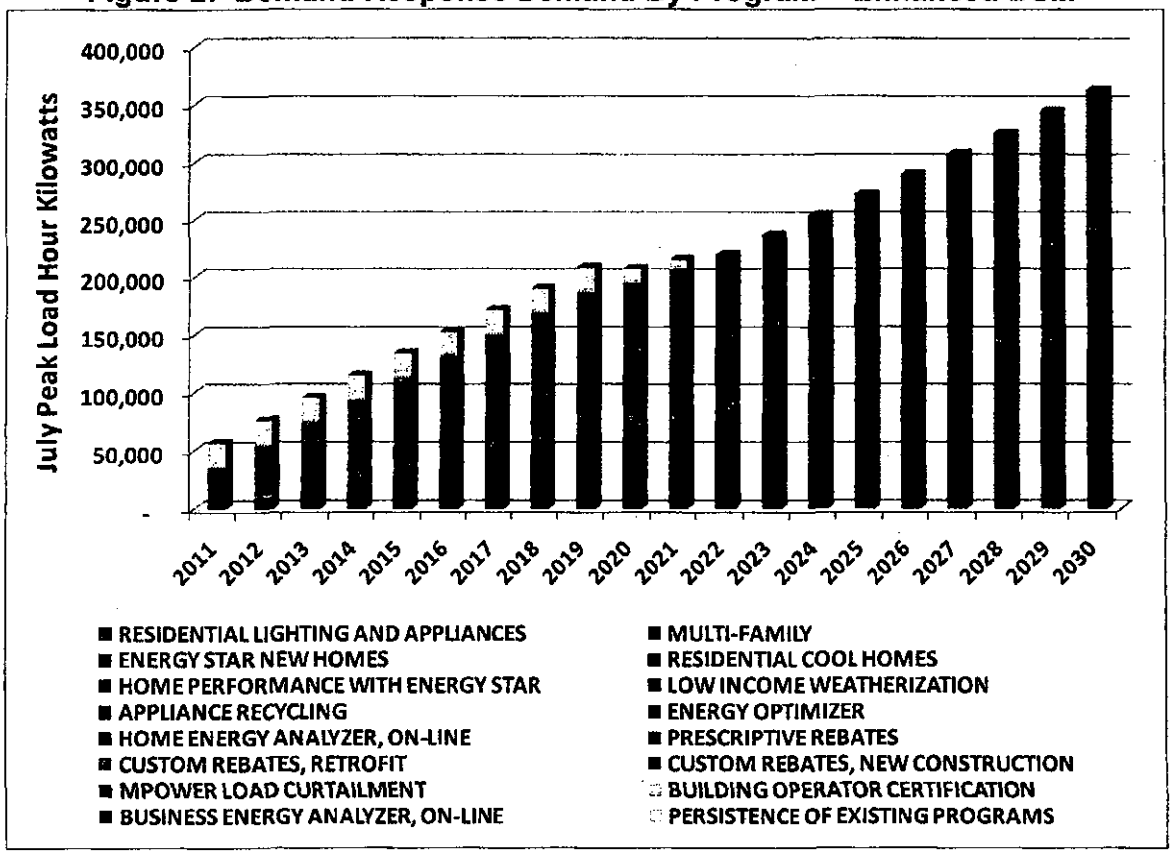


6.3.2 DSM PROGRAMS

2. The composition, by program, of the capacity provided by demand-side resources;

Each demand-side management (DSM) program has been evaluated to determine its capacity impact on peak system load. Peak system load occurs in the MIDAS™ simulation in July. The July peak load hour impact by program for the Enhanced DSM portfolio of programs is shown in Figure 2 below. Tabular data that created Figure 2 is provided on the work paper disc in an Excel file entitled "Figure240-22.060(6)(C)(2)DSM Program Peak Impact Enhanced DSM_GMO.xlsx"

Figure 2: Demand Response Demand By Program – Enhanced DSM



Note that certain programs do not impact peak load on the peak hour and are not included in this chart of peak hour impacts. The energy savings derived from each of these programs is included over the full life of the program.

6.3.3 SUPPLY RESOURCES

3. The composition, by supply resource, of the capacity (including reserve margin) provided by supply resources. Existing supply-side resources may be shown as a single resource;

The supply-side composition for each of the thirteen alternative resource plans are shown in the figures below with superimposed forecasts of reserve margins.

Figure 3: Supply Resources - Plan CAA00 ** Highly Confidential **

Figure 4: Supply Resources - Plan CAA01 ** Highly Confidential **

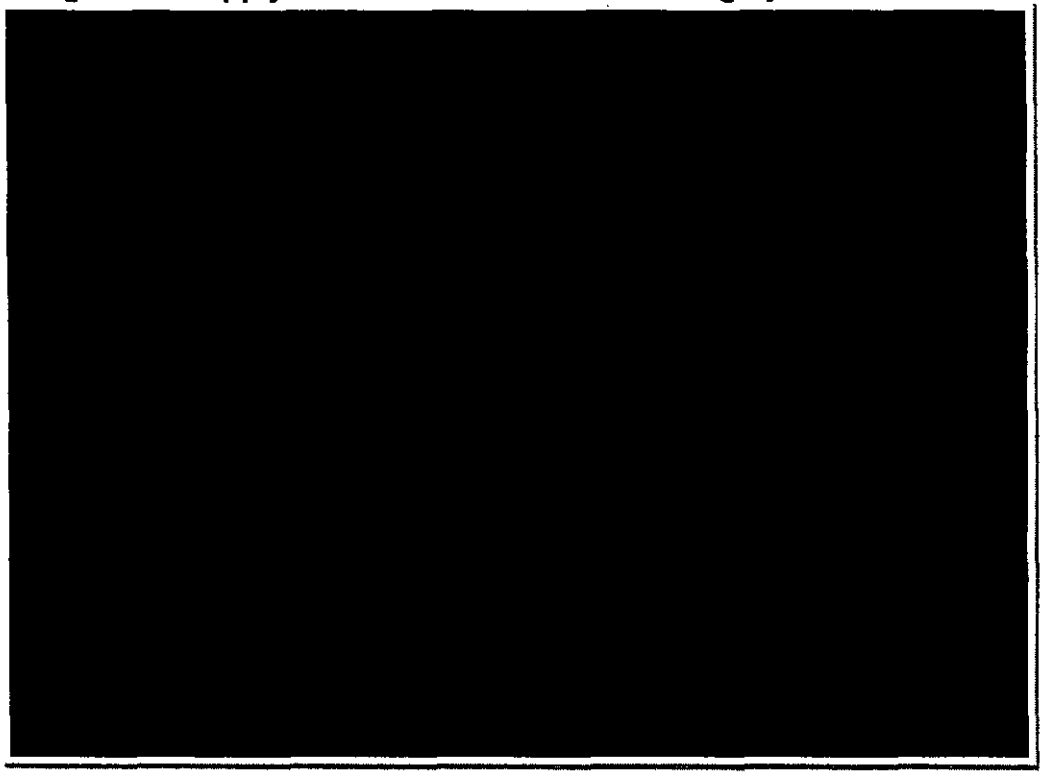


Figure 5: Supply Resources - Plan CAB00 ** Highly Confidential **

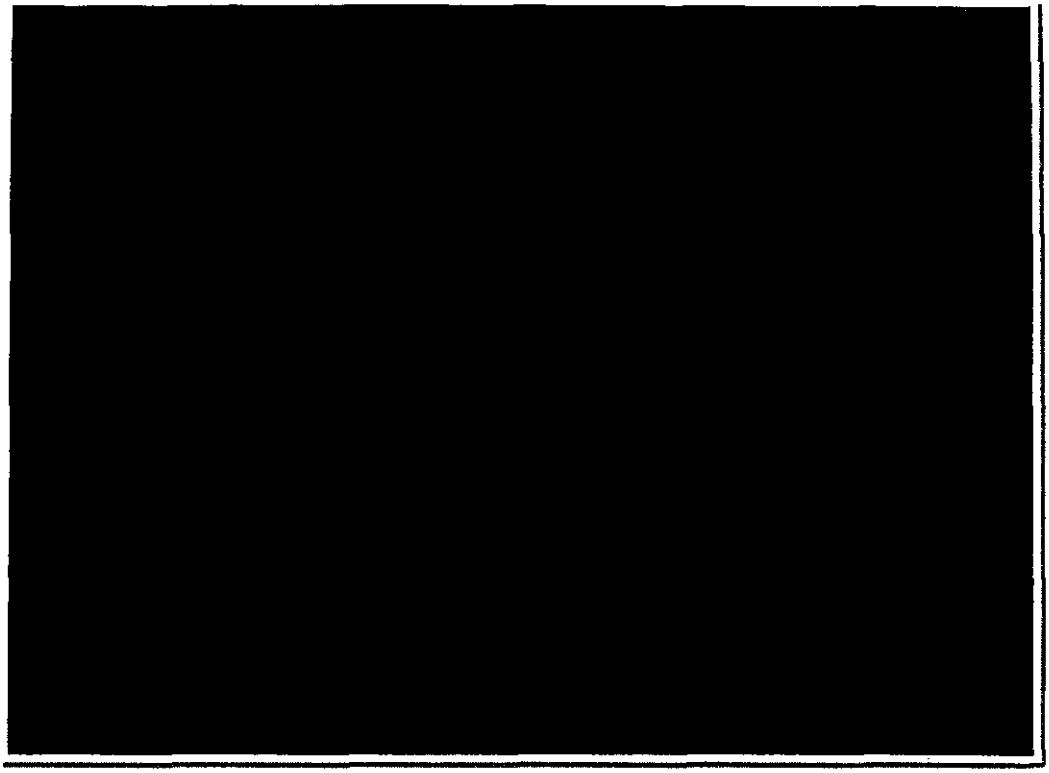
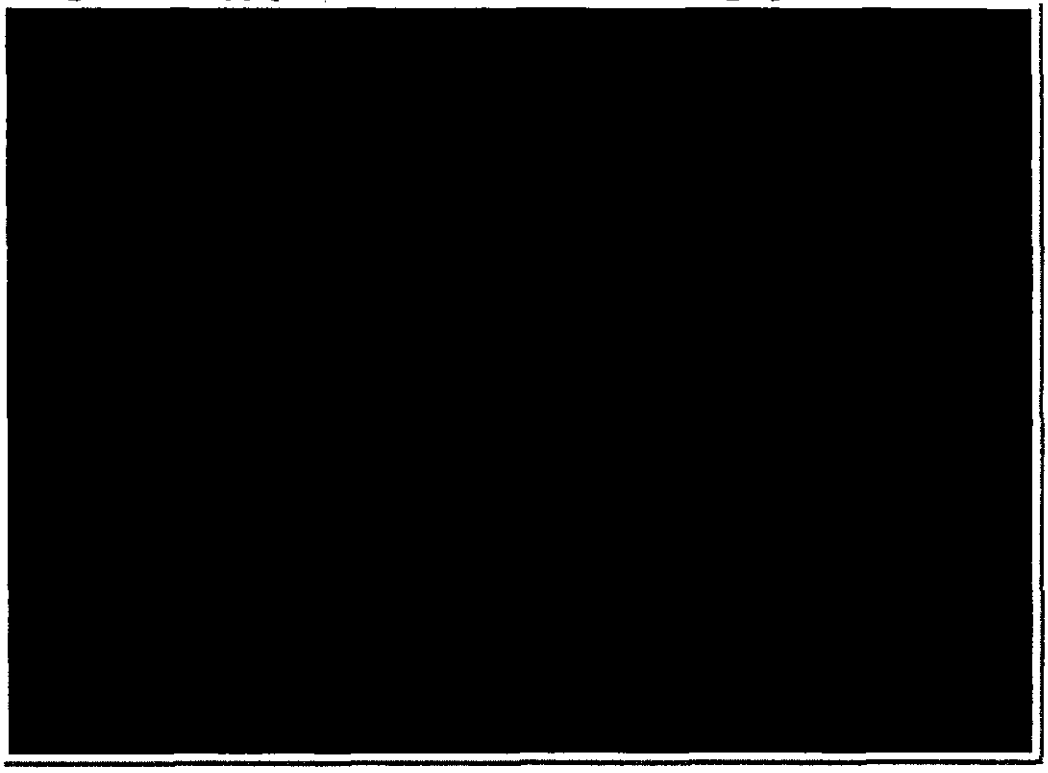


Figure 6: Supply Resources - Plan CAB01 ** Highly Confidential **



HC

Figure 7: Supply Resources - Plan CAB02 ** Highly Confidential **

Figure 8: Supply Resources – Plan CAB04 ** Highly Confidential **

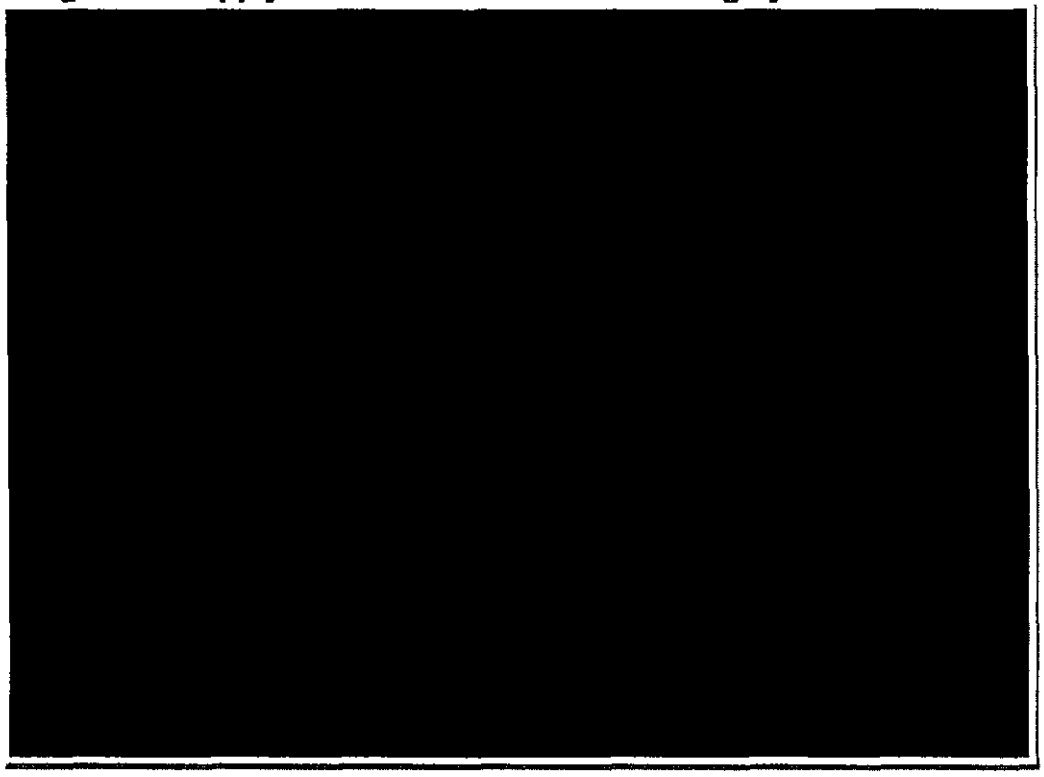


Figure 9: Supply Resources - Plan CAB05 ** Highly Confidential **

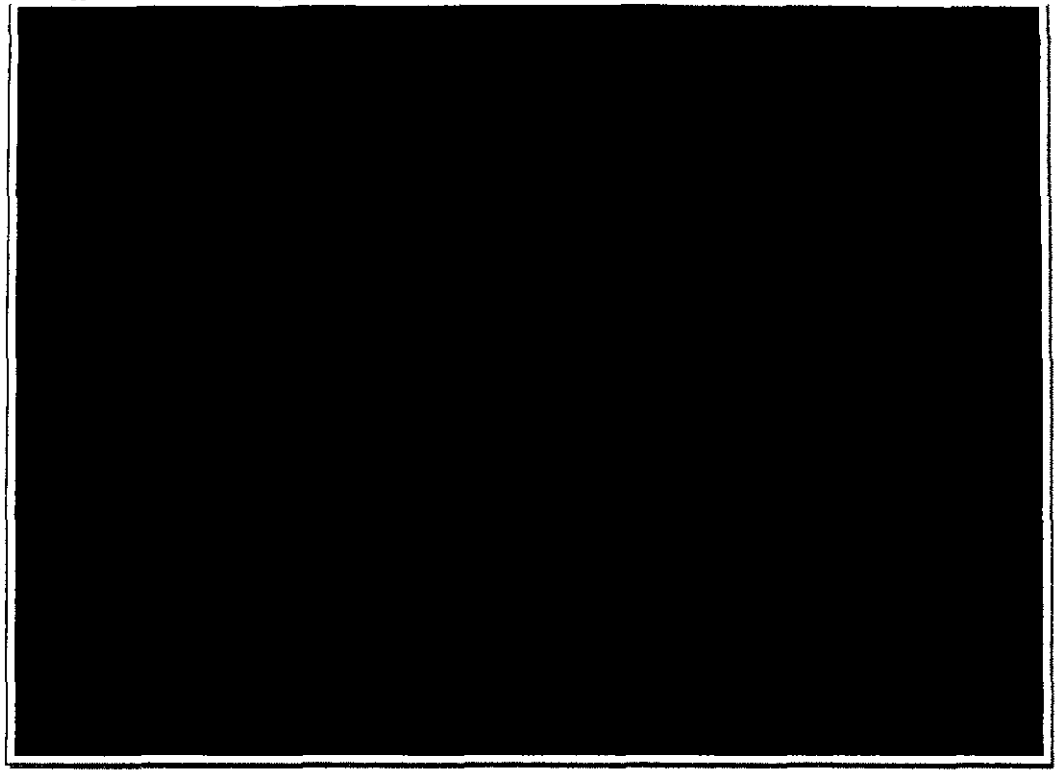
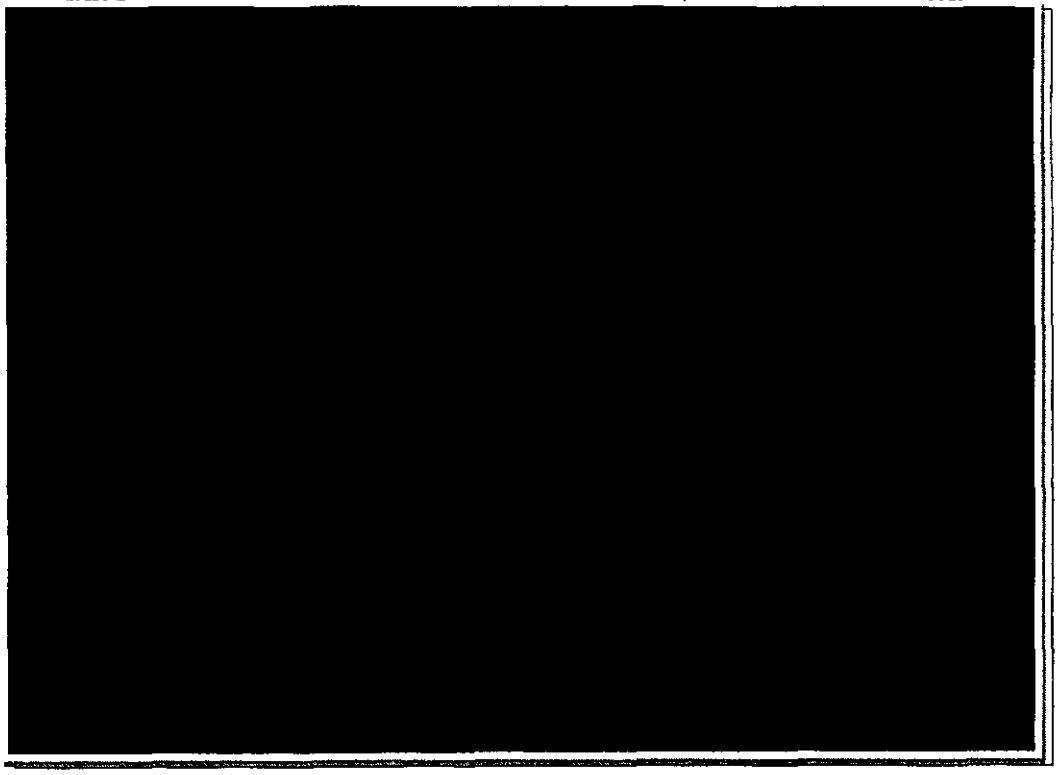


Figure 10: Supply Resources - Plan CBB00 ** Highly Confidential **



HC

Figure 11: Supply Resources - Plan CCB00 ** Highly Confidential **

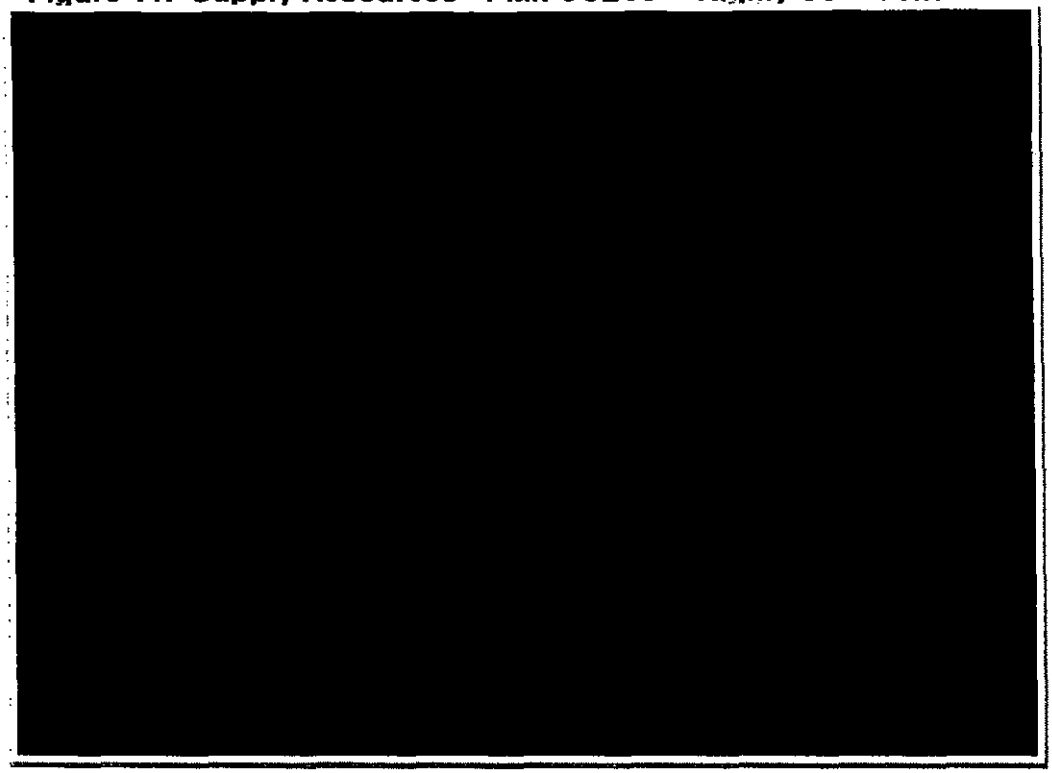


Figure 12: Supply Resources - Plan CCB01 ** Highly Confidential **

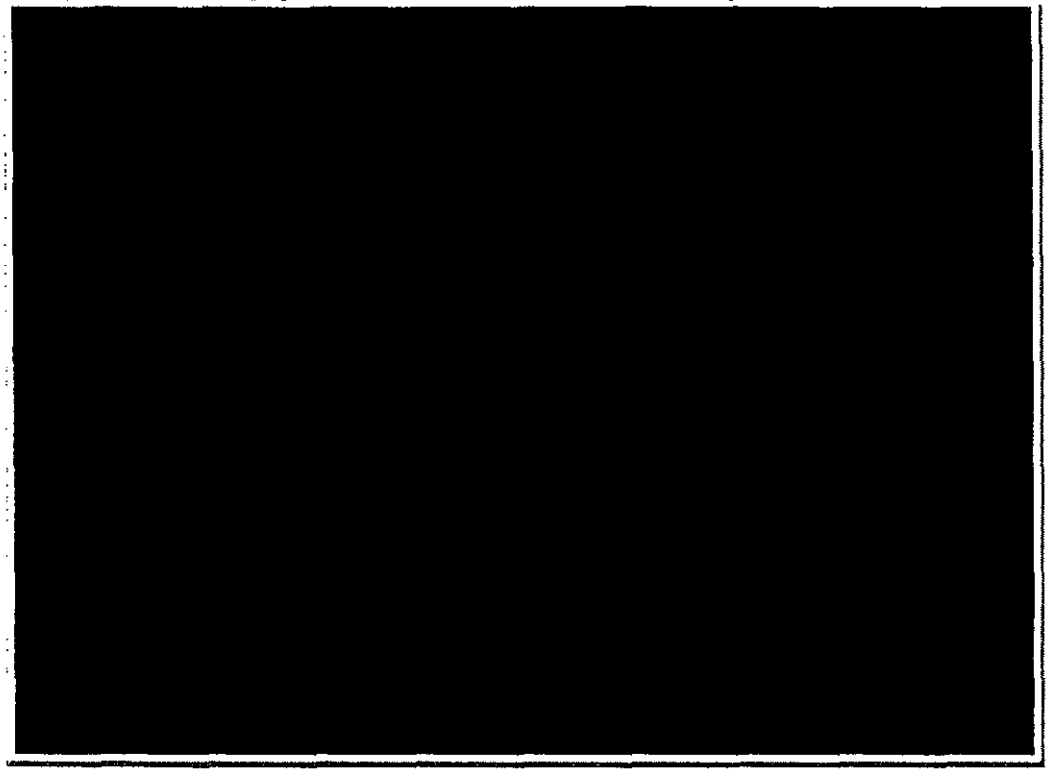


Figure 13: Supply Resources - Plan CXX00 ** Highly Confidential **

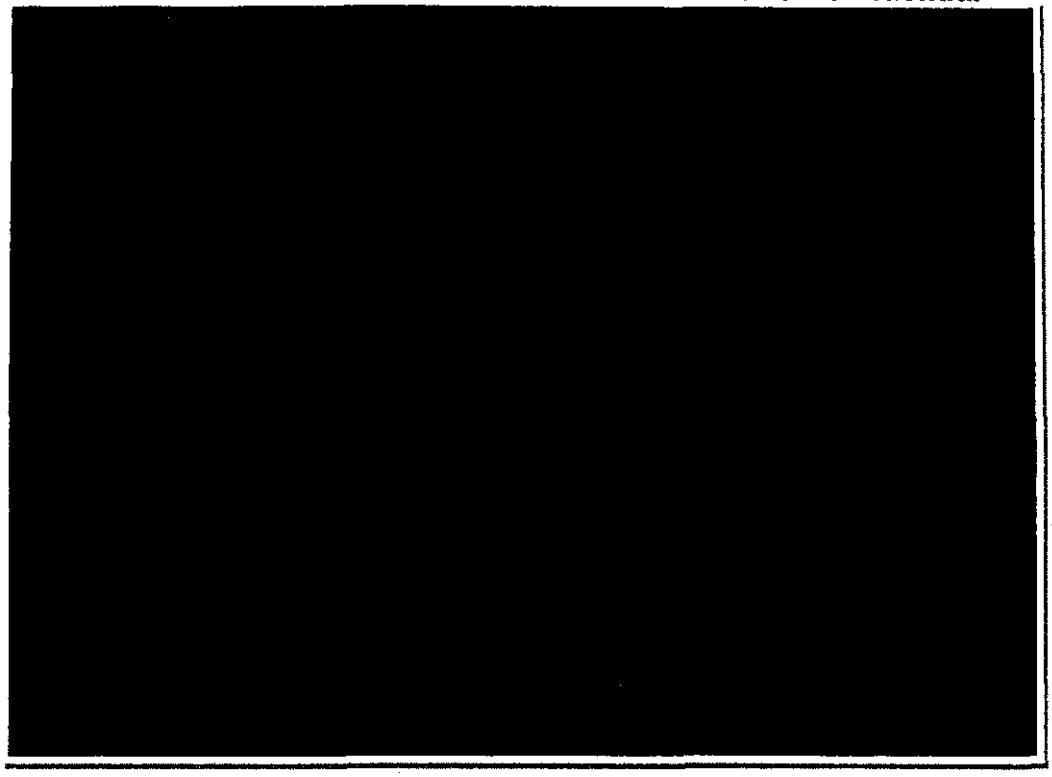
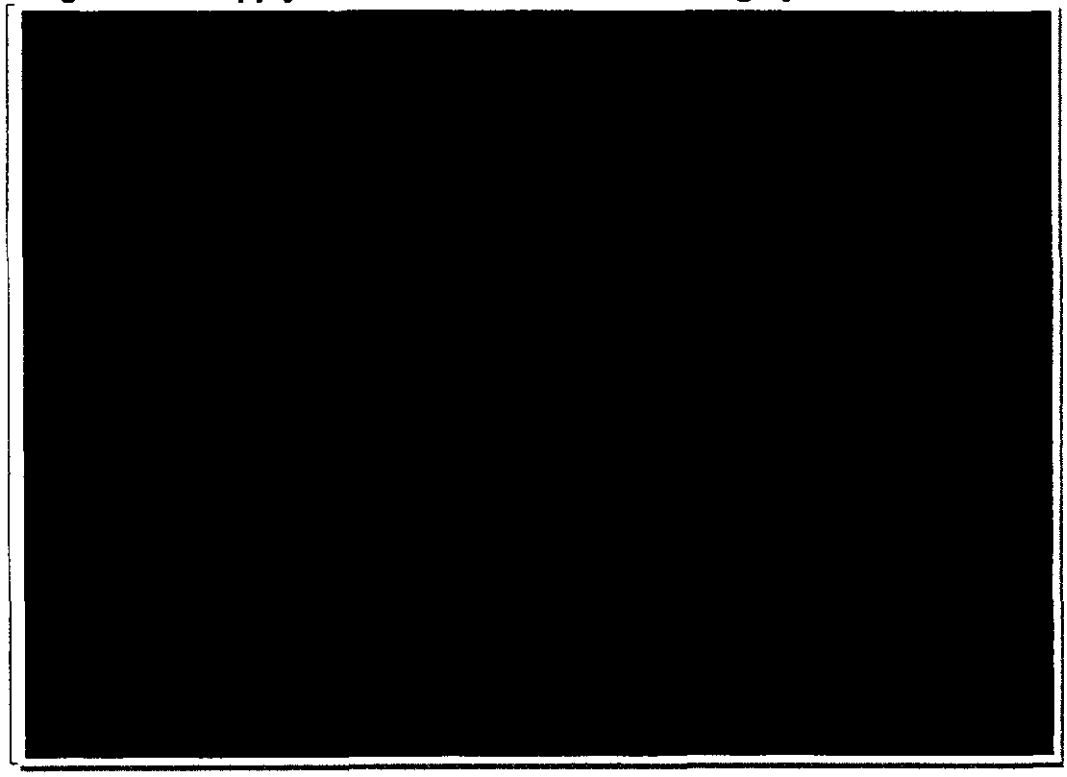


Figure 14: Supply Resources - Plan XAB00 ** Highly Confidential **



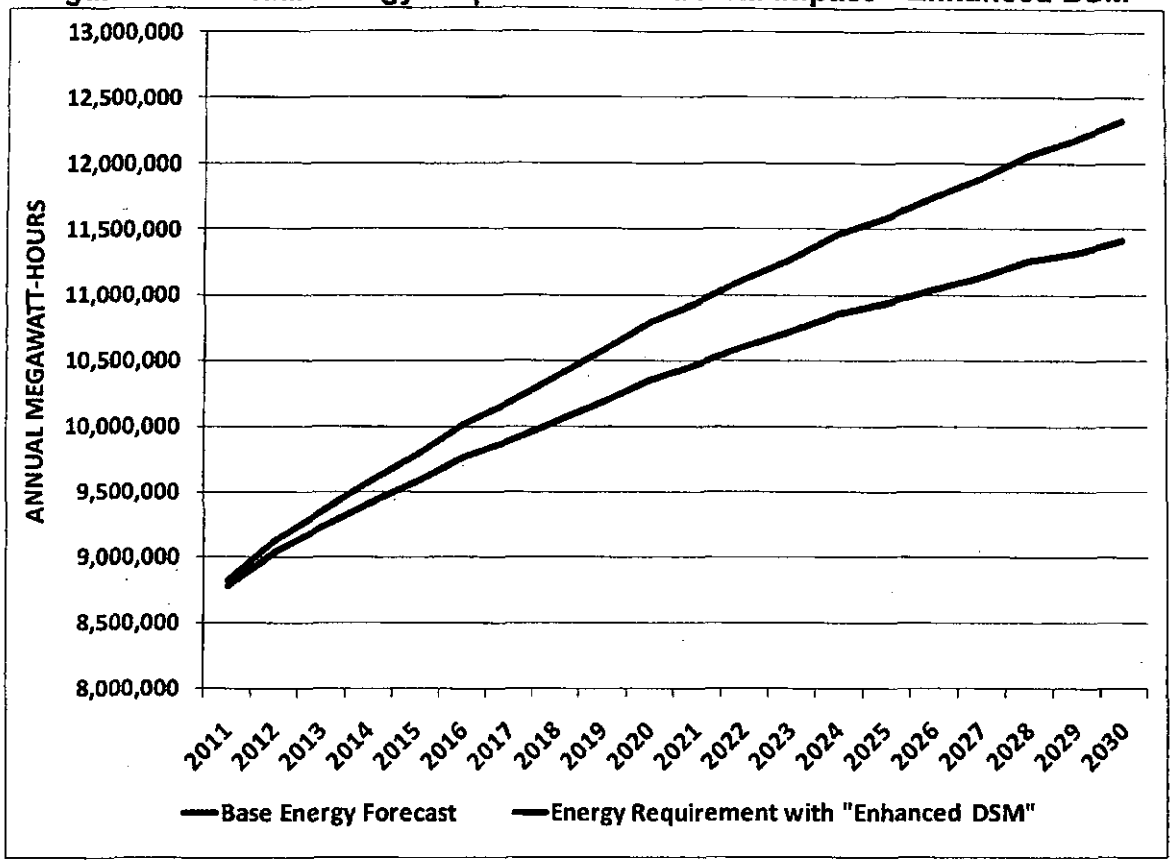
Note that the tabular data that created Figure 3: Supply Resources - Plan CAA00 through Figure 14: Supply Resources - Plan XAB00 provided on the work paper disc in the "Fig060.6.C.3" tab of the Excel files entitled "Figure240-22 060(6)(C)(3)Supply Resources Plan CAA00.xlsx", "Figure240-22 060(6)(C)(3)Supply Resources Plan CAA01.xlsx", "Figure240-22 060(6)(C)(3)Supply Resources Plan CAB00.xlsx", "Figure240-22 060(6)(C)(3)Supply Resources Plan CAB01.xlsx", "Figure240-22 060(6)(C)(3)Supply Resources Plan CAB02.xlsx", "Figure240-22 060(6)(C)(3)Supply Resources Plan CAB04.xlsx", "Figure240-22 060(6)(C)(3)Supply Resources Plan CAB05.xlsx", "Figure240-22 060(6)(C)(3)Supply Resources Plan CBB00.xlsx", "Figure240-22 060(6)(C)(3)Supply Resources Plan CCB00.xlsx", "Figure240-22 060(6)(C)(3)Supply Resources Plan CCB01.xlsx", "Figure240-22 060(6)(C)(3)Supply Resources Plan CXX00.xlsx" and "Figure240-22 060(6)(C)(3)Supply Resources Plan XAB00.xlsx".

6.3.4 DSM ENERGY IMPACT

4. The combined impact of all demand-side resources on the base-case forecast of annual energy requirements;

All alternative resource plans in this filing utilize the Enhanced DSM portfolio of programs with the exception of Plan XAB00. The estimated impacts of these programs on the base case energy requirement are shown in Figure 15 below. Tabular data that created Figure 15: Annual Energy Requirements and DSM Impact – Enhanced DSM is provided on the work paper disc in an Excel file entitled "Figure240-22.060(6)(C)(4)DSM Energy Requirement Impact Enhanced DSM_GMO.xlsx".

Figure 15: Annual Energy Requirements and DSM Impact – Enhanced DSM



It should be noted that the Annual Energy Requirement are inclusive of the effects of reduced line losses.

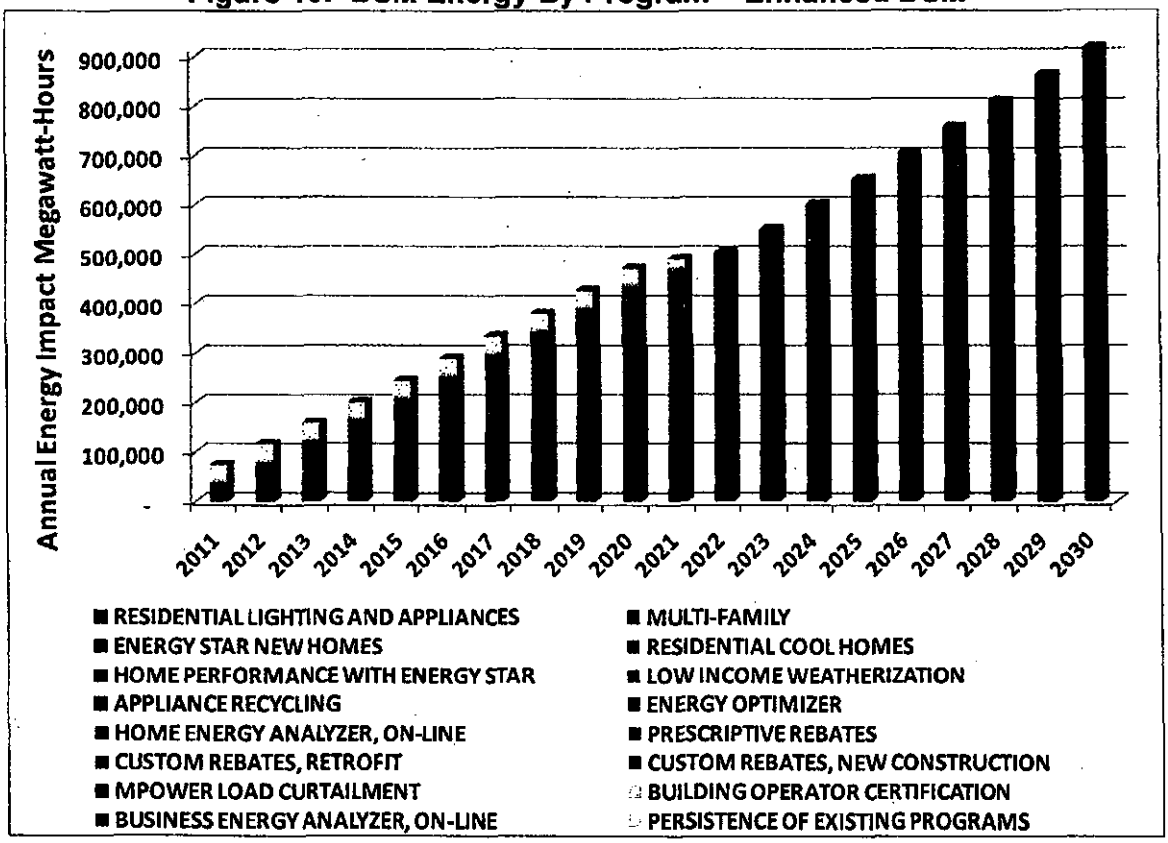
6.3.5 DSM ENERGY BY PROGRAM

5. The composition, by program, of the annual energy provided by demand-side resources;

All alternative resource plans in this filing utilize the Enhanced DSM portfolio of programs with the exception of Plan XAB00. The estimated energy impacts of these individual programs are shown in Figure 16 below. Tabular data that created Figure 16: DSM Energy By Program – Enhanced DSM is provided on the work paper disc in

an Excel file entitled "Figure240-22.060(6)(C)(5)DSM Program Energy Impact Enhanced DSM_GMO.xlsx".

Figure 16: DSM Energy By Program – Enhanced DSM



6.3.6 ENERGY SUPPLY BY RESOURCE

6. The composition, by supply resource, of the annual energy (including losses) provided by supply resources. Existing supply-side resources may be shown as a single resource;

Energy supplied by resource for each plan is plotted in the following charts beginning with Figure 17 below.

Figure 17: Plan CAA00 Generation

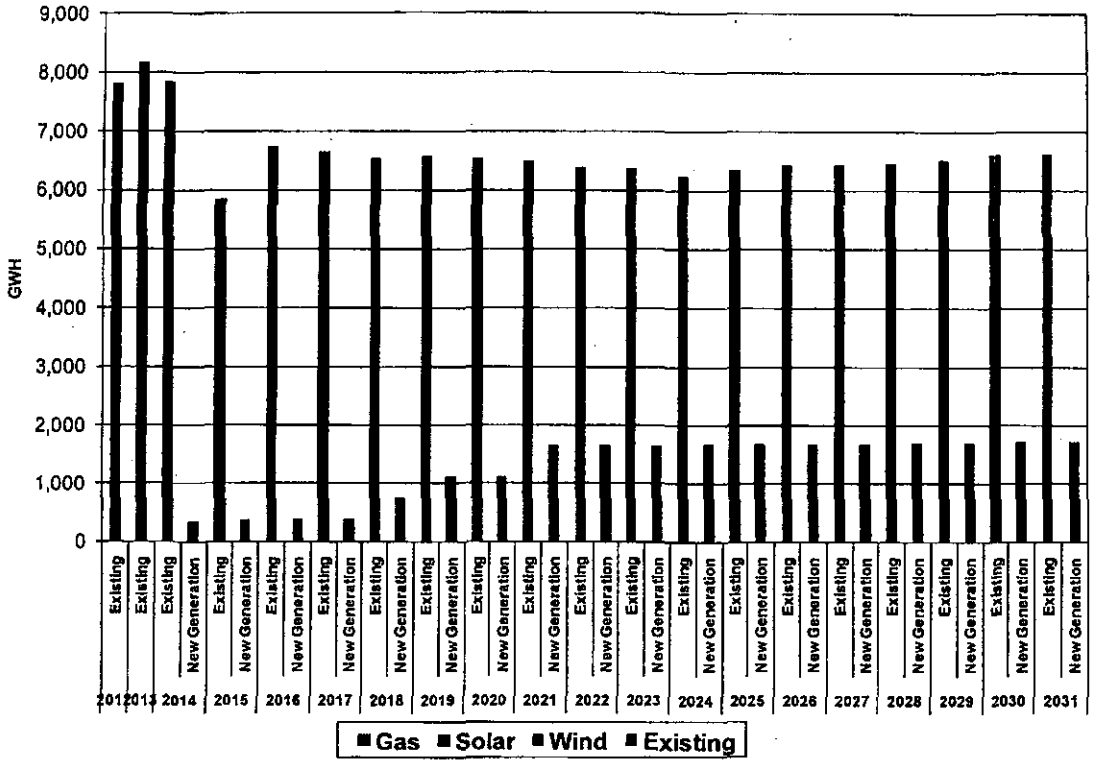


Figure 18: Plan CAA01 Generation

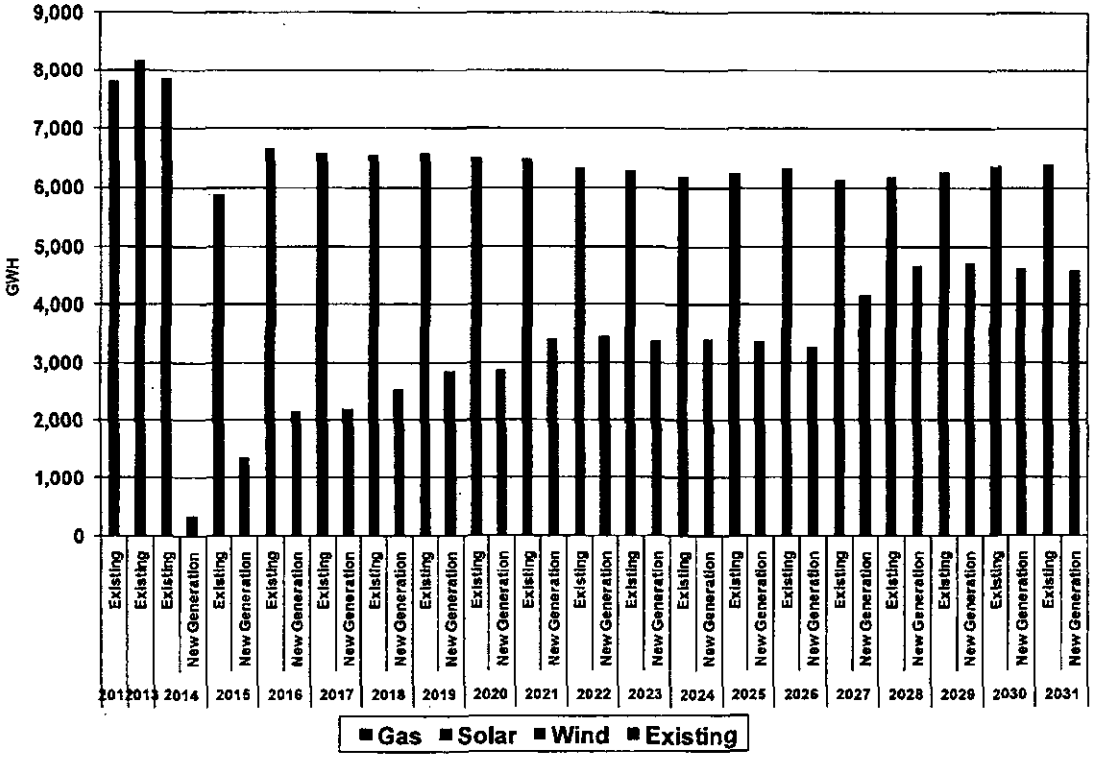


Figure 19: Plan CAB00 Generation

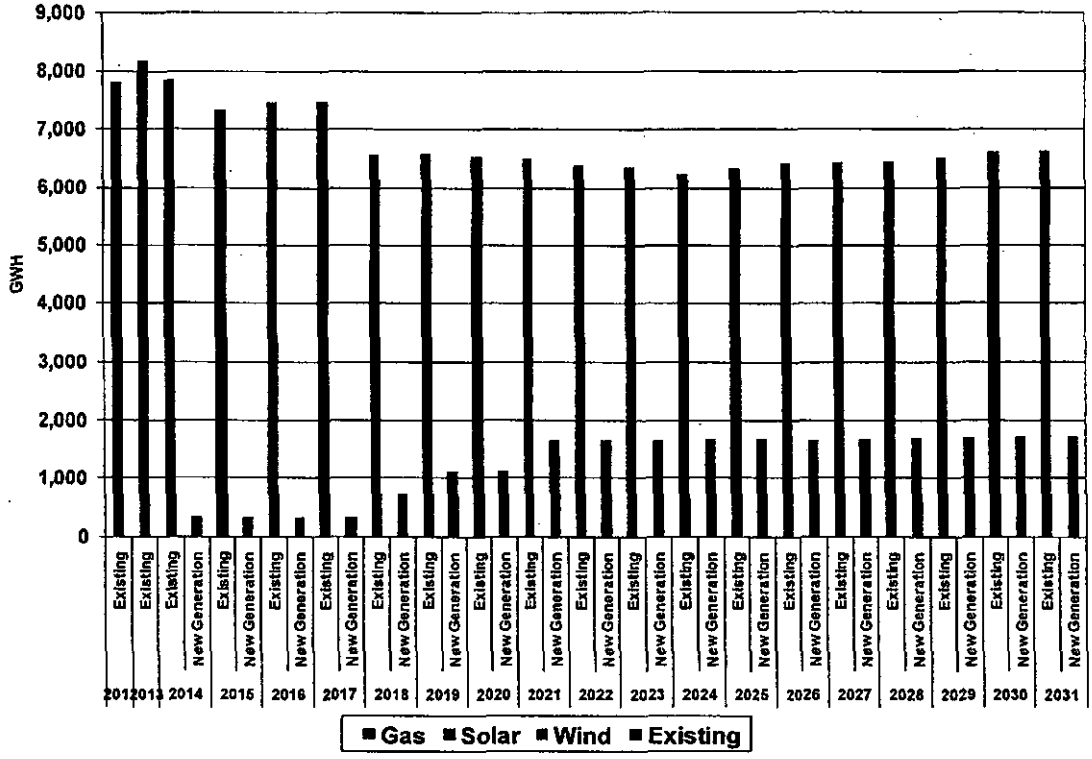


Figure 20: Plan CAB01 Generation

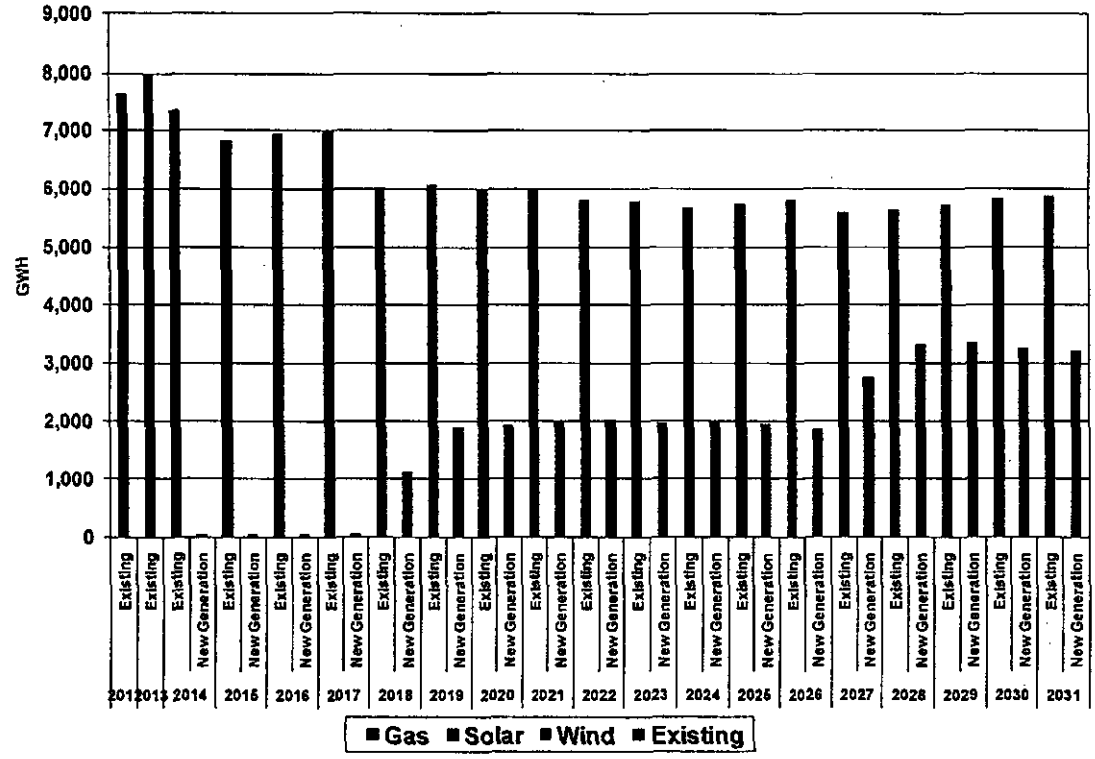


Figure 21: Plan CAB02 Generation

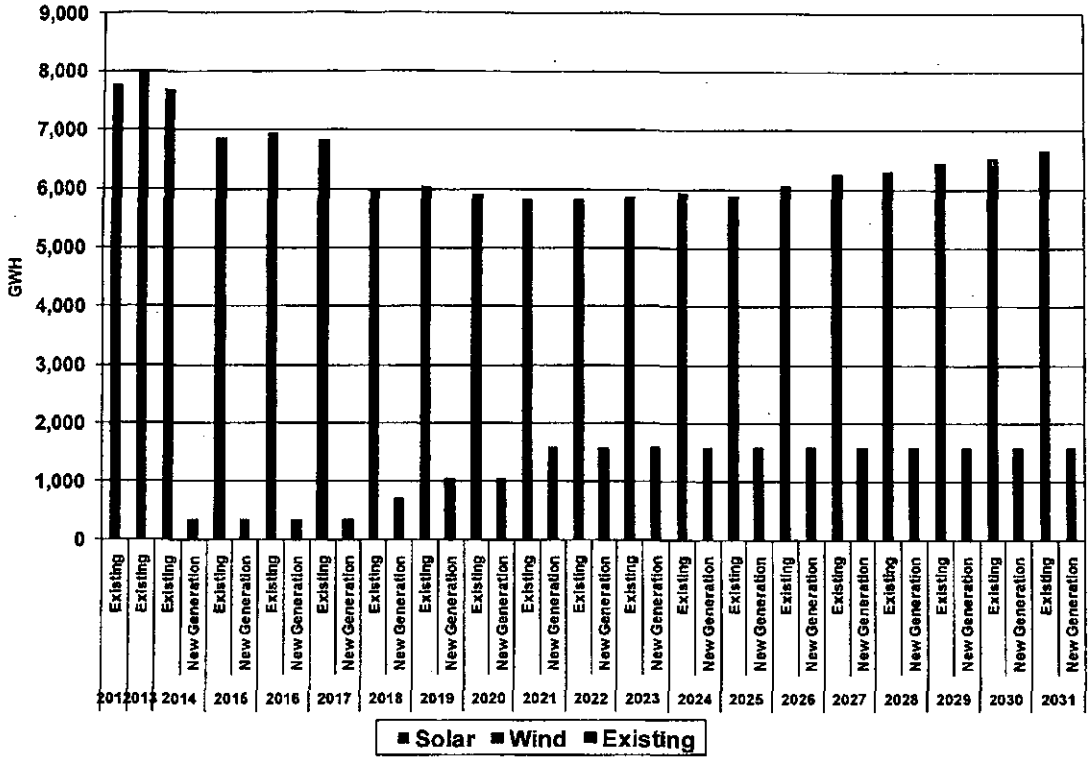


Figure 22: Plan CAB04 Generation

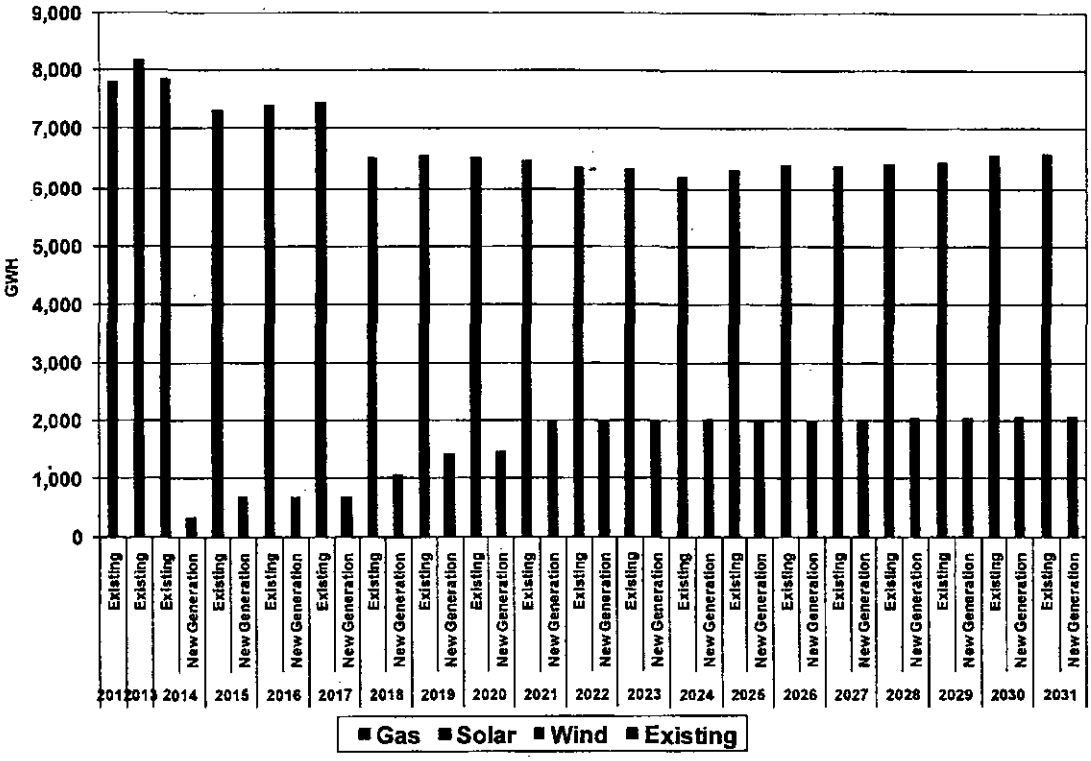


Figure 23: Plan CAB05 Generation

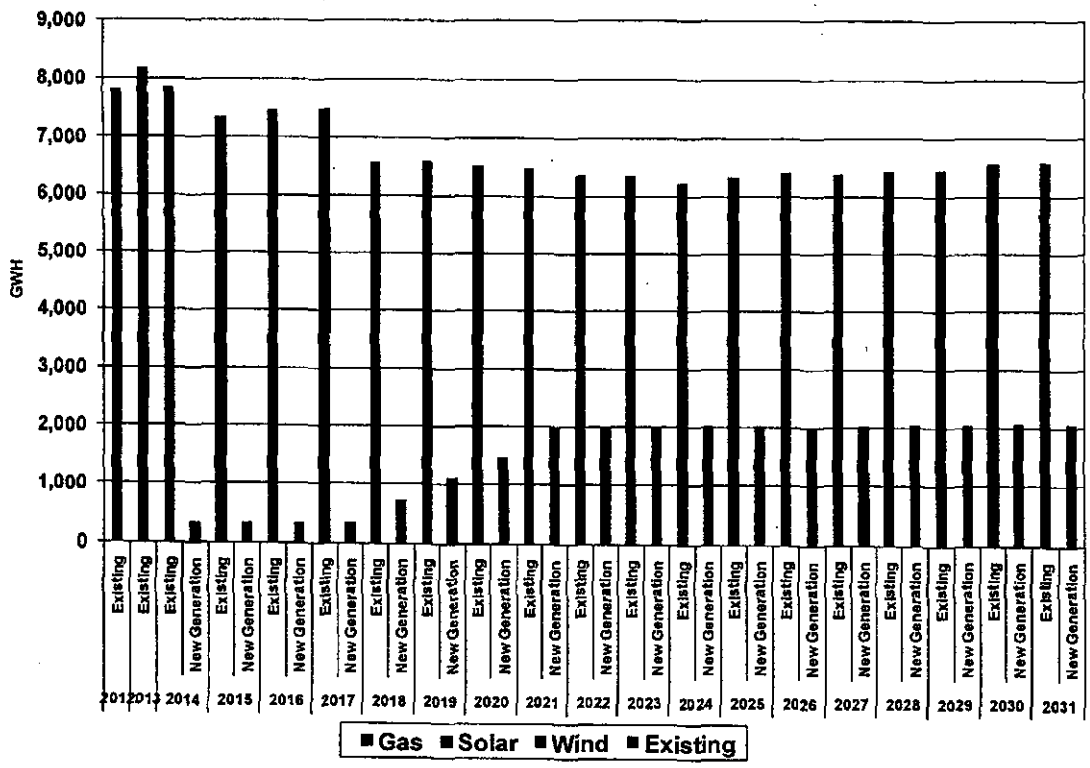


Figure 24: Plan CBB00 Generation

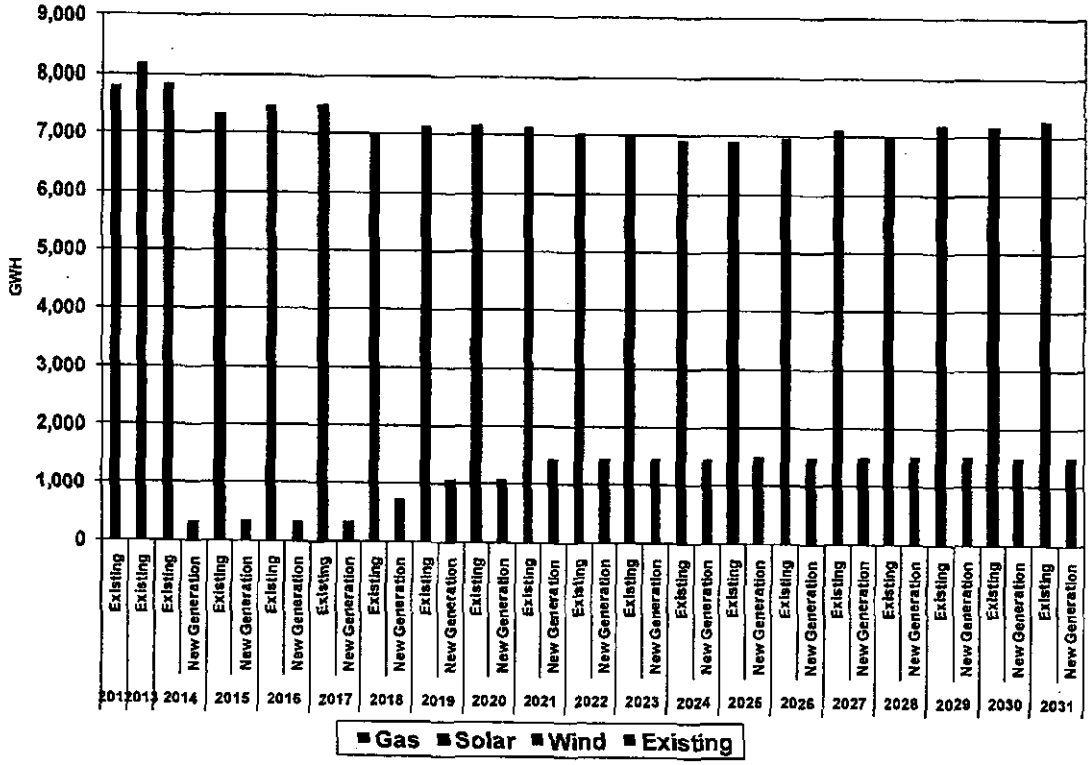


Figure 25: Plan CCB00 Generation

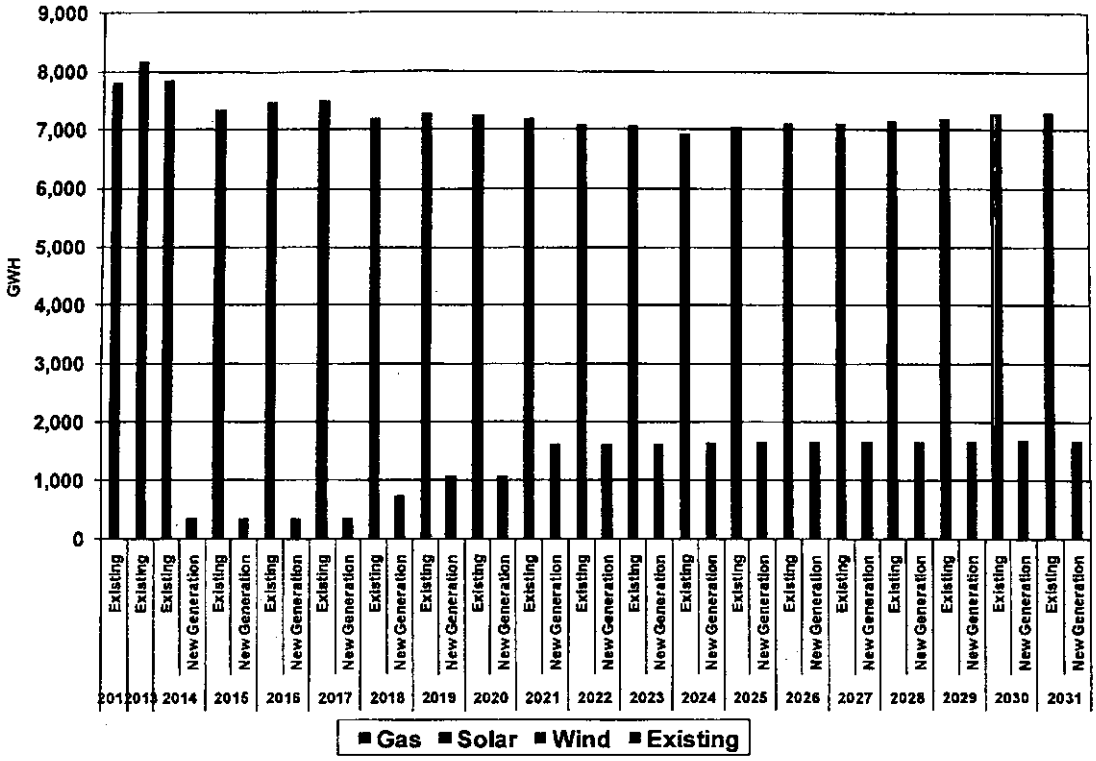


Figure 26: Plan CCB01 Generation

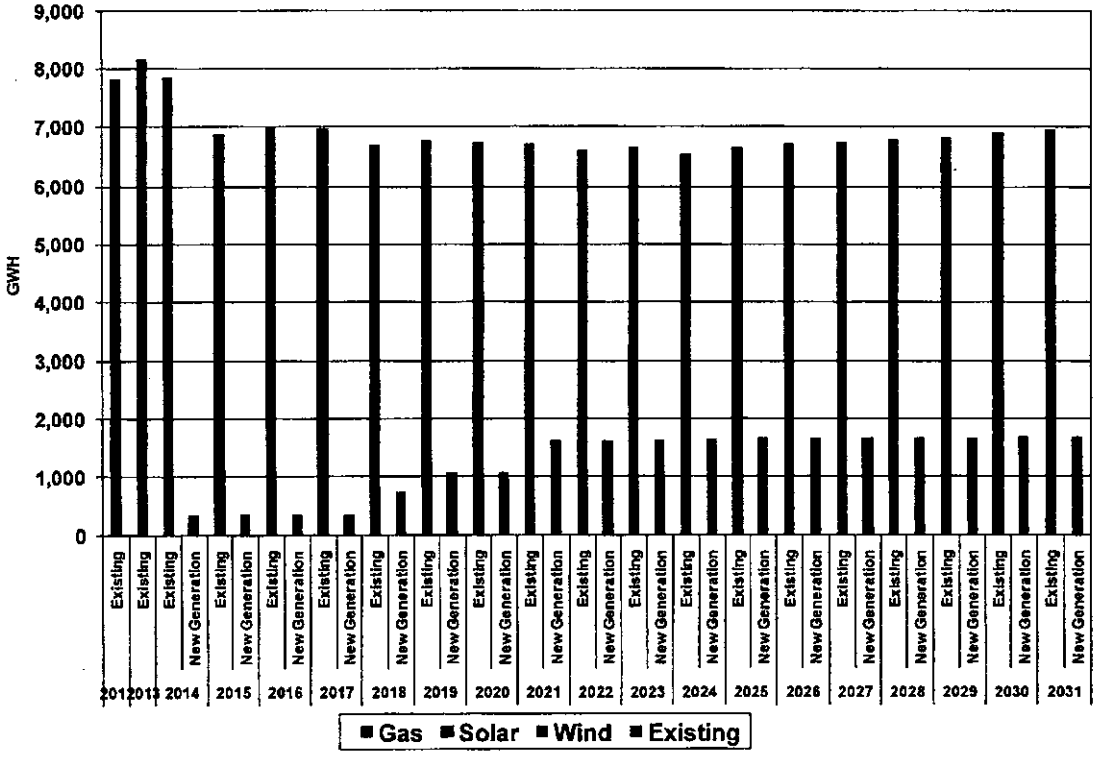


Figure 27: Plan CXX00 Generation

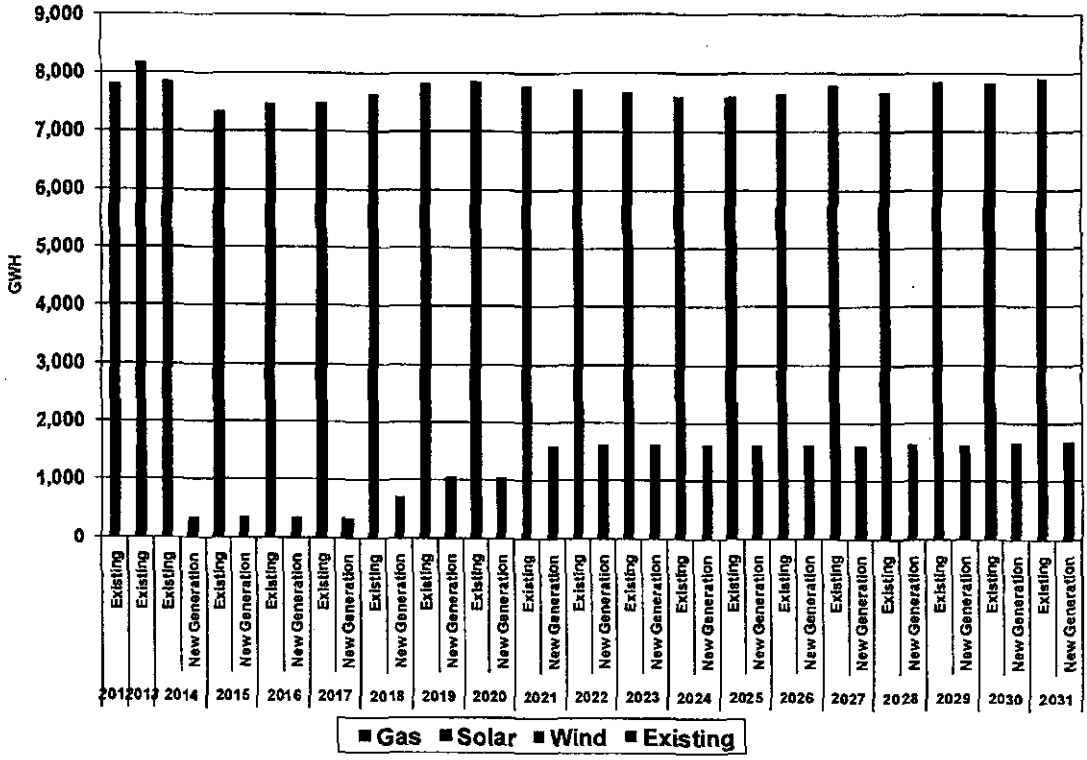
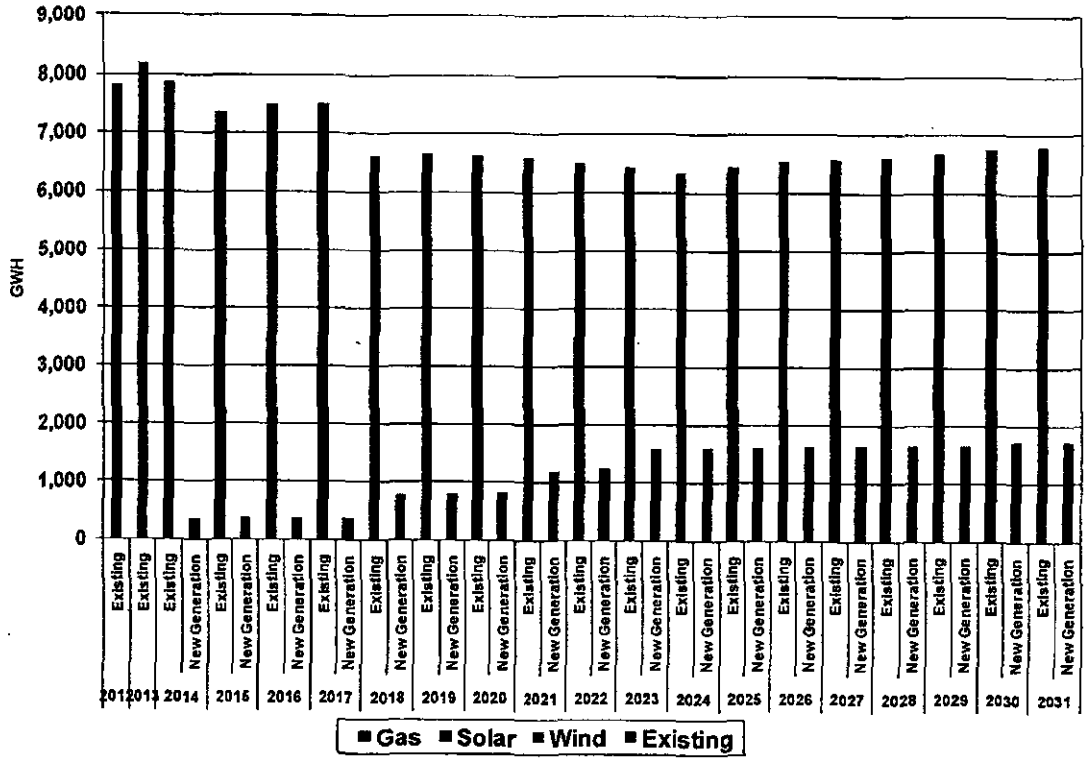


Figure 28: Plan XAB00 Generation



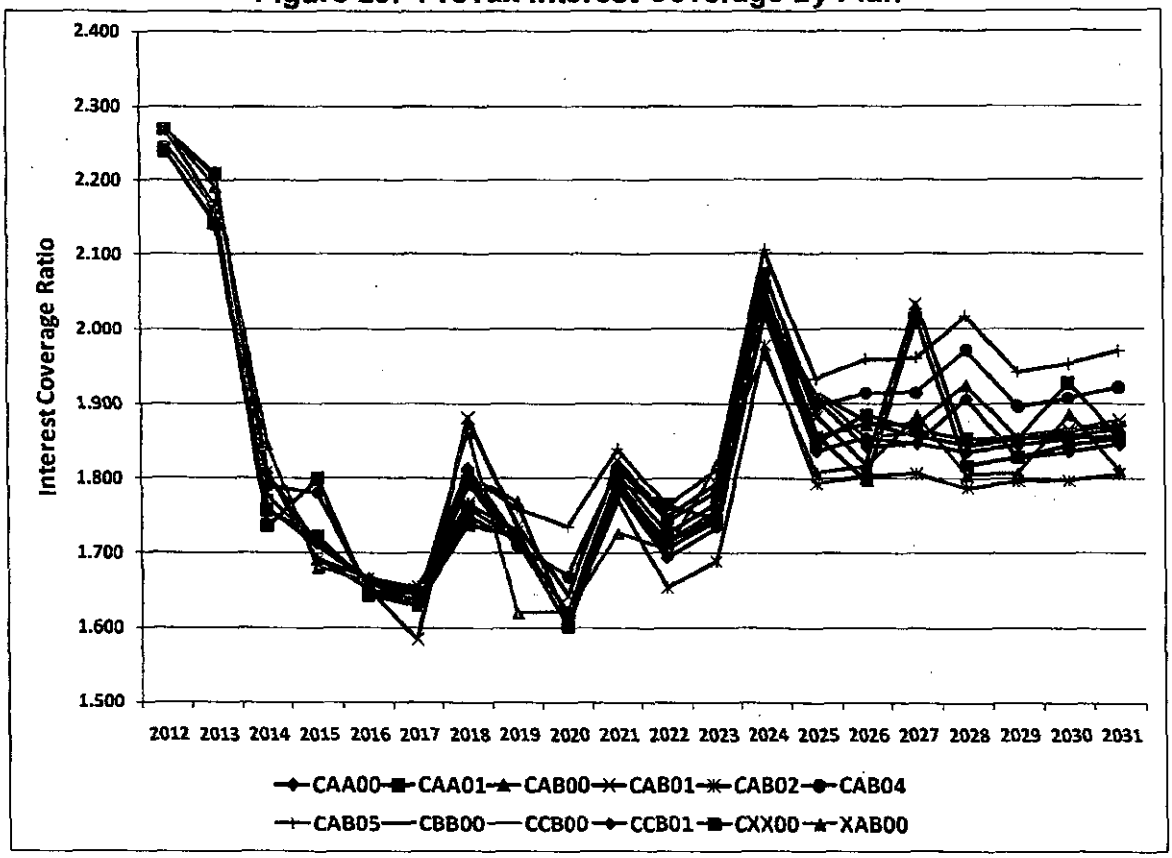
Note that the tabular data that created the twelve figures above is provided on the work paper disc in an Excel files entitled "Figure240-22.060(6)(C)(6)PlanCAA00-Gen.xls", "Figure240-22.060(6)(C)(6)PlanCAA01-Gen.xls", "Figure240-22.060(6)(C)(6)PlanCAB00-Gen.xls", "Figure240-22.060(6)(C)(6)PlanCAB01-Gen.xls","Figure240-22.060(6)(C)(6)PlanCAB02-Gen.xls", "Figure240-22.060(6)(C)(6)PlanCAB04-Gen.xls", "Figure240-22.060(6)(C)(6)PlanCAB05-Gen.xls","Figure240-22.060(6)(C)(6)PlanCBB00-Gen.xls", "Figure240-22.060(6)(C)(6)PlanCCB00-Gen.xls", "Figure240-22.060(6)(C)(6)PlanCCB01-Gen.xls", "Figure240-22.060(6)(C)(6)PlanCXX00-Gen.xls" and "Figure240-22.060(6)(C)(6)PlanXAB00-Gen.xls".

6.3.7 FINANCIAL PERFORMANCE MEASURES

7. The values of the three (3) measures of financial condition identified in subsection (4)(A);

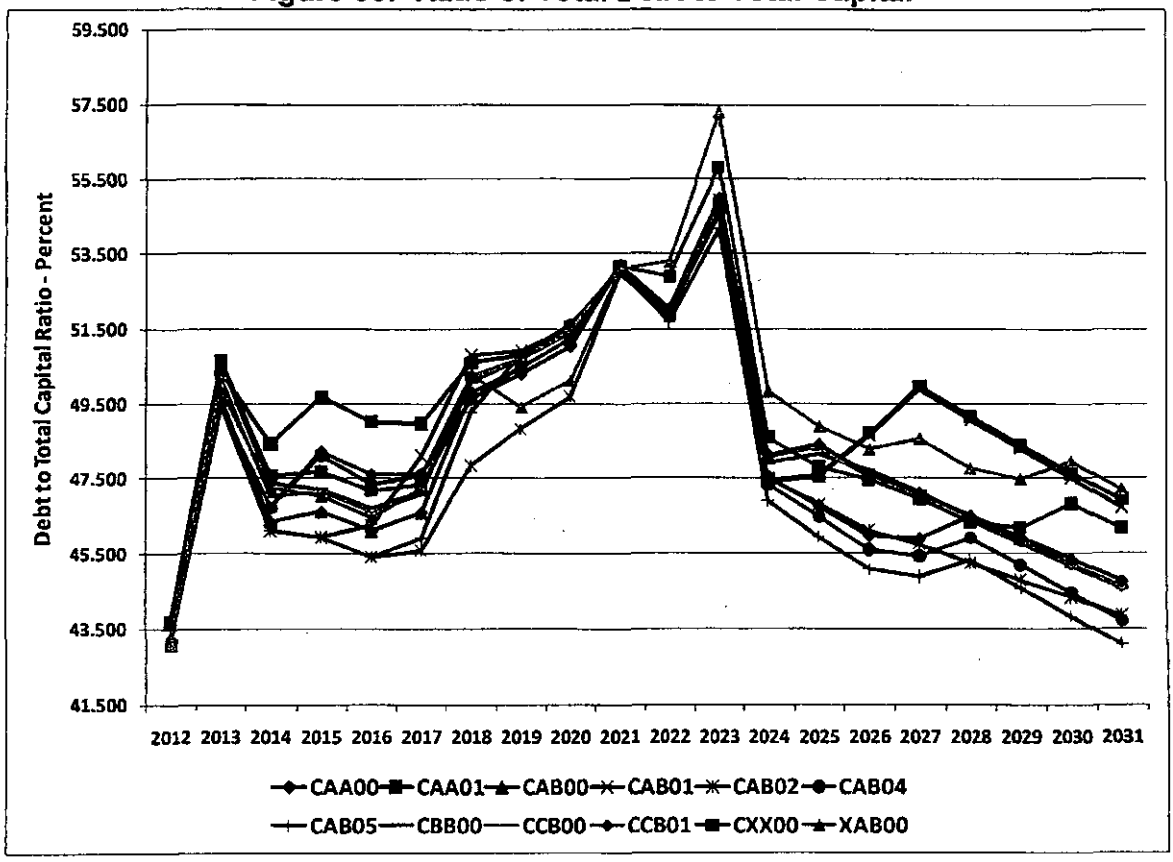
Plots of the values of the three measures of financial condition identified in subsection (4) (A) are given in Figure 29 through Figure 31 below. Tabular data that created these figures is provided on the work paper disc in an Excel file entitled "Figure240-22.060(6)(C)(7)Plan Financial Measures.xlsx".

Figure 29: PreTax Interest Coverage by Plan



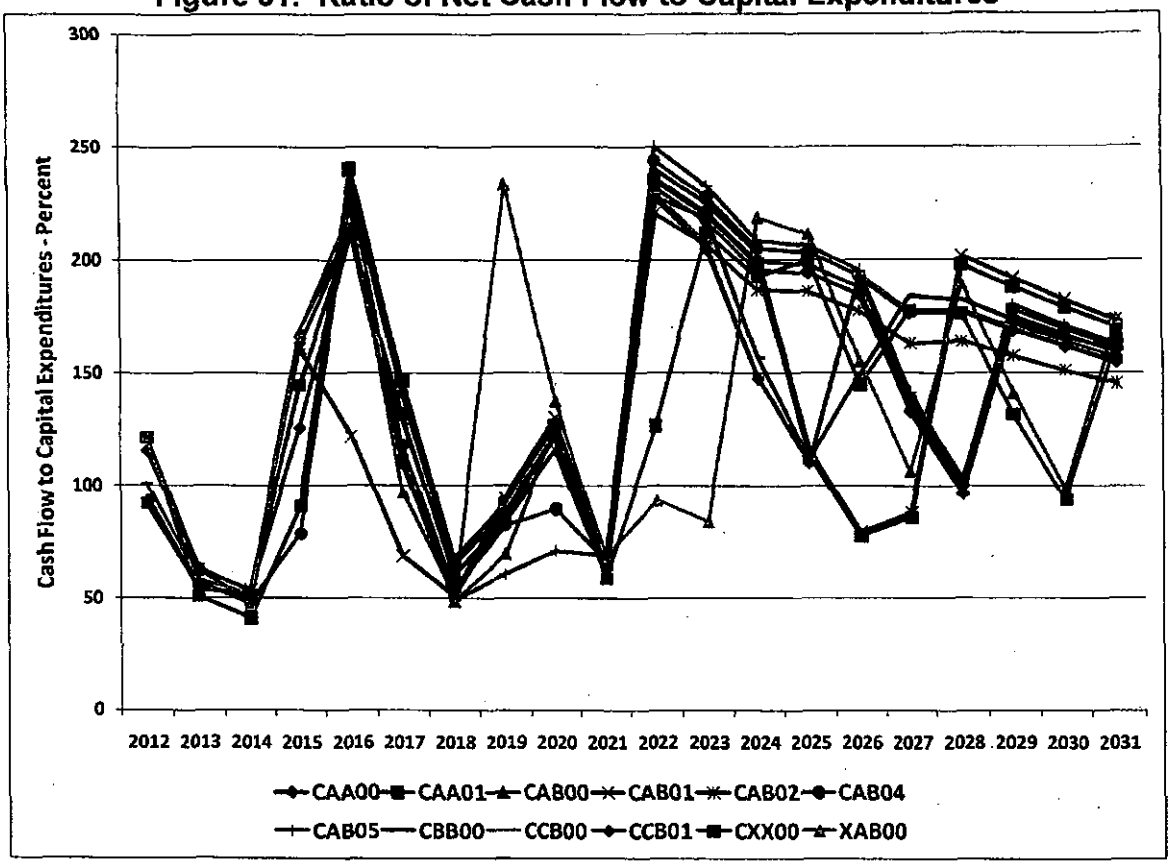
Tabular data that created Figure 29: PreTax Interest Coverage by Plan is provided on the work paper disc in an Excel file entitled "Figure240-22.060(6)(C)(7) PreTaxIntCovRatio.xlsx".

Figure 30: Ratio of Total Debt to Total Capital



Tabular data that created Figure 30: Ratio of Total Debt to Total Capital is provided on the work paper disc in an Excel file entitled "Figure240-22.060(6)(C)(7) TotDebtToTotCapitalRatio.xlsx".

Figure 31: Ratio of Net Cash Flow to Capital Expenditures



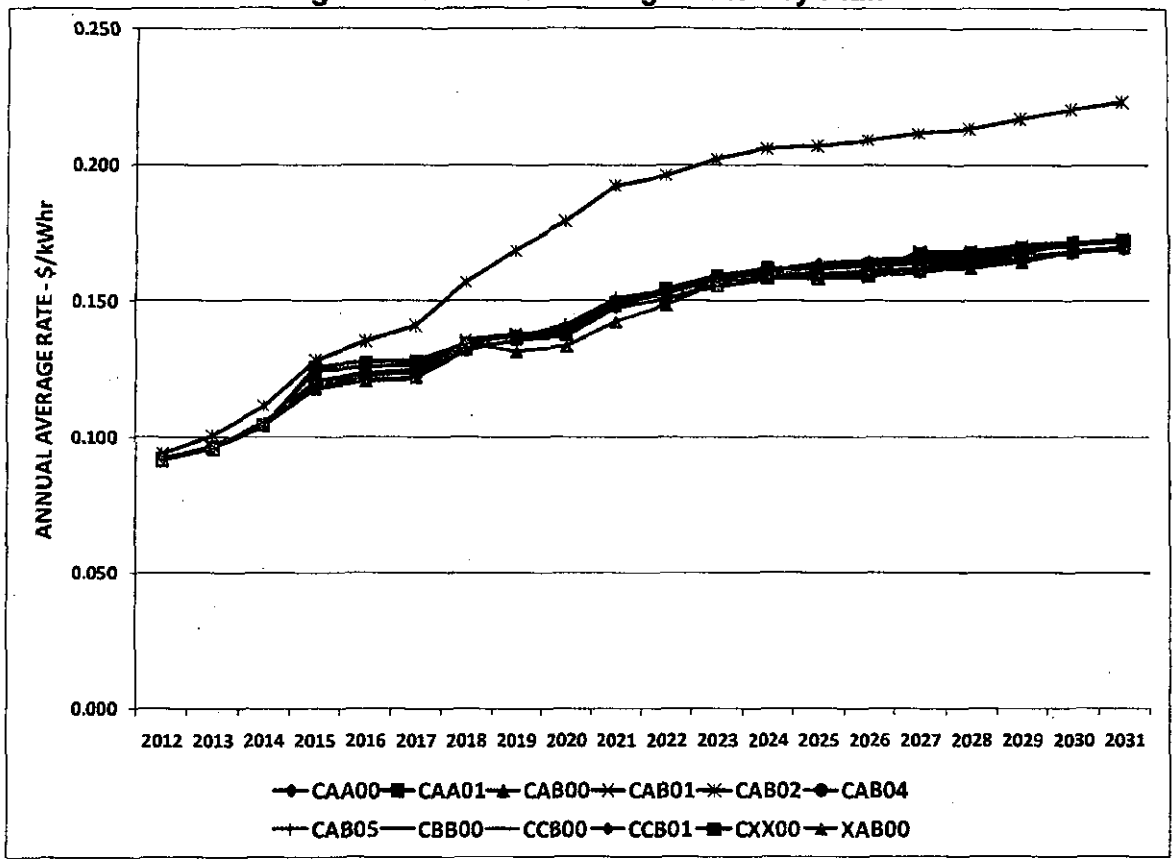
Tabular data that created Figure 31: Ratio of Net Cash Flow to Capital Expenditures is provided on the work paper disc in an Excel file entitled "Figure240-22.060(6)(C)(7) Cash Flow to CapEx Ratio.xlsx".

6.3.8 ANNUAL AVERAGE RATES

8. Annual average rates;

Annual average rates for all alternative plans are detailed in Figure 32. Tabular data that created Figure 32: Annual Average Rates by Plan is provided on the work paper disc in an Excel file entitled "Figure240-22.060(6)(C)(8) AnnualRates.xlsx".

Figure 32: Annual Average Rates by Plan



6.3.9 ANNUAL ENVIRONMENTAL POLLUTANT EMISSIONS

9. Annual emissions of each environmental pollutant identified pursuant to 4 CSR 240-22.040(2)(B)1; and

Annual pollutant emissions are detailed in Figure 33 through Figure 35.

Figure 33: Annual SO2 Emissions by Plan

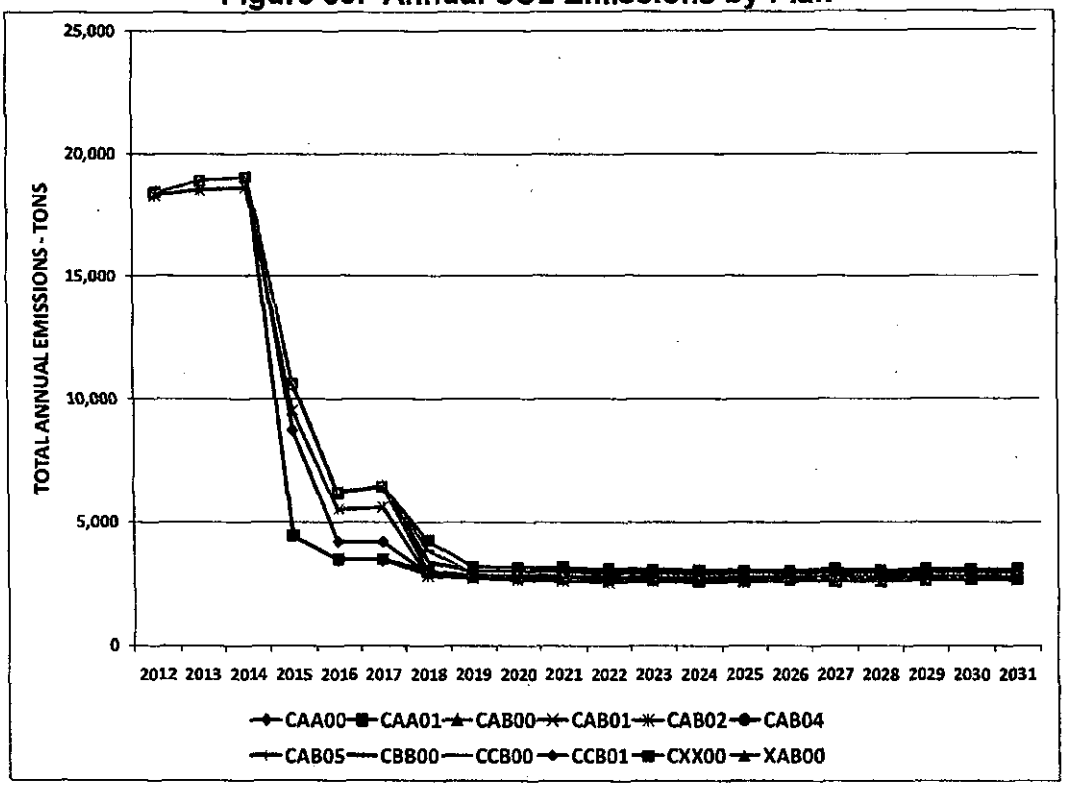


Figure 34: Annual NOx Emissions by Plan

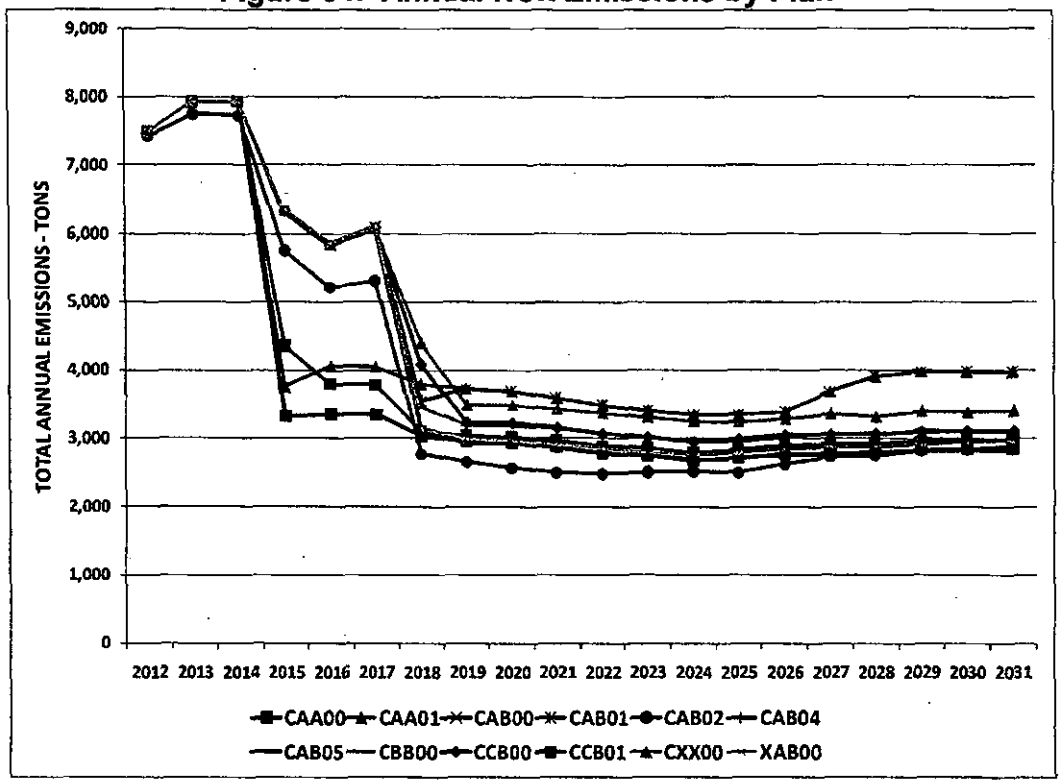
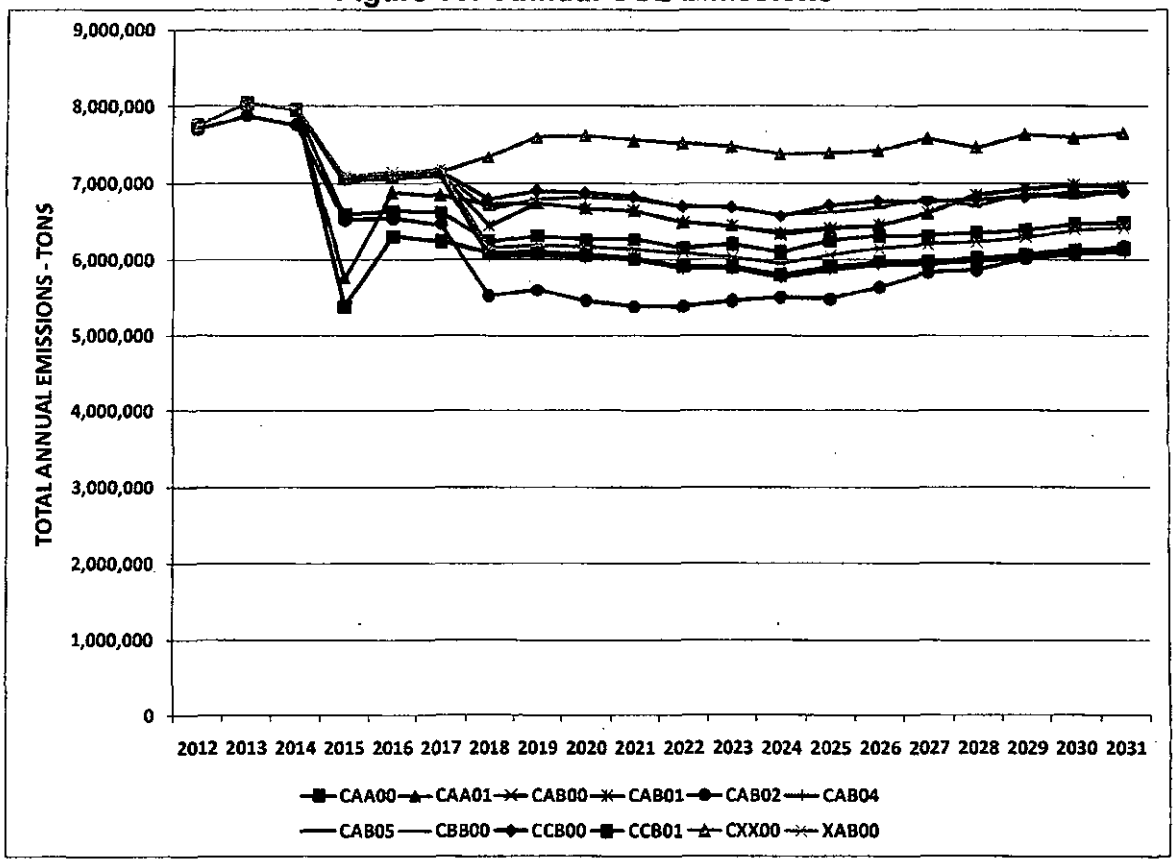


Figure 35: Annual CO2 Emissions



Note: Tabular data that created Figure 33: Annual SO2 Emissions by Plan, Figure 34: Annual NOx Emissions by Plan and Figure 35: Annual CO2 Emissions is provided on the work paper disc in an Excel file entitled "Figure240-22.060(6)(C)(9) AnnualEmissions.xlsx"

6.3.10 ANNUAL PROBABLE ENVIRONMENTAL COSTS

10. Annual probable environmental costs.

Annual PEC are integral to the analysis and therefore have been imbedded in the NPVRR estimates for each plan. As such they can not be distinctly and separately measured.

6.4 RATE CHANGE IMPACT

(D) A discussion of how the impacts of rate changes on future electric loads were modeled and how the appropriate estimates of price elasticity were obtained;

The impact of price elasticity on future loads is discussed in detail in Volume 3 of the original filing.

6.5 MODELING SOFTWARE DESCRIPTION

(E) A description of the computer models used in the analysis of alternative resource plans; and

The MIDAS™ provides hourly chronological dispatch of all system generating assets including unit commitment logic that simulation the actual operation of the utility system resources. The model contains all unit operating variables required to simulate the units. These variables include but are not limited to, heat rates, fuel costs, variable operation and maintenance costs, sulfur dioxide emission allowance costs, scheduled maintenance outages, forced and derate outages rates each on a per unit basis.

The model can also simulate capacity and energy purchases from or sales to a market in either a firm transaction or as a spot market transaction. In the case of market based transactions, all can be conducted with the impact of environmental credits factored in. The level of purchases or sales can also be limited to any range desired. For this IRP, GMO has limited the ability to purchase firm sales to a level consistent with the company's current operating methods and market conditions.

For a complete discussion of the operation of the MIDAS™ model please refer to Volume 7 of the original filing, Section 7.2. This section is the company response to Rule 4 CSR 240-22.070(7)(B).

6.6 LOAD BUILDING PROGRAMS

(F) A description of any 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:

GMO does not have any existing or proposed load-building programs.

6.6.1 AVERAGE RATES

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

GMO does not have any existing or proposed load-building programs.

6.6.2 ANNUAL UTILITY AND PROBABLE ENVIRONMENTAL COSTS

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

GMO does not have any existing or proposed load-building programs.

SECTION 7: SPECIAL INTEGRATED ANALYSIS – FEDERAL ENERGY EFFICIENCY STANDARD

The Company performed a comparison of the lowest cost plan to a plan that eliminated all additional resource additions except for renewable and DSM resources. Details of the methodology of the analysis used is included in Section 2.14.1 of Volume 7 of this filing.

7.1 NPVRR RESULTS

The results of this comparison are detailed in Table 16: Results of Federal Energy Efficiency Standard Simulation

Table 16: Results of Federal Energy Efficiency Standard Simulation

REVENUE REQUIREMENT	
[redacted]	

Tabular data that created Table 16: Results of Federal Energy Efficiency Standard Simulation is provided on the work paper disc in the Excel file entitled "Table240-22.060(7)Federal Energy Efficiency Standard Results.xlsx"

7.2 CONCLUSIONS AND RISK ASSESSMENT

In the event of a Federal Energy Efficiency Standard similar to HR 889 becoming law, the companies new lowest cost plan would become CAB02.