

AmerenUE Integrated Resource Plan Filing Errata

SUPPLEMENTAL FILING EXHIBIT 4

Errata #	Section	Document	Errata Description	page	revised document
1	30	Main	Removed error message, replaced with the correct table reference.	57	4 CSR 240-22.030 Page 57.pdf
2	30	Main	Removed error message, replaced with the correct table reference.	331	4 CSR 240-22.030 Page 331.pdf
3	30	Main	Table name was 'Commercial LGS heating-use forecast', removed 'heating-use'.	209	5 CSR 240-22.030 Page 209.pdf
4	40	Main	In the Filing: I personally doubt the uranium spot market price in 2020-2030 will be more than a factor of two higher than the attached UXC forecasts. Errata change to: It is doubtful that the uranium spot market price in 2020-2030 will be more than a factor of two higher than the attached UXC forecasts.	Vol 1 page 223	n/a
5	40	Main	In the Filing: Conversion is always a very small percentage of nuclear fuel costs. The industry is in a short term supply vs. demand balance. I believe the industry needs another new conversion plant and believe Cameco is uniquely positioned to do that, possibly at their Blind River, Ontario facility. The entire industry is subject to a potential major supply disruption if one facility is closed due to acts of god or accidents. ConverDyn and Urenco are talking about adding a conversion plant at one of Urenco's European facilities. Errata change to: Conversion is always a very small percentage of nuclear fuel costs. The industry is in a short term supply vs. demand balance. The entire industry is subject to a potential major supply disruption if one facility is closed due to acts of god or accidents. ConverDyn and Urenco are talking about adding a conversion plant at one of Urenco's European facilities.	Vol 1 page 223	n/a
6	30	Main	Table and chart for nonmanufacturing GDP didn't have correct data for this variable, replaced with correct data.	138 and 283	4 CSR 240-22.030 Page 138 & 283.pdf
7	50	Main	Added description for measures associated with interruptible Industrial Demand Response Program.	Demand Side Resource Analysis, Page 1	4 CSR 240-22.050 (1) (A) Page 1
8	50	Main	Removed error message, replaced with the correct table reference.	Demand Side Resource Analysis, Page 17	4 CSR 240-22.050 (3)(F), Page 17
9	50	Main	Removed error message, replaced with the correct table reference.	Demand Side Resource Analysis, Page 44	4 CSR 240-22.050 (11)(D) 1-2, Page 44
10	70	Appendix B	Change reference to HERS index from HERS score	page 6	4 CSR 240-22.070_Appendix B, Page 6
11	70	Appendix B	Change reference to HERS index from HERS score	page 34	4 CSR 240-22.070_Appendix B, Page 34
12					
13					

data, is the use of a centralized data repository – Forecast Manager. The toolset has been developed to interface seamlessly with the standard Microsoft Office tools such as Access and Excel. Again, just like HELM-PC, load research data, daily temperature data, day types, etc. are used in the MetrixND project files to create the weather response functions to weather-normalize energy usage and estimate unbilled sales by class. At the end of 2006, Forecast Manager was updated to handle billing cycle data and do the weather normalization of billed sales by cycle; Billed/Unbilled Calculator was incorporated into Forecast Manager at this time.

Current weather response functions used in weather-normalization of billed and calendar sales are a combination of daily artificial neural network models and regression models that use average use-per-customer by class as the dependent variable. Daily normal weather is used in a separate project file with the same model structure and coefficients to project the use-per-customer energy usage given normal weather conditions.

Unbilled Calculation and Weather-Normalization Methodology

On Execution of *Calculate Impacts*, the Analyst is prompted to input the analysis month. The application will then execute daily weather response models for actual and normal daily weather conditions for each customer class where a model has been assigned.

The models will return an estimated average daily use (kWh) for each class and day. The results will be written to the Table **PredictValue**. Table below shows the layout.

Daily Predicted Values

Date	Company	Class	PredAct	PredNormal
6/1/2006	17	10	37.4	38.8
6/2/2006	17	10	35.2	40.2
6/3/2006	17	10	37.9	38.9

4 CSR 22.030 (8) (C)

(C) For the forecast of energy and peak demands, AmerenUE will provide a summary of the range of load forecasts that are reflected in the probability tree of scenarios and the subjective probabilities that are assigned to each of the load forecast cases based on their probabilities as part of the probability tree.

See the response to section 4 CSR 240-22.030 (7) for an explanation of the load forecast cases included in the probability tree. In addition, Table B-2 of 4 CSR 240-22.030 Appendix C provides the percentage changes in Eastern Missouri demand from the BAU case for each of the eight other scenarios. AmerenUE used these percentage changes in the strategy selection phases of the IRP process.

4 CSR 22.030 (8) (D)

(D) For the net system load, the utility shall provide plots of energy usage and peak demand.

- 1. The energy plots shall include the summer, nonsummer and total energy usage for each calendar year.**
- 2. The peak demand plots shall include the summer and winter peak demands.**
- 3. The plots shall cover the historical data base period and the forecast period of at least twenty (20) years. The historical period shall include both actual and weather-normalized values. The forecast period shall include the base-case, low-case and high-case forecasts.**
- 4. The utility shall describe how the subjective probabilities assigned to each forecast were determined.**

Table (5) (B)-36: Commercial LGS forecast (Calendar month - GWh)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Summer	NonSummer	Annual
1995	443	400	398	363	383	446	487	461	447	396	371	405	1,841	3,159	5,000
1996	439	414	416	379	391	465	511	485	441	402	396	423	1,902	3,259	5,161
1997	453	415	407	399	387	483	516	485	445	410	397	432	1,929	3,301	5,230
1998	457	402	426	407	410	493	514	506	449	410	418	472	1,962	3,402	5,364
1999	441	433	439	485	463	523	524	513	476	477	474	505	2,035	3,717	5,752
2000	493	498	429	437	433	557	561	546	472	462	479	510	2,135	3,740	5,875
2001	580	438	456	434	462	529	606	561	496	478	438	517	2,192	3,803	5,995
2002	505	544	399	446	508	511	587	561	511	493	451	503	2,170	3,848	6,018
2003	522	501	504	456	489	562	605	579	529	490	492	578	2,275	4,031	6,306
2004	535	518	492	472	497	577	623	609	552	515	504	529	2,362	4,063	6,425
2005	569	506	510	497	512	591	643	621	565	544	506	556	2,420	4,201	6,621
2006	576	513	523	501	540	613									
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Table (5) (B)-7: Non-manufacturing GDP

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Summer	Nonsummer	Change
1995	72,553	72,703	72,843	72,985	73,137	73,307	73,496	73,703	73,921	74,149	74,387	74,630	881,813	294,426	587,386	
1996	74,869	75,078	75,262	75,458	75,714	76,068	76,536	77,135	77,836	78,599	79,361	80,082	921,997	307,574	614,423	4.6%
1997	80,794	81,495	82,237	83,004	83,701	84,272	84,700	84,987	85,134	85,202	85,260	85,359	1,006,145	339,093	667,052	9.1%
1998	85,488	85,612	85,717	85,817	85,927	86,064	86,230	86,426	86,641	86,870	87,099	87,322	1,035,212	345,360	689,852	2.9%
1999	87,543	87,755	87,972	88,198	88,417	88,624	88,816	88,996	89,161	89,318	89,475	89,635	1,063,911	355,597	708,314	2.8%
2000	89,801	89,961	90,119	90,278	90,440	90,607	90,780	90,963	91,150	91,339	91,525	91,707	1,088,672	363,501	725,171	2.3%
2001	91,892	92,075	92,268	92,465	92,642	92,785	92,888	92,950	92,972	92,972	92,971	92,982	1,111,862	371,594	740,268	2.1%
2002	93,001	93,016	93,023	93,028	93,044	93,082	93,144	93,231	93,338	93,458	93,580	93,696	1,118,642	372,795	745,847	0.6%
2003	93,810	93,916	94,023	94,136	94,251	94,370	94,491	94,619	94,747	94,878	95,012	95,147	1,133,399	378,227	755,172	1.3%
2004	95,283	95,408	95,526	95,648	95,787	95,953	96,150	96,384	96,644	96,921	97,199	97,466	1,154,369	385,131	769,238	1.9%
2005	97,732	97,989	98,254	98,529	98,792	99,033	99,248	99,442	99,609	99,763	99,916	100,077	1,188,385	397,333	791,052	2.9%
2006	100,244	100,402	100,556	100,713	100,876	101,051	101,238	101,440	101,651	101,868	102,086	102,301	1,214,427	405,380	809,048	2.2%
2007	102,517	102,722	102,929	103,144	103,357	103,569	103,777	103,987	104,191	104,394	104,597	104,800	1,243,983	415,523	828,459	2.4%
2008	105,008	105,208	105,408	105,611	105,815	106,020	106,226	106,436	106,644	106,853	107,061	107,269	1,273,559	425,326	848,233	2.4%
2009	107,480	107,682	107,884	108,093	108,301	108,505	108,705	108,905	109,098	109,289	109,480	109,672	1,303,094	435,213	867,881	2.3%
2010	109,868	110,054	110,240	110,432	110,624	110,817	111,010	111,207	111,401	111,596	111,790	111,985	1,331,024	444,435	886,589	2.1%
2011	112,183	112,371	112,558	112,752	112,947	113,144	113,343	113,549	113,753	113,959	114,165	114,370	1,359,093	453,789	905,304	2.1%
2012	114,577	114,779	114,982	115,188	115,392	115,593	115,789	115,985	116,173	116,360	116,546	116,733	1,388,098	463,541	924,558	2.1%
2013	116,924	117,105	117,287	117,474	117,661	117,849	118,038	118,231	118,422	118,612	118,803	118,993	1,415,400	472,541	942,860	2.0%
2014	119,186	119,371	119,556	119,747	119,937	120,125	120,311	120,497	120,679	120,860	121,040	121,220	1,442,528	481,612	960,916	1.9%
2015	121,404	121,579	121,756	121,938	122,118	122,294	122,465	122,634	122,796	122,955	123,114	123,274	1,468,328	490,189	978,139	1.8%
2016	123,439	123,597	123,754	123,913	124,074	124,239	124,408	124,583	124,759	124,937	125,116	125,293	1,492,113	497,990	994,123	1.6%
2017	125,473	125,643	125,814	125,991	126,168	126,346	126,524	126,705	126,884	127,064	127,243	127,422	1,517,278	506,459	1,010,819	1.7%
2018	127,604	127,778	127,952	128,132	128,311	128,487	128,660	128,832	128,999	129,164	129,329	129,495	1,542,741	514,977	1,027,764	1.7%
2019	129,665	129,825	129,984	130,149	130,316	130,487	130,663	130,847	131,033	131,221	131,410	131,597	1,567,197	523,030	1,044,166	1.6%
2020	131,786	131,969	132,154	132,343	132,529	132,710	132,886	133,061	133,227	133,391	133,555	133,721	1,593,331	531,884	1,061,447	1.7%
2021	133,890	134,050	134,209	134,374	134,540	134,709	134,881	135,060	135,239	135,419	135,600	135,780	1,617,751	539,889	1,077,862	1.5%
2022	135,962	136,136	136,309	136,488	136,668	136,849	137,032	137,219	137,404	137,590	137,776	137,962	1,643,394	548,503	1,094,890	1.6%
2023	138,150	138,329	138,509	138,695	138,880	139,065	139,250	139,436	139,619	139,802	139,986	140,169	1,669,890	557,370	1,112,520	1.6%
2024	140,356	140,536	140,714	140,896	141,081	141,269	141,461	141,662	141,863	142,066	142,270	142,473	1,696,647	566,254	1,130,392	1.6%
2025	142,678	142,873	143,069	143,272	143,474	143,675	143,875	144,077	144,276	144,473	144,671	144,868	1,725,281	575,903	1,149,378	1.7%
2026	145,070	145,261	145,453	145,651	145,849	146,045	146,240	146,436	146,626	146,816	147,007	147,199	1,753,653	585,347	1,168,306	1.6%
2027	147,394	147,577	147,759	147,947	148,140	148,342	148,553	148,779	149,011	149,248	149,486	149,722	1,781,957	594,685	1,187,272	1.6%
2028	149,959	150,188	150,417	150,651	150,886	151,124	151,364	151,611	151,858	152,106	152,354	152,600	1,815,117	605,956	1,209,160	1.9%
2029	152,851	153,090	153,331	153,580	153,825	154,065	154,298	154,527	154,746	154,962	155,176	155,393	1,849,843	617,636	1,232,207	1.9%
2030	155,614	155,826	156,036	156,254	156,471	156,687	156,904	157,124	157,340	157,555	157,771	157,987	1,881,569	628,055	1,253,514	1.7%

Figure (8)-7: Non-manufacturing GDP (Mil. Chained 2000 \$)

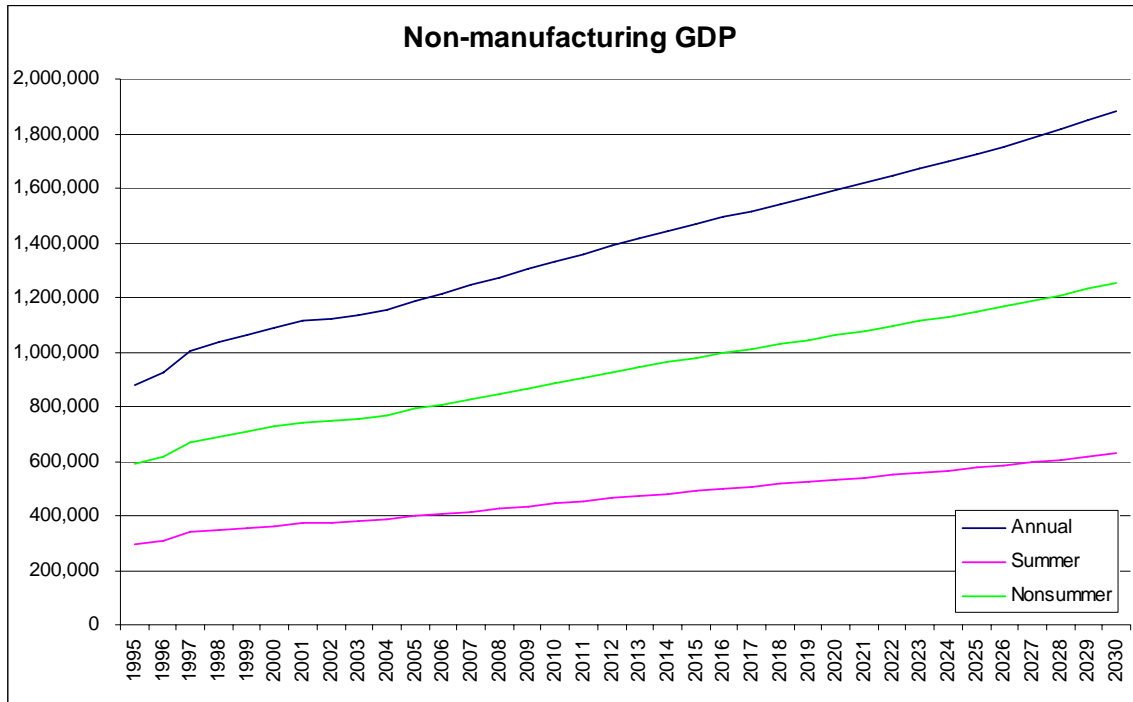
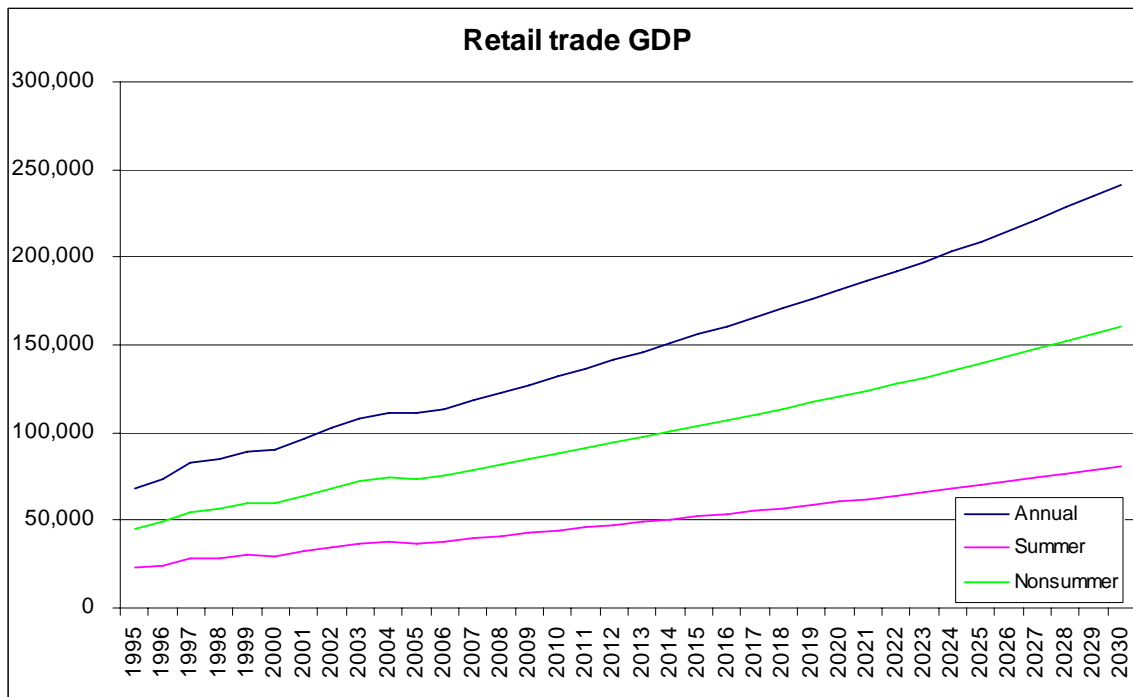


Figure (8)-8: Retail trade GDP (Mil. Chained 2000 \$)



4 CSR 240-22.050 (1) (A)

Identification of End-Use Measures. The analysis of demand-side resources shall begin with the development of a menu of energy efficiency and energy management measures that provide broad coverage of—

All major customer classes, including at least residential, commercial, industrial and interruptible;

The analysis began by compiling measure information from several industry sources, primarily the Database for Energy Efficient Resources (DEER). DEER is a publicly funded and available database of measures and is maintained by the California Public Utilities Commission (CPUC) and the California Energy Commission (CEC).

The majority of the residential sector measures were from the 2006 Missouri Statewide Residential Lighting and Appliance Efficiency Saturation Study, Final Report, November 15, 2006, prepared by RLW Analytics. Other residential and commercial measures were from the EPA ENERGY STAR Qualified Products list.

(http://www.energystar.gov/index.cfm?fuseaction=find_a_product)

Measure information for non-residential motors was from DEER and PG&E Workpapers, filed on August 31, 2006 with the CPUC. Additional information for food service measures was from the PG&E Food Service Technology Center (<http://www.fishnick.com>).

Industrial process measures were developed based on KEMA's California Industrial Existing Construction Energy Efficiency Potential Study, Calmac Study ID: PGE0252.01, May 2006.

Demand response measure information was based on AmerenUE Residential TOU Pilot Study, Load Research Analysis - 2005 Program Results, June 2006, prepared by RLW Analytics. Additional information was taken from California's CPP (Critical Peak Pricing) Pilot programs from 2003-5.

ICF International based the measure information for the interruptible Industrial Demand Response Program on national best practices and the Kansas City Power and Light MPower Tariff.

The full list of measures considered can be found in 4 CSR 240-22.050_Appendix A, pages 2.1 to 2.13, in the column "Efficient Technology". Additional detail is provided in the "Efficient Efficiency Definition", "Base Technology", and "Base Efficiency Definition" columns.

4 CSR 240-22.050 (1) (B)

All significant decision-makers, including at least those who choose building design features and thermal integrity levels, equipment and appliance efficiency levels, and utilization levels of the energy-using capital stock;

The list of measures included in 4 CSR 240-22.050_Appendix A, pages 2.1 to 2.13 is intended to be comprehensive with respect to possible decision makers, recognizing that the measures per se are not typically classified with respect to decision-maker. Rather, decision makers typically are relevant at the program level, when programs are designed to motivate those

4 CSR 240-22.050 (3) (D)

Annualized costs for end-use measures shall not include either utility marketing and delivery costs for demand-side programs or lost revenues due to measure-induced reductions in energy sales or billing demands between rate cases.

The incremental measure costs, as shown in Appendix 4 CSR_240-22.050, pages 2.14 to 2.26, do not include utility marketing and delivery costs or lost revenues.

4 CSR 240-22.050 (3) (E)

Annualized benefits minus annualized costs per installation must be positive or the ratio of annualized benefits to annualized costs must be greater than one (1) for an end-use measure to pass the screening test. The utility may relax this criterion for measures that are judged to have potential benefits which are not captured by the estimated load impacts or avoided costs.

Given the uncertainties associated with the estimates of measure-level costs and savings, a loose economic screen was applied such that if a measure achieved a ratio of benefits-to-costs of 0.91 or higher, it was considered to have passed the measure screening. The results of the measure screening are shown in the “PEB (TRC) Test” column in 4 CSR 240-22.050_Appendix A, pages 2.14 to 2.26.

4 CSR 240-22.050 (3) (F)

End-use measures that pass the probable environmental benefits test must be included in at least one (1) potential demand-side program.

or,

If AmerenUE does not include each end-use measure that passes the probable environmental benefits test in at least one potential demand-side program, it shall provide an explanation as to why that measure was not appropriate for inclusion.

All measures that had a benefit-cost ratio equal to or greater than 0.91 were included in measure bundles that formed the basis for program design and screening. 4 CSR 240-22.050_Appendix A, pages 2.14 to 2.26 of show the results of the probable environmental benefits test for each measures, and Table 2 and Table 3 presented under 4 CSR 240-22.050 (6) (C) below show how the measures passing the screening were allocated to programs. In some cases, measures that did not screen as cost-effective were included in programs. Most measures were screened by building type. For example, a commercial lighting fixture configuration was screened for all commercial types. In addition, basic measures were screened in a variety of configurations. For example, replacement of T-12 lamps with T-8 lamps was represented by a variety of combinations of lamp length and number of lamps per fixture. In many cases, a basic measure might be cost-effective in one or more configurations for one or more buildings, but not cost-effective in others. From a program design perspective it is not feasible to exclude certain building types from participation in a program offering that measure. Therefore, if a measure screened as cost-effective in configurations and building types representing a market that could sustain a program, those measures in all building types were included in the program.

4 CSR 240-22.050 (11) (A)

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:

A list of the end-use measures developed for initial screening pursuant to the requirements of section (1) of this rule;

The list of measures developed for screening is in 4 CSR 240-22.050_Appendix A, pages 2.1 to 2.13.

4 CSR 240-22.050 (11) (B)

The estimated load impacts, annualized costs per installation and the results of the probable environmental benefits test for each end-use measure identified pursuant to section (1);

The estimated load impacts, annualized costs per installation and the results of the probable environmental benefits test for each end-use measure identified pursuant to section (1) are shown in 4 CSR 240-22.050_Appendix A, pages 2.14 to 2.26.

4 CSR 240-22.050 (11) (C)

The results of AmerenUE benefits test for each end-use measure that passes the probable environmental benefits test.

The results of the utility benefits test are presented in 4 CSR 240-22.050_Appendix A, pages 2.14 to 2.26 (same as above). Note that the results of the test are equivalent to the Probable Environmental Benefits Test at the measure level given that all measures and programs have been evaluated using an avoided cost forecasts that includes an assumed cost for compliance with CO₂ emission legislation.

4 CSR 240-22.050 (11) (D) 1-2

If AmerenUE chooses the forecast of market cost of power alternative for 4 CSR 240-22.050 (2)(C), the following is substituted for this portion of the rule:

Documentation of the methods and assumptions used to develop the avoided cost estimates developed pursuant to section (2) including

- 1. A description of the assumptions and procedures used for avoided capacity costs including regulatory capacity, transmission and distribution facilities;**
- 2. A description of the assumptions and procedure used to calculate the market cost of power;**

See the response to section 4 CSR 240-22.050 (2) for a description of the assumptions and procedures used for capacity costs and the market cost of power.

- systems. This program could take advantage of the in-home HVAC technician visit to install air conditioner control switches and possibly smart thermostats.
- **A Multi-Family Program.** The program will engage customers as well as recruit trade allies, ie. private contractors, to promote the installation of energy efficient lighting in common areas as well as provide energy audits for the installation of measures in tenant spaces related to central AC unit diagnostics and tune-up. Incentives would be paid to individuals that implemented the measure.
- **Home Energy Performance.** Incentives will be provided for a bundle of electricity-saving measures will be promoted to owners of all-electric homes.
- **Web-based residential energy audits.** The Company intends to use this audit as one key portal to the broader portfolio of residential solutions. Consumers using the audit will be directed to specific incentive opportunities. Plans already are underway to install this element and costs will not be charged through the portfolio budget.
- **ENERGY STAR Homes Program.** Incentives will be provided to residential builders of homes with a HERS index of 85 or below. The incentives would cover the incremental costs for the installation of efficient HVAC equipment, lighting and shell measures in new homes.
- **Residential Low Income.** The program will target low-income owners of single family homes and will deliver long-term energy savings and bill reductions to low-income customers through a variety of cost-effective lighting and appliance discounts and other building and shell improvements.
- **Direct Load Control.** Participating customers will have an air conditioner control switch installed. The Company will use this to directly control customer load during peak events.
- **Critical Peak Pricing with a Smart Thermostat.** In 2009, the Company expects to offer a pricing program that flows through to customers. The expectation is that this pricing program will be offered after the launch of the direct load control program and will offer customers Smart Thermostat technology. The rate tiers will be structured such that by shifting consumption away from critical peak periods, customers can reduce bills below what they otherwise would pay under standard rate schedules. An evaluation of the Company's pilot CPP program indicated statistically significant consumer response to the CPP tariff when bundled with a technology component such as Smart Thermostat.
- Business Energy Solutions offers a complementary set of energy management options to commercial and industrial customers. A wide range of Individual technology or device incentives will be available, but the objective of the program over time is to move customers towards comprehensive solutions. Customers will be able to enter the program through any individual program element, although the Company will encourage customers to use building benchmarking services available through the program as a first step toward adoption of a "whole building" perspective on energy management. Specific program elements will include:

Prescriptive incentives. Prescriptive Incentives for common commercial and industrial efficiency measures such as improved lighting technologies, efficient commercial food

5. Evaluation, Measurement & Verification (EM&V)

PROGRAM	ENERGY STAR Homes Program
Objective	To increase consumer awareness of and demand for ENERGY STAR homes while increasing the building industry's willingness and ability to construct ENERGY STAR homes. To achieve energy savings through sales of ENERGY STAR homes.
Target Market	New homes market, with initial focus on mid-market homes.
Program Duration	Initial program implementation period: 2009-2010. Given that the objective of the program is to effect a transformation in the new homes market, the program should have limited duration. Although one could argue that efforts should continue to promote improved new home performance beyond ENERGY STAR, we assume that the program will continue for only two program cycles (6 years).
Program Description	The program would target builders with a package of training, technical and marketing assistance and incentives for construction of ENERGY STAR homes (homes with a HERS index of 85 or below). The Program would also provide supplemental incentives for savings measures not otherwise included in the builders' design or construction process (e.g. the ENERGY STAR Advanced Lighting Package, and duct sealing). To the extent that gas utilities offer similar programs in the service territory, close coordination/harmonization of program design and delivery is critical to avoid market confusion.